

Draft Environmental Impact Statement

Cle Elum Dam Fish Passage Facilities and Fish Reintroduction Project

**Storage Dams Fish Passage Study
Yakima Project, Washington**



**U.S. Department of the Interior
Bureau of Reclamation
Pacific Northwest Region
Columbia-Cascades Area Office
Yakima, Washington**



**State of Washington
Department of Ecology
Central Regional Office
Yakima, Washington
Ecology Publication No. 09-12-018**

January 2010

Mission Statements

The Mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

The mission of the Department of Ecology is to protect, preserve and enhance Washington's environment, and promote the wise management of our air, land and water for the benefit of current and future generations.

**Draft Environmental Impact Statement
Cle Elum Dam Fish Passage and Fish Reintroduction Project
Kittitas County, Washington**

Joint Lead Agencies:

For further information contact:

U.S. Department of the Interior
Bureau of Reclamation

Mr. Dave Kaumheimer
Environmental Programs Manager
Columbia-Cascades Area Office
1917 Marsh Road
Yakima, Washington 98901-1749
509-575-5848 ext. 232

State of Washington
Department of Ecology

Mr. Derek I. Sandison
Director, Office of Columbia River
303 S. Mission Street, Suite 200
Wenatchee, Washington 98801
509-457-7120

Cooperating Agencies:

Bonneville Power Administration

This Draft Environmental Impact Statement (DEIS) examines the environmental consequences of alternatives to construct fish passage facilities at Cle Elum Dam, Washington, and to reintroduce fish to the area above the dam. The purpose of the project is to restore connectivity, biodiversity, and natural production of anadromous salmonids. A No Action Alternative, two action alternatives for fish passage, and one alternative for fish reintroduction were evaluated.

This DEIS was prepared in compliance with the National Environmental Policy Act (NEPA) and the State of Washington Environmental Policy Act (SEPA). It also provides the public review required under Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) and the National Historic Preservation Act.

The Bureau of Reclamation (Reclamation) and the Washington State Department of Ecology (Ecology) prepared this DEIS as joint lead agencies.

This DEIS is available for public review through March 22, 2010. Comments can be submitted to the above Bureau of Reclamation address or by email (sha-UCA-FishPassage@usbr.gov). Verbal comments can be left on voicemail at 509-575-5848, ext. 612.

To ask about the availability of this document in a format for the visually impaired, call the Office of Columbia River at 509-575-2490. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

SEPA FACT SHEET

Brief Description of Proposal:

The Bureau of Reclamation (Reclamation) and the Washington State Department of Ecology (Ecology) have prepared this Draft Environmental Impact Statement (DEIS) on the Cle Elum Dam Fish Passage Facilities and Fish Reintroduction Project (FP/FR Project). This document is a joint National Environmental Policy Act (NEPA) and State Environmental Policy Act (SEPA) EIS and meets the requirements of both. Ecology is the SEPA lead agency for the proposal.

Reclamation is evaluating the construction of fish passage facilities at Cle Elum Dam for the FP/FR Project. In conjunction with the fish passage facilities, the Washington Department of Fish and Wildlife (WDFW), in collaboration with Yakama Nation, is evaluating a project to reintroduce fish populations above the dam. Cle Elum Dam did not include fish passage facilities when constructed in 1933; consequently, passage to upstream habitat for fish species was blocked. The proposed project includes downstream juvenile fish passage and upstream adult fish passage facilities. The reintroduction project could involve the use of both low-scale efforts, such as the transportation and release of adults for natural spawning, and intensive supplementation techniques, such as hatchery production, to restore fish above the dam. Construction of the fish passage facilities is evaluated in Chapters 2 and 5 of this document, while the fish reintroduction project is evaluated in Chapters 3 and 6.

Proponents and Contacts:

U.S. Department of the Interior, Bureau of Reclamation

Contact: Mr. Dave Kaumheimer
Environmental Programs Manager
Columbia-Cascades Area Office
1917 Marsh Road
Yakima, Washington 98901-1749
509-575-5848 ext. 232

State of Washington, Department of Ecology

Contact: Mr. Derek I. Sandison
SEPA Responsible Official
Director, Office of Columbia River
303 S. Mission Street, Suite 200
Wenatchee, Washington 98801
509-457-7120

Permits, Licenses, and Approvals Required for Proposal:

To implement any action alternative, Reclamation and Ecology would need to apply for permits and conform to various laws, regulations, and Executive orders. The following permits, actions, and laws may apply:

- National Environmental Policy Act
- Endangered Species Act
- Secretary's Native American Trust Responsibilities
- National Historic Preservation Act
- Executive Order 11988: Floodplain Management
- Executive Order 11990: Protection of Wetlands
- Executive Order 12898: Environmental Justice
- Executive Order 13007: Indian Sacred Sites
- Section 401 Permit, Clean Water Act
- Section 404 Permit, Clean Water Act
- State Environmental Policy Act
- Washington Department of Natural Resources Permit
- National Pollutant Discharge Elimination System Permit(s)
- Hydraulic Project Approval
- Kittitas County Shoreline Management Program
- Kittitas County Critical Areas Permit or Approval

Authors and Contributors:

A list of authors and contributors is provided following Chapter 7.

Date of Issue:

January 28, 2010

Public Comment Period:

In accordance with WAC 197-11-455, persons or agencies shall have 30 days from the date of issue to submit comments on the DEIS. An addition 15 days is being provided to submit comments on this DEIS. Comments must be received by 5 p.m. PST on March 22, 2010 and may be submitted in writing via regular mail or email to:

Ms. Candace McKinley
 Environmental Protection Specialist
 Columbia-Cascades Area Office
 1917 Marsh Road
 Yakima, Washington 98901-1749
 sha-UCA-FishPassage@usbr.gov

Public Meetings:

Reclamation and Ecology will conduct a public meeting to receive public comments on the DEIS. The meeting will be held February 18, 2010 from 5 to 7 p.m. at the City of Cle Elum Council Chamber Room, 119 West 1st Street, Cle Elum, Washington.

Timing of Additional Environmental Review:

Reclamation and Ecology anticipate releasing the Final EIS on the FP/FR Project by December 2010. If a fish hatchery is constructed as part of the fish reintroduction project, it will undergo project-level SEPA and/or NEPA review when it is carried forward.

Document Availability:

The DEIS for the Fish Passage and Fish Reintroduction Project can be viewed on-line at: http://www.usbr.gov/pn/programs/ucao_misc/fishpassage/index.html. The document may be obtained in hard copy or CD by written request to the SEPA Responsible Official listed above, or by calling 509-457-7120. To ask about the availability of this document in a format for the visually impaired, call the Office of Columbia River at 509-575-2490. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

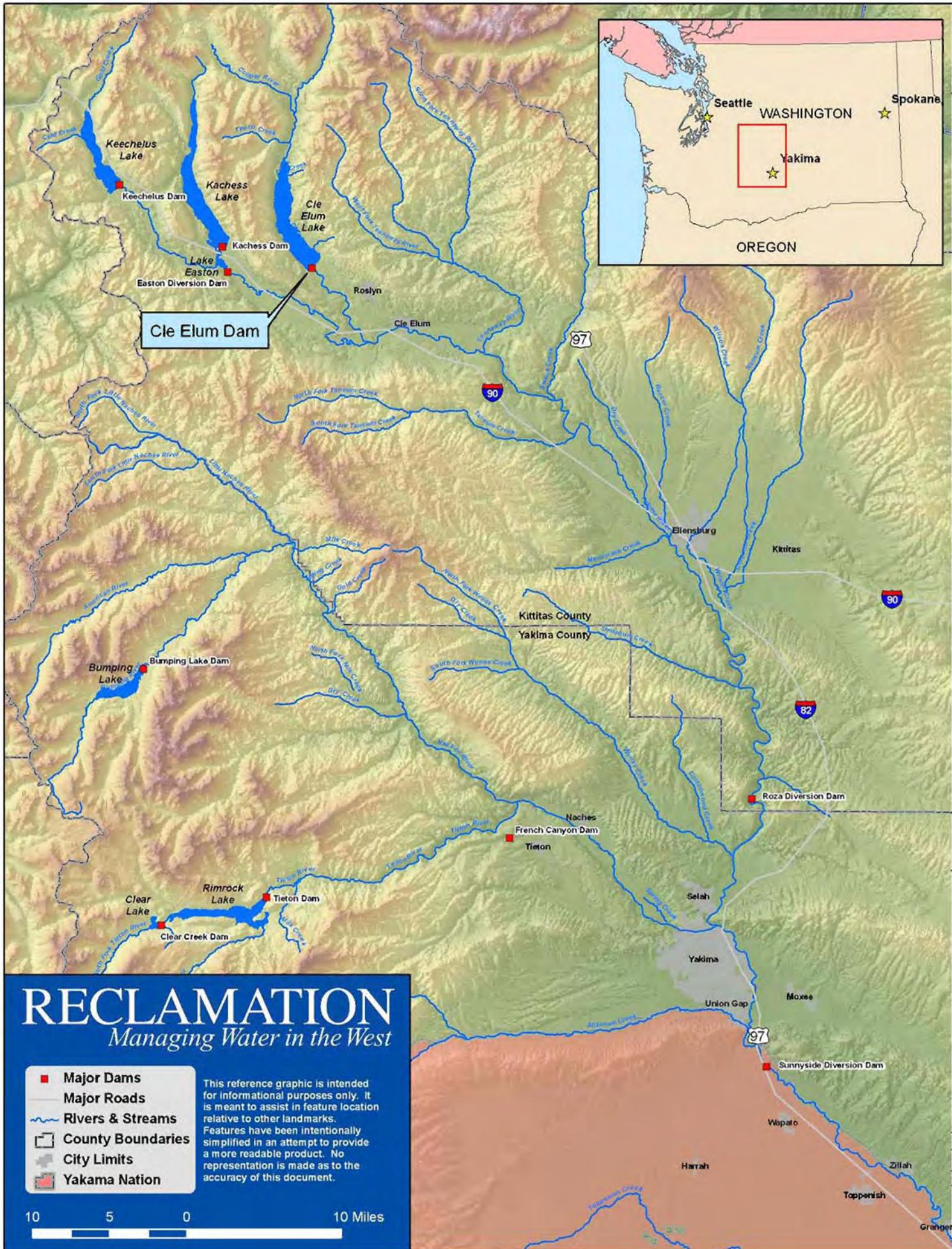
Location of Background Materials:

Background materials used in the preparation of this DEIS are available on-line at:

Yakima Dams Fish Passage Study

http://www.usbr.gov/pn/programs/ucao_misc/fishpassage/index.html

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RECLAMATION

Managing Water in the West

- Major Dams
- Major Roads
- ~ Rivers & Streams
- ▭ County Boundaries
- City Limits
- Yakama Nation

This reference graphic is intended for informational purposes only. It is meant to assist in feature location relative to other landmarks. Features have been intentionally simplified in an attempt to provide a more readable product. No representation is made as to the accuracy of this document.



ACRONYMS AND ABBREVIATIONS

Acronyms and Abbreviations

APE	area of potential effect
BIA	Bureau of Indian Affairs
BMP	best management practices
BNSF	Burlington Northern Santa Fe Railroad
BPA	Bonneville Power Administration
CCs	Considerations and Constraints
CFR	Code of Federal Regulations
cfs	cubic feet per second
CIG	Climate Impacts Group
Core Team	Technical Yakima Basin Storage Fish Passage Work Group
Corps	U.S. Army Corps of Engineers
CSA	Conservation Support Area
DAHP	Washington Department of Archaeology and Historic Preservation
dB	decibel
dBA	decibels on the A-weighted scale
DEIS	Draft Environmental Impact Statement
DO	dissolved oxygen
DOI	U.S. Department of the Interior
DPS	distinct population segment
Draft Planning Report	<i>Draft Cle Elum and Bumping Lake Dam Fish Passage Facilities Planning Report</i>
DS	Determination of Significance
Ecology	Washington Department of Ecology
EDNA	Environmental Designation for Noise Abatement
EIS	Environmental Impact Statement

EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FCC	Federal Communications Commission
FCRPS	Federal Columbia River Power System
FEIS	Final Environmental Impact Statement
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
fisheries comanagers	Yakama Nation and WDFW
FP/FR Project	Fish Passage Facilities and Fish Reintroduction Project
FR	Forest Road
HAER	Historic American Engineering Record
HPA	Hydraulic Project Approval
I	Interstate Highway
IHN or IHN-V	Infectious Hematopoietic Necrosis Virus
IHOT	Integrated Hatchery Operations Team
IMPLAN	Impact Analysis for Planning
IO	input-output
ITA	Indian Trust Assets
KMC	Kittitas (County) Municipal Code
KRD	Kittitas Reclamation District
kV	kilovolt
kW	kilowatt
LWD	large woody debris
MCR	Middle Columbia River
mg/L	milligrams per liter

Mitigation Agreement	<i>Mitigation Agreement between the USDI Bureau of Reclamation and Washington Department of Fish and Wildlife regarding Keechelus Dam Construction Issues Including Fish Passage</i>
MOCA	Managed Owl Conservation Area
MW	megawatt
NAAQS	National Ambient Air Quality Standard
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
NPCC	Northwest Power and Conservation Council (formerly Northwest Power Planning Council)
NRHP	National Register of Historic Places
O&M	operation and maintenance
OMR&P	operations, maintenance, replacement, and power
OSHA	Occupational Safety and Health Administration
Phase 1 Assessment	<i>Phase I Assessment Report Storage Dam Fish Passage Study</i>
PHS	Priority Habitat and Species
PIT	Passive Integrated Transponder
PUD	Public Utilities District
RCW	Revised Code of Washington
Reclamation	Bureau of Reclamation
RED	Regional Economic Development
Reintroduction Plan	<i>Anadromous Fish Reintroduction Plan, Storage Dam Fish Passage Study</i>
RID	Roza Irrigation District
RM	river mile

S-line	supplementation line
SEPA	State Environmental Policy Act
Service	U.S. Fish and Wildlife Service
SHPO	State Historic Preservation Officer
SIL	Scenic Integrity Level
SIP	State Implementation Plan
SMA	Shoreline Management Act
SOD	Safety of Dams
SR	State Route
SRFB	Salmon Recovery Funding Board
Storage Study	Yakima River Basin Water Storage Feasibility Study
TOC	total organic carbon
TWSA	total water supply available
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USFS	U.S. Forest Service
Value Planning Report	<i>Value Planning Final Report - Cle Elum Dam Fish Passage Facilities</i>
VQO	Visual Quality Objective
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WHR	Washington Historic Register
YBFWRB	Yakima Basin Fish and Wildlife Recovery Board
YKFP	Yakima/Klickitat Fisheries Project
YRBWEP	Yakima River Basin Water Enhancement Project
YTAHP	Yakima Tributary Access and Habitat Program

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Introduction

The Bureau of Reclamation (Reclamation) has prepared a Draft Environmental Impact Statement (DEIS) on the Cle Elum Dam Fish Passage Facilities and Fish Reintroduction Project (FP/FR Project) to meet the requirements of the National Environmental Policy Act (NEPA). The Washington State Department of Ecology (Ecology) is a joint lead with Reclamation in the preparation of this DEIS, which will also be used to comply with requirements of the Washington State Environmental Policy Act (SEPA).

Reclamation is evaluating the impacts of the fish passage facilities. Ecology and the Washington Department of Fish and Wildlife (WDFW), in collaboration with the Yakama Nation, are evaluating the fish reintroduction portion of this project.

Purpose and Need for Action

The purpose of the FP/FR Project is to construct fish passage facilities at Cle Elum Dam and to restore ecological connectivity, biodiversity, and natural production of anadromous salmonids in Cle Elum Reservoir. Specifically, the project seeks to:

- Restore sockeye salmon (*Onchorynchus nerka*) populations to self-sustaining levels capable of supporting harvest;
- Increase the life history diversity, geographic distribution, and abundance of coho salmon (*O. kisutch*), spring Chinook salmon (*O. tshawytscha*), and Pacific lamprey (*Entosphenus tridentatus*) to self-sustaining levels capable of supporting increased harvest;
- Contribute to the recovery of Endangered Species Act (ESA)-listed upper Middle Columbia River steelhead (*O. mykiss*); and
- Reconnect isolated populations of ESA-listed bull trout (*Salvelinus confluentus*).

The FP/FR Project is needed because Cle Elum Dam was not equipped with fish passage facilities when constructed. Cle Elum Reservoir was a natural lake that historically supported populations of three species of salmon (sockeye, coho, and spring Chinook), steelhead, Pacific lamprey, bull trout, and other resident fish. Lack of passage at the dam blocked access to the lake and upstream habitat for

anadromous salmonids and contributed to the extirpation of sockeye salmon runs in the Yakima River basin.

The absence of passage has also isolated local populations of bull trout and may have prevented the recolonization of populations.

Background

Historically, anadromous salmonids, including sockeye salmon, coho salmon, spring Chinook salmon, and steelhead, occupied the four natural lakes in the Yakima River basin (Keechelus, Kachess, Cle Elum, and Bumping) and their upstream tributaries, as did resident fish, including bull trout. Timber crib dams were constructed between 1904 and 1910 at the outlets of these four natural glacial lakes. These dams blocked fish passage to previously productive spawning and rearing habitat for anadromous salmonids and resident fish upstream of the dams. Beginning in 1910, Reclamation began constructing storage dams in place of the timber crib dams as well as a fifth storage dam on the Tieton River. As a result, these storage dams eliminated access to and inundated a considerable amount of pristine, high-quality habitat above these dams.

Several watershed assessment and planning efforts have recognized the lack of fish passage at Yakima River basin storage facilities, including Cle Elum, as a significant limiting factor in increasing the abundance of salmon, steelhead, and bull trout populations in the basin.

Alternatives

Analytical Process

In 2003, Reclamation completed a Phase I Assessment of the potential for fish passage at the five major Yakima Project storage damsites – Bumping, Keechelus, Kachess, Tieton, (Rimrock Reservoir), and Cle Elum (Reclamation, 2005). Based on information developed for the Phase I Assessment, Cle Elum and Bumping Lake Dams were identified as the two highest priority sites for continued investigation of fish passage feasibility. A Draft *Cle Elum and Bumping Lake Dam Fish Passage Facilities Planning Report* (Draft Planning Report) was completed by Reclamation in 2008. These two reservoirs present substantially different opportunities for developing fish passage concepts. Based on priorities and funding, Reclamation decided to proceed with the next phase for Cle Elum Dam only at this time. This phase included activities for NEPA compliance and developing a value planning report for fish passage.

The Yakima basin fisheries comanagers, the Yakama Nation and WDFW, developed a reintroduction plan for anadromous fish species above Reclamation's

Yakima Project storage dams. The fish reintroduction plan helped guide the development of alternatives for fish reintroduction at Cle Elum Dam.

These studies led to the development of the Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam Alternative. That alternative was evaluated in the Draft Planning Report and is Alternative 2 in this DEIS.

In June 2009, Reclamation assembled a Value Planning Team comprised of people with diversity, expertise, and independence to creatively scrutinize the alternatives presented in the Draft Planning Report. As a result, the team developed a *Value Planning Final Report - Cle Elum Dam Fish Passage Facilities* (Reclamation, 2009b) (Value Planning Report) that examined the component features of the project and defined critical functions, governing criteria, and associated costs. In addition to the Alternative 2 proposal, the Value Planning Report identified six other proposals. Two of these were combined and are described in this DEIS as Alternative 3-Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam.

Fish Passage Facilities Alternatives

Reclamation considered a number of different fish passage alternatives at Cle Elum Dam. Plan formulation has been an iterative process relying heavily upon the professional expertise and judgment of biologists, engineers, hydrologists, and other team members. Through a collaborative process with the Core Team, the decisions were made as to which alternatives should be pursued in detail.

Alternative 1 -- No Action Alternative

Under the No Action Alternative, Reclamation would not modify Cle Elum Dam or its features to include fish passage facilities and the interim fish passage facility would be removed. In accordance with the Mitigation Agreement between Reclamation and WDFW, Reclamation and WDFW would work to identify an as-yet-undetermined alternative to fish passage, consistent with state law.

Alternative 2 -- Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam

This alternative includes the construction of facilities for downstream juvenile fish passage and upstream adult fish passage. The main features of the downstream fish facility include a multilevel gated intake structure located in the forebay 500 feet upstream of the spillway inlet channel and a juvenile fish bypass conduit. The upstream fish passage facility features would include a barrier dam and fish ladder and adult collection facility (Figure 2-1).

All land required for construction and operation of the proposed downstream fish passage features is federally owned either by Reclamation or is within the Wenatchee National Forest.

Total cost of construction of fish passage facilities at Cle Elum Dam for Alternative 2 is estimated at \$81.0 million (2004 dollars). Average annual OMR&P costs for the Cle Elum Dam fish passage facilities were developed by Reclamation cost engineers and were estimated at \$300,000.

Alternative 3 -- Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam

Alternative 3, which originated from proposals #1 and #3 of the Value Planning Report, is similar to Alternative 2, including construction of both downstream juvenile and upstream adult fish passage. The major difference is that all adult passage facilities downstream of the dam would be located on the right bank. The main features of the downstream fish facility include a multilevel gated intake structure located against the right bank abutment and juvenile bypass conduit. This alternative eliminates the need for an access bridge for the intake structure and a barrier dam. The fish ladder and adult collection facility would both be located on the right bank (Figure 2-3).

Total cost of construction of fish passage facilities at Cle Elum Dam for Alternative 3 was estimated at \$65.6 million (2004 dollars). The annual OMR&P impacts for Alternative 3 were assumed to be essentially the same as for Alternative 2.

Fish Reintroduction Project Alternatives

The Yakima basin fisheries comanagers, the Yakama Nation and WDFW, developed a reintroduction plan for anadromous fish species above Reclamation's Yakima Project storage dams. The fish reintroduction plan is the basis for developing alternatives for fish reintroduction at Cle Elum Dam. The fish reintroduction project is dependent on fish passage facilities and would not be feasible if passage facilities are not constructed.

Alternative 1 -- No Action Alternative

Under the No Action Alternative, Reclamation would not install permanent fish passage facilities at Cle Elum Dam and would remove the existing interim fish passage facilities. Because there would be no fish passage, the Cle Elum Fish Reintroduction Project and other fish reintroduction plans would be discontinued. In accordance with the Mitigation Agreement between Reclamation and WDFW, Reclamation and WDFW would work to identify an as-yet-undetermined alternative to fish passage, consistent with state law.

Alternative 2 -- Fish Reintroduction Project Alternative

Under this alternative, the Yakama Nation and WDFW would implement an active fish reintroduction project to accelerate adult and juvenile salmon repopulation in the habitat above Cle Elum Dam. Species included in the fish reintroduction plan are sockeye salmon, coho salmon, spring Chinook salmon, and summer steelhead. In addition, the fish reintroduction plan would promote genetic connectivity of bull trout by connecting the adfluvial populations in Cle Elum Reservoir and its tributary streams and fluvial populations that reside downstream. Coho and sockeye salmon would be actively reintroduced. For spring Chinook, WDFW and the Yakama Nation would coordinate with the existing supplementation program under the Yakima/Klickitat Fisheries Program. Because steelhead and bull trout are ESA-listed species, no immediate reintroduction plans are proposed. The fish reintroduction project alternative includes the potential to construct a fish hatchery in the future. Specific activities to promote reintroduction would be determined by resource availability and adaptive management.

No specific estimates have been made for the annual OMR&P costs associated with the fish reintroduction project at this time because the level of effort associated with the project is not yet known. A general estimate is that the project would cost between \$300,000 and \$500,000 annually. A fish hatchery would cost \$10 to \$20 million if it were constructed. Estimated costs for annual operation of a hatchery are \$1 million.

Resource Analysis

Following is a narrative summary of the effects of the alternatives on key resources that likely would be affected by the alternatives. Table 1 and Table 2 at the end of this Executive Summary present summaries of impacts on all resources evaluated in this DEIS.

Fish Passage Facilities Alternatives

Water Resources

Alternative 1 – No Action Alternative

Under the No Action Alternative, there would be no construction and dam and reservoir operations would not change. Therefore, no changes to water quality or water supply would occur.

Alternative 2 – Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam

No long-term impacts to water quality would be expected from operation of the fish passage facilities. A short-term pulse of turbidity may occur following re-watering of the areas where ground disturbance occurred during construction; however, these instances would be short in duration and a one-time event. Following construction, all disturbed areas would be stabilized and would not provide a source of chronic erosion over the long-term.

Construction and operation of the fish passage facilities would have no impacts on water supply. Construction operations would be coordinated to allow flow releases from Cle Elum Dam to remain unchanged. Fish passage operations would be integrated into existing project demands and would not impact existing water delivery contracts, total water supply available, or flood control operations.

Alternative 3 – Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam

Construction and long-term impacts to water quality and water supply would be similar to those described for Alternative 2.

Fish

Alternative 1 – No Action Alternative

Under the No Action Alternative, Reclamation would not construct permanent fish passage facilities at Cle Elum Dam. Approximately 29.4 miles of historic spawning and rearing habitat would continue to be blocked from anadromous fish use. In addition, the existing interim fish passage facilities would be removed which would stop the fish reintroduction efforts that have begun in the basin and restrict downstream passage for the anadromous fish that have been released in Cle Elum Lake.

Alternative 2 – Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam

In the long-term, fishery resources would benefit from permanent fish passage facilities. Valuable habitat upstream of Cle Elum Reservoir would be accessible and available to all species for spawning, rearing, foraging, and migration. While there is the potential for short-term increases in turbidity and sedimentation, it is expected that the use of best management practices related to temporary erosion and sediment control will minimize these impacts. In addition, much of the work will be completed during the dry season which will minimize the potential for mobilizing disturbed soils and sediment.

Alternative 3 – Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam

Construction and long-term impacts would be similar to those described for fish passage facilities under Alternative 2.

Threatened and Endangered Species

Alternative 1 – No Action Alternative

Under the No Action Alternative, Reclamation would not modify Cle Elum Dam to include fish passage facilities and the interim fish passage facility would be removed. There would be no increase in ecosystem productivity that would be beneficial to threatened and endangered species that utilize habitat (riverine and terrestrial) above the reservoir. Removal of the interim fish passage facilities would cause the Yakama Nation to stop their ongoing fish reintroduction program, which is intended to benefit bull trout and steelhead.

Alternative 2 – Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam

Overall, the proposed project would benefit bull trout and Middle Columbia River steelhead by allowing access to available upstream spawning and rearing habitat and reconnecting populations that were previously isolated by the dam.

Other listed species such as gray wolves, grizzly bears, Canada lynx, and Ute ladies'-tresses are unlikely to be negatively affected by the project.

Alternative 3 – Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam

Impacts would be similar to those described under Alternative 2.

Cultural Resources

Alternative 1 – No Action Alternative

Under the No Action Alternative, Reclamation would not modify Cle Elum Dam to include fish passage facilities. Therefore, there would be no potential for disturbance of cultural resources. Removal of the interim fish passage facilities from the dam would restore it closer to its historic appearance.

Alternative 2 – Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam

Alternative 2 includes extensive construction that would cause ground disturbance in the area around and downstream of the dam. The area was previously disturbed during construction of the dam. The proposed downstream fish passage conduit passes through the original construction camp used during the building of Cle Elum Dam. While no standing structures still exist, there may be historical

archaeological values that could be affected by ground disturbance. A Kittitas-Yakama seasonal camp, *Aiyalim*, is also located in the dam area. Its exact location is unknown, but the camp could be disturbed by construction. Furthermore, the multilevel intake structure and access bridge would be attached to Cle Elum Dam, which is potentially eligible for the National Register of Historic Places (NRHP). These facilities could detract from the historic qualities of the dam; however, the dam has undergone other modifications since it was constructed.

Alternative 3 – Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam

Impacts to cultural resources would be similar to those described for Alternative 2. However, the intake structure would not be attached to the dam, eliminating that potential impact to the historic structure.

Fish Reintroduction Project Alternatives

Water Resources

Alternative 1 – No Action Alternative

The No Action Alternative would not affect water resources. Because no fish passage facilities would be installed, there would be no Fish Reintroduction Project and water quality and water supply would not be affected in Cle Elum Reservoir or the Cle Elum River.

Alternative 2 – Fish Reintroduction Project Alternative

Impacts on water quality would be mostly limited to the construction and operation of fish passage facilities. Additional effects on water quality due to the Fish Reintroduction Project would be associated with the installation and removal of portable raceways. These actions have the potential to increase sedimentation as the raceways are carried over the banks. These impacts would be minor and temporary. The effluent resulting from fish waste products in the portable raceways could cause minor, temporary water quality impacts.

Fish

Alternative 1 – No Action Alternative

Under the No Action Alternative, no fish passage would be provided; therefore no fish reintroduction would occur. The existing, interim fish reintroduction project would be halted. Primary and secondary ecological productivity above Cle Elum Dam would not increase as is expected with fish reintroduction (Reclamation, 2007 and 2008). Without fish passage facilities and fish reintroduction, the Cle

Elum ecosystem is likely to continue to be less productive than it was before dams blocked fish passage.

Alternative 2 – Fish Reintroduction Project Alternative

Fish reintroduction will benefit native fish populations in the Cle Elum basin. Anadromous fish reintroduction will generate ecosystem benefits by providing additional food sources and nutrients for aquatic species. The infusion of marine-derived nutrients contributed by returning adults would enhance future productivity of anadromous salmonids. Fish reintroduction may change fish community structure in the Cle Elum River basin due to interspecific (between species) competition, predation, and other related factors. However, ecosystem productivity and prey abundance in general is expected to grow as reintroduced juvenile and adult salmon and salmon carcasses provide additional food resources to the system. The overall effect of salmon reintroduction is expected to be positive for the ecosystem, even if some resident fish species are negatively affected by interspecific competition, predation, and other factors related to the reintroduction.

Threatened and Endangered Species

Alternative 1 -- No Action Alternative

Under the No Action Alternative, fish passage facilities would not be provided; therefore, there would be no fish reintroduction project. The lack of passage and reintroduction would continue to be detrimental to bull trout and steelhead. There would be no increased ecological productivity associated with fish reintroduction to provide additional prey for bull trout and steelhead.

Alternative 2 – Fish Reintroduction Project Alternative

Most threatened and endangered species that are present in the Cle Elum River basin are expected to benefit from the Fish Reintroduction Project due to the increase in prey resources and ecosystem productivity from juvenile and adult salmon and from salmon carcasses. The only exception to this in terms of threatened and endangered species may be adfluvial bull trout in Cle Elum Lake, as they may be negatively affected by interspecific competition from reintroduced fish, but bull trout would also benefit from an increased prey base.

Cultural Resources

Alternative 1 -- No Action Alternative

Because there would be no fish passage and therefore, no fish reintroduction the No Action Alternative would not affect cultural resources.

Alternative 2 – Fish Reintroduction Project Alternative

There would be no impacts to cultural resources as a result of the Fish Reintroduction Project. Because the fish will be transported on existing roads with a negligible increase in the overall number of trips per year, the project does not constitute an adverse effect to the NRHP-eligible historic properties in the Fish Introduction Project area of potential effect. The reintroduction of fish to the upper Cle Elum River basin and increased fish in the Yakima River basin would not involve any actions that could affect cultural resources.

Environmental Commitments

Reclamation has the primary responsibility to ensure that environmental commitments are met if the fish passage facilities are constructed. Ecology and WDFW have the responsibility to ensure that environmental comments associated with the fish reintroduction project are met. The DEIS contains many commitments, such as implementing construction monitoring programs, ensuring all safety, water quality, and best management practices are followed, mitigating for those impacts that require mitigation, and implementing after-construction monitoring programs.

Public Involvement

On April 8, 2009, Reclamation published a Notice of Intent (NOI) to prepare a DEIS in the *Federal Register*. Reclamation and Ecology issued a joint press release to local media on April 15, 2009, announcing the scoping meeting and a meeting notice was mailed to interested individuals, Tribes, groups, and Government agencies which described the project, requested comments, and provided information about the public scoping meeting. The scoping meeting was held on April 30, 2009, in Ellensburg, Washington; 20 individuals attended. The alternatives being considered were presented, and attendees were given the opportunity to comment on the alternatives, NEPA/SEPA process, and resources being evaluated in the DEIS.

Reclamation and Ecology received 19 written comments during the scoping period which were used in the preparation of the DEIS. The following are some of those comments:

Fish Passage Facilities

- This project must remain “water neutral” and should be coupled with increased storage to offset negative impacts to water storage in Cle Elum Reservoir and assurance that there would be no short-term or long-term effects to the total water supply available.

- The EIS should look at whether the proposed actions will create increased demand for releases of water from Cle Elum Reservoir or other reservoirs within the Yakima project and, if so, the EIS should consider the impact those increased releases will have on the Yakima Project operations and on the total water supply available.

Fish Reintroduction Project

- Concerns that hatchery fish would be used for reintroduction versus using wild salmon. Use of hatchery fish must be closely monitored with clear objectives and a timeline for discontinuing supplementation.
- Hatchery supplementation for steelhead would be not acceptable.
- Marine-derived nutrient restoration should be evaluated. Is it possibly limiting productivity in the upper river? Consider dumping fish carcasses in the upper Cle Elum River.

Consultation and Coordination

Agency coordination in accordance with ESA, as amended, and the National Historic Preservation Act (NHPA) of 1966 has been initiated. Reclamation will initiate consultation with the U.S. Fish and Wildlife Service (Service) and the National Marine Fisheries Service (NMFS) in Winter 2009-2010. Reclamation will prepare a separate biological assessment on potential impacts to threatened and endangered species associate with the project for each agency.

Additionally, Government-to-Government consultation with the Yakama Nation was initiated in October 2009. The Bureau of Indian Affairs (BIA) Yakima Office and the Yakama Nation Deputy Director of Natural Resources were contacted via letter and telephone to determine the potential presence of Indian Trust Assets (ITAs) within the project area. The letter requested that BIA and the Tribe identify ITAs or any other resources of concern within the area potentially impacted by the project. In addition to the formal consultation, Reclamation is developing the fish passage facilities project in collaboration with the Yakama Nation and WDFW is also developing the fish reintroduction project in collaboration with the Yakama Nation.

Reclamation and Ecology were responsible as joint lead agencies for developing this joint DEIS, in collaboration with WDFW and the Yakama Nation. Though there are many agencies involved and interested, only the Bonneville Power Administration has assumed the role of cooperating agency in regard to this DEIS.

Consultation for ESA and NHPA will be completed prior to the issuance of the FEIS. Also, all necessary permits will be applied for under the Clean Water Act.

Identification of the Preferred Alternative

Fish Passage Facilities

Alternative 3, Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam is identified as the Preferred Alternative for the Fish Passage Facilities portion of the FP/FR Project for this DEIS.

Factors which contributed to the identification of Alternative 3 as the Preferred Alternative included eliminating the need for a fish barrier dam downstream from the spillway stilling basin. Instead, the existing spillway would function as the barrier to upstream migrating fish.

With the multilevel intake structure located against the right bank abutment, access would be from the shore which eliminates the need for the access bridge. Also, eliminating the access bridge minimizes potential impacts to the historic dam structure. In addition, the location of the intake structure reduces the length of the juvenile bypass conduit from 1,520 feet to 950 feet.

No access roads would be required on the left bank of the river since the adult passage facility would be located on the right bank. The road system constructed for installation of the juvenile bypass conduit would also serve for construction and permanent access of the adult passage facility and fish ladder.

In summary, Alternative 3 meets the purpose and need to provide upstream and downstream fish passage past Cle Elum Dam but at a cost savings of approximately \$15 million, and with less impacts and ground disturbance compared to Alternative 2. For these reasons Alternative 3 is identified as the Preferred Alternative.

Fish Reintroduction Project

The Yakima basin fisheries comanagers, WDFW and the Yakama Nation, have identified Alternative 2, the Fish Reintroduction Project, as the Preferred Alternative. The Fish Reintroduction Project meets the purpose and need of restoring ecological connectivity, biodiversity, and natural production of anadromous salmonids. The No Action Alternative does not meet the purpose and need and would end interim fish reintroduction efforts.

Summary of Impacts

Table 1 compares the impacts associated with the three fish passage facility alternatives.

Table 1. Comparison of impacts for fish passage facilities alternatives.

Resource	Alternative 1 – No Action	Alternative 2 – Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam	Alternative 3 – Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam
Water Resources	No impacts.	<u>Short-term:</u> Minor increases in turbidity and sedimentation during construction. <u>Long-term:</u> None.	Same as Alternative 2.
Fish	Historic habitat would continue to be blocked. Removal of interim facilities would stop fish reintroduction efforts.	<u>Short-term:</u> Potential disturbance during construction. <u>Long-term:</u> Benefit to productivity/genetic diversity.	Same as Alternative 2. Fewer construction impacts.
Vegetation	No impacts.	<u>Short-term:</u> Removal of vegetation from construction areas. <u>Long-term:</u> Some loss of permanent vegetation and loss of mature vegetation for approximately 50 years.	Same as Alternative 2. Fewer construction impacts.
Wildlife	No impacts.	<u>Short-term:</u> Minor disturbance near facilities during construction and operation activities. <u>Long-term:</u> Loss of mature habitat for approximately 50 years.	Same as Alternative 2. Fewer construction impacts.
Threatened and Endangered Species			
Bull trout Middle Columbia River (MCR) steelhead	Historic habitat would continue to be unavailable to steelhead and populations of bull trout would remain isolated from one another.	<u>Short-term:</u> Potential disturbance during construction. <u>Long-term:</u> Beneficial effect with implementation of fish passage.	Same as Alternative 2. Fewer construction impacts.
MCR steelhead critical habitat	No impacts.	Permanent impacts to designated critical habitat as a result of barrier dam construction.	Permanent impacts to designated critical habitat as a result of pump construction (less impact than Alternative 2).
Grizzly bear Gray wolf Canada lynx	No impacts.	<u>Short-term:</u> If present, species likely to avoid area during construction. <u>Long-term:</u> Potential beneficial impact from increased prey.	Same as Alternative 2. Fewer construction impacts.
Ute ladies'-tresses	No impacts.	<u>Short-term:</u> Potential habitat may be disturbed. <u>Long-term:</u> None.	Same as Alternative 2. Fewer construction impacts.

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Resource	Alternative 1 – No Action	Alternative 2 – Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam	Alternative 3 – Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam
Northern spotted owl	No impacts.	<u>Short-term:</u> Potential loss of nesting and foraging habitat. <u>Long-term:</u> Potential loss of nesting habitat until forest matures.	Same as Alternative 2. Fewer construction impacts.
Visual Resources	Beneficial impact since interim passage facilities would be removed from dam.	<u>Short-term:</u> Construction equipment and activities would be visible. <u>Long-term:</u> Visible items in project area such as intake structure, access bridge, barrier dam.	Less impact than Alternative 2, as barrier dam and access bridge are eliminated from Alternative 3.
Air Quality	No impacts.	<u>Short-term:</u> Minor dust associated with construction and traffic. <u>Long-term:</u> None.	Same as Alternative 2.
Climate Change	No impacts.	<u>Short-term:</u> Minor increases in greenhouse gas emissions. <u>Long-term:</u> Access to historic habitat may help fish withstand climate change impacts.	Same as Alternative 2.
Noise	No impacts.	<u>Short-term:</u> Construction noise limited to daytime hours. <u>Long-term:</u> None.	Same as Alternative 2.
Recreation	No impacts.	<u>Short-term:</u> Noise, traffic delays. <u>Long-term:</u> None.	Same as Alternative 2.
Land and Shoreline Use	No impacts.	<u>Short-term:</u> Small amounts of land converted from forest to fish passage facilities. <u>Long-term:</u> Same as short-term.	Same as Alternative 2.
Utilities	No impacts.	<u>Short-term:</u> None. <u>Long-term:</u> Minor increase in power demand for pumping.	Same as Alternative 2 except more power would be required for pump.
Transportation	No impacts.	<u>Short-term:</u> Noise, traffic delays. <u>Long-term:</u> None.	Same as Alternative 2.
Environmental Justice	No impacts.	No impacts.	No impacts.
Cultural Resources	No impacts. Removal of interim facilities would restore dam closer to historic appearance.	Potential adverse effects to dam, potential effects to prehistoric/historic resources.	Potential effects to prehistoric/historic resources.
Indian Sacred Sites	No impacts.	No impacts.	No impacts.
Indian Trust Assets	No impacts.	No impacts.	No impacts.
Socioeconomics	No impacts.	<u>Short-term:</u> Construction would generate sales, jobs and labor income in the region. <u>Long-term:</u> Small increase in sales, jobs, and labor income.	<u>Short-term:</u> Same as Alternative 2 except smaller increases. <u>Long-term:</u> Same as Alternative 2.

Table 2 summarizes the impacts associated with the alternatives for fish reintroduction—No Action and the Fish Reintroduction Project Alternative.

Table 2. Summary of impacts associated with Fish Reintroduction Project alternatives.

Resource	Alternative 1 No Action Alternative	Alternative 2 Fish Reintroduction Project
Water Resources	No impact.	<u>Short-term</u> : Minor increases in sedimentation during movement of raceways over banks. <u>Long-term</u> : Minor, temporary increase in ammonia and total dissolved solids raceways. <u>Beneficial</u> : None.
Fish	No fish passage would be provided; therefore, no fish reintroduction would occur. There would be no benefits to fish populations and improvements gained from the interim fish reintroduction project would be lost.	<u>Short-term</u> : None. <u>Long-term</u> : Potential interspecific competition, predation and other related factors within the fish community; potential introduction of pathogens. <u>Beneficial</u> : Reestablished populations upstream of the dam; additional food sources and nutrients for aquatic species; overall growth in ecosystem productivity and prey abundance.
Vegetation	Productivity of riparian areas and nearby forest communities would potentially be reduced when the current reintroduction project is discontinued and nutrients are no longer added to the system.	<u>Short-term</u> : None. <u>Long-term</u> : None. <u>Beneficial</u> : Potential increase in riparian and forest productivity due to introduction of additional nutrients.
Wildlife	Productivity of terrestrial wildlife species would potentially be reduced when the current reintroduction project is discontinued and nutrients are no longer added to the system.	<u>Short-term</u> : None. <u>Long-term</u> : None. <u>Beneficial</u> : Potential increase in terrestrial wildlife species productivity due to introduction of additional prey.
Threatened and Endangered Species		
Bull Trout	Continued reduction in historical habitat; inability to connect with downstream populations.	<u>Short-term</u> : None. <u>Long-term</u> : Potential interspecific competition for adfluvial population from reintroduced fish. <u>Beneficial</u> : Reconnecting populations and maintaining genetic diversity; increased productivity and prey resource; increased available habitat.
MCR steelhead	Continued reduction in historical habitat.	<u>Short-term</u> : None. <u>Long-term</u> : None. <u>Beneficial</u> : Reestablishment of species above the dam.
Gray wolf Grizzly bear Canada lynx	Potential reduction in productivity due to a reduction in prey resources and ecosystem productivity/nutrient cycling.	<u>Short-term</u> : None. <u>Long-term</u> : None. <u>Beneficial</u> : If species are present in the area, potential increase in productivity due to increase in prey resources and ecosystem productivity.
Northern spotted owl	Potential reduction in productivity due to a reduction in prey resources and ecosystem productivity/nutrient cycling.	<u>Short-term</u> : None. <u>Long-term</u> : None. <u>Beneficial</u> : None.

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Resource	Alternative 1 No Action Alternative	Alternative 2 Fish Reintroduction Project
Ute ladies'-tresses	Potential reduction in productivity due to a reduction in ecosystem productivity/nutrient cycling.	<u>Short-term:</u> None. <u>Long-term:</u> None. <u>Beneficial:</u> May benefit from increased ecosystem productivity.
State sensitive and candidate species	Potential reduction in productivity due to a reduction in prey resources and ecosystem productivity/nutrient cycling.	<u>Short-term:</u> None. <u>Long-term:</u> None. <u>Beneficial:</u> Potential increase in productivity due to increase in prey resources for some species; potential benefit from the increase in nutrient cycling in riparian areas from salmon carcasses.
Visual Resources	No impact.	<u>Short-term:</u> None. <u>Long-term:</u> Decomposing salmon carcasses may detract from aesthetics for some people. <u>Beneficial:</u> None.
Air Quality	No impact.	<u>Short-term:</u> None. <u>Long-term:</u> Minor periodic increases in vehicle emissions and fugitive dust when moving fish. <u>Beneficial:</u> None.
Climate Change	Continued loss of upstream habitat could make it harder for fish to withstand the impacts of climate change.	<u>Short-term:</u> None. <u>Long-term:</u> None. <u>Beneficial:</u> Improved conditions for fish should help them withstand the impacts of climate change.
Noise	No impact.	<u>Short-term:</u> None. <u>Long-term:</u> Minor truck noise increase when transporting fish. <u>Beneficial:</u> None.
Recreation	Potential reduction in recreational fishing opportunities in the basin.	<u>Short-term:</u> None. <u>Long-term:</u> None. <u>Beneficial:</u> Potential for improved wildlife viewing from enhanced aquatic and terrestrial productivity.
Land and Shoreline Use	No impact.	<u>Short-term:</u> None. <u>Long-term:</u> Increased fish abundance could result in increased land use regulation due to greater fish habitat value. <u>Beneficial:</u> None.
Utilities	No impact.	<u>Short-term:</u> None. <u>Long-term:</u> Slight increase in electric power demand from operation of pumps for raceways. <u>Beneficial:</u> None.
Transportation	Existing vehicle trips would be reduced when fish transport stops.	<u>Short-term:</u> None. <u>Long-term:</u> Minor increase in traffic from workers and trucks transporting fish. <u>Beneficial:</u> None.
Environmental Justice	No improvements to support subsistence use of natural resources.	<u>Short-term:</u> None. <u>Long-term:</u> None. <u>Beneficial:</u> Improved support for subsistence use of natural resources.
Cultural Resources	No impact.	Potential to impact buried resources from ground disturbance and compaction by raceways and potential disturbance by truck trips.

Resource	Alternative 1 No Action Alternative	Alternative 2 Fish Reintroduction Project
Indian Sacred Sites	No impact.	No impact.
Indian Trust Assets	No impact.	No impact.
Socioeconomics	No impact.	<u>Short-term</u> : None. <u>Long-term</u> : Small increase in sales, jobs, and labor income. <u>Beneficial</u> : Small increase in sales, jobs, and labor income.

Next Steps

There will be a public review and comment period on the DEIS. A public meeting will be held on February 18 from 5 p.m. to 7 p.m. at the City of Cle Elum Council Room to receive oral and written comments on the DEIS. A Final EIS (FEIS) will be prepared following the end of the public review period and it will include written responses to all public comments on the DEIS. It will be made available to the public prior to a final decision on implementation of the proposed action.

In accordance with NEPA, there will be a minimum 30-day period between the availability of the FEIS and the issuance of the Record of Decision. Comments on the FEIS may be offered for consideration. Following this 30-day period, Reclamation will determine the appropriate final action. The NEPA process will be completed with the approval of a Record of Decision.

No final decisions regarding the proposed action have been made by the Regional Director at the time of publication of the DEIS. Final decisions with respect to the proposed action will be included in the Record of Decision.

The Record of Decision will include the significant comments received and issues raised in the FEIS. The selected alternative and the alternatives considered in the FEIS will be discussed. Alternative(s) considered environmentally preferable will also be identified. Factors considered with respect to the alternatives and how these considerations entered into the decision will be discussed. Reclamation will identify all environmental commitments, means to avoid or minimize environmental harm, and any monitoring or enforcement activities to ensure that environmental commitments will be met.

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Chapter 1

PURPOSE AND NEED

CHAPTER 1

PURPOSE AND NEED

1.1 Introduction

The Bureau of Reclamation (Reclamation) and the Washington State Department of Ecology (Ecology) have prepared this Draft Environmental Impact Statement (DEIS) on the Cle Elum Dam Fish Passage Facilities and Fish Reintroduction Project (FP/FR Project). This DEIS is a combined National Environmental Policy Act (NEPA) and State Environmental Policy Act (SEPA) EIS. It meets the requirements of both NEPA and SEPA with Reclamation and Ecology as joint leads in its preparation.

Cle Elum Dam did not include fish passage facilities when it was constructed on the Cle Elum River in 1933; consequently, passage to upstream habitat for fish species was blocked. To restore fish passage Reclamation is evaluating the construction of downstream juvenile fish passage and upstream adult fish passage facilities at the dam.

As part of the effort to restore fish above Cle Elum Dam, Ecology and the Washington Department of Fish and Wildlife (WDFW), in collaboration with the Yakama Nation, are evaluating a project to reintroduce fish populations above the dam. The reintroduction project could involve the use of both small-scale efforts, such as the transportation and release of adults for natural spawning, and/or intensive supplementation techniques, such as hatchery production, to restore fish above the dam. The more intensive efforts could require construction of a fish hatchery in the future.

In this document, Reclamation is evaluating the impacts of the fish passage facilities and Ecology is evaluating the impacts of the fish reintroduction program. The alternatives for fish passage facilities are presented in Chapter 2 and the impacts of those facilities are evaluated in Chapter 5. The alternatives for the fish reintroduction project are presented in Chapter 3 and the impacts are evaluated in Chapter 6. Although the fish passage alternatives and the fish reintroduction program are presented in separate chapters, the two actions are closely related. Implementation of fish reintroduction is dependent on installation of the fish passage facilities. If no passage facilities are installed, fish reintroduction would not be feasible. The fish reintroduction program would expedite reestablishing fish populations in the upper Cle Elum watershed.

1.2 Purpose of and Need for Action

The purpose of the FP/FR Project is to construct fish passage facilities at Cle Elum Dam and to restore ecological connectivity, biodiversity, and natural production of anadromous fish in Cle Elum Reservoir and upper Cle Elum River watershed. Specifically, the project seeks to:

- Restore populations of sockeye salmon (*Onchorynchus nerka*) to self-sustaining levels capable of supporting harvest;
- Increase the life history diversity, geographic distribution, and abundance of coho salmon (*O. kisutch*), spring Chinook salmon (*O. tshawytscha*), and Pacific lamprey (*Entosphenus tridentatus*) to self-sustaining levels capable of supporting increased harvest;
- Contribute to the recovery of ESA-listed upper Mid-Columbia River steelhead (*O. mykiss*); and
- Reconnect isolated populations of ESA-listed bull trout (*Salvelinus confluentus*).

The FP/FR Project is needed because Cle Elum Dam was not equipped with fish passage facilities when constructed. Cle Elum Reservoir was a natural lake that historically supported populations of three species of salmon (sockeye, coho, and spring Chinook), steelhead, Pacific lamprey, bull trout, and other resident fish. Lack of passage at the dam blocked access to the reservoir and upstream habitat for anadromous salmonids and contributed to the extirpation of sockeye salmon runs in the Yakima River basin. The absence of passage has also isolated local populations of bull trout and may have prevented the recolonization of populations.

1.3 Location and Setting

Cle Elum Dam and Reservoir are part of Reclamation's Yakima Project in south-central Washington. Reclamation operates the Yakima Project to achieve the specific purposes of irrigation water supply; flood control; hydropower production; and fish, wildlife, and recreation.

Cle Elum Dam is located at the lower end of a natural lake at river mile (RM) 8.2 on the Cle Elum River, 8 miles northwest of the city of Cle Elum, Washington. The location of the dam and reservoir is shown on the Frontispiece. The earthfill dam includes the main Cle Elum Dam, a dike adjacent to the left abutment of the dam, and three small saddle dikes. The dam has a maximum structural height of 165 feet and a crest length of 1,800 feet including the main dike. The earthfill dam forms a reservoir with an active capacity of 436,900 acre-feet. Cle Elum

Reservoir has the largest storage capacity and average annual runoff of all the reservoirs in the Yakima River basin.

The dam is equipped with a gated spillway (sill elevation 2,223 feet) with a capacity of 40,000 cubic feet per second (cfs) at reservoir elevation 2,240 feet. The spillway consists of radial gates and a concrete-lined open channel in the right abutment. The outlet works consist of a gated control tower and a reinforced concrete conduit (pipe) through the right abutment of the dam.

1.4 Authorization

1.4.1 Federal Authority

1.4.1.1 Reclamation Act

The Tieton and Sunnyside Divisions of the Yakima Project were authorized by the Secretary of the Interior on December 12, 1905, under the Reclamation Act of 1902, for the authorized purpose of irrigation. Cle Elum Dam was constructed in 1933 under this same authority.

1.4.1.2 Yakima River Basin Water Enhancement Project Act

The Yakima River Basin Water Enhancement Project (YRBWEP) was authorized on December 28, 1979 (93 Stat. 1241, Public Law 96-162, Feasibility Study - Yakima River Basin Water Enhancement Project). Section 1205 of Title XII of the Yakima River Basin Water Enhancement Project Act of October 31, 1994 (Public Law 103-434, as amended, 108 Stat. 4550) authorized fish, wildlife, and recreation as additional purposes of the Yakima Project.

In addition, Section 1206 of Title XII of this act authorizes the appropriation of \$2,934,000, cost indexed to September 1990 prices to (1) modify the radial gates at Cle Elum Dam to provide an additional 14,600 acre-feet of storage capacity in Cle Elum Reservoir, (2) provide for shoreline protection of Cle Elum Reservoir, and (3) construct juvenile fish passage facilities at Cle Elum Dam, plus such additional amounts as may be necessary which may be required for environmental mitigation.

1.4.1.3 Hoover Powerplant Act

Some aspects of fish passage facility construction, operation, and maintenance for the Yakima Project are also covered by the Hoover Powerplant Act of 1984. Section 109 of the Hoover Powerplant Act of August 17, 1984 (Public Law 98-381, 98 Stat. 1340) authorizes Reclamation to design, construct, and operate fish passage facilities within the Yakima River basin that are in accordance with the National Power Conservation Council's (NPCC) Columbia River Fish and

Wildlife Program. A companion law was enacted August 22, 1984, to provide, among other things, for operations and maintenance costs related to fish facilities (Public Law 98-396, 98 Stat. 1379).

1.4.2 Washington State Authority

The fish reintroduction project would be implemented by WDFW in cooperation with the Yakama Nation. Because of WDFW's involvement and the fact that State and local permits, approvals, and funding would be required to implement the fish passage facility and fish reintroduction projects, SEPA environmental review is required. Ecology is the lead agency for the SEPA review.

SEPA (Chapter 43.21C Revised Code of Washington [RCW]) is intended to ensure that environmental values are considered during decisionmaking by State and local governments. Under SEPA and SEPA Rules (Chapter 197-11 Washington Administrative Code [WAC]), an EIS is intended to provide an impartial discussion of significant environmental impacts and to inform decisionmakers and the public of reasonable alternatives, including mitigation measures, that would minimize adverse impacts or enhance environmental quality (WAC 197-11-400).

1.5 Background

Historically, anadromous salmonids, including sockeye salmon, coho salmon, spring Chinook salmon, and steelhead, occupied the four natural lakes in the Yakima River basin (Keechelus, Kachess, Cle Elum, and Bumping) and their upstream tributaries, as did resident fish, including bull trout. Timber crib dams were constructed between 1904 and 1910 at the outlets of these four natural glacial lakes. These dams blocked fish passage to previously productive spawning and rearing habitat for anadromous salmonids and resident fish upstream of the dams. Beginning in 1910, Reclamation began constructing storage dams in place of the timber crib dams, as well as a fifth storage dam on the Tieton River. These storage dams eliminated access to and inundated a considerable amount of pristine, high-quality habitat above the dams.

Several watershed assessment and planning efforts have recognized the lack of fish passage at Yakima River basin storage facilities, including Cle Elum, as a significant limiting factor in the recovery of salmon, steelhead, and bull trout populations in the basin. These studies are summarized below.

1.5.1 Northwest Power Conservation Council Fish and Wildlife Program

Beginning in 1983, the NPCC Fish and Wildlife Program identified measures for restoring fish populations in the Yakima River basin. A number of studies have

occurred under this program, including the *Cle Elum Lake Anadromous Salmon Restoration Feasibility Study* (Flagg, et al., 2000). This study, conducted from 1987 to 1993, assessed the feasibility of reestablishing sockeye salmon above Cle Elum Reservoir and concluded that adequate spawning habitat existed.

A report prepared for the Washington State Conservation Commission in 2001, pursuant to the State's Salmon Recovery Act of 1998, cited the lack of anadromous fish passage at Cle Elum and Bumping Lake Dams and other major Yakima River basin storage dams as one of the most critical habitat concerns in the Yakima River basin (Haring, 2001). The NPCC's *2004 Yakima Subbasin Plan* identified fish passage at Cle Elum Dam as a high-priority need in the basin (NPCC, 2004). Section 1.7 of this DEIS provides additional information about some of these studies and other related programs focused on the recovery of anadromous salmonids in the Yakima River basin.

