Chief Joseph Hatchery Program

Draft Environmental Impact Statement

DOE/EIS-0384

May 2007

Chief Joseph Hatchery Program

Responsible Agency: U.S. Department of Energy, Bonneville Power Administration (BPA)

Title of Proposed Project: Chief Joseph Hatchery Program

Cooperating Tribe: Confederated Tribes of the Colville Reservation

State Involved: Washington

Abstract: The Draft Environmental Impact Statement (DEIS) describes a Chinook salmon hatchery production program sponsored by the Confederated Tribes of the Colville Reservation (Colville Tribes). BPA proposes to fund the construction, operation and maintenance of the program to help mitigate for anadromous fish affected by the Federal Columbia River Power System dams on the Columbia River. The Colville Tribes want to produce adequate salmon to sustain tribal ceremonial and subsistence fisheries and enhance the potential for a recreational fishery for the general public. The DEIS discloses the environmental effects expected from facility construction and program operations and a No Action alternative.

The Proposed Action is to build a hatchery near the base of Chief Joseph Dam on the Columbia River for incubation, rearing and release of summer/fall and spring Chinook. Along the Okanogan River, three existing irrigation ponds, one existing salmon acclimation pond, and two new acclimation ponds (to be built) would be used for final rearing, imprinting and volitional release of chinook smolts. The Chief Joseph Dam Hatchery Program Master Plan (Master Plan, Northwest Power and Conservation Council, May 2004) provides voluminous information on program features. The US Army Corps of Engineers, Washington Department of Fish and Wildlife, Washington State Parks and Recreation Commission, Oroville-Tonasket Irrigation District, and others have cooperated on project design and siting.

Public review of and comment upon this Draft EIS will continue through June 18, 2007. Responses to comments will be made part of the Final EIS, which is scheduled for completion in September 2007. BPA expects to issue a Record of Decision whether to implement the project in September 2007.

For more information about the Draft EIS, please contact:

Mickey Carter, Environmental Protection Specialist
Bonneville Power Administration
P. O. Box 3621, KEC-4
Portland, OR 97208-3621
Telephone: (503) 230-5885
Email: macarter@bpa.gov

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Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208
ATT : Public Information Center – CHDL-1

For additional information on DOE NEPA activities, please contact Carol M. Borgstrom, Director, Office of NEPA Policy and Compliance, GC-20, U.S. Department of Energy, 1000 Independence Avenue S.W., Washington D.C. 20585-0103, phone: 1-800-472-2756 or visit the DOE NEPA Web site at www.eh.doe.gov/nepa.

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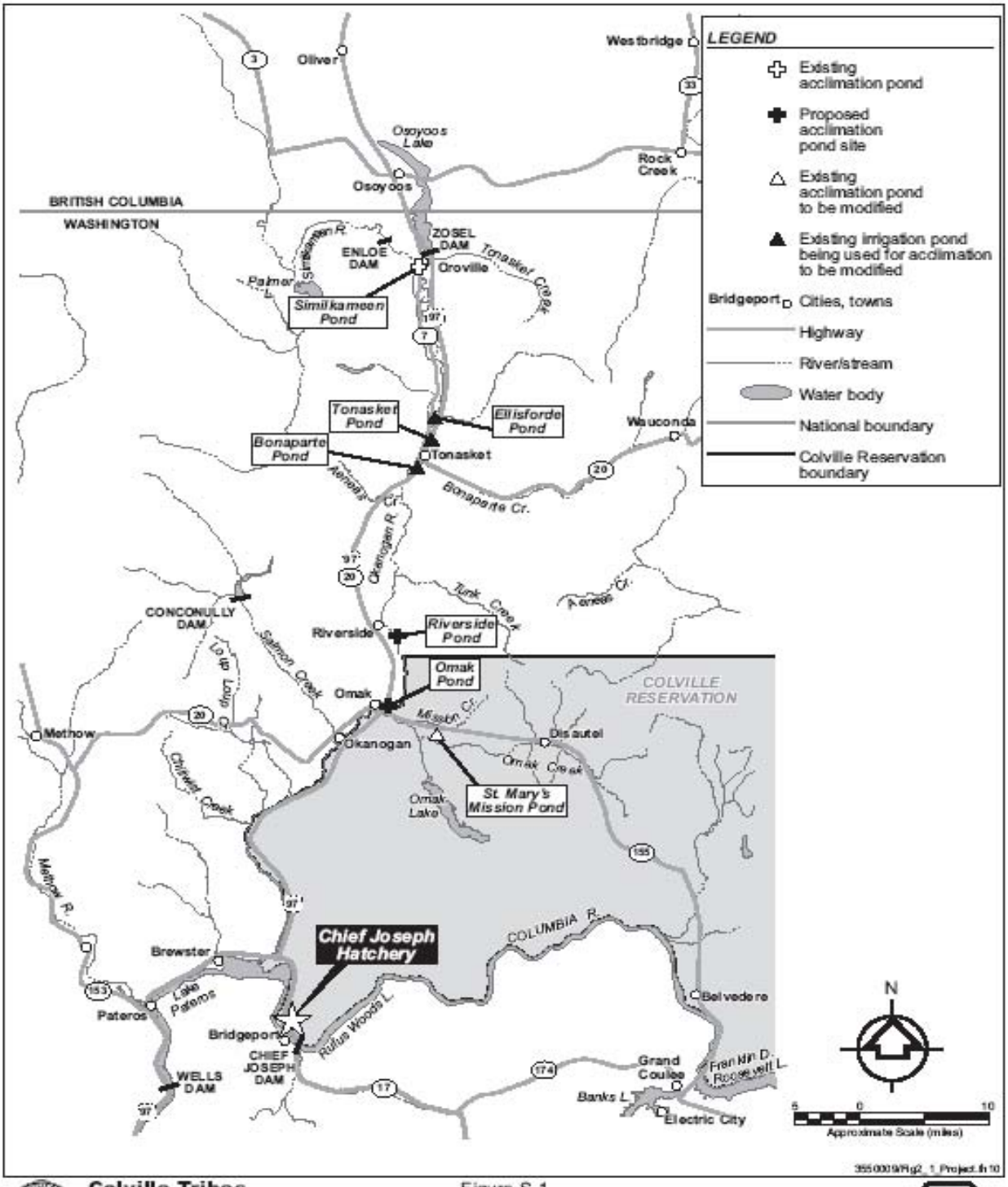
ABBREVIATIONS AND ACRONYMS

APE	Area of Potential Effect
ARPA	Archaeological Resources Protection Act
BA	Biological Assessment
BAMP	Biological Assessment and Management Plan
BPA	Bonneville Power Administration
BMP	Best Management Practices
C	Celsius
CEQ	Council on Environmental Quality
cfs	cubic feet per second
CJHP	Chief Joseph Hatchery Program
CO	carbon monoxide
CTCR	Confederated Tribes of the Colville Reservation
DART	Data Access in Real Time
DO	dissolved oxygen
DPS	Distinct Population Segment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FCRPS	Federal Columbia River Power System
FEMA	Federal Emergency Management Agency
Fpp	Fish per pound
FPPA	Farmland Protection Policy Act
gpm	gallons per minute
HCP	Habitat Conservation Plan
HGMP	Hatchery Genetics Management Plan
HPA	Hydraulic Project Approval
IAC	Interagency Committee for Outdoor Recreation
kv	kilovolt
LFA	Limiting Factor Assessment
NAAQS	National Ambient Air Quality Standards
NATURES	Natural Rearing and Enhancement System
NEPA	National Environmental Policy Act
NFH	National Fish Hatchery
NOAA	National Oceanic and Atmospheric Administration
NPCC	Northwest Planning and Conservation Council (formerly NPPC)
NPDES	National Pollution Discharge Elimination System
NPPC	Northwest Power Planning Council (now NPCC)
NPS	National Park Service
NRHP	National Register of Historic Places
NTU	Nephelometric Turbidity Unit
NVEC	Nespelem Valley Electric Cooperative
OID	Okanogan Irrigation District
OTID	Oroville-Tonasket Irrigation District
Pb	lead

ABBREVIATIONS AND ACRONYMS

PM_{10}	Particulate matter less than 10 microns in diameter
PSAMP	Puget Sound Ambient Monitoring Program
PUD	Public Utility District
RCW	Revised Code of Washington
RM	river mile
ROD	Record of Decision
RTT	Regional Technical Team
RV	recreational vehicle
SCORP	(Washington) Statewide Comprehensive Outdoor Recreation Plan
SHPO	State Historic Preservation Office
SRFB	Salmon Recovery Funding Board
TCP	Traditional Cultural Property
TCR	Traditional Cultural Resource
TDG	total dissolved gases
THPO	Tribal Historic Preservation Office
UCR	Upper Columbia River
UCSRB	Upper Columbia Salmon Recovery Board
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WDOE	Washington Department of Ecology
WDOT	Washington Department of Transportation
WSPRC	Washington State Parks and Recreation Commission



Colville Tribes
CHIEF JOSEPH HATCHERY PROGRAM
DRAFT ENVIRONMENTAL IMPACT STATEMENT

Figure S-1.
Location of Project Facilities

TETRA TECH/KCH

CHAPTER 1: PURPOSE AND NEED

The Northwest Power and Conservation Council (NPCC, www.nwcouncil.org) recommended that the Bonneville Power Administration (BPA) study and consider funding a Chinook salmon production program and hatchery proposed by the Confederated Tribes of the Colville Reservation (Colville Tribes). The proposal intends to increase returns of adult summer/fall Chinook by raising and releasing juvenile fish in the waters of the Okanogan River, and in the Columbia River between its confluence with the Okanogan River and Chief Joseph Dam. The proposed program would construct, operate and maintain a hatchery below the Chief Joseph Dam on the Columbia River and several fish acclimation and release ponds on the Okanogan River and Omak Creek in Okanogan County, Washington (Figure 1-1). These facilities may also be used to produce and reintroduce spring Chinook salmon to historic habitats in the Okanogan subbasin using adult hatchery fish that are surplus to recovery needs in other nearby subbasins. This Environmental Impact Statement (EIS) presents the preliminary design of the project and a summation of its probable environmental effects to inform the public and guide BPA's consideration of this possible undertaking as required by the National Environmental Policy Act (NEPA).

1.1 Purpose and Need

BPA needs to decide whether to fund the proposed project to assist in the protection and mitigation of summer/fall Chinook salmon (*Oncorhynchus tshawytscha*) populations in the Okanogan River and the Columbia River between the Okanogan River and Chief Joseph Dam that are affected by the Federal Columbia River Power System (FCRPS). BPA comes by this protection and mitigation responsibility under the Northwest Electric Power Planning and Conservation Act of 1980 (Northwest Power Act, 16 U.S.C. Sec. 839 et seq). The proposed project would be one more element of a continuing effort by BPA, the Colville Tribes and several other partners and cooperators to protect and manage existing anadromous fish populations and mitigate for effects of the FCRPS in these waters.

BPA defined the scope of the proposed action and any viable alternatives in terms of four primary purposes to be met:

1. Increase abundance, distribution, and diversity of naturally spawning summer/fall Chinook within their historical Okanogan subbasin habitat. As well as helping to protect the species and mitigate for the FCRPS, the proposal needs to be integrated with and complementary to the myriad of other local and regional fishery improvement efforts (habitat improvements, fish passage, water rights programs, harvest controls, etc.) in these waters.

2. Operation of the FCRPS, particularly Chief Joseph Dam, must remain unaffected by the proposal (e.g., spill, timing, dissolved gases, etc.). Power system operational flexibility must not be diminished or otherwise adversely affected.

3. The proposal must not adversely affect populations listed under the Endangered Species Act (ESA) (e.g. through mixed stock harvest, reducing productivity, or otherwise) such that it creates a greater mitigation, protection or recovery burden on BPA. The program must not be contrary to FCRPS biological opinions, ESA recovery objectives, or the Council on Environmental Quality (CEQ) strategy on federal hatcheries (pp 3-5 of: http//www.salmonrecovery.gov/reports_and _papers/biop_remand_2004/Docs/206/JLC_Salmon_Speech_1.25.06.pdf).

4. The Colville Tribes, as project sponsors and proponents, want to produce adequate adult salmon returns to support a tribal ceremonial and subsistence fishery. BPA supports this goal to augment anadromous fish populations so as to enhance the potential for tribal ceremonial and subsistence harvests and a recreational fishery for the general public, though BPA has no authority to permit or regulate harvest.

1.2 The Salmon Situation in the Okanogan

The Colville Tribes are pursuing development of the Chief Joseph Hatchery Program (CJHP) through the NPCC's Fish and Wildlife Program based on numerous historical and biological factors and regulatory decisions.

Historically, Columbia River tribes depended on salmon for subsistence and cultural purposes. Spring fishing along the Okanogan River once provided tribal members with enough salmon (their primary protein source) to last throughout the year. It has been estimated that the combined salmon and steelhead harvest by upper Columbia River tribes in the 1800s exceeded two million pounds annually (CTCR 2004).

By the late 1800s, regional salmon populations were intensively commercially harvested along the Columbia River. In addition, occupation and development of the upper Columbia and Okanogan valleys altered salmonid habitat through timber harvest; agriculture (grazing and farming) and agricultural water withdrawals; and development of transportation systems, municipalities, utilities, and industry. By the early 1930's, spring Chinook in the Okanogan subbasin were extirpated, and the first of eleven dams on the Columbia River furthered the decline of summer/fall Chinook.

Anadromous fish are now extirpated from the Columbia River system above Chief Joseph Dam. The Okanogan River is the uppermost Columbia River tributary still accessible to anadromous fish. Limiting factors to summer/fall Chinook in the Okanogan subbasin are elevated irrigation water withdrawals, sedimentation, summer water temperatures, riparian vegetation loss, and uneven spawning distribution (NPCC 2004) (Section 3.2). Although the dams downstream of Chief Joseph Dam still limit anadromous fish productivity, substantial improvements have been made in recent years for out-migrant juveniles and returning adults. Other limiting factors on anadromous fish include degraded habitat in the lower Columbia River and ocean harvest levels.

Spring Chinook are listed as endangered under the Endangered Species Act (ESA) of 1973 (as amended) (Federal Register, Vol. 64, No. 56, March 24, 1999, p. 14308) throughout much of the Columbia River system. Spring Chinook have been extirpated from the Okanogan River, so the river is not part of the upper Columbia River spring

Chinook Evolutionarily Significant Unit (ESU). Upper Columbia River summer/fall Chinook have been deemed not in danger of extinction (Meyers et al. 1998). However, upper Columbia River steelhead are ESA-listed as endangered and the upper Columbia River Distinct Population Segment (DPS) for steelhead includes the Okanogan River, so evaluation of this project is required under Section 7 of the ESA. Federal agencies must ensure that actions they authorize, fund, or conduct are not likely to jeopardize the continued existence of any ESA proposed or listed species or their designated critical habitat.

The summer/fall Chinook run in the Okanogan River currently is supported by the Eastbank Hatchery near Rocky Reach Dam. The Washington Department of Fish and Wildlife (WDFW) selects brood stock from adult fish collected at a trap at Wells Dam (see Figure 2-1) and transports them to the hatchery for spawning and incubation. Juvenile fish are transported to Similkameen Pond on a tributary to the Okanogan River for final rearing and release. Most of the salmon now returning to the Okanogan are the progeny of this mixed run program. However, since 1987 later-arriving natural-origin summer/fall Chinook have declined to such low levels that early-arriving summer/fall Chinook have been primarily relied upon for hatchery brood stock. So the current population may not be representative of the indigenous population which was probably more suited to the historic range of Okanogan habitat and environmental conditions. Also, hatchery bred fish that return from the ocean as adults to spawn in the Okanogan are concentrating near Similkameen Pond rather than distributing throughout the available habitat in the basin.

Since 2001, the Colville Tribes have released hatchery juvenile spring Chinook in the Okanogan subbasin. As a result, a few adult spring Chinook returned to the subbasin in 2005, and the Colville Tribes observed the First Salmon ceremony for the first time in many years.

Today, harvest and recreational fishing opportunities in the Okanogan are limited by inconsistent adult fish returns. The Colville Tribes manage a limited ceremonial and subsistence fishery, targeting summer/fall Chinook that are in excess of escapement objectives.

1.3 Decisions to be Made and Responsible Officials

BPA will use this EIS to help inform a decision whether or not to fund the fish production program and hatchery as proposed by the Colville Tribes and recommended by the NPCC. The BPA Administrator will issue a Record of Decision (ROD) following public, agency and tribal review and comment on the Draft EIS and after preparation of a Final EIS responding to any relevant comments received.

This EIS is the second step in a 3-step project planning process outlined by the NPCC. The first step was preparation of a fish production and hatchery master plan that was released to the NPCC in May 2004 and for public review in August 2004 (Chief Joseph Dam Hatchery Program Master Plan, http://www.nwcouncil.org/library/Default.htm). The third step would be the implementation of the production program plan beginning with the final design and construction of the hatchery and acclimation ponds should the NPCC continue to support the proposal and BPA decide to fund it.

The U.S. Army Corps of Engineers (USACE), as administrators of the main site where the hatchery facility is proposed, and the State of Washington, as administrator of sites where some other project facilities are proposed and as co-manager of the area's fisheries, may also issue decision documents based on this EIS to serve their environmental and public review responsibilities. Information presented in this EIS may also be used by other federal, tribal, state, and local agencies to make decisions on permits, authorizations, management plans, and other approvals associated with this proposed project.

1.4 The Chief Joseph Hatchery Master Plan

For many years, BPA, the Colville Tribes, WDFW, and other partners and cooperators have directed substantial resources toward protecting, mitigating for and managing anadromous fish in the Okanogan subbasin. Efforts have included habitat protection and restoration measures, fish passage improvements, limited fish supplementation and harvest, public education, water rights programs, watershed planning, and monitoring and evaluation programs. While these efforts have helped improve conditions for anadromous fish, they are not adequate to sustain naturally-spawning populations in the basin. It is generally agreed that a hatchery supplementation program would make the fishery management efforts more comprehensive, cohesive, effective, and timely.

Based on the NPCC's recommendations, BPA funded the Colville Tribes to develop the Chief Joseph Dam Hatchery Master Plan (Master Plan) (May 2004) (http://www.nwcouncil.org/library/Default.htm). The Master Plan defines the hatchery program as part of a comprehensive plan for managing summer/fall and spring Chinook salmon in the Okanogan River and the reach of the Columbia River between Wells Dam and Chief Joseph Dam. The Master Plan (Volume 1) complete with appendices (Volume 2) is incorporated by reference in this EIS in its entirety as the primary source of detailed information on the proposed Chinook production program. It includes the developmental history of the program, biological data, ecological rationale, conceptual design, component descriptions, and cost estimates. It also contains summer/fall Chinook and spring Chinook Hatchery Genetic Management Plans (HGMPs) and environmental and engineering research information that are used as a basis of support for much of the information in this EIS.

1.5 Public Scoping and Key Issues

In order to identify initial concerns and issues with the proposed project and any potential alternatives to the proposed action, BPA scoped the project with the public, agencies and Northwest tribes through a combination of open meetings and informative mailings. A Notice of Intent to prepare an EIS, published in the Federal Register on August 2, 2005, introduced the proposed project and provided scoping meeting and contact information. In August, 2005 notices of upcoming scoping meetings were published in the *Wenatchee World*, *Omak Chronicle*, and the *Colville Statesman* and mailed to parties thought to be interested or potentially affected by the proposal. Public scoping meetings were held at Chief Joseph Dam in Bridgeport, Washington on August 23, 2005; in Okanogan, Washington on August 24, 2005; and in Wenatchee, Washington on August 25, 2005. The scoping comment period extended from August 2 to September 19, 2005.

Scoping revealed five key issues that guided the development of this EIS.

1. The effect of the fish production program on the quality of surface waters and wells in the vicinity of the hatchery and acclimation ponds (Section 3.6)

2. The effect of the production program, hatchery and acclimation ponds on water quantity and use, especially FCRPS dam operations and irrigation and municipal withdrawals (Section 3.6)

3. The effect of the production program and facilities on aquatic organisms including additional stocking of hatchery-bred fish into the Okanogan subbasin and the Columbia River below Chief Joseph Dam (Section 3.2)

4. The effect of the production program and facilities on terrestrial organisms and resources including key wildlife species, plants and their habitats in the area (Sections 3.3, 3.4 and 3.5)

5. The effect of the production program and facility construction on local communities and BPA ratepayers (Sections 3.7, 3.8, 3.9, 3.10 and 3.11)

The substance of the public issues did not indicate that another alternative needed to be developed to compare with or replace the proposed action. Rather, it was generally acknowledged that a fish production program supported by a local hatchery is needed and desired to complement other ongoing efforts and increase adult salmon returns in the Okanogan subbasin. So, only the proposed action and the No Action alternative required by NEPA are analyzed in this EIS.

1.6 Issues Beyond the Scope of this EIS

This EIS compares the environmental consequences of not taking any action (the No Action alternative, continuing with things as they are) and of implementing the proposed project as a means for meeting the stated purposes and need for action (Section 1.2). This EIS addresses the merits of the proposal and cumulative effects when it is combined with other on-going fish protection and mitigation programs and projects (as required by NEPA). Issues associated with fish restoration, harvest levels, hatchery programs in general, or the relative importance/priorities of other on-going fish protection programs or projects are more appropriately addressed in other forums. Examples of such forums include the NPCC's project proposal solicitation process, or the processes by which WDFW and NOAA Fisheries sets harvest limits, or when a government agency proposes to adopt a policy relating to these broader, general programs. For BPA, the Fish and Wildlife Implementation Plan (FWIP) (BPA 2003a) covers the broad issue of funding hatcheries and fish production programs. A decision to implement the Chief Joseph Hatchery Program therefore would tier to BPA's FWIP.

Also outside the scope of this EIS are suggestions made during scoping for project elements that are outside BPA's and CTCR's responsibilities, are not necessary to implement the proposed project, do not contribute directly to meeting the purpose and need for action, or do not address any environmental consequences of the proposal. Examples are:

- Studying the effects of long-term drought on water releases from Zosel Dam in the Okanogan subbasin near Oroville, WA

- Proposals to manage salmon in places other than the Okanogan River subbasin and the Columbia River between the Okanogan River and Chief Joseph Dam

- Constructing a welcome center near the hatchery site for the Okanogan Trails Scenic Byway to aid tourism

- Adding public access, boat launch sites and other recreational developments on the Okanogan River

- Sponsoring riverside clean up initiatives in response to additional recreational use

1.7 Relationship to Fish Management Plans, Programs and Projects in the Vicinity

Numerous programs have been enacted in recent years to address salmon and steelhead conservation and restoration in the Okanogan subbasin. These programs and specific projects being implemented under each are fully described in the Master Plan (CTCR 2004). The major initiatives and their relationship to the CJHP are listed below.

Okanogan Subbasin Plan

The Okanogan Subbasin Management Plan (NPCC 2004) outlines objectives for summer/fall and spring Chinook management that are used to select and prioritize projects to improve stream habitat and salmonid productivity within the Okanogan River subbasins. These objectives relate to the health of natural Chinook populations, artificial propagation, and harvest. The CJHP, if implemented, would improve productivity, abundance, diversity, and sustainability of Chinook salmon in the Okanogan subbasin in concert with the Subbasin Plan's objectives.

Salmon and Steelhead Habitat Limiting Factors Assessment, Watershed Resource Inventory 49: Okanogan Watershed (Entrix, Inc., Golder Assoc., and Washington Conservation Commission, 2004)

This limiting factors assessment (LFA) summarized habitat conditions in the Okanogan River and its tributaries based on current professional knowledge of a Technical Advisory Group. This group included both agency and consulting scientists from the United States and Canada. Action items were suggested for each Okanogan sub-watershed to address limiting factors. State, tribal, and federal agencies use the plan to develop salmon enhancement actions and programs. The proposed CJHP, including the use of acclimation facilities spread throughout Okanogan River in the US, are consistent with the objectives to more fully utilize available habitat.

Mid-Columbia Habitat Conservation Plans

Habitat Conservation Plans (HCPs) were developed by Chelan and Douglas County PUDs to mitigate for the effects of Rocky Reach, Rock Island and Wells Dam

hydroelectric projects on fish and wildlife. These HCPs were coordinated with various state and federal fisheries agencies including National Oceanic and Atmospheric Administration (NOAA) Fisheries, U.S. Fish and Wildlife Service (USFWS), Washington Department of Fish and Wildlife (WDFW), three tribes, and American Rivers. The HCPs commit the PUDs to a 50-year program to ensure that their hydroelectric projects have no net impact on mid-Columbia salmon and steelhead runs. This would be accomplished through fish bypass systems, spill at the dams, off-site hatchery programs, and habitat restoration work. In addition to meeting the ESA, the HCPs are also intended to satisfy obligations under the Federal Power Act, the Fish and Wildlife Coordination Act, the Essential Fish Habitat provisions of the Magnuson-Stevens Fishery Conservation and Management Act, the Pacific Northwest Electric Power Planning and Conservation Act, Title 77 RCW of the State of Washington, and to obligate the parties to work together to address water quality issues. Some of the Chinook mitigation required by the HCPs could be produced at the Chief Joseph Hatchery via cost sharing arrangements. Discussions with the PUDs are on-going.

Biological Assessment and Management Plan: Mid-Columbia River Hatchery Program (Bugert 1998)

The Mid-Columbia HCPs included the development of a Biological Assessment and Management Plan (BAMP) for the mid-Columbia River hatchery program upstream of the Yakima River. The BAMP describes an approach to increase artificial production of summer/fall Chinook in the mid-Columbia region and establish ESU-wide coordination in order to move toward the "no net impact" goal for the PUDs' hydroelectric operations.

The BAMP identifies fish production increases intended to be consistent with conservation of low-risk, natural populations and recovery of ESA-listed species. It includes broadly supported genetic and ecologic assessments of summer/fall and spring Chinook, sockeye, and steelhead, and sets a stage for ESU-wide coordination efforts. Although the BAMP and HCPs have not been formally approved, the CJHP appears to be consistent with their tenets. Discussions with PUDs for cost-sharing are occurring.

Hatchery Reform: Principles and Recommendations of the Hatchery Scientific Review Group (HSRG 2004)

The HSRG was established by Congress to review and make recommendations for improving salmon hatcheries in the Pacific Northwest. Many of the HSRG recommendations have been incorporated into the hatchery practices proposed for the CJHP. For example, the program would control the proportion of hatchery fish spawning in the wild and wild fish spawned in the hatchery in order to improve the overall fitness of the composite wild and hatchery population. The CJHP thus recognizes that to restore fish production using hatcheries will require an approach where the natural, rather than hatchery environment drives local adaptation. This approach should increase the overall survival of the population, leading to higher rates of adult returns to the basin, and therefore the success of the CJHP.

Upper Columbia Salmon Recovery Plan

The Upper Columbia Salmon Recovery Board (UCSRB), a standing committee of the North Central Washington Resource Conservation and Development Council, completed the draft Upper Columbia Salmon Recovery plan in January 2004. The UCSRB Board of Directors includes elected officials or designates from Chelan, Douglas, and Okanogan counties, the Colville Tribes, and the Yakama Nation. The UCSRB coordinates and oversees regional recovery planning for Washington's statewide salmon recovery planning efforts. The UCSRB's efforts are being integrated with subbasin planning activities in the Okanogan subbasin. This draft plan identifies the need for the programs described in the CJHP to address the unique circumstances of the Okanogan subbasin.

Upper Columbia Biological Strategy

The Upper Columbia Biological Strategy was developed by the Regional Technical Team (RTT) to support salmon recovery efforts in the region and specifically to help guide the Washington State Salmon Recovery Funding Board (SRFB) process. The Upper Columbia Biological Strategy has also been adopted as a tool to help guide subbasin planning in the region. Technical guidance developed by the RTT was taken into consideration in the development of the Okanogan Summer/fall Chinook Hatchery and Genetic Management Plan (HGMP) that is the foundation of the CJHP. The RTT has also provided substantial input in the development of the Okanogan Subbasin Plan.

The Colville Tribes and Okanogan County have been co-leads for the "Okanogan County Lead Entity Strategy" since 1999. The primary purpose of the Okanogan County Lead Entity is to provide guidance regarding the development of habitat protection and restoration projects under the 1998 Salmon Recovery Act (RCW 75.85). Lead Entity restoration strategies and project lists developed for SRFB funding provide a critical foundation for the habitat restoration strategies and actions like those proposed in CJHP.

Colville Tribes' Anadromous Fish Management Plan

The Colville Tribes are developing a tribal anadromous fish management plan. The draft plan includes objectives covering enhancement of existing populations, restoration of extirpated populations, increasing harvest opportunities, and cooperation and collaboration with regional fisheries managers. Key to the Colville Tribes' anadromous fish management plan is the restoration of natural spawning populations of summer/fall and spring Chinook, sockeye salmon, and steelhead to their historical habitat throughout the traditional lands of the Colville Tribes. The CJHP is a central component of this plan.

Okanogan River Summer/Fall Chinook Salmon Hatchery Genetic Management Plan and the Okanogan River Spring Chinook Salmon Hatchery Genetic Management Plans

In collaboration with WDFW and the USFWS, the Colville Tribes initiated the preparation of draft HGMPs to guide the management of summer/fall and spring Chinook in the Okanogan subbasin. Both of the plans indicate a need for additional artificial propagation facilities to meet Chinook salmon conservation and harvest objectives in the Okanogan River and in the upper Columbia River above Wells Dam. The draft Chinook

HGMPs, and the collaborative process through which they were reviewed and developed, provide the foundation for the CJHP Master Plan, and subsequently the CJHP.

Habitat Protection and Restoration

Recent habitat protection and restoration activities in the Okanogan subbasin include: protection and restoration of land along key tributaries and mainstem reaches, stream channel and riparian habitat restoration and fencing programs, fish screening projects, and fish passage barrier removals. Habitat restoration has focused primarily on Omak and Salmon creeks, and limited areas along the Okanogan River. These measures will contribute to the success of the CJHP.

Salmon Enhancement Programs

WDFW operates a summer/fall Chinook artificial production program at Similkameen Pond that is responsible for much of the current production in the Okanogan River system. In addition, the Colville Tribes have initiated a number of programs to restore naturally-spawning populations of salmon and steelhead in the subbasin. The proposed CJHP is designed to complement the existing programs.

The Mitchell Act (Public Law 75-502) was passed by Congress in 1938 in recognition that the salmon fishery of the Columbia River was in serious and progressive decline due in large part to hydroelectric dams. The Mitchell Act program provides authority for funding, operation, and maintenance of 18 hatcheries in the Columbia River Basin. All of the Mitchell Act fish production occurs below the Okanogan River (NPCC 2003). Thus, the main beneficiaries of Mitchell Act hatcheries are the lower Columbia River and ocean fisheries. The CJHP would help ameliorate this situation.

Public Education

Many entities share in salmon protection and recovery outreach and education efforts in local schools, public meetings, festivals, and such in the Okanogan subbasin. The CJHP would provide a visitor center and occasional hatchery tours to complement these efforts.

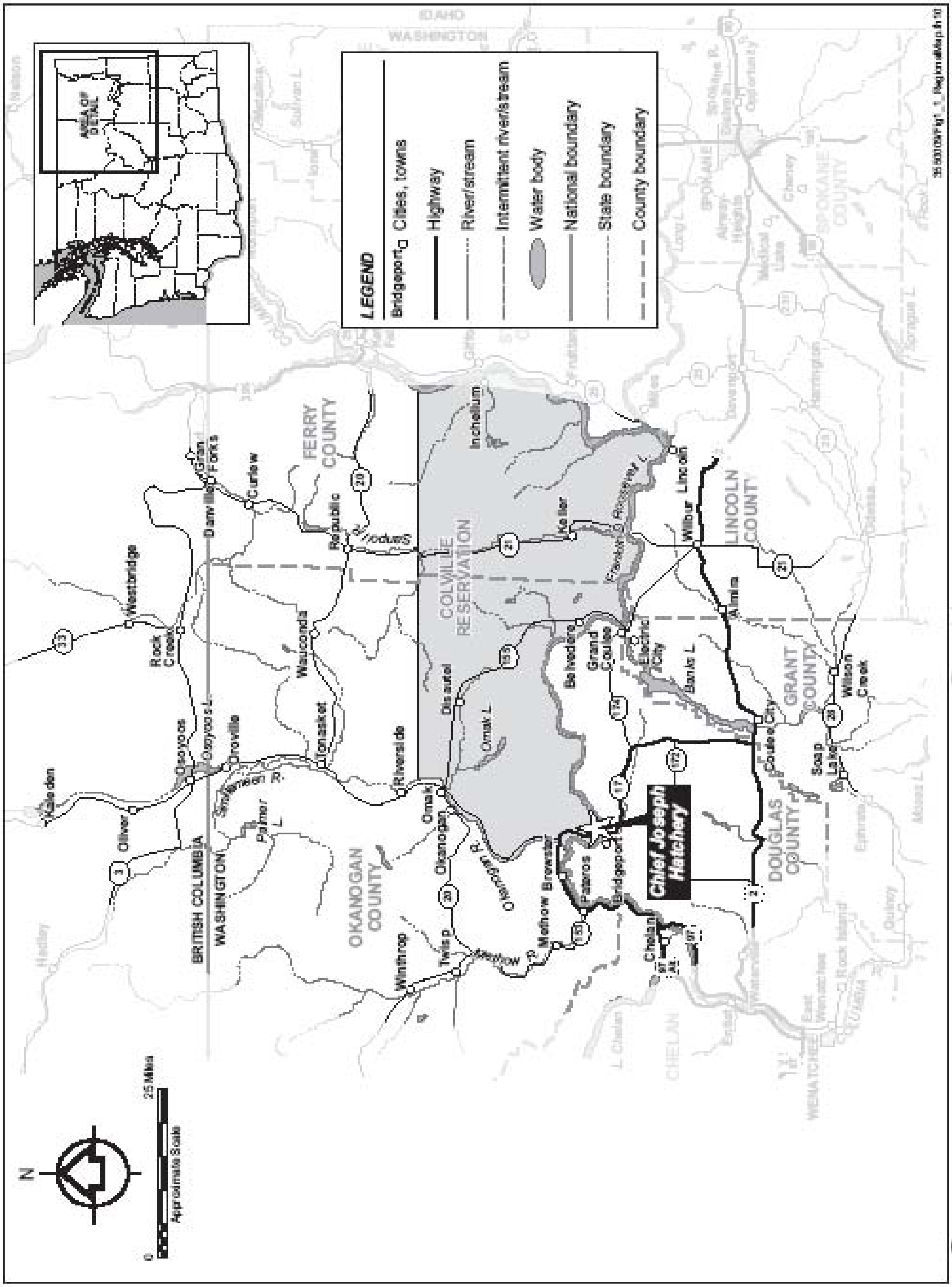


Figure 1-1.
Regional Map

Colville Tribes
CHIEF JOSEPH HATCHERY PROGRAM
DRAFT ENVIRONMENTAL
IMPACT STATEMENT

TETRA TECH

CHAPTER 2: ALTERNATIVES

2.1 Proposed Project

A fish hatchery is proposed for construction on the Columbia River adjacent to Chief Joseph Dam to produce juvenile summer/fall Chinook and spring Chinook (Section 2.1.4). Some of the fish would be released into the Columbia River at the hatchery while others would be transported to acclimation ponds located along the Okanogan River and Omak Creek for final rearing and release (Figure 2-1). A fish ladder at the hatchery and portable live-capture gear (Section 2.1.2) deployed down river and in the Okanogan River would be used to collect adult brood stock, which would reside at the hatchery's adult holding facility. Water, sewer and power utility systems would be installed to serve the hatchery and the three proposed employee houses (Section 2.1.5) near the hatchery.

Two new acclimation ponds (Riverside and Omak) would be built. Three existing irrigation water settling ponds (Bonaparte, Ellisforde and Tonasket ponds) that have already been modified to also function as fish acclimation ponds outside the irrigation season would receive minor improvements. One existing acclimation pond (St. Mary's pond) would also receive minor modifications to enhance its function. (Section 2.1.6)

The fish production program and proposed hatchery have been designed with the cooperation and oversight of the US Army Corps of Engineers to avoid adverse effects on Chief Joseph Dam operations. If any unforeseen or unintended adverse consequences on the operation Chief Joseph Dam or other FCRPS dams become apparent, then the hatchery and/or the fish production program would be altered to alleviate the situation.

2.1.1 Program Biological Components

The proposed Chief Joseph Hatchery Program (CJHP) has three biological components. Decision-makers may choose to adopt them in part or as a whole.

Component 1 is a program designed to increase abundance, distribution, and diversity of naturally spawning summer/fall Chinook salmon within their historical Okanogan subbasin habitat and in the Columbia River between its confluence with the Okanogan River and Chief Joseph Dam. This supplementation program would produce 1,100,000 hatchery smolts annually.

Component 2 would produce an additional 500,000 early-arriving and 400,000 late-arriving hatchery smolts annually in an attempt to broaden the spectrum of the run of returning summer/fall Chinook adults in the future. This component combined with Component 1 would enhance the potential to support tribal ceremonial and subsistence fisheries and provide recreational fishing opportunities for summer/fall Chinook.

Component 3 is a spring Chinook program that would produce 900,000 smolts annually in an effort to return naturally spawning spring Chinook to their historical Okanogan subbasin habitat and in the Columbia River between the Okanogan River and Chief Joseph Dam. Hatchery fish surplus to recovery needs in other nearby subbasins would be used to support this component. This component could also enhance the potential for tribal ceremonial and subsistence fisheries and recreational fishing opportunities. It may also contribute to the recovery of the ESA-listed Upper Columbia River Spring Chinook Evolutionarily Significant Unit (ESU).

Summer/Fall Chinook

Components 1 and 2 would supplement the existing run of summer/fall Chinook, a population that is supported by some natural reproduction and the Eastbank Hatchery/Similkameen Pond program (Section 1.3) which produces up to 576,000 smolts annually. Supplementation within the CJHP would involve five elements (CTCR 2004, Volume 2 Appendix C, Summer/Fall Chinook Hatchery Genetic Management Plan):

- Develop a local Okanogan River brood stock through live capture of adults migrating past Wells Dam
- Propagate the full historical run of summer/fall Chinook by extending the current brood stock collection season by one month earlier and one month later
- Propagate yearling and sub-yearling life stages from the brood stock to reflect natural diversity and add some necessary flexibility in the program
- Improve spawning distribution throughout the historical habitat
- Control the proportion of hatchery-origin fish spawning naturally

It is conceivable, although not currently proposed, that the on-going Eastbank Hatchery/Similkameen Pond production program and the CJHP would be integrated once the CJHP is well established. This would allow use of the local brood stock and smolts that are more representative genetically, phenotypically and behaviorally of the entire run of Okanogan fish than the current stock, and improve the abundance and distribution of smolts and returning adults eventually throughout the available habitat.

Spring Chinook

Component 3, spring Chinook reintroduction, involves using Carson stock spring Chinook (not ESA-listed) collected at the Leavenworth National Fish Hatchery (NFH) or other adult fish surplus to recovery needs in other nearby subbasins as brood stock for producing up to 900,000 smolts annually. During project start-up, spring Chinook smolts would be reared at Little White Salmon and Willard NFHs for a portion of their life cycle, and then moved to Chief Joseph Hatchery (CJH) for 5 to 6 months of low density final rearing. Eventually, smolts would be reared and released at CJH and its affiliated acclimation ponds. At the same time, adult escapement of spring Chinook destined for the Okanogan subbasin and CJH would be allowed to increase to stimulate natural spawning. Eventually, brood stock for the CJHP would be collected from adults

returning to the CJH fish ladder and the existing Omak Creek weir, supplemented as needed with fish collected at Zosel Dam or via live-capture gear in the Okanogan and Columbia rivers (CTCR 2004, Volume 2 Appendix D, Spring Chinook HGMP). Component 3 includes monitoring and evaluation (Section 2.1.3) to identify and correct any potentially adverse interactions between the proposed spring Chinook production program and summer/fall Chinook, steelhead, and Methow River spring Chinook populations, and to document the extent of any tribal or recreational harvest.

It is possible that Methow composite stock (currently ESA-listed as endangered) may eventually be developed for use in place of the Carson stock. Any such decision would be based on consultation with NOAA-Fisheries. The Methow composite stock evolved in the subbasin nearest to the Okanogan and may harbor some genetic material of historical Okanogan spring Chinook. Using Methow composite stock could stimulate the Okanogan reintroduction effort by building a more adapted run providing that Methow composite stock numbers get large enough to contribute to this program.

2.1.2 Critical Research

The proposed project includes two vital research studies. The first consists of radio-telemetry research to determine where and when summer/fall Chinook migrate, where they congregate, the extent to which they are spatially separated from other population components, and whether the timing of passage around Wells Dam is related to timing and location of subsequent spawning. This information is essential to the development of successful brood stock collection protocols and subsequent acclimation of their progeny.

The second research study tests the viability of live-capture, selective fishing gear for local brood stock collection. The live-capture, selective fishing methods would provide the ability to control the ratio of hatchery to natural fish to hatchery fish on the spawning grounds. The use of portable/removable live capture gear would also reduce impacts to other native fish species incidentally collected. This two-year investigation is already underway, with first year results expected to be available in early 2007 and final results in late 2007. The use of beach seines, floating trap-nets, fish wheels, tangle nets, and dip-nets is being evaluated.

2.1.3 Monitoring and Evaluation

A draft monitoring and evaluation plan has been developed that outlines a strategy for how and which information would be gathered to evaluate the success of all components of the proposed production program (CTCR 2004, Appendix H). Crucial information would be collected on fish interactions, productivity rates of hatchery origin and natural origin populations and harvest effects, which would all be used to refine brood stock collection and adjust fish production numbers and release locations.