1.5.2 Safety of Dams Modification at Keechelus Dam

Early in 2001, many Yakima River basin interest groups urged Reclamation to incorporate fish passage facilities as part of the proposed modification of Keechelus Dam under the Safety of Dams (SOD) program. Reclamation considered this issue but determined that fish passage facilities could not be added under the SOD Act authority. However, in the *Record of Decision for Keechelus Dam Safety of Dams Modification Final EIS* (Reclamation 2002a), Reclamation committed to seek funding under existing YRBWEP authority to conduct a feasibility study for fish passage at all Yakima Project storage dams.

1.5.2.1 Mitigation Agreement – WDFW and Reclamation

In response to the fish passage issues that arose during repairs to Keechelus Dam, Reclamation and WDFW entered into a Mitigation Agreement in 2002 to investigate fish passage feasibility at each Yakima Project storage dam (see Appendix A). Major provisions included:

- Conduct an assessment of fish passage, potential fish production, and sustainability at each Yakima Project storage reservoir;
- Examine engineering feasibility at dams where the assessment determined fish passage was desirable and practicable;
- Negotiate with WDFW to determine alternatives to fish passage where the assessment determined it was impracticable or infeasible;
- Seek funds to ensure timely implementation of identified fish passage and alternative fish restoration measures; and

- Where passage is determined to be practicable and desirable, provide interim passage (trap-and-haul) until permanent fish passage facilities are constructed.

1.5.2.2 Hydraulic Project Approval – WDFW

In 2002, WDFW issued a Hydraulic Project Approval (HPA) under Chapter 77.55 RCW for the SOD Modification of Keechelus Dam (Appendix A). The intent of the HPA was to ensure that construction was done in a manner to prevent damage to the State's fish and shellfish and their habitat. The HPA contained several provisions for compliance during and after the project. Some provisions in the HPA are also noted in the Mitigation Agreement. The following are items listed in the HPA:

- Conduct an assessment of fish at all Yakima Project reservoirs in collaboration with WDFW; and
- Provide interim passage (trap-and-haul) in reservoirs in collaboration with WDFW at facilities where fish passage is practicable and desirable based upon the results of the passage assessment.

1.5.2.3 Settlement Agreement – Yakama Nation and Reclamation

In April 2002, the Yakama Nation filed a Notice of Intent to File a Claim under the ESA regarding the Keechelus Dam SOD Modification and later initiated a lawsuit. In 2003, the Court rendered a judgment in favor of Reclamation concerning the NEPA and ESA compliance for the SOD project. The Yakama Nation then appealed that decision to the 9th Circuit Court of Appeals. In 2006, Reclamation and the Yakama Nation entered into a Settlement Agreement to resolve litigation (Appendix A). Some of the conditions that the parties agreed upon were to implement the interim juvenile fish passage at Cle Elum Dam and to develop a work group that provides technical assistance in the development of biological and engineer measures for anadromous fish passage. The Yakama Nation and WDFW were responsible for developing a plan for reintroducing anadromous fish above the Yakima Project storage dams. Some of the conditions that the parties agreed upon were to implement interim juvenile fish passage at Cle Elum Dam and to develop a work group that provides technical assistance in the development of biological and engineering measures for anadromous fish passage and reintroduction of anadromous fish above the Yakima Project storage dams.

1.5.3 Technical Yakima Basin Storage Fish Passage Workgroup (Core Team)

In 2002, as part of the Mitigation Agreement, Reclamation developed and led a formal process to give the fish management agencies (WDFW, National Marine Fisheries Service [NMFS], U.S. Fish and Wildlife Service [Service], and the

Yakama Nation), as well as Federal, State, and local agencies and irrigation interests, the opportunity for input into decisions concerning fish passage measures implemented by Reclamation. This Core Team, formally known as the Technical Yakima Basin Storage Fish Passage Work Group, studied the feasibility of providing fish passage at the five storage dams and completed a feasibility-level engineering investigation for construction of fish passage facilities at Cle Elum and Bumping Lake Dams. Since there was a lack of quantified information and many variables involved in this assessment, the Core Team worked with the following key parameters:

- There would be no changes to current operations;
- Fish passage facilities would be designed and operated within existing operational Considerations and Constraints (CCs) outlined in the *Interim Comprehensive Basin Operating Plan* (Reclamation, 2002b);
- There would be no impacts to “total water supply available” (TWSA);
- Operations would continue to serve existing Reclamation contracts; and
- Potential operation changes that might enhance passage without impacting service to existing contracts or TWSA would be considered.

In developing the fish passage program, the Core Team also made the assumption that the FP/FR Project would not be constrained by ESA issues, nor would it affect the irrigation community in any way, including TWSA and water delivery.

The Core Team was also responsible for implementing the interim juvenile (downstream) fish passage at Cle Elum Dam. With authority under the YRBWEP Act of 1994 (Title XII, Public Law 103-434), the interim passage was constructed in early spring of 2005. The operation of the interim passage, coupled with the release of Passive Integrated Transponder (PIT)-tagged juvenile coho salmon in the reservoir and upper Cle Elum River, was instrumental in evaluating the number of fish leaving the reservoir or the upper Cle Elum River and their associated outmigration calendar dates. The effort confirmed that fish can find the entrances to the passage facilities and will voluntarily move through them (Reclamation, 2006; Reclamation, 2008b; and Reclamation, 2009b).

1.6 Previous Investigations

The following summarizes previous investigations leading up to and contributing to this project.

1.6.1 Cle Elum Improvements Project

In 2002, Reclamation conducted a study authorized by Section 1206 of Title XII of the YRBWEP called the Cle Elum Improvement Project.

Section 1206 authorized:

- Increasing the reservoir pool by 3 feet at Cle Elum Reservoir by modifying the radial gates at the dam to provide an additional 14,600 acre-feet of storage capacity,
- Providing shoreline protection at Cle Elum Reservoir, and
- Constructing juvenile passage facilities at Cle Elum Dam.

The fish passage study, completed for Reclamation by Harza Engineering Company in 1999, entailed a preliminary analysis of potential downstream and upstream fish passage options at Cle Elum Dam (Reclamation, 1999). This fish passage analysis was incorporated into the *Cle Elum Improvements Project Final Cost Estimates*, completed in April 2000 (Reclamation, 2000).

1.6.2 Phase I Assessment Report

In 2003, Reclamation, in collaboration with the Core Team, completed a *Phase I Assessment Report - Storage Dam Fish Passage Study* (Phase I Assessment) at the five major Yakima Project storage dams: Bumping, Kachess, Keechelus, Tieton, and Cle Elum (Reclamation, 2003, revised 2005). This Phase I Assessment was a result of the Mitigation Agreement with WDFW and conditions of the HPA as part of the Keechelus SOD Modification.

The purpose of the Phase I Assessment was to consolidate and document existing habitat information, evaluate preliminary passage concepts, prepare appraisal-level cost estimates for fish passage alternatives, and identify uncertainties associated with fish passage at the dams. The Phase I Assessment presented a range of options and concepts to provide passage and reestablish anadromous fish populations in tributaries above all five storage reservoirs.

The Phase I Assessment concluded that some form of upstream and downstream passage for anadromous salmonids and bull trout is technically feasible at all five dams. It also noted that construction of fish passage facilities would be more expensive at some dams than at others, in relation to available habitat. Also, the quantity and quality of upstream habitat varied. The Phase I Assessment highlighted Cle Elum Dam as one of two high-priority sites for continued investigation. The other high-priority site identified was Bumping Dam.

1.6.3 Anadromous Fish Reintroduction Plan

Concurrently with the Phase I Assessment, fisheries comanagers (WDFW and the Yakama Nation) developed the *Anadromous Fish Reintroduction Plan, Storage Dam Fish Passage Study* (Reintroduction Plan) (Reclamation, 2005a) to guide reintroduction efforts above Cle Elum Dam. This Reintroduction Plan assisted in the design of interim fish passage facilities at Cle Elum Dam. The plan was updated to incorporate additional data generated by modeled analyses and data collection during interim downstream passage (Fast and Easterbrooks, 2008).

1.7 Other Related Yakima River Basin Studies and Activities

Other Yakima River basin activities or issues that are linked in various ways to the objectives of this fish passage study have been considered throughout the planning process. Following is a brief summary of the most pertinent activities.

1.7.1 Yakima River Basin Water Enhancement Project

In 1979, Congress directed Reclamation to conduct a feasibility study of the YRBWEP. The objectives were to develop a plan that would provide supplemental water for presently irrigated lands, water for new lands within the Yakama Reservation, water for increased instream flows for aquatic life, and a comprehensive plan for efficient management of basin water supplies.

In 1984, after identifying fish passage problems, congressional legislation authorized “YRBWEP Phase 1” which primarily involved rebuilding fish ladders and constructing fish screens on river diversions.

The YRBWEP study proceeded through the 1980s but was not fully completed due to uncertainties associated with the adjudication of the basin surface waters that began in 1977. Consequently, Congress passed “YRBWEP Phase 2” legislation in 1994. This legislation provides for significant water conservation and acquisition activities, studies to define the long-term water needs of fish and current irrigators, improvements to the Wapato Irrigation Project, and development of an interim plan (Reclamation, 2002b) for operation of the Yakima Project. Although the YRBWEP feasibility study was not completed, the YRBWEP Workgroup (Section 1.7.4) is currently developing a comprehensive plan for the basin.

1.7.2 Yakima River Basin Water Storage Feasibility Study

In 2003, Reclamation and Ecology initiated the Yakima River Basin Water Storage Feasibility Study (Storage Study) to examine the feasibility and acceptability of storage augmentation in the Yakima River basin. Evaluation of the Black Rock Dam Alternative, along with other storage alternatives, was

presented in Reclamation's *Final Planning Report and Environmental Impact Statement* (Reclamation, 2008a). Reclamation completed its study in April 2009 with a letter to Ecology identifying the No Action Alternative as the preferred alternative.

1.7.3 Yakima Basin Integrated Water Resource Management Alternative Study

Based on comments received on the *Draft Planning Report and Environmental Impact Statement* (Reclamation and Ecology, 2008), Ecology began a separate study in mid-2008 of solutions to the Yakima basin's water supply problems including consideration of habitat and fish passage needs. As a result, the *Yakima Basin Integrated Water Resource Management Alternative Final Environmental Impact Statement* (FEIS) was issued in June 2009 (Ecology, 2009a). The integrated alternative includes fish passage, modifying existing structures and operations, new surface storage, groundwater storage, fish habitat enhancement, water conservation, and market-based reallocation.

1.7.4 Yakima River Basin Water Enhancement Project 2009 Workgroup

With the implementation of YRBWEP Phase 2 and completion of the Storage Study and Ecology's *Yakima Basin Integrated Water Resource Management Alternative FEIS*, there has now been over three decades of work and information produced by basin stakeholders. Reclamation and Ecology initiated the YRBWEP 2009 Workgroup, consisting of the Yakama Nation, other Federal and State agencies, county and city governments, environmental organizations, and irrigation districts, in April 2009. The Workgroup is developing a comprehensive plan for the basin to address water resources and related habitat needs using the past 30 years of studies and information.

1.7.5 Grant County Public Utility District Application to Federal Energy Regulatory Commission

On January 17, 2007, a preliminary permit to study the development of a hydroelectric plant at Cle Elum Dam was issued by the Federal Energy Regulatory Commission (FERC) to the Public Utility District (PUD) No. 2 of Grant County, Washington (FERC Project No. P-12746). While conveying no rights of development, the preliminary permit is an exclusive right to study the site for up to 3 years while the permittee develops plans and performs studies leading to the filing of licensing documents. Additionally, the preliminary permit protects the site from competition from other potential developers.

The project, as proposed in the permit application, is a 30.2-megawatt (MW) powerplant that would be constructed alongside the existing stilling basin at the same location as Reclamation's proposed upstream adult fish collection facility

for Alternative 2. Construction and operation of Reclamation's proposed fish passage facilities could impact the feasibility of developing the site for power production. Reclamation has met with Grant County PUD representatives to discuss the proposed hydropower project. It is Grant County PUD's responsibility to propose a facility that does not impact the location or effectiveness of the fish passage facilities.

On December 18, 2009 Grant County PUD formally notified FERC that they would no longer pursue the hydroelectric project at Cle Elum Dam as currently proposed.

1.7.6 Fish Enhancement Projects

A number of fish enhancement projects are being undertaken by a variety of entities in the Yakima River basin. These include Reclamation's YRBWEP project (Section 1.7.1) and ongoing Reclamation projects to improve its facilities, including the Roza Diversion Dam roller gate improvement project. Other major fish enhancement projects are described below.

1.7.6.1 Yakima/Klickitat Fisheries Project

The Yakima/Klickitat Fisheries Project (YKFP) is a joint project of the Yakama Nation and WDFW, funded in large part by the Bonneville Power Administration (BPA). The YKFP is a salmon reintroduction project that uses supplementation as well as habitat protection and restoration. The project uses artificial propagation to maintain or increase natural fish production. Currently, YKFP is enhancing populations of spring, summer, and fall Chinook salmon; coho salmon; sockeye salmon; and steelhead trout.

1.7.6.2 Yakima River Side Channels Project

This project is comanaged by WDFW and the Yakama Nation under the YKFP. The objective of the Side Channels Project is to protect and restore habitat in the most productive reaches of the Yakima River basin. Projects have included reconnecting side channels, introducing large woody debris (LWD), fencing, and revegetating riparian areas.

1.7.6.3 Yakima Tributary Access and Habitat Program

The Yakima Tributary Access and Habitat Program (YTAHP) is a BPA-funded program to restore fish passage to Yakima River tributaries and to improve habitat in areas where access is restored. The YTAHP projects are primarily fish screening and passage improvements, but also include riparian plantings, fencing, and irrigation system enhancements that benefit fish habitat.

1.7.6.4 Salmon Recovery Funding Board Supported Projects

The Washington Salmon Recovery Funding Board (SRFB) administers funding for approved projects that protect and restore salmon habitat in Washington State. In the Yakima River basin, the Yakima Basin Fish and Wildlife Recovery Board (YBFWRB) coordinates the grant applications. To date, SRFB funding has been used for installing fish passage and screening projects, planting riparian areas, acquiring and protecting land, restoring natural stream channel functions, and promoting fish-friendly agricultural practices.

1.7.7 Additional Analyses

This DEIS references and summarizes numerous reports that have been prepared about the Cle Elum River basin. Key reports are listed below. Many of these documents can be found on the internet at:

http://www.usbr.gov/pn/programs/ucao_misc/fishpassage/index.html or are available in Reclamation's files.

- *Stream Macroinvertebrate Surveys in the Cle Elum and Bumping River Watersheds* (Reclamation, 2005b).
- *Cle Elum Juvenile PIT Tag Fish Bypass System* (Reclamation, 2005c).
- *Cle Elum Dam Interim Fish Passage Operations 2006 Annual Report* (Reclamation, 2006).
- *Coho Salmon Production Potential in the Cle Elum River Basin* (Reclamation, 2007a).
- *Assessment of Sockeye Salmon Production Potential in the Cle Elum River Basin* (Reclamation, 2007b).
- *Physical, Chemical, and Biological Characteristics of Cle Elum and Bumping Lakes in the Upper Yakima River Basin Storage Dam Fish Passage Study* (Reclamation, 2007c).
- *Cle Elum and Bumping Lake Dams Fish Passage Facilities Planning Report – Draft* (Reclamation, 2008b).
- *Cle Elum and Bumping Lake Dams Fish Passage Facilities Designs and Estimates Appendix* (Reclamation, 2008c).
- *Cle Elum and Bumping Lake Dams Fish Passage Facilities Biology Appendix* (Reclamation, 2008d).
- *Cle Elum Dam Interim Fish Passage Operations 2007 Annual Report* (Reclamation, 2008e).

- *Cle Elum Dam Interim Fish Passage Operations 2008 Annual Report* (Reclamation, 2009a).
- *Value Planning Final Report, Cle Elum Dam Fish Passage Facility* (Reclamation, 2009b).

1.8 Related Permits, Actions, and Laws

To implement any action alternative, Reclamation and Ecology would need to apply for permits and conform to various laws, regulations, and Executive orders. The following permits, actions, and laws may apply:

- National Environmental Policy Act
- Endangered Species Act
- Secretary's Native American Trust Responsibilities
- National Historic Preservation Act
- Executive Order 11988: Floodplain Management
- Executive Order 11990: Protection of Wetlands
- Executive Order 12898: Environmental Justice
- Executive Order 13007: Indian Sacred Sites
- Section 401 Permit, Clean Water Act
- Section 404 Permit, Clean Water Act
- State Environmental Policy Act
- Washington Department of Natural Resources Permit
- National Pollutant Discharge Elimination System Permit(s)
- Hydraulic Project Approval
- Kittitas County Shoreline Management Program
- Kittitas County Critical Areas Permit or Approval

1.9 Public Involvement

Reclamation collaborated with a group of biologists, engineers, and other specialists from Federal, State, Tribal, and local entities as part of the Core Team to develop and evaluate fish passage alternatives. The Core Team and subgroups met regularly to work through the biological, engineering, and operational issues associated with fish passage. Representatives from congressional delegations were also invited.

The scoping process for the Cle Elum Dam FP/FR Project DEIS officially began in April 2009 when the *Federal Register* Notice of Intent (NOI) to prepare an EIS was published. Reclamation held a public scoping meeting on April 30, 2009, in Ellensburg, Washington.

1.10 How to Use This Document

This DEIS is organized into seven chapters:

- Chapter 1 has provided the purpose and need for action, study authorities, relevant background information on the study area, history of water management within the basin, prior studies and activities dealing with local water management issues, and a brief discussion of public involvement.
- Chapter 2 presents a description of the Reclamation's fish passage facilities alternatives.
- Chapter 3 provides a description of the WDFW and Yakama Nation fish reintroduction alternatives.
- Chapter 4 describes the affected environment.
- Chapters 5 and 6 address the environmental consequences to resources and provide the NEPA/SEPA technical analyses component of the DEIS for the fish passage facilities alternatives and the fish reintroduction alternatives, respectively.
- Chapter 7 describes the consultation and coordination that has occurred with various entities in developing this DEIS.

Chapter 2

FISH PASSAGE ALTERNATIVES

CHAPTER 2

FISH PASSAGE ALTERNATIVES

2.1 Introduction

This DEIS evaluates alternatives for both fish passage facilities and a fish reintroduction project. Although the two actions are evaluated separately in this DEIS, they are related. Fish passage facilities are necessary to allow fish to pass Cle Elum Dam, and a fish reintroduction project is necessary to restore connectivity, biodiversity, and natural production of anadromous fish in Cle Elum Reservoir. Because Reclamation is the proponent for the fish passage facilities and WDFW and the Yakama Nation are the proponents for the fish reintroduction project, the two actions are evaluated separately.

This chapter presents the process and criteria Reclamation used in developing alternatives for fish passage facilities. It also presents the alternatives considered but eliminated from further study. At the end of this chapter is a table that summarizes the environmental impacts of the alternatives. Three alternatives for fish passage are described and analyzed in this DEIS:

- Alternative 1: No Action;
- Alternative 2: Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam; and
- Alternative 3: Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam (Preferred Alternative).

For the two action alternatives, the alternative description includes construction activities, the typical operations scenario, and operations and maintenance of the facilities.

The alternatives for the fish reintroduction project are described in Chapter 3. Implementation of fish reintroduction is dependent on installation of the fish passage facilities. If no facilities are installed, fish reintroduction would not be feasible.

2.2 Formulation of Alternatives

Reclamation considered a number of different fish passage alternatives at Cle Elum Dam. The professional expertise and judgment of biologists, engineers, hydrologists, and Core Team members was integral to deciding which alternatives should be pursued in detail. The engineers developed conceptual layouts and cost estimates for alternatives that could provide passage through differing ranges of reservoir pool elevations and differing lengths of fish passage time.

The evaluation criteria for the fish passage facility alternatives were whether the facilities would allow the downstream passage of juvenile salmonids and the upstream passage of adult salmonids during prime migration seasons while allowing the dam to be operated so that there would be no impacts to existing water delivery contracts, TWSA, or flood control operations (Section 1.5.3). The feasibility of different alternatives for fish passage facilities were evaluated in the Phase 1 Assessment and Draft Planning Report and in a Value Planning Report as described below. In addition, Reclamation installed interim fish passage facilities at Cle Elum Dam and the Yakama Nation implemented an interim fish reintroduction study to evaluate whether salmonids could be successfully reintroduced to Cle Elum Reservoir and migrate through the Yakima River basin.

2.2.1 Phase I Assessment and Draft Planning Report

In 2003, Reclamation completed a Phase I Assessment of the potential for fish passage at the five major Yakima Project storage dam sites – Bumping, Kachess, Keechelus, Tieton (Rimrock Reservoir), and Cle Elum (Reclamation, 2005b). Cle Elum and Bumping Lake Dams were identified as the two highest priority sites for continued investigation of fish passage feasibility based on the lower cost of constructing fish passage facilities at those dams in relation to the amount of salmonid habitat that would be accessible. A draft *Cle Elum and Bumping Lake Dam Fish Passage Facilities Planning Report* (Draft Planning Report) was completed by Reclamation in 2008. These two reservoirs present substantially different opportunities for developing fish passage concepts. Based on priorities and funding, Reclamation decided to proceed with the next phase for Cle Elum Dam only at this time. This phase includes activities to comply with NEPA and develop a value planning report for fish passage.

The Yakima basin fisheries comanagers, the Yakama Nation and the WDFW, developed a reintroduction plan for anadromous fish species above Reclamation’s Yakima Project storage dams. The fish reintroduction plan helped guide the development of alternatives for fish passage at Cle Elum Dam.

These studies led to the development of Alternative 2: Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam. That alternative was evaluated in the Draft Planning Report.

2.2.2 Value Planning Report

In June 2009, Reclamation assembled a Value Planning Team to review the fish passage alternatives presented in the Draft Planning Report. The team conducted a value planning study and documented the evaluation in the *Value Planning Final Report - Cle Elum Dam Fish Passage Facilities* (Reclamation, 2009b) (Value Planning Report) that examined the component features of the project and defined critical functions, governing criteria, and associated costs. In addition to the Alternative 2 proposal, the Value Planning Report identified six other proposals. Two of these were combined and are described in this DEIS as Alternative 3 - Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam. Alternative 3 was developed because it provides the

same level of fish passage effectiveness while reducing construction and operation costs and environmental impacts.

2.3 Alternative 1 - No Action Alternative

The No Action Alternative represents the most likely future expected if permanent fish passage facilities are not constructed at Cle Elum Dam. The impacts and benefits of the action alternatives are measured against the No Action Alternative. Under the No Action Alternative, Reclamation would not modify Cle Elum Dam or its features to include fish passage facilities, and the interim fish passage facility would be removed. The interim facilities only provide juvenile passage. They also have a limited life, are deteriorating, and will likely fail and require removal in a few years. In accordance with the Mitigation Agreement, Reclamation would work with WDFW to identify an as-yet-undetermined alternative to fish passage, consistent with state law.

2.4 Alternative 2 - Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam

Alternative 2 includes the construction of facilities for downstream juvenile fish passage and upstream adult fish passage. The downstream fish passage facilities are intended to allow fish produced or released into the Cle Elum basin to pass the dam and migrate to the ocean. Because Cle Elum Reservoir is an active irrigation facility, design of the downstream passage facilities must account for fluctuating reservoir levels during juvenile migration periods. The upstream fish passage facilities are intended to allow adult salmonids returning from the ocean to pass Cle Elum Dam to spawn in the tributaries to the reservoir.

The main features of the downstream fish facility include:

- Multilevel intake structure; and
- Juvenile fish bypass conduit.

The upstream fish passage facility would include the following features:

- Barrier dam; and
- Fish ladder and adult collection facility.

In addition to describing these facilities, the following sections discuss:

- Construction activities,
- Typical annual operation scenario, and
- Operation and maintenance activities.

Figure 2-1 shows the site plan for the upstream and downstream fish passage facilities under Alternative 2. Section 2.6 summarizes the major features for Alternatives 2 and 3.

2.4.1 Downstream Fish Passage

The downstream fish passage facility would release 100 to 400 cubic feet per second (cfs) of surface water to attract migrating juvenile fish to an intake structure. From the intake structure, fish would move into a 7-foot-diameter conduit (pipe) through the right abutment of the dam that would discharge fish safely into the spillway stilling basin below the dam. The fish would enter the fish passage system voluntarily rather than being collected and transferred downstream.

All land required for construction and operation of the proposed downstream fish passage features is federally owned either by Reclamation or located within the Wenatchee National Forest.

2.4.1.1 Multilevel Intake Structure

The intake structure, located 500 feet upstream of the spillway inlet channel, would consist of a rectangular concrete tower with five multilevel intake overflow gates. Figure 2-2 provides a front view and interior view of the intake structure.

The overflow gates within the intake structure would release flows for fish passage at any time the reservoir water surface elevation is between 2,190 feet and 2,240 feet (full pool). Overflow gates would provide surface release flows to attract fish from the reservoir into the intake structure. To protect the fish from injury, flows would be dissipated over as many as five weirs, depending on surface water elevation. The weirs and pools would control the potential drop at all times and would permit open channel flow in the juvenile bypass conduit.

A trashrack, with 1-foot bar spacing, would be installed on the upstream side of the overflow gates allowing juvenile fish to easily pass through the openings. However, larger debris would be blocked from entering the structure. An automated trashrake system would be installed to remove the accumulated debris.

In order for maintenance personnel to access the intake structure within the reservoir, a bridge would be constructed from the crest of the dam and extend 500 feet out to the intake structure. The bridge would have two concrete piers and a 150-foot-long earthen approach ramp armored with rock that would extend from the crest of the dam to the bridge abutment.

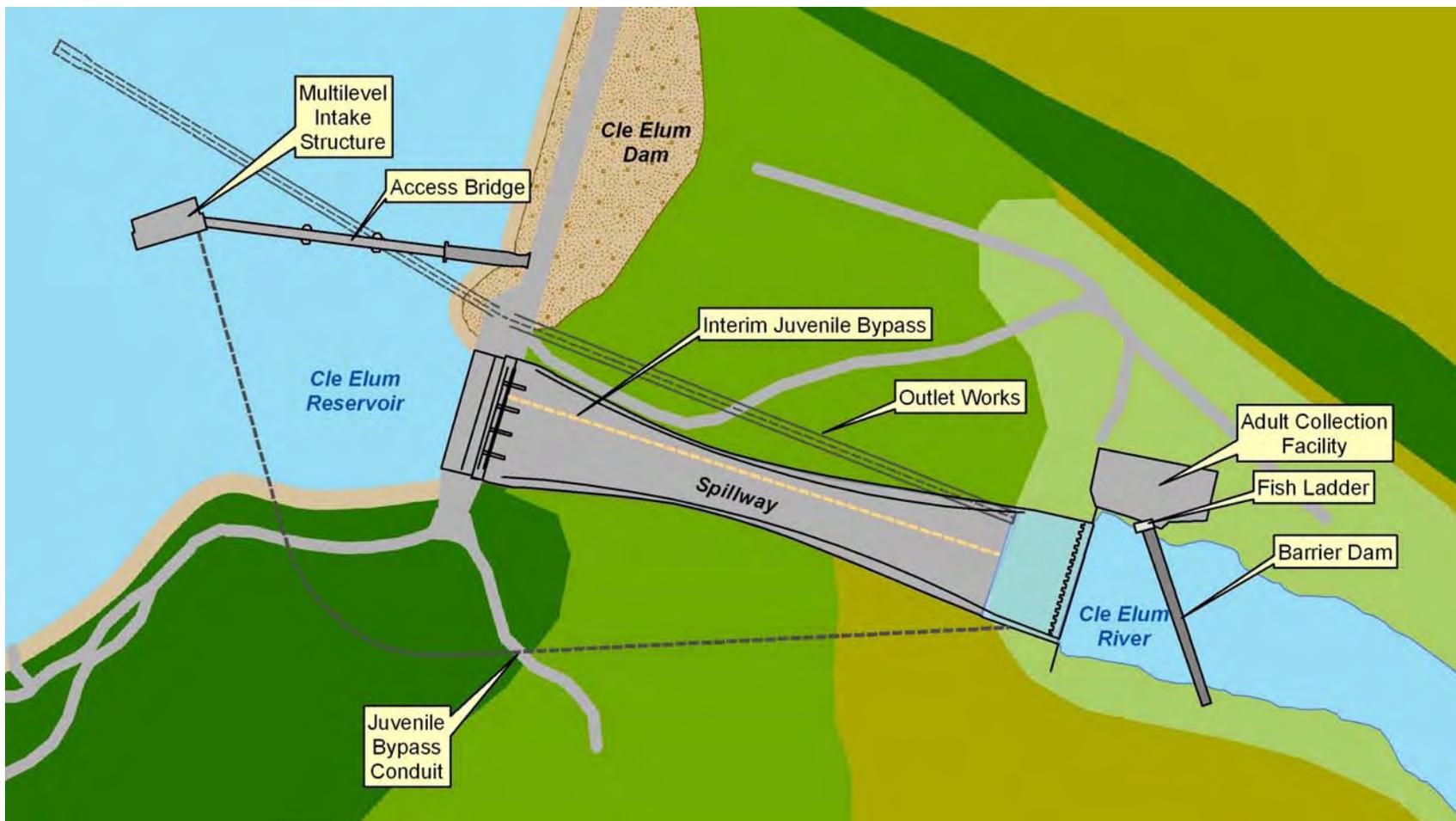


Figure 2-1. Alternative 2 - upstream and downstream fish passage facilities.

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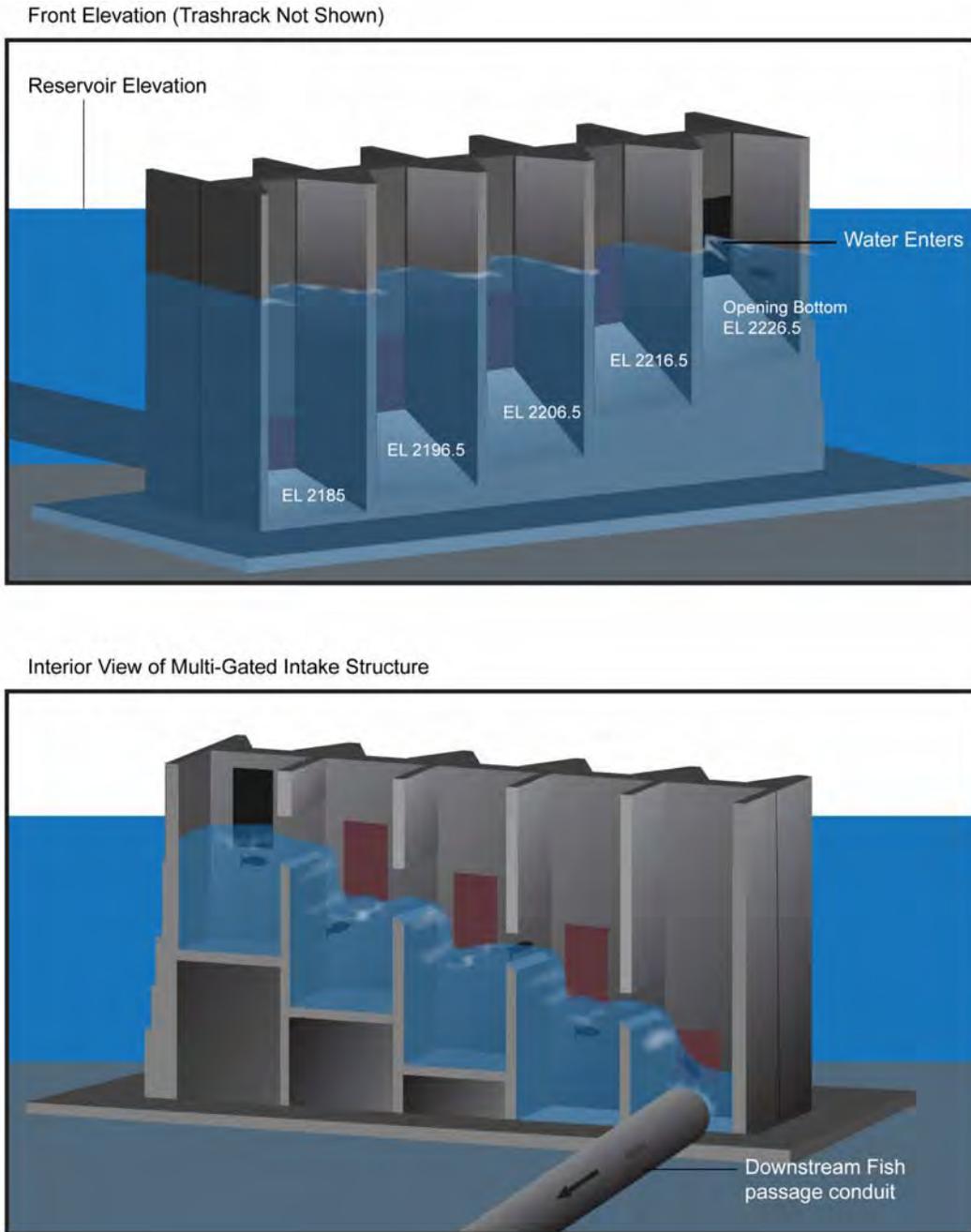


Figure 2-2. Cle Elum intake structure.

2.4.1.2 Juvenile Fish Bypass Conduit

A reinforced concrete juvenile bypass conduit would be installed to carry passage flows from the upstream intake structure to discharge fish into the downstream spillway stilling basin (Figure 2-1).

The underground juvenile bypass conduit would be 1,520 feet in length with a 7-foot inside diameter. It would be gravity flow with a maximum design open channel flow of about 400 cfs. At the end of the conduit section, the bypass transitions over a 20-foot length from a round section to a 7-foot-wide by 7-foot-high rectangular open flume at the downstream end. The conduit would narrow to a 4-foot-wide section extending down a steep slope and flatten out before discharging at the base of the existing stilling basin wall below the dam. The transition from the conduit to the rectangular flume extends another 300 feet to the exit in the river. The total bypass system is approximately 1,800 feet long.

In order to install the conduit, a trench would be excavated and concrete poured to form the walls of the conduit. When the concrete is cured, the trench would be backfilled with the excavated material. The depth of cut would vary from 20 to 75 feet with a 15-foot-wide working space at the invert 3:1 side slopes. The juvenile bypass conduit would pass through the right embankment of the dam.

2.4.2 Upstream Fish Passage

The upstream adult fish passage facility would include a barrier dam, a fish ladder, and a collection facility. The barrier dam and collection facility would be located about 150 feet downstream from the spillway stilling basin. The collection facility would be located on the left bank of the river as shown in Figure 2-1.

2.4.2.1 Barrier Dam

A vertical-drop hydraulic barrier structure, about 300 feet long and controlled by overshot weir gates, would span the width of the Cle Elum River approximately 100 feet downstream from the spillway stilling basin and the juvenile bypass conduit outlet. The barrier would be oriented to the river flow at a 55-degree angle. This angle is intended to create attraction flow to guide fish to the fish ladder entrance. When the collection facility is not in use, the adjustable overshot weir gates would be in their fully-down position.

2.4.2.2 Fish Ladder and Adult Collection Facility

At the fish ladder and adult collection facility, migrating adults would be attracted to the ladder entrance by the auxiliary water flow and then swim up the ladder into the adult fish collection facility (Figure 2-1). Ladder flows of up to 6 cfs would be supplied by the collection facility supply pump and/or gravity flow. The ladder itself would have a series of 12 pools, each 8 feet long by 4 feet wide by 4 feet deep.

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The adult fish collection facility would consist of a building to enclose an adult holding tank, fish lock, and fish handling and sorting equipment. The facility would be similar to the existing collection facility at Roza Diversion Dam on the Yakima River (Figure 2-3). Fish hauling would be required in order for adult fish to access upstream locations. Fish would be collected daily from the facility and transported by a hatchery truck to locations in and around the reservoir watershed. Fish transport would be conducted by WDFW and the Yakama Nation as part of its fish reintroduction project (Chapter 3).



Figure 2-3. View of exterior of Roza adult fish collection facility (top left); pool and weir-type fish ladder (top right); fish chute to work area or back to river (middle left); fish lock (middle right); and adult holding tank (bottom, right).

2.4.3 Construction Activities

Construction of the fish passage facilities is expected to be completed over three construction seasons. Table 2-1 shows the proposed schedule for constructing the different elements of the fish passage facilities. Construction would occur from April 15 to November 30 for three years. The proposed schedule for Alternative 3 would be similar except no barrier dam would be constructed.

The following roads would be used to access the project site. Proposed improvements are identified where appropriate. The proposed roads and improvements are shown in Figure 2-4.

- New county road and bridge across the Cle Elum River located 1 mile downstream from the spillway, being built separately by Kittitas County.
- Existing two-lane paved road connecting to SR-903 which provides access to the left abutment of the dam.
- Improvements to a gravel access road, 1,800 feet east of the dam, to the fish collection site and left side of the barrier dam. Improvements would include widening and grading of a new road alignment. The road would be used later for operation and maintenance of the adult collection facility.
- Construction of a temporary access road from the new county road, a mile downstream from the dam to the right abutment and then onto the lakebed to the cofferdam site for the intake structure. This road would be removed when construction is completed.

Two staging areas and stockpiles would be required for downstream passage. One would be located near the intake on the lakebed (riprap stockpile). The second would be at the top right abutment of the dam (temporary excavation stockpile).

Three staging areas and stockpiles would be required for the upstream passage. One would be located on the left bank downstream from the spillway stilling basin adjacent to the adult collection facility; the second would be on the left bank immediately across from the bottom of the spillway between the spillway and the new access road; and the third would be on the right bank across from the bottom of the spillway and stilling basin.

Table 2-1. Construction schedule.

	1ST CONSTRUCTION SEASON				2ND CONSTRUCTION SEASON								3RD CONSTRUCTION SEASON																	
	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N			
Downstream Passage																														
Intake structure cofferdam	█	█	█																											
Multilevel intake structure (lower section)	█	█	█																											
Juvenile bypass conduit (upper section)	█	█	█																											
Access bridge													█	█	█															
Juvenile bypass conduit (lower section)								█	█	█	█	█	█	█	█															
Multilevel intake structure (upper section)													█	█	█															
Juvenile bypass conduit (middle section)																										█	█	█		
Upstream Passage																														
Right half of the barrier dam								█	█	█	█	█	█	█	█															
Left half of the barrier dam																										█	█	█	█	█
Fish ladder and adult collection facility																											█	█	█	

Cle Elum Dam Fish Passage Facilities and
Fish Reintroduction Project Draft EIS



Figure 2-4. Proposed roads and road improvements.

Two cofferdams would be needed, one each for downstream and upstream construction activities. For construction activities associated with the downstream fish passage facilities, a cellular sheet pile cofferdam would be constructed approximately 500 feet upstream of the dam within the reservoir bed to allow for dewatering of the construction area around the intake structure. For construction activities associated with upstream fish passage facilities, a 12-foot-high cofferdam would be required immediately downstream from the stilling basin to allow for dewatering of the construction area for the barrier dam and fish ladder. The cofferdam would be formed by a combination of large sandbags and gravel.

Power to operate equipment such as roller gates and gantries (cranes that raise and lower the gates) would be provided by connecting to the power supply at the existing gatehouse control building. A new 600-foot-long cable would be installed along the dam from the gatehouse to the access bridge. At the bridge, a cable would be attached to the girders out to the intake structure. Power to operate the trashrake would still be within the capacity of the existing power supply. Power to the adult collection facility and fish ladder would be routed from the gate house and down the face of the dam to these facilities.

The three-phase power supply to serve the barrier dam and the adult collection facility would extend approximately 1,000 feet from the existing gatehouse control building and be routed down the face of the dam.

Total cost of construction of fish passage facilities at Cle Elum Dam for Alternative 2 is estimated at \$81.0 million (2004 dollars). Average annual OMR&P costs for the Cle Elum Dam fish passage facilities were developed by Reclamation cost engineers and were estimated at \$300,000.

2.4.4 Typical Annual Operation Scenario

The following sections describe how the fish passage facilities would be operated on an annual basis. Existing reservoir operations are described in Section 4.2.2. The fish passage facilities will require that the outlet works of the dam would be operated differently. However, the new facilities would not affect overall water operations. All fish passage facilities have been designed to ensure no changes to current reservoir operations, TWSA, or existing Reclamation contracts (Section 1.5.3).

2.4.4.1 Typical Annual Operations Scenario - Downstream Fish Passage Facilities

Downstream fish passage would be provided from mid-March to the end of June when most smolts are expected to have migrated out of the system. The multilevel intake structure would allow fish passage between elevation 2,190 feet to 2,240 feet (full pool). In mid March (average year) as the reservoir fills and reaches an elevation 2,190 feet, fish will be able to access the intake tower. Fish

access into the intake tower typically extends to mid August (average year) when the pool elevation drops below 2,190 feet. It would allow passage early in the season when fish are ready to migrate, but the reservoir is still well below spillway elevation. It would also allow passage during years when the reservoir does not completely fill. The intake structure would provide a surface spill from reservoir elevation at 2,190 feet to maximum pool elevation at 2,240 feet. Analysis of records from 1934 to 2004 shows that Cle Elum Reservoir was above elevation 2,190 feet in early March in about 61 percent of the years. The pool elevation was above 2,190 feet by early April in 73 percent of the years and by early May in about 90 percent of the years. Analysis of current reservoir operations from 1981 through 2007 shows similar results (Figure 2-5). Even in a very low water year (see the minimum curve in Figure 2-5), downstream passage would be available over approximately a 6-week period from some time in May through about June.

The juvenile passage facility would provide surface releases of fish passage flows in the range of 100 to 400 cfs. These flows would occur when reservoir levels are between elevations 2,190 and 2,240 feet. Minimum flows downstream from Cle Elum Dam are usually kept at about 200 cfs to protect Chinook salmon redds downstream in the Cle Elum River. The dam operating staff must maintain a minimum discharge of 100 cfs through the existing outlet gate to prevent potential cavitation from lower releases¹. At times, there would only be another 100 cfs available to operate the juvenile fish passage facility. As reservoir releases are increased to meet downstream irrigation demands, the juvenile fish passage releases would be increased from 100 to 400 cfs. The total minimum outflow from the reservoir would vary from 200 to 500 cfs. For example, at a minimum flow of 200 cfs, 100 cfs each would pass through the juvenile fish passage facility and the outlet works; while at 500 cfs, 400 cfs would pass through the juvenile fish passage facility and 100 cfs through the outlet works. As downstream demands increase above 500 cfs, the additional releases would be made from the existing outlet works while maintaining 400 cfs through the juvenile fish passage facility.

Fish passage operations would be integrated into existing project demands and would not impact existing water delivery contracts, TWSA, or flood control operations. Daily reservoir releases to meet irrigation and/or instream flow demand would be the combined flows through the outlet works plus the juvenile bypass conduit. Water for the upstream passage facility would be provided from the stilling basin by a combination of a pump and gravity flow provided by the barrier dam. The pumped and/or gravity flow would be recirculated to the stilling basin at the adult fish ladder entrance.

¹ Cavitation occurs when bubbles form around pump systems. Pressure from the bubbles can cause damage to equipment.

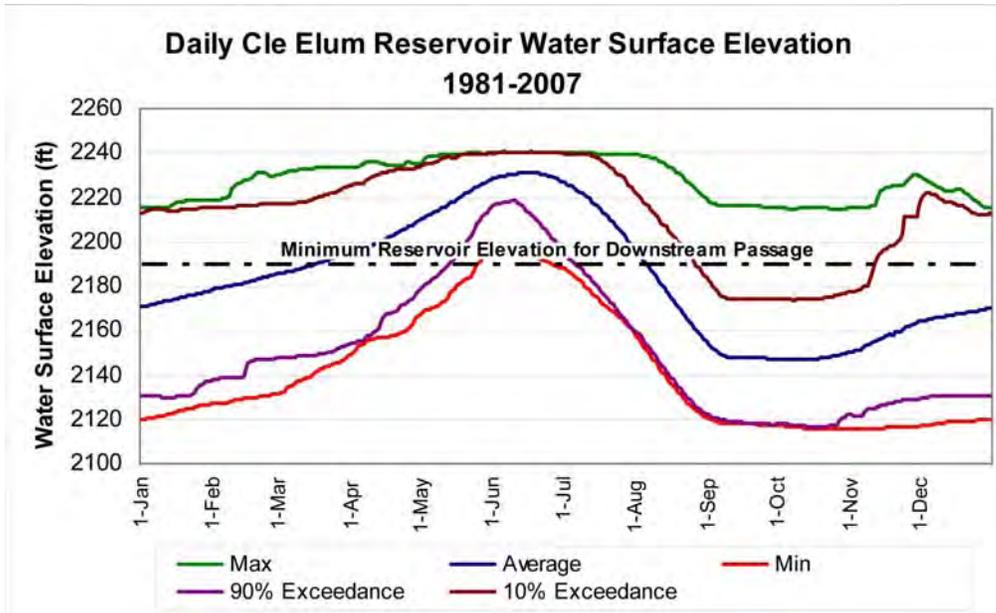


Figure 2-5. Daily Cle Elum Reservoir elevations for 1981 to 2007 showing the minimum elevation for downstream passage.

2.4.4.2 Typical Annual Operation Scenario – Upstream Fish Passage Facilities

The barrier dam and adult collection facility would be operated from mid March to late December. Peak upstream movement of adult salmon would be expected from June through November.

The adjustable gates on the barrier dam would be operated in a fully-upright position during normal operations, and would provide a 10- to 12-foot vertical hydraulic drop to prevent upstream passage beyond the collection facility. This would raise the tailwater elevation upstream of the barrier dam by 10 to 12 feet under normal operations, which would increase by 10 to 12 feet the amount of head exerted on the outlet works. This additional head would, in turn, reduce the discharge capacity of the outlet works; however, the loss in outlet works discharge capacity would be offset by the additional discharge capacity of up to 400 cfs from the juvenile bypass conduit. If additional outlet works discharge capacity were required, the adjustable barrier gates could be lowered to reduce the tailwater surface elevation upstream of the barrier dam and on the outlet works.

This increase in the tailwater elevation at the base of the spillway would not impact spillway operations. When river flows exceed about 6,500 cfs, the adjustable barrier gates would be lowered. This action would prevent the tailwater elevation upstream of the barrier dam from spilling out and flooding the area where the adult collection facility would be located.

Adult fish would be guided by the angled barrier dam to the fish ladder entrance, and from there continue up the ladder and enter the adult collection facility.

Biologists would measure, weigh, examine, take scale and other samples, and mark the fish on a daily basis (or more frequently during peak migration periods). Fish would then be transported in trucks and released in the reservoir or upstream tributaries (see Chapter 3).

If the intake structure and juvenile bypass conduit are in operation at the same time that the adjustable barrier gates are in the raised position, the juvenile fish migrating downstream that are discharged from the juvenile bypass conduit would enter the tailwater upstream of the barrier dam. The fish would then spill over the barrier dam to continue their downstream migration.

The adjustable barrier gates would each have sensors and actuators that would lower each gate in sequence starting at the left side of the river. This sequence would provide the most attraction flow to the collection facility. Sensors would be used to monitor the difference between the water elevation formed at the barrier dam and the river tailwater elevation.

Although the fish passage facilities will require different operations at the dam, their operation will not affect overall water operations. Like the downstream fish passage facilities, operation of the upstream passage facilities would be integrated into existing project demands and would not impact existing water delivery contracts, TWSA, or flood control operations. Water for the upstream passage facility would be provided from the stilling basin by a combination of a pumping plant and gravity flow provided by the barrier dam. The pumped and/or gravity flow would be immediately returned to the stilling basin at the adult fish ladder entrance.

2.4.5 Operations and Maintenance

Responsibilities for fish passage facilities operation and maintenance will be determined by Reclamation with input from the Yakama Nation and WDFW. Typical annual maintenance duties would include inspection and maintenance of the roller gates, overshot barrier gates, trashracks, conduits, power, control and monitoring systems, pumps, fencing, access roads, gantry crane, trashrake, and other equipment and structures. Major maintenance and disassembly of pumps would take place on a 5-year cycle. Replacement of pumps and associated equipment would be on a 20-year cycle.

2.5 Alternative 3 – Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam (Preferred Alternative)

Alternative 3, which originated from proposals #1 and #3 of the Value Planning Report (Section 2.2.2), is very similar to Alternative 2, including construction of both downstream juvenile and upstream adult fish passage. The major difference

is that all passage facilities would be located on the right bank. Locating all the facilities on the right bank reduces construction and operation costs and lessens environmental impacts. The main features of the downstream fish facility include:

- Multilevel intake structure, and
- Juvenile fish bypass conduit.

The main feature of the upstream passage facility would be a fish ladder and adult collection facility. A pump with a fish screen would provide attraction flows to the fish ladder. No barrier dam would be constructed.

In addition to describing these facilities, the following sections discuss:

- Construction activities,
- Typical annual operation scenario, and
- O&M activities.

Figure 2-6 shows the site plan for the upstream and downstream fish passage facilities under Alternative 3. Section 2.6 summarizes the major features for Alternatives 2 and 3.

2.5.1 Downstream Fish Passage

Downstream passage for Alternative 3 would be very similar to Alternative 2 except that under this alternative, the intake structure would be located against the right (southwest) abutment, eliminating the need for the access bridge. The juvenile bypass conduit would be located adjacent to the spillway on the right bank.

2.5.1.1 Multilevel Intake Structure

The intake structure for Alternative 3 is the same as the intake structure for Alternative 2 (see Section 2.4.1.1) except that the intake structure would be located against the right bank abutment. This would require excavation into the abutment and into the lakebed to maintain a deep channel leading to the intake structure. The access bridge to the intake structure would be eliminated because the structure could be accessed from shore (Figure 2-6).

2.5.1.2 Juvenile Fish Bypass Conduit

The juvenile bypass conduit is the same as the juvenile bypass conduit described for Alternative 2 (see section 2.4.1.2), except that the total length of the conduit would be decreased to 950 feet.

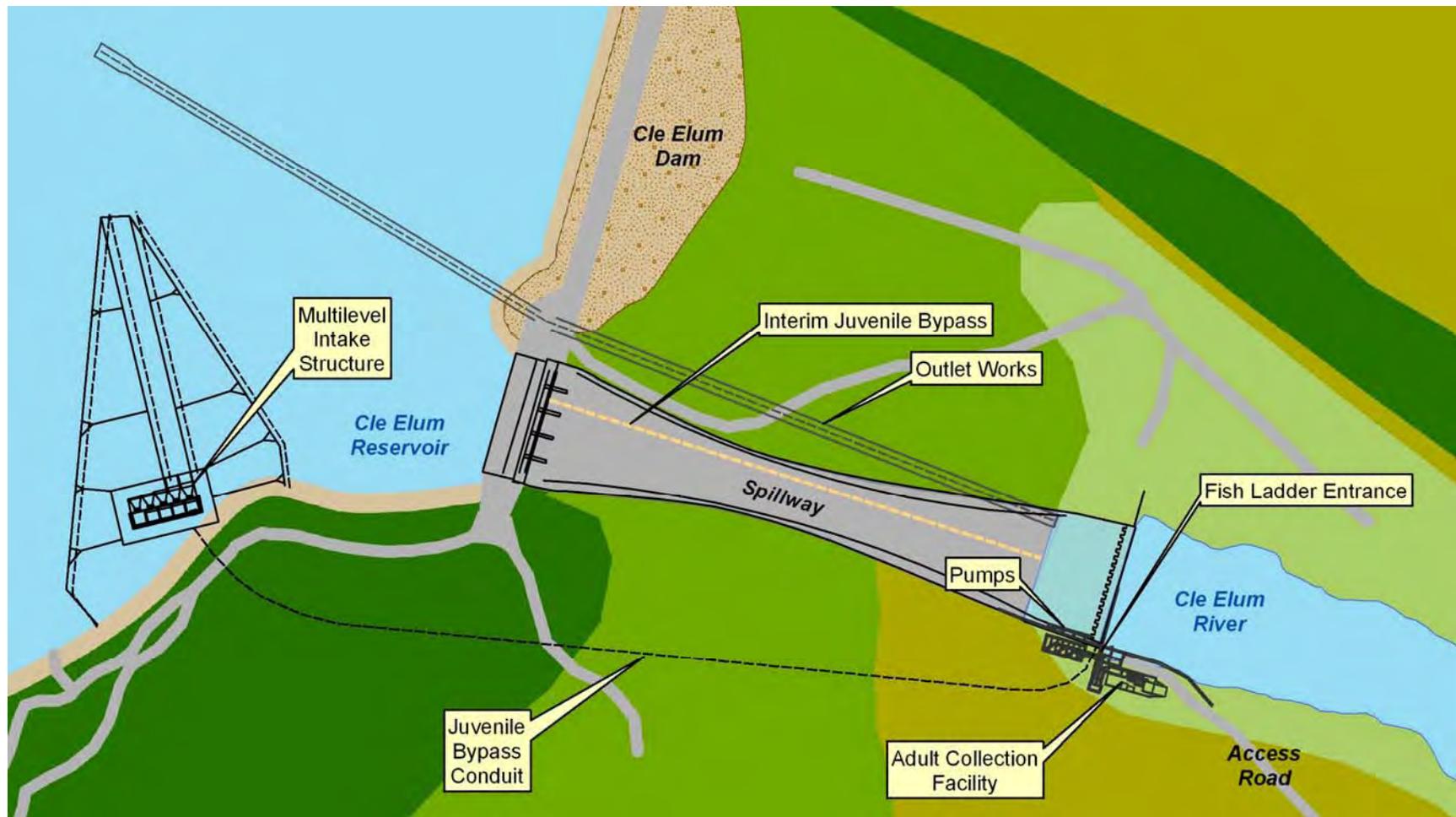


Figure 2-6. Alternative 3 - upstream and downstream fish passage facilities.

2.5.2 Upstream Fish Passage

The upstream fish passage for Alternative 3 would be similar to Alternative 2, except that the facility would be located on the right bank of the river instead of the left. Also, the barrier dam has been eliminated from Alternative 3 and a larger pump would be installed in the stilling basin upstream of the fish ladder entrance.

2.5.2.1 Barrier Dam

Under Alternative 3, no barrier dam would be constructed. Elimination of the barrier dam from the design was recommended as a cost savings in the Value Planning Report (Section 2.2.2). Locating the adult collection facility and fish ladder on the right bank places the ladder entrance in an area of calm water at the base of the spillway. The combination of the flow from the downstream juvenile passage conduit and the pumped auxiliary attraction flow would provide adequate flows for adult fish to find the ladder entrance.

2.5.2.2 Fish Ladder and Adult Collection

The structures associated with the fish ladder and adult collection facility would be the same as for Alternative 2 (Section 2.4.2.2), except for the following:

- The fish ladder and adult collection facility would be located on the right bank instead of the left bank,
- A larger pump would be installed, and
- No barrier dam and associated structures would be installed.

Compared to Alternative 2, a larger pump would be needed to provide auxiliary attraction flows for the adult fish facility, in addition to the flows to the adult collection facility and fish ladder. (The pumping plant for Alternative 2 would provide flows only to the adult holding facility and fish ladder.) The pump would be located in the stilling area near the right bank and operate from July through December, plus whenever the juvenile intake structure is inoperable due to low reservoir levels or high water temperatures (greater than 16° C or 61° F).

2.5.3 Construction Activities

Construction activities would be similar to those for Alternative 2, except that no access roads would be required on the left bank of the river since the adult holding facility would be located on the right bank. The road system constructed for installation of the juvenile bypass conduit would also serve for construction and permanent access to the fish ladder and adult collection facility.

The cofferdam for construction of the intake structure would be reconfigured to account for the new location against the right bank. The cofferdam for the

upstream passage facilities would also be reconfigured using a smaller cofferdam on the right bank to construct the lower portion of the fish ladder, juvenile bypass flume, and to install the pump and fish screen.

The power supply to service the fish passage facilities would still originate from the existing gatehouse control building. The power supply to serve the intake structure would be routed from the gatehouse and under the spillway deck. In similar fashion, service to the adult collection facility would be provided by a power supply originating at the gatehouse, and either routed by way of an overhead power line across the spillway or by following the same route to the multilevel intake tower and then in a buried conduit following the alignment of the juvenile bypass pipe to the adult collection facility and fish ladder.