This plan would be coordinated through existing forums to ensure strategic integration with other programs and projects in this and other subbasins of the Columbia Cascade Province. Finally, the monitoring and evaluation plan would be coordinated with broader, Columbia River Basin monitoring and evaluation efforts in order to seek cost efficiencies and opportunities to address prevailing uncertainties at a larger scale.

2.1.4 Chief Joseph Hatchery Complex

The hatchery would be built on a plateau over the right bank of the Columbia River between Chief Joseph Dam and State Highway 17 at River Mile (RM) 543 near Bridgeport, WA (Figure 2-1). The site is flanked on the east by Chief Joseph Dam and a tribal fishing access site near the base of the dam, and on the west by the USACE's visitor information center, overlook and picnic area (Figure 2-2). Access to the site is from Half-Sun Way, which joins SR-17 about 1,000 feet to the west.

Heavily impacted during the construction of Chief Joseph Dam, this 24.5-acre site was subsequently graded and seeded to grass, and remains undeveloped. Minor grading would be required prior to initiating structural improvements. About 300 feet of the USACE's paved trail along the southern edge of the hatchery site plateau would need to be realigned to accommodate the new hatchery complex.

Main hatchery features would include fish rearing raceways, waste treatment ponds, a main hatchery building, a small administration/visitor facility, a fish ladder and brood stock collection/holding area, and a complex water supply/routing system (Figure 2-3).

Sixty concrete raceways, each about 10 feet wide by 110 feet long, would be built below ground level (below grade) and would occupy about the 2 acres nearest to the USACE's visitor center. The raceways would be arranged in three sets terraced at different elevations to allow use of low-head oxygenators (aerators) between sets to enable serial re-use (re-cycling) of raceway water during emergency or low water conditions.

Raceway waste would be pumped to concrete waste treatment aeration and settling ponds excavated below grade on the western end of the hatchery complex, well above the high-water level of the river (Figure 2-3). After any solids have settled, waste pond flow would be mixed with regular raceway discharge and piped down to the adult holding ponds where it would enter the river via the fish ladder. Waste pond configuration would be dual cell so that one waste pond may be dewatered and cleaned while the other cell remains in use. The waste ponds would function year-round. Concentrated wastes would be removed from the ponds and deposited at an approved dry land location annually. The concentrated wastes may be used as agricultural fertilizer in upland applications if permissible.

East of the raceways, the main hatchery building would contain a laboratory, workshop, incubation area, water treatment equipment, fish food storage, staff offices, and rest rooms within its 20,000 square foot area. Near the main hatchery building would be a 3,000 square foot head box structure for water collection and routing throughout the complex. An administration/visitor facility would be provided at the east end of the hatchery complex, complete with paved access road and parking space for cars, buses and RVs. A paved access road would also be built from the existing fishing access down to the bank of the Columbia River where the fish ladder and adult collection/holding facility would be installed.

Common building materials and standard construction practices would be used for all structures. All necessary leases, easements, and permits (construction/building, water rights, water discharge, in-stream work) would be secured before construction begins. Buildings would be above grade standard industrial-type structures on concrete slabs with spread footings for foundations. The head box, raceways, fish ladder and waste treatment ponds would have cast-in-place concrete walls, extending a few feet above grade. Architecturally, structures would be sensitive to the surrounding landscape, other nearby structures, and the cultural heritage of the Colville Tribes, if possible. Heavy equipment would be used for all excavation. Piping for the water supply network would require extensive use of trenching equipment through the well field along Half-Sun Way Road and from Chief Joseph Dam's relief tunnel (Figure 2-4). In total, about 20 acres would be permanently developed. Native plants would be used to revegetate undeveloped, disturbed areas (about 5 acres).

Construction would probably take 2 years, beginning as early as 2008. Silt fences, hay bales, erosion control matting and other typical construction Best Management Practices (BMPs) would be used to prevent erosion and contain pollution on portions of the site and riverbank affected during construction. The size of the work force at the site would depend on the season, the type of work being performed, and the contractors' approach. It is expected that fewer than 100 workers would be employed any one time.

About two months would be needed to construct the in-stream portion of the fish ladder. Temporary cofferdams consisting of sandbags and/or sheet pile would be placed in the river to isolate this work area. The contractor would be required to use dewatering pumps with sediment filtration to remove and return cofferdam seepage into the river.

The hatchery would support up to 10 different salmon culture programs. All of the salmon culture activities would begin with adult salmon brood stock held in four concrete raceways (about 10 by 80 feet each) located at the head end of the fish ladder. The fish ladder would be submerged about 3-5 feet in the Columbia River, and climb about 20 feet through several 90 degree turns to where the adult holding ponds would be. Some brood stock would swim up the ladder directly to the holding ponds, being attracted by the scent and velocity (40-50 cubic feet per second [cfs]) of the hatchery discharge flow there. The rest of the brood stock would be collected at downstream sites or in the Okanogan River using live-capture gear and transferred by truck to the holding pools. Although the fish ladder would typically be operated only from May through November, hatchery discharge water would be routed down the fish ladder year-round. If unwanted (non-target) fish enter the ladder, they would be sorted from potential brood stock and promptly returned to the river. Screening to block the ladder in the off-season would be installed if monitoring reveals the need.

Selected brood stock would be sorted and monitored in the adult holding ponds until they are ready to spawn. The eggs and milt would be collected in a nearby spawning shed where the eggs would be fertilized and water-hardened before being trucked up to the incubation area in the main hatchery building. There, the young fry would emerge and mature into smolts, be marked (fin-clipped) and moved into the raceways to be reared at proper densities to stimulate growth and heartiness. During rearing, the smolts would be fed a pelletized diet. The raceways would be periodically cleaned to remove feces,

un-eaten food and other waste. Finally, some fish would be released directly from the hatchery into the Columbia River while others would be trucked to various acclimation ponds for release into the Okanogan River.

The administrative/visitor facility would be used year-round for hatchery operations and would be open to visitors and occasional guided tours on normal business days. The gated entrance would be locked when the facility is closed. The USACE's existing trail would be incorporated into an entry plaza at the administrative/visitor center. The tribal fishing site and USACE's visitor information center would be unaltered, and existing access to the river would be maintained although restrictions may be imposed near the fish ladder entrance during brood stock collection.

2.1.5 Utilities and Water Supply

The utilities and water supply systems would be installed as part of the hatchery complex construction over about two years. Electric power for the hatchery complex and water supply pumps would be provided by Nespelem Valley Electric Cooperative, whose lines currently span the sites. A new 125kv /480kv transformer and several hundred feet of overhead power line within the hatchery site would be installed. The existing telephone service along Half-Sun Way would be extended approximately 1,000 feet to the hatchery.

Two sanitary sewer options being considered are an on-site disposal system or a force main connecting to the City of Bridgeport's service. Domestic wastewater from the hatchery would be relatively minor and could easily be handled by an on-site buried drainfield disposal system. However, if soil conditions or other factors are found to prohibit this option, then a lift station and force main could be considered. Although not expected to be needed, the lift station /force main option would consist of a 2,000-gallon buried concrete tank, 2 submersible pumps, and a 2- to 4-inch-diameter plastic pipe extending about 3,000 feet to Bridgeport's nearest sewer main.

Hatchery water would come from three sources: 1) a groundwater well field along Half-Sun Way (also the hatchery's potable water source), 2) an existing relief tunnel that collects seepage from the abutment of Chief Joseph Dam, and 3) an existing irrigation tap in the dam that would divert water from Rufus Woods Lake (Figure 2-4).

Up to twenty groundwater wells may be drilled on an undeveloped 25-acre site along Half-Sun Way adjacent to the Lake Woods Golf Course. Wells would be about 12 inches in diameter and would be spaced to minimize hydraulic interference. Exact well locations, spacing and size would depend upon the results of a groundwater analysis and well tests which would be conducted if the project proceeds to implementation. Attempts would be made to locate wells along existing roads to minimize construction and maintenance costs. Individual well pipelines would be linked to join a 2.5-mile long, 30-inch diameter pipeline which would be buried along the Half-Sun Way right-of-way. The final 1,500 feet of pipeline would run down slope from the road to the hatchery head box structure (Figure 2-3).

Existing flow from the dam's relief tunnel would be collected at a new wet well located on the right bank of the river immediately downstream of the dam and then pumped through a buried 24-inch-diameter pipeline to the hatchery head box (Figure 2-3). The

wet well would be part of a new 24-foot-diameter by 80-foot-deep buried relief tunnel pump station (Figure 2-4). It would be positioned near the relief tunnel to facilitate interconnection. Four pumps would be installed within this structure, on top of which would be a small building containing the pump controls and operator access to the wet well. Pump station construction would require sheet piling, dewatering pumps and possibly grout injection, or "shotcrete" lining, to dewater below-grade portions of the operation.

At the irrigation tap in Chief Joseph Dam (an unused port in the dam), panels would be placed in existing slots on the upstream face of the dam to dewater the opening and allow construction to occur in the dry. Specialized drilling equipment would be used to run a 30-inch pipe through the wall of the dam. The pipe would then be attached down the face of the dam and routed a short distance to join the relief tunnel pipeline trench where the pipeline would continue underground to the hatchery head box. The pipeline trench from the face of the dam to the hatchery head box would be about 12 feet wide and 3,500 feet long. At the reservoir inlet, a pipeline shutoff valve, trash rack and fish screen would be installed in existing slots. Inlet work would be performed from the deck of the dam and piping work from the downstream river embankment.

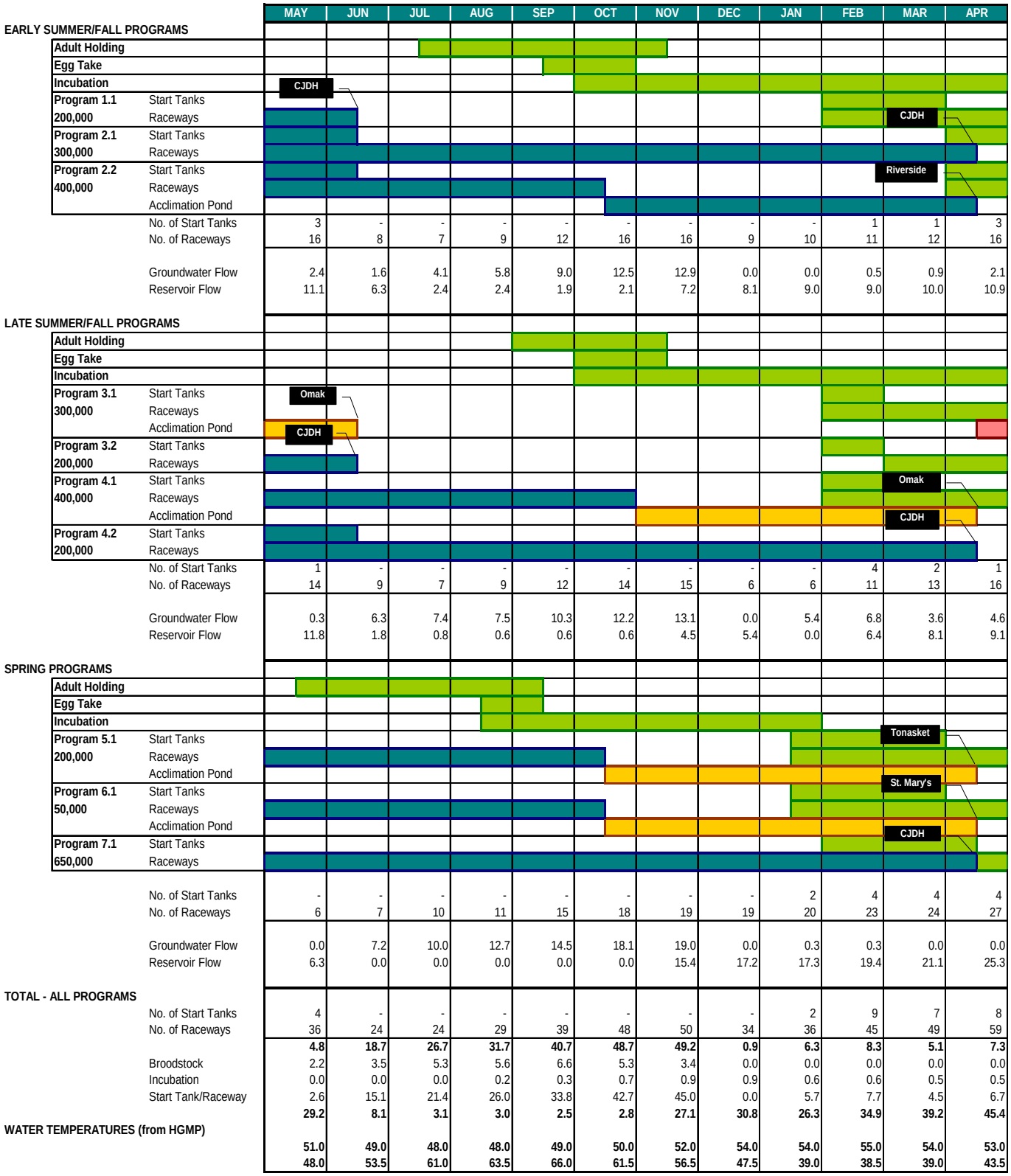
The hatchery water demand needed to incubate and raise fish would vary throughout the year due to the variety of rearing programs planned. Table 2-1 shows a proposed operating schedule for the 10 hatchery programs, including the timing of water use by month for a 2-year fish rearing cycle.

Water from the groundwater wells and relief tunnel is considered to be pathogen-free, but would need to be gas-stabilized to remove excess nitrogen and add oxygen prior to use in the hatchery. Water from Rufus Woods Lake may require filtration to eliminate common water-borne contaminants and particulates. Occasionally, some Rufus Woods Lake water may be needed to supplement the groundwater, in which case it would need to be treated with finer filtration and UV disinfection. Relief tunnel water may need to be chilled to provide suitable temperatures to incubate eggs. The apparatuses associated with these water treatments would be installed either near the head box facility or in the main hatchery building.

2.1.6 Employee Housing

Employee housing would be constructed so that personnel are near during hatchery operations. The proposed site is about 23.3 acres of Washington State Parks and Recreation Commission land located two miles northeast of the hatchery on Half-Sun Way (Figure 2-5) across from the Lake Woods Golf Course. Three 2,000 square-foot single-family homes on one-acre lots would be constructed as permanent residences complete with potable water (through a shared well), individual septic tanks/drain fields, power (from Nespelem Valley Electric Cooperative), and communications connections. These utilities would also be provided to a one-acre parcel nearby to support up to four RVs or camp trailers for temporary residents (e.g. construction personnel and seasonal personnel employed during peak hatchery operations). Another small space (about an

Table 2-1. Approximate Hatchery Operation Schedule: Average Monthly Flows in CFS



		MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
EARLY SUMMER/FALL PROGRAMS													
Adult Holding													
Egg Take													
Incubation													
Program 1.1	Start Tanks												
200,000	Raceways												
Program 2.1	Start Tanks												
300,000	Raceways												
Program 2.2	Start Tanks												
400,000	Raceways												
	Acclimation Pond												
	No. of Start Tanks	3	-	-	-	-	-	-	-	-	1	1	3
	No. of Raceways	16	8	7	9	12	16	16	9	10	11	12	16
	Groundwater Flow	2.4	1.6	4.1	5.8	9.0	12.5	12.9	0.0	0.0	0.5	0.9	2.1
	Reservoir Flow	11.1	6.3	2.4	2.4	1.9	2.1	7.2	8.1	9.0	9.0	10.0	10.9
LATE SUMMER/FALL PROGRAMS													
Adult Holding													
Egg Take													
Incubation													
Program 3.1	Start Tanks												
300,000	Raceways												
	Acclimation Pond												
Program 3.2	Start Tanks												
200,000	Raceways												
Program 4.1	Start Tanks												
400,000	Raceways												
	Acclimation Pond												
Program 4.2	Start Tanks												
200,000	Raceways												
	No. of Start Tanks	1	-	-	-	-	-	-	-	-	4	2	1
	No. of Raceways	14	9	7	9	12	14	15	6	6	11	13	16
	Groundwater Flow	0.3	6.3	7.4	7.5	10.3	12.2	13.1	0.0	5.4	6.8	3.6	4.6
	Reservoir Flow	11.8	1.8	0.8	0.6	0.6	0.6	4.5	5.4	0.0	6.4	8.1	9.1
SPRING PROGRAMS													
Adult Holding													
Egg Take													
Incubation													
Program 5.1	Start Tanks												
200,000	Raceways												
	Acclimation Pond												
Program 6.1	Start Tanks												
50,000	Raceways												
	Acclimation Pond												
Program 7.1	Start Tanks												
650,000	Raceways												
	No. of Start Tanks	-	-	-	-	-	-	-	-	2	4	4	4
	No. of Raceways	6	7	10	11	15	18	19	19	20	23	24	27
	Groundwater Flow	0.0	7.2	10.0	12.7	14.5	18.1	19.0	0.0	0.3	0.3	0.0	0.0
	Reservoir Flow	6.3	0.0	0.0	0.0	0.0	0.0	15.4	17.2	17.3	19.4	21.1	25.3
TOTAL - ALL PROGRAMS													
	No. of Start Tanks	4	-	-	-	-	-	-	-	2	9	7	8
	No. of Raceways	36	24	24	29	39	48	50	34	36	45	49	59
		4.8	**18.7**	**26.7**	**31.7**	**40.7**	**48.7**	**49.2**	**0.9**	**6.3**	**8.3**	**5.1**	**7.3**
	Broodstock	2.2	3.5	5.3	5.6	6.6	5.3	3.4	0.0	0.0	0.0	0.0	0.0
	Incubation	0.0	0.0	0.0	0.2	0.3	0.7	0.9	0.9	0.6	0.6	0.5	0.5
	Start Tank/Raceway	2.6	15.1	21.4	26.0	33.8	42.7	45.0	0.0	5.7	7.7	4.5	6.7
		29.2	**8.1**	**3.1**	**3.0**	**2.5**	**2.8**	**27.1**	**30.8**	**26.3**	**34.9**	**39.2**	**45.4**
WATER TEMPERATURES (from HGMP)													
		51.0	**49.0**	**48.0**	**48.0**	**49.0**	**50.0**	**52.0**	**54.0**	**54.0**	**55.0**	**54.0**	**53.0**
		48.0	**53.5**	**61.0**	**63.5**	**66.0**	**61.5**	**56.5**	**47.5**	**39.0**	**38.5**	**39.0**	**43.5**

acre) at the housing site may be used for temporary storage of hatchery equipment (boats, tagging trailers, live-capture fish gear, etc.), while most of the site would remain in native vegetation.

During construction, up to 10 acres of land may be temporarily disturbed while 5 acres would be permanently developed. Development would consist of access road construction, utility trenches, and housing site clearing, foundations and landscaping. Final surfacing would include paved roads, concrete driveways, and grass lawns. Construction is expected to take about 7 months (October through April) and would employ an average of 10 workers. Building permits and other approvals would be acquired, as appropriate.

2.1.7 Acclimation Ponds

The ponds are discussed below in order from north to south (Figure 2-1). When in use for fish acclimation, the ponds would be visited daily by hatchery staff to feed fish, check intake screens and pumps, and periodically clean the ponds. Waste would be vacuumed from the ponds and stored in containment areas until it could be properly disposed of per State of Washington environmental regulations. The ponds would also all be linked to the main hatchery and the Omak Office of the Colville Tribes' Fish and Wildlife Department via radio telemetry instruments so that water and rearing conditions can be monitored remotely. Sensors would detect pond water level and other physical parameters and transmit this data via either a hard-wired telephone line or a radio-based system.

Similkameen Pond

This pond is at RM 3 of the Similkameen River (a tributary to the Okanogan River) near the town of Oroville. It is owned and operated by WDFW as part of the on-going Eastbank Hatchery/Similkameen Pond production program. No change to the current operations or facilities is proposed although they may eventually be integrated with the CJHP (Section 2.1.1). For the purposes of this analysis, Similkameen Pond is not considered to be part of the CJHP.

Ellisforde Pond

Ellisforde Pond is an Oroville-Tonasket Irrigation District (OTID) irrigation pond located at RM 62.0 of the Okanogan River, adjacent to Highway 97 (Figure 2-6). It would be used to acclimate summer/fall Chinook from October to April (when not being used for irrigation) if one of the other proposed facilities proves infeasible or becomes unavailable. Although it is already adapted for fish acclimation, its outlet would need to be modified for easier volitional fish release and maintenance. The pond would be fed by 25 cfs of water pumped from the Okanogan River.

To install the new concrete outlet structure, a 10 square-foot area would be excavated adjacent to the pond in the unvegetated quarry rock about 20 feet from the Okanogan River shoreline. A silt fence placed between the excavation and the river would control erosion. This work would likely occur between October and December.

Tonasket Pond

This OTID irrigation pond, at RM 59.0 of the Okanogan River, is on State Highway 7 upstream of the town of Tonasket (Figure 2-7). Already adapted for fish acclimation, it only needs radio telemetry instruments to remotely track water and fish rearing conditions at the pond. The pond would withdraw 25 cfs from the Okanogan River between October and April (outside the irrigation use season) for spring Chinook acclimation.

Bonaparte Pond

This OTID irrigation pond is located at RM 56.0 of the Okanogan River, adjacent to Highway 97 downstream of the town of Tonasket (Figure 2-8). It would be used to acclimate summer/fall Chinook from October to April when not being used for irrigation. Although Bonaparte Pond is already adapted for fish acclimation, it needs modifications to improve its drainage and cleaning mechanisms and its radio telemetry instruments. The pond is fed by 25 cfs of water pumped from the Okanogan River.

Construction work would occur within the existing fenced perimeter and may involve minor earth disturbance confined within the existing lined pond and gravel parking area. Modifications would occur when the pond is not in use for irrigation, and would take about two months to complete.

Riverside Pond

This acclimation pond would be built on a hay field at Okanogan RM 41.0 adjacent to the Omak-Riverside Eastside Road and the Cascade Columbia River Railroad line, near the Town of Riverside (Figure 2-9). Riverside Pond would hold 55,000 cubic feet of water to be supplied by seasonally pumping 15 cfs from the Okanogan River and approximately 200 gallons per minute (gpm) of well water to acclimate summer/fall Chinook from October through April. When not in use, the pond would be drained and cleaned. Waste would be vacuumed from the pond and stored in a containment area until it could be properly disposed of per State of Washington environmental regulations.

Development of the pond would require building an access road, a power line connection, a water intake and pump station, three sections of pipeline, the pond, an outlet into the river, predator protection (bird netting or a roof over the pond, depending on funding), controls, and radio telemetry instruments. Construction would take about 7 months. Up to 15 acres of hay field may be temporarily disturbed by construction, 4 of which would be permanently altered. Silt fences, hay bales, erosion control matting and other typical construction BMPs would prevent erosion and control construction contaminants. Native plants would be used wherever possible to revegetate disturbed areas.

The gravel access road would be about 1,800 feet long by 12 feet wide and would use an existing permitted railroad crossing.

The pond would occupy about an acre, most of it below ground surface grade. Much of the excavated soil would be stockpiled and used as fill around the edge of the pond while excess material would be hauled by dump truck to an undetermined location.

A small pump station would be built just south of the pond on the bank of the Okanogan River to transfer river water to the pond through about 300 feet of buried pipeline. Since the water intake part of the pump station would be about 3 to 5 feet deep in the river, a temporary sandbag cofferdam and dewatering pumps would be needed to allow in-stream construction. The cofferdams and dewatering pumps would clear about 1,000 square feet of river area. Dewatering pump discharge would be filtered for sediment before being returned to the Okanogan River. The intake design includes installation of a screen to keep fish and certain other debris out of the pump station. All in-stream work would be completed within two months; the rest of the pump station construction and pipeline occurring above the river bank would take about 6 months. About 1,200 feet of power line would need to be extended from existing lines on the Omak Eastside River Road to serve the pump station and pond.

An existing on-site irrigation well would supply cool, clean ground water to the pump station where it would be mixed with river water and piped into the pond. The 1,500-foot-long pipeline from the well to the pump station would be replaced with higher quality pipe buried at a frost-free depth. Appropriate permits would be obtained so that the pipeline may cross under the railroad.

Water leaving the pond would flow through about 400 feet of buried pipeline that would discharge directly into the Okanogan River at a point about 350 feet downstream of the pump station/intake. Smolts would volitionally release from the pond and pass through this pipeline to the river at the end of their rearing period. When the pond is in use for fish rearing, water would continuously flow through the system, discharging at a low velocity onto a flat concrete pad designed to prevent erosion of the river bed. The pipe outfall would be unscreened because it would be releasing, not diverting flow.

St. Mary's Mission Pond

This existing acclimation pond owned and operated by the Colville Tribes is located in a fallow field at RM 5.0 of Omak Creek, a tributary to the Okanogan River at about RM 32 (Figure 2-10). Up to 2 cfs of Omak Creek water would supply this pond from October to April to acclimate spring Chinook. Proposed modifications would include perimeter security fencing, bird netting over the pond to prevent predation, channels inside the pond with tail and head screens to segregate fish, and radio telemetry instruments to remotely monitor water and fish rearing conditions.

Omak Pond

This acclimation pond would be built in a pasture in the town of Omak at RM 32.0 of the Okanogan River near its confluence with Omak Creek (Figure 2-11). Its 55,000 cubic feet volume would be supplied by pumping 15 cfs of Okanogan River water from October to April to acclimate summer/fall Chinook smolts, and from April to June to rear and release a sub-yearling group of late arriving summer/fall Chinook. When not in use, the pond would be drained and cleaned. Waste would be vacuumed from the pond and stored in a containment area until it could be properly disposed of per State of Washington environmental regulations.

Development of the pond would require building an access road, a power line connection, a water intake and pump station, two sections of pipeline, the pond, an outlet into the river, predator protection (bird netting or a roof over the pond, depending of funding), controls, and radio telemetry instruments. Construction would take about 7 months. Up to 3 acres of pasture may be temporarily disturbed by construction; 2 of which would be permanently altered. Silt fences, hay bales, erosion control matting and other typical construction Best Management Practices (BMPs) would prevent erosion and control construction contaminants. Native plants would be used wherever possible to revegetate disturbed areas.

The gravel access road to Omak Pond would be about 350 feet long by 12 feet wide and would run from the Brooks Tracts Road to the pond and outlet. The relatively flat terrain enables the road to be built with minimal grading.

The pond would occupy about an acre, and due to the high flood elevations in this area, would be built mostly above ground. Soil would be imported in dump trucks to form the pond berm.

A small pump station would be built west of the pond on the bank of the Okanogan River to transfer river water to the pond through about 2,000 feet of buried pipeline. Since the water intake part of the pump station would be about 3 to 5 feet deep in the river, a temporary sandbag cofferdam and dewatering pumps would be needed during in-stream construction. The cofferdams and dewatering pumps would clear about 1,000 square feet of river area. Dewatering pump discharge would be filtered for sediment before being returned to the Okanogan River. The intake design includes installation of a screen to keep fish and certain other debris out of the pump station. All in-stream work would be completed within two months; the rest of the pump station and pipeline construction occurring above the river bank would take about four months. About 1,500 feet of power line would be installed from the pond to the pump station, potentially necessitating reconstruction of a segment of existing line that provides service to the site. This would be determined by the local power company.

A portion of the pipeline would be buried within the Brooks Tracts Road right-of-way, requiring approvals from Okanogan County. Segments of the pipeline near the pump station would require easements with the property owners.

Water leaving the pond would flow through about 200 feet of buried pipeline that would discharge directly into the Okanogan River at a point about 1,500 feet downstream of the pump station/intake. Smolts would volitionally release from the pond and pass through this pipeline to the river at the end of their rearing period. When the pond is in use for fish rearing, water would continuously flow through the system, discharging at a low velocity onto a flat concrete pad designed to prevent erosion of the river bed. The pipe outfall would be unscreened because it would be releasing, not diverting flow.

2.2 No Action Alternative

NEPA requires consideration of a No Action alternative to provide an environmental baseline against which the effects of the proposed action and any other alternatives can be compared (EIS Chapter 3). In this EIS, No Action means that the current uses of the

proposed project sites and current fish management programs and projects (habitat and passage improvements, water rights programs, harvest controls, etc.) would continue. The Chief Joseph Hatchery and two new fish rearing ponds (Riverside and Omak ponds) would not be constructed, and improvements would not occur at Ellisforde, Bonaparte, Tonasket, and St. Mary's Mission ponds. No other changes in the function, type, or number of available fish production facilities would be expected. The programs for summer/fall and spring Chinook production in the Okanogan River system would likely continue at present levels. Currently, the summer/fall Chinook and spring Chinook programs rear and release 576,000 and 300,000 spring Chinook smolts, respectively[1].

2.3 Alternatives Eliminated from Consideration

Public scoping of the proposed action did not indicate that another alternative should be developed to compare to or replace the proposed action (Section 1.5). It was generally acknowledged that a fish production program supported by a local hatchery is needed and desired to complement other ongoing efforts and increase adult salmon returns in the Okanogan subbasin. Therefore only the proposed action and the No Action alternative required by NEPA are analyzed in the EIS.

The following alternatives were considered earlier in the project planning process and during development of the Master Plan (CTCR 2004), but have been eliminated from detailed study in this EIS. They are either physically or economically infeasible or did not appear to satisfy the stated purpose and need or objectives (Section 1.1). Master Plan Chapters 8, 11 and 13 provide more detailed information on the context and process of selecting viable fish production enhancement alternatives and suitable sites for facilities.[2]

2.3.1 Improving Tributary Habitat

Although spawning habitat is fully utilized in the immediate vicinity of the Similkameen Pond, most other historical habitat throughout the Okanogan subbasin is only sparsely used and is thought to be not limiting production (CTCR 2004 and Bugert 1998). On-going summer/fall Chinook habitat programs have focused on reducing sedimentation and lowering summer water temperatures to improve productivity. If at all feasible, this focus would likely require many generations of fish returning over many decades to achieve substantial increases in productivity and habitat use distribution. So, it is not feasible that a focus on habitat improvements would meet protection, mitigation and supplementation objectives in a timely and effective manner.

2.3.2 Improving Passage Conditions at Columbia River Dams

Significant improvements have been made recently to the hydroelectric system below Chief Joseph Dam to increase survival of juvenile and adult salmon. Standards established in biological opinions for federal dams and habitat conservation plans for non-federal dams adopted pursuant to the ESA for adult and juvenile fish passage at the

[1] Spring Chinook program has historically released from 100,000 to 300,000 fish annually.

[2] The Colville Tribes, as project proponent and Master Plan authors, considered that potential alternatives had to satisfy two key criteria: 1) Okanogan River Chinook would be protected; 2) fish returns should be sufficient to supply ceremonial and subsistence harvest needs for tribal members. If an alternative did not meet these criteria, the Colville Tribes' would not support further consideration.

dams are largely being met by dam operations. So, it appears that further significant increases in passage survival outside of the Okanogan subbasin are limited by the basic configuration of the hydroelectric system and scientific knowledge.

2.3.3 Reducing Ocean and Lower Columbia River Harvest

Past ocean and lower river high harvest rates caused significant decline of Okanogan summer/fall Chinook and spring Chinook. When ocean and lower river harvests were substantially reduced under the Pacific Salmon Treaty of March 18, 1985 and annual decisions of the Columbia River Compact, Okanogan summer/fall Chinook runs did not immediately respond and continued in their depressed state. Mixed-stock Chinook management under the Pacific Salmon Treaty and the Columbia River Compact has not been effective for specifically returning upper Columbia River Basin Chinook in sufficient numbers to provide for both population sustainability and harvest. Neither BPA nor the Colville Tribes have the authority to control ocean and lower river harvests.

2.3.4 Use, Expand, or Reprogram Existing Facilities

Expanding or reprogramming the on-going Eastbank Hatchery/Similkameen Pond production program was eliminated as an option for the CJHP for a number of reasons. The Eastbank/Similkameen program collects broodstock from a limited segment of the summer/fall Chinook run and uses Eastbank Hatchery and Methow River brood stock (an aggregate brood stock) which are probably not native to the Okanogan subbasin. In addition, the current program releases only yearling fish, excluding a range of sub-yearlings from the release population, and rears fish only in Similkameen Pond (where most surviving hatchery-origin adults eventually return to spawn) leaving other available habitat underutilized.

The CJHP, as proposed, would complement this on-going program. Key tenets of the CJHP are to increase natural production by seeding historical habitat in the mid and lower Okanogan River, to increase natural production using local brood stock representing the life history diversity historically found in the basin, and to control hatchery origin fish in the escapement. It is conceivable that, although not currently proposed, the on-going Eastbank/Similkameen production program and the CJHP would be integrated once the CJHP is well established (Section 2.1.1).

A limited pilot program managed by the Colville Tribes in Omak Creek produces some spring Chinook. This small watershed is not representative of the historic range of spring Chinook in the Okanogan subbasin and production is limited by the rearing capacity of St. Mary's Mission Pond. The proposed CJHP would incorporate and expand this operation.

2.4 Comparison of the Alternatives Considered in Detail

Table 2-2 compares the Proposed Project and the No Action Alternative to the stated purposes of taking action (Section 1.1).

Table 2-3 summarizes potential environmental consequences (Chapter 3) of the Proposed Project and the No Action Alternative. Scoping issues referenced in this table are listed in Section 1.5.

Table 2-2. Comparison of Alternatives to Stated Purposes of Taking Action

Purposes of Action	Proposed Action	No Action
1. Increase abundance, distribution, and diversity of naturally spawning summer/fall Chinook within their historical Okanogan subbasin habitat and in the Columbia River between the Okanogan River and Chief Joseph Dam.	Would meet this purpose by acclimating fish to underutilized habitat. Implementation of all components of the production program would provide the greatest potential to protect and enhance the summer/fall Chinook population and mitigate for the effects of the FCRPS.	Would meet this purpose to the extent of ongoing efforts of fish habitat and passage improvements, water rights programs, harvest control programs. Rearing program at Similkameen Pond would continue.
2. Operation of the FCRPS, particularly Chief Joseph and Grand Coulee dams (e.g., spill, timing, dissolved gases, etc.), must remain unaffected by the fish production program.	Hatchery design and operational parameters were developed in collaboration with the USACE to ensure that the hatchery does not interfere with dam operations. Concurrently, dam operations were factored into design of the hatchery.	Would meet this purpose by not changing the current situation and having no effect or risk to dam operations.
3. The program must not adversely affect populations listed under the ESA (e.g., through mixed stock harvest, reducing productivity, or otherwise) such that it creates a greater mitigation, protection or recovery burden on BPA.	The production program is designed and would be implemented and monitored to ensure listed species are not adversely affected.	Ongoing habitat, passage, water rights, and harvest control efforts would contribute to this objective. Existing facilities would continue to support the limited ongoing Chinook production program in the Okanogan River. Current risks, insufficiencies, and limitations associated with the existing situation would continue.
4. Increase Chinook salmon populations to enhance the potential for tribal ceremonial and subsistence harvests and a recreational fishery for the public.	Has the greatest potential to enhance adult fish returns of summer/fall and spring Chinook in historical habitat to sustain naturally spawning populations and tribal ceremonial and subsistence or public recreational fisheries.	Unlikely to sustain a harvestable fishery as the current situation has insufficient and downward- trending adult returns. Would not change the depleted spring Chinook situation.

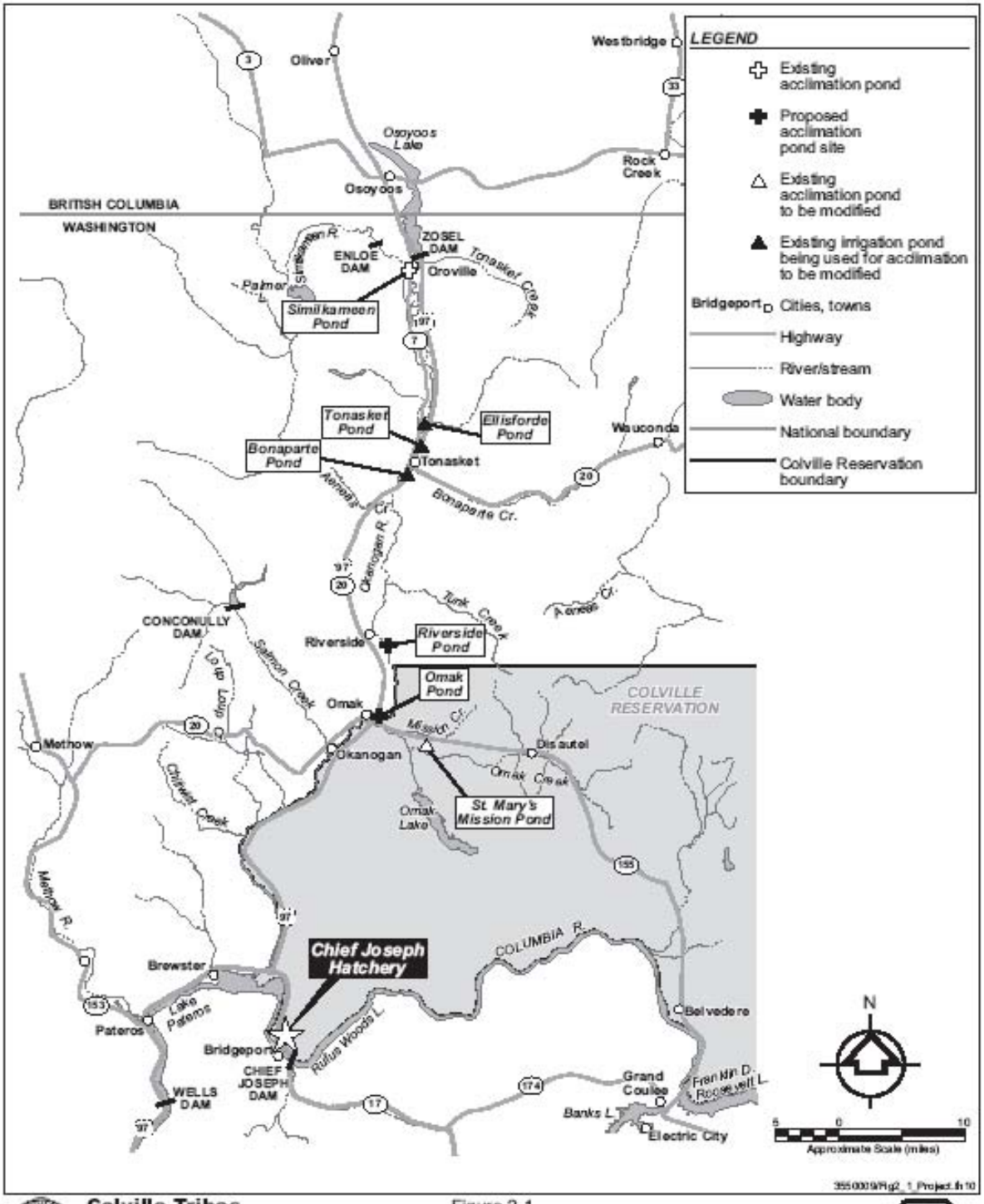
Table 2-3. Summary of Environmental Consequences of Alternatives

Environmental Feature	Proposed Action	No Action
Fish and Aquatic Habitat (EIS Section 3.2 and Issue #3)	Implementing the three production program components should produce greater diversity, abundance and distribution of summer/fall and spring Chinook in the Okanogan subbasin. These returns should complement other on-going salmon protection and mitigation efforts. Some individual fish of all species could experience short-term stress and possible mortality from live fish trapping gear and subsequent capture and handling. Competition and predation between aquatic species at all life stages including hatchery-bred fish would not threaten viability of any species. Some increase in aquatic nutrients is likely from decaying spawned-out salmon carcasses. During construction, site and channel alterations would create minor, localized, temporary disturbances that would not measurably affect the viability of any aquatic species. Water withdrawals during operation of ponds would have an immeasurable effect on habitat in the immediate reach of each diversion for the season of the withdrawals. Fish released from hatchery and rearing facilities would have a low potential to introduce pathogens to other fish populations.	Current risks to salmon population viability would continue but would likely diminish slightly in the long-term due to the other on-going complementary protection and mitigation efforts (habitat and passage improvements, harvest controls, water rights programs). Current conditions of habitat and population viability of other aquatic species should remain unchanged.
Wildlife (EIS Section 3.3 and Issue No.4)	No state or federally listed animal species are known to nest or breed at or near project sites, so no adverse effects are expected. Salmon carcasses may provide a long-term seasonal food source for many large and small scavenger and predator species and certain insects. Animals may be displaced or disturbed in the vicinity of construction activities and during facility operations and occupation (noise, presence of humans and machines, outside lighting). New power lines at the hatchery, housing and Omak Pond sites may provide perches or minor collision risks for certain birds.	No changes to current trends, conditions or protection status are expected for any animal species.
Vegetation, Wetlands, Geologic Hazards and Soils (EIS Sections 3.4 & 3.5, and Issue No. 4)	No state or federally listed plant species occur at or near any project sites, so no effects are expected. At the hatchery site, about 25 acres of non-native vegetation shrub steppe habitat would be disturbed of which about 20 acres would remain permanently developed. At the housing site, about 10 acres of native vegetation shrub steppe habitat would be disturbed of which about 5 acres would be permanently developed. Developing Riverside Pond would convert about 4 acres of hay	On-going disturbance and habitat conversion would continue at current rates. Exotic plants and weeds would continue to exist and be subject to control as in the past.

Environmental Feature	Proposed Action	No Action
	fields and Omak Pond would convert about 2 acres of pasture to development. Work at all other pond sites would disturb little to no additional habitat. Less than 1 acre of riparian habitat near new water intakes and discharge features at the hatchery and Omak and Riverside ponds would permanently be affected. Formal wetland delineations and compensatory wetland mitigation would occur as required in consultation with regulatory agencies if the project proceeds to final design and construction. A temporary increase in exotic plants and weeds at all disturbed sites is likely. All disturbed areas would be replanted with native species and maintained to control weed species. No known landslide-prone areas exist at the project sites. There is negligible to no potential for slope instability at any sites although temporary, localized erosion could occur during construction. No active faults are known within 5 miles of the sites, so potential for earthquake damage is very low.	
Hydrology, Floodplains and Water Quality (EIS Section 3.6) Water quality (Issue #1)	Localized, temporary, construction-related runoff and sedimentation could occur at construction sites but would be controlled through application of typical Best Management Practices (BMPs). Long-term water quality would remain within limits of applicable laws and NPDES permits at all sites. A long term, minor increase in river water nutrients would be likely from decaying spawned-out salmon carcasses. No detectable effect to groundwater quality is expected near any of the sites.	Water quality would not change. Nutrients from increased numbers of spawned-out salmon would not be contributed.
Water quantity and use (Issue #2)	Typically from October to April, Okanogan River stream flow would be reduced about 4 to 6% between the intakes and discharge points of the new ponds (Riverside and Omak). No change to stream flow would occur at ponds currently being used for fish acclimation (Ellisforde, Bonaparte, Tonasket, and St. Mary's). Irrigation withdrawals and other surface water uses typically occur during other times of the year, so this program would have no effect. Groundwater conditions are unlikely to be affected at any sites. The hatchery well field is not in proximity to other wells that could be affected. For example, Lake Woods Golf Course withdraws irrigation water from Rufus Woods Lake. Potable water for Bridgeport State Park is supplied by a well that is over 500 feet upstream of the proposed project well field. Hatchery and acclimation facilities have been designed to have	Water quantity and in-stream flow regimes would not change.

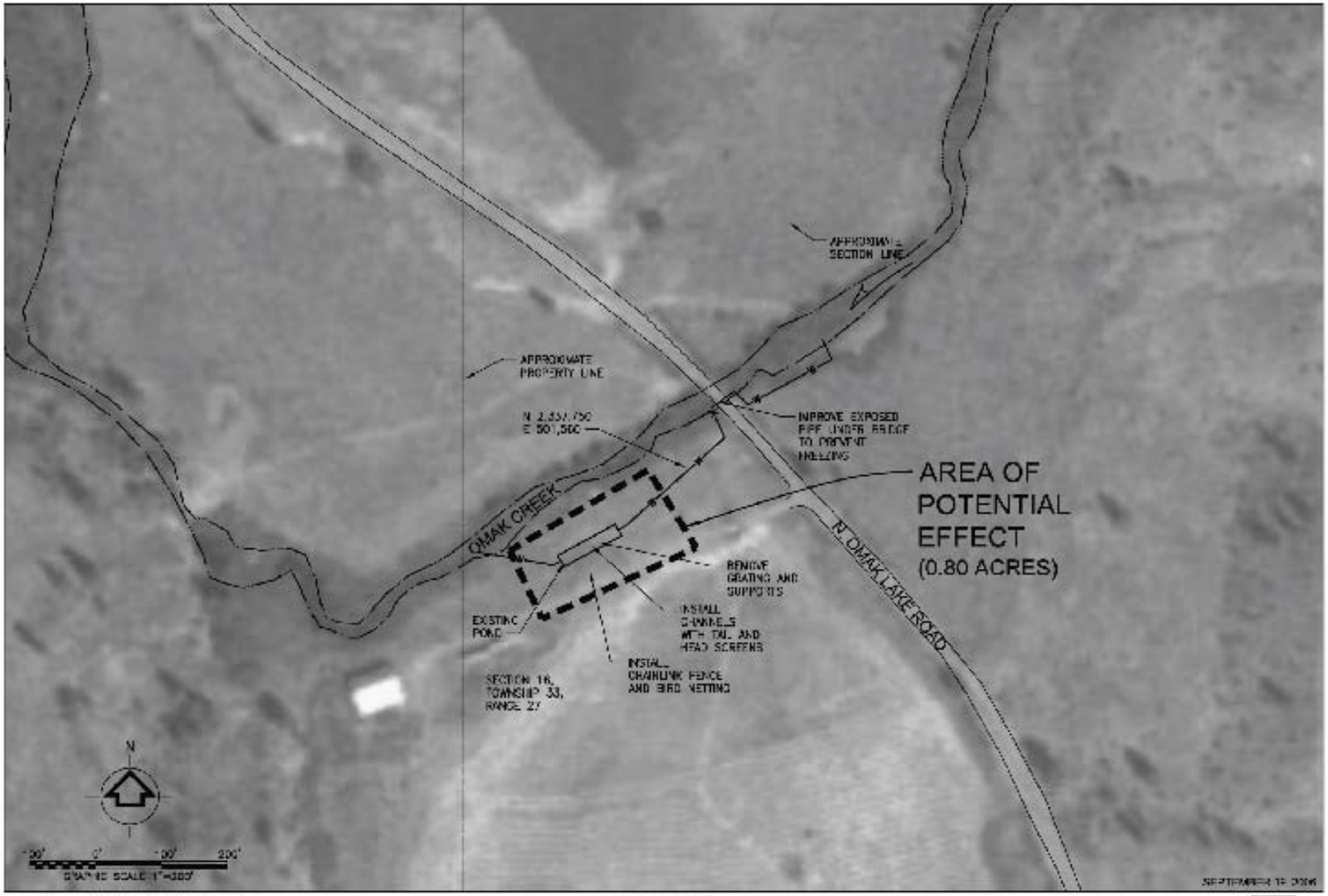
Environmental Feature	Proposed Action	No Action
Floodplains	no effect on FCRPS dam operations or municipal or private surface or groundwater uses. The two new ponds (Riverside and Omak) and their intake and discharge structures would be located in the Okanogan River's 100-year floodplain. Upland sites are infeasible. Ponds possibly could be inundated in a 100-year flood event, but the facilities would likely receive little damage and have little effect on downstream flood dynamics. The hatchery's fish ladder entrance and discharge would be in Columbia River waters directly below Chief Joseph Dam. They are designed to be compatible with dam operations and water flow regimes. No effect on dam operations is expected.	Floodplains remain unchanged. The existing ponds are within 100-year floodplains with potential for inundation with the exception of St. Mary's Pond which is not in a mapped floodplain.
Land Use, Transportation and Recreation (EIS Section 3.7 and Issue #5)	Facility construction, operation, occupancy, and use would be consistent with applicable local zoning, laws and regulations. Necessary permits would be pursued if the project proceeds to final design and implementation. During construction, traffic would increase locally for workers, equipment, and delivery of supplies and materials. No new public roads or changes to existing public transportation system would occur. Long-term traffic increases related to fish transport and worker commutes would be minor. If the production program is successful, there could be a long-term increase in recreation traffic and activities related to salmon viewing and fishing. Public environmental education opportunities may increase through hatchery site visitation.	No change to current land use, transportation or recreation is predicted.
Cultural Resources (EIS Section 3.9 and Issue #5)	Potential long-term sustainable tribal ceremonial and subsistence fishery and recreational fishery would most likely be restored if all components of the production program are implemented. If only Component 1 is implemented, it is unlikely that more than a modest ceremonial and subsistence fishery would result. Possible adverse effects at one of the pond sites on known cultural materials potentially eligible for listing in the National Register of Historic Places would be mitigated by investigative and curation actions taken in agreement with the Tribal Historic Preservation Officer. Known archaeological sites would be avoided at all other project sites, so no effects are expected. If evidence of cultural materials is found later, activity would cease until the finds could be properly assessed. Traditional tribal fishing at the base of Chief Joseph Dam would be temporarily disrupted while installing the hatchery fish ladder and water pipeline.	No change from current conditions at any site is expected. The current fishery is inadequate for even modest ceremonial and subsistence purposes, or recreational fishing. It is unlikely that a sustainable tribal ceremonial and subsistence fishery or recreational fishery would result through currently on-going fishery improvement efforts.

Environmental Feature	Proposed Action	No Action
Aesthetics (EIS Section 3.11 and Issue #5)	The scenic qualities of all sites would remain typical of the region. Aesthetic attributes are not remarkably distinctive, scenic or unique. Although the proposed hatchery site is adjacent to the Columbia River, it is in close proximity to Chief Joseph Dam and would appear congruent with the existing complex of development there. The housing site is an undeveloped upland setting but not within a popular viewshed. The acclimation ponds are all in rural settings and would their low profile would not conflict with the setting.	No change to any sites.
Socioeconomics (EIS Section 3.8 and Issue #5)	Negligible increase to population overall. Some hatchery employees would reside at the hatchery housing site near Bridgeport. Employment opportunities would be created for up to 100 temporary positions during hatchery and housing construction. Long-term new employment for 8 to 15 workers would support hatchery operations. Construction would entail expenditures of about $23 million in the region with a long-term payroll for hatchery operations of about $600,000 annually. Some benefit to local economy could be realized if Chinook recover and stimulate fishing and related recreation and tourism. No measurable effects to area housing, utilities, schools, law enforcement, or tax base are predicted. No impact to BPA ratepayers would occur since the project funds would be part of an established program of annual investment in protection and mitigation of fish and wildlife related to FCRPS facilities and operations.	No project-induced changes to local economies, communities or BPA ratepayers are likely. The potential for some adverse effect on local economy remains if salmon stocks continue to decline.
Air, Noise and Public Safety (EIS Section 3.10 and Issue #5)	Dust and vehicle exhaust would increase locally during construction with no long-term effects at any sites. Temporary increase in noise would occur during construction at all sites, but would meet State standards. Long-term noise from new traffic, operations and residences would be negligible. An increase in demand for public services (medical, hospital, sheriff, fire, etc.) during construction is possible. New safety risks to the public would be short term and mainly associated with construction traffic encounters.	No change in air quality, noise, or public safety would occur at any sites.



Colville Tribes
CHIEF JOSEPH HATCHERY PROGRAM
DRAFT ENVIRONMENTAL IMPACT STATEMENT

Figure 2-1.
Location of Project Facilities



Colville Tribes
CHIEF JOSEPH HATCHERY PROGRAM
DRAFT ENVIRONMENTAL IMPACT STATEMENT

Figure 2-10
ST MARY'S MISSION ACCLIMATION POND

TETRA TECH KCM

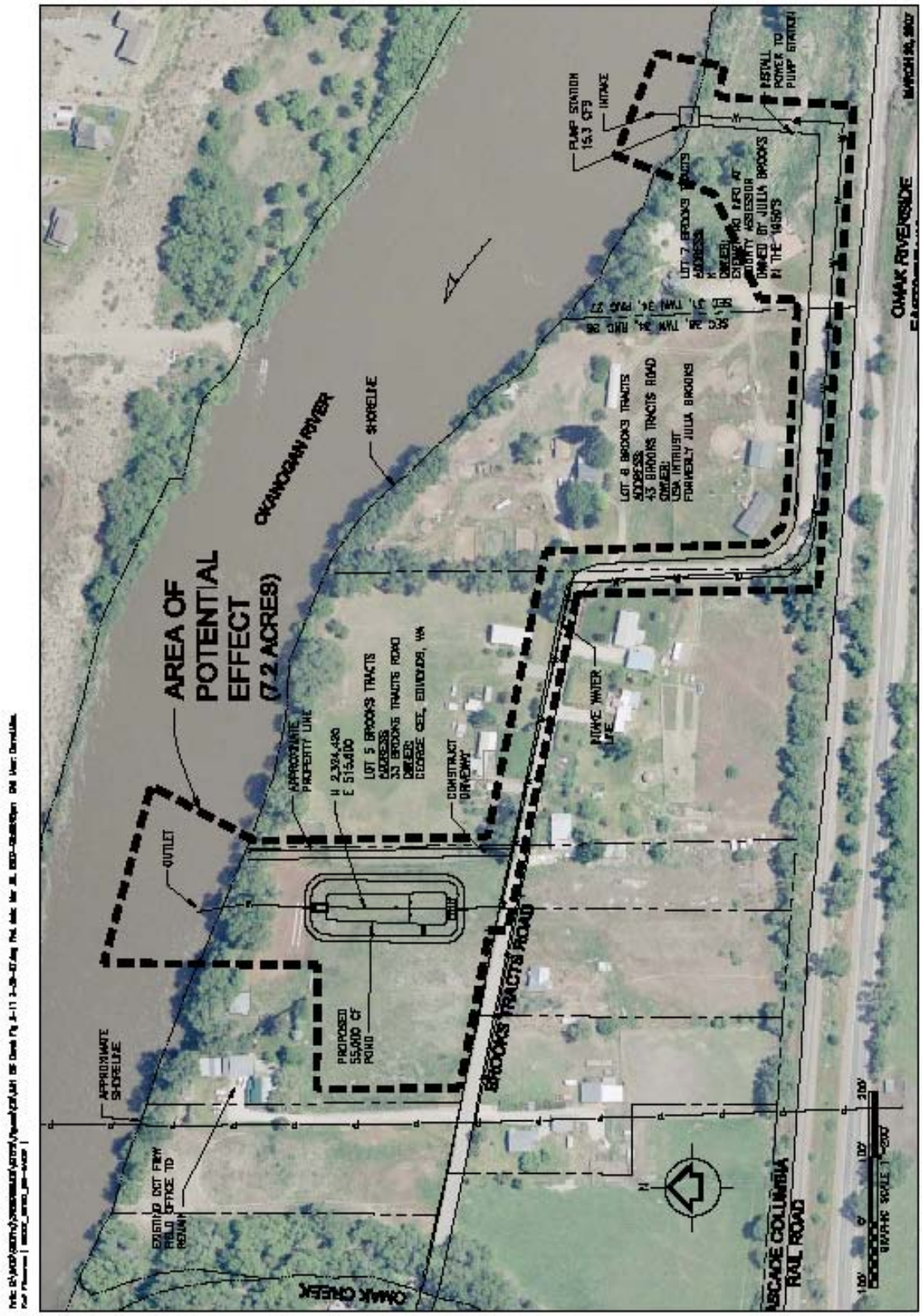


Figure 2-11
OMAK ACCLIMATION POND

Colville Tribes
CHIEF JOSEPH HATCHERY PROGRAM
DRAFT ENVIRONMENTAL
IMPACT STATEMENT

Figure 2-2
PROPOSED CHIEF JOSEPH HATCHERY SITE PLAN

Colville Tribes
CHIEF JOSEPH HATCHERY PROGRAM
DRAFT ENVIRONMENTAL
IMPACT STATEMENT

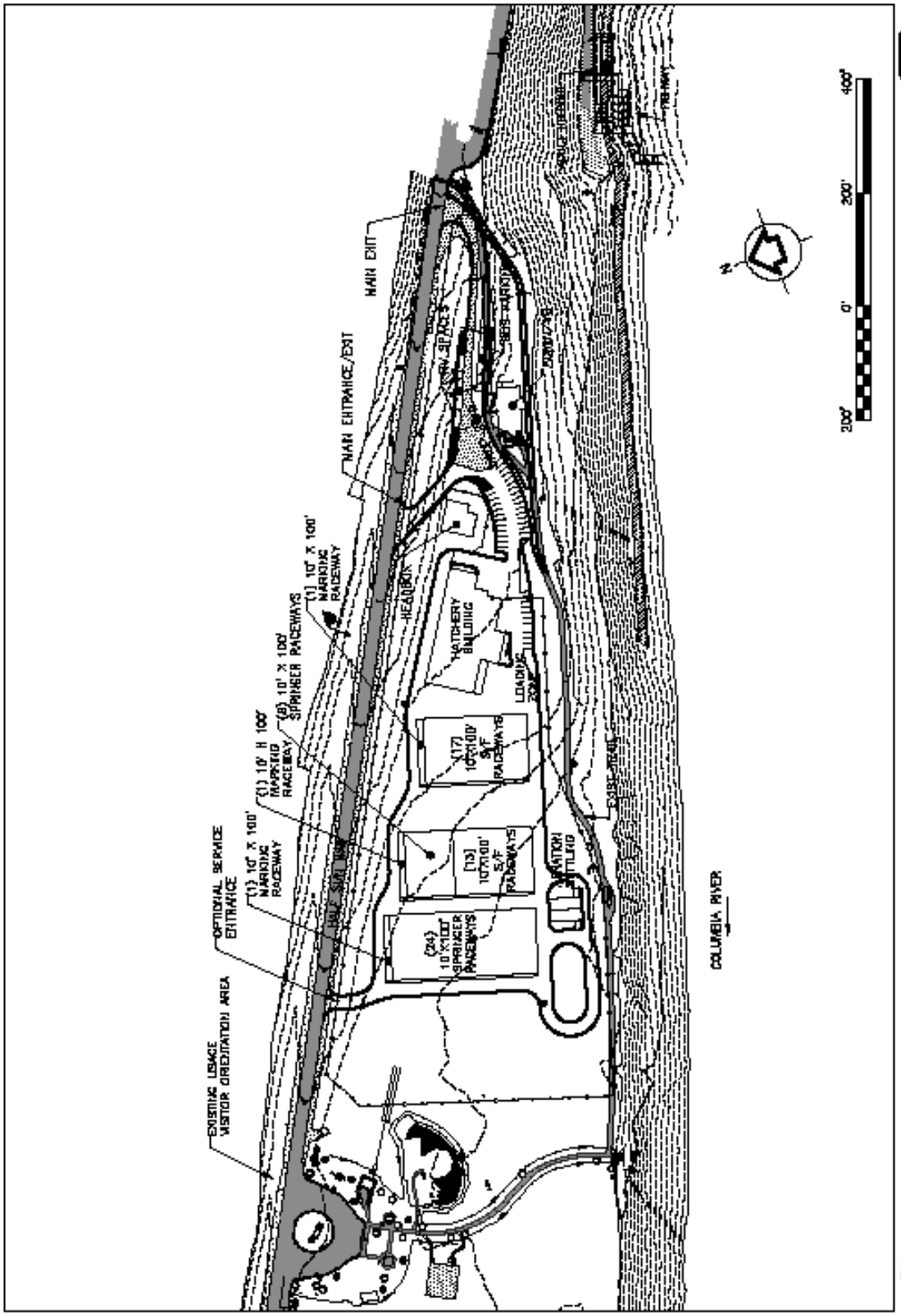
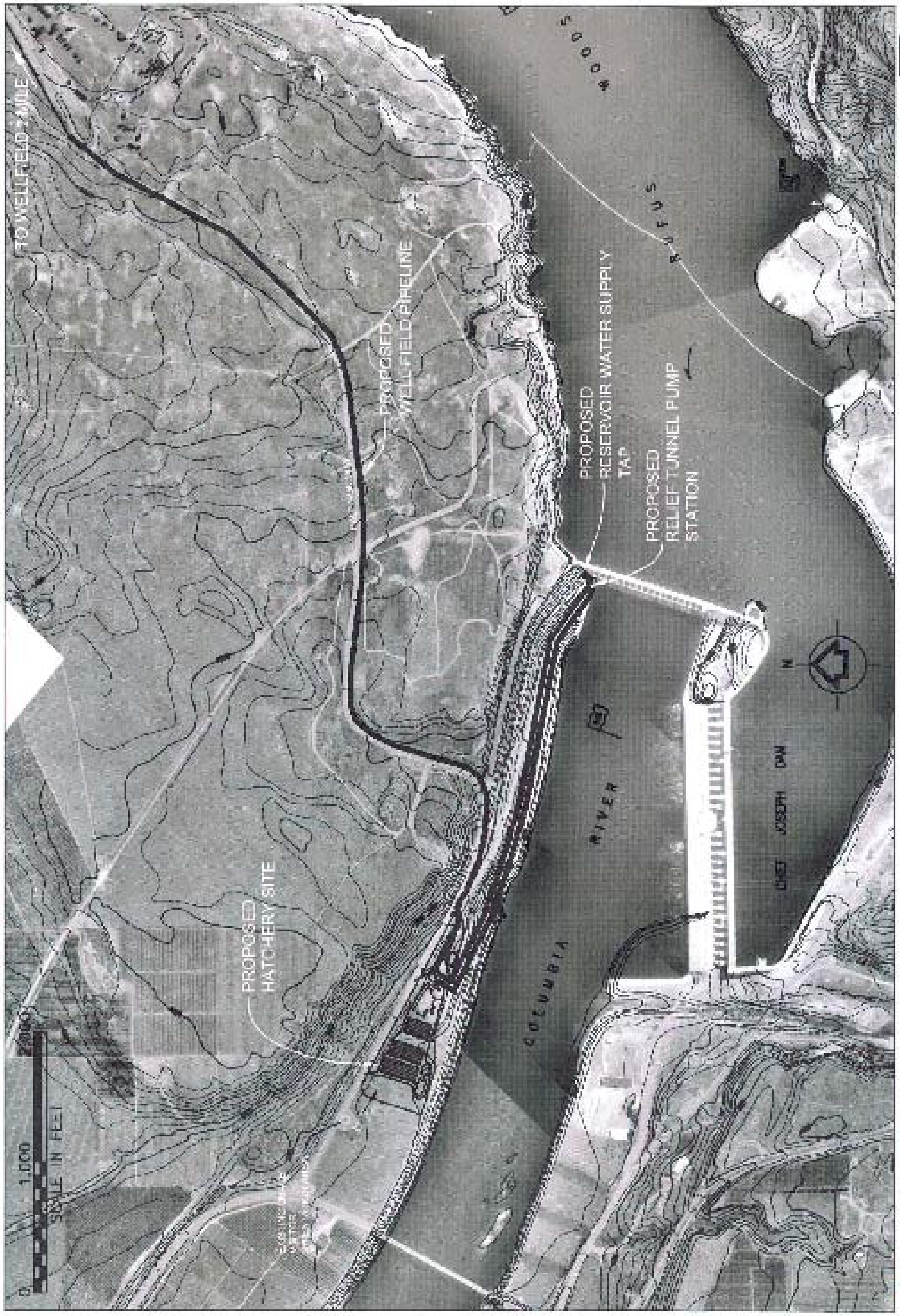


Figure 2-3
SITE PLAN

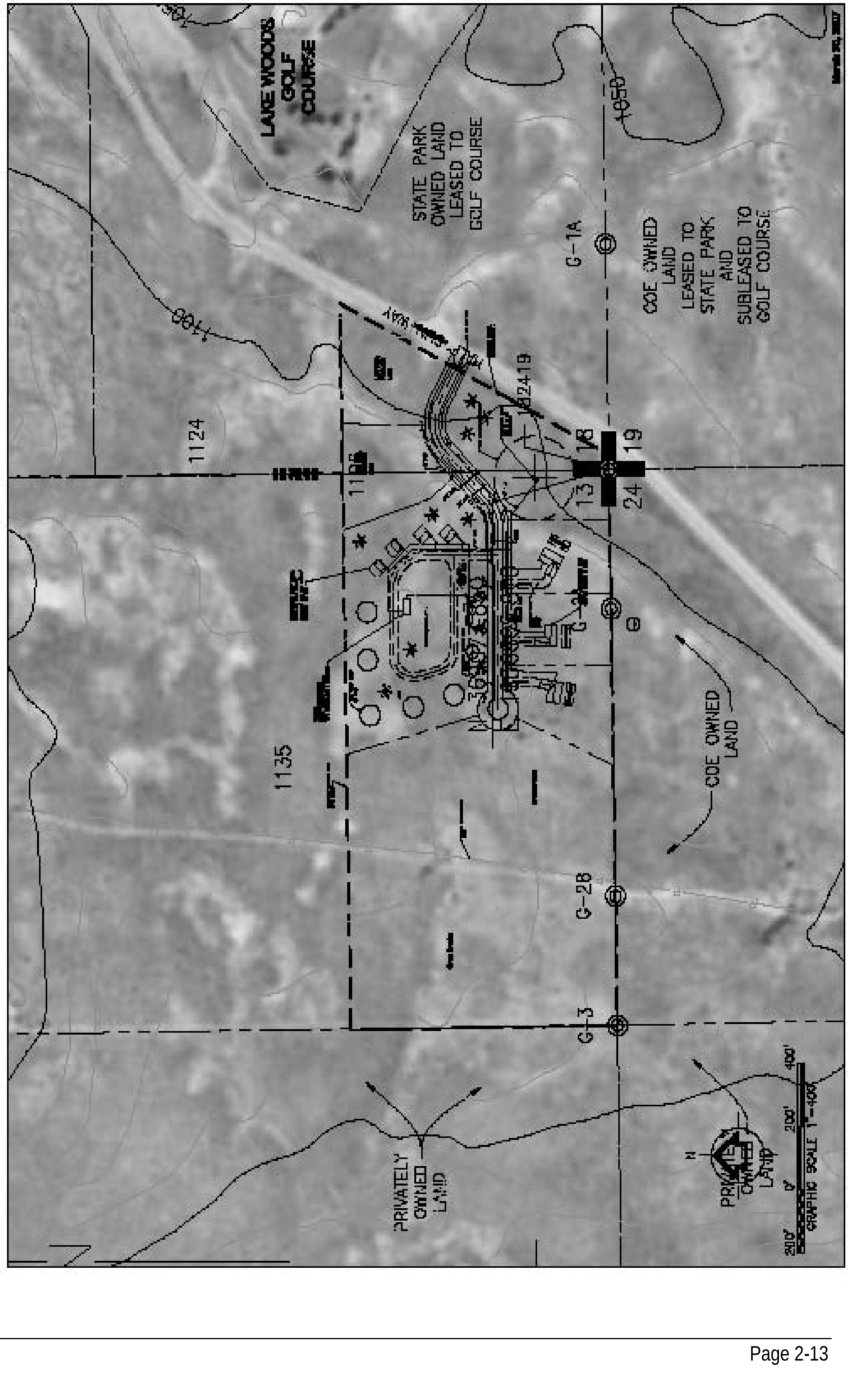
Colville Tribes
CHIEF JOSEPH HATCHERY PROGRAM
DRAFT ENVIRONMENTAL
IMPACT STATEMENT



Colville Tribes
CHIEF JOSEPH HATCHERY PROGRAM
DRAFT ENVIRONMENTAL IMPACT STATEMENT

Figure 2-4
HATCHERY WATER SUPPLY FEATURES

TETRA TECH/KCM



Colville Tribes
CHIEF JOSEPH HATCHERY PROGRAM
DRAFT ENVIRONMENTAL IMPACT STATEMENT

Figure 2-5
HATCHERY STAFF HOUSING PLAN

TETRA TECH

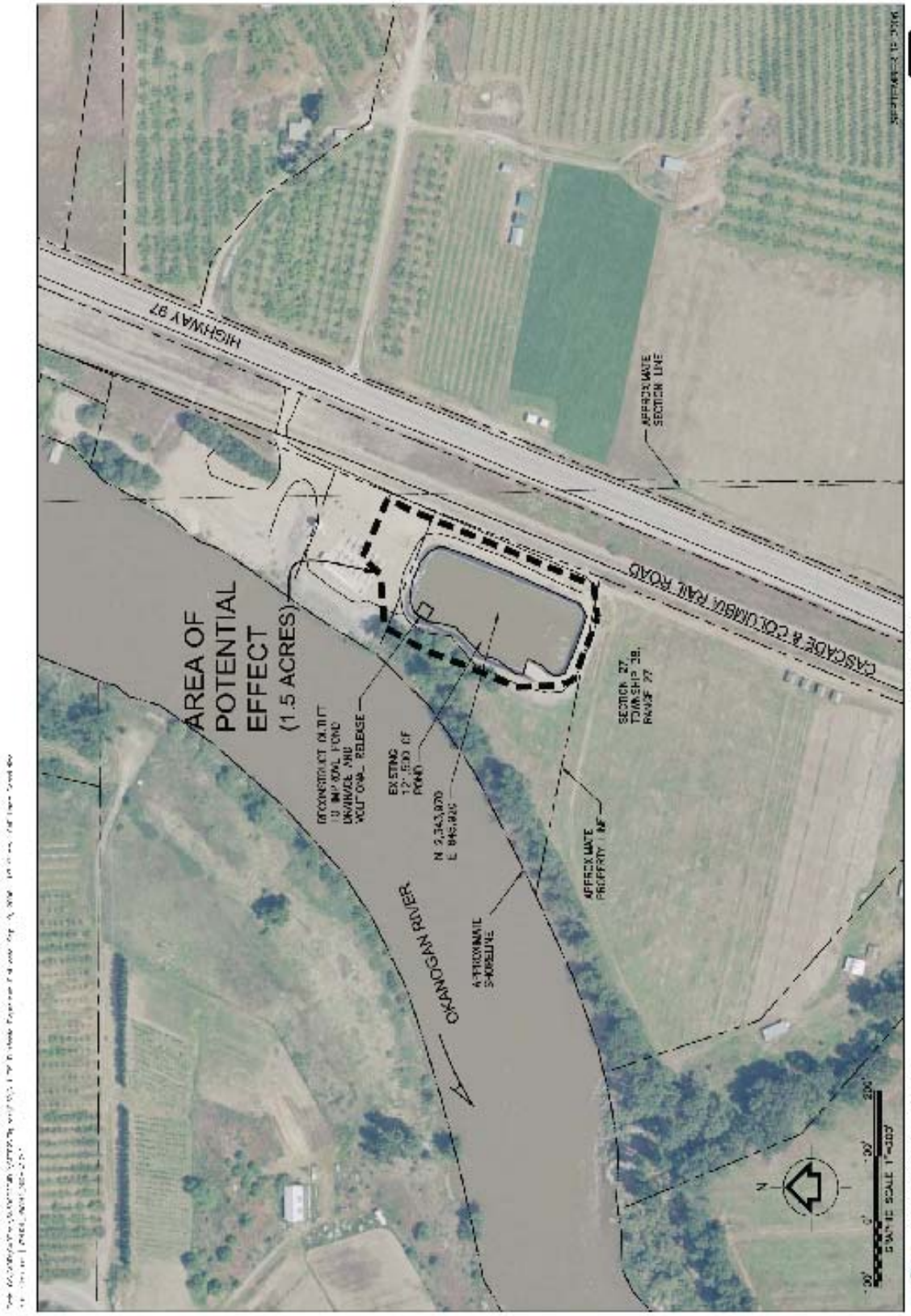
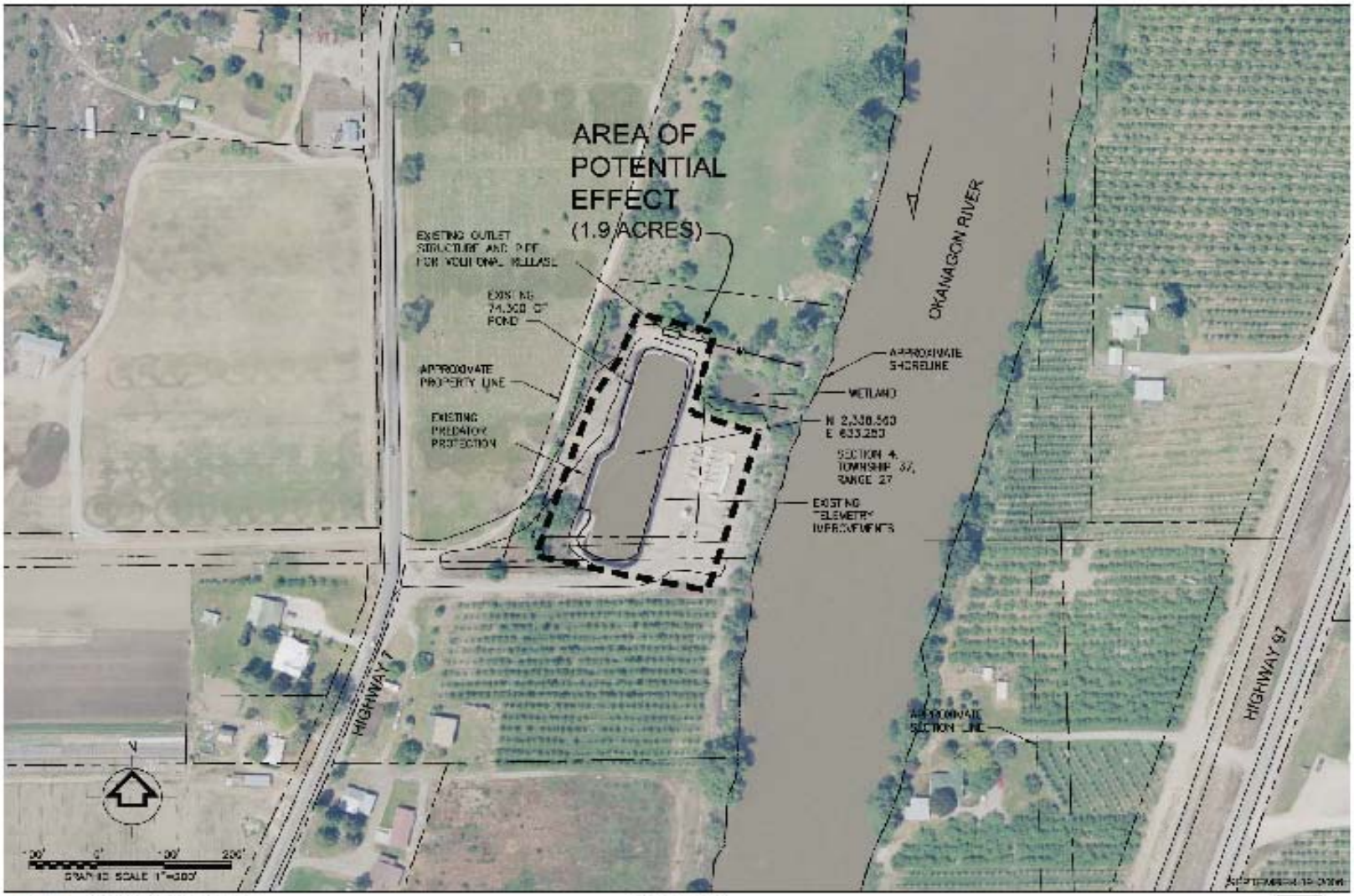


Figure 2-6
ELLISFORDE ACCLIMATION POND



Colville Tribes
CHIEF JOSEPH HATCHERY PROGRAM
DRAFT ENVIRONMENTAL IMPACT STATEMENT

Figure 2-7
TONASKET ACCLIMATION POND

TETRA TECH/KCM

Figure 2-8
BONAPARTE ACCLIMATION POND

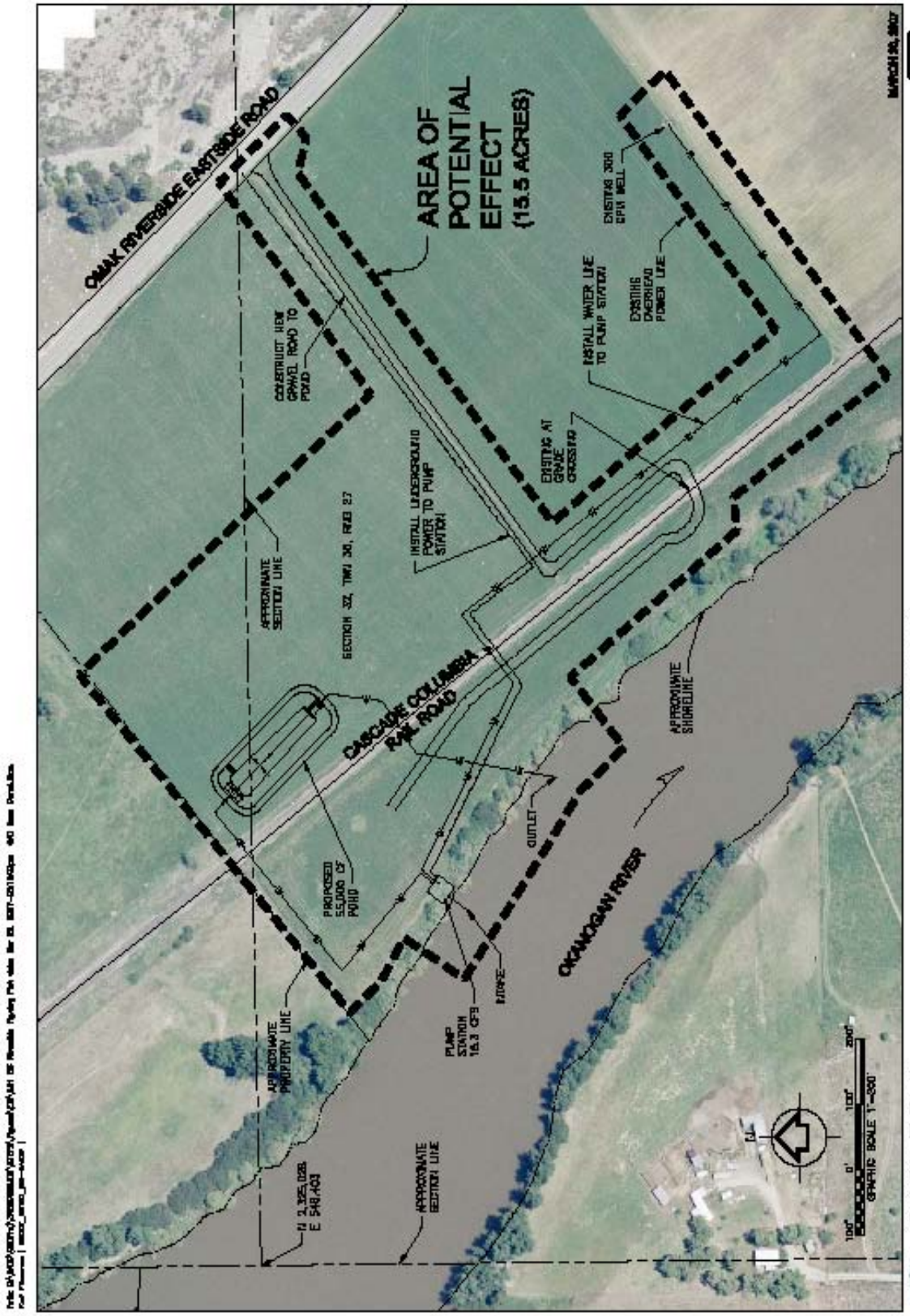


Figure 2-9
RIVERSIDE ACCLIMATION POND

CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter summarizes the potential effects of the proposed project and the No Action alternative on the physical, biological and human environments. Direct, indirect and cumulative effects are disclosed for each aspect of the environment studied. Project design features and reasonable mitigation measures that help avoid, reduce or compensate for certain adverse effects are identified. This chapter includes sections that identify adverse effects that cannot be avoided, irreversible and irretrievable commitments of resources, short-term uses of the environment, and effects on long-term productivity.

The Chief Joseph Dam Hatchery Master Plan (Master Plan) (CTCR 2004, http://www.nwcouncil.org/library/Default.htm) is incorporated by reference in this EIS in its entirety. It includes much biological data, ecological rationale, and environmental and engineering research information that are used as a basis to support much of the information in this EIS. It also contains summer/fall Chinook and spring Chinook Hatchery Genetic Management Plans (HGMPs) and a monitoring and evaluation design.

3.1 Overview

The proposed Chief Joseph Hatchery and fish acclimation ponds would be located in Okanogan County in the north central region of Washington State (Figure 1-1), an area sparsely populated and largely dependent economically on agriculture. River valleys are important for irrigated orchards and other crops, transportation corridors and human occupation while uplands are used primarily as pasture and open range for livestock. Shrub-steppe plant communities reflective of the semi-arid Columbia Plateau climate dominate the landscape outside the river bottoms, with wildlife and vegetative composition being typical of that habitat. The average annual precipitation ranges from 11 to 16 inches with much of it coming as summer thunderstorms and hail storms. Snow may accumulate to 10 to 20 inches in the winter.

The Okanogan River valley communities include Okanogan, Omak, Tonasket, Oroville, and Riverside. With Bridgeport on the Columbia River, these communities support primarily service-oriented businesses for the surrounding rural agricultural areas and the west side of the Colville Indian Reservation. Primary industrial activities in the area are fruit-packing and processing facilities and a lumber mill near Omak. Hydropower facilities operated by the USACE (Chief Joseph Dam) and Douglas County PUD (Wells Dam) are important employers. Two main transportation corridors, US Highway 97 and State Route 17, serve the area.

3.2 Fish and Aquatic Habitat

3.2.1 Affected Environment

The main fish-bearing waters in the project area are the Columbia River between Wells Dam and Chief Joseph Dam, and the Okanogan River and its tributaries (Figure 1-2). These historically contained both anadromous and resident salmonid populations (Wydoski and Whitney 2003). Appendix B lists the fish species in the area and their protected status.

Fish Populations

Anadromous Fish

The Columbia and Okanogan rivers support spring Chinook, summer/fall Chinook, sockeye, and summer steelhead trout (CTCR 2005c). While coho salmon are present in the Columbia River, they have been extirpated from the Okanogan River subbasin and there are no current plans for reintroduction (NPCC 2004).

Upper Columbia River Spring Chinook

The Upper Columbia River (UCR) spring Chinook salmon were listed as endangered in 1999 (Federal Register, Vol. 64, No. 56, March 24, 1999, p. 14308). The ESU includes all naturally-spawned populations of spring Chinook in accessible reaches of Columbia River tributaries between Rock Island and Chief Joseph dams, however Upper Columbia spring Chinook are considered extinct from the Okanogan subbasin (Smith et al. 2006). UCR spring Chinook are also a Washington State Candidate species and are culturally significant to the Colville Tribes for ceremonial and subsistence purposes (Section 3.9).

Adult spring Chinook migrate past Wells Dam from May through June to spawn in water between 42º and 58ºF. As summer progresses, water temperatures rise in the Okanogan, creating thermal barriers to migrating adult spring Chinook (NPCC 2004). As a result, late-returning spring Chinook adults experience high mortality prior to spawning.

UCR spring Chinook juveniles primarily reside in fresh water for at least one year prior to rapidly migrating to the ocean during their second spring (West Coast Salmon Biological Review Team 2003). Optimal water temperature for juvenile rearing is 54º to 55ºF; temperatures in excess of 73ºF are lethal.

Recently, the average escapement for the entire UCR spring Chinook ESU has been less than 5,000 hatchery-origin plus wild Chinook (Myers et al. 2004). The short- and long-term trends in abundance are declining. The average smolt-to-adult survival of spring Chinook produced at Entiat, Methow, Leavenworth, and Winthrop hatcheries for 1989 to 1998 was 0.002% (Mobrand Biometrics unpublished). There are no estimates of historical production of spring-run Chinook salmon from the Okanogan River subbasin.