As with Alternative 2, all land required for construction and operation of the downstream fish passage features is federally owned either by Reclamation or located within the Wenatchee National Forest.

Total cost of construction of fish passage facilities at Cle Elum Dam for Alternative 3 was estimated at \$65.6 million (2004 dollars). The annual OMR&P impacts for Alternative 3 were assumed to be essentially the same as for Alternative 2.

2.5.4 Typical Annual Operation Scenario

The Alternative 3 fish passage facilities would be operated similarly to Alternative 2 (Section 2.4.4.1). There would be no impacts to existing project operations, TWSA, or Reclamation contracts.

2.5.4.1 Typical Annual Operation Scenario – Downstream Fish Passage Facilities

Downstream fish passage operations would be the same as for Alternative 2 (Section 2.4.4.1).

2.5.4.2 Typical Annual Operation Scenario – Upstream Fish Passage Facilities

The upstream fish passage facility operations would be the same as for Alternative 2 (Section 2.4.4.2). However, since the barrier dam is not proposed with Alternative 3, operations associated with it would not be included.

2.5.5 Operations and Maintenance

Operations and maintenance would be the same as for Alternative 2 (Section 2.4.5), except there would be a larger pumping unit. The access bridge and barrier dam are not included with Alternative 3.

2.6 Comparison of Facilities for Alternative 2 and Alternative 3

Table 2-2 compares the major facilities associated with each of the two action alternatives. Figure 2-7 shows where the intake structures would be located for each alternative.

Table 2-2. Summary of major facilities – Cle Elum Fish Passage Facility.

Facility/Structure	Alternative 2	Alternative 3
Juvenile Downstream Fish Passage		
Multilevel intake structure	Located upstream of dam 5 drop bays; 4 -8 ft.-wide roller gates.	Same as Alternative 2, except located against right abutment of dam.
Access bridge	16-ft.-wide x 370-ft.-long on 2 concrete piers.	None.
Fish passage conduit	1,520-ft.-long, 7-ft.-diameter concrete conduit, nonpressurized, 400 cfs flow capacity.	Same as Alternative 2, except length is approximately 950 feet long and alignment altered to accommodate new intake location.
Trashrack	1-ft. bar spacing, automated trashrake system.	Same as Alternative 2.
PIT-tag detector system	Located near the flume exit.	Same as Alternative 2.
Adult Upstream Fish Passage		
Collection facility	150 ft. downstream from the spillway stilling basin, left bank of river, prefabricated metal building, drainfield.	Same as Alternative 2, except located on the right bank adjacent to the spillway.
Fish ladder flows	4 cfs to 6 cfs.	Same as Alternative 2.
Fish ladder pools	12 ft. long x 4 ft. wide x 4 ft. deep.	Same as Alternative 2, but somewhat longer.
Weirs	2 ft. wide x 1 ft. deep center notch.	Same as Alternative 2.
Trashrack	26 ft. wide x 7 ft. tall; 1-inch clear openings; maximum approach velocity of 1 ft/s.	None.
Pump	Provides flow only to the fish collection tank and fish ladder, which requires 4-6 cfs. Gravity flow from the barrier dam used to provide auxiliary attraction flow for the fish ladder.	Provides collection tank and fish ladder flow; provides auxiliary attraction flow for fish ladder when intake structure is not in operation (July-December). Variable speed with a maximum of up to 180 cfs.
Barrier dam	300 ft. long x 44 ft. wide x 12 feet high at an angle of 55 degrees. Vertical hydraulic drop of 10-12 ft., with adjustable barrier gates.	None.



Figure 2-7. Aerial view of Cle Elum Dam showing approximate locations of intake structures for both action alternatives. Pool elevation is 2,119 feet in this photo.

2.7 Other Alternatives Considered but Eliminated from Further Study

During the conceptual design phase, various alternatives were considered but eliminated from further analysis because of safety concerns, cost-effectiveness, O&M issues, and/or failure to meet fish passage operational criteria. These alternatives are summarized below.

2.7.1 Surface Attraction Intake and Pressurized Bypass for Downstream Passages

This alternative was based on constructing a new intake tower over the existing outlet channel. The general approach would be to use surface attraction in combination with a pressurized bypass to pass fish around the dam.

The Core Team dismissed this concept due to the potential to create seepage through the dam which would create a dam safety issue. In addition, the pressurized pipe could injure fish.

2.7.2 Floating Surface Attraction to a Trap-and-Haul Facility for Downstream Passage

This alternative would implement a floating surface fish attraction facility with guide nets, similar to the “gulper” collector used on the Puget Sound Energy Baker Lake project in western Washington. The facilities would be based on a

surface collector housed on a floating barge, which would continuously adjust to the water surface. Guide nets attached to the barge entrance would probably be required to maintain a reasonable level of effectiveness with this system.

The Core Team dismissed this alternative mainly due to concerns of O&M issues during the winter period when there would be snow, freezing conditions, and a potentially frozen lake surface.

2.7.3 Surface Attraction with an Open Channel Bypass for Downstream Passage

In this alternative, fish attraction would be used with multiple intakes leading to separate open channel bypass conduits. A percentage of the total outflow would be used to create the attraction. Once captured by the bypass velocities, fish would be transported downstream from the spillway back to the river.

The Core Team dismissed this alternative because the facility would not operate over a wide enough range of juvenile outmigration conditions. The multiple intake structure's operational range of less than 50 feet would not have provided passage from mid-March through mid-July during a normal water year.

2.7.4 Fish Ladder with a Slide to Reservoir for Upstream Passage

In this alternative, the ladder entrance would be located downstream from the spillway and existing outlet works. An entrance channel would provide passage across the river to the ladder entrance. The ladder would extend from the river to the crest of the dam. The ladder would be watered up by continuously pumping water from the stilling basin to the crest of the dam and then spilled down the ladder. At the crest of the dam, a slide would extend from the top of the ladder down to the reservoir water surface that would allow fish to pass from the crest of the dam into the reservoir.

The Core Team dismissed this alternative because of excessive pumping costs required, winter icing conditions, and the required length of the fish ladder to reach the crest of the dam.

2.8 Summary Comparison of Environmental Impacts of Alternatives

Table 2-3 compares the impacts associated with the three fish passage facility alternatives. The phrase "short-term" refers to impacts associated with construction activities. The phrase "long-term" refers to impacts following the construction period. Additional information about the impacts is found in Chapter 5.

Cle Elum Dam Fish Passage Facilities and
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Table 2-3. Comparison of impacts for fish passage facilities.

Resource	Alternative 1 – No Action	Alternative 2 – Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam	Alternative 3 – Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam
Water Resources	No impacts.	<u>Short-term:</u> Minor increases in turbidity and sedimentation during construction. <u>Long-term:</u> None.	Same as Alternative 2.
Fish	Historic habitat would continue to be blocked. Removal of interim facilities would stop fish reintroduction efforts.	<u>Short-term:</u> Potential disturbance during construction. <u>Long-term:</u> Benefit to productivity/genetic diversity.	Same as Alternative 2. Fewer construction impacts.
Vegetation	No impacts.	<u>Short-term:</u> Removal of vegetation from construction areas. <u>Long-term:</u> Some loss of permanent vegetation and loss of mature vegetation for approximately 50 years.	Same as Alternative 2. Fewer construction impacts.
Wildlife	No impacts.	<u>Short-term:</u> Minor disturbance near facilities during construction and operation activities. <u>Long-term:</u> Loss of mature habitat for approximately 50 years.	Same as Alternative 2. Fewer construction impacts.
Threatened and Endangered Species			
Bull trout Middle Columbia River (MCR) steelhead	Historic habitat would continue to be unavailable to steelhead and populations of bull trout would remain isolated from one another.	<u>Short-term:</u> Potential disturbance during construction. <u>Long-term:</u> Beneficial effect with implementation of fish passage.	Same as Alternative 2. Fewer construction impacts.
MCR steelhead critical habitat	No impacts.	Permanent impacts to designated critical habitat as a result of barrier dam construction.	Permanent impacts to designated critical habitat as a result of pump construction (less impact than Alternative 2).
Grizzly bear Gray wolf Canada lynx	No impacts.	<u>Short-term:</u> If present, species likely to avoid area during construction. <u>Long-term:</u> Potential beneficial impact from increased prey.	Same as Alternative 2. Fewer construction impacts.
Ute ladies'-tresses	No impacts.	<u>Short-term:</u> Potential habitat may be disturbed. <u>Long-term:</u> None.	Same as Alternative 2. Fewer construction impacts.
Northern spotted owl	No impacts.	<u>Short-term:</u> Potential loss of nesting and foraging habitat. <u>Long-term:</u> Potential loss of nesting habitat until forest matures.	Same as Alternative 2. Fewer construction impacts.

Chapter 2
Fish Passage Alternatives

Resource	Alternative 1 – No Action	Alternative 2 – Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam	Alternative 3 – Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam
Visual Resources	Beneficial impact since interim passage facilities would be removed from dam.	<u>Short-term:</u> Construction equipment and activities would be visible. <u>Long-term:</u> Visible items in project area such as intake structure, access bridge, barrier dam.	Less impact than Alternative 2, as barrier dam and access bridge are eliminated from Alternative 3.
Air Quality	No impacts.	<u>Short-term:</u> Minor dust associated with construction and traffic. <u>Long-term:</u> None.	Same as Alternative 2.
Climate Change	No impacts.	<u>Short-term:</u> Minor increases in greenhouse gas emissions. <u>Long-term:</u> Access to historic habitat may help fish withstand climate change impacts.	Same as Alternative 2.
Noise	No impacts.	<u>Short-term:</u> Construction noise limited to daytime hours. <u>Long-term:</u> None.	Same as Alternative 2.
Recreation	No impacts.	<u>Short-term:</u> Noise, traffic delays. <u>Long-term:</u> None.	Same as Alternative 2.
Land and Shoreline Use	No impacts.	<u>Short-term:</u> Small amounts of land converted from forest to fish passage facilities. <u>Long-term:</u> Same as short-term.	Same as Alternative 2.
Utilities	No impacts.	<u>Short-term:</u> None. <u>Long-term:</u> Minor increase in power demand for pumping.	Same as Alternative 2 except more power would be required for pump.
Transportation	No impacts.	<u>Short-term:</u> Noise, traffic delays. <u>Long-term:</u> None.	Same as Alternative 2.
Environmental Justice	No impacts.	No impacts.	No impacts.
Cultural Resources	No impacts. Removal of interim facilities would restore dam closer to historic appearance.	Potential adverse effects to dam, potential effects to prehistoric/historic resources.	Potential effects to prehistoric/historic resources.
Indian Sacred Sites	No impacts.	No impacts.	No impacts.
Indian Trust Assets	No impacts.	No impacts.	No impacts.
Socioeconomics	No impacts.	<u>Short-term:</u> Construction would generate sales, jobs and labor income in the region. <u>Long-term:</u> Small increase in sales, jobs, and labor income.	<u>Short-term:</u> Same as Alternative 2 except smaller increases. <u>Long-term:</u> Same as Alternative 2.

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Chapter 3

FISH REINTRODUCTION ALTERNATIVE

CHAPTER 3

FISH REINTRODUCTION ALTERNATIVES

3.1 Introduction

As described in Chapter 2, this DEIS evaluates alternatives for both fish passage facilities and a fish reintroduction project. This chapter describes the alternatives proposed for the fish reintroduction project by WDFW and the Yakama Nation. The fish reintroduction project is dependent on the construction of fish passage facilities described in Chapter 2. If fish passage is not installed at Cle Elum Dam, salmonids would not be able to migrate past the dam and reintroduction efforts would not be feasible. The two alternatives under consideration for the fish reintroduction project are:

- Alternative 1 – No Action
- Alternative 2 – Fish Reintroduction Project

The chapter includes a description of how the proposed alternative was selected. It also presents the alternatives considered but eliminated from further study. At the end of this chapter, Table 3-1 summarizes the environmental impacts of the project.

3.2 Formulation of Alternatives

The Yakima basin fisheries comanagers, the Yakama Nation and WDFW, developed a reintroduction plan for anadromous fish species above Reclamation's Yakima Project storage dams (Reclamation, 2005). The fish reintroduction plan is the basis for developing alternatives for fish reintroduction at Cle Elum Dam.

This fish reintroduction plan contains a suggested sequence and methodology for reintroduction of anadromous fish species above the storage dams. The anadromous fish species being considered for reintroduction above the storage dams in order of preference include sockeye salmon, coho salmon, spring Chinook salmon, summer steelhead, and Pacific lamprey. An additional objective of the fish reintroduction plan is to provide two-way passage for resident bull trout to restore genetic connectivity between adfluvial populations in the storage reservoirs and their tributary streams, and fluvial (riverine) bull trout that reside downstream from the dams.

At the beginning of the reintroduction study, the Core Team along with Reclamation determined that construction of permanent juvenile and adult fish

passage facilities is technically feasible at the two projects selected for initial consideration, Cle Elum Dam and Bumping Lake Dam. This DEIS addresses fish passage only the Cle Elum Dam because it was determined that it would provide access to the highest quality habitat.

The fisheries comanagers determined that an active fish reintroduction project designed to utilize the newly accessible upstream habitat would be needed to achieve the greatest benefit to any proposed fish passage alternative. This determination was made considering the significant costs involved in planning, engineering, constructing, operating, and maintaining any proposed fish passage facility and the length of time required for a natural colonization process.

Fish reintroduction would use a combination of in-basin and out-of-basin donor broodstock. The Yakama Nation and WDFW have developed a reintroduction plan based on using species available in the near term, mid term and long term. No specific dates have been attached to these different phases of reintroduction since their implementation is based on the availability of different species and the success of initial reintroduction phases.

Near-term efforts would be a continuation of the ongoing interim efforts being undertaken by the Yakama Nation. Near-term efforts would use hatchery coho (smolts and adults) and sockeye adults collected at Priest Rapids Dam when run abundance permits. Coho are readily and reliably available in all years to reestablish a localized broodstock for hatchery and natural production above Cle Elum Dam. Coho salmon would continue to be used to initiate restoration of a properly functioning ecosystem by introducing marine-derived nutrients back into the Cle Elum River watershed. This would enhance the primary goal of reestablishing sockeye salmon, whose juveniles rear in a freshwater lake environment. In the near term, coho and spring Chinook reintroduction would use available sources of in-basin donor broodstock collected downstream from Cle Elum Dam. Out-of-basin sources would be utilized for sockeye because no in-basin sources are available. Because summer steelhead is listed under the ESA, any reintroduction efforts would be closely coordinated with NMFS and would focus on kelt reconditioning. A kelt is a steelhead that has spawned and is in poor condition.

For the mid-term reintroduction, a combination of out-of-basin and locally returning adults would be utilized as fish return to Cle Elum Reservoir. The long-term phase would begin when local or returning sources are solely utilized to supplement fish spawning in the reservoir and/or tributaries.

3.3 Alternative 1 - No Action Alternative

The No Action Alternative for the fish reintroduction project is the same as described for fish passage in Chapter 2 (Section 2.3). Reclamation would not install permanent fish passage facilities at Cle Elum Dam and would remove the

existing interim fish passage facilities. Because fish reintroduction would not be feasible without fish passage facilities, the Cle Elum fish reintroduction project and other fish reintroduction plans would be discontinued. In accordance with the Mitigation Agreement (Appendix A), Reclamation would work with WDFW to identify an as-yet-undetermined alternative to fish passage, consistent with state law.

3.4 Alternative 2 - Fish Reintroduction Project

Under Alternative 2, WDFW and the Yakama Nation would implement an active fish reintroduction project to accelerate adult and juvenile salmon repopulation in the habitat above Cle Elum Dam once Reclamation's fish passage facilities described in Chapter 2 have been installed. Species included in the fish reintroduction plan are sockeye salmon, coho salmon, spring Chinook salmon, and summer steelhead. In addition, the fish reintroduction plan would promote genetic connectivity of bull trout by connecting the adfluvial populations in Cle Elum Reservoir and its tributary streams and fluvial populations that reside downstream. Specific activities to promote reintroduction would be determined by resource availability and adaptive management. Bull trout and summer steelhead are listed as threatened under the ESA.

The following sections describe the fish reintroduction project developed by fisheries biologists from WDFW and the Yakama Nation. The biologists established goals for successful reintroduction based on extensive research. Documents supporting the fish reintroduction plan can be found at http://www.usbr.gov/pn/programs/ucao_misc/fishpassage/index.html.

3.4.1 Coho Salmon Reintroduction

Coho salmon are the most suitable species for early reintroduction above Cle Elum Dam because of the availability of juveniles and adults. Coho are currently returning to portions of the Yakima basin. When at least 3,500 coho return annually to Cle Elum Reservoir, the objective will have been reached to "increase the life history diversity, geographic distribution, and abundance of coho salmon to self-sustaining levels capable of supporting harvest." In addition to establishing a self-sustaining coho population, coho would be used to initiate a properly functioning ecosystem by introducing marine-derived nutrients back into Cle Elum River watershed. Coho salmon reintroduction would include the following actions:

- Release up to 500,000 juvenile coho annually including 250,000 spring fed fry (recently hatched fish that have been fed in a hatchery) and 250,000 summer parr placed directly into Cle Elum Reservoir or its tributary streams. If resources are available, up to 1,000,000 coho may be placed into the reservoir.

- Initially release 100 to 200 pairs of adult coho into Cle Elum Reservoir. When returns are abundant, up to 1,000 pairs may be placed into the reservoir.
- Place salmon carcass analogs or heat-sterilized whole salmon carcasses (Yakima coho, spring Chinook, and/or fall Chinook) above Cle Elum Reservoir to increase ecosystem productivity.
- Transport returning adults above the dam using the adult fish passage facilities.
- Utilize PIT tagging to monitor smolt survival and the number of returning adults. PIT tagging is a system of monitoring the movement of fish using microchips.

3.4.2 Sockeye Salmon Reintroduction

The goal of sockeye reintroduction is to restore sockeye populations to self-sustaining levels capable of supporting harvest. This has been defined as when at least 35,000 sockeye return to Cle Elum Reservoir in 10 out of 20 years.

Activities to meet these goals include:

- Release 500 to 1,000 pairs of adult sockeye captured at Priest Rapids Dam (adults could be of either Wenatchee or Lake Osoyoos origin because it is not possible to differentiate between the two stocks at the trap).
- As an option to releasing adult sockeye as described above, release 50,000 to 4,000,000 juvenile salmon from Lake Osoyoos produced at an out-of-basin hatchery.
- Capture 20 to 25 adult sockeye at Priest Rapids Dam (radio-tagged to allow monitoring) and release into Cle Elum Reservoir.
- Transport returning adults above the dam using the adult fish passage facilities.
- Release radio-tagged, in-basin returning adults into the reservoir to monitor the location and timing of any spawning activity.

Sockeye populations exhibit highly variable abundance. This variability makes it difficult to design a plan with firm dates for consistent and adequate numbers of fish for the reintroduction program. There are two potential sockeye salmon donor stocks in the upper Columbia Basin-Lake Wenatchee or Lake Osoyoos (Okanogan River basin; Canadian spawners). These available stocks would be evaluated to determine donor stock suitability, availability and the potential for spawning, incubating and rearing juvenile sockeye salmon to the fingerling, parr or smolt stage for release in Cle Elum Reservoir.

The preferred source of sockeye is adults trapped at Priest Rapids Dam. However, in some years the adult sockeye run may be too small to allow trapping. In those years, releasing fry from Lake Osoyoos broodstock would be the only option.

Reclamation estimated that approximately 263,000 to 1.2 million smolts are needed to fully seed the Cle Elum watershed above Cle Elum Dam (Reclamation, 2007b). The near-term goal would be to produce as many fed fry (March to April) and summer parr (June to July) as feasible from the appropriate donor stock. The near-term effort consists of two possible scenarios.

The first scenario consists of trapping 500 to 1,000 pairs of adult sockeye at the Priest Rapids Dam Off-Ladder Adult Fish Trap, transporting and releasing them directly into Cle Elum Reservoir. This would eliminate the need to incubate the eggs and rear the fry or parr. This would also minimize disease issues associated with hatchery rearing.

In the second scenario, the Yakama Nation in conjunction with Okanagan Nation Alliance would collect and spawn adult Lake Osoyoos sockeye. Excess eggs and milt would be shared with the Yakama Nation. Transporting eggs and milt from Canada would require permits from Federal, State, and Provincial agencies. With proper permits, the eggs would then be transferred to an available hatchery where they would be fertilized and raised to either fed fry and/or summer parr stage and released directly into Cle Elum Reservoir. Between 50,000 and 4,000,000 juvenile sockeye (depending on available facility space) consisting of fed fry and/or summer parr would be released into Cle Elum Reservoir.

All disease prevention protocols prescribed by State and Federal fish health officials would be followed in selecting and importing donor sockeye salmon eggs, juveniles and adults. The comanagers and the Service are concerned about the reintroduction of sockeye into the Yakima River basin due to the presence of Infectious Hematopoietic Necrosis Virus (IHN-V) in existing Columbia Basin sockeye stocks. Careful monitoring and selection of disease-free broodstock would be essential in a reintroduction effort to protect the other existing species of salmon and resident salmonids in the Yakima River watershed.

In July 2009, the Yakama Nation released approximately 1,000 adult sockeye collected at Priest Rapids Dam into Cle Elum Reservoir. The Yakama Nation tested 60 post spawned sockeye carcasses collected off the spawning grounds in the upper Cle Elum River in fall 2009 for IHN-V and bacterial kidney disease. The Service pathology lab conducted the tests and found 100 percent of the fish sampled to be free of both pathogens.

3.4.3 Spring Chinook Salmon Reintroduction

The goal of spring Chinook reintroduction is to increase the life history diversity, geographic distribution, and abundance of spring Chinook salmon to self-

sustaining levels capable of supporting harvest. The goal will be achieved when at least 3,500 spring Chinook salmon return annually to Cle Elum Reservoir. Activities to meet these goals include:

- Coordinate with the existing YKFP spring Chinook supplementation project.
- Release excess Cle Elum Hatchery supplementation line (or S-line) adults captured at Roza Diversion Dam, up to 2,500 pairs.
- Release fed fry raised from surplus S-line eggs.
- Transport returning adults above the dam using the adult fish passage facilities.

The reintroduction of spring Chinook salmon above Cle Elum Dam would be coordinated with the YKFP. The YKFP is presently supplementing spring Chinook salmon in the basin using a complex, statistically rigorous experimental design to evaluate new supplementation techniques (Busack et al., 1997). Currently, all smolts produced at the Cle Elum Supplementation and Research Facility are fully allocated to the experimental design and cannot be used for reintroduction experiments at this time. Fish would be used when they become available. Spring Chinook salmon would be trapped at Roza Dam in the interim until completion of the adult collection facility at Cle Elum Dam. Those fish that can be identified as excess S-line hatchery fish would be transported to Cle Elum Reservoir and released. Any fish that enter the Cle Elum Dam fish trap would also be transported above Cle Elum Reservoir.

3.4.4 Summer Steelhead Salmon Reintroduction

Steelhead is an existing native, wild stock that is listed as threatened under the ESA. There are too few steelhead in the upper Yakima basin to include natural origin returning adults in a Cle Elum Dam reintroduction plan at this time. Efforts to improve steelhead status in the upper Yakima basin would focus on increasing the status and productivity of the existing steelhead population in the mainstem and tributaries downstream from storage reservoirs. The reintroduction plan would use offspring of kelts reconditioned under the existing Yakama Nation program.

ESA protocols involved in trapping and handling listed fish at both the juvenile and adult stages are a significant obstacle to active, “hands-on” supplementation. NMFS would be consulted before any steelhead adults that voluntarily enter the adult fish trap below Cle Elum Dam are handled or transported to the reservoir above the dam using trap-and-haul methods.

3.4.5 Other Native Fish

All native fish (i.e., bull trout, rainbow trout, cutthroat trout, whitefish, Pacific lamprey and suckers) that voluntarily enter the proposed Cle Elum Dam adult fish trap would be transported and released into Cle Elum Reservoir to reestablish a properly functioning ecosystem.

3.4.6 Facilities Needed

The following facilities would be needed to facilitate the fish reintroduction program:

- Permanent fish passage facilities at Cle Elum Dam (see Chapter 2), and
- Portable raceways for short-term acclimation.

Portable raceways would be used to acclimate and imprint coho, spring Chinook and/or steelhead presmolts to the area where they will return. Portable raceways would be used instead of constructing permanent facilities. The raceways would be aluminum and approximately 4 feet wide, 4 feet deep, and 20 feet long with an inflow spray bar and a 6-inch drain leading back to the river or reservoir. The raceways would be gravity or pump fed, allowing reservoir or river water to flow through. Acclimation usually lasts 1 to 4 months and occurs between December and March. Fish would be placed into the raceway and fed daily until they are released directly into the river or reservoir.

Approximately 5 to 10 portable raceways would be utilized. Their exact location is not known at this time, but they would generally be located in the Salmon la Sac area of the upper reservoir. The portable raceways would be removed from the reservoir or river when not in use.

3.4.6.1 Potential Fish Hatchery

In addition, it is possible that the fish reintroduction project would require a fish hatchery sometime in the future. Because of the uncertainty of the need for such a facility, it is described and analyzed at a programmatic level in this EIS. The hatchery would undergo detailed environmental review in the future if the project is carried forward. The proposed hatchery would be used to spawn and incubate up to 4 million sockeye eggs. The purpose of the hatchery would be to increase the overall survival of eggs to the fed fry stage. Egg survival increases by as much as 50 percent in a hatchery. The fish would be held at the hatchery until the fed fry stage sometime in late May or early June. They would then be transported to and directly released into the reservoir. Spawning of adults would be similar to the techniques used in the Okanogan River basin. Fish would be allowed to return to the spawning ground and then they would be trapped using a beach seine, sorted by sex and ripeness and eventually spawned on the bank of the river. The eggs and milt would then be transported to the hatchery for fertilization and incubated.

3.4.7 Estimated Costs

No specific estimates have been made for the annual OMR&P costs associated with the fish reintroduction project at this time because the level of effort associated with the project is not yet known. A general estimate is that the project would cost between \$300,000 and \$500,000 annually. A fish hatchery would cost \$10 to \$20 million if it were constructed. Estimated costs for annual operation of a hatchery are \$1 million.

3.5 Other Alternatives Considered but Eliminated from Further Study

The Yakama Nation and WDFW considered a number of other options for the fish reintroduction plan. These options are detailed in the Anadromous Fish Reintroduction Plan (Reclamation, 2005a) and the Sockeye Reintroduction Plan (WDFW and Yakama Nation, 2008). The Yakama Nation and WDFW also considered options to active fish reintroduction.

3.5.1 Fish Reintroduction without Fish Passage Facilities

Under this alternative, the Yakama Nation and WDFW would have developed a fish reintroduction plan even though no fish passage facilities would be constructed at Cle Elum Dam. This alternative was eliminated from further study because anadromous fish could not be reintroduced without upstream/downstream fish passage.

3.5.2 Fish Passage Facilities without Active Fish Reintroduction

Under this alternative, Reclamation would install fish passage facilities at Cle Elum Dam, but there would be no active fish reintroduction project. Existing fish populations in the basin would be allowed to recolonize or pioneer newly accessible upstream habitat. This alternative was determined to be unacceptable to fisheries comanagers because it does not meet the purpose and need of the project. It could take 15 to 20 years (three to four salmon generations) or more to realize significant use of habitat above the reservoir if fish reintroduction is not aided by human intervention. This is especially true for sockeye salmon which were extirpated from the basin. Currently, viable populations of Columbia Basin sockeye will not passively recolonize the upper Cle Elum basin because there is almost no chance of Lake Wenatchee or Lake Osoyoos (Okanogan River) strays migrating up the Yakima River. In the past 15 years, only three adult sockeye have been observed at the Roza Diversion Dam adult fish trap at RM 127.9.

3.6 Summary Comparison of Environmental Impacts of Alternatives

Table 3-1 summarizes the impacts associated with the No Action and Fish Reintroduction Project Alternatives. The phrase “short-term” refers to impacts associated with construction activities. The phrase “long-term” refers to impacts following the construction period. Additional information on impacts is provided in Chapter 6.

Table 3-1 Summary of impacts associated with Fish Reintroduction Project alternatives.

Resource	Alternative 1 No Action Alternative	Alternative 2 Fish Reintroduction Project
Water Resources	No impact.	<u>Short-term</u> : Minor increases in sedimentation during movement of raceways over banks. <u>Long-term</u> : Minor, temporary increase in ammonia and other effluent from portable raceways. <u>Beneficial</u> : None.
Fish	Removing the existing interim passage facilities and not installing new facilities would limit restoration opportunities in Yakima River basin. Potential decline of productivity in the Cle Elum, Cooper, and Waptus Rivers and Cle Elum Reservoir.	<u>Short-term</u> : None. <u>Long-term</u> : Potential interspecific competition, predation and other related factors within the fish community; potential introduction of pathogens. <u>Beneficial</u> : Reestablished populations upstream of the dam; additional food sources and nutrients for aquatic species; overall growth in ecosystem productivity and prey abundance.
Vegetation	Productivity of riparian areas and nearby forest communities would potentially be reduced when the current reintroduction project is discontinued and nutrients are no longer added to the system.	<u>Short-term</u> : None. <u>Long-term</u> : None. <u>Beneficial</u> : Potential increase in riparian and forest productivity due to introduction of additional nutrients.
Wildlife	Productivity of terrestrial wildlife species would potentially be reduced when the current reintroduction project is discontinued and nutrients are no longer added to the system.	<u>Short-term</u> : None. <u>Long-term</u> : None. <u>Beneficial</u> : Potential increase in terrestrial wildlife species productivity due to introduction of additional prey.
Threatened and Endangered Species		
Bull Trout	Continued reduction in historical habitat; inability to connect with downstream populations.	<u>Short-term</u> : None. <u>Long-term</u> : Potential interspecific competition for adfluvial population from reintroduced fish. <u>Beneficial</u> : Reconnecting populations and maintaining genetic diversity; increased productivity and prey resource; increased available habitat.
MCR steelhead	Continued reduction in historical habitat.	<u>Short-term</u> : None. <u>Long-term</u> : None. <u>Beneficial</u> : Reestablishment of species above the dam.

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Resource	Alternative 1 No Action Alternative	Alternative 2 Fish Reintroduction Project
Gray wolf Grizzly bear Canada lynx	Potential reduction in productivity due to a reduction in prey resources and ecosystem productivity/nutrient cycling.	<u>Short-term:</u> None. <u>Long-term:</u> None. <u>Beneficial:</u> If species are present in the area, potential increase in productivity due to increase in prey resources and ecosystem productivity.
Northern spotted owl	Potential reduction in productivity due to a reduction in prey resources and ecosystem productivity/nutrient cycling.	<u>Short-term:</u> None. <u>Long-term:</u> None. <u>Beneficial:</u> None.
Ute ladies'-tresses	Potential reduction in productivity due to a reduction in ecosystem productivity/nutrient cycling.	<u>Short-term:</u> None. <u>Long-term:</u> None. <u>Beneficial:</u> May benefit from increased ecosystem productivity.
State sensitive and candidate species	Potential reduction in productivity due to a reduction in prey resources and ecosystem productivity/nutrient cycling.	<u>Short-term:</u> None. <u>Long-term:</u> None. <u>Beneficial:</u> Potential increase in productivity due to increase in prey resources for some species; potential benefit from the increase in nutrient cycling in riparian areas from salmon carcasses.
Visual Resources	Removal of interim passage facilities would restore dam closer to original appearance.	<u>Short-term:</u> None. <u>Long-term:</u> Decomposing salmon carcasses may detract from aesthetics for some people. <u>Beneficial:</u> None.
Air Quality	No impact.	<u>Short-term:</u> None. <u>Long-term:</u> Minor periodic increases in vehicle emissions and fugitive dust when moving fish. <u>Beneficial:</u> None.
Climate Change	Continued loss of upstream habitat could make it harder for fish to withstand the impacts of climate change.	<u>Short-term:</u> None. <u>Long-term:</u> None. <u>Beneficial:</u> Improved conditions for fish should help them withstand the impacts of climate change.
Noise	No impact.	<u>Short-term:</u> None. <u>Long-term:</u> Minor truck noise increase when transporting fish. <u>Beneficial:</u> None.
Recreation	Potential reduction in recreational fishing opportunities in the basin.	<u>Short-term:</u> None. <u>Long-term:</u> None. <u>Beneficial:</u> Potential for improved wildlife viewing from enhanced aquatic and terrestrial productivity.
Land and Shoreline Use	No impact.	<u>Short-term:</u> None. <u>Long-term:</u> Increased fish abundance could result in increased land use regulation due to greater fish habitat value. <u>Beneficial:</u> None.
Utilities	No impact.	<u>Short-term:</u> None. <u>Long-term:</u> Slight increase in electric power demand from operation of pumps for raceways. <u>Beneficial:</u> None.

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Fish Reintroduction Project Alternatives

Resource	Alternative 1 No Action Alternative	Alternative 2 Fish Reintroduction Project
Transportation	Existing vehicle trips would be reduced when fish transport stops.	<u>Short-term</u> : None. <u>Long-term</u> : Minor increase in traffic from workers and trucks transporting fish. <u>Beneficial</u> : None.
Environmental Justice	No improvements to support subsistence use of natural resources.	<u>Short-term</u> : None. <u>Long-term</u> : None. <u>Beneficial</u> : Improved support for subsistence use of natural resources.
Cultural Resources	Removal of the temporary passage facilities would restore the dam closer to its original appearance.	Potential to impact buried resources from ground disturbance and compaction by raceways and potential disturbance by truck trips.
Indian Sacred Sites	No impact.	No impact.
Indian Trust Assets	No impact.	No impact.
Socioeconomics	No impact.	<u>Short-term</u> : None. <u>Long-term</u> : Small increase in sales, jobs, and labor income. <u>Beneficial</u> : Small increase in sales, jobs, and labor income.

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Chapter 4

AFFECTED ENVIRONMENTS

CHAPTER 4

AFFECTED ENVIRONMENT

4.1 Introduction

This chapter provides information about current resource conditions, or the affected environment, for each resource potentially impacted by the Cle Elum Dam Fish FP/FR Project.

4.2 Water Resources

This section describes the affected environment for both water quality and water supply in the project area.

4.2.1 Water Quality

Cle Elum Reservoir, the largest reservoir in the Yakima River basin, is located 8 miles northwest of the town of Cle Elum in the upper Yakima River basin. It was created by constructing a dam at the lower end of a natural glacial lake. The Cle Elum River watershed has over 500 miles of streams draining 231 square miles. Most streams above Cle Elum Reservoir are unregulated and free flowing (Haring, 2001). The Cle Elum River headwaters are in the Alpine Lakes Wilderness Area near Mount Daniel. The river flows south from the wilderness boundary and enters Cle Elum Reservoir. The dam releases water into the Cle Elum River, which flows into the Yakima River at RM 185.6. Major tributaries include the Cooper and Waptus Rivers.

Most of the upper Cle Elum River, upstream of Cle Elum Reservoir, is located in a steep, rocky canyon. The riverbed consists mainly of large boulders, cobbles, and gravels. Stream habitats are varied and include cascades, riffles, and pools suitable for spawning and rearing fish. Log jams and large woody debris (LWD) are abundant in the river channel. The river valley widens and the gradient is low where the Cle Elum River flows through the wide and shallow Tucquala (or Fish) Lake. The mixed conifer forests and alpine meadows bordering the river are relatively undisturbed except for the presence of a gravel road and light recreational activities such as hiking trails.

Limnological studies (a study of the biological, chemical, meteorological, and physical aspects of lakes) conducted by Reclamation have shown temperature stratification in Cle Elum Reservoir (Reclamation, 2007c). The outlet works for Cle Elum Dam drafts water from well below the full pool elevation. The reservoir has low productivity and is therefore considered oligotrophic (i.e.,

having low nutrient and high dissolved oxygen (DO) levels) (Lieberman and Grabowski, 2007; Rector, 1996).

A limnological study of Cle Elum Reservoir was conducted between September 2003 and October 2005 to improve the understanding of the physical, chemical, and biological conditions in the reservoir, to assess primary and secondary production, to determine if the present conditions would support introduced anadromous salmonids, and ultimately to determine to what extent anadromous fish can be restored to the basin (Lieberman and Grabowski, 2007). This study showed that Cle Elum Reservoir has water columns that mix twice each year (dimictic), with turnover occurring in or around April and October, and strong stratification occurring from July through September. The maximum temperatures occurred in July, and exceeded 16° C down to a depth of about 50 feet in Cle Elum Reservoir (Lieberman and Grabowski, 2007).

Cle Elum Reservoir is oligotrophic (nutrient-poor and oxygen-rich). As warmer temperatures occur, the water is able to hold less DO. This results in a warm surface layer (epilimnion) with lower DO concentrations than cooler deeper layers. At the deepest stations monitored during this study, Cle Elum Reservoir had a middle thermal layer (metalimnion) with a maximum DO concentration. This is typically caused by oxygen produced by algal populations that can develop more rapidly when they sink (Wetzel, 1983). The minimum DO measured in Cle Elum Reservoir was approximately 6.5 milligrams per liter (mg/L) near the bottom (Lieberman and Grabowski, 2007).

Cle Elum Reservoir's major limiting factors for anadromous fish production are low nutrient levels, chlorophyll *a* concentrations, phytoplankton and zooplankton populations, and total organic carbon (TOC) concentrations. Nutrient enrichment of the reservoir is considered a potential method to increase these parameters to support reintroduced populations of anadromous fish (Reclamation, 2005a). Cle Elum Reservoir is not currently listed on the Washington State 303(d) list of impaired waterbodies for any contaminants or parameters of concern such as temperature or dissolved oxygen (Ecology, 2008).

The Cle Elum River is 303(d)-listed for water temperatures that are higher than the standard acceptable levels for fish (Ecology, 2008). Downstream from the dam, higher water temperatures may be a result of dam impoundment and surrounding forest practices. However, above Cle Elum Reservoir higher water temperature in the upper reach of the Cle Elum River is more likely a result of water flowing slowly through warm, shallow Tucquala Lake (Reclamation, 2007c). Much of the upper Cle Elum watershed lies within the Alpine Lakes Wilderness Area and is therefore not affected by forest practices. Both Thorp Creek and the Cooper River, tributaries to the upper Cle Elum River, are also listed on the 303(d) list for temperature.

4.2.2 Water Supply

This section describes the operation of Reclamation's Yakima Project and operation of Cle Elum Dam. These operational requirements determine how much water is retained in and released from Cle Elum Reservoir.

4.2.2.1 Project Operations

Reclamation operates its five Yakima Project reservoirs in a coordinated manner to provide for the needs of the system as a whole. The releases from each reservoir are balanced to meet systemwide irrigation and water demands in conjunction with natural runoff and return flow available in the basin. No single reservoir is designated to supply the needs of one particular area, irrigation district, or Yakima Project division. The major storage facilities store runoff during the winter and spring/summer seasons. This water is released later during low-flow periods in the summer and fall seasons for irrigation.

Operational releases at Cle Elum Dam are affected by the presence of Chinook salmon redds in the Cle Elum River downstream from the dam. About 12 percent of the spring Chinook salmon redds in the upper Yakima River basin were found in the Cle Elum River in recent years, while about 50 percent of the redds were found in the Yakima River reach upstream of the mouth of the Cle Elum River to Easton Diversion Dam. The presence of redds downstream results in conflicting needs for the operational releases from the reservoirs.

Reclamation makes efforts to reduce the impacts of Yakima Project operations on fishery resources and to provide for appropriate water flows, while providing water for irrigation. Reclamation implements three atypical operational strategies beginning in late August each year. These are "Flip-Flop," "Mini Flip-Flop," and "KRD Canal Bypass" and are described below. Each of these operational schemes is designed to balance the need for irrigation water delivery with the protection of spring Chinook salmon redds in the upper arm of the Yakima River above Roza Diversion Dam.

Flip-Flop

The purpose of the flip-flop operation is to encourage spring Chinook salmon in the upper mainstem Yakima River above Roza Diversion Dam to spawn at lower river stage levels. This minimizes the river flows (and storage releases) required to keep the redds watered and protected during the subsequent incubation period (November through March). Flip-flop operation meets lower Yakima basin irrigation demands (below the confluence of the Naches River) primarily from storage in the upper mainstem Yakima River (above Roza Diversion Dam) during the summer months. Flows are reduced in the upper mainstem Yakima River during the latter part of the irrigation season. Late-season lower Yakima basin demands are then met primarily from Rimrock Reservoir on the Naches River.

Mini Flip-Flop

From mid-April through August, higher than normal flows persist in the Keechelus to Lake Easton reach in the upper Yakima River. In September and October, Keechelus Reservoir releases are reduced to approximately 10 percent or less of the irrigation demand and the remaining 90 percent of this demand is supplied through increased releases from Kachess Reservoir. Reduction in flows from Keechelus Reservoir provides suitable spawning flow in the Yakima River reach from Keechelus Reservoir to the upper end of Lake Easton. This minimizes the river flows (and Keechelus Reservoir storage releases) required to keep the redds watered and protected during the subsequent incubation period (November through March).

Kittitas Reclamation District (KRD) Canal Bypass

This operational strategy uses storage upstream of Easton Diversion Dam to supply some of the irrigation diversion demand in the lower Kittitas/Ellensburg valley, Roza Irrigation District, and flow demands below Roza Diversion Dam while maintaining target spawning flows in the Easton reach of the Yakima River. Instead of conveying this irrigation water in the Easton reach, this water is diverted into the KRD canal at Easton Dam and bypassed through the KRD canal and back into the river through the 1146 Wasteway beginning about September 1 and continuing until about mid-October when KRD's irrigation season ends. This allows the target flow below Easton Diversion Dam (about 200 cfs) to be maintained while releases from Keechelus and Kachess Reservoirs, totaling about 1,450 cfs, are continued for downstream demand.

4.2.2.2 Cle Elum Dam and Reservoir Operations

Cle Elum Reservoir is operated to meet irrigation demands, flood control, and instream flows for fish. The prime flood control season extends from mid-November through mid-June. Cle Elum Reservoir regulates about 20 percent of the entire runoff above Parker gage (RM 103.7). The reservoir has the largest storage capacity in the Yakima River basin and is the main resource for meeting the large irrigation demands in the lower Yakima River basin.

Water releases from Cle Elum Reservoir are greatest in July and August in order to meet most of the lower Yakima River basin diversion demands during these months. Late season irrigation demands (mid-September) are met primarily from Rimrock Reservoir. The 2,863 cfs median July/August release from Cle Elum Reservoir is reduced during the flip-flop operation to a minimum flow range of 200 to 300 cfs to support both spawning and irrigation demands on the upper Yakima River basin system. This allows Reclamation to meet a target flow of around 200 cfs in the Cle Elum River during winter for spring Chinook salmon incubation and early rearing. The 5 percent and 95 percent exceedance flows for reservoir releases are 3,319 cfs and 85 cfs, respectively.

The reservoir typically reaches its lowest elevation in September or October when the irrigation season ends. In the winter months, water is released to meet downstream demands and to maintain flood control space. In the spring, water is stored in the reservoir to regulate downstream flows for flood control and to store water for irrigation demands later in the year. The highest reservoir elevations generally occur in the May to July period depending on the annual water supply. Full pool is at elevation 2,240 feet.

4.3 Fish

Cle Elum Reservoir historically supported anadromous Chinook, summer steelhead, coho, and sockeye salmon as well as bull trout (Haring, 2001). Cle Elum Dam is currently a barrier to naturally returning anadromous fish passage. No anadromous fish are present in the reservoir or the Cle Elum River upstream of the dam, with the exception of some sockeye and coho that have been introduced in recent years, as noted below. Cle Elum Reservoir and its tributaries continue to provide habitat for a variety of native and nonnative resident fish. Native resident fish species are listed in Table 4-1. Introduced resident species include brown trout (*Salmo trutta*), brook trout (*Salvelinus fontinalis*), and lake trout (*Salvelinus namaycush*).

Table 4-1. Native resident (nonanadromous) fish species in Cle Elum Reservoir.

Common Name	Scientific Name
kokanee	<i>Oncorhynchus nerka</i>
bull trout (adfluvial)	<i>Salvelinus confluentus</i>
mountain whitefish	<i>Prosopium williamsoni</i>
pygmy whitefish	<i>Prosopium coulteri</i>
cutthroat	<i>Oncorhynchus clarki</i>
rainbow trout	<i>Oncorhynchus mykiss</i>
longnose	<i>Rhinichthys cataractae</i>
leopard dace	<i>Rhinichthys falcatus</i>
speckled dace	<i>Rhinichthys osculus</i>
chiselmouth	<i>Acrocheilus alutaceus</i>
reidside shiner	<i>Richardsonius balteatus</i>
peamouth	<i>Mylocheilus caurinus</i>
northern pikeminnow	<i>Ptychocheilus oregonensis</i>
largescale sucker	<i>Catostomus macrocheilus</i>
mountain sucker	<i>Catostomus platyrhynchus</i>
bridgelip sucker	<i>Catostomus columbianus</i>
burbot	<i>Lota lota</i>
threespine stickleback	<i>Gasterosteus aculeatus</i>
Paiute	<i>Cottus beldingi</i>
torrent sculpin	<i>Cottus rhotheus</i>
mottled sculpin	<i>Cottus bairdi</i>

The construction of a crib dam at Cle Elum Reservoir contributed to the extirpation (local extinction) of sockeye from the basin in the early 1900s. Later Reclamation constructed Cle Elum Dam, without fish passage facilities, effectively eliminating access to previously productive spawning and rearing habitat for sockeye salmon, coho salmon, spring Chinook salmon, and steelhead above the dam passage barrier (Bryant and Parkhurst, 1950; Davidson, 1953; Fulton, 1970; Mullan, 1986). Pacific lamprey (*Lampetra tridentata*) and western brook lamprey (*L. richardsoni*) were also eliminated above the dam. The lack of passage has also isolated local populations of bull trout, eliminating interconnectedness and the exchange of genetic material among populations. This could prevent the recolonization of bull trout populations.

In spring 2005, Reclamation constructed an interim downstream fish passage facility at Cle Elum Dam (Section 1.6.3). No upstream fish passage facilities have been installed. The interim fish passage facilities have allowed the Yakama Nation to reintroduce coho and sockeye salmon above the dam as part of the fish passage feasibility study.

The following sections describe those fish that are present in the Cle Elum River and/or Cle Elum Reservoir. Summer steelhead and bull trout are also present in the area. These species are listed under the ESA and are described in Section 4.6.

4.3.1 Sockeye

Sockeye salmon runs in the Yakima River basin were historically larger than any other runs in the Columbia River Basin in terms of numbers (Reclamation, 2008b). Historic Cle Elum Lake and the Cle Elum River historically supported sockeye salmon. Historic Cle Elum Lake was once an important habitat area for this species since juvenile sockeye salmon rear mainly in lakes (Reclamation, 2007b). The reintroduction of sockeye salmon into Cle Elum Reservoir began in 2009 with the release by the Yakama Nation of 500 pairs of adult sockeye (Wenatchee and Lake Osoyoos stocks) trapped at Priest Rapids Dam.

4.3.2 Coho

Although coho endemic to the Yakima River basin were extirpated from the basin in the early 1980s, natural reproduction of hatchery-reared coho is now occurring in both the Yakima and Naches Rivers. The Yakama Nation releases approximately 1 million coho smolts in the Yakima basin annually (Newsome, pers. comm., 2009).

Currently, coho salmon enter the Yakima River in the fall with about 10 to 20 percent of the adults reaching the upper watershed between Cle Elum and Easton in November and December. Spawning occurs soon afterward; the eggs incubate over the winter and hatch in the spring. After the fry emerge from the gravel, the

juveniles rear in the stream until the following spring when they outmigrate as 1-year-old smolts (Reclamation, 2008b).

Coho salmon are currently being reintroduced into Cle Elum Reservoir as part of the testing of the interim downstream passage facility. In 2005, small test groups of PIT-tagged coho salmon smolts were released directly into the passage facility. A large-scale test was conducted in 2006 with about 10,000 PIT-tagged smolts released from net pens near Cle Elum Dam. The test was successful with 617 coho salmon detected passing through the Chandler juvenile downstream passage facility below Prosser Dam (Reclamation, 2007a). Currently the Yakama Nation is releasing 500,000 spring fry and summer parr coho in addition to the smaller releases of smolts.

4.3.3 Spring Chinook

Spring Chinook salmon are reared at the Cle Elum supplementation facility as part of the YKFP supplementation project; there is also a natural component of the population that migrates further up the Yakima River. An estimated 12 percent of the adult natural spring Chinook salmon that spawn in the upper Yakima River basin spawn in the 8-mile reach of the Cle Elum River downstream from the dam (Reclamation, 2008b).

All Yakima River stocks of spring Chinook salmon exhibit an extensive downstream migration of pre-smolts in the late fall and early winter (Pearsons, et al., 1996; Berg and Fast, 2001). Most juvenile spring Chinook salmon in the upper Yakima River basin migrate downriver during the fall-winter period and overwinter in the Yakima River somewhere between Roza and Prosser Diversion Dams (Berg and Fast, 2001).

Adult spring Chinook salmon return to the upper mainstem Yakima River beginning in May. Adults migrate close to the area where they will spawn and find a place to hold in cover (deep water with woody debris or undercut banks or both) until they spawn in September and October. Depending on water temperature, the peak of spawning activity for spring Chinook salmon in the upper mainstem Yakima River is from September 15 to October 1 (Fast et al., 1991). Adults that spawn in the upper reaches of tributaries typically move into the tributaries by the end of June or early July when flows are still high enough for them to traverse the lower reaches of the tributaries. Some migrating adult fish will arrive early, prior to the time some tributary streams become intermittent in the summer and remain so until fall precipitation begins, to make it past the parts of the streams that eventually go dry for a period of time. Variability in run timing is influenced by high and low flows. Run timing for spawning runs of all salmon and steelhead is delayed during years of high flow and accelerated in years of low flow (Reclamation, 2008b).

4.3.4 Pacific Lamprey

Pacific lamprey are very rare in the Yakima River basin and little is known about their life history, historic distribution, or current limiting factors; therefore, reintroduction of this species is considered a long-term objective. The Yakama Nation is currently developing a reintroduction plan for this species and is considering areas above Cle Elum Dam.

4.4 Vegetation

Mixed conifer forests surround Cle Elum Reservoir, Cle Elum River, and their tributaries. The forest habitat is dominated by ponderosa pine (*Pinus ponderosa*) and Douglas fir (*Pseudotsuga menziesii*), with serviceberry (*Amelanchier alnifolia*), hazelnut (*Corylus cornuta*), bitterbrush (*Purshia tridentata*), snowberry (*Symphoricarpos albus*), Oregon grape (*Mahonia nervosa*), kinnikinnick (*Arctostaphylos uva-ursi*), balsamroot (*Balsamorhiza sp.*), lupine (*Lupinus sp.*), strawberry (*Fragaria sp.*), and a variety of native grasses in the understory. Within the rocky reservoir and river riparian areas, woody vegetation includes black cottonwood (*Populus balsamifera*), red alder (*Alnus rubra*), vine maple (*Acer circinatum*), big-leaf maple (*Acer macrophyllum*), rose (*Rosa sp.*), and spirea (*Spiraea sp.*).

The landscape is a mix of lush alpine meadows and dry Douglas fir and ponderosa pine forest in the upper portion of the watershed where the Cle Elum River flows through Tucquala Lake. In the vicinity of Cle Elum Dam, where construction activities are proposed, mixed conifer stands are the most common vegetation. Figures 4-1 to 4-4 illustrate the vegetation conditions at the proposed construction areas. On the east side of Cle Elum Dam in the vicinity of the proposed stockpile and staging areas, the habitat is characterized by young stands of ponderosa pine and Douglas fir with an understory of bitterbrush and kinnikinnick. Downstream in the area of the proposed adult collection facility is mid-aged Douglas fir with some ponderosa pine and lodgepole pine (*Pinus contorta*). There are some black cottonwoods on the shoreline of the river.

Threatened and endangered plant species are discussed in Section 4.6.



Figure 4-1. Habitat in the area proposed for the Alternative 2 adult collection facility. Most of the facility would be located in a natural opening with some trees removed.



Figure 4-2. Riparian vegetation removed for construction of the adult collection facility. This figure shows the Alternative 2 location of the adult collection facility.



Figure 4-3. Area downstream from Cle Elum Dam where the barrier dam would be constructed for Alternative 2.



Figure 4-4. Typical habitat in the vicinity of the proposed staging and stockpile area for the juvenile fish collection facility on the west side of the dam—young Douglas fir, ponderosa pine, and bitterbrush.

4.5 Wildlife

The forest and riparian habitat areas surrounding Cle Elum Reservoir and Cle Elum River are relatively undisturbed and provide high-quality habitat for a variety of native wildlife species (Table 4-2). Riparian areas are noted for having highly diverse plant and animal communities (Kauffman et al., 2001). Approximately 85 percent of Washington’s terrestrial vertebrate species use riparian habitat for essential life activities, and the density of wildlife in riparian areas is comparatively high (Knutson and Naef, 1997).

Riparian areas are used by many species including bear, deer, elk, heron, waterfowl, small mammals, reptiles, amphibians, cavity-nesting birds, raptors, and a variety of songbirds. Invertebrate species are also important in the Cle Elum River basin food web, for nutrient cycling, and as a food source for fish and wildlife species. Many wildlife species in the Cle Elum River basin have a food web relationship with salmon as primary or secondary consumers as described in the third column of Table 4-2.

Table 4-2. Common wildlife species in the Cle Elum River basin (Reclamation, 2008b).

Common Name	Scientific Name	Relationship to Salmon (Cederholm et al., 2001) ^{1, 2}
Mammals		
elk	<i>Cervus canadensis</i>	
mule deer	<i>Odocoileus hemionus</i>	
black bear	<i>Ursus americanus</i>	strong, consistent
coyote	<i>Canus latrans</i>	recurrent
red fox	<i>Vulpes vulpes</i>	indirect
cougar	<i>Puma concolor</i>	
bobcat	<i>Lynx rufus</i>	recurrent
martin	<i>Martes martes</i>	
beaver	<i>Castor canadensis</i>	
river otter	<i>Lontra canadensis</i>	strong, consistent
muskrat	<i>Ondatra zibethicus</i>	
mink	<i>Neovison vison</i>	
snowshoe hare	<i>Lepus americanus</i>	
northern flying squirrel	<i>Glaucomys sabrinus</i>	rare
golden-mantled ground squirrel	<i>Spermophilus lateralis</i>	
Douglas squirrel	<i>Tamiasciurus douglasii</i>	rare
yellow-bellied marmot	<i>Marmota flaviventris</i>	
bushy-tailed woodrat	<i>Neotoma cinerea</i>	
yellow pine chipmunk	<i>Tamias amoenus</i> ,	
vagrant shrew	<i>Sorex vagrens</i>	
water shrew	<i>Sorex alaskanus</i>	recurrent
deer mouse	<i>Peromyscus maniculatus</i>	rare
Reptiles and Amphibians		
Cascades frog	<i>Rana cascadae</i>	

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Common Name	Scientific Name	Relationship to Salmon (Cederholm et al., 2001) ^{1, 2}
Pacific tree frog	<i>Hyla regilla</i>	
western toad	<i>Bufo boreas</i>	
northern long-toed salamander	<i>Ambystoma macrodactylum</i>	
western skink	<i>Eumeces skiltonianus</i>	
northern alligator lizard	<i>Elgaria coerulea</i>	
rubber boa	<i>Charina bottae</i>	
garter snake	<i>Thamnophis sirtalis</i>	indirect
Birds*		
mallard	<i>Anas platyrhynchos</i>	rare
green-wing teal	<i>Anas carolinensis</i>	
wood duck	<i>Aix sponsa</i>	
Barrows goldeneye	<i>Bucephala islandica</i>	recurrent, indirect
common merganser	<i>Mergus merganser</i>	strong, consistent
hooded merganser	<i>Lophodytes cucullatus</i>	indirect
bufflehead	<i>Bucephala albeola</i>	
bald eagle	<i>Haliaeetus leucocephalus</i>	strong, consistent indirect
northern goshawk	<i>Accipiter gentilis</i>	
sharp-shinned hawk	<i>Accipiter striatus</i>	
Cooper's hawk	<i>Accipiter cooperii</i>	
red-tailed hawk	<i>Buteo jamaicensis</i>	indirect
American kestrel	<i>Falco sparverius</i>	
osprey	<i>Pandion haliaetus</i>	strong, consistent
northern pygmy owl	<i>Glaucidium passerinum</i>	
northern saw whet owl	<i>Aegolius acadicus</i>	
northern flicker	<i>Colaptes auratus</i>	
pileated woodpecker	<i>Dryocopus pileatus</i>	
red-breasted nuthatch	<i>Sitta canadensis</i>	
evening grosbeak	<i>Coccothraustes vespertinus</i>	
black-headed grosbeak	<i>Pheucticus melanocephalus</i>	
western tanager	<i>Piranga ludoviciana</i>	
American robin	<i>Turdus migratorius</i>	rare
black-capped chickadee	<i>Poecile atricapilla</i>	
American dipper	<i>Cinclus mexicanus</i>	recurrent, indirect
spotted sandpiper	<i>Actitis macularia</i>	indirect
common nighthawk	<i>Chordeiles minor</i>	
olive-sided flycatcher	<i>Contopus cooperi</i>	
Pacific-slope flycatcher	<i>Empidonax difficilis</i>	
song sparrow	<i>Melospiza melodia</i>	
turkey vulture	<i>Cathartes aura</i>	recurrent

*Note that many more birds than are listed here are common in the Cle Elum River basin.