Spring Chinook runs were extirpated from the Okanogan River by the 1930s due to over harvest, irrigation water withdrawals, and construction of impassable dams. Historically, Salmon Creek and its tributaries (Figure 2-1) were the primary spring Chinook spawning areas in the U.S. portion of the Okanogan River subbasin. This area became inaccessible over 80 years ago due to construction of Conconully Dam and the Okanogan Irrigation District (OID) diversion dam at RM 4.3 (Section 3.2.2) (NPCC 2004). There is insufficient flow below the OID diversion dam to provide fish habitat.

Spring Chinook recently have been reintroduced into the Okanogan subbasin by the Colville Tribes. About 50,000 to 150,000 “Carson stock” smolts have been acclimated at St. Mary’s Mission Pond and released in Omak Creek annually since 2003. In spring 2005, eleven spring Chinook adults returned to Omak Creek (C. Fisher, CTCR, personal communication, January 6, 2006).

Upper Columbia River Summer/Fall Chinook

Adult summer/fall Chinook salmon in the Columbia River migrate past Wells Dam between mid-July and November to spawn in the Okanogan and Similkameen rivers. Most summer/fall Chinook adults return to the Similkameen River and spawn within a 1.2-mile area in the vicinity of Similkameen Pond (C. Fisher, CTCR, personal communication, November 2005) where a summer/fall Chinook rearing and release program managed by WDFW has been ongoing for many years. The spawning density in this reach exceeds 644 redds per mile which may reduce the overall spawning success of the population. Juveniles use the Okanogan River and the Columbia River between Wells and Chief Joseph dams for rearing before emigrating toward the ocean in the spring and early summer (CTCR 2004). The proportion of hatchery-origin fish spawning in the wild increased with increasing adult escapement (NPCC 2004).

The Similkameen Pond program (Section 3.2.2) relies on brood stock collected at Wells Dam from July through August (brood stock collection in 2005 was extended into September). These adults, a combination of Methow and Okanogan subbasin fish, produce about 576,000 smolts for rearing and release at Similkameen Pond annually.

Summer/fall Chinook also spawn in areas of the Okanogan River below Zosel Dam (RM 78.9), a fish passage barrier. About 76% of hatchery-origin fish spawn in areas of scoured gravel and in the tributary confluences above Riverside (approximately RM 40) (CTCR 2004). Late-arriving fall Chinook spawn primarily in the lower Okanogan River and possibly in the Columbia River up to the base of Chief Joseph Dam (NPCC 2004).

Recent summer/fall Chinook run sizes have been highly variable. The number of adults passing Wells Dam has ranged from 2,774 in 1996 to 68,572 in 2002 (Table 3-1). While this stock does not warrant protection status under the ESA, it is considered depressed. The Okanogan population has a declining short-term trend of 8.8% and a declining long-term trend of 5.2% (CTCR 2004). The smolt-to-adult survival of yearling summer/fall Chinook salmon released from Similkameen Pond has increased from 0.4% for brood year 1995 to nearly 2% in recent years (CTCR 2004). This increase is likely due to changes in conditions of the Columbia River estuary and the Pacific Ocean.

Table 3-1. Number of Summer/Fall Chinook Salmon Counted at Wells Dam, 1993-2004

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Adults	4,461	7,053	3,774	2,774	2,980	4,396	9,185	8,527	39,973	68,572	50,943	36,694
Jacks	330	922	464	357	300	883	1,052	4,896	7,370	599	2,655	1,905

Source: Columbia River Data Access in Real Time (DART) 2005

Upper Columbia River Steelhead

The Upper Columbia River Summer Steelhead (*Oncorhynchus mykiss*) Distinct Population Segment (DPS), formerly listed as endangered under the ESA, was listed as threatened effective February 6, 2006 (Federal Register, Vol. 71, No. 3, January 5, 2006). The DPS includes all naturally spawning steelhead in the Columbia River Basin and its tributaries upstream from the Yakima River to the Canadian border, including the

Okanogan River and Wells Hatchery stock (CTCR 2005c). Summer steelhead are also classified as a Washington State Candidate species (WDFW 2005b). The Interior Columbia Basin Technical Review Team recently listed the Okanogan River subbasin summer steelhead as an independent population (NPCC 2004); however, the State of Washington manages steelhead in the Okanogan and Methow rivers as a composite stock, i.e. the same population (CTCR 2005a).

Adult summer steelhead migrate past Wells Dam from July through November with peak passage occurring from late August through September (Columbia River DART 2005). Spawning begins in late March, peaks in April, ends in mid-May, and progresses upstream along the mainstem Okanogan before entering the tributary habitats. Juveniles generally migrate from early spring through June.

Natural steelhead production is severely reduced in the Okanogan River subbasin due to tributary habitat degradation, construction of dams, and irrigation water withdrawals. Out-of-basin factors contributing to steelhead declines include passage mortalities at Columbia River dams and harvest in lower Columbia River fisheries. Currently, steelhead are primarily hatchery-origin fish from Wells Dam Hatchery. The numbers of adult summer steelhead migrating past Wells Dam from 1993 through 2004 are presented in Table 3-2. Between 1991 and 2000, only 6.5% of the adults passing Wells Dam were natural-origin (unmarked) fish (CTCR 2004).

Table 3-2. Number of Summer Steelhead Adults Counted at Wells Dam, 1993-2004

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Total	2,395	2,143	945	3,964	4,032	2,692	3,463	6,185	17,287	9,217	9,029	9,283
Unmarked	0	0	0	0	0	344	533	1,756	7,808	5,688	5,330	5,574

Source: Columbia River Data Access in Real Time 2005

Summer steelhead use the Columbia River and the Okanogan River and as a migration corridor and for rearing. Steelhead redds have been documented in the Okanogan and Similkameen rivers, as well as Salmon, Omak, Tunk, Bonaparte, Ninemile, Tonasket, and Vaseux creeks (CTCR 2005c) (Figure 2-1). Aeneas, Chiliwist, and Johnson creeks may provide habitat for other life stages, but are not accessible to adult steelhead or do not have suitable spawning habitat.

Omak Creek was reconnected to the Okanogan in the 1990s and is currently an important summer steelhead production area. In 2004, the steelhead escapement was 104 fish. A few redds have also been sighted in Mission Creek above Mission Falls (CTCR 2005c).

Steelhead redds have also been documented annually in Tunk Creek (RM 0 to 0.1), Bonaparte Creek from the mouth to Bonaparte Falls (RM 1.0), and Ninemile Creek (RM 0 to 1.2). Summer steelhead smolts and one adult have been observed in Tonasket Creek between the mouth and Tonasket Falls in one out of ten years (RM 2.2) (CTCR 2005c).

There is insufficient data available to determine trends in abundance, timing, and distribution of summer steelhead in the Okanogan subbasin (CTCR 2005c). During surveys conducted in 2005 by the Colville Tribes, 470 steelhead redds were documented

in the Similkameen and Okanogan rivers, with an average density of 7 redds per mile. The highest redd density—30 redds per mile—was documented in the reach between the Similkameen River and Zosel Dam (RM 78.9), with the greatest concentration found below the US Highway 97 bridge at Oroville.

Sockeye

The Okanogan subbasin supports a population of sockeye salmon, one of only two viable populations remaining in the Columbia River Basin. All sockeye spawning and rearing occurs within the Canadian portion of the Okanogan subbasin where suitable spawning habitat is abundant (NPCC 2004).

Since 1977, annual sockeye salmon counts at Wells Dam have been highly variable, ranging from 1,666 to 81,054 adults. Counts from 1993 through 2004 are presented in Table 3-3. While recent sockeye salmon returns have been relatively large, there has been a continual decline in escapement.

Table 3-3. Number of Sockeye Salmon Adults Counted at Wells Dam, 1993-2004

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Adults	27,849	1,666	4,892	17,701	24,621	4,666	12,388	59,944	74,486	10,659	29,374	78,053

Source: Columbia River Data Access in Real Time 2005

Resident Fish

There are 20 native resident fish species and five introduced species in the Okanogan River subbasin (Appendix B). Species with federal or state protected status are discussed individually below.

Bull trout were listed as Threatened under the ESA on June 10, 1998 (NPCC 2004). All *Salvelinus confluentus* in the Columbia River are currently considered bull trout as no anadromous Dolly Varden were ever documented in the Columbia River Basin (Smith et al. 2006). The historic extent of bull trout distribution in the upper Columbia River and its tributaries is unknown, although they were reported in upper Salmon Creek and its tributaries over 50 years ago (NPCC 2004). Currently, migratory bull trout (bull trout which spawn in other basins) are present in the Columbia River during winter and spring, but have most likely been extirpated from the lower Okanogan subbasin. Spawning bull trout require very cold clear water with clean gravel substrates--conditions which are not present in the Okanogan River subbasin.

The redband trout, a race of rainbow trout, is a federal species of concern and may possibly occur in the upper reaches of Omak, Salmon, Bonaparte, Loup Loup, and Tunk creeks. Rainbow trout are known to occur in these areas, and they have been stocked in several lakes including Bonaparte Lake, Conconully Reservoir, and Leader Lake within these watersheds. But, tests have not determined if they are redband trout, rainbow trout, or hybrids (C. Fisher, CTCR, personal communication, December 5, 2005). The introduced rainbow trout may have hybridized with the native redband trout.

Westslope cutthroat trout, also a federal species of concern, occurs in higher elevation coldwater streams. They have been documented in the North Fork Salmon Creek and Aeneas Creek (C. Fisher, CTCR, personal communication, December 5, 2005). The pygmy whitefish, a federal species of concern and a State of Washington "Sensitive" species, is present in Lake Osoyoos (WDFW 2005b; Wydoski and Whitney 2003).

Two state "Candidate" species, leopard dace and Umatilla dace, are also present in the area (Wydoski and Whitney 2003). Both were listed by the State of Washington in 1998 due to their discontinuous distribution and their unknown status. Leopard dace, found in the Similkameen River and the Columbia River below Chief Joseph Dam, prefers stream habitats with currents less than 1.5 feet per second. Umatilla dace, found in the Similkameen, Okanogan, and Columbia rivers, prefer faster water with boulder and cobble substrates free of silt.

Five introduced species are present in the Okanogan subbasin: Lahonton cutthroat trout, grass carp, brook trout, smallmouth bass, and largemouth bass (Wydoski and Whitney 2003). Lahonton cutthroat trout (stocked by the Colville Tribes) and grass carp are present in Omak Lake where they tolerate the lake's high total dissolved solids. Smallmouth and largemouth bass occur throughout the Okanogan subbasin and the Columbia Basin. Other warm water species occurring in the Columbia River include pumpkinseed, black crappie, yellow perch, walleye, and common carp. These species may also occur in the Okanogan River below Chiliwist Creek. Brown trout have been observed in the Wells Dam fishway. Bass, walleye, and, to a lesser extent, brown trout prey on salmonids and other native fish.

Habitat

The following discussion focuses on habitat suitable for anadromous salmonids within three distinct areas: the Columbia River reach, the Okanogan River mainstem, and major tributaries to the Okanogan River.

Columbia River Reach

The Columbia River reach between Wells and Chief Joseph dams extends about 29.5 miles and is dominated by pool-type habitat of Lake Pateros, the impoundment formed by Wells Dam. It serves as a migration corridor and rearing habitat for adult and juvenile spring Chinook, summer/fall Chinook, summer steelhead, bull trout, and sockeye. Summer/fall Chinook spawn in or near the tailrace of Chief Joseph Dam.

Okanogan Mainstem

The Okanogan is the northern-most river accessible to anadromous fish in the Columbia River Basin (CTCR 2005a). It is a low-gradient, low-velocity system originating from lakes in Canada. Production of salmonids is limited in the mainstem by high water temperatures, high sediment, lack of habitat diversity, and in some places, lack of connectivity with the floodplain. The Okanogan River has few stable sources of cold water (NPCC 2004) and a thermal barrier forms each summer at the mouth which affects the upstream passage of fish.

Lake Pateros extends upstream into the Okanogan River to just below Chiliwist Creek (RM 15.1). This reach is wide and shallow and contains poor quality habitat for anadromous fish. Suitable spawning substrate is lacking. The channel is moderately confined by US Highway 97 and railroad beds.

Between RM 15.1 and the Similkameen River (RM 74.2), the Okanogan channel is confined by US Highway 97, railroad beds, and dikes. This artificial confinement has lead to lateral erosion resulting in large areas of silt and sand substrate within the stream channel (NPCC 2004). Areas of scoured gravel and tributary confluences within this section provide important summer/fall Chinook spawning habitat.

The Similkameen River contributes 75% of the water flowing through the Okanogan River. It is a flashy snowmelt system with high turbidity and cooler water temperatures than the Okanogan (CTCR 2005a). The majority of the sediment in the lower Okanogan River is delivered by the Similkameen River.

From the Similkameen River confluence upstream to the outlet of Lake Osoyoos at Zosel Dam (RM 78.9), the Okanogan River is stable and clear (CTCR 2005a). The substrate is dominated by gravel and cobble. Summer/fall Chinook spawn in this portion of the river while other salmonids use the area as a migratory corridor. Primary limiting factors to salmonid production above the Similkameen River confluence include high water temperatures, sediment, loss of habitat diversity, and loss of floodplain connectivity.

The United States border with Canada bisects the southern portion of Lake Osoyoos. In mid- to late-summer, low oxygen levels and high water temperatures in the lake reach levels lethal to salmonids. Water flowing from Lake Osoyoos has characteristically high temperature and low sediment load and transport (NPCC 2004). Above Lake Osoyoos, the mainstem Okanogan River supports sockeye and Chinook salmon and steelhead trout up to McIntyre Dam which is a complete passage barrier to fish. Other than Omak Creek and possibly Salmon Creek, the area with the greatest potential to support a spring Chinook salmon run occurs within the Canadian portion of the Okanogan River subbasin (NPCC 2004).

Major Okanogan Tributaries

Perennial tributaries to the Okanogan River that historically provided or currently provide suitable salmonid habitat include Chiliwist Creek, Similkameen River, Loup Loup Creek, Salmon Creek, Omak Creek, Aeneas Creek, Tunk Creek, Bonaparte Creek, and Tonasket Creek (Figure 2-1). Vaseux and Inkaneep creeks in Canada also provide salmonid habitat. Habitat in the tributaries is primarily limited by low flows caused by irrigation water demands and the subsequent reduction in gravel recruitment and availability of coldwater refuge areas (NPCC 2004).

The Chiliwist watershed (Okanogan RM 15.1) minimally contributes to the fish production of the Okanogan basin, both historically and currently. Historically, summer steelhead trout most likely inhabited Loup Loup Creek (Okanogan RM 16.9). Currently, the creek is dry below the falls during the irrigation season (NPCC 2004).

Salmon Creek, which enters the Okanogan River at RM 25.7, is currently inaccessible to most anadromous fish. In addition to Conconully Dam, there is an OID diversion dam on Salmon Creek at RM 4.3 which has been in operation for more than eighty years. The diversion dewaters lower Salmon Creek except during periods of snowmelt when spill occurs at the dam (NPCC 2004). Excellent spawning and rearing habitat occurs between the OID diversion and Conconully Dam. A project has been proposed to re-allocate irrigation water back to the stream allowing salmonids access to 11 miles of habitat. Historically, Upper Salmon Creek and its tributaries were the major production areas for spring Chinook salmon within the U.S. portion of the Okanogan subbasin.

Omak Creek enters the Okanogan River at RM 31. Omak Creek is an important summer steelhead production area from its mouth upstream to Mission Falls. Restoration efforts of the Colville Tribes in the 1990s reconnected the creek to the Okanogan River. Though Omak Creek provides some suitable spawning and rearing habitat, its capacity to produce salmonids is primarily limited by low habitat diversity and quantity. Other limiting factors include sedimentation, barriers, and channel instability (NPCC 2004).

Aeneas Creek, which enters the Okanogan River at RM 50, is a spring-fed stable source of cold water. The lower 1/3 mile is a cold-water refuge for migrating sockeye and summer/fall Chinook in the Okanogan. There is no spawning habitat in this area due to unsuitable substrate.

Little is known about the habitat in Tunk Creek which enters the Okanogan River about five miles north of Riverside, Washington. Summer steelhead are known to spawn in Tunk Creek from the mouth to an impassable natural falls at RM 0.1 (NPCC 2004).

Bonaparte Creek, which enters the Okanogan River at RM 56.7, provides a mile of suitable summer steelhead habitat from its mouth to Bonaparte Falls. Summer steelhead return to Bonaparte Creek annually (NPCC 2004).

Ninemile Creek originates in Canada and enters the Okanogan River at RM 80.2. Adult summer steelhead have been observed near its mouth, but there is no data regarding abundance or production. The lower two miles of the creek are used only as a migration corridor. No spawning habitat occurs in this reach because the channel bottom is cement interspersed with areas of sparse, unconsolidated gravels (NPCC 2004). Agricultural practices at the adjacent orchards may introduce chemicals into the stream which could limit fish production. Macro-invertebrate abundance and diversity are low.

Tonasket Creek which enters the Okanogan River at RM 77.8 near Oroville, Washington has highly variable flows. Summer steelhead spawn in the lower mile in years with sufficient water (NPCC 2004).

The Similkameen River (Okanogan RM 74.2) is the Okanogan River's major tributary. According to the Colville Tribes, Enloe Dam (RM 8.8) is most likely a fish barrier. The dam has affected downstream fish habitat by retaining gravels while allowing the transport of fine sediment (NPCC 2004). Below Enloe Dam, the Similkameen River flows through a relatively high-gradient, confined canyon, transitioning to an unconfined, low gradient channel. This gravel deposition area supports the highest densities of spawning summer/fall Chinook salmon in the Okanogan watershed.

Above Lake Osoyoos in Canada, Vaseux and Inkaneep creeks contain excellent spawning habitat for salmonids. Inkaneep Creek provides about three miles of habitat (NPCC 2004), and could support Chinook and limited steelhead spawning. Rearing within Inkaneep Creek would be limited due to high summer water temperatures. Limiting factors also include sedimentation, lack of large woody debris, reduced habitat complexity, and the presence of unscreened water diversions.

Hatchery Production

Hatchery programs in the Okanogan subbasin produce summer/fall Chinook, spring Chinook, summer steelhead, and rainbow trout. The programs are summarized below and more information can be found in the Okanogan Subbasin Plan (NPCC 2004).

About 576,000 yearling summer/fall Chinook smolts are currently produced and released by WDFW at Similkameen Pond (Similkameen RM 3.1) using brood stock collected at Wells Dam. This program was developed to mitigate for the summer Chinook adults that may have been produced in this area prior to the Wells, Rocky Reach, and Rock Island hydroelectric developments (CTCR 2004).

The Similkameen summer/fall Chinook program has not consistently produced sufficient fish to meet its limited program objectives. In some years, the Similkameen program has lost substantial numbers of fish to disease. Water quality problems, including high water temperature, pollution, and heavy loads of fine sediments, have also posed challenges for the program. In other years, insufficient eggs have been collected at Wells Dam.

In recent years, returns of adult hatchery summer/fall Chinook to the Similkameen River and upper Okanogan have increased substantially. High smolt-to-adult survival of the Similkameen Pond fish has produced an extremely high spawner density in the Similkameen River of more than 644 redds per mile. Unfortunately, this has not meant an increase in natural-origin fish. The capacity of the Similkameen spawning habitat is being exceeded as Chinook are building redds on previously established redds. Most of the adult hatchery fish returning between 1995 and 2000 spawned in the Similkameen River while some spawned above the Town of Riverside, leaving a large portion of the Okanogan River underutilized.

Recently, spring Chinook have been artificially propagated and released in the Okanogan subbasin (mainstem and Omak Creek) through a cooperative agreement between the National Oceanic and Atmospheric Administration (NOAA) Fisheries, U.S. Fish and Wildlife Service (USFWS), CTCR, and WDFW (Table 3-4). These fish are part of an interim program to support tribal ceremonial and subsistence harvest and provide information for a proposed, long-term integrated recovery program (NPCC 2004).

Table 3-4. Year, Quantity, and Location of Spring Chinook Salmon Released in Okanogan River Basin

Year	No. Fish Released	Release Location	Age of Released Fish
2001	40,000	Omak Creek	Smolts
2002	48,000	Omak Creek	Smolts
2002	254,000	Ellisforde Pond	Smolts
2003	34,000	Omak Creek	Smolts
2003	100,000	Bonaparte Pond	Smolts
2004	100,000	Ellisforde Pond	Yearlings

Source: CTCR 2004

Summer steelhead from Wells Hatchery stock are released each year into the Okanogan subbasin. In the past, releases have varied considerably, ranging from 37,500 to 82,415 juvenile fish in the lower Similkameen River and between 30,000 to 160,756 juveniles in the rest of the Okanogan subbasin (primarily Omak and Salmon creeks). Current releases of Wells Hatchery stock steelhead are planned at 50,000 into the lower Similkameen River with another 50,000 being distributed to various locations in the Okanogan subbasin (NPCC 2004).

The Colville Trout Hatchery is located on the Columbia River downstream of Chief Joseph Dam at RM 542. Kokanee and rainbow trout are reared at this facility for the Lake Roosevelt net pen programs. At WDFW's Omak Hatchery on Jasmine Creek near the Town of Omak, resident rainbow trout are reared to be planted in various locations including Bonaparte Lake, Leader Lake, and Conconully Reservoir. Rainbow, Lahoton, cutthroat, eastern brook, and tiger (eastern brook x brown) trout as well as kokanee salmon are stocked in closed-system lakes throughout the Okanogan subbasin.

Harvest

The Colville Tribes currently manage a limited summer/fall Chinook salmon fishery immediately below Chief Joseph Dam. A sockeye fishery is occasionally held and, more recently, a limited spring Chinook fishery occurred in the Okanogan River. Harvests are for ceremonial and subsistence uses rather than commercial or sport purposes. Over the last several decades, the Colville Tribes' combined salmon and steelhead harvest has averaged 930 fish annually (CTCR 2004). These fish are harvested in a snag fishery at the base of Chief Joseph Dam and a net fishery in the lower Okanogan River.

Management of summer/fall Chinook in the Okanogan River is based on achieving adult spawner escapement objectives regardless of fish origin. Tribal and recreational harvest management does not distinguish between hatchery and natural origin Chinook (NPCC 2004). Runs of summer/fall Chinook to the Okanogan River have been highly variable. Tribal and recreational harvest of summer/fall Chinook in the Okanogan River and the Columbia River from its confluence with the Okanogan to Chief Joseph Dam generally depends on adult abundance determined through preseason predictions by fishery management agencies and actual counts taken at Rocky Reach and Wells dams.

Recreational fishing in the Okanogan has been infrequent, opening only when at least 11,000 summer/fall Chinook pass Priest Rapids Dam.

Tribal fisheries below Chief Joseph Dam occur annually with harvest generally proportional to run size. The Colville Tribe's rod-and-reel snag fishery for summer Chinook below Chief Joseph Dam provides a harvest of less than 1,000 fish average annually for their more than 8,000 person membership (NPCC 2004). The low catch number is due to the inefficiency of the gear being used. Even with the record run of summer/fall Chinook passing Wells Dam in 2001 (47,700 fish), harvest was only 3,400 fish (CTCR 2004).

Recreational steelhead fishing is limited to hatchery-origin fish in the Okanogan River. Season openings, managed by WDFW and NOAA-Fisheries, are unpredictable and depend on the highly variable smolt-to-adult survival rates of Wells Hatchery smolts (NPCC 2004). With the recent large runs of hatchery steelhead, the recreational fishery re-opened primarily to remove excess hatchery-origin fish from the naturally spawning population. This fishery, which targets an endangered species, is unique and is allowed only as a conservation measure to improve the viability of the naturally spawning population. Future harvest will depend on the recovery of the Upper Columbia River Steelhead DPS in general and the Okanogan population specifically.

3.2.2 Environmental Consequences

Proposed Project

The proposed hatchery program (Chapter 2) would increase the number of summer/fall Chinook adults (Program Components 1 and 2) and UCR spring Chinook (Program Component 3) adults returning to the Okanogan subbasin, aiding in the protection of these species. The brood stock selection, collection locations, and timing would likely lead to greater diversity and distribution of both summer/fall and spring Chinook salmon populations if all three program components are implemented. Summer/fall Chinook spawning would expand into currently underutilized areas of the lower and middle Okanogan River. Nutrient enrichment from decaying carcasses would increase throughout the basin, benefiting all fish species and their prey. Tribal ceremonial and subsistence harvest of target fish of each species could be enhanced and recreational fishing opportunities may become available.

Construction Effects

Most of the proposed facilities would be built in upland areas (Chapter 2). In-stream construction would occur at the hatchery, Riverside Pond and Omak Pond (Table 3-5).

During construction, no temporary or permanent barriers would completely block any water body. In-stream structures would be adjacent to the river bank and would occupy very little in-stream area. These areas would be permanently unavailable to fish but are not designated as critical habitat. The small size of the structures would have little or no effect on fish populations.

Table 3-5. In-stream Facilities Associated with Chief Joseph Hatchery Program

Construction Site	Instream Facilities	Water body	Project Component
Chief Joseph Hatchery	▪ Water Intake & outlet/effluent pipes ▪ Screens ▪ Fish ladder	Rufus Woods Lake and Columbia River	1, 2, and 3
Riverside Pond	▪ Water intake and pump station ▪ Outlet/release structure	Okanogan River	1, 2, and 3
Omak Pond	▪ Water intake and pump station ▪ Outlet/release structure	Okanogan River	1, 2, and 3

To control impacts to water quality, construction of Riverside and Omak pond intakes and outlets would be conducted during low water periods. Timing would be adjusted to avoid detrimental effects on migrating fish. The sites do not provide critical habitat for steelhead or resident fish, but suitable summer/fall Chinook spawning habitat is present nearby. July, August, and September are months in which instream work has been permitted in the past (C. Fisher, CTCR, personal communication, January 9, 2006; W. Meyer, WDFW, personal communication, January 9, 2006). Any in-stream construction would be scheduled to comply with requirements of regulatory or permitting agencies (e.g., NOAA Fisheries, USFWS, USACE, Washington Department of Ecology, etc.)

Temporary cofferdams and water diversion structures would route water around all in-stream work areas to lessen impacts to water quality and fish. Portable pumps, used to remove water from the work areas, would be screened to exclude fish. During installation of the cofferdams, a fisheries biologist would be on site to capture any fish stranded during dewatering and return them to flowing waters. Best Management Practices (BMPs) (e.g., silt fences, hay bales, erosion control matting, sediment retention ponds, etc.) would be applied to all in-stream structures and construction to reduce erosion on portions of the riverbank affected by construction.

Water quality effects are expected to be temporary, i.e. limited only to the construction period, and should return to a pre-construction condition. Construction is not expected to affect in-stream temperatures. Leakage of petroleum products and other pollutants from heavy equipment operating within the stream course would be minimized by proper equipment maintenance, use of absorbents, and conducting refueling operations away from the water body. Riparian vegetation affected by construction would be replaced if it would not compromise operation of or access to the in-stream structures.

Operations Effects

Operation of the hatchery facilities and fish production program could affect fish through water quality impacts, intake structures and water use, introduction of fish diseases,

genetic effects on population productivity, operation of the fish ladder, and collection of brood stock.

Water Quality Effects

Water quality effects can include sediment, changes in nutrient levels, introduction of chemical pollutants into the water body, and altered water temperatures.

Sediment and Nutrients

Sediment, fish food, and fish waste would be introduced into the Columbia River at the hatchery site year-round. These introductions would be minimized by directing the intake filter backwash and raceway effluents to the proposed waste water treatment aeration/settling ponds (Chapter 2).

The acclimation sites would also be sources of nutrients and sediment when in use between October and April annually. During this time period, river water temperatures are cold, and the fish consume less food and produce less waste than at the hatchery (C. Fisher, CTCR, personal communication; November 3, 2005). Currently operating acclimation sites appear to remain relatively clean. But, as an added measure, effluent from seasonal pond cleaning may be routed through a detention pond prior to returning to the river. Waste would be disposed of in an appropriate upland location per Washington State environmental regulations.

At existing acclimation sites, flow, pH, total suspended sediments, total phosphorous, dissolved oxygen, and water temperature are monitored and have remained within the acceptable ranges established in the National Pollution Discharge Elimination System (NPDES) permits. It is expected that the amount of sediment and nutrients introduced from the hatchery and acclimation ponds would not affect the overall water quality in the Columbia River, Okanogan River, and Omak Creek, and would not adversely affect fish and other aquatic organisms. Introduction of nutrients may, in fact, produce beneficial effects as significant settling of natural nutrient load occurs in upstream reservoirs.

The nutrient content of the Okanogan subbasin waters would also be increased through introduction of salmon carcasses from returning adult spawners. This enrichment would be variable throughout the subbasin and would be greatest around spawning sites. The number of returning fish and potential for nutrient enrichment would also be dependent upon downstream harvests. Further discussion of water quality effects is in Section 3.6.

Chemical Pollutants

The types and amounts of chemicals used at a hatchery or rearing facility depend upon site-specific conditions, fish culture practices, species of fish, and types of parasites or disease organisms being treated. Information about the types and amounts of chemicals which would be used at the proposed hatchery facility and acclimations ponds is not currently available. However, all chemical handling, application, and disposal would adhere to U.S .Department of Agriculture (USDA), state, and other federal regulations to protect human and environmental health.

Temperature

Water discharged from the hatchery into the Columbia River may, at times, be of a different temperature than the receiving waters. The temperature difference would vary by season and would depend on hatchery operational needs and the current ambient river temperature. The amount of water discharged would be small in relation to the flow of the river and discharge water is expected to rapidly mix with river water. The effect on the river as a whole would be negligible.

Water temperatures in the Okanogan River and Omak Creek are not expected to be affected by operation of the acclimation ponds. Water in the ponds would be subject to warming through solar radiation, but because they would be in use in winter, this effect is not expected to measurably increase the temperature of the receiving streams.

The CJHP proposes to shift the collection of spring Chinook brood stock to as early in the run as possible to try to establish a future run that returns prior to late June. This strategy should decrease the probability of migrating spring Chinook encountering the thermal barrier that forms each summer at the mouth of the Okanogan River and their possible migration downstream into the Methow River.

Fish Health

Hatchery effluents may slightly increase the abundance and virulence of endemic pathogens present in the Columbia River near Chief Joseph Hatchery. Hatchery intake water would pass through a filtration system and most likely an ultraviolet light system to reduce pathogens prior to hatchery use, and hatchery effluent would be greatly diluted before reaching waters inhabited by major fish populations. No water treatment would occur at the acclimation ponds. However, rearing densities would be much lower than typical propagation standards, reducing the potential for disease outbreaks (CTCR 2004).

Little information is available on the relationship between hatcheries and disease outbreaks in natural populations of fish (Smith et al. 2006). The impact to natural fish populations from endemic pathogens may be small since native fish have co-evolved with the endemic pathogens and because native fish are present in the wild in lower densities than found in hatchery settings. Natural fish are also already exposed to pathogens from five other existing hatcheries in the general area.

CJHP operations would follow state and federal protocols for reducing the transfer of disease to wild fish. Juvenile fish would be sampled for presence and virulence of pathogens prior to release at any sites. Fish with pathogens not present in the wild population would not be released. Fish carcasses from the hatchery would be distributed to selected waters in accordance with the Pacific Northwest Fish Health Protection Committee Salmon and Steelhead Carcass Distribution Protocols (CTCR 2004).

Brood Stock Collection

Currently, a mixed brood stock of Methow and Okanogan summer/fall Chinook is collected at Wells Dam between July and September. Under CJHP, collection at Wells Dam would continue until sufficient brood stock is collected at the CJH fish ladder and

from live-capture at various locations in the Columbia, Okanogan and the Similkameen rivers. The collection season for the CJHP would be extended to capture fish representative of the entire returning run. All collections would comply with collection and ESA Section 10 incidental take permit requirements. Injuries to fish listed under ESA Section 10 would be documented and reported.

The proposed hatchery fish ladder along the north bank of the Columbia River (Section 2.1.4) would not impede fish movement due to the ladder's close proximity to Chief Joseph Dam (the dam is a complete barrier to anadromous fish passage), the ladder's relatively small size, and its orientation and design.

Methods, timing, and locations of live captures would be chosen on a site-specific basis and would be aimed at collection effectiveness and minimization of adverse effects on non-target species.

Brood stock would be randomly collected in proportions approximating the timing and age distribution of the population. Natural-origin fish would be incorporated into the brood stock to prevent genetic divergence between hatchery and wild fish. Monitoring would assure that life-history characteristics of the natural population are maintained. It is anticipated that the brood stock collection locations and timing would lead to greater diversity and distribution of both summer/fall and spring Chinook salmon populations. No adverse effects on existing salmon populations are anticipated as the program is designed to increase the abundance of the target species.

Non-target fish entering the hatchery ladder during operation (May through November) or collected in the live-capture gear could be stressed by handling and holding prior to their return to the river. It is not known how many non-target fish may enter the ladder or live-capture gear annually. It is not likely that UCR steelhead or spring Chinook would be adversely affected since the ladder and gear would not be operated when steelhead are typically migrating into the Okanogan subbasin (March to April) and since non-target spring Chinook in the area would most likely be strays from the Methow River (Okanogan spring Chinook are deemed extinct). As described below, some hatchery bred spring Chinook potentially could be in the area. Fish managers would set handling protocols for releasing or returning the captured spring Chinook strays to the Methow. A bull trout may rarely stray into collection areas, but it is unlikely that the population would be affected by brood stock collection. Individuals of other resident species may also be incidentally captured and handled, but it is not likely that these species would be affected at a population level.

Spring Chinook brood stock would also be collected from the semi-permanent Omak Creek weir that was installed several years ago to collect summer steelhead brood stock. Steelhead have returned to the weir between March 15 and late April, and hatchery-bred spring Chinook began returning in 2005 around May 15 (C. Fisher, CTCR, personal communication, December 13, 2005). Therefore, the return timing of the two species would probably not overlap. Also, there has been no mortality observed among steelhead or native resident fish since weir operation began. Non-target fish species freely pass through the weir without being handled. UCR spring Chinook would not be affected by this collection because they have been extirpated from the Okanogan subbasin. Bull trout

are not known to inhabit Omak Creek and have never been observed in the area during weir operation (C. Fisher, CTCR, personal communication; November 3, 2005).

Rearing

The interactions between hatchery and wild fish are affected by hatchery rearing conditions, which influence the physiological, morphological, and behavioral characteristics of the hatchery fish. Rearing techniques that mimic the natural environment, such those based on NATURES criteria, have improved the post-release survival of hatchery-reared Chinook (BPA 2003b) and reduce the potential for divergence between hatchery-origin and natural-origin fish. NATURES rearing techniques that would be implemented in the CJHP include:

- Minimizing human contact
- Low-density incubation and rearing at CJH and each acclimation pond
- Using automatic feeders at CJH
- Using dark-colored early-rearing troughs
- Placing natural cover such as tree branches in the raceways or acclimation ponds
- Using baffles in raceways to create varying flow patterns
- Varying the degrees of shading and sunlight penetration to raceways
- Providing raceways with colored bottoms to mimic a natural stream bed
- Volitionally releasing fish from CJH and each acclimation pond

Interbreeding

Wild summer/fall Chinook would be, by design, affected by interbreeding with hatchery-origin fish released through the proposed program. However, the potential for adverse effects would be reduced by monitoring the proportions of natural-origin fish and hatchery-origin fish spawning in the river. All hatchery fish would be fin-clipped to distinguish them from natural-origin fish. In the proposed program, at least 80% of the naturally spawning population would be natural-origin fish in the better return years. If the percentage of hatchery-origin fish rises above 20%, the co-managers would increase harvest and/or decrease production (CTCR 2004). In low return years, the proportion of hatchery-origin fish in the naturally spawning population would be allowed to increase to meet the escapement objective.

No impacts are anticipated to spring Chinook since spring Chinook are considered extirpated from the Okanogan subbasin. Any natural production currently occurring in the subbasin is the result of recent hatchery supplementation with Carson stock fish.

The potential for straying and interbreeding with other Columbia River stocks is expected to be minimal. CJHP fish would be acclimated to local conditions prior to being released, allowing sufficient time for imprinting on natal water. The rearing/acclimation ponds would be supplied with river water, exposing fish to the chemical composition of the river and maximizing homing ability.

It is anticipated that the potential for interbreeding between out-of-basin strays and naturally spawning fish in the Okanogan subbasin would be low. The Okanogan River is the uppermost Columbia River tributary accessible to anadromous fish. The potential for ESA-listed spring Chinook from the Methow River to stray into the Okanogan River also is low. Annual monitoring would confirm this assumption. Adult carcass surveys would retrieve the coded wire tags that identify the fish's origin. Modifications would be made to the program if straying rates are too high.

Natural Escapement Distribution

Currently, the majority of summer/fall Chinook returning to the Okanogan subbasin spawn near WDFW's Similkameen Pond, leaving a large portion of the subbasin underutilized by salmon. The proposed project would release Chinook smolts from several locations and should result in returning summer/fall Chinook adults being more evenly distributed throughout the subbasin.

Implementation of the summer/fall Chinook program (Program Components 1 and 2) is anticipated to increase runs past Wells Dam by 3,000–15,000 early-arriving adults and 3,000-14,000 later-arriving adults (CTCR 2004). During years of low escapement, the run would be managed to support natural escapement, broodstock needs, and perhaps a minimal tribal ceremonial and subsistence fishery. The total brood stock requirements for the program are 842 early-arriving and 618 later-arriving summer/fall Chinook adults. During high escapement years, tribal and recreational selective fisheries may be expanded to capture surplus hatchery-origin fish at the discretion of agencies responsible for setting harvest goals.

Currently the expected spring Chinook adult returns are 1,800 to Chief Joseph Dam and 900 to the Okanogan subbasin (CTCR 2004). The goal for the proposed spring Chinook program is to produce, on average, about 2,700 adults for the Okanogan subbasin. The program is sized to eventually provide for tribal ceremonial and subsistence and recreational fisheries. Initially, total brood stock requirements for the program would be about 324 fish. If all aspects of the initial program were successful, brood stock needs may increase to about 644 fish.

Spring Chinook carcasses are expected to be retained in Omak and Salmon creeks and the Okanogan River. Carcasses that remain in-stream after spawning would provide needed nutrients to the ecosystem. Resident and anadromous fish as well as terrestrial animals and plants would benefit in the short- and long-term from the rich source of nutrients. Increasing the number of fish and their distribution would be a benefit to the entire Okanogan subbasin.

Competition and Predation

Introducing large numbers of fish into a water body at one location and at one time can cause competition between the hatchery fish and natural fish for food and habitat. It can also stimulate predation by natural fish on hatchery fish and vice versa. The proposed hatchery program is designed to reduce the potential for competition and predation by placing hatchery fish at several acclimation locations and allowing for volitional release of fish from each site. The volitional releases would occur when fish are physiologically

ready to migrate. It is expected that larger yearling fish would move rapidly downstream to the Columbia River estuary, minimizing the potential for competition with natural fish. The program also allows fish to volitionally leave the hatchery rearing facility over time, avoiding large densities of fish and minimizing competition and predation risks.

Summer/fall Chinook salmon would be released as yearling smolts at 10 fish per pound (fpp). Spring Chinook would be released at 15 fpp. Some predation on small resident fish may occur during outmigration, but this would probably be negligible. Outmigrating Chinook smolts are not expected to prey on ESA-listed steelhead because the steelhead juveniles would generally be larger than the Chinook. Because sub-yearling steelhead are usually found in tributaries whereas Chinook prefer mainstem rivers, the juveniles of both species are most likely to be spatially separated.

Some summer/fall Chinook would be released as sub-yearlings at 50 fpp in an effort to enhance life history diversity. These fish are expected to move rapidly down the Okanogan River due to rising water temperatures and rear in Columbia River reservoirs where they may compete with ESA-listed salmonids. Interactions should be minimal, however, as the upper Columbia River species that are listed all rapidly migrate into and then down the Columbia River as yearling fish.

In accordance with the operating plan outlined in the current HGMP (CTCR 2004), release numbers and escapement would be monitored to remain within the estimated local and basin-wide carrying capacity for spawning, freshwater rearing, migration, and estuarine and near-shore rearing. In years with large runs, harvest would be increased to capture surplus hatchery-origin fish and thus ensure that hatchery fish make up less than 20% of total adult escapement in the basin.

Harvest

One of the purposes of the proposed project is to support a potential tribal and recreational fishery of hatchery-origin Chinook in the Columbia River and the Okanogan subbasin (Chapter 1). Few non-target or ESA-listed fish would be exposed to the terminal fishery below Chief Joseph Dam. Some late-returning adult spring Chinook may be exposed to harvest activities targeting the early portion of the summer/fall Chinook run if Program Component 3 is implemented. The harvest, however, would be selective and all non-fin-clipped fish would be released.

ESA-listed UCR steelhead could be incidentally affected in the long-term by any increase in Chinook fishing pressure within the Okanogan subbasin. The impacts would be addressed by harvest and fishery managers through ESA compliance consultations with NOAA Fisheries. ESA-listed steelhead must be released, but some individuals would probably die from injury or stress.

Any harvests would be conducted within the incidental mortality limitations established in the ESA Section 10 permit and would follow the performance standards specified in the HGMPs (CTCR 2004). Harvest opportunities could be adjusted annually to manage hatchery-origin fish escapement and thereby minimize potential adverse impacts to natural populations. Selective fishing gear and timing and location of fisheries could be restricted if excessive harvest mortality occurs in non-target species.