¹ Relationship to Salmon – Definitions:

Strong, consistent – The relationship with salmon is direct and routine, the species feeds on salmon or salmon eggs. Salmon play (or historically played) an important role in this species distribution, viability, abundance, and/or population status.

Recurrent – The relationship with salmon is direct and routine, though occasional and localized in nature. While the species may benefit from this relationship, it is generally not considered to affect the distribution, abundance, viability, or population status of this species. The percent of salmon in the diet may vary from 5 percent to over 50 percent, depending on the location and time of year.

Indirect – The relationship with salmon is as a secondary consumer and is routine. For example, species feed on wildlife species that feed on salmon or salmon eggs or they feed on insects that are affected by the nutrients of salmon carcasses. The role of carcass-derived nutrient cycling on lentic system riparian and wetland vegetation, and subsequent links to wildlife, is not included in this relationship.

Rare – Salmon play a very minor role in the diet of these species, often amounting to less than 1 percent of the diet. Typically, salmon are only consumed on rare occasions, for instance during a shortage of usual food sources.

² Blank indicates no known relationship

Threatened and endangered wildlife species and State priority species are discussed in Section 4.6.

4.6 Threatened and Endangered Species

Table 4-1 lists the Federal and State threatened and endangered species, and State priority species that may occur in the project area. The Federal species lists were obtained from the Service and NMFS in October 2009.

The WDFW was also consulted for information about State listed species in the project area. The WDFW priority species that have been identified in the Cle Elum River basin include grizzly bear (*Ursus arctos*), Larch Mountain salamander (*Plethodon larselli*), northern goshawk, merlin (*Falco columbarius*), bald eagle, Harlequin duck (*Histrionicus histrionicus*), and northern spotted owl (*Strix occidentalis*) (WDFW, 2009b). Other priority species, such as white-headed woodpecker (*Picoides albolarvatus*), pileated woodpecker, great blue heron (*Ardea herodias*), and common loon (*Gavia immer*), are also known to occur in the Yakima River basin and are expected to occur in the Cle Elum River basin. WDFW priority habitats in the project area include riparian, elk, and mountain goat habitat (WDFW, 2009b).

These species are discussed following Table 4-3.

Table 4-3. Federally and State-Listed Endangered, Threatened, Sensitive and Candidate Species that may occur in the Cle Elum River basin.

Species	Scientific name	Federal Status*	State Status*
Federally Listed and Candidate Species			
bull trout	<i>Salvelinus confluentus</i> – Columbia River DPS	T, CH	C
steelhead	<i>Oncorhynchus mykiss</i> – Middle Columbia River DPS	T, CH	C
gray wolf	<i>Canis lupus</i>	E	E
grizzly bear	<i>Ursus arctos horribilis</i>	T	E
Canada lynx	<i>Lynx canadensis</i>	T, CH	T
northern spotted owl	<i>Strix occidentalis caurina</i>	T, CH	E
Ute ladies'-tresses	<i>Spiranthes diluvialis</i>	T	E
fisher	<i>Martes pennati</i> – West Coast DPS	C	E
State Designated and Federal Species of Concern			
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	SC	C
wolverine	<i>Gulo gulo</i>	SC	C
bald eagle	<i>Haliaeetus leucocephalus</i>	SC	S
northern goshawk	<i>Accipiter gentilis</i>	SC	C
peregrine falcon	<i>Falco peregrinus</i>	SC	S
Rocky Mountain tailed frog	<i>Ascaphus montanus</i>	SC	C
western toad	<i>Bufo boreas</i>	SC	C
sharp-tailed snake	<i>Contia tenuis</i>	SC	C
Larch Mountain salamander	<i>Plethodon larselli</i>	SC	S
black-backed woodpecker	<i>Picoides arcticus</i>		C
flamulated owl	<i>Otus flammeolus</i>		C
golden eagle	<i>Aquila chrysaetos</i>		C
Lewis' woodpecker	<i>Melanerpes lewis</i>		C
merlin	<i>Falco columbarius</i>		C
pileated woodpecker	<i>Dryocopus pileatus</i>		C
white-headed woodpecker	<i>Picoides albolarvatus</i>		C
Great blue heron	<i>Ardea herodias</i>		M
common loon	<i>Gavia immer</i>		S
Thompson's chaenactis	<i>Chaenactis thompsonii</i>		S
western ladies tresses	<i>Spiranthes porrifolia</i>		S

*E = Endangered; T = Threatened; C = Candidate; CH = Critical habitat has been designated for this species; S = Sensitive; SC = Species of Concern; M = monitor species.

4.6.1 Bull Trout

In June 1998, the Service listed the Columbia River basin “distinct population segment” (DPS) of bull trout as threatened under the ESA (63 FR 31647). The Service identified eight subpopulations in the Yakima River basin, which include isolated populations in Cle Elum Reservoir; this population appears to be very low. Bull trout require cold, clear water with stable channels and adequate cover (Thurow, 1987; Ziller, 1992). Critical habitat for bull trout was designated in 2005 and includes the Cle Elum River (70 FR 56212) from the confluence with the Yakima River upstream to the downstream side of the spillway at Cle Elum

Reservoir, several small segments of the Cle Elum River above the reservoir, and some portions of Cle Elum River tributary streams above the reservoir. Currently, the Cle Elum Reservoir is not included within designated critical habitat; however, critical habitat designations are currently under review and the reservoir is proposed for designation (deLavernne, 2009).

Bull trout occurred historically throughout most of the Yakima River basin. Today, however, they are fragmented into relatively isolated populations. Although bull trout were probably never as abundant as other salmonids in the basin—due in part to their requirements for cold, clear water—they were likely more abundant and more widely distributed than they are today (WDFW, 1998).

Three bull trout life history forms are present in the Yakima River basin: adfluvial (migrate to lakes), fluvial (migrate to rivers), and resident. Adfluvial and fluvial fish reside in lakes and mainstem rivers, respectively, during part of the year. Fry and juveniles rear in their natal streams for 1 to 4 years before migrating downstream into lakes or mainstem river systems. Adults migrate back into tributary streams to spawn, after which they return to the lake or river. The resident life history form resides in a particular stream for its entire life cycle.

An adfluvial population could still be present in Cle Elum Reservoir; however, no spawning population has been documented in the upper Cle Elum basin. Adfluvial bull trout may have been replaced by non-native lake trout, which have been naturally reproducing in Cle Elum Reservoir since being stocked in the 1920s. A fluvial population is present in the mainstem Yakima River although few bull trout have been recorded in the mainstem above Roza Diversion Dam. Bull trout are late summer/early fall spawners and most spawning activity in the Yakima River basin, irrespective of life history form, occurs from early September through early October. However, spawning may occur as early as August or as late as mid-October to early November. For the migratory life history forms, the spawning migration can begin as early as mid-July when adults move upstream to hold in deep pools, or it may occur just prior to spawning.

Bull trout do not spawn in the river below Cle Elum Dam (WDFW, 2009c). Fluvial juveniles and subadult bull trout may rear in the area, but this use has not been documented.

The primary downstream migration period for juvenile bull trout from their natal tributaries into lakes or rivers occurs from June through November. The early summer migration appears to be in response to increased flows and may correspond with a switch in prey from invertebrates to fish. The fall migration appears to be primarily in response to decreasing water temperatures and the need to find suitable overwintering habitat (Fraley and Shepard, 1989; Murdoch, 2002).

4.6.2 Middle Columbia River Steelhead

The steelhead population in the Yakima River basin is a component of the MCR DPS steelhead that was listed as threatened in 1999 (64 FR 14517). Four genetically distinct spawning populations of wild steelhead have been identified in the Yakima River basin, one of which spawns in the upper Yakima River and its tributaries (Phelps, et al., 2000). Critical habitat was designated for the MCR steelhead and includes the Cle Elum River downstream from Cle Elum Dam (70 FR 52630).

Currently, no steelhead occur upstream of Cle Elum Dam. Small numbers of steelhead may spawn in the Cle Elum River downstream from the dam.

Adult MCR steelhead return to the upper Yakima River between September and May. Generally, adult MCR steelhead migration into the Yakima River basin begins in late summer and peaks in late-October and again from late February or early March following a relatively inactive period during the coldest winter water temperatures. Typically, steelhead spawn earlier in the warmer waters of lower-elevation areas rather than in the colder waters of higher-elevation areas. Overall, most spawning occurs between March and May (Hockersmith et al., 1995), although WDFW personnel have observed steelhead spawning as late as July in the Teanaway River (RM 176.1), a tributary to the upper Yakima River.

Yakima River basin steelhead are tributary spawners, with most spawning occurring in the complex, multichannel reaches of those tributaries with a moderate gradient of about 1 to 4 percent (Berg and Fast, 2001). Juvenile steelhead emerge from the gravel between June and August and rear in the areas near where they were spawned for 2 to 4 years before migrating to the sea. Juvenile steelhead utilize tributary and mainstem reaches throughout the Yakima River basin as rearing habitat and use faster and deeper water as they grow. Some downstream movement begins in November, but the peak of the smolt outmigration occurs between mid-April and May.

4.6.3 Gray Wolf

The gray wolf (*Canis lupus*) is a Federal and State endangered species. The gray wolf is a wide-ranging carnivore, using a variety of habitats. Their primary prey includes deer and elk. Historic habitat for this species occurs in the proposed project areas; however, none have been recorded by WDFW in the Cle Elum Reservoir area (WDFW, 2009a). Wolves tend to move away from areas with high road densities (Mech et al., 1988; Mech and Boitani, 2003). The project area has a fairly high road density, which reduces the likelihood of this species occurring on a regular basis. Gray wolves occasionally forage on spawning salmon and salmon carcasses, but it is not a main food source for wolves (Cederholm et al., 2001).

4.6.4 Grizzly Bear

The grizzly bear (*Ursus arctos horribilis*) is a Federal threatened and State endangered species. Grizzly bears are wide-ranging and feed on roots, berries, ants, grubs, carrion, small mammals, and ungulates. Suitable habitat existed in the Cle Elum Reservoir area historically, but fairly high road densities, development, and increased human use have decreased the quality of the habitat in the area. Grizzly bear observations have been recorded in the vicinity of Cle Elum Reservoir (WDFW, 2009a). Small numbers of this species may also be found in other areas of the Cle Elum River basin. Grizzly bears have a strong and consistent relationship with salmon as they will forage heavily on spawning salmon and salmon carcasses (Cederholm et al., 2001).

4.6.5 Canada Lynx

In March 2000, the Service listed the Canada lynx (*Lynx canadensis*) as threatened under the ESA. Canada lynx are known to occur in several western and northern tier states including Washington. The life history and habitat requirements of Canada lynx are described in detail in the *Endangered and Threatened Wildlife and Plants: Determination of Threatened Status for the Contiguous U.S. Distinct Population Segment of the Canada Lynx and Related Rule; Final Rule* (Service, 2000) and is summarized in the following paragraphs.

In Washington, resident lynx populations were historically found in the northeast and north-central regions and along the east slope of the Cascade Mountains. In the West, the distribution of the lynx is associated with subalpine coniferous forest. Within these general forest types, lynx are most likely to persist in areas that receive deep snow, for which the lynx is highly adapted. Most of the lynx occurrences are in the 4,920- to 6,560-foot elevation class. The WDFW Priority Habitat and Species (PHS) data do not indicate any documented occurrences of Canada lynx in the project area. If present in the Cle Elum basin, they are most likely to occur at higher elevations.

4.6.6 Northern Spotted Owl

The northern spotted owl (*Strix occidentalis caurina*) was listed as a threatened species by the Service in 1990, primarily due to widespread habitat loss and inadequate protective mechanisms. It is listed by the State as endangered due to its sharp decline in recent years in Washington State. Spotted owls generally rely on older forested habitats because such forests contain the structures and characteristics required for nesting, roosting, and foraging. Features that support nesting and roosting typically include a moderate-to-high canopy closure (60 to 90 percent); a multilayered, multispecies canopy with large overstory trees (with diameter at breast height of greater than 30 inches); a high incidence of large trees with various deformities (large cavities, broken tops, mistletoe infections, and other evidence of decadence); large snags; large accumulations of fallen trees and other woody debris on the ground; and sufficient open space below the canopy for

spotted owls to fly (Thomas et al., 1990). Forested stands with high canopy closure also provide thermal cover (Weathers et al., 2001) and protection from predators. Spotted owls forage on wood rats, mice, bats, and occasionally small birds, moths, crickets, and large beetles. They are not known to be a primary or secondary consumer of salmon (Cederholm et al., 2001).

Critical habitat for northern spotted owl is found near Cle Elum Reservoir and Cle Elum River (WDFW, 2009a). The southern half of Cle Elum Reservoir lies within a proposed Conservation Support Area (CSA) as discussed in the 2008 Final Recovery Plan (Service, 2008). CSAs are existing land-use allocations that benefit spotted owls and are intended to support the dry-forest landscape management approach for recovery of northern spotted owl in the fire-dominated eastern Cascades.

Reproducing pairs of spotted owls have been observed in the Cle Elum Reservoir area; however, none of the reproducing pairs were observed within 1 mile of the alternatives discussed in this document. The closest documented occurrence is 1.8 miles away, which was a historical observation made in 1993. The most recent documented occurrence is 3.6 miles away, which occurred in 2005 (WDFW, 2009a).

4.6.7 Ute Ladies'-tresses

Ute ladies'-tresses (*Spiranthes diluvialis*) is a species within the orchid family that was federally listed as a threatened species on January 17, 1992 (50 CFR Part 17) due to habitat loss or modification, small population size, and low reproductive rate (Service, 1992). Ute ladies'-tresses are found in moist soils near riparian areas, lakes, moderately moist (mesic) to wet meadows, river meanders, and perennial spring habitats. This plant generally occurs within an elevation range between 1,500 and 7,000 feet, with the lower elevations in the western part of its range. The orchid generally occurs below montane forests, in open areas of shrub or grassland, or in transitional zones. It is considered a lowland species, typically occurring near streams and rivers. The plant is not found on steep mountainous parts of a watershed, or out in the flats along slow meandering streams. This species tends to occupy grass, rush, sedge, and willow sapling dominated openings.

Ute ladies'-tresses were discovered in Washington State for the first time in Okanogan County in 1997. It was also found near the Chief Joseph Dam in Chelan County (Service, 2009). At present, there are no known populations of Ute ladies'-tresses within the project area at Cle Elum Reservoir (Washington Natural Heritage Program, 2008; 2009); however, potential habitat for this species is present.

4.6.8 Fisher

The fisher (*Martes pennati*) is a State endangered and Federal candidate species. The fisher is a medium-sized mammalian carnivore that feeds on a variety of small- to medium-sized mammals, birds and carrion. It inhabits dense coniferous forest with extensive and continuous canopy. It uses riparian areas and ridgelines as movement corridors. Fisher populations have declined because of overtrapping, predator control, and habitat alteration. The presence of this species in the proposed project area at Cle Elum Reservoir has not been confirmed, though there are several sightings on record in the Naches Ranger District to the southwest (U.S. Forest Service (USFS), 2006). Fishers will eat salmon carcasses on rare occasions, but this is not a regular part of their diet (Cederholm et al., 2001).

4.6.9 State Sensitive and Candidate Species

In addition to the Federal- and State-listed species discussed above, several other wildlife species that occur in the Cle Elum River basin are State sensitive and candidate species (Table 4-3).

The bald eagle is a State sensitive and Federal species of concern. Bald eagles have a strong and consistent relationship with salmon as they feed directly on spawning salmon and salmon carcasses. They also have an indirect relationship with salmon because they sometimes feed on birds and mammals that feed on salmon and salmon eggs (Cederholm, et al., 2001).

The common loon, a State sensitive species, forages on young salmon while they rear in fresh water (Cederholm, et al., 2001).

The golden eagle, a State candidate species, will occasionally forage on spawning salmon and salmon carcasses. The wolverine, another State candidate species, will on rare occasions feed on salmon carcasses (Cederholm, et al., 2001).

Other State candidate species in Table 4-3 do not have known relationships with salmon as primary or secondary consumers, though some may occasionally be considered secondary consumers. For instance, tailed frogs and big-eared bats may sometimes forage on insects that derive their nutrients from salmon carcasses. The candidate woodpecker species in Table 4-3 likely have the least direct relationship with salmon as they forage mainly on insects that feed on wood. However, all species may be influenced to some degree by the increase in nutrients in riparian areas from salmon carcasses.

Two State sensitive plant species have been recorded in the Cle Elum River basin in recent years, western ladies tresses and Thompson's chaenactis. Neither plant species is likely to have a relationship with salmon. Though western ladies tresses do grow along streams, the mapped location for this species in the Cle

Elum River basin is not near a stream or river with potential salmon access (WDNR, 2009). Thompson's chaenactis grows on dry rocky slopes and ridges.

4.7 Visual Resources

Cle Elum Reservoir was originally a natural glacial lake located within a U-shaped glacial valley of the Cle Elum River. The water levels of Cle Elum Reservoir change throughout the year. The reservoir is generally full in late spring and early summer, but is drawn down for irrigation starting in the spring. The reservoir does not refill until the following spring. This leaves large areas of exposed shorelines from late summer through the winter. Stumps from trees that were logged before the dam was constructed are exposed. In dry years, the reservoir may not completely fill and the upper portions of the reservoir are exposed year-round.

The visual setting for Cle Elum Reservoir provides a perceived "natural" landscape with limited development along the shores. Viewers of the reservoir are primarily recreationists and seasonal residents. Background views are forested with patches of logged hillsides, valley walls, ridges, and mountains beyond. Pine and Douglas fir trees dominate the vegetation. Development adjacent to the reservoir is generally limited to USFS roads on the east and west shore, boat launches, campgrounds, and cabins. Year-round residences and resorts are more common south of the reservoir.

The lands around Cle Elum Reservoir are within the Wenatchee National Forest. The USFS manages these lands principally as scenic viewsheds according to its 1990 Wenatchee National Forest Plan (USFS, 1990). The USFS management direction for scenic viewsheds containing dams and reservoirs is described in terms of Visual Quality Objectives (VQOs). The VQOs describe the degree of acceptable alteration of the undisturbed landscape (USFS, 1974 in Reclamation, 2008b). The USFS's land allocation for the Cle Elum valley (and the reservoir) is Scenic Travel 1 -Retention VQO (Jackson, 2008 in Reclamation, 2008b). Visual quality is to be considered as one of the most important resources to be protected under this land allocation (USFS, 1990).

In 1995, the USFS developed the Scenery Management System (U.S. Department of Agriculture (USDA) 1995) for integrating scenic values and landscape aesthetics in Forest Plans. The scenic integrity or intactness of national forest lands is the means by which proposed alterations to the land are evaluated. Scenic Integrity Levels (SILs) are established for each Management Area ranging from Very High, meaning the landscape is unaltered, to Low, meaning moderate alterations are apparent on the landscape. The SIL for lands around Cle Elum Reservoir is High, meaning the landscape appears intact (Reclamation, 2008b). The visual resource analysis in this EIS references both the VQO and the SIL of

the study area. Table 4-4 describes the relationship between VQOs and SIL as contained in the Scenery Management System (USDA, 1995).

Table 4-4. Relationship between Visual Quality Objectives and Scenic Integrity Levels¹.

SIL/VQO	Condition	Perception, Degree of Deviation
High/Retention	Appears Unaltered	Not Evident. Deviations may be present but must repeat form, line, color, and texture of characteristic landscape in scale.

Source: USDA 1995, 2-4.

¹ VQO and SIL presented as allocated for Cle Elum Reservoir.

The lands around the reservoir are also part of the Mountains to Sound Greenway National Scenic Byway, which is designated as a Washington State Scenic Byway. This designation is based on the route’s outstanding scenic character and environmental experiences.

4.8 Air Quality

4.8.1 Air Quality Standards and Regulations

The Environmental Protection Agency (EPA) has developed standards for air pollutant levels, called the National Ambient Air Quality Standards (NAAQS). Each State is also responsible for protecting air quality by developing a State Implementation Plan (SIP) to maintain or improve air quality. In their SIPs, states are required to address the EPA’s Prevention of Significant Deterioration requirement. Prevention of Significant Deterioration applies to new major sources or major modifications at existing sources of pollutants where the area the source is located is in attainment or unclassifiable with the NAAQS. SIPs must also address visibility within federally designated Class I areas, where good air quality is deemed to be of national importance (Section 162 Clean Air Act, August, 1977, defines Class I areas). The Alpine Lakes Wilderness Area, at the headwaters of the Cle Elum River, is a Class I area (USFS, no date).

Under the provisions of the Clean Air Act, Government entities must maintain levels of pollutants of concern below the NAAQS. “Nonattainment areas” are defined as areas that do not meet the national primary or secondary ambient air quality standard for a pollutant, or that contribute to ambient air quality in a nearby nonattainment area. Areas that meet the national primary or secondary ambient air quality standard for pollutants are designated as “attainment areas.”

Mobile air emission sources (such as construction equipment and maintenance trucks) are regulated separately under the Federal Clean Air Act, including

vehicle inspection and maintenance programs, and are not included when determining if a pollution source must go through permitting.

Projects that require earthwork or otherwise have the potential to create fugitive dust are required to use best management practices (BMPs) to control dust at the project site. According to WAC 173-400-300, fugitive air emissions are emissions that “do not and which could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening.” These emissions include fugitive dust from unpaved roads, construction sites, and tilled land. Fugitive emissions are considered in determining the level of air permitting required only for a certain subset of sources, not including this type of proposed project. However, pursuant to WAC 173-400-040(8)(a): “The owner or operator of a source of fugitive dust shall take reasonable precautions to prevent fugitive dust from becoming airborne and shall maintain and operate the source to minimize emissions.”

4.8.2 Existing Air Quality Conditions

Kittitas County is not currently designated as a nonattainment area for any of the pollutants of concern listed in the Clean Air Act (Ecology, 2009b). As a result, Kittitas County is in attainment for all criteria pollutants. Because of the sparse population and rural nature of most of the County, existing sources of air pollution are minimal.

Sources of existing air pollutants in the project area are generally limited to vehicle emissions. Forest fires on the dry, eastern side of the Cascade Range are another source of occasional air pollution. Wood smoke contains carbon monoxide, formaldehyde, nitrogen oxides and particulates. Fugitive dust and combustion emissions are generated in the area by vehicles traveling on gravel or dirt roads, construction, and other activities that disturb the soils and utilize combustion engines. Air pollution from urban centers west of the Cascades can also enter the Cle Elum River valley during certain weather conditions.

4.9 Climate Change

Climate studies indicate that temperatures in the Pacific Northwest have increased over historic records and that spring snowpack has declined (Mote et al., 2003; Rauscher et al., 2008; Purdue University, 2008). There is consensus in recent studies that climate change has the potential to significantly alter the temperature, amount and timing of runoff, fish and wildlife habitat and the agricultural economy in the Yakima River basin. Additional information on climate change studies related to the Yakima basin can be found in Section 4.2.2.6 of the *Yakima River Basin Water Storage Feasibility Study Final Planning Report/EIS* (Reclamation, 2008a), which is incorporated by reference into this DEIS.

Ecology and the Washington State Department of Commerce (formerly Community, Trade, and Economic Development) recently worked with the University of Washington's Climate Impacts Group (CIG) to assess impacts of climate change in Washington. The studies were authorized through the 2007 House Bill 1303 and EO 07-02. The CIG (2009) released its assessment of the changes associated with global warming, including impacts to public health, agriculture, forestry, infrastructure, and water supply and management, in early 2009. Key temperature and precipitation findings for the Yakima River basin included:

- An increase in average annual temperature of 2.0° C (1.5-5.2° F) by the 2040s and an increase in water temperatures.
- A 38- to 46-percent decline in spring snowpack by the 2040s. Streams and rivers would experience higher extreme streamflows—more frequent periods of high flow in the winter and more frequent periods of low flow in the summer. Flooding that historically has occurred in some parts of the Yakima River basin every 20 years, on average, is expected to occur up to 50 percent more frequently by 2040.

The CIG study is based on scenarios developed by the Intergovernmental Panel on Climate Change. Many scientists now recognize that emissions are rising faster than these scenarios anticipate, and that temperatures and precipitation patterns will likely change more dramatically.

The study predicts that summer reservoir storage would decline and winter storage would increase. Historically, Cle Elum Reservoir has had a 33-percent probability of dropping below 10 percent of capacity in any year; in 2040 that probability is predicted to rise to 63 to 76 percent. Reservoir storage at Cle Elum is predicted to increase in winter months, but decrease in summer months.

Climate change would have a minimal effect on senior water rights, but would likely have a significant effect on junior water rights. The probability that junior water rights would be prorated is predicted to increase from its current level of 30 percent to a range of 65 to 74 percent by 2040. Water deliveries are predicted to drop from current rates of 10 percent to below 50 percent an estimated 18 to 24 percent of the time in 2040.

Changes in water availability and carbon dioxide levels due to climate change would affect agricultural production, including a projected decline in cherry and apple crop values and yields. This could result in an estimated loss of \$25 million in total annual apple and cherry crop value by 2040. Stockle et al. (2009) and the CIG also looked more broadly at the potential effects on agriculture in greater eastern Washington and concluded that there would be a range of positive and negative effects on agriculture, and that the effects would depend on measures taken to adapt.

Higher temperatures are expected to interfere with salmon migration, elevate the risk of disease, and increase mortality for both adult and juvenile fish. Increases in the frequency and intensity of winter flooding are expected to have a negative effect on the survival of juvenile coho, Chinook salmon, sockeye salmon, and steelhead. Reductions in spring snowmelt and flows during the summer and fall may have a negative effect on the migrations of salmon populations, including summer-run steelhead, sockeye, and summer Chinook. Extreme thermal stress and thermal barriers to migration are projected to persist for 10 to 12 weeks, from mid-June to early September, in the upper Yakima River. Low flows may also negatively affect the supply of suitable rearing habitat for Chinook, coho, and steelhead, and the supply of spawning habitat for salmon populations that spawn in early fall.

4.10 Noise

Noise can be defined as unwanted sound. However, sound is measurable, whereas noise is subjective. The relationship between measurable sound and human irritation is the key to evaluating noise impact. There are several ways to measure noise, depending on the source of the noise, the receiver, and the reason for the noise measurement.

A decibel (dB) is the unit used to describe the amplitude of sound. Noise levels are stated in terms of decibels on the A-weighted scale (dBA). This scale reflects the response of the human ear by filtering out some of the noise in the low- and high-frequency ranges that the ear does not detect well. The A-weighted scale is used in most noise ordinances and standards.

The dBA scale is logarithmic. Therefore, individual dBA ratings for different sources cannot be added directly to calculate the sound level for combined sources. For example, two sources, each producing 50 dBA will, when added logarithmically, produce a combined noise level of 53 dBA.

Noise effects in humans can be physical or behavioral. The mechanism for chronic exposure to elevated sound levels leading to hearing damage is well established. The elevated sound levels cause trauma to the cochlear structure in the inner ear, which gives rise to irreversible hearing loss. Hearing loss can begin to occur with prolonged exposure at 85 dB. For context, normal conversation is approximately 60 dB, and the noise from heavy city traffic can reach 85 dB. Motorcycles, firecrackers, and small firearms, all emit sounds from 120 to 150 dB (NIDCD, 2008). Noise pollution also constitutes a significant factor of annoyance and distraction.

Animals can hear noise with frequencies at levels above or below the range of human hearing. Some animals have the ability to move their ears or have ears that are shaped to allow the animal to localize the direction from which the noise

was generated. Little is known about how animals hear, but it is widely accepted that, in general, most animals have better hearing than humans.

Different species of animals respond to noise in different ways and even individuals within the same species can show varying responses to noise. An animal's response to noise is complicated and depends upon a number of factors including noise level and frequency, distance from the source, duration of the event, equipment type and condition, frequency of exposure to noisy events over time, topography, slope, time of day, reproductive status, hearing sensitivity, weather, and behaviors exhibited during the noise event (Delaney and Grubb, 2003).

4.10.1 Noise Standards and Regulations

State, county, and local noise regulations specify standards that restrict both the level and duration of noise measured at any given point. The maximum permissible environmental noise levels depend on the land use of the property that contains the noise source (i.e., industrial, commercial, or residential) and the land use of the property receiving the noise.

Cle Elum Reservoir and Dam are located in Kittitas County which has no noise regulations; therefore, the Washington State regulations apply to the project. WAC 173-60 establishes limits on the levels and duration of noise crossing property boundaries. Allowable maximum sound levels depend on the zoning of the noise source and the zoning of the receiving property. The WAC 173-60-040 establishes maximum permissible environmental noise levels. These levels are based on the Environmental Designation for Noise Abatement (EDNA), which is defined as an area or zone (environment) within which maximum permissible noise levels are established. There are three EDNA designations (WAC 173-60-030), which generally correspond to residential, commercial/recreational, and industrial/agricultural uses:

- Class A: Lands where people reside and sleep (such as residential);
- Class B: Lands requiring protection against noise interference with speech (such as commercial/recreational);
- Class C: Lands where economic activities are of such a nature that higher noise levels are anticipated (such as industrial/agricultural).

Noise-sensitive areas in the project vicinity include Class A and Class C EDNA. Table 4-5 summarizes the maximum permissible levels applicable to noise received at the three EDNAs.

Table 4-5. Maximum allowable noise levels.

Environmental Designation for Noise Abatement of Noise Source	Environmental Designation of Noise Abatement of Receiving Property		
	Class A (dBA)	Class B (dBA)	Class C (dBA)
Class A (residential/recreational)	55	57	60
Class B (commercial)	57	60	65
Class C (industrial)	60	65	70

WAC 173-60-050 identifies noise sources or activities that are exempt from the noise limits described in the above table:

- Sounds created by traffic on public roads;
- Sounds created by warning devices (i.e., back-up alarms); and
- Sounds from blasting and from construction equipment are exempt from the standards during the day (7:00 a.m. to 10:00 p.m. weekdays and from 9:00 a.m. to 10:00 p.m. on weekends) in rural and residential districts.

Although not regulated, construction noise can be significant. Most construction noise comes from equipment. Noise levels of typical construction equipment at 50 feet from the source of the noise are shown in Table 4-6.

Table 4-6. Construction equipment Average Maximum Noise Level (L_{max}).

Equipment	Examples	Actual Measured Average L_{max}^a at 50 ft
Earth Moving	Compactors	83
	Front End Loader	79
	Backhoe	78
	Tractors	84
	Graders	89
	Pavers	77
Materials Handling	Concrete Mixer Truck	79
	Concrete Pump Truck	81
	Crane	81
Stationary	Pumps	81
	Compressors	78
	Generators	81
Hauling	Dump Truck	76
Impact Equipment	Pile drivers	110
Impact Tools	Jackhammers	81
	Rock Drills	81
	Pneumatic Tools	85

Source: Washington State Department of Transportation measured data. Federal Highway Administration (FHWA) Roadway Construction Noise Mode Database (2005).

^a L_{max} is the maximum value of a noise level that occurs during a single event.

Depending on the activity, peak noise levels from equipment shown in Table 4-6 would range from 69 to 110 dBA at 50 feet from the source. However, noise levels decrease with distance from the source at a rate of approximately 6 to 7.5 dBA per doubled distance, and noise levels received further from construction activities would be lower than those listed in Table 4-6. For example, at 200 feet from the noise source, noise levels from construction equipment would range from 64 to 96 dBA.

4.10.2 Existing Noise Sources and Levels

Cle Elum Reservoir is located in a relatively remote forested area that is sparsely populated. Sensitive noise receptors at Cle Elum Reservoir include several parcels of private land with houses or cabins located below (southeast) and across (northeast) the reservoir from the dam and along the east shore of the reservoir and upper river. The closest residences are about 4,000 feet from the dam construction area. Recreational boaters and river anglers may also be found in proximity to the project area.

Typical background noise levels in coniferous recreational settings range from 35 to 45 dBA in the summer daytime and 30 to 35 dBA in the winter daytime (USFS, 2007). Current sound levels at Cle Elum Reservoir are not uncharacteristic for the type of land uses found there as vegetation and winter snowpack absorb human-caused noise. The exception to this is noise at the shore or on the reservoir surface. At these locations, noise tends to amplify and travel farther due to a lack of features to serve as sound barriers or to absorb sound.

Sensitive noise receptors above Cle Elum Dam include several parcels of private land with houses or cabins located along the USFS road (FR 4330) that parallels the east side of the reservoir and the Cle Elum River. There are also campgrounds along the road. The area above Tucquala Lake where the road ends is within the Alpine Lakes Wilderness Area.

Depending upon the equipment being used, noise levels generated at the site would be expected to attenuate to background or ambient noise levels (average 40 dBA in summer daytime) between 3,600 feet and 12,800 feet from the construction area. This does not account for environmental factors such as wind, vegetation, and topography, which can further reduce noise associated with construction. Dense vegetation can reduce noise levels by 5 dB for every 100 feet of vegetation, up to a maximum reduction of 10 dB (U.S. Department of Transportation (USDOT), 1995). Wind can reduce noise levels by as much as 20 to 30 dB at long distances (USDOT, 1995). A break in the line of sight can result in a 5 dB reduction. Therefore, the distances stated above are fairly conservative and the actual distance to reach ambient noise levels is expected to be much less based on the topography and dense vegetation surrounding the project area.

4.11 Recreation

Recreationists are attracted to the Cle Elum Reservoir area by its scenic setting, water, and recreation opportunities. Primary recreation activities include fishing the reservoir and rivers for cold-water species; boating and kayaking; whitewater rafting, motorized boating; and other related activities such as camping, swimming, hiking, hunting, picnicking, and wildlife viewing. In the winter, recreation activities include cross-country skiing, snowshoeing, and snowmobiling. Recreation opportunities are largely found along the eastern shore of Cle Elum Reservoir and both downstream and upstream of the reservoir along the Cle Elum River and its tributaries.

Recreational areas for activities such as camping and boating are managed by the USFS out of its Cle Elum Ranger District. The larger, developed campgrounds along the reservoir and along the upper Cle Elum River include Wish Poosh, Cle Elum River, and Salmon La Sac. Camping also occurs in undesignated areas along the reservoir and river. Picnic sites and campgrounds are close to, or exceed, capacity on summer weekends and exceed capacity on holiday weekends.

The Cle Elum River does not provide the quality of fishing found in the Yakima River because of more limited access, swift water, and the amount of woody debris. The Cle Elum River has regionally acclaimed whitewater rafting. The rapids are rated as Class IV-V from Scatter Creek to Salmon La Sac Creek (China Gorge), and as Class 1 from Salmon La Sac Creek to Cle Elum Reservoir and from Cle Elum Dam to the river's confluence with the Yakima River (American Whitewater, 2009).

Dispersed recreational use in the area increases as water levels in Cle Elum Reservoir become lower during the summer. This is largely due to increased dispersed camping opportunities and added access along emerging shorelines. Public use such as off-highway vehicle riding also increases as mud flats develop and additional areas can be accessed. Additionally, as the developed campsites in the area become full, many campers are left with little choice but to camp in dispersed areas. As a result, areas along Cle Elum Reservoir and the Cle Elum River are extremely popular for dispersed camping.

4.12 Land and Shoreline Use

Land surrounding Cle Elum Reservoir is primarily in public ownership with areas of private ownership. The USFS is the primary landowner in areas to the west, east, and north of the reservoir. The USFS provides lands for a wide variety of special uses by private individuals and public agencies. Examples of special permitted uses in the Cle Elum River basin are recreation residences and resorts.

Recreational areas such as Salmon La Sac are located north of Cle Elum Reservoir along the upper Cle Elum River. The communities of Ronald, Roslyn, and Cle Elum are located to the south; and various developments occur to the east and south of the reservoir (e.g., Wildwood). A major resort development (Suncadia) is located on a 7,400-acre site along the lower Cle Elum River.

Land use in the Cle Elum River basin is primarily forestland, with areas of commercial timber harvest, recreational use, and year-round and seasonal residential use. Diverse recreational activities occur across much of the study area (Section 4.11). Land use character is primarily natural resource and rural throughout the basin.

Land use planning in the area is under the jurisdiction of Kittitas County except for those areas that are under Reclamation and USFS management. Land in and around the dam and east shore of the reservoir site is designated “rural” in the County Comprehensive Plan, with zoning designations of “forest and range” and “Rural-3” (Kittitas County, 2008). The forest and range zone is intended “to provide for areas of Kittitas County wherein natural resource management is the highest priority and where subdivision and development of lands for uses and activities incompatible with resource management are discouraged.” The Rural-3 zone is intended “to provide areas where residential development may occur on a low density basis” with a primary goal “to minimize adverse effects on adjacent natural resource lands” (Kittitas Municipal Code [KMC] Title 17).

Much of the land surrounding the reservoir to the west, east (beyond the immediate shorelands), and north is designated and zoned Commercial Forest. The Commercial Forest zone is intended to “provide for areas of Kittitas County wherein natural resource management is the highest priority and where the subdivision and development of lands for uses and activities incompatible with resource management are discouraged consistent with the commercial forest classification policies of the comprehensive plan.”

Cle Elum Reservoir is a Lake of Statewide Significance under the Shoreline Management Act (SMA). Tucquala Lake, upstream of Cle Elum Reservoir, and Cooper Lake on the Cooper River, are Shorelines of the State protected by the SMA. The Cle Elum River from the National Forest boundary downstream to the confluence with the Yakima River is a Shoreline of the State. Under the Kittitas County Shoreline Master Program, much of the shoreline of Cle Elum Reservoir and the Cle Elum River is within a Conservancy shoreline environment designation. The intent of this designation is to sustain natural resource development while maintaining the natural character of the shoreline area.

4.13 Utilities

Electric power within Kittitas County is provided by Kittitas County PUD and Puget Sound Energy. Puget Sound Energy delivers power to the left end of Cle Elum Dam with a 12.5-kilovolt (kV) line which is transformed to 240-volt, three-phase power at the dam. There is also a 30-kilowatt (kW), 240-volt, three-phase backup generator at the dam. Area providers for telecommunications include FairPoint Communications and Qwest.

Water releases from Cle Elum Dam are part of the water supply for hydroelectric facilities lower in the Yakima River basin. Hydropower is generated within the Yakima Project at Roza and Chandler Powerplants. All hydropower generation at Chandler Powerplant is marketed by the BPA. The hydropower generation at Roza Powerplant is primarily used to supply power to pumps for irrigation water delivery to Roza Irrigation District (RID) water users. When the power generated by Roza Powerplant is in excess of RID's power demand, the excess power is marketed through BPA under the Federal Columbia River Power System (FCRPS). During the irrigation season, when RID's demand for power exceeds the power supply available from Roza Powerplant, the district receives additional power from BPA. This annual exchange of power is accomplished through an agreement between Reclamation and BPA (Reclamation, 2002b).

Downstream from the mouth of the Yakima River, Federal powerplants on the lower Columbia River are located at McNary, John Day, The Dalles, and Bonneville Dams.

4.14 Transportation

This section addresses road/highway facilities serving the areas where fish passage and fish reintroduction activities would occur. Major highways in the Yakima River basin include Interstate (I) 90 and I-82, Federal Highways 97 and 12, and State Routes (SR) and local highways 10, 821, and 24. The Burlington Northern Santa Fe (BNSF) Railroad runs generally parallel to I-90 in the upper basin, west of the Yakima River.

Regional and local access to Cle Elum Reservoir and the upper Cle Elum River is via SR-903/Salmon La Sac Road, a two-lane roadway extending northwest from the town of Cle Elum to Forest Road (FR) 4330. Access to Tucquala Lake is provided by FR 4330 (also known as Cle Elum Valley Road or Salmon La Sac Road). Access to the left abutment of the dam is provided by SR-903 and County Road 25010 (Cle Elum Lake Dam Road). Access to the right abutment of the dam is from Bull Frog Road, a Kittitas County road. Kittitas County is planning to construct a new bridge over the Cle Elum River downstream from the dam and a new road to access developments on the west side of the river.

Access to fish hatcheries at Priest Rapids Dam and Lake Osoyoos would be on major highways in the area. The route from Priest Rapids Dam would follow SR-243 to I-90 to Exit 84 in the town of Cle Elum. The route from Lake Osoyoos would follow SR-20/US 97 to SR-903.

4.15 Environmental Justice

Environmental justice addresses the fair treatment of people of all races and incomes with respect to actions affecting the environment. Fair treatment implies that no group should bear a disproportionate share of negative impacts. Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” dated February 11, 1994, requires agencies to identify and address disproportionately high and adverse human health or environmental effects of their actions on minorities and low-income populations and communities, as well as the equity of the distribution of the benefits and risks.

Kittitas County Census Tract 9751, which includes the area around Cle Elum Dam and Reservoir, was selected for the immediate study area. Table 4-7 provides the numbers and percentages of population by racial category for this census tract, Yakima basin counties, and the State of Washington. The information is based on the 2000 U.S. Census data, the most recent consistent source of information for the basin. The data have likely changed since 2000, but this information is a reliable indicator of population percentages.

In comparison to the State of Washington and Kittitas County, the local study area has a smaller percentage of total racial minority and ethnic (Hispanic or Latino) populations. Additional potentially affected minority populations include members of the Yakama Nation and downstream Indian Tribes. While census data are available for recognized Indian reservations, specific data for Tribal members are not. Tribal members may be affected regardless of whether or not they reside on their reservations.

Table 4-7. Race and ethnicity.

	Study Area Number (%)	Kittitas County Number (%)	Yakima County Number (%)	Benton County Number (%)	State of Washington Number (%)
Total Population	5,397 (100%)	33,362 (100%)	222,581 (100%)	142,475 (100%)	5,894,121 (100%)
One race	5,312 (98.4%)	32,704 (98.0%)	214,830 (96.5%)	138,646 (97.3%)	5,680,602 (96.4%)
White	5,159 (95.6%)	30,617 (91.8%)	146,005 (65.6%)	122,879 (86.2%)	4,821,823 (84.9%)
Black or African American	23 (0.4%)	236 (0.7%)	2,157 (1.0%)	1,319 (0.9%)	190,267 (3.3%)
American Indian and Alaska Native	58 (1.1%)	303 (0.9%)	9,966 (4.5%)	1,165 (0.8%)	93,301 (1.6%)
Asian	26 (0.5%)	731 (2.2%)	2,124 (1.0%)	3,134 (2.2%)	322,335 (5.6%)
Native Hawaiian and Other Pacific Islander	9 (0.2%)	49 (0.1%)	203 (0.1%)	163 (0.1%)	23,953 (0.4%)
Some other race	37 (0.7%)	768 (2.3%)	54,375 (24.4%)	9,986 (7.0%)	228,923 (4.0%)
Two or more races	85 (1.6%)	658 (2.0%)	7,751 (3.5%)	3,829 (2.7%)	213,519 (3.6%)
Racial Minority	238 (4.4%)	2,745 (8.2%)	76,576 (34.4%)	19,596 (13.8%)	1,072,298 (18.2%)
Hispanic or Latino (of any race)	122 (2.3%)	1,668 (5.0%)	79,905 (35.9%)	17,806 (12.5%)	441,509 (7.5%)
Minority ₁	5.9%	10.6%	43.5%	18.3%	21.1%

Source: US Census Bureau, 2000.

₁ Nonwhite not Hispanic or Latino plus Hispanic or Latino.

Table 4-8 provides income, poverty, unemployment, and housing information for the same geographic area. Low-income populations are identified by several socioeconomic characteristics. As categorized by the 2000 Census, specific characteristics include income (median family and per capita), percentage of the population below poverty (families and individuals), unemployment rates, and substandard housing. Median family income for the study area is greater than the County, but less than the State. The study area has per capita income higher than the County and the State. Compared to the State, the study area and Kittitas County have greater percentages of families and individuals below the poverty level.

Table 4-8. Income, poverty, unemployment, and housing.

	Study Area	Kittitas County	Yakima County	Benton County	Washington
Income					
Median family income	\$47,902	\$46,057	\$39,746	\$54,146	\$53,760
Per capita income	\$23,503	\$18,928	\$15,606	\$21,301	\$22,973
Percent below poverty level					
Families	7.7	10.5	14.8	7.8	7.3
Individuals	11.4	19.6	19.7	10.3	10.6
Percent unemployed	6.8	9.1	11.1	6.1	6.2
Percent of Housing					
1.01 or more occupants per room	3.0	3.1	14.2	6.1	5.1
Lacking complete plumbing facilities	0.8	0.8	0.8	.04	0.5

Source: U.S. Census Bureau, 2000.

Other measures of low income, such as unemployment and substandard housing, also characterize demographic data in relation to environmental justice. The 2000 unemployment rates for the study area and Kittitas County were higher than the State's 6.2 percent rate. Substandard housing units are overcrowded and lack complete plumbing facilities. The percentage of occupied housing units with 1.01 or more occupants per room in the study area and County was lower than the percentage for the State. The percentage of housing units lacking complete plumbing facilities in the study area and County was greater than the State.

4.16 Cultural Resources

Cultural resources, the physical or other expressions of past human activity, are finite, nonrenewable, and often fragile. These resources encompass a broad range and can include specific places associated with traditional ceremonies; artifacts, structures, archeological sites, objects, buildings and landscapes associated with a period of time, a person, or historic movements. They also include Native American human remains and funerary offerings. Federal agencies are required to identify and evaluate the significance of cultural resources located within the area of potential effects (APE) of any Federal undertaking.

Federal agencies' responsibility to consider and protect cultural resources is based on a number of Federal laws and regulations. In particular, the National Historic Preservation Act (NHPA) of 1966, as amended, and its implementing regulations for Section 106, set out the requirements and process to identify and evaluate historic resources, assess effects to these resources, and mitigate effects to significant resources which occur as a result of the agency's permitted undertaking. Under Section 110 of the NHPA, the responsibility of the Federal

agency that owns or formally manages land includes identifying and managing the historic resources on that land, even when there is no new undertaking. Cultural resources may also be protected under the Native American Graves Protection and Repatriation Act (NAGPRA); the American Indian Religious Freedom Act; EO 13007, Protection of Native American Sacred Sites; and other Federal, State, or Tribal laws and policies, where applicable.

For cultural resources, a significant environmental effect occurs when the proposed project would disrupt or adversely affect a prehistoric or historic archeological site or a property of historic interest or cultural significance to a community or ethnic or social group. These impacts are considered significant if they would occur to cultural resource sites that are listed, or eligible for listing, to the National Register of Historic Places (NRHP) and are unmitigated. Other adverse impacts would include disturbance to graves and cultural items protected under NAGPRA and destruction of, or preventing access to, sacred sites protected under EO 13007. Examples of the types of impacts that could result from the proposed action include construction, operation, or reintroduction activities resulting in the destruction, disturbance, disassociation, or alteration of a protected resource.

SEPA requires that cultural resources within a proposed project area must be identified, and that measures must be proposed to reduce or control impacts on these resources. Under SEPA, the Washington Department of Archaeology and Historic Preservation (DAHP) provides formal opinions on the significance of sites and the impact of proposed projects on sites. Other State laws governing historic resources protect Native American graves (RCW 27.44), abandoned historic cemeteries (RCW 68.60), and archaeological sites (RCW 27.53). These laws contain clauses regarding the inadvertent discovery of cultural resources during activities such as construction. Washington State Governor's EO 05-05, enacted in 2005, applies to State agencies planning a capital project not subject to Section 106 and capital projects not subject to Section 106 which are funded with state grants. Executive Order 05-05 requires State agencies to review capital projects with DAHP and the affected Tribes; conduct appropriate surveys; and take reasonable actions to avoid, minimize, or mitigate adverse effects to historic properties.

4.16.1 Archaeological and Historical Overview

Human occupation in the project area dates to 11,500 years ago based upon the discovery of a Clovis-style projectile point along the shoreline of historic Cle Elum Lake. These earliest peoples were likely pursuing large game animals such as mammoth. The human occupants from 11000 to 6500 BC were nomads and occupied temporary camps. Earlier people relied on hunting mammals and birds and gathering wild plants. Later there was an increased reliance on riverine resources such as fish. After 5200 BC, the pattern towards fish, smaller game and plant resources continued. Beginning about 3000 BC, people were starting to live

in shallow pithouses and reoccupying locations for salmon harvesting while continuing to occupy fishing and hunting camps. After 1900 BC, populations in the area had increased and widespread use of pithouses indicates a heavy reliance on fishing. By at least 1000 AD, large winter villages consisting of semisubterranean pithouses and larger longhouses had been established along the major rivers. People were heavily reliant on salmon runs. The architecture and layout of winter villages became even more permanent with the introduction of the horse in the early 1700s.

At the time of European contact, permanent villages were located along the Columbia and Yakima Rivers with seasonal camps in the uplands. The indigenous peoples who were utilizing seasonal camps in the upper Yakima and Cle Elum River basins are the Sahaptin-speaking Kittitas and Yakama.

The first documented Euro-Americans near the region were members of the Lewis and Clark Expedition. President Jefferson sent the expedition to explore the area along the Missouri River and to seek a route to the Pacific Coast. The expedition passed near the mouth of the Yakima River in 1805. Fur trappers, missionaries, and settlers soon followed.

The Hudson Bay Company was active in the Columbia Basin from the early 1800s to approximately 1860. Early fur traders mostly populated the Columbia River area; however, they did utilize established native overland routes through the project area. In 1853, the United States began to explore the possibility of constructing a route across the North Cascades, providing a northern route to the Puget Sound. Previously, most wagon trains would divert to the Willamette Valley to the south, where passage was easier. George McClellan was sent by Territorial Governor Isaac Stevens in 1853 and 1854 to find a route for a wagon road. While searching for the route that would later become known as Snoqualmie Pass, McClellan passed through the Keechelus and Cle Elum Reservoir areas. In 1855, the Tribes and Bands that are officially known today as the Confederated Tribes and Bands of the Yakama Nation, signed the Treaty of 1855 ceding over 6 million acres to the white settlers.

Passage of the Homestead Act in 1862 and construction of a wagon road over Snoqualmie Pass in 1865 brought about an increase in Euro-American activity through the project area. Early interest in the project area focused on the available mineral resources including coal, gold, and iron. In 1867, the Northern Pacific Railroad sent surveyors to the Snoqualmie Pass area to establish access routes across the Cascade Range.

There was an increase in commercial interests in the project area, including coal mining and timber harvesting, in the late 1800s and throughout the 1900s. Reclamation's Yakima Project was authorized in 1905 and led to the construction of an extensive irrigation system, including Keechelus, Kachess, Cle Elum, Rimrock, and Bumping Reservoirs. These reservoirs, constructed between 1909

and 1933, led to an increase in agricultural communities throughout the Yakima River basin.

Cle Elum Dam, completed in 1933, was the last major storage facility constructed for the Yakima Project. As early as 1905, Reclamation engineers determined that Cle Elum's large volume was necessary to the success of the Yakima Project. In 1905, Union Gap Irrigation Company built a timber crib dam at the mouth of the existing glacial lake. In 1907, Reclamation constructed a small crib and rockfill dam to replace the timber crib dam which had been destroyed. This brought initial storage to 26,000 acre-feet. Over the next 20 years, limited work such as reservoir clearing took place at the site until the early 1930s, when full-scale construction of the 165-foot-high earth and rockfill structure commenced. The new dam, including an earthen dike system, increased storage to 356,000 acre-feet. In 1936, Reclamation installed five 37-foot by 17-foot radial gates in the spillway to control flow and increase the reservoir's capacity to 436,900 acre-feet.

4.16.2 Known and Reported Historic Resources

Known and reported historic resources in the APE and the level of survey conducted to date are described here. The majority of these sites have not been evaluated for eligibility in the NRHP. The list is incomplete for areas in which no or limited identification efforts have taken place.

The Cle Elum APE for the construction of fish passage facilities includes the dam, a small area of the reservoir immediately adjacent to the dam's upstream side (for the intake structure), the spillway and land adjacent to the spillway on the south side, stilling basin, and an elongated, finger-shaped area of land immediately north of and adjacent to Cle Elum River extending southeast from the dam to an old footbridge, including the left bank access road (Figure 4-5). The APE for the Cle Elum fish passage facilities is confined to the northern halves of two adjacent land sections: Sections 10 and 11 of Township 20 North, Range 14 East, Willamette Meridian.



Figure 4-5. APE for the construction of fish passage facilities.

The APE for the fish reintroduction project has not been formally defined because the locations of the portable raceways have not been identified. Based on state guidelines that require haul routes to be included in the APE if they are adjacent to historic properties, it is anticipated that the APE will include the haul route from Cle Elum Dam up Salmon La Sac Road (Figure 4-6). It is not anticipated that the haul routes from Priest Rapids Dam or Lake Osoyoos will be included in the APE because of the limited trips required on those roads. The haul route from

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the dam includes Salmon La Sac Road/ FR 4330 between Cle Elum Reservoir and Tuquala Lake. This would include portions of Sections 2, 3, 11, 14, 23, 26, and 35 of Township 23 North, Range 4 East; Sections 3, 9, 10, 16, 21, 28, 29, 32, and 33 of Township 22 North, Range 4 East; Sections 4, 5, 9, 16, 21, 27, 28, and 34 of Township 21 North, Range 4 East.

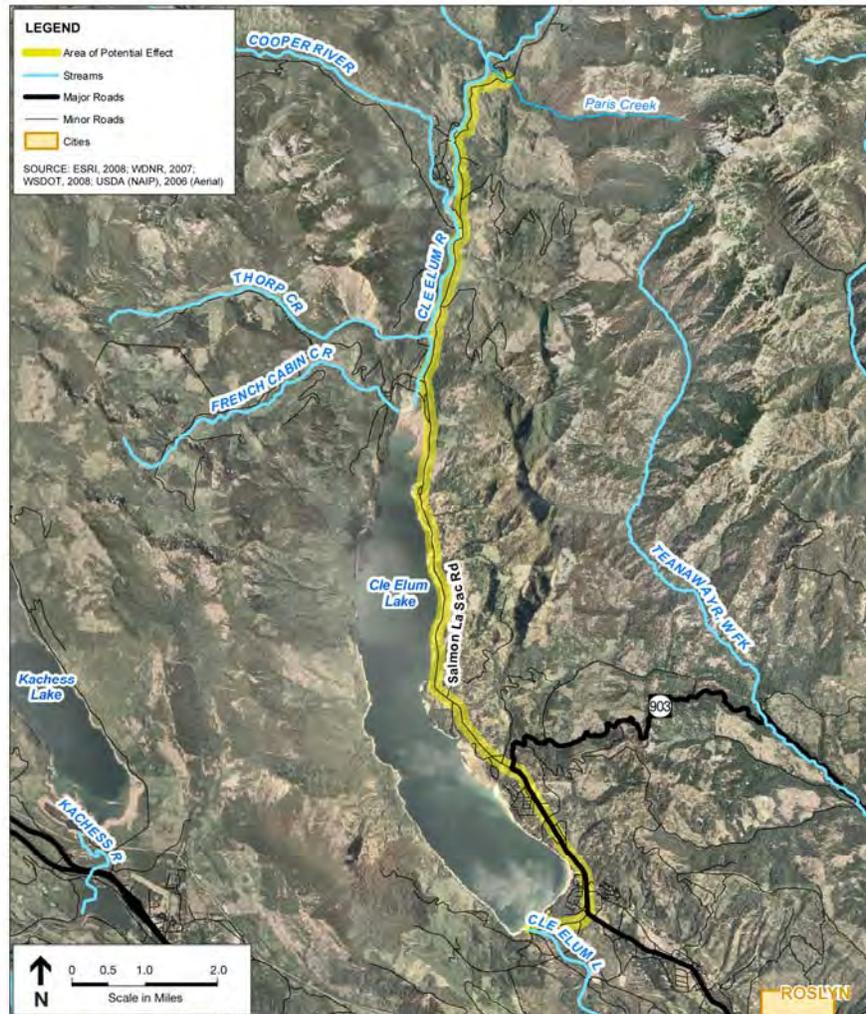


Figure 4-6. Approximate APE for the fish reintroduction project.