The CTCR and WDFW have adopted a draft harvest agreement designed to protect the CTCR's opportunity to harvest summer/fall Chinook in the Okanogan River system associated with increased production under this program (personal communication, Steve Smith, September 19, 2006). If other Columbia River Basin fishery managers were to increase allowable harvest rates on the summer/fall Chinook ESU, over-harvesting of Methow and Wenatchee populations would occur, a management outcome unacceptable to these managers. Therefore, potential downstream harvest of Chinook produced under the CJH program would be limited because of the potential to affect other populations. In addition, the effect of the program on ocean-based fisheries would be very small.

No Action Alternative

With the No Action alternative, no new facilities would be constructed and none of the expected impacts or benefits associated with the CJHP would occur. The current summer/fall and spring Chinook supplementation programs would be expected to operate as in the recent past. Summer/fall Chinook would continue to be managed under the Eastbank Hatchery/Similkameen Pond program. Brood stock selection would not represent the timing of the entire summer/fall Chinook run, potentially decreasing genetic diversity of the population. Some progeny would be reared in water from sources other than the Okanogan River. Juveniles would be transported for long distances from the natal hatchery to the acclimation facilities. Smolts would be released from only a few locations within the Okanogan subbasin. Summer/fall Chinook redd densities in the vicinity of Similkameen Pond would be expected to continue to be high as fish would not be distributed well throughout the subbasin.

Declining population trends would likely continue. The summer/fall Chinook salmon population would likely remain depressed, exhibiting a long-term declining trend. Natural re-colonization into underutilized areas is unlikely to occur (CTCR 2004). Spring Chinook population size in the Okanogan is also not likely to improve.

Chinook production would continue to be far below the carrying capacity of the Okanogan subbasin. No spawning would be expected to occur in the lower Okanogan River which historically supported heavy spawning concentrations of summer/fall Chinook salmon. Historically important summer/fall Chinook spawning areas near Riverside and Omak would continue to be underutilized. Nutrient enrichment from salmon carcasses would be limited in availability and distribution which also would keep natural production levels low. Escapement to the Okanogan River would continue to be far below the carrying capacity of the subbasin. Harvest opportunities would likely be limited further, occurring less frequently and for shorter periods of time. The opportunity to develop local broodstock would be foregone and out-of-basin stock (Carson and others) would continue to be imported.

3.2.3 Cumulative Effects

Aquatic habitat in the region has been substantially affected by hydroelectric dams, agriculture, and rural development. Agricultural and rural developments continue. Construction and operation of the proposed project should have a nearly undetectable effect on the accumulation of development in and near aquatic habitat. The proposed CJHP project is compatible with and additive to other aquatic habitat and fish

management programs in the region. CJHP is expected to increase aquatic habitat use and the populations of target species while not appreciably affecting others.

The State of Washington and the Colville Tribes have initiated a comprehensive habitat rehabilitation program for the mainstem Okanogan River and several tributaries with the goal of improving fish populations (CTCR 2004). Ongoing and proposed future projects include increasing stream flows, improving fish passage, screening diversions, reducing sediment loads, and restoring stream channel and riparian habitats. The Chief Joseph Hatchery program would provide acclimation facilities for the supplementation of juvenile salmonids to increase spring and summer/fall Chinook stocks in the Okanogan River subbasin. The Colville Tribes and the Okanagan Nation Alliance are collaborating on the recovery of at-risk fish and wildlife species in the Canadian portion of the Okanogan River watershed with a goal of improving salmonid populations (CTCR 2004). These programs, in combination with the CJHP, would have a beneficial cumulative effect on the summer/fall and listed spring Chinook stocks, as well as listed UCR steelhead, in the Okanogan River subbasin.

The State of Washington has also initiated habitat rehabilitation in subbasins other than the Okanogan within the UCR spring Chinook and UCR steelhead ESUs, such as the Methow, with the goal of improving fish populations. The CJHP may use the Methow composite spring Chinook stock in the future, and the CJHP monitoring and evaluation of the spring Chinook supplementation program would assess spring Chinook and steelhead interactions. Habitat restoration and hatchery supplementation in other subbasins in combination with the CJHP could have a net beneficial effect on the recovery of ESA-listed UCR spring Chinook and UCR steelhead ESUs.

Public and private agencies and operators of hydroelectric projects on the mainstem Columbia River are conducting studies and implementing changes in operations to improve downstream survival of juvenile salmonids, with the intent of increasing adult returns (CTCR 2004). These changes include increased spring flows, spill programs, and improvements to the bypass, collection and transport systems. The changes in the operation of mainstem Columbia River dams and the supplementation of salmonids from the CJHP could produce a net increase in the population of ESA-listed salmonid species and other fish. Alternatively, in drought years where the magnitude, duration, and timing of spill events and flows through Columbia River dams are reduced, possibly causing a corresponding reduction in juvenile salmonid survival rates, supplementation from the CJHP could offset losses, thus reducing adverse effects on the total population.

Performance standards for adult and juvenile passage at the nine Columbia River mainstem dams have been established and are monitored through the NPCC's Fish and Wildlife Program, Federal Energy Regulatory Commission (FERC) licensing requirements, and NOAA's ESA regulations (CTCR 2004). As part of the Okanogan subbasin natural production monitoring and evaluation program, the Colville Tribes and WDFW conduct steelhead and summer/fall Chinook redd surveys annually. Monitoring returns for the CJHP would provide additional data for improving the management of salmonid stocks in the subbasin. Monitoring fish survival through the Columbia River dams and production within the Okanogan subbasin in combination with the CJHP monitoring and evaluation activities could facilitate improvements in the management of

runs and estimates of carrying capacity in the Okanogan subbasin, and would be expected to result in a net benefit to listed and unlisted anadromous fish and their habitats.

As the proposed CJHP increases the number of Chinook adults returning to the Columbia River below Chief Joseph Dam and in the Okanogan subbasin, allowable tribal and recreational harvest levels in the Columbia and Okanogan rivers may increase. Potential adverse impacts from increased Chinook harvest levels to non-target species, such as ESA-listed UCR steelhead, sockeye, and resident fish would not be offset by the proposed program. With increased fish production from the CJHP as well as habitat restoration and enhancement and improved spill at mainstem dams, commercial harvests may increase. Close monitoring would be required to ensure that the benefits of increased fish runs are not negated by increased harvest.

3.3 Wildlife

3.3.1 Affected Environment

The general area is characterized by semi-arid habitat types typical of northeastern Washington State. The most common habitats are shrub-steppe, agricultural, and mixed-use development. Open water and riparian habitats are represented by the Columbia River, the Okanogan River, Similkameen River, Omak Creek, and various ponds. Riparian areas typically support the highest diversity of wildlife, especially birds and mammals. Wetland habitats are uncommon although in this part of Washington they are an important habitat type and often support a wide variety of wildlife. The vegetative communities that form the various habitats are described more fully in Section 3.4. Appendix B lists wildlife and associated habitats found in the general area.

The shrub-steppe habitat type is common in the region and supports a variety of wildlife, including mule deer, burrowing owl, and sagebrush lizard. Over 100 bird species forage and nest in shrub-steppe including three species found only in sagebrush habitats: sage thrasher, sage sparrow, and Brewer's sparrow (Ashley and Stovall 2004).

Orchards and pasture lands comprise the agricultural habitats. Mixed-use development habitats are areas containing human development such as rural residential areas, parks, the golf course, roads, businesses, etc. Areas with higher levels of human development are generally not as important to wildlife although some species, such as gulls, starlings, sparrows, and ground squirrels have higher tolerances for humans and may be found in developed areas.

Culturally important wildlife species that may occur in the general area include mule deer, white-tailed deer, black bear, gray wolf, beaver, rabbits, rodents, eagles, hawks, owls, upland game birds, waterfowl, great blue heron, scavenger birds, snakes, lizards, and river mussels.

The golden eagle is a year-round resident of Okanogan County. It and the bald eagle are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668a-d). Golden eagle nesting occurs near each of the proposed acclimation ponds (WDFW 2005b).

ESA-listed Species

Of the species on the Priority Habitats and Species List (WDFW 2005b) for Okanogan County having special status under ESA, only bald eagles, yellow-billed cuckoos, and gray wolf may occur anywhere near the project sites (M. Miller, USFWS, personal communication, July 15, 2005). Other listed species are not expected to occur near project sites because the habitat is unsuitable or the sites are not in reasonable proximity to their current distribution or historic range. For example, CJHP sites do not contain suitable habitat for grizzly bear or Canada lynx because these species are strongly associated with forested habitats at higher elevations. Nor is it likely that sage grouse or pygmy rabbit use CJHP sites. Of the two known Washington populations of sage grouse, one is in Douglas and Grant counties and the other is in Kittitas and Yakima counties (Stinson, Hays, and Schroeder 2004). The nearest historically known pygmy rabbit site was located in 1950 near Mansfield, about 12 miles south of Chief Joseph Dam.

Bald Eagles

The bald eagle is listed under the ESA and by the State of Washington as a threatened species (WDFW 1991a). The historical distribution of the bald eagle is unknown in the upper Columbia River (Smith et al. 2006), although they are known to winter along the Okanogan and Columbia rivers and nest in the vicinity of Rufus Woods Lake (USACE 2002). Lake Pateros supports a winter population of more than 40 birds (WDFW 2005b). In November 2005, two mature bald eagles were observed in the riparian area adjacent to the Okanogan River near Bonaparte Pond. A possible nest has been documented along the Okanogan River in the vicinity of Ellisforde Pond.

The most important food sources for bald eagles at Columbia River reservoirs are coots, mallards, and chukars. Opportunistic feeders, bald eagles will also seek carrion and anadromous and resident fish. Bald eagles commonly forage along wide rivers with gravel bars that retain salmon carcasses. Eagles use prominent snags, dead-topped trees or exposed lateral limbs with an unobstructed view of water for perching. Along the Okanogan River, eagles prefer ponderosa pine and black cottonwood trees due to their availability and height. In open areas, eagles may use cottonwoods or willows for night roosting.

Yellow-billed Cuckoo

The yellow-billed cuckoo is an ESA candidate for listing and a Washington State threatened species. The cuckoo disappeared from most of its breeding range in the 1930s (WDFW 1991b) and has not been documented in the general area (WDFW 2005b). Yellow-billed cuckoos breed mid-June to mid-August, nesting in deciduous forested riparian and wetland habitats with dense foliage within 30 feet of the ground (WDFW 1991b). Few cuckoos have been documented in riparian areas less than 300 feet wide and 4 acres in area. They eat insects exclusively and require very large territories. The birds have been observed foraging in riparian areas and orchards in California. They may nest in early to mid-successional habitat and forage in mature forests. The factors limiting yellow-billed cuckoo populations in Washington are unknown, but studies in California suggest that riparian habitat availability and food may be limiting.

Gray Wolf

Wolves, ESA-listed as threatened, were historically common and well-distributed throughout Washington (Palmquist 2002). They were nearly extirpated from Washington by the 1930s due to intensive human settlement, overexploitation of prey species by settlers, extreme predator control measures to protect livestock beginning in the 1800s, and loss of habitat (USFWS 1987). In the last couple of decades, wolf populations in western North America have increased and they have reoccupied the north Cascades and eastern Washington, emigrating from British Columbia, Idaho, and Montana. Gray wolves are present in the Canadian portion of the Okanogan subbasin (Palmquist 2002), although no breeding pairs or packs are known to reside in Washington State. Expansion of their range into the Okanogan subbasin is impeded by intensive human development and occupation. So, wolves are not expected to be present in the vicinity of project sites.

Species of Concern

The following species of concern possibly occur in the general area (M. Miller, USFWS, personal communication, July 2005): black swift, burrowing owl, Columbian sharp-tailed grouse, loggerhead shrike, northern goshawk, olive-sided flycatcher, peregrine falcon, western gray squirrel, long-eared myotis, pallid Townsend's big-eared bat, sagebrush lizard, California floater, and giant Columbia spire snail. Of these, only the burrowing owl, loggerhead shrike, peregrine falcon, sagebrush lizard, and the giant Columbia spire snail have any likelihood of being found in or near the project sites. The sites are not suitable habitat for the other species.

Burrowing owls use burrows excavated by other species such as badger, yellow-bellied marmot, striped skunk, or ground squirrels. In 1988, over 100 active nests were found in the Columbia River Basin (Wahl, Tweit, and Mlodinow 2005). In the 1980s, several pairs were reintroduced at sites near Vaseux and Osoyoos lakes (Cannings, Cannings, and Cannings 1987). The burrowing owl is a rare summer resident of the Okanogan subbasin. If suitable burrows are present, the owls may occur in the grassland and shrub-steppe habitats at the proposed hatchery and housing sites and in the fallow field near St. Mary's Mission Pond.

Loggerhead shrike inhabit relatively undisturbed shrub-steppe habitats with greasewood, sagebrush, and patchy grass. Its summer distribution is mainly east of the Cascades at low elevations along the Columbia River and in Okanogan and Klickitat counties (Wahl, Tweit, and Mlodinow 2005). Shrikes often nest in ravines, scattered trees or hedgerows. They are very rare in the Columbia River Basin during the winter, but have been documented in Okanogan County.

Peregrine falcons are a species with "monitor" status under ESA. Peregrines are a rare-to-uncommon summer resident of Okanogan County and the Columbia River Basin (Wahl, Tweit, and Mlodinow 2005). They nest on cliffs, bridges, and tall buildings and forage over large river deltas and agricultural fields, preying on waterfowl, shorebirds, and starlings. Peregrines may potentially forage at Lake Pateros and over agricultural fields. They have been documented occasionally at Chelan Ridge, Okanogan County, during the fall migration. Suitable nesting habitat does not occur at any of the project sites but may occur in the vicinity.

Sagebrush lizard populations are widely scattered throughout eastern Washington, occurring in sagebrush plains and open juniper or pine woodlands with brushy cover (Storm and Leonard 1995). Rock outcrops are used for basking and cover. Sagebrush lizards feed on insects and invertebrates and are prey for snakes and birds. Suitable sagebrush lizard habitat occurs at the hatchery and housing sites and possibly in the fallow field near St. Mary's Mission Pond.

Giant Columbia spire snails, also known as the Columbia pebblesnail, inhabit streams with relatively high dissolved oxygen concentration and low turbidity levels (Pacific Biodiversity Institute 2005b). Historically, the snail was widespread throughout the lower Snake and Columbia rivers. They currently occur in six locations, three of which are in the Okanogan River. The snail has a life span of about one year, with 90% of the population turning over annually. For this reason, a disruption during the breeding season can have a devastating impact to the population.

Hatchery Site

Habitat types at the proposed hatchery site include open water, riparian, and mixed-use development (mowed, irrigated grasslands). Several seeps or irrigation outflows are developing wetland characteristics. The site is subject to human activity and disturbance from the USACE visitor orientation area, irrigated grass cover, and the nearby roads and highway. Some species like gulls, terns, and Canada geese may use the irrigated grasslands for foraging and resting. The Columbia River at the site is too deep to allow foraging by wading birds and the steep, rip-rapped bank precludes waterfowl nesting.

Small mammals and reptiles are probably present at the hatchery site and larger mammals such as coyotes may be present sporadically. The adjacent steep river banks most likely preclude the site as a river access point for large mammals. Large mammals may be discouraged from using the site due to the sparse cover and human disturbance from the highway and the visitor orientation area.

Swallows and bats most likely forage for insects over the open water and grasslands at the site. Belted kingfishers, red-winged blackbirds, warblers, and other songbirds are found in willow habitats similar to those at the river's edge. Human presence may preclude some species from using the site, but more tolerant species may be found there. These species may include ring-billed gull, California gull, killdeer, Brewer's blackbird, European starling, black-billed magpie, American crow, and common raven.

Housing Site

The housing site, situated in bitterbrush shrub-steppe habitat, is likely inhabited by a variety of birds typical of shrub-steppe habitats (Appendix B). The deep, loamy soils there are home to mice, voles and larger burrowing mammals. Coyotes hunt and travel in the area. Nearby, the Rufus Woods Lake area and its tributaries provide important mule deer winter range and fawning habitat (WDFW 2005c) and forage for Canada geese.

Ellisforde Pond

Ellisforde Pond, located on a high, rip-rapped bank above the Okanogan River, is an existing concrete irrigation pond with pumps surrounded by gravel fill, paving and fencing (Figure 2-7). Vegetation within the fenced gravel compound is sparse. The riparian area, with more varied and dense vegetation, lies outside the fenced area.

The most common wildlife species at the Ellisforde Pond site are likely those that use a variety of habitats and tolerate high levels of human activity and disturbance. Killdeer may nest on the gravel fill. Belted kingfishers periodically forage at the Ellisforde Pond while salmonids are being reared. Rats, mice, voles, and snakes may also occur.

The narrow, riprapped riparian area at the Ellisforde Pond site may serve as a travel corridor for deer, coyotes, furbearers, and black bears. Garter snakes and furbearers may inhabit the river shorelines and adjacent shallow water habitats. The few mature trees nearby provide suitable perching for bald eagles which are likely present during the winter. Cavity-nesting ducks and osprey rest along the Okanogan River in the vicinity of the pond (WDFW 2005b).

Tonasket Pond

Tonasket Pond, another fenced irrigation pond complex recently modified for fish acclimation, lacks vegetation. The pond site could support wildlife species that are very tolerant of humans, as described for Ellisforde Pond. The site is not likely an established use area for fish-eating birds. Riparian habitat and a constructed emergent wetland lined with riprap exist between the pond's fence and the Okanogan River, and an orchard lies to the east. The constructed wetland provides escape cover for small animals including mink, voles and snakes. The shoreline may be used by birds such as gulls, terns, great blue heron, mallards, common loon, and mourning dove. Cavity-nesting ducks, including wood ducks, hooded mergansers and Barrow's goldeneye nest nearby (WDFW 2005b).

The 15- to 30-foot wide riparian area may be a travel corridor for mule deer, coyotes, furbearers, and black bears. The riparian area and adjacent open water provide cover and resting, nesting and foraging habitat for many species of birds. Bald eagles have been documented along the Okanogan River near Tonasket Pond (WDFW 2005b), and past beaver activity is apparent.

Bonaparte Pond

Bonaparte Pond is surrounded by gravel fill and paving and is contained within a chain link fence topped with barbed wire. The 5-foot-wide riparian area between the fence and the Okanogan River has a riprap bank and holds a few sapling willow shrubs and roses. Very little wildlife habitat exists, but the area may be used as a travel corridor by wildlife, although its suitability may be compromised by the presence of a non-motorized boat ramp located upstream of the site. Bald eagles are known to use nearby snags and cottonwoods as fall/winter perches.

Riverside Pond

The proposed Riverside Pond site is an irrigated hay and alfalfa field crossed by the Cascade Columbia River Railroad line and bordered by a 15- to 25-foot wide densely vegetated riparian area. The surrounding landscape is agriculture and rural residences. The riparian area is a rich source of insects, fruits, and berries for upland game birds, songbirds, and bats; and a few mammal trails traverse it. Large mammals such as deer, coyote and black bear use the area as a travel corridor. Recent beaver activity is apparent, and other furbearers likely use the shorelines and adjacent shallow water habitats. Water shrews and water voles may be present, providing a prey base for predators. Butterflies also probably use this habitat. It is likely that small mammals and reptiles typical of agricultural lands use the Riverside Pond site hayfield, and bats may forage over the area.

St. Mary's Mission Pond

St. Mary's Mission Pond sits in a large fallow field adjacent to Omak Creek that supports a 10- to 15-foot-wide riparian area. The field and riparian habitat support wildlife similar to Riverside Pond, although St. Mary's field also contains sagebrush which adds some structural complexity. California quail, Merriam's turkey and ruffed grouse inhabit the area, and black bear sign is common.

Omak Pond

The proposed Omak Pond site is a fallow field containing a barn and sheds skirted by a 15- to 20-foot-wide riparian area. It is likely used by the same species associated with these habitats at Riverside and St. Mary's Mission ponds. The barn and sheds may provide roosting habitat for bats.

3.3.2 Environmental Consequences

Proposed Project

Hatchery Site

Construction Effects

Construction of the hatchery complex would temporarily alter about 24.5 acres and permanently occupy 20 acres. Habitats affected include irrigated grasslands, shrub-steppe fringe, mixed-use developed areas, and a slight amount of riparian area. The fish ladder and effluent pipes would be placed within the narrow riparian area dominated by small willows, reducing available songbird nesting habitat to some small degree. The effect of the reduction would be negligible in the area. None of the habitat is limited or considered critical in the general area.

Possible effects on any wildlife populations from hatchery construction are considered negligible. Wildlife species inhabiting the site and its vicinity are probably tolerant of the noise associated with Chief Joseph Dam, State Highway 17, and the USACE visitor orientation area. Animals most likely to be temporarily displaced are small mammals,

birds, insects, and reptiles. Bald and golden eagles, often present along the Columbia River during the winter, may avoid the site during hatchery construction.

Operations Effects

Because of daily traffic to and from the hatchery and noise from machinery, raceways, and pumps, wildlife species sensitive to human activity and noise may not return to the area. This effect is expected to be negligible because the site is currently lightly used by wildlife and, with the exception of bald eagles which are present during the winter along the river at Lake Pateros and Rufus Woods Lake, none of the species are threatened, endangered, or a species of concern.

The permanent loss of about 20 acres of irrigated grassland and fringe shrub-steppe habitat would not affect the viability of any wildlife population since this habitat is not limited in the general area. Furthermore, the habitat at the site is currently isolated from other upland habitats by State Highway 17 which most likely discourages wildlife from moving into it.

Several hundred feet of overhead power and telephone lines and a new transformer would be installed at the site, requiring placement of an unknown number of poles. The remainder of the power supply would be installed underground. Birds commonly use overhead lines for perching, so new lines may attract more bird use of the area. Raptors such as kestrels may benefit from the increased foraging opportunities provided by the lines in the long term. It is possible some birds may die from colliding with the lines, but the lines would be designed to avoid the likelihood of electrocution. Although mortality potential has not been quantified, it is expected to be negligible because this area is not and probably would not be in the future be heavily used by birds.

The fish food storage area would be enclosed to minimize foraging by wildlife such as mice, rats, bears, and birds. Used salmon carcasses would be stored in covered totes and transferred off-site to minimize attracting scavengers.

As the program continues, several thousand adult Chinook are expected to return to the fish ladder. Fish that die in Lake Pateros before entering the fish ladder will likely feed animals such as eagles, bears, furbearers, other fish, and macro-invertebrates. These species and their predators would benefit in the long term from the increased foraging opportunities. The distribution of such wildlife may shift during the spawning season to areas where salmon carcasses are found.

Housing Site

Construction Effects

Construction of the hatchery employee housing would disrupt about 10 acres of shrub-steppe wildlife habitat for about 7 months. Most resident wildlife is expected to be displaced during this time. Bald and golden eagles wintering at Rufus Woods Lake may be displaced when outdoor construction is particularly loud.

Operations Effects

About 5 acres of bitterbrush shrub-steppe habitat would be permanently lost to housing development. The surrounding habitat would be permanently affected by human use and occupancy, which may include pets, noises, children, bicycles, vehicle traffic, stray trash, and the unintentional spread of non-native weeds. Native plant diversity may diminish as soil disturbance and competition with non-native species increases, and typical sagebrush-inhabiting wildlife would be displaced to other areas. Mule deer would likely be displaced from the area. Wildlife species at the site would likely shift to species more tolerant of humans. The overhead utility lines may benefit some birds (rock dove, mourning dove, blackbirds, kestrel, and European starlings) tolerant of humans by providing perching structures. Bears could be attracted to the housing site in search of garbage and pet food. These effects are expected to be limited to the immediate vicinity of the housing site.

The housing areas would likely be landscaped with lawn grasses and ornamental shrubs and trees which would be watered. The wetter landscape and septic drain field areas may attract small mammals, amphibians and reptiles including rattlesnakes. Individual snakes, especially rattlesnakes, may be adversely affected by human interactions. Insects attracted to outdoor lighting may increase foraging opportunities for bats. Long-term impacts to wildlife populations are not anticipated.

Acclimation Ponds

Ellisforde Pond

If Ellisforde Pond is modified to support the proposed CJH program (this is a contingency facility) construction would be limited to the pond outlet within the confines of the existing pond. All work would probably occur between May and September. Because this pond already exists, wildlife in the vicinity are probably fairly tolerant of noise and activity, but some wildlife, including nesting songbirds and waterfowl, may be displaced. If the eagle nest nearby is occupied, construction activities would avoid the nesting period (January 1 – July 31) and would be restricted within 660 to 800 feet (Watson and Rodrick 2001). All effects would be transitory and minor. During operation of the pond for fish acclimation, the wildlife disturbance level would be similar to that already being experienced.

Tonasket Pond

Since construction is limited to installation of telemetry equipment, no discernable effects to wildlife at Tonasket Pond are expected. The wildlife disturbance level during operations would be similar to that already being experienced.

Bonaparte Pond

Proposed construction at Bonaparte Pond would be confined within the existing structure and occur between May and September. Wildlife in the vicinity may be temporarily displaced during this time. The wildlife disturbance level during operations would be similar to that already being experienced.

Riverside Pond

The new construction proposed at the Riverside Pond site would temporarily alter about 15 acres of pasture and about 2,000 square feet of shrub-scrub and riparian habitat. Construction would probably occur between March and September, the nesting period for songbirds and cavity-nesting ducks, so activity and noise could disrupt nesting for a few individuals. Bald eagles would not be affected since they do not use the habitat in this area. Giant Columbia spire snails may occur in the Okanogan River and could be affected by in-stream construction-generated turbidity. Sediment-reducing BMPs required during construction would reduce potential impacts to this species.

About 4 acres of pasture would be permanently replaced with the pond, piping, associated structures, and access roads. Individuals of some wildlife species such as mule deer, small mammals, upland game birds, and snakes would be displaced by this loss of habitat. Less than 1,000 square feet of riparian habitat would be permanently replaced by the proposed water intake, pump station and outlet structure, and certain wildlife would be displaced. But, the local habitats affected by construction at this site are not limited in the general area, so the potential effects to wildlife populations are expected to be negligible.

Netting would be installed over the pond to minimize avian predation and fencing would be erected to prevent entry of land-based predators. Therefore, operation of this facility is not expected to benefit fish-eating species. Some individual birds may become trapped in the netting. New overhead power lines at the site would prove both beneficial (perching, foraging and nesting) and adverse to birds (possible collisions). Human activity may permanently disturb certain wildlife.

Omak Pond

Omak Pond construction would temporarily displace wildlife from about 3 acres of fallow field and about 2,000 square feet of riparian habitat. The riparian habitat includes large trees suitable as eagle perches, and bald eagles are usually present in the area during the winter. But, construction would occur outside the wintering period between April and September. Still, eagles, if present, may avoid the trees during the construction period. Nesting by songbirds and cavity-nesting ducks could be disrupted by noise and activity. If present in this reach of the Okanogan River, giant Columbia spire snails could be affected by in-stream construction-generated turbidity. Sediment-reducing BMPs required during construction would reduce potential impacts to this species.

Omak Pond would permanently occupy 2 acres of fallow field. Individuals of some species, such as deer, small mammals, upland game birds, and some songbirds would be displaced by this loss of habitat. Less than 1,000 square feet of riparian habitat would be permanently replaced by the proposed intake, pump station and outlet structure, and would displace certain wildlife. The loss of large trees would reduce the amount of suitable perch sites for bald eagles, which migrate through the area and spend winter along the Okanogan River. But, the local habitats affected by construction at this site are not limited in the general area, so the potential effects to wildlife populations are expected to be negligible.

Netting would be installed over the pond to minimize avian predation and fencing would be erected to prevent entry of land-based predators. Therefore, operation of this facility is not expected to benefit fish-eating species. Some individual birds may become trapped in the netting. New overhead power lines at the site would prove both beneficial (perching, foraging and nesting) and adverse to birds (possible collisions). Human activity may permanently disturb certain wildlife.

St. Mary's Mission Pond

Modifications proposed for St. Mary's Mission Pond include removal of the pond grating, installation of channels with tail and head screens, a water level alarm system, predator netting, and installation of a chain-link fence. These minor activities may temporarily disturb some wildlife for about 2 months. A very small amount of fallow field habitat surrounding the pond may be temporarily affected by construction, but it is expected to restore itself naturally. The wildlife disturbance level during operations would be similar to that already being experienced.

Effects Attributable to the Fish Production Program

If the proposed program is successful in increasing returns of Chinook salmon to the Okanogan subbasin, and if increased salmon escapement and distribution are achieved, wildlife which forage on salmon (e.g. eagles, ospreys, mergansers, great blue herons, gulls, mink, otters, and bears) could significantly benefit in the long term. The depleted freshwater mussel population (historically an important food source for the Colville Tribes) may improve since they depend upon salmon as hosts for parts of their life cycle.

No Action Alternative

With the No Action Alternative, no change to the current situation would occur. The summer/fall and spring Chinook supplementation programs would continue as in the past. No new construction, site disturbance, wildlife displacement, or fish production would be expected. Long-term declining population trends of summer/fall Chinook salmon would continue, and natural re-colonization of underutilized habitat would not likely occur (CTCR 2004). Salmon carcasses, which provide an important forage base and source of nutrients for eagles, bears, and scavengers, would continue to be limited in availability and distribution. Natural production of juveniles, an important prey base for piscivorous species such as mergansers, osprey, great blue heron, mink, and otter, would continue to be low and limited in distribution.

3.3.3 Cumulative Effects

The proposed project would result in a very minor, incremental addition to the accumulated decline of available wildlife habitat and to the frequency of human/animal interactions in region. Wildlife habitat has been and will continue to be affected by development of agriculture, housing developments, roads, industry, and hydroelectric installations. None of the habitats affected by this project are critical or limited and the cumulative effect of their removal is considered inconsequential in the region. Development represents a gradual "nibbling" away and fragmentation of wildlife habitat

in the region and may ultimately contribute to more serious cumulative effects if large-scale future development occurs.

The proposed project, in conjunction with habitat restoration/enhancement and spill projects, is expected to increase salmonid populations in the area. These projects in aggregate would result in an increase in salmonid carcasses which are fed upon by various wildlife species such as bald eagles, osprey, and black bears which could serve to buffer some of the other cumulative pressures on these species.

3.4 Vegetation and Wetlands

3.4.1 Affected Environment

The project area is within the Okanogan Highlands and Columbia Basin physiographic provinces (Franklin and Dyrness 1973). The Okanogan Highlands Province is characterized by moderate slopes above about 4,000 feet elevation separated by five broad, low-lying river valleys. The Okanogan River subbasin is the western-most watershed in the province.

The project area is primarily composed of shrub-steppe, agriculture, and rural residences. Deciduous riparian, riverine, and reservoir vegetative communities are also present. Agricultural lands are used to produce hay, cereal grains, and fruit (apples, pears, and cherries). Much of the remaining shrub-steppe habitat has been altered by livestock grazing, fire suppression and invasion by exotic plant species (Ashley and Stovall 2004). Native bunchgrass cover has declined and sagebrush has increased. The surviving native habitat of eastern Washington is highly fragmented and more likely to occur on shallow soils because areas of deep soils are more desirable for agriculture.

Many plant species are important to the Colville Tribes for traditional subsistence practices, medicines, and ceremonies. Species that may occur in the project vicinity are listed in Appendix B.

Black cottonwood, alders, willows, hawthorn, rose, spirea, and snowberry occur in the riparian areas at the proposed acclimation sites. Desert-parsley, sagebrush, rabbitbrush, and bunch grasses are present at the proposed hatchery and housing sites. Prickly pear cactus also grows at the proposed housing site.

Hatchery Site

Most of hatchery site was planted to weedy grasses and forbs and now supports weedy species such as orchard grass, oat grass, horseweed, and mullein. The site is mowed and irrigated by the USACE. Riprap with very little vegetation extends up the Columbia River bank to reduce erosion from high discharges and/or water velocities from the dam. Closer to the dam there are several seeps or outflows from irrigation that are developing wetland conditions. These small areas (less than 0.5 acres total size) contain narrow-leaved willows.

Housing Site

The proposed housing site is in typical bitterbrush shrub-steppe habitat. Dalmatian toadflax, a noxious weed, may be present at the site in low numbers. Cheatgrass, a highly invasive non-native species, is the most common herbaceous plant at the site.

Ellisforde Pond

Ellisforde Pond, located on a high bank above the Okanogan River, is surrounded by gravel fill and paving. Vegetation within the fenced compound is sparse. The riparian area consists of a few older black cottonwood trees, willows, chokecherry, and Rocky Mountain maple. Purple loosestrife, a noxious weed, is also present (Whitson et al. 1999). Riprap is extensive along the bank.

Tonasket Pond

Tonasket Pond is a concrete irrigation pond with associated pumps surrounded by a dirt access road. Vegetation is lacking inside the fenced area. A pipe discharges a small amount of water from the pond into a created wetland to the north. Cattails, smartweed, pondweed, weedy sweet clover, and a few scattered willows and cottonwood grow in the wetland. The banks of the wetland consist of riprap. A berm over the main discharge pipe from the pond to the Okanogan River is covered with elm trees, aspen saplings, and grasses. The riparian area is about 10 to 15 feet wide and is dominated by red-osier dogwood, willows, and black cottonwood.

Bonaparte Pond

Bonaparte Pond, an existing concrete irrigation pond, is surrounded by gravel fill and paving and contained within a chain link fence. Vegetation within the fenced area is sparse. The five-foot-wide riparian area between the fence and the Okanogan River holds a few sapling willow shrubs and roses. The bank consists of riprap. A railroad right-of-way occurs along the inland side of the complex.

Riverside Pond

Riverside Pond site would be within 200 feet of the Okanogan River. The surrounding landscape consists of agricultural lands and rural residences. The site is an irrigated field used to raise hay and alfalfa within a landscape of agricultural lands and rural residences.

It includes a water pump, the Cascade Columbia River Railroad line and a 15- to 25-foot-wide riparian area along the river containing willow and black hawthorn about 6 to 10 inches in diameter and 25 feet in height. The riparian understory is dense rose, common snowberry, goldenrod, thistles, and milkweed. A portion of the hay/alfalfa field lies between the riparian area and the railroad tracks.

St. Mary's Mission Pond

St. Mary's Mission Pond is in a large fallow field adjacent to Omak Creek. The 10-15 foot-wide riparian area is dominated by red-osier dogwood, willows, alder, birch,

clematis, reed canarygrass, twinberry, and bulrush. The fallow field includes annual rye, crested wheatgrass, Russian thistle, and ripgut brome, as well as native sagebrush.

Omak Pond

The Omak Pond site is a fallow field lined by a 15-20-foot-wide riparian area along the Okanogan River. Near the proposed pond outlet is a group of 8 to18-inch-diameter elm trees about 50 feet tall, with red-osier dogwood, rose, and snowberry in the understory. At the proposed water supply intake, the riparian area is narrower and void of mature trees. A few black hawthorn and black locust saplings are scattered near the fallow field. Weeds in the field include annual rye, orchard grass, horseweed, mullein, oat grass, and diffuse knapweed. The Colville Tribal office complex nearby has been landscaped with ornamental trees and shrubs including sweet gum, sumac, black locust, and pine.

Rare, Threatened and Endangered Plant Species

Federally listed plant species and species of concern likely to be found in Okanogan County are listed in Table 3-6. The state status of each species is also shown.

Table 3-6. Federal Endangered, Threatened, and Species of Concern Plants occurring in Okanogan County, Washington

Common Name	Scientific Name	Federal Status	State Status
Ute ladies'-tresses	*Spiranthes diluvialis*	T	E
Triangular-lobed moonwort	*Botrychium ascendens*	SoC	S
Crenulate moonwort	*Botrychium crenulatum*	SoC	S
Two-spiked moonwort	*Botrychium paradoxum*	SoC	T

Source: WDNR 2005.

E = Endangered; T = Threatened; SoC = Species of Concern; S=Sensitive

Ute Ladies'-tresses

The Ute ladies'-tresses orchid is listed as threatened under the ESA and as endangered by the State of Washington (Smith et al. 2006). Four populations of this orchid are documented in Washington; all occur from 720 to 1,500 feet in elevation. One population occurs in a periodically flooded alkaline flat in northern Okanogan County. The other three populations occur close to one another on gravel bars adjacent to the Columbia River in Douglas County (WDNR 2005). This rare orchid grows in moist, calcareous soils in wetland meadows or wetland complexes with channels or swales having low vegetation cover. The Columbia River populations grow on stabilized gravel bars that are inundated early in the growing season and remain moist for the duration of the season. Although Ute ladies'-tresses may potentially occur in the general area, it is unlikely to occur within the project's area of potential effect due to lack of suitable habitat.

Triangular-lobed Moonwort

The triangular-lobed moonwort, a perennial fern, can be found growing in coniferous forests, wet and dry meadows, roadsides, ravines, and adjacent to perennial streams in

rocky soil, surface gravel, or moist decayed litter (WDNR 2005). Of the 20 recently documented occurrences in Washington, four are in Okanogan County, and all are 2,100 to 6,400 feet in elevation. Although suitable habitat occurs within the general area, the project sites lie below 1,500 feet elevation.

Crenulate Moonwort

The crenulate moonwort occurs in moist areas of the Okanogan Highlands province between 2,000 to 5,200 feet in elevation (WDNR 2005) within dense western redcedar, western hemlock, and Engelmann spruce forests. Because the general project area lies below 1,500 feet elevation and is not forested, this fern is not expected to occur.

Two-spiked Moonwort

Of the 14 recently documented occurrences of two-spiked moonwort in Washington, three are in north central Okanogan County. The fern is unlikely to occur within the project area because it is found in mature redcedar forests at 2,400 to 6,400 feet elevation.

Noxious Weeds and Invasive Non-Native Plants

Noxious weeds are introduced plants that compete with native plants, may reduce native biodiversity and habitat suitability for native wildlife, and are likely toxic to humans and/or livestock (Whitson et al. 1999). The State of Washington classifies noxious weeds according to the risk they pose to environmental and economic resources. Appendix B lists the 26 noxious weeds potentially present or known to occur in the Okanogan subbasin and the state and county status of each weed. Noxious weed species observed during the site visit in November, 2005 are also noted in Appendix B.

Not all invasive non-native plants are legally designated as noxious weeds. Cheatgrass, for example, was first collected in Washington in 1896 (Washington Biodiversity Project 2007), and since that time has become widespread in the state and throughout the intermountain west (Vander Haegen et al. 2001). Native bunchgrasses in shrub-steppe communities are being replaced with cheatgrass and several knapweed species as a result of ground disturbance, grazing, and fire suppression. Russian knapweed is widespread throughout the Columbia River Basin, especially near major watercourses (Ashley and Stovall 2004). Cheatgrass is very common at the hatchery and housing sites. Dalmatian toadflax also may be present at the housing site in low numbers.

Purple loosestrife, a wetland weed that forms dense monocultures, is present near Ellisforde Pond. At St. Mary's Mission Pond, reed canarygrass is in the riparian area of Omak Creek and Russian thistle occurs in the fallow field. Reed canarygrass grows in disturbed sites and seasonally inundated areas. It can out-compete native plants, forming dense monocultures and altering the soil hydrology. Russian thistle, an invasive weed common to roadsides, railways and dry open areas, establishes in areas without competition from other plants (Royer and Dickinson 2004).

3.4.2 Environmental Consequences

Proposed Project

Short-term adverse impacts would include removal or disturbance of vegetation during construction activities at all proposed sites. Long-term adverse impacts would occur where there is permanent loss of vegetation, reduction in native plant diversity, or increase in invasive or noxious weeds.

No ESA or Washington State listed plants or federal species of concern would be affected at the project sites since no suitable habitat exists. Construction would affect several culturally important plant species, including bunchgrasses, sagebrush, rabbitbrush, balsamroot, and prickly pear cactus, which grow in shrub-steppe habitats, and dogwood, willow, hawthorn, rose, and snowberry, which occur in riparian habitats (Appendix B).

BMPs would be implemented at all construction sites to limit effects on native plants and species of cultural significance. Examples include retaining riparian and wetland vegetation wherever practicable; salvaging and replanting riparian and wetland vegetation wherever site conditions allow; and using native species to revegetate disturbed soils. Other BMPs include placing silt fences, hay bales, and erosion control matting to prevent riverbank erosion; washing construction vehicles and equipment to avoid introducing and spreading noxious weed seeds; and monitoring equipment to ensure early detection and correction of fuel or oil leaks.

Construction of the proposed project would require gravel and rock for building pads, access roads, and other uses. If previously existing rock material sites are used, impacts to vegetation would not be as great as developing an entirely new site. Use of off-site material sources could introduce additional noxious weeds to the proposed project sites. It is assumed that any material sites proposed for this project would be properly managed and permitted by the appropriate agencies.

Fugitive dust would be generated at most, if not all, construction sites. Dust could coat nearby vegetation, though the effect of the dust would decrease with distance from the source. Vegetation that is heavily coated could be adversely affected. It is expected, however, that dust abatement practices would limit impacts to the immediate activity areas and the construction periods. No persistent adverse effects are anticipated.

Hatchery Site

All 24.5 acres of the hatchery site would likely be disturbed during construction due to material stockpiling, equipment staging and related activities. Permanent facilities would occupy about 20 acres of which 2.5 acres would be impervious. Less than 1 acre of shrub-steppe vegetation would be permanently affected. Implementing weed control measures and revegetating disturbed soils with native shrubs and grasses should minimize adverse impacts to vegetation. Landscaping with native species would occur around some hatchery buildings. Long-term operation of the hatchery is not expected to affect plant communities.

Construction of the proposed fish ladder and adult fish holding ponds would permanently occupy a 20,000 square foot area on the steep, riprapped river bank of the Columbia River. Attempts would be made to salvage the small patch of narrow-leaf willow there and replant them following construction. If salvage is not possible, other nearby willow stands could provide cuttings for revegetation.