4.16.2.1 Cle Elum Dam Area

On July 16, 2007, research of recorded cultural resources and investigations in the APE for construction of fish passage facilities was conducted at the DAHP in Olympia. Further cultural resource information was obtained through the USFS and Reclamation. The research revealed nine recorded cultural resources within or immediately adjacent to the APE and several other reported sites (Table 4-9). They include sites related to the prehistoric and early historic Native American occupation of the area, and sites related to historic Euro-American water development.

Table 4-9. Recorded cultural resources: Cle Elum Reservoir APE.

Site Number	Short Description	Within APE?	Eligibility for NRHP	Miscellaneous
FS-01482	Mudstone flakes and cobble scatter	Adjacent	Not evaluated	In drawdown zone, extensive disturbance.
FS-01492	Cle Elum Clovis Point	Yes	Not evaluated	Not at site, removed, could be others under reservoir drawdown zone.
45-KT-2146	Cle Elum Historic Water Line Complex	Yes	Not Eligible	Long linear feature that runs through APE.
45-KT-2147	Roslyn Water Line Complex	Yes	Yes (water line bridge only)	Long linear feature that runs through APE.
45-KT-2153	Ed's Doll Head Scatter	Adjacent	Not Eligible	Historic refuse, including a doll's head.
45-KT-2157	Lunchbox Refuse Scatter	Other side of river fm APE	Not evaluated	Historic refuse dump.
45-KT-2158	Attention Refuse Scatter	Adjacent	Not evaluated	Historic refuse dump adjacent to road intended for construction trucks.
45-KT-2162	Bridge abutment #1—West Side	Adjacent	Not evaluated	Remnants of historic bridge abutment across the river from APE.
45-KT-2165	Telephone Line	Yes	Not evaluated	--

Of particular note is a prehistoric Clovis-style projectile point discovered in 1984 by a recreationist, during an unusually low drawdown year. The point was found on a terrace along the reservoir. An intensive shoreline inspection 4 years later revealed no further materials. The water level of Cle Elum Reservoir has not dropped enough since 1984 to expose the terrace where the point was discovered. The recent Clovis finds in East Wenatchee indicate that a Clovis site in the Cle Elum area is plausible.

In 1983, the DAHP prepared a draft nomination form to the NRHP for early Federal irrigation projects in Washington, of which Cle Elum Dam is a part. However, there has been no formal determination of eligibility or Historic American Engineering Record (HAER) follow-up. Some buildings associated with the dam have been removed; however, the dam construction camp site may still contain archaeological and historical data.

Also, in the vicinity of the APE lie prehistoric and early historic Native American sites (probably associated with one or more of the Bands and Tribes of the Yakama Nation) including artifact scatters, petroglyphs, resource procurement

areas, and *Aiyalim*, a seasonal salmon camp. Its precise location and condition has not yet been verified.

4.16.2.2 Fish Reintroduction Project Area

The affected environment for the state's fish reintroduction project is considered to include the truck routes that will be used to move fish to Cle Elum Reservoir and its tributaries. There are two proposed routes for bringing fish to Cle Elum Reservoir: the first would bring fish from the vicinity of Priest Rapids Dam on the Columbia River; the second would bring fish from Lake Osoyoos near the Canadian border.

Both haul routes would include traveling on major highways. The route from Priest Rapids Dam would follow SR-243 to I-90; the route from Lake Osoyoos would follow SR-20/US 97 to SR-903. Once onto I-90, trucking would continue westward to Exit 84 into the town of Cle Elum. Only one route option exists from Cle Elum to the northernmost trucking destination of Tuquala Lake, approximately 12 miles north of Cle Elum Reservoir.

Both routes include driving along designated Scenic Byways. The route from Priest Rapids Dam would include driving a segment of I-90 that is a designated National Scenic Byway (the Mountains to Sound Greenway from Seattle to Thorp) and SR-903 which is a designated State Scenic Byway (the Swift Water Corridor).

The route from Lake Osoyoos would include driving on three State Scenic Byways: the Okanogan Trails Scenic Byway from Osoyoos to Pateros, the Cascade Loop, and the Swift Water Corridor from SR-970 to Cle Elum Reservoir.

Forest Road 4330

Forest Road 4330 runs along the east side of Cle Elum Reservoir continuing north to Tuquala Lake. Cultural resources related to hunting, mining, and homesteading during the late 1880s and early 1900s are recorded along the road corridor. Resources include historic mining properties, wagon roads, cabins, and debris scatters. Precontact resources are also represented and relate to seasonal hunting, fishing, and gathering uses along this stretch of the Cle Elum River valley. Seasonal camps and tool manufacturing sites have been recorded. There are several ethnographically-documented fishing and seasonal gathering locations along the Cle Elum River and include areas such as Salmon La Sac and Red Mountain (Hollenbeck and Carter, 1986).

The current road alignment follows the general route of an Indian trail noted by 1869 pioneer A. J. Splawn (Carter, 1986) and is referred to as a wagon road on an 1897 map (U.S. Surveyor General, 1897). The route is mentioned in a history of the Cle Elum Mining District as a "stage line...established between Cle Elum and Tuquala Lake, with Camp Creek as a major destination point" (Carter and

Bannister, 1986). By 1907, maps note the route as a County Road (U.S. Surveyor General 1907a, 1907b).

Construction of Cle Elum Dam raised the level of the lake; therefore, the haul route for the fish reintroduction project is closer to the water than it was prior to dam construction. As a result, cultural resources that might be expected in the APE include more seasonal or temporary use of the landscape. Trails, lithic scatters, culturally modified trees, or resource procurement sites might be expected.

The fish reintroduction APE is an area heavily impacted by mining beginning in 1881 with the discovery of iron ore along the Cle Elum River. The Cle Elum Mining District was established in 1883. Copper and coal mining also shaped the project vicinity including the founding of the towns of Roslyn and Cle Elum in 1886. An evaluation of the significance of the Cle Elum Mining District notes that “the combination of remoteness of mines, the ruggedness of the terrain, and the fact that the ore bodies were not extensive nor rich enough to warrant development on a large scale were drawbacks that prevented the Cle Elum Mining District from contributing significantly to the mineral production in the State” (Carter and Bannister, 1986). The Cle Elum Mining District is not considered eligible as a Historic District although individual elements may be. It is likely that not all features of the District have been identified.

Three cultural resource investigations have been conducted within portions of the APE.

First, a survey of approximately 10 miles of the APE was conducted in 1988 for a proposed widening of the road (Rice and Stevens, 1988). One prehistoric lithic scatter, 45-KT-737, was identified during this investigation. Once the presence of the site was known, the site was avoided with no further efforts to define the nature and extent of the site.

Second, a survey and shovel probes were conducted in 2008 prior to reconstruction of approximately 1,000 feet of FR 4330 within the right-of-way after a flood washed out a portion of the road (Piper, 2008). No cultural resources were identified.

Third, a survey of over 16,000 acres, including portions of the Cle Elum Ranger District of the Wenatchee National Forest, was conducted as part of a proposed land exchange (Burtchard and Miss, 1998). Three discontinuous areas surveyed as part of this effort overlap with portions of the current APE. No cultural resources were identified in the APE or within these survey areas.

In August 2009, research of recorded cultural resources and investigations in the APE for the fish reintroduction project was conducted at DAHP. Twenty-three sites have been recorded within 0.5 mile of the FR 4330 corridor (Table 4-10). This includes five prehistoric sites, none of which have had a formal

determination of eligibility. Of the 18 historic sites, one is listed on the NRHP (Salmon La Sac Guard Station), three are eligible, 10 have been determined not eligible, and four have not had a formal determination.

Table 4-10. Recorded cultural resources within 0.5 mile of the Forest Road 4330 corridor; listed from South to North.

Site Number	Short Description	Side of Roadway	NRHP Eligibility	Notes
45-KT-1281	Precontact Isolate (biface/core)	North (East)	Not Formally Determined (Presumed Not Eligible)	--
FS-1458	Multicomponent site (Bell Creek Site)	West	Not Formally Determined	--
45-KT-2780	Historic Mining Property (Howson Creek Mine)	Both	Not Formally Determined	--
WF-0222	West Bank Trail Trolley	West	Determined Not Eligible	--
45-KT-737	Precontact Lithic Scatter	West	Not Formally Determined	50+ flakes removed from 1 unit between 0-40 cm below surface; Boundaries undetermined.
45-KT-2715	Historic Refuse Scatter (Cle Elum River Dump #1)	West	Determined Not Eligible	--
WF-0666	Precontact Lithic Scatter (Salmon La Sac Lithics)	West	Determined Not Eligible	--
45-KT-519	Salmon La Sac Guard Station / Kittitas Railway & Power Company Depot	East	Listed	WHR* listed.
WF-0354	Prehistoric Seasonal Camp (Paris Creek Trailhead)	East	Not Formally Determined	Multicomponent; associated with huckleberry gathering.
WF-0522	Historic Wagon Road (Boulder Creek)	Both	Determined Eligible	--
45-KT-2891	Historic Mining Property (Camp Creek)	Both	Determined Eligible	--
45-KT-2781	Historic Mining Property (Johnny Burke Silver Mine)	West	Determined Not Eligible	--
WF-0698	Historic Mining Property (Simon Justham Cabin); Precontact artifacts	Both	Determined Eligible	--
WF-0699	Historic Mining Property (Plymouth Mines)	East	Determined Not Eligible	--
45-KT-2887	Historic Isolate (Marten hunting trap)	West	Determined Not Eligible	--
45-KT-2883	Historic Mining Property (Fortune Creek Cabin)	East	Determined Not Eligible	--
45-KT-2886	Historic Mining Property (Lumsden Cabin)	West	Determined Not Eligible	--
45-KT-2620	Historic Mining Property (Silver Creek Mining Co. Mines)	East	Determined Not Eligible	--
45-KT-2889	Precontact Lithic Scatter (Silver Creek Lithics)	East	Not Formally Determined	Boundaries undetermined.

45-KT-2884	Historic Debris Scatter (Indian Camp)	West	Not Formally Determined	--
45-KT-2882	Historic Debris Scatter (Silver Creek Historic Can Dump)	East	Determined Not Eligible	--
45-KT-2890 / WF-0364	Historic Mining Property (Scatter Creek Cabin)	East	Determined Not Eligible	--
45-KT-2888	Historic Isolate (Fish Lake Tobacco Can)	West	Not Eligible	--

*WHR = Washington Historical Record listed.

4.17 Indian Sacred Sites

Executive Order 13007, Indian Sacred Sites (May 24, 1996), directs Federal agencies to accommodate access to, and ceremonial use of, Indian Sacred Sites by Indian religious practitioners and to avoid adversely affecting the physical integrity of such sacred sites on Federal lands. The agencies are further directed to ensure reasonable notice is provided for proposed land actions or policies that may restrict future access to or ceremonial use of, or adversely affect the physical integrity of, sacred sites. The EO defines a sacred site as a “specific, discrete, narrowly delineated location on Federal land that is identified by an Indian Tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion.”

Sacred sites may include ceremonial areas and landmarks such as rock formations which are symbolic representations of religious beings. No sacred sites have yet been identified within the APE. However, the Yakama Nation has expressed concern in the past about other projects in the general vicinity. Reclamation is consulting with the Yakama Nation regarding potential cultural resource and sacred site issues.

4.18 Indian Trust Assets

Indian Trust Assets (ITAs) are legal interests in property held in trust by the United States for federally-recognized Indian Tribes or individual Indians. ITAs may include land, minerals, federally-reserved hunting and fishing rights, federally-reserved water rights, and instream flows associated with trust land. Beneficiaries of the Indian trust relationship are federally-recognized Indian Tribes with trust land; the U.S. acting as trustee. By definition, ITAs cannot be sold, leased, or otherwise encumbered without approval of the U.S. government.

Per the 1994 memorandum “Government-to-Government Relations with Native American Tribal Governments,” Reclamation is responsible for the assessment of project effects on Tribal trust resources and federally-recognized Tribal governments. Reclamation is tasked to actively engage and consult federally-

recognized Tribal governments on a Government-to-Government level when its actions affect ITAs.

The U.S. Department of Interior (DOI) Departmental Manual Part 512.2 defines the responsibility for ensuring protection of ITAs to the heads of bureaus and offices (DOI, 1995). The DOI is required to “protect and preserve ITAs from loss, damage, unlawful alienation, waste, and depletion” (DOI, 2000). It is the responsibility of Reclamation to determine if the proposed project has the potential to affect ITAs.

Reclamation initiated Government to Government consultation with the Yakama Nation in October 2009. The BIA Yakima Office and the Yakama Nation were contacted by letter to determine the potential presence of ITAs within the project area. The letter requested that BIA and the Tribe identify ITAs or any other resources of concern within the area potentially impacted by the fish passage project. To date, no ITAs have been identified in or near the project area. It is the general policy of Reclamation to perform its activities and programs in such a way as to protect ITAs and avoid adverse effects whenever possible (Reclamation, 2000). Reclamation will comply with procedures contained in Departmental Manual Part 512.2 which protect ITAs.

4.19 Socioeconomics

The socioeconomic analysis developed for this DEIS consists of a cost-based Regional Economic Development (RED). At this time, the RED analysis has been conducted for the fish passage facilities only. The costs of the fish reintroduction project are not yet known because the level of fish reintroduction effort will be dependent on available funding. Therefore, no cost estimate or RED impact analysis has been included for the fish reintroduction project.

The RED analysis focuses on estimating alternative-specific economic impacts to the study region’s local economy. For this analysis, regional impacts stem from two primary effects: upfront construction costs and annual operations, maintenance, replacement, and power (OMR&P) costs.

Additional costs occurring within the region were measured compared to the No Action Alternative. The RED analysis includes not only the initial or direct impact on the primary affected industries, but also the secondary impacts (multiplier effects) resulting from those industries providing inputs to the directly affected industries (indirect effects) as well as household spending of income earned by those employed in the directly or indirectly impacted sectors of the economy (induced effects).

The study area or “region” was selected based on the location of the proposed fish passage facilities and the economic interaction between neighboring counties within the area. The project area is located within Kittitas County. However,

given the proximity of the City of Yakima in Yakima County, the assumption was made that Yakima and Kittitas Counties are economically linked; therefore, the region was defined as both Yakima and Kittitas Counties of Washington State.

Regional economic activity can be measured in a variety of ways. This analysis focuses on three commonly applied measures of regional economic impact: output, employment, and labor income. Output reflects the dollar value of production (sales revenues and gross receipts) from all industries in the region. Labor income is a measure of employee compensation (wages and benefits) plus income for self-employed individuals. Employment measures the number of jobs in a particular sector, both full-time and part-time.

The regional economic impact analysis involves running estimates of in-region costs through an economic impact model generated specifically for the study area. The IMPLAN (Impact analysis for PLANning) model was selected for this analysis. IMPLAN is a commonly applied input-output (IO) modeling system that estimates the effects of changes in expenditures within a region. Input-output models measure commodity flows from producers to intermediate and final consumers. Purchases for final use (final demand) drive the model. Industries produce goods and services for final demand and purchase goods and services from other producers. These other producers, in turn, purchase goods and services. This buying of goods and services (indirect purchases) continues until leakages from the region (imports and value added) stop the cycle.

These indirect and induced effects (the effects of household spending) can be derived mathematically using a set of multipliers. The multipliers describe the change of output for each and every regional industry caused by a \$1 change in final demand for any given industry.

IMPLAN data files are compiled from a variety of sources for the study area, including the U.S. Bureau of Economic Analysis, the U.S. Bureau of Labor, and the U.S. Census Bureau. Input-output models are static—they measure impacts based on economic conditions at a given point in time. Since the IMPLAN data used in this analysis were from 2004, impacts are measured based on a 2004 representation of the regional economy.

Table 4-11 displays the latest output, employment, and labor income information as generated by the IMPLAN model based on 2004 data for the combined economy of Kittitas and Yakima Counties, aggregated into 14 major sectors. In 2004, these two counties generated \$12.6 billion in output, 134.5 thousand jobs, and \$4.4 billion in labor income.

The IMPLAN model includes 509 sectors which were aggregated into 14 primary sectors for display purposes. While the ranking of the five most important sectors within the economics of Kittitas and Yakima Counties vary based on the regional economic measure considered, the following major economic sectors consistently fell within the top five: 1) agriculture, forestry, and fisheries; 2) manufacturing;

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3) retail trade; 4) services; and 5) Federal, State, and local government. Looking at the employment measure, these five sectors represent about 83 percent of the total employment within the region in 2004.

In addition to providing some detail on the current (2004) makeup of the regional economy, this current condition information was used to evaluate the magnitude of estimated regional economic impacts. These estimates of current conditions were assumed to adequately reflect the No Action Alternative and to provide a useful basis for comparison.

Table 4-11. Baseline data for Kittitas and Yakima counties - output, employment, and labor income.

IMPLAN Model: Yakima Fish Passage Kittitas and Yakima Counties							
Base Year: 2004							
IMPLAN Industry #s	Industry	Industry Output (million \$)	% of Total	Employment (Jobs)	% of Total	Labor Income (million \$)	% of Total
1-18	Agriculture, Forestry, and Fisheries	1,689.235	13.45	26,193	19.47	626.014	14.29
19-29	Mining	1.891	0.02	17	0.01	0.643	0.01
30-32	Utilities	111.834	0.89	226	0.17	20.175	0.46
33-45	Construction	650.321	5.18	6,147	4.57	257.398	5.88
46-389	Manufacturing	2,806.953	22.35	9,537	7.09	434.830	9.93
390	Wholesale Trade	601.510	4.79	5,373	3.99	226.148	5.16
391-400	Transportation and Warehousing	382.527	3.05	4,261	3.17	170.289	3.89
401-412	Retail Trade	787.549	6.27	12,681	9.43	318.007	7.26
413-424	Information	358.231	2.85	1,975	1.47	83.952	1.92
425-430	Finance and Insurance	385.816	3.07	2,538	1.89	113.214	2.59
431-436	Real Estate, Rental, and Leasing	346.029	2.76	2,706	2.01	70.190	1.60
437-494	Services	2,507.039	19.96	41,655	30.97	1,104.959	25.23
495-506	Federal, State, and Local Government	1,313.388	10.46	21,214	15.77	953.728	21.78
507-509	Other	617.146	4.91	0	0.00	0.000	0.00
	Totals:	12,559.468		134,520		4,379.548	

Chapter 5

**ENVIRONMENTAL CONSEQUENCES – FISH PASSAGE
FACILITIES**

CHAPTER 5

ENVIRONMENTAL CONSEQUENCES – FISH PASSAGE FACILITIES

5.1 Introduction

This chapter discusses the impacts of construction and operation of each of the fish passage alternatives. The impacts on the affected resources are discussed in the same order the resources were presented in Chapter 4. Cumulative impacts are described in Section 5.20. Impacts of the fish reintroduction project are discussed in Chapter 6.

5.2 Water Resources

5.2.1 Methods and Impact Indicators

The impact indicators for water quality are increased sedimentation and turbidity. The Water Quality Standards for Surface Waters of the State of Washington (Chapter 173-201 WAC) outline the required thresholds for turbidity during construction. There are currently no State standards for instream sediment. However both NMFS (1996) and the Service (1998) found that the sediment indicator is properly functioning when spawning sized gravels contain less than 12 percent fine sediments (fines), and is not properly functioning when fines are 17 percent or greater.

Also, the *Fisheries Handbook of Engineering Requirements and Biological Criteria* (Bell, 1986) was used to determine the appropriate water temperature criteria for adult salmon and steelhead, and to evaluate how operations of the upstream adult fish passage facilities for Alternatives 2 and 3 would affect temperature.

The impact indicator for water supply is the effect on TWSA. Impacts to reservoir operations and existing Reclamation contracts were also considered.

5.2.2 Water Quality

5.2.2.1 *Alternative 1 - No Action Alternative*

Under the No Action Alternative, there would be no construction, and dam and reservoir operations would not change. Therefore, no impacts to water quality would occur.

5.2.2.2 *Alternative 2 - Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam*

The downstream and upstream fish passage facilities would be constructed over a 3-year period as described in Table 2-1. Potential impacts to water quality for both downstream and upstream fish passage facilities are described below.

Downstream Fish Passage Facilities

Construction activities associated with the intake structure (Figure 2-1 and 2-6) would be located within the drawdown zone of the reservoir and would require installation of a temporary cofferdam that would isolate the construction area. The cofferdam would be installed around September 1 in the first year of construction and removed by the end of November in the second year of construction. The cofferdam would be installed and removed when the reservoir bed is dry (below elevation 2,160 feet). Impacts to water quality are unlikely since construction activities would occur within the dewatered confines of the cofferdam and on the dry lakebed. However, minor impacts could occur when the reservoir elevation is raised. Soils disturbed during construction could temporarily be mobilized and result in a short-term increase in localized turbidity.

Construction of the access bridge and ramp, from the dam to the intake structure, would occur from September 1 to November 30 in the second year of construction and when the reservoir lakebed is dry. Construction impacts to water quality from constructing the access ramp and bridge are unlikely since construction-related activities would occur when the reservoir lakebed is dry. However, minor impacts could occur when the reservoir elevation is raised. Soils disturbed during construction could temporarily be mobilized and result in a short-term increase in localized turbidity.

Construction of the buried juvenile bypass conduit within the reservoir lakebed would occur from September 1 to November 30 during the first year of construction and when the reservoir lakebed is dry. Any seepage within the construction area pumped from the access bridge, intake structure, and uppermost section of the juvenile bypass conduit construction areas would be collected in a retention pond. This pond would have a pervious liner designed to retain any solids suspended in the water. The clean water would be allowed to be absorbed into the lakebed.

Construction of the lower section of the juvenile bypass conduit from the outfall chute to the dam would occur from April 15 to November 15 during the second year of construction. The right bank cofferdam used during construction of the right half of the barrier dam would also serve to provide a dewatered area to construct the juvenile bypass conduit chute that exits into the river. Construction of the middle section (right abutment) of the juvenile bypass conduit would occur between August 1 and October 30 during the third year of construction.

During construction of the juvenile bypass conduit and as a result of ground disturbing activities, there would be the potential for erosion of upland soils and

delivery of sediments to the river. The potential for increased sedimentation and turbidity would be considered temporary and would not persist following construction. Measures described in Section 5.2.4.1 would be taken to minimize the potential for erosion of upland soils and subsequent sedimentation and turbidity of downstream areas.

A temporary road would be required to access the intake construction area. The road would be removed following construction. Clearing and grading would be required to construct the temporary access road, which may result in erosion of upland soils or transport of upland soils into aquatic environments, either through roadway runoff or via equipment tracking soil into and out of aquatic areas. Appropriate BMPs would be in place to minimize the potential for erosion and subsequent sedimentation and turbidity in downstream areas.

As with all construction activities, there is a potential for accidental spills of contaminants (fuel, oil, grease, and hydraulic fluids) associated with the use of heavy machinery. Contamination is also possible during use of wet cement, concrete, or grout. Minimization measures and BMPs described in Section 5.2.4.1 would be in place to ensure that accidental spills and contaminant releases do not occur.

No long-term impacts to water quality would be expected from operation of the downstream fish passage facilities. There is some potential to affect water quality (temperature) by collection of surface water at the intake structure, which is generally warmer than if water were collected from lower in the water column, and subsequently bypassing these flows downstream. However, these impacts are considered relatively minor given the small volume of flow transported through the downstream bypass facilities in comparison to the overall volume passing over the outlet works (2,500 cfs or more). Operation of the fish passage facilities would not involve any soil disturbing activities and water released from the fish passage facilities would be of the same quality as water currently being released from the dam. A short-term pulse of turbidity may occur following rewatering of the areas where ground disturbance occurred; however, these instances would be short in duration and a one-time event. Following construction, all disturbed areas would be stabilized to avoid creating a long-term source of chronic erosion.

Upstream Fish Passage Facilities

Construction of the barrier dam would require installation of a temporary cofferdam located approximately 500 feet below the spillway. The cofferdam and barrier dam would be constructed in two phases. The right-bank half of the cofferdam would be constructed from April 15 to July 30, followed by the left-bank half from August 1 to November 30. After the right-bank half of the barrier dam is completed, the cofferdam would be removed and reinstalled on the left-bank half of the river, leaving about half of the river channel free flowing throughout the construction period.

A minor amount of turbidity and sedimentation would occur during installation of the right- and left-bank cofferdams. The effects of turbidity from placement of the sandbags on the river bottom are not anticipated to extend more than 200 feet downstream from the site during each 5-day construction and removal period. This would be a resuspension of existing sediments and not the introduction of new sediment from upland areas.

Completion of the fish ladder and adult collection facility would occur between August 1 to October 30 during the third year of construction. The lowermost section of the fish ladder that enters the river (e.g., the first few pool-weir steps) would be constructed within the same time period that the left-bank half of the barrier dam is constructed, when the left-bank cofferdam is in place.

During construction, fine sediments could enter the river as a consequence of ground disturbance from construction of the fish ladder and adult collection facility. Measures would be taken to ensure that fine sediments did not enter the river channel (Section 5.2.4.1).

The unpaved access roads may increase some sediment input to the rivers during precipitation events. A new 550-foot-long access road would be required to access the east side of the barrier dam for maintenance. Improvements to an existing access road would be required to access the fish collection facilities on the east side of the dam. Impacts would be similar to those described for the intake structure and access road. New roadways may provide a chronic and long-term source of sedimentation and turbidity to downstream areas if not properly maintained and stabilized. The potential for accidental spills of contaminants would be similar to those described for the downstream facilities.

Operation of the bypass facilities is not likely to have any direct effect upon water quality; however, the introduction of adult salmon above the reservoir would, as intended, indirectly increase the nutrient content of the water thereby increasing primary productivity. This may ultimately influence water quality characteristics such as water clarity and contribute to algal growth, especially within the reservoir. The decay of algae may result in decreased DO levels within the reservoir.

While no long-term impacts to river water quality would be expected from operation of the upstream fish passage facilities, it is possible that if disturbed areas are not properly stabilized following construction, they may provide a chronic source of erosion. Soil stabilization BMPs including use of straw bales, mulch, straw wattles, seeding, and planting of disturbed areas would minimize the potential for long term sources of erosion.

5.2.2.3 *Alternative 3 - Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam*

Downstream Fish Passage Facilities

Construction and long-term impacts to water quality as a result of the installation of the intake structure and bypass conduit would be similar to those described for Alternative 2. However, the access ramp and bridge would not be constructed for Alternative 3 since the intake structure is in a different location.

Upstream Fish Passage Facilities

Construction and long-term impacts to water quality would be similar to those described for Alternative 2 for the installation of the fish ladder and adult collection facility. There would be no construction or long-term impacts to water quality caused by installing the barrier dam since it is not included in this alternative.

5.2.3 Water Supply

5.2.3.1 *Alternative 1 - No Action Alternative*

The No Action Alternative would have no impacts on water supply because there would be no changes in reservoir operations.

5.2.3.2 *Alternative 2 - Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam*

Construction and operation of the fish passage facilities would have no impacts on water supply. Construction would be coordinated to allow flow releases from Cle Elum Dam to remain unchanged. Fish passage operations would be integrated into existing project demands and would not impact existing water delivery contracts, TWSA, or flood control operations. See Section 2.4.4.1 for a description of how water would be routed through the fish passage facilities.

During the first year of construction, there could be a minor loss of storage due to the intake structure cofferdam. Approximately 30 acre-feet could be lost, but this is not expected to affect water delivery contracts, TWSA, or flood control operations.

5.2.3.3 *Alternative 3 - Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam*

The Alternative 3 fish passage facilities would be operated similarly to Alternative 2 (see Section 2.4.4.1). There would be no impacts to existing project operations, TWSA, or Reclamation contracts.

5.2.4 Mitigation

5.2.4.1 Water Quality

The primary mitigation measure to minimize construction impacts to water quality would be to construct the facilities when the reservoir lakebed is dry. Any seepage would be collected in a retention pond with a pervious liner designed to retain any solids suspended in the water to keep them from seeping into the lakebed soils. The clean water would be allowed to be absorbed into the lakebed.

To prevent soil erosion and sediments from entering the river and adversely affecting water quality during construction of the juvenile bypass conduit, fish ladder, adult collection facility, and access roads, containment measures such as silt fences, sediment containment dams and over-the-bank infiltration galleries would be employed as needed. A temporary erosion and sediment control plan would be developed and the project would adhere to the National Pollutant Discharge Elimination System construction stormwater permit issued for the project. These measures would minimize the potential for sedimentation and turbidity.

The cofferdam for construction of the barrier dam would minimize the adverse impacts that could result from direct contact of the river with construction activities. Any short-term increases in turbidity and sedimentation caused by construction of the barrier dam would be reduced because only one-half of the river channel would be worked on at a given time, allowing the other half of the channel to remain relatively undisturbed. In addition, seepage from within the right- and left-bank cofferdams would be discharged into the riparian zone next to the river, incorporating silt curtains and/or straw bales to trap fine sediments. Seepage would then be allowed to soak into the ground.

Stockpile and staging areas would be isolated with a containment berm or physical structure to reduce erosion and sediment impacts to reservoir and river water quality. All equipment would be stored a minimum of 150 feet from any surface water feature when not in use. All equipment working below the ordinary high water mark would use vegetable oil based hydraulic fluids. All refueling would occur at a minimum of 150 feet from the ordinary high water mark. The stockpile and staging areas would be stabilized and revegetated following construction.

Implementation of BMPs would reduce potential adverse impacts to water quality in the reservoir and river that may occur during construction. To perform any concrete-related work, the contractor would be required to completely isolate all construction areas from the water prior to the start of any work. In addition, the contractor would be required to take measures to prevent concrete from coming in contact with a stream or lake for a minimum of 24 hours after the work has been completed to ensure that the concrete fully cures.

Contractors would be required to treat all construction discharge water (e.g., concrete washout, pumping for work area isolation, vehicle wash water, drilling fluids) as follows:

- Design, build, and maintain facilities to collect and treat all construction discharge water, including any contaminated water produced by drilling, using the best available technology applicable to site conditions.
- Provide treatment to remove debris, nutrients, sediment, petroleum hydrocarbons, metals, and other pollutants likely to be present.
- Prevent pollutants from contacting any wetland or the 2-year floodplain, including green concrete, contaminated water, silt, welding slag, sandblasting abrasive, or grout that has been cured less than 24 hours.

5.2.4.2 Water Supply

There would be no impacts to water supply; therefore, no mitigation is required.

5.3 Fish

5.3.1 Methods and Impact Indicators

Potential impacts to fish species are primarily related to clearing and grading. These activities can cause erosion and degrade water quality through an increase in turbidity. They can potentially degrade spawning habitat by introducing fine sediment into available spawning gravel downstream from construction activities. The removal of riparian vegetation can also have an adverse effect on fish species by removing sources of LWD, which is important in creating complex stream habitats, providing hiding places and refugia for juvenile fish, and influencing channel-forming processes. Removal of riparian vegetation can also have adverse effects on water quality and quantity by encouraging faster runoff rates and erosion, which can lead to channel bed scour and increased turbidity and sedimentation of downstream areas. The physical construction or placement of structures within the active channel can also reduce habitat availability and increase competition for resources between fish species, as well as increase the potential for predation.

5.3.2 Alternative 1 – No Action Alternative

Under the No Action Alternative, Reclamation would not construct permanent fish passage facilities at Cle Elum Dam. Approximately 29.4 miles of historic spawning and rearing habitat would continue to be blocked from anadromous fish use. In addition, the existing interim fish passage facilities would be removed,

which would stop the fish reintroduction efforts that have begun in the basin and strand the anadromous fish that have been released into Cle Elum Reservoir.

5.3.3 Alternative 2 – Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam

5.3.3.1 Downstream Fish Passage Facilities

No impacts to fishery resources would occur during construction of the intake structures since construction would occur when the reservoir lakebed is dry. It is likely that once the pool elevation is brought back up, there could be some minor and temporary localized turbidity due to resuspension of fine material disturbed during construction. This would be short term (likely to last only several hours) and would not be a chronic source of turbidity or sedimentation of downstream areas. It is expected that fines would settle out quickly. The clearing and grading necessary to construct the temporary access road and install the intake structure may result in erosion of upland soils into the aquatic environment, or tracking of sediment offsite if not properly stabilized following construction.

During construction for the juvenile bypass conduit, sediments could enter the river and impact spring Chinook redds located immediately downstream from the construction area. The increased turbidity could affect eggs and fry. It is unlikely that juvenile salmonids rearing in the project area will be affected since they would be able to avoid turbid areas.

Construction of the juvenile bypass conduit would result in removal of 640,000 square feet (14.7 acres) of second-growth forest adjacent to the spillway. In the long term (40 to 50 years), this disturbed area would be allowed to mature to the preconstruction forest condition (after replanting of native conifer species). However, in the short term, some LWD recruitment potential would be lost and the benefits to habitat-forming processes would be diminished. The loss of LWD would be limited to the area within one tree height of the river (100 to 150 feet) and the areas adjacent to the river, not the spillway.

As with all construction activities, there is a potential for accidental spills of contaminants (fuel, oil, grease, and hydraulic fluids) associated with the use of heavy machinery. Contamination is also possible during use of any wet cement, concrete, or grout. Minimization measures and BMPs described in Section 5.2.4.1 would be in place to ensure that accidental spills and contaminant releases do not occur.

Fishery resources would benefit from the permanent downstream fish passage structures. Valuable habitat upstream of Cle Elum Reservoir would be opened up and available to all species for spawning, rearing, foraging, and migration. While there is the potential for short-term increases in turbidity and sedimentation, it is expected that the use of BMPs for temporary erosion and sediment control would

minimize these impacts. In addition, much of the work would be completed during the dry season, minimizing the potential for mobilizing disturbed soils and sediment.

5.3.3.2 Upstream Fish Passage Facilities

During construction, there would be a temporary loss of fish habitat from installation of the right- and left-bank cofferdams used to install the barrier dam. Over time, installation of the barrier dam may provide an increase in the amount of slow-water habitat along the downstream face of the barrier dam.

The construction of the barrier dam would result in the permanent loss of a minor amount of potential spawning habitat for spring Chinook and an even smaller amount of spawning habitat for summer steelhead. Summer steelhead juveniles have a low probability of being present year-round and rearing in the project area.

During construction it would be necessary to dewater the work area and remove fish prior to construction. This would likely require the use of fish removal techniques including seining and potentially electrofishing. Any handling of fish, especially listed fish species, has the potential to result in harm to a limited number of individuals based on construction timing and life history of the species. Impacts to federally listed species (Section 5.6) are unlikely. Summer steelhead juveniles have a low probability of being present year-round or rearing in the project area. Bull trout are not anticipated to be in the project area during construction.

Pulses of turbidity and subsequent sedimentation of downstream areas are also likely to occur once during the installation of the cofferdams and a second time during their removal. These events would be limited in duration to a few days and would not be a chronic source of turbidity and sedimentation. Other potential sources of turbidity and sedimentation are related to land clearing and grading for access roads, which could potentially provide a source of erosion of upland soils into downstream areas.

About 23,700 square feet (0.5 acres) of riparian and second-growth forest (Douglas fir, pine and cottonwood) would be permanently replaced by the fish ladder and adult collection facility. In the long term, some LWD recruitment potential would be lost and the benefits to habitat-forming processes would be diminished. The loss of LWD would be limited to the area within one tree height of the river (100 to 150 feet) and the areas adjacent to the river, not the spillway. The loss of LWD recruitment potential would be minor. About 203,300 square feet (4.7 acres) of second-growth forest (Douglas fir, pine and cottonwood) would be temporarily disturbed during the construction period for stockpile and staging areas, and another 20,000 square feet (0.45 acres) on the dry lakebed near the intake structure. There would be four proposed staging or stockpile areas—the dry lakebed near the intake structure; the right abutment; and two on the left bank below the spillway. The disturbed forest areas would be replanted and allowed to

mature to the preconstruction forest condition. However, it would take 40 to 50 years for the trees to mature, so in the short term, LWD recruitment potential would be lost and the benefits to habitat-forming processes would be reduced. The loss of LWD recruitment would be limited to those areas within 100 to 150 feet of the river and is expected to be minor.

During construction of the fish ladder and adult collection facility, there would be a temporary loss of fish habitat from installation of the left-bank cofferdam. Use of the left-bank cofferdam would allow for the lowermost section of the fish ladder to be constructed in the dry, and sediment containment measures would be used to prevent fine sediments from entering the river.

The potential for accidental spills of contaminants would be similar to those described for the downstream passage facilities. Minimization measures and BMPs described in Section 5.2.4.1 would be in place to ensure that accidental spills and contaminant releases do not occur.

Over time, fish would benefit from upstream passage facilities by allowing access to approximately 29.4 miles of historic spawning and rearing habitat (Figure 5-1). The small loss of habitat in the dam area due to construction of the barrier dam and fish ladder facility would be minor in comparison to the habitat that would be accessible under this alternative. Temporary impacts to fish resources as a result of potential localized increases in turbidity and sedimentation would be minimized by the implementation of BMPs for the control of erosion and sedimentation. While regeneration of riparian habitat would take decades to reach maturity, new habitat upstream would continue to support habitat-forming processes and contribute to improved fish population dynamics. Minimization and mitigation measures and impact avoidance techniques are discussed further in Section 5.3.5. It is anticipated that fisheries resources in the Cle Elum River would eventually benefit, with some minor and temporary short-term impacts.

The mortality rate would be extremely low for fish removal activities during construction. A biological assessment will be prepared to address impacts to listed species from fish removal activities. In general, NMFS and the Service will allow for some take of listed species when they issue their Biological Opinion for the proposed project and selected alternative. This is usually based upon fish density data, if available. Adherence to established fish removal protocols and having a qualified biologist(s) performing fish removal will minimize fish mortality during removal activities. If done correctly, there should be no mortality; however, there is always an inherent risk when performing any type of fish handling activity that has the potential to injure or harm fish, such as the use of electrofishing.

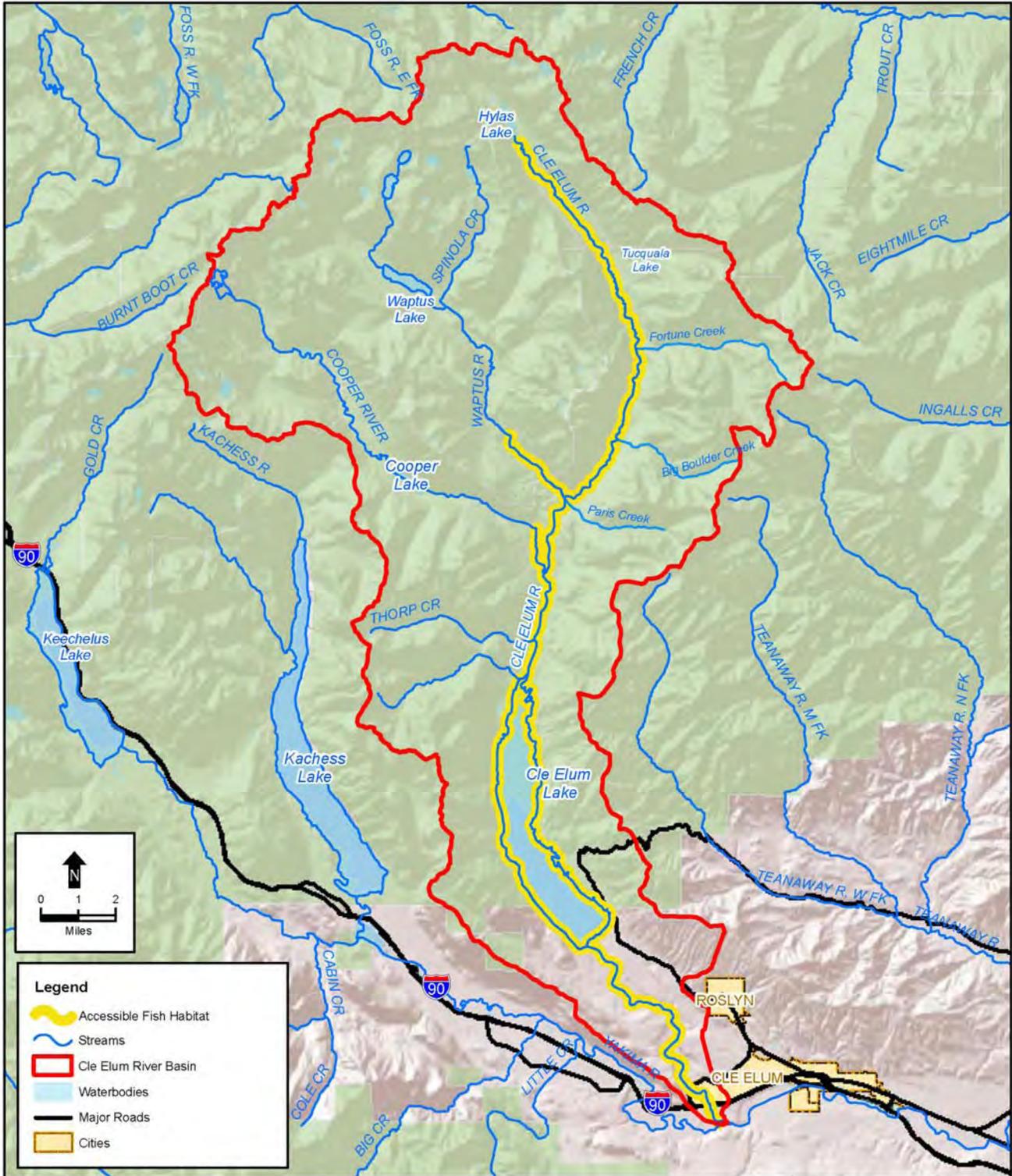


Figure 5-1. Accessible fish habitat in the Cle Elum basin.

5.3.4 Alternative 3 – Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam

5.3.4.1 Downstream Fish Passage Facilities

Construction and long-term impacts for the downstream fish passage would be similar to those described for Alternative 2 except that there would be no access bridge.

5.3.4.2 Upstream Fish Passage Facilities

Construction and long-term impacts would be similar to those described for the upstream fish passage facilities under Alternative 2. However, the right-bank cofferdam would be much smaller since it only has to isolate the construction area where the lowermost section of fish ladder and juvenile bypass conduit chute enter the river. There would be less fish habitat loss because the channel spanning barrier dam would not be required under this alternative. Habitat loss would include that necessary for the installation of the lowermost section of ladder, juvenile bypass conduit chute, and flow attractant pump.

5.3.5 Mitigation

Mitigation measures would be the same as those described for Alternative 2 under water quality (Section 5.2.4.1). In addition to these mitigation measures, special fish removal standards and protocols would be utilized to remove fish from areas to be dewatered. The NMFS fish removal protocols and standards would be used and carried out by a qualified biologist. Reclamation would submit for and obtain State and Federal permits/approvals, including an HPA from WDFW.

Reclamation would also meet Section 7 requirements of the ESA by completing a biological assessment and consulting with the Service and NMFS on any direct or indirect effects to listed species or designated critical habitat. If formal consultation is required, a Biological Opinion would be developed by the Service or NMFS, which would outline the level of take permitted and provide guidance on how to minimize the amount of incidental take. While not considered mitigation, the receipt of necessary approvals/permits ensures that the impacts associated with the project are minimized to all extents practicable.

To mitigate for the potential loss of LWD recruitment over the short and long term, all coniferous trees removed would be used for habitat enhancement activities in the Cle Elum River basin.

5.4 Vegetation

5.4.1 Methods and Impact Indicators

Impacts to vegetation were based on the amount of area disturbed by the footprint of the downstream and upstream fish passage facilities and any associated elements. Impacts include the amount of vegetation that would be temporarily disturbed and subsequently replanted, and vegetation that would be permanently removed and replaced with project facilities.

5.4.2 Alternative 1 – No Action Alternative

There would be no construction under the No Action Alternative; therefore, no impacts to existing vegetation would occur.

5.4.3 Alternative 2 – Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam

Table 5-1 summarizes the temporary loss of habitat that would occur during construction, and the permanent loss of habitat resulting from the fish passage facilities under Alternative 2. Table 5-2 summarizes and compares the temporary, permanent, and total impact areas for Alternatives 2 and 3. In total, Alternative 2 would result in approximately 3 acres more impact to vegetation and habitat than Alternative 3. The differences between the alternatives are discussed in detail under Alternative 3.

5.4.3.1 *Downstream Fish Passage Facilities*

About 17,500 square feet (0.4 acres) of drawdown zone habitat (disturbed lakebed) would be permanently replaced by the juvenile passage intake structure. Construction of the juvenile bypass conduit would result in the removal of approximately 640,000 square feet (14.7 acres) of second-growth forest adjacent to the spillway for construction access. Following construction, this disturbed area would be replanted with native conifer trees and allowed to mature to the preconstruction forest condition. This would result in a loss of forest habitat until the area is reestablished with a native forest community. The reestablishment could take 40 to 50 years.

Approximately 157,500 square feet (3.6 acres) of second-growth forest (Douglas fir, pine and cottonwood) would be removed during construction for stockpile and staging areas for the juvenile fish passage facilities. In addition, about 2,600 linear feet of existing access roads would be widened and drains added. This road work would primarily affect already disturbed areas adjacent to the roads.

5.4.3.2 Upstream Fish Passage Facilities

About 23,700 square feet (0.54 acres) of riparian and second-growth forest (Douglas fir, pine and cottonwood) would be permanently replaced by the fish ladder and adult collection facility. Staging and stockpile areas would require the removal of approximately 65,800 square feet (1.5 acres) of second-growth forest during the construction period. The new access road for the adult fish barrier would remove approximately 550 linear feet of disturbed Douglas fir and pine forest, in addition to the other access roads described above to the downstream fish passage facilities.

Table 5-1. Habitat losses associated with Cle Elum Reservoir construction of fish passage facilities under Alternative 2.

Feature	Location	Amount (approx.)	Type	Duration
Downstream Juvenile Fish Passage				
Access Ramp to Bridge	Forebay between dam and intake structure	7,500 sq. ft. (150 x 50 ft.) 0.17 acres	Drawdown zone	Permanent
Intake Structure	500 ft. upstream of existing outlet works gatehouse	17,500 sq. ft. (175 x 100 ft.) 0.4 acres	Drawdown zone	Permanent
Juvenile Bypass Conduit (temporary)	From intake structure to conduit exit	640,000 sq. ft. (400 x 1600 ft.) 14.7 acres	Second-growth forest – Douglas fir/ponderosa pine	Construction
Juvenile Bypass Conduit (permanent)	From intake structure to conduit exit	76,000 sq. ft. (50 ft. x 1,520 ft.) 1.7 acres	Second-growth forest – Douglas fir/ponderosa pine	Permanent (50 yrs to maturity)
Staging & Stockpile Areas	Forebay in drawdown zone and right abutment	157,500 sq. ft. 3.6 acres	Drawdown zone Riparian/second-growth forest	Construction
Upstream Fish Passage				
Barrier Dam	Immediately downstream from stilling basin	106,400 sq. ft. (280 x 380 ft.) 2.4 acres	Riverine & Riparian	Construction
Barrier Dam	Immediately downstream from stilling basin	13,000 sq. ft. (298 x 44 ft.) 0.3 acres	Riverine	Permanent
Fish Ladder & Adult Collection Facility	Left bank downstream from dam adjacent to spillway	23,700 sq. ft. (210x110 + 10x60) 0.5 acres	Riparian & second-growth Douglas fir, pine & cottonwood	Permanent
Staging & Stockpile Areas	Left bank below spillway	65,800 sq. ft. 1.5 acres	Riparian/second-growth forest	Construction
Access Roads				
Improved Access Roads (existing)	Throughout project	2,600 ft. (linear)	Disturbed areas adjacent to existing roads	Permanent
New Access Roads	Access to right side of adult fish barrier	550 ft. (linear)	Disturbed areas used for camping in Douglas fir & pine forest	Permanent

Table 5-2. Comparison of habitat impacts, Alternatives 2 and 3.

Impact	Alternative 2	Alternative 3
Temporary	969,700 sq. ft. (22.3 acres)	863,300 sq. ft. (19.8 acres)
Permanent	137,700 sq. ft. (3.2 acres)	117,200 sq. ft. (2.7 acres)
Total	1,107,400 sq. ft. (25.5 acres)	980,500 sq. ft. (22.5 acres)

Note: Totals do not include permanent impacts from access roads totaling 3,150 linear feet, which are the same for both alternatives.

5.4.4 Alternative 3 – Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam

Table 5-3 summarizes the temporary loss of habitat that would occur during construction, and the permanent loss of habitat resulting from the fish passage facilities under Alternative 3. Table 5-2 summarizes and compares the temporary, permanent, and total impact areas for Alternatives 2 and 3.

5.4.4.1 Downstream Fish Passage

Alternative 3 would result in 7,500 square feet (0.17 acres) less permanent impact to habitat than Alternative 2 for downstream fish passage facilities because it does not include an access ramp. The other downstream fish passage facility impacts are the same under both alternatives.

5.4.4.2 Upstream Fish Passage

Alternative 3 would not require construction of a barrier dam, resulting in 119,400 square feet (2.7 acres) less habitat impact than Alternative 2 for upstream fish passage facilities.

The fish ladder and adult collection facility would be located on the right bank adjacent to the spillway under Alternative 3. This would be part of the same area cleared of riparian and second-growth forest for construction of the juvenile bypass conduit. The long-term impact would be permanent replacement of a portion of this area by the adult collection facility. The left bank would not be impacted under this alternative.

The amount of area disturbed for existing road improvements would be somewhat less than for Alternative 2 because access on the left bank for the adult collection facility would no longer be necessary.

Table 5-3. Habitat losses associated with Cle Elum Reservoir construction of fish passage facilities under Alternative 3.

Feature	Location	Amount (approx.)	Type	Duration
<i>Downstream Juvenile Fish Passage</i>				
Access Ramp to Bridge	Forebay between dam and intake structure	Eliminated	n/a	n/a
Intake Structure	500 ft. upstream of existing outlet works gatehouse	17,500 sq. ft. (175 x 100 ft.) 0.4 acres	Drawdown zone	Permanent
Juvenile Bypass Conduit (temporary)	From intake structure to conduit exit	640,000 sq. ft. (400 x 1600 ft.) 14.7 acres	Second-growth forest – Douglas fir/ponderosa pine	Construction
Juvenile Bypass Conduit (permanent)	From intake structure to conduit exit	76,000 sq. ft. (50 ft. x 1,520 ft.) 1.7 acres	Second-growth forest – Douglas fir/ponderosa pine	Permanent (50 yrs to maturity)
Staging & Stockpile Areas	Forebay in drawdown zone and right abutment	157,500 sq. ft. 3.6 acres	Drawdown zone Riparian/second-growth forest	Construction
<i>Upstream Fish Passage</i>				
Barrier Dam	Immediately downstream from stilling basin	Eliminated	n/a	n/a
Fish Ladder & Adult Collection Facility	Right bank downstream from dam adjacent to spillway	23,700 sq. ft. (210x110 + 10x60) 0.5 acres	Riparian & second-growth Douglas fir, pine & cottonwood	Permanent
Staging & Stockpile Areas	Left bank below spillway	65,800 sq. ft. 1.5 acres	Riparian/second-growth forest	Construction
<i>Access Roads</i>				
Improved Access Roads (existing)	Throughout project	2,600 ft. (linear)	Disturbed areas adjacent to existing roads	Permanent
New Access Roads	Access to right side of adult fish barrier	550 ft. (linear)	Disturbed areas used for camping in Douglas fir & pine forest	Permanent

5.4.5 Mitigation

Following completion of construction activities, Reclamation would contour, restore, and revegetate all disturbed areas. Restoration activities would begin in the spring following project completion. Areas would be replanted with native vegetation, including conifers, and allowed to mature. It would take 40 to 50 years for conifers to mature.

5.5 Wildlife

5.5.1 Methods and Impact Indicators

The impacts indicators for wildlife are the amount of habitat removal and potential disturbance of wildlife species. Wildlife species commonly found in the project area are described in Section 4.5.

5.5.2 Alternative 1 – No Action Alternative

The No Action Alternative assumes that no construction would occur; therefore, no construction-related impacts to wildlife would occur. Wildlife species above Cle Elum Dam would continue to experience reduced productivity of the ecosystem, including a reduced availability of fish prey. Removal of the interim fish passage facilities could create noise that would cause minor, temporary impacts to wildlife. Wildlife would likely avoid the area during construction periods.

5.5.3 Alternative 2 – Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam

Table 5-1 lists the estimated amount and type of habitats that would be affected, both temporarily and permanently, under Alternative 2. Wildlife species that inhabit riparian and upland forests in the project area would be disturbed or displaced during the 3 years of project construction. Riparian areas are used by many species including bear, deer, elk, heron, waterfowl, small mammals, reptiles, amphibians, cavity-nesting birds, raptors, and a variety of songbirds. Some losses of individual animals may occur if there is not sufficient unoccupied habitat in the adjacent areas during construction. This would be offset somewhat by the relatively small areas disturbed.

As shown in Table 5-2, approximately 22 acres of forest habitat would be lost during construction and subsequently restored, while approximately 3 acres of forest habitat would be permanently lost. Over time as the forest matures, wildlife species are expected to become reestablished in the restored forest areas.

Construction activities and noise could result in the temporary displacement of wildlife in the area such as birds and small mammals. Construction-related noise is discussed in more detail in Chapter 4. Based on the types of equipment used in construction, it is estimated that construction noise would be reduced to background levels between 3,600 and 12,800 feet (2.4 miles) from the construction area. This is a conservative estimate and the actual distance is likely to be much less due to topography, dense vegetation, and wind in the project area. Each species of wildlife has a different response to noise and those responses may even be different within individuals of a certain species. Little is known about

wildlife response to noise; however, it is a general assumption that most wildlife have better hearing than humans and may be more sensitive to increased noise levels. What is known is more focused on threatened and endangered species such as the spotted owl (see Section 5.6.3.6).

Human activities associated with the operation of the juvenile passage intake structures, the adult collection facilities, as well as operation of the trap-and-haul trucks, would increase in the project area and may also result in long-term disturbance of wildlife, as well as a slight increase in mortality risk from vehicle collisions.

5.5.4 Alternative 3 – Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam

Impacts to wildlife would be similar to those described for Alternative 2. However, Alternative 3 would result in approximately 3 acres less total disturbed area than Alternative 2 (Table 5-2). This is because Alternative 3 would not include a barrier dam or access ramp, and because the fish ladder and adult collection facility would be located on the right bank and the left bank would not be disturbed (see Table 5-3).

5.5.5 Mitigation

Forested habitats that are removed during construction but not permanently eliminated by fish passage facilities would be restored by replanting the areas with native conifer trees. Restored areas would be allowed to mature. Approximately 40 to 50 years would be required for trees to reach maturity.

5.6 Threatened and Endangered Species

5.6.1 Methods and Impact Indicators

The impact indicators for threatened and endangered species are habitat loss and disturbance of the species. Federal and State threatened, endangered, and other special-status species in the project area are described in Section 4.5. Impacts to these species are largely related to vegetation removal, clearing and grading activities, and increased noise and human activity during construction. The potential for adverse impacts will be minimized by limiting the construction footprint to that necessary to construct the project and by implementing construction BMPs to further minimize these impacts. Overall, the proposed project is anticipated to result in a net benefit to fish, wildlife and vegetation by increasing primary productivity within the watershed through introduction of marine derived nutrients supplied by returning adult salmon. The following discussion focuses primarily on threatened and endangered species, which due to

their population status require special considerations to ensure that the proposed project will not adversely impact these species or the habitat that supports them.

5.6.2 Alternative 1 – No Action Alternative

Under the No Action Alternative, Reclamation would not modify Cle Elum Dam to include fish passage facilities and the interim fish passage facility would be removed. There would be no increase in ecosystem productivity that would be beneficial to threatened and endangered species that utilize habitat (riverine and terrestrial) above the reservoir. Construction activities and noise associated with removal of the interim fish passage facilities could cause minor temporary impacts to listed species. No in-water work is anticipated, so no impacts to listed fish are expected.