Housing Site

Construction at the housing site would temporarily disturb up to 10 acres and permanently disturb 5 acres of bitterbrush shrub-steppe habitat. About 0.2 acres would be converted to impervious surface as residences and pads for RVs or camp trailers. Construction would affect species of cultural importance to the Colville Tribes (e.g. bunchgrasses, sagebrush, rabbitbrush, desert-parsleys, willow, balsamroot, asters, yarrow, plantain, and prickly pear cactus). Some species desirable for gardens or container plants, such as prickly pear, may be collected from the area. The house lots would likely be landscaped with lawn grasses, ornamental shrubs and trees, and native species.

Long-term occupancy and use of the housing site would likely affect remaining plant communities on the site and on adjacent lands. Cheatgrass and Dalmatian toadflax, two weed species already present at the site, may be promoted by activities such as foot traffic, pets, horses, bicycles, and motorized vehicles use. In addition to BMPs during construction, long-term monitoring and weed management would be accomplished to prevent weeds from spreading. Without these measures, weeds would likely out-compete native species at the site and spread to adjacent lands, diminishing native plant diversity and structural complexity in the vicinity.

Acclimation Ponds

Ellisforde Pond

Modifications to the existing pond structure would involve excavating a 10-square-foot area within an unvegetated rock quarry and light construction traffic and staging on an existing unvegetated gravel pad. No short- or long-term effects to any plant communities are anticipated from either construction or operation of the site.

Tonasket Pond

No construction is proposed at Tonasket Pond, so the plant communities would not likely change. Operation of the site is not expected to alter existing plant communities.

Bonaparte Pond

All proposed construction would occur within the existing pond, and access and staging would be confined to an existing unvegetated gravel pad. No short- or long-term adverse impacts to plant communities are anticipated from either construction or operation.

Riverside Pond

About 15 acres of pasture and 2,000 square feet of scrub-shrub riparian habitat would be temporarily altered through vegetation removal, soil disturbance, and soil compaction. About 4 acres of pasture and 1,000 square feet of riparian habitat would be permanently developed. About an acre of pasture would be converted to impervious surface.

The riparian habitat includes willows, hawthorn, snowberry, and rose. Some individual plants would be permanently lost to accommodate the water intake, pump station and outlet pipe. Revegetation with native species may be possible. Material excavated from the site would be re-used for construction fill, but re-use is not expected to result in the spread of noxious weeds since none were observed on site.

St. Mary's Mission Pond

Proposed construction at St. Mary's Mission pond would temporarily alter a small (less than 1 acre) portion of the fallow field around the site. Spread of non-native species present in the field should be adequately managed by implementing prescribed BMPs.

Omak Pond

Construction of the proposed Omak Pond would temporarily alter about 7 acres of fallow field and mixed-use development along Brooks Tracts Road. About 2 acres would be permanently developed; less than 1 acre would be converted to impervious surface. No adverse effects to native plant communities are expected because the field is composed of non-native, weedy species.

Construction of the water intake, pump station and outlet structure would alter about 1,000 square feet of riparian habitat occupied by dogwood, rose, snowberry, and hawthorn. BMPs implemented to retain and restore native riparian vegetation, reduce the spread of noxious weeds, and prevent erosion during construction should adequately protect other vegetation. Long-term operation of the site is expected to have no effects on plant communities.

No Action Alternative

With the No Action Alternative, vegetative conditions and trends at all sites would continue unaffected. None of the impacts associated with construction or operation of the proposed project would occur. No direct changes to plant communities are likely.

3.4.3 Cumulative Effects

Decreases in native plant communities in the Okanogan subbasin occur primarily from agricultural, residential, and commercial development. As the population of the area increases, more development would be expected and more native plant communities would be lost. The proposed project would contribute a regionally minor loss of native shrub-steppe and riparian plant communities, including loss of individual plants of species deemed culturally important to the Colville Tribes. The project also entails a minor increase in the potential to locally spread noxious weeds. Increased demand for

recreational sites and recreation access as a result of this project and others may further contribute to loss of native plant communities (especially riparian areas) and spread of weeds. The effects associated with the proposed project are individually minor, but are part of a continuing pattern in the region.

3.5 Geologic Hazards, and Soils

3.5.1 Affected Environment

Geology

The proposed CJHP sites lie at the boundary between the Okanogan-Selkirk Highlands and the Columbia Plateau physiographic provinces (Galster, Coombs, and Waldron 1989). The Okanogan-Selkirk Highlands are a mixture of various types of metamorphic rocks that have been intruded by younger granitic rocks. The Columbia Plateau is characterized by multiple layers of basalt from lava flows that occurred during the Miocene era. Volcanic and sedimentary rocks layers that have been deformed by folding and other geologic processes surround the Okanogan Valley.

The region was modified by Pleistocene glaciers that moved southward across the Okanogan-Selkirk Highlands, the Columbia River Valley, and onto the Columbia Plateau. The ice left a variety of glacial debris, including glacial till; morainal deposits; outwash sand and gravel; and fine-grained lacustrine silt, fine sand, and clay. Following the glacial retreat, the Missoula floods resulted in catastrophic erosion within the Columbia Basin and deposition of coarse-grained sediments (sands, gravels, cobbles, and boulders) in many areas along the Columbia River. The Columbia River has cut downward through the glacial sediments and into the granitic bedrock of the Okanogan-Selkirk Highlands, creating a steep-walled, terraced inner valley within the broad, older valley. The broad, older valley is about 1,000 feet deep and 12,000 feet wide in some areas. The Okanogan River has also cut downward through the glacial sediments creating well-developed glaciated river terraces comprised of silt, sand, and gravel.

Project Site Soils and Groundwater

Construction records for Chief Joseph Dam indicate 10 to 100 feet of permeable gravel and cobbles overlies the granitic bedrock at the proposed hatchery site. The gravel and cobbles are overlain by “dump moraine” and over 100 feet of glacial till consisting of large boulders and blocks of basalt, siltstone, and sandstone in a matrix of sand, silt, and gravel. The proposed hatchery site, used as a staging area during dam construction, was subject to extensive ground disturbance, including filling, grading, road construction and shoreline stabilization (Weaver and Shannon 2006). Borings in the vicinity of the hatchery suggest the presence of groundwater at or near the tailwater elevation of the dam (generally between elevations 780 and 790 feet elevation).

Near-surface soils information is inferred from an extrapolation of data mapped along the south shore of the Columbia River based on the Douglas County Soil Survey which was conducted primarily for erosion potential. In summary, the near surface soils at the hatchery have a low to moderate susceptibility to erosion.

All the acclimation pond sites are expected to be underlain by alluvial soils consisting of sand, gravel and cobbles based on existing geologic maps (Stoffel et al. 1991), the topography of the area, and photographic interpretation. The soils have a low to moderate susceptibility to erosion. Bedrock is expected to occur at depths greater than 30 feet. Groundwater at the site is expected at about 10 feet deep, which is probably controlled by the surface water elevation of the nearest river.

Geological Hazards

Slope Stability

According to slope stability mapping was conducted in 1991 by Stoffel et al (1991), there are no landslide-prone areas at the hatchery site or the sites of associated components such as water supply sources, pipelines, roads, housing, and building areas. However, localized areas of instability may exist along the Columbia River shoreline due to localized surface water runoff or infiltration. Large-scale instability related to stream-bank erosion and reservoir level fluctuations is not evident in the topographic features along the right bank or from geologic mapping.

No areas of instability have been mapped in near any of the acclimation ponds (Stoffel et al. 1991). Although localized areas of instability may exist along river banks, large-scale instability related to stream-bank erosion is unlikely at the pond sites due to the straight nature of the channel and lack of stream cut banks.

Seismic Conditions

Numerous faults and fractures occur within the granitic bedrock, but the mapping reveals no active faults within 5 miles of proposed project sites. Although there are “contacts” or places where two different types of rocks come together near the Riverside and Omak sites, these contacts are not assumed to be active faults. Historically there have been no significant (magnitude 4 or greater) earthquakes within 10 miles of the proposed project sites. The soils underlying the proposed project sites are generally not susceptible to earthquake-induced liquefaction.

3.5.2 Environmental Consequences

Proposed Project

Operation of the hatchery, housing, and acclimations ponds is not expected to affect soils or geologic hazards at the proposed project sites.

Soils, Erosion and Sediment Transport

Construction of the hatchery and new acclimation ponds would require excavations for buildings, ponds, roadways, pipelines and other utilities. About 16,000 cubic yards (cy) of soil and rock may be excavated for hatchery facilities and about 3,000 cy would be excavated at the housing site. From 3,000 to 11,000 cy of soil would be excavated for the new Riverside and Omak acclimation ponds and associated pipelines and pump stations. Improper excavation can affect erosion and sediment transport. The proposed project

would employ BMPs during construction to reduce erosion and off-site sediment transport. Some of the techniques include:

- Restricting construction traffic to designated work areas
- Applying dust abatement on construction roads to reduce airborne particulates
- Balancing earthwork cuts and fills to reduce import and export of materials
- Covering long term soil stockpiles to reduce wind erosion
- Reseeding disturbed areas with approved native vegetation

Increased erosion potential can occur when working across and through stream banks and other slopes. The hatchery and housing sites are located on relatively flat ground and are not expected to stimulate erosion or to be affected by erosion. Construction of the hatchery and new ponds' water intakes could result in minor increased erosion potential to the locality of the area where the pipe enters the water. A Hydraulic Project Approval (HPA), USACE 404 permits, and ESA consultation would likely require additional erosion and sedimentation prevention practices.

Slope Stability

It is not expected that the hatchery or the new acclimation ponds would affect or be affected by unstable slopes. The proposed facilities would not be located in areas of slope instability. Cuts and fills at the hatchery and acclimation ponds are generally less than about 10 feet, although the relief tunnel pump station at the hatchery (Figure 2-4) would be about 80 feet deep. The amount of earthwork and the proximity of the facilities to nearby slopes are not expected to result in conditions that destabilize the slopes. Structures and facilities for water containment can contribute to slope destabilization depending upon their locations and whether or not they are watertight, but the project incorporates measures to avoid water leakage, including lining all ponds and other water-retention facilities. The pipelines that are attached to the face of the dam, extending from the irrigation opening, would be exposed to allow visual inspection for any leakage that could affect the embankment slope below the dam. In addition, short shafts may be used to support pipelines on steep slopes to provide adequate support and avoid near-surface soils that may be loose.

Seismic Considerations

None of the project components would be located over known active faults. The buildings and facilities would be designed to the 2003 International Building Code to resist earthquake ground shaking corresponding to an earthquake having a 2% probability of occurrence in 50 years, which corresponds to a 2,475 year recurrence interval.

No Action Alternative

Under the No Action alternative, the proposed hatchery and acclimation ponds would not be built. None of the effects discussed above would occur.

3.5.3 Cumulative Effects

The contributions of the CJHP to erosion and sediment transport, slope instability, and seismic concerns would be negligible to non-existent. Erosion and sediment transport would be controlled through BMPs and permit requirements. The project facilities would be designed and built to avoid contributions to slope instability. No sites are located in areas of active seismic faults and all would be built to accepted earthquake standards.

3.6 Hydrology, Floodplains, and Water Quality

3.6.1 Affected Environment

Hydrology

Okanogan River

The Okanogan River originates in British Columbia and flows through a series of large lakes (both natural and manmade) before reaching the United States. The watershed encompasses about 2,600 square miles within the State of Washington and about 6,300 square miles in British Columbia (WDOE 1995). The Okanogan River within Washington flows about 79 miles from the outlet of Osoyoos Lake on the Canadian border to the Columbia River (Lake Pateros) at RM 533.5 near Brewster, Washington (Entrix, Inc., Golder Associates, and Washington Conservation Commission 2004). The influence of Wells Dam on the Columbia River causes the Okanogan River flow to back up and become essentially slack water to about RM 15.1.

Okanogan River flow is regulated by dams at three lakes: Osoyoos in the United States, and Skaha and Okanagan in Canada. Flow is regulated to meet several objectives including flood control, preferred lake elevations, and enhancement of fish production (CTCR 2005a). Okanogan River flow is monitored just downstream of Lake Osoyoos at RM 77.5 by the U.S. Geological Survey (USGS) Oroville gauge (station 12439500). Downstream gauges are near Tonasket at RM 50.8 (station 12445000) and Malott at RM 17.0 (station 12447200). The Ellisforde, Tonasket, and Bonaparte irrigation/acclimation ponds are located upstream of the Tonasket gauge. The proposed Riverside and Omak ponds would be located between the Tonasket and the Malott gauges.

Average annual flows of the Okanogan River have not changed much since gauging began in 1911 (WDOE 1995), but seasonal timing and duration of flows have changed substantially. Due to flow regulation by dams, peak flows are lower and low flows are higher than before. Flows increase in May during spring snowmelt and typically peak in late June. Low flows occur from mid-August to September and remain low throughout the winter. Average monthly flows during peak spring runoff measured at the Tonasket gauge approach 10,000 cfs in late June (Figure 3-1); flood flows during this period can be over 25,000 cfs (USGS no date). Low flows in late summer and fall typically average between 1,000 and 1,500 cfs, but have been recorded as low as 400 cfs from 1995 to 2004 (as measured at the Tonasket gauge).

Dams and other diversions for flood control and irrigation affect flows in the Okanogan River watershed. About 105,414 acre-feet of surface water are diverted annually for

irrigation (Entrix, Inc., Golder Associates, and Washington Conservation Commission 2004). WDOE has issued surface water rights for 107,160 acre-feet and estimates potential future use near about 500 cfs.

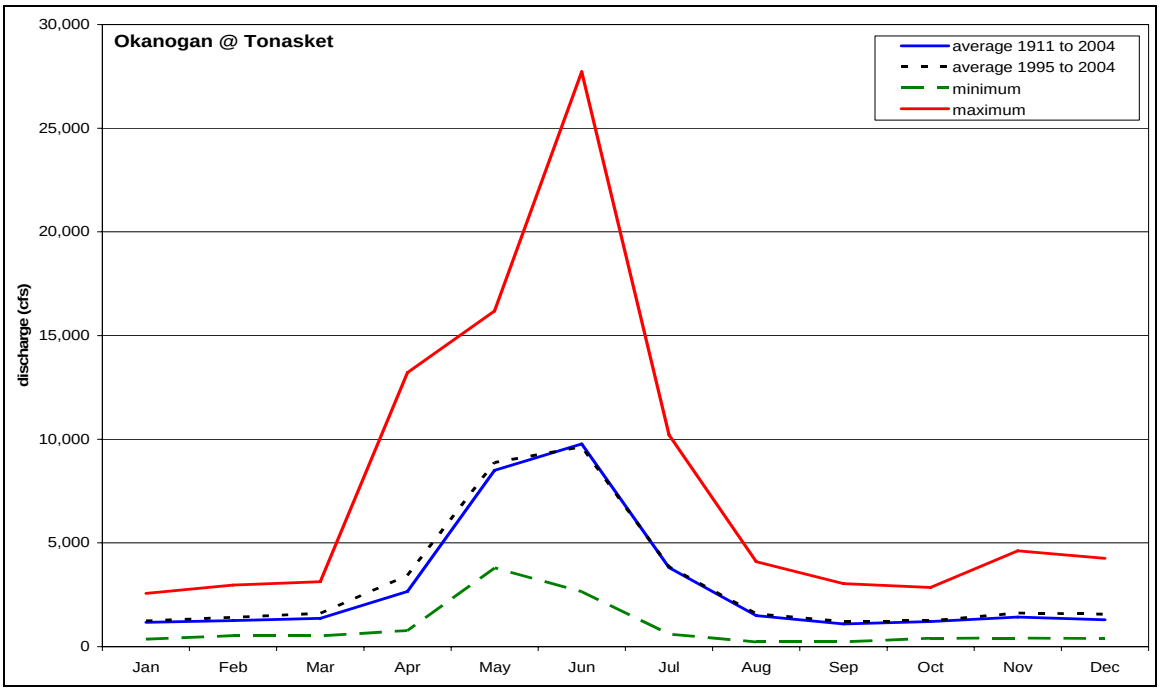


Figure 3-1. Okanogan River Average Monthly Discharge at the USGS Okanogan near Tonasket Gauge (Station 12445000)

Minimum in-stream flows for the Okanogan River were set by rule by WDOE in 1976. Between Tonasket and the river's mouth, minimum flows must range from 600 to 3,800 cfs. For the upper Okanogan River, minimum flows must range from 300 to 500 cfs. Flows fall below these levels an average of 60 days per year in the reach below the confluence with the Similkameen River and 100 days per year above this point (WDOE 1995). WDOE has closed all perennial streams in the watershed to issuance of further water right permits between May 1 and October 1 (WDOE 1995).

Omak Creek

The Omak Creek subbasin is entirely within the Colville Reservation. The 22-mile-long creek has a drainage area of about 140 square miles. It flows into the Okanogan River at RM 31. Elevations within the Omak Creek subbasin range from 860 feet at its mouth to 6,774 feet at Moses Mountain. WDOE has collected flow data since 2002 at the Omak Creek gauge (station I.D. 49C100) at RM 5.5. The USGS operated the station from 1972 to 1978. Based on this very limited record, high flows occur in the spring and are variable, averaging between 25 and 100 cfs (Figure 3-2), and low flows occur in the late summer averaging less than 5 cfs (Figure 3-2). Flows in the winter average near 10 to 15 cfs, but may drop to as low as 1 cfs. The stream can go dry. CTCR (2002) reported that Omak Creek is not altered by irrigation use. Surface water rights and claims on Omak Creek amount to 2.8 cfs (WDOE 2002a). Water right adjudication for Omak Creek is

incomplete pending judicial action (WDOE 2002b). When available, 2 cfs is taken at the St. Mary's Mission Pond between October and April for fish rearing.

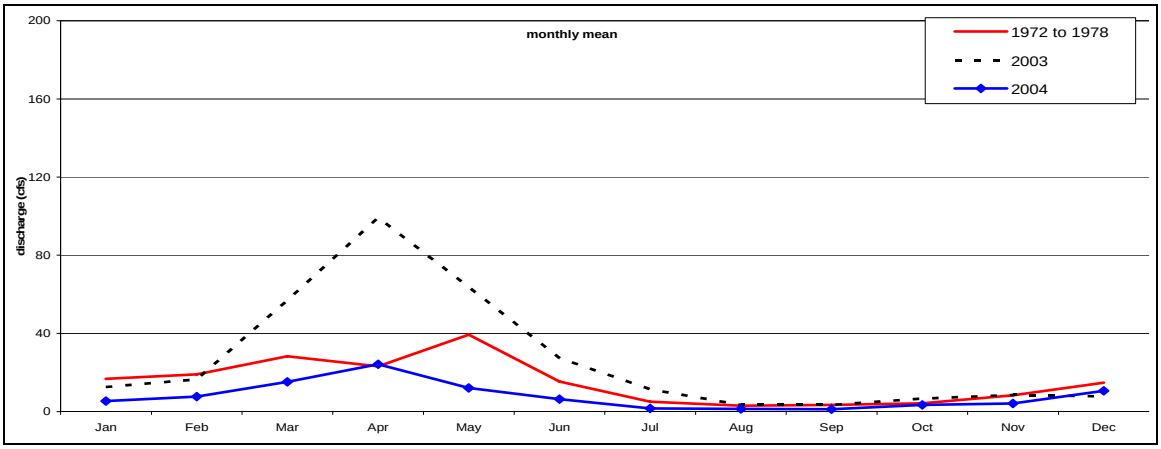


Figure 3-2. Omak Creek Average Monthly Discharge (USGS and WDOE data from RM 5.5)

Columbia River near Chief Joseph Dam

Lake Pateros occupies the 30 mile stretch of the Columbia River from Chief Joseph Dam downstream to Wells Dam. Rufus Woods Lake extends 51 miles from Chief Joseph Dam upstream to Grand Coulee Dam. Chief Joseph Dam is a run-of-river hydroelectric project, and Rufus Woods Lake is not used for flood control. Its elevation fluctuates very little throughout the year (between 950 feet and 956 feet normally). The dam's tailwater is at 780 feet, with levels exceeding 790 feet about 5% of the time.

Investigations of geologic conditions at the hatchery site indicated that only the lower 20 to 30 feet of material overlying bedrock appears to be hydraulically connected to the Columbia River. The upper 60 to 70 feet of silty, gravelly sand substrate does not hold water (Sweet, Edwards & Associates 1986).

An aquifer underlies the right abutment of Chief Joseph Dam. A 1,000-foot long relief tunnel was installed in the aquifer beneath the dam abutment to control groundwater flows and seepage pressure. The tunnel flows nearly 100 cfs. This tunnel is proposed as a source of water for the Chief Joseph Hatchery.

Bridgeport State Park and the Lake Woods Golf Course use the aquifer near the park. Well pumping tests indicated there is a high level of conductivity between the aquifer and the reservoir; the reservoir recharges the aquifer. The proposed well field for hatchery water would use this aquifer.

Floodplains

Executive Order 11988 (Floodplain Management) directs federal agencies to evaluate the potential effects of their actions in 100-year flood zones shown on Federal Emergency Management Agency (FEMA) flood insurance rate maps. In the project area, only the Okanogan River has a FEMA-mapped floodplain (Figure 3-3). The Okanogan River floodplain averages about a mile wide and descends from 920 feet in elevation at the

Canadian border to 780 feet at the confluence with the Columbia River. The hatchery, housing, well field, and St. Mary's Mission Pond would not be within the floodplain. Bonaparte, Ellisforde, and Tonasket ponds already exist within the floodplain, and the Riverside and Omak ponds are proposed within the floodplain.

Water Quality

In 2006, WDOE adopted standards for surface waters of the State (Chapter 173-201A WAC) based on a statewide classification system of designated uses. While the 2006 standards cannot be cited as the federal standard under the Clean Water Act until approved by the EPA, WDOE implemented the 2006 standards in December 2006 to the fullest extent of their authority. EPA previously approved portions of the 2003 standards (which are incorporated in the 2006 standards); however, EPA approval is pending for important water quality standards such as water temperature and dissolved oxygen.

The Colville Tribes have jurisdiction over the water quality on their reservation lands. Although the classification terminologies between the State and Colville Tribes differ, the water quality standards are essentially the same. The Okanogan River and Omak Creek are designated by the state as Class A and by Colville Tribal law as Class II waters, each entity's "excellent" designation. This means the waters generally exceed the requirements for all designated uses, which include: 1) domestic and other water supply; 2) salmonid and other fish migration, rearing, spawning, and harvesting; 3) wildlife habitat; 4) recreation, such as swimming, boating, fishing and aesthetic enjoyment; and 5) commerce and navigation. Colville Tribal law includes an additional use for ceremonial and religious purposes for their Class II waters.

Okanogan River

The Okanogan River is on WDOE's Clean Water Act 303(d) list of impaired and threatened water bodies requiring additional pollution controls for failure to meet standards for temperature, dissolved oxygen (DO), and pH. Fecal coliform bacteria, nutrient and turbidity levels are generally at acceptable levels for most of the year.

Temperature

WDOE (1997) notes a consistent late summer water temperature criteria violation from 1983-1993 in the Okanogan River. The 2004 303(d) list notes that Malott station exceeded the state standard of 18°C 13 of 55 times for samples taken from 1993-2001 with high temperatures usually occurring in July, August, and September (Figure 3-4). These occurrences are a result of natural phenomena (low gradient and solar radiation on upstream lakes) exacerbated by summer low flows caused by irrigation withdrawals, poor riparian conditions, and increased temperatures in water released from dams (Entrix, Inc., Golder Associates, and Washington Conservation Commission 2004).

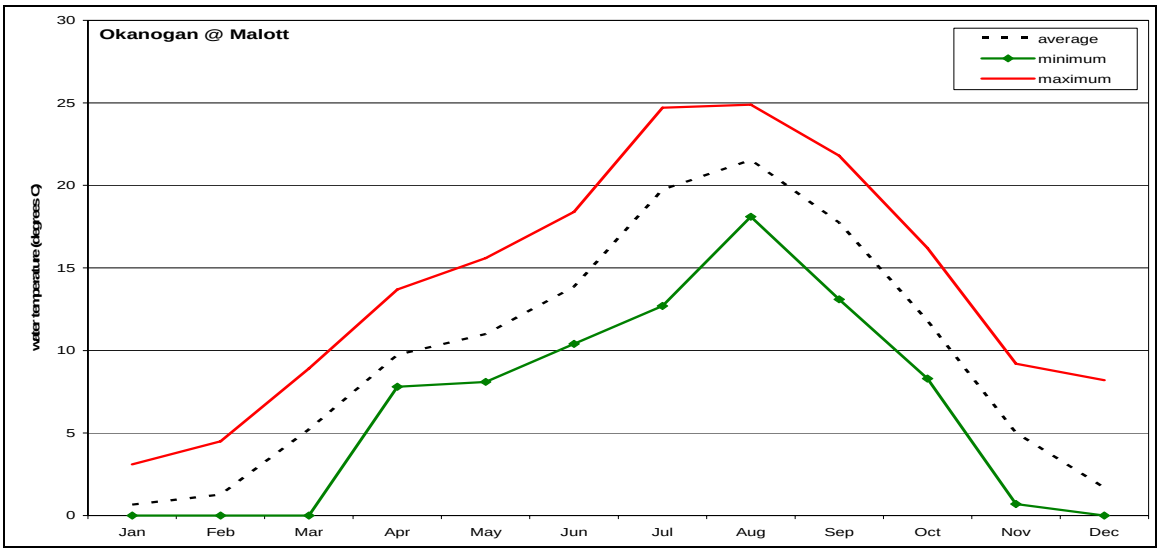


Figure 3-4. Okanogan River Average Monthly Water Temperature at Malott (WDOE grab samples 1977 to 2004)

Dissolved Oxygen

Dissolved oxygen (DO) in the Okanogan River system is generally at or above Class A standards (at least 8 mg/l) even during the summer when water temperatures are highest (Entrix, Inc. Golder Associates, and Washington Conservation Commission 2004). WDOE listed the Okanogan River on the 2004 303(d) list as impaired because monitoring at Oroville showed that DO standards were not met for 4 out of 50 samples taken from 1993 to 2001. Typically, Okanogan River DO exceeds 12 mg/l from November to March and reaches the lowest levels (7 to 8 mg/l) from July to September.

Hydrogen Ion Concentration (pH)

The state standard for Class A waters is for pH between 6.5 and 8.5. Okanogan River pH values generally range between 7.0 and 9.0. The river is listed on the WDOE 2004 303(d) list as impaired because values were recorded above 8.5 (WDOE 2004).

The CTCR (2005a) reported that pH has remained consistent over time between the upper and lower Okanogan River and the Similkameen River. The lack of yearly fluctuation indicates that the Okanogan subbasin has excellent buffering characteristics, protecting it from fluctuating pH levels.

Fecal Coliform Bacteria

Data collected from monitoring sites from 1977 to 1997 indicate that fecal coliform is well below state standards (WDOE 1997). From 1977 to 2004, the monthly mean count has been below 50 colonies per 100 ml except for measurements taken in June for which the typical mean was less than 75 colonies per 100 ml. State standards allow for up to 10% of samples to exceed standard as long as the mean value of samples is below 100 colonies per 100 ml.

Nutrients

Nitrates (nitrate-nitrite and ammonia) and phosphorous in the Okanogan River were at acceptable levels for Class A waters (less than 0.2 mg/l) from 1977 to 2004 (Entrix, Inc., Golder Associates, and Washington Conservation Commission 2004). CTCR (2005a) reported that the nitrogen to phosphorus ratio in the Okanogan River subbasin suggests that nitrogen is limiting aquatic biological productivity.

Turbidity

State standards do not specify target turbidity levels for rivers, but allow only limited turbidity increases over background levels due to human actions. In most streams, there are periods when the water is relatively turbid and contains variable amounts of suspended sediments (Bjornn and Reiser 1991). Turbidity spikes up to about 80 Nephelometric Turbidity Units (NTU) in the Okanogan River occur during the peak runoff in the spring, but generally turbidity is less than 10 NTU (as measured at Malott).

Omak Creek

Omak Creek is on the Colville Reservation under the water quality jurisdiction of the Colville Tribes and EPA. Data from Omak Creek is limited; however, data from the WDOE 303(d) list shows that Omak Creek does not meet state Class A criteria for temperature, DO, and pH. Major factors affecting water quality in Omak Creek are believed to be accelerated sediment yield from uplands and stream banks (NRCS 1995) and poor riparian conditions due to livestock grazing on stream banks. Peak water temperatures exceeded 24°C between 1997 and 2002 (Entrix, Inc., Golder Associates, and Washington Conservation Commission 2004). Because high temperatures reduce oxygen saturation potential, low DO is a concern.

Measurements in Omak Creek in 1990 showed that turbidity was less than 20 NTU most of the year. The highest turbidities appear to occur in April and May when several samples were between 20 and 100 NTU and some exceeded 100 NTU (Entrix, Inc., Golder Associates, and Washington Conservation Commission 2004). State standards for fecal coliform bacteria, nitrates, ammonia and phosphate have also been exceeded in Omak Creek. Livestock and septic tanks are thought to be the reason.

Columbia River

Water quality has been improving in Rufus Woods Lake and the mid-Columbia River since the 1980s (Beak Consultants and Rensel Associates 1999; Rensel 1996; Rensel 1989). Until recently, biological production in the lake and river was considered to be nitrogen-limited or not limited by the nutrient content in the water. With the closing of fertilizer plants in British Columbia, primary biological productivity is now heavily phosphorus-limited. Total phosphorus measurements for Rufus Woods Lake in 1995 averaged 30 mg/l; orthophosphate is below detection limits (USACE 2000).

Sediment and turbidity in Rufus Woods Lake are generally low. However, turbidity can increase during spring runoff due to higher levels of suspended solids in snowmelt

(USACE 2000). Spring and summer flows may also carry higher turbidity levels due to phytoplankton blooms primarily caused by longer days and warmer water temperatures.

Total dissolved gas (TDG) in the upper Columbia River and near Chief Joseph Dam can exceed state standards. TDG is influenced primarily by Grand Coulee Dam and Canadian dam operations upstream. TDG spikes reaching 140% have been observed in Rufus Woods Lake (USACE 2000).

Surface water temperatures in Rufus Woods Lake range throughout the year from about 3°C to 22°C as measured in the forebay above Chief Joseph Dam (Univ. of Washington 2000). Full-year temperature data are not available downstream of the dam (USACE 2000). Because Rufus Woods Lake temperatures can exceed those required for salmon production during the summer and fall, multiple water supply sources are being proposed for the Chief Joseph hatchery. Water in the Chief Joseph Dam relief tunnel sampled over several decades was substantially cooler than the reservoir water during the summer and fall, and warmer in the winter and spring. Water quality from all three proposed hatchery water sources is generally good, with only a few limited instances exceeding recommendations for hatchery use (USACE 2004). Occasional elevated levels of pH and aluminum were reported.

3.6.2 Environmental Consequences

Proposed Project

Hydrology

Construction Effects

Construction of the CJHP facilities would entail working in the Columbia and Okanogan rivers. Installation of water intakes, pump stations and outlets at acclimation ponds and the hatchery outfall would dewater areas less than 2,000 square feet each. Dewatering would involve placing cofferdams to isolate the work areas from the main river channels, then pumping the water out to sediment settling ponds. Water would then be filtered and returned to the rivers. Placement of the cofferdams and water pumping are not expected to affect river flow patterns or volume because no water would be consumed.

Operations Effects

Hatchery water would come from Rufus Woods Lake, the Chief Joseph Dam relief tunnel, and groundwater wells. Because of the addition of groundwater from the wells, slightly more water would be discharged to the Columbia River than is diverted. Maximum flow derived from groundwater and pumped through the hatchery and then released at the outfall would be about 25 cfs, which is about 0.05% of the total Columbia River flow at its minimum average flow.

Diversion of water from the relief tunnel to the hatchery would have no effect upon the aquifer since the relief tunnel is already in operation. The proposed well field would have a minimal effect on the aquifer because the aquifer is very pervious and is recharged from the reservoir. The well field is not expected to affect the water surface in upslope

areas more than 200 feet away, but this assumption would be tested before implementation. The proposed well field is not expected to adversely affect the Bridgeport State Park well because it would be 500 feet downstream and at a higher elevation than the Park's well. Preliminary analysis of aquifer conditions by hydrogeologists indicates that there is no potential to affect existing wells.

At the acclimation ponds, the diversion of water from the Okanogan River and Omak Creek would reduce stream flows between the water intakes and outlets (the "bypass reach") by the amount of water taken into each pond. The effect of these diversions depends on the bypass length, percent of total river flow diverted, and the season of diversion (typically October through April annually). Ellisforde, Tonasket, and Bonaparte ponds would divert up to 25 cfs each; their bypass reaches are less than 200 feet long. The Riverside and Omak sites would divert up to 15 cfs each. The Riverside bypass reach would be about 300 feet long, and the Omak bypass reach would be about 1,300 feet long. The minimum river flow near all these ponds has been about 400 cfs over the last ten years (measured at the Tonasket gauge), so diverting water for fish acclimation would reduce Okanogan River flows about 4% to 6% at the bypass reaches.

The 600-foot Omak Creek bypass reach at St. Mary's Mission Pond would continue to be affected by water diversion at the same level as occurs under existing conditions. Up to 2 cfs is already withdrawn from October to April. Flows in the winter average 10 to 15 cfs, but may drop to 1 cfs. Therefore, on average, flows in the bypass reach may be reduced by as much as 13% to 20%. During very low winter flows, the 2 cfs pond requirement may exceed the water available in Omak Creek, and if the full amount is diverted Omak Creek may go dry.

Operation of the hatchery and acclimation ponds would not affect irrigation withdrawals because program use would be non-consumptive. In the Okanogan subbasin, the Oroville-Tonasket Irrigation District and the CJHP would coordinate the shared seasonal use of three OTID ponds to serve irrigation and fish production needs.

Floodplains

Construction Effects

The hatchery, housing, and well field sites and St. Mary's Mission Pond are not proposed in FEMA-mapped floodplains, so no effects to floodplains are expected.

The proposed modifications to Bonaparte, Ellisforde and Tonasket ponds would not change current topography or river flows, so the Okanogan River 100-year floodplain would not be affected.

The Riverside and Omak ponds would be newly built within the Okanogan River 100-year floodplain, but there are no practical alternatives for these facilities. The pond surfaces would be near the existing ground level with some ground contouring necessary to establish a level platform for them. The ponds should have very little effect if any on river flow even at flood stage due to their low profiles, and the expansive size and low gradient of the floodplain at these locations.

Operations Effects

Because the hatchery, housing, well field, and St. Mary's Mission Pond are not proposed in designated floodplains, operations at these facilities would not affect floodplains.

If flooding occurs at the Bonaparte, Ellisforde, Tonasket, Riverside, or Omak ponds, pond infrastructure could be damaged. Loss of fish would not be expected because flood flows would most likely occur between April and July when the ponds would not be in use for fish rearing.

Water Quality

Construction Effects

In-stream work would require a Clean Water Act Section 404 permit from the USACE, WDOE Section 401 water quality certification, and Hydraulic Project Approval from WDFW. Local shoreline permits from the County and/or the Colville Tribes may also be required. Dewatering guidelines established by Washington Department of Ecology (WDOE) would be followed to protect water quality where appropriate.

A storm water pollution prevention plan would be designed and implemented to limit turbid water runoff from work areas. In addition, BMPs would be required to remove suspended sediment from waters pumped out of in-stream work areas, to isolate areas of excavation and grading by installing silt fences or similar devices, and to curb erosion between earth work areas and surface waters with straw bales, matting and similar techniques. The potential for introducing petroleum products and other toxic substances from construction equipment into the rivers would be reduced by keeping equipment in excellent condition and performing all refueling and maintenance operations well away from the water and riparian areas.

Even with these measures, a short-term decrease in water quality through inadvertent releases of minor amounts of sediment or pollutants to the rivers may occur. Rain events during construction increase the risk of water quality degradation from soil erosion and introduction of storm water runoff containing other pollutants. Any substances entering surface waters would most likely be greatly diluted by the increased water volume in the water body during such an event.

Operations Effects

Hatchery programs use water for incubation, rearing and acclimation of juvenile fish, and adult holding. Rearing and acclimation ponds use the most water. The CJHP must comply with all federal, state and tribal water quality standards for effluent discharges and federal and state regulations on use of chemicals and fish food. The CJHP has been designed to comply with these requirements, and all necessary permits and approvals would be obtained prior to operations. Water quality would be periodically monitored at all facilities so that problems may be detected and remedied.

At existing acclimation sites, flow, pH, total suspended sediments, total phosphorous, dissolved oxygen, and water temperature are monitored and have remained within the

acceptable ranges established in the National Pollution Discharge Elimination System (NPDES) permits. It is expected that the amount of sediment and nutrients introduced into the waters from the hatchery and acclimation ponds would not affect the overall water quality of the Columbia River, Okanogan River, and Omak Creek. Introduction of nutrients may, in fact, produce beneficial effects as significant settling of natural nutrient load occurs in upstream reservoirs.

All of the water used in the hatchery and ponds would be discharged back to their source rivers after use and after settling/treatment to remove fish waste and unconsumed food. Most hatchery water would be detained for one hour before discharge. Solid materials in the rearing raceways would be vacuumed periodically and then routed through aeration and settling ponds to remove solids and excess nutrients. Concentrated wastes from the settling ponds would be removed about once a year and disposed of at approved dry land locations, possibly as agricultural fertilizer. Space is available on site for additional waste treatment facilities in response to technology advances or changes in regulatory requirements. Although hatchery personnel would be trained in proper storage and use, toxic chemicals and antibiotics (used to control diseases in fish) may still be introduced into water bodies as a result of spills or human error at hatcheries.

Although solar heating of rearing and acclimation pond water could occur, the temperatures of pond and hatchery waters are not expected to markedly exceed the temperatures of their source streams. When returned to their streams, the waters should mix quickly, so thermal effects would be very minor and confined near the outlet pipes.

To meet critical temperature requirements, hatchery incubation water may be routed through chillers. When returned to the Columbia River, this cooler water is expected to mix rapidly with the ambient water, so thermal effects would be very limited (due to the very high volume of receiving waters) and confined near the hatchery discharge pipe.

The nutrient content of Okanogan subbasin waters would increase as more adult salmon return to spawn and their carcasses accumulate. This would most likely be beneficial to the aquatic environment. Historically, large numbers of salmon carcasses likely made the nutrient content of the water quite high, contributing to the availability of food organisms for juvenile salmon. The dissolved nutrients would also benefit other aquatic species as well as terrestrial flora and fauna.

It is possible that very large numbers of salmon carcasses could contribute excess nutrients to the aquatic environment. In this case, algal blooms may occur particularly in areas of slow currents and low, warmer water. Algal blooms can cause turbidity and increased biological oxygen demand. Although the number of decomposing carcasses needed to create such eutrophic conditions is unknown, it is surmised that it could number in the tens or even hundreds of thousands. It is not expected that the proposed project would produce so many salmon carcasses that excess nutrification of the Okanogan subbasin would occur.

There is some concern that decomposing salmon could contribute polychlorinated biphenyls (PCBs) and other environmentally persistent chemicals such as DDT (Missildine 2005). Salmon can ingest these chemicals while in the marine environment and store them in their body fats. Salmon could release the toxic chemicals in freshwater

when they die after spawning. Krummel et al. (2003) found that PCB concentrations in the sediment of Alaskan lakes increased seven-fold after the return of adult sockeye salmon for spawning. Puget Sound Ambient Monitoring Program data show that coho and Chinook salmon in the Pacific Northwest are contaminated with PCBs (PSAMP 2000). These data suggest that if an increase in adult spawning occurs in an area that has not had high numbers of spawners in decades, an increase of PCBs and other persistent organic pollutants could occur. Though it is not expected that the CJHP would produce salmon in numbers that would substantially affect water quality in the Okanogan subbasin, water quality monitoring would occur to detect problems. Adjustments to the program to reduce carcass loading could be made to reduce water quality degradation.

No Action Alternative

The No Action Alternative would mean current conditions would continue. Hydrology and water quality would continue to be affected as they have in the past. Trends in development within the 100-year floodplain would continue. Additional nutrients would not be contributed to the ecosystem through additional salmon carcasses.

3.6.3 Cumulative Effects

Continual structural development within the 100-year floodplain of the Okanogan River restricts the natural ability of the river to moderate the magnitude and duration of flows, maintain water quality, and provide nutrients to riparian ecosystems. The CJHP would develop two acclimation ponds within the floodplain which individually would result in a negligible addition to the loss of natural floodplain functions, but combined with other actions, could incrementally contribute to degradation of floodplain functions. The project, if successful in returning large runs of salmon, could also incrementally add to the demand for recreational infrastructure to be built within the 100-year floodplain, and could add a source of nutrients via decomposing salmon carcasses.

Despite all precautions, protections, and permit provisions, the project could incrementally contribute to water quality degradation when added to past and future projects. But, overall pollutant levels and trends would not be expected to change substantially over time. The CJHP is not expected to contribute to non-compliance with water quality standards; therefore, the proposed program would be consistent with state water quality anti-degradation provisions.

3.7 Land Use, Transportation and Recreation

3.7.1 Affected Environment

Land Use

The project sites are in unincorporated Okanogan County on lands owned by the USACE, the Oroville-Tonasket Irrigation District (OTID), the Colville Tribes, BPA, and Washington State Parks and Recreation Commission (WSPRC). The USACE has authority over land use and construction permitting for projects on their land; the Colville Tribes have authority for land use and construction permitting on tribal trust lands; and

Okanogan County has authority for land use and construction permitting for all other non-federal ownership in the county.

The hatchery site is owned by the USACE, which also operates the visitor orientation site to the west. The water intake and pipeline are also proposed on USACE land.

The housing site, owned by WSPRC, is undeveloped open space amidst native shrub-steppe plant communities, and a nearby orchard and golf course.