In accordance with the Mitigation Agreement, Reclamation would work with WDFW to identify an as-yet-undetermined alternative to permanent fish passage facilities.

5.6.3 Alternative 2 – Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam

5.6.3.1 Bull Trout

Potential impacts to water quality and fish were previously described in Sections 5.2 and 5.3. Bull trout are not known to spawn below Cle Elum Dam. However, potential use by fluvial juveniles and subadults from the Yakima River is possible in the project area, although not documented.

The proposed intake structure does not currently overlap with federally designated critical habitat for Columbia River DPS bull trout; however, revisions to critical habitat designations are currently being proposed and include the Cle Elum Reservoir (deLavernne, 2009). These proposed designations will likely become effective before project construction occurs.

Overall, the proposed project would benefit bull trout by allowing access to available upstream spawning and rearing habitat and reconnecting populations that were previously isolated by the dam and by increasing the prey base for bull trout.

5.6.3.2 Middle Columbia River Steelhead

Impacts to summer steelhead would be similar to those described for fish in Section 5.3. The proposed barrier dam, fish ladder and juvenile conduit would be located in federally designated critical habitat for MCR steelhead.

Overall, the proposed project would benefit steelhead by allowing access to available upstream spawning and rearing habitat.

5.6.3.3 *Gray Wolf*

Gray wolves may occasionally pass through this area of forest as they are a wide-ranging species. If gray wolves are present during construction, they are likely to avoid the construction area. Since they are wide ranging and not known to breed in this area, they are not likely to be negatively affected by the small amount of forest loss that would occur due to this project.

5.6.3.4 *Grizzly Bear*

Like the gray wolf, the grizzly bear is a wide-ranging species that may occasionally occur in the Cle Elum Reservoir area. They are not likely to be negatively affected by the project as the amount of forest loss is very small in comparison to their range.

5.6.3.5 *Canada Lynx*

The Canada lynx is also a wide-ranging species that may potentially occur in the Cle Elum Reservoir area. However, their presence in lower elevation areas, including the project area, is not expected. They are not likely to be negatively affected by the project as the amount of forest loss is very small in comparison to their range. There is no critical habitat for Canada lynx in the vicinity of the proposed fish passage facilities.

5.6.3.6 *Northern Spotted Owl*

The construction area around Cle Elum Dam lies within the CSA for the northern spotted owl which is part of the critical habitat for the species. The I-90 CSA covers an area of 513,520 acres (Service, 2008). There would be a loss of 25.5 acres of forest habitat within this CSA, and therefore a loss of potential foraging and nesting habitat for this species. Most of this habitat loss would be temporary (40 to 50 years until trees reach maturity), with only 3.2 acres of permanent forest loss. Potential foraging habitat for spotted owl would become reestablished in a much shorter time than potential nesting habitat because the owls forage in newly developing forests, but they require mature trees for nesting.

As with other species, increased noise during construction has the potential to have an adverse impact on the northern spotted owl. More information is available on noise impacts to the northern spotted owl than for other species. That information is reported here as an example of potential noise impacts to wildlife.

Threshold distances have been established where a target species (in this case the northern spotted owl) elicits a specific response to noise (Service, 2003). The threshold distances were taken from a Biological Opinion for the Olympic National Forest Program of Activities, and may not necessarily apply to all situations, especially since the forest practices generally use equipment that

differs from construction equipment and includes the use of noise-reducing conservation measures (Service, 2003).

The threshold distances include:

- a noise-only detectability threshold (where the noise is detectable to a spotted owl, but the owl does not show a response) – 4 dBA above baseline or ambient noise levels);
- a noise-only alert threshold where the northern spotted owl shows an apparent interest by turning the head or extending the neck – 57 dBA;
- a noise-only disturbance threshold where the spotted owl shows avoidance of the noise by hiding, defending itself, moving the wings or body, or postponing a feeding – 70 dBA; and
- a noise-only injury threshold where the spotted owl is actually injured, which can be defined as an adult being flushed from a nest or the young missing a feeding – 92 dBA.

The detectability, alert, and disturbance threshold distances differ as baseline noise differs, but the injury threshold of 92 dBA remains constant.

Construction noise is considered point source noise. Noise from a point source spreads spherically over distance, traveling in all directions equally from the source. The standard reduction for point source noise is 6 dB per doubling of distance from the source (Service, 2003). An additional 1.5 dB reduction can also be added to the 6 dB when soft site conditions exist such as ground cover or normal unpacked earth between the source and the receptor. Dense vegetation can also reduce noise levels by 5 dB for every 100 feet of vegetation, up to a maximum of 10 dB.

The loudest piece of equipment expected to be used at the fish passage facilities project site is a pile driver with an L_{max} of 110 dBA at 50 feet (Section 4.10.1). In general, soft site conditions exist on the site, which means that noise levels would be reduced by 7.5 dB per doubling of distance. In addition, noise would be further reduced by an additional 10 dB due to dense vegetation. Background noise is anticipated to be approximately 40 dB. Using this information, it was determined that construction noise levels would attenuate to background levels within 12,800 feet from the source.

Spotted owl occurrence in the immediate project area is unlikely due to roads and residential development. However, it is anticipated that construction noise may extend anywhere from 3,600 feet to 12,800 feet (2.4 miles) before reaching background noise levels. The closest documented occurrence of an active reproducing pair of spotted owls is over 3 miles away. A historical breeding pair was documented approximately 1.8 miles away in 1992.

Spotted owls, if present between 6,400 and 12,800 feet from the source, would be able to detect noise from pile driving activity but would likely show no response. Owls would show an alert response between 1,600 and 3,200 feet from the source; would elicit disturbance behaviors between 400 and 800 feet; and would be injured if within 400 feet from the activity causing the noise. Based on this information, and the fact that the closest active nest is approximately 3.8 miles from the construction area, it is unlikely that the northern spotted owl would be adversely impacted by construction noise.

5.6.3.7 *Ute Ladies'-tresses*

Although there are no known populations of Ute ladies'-tresses in the project area, potential habitat for this orchid is present in riparian areas along Cle Elum Reservoir. Potential riparian habitat for this orchid may be disturbed, temporarily or permanently, but is it unlikely that the species would be affected as no populations are known to exist in the project area.

5.6.3.8 *Fisher*

Fishers inhabit dense forest areas and use riparian areas as movement corridors. Like the gray wolf and grizzly bear, the fisher is a wide-ranging species that is unlikely to be affected by the small-scale habitat changes anticipated due to this project. In addition, no fishers have been recorded specifically in the Cle Elum River basin.

5.6.3.9 *State Sensitive and Candidate Species*

Several State sensitive and candidate species may be affected by riparian and upland forest habitat loss in the project area.

Lewis', white-headed, and pileated woodpeckers forage and nest in mature and dead trees that may be lost due to the project. These species, if present, might lose valuable nesting and foraging habitat as a result of the project.

Birds of prey, including bald eagle, golden eagle, flammulated owl, merlin, northern goshawk, and peregrine falcon, are more likely to be affected by a loss of potential prey habitat than potential nesting habitat. These species forage on birds and mammals that live in forest and riparian habitats, such as those that would be affected by the project.

Only the lower area of the reservoir, adjacent to the dam, would be affected by the project. Therefore, the project is unlikely to have a negative effect on the common loon, which would be able to access the rest of the 7.4-mile-long reservoir.

Riparian habitat for two amphibians, western toad and tailed frog, may be affected during construction. However, the reservoir habitat area that would be affected is

not a prime habitat location for either of these species. Western toad prefers shallow wetlands and tailed frogs are found in clear, cold streams.

If present in the project area, sharp-tailed snakes may be affected by the loss of forest habitat during construction. Individual snakes could be killed during construction, and potential habitat would be lost for this species.

Foraging habitat for Townsend's big-eared bat and wolverine may be lost. Townsend's big-eared bats forage over riparian areas and forest openings, and wolverines forage in forested areas.

Riparian habitat that may contain western ladies tresses would be lost in the project area, though populations of this plant species have not been observed in this area.

Thompson's chaenactis grows on dry, rocky slopes. This habitat is not present in the project area and this species is unlikely to be affected by the project.

5.6.4 Alternative 3 – Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam

Impacts for threatened and endangered species in the area would be similar to those for Alternative 2. The impact to federally designated critical habitat for MCR steelhead would be less than Alternative 2 due to the lack of the barrier dam. Impacts to steelhead critical habitat would still occur due to installation of the flow attractant pump and the lower end of the fish ladder and juvenile bypass conduit, but these impacts would be significantly less than under Alternative 2.

5.6.5 Mitigation

5.6.5.1 Bull Trout

Mitigation measures would be the same as those described for water quality for Alternative 2 (Section 5.2.4.1).

5.6.5.2 Middle Columbia River Steelhead

Mitigation measures would be the same as those described for water quality for Alternative 2 (Section 5.2.4.1).

In addition, for both action alternatives, spawner surveys would be conducted in late spring to determine if steelhead are spawning or rearing in the areas that could potentially be affected by cofferdam installation and removal. Recent radio telemetry work completed by Karp et al. (2009) found no steelhead beyond RM 3 in the lower Cle Elum River, so the likelihood of steelhead spawning and rearing occurring within the construction area is remote.

5.6.5.3 Wildlife Species

Mitigation measures for restoring forested habitat are described for Alternative 2 under Wildlife (Section 5.5.5).

5.6.5.4 Plant Species

Once the final construction design is completed, plant surveys would be conducted in proposed construction areas to determine if any special-status plant species would be affected by the project. The plant surveys would be conducted during the growing season when Ute ladies'-tresses and western ladies tresses are most likely to be observed in the field. If either of these species is observed in or near the proposed construction area, mitigation would be provided for protecting these rare plant populations.

5.7 Visual Resources

5.7.1 Methods and Impact Indicators

The visual impacts of the new fish passage facilities under Alternatives 2 and 3 were evaluated by comparing the expected outcome of the alternatives to the No Action Alternative. The potential impacts were also evaluated by examining the extent to which the facilities comply with visual resources management direction established in the 1990 Wenatchee National Forest Plan and the USFS Scenery Management System as described in Section 4.7 (USDA, 1995).

5.7.2 Alternative 1 – No Action Alternative

No new fish passage facilities would be installed under the No Action Alternative; therefore, there would be no impacts to visual resources. Removal of the existing interim fish passage facilities would restore the dam closer to its historic appearance.

5.7.3 Alternative 2 – Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam

The visual impact caused by the removal of second-growth forest for construction would gradually improve over time as trees reach maturity. Permanent fish passage facilities that would be visible upstream of the dam include the intake structure and access bridge. The intake structure would consist of a multilevel gated structure and concrete intake tower located 500 feet upstream of the dam (Figure 2-2). Depending on the elevation of the reservoir, the intake structure would be partially or entirely visible above water. Views of the construction site would generally create an unattractive visual setting during the construction period.

Permanent fish passage facilities that would be visible downstream from the spillway include the barrier dam, fish ladder, and collection facility. Visual impacts of downstream facilities would be minimal given the limited viewpoints of this area.

In general, the fish passage facilities would have minimal visual impact, remaining subordinate to the existing dam and associated structures. Consultation with the architect for the facility in advance of final design preparation would ensure the new facilities and the restoration of the lands disturbed for their construction would meet the prescribed VQO of Retention and corresponding SIL of High (see Section 4.7) to the extent practicable. No views from the Mountains to Sound Greenway National Scenic Byway would be affected by the permanent fish passage facilities.

Table 5-4 summarizes effects on views.

Table 5-4. Summary of visibility during construction -- Cle Elum Reservoir.

Location	Visible Items	Viewpoint	Likely Period of View
Above dam, on or adjacent to reservoir	Construction activities, heavy equipment, cofferdam, etc.	SR-903, east of the dam and north, through trees, generally half a mile or greater	A minute or less, depending on speed of travel and distance from dam
		Reservoir, shoreline, campgrounds, generally unobstructed, a thousand feet or more	Several minutes or more, depending on level of interest in construction activities and distance from the dam
		Residences, east of the dam and north, adjacent to or overlooking the reservoir, portions through trees, portions unobstructed, generally a half mile or greater	Variable, depending on level of interest in construction activities and distance from the dam
Below dam	Construction activities, heavy equipment, excavation, cofferdam, etc.	SR-903, east of the dam and south, through trees, generally a half mile or greater, generally not visible	Potentially a few seconds, if visible
		New County Road, south of the dam, through trees, not visible	None
		Riverbank, south of the dam, through trees, from areas publicly accessible during construction, generally 2,000 feet or more, generally not visible	Variable, depending on level of interest in construction activities and distance from the dam, if visible

5.7.4 Alternative 3 – Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam

Relative to Alternative 2, permanent visual resource impacts would be less because the barrier dam and access bridge would not be built, and the intake structure would be relocated against the right abutment.

5.7.5 Mitigation

Visual resources would not be substantially affected by either Alternative 2 or Alternative 3, and no mitigation would be anticipated.

5.8 Air Quality

5.8.1 Methods and Impact Indicators

The impact indicators for air quality are the potential for increased vehicle and equipment emissions and fugitive dust.

5.8.2 Alternative 1 – No Action Alternative

Under the No Action Alternative, no fish passage facilities would be installed; therefore, there would be no construction-related impacts to air quality. Removal of the existing interim fish passage facilities could cause increased fugitive dust and minor increases in traffic emissions to remove the debris. Impacts to air quality from these activities would be minor.

5.8.3 Alternative 2 – Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam

Air quality impacts associated with constructing the proposed facility would be minimal. The primary type of air pollution during construction would be combustible pollutants from equipment exhaust and small dust particles from disturbed soils becoming airborne. Construction activities that can produce dust emissions include excavation, earthwork, trenching, vehicle and truck travel over unpaved roads, wind blowing over disturbed areas, and tailpipe exhaust being emitted from vehicles and equipment. Short-term emissions from construction sites are exempt from air quality permitting requirements. Construction emissions would vary from day to day, depending on the timing and intensity of construction. Dust emissions would be noticed by recreational users and residents near the dam, but neither are located in the immediate construction area. The road that equipment would travel on is paved, so dust emissions would not affect people accessing the area.

No adverse air quality impacts are anticipated with the long-term operation of the fish passage facilities.

5.8.4 Alternative 3 – Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam

Impacts to air quality would be similar to those described for Alternative 2.

5.8.5 Mitigation

The contractor would be required to maintain roads used during construction, and dust abatement efforts would be enforced. The project would comply with all applicable emission standards. Appropriate BMPs including maintaining construction equipment would reduce potential impacts.

5.9 Climate Change

5.9.1 Methods and Impact Indicators

The impact indicators for climate change are the production of greenhouse gas emissions and the effect of climate change on the project.

5.9.2 Alternative 1 – No Action Alternative

Under the No Action Alternative, removal of the existing interim fish passage facilities would require some vehicle trips to haul away debris. Those limited trips would not add significantly to greenhouse gas emissions. Fish passage would not be provided at the dam, and the habitat above the dam would continue to be inaccessible to anadromous fish. Fish populations would not increase and fish would not have access to cooler tributaries. This may make it more difficult for fish to withstand changing climatic conditions.

5.9.3 Alternative 2 – Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam

Construction equipment and traffic associated with Alternative 2 would generate greenhouse gas emissions that contribute to climate change. However, the increased emissions are not expected to cause appreciable impacts because they would be relatively small.

Current predictions of the effects of climate change in the Yakima River basin (Section 4.9) indicate a potential decline in snowpack with resulting changes in reservoir storage. Reservoir storage at Cle Elum is predicted to increase in winter months, but decrease in summer months. The reservoir is predicted to drop below 10 percent of its capacity between 63 and 76 percent of the time instead of the current 33 percent of the time. The predicted changes in runoff and reservoir storage could affect operation of the Yakima Project. Specifically, it could affect how the fish passage facilities at Cle Elum Dam are operated. Because of the uncertainty of predictions of runoff and precipitation in the Yakima basin, it is not possible to discuss those impacts quantitatively at this time. If less water is available in Cle Elum Reservoir or if the runoff occurs earlier in the year, water availability for irrigation and fish passage facility operations could be affected.

Increased temperatures are predicted to affect fish by interfering with salmon migration, elevating the risk of disease, and increasing mortality (Section 4.9). Fish passage facilities at Cle Elum Dam would expand the habitat available to anadromous fish, increasing the abundance and productivity of fish. The improved health of fish populations and access to cooler tributary streams should help fish withstand the impacts of climate change.

5.9.4 Alternative 3 – Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam

Climate change impacts would be similar to those expected for Alternative 2.

5.9.5 Mitigation

Greenhouse gas emissions from construction equipment and vehicles could be reduced by following BMPs such as maintaining engines in good working order and minimizing trip distances.

Changes in water availability in the Yakima River basin will require Reclamation to adaptively manage the river in response to changing conditions. Reclamation will coordinate with the fisheries comanagers and other water interests in the basin to adapt to climate change.

5.10 Noise

5.10.1 Methods and Impact Indicators

The impacts indicators for noise are increases in noise associated with construction or operation of the fish passage facilities.

5.10.2 Alternative 1 – No Action Alternative

Under the No Action Alternative, no permanent fish passage facilities would be constructed. There would be no noise impacts associated with construction or operation of the facilities. Minor noise impacts would occur when the existing interim passage facilities are removed and hauled from the site.

5.10.3 Alternative 2 – Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam

Noise associated with excavation, construction, and material hauling would be the most noticeable impacts. Noise impacts would occur during 7 months each year of the 3-year construction period at Cle Elum Dam. The increase in noise would be temporary, localized, and limited to daytime hours. Construction noise is exempt from regulation under the WAC if conducted within the hours specified

within the Code (Section 4.10.1). People recreating in the area adjacent to the dam would be subject to construction noise; however, there is limited recreational use of the area close to the dam where construction would occur. These users may choose to recreate in other areas of the reservoir during the construction period. No residences are located near the proposed construction activities. Construction noise could also temporarily affect wildlife as described in Sections 5.5 and 5.6.

Some of the construction equipment that would be used to install the fish passage facilities would operate at noise levels high enough to cause hearing damage. Because the noise levels would dissipate below those levels within a less than 1,000 feet from the construction area, the only people likely to be exposed to damaging noise levels would be construction workers and other workers at the dam. Those workers would wear hearing protectors to reduce damage.

None of the fish passage facilities would generate noise once operational; therefore, no adverse noise impacts are expected from operation of the fish passage facility at Cle Elum Dam.

5.10.4 Alternative 3 – Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam

Noise impacts would be similar to those described for Alternative 2.

5.10.5 Mitigation

The project would comply with applicable noise regulations by restricting construction activities to daytime hours. Construction workers would comply with safety regulations regarding noise. Because the noise impacts are expected to be minor and temporary, no other mitigation is proposed.

5.11 Recreation

5.11.1 Methods and Impact Indicators

The impacts indicators for recreation are disturbance of recreational areas, access limitations, and increased noise.

5.11.2 Alternative 1 – No Action Alternative

There would be no impacts to recreation under the No Action Alternative because no construction would occur. Truck traffic to haul away debris from the existing interim fish passage facilities would not limit access to recreation areas.

5.11.3 Alternative 2 – Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam

One of the primary effects on recreation users with implementation of Alternative 2 would be disruption caused by construction traffic. All construction traffic accessing the site would use SR-903 and FR 4330, the main recreational access to Cle Elum Reservoir and beyond. Construction would occur during the prime recreation season for 3 years; however, the intensity of construction traffic would vary and would be light during some periods. Equipment deliveries would be limited to weekdays and workers traffic would mostly occur outside peak recreation times. Therefore, construction traffic is not expected to cause significant delays for recreationists.

Construction and use of the new access road to the barrier dam would disrupt the solitude of anglers, hikers, and dispersed campers within sight and sound of the roadway. However, this should be minor as recreational use within this area is low to moderate and there is no designated campground. This and any other newly established roads, or roads which are not presently used by recreationists and are not needed for future O&M of the facilities, would be closed at the end of construction and then restored. This would prevent any major changes to the character of the landscape due to increased public use and access.

Reservoir users within sight and sound of the construction area would experience disruption of their recreational experience because of noise and dust. The magnitude of the impact would be directly related to the distance from the project area. The project would not affect recreation facilities such as established campgrounds, boat ramps, or trailheads. Reservoir users would be able to move to areas of the reservoir where disruption would be minimal.

No long-term impacts to recreation would occur from the operation of the fish passage facilities.

5.11.4 Alternative 3 – Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam

Impacts to recreation would be similar to those described for Alternative 2. Because the barrier dam and access road would not be built, no construction-related recreational impacts would occur to users of those areas.

5.11.5 Mitigation

Many recreationists in the area originate from communities within the region. Therefore, a public communication strategy using community media such as newspapers, local television, and radio would be effective in preparing recreation users for possible construction-related delays, traffic slowdowns associated with slow-moving construction equipment, increased dust and noise, and potential road congestion. No equipment or construction material deliveries would occur during

high-use weekends or when recreation activity is expected to increase. Reclamation will continue to coordinate with the USFS to minimize construction impacts to recreation.

5.12 Land and Shoreline Use

5.12.1 Methods and Impact Indicators

The impacts indicators for land and shoreline use are property acquisition, conversion of land uses, and compliance with applicable zoning regulations.

5.12.2 Alternative 1 – No Action Alternative

There would be no impacts to land and shoreline use under the No Action Alternative because no construction would occur.

5.12.3 Alternative 2 – Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam

All of the fish passage facilities would be constructed on Federal land, so there is no need to acquire property. Some vegetated riparian areas would be converted to fish collection facilities or other fish passage facility use. The area that would be converted is small (less than 3 acres) and the uses are compatible with other uses of the dam. Because all land involved with the project is Federal, local zoning regulations do not apply; however, the project is compatible with the Commercial Forest zoning. Because the Cle Elum River and Reservoir are regulated under the Shoreline Management Act, shoreline permits may be required from Kittitas County.

5.12.4 Alternative 3 – Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam

Impacts to land and shoreline use would be similar to those described for Alternative 2.

5.12.5 Mitigation

Because the project is compatible with existing land and shoreline use and no property acquisition is required, no mitigation is required.

5.13 Utilities

5.13.1 Methods and Impact Indicators

The impacts indicators for utilities are disruptions to existing utilities and the need for additional utilities.

5.13.2 Alternative 1 – No Action Alternative

No impacts to utilities are anticipated under the No Action Alternative. Removal of the interim fish passage facilities is not expected to disrupt utilities, and no new utilities would be required.

5.13.3 Alternative 2 – Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam

Electricity would need to be provided on the left side of the dam for the fish ladder and adult collection facilities. Power poles would most likely be used to supply electricity to these two structures. Power would be provided to the intake structure via a buried cable. Installation is not expected to disrupt electrical utilities, and the minor increased demand for power would not affect regional power supplies. No other new utilities would be required.

5.13.4 Alternative 3 – Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam

Impacts to utilities would be similar to those described for Alternative 2. A buried cable along the left and routed across the spillway to the right abutment would be used to provide electricity to the fish ladder and adult collection facility on the right bank. More power would be required to supply the fish ladder compared to Alternative 2, but the increased power demand is not expected to affect regional power supplies.

5.13.5 Mitigation

Since no appreciable impacts would occur, no mitigation measures would be necessary.

5.14 Transportation

5.14.1 Methods and Impact Indicators

The impacts indicators for transportation are increases in traffic and traffic disruptions.

5.14.2 Alternative 1 – No Action Alternative

The No Action Alternative would not cause impacts to transportation. There would be a limited increase in truck and equipment traffic related to the demolition and removal of the interim fish passage facilities.

5.14.3 Alternative 2 – Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam

Project construction would take place over a 3-year period, largely occurring during the summer and fall seasons. It is anticipated that most of the employees would travel to the worksites from within a 50-mile radius including Yakima and the surrounding area. The roadway network discussed in Section 4.13 would be the primary route used by construction vehicles traveling to and from the project site. Most workers and construction traffic would come from Cle Elum or Ellensburg and would access the site via SR-903.

There are no road limitations that are likely to restrict access of construction equipment to the site. SR-903, which provides access from I-90 to the dam area, is a rural collector road with 12-foot-wide lanes. There are no known weight or height restrictions on the road that would limit construction equipment.

Construction-related traffic would consist of deliveries of project equipment and construction materials (such as concrete and steel) by truck. Truck deliveries are anticipated to occur between 8 a.m. and 4:30 p.m. on weekdays. The exact schedule for construction deliveries is not yet known, but it is expected that most deliveries of equipment and construction materials would be concentrated at the beginning of the construction periods. Construction worker traffic would occur throughout the construction period, with workers arriving before 8 a.m. and leaving after 4:30 p.m. during 6 or 7 days a week, depending on the construction schedule (see Table 2-1).

Worker commutes are not expected to cause major increases in traffic in the project area. Traffic in the area is generally light, with peak traffic occurring on weekend days. Most workers would arrive before peak recreation times of day on weekdays and would leave in the late afternoon. Construction deliveries could cause minor delays to local traffic because they are more likely to occur during peak recreation times of day. However, construction deliveries would not occur on weekends when recreational traffic is highest.

The fish passage project would require new access roads. These roads are described in Section 2.4.3. The project would not require any traffic detours.

The only traffic increase resulting from operation of the fish passage facilities would be occasional maintenance trips. Traffic impacts associated with the fish reintroduction project are described in section 6.14.

5.14.4 Alternative 3 – Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam

Impacts to transportation would be similar to those described for Alternative 2. Alternative 3 would require fewer access roads and would not require access to the left side of the dam (Section 2.5.3).

5.14.5 Mitigation

Public access to the construction site, borrow areas, and staging areas would be restricted. Standard safety measures, such as reduced speed limits and signing, would be required for access roads to the construction site. The contractor would be required to maintain roads during hauling and to restore roads following completion of construction. Dust abatement efforts would also be enforced.

5.15 Environmental Justice

5.15.1 Methods and Impact Indicators

Census data were analyzed to determine the demographic makeup of the project area (see Section 4.14). That information was used to determine if minority or low-income populations would be disproportionately impacted by the project.

The following issues are evaluated to determine potential impacts regarding environmental justice:

- Are affected resources used by minority or low-income populations?
- Are minority or low-income populations disproportionately subject to adverse environmental, human health, or economic impacts?
- Do the resources affected by the project support subsistence living?

5.15.2 Alternative 1 – No Action Alternative

Under the No Action Alternative, no impacts to environmental justice would occur. However, there would be no opportunity to improve subsistence use of available resources because removing the interim fish passage facilities and not installing permanent facilities would not benefit fish species in the basin.

5.15.3 Alternative 2 – Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam

Impacts associated with the installation of fish passage facilities would be minor, temporary, and construction related. The immediate geographic area potentially affected by the alternative has lower percentages of minority and low-income

populations than the Yakima basin counties or the State of Washington. There would be no disproportionate adverse impact to those populations; everyone in the area would be equally affected.

Members of the Yakama Nation and other Tribes outside the immediate geographic area may currently use natural resources in the Cle Elum Reservoir area and would be expected to do so in the future. They may use these resources disproportionately to the total population. The subsistence use of renewable natural resources (such as fish, wildlife, and vegetation) by Tribes or other populations in the construction area and downstream has not been quantified. Improvements to fish abundance from access to habitat above the dam may increase the potential for subsistence use of these resources.

5.15.4 Alternative 3 – Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam

Impacts to environmental justice would be similar to those for Alternative 2.

5.15.5 Mitigation

The project would not have an adverse environmental justice impact, so no mitigation would be necessary.

5.16 Cultural Resources

5.16.1 Methods and Impact Indicators

Impacts indicators for cultural resources are the potential for disturbing known or unknown historic or cultural resources.

5.16.2 Alternative 1 – No Action Alternative

Under the No Action Alternative, Reclamation would not modify Cle Elum Dam to include fish passage facilities. Therefore, there would be no potential for disturbance of cultural resources. Removal of the interim fish passage facilities from the dam would restore it closer to its historic appearance.

5.16.3 Alternative 2 – Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam

Alternative 2 includes extensive construction that would cause ground disturbance in the area around and downstream from the dam. The area was previously disturbed during construction of the dam. The proposed downstream fish passage conduit (Figure 2-1) passes through the original construction camp used during

the building of Cle Elum Dam. While there are no standing structures extant, there may be historical archaeological values that could be affected by ground disturbance. A Kittitas-Yakama seasonal camp, *Aiyalim*, is also located in the dam area. Its exact location is unknown, but the camp could be disturbed by construction. Furthermore, the gated intake structure and access bridge would be attached to Cle Elum Dam, which is potentially eligible for listing on the NRHP. The new facilities could detract from the historic qualities of the dam; however, the dam has undergone other modifications since it was constructed.

5.16.4 Alternative 3 – Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam

Impacts to historic resources would be similar to those described for Alternative 2. However, the intake structure would not be attached to the dam, minimizing the potential impact to the historic structure.

5.16.5 Mitigation

Reclamation's policy is to avoid impacts to historic resources whenever possible. Prior to completing the FEIS, an intensive cultural resources survey of the APE would be conducted to identify any cultural resources that may be affected by this action. If an action is planned that could adversely affect NRHP-eligible archeological, historical, or traditional cultural property sites, Reclamation would investigate options to avoid the site. If avoidance is not possible, protective or mitigation measures would be developed and considered. Cultural resource management actions would be planned and implemented consistent with consultation requirements defined in 36 CFR 800 (Section 106), using methods consistent with the Secretary of the Interior's Standards and Guidelines.

If mitigation is necessary, Reclamation, working in coordination with other involved Tribes and agencies, including the Yakama Nation, the Washington DAHP, and the Advisory Council on Historic Preservation, would develop an agreement that would detail any requirements needed to mitigate and resolve adverse impacts.

Appropriate mitigation would be developed prior to issuing the ROD on the project for NRHP-eligible cultural resources that could be adversely affected by construction operations. If it is determined that Cle Elum Dam is eligible to the NRHP and that the proposed action would have an adverse effect upon the qualities that qualify it for the register, then mitigation such as an Historic American Engineering Record (HAER) recording may be necessary to resolve the adverse effects to the historic fabric of the dam.

It is also possible that either one of the proposed action alternatives may impact historic archaeological resources such as the Cle Elum Dam construction camp, or *Aiyalim*, the Kittitas-Yakama seasonal salmon fishing camp, although the

condition and location of the camps have yet to be verified through archaeological investigation. If it is determined that either camp is eligible to the NRHP and that the proposed action would have an adverse effect upon the qualities that qualify either for the register, then mitigation such as archaeological data recovery and/or ethnohistorical documentation would be conducted.

5.17 Indian Sacred Sites

5.17.1 Methods and Impact Indicators

Impacts indicators for Indian sacred sites are the potential for disturbing or limiting access to such sites.

5.17.2 Alternative 1 – No Action Alternative

Under the No Action Alternative, no impacts to Indian sacred sites would occur as a result of this project. The limited construction activities associated with removal of the interim passage facilities would be confined to the dam and are unlikely to affect Indian sacred sites.

5.17.3 Alternative 2 – Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam

No sacred sites have yet been identified within the project area. Prior to completion of the FEIS, Reclamation would consult with the Yakama Nation regarding potential sacred site issues. Since fish passage construction is a collaborative effort between Reclamation and the Yakama Nation, consultations with the Yakama Nation are ongoing.

5.17.4 Alternative 3 – Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam

Potential impacts to the Indian sacred sites would be similar to those for Alternative 2. Under Alternative 3 there would be less ground disturbed since the left bank area would not be disturbed.

5.17.5 Mitigation

Reclamation's policy is to avoid impacts to sacred sites whenever possible. Additional efforts to identify sacred sites will occur as a part of the cultural resources survey described in Section 5.16.5. Consultation with the Yakama Nation would identify how to protect sacred sites and provide continued access if any such sites would be affected by construction.

5.18 Indian Trust Assets

5.18.1 Methods and Impact Indicators

Impacts indicators for ITAs are the potential for affecting ITAs. To identify ITAs in the project area, Reclamation sent letters to the Yakama Nation and Bureau of Indian Affairs and followed up with telephone calls. No ITAs were identified.

5.18.2 Alternative 1 – No Action Alternative

No impacts to ITAs are anticipated because none have been identified in the project area at this time. If ITAs are identified during future consultation, Reclamation would comply with its Indian Trust Assets Policy (July 2, 1993) that states impacts to ITAs will be avoided whenever possible.

5.18.3 Alternative 2 – Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam

Impacts to ITAs would be similar to Alternative 1.

5.18.4 Alternative 3 – Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam

Impacts to ITAs would be similar to those for Alternative 1.

5.18.5 Mitigation

If ITAs are identified during future consultation, Reclamation would comply with its Indian Trust Assets Policy (July 2, 1993) that states impacts to ITAs will be avoided whenever possible.

5.19 Socioeconomics

Construction and operation of fish passage facilities at Cle Elum Dam associated with the proposed alternatives are expected to generate socioeconomic impacts within Kittitas and Yakima counties due to in-region construction and OMR&P costs.

5.19.1 Methods and Impact Indicators

A brief description of the methods and assumptions employed in the socioeconomic analysis is presented in the socioeconomic affected environment section (4.19.1). Impact indicators for socioeconomics are measured in terms of

output, employment, and labor income associated with changes in upfront construction costs and annual OMR&P costs.

5.19.2 Alternative 1 – No Action Alternative

No socioeconomic impacts are anticipated from the No Action Alternative because no fish passage related construction costs or OMR&P costs would be incurred. Minor costs would be associated with the removal of the interim passage facilities.

5.19.3 Alternative 2 – Right Bank Juvenile Passage with Left Bank Adult Passage with Barrier Dam

5.19.3.1 Upfront Impacts from Construction Costs

Total in-region construction costs for the fish passage facilities at Cle Elum Dam associated with Alternative 2 designs were developed by Reclamation cost engineers. These in-region costs were separated into various construction sectors and run through the IMPLAN model (Section 4.19.1). Results are presented in Table 5-5.

Table 5-5. Cle Elum Dam fish passage facilities—construction cost-related output, employment, and labor income impact (2004).

IMPLAN Industry Numbers	Industry	Industry Output (million \$) ¹	Employment (Jobs) ¹	Total Labor Income(\$) ¹	Percent Change ^{2,3} from Current Conditions ⁴
1-18	Agriculture, Forestry, and Fisheries	423,296	6	119,821	0.02
19-29	Mining	100	0	33	0.00
30-32	Utilities	345,982	1	60,942	0.31
33-45	Construction	61,592,318	615	26,165,785	10.01
46-389	Manufacturing	1,828,748	7	343,255	0.08
390	Wholesale Trade	2,562,389	23	963,375	0.43
391-400	Transportation and Warehousing	1,424,398	15	615,538	0.34
401-412	Retail Trade	3,810,892	63	1,516,919	0.50
413-424	Information	1,058,983	5	224,366	0.26
425-430	Finance and Insurance	1,772,340	11	493,640	0.43
431-436	Real Estate, Rental, and Leasing	1,788,707	12	366,239	0.44
437-494	Services	12,241,776	198	5,646,705	0.47
495-506	Federal, State, and Local Government	1,080,754	6	315,030	0.03
507-509	Other	2,992,727	0	0	n/a
Totals:		92,923,411	961	36,831,646	0.71

¹ Figures in each row are rounded, therefore the totals presented in each column may not agree exactly with the rounded sums.

² See Table 4-11 for current conditions estimates.

³ Note that current conditions estimates in Table 4-9 are in millions of dollars, whereas impact estimates listed above are in dollars.

⁴ The percent change across impact measures varies slightly. The percentages presented reflect employment changes.

Total contract cost of construction of fish passage facilities at Cle Elum Dam for Alternative 2 was estimated at \$81.0 million (2004 dollars), of which \$65.4 million was expected to be incurred within the two-county region. The noncontract costs would not generate economic impacts. These in-region contract construction costs were estimated to generate an additional \$92.9 million of output/sales, 961 jobs, and \$36.8 million of labor income over the 3-year construction period. While the overall impact of this in-region construction activity was estimated to be relatively small—less than 1 percent change in total economic activity as compared to current conditions (see Table 4-11)—certain sectors of the economy are expected to temporarily experience somewhat larger positive impacts (e.g., the construction sector was estimated to incur gains of 9 to 10 percent).

5.19.3.2 Annual Impacts from OMR&P Costs

Average annual OMR&P costs for the Cle Elum Dam fish passage facilities were developed by Reclamation cost engineers and were estimated at \$300,000. All of these costs are assumed to occur within the region. These in-region OMR&P costs were estimated to generate an additional \$436,700 of output/sales, five jobs, and \$216,200 of labor income annually, on average. The impact of these in-region OMR&P costs on the overall economy and, specifically, on the construction industry and other maintenance and repair sector, was estimated to be relatively small (a change of less than 2 percent compared to current conditions).

5.19.4 Alternative 3 – Right Bank Juvenile Passage with Right Bank Adult Passage without Barrier Dam

5.19.4.1 Upfront Impacts from Construction Costs

Results of running in-region contract construction costs through the IMPLAN model for Alternative 3 are presented in Table 5-6. Noncontract costs would not generate economic impacts. Total cost of contract construction of fish passage facilities at Cle Elum Dam for Alternative 3 was estimated at \$60.4 million (2004 dollars), of which \$55.8 million was expected to be incurred within the two-county region. These in-region construction costs were estimated to generate an additional \$75.7 million of output/sales, 790 jobs, and \$30.2 million of labor income over the 3-year construction period. While the overall impact of this in-region construction activity was estimated to be relatively small—less than 1 percent change in total economic activity as compared to current conditions (see Table 4-11)—certain sectors of the economy are expected to temporarily experience somewhat larger positive impacts (e.g., the construction sector was estimated to incur gains in the range of 7 to 8 percent).

Table 5-6. Cle Elum Dam fish passage facilities—construction cost-related output, employment, and labor income impact (2004).

IMPLAN Industry Numbers	Industry	Industry Output (million \$) ¹	Employment (Jobs) ¹	Total Labor Income(\$) ¹	Percent Change ^{2,3} from Current Conditions ⁴
1-18	Agriculture, Forestry, and Fisheries	350,794	5	99,300	0.02
19-29	Mining	69	0	23	0.00
30-32	Utilities	283,014	1	49,895	0.27
33-45	Construction	50,049,441	505	21,474,598	8.22
46-389	Manufacturing	1,516,936	6	287,115	0.06
390	Wholesale Trade	2,076,209	19	780,587	0.34
391-400	Transportation and Warehousing	1,111,387	12	484,590	0.27
401-412	Retail Trade	3,144,699	52	1,251,526	0.41
413-424	Information	872,179	4	184,682	0.22
425-430	Finance and Insurance	1,444,101	9	402,223	0.35
431-436	Real Estate, Rental, and Leasing	1,448,381	10	296,047	0.35
437-494	Services	10,074,370	163	4,655,408	0.39
495-506	Federal, State, and Local Government	887,388	5	258,549	0.02
507-509	Other	2,455,849	0	0	n/a
Totals:		75,714,814	790	30,224,543	0.59

¹ Figures in each row are rounded, therefore the totals presented in each column may not agree exactly with the rounded sums.

² See Table 4-11 for current conditions estimates.

³ Note that current conditions estimates in Table 4-11 are in millions of dollars, whereas impact estimates listed above are in dollars.

⁴ The percent change across impact measures varies slightly. The percentages presented reflect employment changes.

5.19.4.2 Annual Impacts from OMR&P Costs

The annual OMR&P impacts for Alternative 3 were assumed to be essentially the same as for Alternative 2.

5.19.5 Mitigation

Since all of the short-term and long-term cost-based socioeconomic impacts are positive (i.e., they result in a gain in regional economic activity), no mitigation would be necessary.

5.20 Cumulative Impacts

Cumulative impacts are the effects that may result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions (40 CFR 1508.7). “Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR 1508.7). Generally, an impact can be considered cumulative if: a) effects of several actions occur in the same locale; b) effects on a particular resource are similar in nature; and c) effects are long-term in nature. Potential areas where cumulative impacts might occur as a result of the construction and operation of fish passage facilities are discussed below.

Overall, the cumulative impacts of the fish passage facilities project are expected to be beneficial, especially to fish, vegetation, wildlife, and threatened and endangered species. Constructing fish passage facilities would contribute to the restoration of salmon populations in the Yakima River basin. The fish passage facilities would provide access to high quality spawning and rearing habitat that has not been available for a century. Providing access to the area above Cle Elum Dam, combined with other fish passage projects proposed in the basin (Section 1.7.6) would help increase the extent of habitat in the basin for coho, steelhead, and Chinook salmon. It would allow the reintroduction of extirpated sockeye runs and allow expanded migrations and genetic interchange for bull trout. The fish reintroduction project is intended to expedite the recovery of fish populations in the Yakima River basin by reintroducing native anadromous fish and their marine-derived nutrients back into this system. These two projects combined with other fish passage and habitat enhancement projects in the basin would help reverse environmental damage from the early 1900s. These improvements would benefit resident and anadromous fish in the Yakima basin and reduce the risks of further decline.

Improved conditions for fish and increased abundance and productivity of fish populations would also benefit other wildlife in the basin. Although the construction of fish passage facilities would result in some loss of vegetation and habitat in the vicinity of Cle Elum Dam and similar impacts would be expected at other dams, this loss would be compensated for by ecosystem benefits resulting from additional food sources and nutrients for aquatic species, including resident and anadromous fish, as well as terrestrial animals (e.g., bears, eagles) and plants.

Construction of the fish passage facilities would result in minor, temporary impacts that could have cumulative impacts when combined with other proposed construction projects in the area, including the Kittitas County road and bridge project and residential development in the area downstream from the dam. If construction of the fish passage facilities occurs at the same time as construction of other projects proposed in the area, the temporary impacts to water quality, air quality, noise, and transportation could be compounded. Construction could also cumulatively add to the temporary disruption of recreation adjacent to the dam.

Construction impacts are generally expected to be minor and required BMPs would minimize potential cumulative impacts.

Past alternatives have altered the visual appearance of the dam and affected its historic attributes. Construction of the fish passage facilities would further alter the appearance of the dam and potentially detract from its historic attributes. Because public views of the dam are limited, the cumulative visual impacts are not expected to be significant. Reclamation will consult with DAHP to determine the historic significance of the dam and to develop appropriate mitigation measures, if warranted.

Construction of fish passage facilities would result in minor, short-term increases in vehicle emissions. Those increased emissions, combined with those from other construction projects in the area, could also cumulatively contribute to increased greenhouse gas emissions, but those increases would be minor. The fish passage facilities and other new construction in the area would require additional utilities which would add to the power demand in the region. The increased cumulative demand is not expected to result in power shortages. The increased cumulative power demand also has the potential to increase greenhouse gas emissions; however, most of the regional power supply is provided by hydroelectricity and newly developing wind power.

The fish passage project is expected to contribute to cumulative socioeconomic benefits in the region. The fish passage project is not expected to contribute to cumulative impacts to land use or environmental justice.

5.21 Unavoidable Adverse Impacts

Unavoidable significant adverse impacts are defined as environmental consequences of an action that cannot be avoided, either by changing the nature of the action or through mitigation if the action is undertaken. The only unavoidable adverse impact identified for the fish passage alternatives would be the removal of vegetation required for the fish ladder and adult collection facility. The amount of vegetation that would be permanently removed is small (3 acres); therefore, the impact is not considered significant.

5.22 Relationship between Short-Term Uses and Long-Term Productivity

NEPA requires considering “the relationship between short-term uses of man’s environment and the maintenance and enhancement of long-term productivity” (40 CFR 1502.16). This occurs when short-term negative effects are counterbalanced by a long-term positive effect (and vice-versa). Construction of either alternative would cause some short-term adverse impacts to water quality,

fish, vegetation, wildlife, air quality, and noise. These short-term impacts are counterbalanced by the long-term benefits to fish, threatened and endangered species, and ecosystem productivity.

5.23 Irreversible and Irretrievable Commitments of Resources

Irreversible commitments are decisions affecting resources, such as wetlands and vegetation, where the resource is lost and replacement can only occur over a long period or time, or at great expense, or cannot be replaced at all (for example, minerals). Irretrievable commitments refer to loss of production or use of resources as a result of a decision, such as removal of trees which eliminates another harvest until a new stand grows. They represent opportunities foregone for a period of time that a resource cannot be used. While there would be some temporary and permanent removal of vegetation with this project, overall the irreversible and irretrievable commitments of resources associated with that removal are minor relative to the amount of resources available in the basin.

5.24 Environmental Commitments

This section lists the environmental commitments made in the DEIS. Reclamation has the primary responsibility to ensure these commitments are met if an action is implemented.

5.24.1 Water Resources

Application would be made to the U.S. Army Corps of Engineers (Corps) for a permit under Section 404 of the Clean Water Act before commencing any work at the damsite, pumping plant intakes, fish bypass outlets, and contractor use areas, as necessary. Because the fish passage facilities would be located on Federal land, the project is exempt from State construction stormwater permits. If necessary, Reclamation would obtain a Section 401 water quality certification from Ecology. An HPA would be obtained from WDFW. The contractor would be supplied copies of the permits and the associated conditions they would be required to adhere to throughout construction.

The primary mitigation measure to minimize construction impacts to water quality would be to construct the structures when the reservoir lakebed is dry. In addition, seepage pumped from the access bridge, intake structure, and uppermost section of the juvenile bypass conduit construction areas would be collected in a retention pond. This pond would have a pervious liner designed to retain any solids suspended in the water to prevent unwanted materials from seeping into the lakebed soils. The clean water would be allowed to be absorbed into the lakebed.

To prevent soil erosion and sediments from entering the river and adversely affecting water quality during construction of the juvenile bypass conduit, fish ladder, adult collection facility, and access roads, containment measures such as silt fences, sediment containment dams and over-the-bank infiltration galleries would be employed as needed.

The cofferdam for construction of the barrier dam would eliminate the adverse impacts that could result from direct contact with the river from construction activities. Any short-term increases in turbidity and sedimentation caused by construction of the barrier dam would be reduced because only one-half of the river channel would be worked on at a time, allowing the other half of the channel to remain relatively undisturbed. In addition, seepage from within the right- and left-bank cofferdams would be discharged into the riparian zone next to the river, incorporating silt curtains and/or straw bales to trap fine sediments. Seepage would then be allowed to soak into the ground.

Stockpile and staging areas would be isolated with a containment berm or physical structure to reduce erosion and sediment impacts to reservoir and river water quality. Access roads may increase some sediment input to the rivers during precipitation events.

Implementation of BMPs would reduce potential adverse impacts to water quality in the reservoir and river that may occur during construction. To perform any concrete-related work, the contractor would be required to completely isolate all construction areas from water prior to the start of any work. In addition, the contractor would be required to take measures to prevent concrete from coming in contact with a stream or lake for a minimum of 24 hours after the work has been completed to ensure that the concrete has fully cured.

Contractors would be required to treat all construction discharge water (e.g., concrete washout, pumping for work area isolation, vehicle wash water, drilling fluids) as follows:

- Design, build, and maintain facilities to collect and treat all construction discharge water, including any contaminated water produced by drilling, using the best available technology applicable to site conditions.
- Provide treatment to remove debris, nutrients, sediment, petroleum hydrocarbons, metals, and other pollutants likely to be present.
- Prevent pollutants from contacting any wetland or the 2-year floodplain, including green concrete, contaminated water, silt, welding slag, sandblasting abrasive, or grout that has been cured less than 24 hours.

All construction activities would comply with applicable EPA, Occupational Safety and Health Administration, and State requirements for quality and control of runoff from the construction site, sediment control, noise control, and safety.

Fish passage facilities would be operated to ensure no impacts to existing water contracts, TWSA, or flood control operations.

5.24.2 Fish

Mitigation measures would be the same as those described for water resources above (see Section 5.24.1).

5.24.3 Vegetation

Following completion of construction activities, Reclamation would contour, restore, and revegetate all disturbed areas using native vegetation. Restoration activities would begin the spring following each construction season.

5.24.4 Threatened and Endangered Species

Spawner surveys would be conducted in late spring to determine if steelhead are spawning or rearing in the areas that could potentially be affected by cofferdam installation and removal. Recent radio telemetry work completed by Karp et al. (2009) found no steelhead beyond RM 3 in the lower Cle Elum River, so the likelihood of steelhead spawning and rearing within the construction area is remote.

Once the final construction design is completed, plant surveys would be conducted in proposed construction areas to determine if any special status plant species would be affected by the project. The plant surveys would be conducted during the growing season.

5.24.5 Air Quality

The contractor would be required to maintain roads utilized during construction, and dust abatement efforts would be enforced.

5.24.6 Recreation

Reclamation would use community media such as newspapers, local television, and radio to inform recreation users of possible construction-related delays, traffic slowdowns associated with slow-moving construction equipment, increased dust and noise, and potential road congestion.

5.24.7 Land and Shoreline Use

During final design of the project, Kittitas County officials would be contacted to confirm that the project conforms with county ordinances regarding use of county bridges and roads, and Reclamation would apply for a shoreline permit.

5.24.8 Transportation

Public access to the construction site, borrow areas, and staging areas would be restricted. Standard safety measures, such as reduced speed limits and signing, would be required for access roads to the construction site. The contractor would be required to maintain roads during hauling and to restore roads following completion of construction. Dust abatement efforts would also be enforced.

5.24.9 Cultural Resources

An intensive cultural resources survey of the APE would be conducted to identify any cultural resources that may be affected by the project. If an action is planned that could adversely affect an NRHP-eligible archeological, historical, or traditional cultural property site, then Reclamation would investigate options to avoid the site. If avoidance is not possible, protective or mitigation measures would be developed and considered.

If mitigation is necessary, Reclamation, working in coordination with other involved agencies as necessary (depending on the level of mitigation and kinds of resources affected), such as the Yakama Nation, the Washington State DAHP, and the Advisory Council on Historic Preservation, would develop an agreement that would detail any requirements needed to mitigate and resolve adverse effects to eligible cultural resources that may result from the construction and operation of fish passage at Cle Elum Dam.

It is also possible that the project may impact historic archaeological resources such as the Cle Elum Dam construction camp and/or *Aiyalim* (the Kittitas-Yakama seasonal salmon fishing camp) although the condition and locations of the camps have yet to be verified through archaeological investigation. If it is determined that either camp is eligible to the NRHP and that the project would have an adverse effect upon the qualities that qualify either for the register, mitigation such as archaeological data recovery and/or ethnohistorical documentation would be conducted.

Chapter 6

**ENVIRONMENTAL CONSEQUENCES – FISH
REINTRODUCTION PROJECT**

CHAPTER 6

ENVIRONMENTAL CONSEQUENCES - FISH REINTRODUCTION PROJECT

6.1 Introduction

This chapter describes the environmental consequences associated with the fish reintroduction project proposed by WDFW and the Yakama Nation. Because no construction would be required for the fish reintroduction project beyond construction of the fish passage facilities (Chapters 2 and 6), short-term construction impacts are not included in this chapter. The exception is a possible fish hatchery facility that might be constructed in the future. Potential short-term impacts of this facility are described programmatically, where appropriate. Additional environmental review would be undertaken in the future if a fish hatchery project is carried forward. Cumulative impacts are described in Section 6.20.

6.2 Water Resources

6.2.1 Methods and Impact Indicators

Indicators of water quality impacts are (1) increased sedimentation and turbidity (described in Section 4.2.1), and (2) the effect of water quality parameters such as temperature and nutrient levels on the survival of reintroduced fish. Water supply indicators are impacts to TWSA, existing Reclamation contracts, and flood control operations.

6.2.2 Alternative 1 – No Action Alternative

6.2.2.1 *Water Quality*

Because there would be no operational changes or fish reintroduction under the No Action Alternative, water quality would not be affected in Cle Elum Reservoir or the Cle Elum River.

6.2.2.2 *Water Supply*

The No Action Alternative would not impact water supply, because there would be no changes to operations of the dam.

6.2.3 Alternative 2 – Fish Reintroduction Project

Impacts on water quality would be mostly limited to the construction and operation of fish passage facilities described in Section 5.2. Additional effects on water quality due to the fish reintroduction project would be associated with the installation and removal of portable raceways. These actions have the potential to increase sedimentation as the raceways are carried over the banks. These impacts would be minor and temporary. Sedimentation would cause impacts previously described in Section 5.2 near the construction site.

Fish acclimating in the portable raceways would generate waste products. Effluent from the raceways would contain elevated concentrations of ammonia and total suspended solids. Release of the effluent into the river or lake could cause minor, temporary impacts to water quality. It is likely that a mixing zone may be required, which would allow for some exceedences of surface water quality standards within the mixing zone. No adverse impacts to water quality or fishery resources are anticipated due to the small scale of the operation and large volumes of water in the discharge area, which will quickly dilute concentrations to acceptable levels. Fish in holding tanks may be more susceptible to disease and could potentially expose fish in the river or reservoir to harmful pathogens via the raceway discharge. It is recommended that a fish health monitoring program and protocols be established to minimize potential for transfer of pathogens from raceways to Cle Elum Reservoir or the Cle Elum River.

The major water quality limiting factors for anadromous fish production in Cle Elum Reservoir are low nutrient levels, chlorophyll *a* concentrations, phytoplankton and zooplankton populations, and TOC concentrations. Nutrient enrichment of the reservoir is considered a potential method to increase these parameters to support reintroduced populations of anadromous fish. Nutrient enrichment is being undertaken in the interim through the Yakama Nation's introduction of coho salmon above the dam (Reclamation, 2005a).

Cle Elum Reservoir is not included on any impaired water quality or "303(d)" listings (Ecology, 2008). Temperature is generally not an issue within Cle Elum Reservoir. However, the reach of the Cle Elum River just below the dam and at the inlet to Cle Elum Reservoir are 303(d) listed for the temperature parameter. In addition, two short reaches of upper tributaries (Cooper River and Thorp Creek) are also 303(d) listed for temperature. These could present thermal barriers to fish movement during the seasonal low flow summer months. However, the migrating fish would be moving into those areas in late spring or fall when water temperatures would be lower. Given the large extent of high-quality habitat with properly functioning conditions for the temperature indicator, it is not anticipated that the few areas of high stream temperatures would be detrimental to successful fish reintroduction.

Construction of a fish hatchery in the future could create water quality impacts such as increased erosion, sedimentation, and turbidity. Releases of water from

the hatchery facility could introduce additional nutrients to the river, negatively affecting water quality. Additional studies would be conducted on the water quality impacts associated with the fish hatchery facility as part of future environmental review if the project is carried forward.

6.2.4 Mitigation

Mitigation for short-term impacts associated with installation of the portable raceways and the possible construction of a fish hatchery would include BMPs to minimize erosion and to prevent spills from construction equipment. A fish health monitoring program and protocols would be established to minimize potential for transfer of pathogens from raceways and WDFW would coordinate with Ecology to determine appropriate treatment methods for the raceway effluent, if necessary. If a hatchery is constructed, it would be required to be operated in a manner to avoid water quality impacts to the river.

6.3 Fish

6.3.1 Methods and Impact Indicators

In coordination with other State and Federal agencies and the Yakama Nation, Reclamation has conducted numerous studies on the existing environment and the potential for restoring anadromous salmon runs upstream and downstream from Cle Elum Dam. These studies and related summary reports were reviewed along with other related scientific literature for the preparation of this section of the DEIS.

Modeling assumptions have been made in the Cle Elum fish reports for estimating the potential habitat available for salmon species, mainly coho and sockeye. These assumptions are also reflected in the summary data presented here in terms of the estimated potential for future fish populations upstream of the dam.

6.3.2 Alternative 1 – No Action Alternative

Under the No Action Alternative, Reclamation would not construct permanent fish passage facilities at Cle Elum Dam. Approximately 29.4 miles of historic spawning and rearing habitat would continue to be blocked from anadromous fish use. In addition, the existing interim fish passage facilities would be removed which would stop the fish reintroduction efforts that have begun in the basin and restrict downstream passage for the anadromous fish that have been released in Cle Elum Lake. Improvements gained in fish abundance and in ecological productivity upstream of Cle Elum Dam from the interim fish reintroduction project would be lost.

6.3.3 Alternative 2 – Fish Reintroduction Project

Restoring fish passage at Cle Elum Dam and other dams in the Yakima River basin is said to be a key component for both steelhead and bull trout recovery, as well as for reestablishment of sockeye salmon in the Yakima River basin. Restoration of fish passage also offers significant benefits to spring Chinook and coho salmon (YRFWRB, 2008).

The goal of the fish reintroduction project is to increase native salmon populations in Cle Elum Reservoir and its fish passable tributaries including Cle Elum, Cooper, and Waptus Rivers, and to restore productivity in these systems that was lost when Cle Elum Dam was constructed. Since the Cle Elum River basin historically supported sockeye, spring Chinook and coho salmon, and steelhead, anadromous salmonid populations are anticipated to reestablish with installation of fish passage facilities at the dams and as active reintroduction efforts are pursued.