Ellisforde and Tonasket ponds are irrigation ponds on the Okanogan River owned and operated by the OTID. Nearby land uses are orchards, pastures, and rural farm homes. Bonaparte Pond, another irrigation pond owned by OTID, sits along the Okanogan River next to a WDFW public fishing and boat launch access site, a fruit orchard, the Cascade Columbia River Railroad, and US Highway 97. Commercial establishments exist across the highway. All three of these ponds have been modified for fish acclimation.

The Riverside Pond site, owned by BPA, is a fallow hay field with a farm house and outbuildings. It is divided by the Cascade Columbia River Railroad, but a road links parcels on both sides of the tracks.

St. Mary's Mission Pond occupies about an acre in a fallow field owned by the Colville Tribes along Omak Creek.

The Omak Pond site, also owned by the Colville Tribes, contains a barn, a shed and a house used by the Colville Tribes' Fish and Wildlife staff. The proposed acclimation pond, along with associated facilities, would occupy about two acres in a pasture. The adjacent lands are also used as pasture and rural home sites.

Only the sites adjacent to the Okanogan River are within a Federal Emergency Management Agency (FEMA) mapped flood zone (Figure 3-3). The Columbia River near the hatchery site does not have a defined flood zone because water levels are controlled by the operation of Wells and Chief Joseph dams. Omak Creek does not have a flood zone because of its small size.

Transportation

General transportation patterns in the Okanogan valley are typical of lightly populated rural agricultural communities in central and eastern Washington. Passenger vehicles account for about 80% to 90% of the total road use while commercial trucks including farm machinery account for the rest. Traffic increases near larger communities compared to more rural locations. Truck traffic has a seasonal pattern, increasing when agricultural harvesting and transport to market is occurring.

The roads adjacent to the project sites include US Highway 97, Washington State Highway 17, Highway 7, Half-Sun Way, Omak Riverside Eastside Road, Brooks Tracts Road, North Omak Lake Road, and the Cascade Columbia River Railroad. Table 3-7 shows the characteristics of these roads.

Table 3-7. Highways, Roads and Railroads in the Project Vicinity

Road Name and Number	Ownership & Classification	Project sites accessed	Lanes & Speed	Importance in Region
US Highway 97	State of Washington, Rural-Principal arterial	All sites accessed; Bonaparte and Ellisforde ponds accessed from Hwy 97 arterials	2 12-ft paved lanes with 8 ft paved shoulders; 60 mph	Primary access to Okanogan Valley. Okanogan Scenic Byway
Highway 17	State of Washington Rural-Minor arterial	Provides access to hatchery site from Bridgeport and Omak	2 11.5-ft paved lanes with 8 ft paved shoulders; 60 mph	Provides access between Bridgeport and Hwy 97
Highway 7	Okanogan County	Accesses Tonasket Pond from Town of Tonasket via a gravel access road	2 paved lanes, 24 ft road width with 2-3 ft gravel shoulders; 35 mph	Provides access to west side of Okanogan River
Half-Sun Way	Private (on USACE-owned land)	Accesses hatchery and housing sites	2 paved lanes, 20 ft road with 2 ft gravel shoulders; 15-35 mph	Carries traffic from Hwy 17 across USACE land adjacent to CJD, Bridgeport State Park, Lake Woods Golf Course
Omak Riverside Eastside Road	Okanogan County	Accesses Riverside Pond site	2 paved lanes, 24 ft road with 2-3 ft gravel shoulders; 35 mph	East side of Okanogan River between Omak and Riverside
Brooks Tracts Road	Okanogan County	Accesses Omak Pond site from St. Hwy 97 or St. Hwy 155	2 paved lanes, 16 to 18 ft road with 2-3 ft gravel shoulders; 25 mph	Accesses rural areas along Okanogan River outside Omak
North Omak Lake Road	Okanogan County	Accesses St. Mary's Mission Pond site	24-ft wide paved road with 2-3 ft gravel shoulders narrows to 16-18 ft road with no shoulders; 35 mph	Accesses rural areas between St. Hwy 155 and Omak Lake
Cascade Columbia River Railroad	RailAmerica	Runs through the Riverside site; adjacent to Bonaparte and Ellisforde ponds with crossing access	Single Track	Wenatchee to Oroville

Sources: WSDOT 1998, WSDOT 2000, WSDOT 2004

The Washington Department of Transportation (WSDOT) monitors traffic use on two roads in the project area, US Highway 97 and State Highway 17. The average daily traffic volumes reported along Highway 97 in 1998 were 3,395 vehicles near Monse and 3,764 vehicles near Okanogan (WSDOT 2000). Truck traffic accounted for 19 percent and 15 percent of the total use these segments respectively. The average daily traffic volumes reported in 2004 for segments of Highway 97 near Riverside were 4,100 and Ellisforde were 3,200 vehicles (WSDOT 2004). The average daily traffic volume on

Highway 17 between Bridgeport and Highway 97 in 1995 was 2,395, of which 10 percent was identified as trucks.

Recreation

Recreation and tourism are important in the Okanogan County economy (Section 3.8) and make a substantial contribution to the quality of life for local residents. The most popular activities are sightseeing, picnicking, and driving for pleasure (IAC 2002), but hunting and fishing are also important. Recreation resources within the project area include developed facilities, use areas, and boat ramps along the Columbia River from Pateros to Chief Joseph Dam and from the mouth of the Okanogan River to the Canadian border. There are no wild and scenic rivers or other special recreational land designations in the vicinity of the project sites (i.e. National Parks, National Recreation Areas, wilderness, wildlife preserves, etc.).

Most recreation near Chief Joseph Dam is oriented to the Columbia River and includes the two USACE visitor facilities at the dam itself. At the base of Chief Joseph Dam, the Right Bank Fishing Area provides a fishing site for Colville Tribal members only and a spillway viewpoint open to all visitors (USACE 2002). The USACE also maintains a spillway scenic overlook on the upstream side of the same abutment. The site is linked to USACE's North Shore Trail, a two-mile-long paved route from the visitor orientation site upstream to various viewpoints. Adjacent to the Chief Joseph powerhouse, USACE provides covered picnic shelters and a children's play area.

The Lake Woods Golf Course is on 80 acres along Half-Sun Way about two miles upstream of the dam. The 9-hole course skirts Rufus Woods Lake and has limited amenities. Bridgeport State Park, managed by WSPRC, provides both day use and camping facilities on 712 acres of rolling grassy terrain fronting Rufus Woods Lake for about a mile. Water sports and fishing for kokanee, trout, and walleye pike are popular activities. From 2000 to 2005, Bridgeport Park visitation ranged from 65,000 to 82,500 per year (S. Minkler, WSPRC, personal communication, December 20, 2005).

Sightseeing, walking, and fishing are the primary recreational uses along the Okanogan River which is paralleled by US Highway 97 from the town of Pateros north to the Canadian border. This route is designated as the Okanogan Scenic Byway and follows part of the historic Cariboo Trail.

Recreational fishing occurs either from river banks or boats. Fishing opportunities for salmonids in Okanogan River are limited. Fishing for trout is not permitted. With spring Chinook extirpated, steelhead listed as an endangered species, and limited populations of summer/fall Chinook, recreational salmon fishing has been closed or highly restricted in most years (NPCC 2004). WDFW does, however, allow salmon fishing in the lower 1/2 mile of river downstream of the Highway 97 Bridge. On rare occasions, the rest of the Okanogan River is open for salmon fishing when runs exceed a certain size in a given year (NPCC 2004). Steelhead fishing is limited to only hatchery-origin fish in the Okanogan River, and seasonal openings are highly unpredictable. Fishing for other game and non-native species is permitted, although some restrictions apply.

3.7.2 Environmental Consequences

Proposed Project

Land Use

Hatchery and Housing Sites

The Chief Joseph Dam-Rufus Woods Lake Master Plan designates the area for the proposed hatchery as multiple resource management (USACE 2002). Land under this classification may be managed for one or more uses including low density recreation, inactive/future recreation areas, fish and wildlife management, or vegetation management. Resource objectives for this land use classification include (1) restoration of wildlife habitat; (2) maintain and protect habitats for existing wildlife species; (3) control weed species; and (4) provide some public use of the area. Construction of the hatchery would not be consistent with these identified resource objectives as the hatchery would not restore, maintain, or protect existing wildlife habitat. It would reduce the available habitat. However, USACE personnel involved in project planning have not indicated that hatchery development would be an inappropriate use of this site (CTCR 2004). The hatchery water supply pipelines are proposed on USACE land designated for project operations, multiple resource management, or recreation. A hatchery water supply would be consistent with this designation. The housing site is on WSPRC land classified as open space by Okanogan County.

Acclimation Pond Sites

Ellisforde, Bonaparte, and Tonasket ponds are existing irrigation ponds that have been adapted for fish rearing. The use of these ponds under the proposed project is not a change from existing land uses. Continued use of the sites for fish rearing is consistent with the Minimum Requirement District zoning established by Okanogan County.

The proposed Riverside Pond would occupy about 4 acres of undeveloped land, which would represent a change in land use from agriculture production to an industrial facility for aquaculture. The proposed use change is consistent with the Minimum Requirement District zoning established by Okanogan County.

St. Mary's Mission Pond is located on Colville tribal land that is zoned as "Shoreline Management". Continued use of the site for fish acclimation is consistent with the requirements of the Shoreline Management zone.

Omak Pond is proposed in a fallow field on Colville tribal land that is also zoned "Shoreline Management." The development and use of an acclimation pond on this site would represent a change in the land use from rural residential to aquaculture production, but that change would be consistent with Shoreline Management zoning.

Transportation

Construction Effects

Construction of the hatchery, housing and new ponds is expected to have minor to substantial impacts on traffic depending upon the road involved. The number of vehicles, particularly trucks, using the area would increase, but not to levels unsupportable by the local road system.

Hatchery and Housing Sites

Transporting materials and equipment to the project sites would increase truck traffic on Highways 17 and 97 and Half-Sun Way intermittently during construction (about 20 months). Construction traffic would increase daily truck traffic about 4% on Highway 17 (250 additional truck trips per day) and 1.5% on Highway 97 (655 additional truck trips per day). Construction traffic would represent the majority of large truck traffic on Half-Sun Way. About 100 workers may be present on the construction sites at one time. Conflicts between large trucks, commuting workers, residents, and recreational travelers may occur during the summer recreation season and, to a lesser extent year-round.

Hatchery Water Supply Pipelines

The pipeline providing water from the north embankment of Chief Joseph Dam would extend along a non-public maintenance road. Construction would be coordinated with USACE to ensure access to the dam is provided as needed.

The well field pipeline would be routed along Half-Sun Way. Public access would be limited to one lane during construction, and signage, flaggers, and other safety measures would be used to control traffic. Most construction would occur outside of the recreation season to reduce conflicts, but it is likely that disruption and minor delays for local residents and recreation travelers accessing the state park and golf course would occur for about 12 months.

Acclimation Pond Sites

Construction of new acclimation ponds may take up to 7 months, while modification of existing ponds would take less time. Up to 20 workers may be present on sites where new ponds would be built; fewer workers would be required to modify existing ponds. During construction, intermittent transport of construction materials and equipment, debris, excess soil, and workers would affect local traffic composition and volume.

Construction of Riverside Pond would substantially increase truck traffic on Omak Riverside Eastside Road and, to a lesser extent, on Highway 97 as excavated material is hauled off-site. The proposed gravel access road would reduce the potential for conflicts with other users of the Omak Riverside Eastside Road by allowing for staging of construction vehicles off the main road. The existing railroad crossing within the Riverside site would be upgraded to allow access of limited clearance vehicles. All necessary permits from the railway owner would be obtained, and appropriate safety measures would be taken at the crossing.

Construction of the Omak Pond would substantially increase traffic on the Brooks Tracts Road, the Omak Riverside Eastside Road, and Highway 155. The Brooks Tracts Road would be most impacted as it is the primary access to several homes and the Colville Tribes' fish and wildlife field office, is quite narrow, and has no shoulders. Large trucks delivering construction materials or hauling excavated dirt or debris from the site would conflict with other road users for a few weeks. The water supply pipeline for Omak Pond would be buried in the shoulder of the road which would restrict the available road width for public access. Appropriate construction signage and flaggers would be used to ensure safe one-way vehicle access near the construction site.

Operations Effects

The traffic increases attributable to hatchery operations would be very small, consisting primarily of 8 to 15 employees commuting to work at the hatchery complex year round and to acclimation ponds from October to April, and trucks transporting fish from the hatchery to acclimation ponds from late-October to early-November. Based on the fall closure dates for the State Park and golf course, fish transport traffic would not conflict with recreational traffic on Half-Sun Way.

Recreation

Construction Effects

Hatchery and Housing Sites

Bridgeport State Park and the Lake Woods Golf Course are accessible only via Half-Sun Way, so construction and recreational traffic would conflict for about 20 months, largely during the summer. Coordination with state park managers on construction sequencing to minimize conflicts with recreation users would occur. Still, construction activities would be visually evident and audible to visitors. Bridgeport State Park and Lake Woods Golf Course may experience some leisure-time and lunchtime use by workers during hatchery and housing construction although it is very difficult to estimate to what degree.

Acclimation Ponds

Construction and modification of acclimation ponds would have negligible effects on recreation due to the short duration of activity, limited land disturbance and typical recreational uses near the sites. Generally, recreation uses near the sites include some bank and boat-based fishing, potentially some hunting, and driving for pleasure. Recreation visitors along US Highway 97, the Okanogan Scenic Byway, may encounter the truck traffic associated with pond work, and may experience occasional slowing or stopping.

Operations Effects

Once built, the hatchery and houses are not expected to adversely affect recreation at Bridgeport State Park or Lake Woods Golf Course. The visibility of the new facilities may attract motorists on US Highway 97, which may increase use of the nearby USACE visitor orientation area and the State Park. The hatchery administration/visitor facility

may draw additional educational groups and visitors. It would provide an opportunity to disseminate interpretive information about the fishery and its importance to local culture. This facility would complement the information kiosks already provided by the adjacent USACE visitor orientation site. By providing additional recreational opportunities and promoting awareness of the environment and natural resource management, this facility would be consistent with values identified in Okanogan County's Outdoor Recreation Comprehensive Plan (2004).

The proposed hatchery program is expected to increase returns of summer/fall Chinook and spring Chinook salmon to the Okanogan River and Columbia River below Chief Joseph Dam, which could increase the potential for tribal and recreational fishing and tourist visitation. When escapement reaches levels that can sustain the artificial propagation program and when natural spawning objectives are met, the remaining salmon could be available for a tribal and recreational fishery. While it is not possible to predict how many salmon may be available for fishing or viewing in a given year, production levels under the CJHP assume surplus fish would return. Increased bank fishing and sightseeing along the Okanogan River especially near acclimation ponds could result in some minor increase vegetation and soil trampling, littering, and trespass. Existing boat launch sites (Chief Tonasket and the Bonaparte launches) are expected to accommodate some level of increased use. The new Riverside and Omak ponds could return salmon to a reach of the Okanogan River not currently served by developed recreation sites, which could put some pressure on local authorities to provide access and facilities.

No Action Alternative

Land Use

With the No Action alternative, no land use changes are expected. All sites would likely continue to be used as they are currently. Agricultural land and wildlife habitat would be developed for other purposes at current rates in the general area.

Transportation

Traffic levels and usage patterns would probably continue as they are currently, changing and expanding as communities grow.

Recreation

Recreation traffic, pursuits, visitation, and attractions would continue as they currently are. The Chief Joseph Dam and associated visitor facilities, Bridgeport State Park and Lake Woods Golf Course would continue to be key attractions, providing a predictable setting for returning visitors. Traffic on Half-Sun Way would increase only if park and golf course visitation increased. Salmon fishing opportunities would occur to the extent current Okanogan subbasin fish propagation programs allow. It is expected that these programs would be modified over time and may provide more fishing opportunities.

3.7.3 Cumulative Effects

The land use changes proposed at the hatchery, housing, Riverside and Omak pond sites would contribute 31 acres of permanent development to the gradual conversion of agricultural land and wildlife habitat lands in the region.

Significant changes in transportation modes, routes or traffic levels are not expected within the region in the foreseeable future. The project would contribute to increases in traffic with the most substantial cumulative contributions occurring during construction and near construction sites. During long-term operations of facilities, the project would only contribute incrementally to growing use.

The proposed project combined with other fishery improvement projects in the region would likely increase salmon populations in the Okanogan River and the Columbia River below Chief Joseph Dam. This would probably increase demand for fishing and may result in increased pressure to add boat launches and other recreation facilities and designate and regulate fishing seasons and areas wherever increased salmon are present.

3.8 Socioeconomics

3.8.1 Affected Environment

The general area for socioeconomic effects includes Chelan, Douglas, and Okanogan counties. The primary communities (Figure 1-1) include:

- Wenatchee, Chelan County
- East Wenatchee, Douglas County
- Bridgeport, Douglas County
- Brewster, Okanogan County
- Omak, Okanogan County
- Okanogan, Okanogan County
- Pateros, Okanogan County
- Tonasket, Okanogan County

Omak, Okanogan, and Tonasket are near the acclimation pond sites. Wenatchee and East Wenatchee, about 90 miles south of the hatchery site, are the nearest large population and economic activity centers.

Brewster, Bridgeport, and Pateros are closest to the hatchery site. Their populations are relatively small and stable (about 2,000 or fewer residents each) with a well-represented Hispanic component (Office of Financial Management 2005a; Washington State Data Book 2003). Okanogan and Omak are slightly larger communities (2,000 to 5,000 residents each) nearer the acclimation ponds. Their populations include many American Indians probably due to the proximity of the Colville Indian Reservation. The Colville Indian Reservation covers about 2,100 square miles in Okanogan and Ferry counties (CTCR 2005b). The Confederated Tribes of the Colville Reservation is a federally recognized American Indian Tribe and Sovereign Nation.

The per capita income of the area is low compared to Washington in general (Table 3-8). Although county unemployment rates are stable and comparable to the statewide average, they may be higher within the small communities (Washington State Data Book 2003) primarily due to changes in the viability of the tree fruit industry and agriculture within the area (B. Brammer, Crane & Crane, and E. Parisel, Brewster Heights Packing,

personal communications, October 2005). Employment opportunities are better in Wenatchee and East Wenatchee, which have more diversified economies.

Table 3-8. County Economic Activity and Income, 2003

Sector	Chelan Co.	Douglas Co.	Okanogan Co.	Washington
Per Capita Income (2003)	$27,500	$22,800	$23,100	$33,300
Average Annual Wage Per Job (2003)	$28,600	$25,500	$22,900	$39,200
Employment (2005)	42,050	21,190	21,610	3,135,400
Unemployment Rate (2005)	4.1%	4.0%	5.0%	5.1%
Income and (Employment) By Major Sector (2003)				
Farm Earnings	$94,500,000 (4,482)	$25,663,000 (2,600)	$64,462,000 (4,692)	NA
Forestry/Logging	$3,600,000 ------	------ ------	$4,500,000 (1,709)	NA
Farm Service	------ ------	$13,600,000 ------	$28,943,000 ------	NA
Construction	$121,134,000 (3,023)	$22,220,000 (654)	$24,686,000 (1,006)	NA
Manufacturing	$106,871,000 (2,068)	$13,226,000 (238)	$4,794,000 (406)	NA
Wholesale Trade	$52,407,000 (1,313)	$13,281,000 (306)	$15,452,000 (351)	NA
Retail Trade	$128,000,000 (5,658)	$31,884,000 (1,260)	$55,734,000 (2,273)	NA
Transportation	$37,869,000 (996)	$14,985,000 (367)	$8,991,000 (293)	NA
Information	$23,250,000 (607)	$2,029,000 (51)	$5,400,000 (160)	NA
Health Care	$254,626,000 (5,595)	$21,106,000 (553)	$42,571,000 (1,475)	NA
Food Service	$35,548,000 ------	------ ------	$8,813,000 ------	NA
Federal Govt.	$51,473,000 (244)	$16,893,000 (195)	$35,638,000 (508)	NA
State Govt.	$54,886,000 (1,223)	$$3,200,000 (76)	$13,654,000 (332)	NA
Local/Tribal Govt.	$197,982,000 (4,254)	$74,626,000 (1,726)	$166,369,000 (4,474)	NA

Source: Bureau of Economic Analysis, 2005a; Office of Financial Management, 2005a; and Washington State Data Book 2003

The main income and employment sectors in the counties are farms and food processing, local public utility district hydro projects, and tribal forest product and gaming industries (Table 3-8). These are considered basic economic sectors because they bring in substantial revenues from outside sources and support the local service industries.

The Colville Tribes' Forest Products Division is a primary annual revenue source for the area. Other operating revenues come from federal and state agencies. Tribal sources report relatively high levels of unemployment and that there is a need to enhance economic opportunities (CTCR 2005b). The CJHP is viewed by the Colville Tribes as a means of supporting a stable ceremonial and subsistence fishery while possibly benefiting the local recreational economy (CTCR 2004).

Recent housing growth has occurred primarily in the larger communities of Wenatchee and East Wenatchee. New housing development has been low in communities like Brewster and Bridgeport, and median house values in the smaller communities are below the state average (Washington State Data Book 2003). A review of the multiple listing services for the local project area suggests limited available housing to buy or rent.

3.8.2 Environmental Consequences

Proposed Project

Construction Effects

Population

Permanent population changes are not expected from construction of the project facilities. A temporary increase in the local population may occur during project construction if workers from outside the general area seek convenient, temporary accommodations rather than returning to their own homes.

Employment and Income

Construction would cost about $17.3 million for the summer/fall Chinook program components and about $5.5 million for the spring Chinook component, for a total of about $22.8 million (CTCR 2004). Expenditures for labor, materials, and services would likely occur within the local area and throughout the State of Washington primarily at the contractor's discretion.

Construction would provide short-term employment opportunities for local and non-local labor, based on the location of the prime and sub-contractors and the need for skilled and general laborers. Construction would contribute to statewide direct and indirect construction-related expenditures, with corresponding employment and income impacts. The number of local residents who may be employed during construction is not predictable, but the construction work force would likely range from about 20 up to 100 full- and part-time positions at one time depending on the construction phase.

Construction expenditures for the summer/fall Chinook program components lead to total direct and secondary expenditures[3] amounting to about $35.6 million (Table 3-9). This figure includes about $13,026,000 million in statewide labor income, contributing to about 385 to 425 short-term jobs. For the spring Chinook program component, the total

[3] Secondary expenditures are purchases made by persons receiving income from the project.

statewide direct and secondary expenditures would be about $11.4 million which would contribute about $4.1 million in labor income from to about 120 to 135 short-term jobs.

Table 3-9. Proposed Project Construction and Operation Expenditures

Construction-Operation Component	Direct Capital and Operation Costs	Estimated Total State and Local Expenditures	Estimated Total Labor Income (Statewide)	Estimated Total Potential Employment (Statewide and Local)
Summer/Fall Chinook Program Capital Construction Costs	$17,370,000	$35,604,000	$13,026,000	385-425 (Statewide short-term)
Summer/Fall Chinook Program Operation Costs (Annual)	$1,203,000	$2,466,000 (High Range)	$902,000 (High Range)	8-15 (Local; includes Spring Chinook Component & Monitoring-Evaluation)
Spring Chinook Program Capital Construction Costs	$5,570,000	$11,417,000	$4,177,000	120-135 (Statewide Short-Term)
Spring Chinook Operation Costs (Annual)	$385,000	$789,000 (High Range)	$289,000 (High Range)	Included with Summer/Fall Chinook Program Above

Sources: Confederated Tribes of the Colville Reservation 2004; Office of Financial Management 2004.

Housing and Local Services

Local temporary housing and lodging opportunities are currently limited and are expected to remain limited during construction. Although a portion of the construction workforce may commute from the Wenatchee-East Wenatchee area, most workers would stay in local motels, other rentals, or use nearby RV parks and temporary RV facilities.

Local utility and municipal services for transportation, power, telephone/computer connections, and sewer are available to meet the needs of project construction and operation (CTCR 2004). Hatchery water would come from the Columbia River and groundwater wells. Population impacts resulting from project construction and operation would not require an investment in new local services beyond those already planned for general development. No new services are required for the project. Temporary increase in local demand for retail goods and services (e.g. fuel, groceries, personal supplies, and restaurants) is likely during construction.

Operations Effects

Population

Operation of the proposed hatchery and acclimation ponds would require a workforce of about 8 to 15 full and part-time positions. Even assuming each employee has additional family members, the effect of the increase in local population on area infrastructure is expected to be slight. Potential population growth related to any improved salmon-related recreational opportunities is also expected to be negligible.

Employment and Income

Operating costs for the CJHP (all program components), including labor, supplies, leases, travel, hardware, etc., would be about $1.2 million annually. Total labor salary costs would be about $612,000 annually in 2008 dollars. It is expected that local residents with appropriate skills and training would be employed by the CJHP.

Housing and Local Services

Permanent housing availability near the hatchery site is limited. The proposed project includes construction of three houses for permanent employees and connections for up to four RVs or camp trailers at the hatchery housing site. It is expected that other employee housing needs would be met by the local supply.

Federal fish hatchery facilities are exempt from local and county property taxes. Currently, there are no payment-in-lieu of taxes agreements with Okanogan County for such facilities (S. Furman, Okanogan County, personal communication, November 2005), so the project would be generate no property tax revenues to support local government.

Economic Value of Fisheries

The CJHP, although not a commercial operation, could help establish tribal ceremonial and subsistence fisheries and recreational fisheries that would have economic value. The economic value for these fisheries is usually expressed in terms of direct net value which measures the change to net social welfare resulting from a project. The value of sport fisheries is also expressed as expenditures. It is the type of value that is used in benefit-cost analyses to assess net economic gains or losses to an economy.

Ceremonial and Subsistence Fisheries

The CJHP is designed in part to help support returning adult Chinook populations to a level where the potential for a predictable ceremonial and subsistence fisheries for the Colville Tribes would be possible. The Colville Tribes' aim is to increase the level of returning adults from less than 1,000 fish to about 8,000 fish annually (CTCR 2004) to meet ceremonial and subsistence demand. Ceremonial and subsistence fisheries are conventionally valued in economic terms at commercial fishing values (approximately $1.00 to $4.00 per pound for Columbia River tailgate fisheries [direct sales by the angler from the back of a vehicle]). An alternative valuation can be done to reflect the total direct net value. This "total value" approach could help provide an idea of the social welfare value of the fishery. The "total value" per fish applied in Table 3-10 is a value estimate developed for the Washington State Department of Ecology. It is used here as a "representative value" for a total value estimate.

Table 3-10 shows the direct net value of the total CJHP fishery at ranges of adult fish return. The ceremonial and subsistence fishery value would be a subcomponent of the total direct net value. Depending upon the magnitude of the summer/fall Chinook adult returns, the total direct net value would likely range from about $822,000 to $1,918,000 annually for early-arriving fish (based on 3,000 to 15, 000 returning fish) and from about $822,000 to $1,644,000 for late-arriving fish (based on 3,000 to 14,000 returning fish). If

estimated at conventional commercial value (assuming $15 to $40 per fish), the annual tribal subsistence and ceremonial value would likely be in the $120,000 to $320,000 range (based on the goal of 8,000 fish).

Table 3-10. Proposed Annual Fish Production Goals Above Wells Dam and Estimated Potential Direct Net Economic Value (2004 Dollars)

Production Type	Total Estimated Adult Production Increase for Fisheries	Estimated Maximum Recreation Fisheries	Estimated Total Direct Net Value/Fish (Representative Value)	Estimated Recreation Direct Net Value/Fish	Estimated Total Direct Net Value for Total Production Increase (2004$)	Estimated Maximum Direct Net Value for Recreation Increase (2004$)
Early Arriving Summer/Fall Chinook (Program Components 1 and 2)	3,000-15,000 fish	7,000 fish	$274.00	$97.50	$822,000-$1,918,000	$682,500
Late Arriving Summer/Fall Chinook (Program Components 1 and 2)	3,000-14,000 fish	6,000 fish	$274.00	$97.50	$822,000-$1,644,000	$585,000
Spring Chinook (Program Component 3)	2,700 (Okanogan Subbasin and CJ Tailrace)	To Be Determined	$274.00	$97.50	$739,800	NA

Source: GDP implicit price deflator for 2004 value estimates; Layton, Brown, and Plummer 1999; Carter ND; Olsen, Richards, and Scott 1991; Huppert et al. 2004; Olsen and White 2004; Confederated Tribes of the Colville Reservation 2004.

Note: These estimates do not include ocean or Lower Columbia River in-river harvest.

Recreational Fisheries

Direct net values for a recreational fishery are typically higher than commercial values. The recreational fishing direct net values used in Table 3-10 reflect recent value estimates associated with Columbia River Initiative water management studies. Based on the maximum expected run size, the annual direct net value for recreational fish would be about $682,500 for early arrivals and about $585,000 for late arrivals.

Estimated recreational fishing expenditures and income impacts are displayed in Table 3-11. Because site-specific data for recreational expenditures are unavailable, these data are based on related sources and the stated assumptions about catch rates per angler day. As such, the value estimates should be acknowledged as representative of what could be expected within the regional economy.

Table 3-11. Proposed Annual Fish Production Goals Above Wells Dam and Potential Recreational Fishing Expenditures and Income Estimates (2004 dollars)

Production Type	Estimated Maximum Increase for Recreational Fisheries	Estimated Recreation Expenditure Per Angler Day (2004$)	Estimated Recreation State Personal Income Per Angler Day (2004$)	Potential Recreation Expenditures (2004$)	Potential State Income Impact (2004$)
Early -Arriving Summer/Fall Chinook	7,000 fish	$81.00 (Mid-Range)	$45.50	$283,500-$1,134,000	$159,250-$637,000
Late-Arriving Summer/Fall Chinook	6,000 fish	$81.00 (Mid-Range)	$45.50	$243,000-$972,000	$136,500-$546,000
Spring Chinook	To Be Determined	$81.00 (Mid-Range)	$45.50	NA	NA

Source: GDP implicit price deflator is used for 2004 value estimates. Layton, Brown, and Plummer 1999; USFW 2003; Carter unpublished; Olsen, Richards, and Scott 1991; Huppert et al. 2004; Olsen and White 2004; Confederated Tribes of the Colville Reservation 2004.

Note: For potential recreation expenditures and state income, a catch rate range of one fish per 0.5-2.0 angler days is applied above. Also expenditure data per trip and per fish is highly influenced by varying locations and catch rates and whether the fishery is largely local in nature or export (destination fishery for sport fishermen). Estimates do not include ocean or lower Columbia River in-river recreational harvest.

At the local or regional level, annual recreational expenditures are estimated to be about $283,500 to $1,134,000 for early-arriving summer/fall Chinook and about $243,000 to $972,000 for late-arriving fish. State-level sales multipliers for recreational expenditures on goods and services average about 2.0 and usually range between about 1.5 to 2.5 (Loomis and Walsh 1997). Consequently, the total state level expenditure impacts will likely exceed the values provided in Table 3-11.

Potential state income impacts are based on available ODFW estimates for fresh water salmon fishing (Carter unpublished). Potential state income impacts related to sport fishery expenditures are estimated to range between $159,250 to $637,000 for early arriving summer/fall Chinook and about $136,500 to $546,000 for late-arriving fish.

Electric Power Rates

BPA anticipates that its' Fish and Wildlife Program investments will be about $700 million annually for the 2007-2009 period (BPA 2005). This value was factored in to establish BPA's wholesale power rates for the 2007-2009 rate period. If NPCC recommends funding the CJHP, and BPA decides to fund it, funds would be allocated from the established Fish and Wildlife Program budget, and power rates would not be affected. However, funding CJHP may affect decisions on which other projects are funded in the rate period.

3.8.3 Environmental Justice

Under Executive Order 12898 to the Council of Environmental Quality, environmental justice guidelines have been established to disclose disproportionately high or adverse environmental effects on minority and low income populations (CEQ n.d.). These effects are summarized below.

- Population: no change to minority or low income populations is expected.
- Income/employment: some additional jobs and income may be available to local minorities and low income families during CJHP construction and operations, but no substantial long-term change to employment or income is expected.
- Housing: no changes to housing availability, costs, or quality in the local communities would occur as a result of CJHP.
- Local services: during construction (about 2 years), an increase in demand for local services is likely near the hatchery site (Bridgeport and Pateros), but demand is not expected to rise to the level where product or service availability or price is unusually affected.
- Power rates: BPA wholesale power rates would not change due to the CJHP, and it is expected that local PUD rates would similarly be unaffected.
- Ceremonial and subsistence and recreational fisheries: the value (non-monetary) of an improved Colville Tribal ceremonial and subsistence fishery would likely increase the quality of life of Tribal members in general. An improved recreational fishery for the general public would likely benefit other local minorities and low income families as well.

No Action Alternative

With the No Action alternative, Chinook salmon are likely to continue to return above Wells Dam and into the Okanogan subbasin. With current trends and rates of return, it is possible that meaningful social or economic benefits to the region from salmon: 1) may not be realized, 2) may be realized at a much slower pace than with the CJHP, or 3) may be only partially realized in the long term. The uncertainty of future salmon returns and rates makes the likelihood of BPA meeting its mitigation obligation for construction of the upper Columbia River dams equally uncertain.

3.8.4 Cumulative Effects

The CJHP would add relatively few permanent jobs to the region, so the incremental effects on area population, income, and needed to change infrastructure and services would be negligible. The CJHP may combine with other community efforts to contribute a substantial benefit to the social welfare of the Confederated Tribes of the Colville Reservation and local recreationists if the values of potentially increased fisheries are realized and an element of economic diversity is provided. The numerous federal, state, local, and tribal efforts to improve fish populations, river flow, and aquatic habitat in the

region should result in salmon population increases which, together, should provide economic benefits.

3.9 Cultural Resources

Cultural resources include prehistoric and historic archaeological sites, historic structures, and traditional cultural properties (TCPs - places that may or may not have human alterations, but are important to the cultural identity of a community or Indian tribe). The National Historic Preservation Act of 1966, as amended, requires that these resources be inventoried and evaluated for eligibility for listing in the National Register of Historic Places (NRHP) and that project effects be determined. Laws and regulations protecting cultural resources are described in Chapter 4.

3.9.1 Affected Environment

The CJHP area setting is typical of the Columbia Plateau, characterized by geological features, plant and animal communities and waterways that are important to traditional Native American uses. The CJHP project sites along the Okanogan and Columbia rivers and Omak Creek are lands within the Colville Reservation or lands within the historical homeland of three member tribes of the Colville Tribes: the San Poil-Nespelem, the Moses-Columbia, and the Southern Okanogan. The Colville Tribes comprise descendants of 12 different aboriginal groups: the Wenatchee, Chelan, Entiat, Methow, Okanogan, Nespelem, San Poil, Lakes, Colville, Moses-Columbia, Palus, and Chief Joseph Band of the Nez Perce. Archaeological evidence from reservation sites suggest that the area has been occupied since around 7,000 years ago (CTCR 2000).

Family groups of the Middle Columbia Salish peoples typically dispersed from winter villages in the spring when root crops matured. Salmon fishing spanned May to August, and people tended to gather in fishing camps. Dispersal to hunting grounds began in late summer. Winter villages were constructed in October and November typically in the lowlands along major rivers and near firewood.

The arrival of European goods and diseases greatly altered traditional ways of life. The first direct contact between the people of this area and non-Indians occurred around 1811 when fur traders explored the area (CTCR 2000). By the mid-1800s, the governor of the Washington Territory recommended that reservations be established to relocate Indian tribes to prevent conflicts with settlers. The Colville Reservation was established by Executive Order in 1872 for all non-treaty peoples of northeastern Washington.

Historically, the Okanogan River provided an important subsistence fishery for the Colville Tribes. To take advantage of fish and water, most permanent tribal villages were established along the river (CTCR 2004). With the extirpation of anadromous fish from other parts of the Colville Reservation, the remaining Okanogan and Columbia river fishery is inadequate to meet ceremonial and subsistence needs of tribal members.

Significant historic structures in the CJHP area include the Highway 17 bridge (circa early 1950s, listed in the NRHP (www.nr.nps.gov, site accessed 6/7/06), the Cascade Columbia Railroad paralleling the Okanogan River (built by the Great Northern Railway Company in 1910, actively in use, not listed in the NRHP), and Chief Joseph Dam

(completed in 1954) area including Rufus Woods Lake (designated as the Rufus Woods Lake Archaeological District, determined to be eligible for NRHP listing (USACE 2002)).

3.9.2 Environmental Consequences

The National Historic Preservation Act of 1966 (U.S.C. 470 et seq., as amended) Section 106 requires federal agencies to consider the effect of any proposed undertakings on properties listed in, or eligible for listing in, the NRHP. BPA contracted with Colville Tribes' History and Archaeology Program to survey the CJHP sites for cultural resources, to determine their importance as traditional use sites, and to determine the effects of proposed activities on the resources. Background literature searches and a combination of pedestrian and subsurface shovel testing surveys were conducted.

Proposed Project

Hatchery Site

The hatchery site was used as a staging area during construction of Chief Joseph Dam in the early 1950s and was subject to extensive ground disturbance that included grading, filling, road construction, and shoreline stabilization. The area was originally surveyed prior to construction of the dam, and no artifacts were found, and subsequent surveys by the USACE in 1976 and the Colville Tribes in 2002 identified no cultural materials, so no additional field investigations were performed there.

Pedestrian surveys and limited shovel testing were conducted on the well field site. No cultural materials were observed, no standing historic structures were present, and the area was determined to not have a high probability for cultural resources. The water pipeline routes and about 1,500 feet along the Chief Joseph Dam relief tunnel were surveyed, and no historic cultural materials were found.

Three historic properties are visible in the vicinity of the hatchery site: the Highway 17 bridge, a section of wagon road, and the Chief Joseph Dam. The hatchery would modify the background setting of these historic resources, but its appearance and function would be consistent with structures typically associated with large dams. The hatchery would not affect the historical significance of listed or eligible sites.

Housing Site

The pedestrian survey of the housing site revealed no archaeological sites. The entire area of potential effect is within a stabilized dune field and is not a high probability area for cultural resources. Construction and occupancy would not affect known cultural sites or traditional cultural properties.

Ellisforde, Tonasket, Bonaparte and St. Mary's Mission Ponds

Most modifications to these existing irrigation and acclimation ponds would occur within the developed areas, resulting in little to no new ground disturbance. Where ground disturbance or cultural materials were likely, pedestrian and shovel test surveys were

conducted. No archaeological materials or historic structures were identified, so no known cultural sites or traditional cultural properties would be affected.

Riverside Pond

This site received a pedestrian survey and shovel testing. One spot yielded artifacts and debitage (Weaver and Shannon 2006). The layout of proposed facilities at this site was changed to avoid this spot, so no effect to cultural resources is expected. However, if construction reveals additional cultural resources, work would stop until the finds could be properly assessed and consultation with the SHPO and THPO occurs.

The Cascade Columbia Railroad crosses the property. An existing road crossing would be used for project access, but no new effects to the railroad are likely. No other historic structures exist on this site.

Omak Pond

Development of a new fish acclimation pond, water supply intake and pipeline, and outlet pipe to the Okanogan River would occur in proximity to a National Register-eligible site, 450K188 (Weaver and Shannon 2006). Pedestrian surveys and shovel testing identified another site that is recorded as potentially eligible for NRHP listing.

Digging the pond and water supply lines would require excavation of an extensive area to a depth of about 3.5 feet. It is unlikely that cultural material could be avoided by this action, so BPA and the Colville Tribes agreed to an exploration and mitigation plan to address effects to cultural materials. Remote sensing, data recovery excavations, construction monitoring, and long-term curation of artifacts has been mutually accepted.

Traditional Cultural Properties

Research indicates that while there are TCPs near or within the project sites, no adverse affects are anticipated (Weaver and Shannon 2006). Traditional cultural resources (TCRs) (native plants and animals used by the Tribes) are also present throughout the general area, but the project would have very little effect on all of them except the native fish runs. The three components of the proposed action would result in different levels of Chinook salmon returns to the Okanogan subbasin and their potential cultural and/or subsistence use by the CTCR. While return levels are highly dependent upon ocean and river conditions, it can generally be concluded that the greater the number of healthy smolts released, the greater the number of fish that may return to the Okanogan River subbasin, and the greater likelihood of Tribal use for ceremony and subsistence. Any or all of the three program components can be implemented. Their effects on TCR use potential are as follows:

- Program Component 1: Production of 1,100,000 summer/fall Chinook smolts. Returning fish are expected to meet escapement needs, increasing their abundance and distribution throughout the Okanogan subbasin. Adoption of this component alone would probably not be sufficient to allow an increased and sustainable tribal ceremonial or subsistence harvest.

- Program Component 2: Production of 500,000 early-arriving and 400,000 late-arriving summer/fall Chinook smolts added to Program Component 1 would be expected to meet escapement needs and provide enough fish to increase and sustain a tribal ceremonial and subsistence fishery. Implementation of only Program Component 2 probably would not be sufficient to satisfy traditional cultural uses.

- Program Component 3: Production of 900,000 spring Chinook smolts would be expected to add another element to a stable ceremonial and subsistence fishery for tribal members over time.

No Action Alternative

With the No Action Alternative, cultural resources and TCPs would remain unaffected. The Omak Pond site would not be studied and mitigated or materials curated, and site information would likely go unrecorded. Salmon production would not significantly increase and tribal ceremonial and subsistence use of this TCR would likely be unchanged from current conditions.

3.9.3 Cumulative Effects

Construction of CJHP facilities would contribute to a continuum of development and policies that affect historic cultural values and resources (e.g., agricultural production, housing and infrastructure development, regional fish management policies, and ocean and river harvest of salmon). The CJHP, in conjunction with other fishery management efforts, would help increase populations of Chinook salmon, a culturally important resource. Cultural resource investigations conducted as part of this project contribute cumulatively to the body of knowledge of history and uses of the area.