Fish passage and anadromous fish reintroduction are expected to generate ecosystem benefits upstream of Cle Elum Dam by providing additional food sources and nutrients for aquatic species, including resident and anadromous fish, as well as terrestrial animals (e.g., bears, eagles) and plants. The infusion of marine-derived nutrients contributed by the carcasses of returning adults is fundamental to ecological functioning of the watershed and would enhance aquatic and terrestrial production, improve the overall trophic status of the ecosystem, and enhance future productivity of anadromous salmonids. The return of spawning adult salmon serves as a “nutrient pump” by transporting marine-derived nutrients to headwaters and streams where they provide an energy input into the system. Juvenile rearing salmon can feed directly on decomposing salmon carcasses or on the benthic macroinvertebrate production enhanced by the release of nutrients from the carcasses. Recent research has shown that nutrients contributed by returning adult salmon also influence productivity in the riparian zone through several physical and biological mechanisms (Cederholm et al., 2001). Restoring these nutrient cycles is a fundamental element of efforts to improve the ecological functioning of these watersheds (Reclamation, 2008d).

Table 6-1 summarizes projected fish population estimates resulting from the reintroduction and potential limiting factors upstream of Cle Elum Dam based on recent studies of fish habitat potential in the Cle Elum River basin.

With fish reintroduction, fish community structure in the Cle Elum River basin is likely to change due to interspecific (between species) competition, predation and other related factors. However, ecosystem productivity and prey abundance in general are expected to grow as reintroduced juvenile and adult salmon and salmon carcasses provide additional food resources to the system. The overall effect of salmon reintroduction is expected to be positive for the ecosystem, even if some resident fish species are negatively affected by interspecific competition, predation, and other factors related to the reintroduction.

The fish reintroduction project involves the use of hatchery fish. Using hatchery raised progeny of anadromous salmonids has the potential to introduce pathogens into the environment. This could have an adverse effect on natural production of both salmonids and nonsalmonids already occurring in the basin. The Service's sampling to date indicates that the Yakima basin remains one of the most pathogen-free systems in the Columbia River Basin. Of particular concern is IHN-V, which is an infectious disease affecting Pacific salmon and rainbow trout/steelhead, among others. The virus is spread via feces, urine, sexual fluids and external mucous and targets the kidneys, spleen, encephalon, and digestive tract. The most prominent environmental factor affecting the IHN-V is water temperature, with onset of clinical disease occurring between 8° C and 15° C in the natural environment.

This disease can cause large losses of eggs and juveniles in fish hatcheries and is usually prevalent in sockeye salmon (Flagg et al., 1988). The concern with reintroduction is the potential to infect other salmonid species when offspring of the Okanogan and/or Wenatchee broodstocks are introduced into the Cle Elum River subbasin. To address this concern, all fish transfers (eggs and adults) into the subbasin would be screened for the IHN-V (certified IHN-V-free) and other pathogens to maintain the relatively pathogen-free status for the overall Yakima basin. Compliance with Integrated Hatchery Operations Team (IHOT), Pacific Northwest Fish Health Protection Committee (PNFHPC), State, and Tribal guidelines with respect to fish health inspections and fish transfers from one basin to the next would minimize pathogen spread during reintroduction efforts.

A fish hatchery may be constructed in the future to support sockeye salmon reintroductions into the Cle Elum River basin. The hatchery would likely be off-channel, similar to the existing supplementation facility on the Yakima River near Cle Elum. The hatchery is not expected to negatively impact fish. Standard protocols for disease prevention and water quality control at hatcheries would be followed to prevent any negative impacts to fish habitat in the Yakima River. The main intent is to facilitate reestablishment of sockeye populations in the Yakima River basin. Specific impacts associated with the hatchery would be evaluated in future environmental reviews if the project is carried forward.

Table 6-1. Projected anadromous fish populations and limiting factors in Cle Elum Reservoir and its tributaries (Reclamation 2007a,b, 2008b).

Species	Spawning Substrate (sq. meters)	Pairs of Spawning Adults	Number of Smolts	Limiting Factors
Coho	159,160	15,000 based on spawning substrate. 1,851 based on overwintering habitat.	596,817 based on spawning substrate. 30,818 based on overwintering habitat.	Low abundance of macroinvertebrate prey in Cle Elum Reservoir Tributaries. Warm summertime water temperatures. Overwintering habitat. Interspecific competition from native resident fish, nonnative fish (large lake trout in Cle Elum Reservoir), and other reintroduced migratory fish.
Sockeye	159,160	22,737 based on spawning substrate. 30,000 to 50,000 based on lake rearing habitat.	409,023 to 2,907,365 using lake-based methods under average conditions.	Spawning habitat. Low productivity in Cle Elum Reservoir. Interspecific competition from native resident fish, nonnative fish (large lake trout in Cle Elum Reservoir), and other reintroduced migratory fish.
Spring Chinook		3,500 to 5,000 is the goal for a self-sustaining population with opportunities for harvest.		Similar to coho.
Bull Trout	There are no plans to reintroduce fish, but the project would restore connectivity between populations of adfluvial, fluvial, and resident fish in the Yakima River basin.			
Steelhead	Steelhead reintroduction above the dam would be "small-scale" in the near-term because steelhead are an existing native, wild stock that is listed as "threatened" under the ESA. Therefore, no population estimates have been made.			

6.3.4 Mitigation

As discussed in Section 6.3.3, there is a potential for increased risk of pathogen transfer from hatchery-reared salmon reintroduced into the upper Cle Elum River basin. To ensure that the health of existing fish populations, as well as those introduced, are pathogen free, all fish transfers (eggs and adults) into the subbasin would be screened for the IHN-V and other pathogens. The transfers would comply with IHOT, PNFHPC, State, and Tribal guidelines for fish health inspections and fish transfers from one basin to another.

It is also recommended that post-reintroduction sampling take place in established spawning grounds via carcass sampling to verify presence/absence of the IHN-V. Periodic sampling should also occur among other fish species to ensure that interspecies transfer of pathogens is not occurring within the basin.

No other mitigation is proposed since the project is designed to benefit fish populations and primary and secondary production in the Cle Elum River basin.

6.4 Vegetation

6.4.1 Methods and Impact Indicators

Impacts to vegetation were based on the amount of vegetation that would be removed as a result of the project.

6.4.2 Alternative 1 – No Action Alternative

No vegetation would be removed under the No Action Alternative. However, the No Action Alternative would be potentially detrimental to vegetation communities in the vicinity of Cle Elum Reservoir and Cle Elum River above the reservoir because recent anadromous fish reintroduction actions would cease. On-going fish reintroductions are expected to increase the productivity of riparian and nearby forest communities (see Section 4.4). Therefore, the No Action Alternative would reverse the current trend toward increasing productivity in the basin that is expected with the reintroduction of anadromous fish above the dam.

6.4.3 Alternative 2 – Fish Reintroduction Project

Anadromous salmon provide a nutrient link between marine, freshwater, and terrestrial environments because adult salmon feed mainly in marine environments and then return to freshwater rivers, lakes, and streams to spawn and die. Once salmon die in freshwater environments, other wildlife species consume them and spread their nutrients into terrestrial environments. As a result of this nutrient cycling, vegetation communities in riparian areas and other surrounding habitats, mainly forest and alpine meadow in the Cle Elum River basin, have the potential to become more productive due to the new influx of nutrients from anadromous salmon carcasses. A list of vegetation communities benefiting from increased productivity is found in Section 4.4. No negative impacts to vegetation are anticipated from reintroducing fish to the basin.

If a fish hatchery is constructed in the future, it would likely eliminate some existing riparian vegetation. Additional studies would be conducted to evaluate impacts to vegetation as part of future environmental review if the fish hatchery project is carried forward.

6.4.4 Mitigation

No mitigation is proposed because the fish reintroduction project is expected to be beneficial for vegetation community production. Any future hatchery facility would be designed and located to minimize impacts to vegetation. Specific mitigation for a hatchery would be developed as part of future environmental review if the hatchery project is carried forward.

6.5 Wildlife

6.5.1 Methods and Impact Indicators

The impact indicators for wildlife are the amount of habitat removal and potential disturbance of wildlife species.

6.5.2 Alternative 1 – No Action Alternative

Anadromous salmon are considered to be a keystone species because they cycle nutrients from marine environments into freshwater and terrestrial environments. They are an important part of the foodweb for many species that depend upon salmon and salmon eggs as a main food source (Cederholm et al., 2001). For wildlife species with a strong relationship with salmon in particular, the No Action Alternative is likely to continue to have a negative effect on wildlife habitat and species. This is because prey availability and nutrient cycling in the riparian areas would continue to be lower than it was when anadromous fish were present in the system 100 years ago. Productivity could even be lowered below present conditions because fish reintroductions have already started, but they would cease with the No Action Alternative.

6.5.3 Alternative 2 – Fish Reintroduction Project

Many wildlife species are expected to benefit overall from fish reintroduction due to the increase in prey resources from juvenile and adult salmon and from salmon carcasses. Some species would benefit more than others due to their relationships with salmon. For example, black bears and bald eagles feed directly on salmon and salmon carcasses, and they are expected to benefit directly from an increase in this food supply in the Cle Elum River basin. Other species may feed as secondary consumers on species that feed on salmon and salmon carcasses. For example, swallows and shrews may feed on insects that derive their nutrients from salmon carcasses (Cederholm et al., 2001).

Construction and operation of a fish hatchery on the upper Yakima River could result in temporary and permanent displacement of wildlife from the hatchery area. Additional studies would be conducted as part of future environmental review if the fish hatchery is carried forward.

6.5.4 Mitigation

No mitigation is proposed since wildlife habitat and species are expected to benefit from increased prey resources and ecosystem productivity. Specific mitigation measures for impacts associated with the potential fish hatchery would be determined in future environmental review if the project is carried forward.

6.6 Threatened and Endangered Species

6.6.1 Methods and Impact Indicators

The impacts indicators for threatened and endangered species are habitat loss and disturbance of species.

6.6.2 Alternative 1 – No Action Alternative

Under the No Action Alternative, fish passage facilities would not be provided; therefore, there would be no fish reintroduction project. The lack of passage and reintroduction would continue to be detrimental to bull trout and steelhead. There would be no increased ecological productivity associated with fish reintroduction to provide additional prey for bull trout and steelhead.

6.6.3 Alternative 2 – Fish Reintroduction Project

Most threatened and endangered species that are present in the Cle Elum River basin are expected to benefit from fish reintroduction due to the increase in prey resources and ecosystem productivity from juvenile and adult salmon and from salmon carcasses. The only exception to this in terms of threatened and endangered species may be adfluvial bull trout in Cle Elum Reservoir, as they may be negatively affected by interspecific competition from reintroduced fish. However, bull trout are expected to benefit from the increased prey base.

6.6.3.1 Bull Trout

The adfluvial population of bull trout above Cle Elum Dam may be negatively affected by interspecific competition from reintroduced fish. However, a goal of the project is to benefit bull trout in terms of reconnecting isolated populations of bull trout upstream and downstream from the dam. Over the long term, the advantage of reconnecting populations and maintaining genetic diversity is likely more important to conserving this species than shorter term impacts from interspecific competition.

The increase of marine-derived nutrients into the system is also expected to benefit bull trout as these nutrients would increase productivity and prey resources for bull trout as described in Section 6.3.3.

All resident fish upstream of the dam are likely to be affected in some way by the reintroduction, but the overall benefit to ecosystem productivity and health is expected to be very high and is likely to benefit most species, including bull trout, over the long term.

6.6.3.2 Middle Columbia River Steelhead

The effect on MCR steelhead is expected to be beneficial since up to 29.4 miles of stream habitat would become available once again. Small-scale reintroduction of this species above the dam would also be beneficial to this species as it increases the chances of steelhead becoming reestablished above the dam.

6.6.3.3 Gray Wolf

The expected increase in ecosystem productivity due to fish reintroduction may result in increased prey resources for gray wolf. No negative effects are anticipated for this species.

6.6.3.4 Grizzly Bear

If present in the Cle Elum River basin, grizzly bear could be positively affected by increased prey resources as they feed directly on salmon carcasses. This species would also benefit from an increase in ecosystem productivity.

6.6.3.5 Canada Lynx

Like the gray wolf and grizzly bear, the expected increase in ecosystem productivity due to fish reintroduction may result in increased prey resources for Canada lynx. No negative effects are anticipated for this species.

6.6.3.6 Northern Spotted Owl

The expected increase in ecosystem productivity due to fish reintroduction may result in increased prey resources for northern spotted owl. However, northern spotted owl is not known to be even a secondary consumer of salmon, so there would likely be no effect from fish reintroduction, negative or positive, for this species.

6.6.3.7 Ute Ladies'-tresses

An increase in ecosystem productivity due to the fish reintroduction may be beneficial to Ute ladies'-tresses, if it is present in the Cle Elum River basin.

6.6.3.8 Fisher

Fishers are unlikely to be affected by fish reintroduction as they are known to forage on salmon carcasses only on rare occasions (Cederholm et al., 2001). In addition, fishers are not common in the Cle Elum River basin, and none has been recorded here specifically.

6.6.3.9 State Sensitive and Candidate Species

State sensitive and candidate species that are primary or secondary consumers of salmon are more likely to benefit from the fish reintroduction project than other species with less direct relationships with salmon.

Bald eagles are the most likely species to benefit as they feed both directly on salmon and salmon carcasses and on other wildlife species that feed on salmon. Common loons may also benefit as they feed directly on young salmon. Wolverines rarely feed on salmon carcasses.

Other State candidate species are less likely to experience benefits from the project. However, all species may be influenced to some degree by the increase in nutrient cycling in riparian areas from salmon carcasses.

6.6.4 Mitigation

No mitigation is proposed since the effect of the fish reintroduction project on threatened and endangered species in the Cle Elum River basin is expected to be positive. Specific mitigation measures for impacts associated with the potential fish hatchery would be determined in future environmental review if the project is carried forward.

6.7 Visual Resources

6.7.1 Methods and Impact Indicators

The potential impacts of the fish reintroduction project were evaluated by comparing the expected outcome of the alternative to the No Action Alternative. The potential impacts were also evaluated by examining the extent to which the fish reintroduction project responds to visual resources management direction established in the 1990 Wenatchee National Forest Plan and the USFS Scenery Management System as described in Section 3.7 (USDA, 1995).

6.7.2 Alternative 1 – No Action Alternative

No impacts to visual resources are expected with the No Action Alternative. There would be no short- or long-term activities that would result in aesthetic or visual impacts.

6.7.3 Alternative 2 – Fish Reintroduction Project

The fish reintroduction project would involve transporting fish by truck to Cle Elum Reservoir and its tributaries. These activities would not alter existing views in the area and are expected to have no impacts on visual resources. The presence of decomposing salmon carcasses as spawning adults return to the upper Cle Elum River and its tributaries could be viewed as detracting from the area aesthetics by some individuals, but it is a natural process. The decomposing carcasses would be visible by recreational users who access the areas above Cle Elum Lake. Portable raceways used for short-term acclimation may be visible in the reservoir or river, but would only be present between December and March

and would be removed when not in use. Because the raceways would be used only during winter months when recreation use of the area is limited to snowmobilers and cross country skiers, few people would see the raceways. The portable raceways would be a minor element on the land, remaining visually subordinate to the surrounding landscape. Views would continue to meet the prescribed VQO of Retention and corresponding SIL of High.

No views from the Mountains to Sound Greenway National Scenic Byway would be affected by the fish reintroduction project.

Construction of a potential fish hatchery would have adverse visual impacts such as fugitive dust, heavy equipment, cofferdams and other temporary structures. Views of the construction site would generally create an unattractive visual setting during the construction period or create a visual setting that is different from the current situation. A new facility in the riparian area could have negative visual impacts depending on the location of the facility, the existing character of the surrounding landscape, and the scale of the project. If the hatchery project is carried forward, additional studies would be conducted to evaluate visual impacts as part of future environmental review.

6.7.4 Mitigation

Because there would be no visual resource impacts associated with the fish reintroduction project, no mitigation is proposed. Specific mitigation for the potential fish hatchery facility would be determined in future environmental review if it is carried forward.

6.8 Air Quality

6.8.1 Methods and Impact Indicators

The impact indicator for air quality is increased vehicle emissions and dust.

6.8.2 Alternative 1 – No Action Alternative

Under the No Action Alternative, no additional vehicle emissions would be generated by vehicles transporting fish. Current vehicle trips would be reduced because trips associated with the Yakama Nation's existing fish reintroduction program would be discontinued.

6.8.3 Alternative 2 – Fish Reintroduction Project

The fish reintroduction project would involve a limited number of new vehicle trips when fish are transported to Cle Elum Reservoir. It is estimated that approximately 10 trips per year would occur from hatchery facilities outside the

Yakima basin. These trips would range from approximately 200 to 500 miles round trip. To transport adult fish from the fish collection facility at the base of Cle Elum Dam would require approximately one trip per day year-round. These trips would be approximately 50 miles round trip, and portions of those trips would be on gravel roads.

These vehicle trips would generate vehicle emissions that could affect air quality parameters such as carbon monoxide and nitrogen oxide. The trips on gravel roads would contribute to fugitive dust. Dust emissions would be noticed by recreational users and residents travelling on FR 4330. Because the vehicle trips would be limited in number and infrequent, air quality impacts would be temporary in nature and minor.

Construction of a fish hatchery in the future could produce fugitive dust and increased vehicle emissions that could contribute to air quality problems. These impacts would be temporary. Additional studies would be conducted as part of future environmental review if the fish hatchery proposal is carried forward.

6.8.4 Mitigation

Emissions from vehicles transporting fish could be reduced by following BMPs to minimize emissions, such as maintaining engines in good working order and minimizing trip distances. Specific mitigation for the potential fish hatchery facility would be determined as part of future environmental review if it is carried forward.

6.9 Climate Change

6.9.1 Methods and Impact Indicators

For climate change, impact indicators consider two aspects of climate change— (1) the potential for the project to contribute to climate change through increased greenhouse gas emissions, and (2) the impact of climate change on the success of the fish reintroduction project.

6.9.2 Alternative 1 – No Action Alternative

No fish passage would be provided under the No Action Alternative. Because fish would not be able to access areas upstream of Cle Elum Dam, there would be no expansion in spawning areas for fish and no improvements to conditions for fish. This may make it more difficult for fish to withstand changing climatic conditions.

6.9.3 Alternative 2 – Fish Reintroduction Project

The limited number of truck trips associated with the fish reintroduction project is not expected to generate significant amounts of greenhouse gas emissions. Providing fish passage at Cle Elum Dam would expand the territory available to anadromous fish by opening up habitat above the dam. This would provide expanded spawning habitat for fish and is expected to increase their abundance and productivity. If sockeye salmon are successfully reintroduced to the Yakima basin, this would establish a new population of fish, improving the potential for Columbia River Basin sockeye to survive. The project would provide access to cooler tributary streams above the dam. Access to the cooler streams may offset some of the impacts of predicted warmer stream temperatures in the lower basin. Fish passage facilities would improve the genetic connectivity of bull trout. These improved conditions for fish are expected to help them withstand the impacts of climate change.

6.9.4 Mitigation

Because the project would not contribute to climate change through increased greenhouse gas emissions, no mitigation is proposed. If climate change results in altered runoff and water availability in Cle Elum Reservoir, WDFW and the Yakama Nation would coordinate with Reclamation to adapt the fish reintroduction project to changing conditions.

6.10 Noise

6.10.1 Methods and Impact Indicators

The impact indicators for noise are increases in noise associated with the fish reintroduction project.

6.10.2 Alternative 1 – No Action Alternative

No new noise impacts are expected with the No Action Alternative. Existing truck noise would decrease when the Yakama Nation discontinues its existing fish reintroduction project. There would be no short- or long-term activities that would generate noise.

6.10.3 Alternative 2 – Fish Reintroduction Project

The only noise generating activities associated with the fish reintroduction project would be the truck trips associated with transporting fish above Cle Elum Dam. Truck noise would be heard by recreational users and residents along FR 4330. Wildlife adjacent to the road would also hear the truck noise. Because the increases in truck trips would be limited to one or two trips per day, increased noise would be minimal.

Construction of a fish hatchery could result in temporary noise impacts from equipment and other construction activities. Additional studies of noise impacts would be conducted as part of future environmental review if the fish hatchery proposal is carried forward.

6.10.4 Mitigation

Because there would be no noise impacts, no mitigation is proposed. Specific mitigation for the potential fish hatchery facility would be determined as part of future environmental review if it is carried forward.

6.11 Recreation

6.11.1 Methods and Impact Indicators

The impact indicators for recreation are disturbance of recreational areas, access limitations, and increased noise.

6.11.2 Alternative 1 – No Action Alternative

Under the No Action Alternative, no fish passage would be provided. Because fish would not be able to access areas upstream of Cle Elum Dam, there would be no improvements to conditions for fish. This may make the system less productive for fish, and may reduce the quality of recreational fishing in the basin.

6.11.3 Alternative 2 – Fish Reintroduction Project

The transport of fish to Cle Elum Reservoir and placement of fish carcass analogs in upper Cle Elum River or its tributaries are not expected to have impacts on recreation. The presence of decomposing salmon carcasses as spawning adults return to the upper Cle Elum River and its tributaries could be viewed by some individuals as detracting from the recreational experience. Other people may be attracted to the basin to view the natural process and increased fish. On a longer-term basis, the ecosystem benefits expected to be derived from fish reintroduction may enhance aquatic and terrestrial production, which may result in improved wildlife viewing opportunities in the area.

Construction and operation of a fish hatchery is not expected to adversely impact recreation. Potential impacts would be evaluated in future environmental review if the project is carried forward.

6.11.4 Mitigation

Because there would be no adverse recreation impacts, no mitigation is proposed.

6.12 Land and Shoreline Use

6.12.1 Methods and Impact Indicators

The impact indicators for land and shoreline use are property acquisition, conversion of land uses, and compliance with applicable zoning regulations.

6.12.2 Alternative 1 – No Action Alternative

No land use impacts are expected with the No Action Alternative. There would be no short- or long-term activities that would result in land use impacts.

6.12.3 Alternative 2 – Fish Reintroduction Project

The reintroduction of fish above Cle Elum Dam and the improved abundance of fish in the reservoir and river system (both upstream of and downstream from the dam) would not cause any direct land use impacts. Indirect impacts to land use could occur, however, as a result of improved fish abundance downstream from the dam where privately-owned land and developments are located adjacent to the Cle Elum and Yakima Rivers. Increased fish abundance in the rivers could result in increased land use regulation in recognition of the increased fish habitat value of the rivers. Regulatory conditions can affect the location, type, and rate of development in an area. The result may be a change in development patterns along the river. Also, some individual landowners may not be able to develop their property as intensively as they would like. For example, an indirect result of improved fish abundance could be a requirement to increase setbacks or buffers associated with Shoreline Management or Critical Areas regulations, which could limit development potential on certain parcels. Adoption of revised regulations would be an involved process with opportunities for public input and review.

Construction of a fish hatchery would require the acquisition of property. If the hatchery project is carried forward, additional studies would be conducted to select a site for the hatchery that is compatible with existing land use regulations. Impacts to land use would be evaluated as part of future environmental review if the project is carried forward.

6.12.4 Mitigation

Should new regulatory conditions be proposed in the future as a result of increased fish habitat value of the Cle Elum and Yakima Rivers, there would be opportunity for individual landowners to comment on the proposed regulations prior to adoption by local jurisdictions. Specific mitigation measures for the potential fish hatchery would be developed as part of future environmental review if the project is carried forward.

6.13 Utilities

6.13.1 Methods and Impact Indicators

The impact indicators for utilities are disruptions to existing utilities and the need for additional utilities.

6.13.2 Alternative 1 – No Action Alternative

Because there would be no permanent fish passage facilities and no additional construction, electric power would not be affected. Downstream hydropower generation would not be changed as there would be no changes in operations of the Yakima Project and downstream hydroelectric facilities. Therefore, utilities would not be affected by the No Action Alternative.

6.13.3 Alternative 2 – Fish Reintroduction Project

The fish reintroduction project may cause a slight increase in electric power demand from operation of pumps for raceways or the potential hatchery, as well as general electricity usage from construction and hatchery operations. Electric power connections to project facilities would be required. Because the demand for increased electricity would be small, it is expected to be within the capacity of the local suppliers. Hydropower is not expected to be affected by fish reintroduction as no changes in flow through hydroelectric facilities are anticipated.

If a hatchery is constructed in the future, electricity, drinking water, wastewater utilities, and telecommunications would be necessary. Specific impacts associated with the potential fish hatchery would be determined in future environmental review if the project is carried forward.

6.13.4 Mitigation

The fish reintroduction project would have minimal impacts on utilities; therefore, no mitigation is proposed. The potential fish hatchery would require long-term provision of all necessary utilities. Specific mitigation measures for the provision of utilities to the potential fish hatchery facility would be determined in future environmental review if the project is carried forward.

6.14 Transportation

6.14.1 Methods and Impact Indicators

The impact indicators for transportation are increases in traffic and traffic disruption.

6.14.2 Alternative 1 – No Action Alternative

Under the No Action Alternative, no additional vehicle trips would be generated. Existing vehicle trips would be reduced when the Yakama Nation discontinues its existing fish reintroduction project. Therefore, no negative transportation impacts are expected with the No Action Alternative.

6.14.3 Alternative 2 – Fish Reintroduction Project

The fish reintroduction project would involve a limited number of new vehicle trips when fish are transported to Cle Elum Reservoir. It is estimated that approximately 10 trips per year would occur from hatchery facilities outside the Yakima basin, ranging from approximately 200 to 500 miles round trip. These trips would utilize local roads near the hatchery facilities, regional highways, and I-90 to access SR-903/Salmon La Sac Road. Transporting adult fish from the fish trap facility at the base of Cle Elum Dam would require one truck trip per day year round. Because the vehicle trips would be limited in number and infrequent, no transportation impacts are expected to recreational users and residents travelling on FR 4330.

Construction of a fish hatchery facility could temporarily increase traffic in the area. There would also be increased traffic from employee and maintenance vehicles to the facility when it is complete. Additional studies would be conducted as part of future environmental review to determine specific impacts if the project is carried forward.

6.14.4 Mitigation

Because there would be no transportation impacts, no mitigation is proposed. Specific mitigation measures for the fish hatchery would be developed in future environmental review if the project is carried forward.

6.15 Environmental Justice

6.15.1 Methods and Impact Indicators

Census data were analyzed to determine the demographic makeup of the project area (Section 4.14). That information was used to determine if minority or low-income populations would be disproportionately impacted by the project.

In addition to the identification of minority and/or low-income populations in the study area, the following issues were evaluated to determine potential impacts:

- Are affected resources used by minority or low-income populations?

- Are minority or low-income populations disproportionately subject to adverse environmental, human health, or economic impacts?

- Do the resources affected by the project support subsistence living?

Environmental resources potentially used by minority groups in the study area are terrestrial and aquatic. Members of the Yakama Nation and other Tribes outside the immediate area may currently use these resources and would be expected to do so in the future. They may use these resources disproportionately to the total population. The subsistence use of renewable natural resources (such as fish, wildlife, and vegetation) by the Yakama Nation or other Tribes in the project area has not been quantified.

6.15.2 Alternative 1 – No Action Alternative

Under the No Action Alternative, the existing temporary fish passage facilities at Cle Elum Dam would be removed and no permanent facilities would be installed. As a result, the Yakama Nation would discontinue its ongoing efforts to reintroduce coho and sockeye above the dam. The Yakama Nation and other Tribes would not benefit from increased fish in the basin and there would be no improvements to vegetation and wildlife. Consequently there would be no improvements to support subsistence use of natural resources. This could be a negative impact on the Tribes.

6.15.3 Alternative 2 – Fish Reintroduction Project

The reintroduction of fish above Cle Elum Dam would not cause any negative environmental justice impacts. The presence of fish in the reservoir and upper tributaries and additional fish downstream would not cause negative impacts; therefore, there would be no disproportionate adverse impacts to minority or low-income populations. The fish reintroduction project would increase fish in the basin and improve conditions for vegetation and wildlife in the upper Cle Elum River basin. These resources support subsistence use and improvements to those resources could be a positive impact to the Yakama Nation and other Tribes.

Construction of a fish hatchery has the potential to cause environmental justice impacts. Specific analysis of environmental justice impacts would be conducted as part of future environmental review if a hatchery is carried forward.

6.15.4 Mitigation

Because the environmental justice impacts of the fish reintroduction project would be positive, no mitigation is proposed. Specific mitigation measures for the fish hatchery would be developed as part of future environmental review if the project is carried forward.

6.16 Cultural Resources

6.16.1 Methods and Impact Indicators

The impact indicator for cultural resources is the potential for disturbance of historic or cultural resources.

6.16.2 Alternative 1 – No Action Alternative

There would be no impacts to cultural resources under the No Action Alternative because there would be no construction and no changes to operations.

6.16.3 Alternative 2 – Fish Reintroduction Project

There would be no impacts to cultural resources as a result of the fish reintroduction project. Because the fish would be transported on existing roads with a negligible increase in the overall number of trips per year, the project does not constitute an adverse effect to the NRHP-eligible historic properties in the fish reintroduction project APE. The reintroduction of fish to the upper Cle Elum River basin and increased fish in the Yakima River basin would not involve any actions that could affect cultural resources.

There are several historic buildings along the route through the towns of Cle Elum and Roslyn, some of which are listed on the NRHP. The increase in volume of traffic as a result of this project is not considered a potential impact to these buildings.

Portable raceways for fish acclimatization would require ground disturbance to level the selected location on the edge of the reservoir or river. The ground disturbance could vary depending on the topography of the selected location; disturbance could be fairly minimal if footings can be used. The maximum expected disturbance would likely be slightly larger than the footprint of the portable raceway—4 feet by 20 feet. The depth of disturbance would depend on the incline. Because the portable raceways would be heavy, buried cultural resources could be affected by soil compaction.

Construction of a fish hatchery has the potential to affect cultural resources, especially since the facility would likely be located in a riparian area. If the project is carried forward, future environmental review would be conducted to determine the presence of cultural resources. The facility would be located to avoid impacts.

6.16.4 Mitigation

Because no impacts are anticipated to cultural resources from transporting the fish for reintroduction above Cle Elum Reservoir, no mitigation is proposed. Once the

general location of the portable raceways is identified, a cultural resources assessment, including field work, would be conducted. Ecology and WDFW will consult with DAHP and the Yakama Nation and other affected Tribes and agencies regarding cultural resource impacts of the fish reintroduction project. Any necessary mitigation would be developed in coordination with those agencies and Tribes. Specific mitigation measures for the hatchery would be developed as part of future environmental review if it is carried forward.

6.17 Indian Sacred Sites

6.17.1 Methods and Impact Indicators

See the Methods and Impacts Indicators for the fish passage facilities in Section 5.16.1.

6.17.2 Alternative 1 – No Action Alternative

No impacts to Indian sacred sites are anticipated under the No Action Alternative. There would be no construction or other activities that could disturb any sites.

6.17.3 Alternative 2 – Fish Reintroduction Project

No sacred sites have been identified within the APE (Section 4.17 and 5.17). If a fish hatchery is constructed in the future, it has the potential to be located in an Indian sacred site area. Studies would be conducted as part of future environmental review to identify and avoid such sites if the project is carried forward.

6.17.4 Mitigation

Since no sacred sites have been identified, no mitigation is required.

6.18 Indian Trust Assets

6.18.1 Methods and Impact Indicators

Impacts indicators for ITAs are the potential for affecting ITAs.

6.18.2 Alternative 1 – No Action Alternative

No impacts to ITAs are anticipated because none have been identified in the project area (Section 5.18).

6.18.3 Alternative 2 – Fish Reintroduction Project

No impacts to ITAs are anticipated because none have been identified in the project area (Section 5.18).

6.18.4 Mitigation

Since no ITAs have been identified, no mitigation is required.

6.19 Socioeconomics

6.19.1 Methods and Impact Indicators

The impacts indicators for socioeconomics are costs associated with the project.

6.19.2 Alternative 1 – No Action Alternative

Under the No Action Alternative, there would be no socioeconomic impacts associated with upfront construction costs or annual OMR&P costs. Because the existing temporary fish passage facilities would be removed and no permanent facilities would be installed, fish numbers in the basin are not expected to increase to levels that would allow improvements to socioeconomic conditions.

6.19.3 Alternative 2 – Fish Reintroduction Project

6.19.3.1 Upfront Impacts from Construction Costs

The fish reintroduction project would not require any construction beyond the fish passage facilities. Costs for those facilities were evaluated in Section 5.19.3.1. A fish hatchery would cost \$10 to \$20 million if it were constructed. Exact costs would be determined in future environmental review if the project is carried forward.

6.19.3.2 Annual Impacts from OMR&P Costs

No specific estimates have been made for the annual OMR&P costs associated with the fish reintroduction project at this time because the level of effort associated with the project is not yet known. A general estimate is that the project would cost between \$300,000 and \$500,000 annually. Costs are expected to include personnel to transport and monitor the fish, transportation costs, and portable raceways. The costs would depend on the level of fish reintroduction activities and the speed of the reintroduction. If a more rapid colonization is attempted, it would require greater effort and incur greater costs. Estimated costs for annual operation of a hatchery are \$1 million. Exact costs would be determined in the future if the project is carried forward. These costs would have

a similar impact to socioeconomics as described for fish passage (Section 5.19.3). The costs would result in relatively small positive impacts in the region.

6.19.4 Mitigation

Because the socioeconomic impacts of the fish reintroduction project are expected to be positive, no mitigation is proposed.

6.20 Cumulative Impacts

Cumulative impacts are the effects that may result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions (40 CFR 1508.7). “Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR 1508.7). Generally, an impact can be considered cumulative if: a) effects of several actions occur in the same locale; b) effects on a particular resource are similar in nature; and c) effects are long-term in nature. Potential areas where cumulative impacts might occur as a result of the construction and operation of fish passage facilities and the fish reintroduction project are discussed below.

The cumulative impacts of the fish reintroduction project are expected to be beneficial, especially to fish, wildlife, and threatened and endangered species. Combined with the fish passage facilities, the fish reintroduction project would contribute to the restoration of salmon populations in the Yakima River basin. Providing access to the area above Cle Elum Dam, combined with other fish passage projects proposed in the basin (Section 1.7.6) would help increase the extent of habitat in the basin for coho, steelhead, and Chinook salmon. It would allow the reintroduction of extirpated sockeye runs and allow expanded migrations and genetic interchange for bull trout. The fish reintroduction project is intended to expedite the recovery of fish populations in the Yakima River basin by reintroducing native anadromous fish and their marine-derived nutrients back into this system. These two projects, combined with other fish passage and habitat enhancement projects in the basin, would help reverse environmental damage from the early 1900s. These improvements would benefit resident and anadromous fish in the Yakima basin and reduce the risks of further decline.

The cumulative effects of reintroducing salmon into the riparian ecosystem are expected to be beneficial to vegetation communities. The fish reintroduction program would introduce nutrients to the area above the dam which may increase the productivity of riparian areas. These improvements, combined with riparian restoration being undertaken throughout the Yakima River basin (Section 1.7), would cumulatively benefit riparian vegetation communities.

Improved conditions for fish, increased abundance and productivity of fish populations, and improved vegetation communities would provide additional food

sources and nutrients and cumulatively benefit aquatic species, including resident and anadromous fish as well as terrestrial animals and plants.

Vehicle trips to transport fish would slightly increase overall traffic and therefore could add cumulatively to air quality impacts in the area and to increased greenhouse gas emissions. Because the project would generate a small number of trips, it is not expected to add significantly to cumulative air quality impacts in the region or to climate change.

Providing fish passage and reintroducing fish is expected to improve their abundance and productivity. Other ongoing fish habitat improvements and fish enhancement projects in the Yakima basin (see Section 1.7.6) are expected to further improve conditions for fish, which cumulatively could improve the ability of fish to withstand climate changes. Improved conditions for fish could also be cumulatively beneficial to recreational fishing and related recreational activities in the basin.

Cumulative impacts to socioeconomics and environmental justice are expected to be positive. Increased fish abundance could provide recreational jobs and improve subsistence uses in the basin.

The project is not expected to contribute to cumulative impacts to water resources, visual resources, noise, land use, transportation, or cultural resources including Indian sacred sites and ITAs.

6.21 Unavoidable Adverse Impacts

Unavoidable significant adverse impacts are defined as those that meet the following two criteria:

- There are no reasonably practicable mitigation measures to eliminate the impacts.
- There are no reasonable alternatives to the proposed project that would meet the purpose and need of the action, eliminate the impact, and not cause other or similar significant adverse impacts.

The fish reintroduction project is not expected to result in any unavoidable adverse impacts. The project would provide benefits to fish, vegetation and wildlife which in turn would benefit other resources in the Yakima basin.

6.22 Relationship between Short-Term Use and Long-Term Productivity

NEPA requires considering “the relationship between short-term uses of man’s environment and the maintenance and enhancement of long-term productivity” (40 CFR 1502.16). Long-term productivity refers to the capability of the land to provide market outputs and amenity values for future decades. The quality of life for future generations is linked to the capability of the land to maintain its productivity.

The fish reintroduction project would not involve any activities that would produce short-term effects to resources. The project would improve the long-term productivity of fish in the Cle Elum watershed and downstream. The addition of marine-derived nutrients to the upper watershed would also improve the long-term productivity of vegetation and wildlife.

6.23 Irreversible and Irretrievable Commitment of Resources

An irreversible commitment is a permanent resource loss, including the loss of future options. These commitments are removed by an alternative without the option to renew these resources (such as spent time and money). These commitments usually apply to nonrenewable resources, such as minerals, or to factors that are renewable only over long periods, such as soil productivity. The fish reintroduction project would not result in any irreversible commitment of resources.

An irretrievable commitment is the loss of use or production of a natural resource for some time. For example, if suitable wildlife habitat is being used for a reservoir, habitat growth or productivity is lost while the land is a reservoir but, at some point in time, could be revegetated. These commitments would include any constructed feature of an alternative for the life of that constructed feature. Fish reintroduction would not result in any irretrievable commitment of resources and would improve the long-term productivity of fish, vegetation, and wildlife in the Yakima basin.

6.24 Environmental Commitments

An HPA may be required to supply water to the portable raceways. If required, WDFW would obtain the HPA prior to implementing the fish reintroduction project. Ecology and WDFW would consult with DAHP regarding potential impacts to cultural resources. Because the project would not result in any negative impacts, no environmental commitments have been made.

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If the Yakama Nation and WDFW determine in the future that a fish hatchery would benefit the fish reintroduction project, additional environmental analysis under SEPA and/or NEPA would be conducted. Construction of a new fish hatchery would require a variety of permits, including a Section 404 permit from the Corps and an HPA from WDFW. The hatchery project would comply with applicable Federal, State and local requirements. Specific environmental commitments would be determined when the project is carried forward.

Chapter 7

CONSULTATION AND COORDINATION

CHAPTER 7

CONSULTATION AND COORDINATION

This chapter describes Reclamation's and Ecology's public involvement, consultation, and coordination activities to date, plus future actions that will occur during the processing of this document. Public information activities will continue through the future developments of this project.

7.1 Public Involvement

Public involvement is a process where interested and affected individuals, organizations, agencies, and governmental entities are consulted and included in the decision making process. In addition to providing information to the public regarding the DEIS, Reclamation and Ecology solicited responses regarding the public's needs, values, and evaluations of the proposed alternatives. Both formal and informal input was encouraged and used.

7.1.1 Scoping Process

An early and open scoping process is required as part of the EIS preparation (49 Code of Federal Regulations [CFR], Part 1501.7). Scoping, as defined in the Council on Environmental Quality (CEQ) regulations of 1978, is "an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action." The scoping process helps to:

- Develop alternatives to the proposed action,
- Identify issues, concerns, and possible impacts of the alternatives to the resources identified, and
- Identify existing information sources.

On April 2, 2009, Ecology published a public notice for a Determination of Significance (DS) and request for comments on the scope of the DEIS. Also, Ecology distributed a total of 21 meeting notices to interested individuals.

On April 8, 2009, Reclamation published a NOI to prepare a DEIS in the *Federal Register*. Reclamation and Ecology issued a joint press release to local media on April 15, 2009, announcing a scoping meeting. A meeting notice was mailed to interested individuals, Tribes, groups, and governmental agencies which described the project, requested comments, and provided information about the public scoping meeting.

The *Scoping Summary Report* (Reclamation and Ecology, 2009) is available upon request or can be accessed from the Yakima Dams Fish Passage Study Web Site: http://www.usbr.gov/pn/programs/ucao_misc/fishpassage/index.html.

7.1.1.1 Public Scoping Meeting

On April 30, 2009, Reclamation, Ecology, WDFW, and the Yakama Nation held a public scoping meeting at the Hal Holmes Center in Ellensburg, Washington. The Scoping Meeting was preceded by a 1-hour open house. The meeting was held from 6:30 to 7:30 p.m. and 20 individuals attended. The alternatives being considered were presented, and attendees were given the opportunity to comment on the alternatives, NEPA/SEPA process, and resources being evaluated in the DEIS.

7.1.1.2 Comments and Other Information Received from the Public

The scoping period began April 8, 2009, and concluded May 8, 2009. Six comment letters were received. Reclamation and Ecology used the comments received to assist in the following:

- Identifying the significant issues relevant to the proposed actions,
- Identifying those elements of the environment that could be affected by the proposed actions, and
- Formulating alternatives to the proposed actions.

The following are comments and questions received during the scoping period. These comments have been considered by Reclamation and Ecology in the preparation of this DEIS:

Fish Passage Facilities

- This project must remain “water neutral” and should be coupled with increased storage to offset negative impacts to water storage in Cle Elum Reservoir and assurance that there would be no short-term or long-term effects to the total water supply.
- The EIS should look at whether the proposed actions will create increased demand for releases of water from Cle Elum Reservoir or other reservoirs within the Yakima Project and, if so, the EIS should consider the impact those increased releases will have on the Yakima Project operations and on the total water supply available.
- How will the altered hydrograph and irrigation water releases from Cle Elum Reservoir affect fish behavior below the dam and the effectiveness of attractor flow at the proposed adult trap-and-haul facility? Given the different run timing of different species, and the annual pattern of water releases at Cle Elum, will this vary by species?

- Include more discussion of investigation of passage at Bumping Dam, including timeline.
- Explain in greater detail the relationship between the Hoover Powerplant Act of 1984 and Reclamation authority regarding fish passage in the Yakima basin. The Draft Planning Report indicates that this Act provided the authority. But, it also says that the Title XII legislation, which authorized fish passage in 1994, may make a passage project easier at Cle Elum than at other reservoirs. Does Reclamation foresee additional authority necessary for passage at other reservoirs that were not included in Title XII?
- Effects to water quality during construction should be considered, including mitigation measures.
- Consider how climate change could affect fish passage facility and river elevation.
- Consider cumulative effects.
- Include a mitigation monitoring program for project.

Fish Reintroduction Project

- Concerns that hatchery fish would be used for reintroduction versus using wild salmon. Use of hatchery fish must be closely monitored with clear objectives and a timeline for discontinuing supplementation.
- Hatchery supplementation for steelhead would not be acceptable.
- The EIS should explore the possibility of reintroduction or supplementation of bull trout to the area as part of the project. The level of analysis should be commensurate with other species.
- The proposed timing of the fish passage facilities appears to focus on anadromous species. These times may or may not coincide with the needs of the bull trout. This timing needs to be evaluated to determine what it could mean for bull trout now and in the future.
- Discussion of upstream passage focuses on adult salmon; subadult bull trout and smaller fish should also be considered in the design.
- Will this project affect fish below the dam?
- Does reservoir drawdown result in disconnection of surface flow where the head of the lake meets the Cle Elum River? If so, how will this affect the success of reintroduction efforts?

- The DEIS should explore alternatives that promote wild species versus relying on hatchery fish. EIS should discuss impacts to genetic integrity of wild salmon from introduction of hatchery fish.
- Marine-derived nutrient restoration should be evaluated. Is it possibly limiting productivity in the upper river? Consider dumping fish carcasses in the upper Cle Elum River.
- The lower Cle Elum River needs to be managed to allow for flooding in water-surplus years. This would improve wood recruitment, side-channel morphology, and substrate conditions. Include a larger outlet orifice in the preferred option.

7.2 Agency Coordination and Consultation

7.2.1 Cooperating Agencies

Reclamation and Ecology were responsible as joint lead agencies for developing this joint DEIS, in coordination with WDFW and the Yakama Nation.

Though there are many agencies involved and interested in the FP/FR Project, only BPA has assumed the role of cooperating agency in regard to this DEIS. As a cooperating agency, BPA has agreed to perform the following duties:

- Participate in the NEPA process.
- At the request of Reclamation and/or Ecology, develop information and prepare environmental analyses, including portions of the DEIS on which the cooperator has specific expertise.
- Review the Draft and Final EIS.

7.2.2 Endangered Species Act, Section 7

Section 7(a)(2) of the ESA of 1973 (Public Law 93-205;16 USC 1531 et seq., as amended) requires Federal agencies to consult with the Service and NMFS when a Federal action may affect a listed endangered or threatened species or critical habitat. This is to ensure that any action authorized, funded, or carried out by a Federal agency is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat.

Reclamation will initiate consultation with the Service and NMFS in Winter 2009-2010. Reclamation will prepare a separate biological assessment on potential impacts to threatened and endangered species associated with the project for each agency.

7.2.3 U.S. Forest Service

Reclamation will continue coordinating project activities with the USFS throughout the project.

7.2.4 U.S. Army Corps of Engineers

Coordination activities are ongoing with the U.S. Army Corps of Engineers (Corps) in conjunction with their interests and responsibilities for wetlands. Reclamation will make application to the Corps for a permit under Section 404 of the Clean Water Act as stated in the “Environmental Commitments” section.

7.2.5 Environmental Protection Agency

Coordination activities are ongoing with the Environmental Protection Agency because of its role in the NEPA review process.

7.2.6 Washington Department of Archaeology and Historic Preservation

The NHPA of 1966, as amended in 1992, requires that Federal agencies consider the effects that their projects have upon historic properties. Section 106 of this act and its implementing regulations (36 CFR Part 800) provides procedures that Federal agencies must follow to comply with NHPA on specific undertakings. These regulations encourage Federal agencies to combine NHPA public outreach efforts with the public outreach mandated by the NEPA process. Public outreach efforts for this DEIS are described in the first part of this chapter.

To comply with Section 106 of NHPA, Federal agencies must consult with the State Historic Preservation Officer (SHPO), Native American Tribes with a traditional or religious interest in the study area, and the interested public. Federal agencies must show that a good faith effort has been made to identify historic properties in the area of potential effect for a project. The significance of historic properties must be evaluated, the effect of the project on the historic properties must be determined, and the Federal agency must mitigate adverse effects the project may cause on significant resources. Reclamation will begin consultation when this DEIS is released to the public.

Other Federal legislation further promotes and requires the protection of historic and archeological resources by the Federal Government. Among these laws are the Archeological Resources Protection Act of 1979 and the Native American Graves Protection and Repatriation Act of 1990.

Reclamation will begin formal consultation on the fish passage facilities when this DEIS is released to the public and will complete consultation prior to issuing the FEIS. Ecology and WDFW will begin consultation on the fish reintroduction project when this DEIS is released.

7.3 Tribal Consultation and Coordination

Executive Order 13175 establishes “regular and meaningful consultation and collaboration with Tribal officials in the development of Federal policies that have Tribal implications, to strengthen the United States Government-to-Government relationships with Indian Tribes, and to reduce the imposition of unfunded mandates upon Indian Tribes.”

Reclamation initiated Government-to-Government consultation with the Yakama Nation in October 2009. The BIA Yakima Office and the Yakama Nation Deputy Director of Natural Resources were contacted via letter and telephone to determine the potential presence of ITAs within the project area. The letter requested that BIA and the Nation identify ITAs or any other resources of concern within the area potentially impacted by the FP/FR Project. In addition to the formal consultation, Reclamation is developing the fish passage facilities project in collaboration with the Yakama Nation and WDFW is also developing the fish reintroduction project in collaboration with the Yakama Nation.

7.3.1 Indian Trust Assets

ITAs are legal interests in property held in trust by the United States for federally-recognized Indian Tribes or individual Indians. ITAs may include land, minerals, federally-reserved hunting and fishing rights, federally-reserved water rights, and instream flows associated with trust land. Beneficiaries of the Indian trust relationship are federally-recognized Indian Tribes with trust land; the United States acts as trustee. By definition, ITAs cannot be sold, leased, or otherwise encumbered without approval of the United States government.

Reclamation is responsible for the assessment of project effects on Tribal trust resources and federally-recognized Tribal governments (as directed in the 1994 memorandum “Government-to-Government Relations with Native American Tribal Governments”). Reclamation is tasked to actively engage and consult federally-recognized Tribal governments on Government-to-Government level when its actions affect ITAs.

The DOI Departmental Manual Part 512.2 defines the responsibility for ensuring protection of ITAs to the heads of bureaus and offices (DOI, 1995). DOI is required to “protect and preserve Indian trust assets from loss, damage, unlawful alienation, waste, and depletion” (DOI, 2000). It is the responsibility of Reclamation to determine if the proposed project has the potential to affect ITAs.

The Yakama Nation and the BIA were contacted regarding the presence of ITAs in or near the project area and none were identified. It is the general policy of Reclamation to perform its activities and programs in such a way as to protect ITAs and avoid adverse effects whenever possible (Reclamation, 2000). Reclamation will comply with procedures contained in Departmental Manual Part 512.2 which protect ITAs.

7.3.2 National Historic Preservation Act

As described in Section 7.2.6, the NHPA requires Federal agencies to consult with the SHPO and Native American Tribes with a traditional or religious interest in the study area, and with the interested public. Reclamation has identified the Yakama Nation as a Tribe with a potential traditional or religious interest in the study area. Reclamation will consult with the Yakama Nation as provided under the NHPA, NAGPRA (Section 7.3.3), and EO 13007 (Section 7.3.4).

7.3.3 Native American Graves Protection and Repatriation Act

Reclamation will include in construction contracts a stipulation and protocol in the event of inadvertent discovery of human remains that are determined to be American Indian.

7.3.4 Executive Order 13007: Indian Sacred Sites

Executive Order 13007 (1996) instructs Federal agencies to promote accommodation of access and protect the physical integrity of American Indian sacred sites. A sacred site is defined as any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian Tribe (or Indian individual determined to be an appropriately authoritative representative of an Indian religion) as sacred by virtue of its established religious significance to or ceremonial use by an Indian religion. A sacred site can only be identified if the Tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of a site.

7.4 Compliance with Other Federal Laws

In addition to the laws, EO, and regulations described above, Reclamation has complied and will continue to comply with the following laws and EO.

7.4.1 Executive Order 11988: Floodplain Management

Reclamation will comply with EO to reduce the risk of flood loss to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains.

7.4.2 Executive Order 11990: Protection of Wetlands

Reclamation will comply with EO to minimize disturbance, loss, or degradation of wetlands.

7.4.3 Executive Order 12898: Environmental Justice

Executive Order 12898 established environmental justice as a Federal agency priority to ensure that minority and low-income groups are not disproportionately affected by Federal actions. As discussed in Chapters 5 and 6, none of the action alternatives would have disproportionate adverse impacts to minority or low-income populations.

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LIST OF PREPARERS

LIST OF PREPARERS

Name and Title	Education and Professional Experience	Affiliation	Contribution
Lola M. Abshire Regional NEPA Coordinator	B.S., Natural Resources Management, University of Arizona 30 years of experience in resource management and environmental compliance	Bureau of Reclamation	NEPA guidance, document review, and filing
Molly Adolfson Contractor	B.A., Environmental Science, Western Washington University 31 years professional experience in environmental impact analysis, water quality, natural resource management	ESA Adolfson, Washington State Department of Ecology contractor	SEPA review; QA/QC
Levi Brekke Civil Engineer	B.S., Civil Engineering, University of Iowa M.S., Environmental Science and Engineering, Stanford University Ph.D., Civil Engineering, University of California, Berkeley 12 years of experience in environmental and water resources engineering	Bureau of Reclamation	Climate Change analysis
Corey Carmack Native American Affairs Coordinator	M.S., Cultural Resource Management, Central Washington University 9 years experience in environmental compliance	Bureau of Reclamation	Indian Trust Assets

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Name and Title	Education and Professional Experience	Affiliation	Contribution
Katherine Chobot, Contractor	M.A., Museology, University of Washington B.A., Art History, University of Washington 8 years of experience with historic and cultural resources	Paragon Research Associates, LLC Washington State Department of Ecology contractor	Historic properties and Cultural Resources
Wendy Christensen Technical Projects Program Manager	B.S., Civil Engineering, Colorado State University M.S., Engineering Management, Washington State University 19 years of experience in civil engineering and project management	Bureau of Reclamation	Program Manager, document review
Dan Church Cartographer	B.A., Geography, Central Washington University 18 years experience in GIS and visual information	Bureau of Reclamation	GIS maps and reference graphics
John Easterbrooks Fisheries Biologist	B.S., Wildlife Management, University of Maine M.S., Fishery Resource Management, University of Idaho 31 years experience with WDFW in the Yakima Basin; charter member of SOAC	Washington Department of Fish and Wildlife, Fish Program	Fish Passage Facilities coordination and document review Anadromous fish analysis Resident fish analysis
Paula Engel Economist	B.S., Animal Science, University of Idaho M.S., Agricultural Economics, University of Idaho 18 years of experience in resource economics	Bureau of Reclamation	Regional Economic Development analysis

List of Preparers

Name and Title	Education and Professional Experience	Affiliation	Contribution
Adam Hill Contractor	B.S., Civil Engineering, Washington State University M.S., Civil Engineering, Washington State University Water Resources Engineer 3 years professional experience in water resources planning and engineering	Anchor QEA, Washington State Department of Ecology contractor	Water Resources Utilities and Public Services
Gina Hoff Water Quality Specialist	B.S., Microbiology, Central Washington University 7 years of experience	Bureau of Reclamation	Water quality analysis
Lynn Holt Technical Writer	17 years of experience in public affairs and writing	Bureau of Reclamation	Document management and editing Public involvement
Joel Hubble Fisheries Biologist	B.S., Fisheries, University of Washington, College of Fisheries M.S., Biology-Fisheries, Central Washington University 31 years of experience in fishery science	Bureau of Reclamation	Fish Passage Facilities Alternative description Coordination and document review Anadromous fish analysis Resident fish analysis
Warren Hurley Archaeologist	B.A., Anthropology, Northern Arizona University 23 years experience in archaeology and cultural resources management	Bureau of Reclamation	Historic properties analysis Indian Sacred Sites analysis State Historic Preservation Officer consultation Native American Graves Protection and Repatriation Act consultation

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Name and Title	Education and Professional Experience	Affiliation	Contribution
Paula Johnson Contractor	M.A., Museology, University of Washington 17 years professional experience in cultural resources management; Archaeologist	Paragon Research Associates, LLC, Washington State Department of Ecology Contractor	Cultural Resources
Mark Johnston Fisheries Biologist	B.S., Wildlife Management , Central Washington University 23 years as professional fisheries biologist	Yakama Nation	Anadromous Fish Reintroduction Plan
David Kaumheimer Environmental Programs Manager	B.S., Wildlife Ecology, University of Wisconsin M.S., Wildlife Management, University of Idaho 30 years of experience	Bureau of Reclamation	NEPA guidance, document review
Steve Krueger Contractor	B.S., Fisheries and Wildlife Management, Lake Superior State University 15 Years of experience in fisheries and fish and wildlife management	ESA Adolfson, Washington State Department of Ecology Contractor	Fish, Vegetation, Wildlife, Threatened and Endangered Species
Karmen Martin Contractor	B.S., Environmental Policy and Assessment, Western Washington University 15 years professional experience in environmental impact analysis, natural resource management	ESA Adolfson, Washington State Department of Ecology Contractor	Recreation, Land and Shoreline Use, Air Quality, and Noise
Candace McKinley Environmental Protection Specialist	B.S., Biology, Central Washington University 18 years of experience	Bureau of Reclamation	NEPA Project Manager

List of Preparers

Name and Title	Education and Professional Experience	Affiliation	Contribution
Peggy Miller Fish and Wildlife Biologist	B.S., Wildlife, University of Washington M.S., Biology, Utah State University 8 years of experience	Washington Department of Fish and Wildlife	Fish Reintroduction Project Document Review
Steve Montague Supervisory Civil Engineer	B.S., Civil Engineering, University of Wisconsin 28 years of experience	Bureau of Reclamation	Preparation of Fish Passage Facilities Feasibility Design
Bob Montgomery, P.E. Contractor	M.S. Civil Engineering, University Washington B.S. Civil Engineering, University Washington 27 years professional experience in water resources planning and engineering	Anchor QEA, Washington State Department of Ecology contractor	Water resources, public services and utilities
Jonathan Platt Resource Economist	B.S., Business Admini- stration, Bryant College M.S., Agricultural and Resource Economics, Colorado State University 22 years of experience in resource economics	Bureau of Reclamation	National Economic Development analysis
Brent Renfrow District Habitat Biologist	B.S., Wildlife Biology, Colorado State University; M.A., Environmental Education, University of Northern Colorado 24 years professional experience as habitat biologist	Washington Department of Fish and Wildlife	Document review

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Name and Title	Education and Professional Experience	Affiliation	Contribution
Ann Root Contractor	B.S., Geographical Planning, Montana State University; M.S., Oregon State University; Ph.D., Oregon State University 21 years professional experience in NEPA/ SEPA documentation, water resources	ESA Adolfson, Washington State Department of Ecology Contractor	SEPA project manager; SEPA and NEPA document management
Brian Saluskin Fish Passage Biologist	B.S., Fish & Wildlife Science, Salish Kootenai College 15 years fisheries program experience 34 years tribal fisherman	Yakama Nation	Anadromous Fish Reintroduction Plan
Derek Sandison, Director	B.A., Biology Science, Central Washington University M.S., Natural Resource Management, Central Washington University 35 years experience in public health, environmental planning, and State environmental Policy Act compliance	Washington State Department of Ecology, Office of Columbia River	SEPA Responsible Official, study oversight, and document review

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All locations are in the State of Washington, unless otherwise noted.

U.S. Congressional Delegation

United States Senate

Honorable Maria Cantwell, Richland, Seattle; Washington DC

Honorable Patty Murray, Seattle, Tacoma, Yakima; Washington DC

House of Representatives

Honorable Richard Hastings, Pasco, Yakima; Washington DC

Governor of Washington

Honorable Christine Gregoire, Olympia

Indian Tribes

Confederated Tribes and Bands of the Yakama Nation, Toppenish
Snoqualmie Indian Tribe, Snoqualmie

Washington State Legislature

13th Legislative District

Senator Janea Holmquist, Olympia

Representative Bill Hinkle, Olympia

Representative Judy Warnick, Olympia

14th Legislative District

Senator Curtis King, Olympia

Representative Charles Ross, Olympia

Representative Norm Johnson, Olympia

Federal Agencies

Department of Agriculture

Forest Service, Cle Elum

Department of Defense

Department of the Army

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Corps of Engineers, Seattle
Department of Energy
 Bonneville Power Administration, Portland, Oregon
Department of Commerce
 National Oceanic and Atmospheric Administration
 National Marine Fisheries Service, Ellensburg, Seattle
Department of the Interior
 Bureau of Indian Affairs, Toppenish; Portland, Oregon
 Fish and Wildlife Service, Wenatchee, Yakima

State and Local Government Agencies

State of Washington

Department of Ecology, Yakima
Department of Ecology SEPA Unit, Olympia
Department of Agriculture, Olympia
Department of Commerce, Olympia
Department of Fish and Wildlife, Yakima, Olympia
Department of Natural Resources, Olympia
Department of Transportation, Yakima, Olympia
Department of Archaeology & Historic Preservation, Olympia
Washington Parks and Recreation, Olympia
Recreation and Conservation Office, Olympia

Local Agencies

Benton County
 Commissioners, Prosser
City of Cle Elum
City of Roslyn
City of Ellensburg
City of Yakima
Grant County
 Public Utility District, Ephrata
Kittitas County
 Commissioners, Ellensburg
Yakima County
 Commissioners, Yakima

Irrigation Districts

Kittitas Reclamation District, Ellensburg
Roza Irrigation District, Sunnyside

Libraries

Carpenter Memorial Library, Cle Elum
Ellensburg Public Library, Ellensburg
Roslyn Public Library, Roslyn

Organizations

Blue Leaf Environmental, Ellensburg
Center for Environmental Law and Policy, Spokane
Columbia River Intertribal Fish Commission, Portland, Oregon
Kittitas Conservation Trust, Roslyn
Washington Environmental Council, Seattle
Yakima Basin Fish and Wildlife Recovery Board, Yakima
Yakima Basin Joint Board, Sunnyside
Yakima Basin Water Resource Agency, Yakima

Individuals

Will Atlas, Seattle
Paul Friesema, Evanston, Illinois
Franklin Roppel, Bellevue

Business Entities

Jeff Slothower, Lathrop, Winbauer, Harrell, Slothower & Dennison, LLP,
Ellensburg

Media

Ellensburg Daily Record, Ellensburg
North Kittitas County Tribune
Yakima Herald Republic, Yakima

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GLOSSARY

GLOSSARY

acre-foot	The volume of water that could cover 1 acre to a depth of 1 foot. Equivalent to 43,560 cubic feet or 325,851 gallons.
active capacity	The reservoir capacity or quantity of water which lies above the inactive reservoir capacity and normally is usable for storage and regulation of reservoir inflow to meet established reservoir operating requirements.
adfluvial spawner	Fish that spawn in tributaries and, as adults, reside in lakes.
alluvial	Composed of clay, silt, sand, gravel, or similar material deposited by running water.
anadromous	Fish that hatch and develop to adolescence in rivers and migrate to saltwater to feed, then migrate from saltwater to freshwater to spawn.
cfs	Flow rate in cubic feet per second.
cumulative effect	For NEPA purposes, these are impacts to the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such action.
endangered species	Under the Endangered Species Act, a species that is in danger of extinction throughout all or a significant portion of its range. To term a run of salmon “endangered” is to say that particular run is in danger of extinction.
Environmental Justice	The fair treatment of people of all races and incomes with respect to actions affecting the environment. Fair treatment implies that there is equity of the distribution of benefits and risks associated with a proposed project and that one group does not suffer disproportionate adverse effects.
feasibility study	Detailed investigation specifically authorized by the Congress to determine the desirability of seeking congressional authorization for implementation of a preferred alternative, normally the NED Alternative, which reasonably maximized net national economic development benefits.
fed fry	A recently hatched fish that has been fed in a hatchery.

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flip-flop	An operational action in the upper Yakima River basin in late summer to encourage anadromous salmon to spawn at lower river state levels so that the flows required to keep the redds watered and protected during the subsequent incubation period are minimized.
fingerling	A juvenile fish during its first summer after emergence, usually under 3 inches long (see also fry and smolt).
fluvial spawner	Fish that spawn in streams and, as adults, reside in rivers.
fry	The life stage of fish between the egg and fingerling stages. Depending on the fish species, fry can measure from a few millimeters to a few centimeters in length (see also fingerling and smolt).
habitat	The combination of resources and the environmental conditions that promotes occupancy by individuals of a given species and allows those individuals to survive and reproduce.
historic property	Any building, site, district, structure, or object (that has archeological or cultural significance) included in, or eligible for inclusion in, the National Register.
inactive capacity	The reservoir capacity or quantity of water which lies beneath the active reservoir capacity and is normally unavailable for withdrawal because of operating agreements or physical constraints.
Indian Sacred Site	A specific, discrete, narrowly delineated location on Federal land that is identified by an Indian Tribe or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion.
kelt	Steelhead that has spawned and is in poor condition.
Indian Trust Assets (ITA)	Legal interests in property held in trust by the United States for Indian Tribes or individuals. They are rights that were reserved by or granted to American Indian Tribes or Indian individuals by treaties, statutes, and Executive orders. These rights are sometimes further interpreted through court decisions and regulations.

oligotrophic	Lacking plant nutrients and usually containing plentiful amounts of dissolved oxygen without stratification.
PIT-tag	A method of tagging and tracking fish using microchips. A Passive Integrated Transponder (PIT) is implanted in a smolt to monitor smolt survival and the number of returning adults.
parr	Juvenile anadromous salmonids while they are actively feeding and rearing in freshwater.
redd	The nest that a spawning female salmon digs in gravel to deposit her eggs.
riparian	Relating to, living in, or located on a water course.
Roza Powerplant	The existing powerplant located at Roza Canal milepost 11.
salmonid	A family of soft-finned fishes of cold and temperate waters that includes salmon, trout, chars, freshwater whitefishes and graylings.
smolt	Adolescent salmon or steelhead, usually 3 to 7 inches long, that are undergoing changes preparatory for living in saltwater (see also fry and fingerling).
spawner	Adult salmon that has left the ocean and entered a river to spawn.
Supplementation-line (S-line)	YKFP defines Supplementation Line as offspring produced by broodstock that had not themselves been raised in the Cle Elum hatchery. Often the term "at least one generation removed from the hatchery" is applied to these broodstock. The YKFP has a policy of not using for broodstock any adult fish that has a missing adipose fin, which means that fish was raised in the hatchery.
threatened species	Under the Endangered Species Act, a species that is likely to become endangered within the foreseeable future.
Title XII target flows	Specific instream target flows established for Yakima Project operations at Sunnyside and Prosser Diversion Dams by Title XII of the Act of October 31, 1994 (Public Law 103-464).
total water supply available	The total water supply available for the Yakima River basin

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(TWSA)

above the Parker gage for the period April through
September.

Appendix A

AGREEMENTS AND PERMITS

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MITIGATION AGREEMENT BETWEEN THE USDI BUREAU OF RECLAMATION AND WASHINGTON DEPARTMENT OF FISH AND WILDLIFE REGARDING KEECHELUS DAM CONSTRUCTION ISSUES INCLUDING FISH PASSAGE.

This Mitigation Agreement ("Agreement") is made between the Washington State Department of Fish and Wildlife, hereinafter referred to as WDFW, and the USDOl Bureau of Reclamation, hereinafter referred to as Reclamation. For purposes of this Agreement, the above entities are referred to collectively as "the Parties." The terms of this Agreement shall be binding upon the respective successors or assigns of each Party.

WHEREAS the U.S. Department of Interior Bureau of Reclamation ("Reclamation") and the Washington Department of Fish and Wildlife ("WDFW") share a common objective to protect, maintain and enhance water, fish and wildlife resources, and they recognize their mutual desire to continue a long-standing working relationship;

WHEREAS Congress established that the purposes of the Federal Yakima Project include fish, wildlife and recreation and that the existing storage rights of the project include storage for the purposes of fish, wildlife and recreation (Public Law 103-434, Title XII Yakima River Basin Water Enhancement Project - Sec 1205(e) Operation of Yakima Project);

WHEREAS Congress established that said storage for the purposes of fish, wildlife and recreation shall not impair the operation of the Yakima Project to provide water for irrigation purposes nor impact existing contracts (Public Law 103-434, Title XII Yakima River Basin Water Enhancement Project - Sec 1205(e) Operation of Yakima Project);

WHEREAS The Washington State law requires that a dam or other obstruction shall be provided with a durable and efficient fishway approved by the director of WDFW and that the fishway shall be maintained in an effective condition and continuously supplied with sufficient water to freely pass fish (RCW 77.55.060);

WHEREAS Reclamation and WDFW agree that Reclamation's authorities in the Yakima Basin provide for a broad range of fish enhancement activities including such things as barrier removal, screening of diversions and restoration of instream flows on both the mainstem river and tributaries, within proscribed limits;

WHEREAS Reclamation and WDFW agree that restoring fish passage at man-made barriers is, in nearly all cases, biologically preferable for conserving, restoring and enhancing indigenous fish species; and

WHEREAS the parties agree that moving forward expeditiously with repairs to Keecheilus Dam is in the public interest to protect public safety and provide necessary

water for project purposes.

THEREFORE the parties agree to work collaboratively to carry out their respective responsibilities and agree as follows:

I. Commitments of WDFW:

WDFW Agrees:

- 1) To issue a Hydraulic Project Approval (HPA) for the proposed Safety of Dams reconstruction of Keechelus Dam as soon as possible. The HPA shall incorporate the provisions of this agreement.
- 2) To provide technical support to Reclamation so that the fisheries objectives of this agreement may be met.

II. Commitments by the United States of America

Reclamation Agrees:

- 1) To abide by the provisions of the HPA.
- 2) To immediately conduct an assessment of fish passage at all Yakima Project storage reservoirs in the Yakima River Basin as outlined in the HPA for the Keechelus Safety of Dams Modification Project. The assessment shall include consideration of the potential fish production and likelihood of sustainability above each dam using a mutually acceptable assessment tool. Where fish passage is determined to be desirable and practicable, based upon the results of this assessment, Reclamation shall examine engineering feasibility. Where fish passage is determined to be impracticable or infeasible, Reclamation shall negotiate with WDFW to provide an alternative to fish passage, consistent with state law.
- 3) To seek appropriate funding to ensure timely implementation of: a) fish passage facilities, where passage is determined to be desirable and practicable by the project-wide passage assessment (item 2 above), and b) alternative fish restoration measures for locations where fish passage is determined by the project-wide assessment to be biologically beneficial but impractical or infeasible.
- 4) Until construction of fish passage facilities at each of the Yakima Project storage reservoirs where fish passage has been determined as necessary as per item 2 above, and such fish passage facilities are in operation, to provide interim fish passage (e.g. trap and haul program) in collaboration with WDFW at each of those reservoirs.

- 5) To restore fish passage for salmonids from Lake Keechelus into Cold Creek, in collaboration with WDFW, as an interim measure to address fish passage concerns at Keechelus Dam and construction-related impacts of the Safety of Dams project. Reclamation shall do this in concert with the reconstruction of Keechelus Dam and ensure that conditions suitable for adult passage into Cold Creek from the reservoir are restored.
- 6) To develop a formal process involving regularly scheduled meetings to occur no less than biannually to ensure that there is ample opportunity for input by the fish management agencies (WDFW, National Marine Fisheries Service, US Fish and Wildlife Service and the Yakama Nation) into decisions concerning fish enhancement measures implemented by Reclamation under its various authorities in the Yakima River basin.
- 7) To ensure that construction materials for major Reclamation projects (including Safety of Dams projects) are sourced from sites not in the geomorphic flood plain of the Yakima River, or tributaries, whenever practicable.
- 8) To ensure that the proposed Safety of Dams reconstruction-related actions at Keechelus Dam will not result in significant additional costs for retrofitting fish passage facilities at Keechelus Dam nor require future significant modification of the portions of the dam being reconstructed as part of the SOD work.
- 9) To ensure that the functions of the large (approximately 300 acres) wetland complex below the toe of Keechelus Dam are not impaired. This wetland is the source of water for three different water courses, at least two of which are fish-bearing streams, which flow into a river side channel complex below Keechelus Dam. Reclamation shall mitigate for unavoidable impacts to this wetland as outlined in the Final Environmental Impact Statement (FEIS) for the Keechelus Dam Safety of Dams Modification (September 2001). If for some reason the land acquisition outlined in the FEIS cannot be accomplished, alternative mitigation strategies shall be developed in cooperation with the WDFW and others.

III. DISPUTE RESOLUTION

- 1) In the event that a dispute between the parties should arise, the parties shall make every effort to informally resolve the matter. Should a dispute arise, the aggrieved party shall send the other parties written notice of the issue in dispute, which shall state the aggrieved party's preferred resolution to the matter. Nothing shall prevent the parties from using any other remedy otherwise available to them if informal dispute resolution does not work; provided, however, that no party shall engage in self-help without first notifying the other parties of its intended act(s) and providing reasonable time for the other parties to respond.

- 2) Each Party shall have all remedies otherwise available in equity or at law to enforce the terms of this agreement, including specific performance and injunctive relief. No party shall be liable in damages to any other Party or other person for any breach of this agreement, any performance or failure to perform a mandatory or discretionary obligation imposed by this agreement, or any other cause of action arising from this agreement.

IV. MODIFICATION OF AGREEMENT

This agreement may only be modified upon written agreement of the parties.

V. SAVINGS CLAUSE

Nothing herein shall prevent, waive or diminish the right or authority of WDFW to use any statutory or other remedy available to enforce the provisions of this agreement. Nothing herein shall prevent, waive or diminish the right or authority of WDFW to protect populations of fish, or any other aquatic life in Lake Keechelus, the Yakima River or tributaries to the fullest extent allowed by law, nor shall this preclude the WDFW from using any statutory or other remedy available concerning or relating to these fish. Nothing contained in this agreement is intended to unlawfully limit the authority or responsibility of the Department of Fish and Wildlife to invoke penalties or otherwise fulfill its responsibilities as a public agency.

VI. GENERAL PROVISIONS

- 1) Nothing herein shall or shall be construed to obligate Reclamation to expend or involve the United States of America in any contract or other obligation for the future payment of money in excess of appropriations authorized by law and administratively allocated for the purposes and projects contemplated hereunder.
- 2) No member of, or delegate to Congress or resident Commissioner, shall be admitted to any share or part of this Agreement or to any benefit that may arise out of it.
- 3) The parties agree to comply with all federal statutes relating to nondiscrimination, including but not limited to: Title VII of the Civil Rights Act of 1964, as amended which prohibits discrimination on the basis of race, color, religion, sex or national origin; Title IX of the Education amendments of 1972, as amended, which prohibits discrimination on the basis of sex; the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act of 1990, as amended, which prohibit discrimination on the basis of disability; the Age Discrimination in Employment Act of 1976, as amended, which prohibits discrimination based on age against those who are at least 40 years of age; and the Equal Pay Act of 1963.
- 4) The Agreement shall become effective on the date of last signature hereto and

extended until terminated. Either party may formally request modification of the agreement.

- 5) Nothing in this Agreement shall, or shall be construed to alter or affect the authorities, rights or obligations of the parties under existing law or regulations.

THE UNITED STATES OF AMERICA

By: Eric Glover
Dated: 4/8, 2002

Eric Glover
Area Manager
Bureau of Reclamation

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

By: Jeff Tayer
Dated: 7/14-08-, 2002

Jeff Tayer, Regional Director
Department of Fish and Wildlife



HYDRAULIC PROJECT APPROVAL
RCW 77.55.100 - appeal pursuant to Chapter 34.05 RCW

State of Washington
Department of Fish and Wildlife
Region 3 Office
1701 South 24th Avenue
Yakima, Washington 98902-5720

DATE OF ISSUE: April 17, 2002

LOG NUMBER: 00-E1998-01

PERMITTEE

AUTHORIZED AGENT OR CONTRACTOR

USDI Bureau of Reclamation
Upper Columbia Area Office
ATTENTION: David Kaumheimer
1917 Marsh Road
Yakima, Washington 98901
(509) 575-5848 ext. 232
Fax: (509) 454-5650

USDI Bureau of Reclamation
Pacific Northwest Construction Office
ATTENTION: Bernie Meskimen
P.O. Box 2967
Yakima, Washington 98902
(509) 575-5946
Fax: (509) 454-5622

PROJECT DESCRIPTION: **Dam Reconstruction** -Safety of Dams reconstruction of Keechelus Dam. Work includes reconstructing the earthen dam, construction of access roads, handling and stockpiling of materials, excavating and placing fill and drain in wetlands, constructing new bridges, and installing bank protection materials.

PROJECT LOCATION: **Lake Keechelus Dam - Yakima River** - Keechelus Dam adjacent to I-90, east of Snoqualmie Pass.

#	<u>WRIA</u>	<u>WATER BODY</u>	<u>TRIBUTARY TO</u>	<u>1/4 SEC.</u>	<u>SEC.</u>	<u>TOWNSHIP</u>	<u>RANGE</u>	<u>COUNTY</u>
1	39.0002	Yakima River	Columbia River	SE	27	20 North	15 East	Kittitas

PROVISIONS

- TIMING LIMITATIONS:** The project may begin **May 1, 2002** and shall be completed by **November 30, 2004**.

GENERAL PROJECT PROVISIONS APPLICABLE TO ALL ELEMENTS

GENERAL

- Work shall be accomplished per plans and specifications entitled, Keechelus Dam Modification, Solicitation Number 02SP101485, dated September 21, 2001 and information submitted by USDI Bureau of Reclamation (Reclamation) to Washington Department of Fish and Wildlife (WDFW) with the Hydraulic Project application, except as modified by this Approval. A copy of these plans shall be available on-site during construction. Plan changes must be specifically approved by the WDFW field representative.
- Temporary run-off and erosion control measures shall be employed as necessary throughout the project area to prevent discharge of sediment-laden water, earth or sediment to watercourses or wetlands. Unless specifically approved in the plan of work, there shall be no discharge of sediment, turbid water or water containing materials harmful to fish or aquatic life to water bodies or wetlands.
- Concrete structures shall be sufficiently cured to prevent leaching of chemicals harmful to fish or aquatic life prior to removal of containment measures and allowing contact with surface water.



HYDRAULIC PROJECT APPROVAL

RCW 77.55.100 - appeal pursuant to Chapter 34.05 RCW

State of Washington
Department of Fish and Wildlife
Region 3 Office
1701 South 24th Avenue
Yakima, Washington 98902-5720

DATE OF ISSUE: April 17, 2002

LOG NUMBER: 00-E1998-01

5. Aggregate, sand, gravel, clay or earth needed to construct the project shall be obtained from the Bureau of Reclamation designated borrow areas referred to as DSL Borrow Area, DSLE Borrow Area, Iron Horse Trail Quarry and the Crystal Springs SnoPark site, or obtained from public or commercial sources which are not in the geomorphic flood plain of the Yakima River, except that gravel may be obtained from floodplain sources where it can be clearly shown that removal of these materials is not likely to adversely affect Middle Columbia River steelhead or bull trout.

REQUIRED SALVAGE OF TREES AND SHRUBS

6. Select trees and riparian shrubs which must be removed to construct this project shall be salvaged for use on site (see restoration plans) or stockpiled at an approved stockpile site for use elsewhere in creating fish habitat and restoring shoreline vegetation. Trees and shrubs for salvage shall be identified and clearly marked on site in collaboration with WDFW. The total number of trees with intact rootwads to be salvaged shall be determined by WDFW and Reclamation at the time of marking based on the needs for restoration work, the ability to stockpile trees and the size of the trees actually salvaged for these purposes. .
7. Removal of each tree designated for salvage shall be done by excavating around the rootwad to loosen soil and then pushing the tree over so as to keep a large rootwad attached to the tree for use as in-channel Large Woody Debris (LWD). Where practical, select trees shall be removed and placed or stockpiled as whole trees (no cutting, limbing or removal of rootwads).
8. Trees and shrubs of a size suitable for machine transplanting as part of construction site or wetland restoration shall be marked in advance, removed with a trackhoe with rootballs intact, protected from dessication and replanted as soon as possible.

STAKING AND MARKING

9. The project boundary and clearing limits shall be clearly marked/staked prior to any clearing or ground disturbing activity. Sensitive areas and trees to be protected from disturbance or salvaged shall be delineated/marked so as to be clearly visible to equipment operators.

ENVIRONMENTAL COMPLIANCE INSPECTION AND REPORTING

10. The Bureau of Reclamation shall monitor and ensure contractor compliance with HPA provisions. If work occurs in violation of permit provisions, Reclamation shall immediately stop work on the particular task or project section until the problem is corrected. Reclamation shall promptly notify WDFW of any non-compliance with provisions and the actions taken to address the problem.
11. The permittee shall provide a qualified "Environmental Compliance Inspector", knowledgeable about fishes, wetlands and the environment of the upper Yakima River Basin. This inspector shall have the authority to assure compliance with plans, permit provisions and mitigation measures. This inspector shall be on site on a sufficiently regular basis to monitor work and ensure compliance with HPA provisions. The inspector shall be present during all activities of special concern identified in the approved Plan of Work and pre-construction meeting.

EQUIPMENT LIMITATIONS

12. Except for work to install containment/coffer dams, all work shall be done in isolation from surface water (i.e. wetlands, streams, Lake Keechelus, and the Yakima River). Equipment shall work from the access



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roads, constructed work platforms, the bank, from the dry shoreline or dry lake bed, or from inside of containment or coffer dams.

13. Equipment operating in the shoreline zone, wetlands or associated buffers, or operating within the ordinary high water line shall be maintained in good working conditions such that petroleum products or other harmful chemicals are not leaked or spilled to these areas.
14. Equipment entering the wetted perimeter of the river, lake or tributary streams in accordance with the approved plan of work (i.e. to install containment structures, etc.) shall be cleaned prior to entering the water so as to be free of accumulations of earth, petroleum products and other materials harmful to fish life.

REQUIRED NOTIFICATIONS, MEETINGS AND SUBMITTALS

NOTIFICATION REQUIREMENT

15. The permittee or contractor shall notify the Department field office by phone (509) 925-1013 or FAX (509) 925-4702 at least 72 hours prior to starting work on those portions of this project within the ordinary high water line. Leave message for Habitat Biologist Brent Renfrow. The notification shall include the permittee's name, project location, starting date for work, and the log number for this Hydraulic Project Approval.

PRE-CONSTRUCTION MEETINGS AND SUBMITTALS

16. **Water Control Plan.** Prior to commencement of work within the ordinary high water marks, the permittee shall submit for approval a detailed water control plan showing the proposed methods for isolation of work areas from water, methods for care of the release of water from Keechelus Lake during construction, and measures to be taken to meet river flow and water quality requirements. This plan shall include back-up pump(s) installed and ready for immediate service or other satisfactory contingency measures to maintain instream flow without interruption. No work shall begin within the ordinary high water marks until a satisfactory plan is approved.
17. **Spill Prevention and Containment Plan.** Prior to commencement of work within the ordinary high water marks, the permittee shall submit for approval a detailed Spill Prevention and Containment Plan. No work shall begin within the ordinary high water marks until a satisfactory plan is approved.
18. **Plan of Work.** Prior to commencement of work, the permittee shall arrange a preconstruction meeting with WDFW, the project superintendent and key personnel to discuss and develop a detailed Plan of Work, and highlight areas of special concern. The Plan of Work shall address all elements of work related to or affecting the lake, watercourses, and wetlands. The plan shall include the timing and sequence of work, installation and removal of the temporary containment structures needed to isolate the work areas, water management in the work area, dewatering of work areas, location of settling ponds, access roads, borrow and stockpile areas, etc.. The plan of work shall describe in detail how the permittee shall ensure protection of water quality, fish and fish habitat during clearing, grubbing, and construction of the downstream drain,



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outlet tunnel section, bridges, cutoff wall and embankment. No work shall begin within the ordinary high water marks until a satisfactory plan is approved and staked in the field as appropriate.

19. **Wetland Restoration and Monitoring Plan.** By August 15, 2002, the permittee shall submit to WDFW for approval a detailed wetland restoration and monitoring plan for restoring the large wetland complex immediately downstream of Keechelus Dam and monitoring the success of the restoration measures. The plan shall include the time table for restoration and the schedule for monitoring and reporting. This plan shall include landscaping and cultural measures for restoring vegetation, and structural measures to restore pre-project (i.e. 1998) hydrology to the wetland complex and stream channels. The plan shall also include a ten-year monitoring program and contingency measures to ensure that vegetation is successfully restored and that the hydrology is not adversely affected by the toe drain or other project features.

CARE AND MANAGEMENT OF WATER DURING CONSTRUCTION

TEMPORARY CONTAINMENT STRUCTURES

20. Temporary containment structures shall be in place prior to initiation of in-water work or ground-disturbing work within or adjacent to the ordinary high water line of Lake Keechelus, water courses or wetlands. Containment structures must effectively isolate the work area and prevent discharge of sediment or harmful materials to water or wetlands.
21. Containment structures placed or worked in water shall be installed using only clean materials (e.g. sand bags, "ecology blocks", plastic sheeting, washed gravels, etc.) until the structure is closed and the work area fully contained. Only clean materials shall be allowed on the outboard side of structures. After the work area is contained, materials containing fines may be used within the contained area if necessary.
22. Removal of containment structures and cofferdams shall be done in the reverse of the sequence in which they are installed. Removal shall be done in a manner which minimizes the release of fine sediment to water or wetlands. Materials used in the temporary containment structures shall be removed from the site and disposed of in approved locations.

DEWATERING OF WORK AREAS

23. During initial dewatering of work areas, turbid water shall be pumped to an upland area to allow fines to settle out before the water re-enters the river. Subsequent pumping to remove clean water infiltrating through sands and gravels may be discharged directly to water courses and wetlands provided that: a) a perforated sump chamber is installed away from the main work area to intercept the inflow, b) waste water containing raw concrete or other harmful materials is NOT reaching the sump chamber, c) water being pumped from the sump is clear (no suspended solids or turbidity), and d) state water quality standards are satisfied. Lines discharging water shall be equipped with a diffusing device which shall prevent the scouring and dislodging of fine sediments from the bank or bed of the watercourse or wetlands.
24. Wastewater containing earth, silt or contaminants (e.g. bentonite, raw concrete, etc.) shall be pumped to an upland area where these contaminants shall be treated and removed from the water. Care shall be taken to ensure no harmful material (e.g. fresh cement, petroleum products, wood preservatives, toxic chemicals, etc.)



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are allowed to enter the water of the river, lake, streams or wetlands. (Note that raw concrete is toxic to fish and other aquatic life.)

SETTLING PONDS

25. Settling ponds shall be located in upland sites away from watercourses and wetlands, or at specifically approved locations. Water and erosion control measures shall be taken at all sites so as to prevent transport of sediment or harmful materials (e.g. fresh cement, petroleum products, bentonite, chemicals, etc.) to waters or wetlands.

MAINTENANCE OF INSTREAM FLOW BELOW DAM

26. Flows released from the dam to the river shall be set at approximately 100 cfs by September 10th. Once spawning of chinook and bull trout occurs downstream from the dam, there shall be no reduction in flow released from the dam except as follows: a) flow below the dam may be reduced to 70 cfs for a period of time not to exceed 24 hours to allow installation and removal of low flow bypass facilities as per the approved water control plan; and b) flow below the dam may be reduced to less than 100 cfs IF, based upon the location and distribution of redds, Reclamation's ability to operate, and recommendations of SOAC, WDFW and Reclamation concur that a lower instream flow is acceptable.
27. After September 10th, WDFW shall be notified prior to altering flows. Leave message for John Easterbrooks (509) 457-9330 and Brent Renfrow (509) 925-1013. Except for emergency actions, notification shall be at least 72 hours in advance of the anticipated change.
28. During the period when the dam's outlet works are blocked to replace the outlet conduit section, river flow shall be monitored continuously to ensure that the bypass system is functioning adequately and that there is no disruption of water flow to the river.
29. Sufficient measures shall be taken to prevent sediment from entering the river from the bypass operations or from construction-related discharges from the work area. If pumps are used to bypass flow to the river, the pump intake shall be located where only clean water will be drawn into the pump. If necessary to obtain proper submergence of the intake, a pool sufficient to accommodate the pump intake and pump screen may be excavated in the lake bed at the location of the intake. The pump outlet shall be equipped with a diffusing device or located where the discharge will not mobilize fine materials nor scour the river bank or bed. There shall be no increase of turbidity (over background) permitted in the river below the project.
30. If pumps are used to bypass flow to the river, the pump system shall be equipped with a fish guard (screen) to prevent passage of fish into the pumps. The screen shall be consistent with the current WDFW screening criteria (copy attached). Screen maintenance shall be adequate to maintain screen criteria and to prevent injury or entrapment to juvenile fish. The screen shall remain in place whenever water is withdrawn through the pump intake.



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CLEARING AND GRUBBING OF CONSTRUCTION AREA

TREE AND STUMP REMOVAL

31. All work within wetlands or watercourses shall be done in isolation from the wetted perimeter, or performed during a period when the site is dry.
32. The work area shall be protected from erosion. Water and sediment control measures shall be installed and maintained to prevent discharge of earth or silty water to wetlands or watercourses.

EMBANKMENT REMOVAL AND RECONSTRUCTION

REMOVAL AND RECONSTRUCTION OF EXISTING EMBANKMENT

33. Work shall be performed per the plans and specifications and as detailed in the approved Plan of Work (refer to provision #18 above).
34. Any surplus or waste embankment material shall be disposed of at approved location(s) outside of the Yakima River floodplain.

OUTLET WORKS AND OUTLET CHANNEL

REPLACEMENT OF PORTION OF OUTLET CONDUIT

35. Work shall be done in the dry.
36. Any concrete or grout shall be sufficiently cured prior to contact with water to avoid leaching of materials harmful to fish. (Note that raw concrete is toxic to fish and other aquatic life.)

RIPRAP

37. Grouted riprap installation in the outlet channel shall be placed in the dry.

CLEARING AND MODIFICATION OF OUTLET CHANNEL BANKS

38. To prevent sloughing of earth into the outlet channel and the Yakima River, the outlet channel shall be isolated from the excavation area during bank sloping by a temporary containment barrier of ecology blocks or equivalent, durable and sturdy containment barrier.

SPILLWAY AND OUTLET CHANNEL BRIDGES

GENERAL

39. The work areas at each bridge site shall be separated from the channel by a secure barrier that shall prevent sloughing or erosion of earth and fine material from the work area into the water course.



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REMOVAL OF EXISTING BRIDGES

40. Prior to bridge removal, any accumulation of earth or traction material on the bridges shall be carefully removed in a manner which does not discharge this material to the watercourse. Waste material shall be disposed of in approved locations.
41. The existing steel bridges shall be removed in a manner which does not damage the beds or banks of the watercourses. Bridge members shall be fully suspended while being removed from across the channel. There shall be no dragging of the bridge members through the riverbed or across the face of the bank.

BRIDGE CONSTRUCTION

42. During preparation of abutments, adequate containment shall be provided to prevent discharge of earth, raw concrete, grout, chemicals or other harmful material to the channel.
43. The new bridges shall be installed in a manner as to not damage the beds or banks of the watercourses. Bridge members shall be suspended while being placed across each channel. There shall be no dragging of bridge members through the channel or across the face of the bank.
44. During grouting or pouring of concrete, the bridges shall be draped or sealed to prevent leakage of raw cement or other harmful materials, or leakage of water contaminated with such materials to the watercourses.
45. Bridge approach material shall be structurally stable and protected from erosion. Adequate drainage facilities shall be incorporated in the roadway and bridge approach material to direct road runoff away from the bridge and into biofiltration swale or other suitable stormwater treatment area.
46. Curbs or wheel guards shall be installed on each bridge.

GATEHOUSE BRIDGE

BRIDGE REPLACEMENT

47. Removal of the existing bridge and installation of the new gate house bridge shall be done in a manner which does not allow earth, debris or waste materials to be entrained in to the outlet of the reservoir and discharged to the Yakima River.

DOWNSTREAM DRAIN CONSTRUCTION

WORKSITE LIMITATIONS

48. All work shall be done in isolation from surface water. All sediment shall be contained within the work area boundary.



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49. The equipment travel routes, clearing limits, and excavation limits shall be clearly staked in the field prior to beginning work within the wetland complex. The wetland outside of the construction area shall be clearly marked in the field and separated from the construction area with silt fence or equivalent barrier.
50. During construction, water in the drain trench shall be pumped to suitable location for treatment. Following treatment, this water shall be directed back to the wetland complex to help maintain the natural soil water table. Clean water infiltrating into the drain trench may be discharged directly to the wetland area in a manner consistent with provision #23 above.

TRENCH EXCAVATION AND INSTALLATION OF DRAIN IN WETLAND

51. Equipment operating within the delineated areas of the wetlands shall be maintained in good working condition such that petroleum products and other harmful materials are not leaked to wetlands.
52. All wetland soils removed during trench excavation shall be transported to the borrow pit or other approved site for temporary stockpiling for use in final restoration of the borrow pit.

DOWNSTREAM DRAIN OUTFALLS

53. Outfall to the Yakima River shall be constructed in isolation from the flowing water of the river.
54. The outfall shall be protected from erosion.

FISH PASSAGE IN LAKE KEECHELUS TRIBUTARY STREAMS DURING DAM CONSTRUCTION

TEMPORARY FISH PASSAGE DURING RESERVOIR DRAWDOWN

55. During the time period that Keechelus Reservoir is drawn down below the average low pool elevation (approximately elevation 2456), Reclamation shall monitor fish passage from Lake Keechelus into the major tributary streams to Lake Keechelus (i.e. Gold Creek, Meadow Creek and Coal Creek) at least two times per week. If passage is impaired, permittee shall immediately report this information to WDFW and consult with WDFW to determine what corrective measures shall be taken to provide passage (e.g. temporary flume, minor channel modification, permanent channel modification, etc.). Reclamation shall construct corrective measures as soon as possible but not later than seven days after determining that passage is impaired.

FISH PASSAGE AT KEECHELUS DAM OR ALTERNATIVE

56. Permittee shall immediately conduct a project-wide assessment of fish passage at all Yakima Project reservoirs. This assessment shall be done in collaboration with WDFW and the first phase of the assessment shall be completed and distributed by January 31, 2003. The first facility to be considered in this project-wide assessment shall be Keechelus Dam. The assessment shall include investigations as to the engineering, constructability and biological considerations of fish passage at each facility. The assessment shall include consideration of the potential fish production and likelihood of sustainability above each dam using a mutually acceptable assessment tool. Phase II of the assessment shall prioritize where fish passage is



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determined to be desirable and practicable, based upon the results of the phase I assessment. Phase II shall focus on engineering feasibility, cost, water management implications, and biological parameters for restoring specific stocks. Phase II of the assessment shall be completed by January, 2004. Where fish passage is determined to be both desirable and feasible, the permittee shall seek funding and complete design and construction of fish passage facilities in a timely manner. A separate HPA or HPA amendment is required for construction of these facilities. Where fish passage is determined to be undesirable or impractical, based upon the results of this assessment, Reclamation shall negotiate with WDFW an alternative to providing fish passage consistent with state law. The net benefit of this alternative shall provide equal or greater productivity and ecological function than that predicted for fish passage facilities if constructed at the dam(s).

- 57. The Permittee shall immediately begin the assessment of Keechelus Dam as per provision #56 above, and determine whether the proposed design and construction of the Safety of Dams Project will adversely affect the feasibility, cost or efficacy of fish passage facilities at this dam. Reclamation shall modify the Safety of Dams work as necessary to ensure that the proposed Safety of Dams reconstruction-related actions at Keechelus Dam will not result in significant additional costs for retrofitting fish passage facilities at Keechelus Dam nor require future modification of the portions of the dam being reconstructed as part of the SOD work.**
- 58. The Permittee shall provide interim fish passage (e.g. trap and haul program) in collaboration with WDFW at facilities where fish passage is desirable based upon the results of the project-wide passage assessment. Interim passage shall be provided at locations agreed upon by the fish management entities as soon as possible but not later than one year from completion of Phase II of the passage study.**

SITE RESTORATION

GENERAL SITE RESTORATION

- 59. Settling ponds and other earthworks within the ordinary high water mark of Lake Keechelus shall be recontoured to original grade, unless an alternate restoration/grading plan is specifically approved by WDFW.**
- 60. All earth areas adjacent to the watercourse which have been exposed or disturbed by this project are to be graded to a stable grade, seeded with a suitable erosion control seed mix which includes native grasses and forbs, and protected from erosion with a straw mulch or equivalent.**
- 61. Riparian and wetland plantings shall be cared for and maintained as per the monitoring plan, so as to ensure survival and rapid establishment of a robust plant community.**

LONG-TERM WETLAND RESTORATION

- 62. Permittee shall complete the implementation of the approved wetland restoration plan by November 30, 2004.**



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63. The wetland channels shall be restored to include complex large woody debris such as rootwads or small debris jams, etc.. The banks of the channel, where not fully vegetated, shall be planted with appropriate native plants adapted to streambanks and wetlands.

POST-CONSTRUCTION MONITORING

WETLAND COMPLEX RESTORATION MONITORING

64. The permittee shall monitor the performance and function of the wetland complex, the impacts of the new toe drain on the wetland and flow within the wetland channels, the success in restoration of pre-1998 wetlands hydrology and the success of revegetation of the areas disturbed during construction. Monitoring shall also assess whether mitigation objectives described in the EIS are achieved. Project monitoring shall be as per the approved submitted monitoring plan, and shall include a detailed inspection with sampling and photo documentation and written report submitted to WDFW for approval for one, three, five and ten years post construction. Copies of the monitoring results shall be sent to WDFW following each periodic site review. Any failures of features or revegetation and any deficiencies in performance shall be corrected in a timely fashion. Any corrective action which requires work within the lake, river, wetland or stream channels shall require specific approval from WDFW.

65. If monitoring results indicate that the restoration plan is not successful (i.e. wetland hydrology is not fully restored or that areas remain where native vegetation has not been successfully established) by year five the permittee shall develop a contingency plan to address the restoration deficiencies. The permittee shall submit this plan to WDFW for review and approval, and implement the approved corrective measures in a timely fashion.

SEPA: DS, Adoption of Existing Environmental Document and addendum - Washington Department of Ecology, April 8, 2002

APPLICATION ACCEPTED: April 17, 2002

ENFORCEMENT OFFICER: Rogers 125 [P1]

Brent Renfrow
Area Habitat Biologist (509) 925-1013

For Director
WDFW

Enclosures: Location map, site plan, construction boundary map, and project narrative



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GENERAL PROVISIONS

This Hydraulic Project Approval (HPA) pertains only to the provisions of the Fisheries Code (RCW 77.55 - formerly RCW 75.20). Additional authorization from other public agencies may be necessary for this project.

This HPA shall be available on the job site at all times and all its provisions followed by the permittee and operator(s) performing the work.

This HPA does not authorize trespass.

The person(s) to whom this HPA is issued may be held liable for any loss or damage to fish life or fish habitat which results from failure to comply with the provisions of this HPA.

Failure to comply with the provisions of this Hydraulic Project Approval could result in a civil penalty of up to one hundred dollars per day or a gross misdemeanor charge, possibly punishable by fine and/or imprisonment.

All HPAs issued pursuant to RCW 77.55.100 or 77.55.200 are subject to additional restrictions, conditions or revocation if the Department of Fish and Wildlife determines that new biological or physical information indicates the need for such action. The permittee has the right pursuant to Chapter 34.04 RCW to appeal such decisions. All HPAs issued pursuant to RCW 77.55.110 may be modified by the Department of Fish and Wildlife due to changed conditions after consultation with the permittee: PROVIDED HOWEVER, that such modifications shall be subject to appeal to the Hydraulic Appeals Board established in RCW 77.55.170.

APPEALS - GENERAL INFORMATION

IF YOU WISH TO APPEAL A DENIAL OF OR CONDITIONS PROVIDED IN A HYDRAULIC PROJECT APPROVAL, THERE ARE INFORMAL AND FORMAL APPEAL PROCESSES AVAILABLE.

A. INFORMAL APPEALS (WAC 220-110-340) OF DEPARTMENT ACTIONS TAKEN PURSUANT TO RCW 77.55.100, 77.55.110, 77.55.140, 77.55.190, 77.55.200, and 77.55.290:

A person who is aggrieved or adversely affected by the following Department actions may request an informal review of:

- (A) The denial or issuance of a HPA, or the conditions or provisions made part of a HPA; or
- (B) An order imposing civil penalties.

It is recommended that an aggrieved party contact the Area Habitat Biologist and discuss the concerns. Most problems are resolved at this level, but if not, you may elevate your concerns to his/her supervisor. A request for an INFORMAL REVIEW shall be in WRITING to the Department of Fish and Wildlife, 600 Capitol Way North, Olympia, Washington 98501-1091 and shall be RECEIVED by the Department within 30-days of the denial or issuance of a HPA or receipt of an order imposing civil penalties. The 30-day time requirement may be stayed by the Department if negotiations are occurring between the aggrieved party and the Area Habitat Biologist and/or his/her supervisor. The Habitat Protection Services Division Manager or his/her designee shall conduct a review and recommend a decision to the Director or its designee. If you are not satisfied with the results of this informal appeal, a formal appeal may be filed.

B. FORMAL APPEALS (WAC 220-110-350) OF DEPARTMENT ACTIONS TAKEN PURSUANT TO RCW 77.55.100 OR 77.55.140:



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A person who is aggrieved or adversely affected by the following Department actions may request an formal review of:

- (A) The denial or issuance of a HPA, or the conditions or provisions made part of a HPA;
- (B) An order imposing civil penalties; or
- (C) Any other "agency action" for which an adjudicative proceeding is required under the Administrative Procedure Act, Chapter 34.05 RCW.

A request for a FORMAL APPEAL shall be in WRITING to the Department of Fish and Wildlife, 600 Capitol Way North, Olympia, Washington 98501-1091, shall be plainly labeled as "REQUEST FOR FORMAL APPEAL" and shall be RECEIVED DURING OFFICE HOURS by the Department within 30-days of the Department action that is being challenged. The time period for requesting a formal appeal is suspended during consideration of a timely informal appeal. If there has been an informal appeal, the deadline for requesting a formal appeal shall be within 30-days of the date of the Department's written decision in response to the informal appeal.

- C. FORMAL APPEALS OF DEPARTMENT ACTIONS TAKEN PURSUANT TO RCW 77.55.110, 77.55.200, 77.55.230, or 77.55.290:

A person who is aggrieved or adversely affected by the denial or issuance of a HPA, or the conditions or provisions made part of a HPA may request a formal appeal. The request for FORMAL APPEAL shall be in WRITING to the Hydraulic Appeals Board per WAC 259-04 at Environmental Hearings Office, 4224 Sixth Avenue SE, Building Two - Rowe Six, Lacey, Washington 98504; telephone 360/459-6327.

- D. FAILURE TO APPEAL WITHIN THE REQUIRED TIME PERIODS RESULTS IN FORFEITURE OF ALL APPEAL RIGHTS. IF THERE IS NO TIMELY REQUEST FOR AN APPEAL, THE DEPARTMENT ACTION SHALL BE FINAL AND UNAPPEALABLE.

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SETTLEMENT AGREEMENT

*Confederated Tribes and Bands of the Yakama Nation v.
J. William McDonald, et al.,
9th Cir. Docket No. 03-35229,
District Court No. CY-02-3079-AAM (E.D. Wash.)*

WHEREAS, the parties consent to execution of this Settlement Agreement (Agreement) in full settlement of all issues arising in *Confederated Tribes and Bands of the Yakama Nation v. J. William McDonald, et. al.*, 9th Cir. Docket No. 03-35229, District Court No. CY-02-3079-AAM (E.D. Wash.),

WHEREAS, the parties have conferred and engaged in negotiations pursuant to the Mediation Program of the U.S. Court of Appeals for the Ninth Circuit,

WHEREAS, this Settlement Agreement is the result of each party's good faith effort to resolve this case,

WHEREAS, each government party to this Settlement Agreement desires to work within the framework of a government-to-government relationship,

WHEREAS, the parties agree that this Settlement Agreement constitutes a fair resolution and compromise of this matter and its underlying competing contentions,

WHEREAS, the parties intend that this Settlement Agreement completely resolve, as among them, all issues raised in this case, or that could properly have been raised in this case, and that this Settlement Agreement is binding upon the parties, and

WHEREAS, though intended to resolve all issues in this case, this Settlement Agreement primarily addresses the establishment of a cooperative framework among the parties for achieving the ultimate goal of passage of anadromous fish at all U.S. Bureau of Reclamation (BOR) irrigation water storage facilities within the Yakima Basin where feasible, as well as anadromous fish reintroduction and habitat restoration efforts,

THE PARTIES AGREE AS FOLLOWS:

1. The Yakama Nation agrees to voluntarily dismiss its appeal in this action before the U.S. Court of Appeals for the Ninth Circuit, with prejudice.

2. BOR agrees to use its existing congressional authority and funding under § 1206 of the Yakima River Basin Water Enhancement Project (YRBWEP), Pub. L. No. 103-434, 108 Stat. 4550, 4560 (1994), to implement interim juvenile (downstream) fish passage measures at Cle Elum Dam, as developed by the Technical Yakima Basin Storage Fish Passage Work Group described in ¶ 6(a). BOR has implemented interim juvenile (downstream) fish passage at Cle Elum Dam and shall continue to do so per this paragraph.

3. "Interim" is defined throughout this Settlement Agreement as the period of time from the execution date of this document to the time at which permanent adult (upstream) and/or

juvenile (downstream) fish passage is implemented, or to the time at which the Regional Director, Pacific Northwest Region, BOR, concludes that permanent adult (upstream) and/or juvenile (downstream) fish passage is infeasible, for Cle Elum and Bumping Lake Dams as described in ¶ 7.

4. The parties agree to study and develop feasible measures, if any, for inclusion in a Cooperative Technical Plan for permanent juvenile (downstream) and adult (upstream) fish passage implementation at Cle Elum and Bumping Lake Dams.

5. BOR agrees to provide up to \$65,000.00 in annual funding to the Yakama Nation for cooperative planning activities by the Yakama Nation Fisheries Resource Management Program, beginning in FY 2005 and continuing until submission of the planning report to the Office of the Secretary as described in ¶ 7. To receive this funding, the Yakama Nation must enter into an appropriate financial agreement with BOR, and thereafter comply with the terms of that financial agreement, or any future agreement executed to provide additional funding to the Yakama Nation. After the planning report is submitted to the Office of the Secretary as described in ¶ 7, BOR's funding obligations to the Yakama Nation shall cease.

6. BOR will develop the Cooperative Technical Plan in accordance with the following principles:

a. The Technical Yakima Basin Storage Fish Passage Work Group shall provide technical assistance in the development of biological and engineering measures for anadromous fish passage and reintroduction of anadromous fish above the Yakima Project storage dams. The Work Group shall provide technical assistance in the evaluation and monitoring of such measures upon implementation. This Work Group may consist of biologists and engineers from BOR, the Yakama Nation, irrigation interests, NOAA Fisheries, the U.S. Fish and Wildlife Service, the U.S. Forest Service, and the Washington Department of Fish and Wildlife.

b. To the extent that interim fish passage measures are implemented, the Cooperative Technical Plan shall include a proposed program to monitor and evaluate the performance of the fish passage measures at Cle Elum and Bumping Lake Dams and a proposal for authorization of participation by, and funding for, the Yakama Nation in the monitoring and evaluation activities.

c. The Cooperative Technical Plan will include a section discussing whether existing data from Cle Elum and Bumping Lake Dams and from the monitoring programs discussed in ¶ 6(b) can be used in the development of additional plans for fish passage measures at other BOR dams in the Yakima Basin, including Keechelus, Kachess, and Tieton Dams. The section shall also identify uncertainties and additional data necessary to determine the feasibility of fish passage at these three dams.

7. Consistent with federal law and applicable planning principles and standards, the Regional Director, Pacific Northwest Region, BOR, shall prepare a planning report with regard to the feasibility of implementing permanent fish passage at Cle Elum and Bumping Lake Dams. BOR shall include the Cooperative Technical Plan in BOR's administrative record for this

planning report and in the report itself as an appendix. The planning report shall include the Regional Director's recommendations and conclusions with respect to the feasibility of implementing permanent juvenile (downstream) and adult (upstream) fish passage implementation at Cle Elum and Bumping Lake Dams. BOR shall submit, through appropriate Departmental channels, the Regional Director's planning report and any other required documentation to the Office of the Secretary, U.S. Department of the Interior, for consideration.

8. Within six months of the completion of the planning report for Cle Elum and Bumping Lake Dams outlined in ¶ 7, the parties shall meet to discuss whether the Technical Yakima Basin Storage Fish Passage Work Group should study and develop additional plans (consistent with federal law and applicable planning principles and standards) with regard to the feasibility of implementing permanent adult (upstream) and juvenile (downstream) fish passage at Kachess, Keechelus and Tieton Dams within the Yakima River Basin. If the parties agree that additional plans are warranted, they shall attempt to negotiate a memorandum of agreement outlining the process and establishing deadlines for the completion of additional plans addressing passage at Kachess, Keechelus, and Tieton Dams.

9. Designated representatives of the parties shall meet on a semiannual basis to discuss the progress of the implementation of the Settlement Agreement.

10. Nothing in this Agreement shall be deemed to waive, abrogate, diminish, define or interpret the rights of the Yakama Nation under the Treaty of June 9, 1855. The parties do not construe this Settlement Agreement to waive, abrogate, diminish, define or interpret the Treaty rights of the Yakama Nation.

11. Nothing in this Agreement shall be construed to limit or modify the discretion accorded to the Federal Defendants, by the Endangered Species Act, 16 U.S.C § 1531 et seq., the Administrative Procedures Act, 5 U.S.C. §§ 551-559, 701-706, or other federal laws.

12. This Agreement shall not be construed as an admission or agreement by any party, whether plaintiff, defendant or intervenor, as to the validity or legitimacy of any or all of any party's factual or legal contentions made in this case, including but not limited to any party's contentions regarding Yakama Nation Treaty rights.

13. Except as set forth in this Agreement, all parties reserve and do not waive any and all other legal rights and remedies.

14. Nothing in this Agreement shall be construed to obligate the United States to pay any attorney's fees or costs associated with this case.

15. The parties agree that the United States shall not be liable for costs or attorney's fees under the Equal Access to Justice Act, 28 U.S.C. § 2412 or the Endangered Species Act, 16 U.S.C. 1540(g).

16. No provision of this Agreement shall be interpreted to constitute a commitment or requirement obligating the United States to pay funds in violation of the Anti-Deficiency Act, 31 U.S.C. § 1341, and nothing herein shall be construed to obligate the United States to expend or

involve the United States in any contract or other obligation for future payment of money in excess of appropriations authorized by law and administratively allocated for the purposes and projects contemplated hereunder.

17. No member of or Delegate to Congress, or Resident Commissioner, shall be admitted to any share or part of this Agreement or to receive any benefit that may arise out of it other than as a water user or landowner in the same manner as other water users or landowners.

18. Nothing in this Agreement shall be deemed to waive, abrogate, diminish, define, interpret or impair the rights of the landowners/water users, irrigation districts, water companies or municipalities which receive their water from or through BOR operated reservoirs, dams or other facilities.

19. Nothing in this Agreement shall be deemed to waive, abrogate, diminish, define, interpret or impair the obligation or ability of BOR to deliver water in accordance with its contracts and obligations provided by the 1945 Judgment in *KRD, et al. v. SVID et al.*, Civil 21, US. District Court (ED Wash.), and the water rights adjudicated in *Washington State Dept. of Ecology v. Acquavella*, Yakima County No. 77-2-01484-5.

20. The parties disagree as to whether reintroduced fish stocks or species, if any, and restoration of habitat for such reintroduced stocks or species constitute "enhancement" of fish life as defined in *Washington State Dept. of Ecology v. Acquavella*, Yakima County No. 77-2-01484-5. Nothing in this Agreement shall be deemed to waive, abrogate, diminish, define, or interpret the rights of any parties with regard to this issue. The parties expressly reserve their rights, as well as any arguments, on this issue.

21. This Agreement constitutes the final, complete and exclusive agreement and understanding among the parties hereto with respect to the matters addressed herein. There are no representations, agreements or understandings relating to this Agreement other than those expressly contained herein. All prior communications, discussions, drafts, meetings or writings of any kind are superseded by this Agreement and shall not be used by any party to vary, contest or otherwise interpret the terms of this Agreement.

22. In the event of a disagreement among the parties concerning the interpretation or performance of any aspect of this Agreement, the dissatisfied party shall provide the other parties with written notice of the dispute and a request for negotiations. Within 30 days of the date of the written notice, or such time thereafter as the parties may mutually agree upon, the parties shall meet and confer in an effort to resolve their differences. If the parties are unable to reach agreement within 30 days of such meeting, the dissatisfied party may seek appropriate resolution by filing the appropriate complaint based on applicable law.

23. Any notice required or made with respect to this Agreement shall be in writing and shall be effective upon receipt. For any matter relating to this Agreement, the contact persons are:

For Plaintiff

Tom Zeilman
15 North 15th Avenue
Yakima, Washington 98902

For Defendant

Area Manager
Upper Columbia Area Office
U.S. Bureau of Reclamation
1917 Marsh Road
Yakima, WA 98901

24. The parties may agree in writing to modify any provision of this Agreement.

25. The undersigned representatives of each party certify that they are fully authorized by the party or parties they represent to agree to the terms and conditions of this Agreement and do hereby agree to the terms herein.

For the Bureau of Reclamation:


J. WILLIAM MCDONALD

Regional Director
Pacific Northwest Region
Bureau of Reclamation
U.S. Department of the Interior

Sept. 1, 2006
Date

For the Yakama Nation:



Chairman
Yakama Tribal Council

Dec. 16-06
Date