3.10 Air, Noise and Public Safety

3.10.1 Affected Environment

Air

The Environmental Protection Agency (EPA) and WDOE have responsibility for air quality in Okanogan County. WDOE has adopted the National Ambient Air Quality Standards (NAAQS) established by the EPA. Washington State ambient air quality standards have been established for total suspended particles, particulate matter (PM_{10} and $PM_{2.5}$), ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and lead (Pb). While WDOE concerns itself with regional air quality, EPA has jurisdiction over air quality on the Colville Reservation until the Colville Tribes adopt their own air resource management program.

There is very little specific information about air quality in Okanogan County or the Colville Reservation. No baseline data for particulate matter exists, and ambient air quality standards have not been established. Generally, the location, terrain, and wind patterns result in optimum conditions for maintaining high air quality through the Okanogan Valley. Visual observations indicate that the largest source of suspended fine

particles appears to be road dust from vehicles. Since Okanogan County's economy is based primarily on rural agriculture, the relatively sparse population tends to indicate that pollution would be fairly low.

Fugitive dust represents a common pollutant generated during construction. State regulations require that the owner or operator of any 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. Construction equipment may also be a prominent local source of exhaust emissions.

Noise

Okanogan County has adopted Washington State's regulations for maximum environmental noise levels (WAC 173-60). The Washington Administrative Code establishes three environmental districts for noise abatement. Class A applies to residential areas; Class B applies commercial areas; and Class C applies to industrial areas. Noise originating from temporary construction sites is exempt from these regulations except where the noise affects Class A receptors at night. No baseline for existing background noise levels has been established Okanogan County or the proposed project sites.

Noise levels at all project sites are typical of rural areas of eastern Washington. Noise sources near the hatchery and housing sites are dominated by Chief Joseph Dam and powerhouse and include Half-Sun Way, State Highway 17, and the Columbia River. Noise sources near the acclimation pond sites are flowing river water and wind through riparian vegetation. Bonaparte and Ellisforde ponds are on Highway 97 and the Cascade Columbia River Railroad where there is additional continuous traffic noise and intermittent noise from trains. The Riverside site also has intermittent train noise.

Public Safety

Numerous tribal, federal, state, county, and city agencies provide public health and safety resources for the Okanogan Valley. The Okanogan County Sheriff's office serves as the communications link between the public and the emergency service providers (Okanogan County 2005). Within the Colville Reservation, the Colville Tribes provide additional public health and emergency services including law enforcement, fire protection, and health and medical treatment. Colville Tribal services are coordinated with county services as appropriate.

Available health and medical services within the county including the North Valley Hospital in Tonasket, Mid-Valley Hospital in Omak, and the Okanogan Douglas Hospital in Brewster. Each offers emergency room services.

Fire protection is provided by the county. The Omak, Tonasket, Riverside, and Brewster/Pateros fire districts have fire stations that are staffed by volunteer fire-fighters.

The risks of intentional destructive acts (terrorism, sabotage or extreme vandalism) or catastrophic accidents is very low in remote, lightly populated, relatively unindustrialized Okanogan County. Wildfires or damage to the Columbia River dams would be the most

threatening events. Effective forest and rangeland wildfire protection and suppression measures are coordinated among the Washington Department of Natural Resources, U.S. Forest Service, and the Colville Tribes Natural Resources fire management staff. The Chief Joseph Dam is a highly protected, secure federal facility.

3.10.2 Environmental Consequences

Proposed Project

Air

Construction Effects

Air quality effects would be short term and localized, ceasing once construction is complete. Fugitive dust from land clearing, grading, excavation, wind erosion of stockpiles, and construction traffic on unpaved roads would be the main air pollutant. Vehicle emissions would also add particulates and other pollutants in the air near construction activity. Most construction activity would occur at the hatchery, housing, hatchery water pipelines, and the Riverside and Omak pond sites. Construction activities at the St. Mary's Mission, Ellisforde, and Bonaparte pond sites require little ground disturbance and are expected to create very minor amounts of dust.

At the hatchery site construction would have the greatest potential for generating fugitive dust because the area to be cleared is relatively large and activity is expected to last about 2 years. Implementation of the measures below is expected to keep fugitive dust from construction below the Washington State legal standards for PM10 and PM2.5.

- Limit ground disturbance to the smallest area possible at one time
- Apply water or other dust abatement compounds on unpaved roads, stockpiles, and excavated areas.
- Cover stockpiles or excavated areas that would remain exposed for several weeks

Operations Effects

Operation of the hatchery facilities and ponds is not expected to produce fugitive dust or other air pollutants in excessive amounts. Soil exposed during construction would be landscaped to reduce the potential for wind erosion. Access roads would be graveled or paved to prevent dust and erosion. Electrical power would be used to run pumps and other mechanical systems, avoiding combustion exhaust.

Noise

Construction Effects

The hatchery, housing, and acclimation ponds sites are in areas characterized as rural residential, agriculture, or industrial. Noise is expected to be generated by equipment, vehicles, and personnel during facility construction. Due to the rural or industrial setting

of most of the project sites, it is not anticipated that construction noise would exceed the standards identified for Class A or Class B receptors. Although temporary construction noise is exempt from State of Washington noise regulations (except where it affects Class A receptors at night), the noise effects at each project site are discussed below.

Hatchery Site

A continuous level of considerable noise would be generated during daylight work hours over the two year construction period. The USACE Chief Joseph Dam offices and industrial facilities across the Columbia River would be the nearest point of human hearing reception. Noise from Chief Joseph Dam turbine outflow would likely mask all hatchery construction noise.

Housing Site

Construction is expected to take about 7 months from October through April during daylight hours. Golfers at Lake Woods Golf Course would be the nearest receptors during the late-spring or early-fall recreation season.

Hatchery Water Supply

Drilling and testing of well sites would take about a year, introducing continuous noise during the day that would likely be audible to Bridgeport State Park users. Burying the water supply pipeline along Half-Sun Way would take several months and would be heard at the park and golf course.

Acclimation Ponds

Riverside Pond would be constructed in a rural area where hay farming occurs. Three residences within a mile of the site would likely experience daytime construction noise and traffic for about 7 months. Omak Pond would be constructed within a half mile of 15 rural residences. Daytime construction noise would also be heard for about 7 months.

Intermittent noise would be generated at the existing Bonaparte, Tonasket, Ellisforde, and St. Mary's Mission ponds during minor construction and maintenance activities.

Operations Effects

During standard operation, the hatchery and acclimation ponds would generate intermittent noise at low levels. The water pumping systems would be the most audible. The noise generated on these sites is not expected to exceed the Washington State Class A and Class B standards.

Public Safety

Construction Effects

For construction workers, safety risks may include falling, cutting and crushing hazards, and heavy vehicular equipment hazards. The potential for injuries depends upon contractor experience, proper supervision and training of workers, and adherence to

BMPs and state and federal safety standards. Risks to the general public would be negligible as they would be excluded from construction sites.

Emergency services during construction would be available through initial contact with the Okanogan County Sheriff's office via a phone call to "911". Although Okanogan County is a large rural area with few developed communities and the project sites are widespread, police, fire, EMT, and hospital services are available from key communities dispersed throughout the county, thus minimizing response time. Additional staffing from these services is not expected to be needed to handle the amount and type of emergencies that may occur during the project's construction phase.

Operations Effects

To prevent unauthorized access and for public safety, the hatchery and acclimation ponds would be fenced and gated. Access to the Riverside Pond across the Cascade Columbia River Railroad grade would require signage to caution vehicles to beware of trains.

Chemicals that may be used at the hatchery include chlorine, formalin, iodaphor, and sodium thiosulphate. Staff would be trained in their proper use, transport, handling and storage to minimize dangers of over-exposure or accidental release to the environment. Appropriate safety equipment would be provided, and chemicals would be stored in areas designed to contain the chemical in the event of a spill according to the Washington Industrial Safety and Health Administration regulations, the Uniform Fire Code, and other applicable regulations. Any used absorbent materials containing controlled chemicals would be disposed consistent with the Material Safety Data Sheet and applicable federal, state, and local regulations.

Existing emergency service providers are within 15 miles of all project sites, so even a very catastrophic injury or incident should receive relatively prompt response. The risks of intentional destructive acts (terrorism, sabotage or extreme vandalism) or catastrophic accidents should not change with the existence of the hatchery or acclimation ponds.

No Action Alternative

Under the No Action Alternative, noise, air and public safety would remain unchanged from the current situation. No construction would take place at the hatchery, housing site, or ponds.

3.10.3 Cumulative Effects

For the duration of construction, the cumulative air quality near the hatchery, housing and Omak and Riverside pond sites would likely be adversely affected by dust and perhaps vehicle emissions. These effects would dissipate daily, and entirely once construction is complete. Air quality impacts would comply with Washington State regulations.

The hatchery would add to the ambient noise level but would not exceed Washington State noise standards. Since the area is already dominated by the noise from the dam, the effect is considered negligible. Because the area around the housing site is not expected to attract more development, the housing site itself is the only sound source nearby other

natural ambient sound, so no cumulative effect exists. Minor pump and water flow noises at the acclimation ponds would be practically undetectable from nearby receptors.

No cumulative effects are expected to public health.

3.11 Aesthetics

3.11.1 Affected Environment

Hatchery Site

Although the hatchery site sits on a plateau along the Columbia River and in close proximity to the Chief Joseph Dam, the visual quality of the site is considered low. The site was heavily modified during construction of the dam, has been graded, irrigated, and planted to non-native grasses. The site is a gently westward-sloping, grass-covered plateau about 70 to 100 feet above the Columbia River and about 150 feet below the top of the Columbia Plateau. It is not considered visually distinctive or unusual within the region. Figure 3-5 shows the hatchery site as viewed from across the Columbia River near the Chief Joseph Dam administrative complex, and Figure 3-6 is the view from the USACE visitor orientation area adjacent to the site.

The site is surrounded by shrub-steppe habitat typically found in the non-irrigated portions of the Columbia Basin. No distinctive natural landscape or geological features exist on or near the site.

Chief Joseph Dam, the dam's administrative offices and associated structures are located directly upstream and across the river, and dominate the local viewshed. The Town of Bridgeport is visible about one mile downstream. The USACE visitor orientation area is due west of the proposed hatchery site. Half-Sun Way runs above the north edge of the proposed site. A steep, rocky slope, sparsely covered with sage, scrub brush, and grasses runs from the river edge to the south edge of the site and above Half-Sun Way to the top of the Columbia Plateau.

Views of the site are unrestricted from the dam's visitor center across the river, from the USACE visitor orientation area along the slope to the west, and from Half-Sun Way. Views partially restricted by slope occur from the tribal fishing area east of the site near the base of the dam. The number of viewers from these vantage points depends on seasonal recreational and tribal fishing opportunities.

Travelers on State Highway 17 get brief views of the site, varying from restricted to unrestricted. To slower moving traffic along Half-Sun Way, unrestricted foreground views of the site are available for a longer duration. About 5% of the 2,250 residents of Bridgeport (about 1 mile down river) may have restricted views of the site. Viewing durations are estimated to range from less than a minute up to eight hours per visit.

Housing Site

The housing site is located east and upslope of the hatchery complex site above Half-Sun Way and southwest of the Lake Woods Golf Course. This undeveloped site is sparsely covered with native shrub-steppe vegetation and is visible to travelers on Half-Sun Way. The number of potential viewers varies with traffic flow on Half-Sun Way and seasonal operation of the golf course and state park. The visual quality of the site is considered to be low due to the lack of visually significant characteristics in the view corridor.

Ellisforde Pond

Ellisforde Pond is in an agricultural area with orchards south of the site and east of US Highway 97. The site includes an existing fenced irrigation pond which has already been modified for fish rearing. Agricultural workers may have infrequent unrestricted views of the site from the orchard to the south. Local travelers and sightseers have partially restricted foreground views from Highway 97. These views are partially restricted by the elevated tracks of the Cascade Columbia River Railroad and the orchard to the south. Views of the site from the Okanogan River are restricted by riparian vegetation growing on the river bank. The visual quality of the site is considered to be low due to the lack of visually significant characteristics.

Tonasket Pond

Tonasket Pond, an existing irrigation pond with pumping equipment, is in an area of relatively flat farm land abutting steep bluffs sparsely covered in native vegetation. Local travelers on State Highway 7 and residents of several nearby farmhouses have unrestricted foreground views of the site. Recreational viewers have restricted foreground views from the Okanogan River due to dense riparian vegetation. The visual quality of this site is considered low due to the lack of visually significant characteristics.

Bonaparte Pond

Bonaparte Pond is near the Town of Tonasket between the Okanogan River and the Cascade Columbia River Railroad and US Highway 97. The visual character of the area changes from agricultural to commercial/industrial upon approaching Tonasket. The site consists of an existing irrigation/acclimation pond and pump system within a fenced, graveled yard. Traveler's foreground views are partially restricted by the elevated railroad tracks. Foreground views from the Okanogan River are restricted by trees and brush growing on the river bank. Partially restricted mid-ground views of the site may be available from the commercial/industrial areas northeast of the pond. The visual quality of the site is considered to be low due to the lack of visually significant characteristics.

Riverside Pond

Riverside Pond would be located between the Okanogan River and the Cascade Columbia River Railroad west of Omak/Riverside Eastside Road. The visual character of the general area is relatively flat farm lands below steep bluffs covered in native shrub-steppe vegetation. The site is currently a hay and alfalfa field. A farmhouse is directly across the Okanogan River from the site.

Visitors and local residents have unrestricted foreground views from Omak/Riverside Eastside Road and adjacent croplands. Restricted foreground and mid-ground views may be available from the Okanogan River and the farmhouse across the river, although visibility is restricted by dense riparian vegetation. The overall visual quality of the proposed site is considered low due to the lack of visually significant characteristics.

St. Mary's Mission Pond

St. Mary's Mission Pond is in an area of rural agricultural and undeveloped land. The site is a flat fallow field already developed with a concrete acclimation pond/raceway with steel grate cover and pump equipment. Local travelers and recreational viewers have unrestricted foreground views of the site from North Omak Lake Road. Views of the site are restricted from the north by vegetation growing along the bank of Omak Creek. The visual quality of the site is considered low due to the lack of visually significant characteristics.

Omak Pond

The Omak Pond site is on Brooks Tracts Road near the Colville Tribes' Fish & Wildlife Department's office. The general area has rural agricultural/residential character. Nearby residents have unrestricted foreground views of the site. Partially restricted mid-ground views of the site may be available from the residential areas on the bluff across the Okanogan River from the site. Other potential views are restricted by well established trees surrounding most of the site. The visual quality of this site is considered to be low due to the lack of visually distinct characteristics.

3.11.2 Environmental Consequences

Potential effects on aesthetic resources include temporary visual changes during construction and permanent visual changes as a result of construction and operation of project facilities. The most visually sensitive viewers include sightseers and local travelers along State Highway 17 and US Highway 97, workers at the Chief Joseph Dam complex, and residents near some of the pond sites.

Construction Effects

Hatchery Site

Construction activities would occur constantly for about 2 years primarily during daylight hours. Construction workers and equipment would be observable from key viewpoints, particularly from the USACE visitor orientation area adjacent to the site. Construction activities would also occasionally generate fugitive dust which could partially obscure views depending upon the amount of dust generated at any one time. Dust abatement practices would help reduce this impact. During the construction period, low to moderate impacts would occur to the visual quality in the general area.

Housing Site

Housing construction would be visible from Half-Sun Way and the west end of the Lake Woods Golf Course. Construction activities would be apparent during daylight hours for about seven months. Fugitive dust also would be occasionally visible from these view points. Housing construction would have a low impact on visual resources because the views would be of short duration, and the number of viewers would be limited.

Acclimation Ponds

Construction activity and a little dust may be noticeable at Ellisforde Pond (an existing facility) for 2 to 5 months as improvements to the outlet and installation of monitoring and telemetry systems occur.

Installing telemetry equipment at Tonasket Pond would be very short duration and without visual effects.

At Bonaparte Pond, a little dust and temporary views of construction workers and equipment (backhoes, bulldozers, etc.) would be seen for about 5 months.

Construction of Riverside Pond would be obvious to users of Omak/Riverside Eastside Road and local residents for about 7 months as views of construction workers, heavy equipment, supply vehicles, and dust would be apparent. Dust abatement would curtail the effects occasionally.

At St. Mary's Mission Pond, the visual effects of proposed modifications at this existing facility would last about 2 months. Overall the facility would not appear different except a little dust may be temporarily created, and a chain link fence would surround the pond.

Omak Pond construction would be obvious to nearby residents and users of the Brooks Tracts Road for about 7 months. Construction workers, heavy equipment, supply vehicles, and dust would be seen regularly. Water supply pipeline trenching along Brooks Tracts Road and trucks hauling excavated material would be the most noticeable activities. Dust abatement would be especially important at this site.

Operations Effects

Hatchery Site

After construction, the visual character of the hatchery site would change from a grass-covered, irrigated field to that of a fenced, industrial fish hatchery facility (Figure 3-7). Visually, the facility would introduce a 20,000 square foot hatchery support building approximately 25 to 35 feet high; a 4,000 square foot administration building and visitor center, approximately 20 to 30 feet high; a head works structure and other low-height structures (approximately 1 to 4 feet high) including fish rearing raceways, waste treatment pond, adult holding tanks and fish ladder.

The main production area and adult fish holding facility would be surrounded by chain-link security fencing providing 24-hour restricted access. The administration building and visitor center would also be fenced for security, but the gates would be open during normal hours of operation to allow visitor access.

The security fence surrounding the facility would be black vinyl-coated chain link in order to reduce its visual contrast. Neutral colors would be used on building roofs and exteriors to reduce their visual effect. Architectural elements which are suggestive of the culture of the Colville Confederated Tribes would be incorporated into the building design. The main hatchery building would be located on the north side of the site to reduce its prominence. The adjacent service yard area would be paved to support year-round activity and limit dust.

Once completed, the hatchery would enhance the experience of visitors and sightseers by providing visual and educational opportunities within the visitor center. The hatchery would be visible from the Chief Joseph Dam administration and maintenance facilities across the Columbia River. USACE workers would have extended views of the site and are therefore more likely to be affected by the visual quality of hatchery features.

While some views of the site from parts of the Town of Bridgeport may be altered, the distance from the site makes the visual effect considerably lower. Also, since the site is well below the top of the rim of the Columbia River plateau, the structures would have little effect local skyline views. While the working area of the hatchery would be restricted to public access, the perimeter of the facility could be connected to the existing public trail system and the existing USACE visitor orientation area in a manner compatible with current uses. The view across the site from these public areas is currently dominated by Chief Joseph Dam and powerhouse. It is not an uninterrupted, natural scenic view.

Housing Site

The visual character of the 23-acre housing site would change from undeveloped shrub-steppe habitat to low-density housing (3 structures). Building roofs and exteriors would be of natural-colored materials to reduce their visual prominence. Driveways and access roads would be unpaved, producing some occasional fugitive dust. Landscaping would be a mix of traditional lawns, flowerbeds and gardens, and native vegetation. The equipment storage area and the four proposed temporary housing spots (RV or camp trailer pads) would be situated to minimize their visibility from the golf course.

Acclimation Ponds

The proposed modifications and operation of existing facilities at Ellisforde, Tonasket, Bonaparte, and St. Mary's Mission ponds should be unnoticeable to the casual viewer as they are not expected to change the area's visual character or scenic quality.

The new Riverside Pond would not significantly change the visual character of the area from that of rural farm land. Omak Pond would be a more apparent alteration among adjacent small farms and rural homes. Whether or not the ponds are roofed (funding permitting), the facilities would appear similar to irrigation ponds or other buildings

typical of the river corridor. Building roofs and exteriors would be of natural-colored materials to reduce their visual prominence. If not roofed, the ponds would be surrounded by chain link fences and gravel perimeters for vehicle access. The uncovered configurations would probably be less visible.

Views by local travelers and residents of the Riverside Pond site in particular would be restricted by existing vegetation along both banks of the Okanogan River, the elevated tracks of the Cascade Columbia River Railroad, and its distance from US Highway 97. Operations and maintenance activities would have low visual impact due to short view durations, the limited number of viewers, the limited number of people working at the facilities, and the seasonal nature of the activities (October to April annually).

3.11.3 Cumulative Effects

Anticipated development patterns around Chief Joseph Dam would likely include industrial and public use facilities which are similar in appearance to those found today, most of which support the operation of Chief Joseph Dam. The hatchery and employee housing would add to the accumulation of development in the vicinity of Chief Joseph Dam, but would likely be overshadowed by the dam and its associated facilities. The hatchery would not be expected to substantially alter the visual character of the area or contrast with existing or potential future development.

The low-profile of the new below-grade Riverside and Omak ponds would not be expected to contribute to adverse cumulative effects on the viewshed within the Okanogan River valley as views of irrigation ponds and similar buildings in the area are not uncommon. There should be no cumulative impacts associated with modifications at the other acclimation ponds.

The CJHP, together with other fish protection and enhancement efforts in the watershed, could add a significant element of visual quality through chances to seasonally view salmon as they migrate to spawn in the Okanogan Basin and the Columbia River below Chief Joseph Dam.

3.12 Unavoidable Adverse Effects and Irreversible and Irretrievable Commitment of Resources

The CJHP would entail irreversible and irretrievable commitments of some agricultural land (about 6 acres), some shrub-steppe habitat (about 10 acres), some non-native vegetation shrub-steppe habitat (about 20 acres), and riparian vegetation (less than 1 acre) where new development is proposed (hatchery complex, housing site and two new ponds). The stream reaches between the intakes and outlets of the ponds would have slightly lower total flow when water is diverted for fish acclimation (October through April annually). Placement of new facilities within floodplains could also reduce floodplain function to some minor, localized degree. Building materials, fuel, equipment and operational supplies comprised of various materials such as rock, metals, wood, glass, plastic, petroleum products and other chemicals would be installed and/or consumed at all sites.

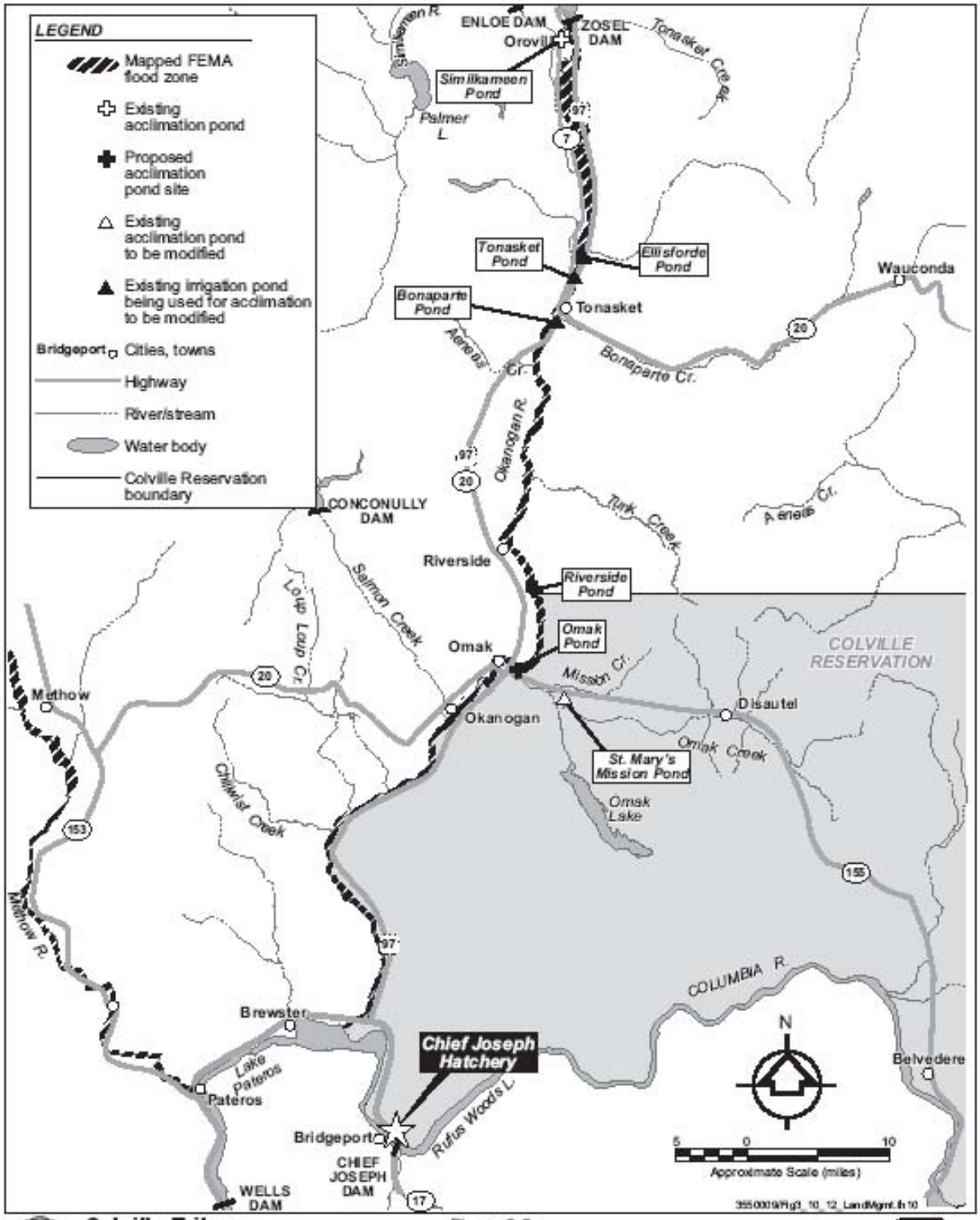
3.13 Short-term Use of the Environment and Effects on Long-term Productivity

The CJHP is expected to greatly enhance productivity of the aquatic environment through salmon population increases, from which other aquatic and terrestrial species including humans may derive benefits. The lands developed as a hatchery complex, employee housing and acclimation ponds would be permanently taken out of vegetative productivity. Construction activities would temporarily affect more land than would be permanently developed with hatchery structures, but long-term productivity would not likely be adversely affected because of the measures that would be taken to restore disturbed, undeveloped areas to pre-existing condition or better (replanting with native species, weed control, standard construction BMPs, etc.). The stream reaches between the intakes and outlets of the ponds would have slightly lower total flow when water is diverted for fish acclimation (October through April, outside the normal irrigation season). The No Action alternative would not significantly change the aquatic environment or alter any terrestrial sites.

3.14 Additional Mitigation Measures

The CJHP design process incorporated many measures to help avoid, minimize or compensate for potential adverse effects. For example, to prevent potential damage from intentional destructive acts (i.e. vandals, sabotage, terrorist acts), certain security measures are included. Security fencing, gates and lighting are proposed at the hatchery, and employee housing was relocated from the hatchery complex to a separate location to control visitors at the hatchery complex and the vicinity of Chief Joseph Dam in off-duty hours. Moving the housing also ameliorates the aesthetics of the hatchery complex somewhat from the dam site and USACE visitor area as does selecting common building materials and architectural design for all structures to be as congruent as possible with other structures nearby. Other examples include using native vegetation, vegetation screens and weed control when re-landscaping disturbed areas; using standard construction BMPs to prevent erosion and pollution contamination; using dust abatement to protect air quality at disturbed areas; dewatering in-stream work areas, scheduling in-stream work during low river flows, and filtering pump-return water to lessen sedimentation and provide safer work conditions; and having a cultural resources specialist present to monitor site clearing, excavation and foundation preparation activities at sites with potentially sensitive cultural resources.

If this project proceeds to final design and implementation, other mitigation measures may be applied as required to secure permits, approvals, leases, rights-of-way, or other instruments, or to respond to conditions that may have changed or may be different than anticipated in the preliminary planning process.



Colville Tribes
CHIEF JOSEPH HATCHERY PROGRAM
DRAFT ENVIRONMENTAL IMPACT STATEMENT

Figure 3-3.
Project Area Land Management; FEMA Flood Zones

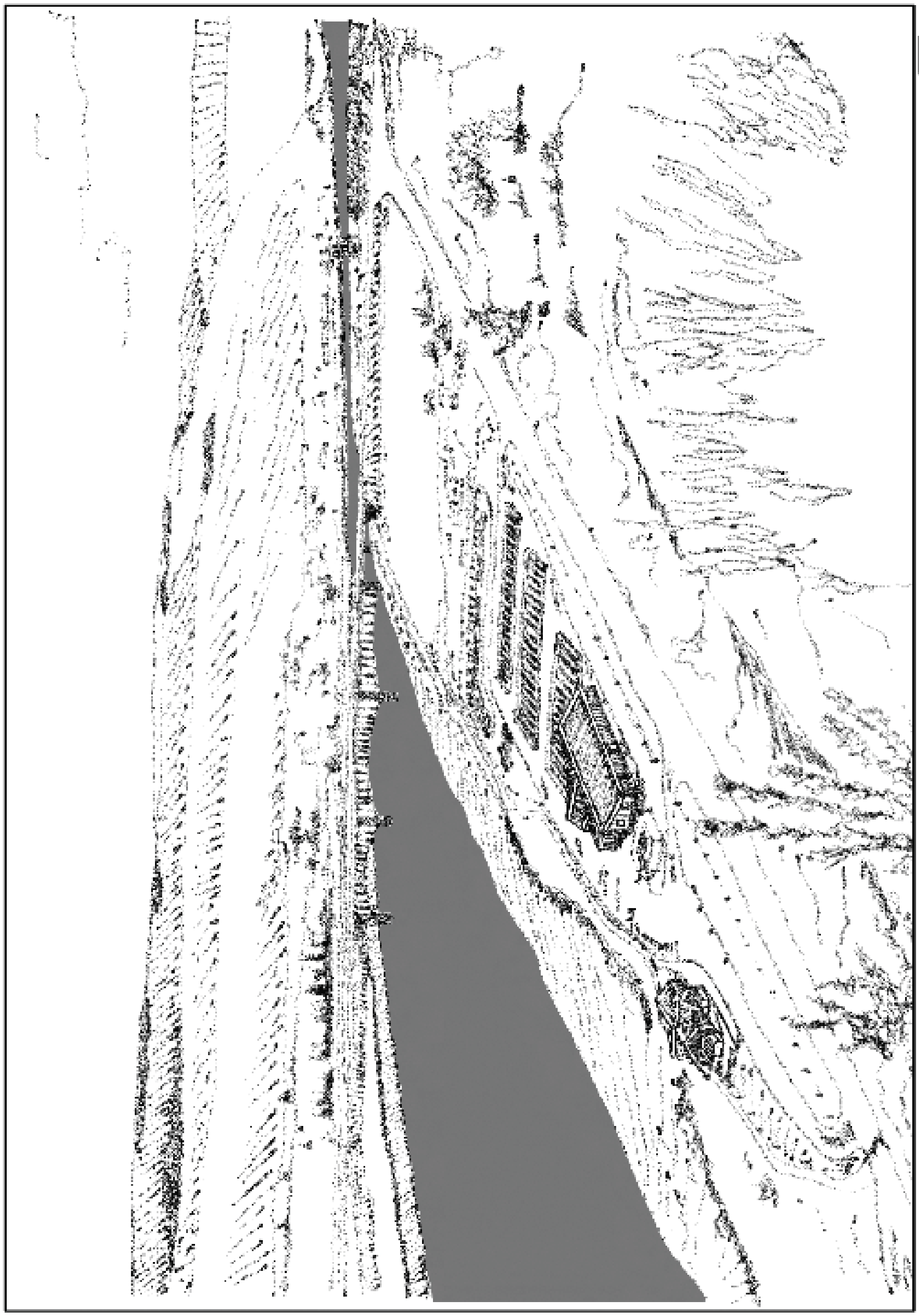
TETRA TECH/KCH

Figure 3-5. View of the Proposed Hatchery Site from the South Side of the Columbia River

Figure 3-6. View of the Hatchery Site from Visitor Orientation Area

Figure 3-5. View of the Proposed Hatchery Site from the South Side of the Columbia River

Figure 3-6. View of the Hatchery Site from Visitor Orientation Area



Colville Tribes
CHIEF JOSEPH HATCHERY PROGRAM
DRAFT ENVIRONMENTAL
IMPACT STATEMENT

Figure 3-7
Architect's Rendering of the Proposed Chief Joseph Hatchery

TETRA TECH/KCM

CHAPTER 4: CONSULTATION AND COORDINATION

Numerous federal, state, and local environmental laws and administrative requirements must be satisfied prior to initiation of the proposed project. Compliance with these regulatory requirements is examined in this chapter. The intent of each law, regulation, ordinance, or guideline is described, followed by an assessment of the proposed project's compliance/consistency.

4.1 National Environmental Policy Act

The National Environmental Policy Act of 1969 as amended (42 USC 4321 et seq.) requires federal agencies to assess and disclose the effects of proposed actions on the environment. This EIS has been compiled to meet NEPA requirements, enabling BPA, the Colville Tribes, and the other agencies involved to consider and disclose the potential environmental consequences of and mitigation for the proposed action.

BPA and the Colville Tribes conducted formal scoping meetings and informal outreach efforts with interested and potentially affected parties. The identified key issues were used to guide the environmental analysis. Copies of the Draft EIS have been sent to the relevant agencies, organizations, and interested parties for review and comment (Appendix A). After a formal public comment period on the Draft EIS, responses to comments and additions, corrections, or clarifications to the analysis will constitute the Final EIS. The Final EIS will be used by federal decision-makers to determine if they wish to proceed with the Chief Joseph Hatchery Program.

4.2 Wildlife and Habitat

4.2.1 Federal Endangered Species Act

The Endangered Species Act of 1973 and its amendments (ESA, 16 USC 1531 et seq.) require federal agencies to ensure that their actions do not jeopardize endangered or threatened species or their critical habitats. Sources of information for the potential occurrence of sensitive species and their habitats in the project area include NOAA Fisheries, USFWS, and the Washington Natural Heritage Database. Each was consulted during formulation of the EIS for lists of threatened, endangered, sensitive, or candidate species and presence of habitat. Based on this information, a Biological Assessment (BA) was prepared and submitted to USFWS and NOAA Fisheries on May 5, 2006 for formal ESA Section 7 consultation. USFWS concurred with the findings of the BA in regards to ESA-protected species under their purview on June 9, 2006 with several recommendations:

1. captured bull trout should be radio-tagged and tracked, and these activities should be covered by ESA Section 10 permit

2. tracking should be coordinated with other entities to provide comprehensive coverage and cost efficiency

3. an annual report should be produced of bull trout observations, captures, and tagging.

NOAA Fisheries responded that a Biological Opinion would be provided by September 2007, and that a jeopardy opinion is not forthcoming. No decision on the proposed action will be reached by BPA until this consultation is complete. Potentially affected species are discussed in Sections 3.3 and 3.4 of this EIS.

4.2.2 Fish and Wildlife Conservation

The Fish and Wildlife Coordination Act of 1934 (16 USC 661 et seq.) requires federal agencies to consult with the USFWS and state fish and wildlife agencies when "waters of any stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted…..or otherwise controlled or modified" by permit or license. Provisions of the Pacific Northwest Electric Power Planning and Conservation Act of 1980 (6 USC 839 et seq.) are intended to protect, mitigate, and enhance fish and wildlife of the Columbia River and its tributaries. Other federal acts and laws, such as the Fish and Wildlife Conservation Act of 1980 (16 USC 2901 et seq.), encourage federal agencies to conserve and promote conservation of game and non-game species and their habitats.

The proposed action would divert waters of the Columbia and Okanogan rivers and Omak Creek to rear and acclimate Chinook salmon. This use would enhance restoration of Okanogan summer/fall Chinook and Upper Columbia River spring Chinook, increasing their abundance, productivity, distribution, and diversity. A copy of this EIS will be sent to the USFWS for consultation under the Fish and Wildlife Coordination Act. Sections 3.2 and 3.3 of this EIS describe the potential effects to fish and wildlife resources.

4.3 Heritage Conservation and Cultural Resources Protection

The National Historic Preservation Act of 1966 as amended (16 USC 470) requires federal agencies with land management or permitting authority to take into account the potential effects of their undertakings on properties that are listed or eligible for listing on the National Register of Historic Places. Consultation must occur with the State Historic Preservation Office (SHPO) and relevant Tribal Historic Preservation Office (THPO) regarding the inventory and evaluation of properties potentially eligible for National Register nomination and to determine whether the project undertaking would adversely affect them. Cultural resource surveys were conducted at each proposed project site where ground disturbance may occur (Sections 3.9). Consultation was initiated with the SHPO and Colville Tribes' THPO on April 19, 2005, and is on-going pending the field investigation and mitigation at one project site.

Facilities proposed on federal or Tribal land will follow the requirements of the Archaeological Resource Protection Act (16 USC 470 et seq.). ARPA requirements must be followed should archaeological resources be removed from the hatchery site, housing site or Riverside or Omak pond sites. The Archaeological and Historic Preservation Act (16 USC 469 et seq.) directs federal agencies to notify the Secretary of the Interior if they find that a federal action might cause the destruction of significant scientific, prehistoric

or archaeological data. Section 3.9 discusses the likelihood of encountering cultural materials at the proposed construction sites.

Executive Order 13175, Consultation and Coordination with Indian Tribes, states that the U. S. government will continue to work with Indian Tribes on a government-to-government basis to address issues concerning tribal self-government, trust resources, and Indian tribal treaty and other rights. The Chief Joseph Hatchery Project, a project sponsored by the Confederated Tribes of the Colville Reservation, would contribute to the spirit of intergovernmental cooperation, and upon implementation, has the potential to enhance the culturally significant tribal ceremonial and subsistence fishery for Chinook salmon in the Okanogan River and the Columbia River below Chief Joseph Dam.

4.4 Floodplain/Wetlands Assessment

Executive Orders 11988, Floodplain Management and Executive Order 11990, Protection of Wetlands, require the protection of these areas. If either would be affected or altered by project facilities, the effects must be disclosed. Section 3.4 and 3.6 of this EIS describe the effects of the proposed project on wetlands and FEMA-mapped floodplains.

4.4.1 Resource Description

A narrow corridor along the Okanogan River is designated as a floodplain by FEMA (Figure 3-3) (FEMA 1981 and 1997). The Columbia River floodplain near the hatchery site has not been mapped by FEMA, probably because of the flow regulation attributable to Chief Joseph and Wells dams. Omak Creek, a small tributary to the Okanogan River, has not had its floodplain mapped by FEMA either.

Each proposed project site was inspected to determine the presence of hydrophytic vegetation and other key wetland indicators. Two wetland areas were identified: a constructed wetland adjacent to Tonasket Pond and patches of narrow-leaved willow at the hatchery site. The Tonasket Pond wetland was constructed by OTID and is watered by irrigation outflow from the pond. The willow patches near the hatchery site result from irrigation seepage and total less than 0.5 acres.

4.4.2 Floodplain/Wetlands Effects

Modifications of the intakes and outlets at the existing irrigation ponds would occur within the Okanogan River floodplain and riparian areas, as would the new construction of Riverside and Omak ponds. These activities would not substantially reduce or impair the Okanogan River floodplain due to its width and gradient at these locations. Similarly, the proposed hatchery outfall and fish ladder would not obstruct the passage of flow in the Columbia River channel below Chief Joseph Dam.

Construction would not occur in or affect any natural wetland areas outside the riparian areas. The constructed wetland at Tonasket Pond would not be affected because no activities are proposed there (Section 3.4.2). Near the hatchery site, a few small patches of willows supported by irrigation seepage would be eliminated by construction. Salvage of the willows for cuttings for revegetation is planned.

4.4.3 Alternatives

Where new construction is proposed, facilities have been sited to avoid wetlands if possible. Water supply intakes and hatchery/acclimation pond outlets are water dependent uses, and it is not feasible to locate these facilities outside of the floodplain and riparian areas. Construction of Riverside and Omak ponds would be within the FEMA-mapped Okanogan River floodplain, but no practical alternatives exist for siting these two ponds. Several alternative designs and other sites were investigated, but were found to render no substantial difference in effects to floodplains. It is essential that the ponds be located to use the river waters for imprinting and acclimation of juvenile salmon and to allow smolts to eventually volitional release into the rivers for out-migration.

4.4.4 Mitigation

Steps taken to avoid or minimize adverse effects on floodplains include limiting the profile of structures to alter the least amount of in-stream, stream-side and floodplain area and not unnecessarily hinder the passage of flow. In addition, Best Management Practices will be incorporated into the final design and construction protocols to minimize the short-term effects of in-stream or near-stream construction on the river channels. The amount of new construction within floodplains has also been reduced by proposing to use several existing irrigation ponds along the Okanogan River for fish acclimation and release.

4.5 Other Consultation and Compliance Requirements

4.5.1 State, Area-wide, and Local Plans and Approval

Various federal, state, tribal, and local permits and approvals would be required to implement the Chief Joseph Hatchery Program. Project components on federal land include the Chief Joseph Hatchery and the housing site (USACE) and the Riverside site (BPA). State and federal permits may apply to construction and operations at these sites. Facilities on the Colville Reservation (the proposed Omak Pond and modifications to St. Mary's Mission Pond) would require tribal governmental approval. Modifications to Bonaparte, Ellisforde and Tonasket ponds may require federal, state, Okanogan County, and Oroville-Tonasket Irrigation District approvals prior to construction (Table 4-1).

The hatchery and acclimation ponds are water-dependent uses, so in-water work permits and approvals would be required. Elements would be incorporated into project design to assure consistency with the appropriate authorizations once they are known.

In-stream construction requires a Hydraulic Project Approval (HPA) from WDFW or the Colville Tribes, depending on the work location. The HPA would specify when in-water work can occur and what measures would be needed to protect channels, riparian zones and water quality. In addition, a Shoreline Substantial Development Permit may be required from Okanogan County (under authority delegated by WDOE) or the Colville Tribes for working within 200 feet of a waterway. This permit would stipulate conditions for near-water construction activities. Okanogan County and the Tribes may also require an approval to allow construction within a designated floodplain to assure that appropriate design measures are included.

Table 4-1. Permits and Other Approvals Expected to be Required for the Hatchery and Acclimation Ponds

Type of Permit	Permitting Agency / Authority	Permit Timeline
Water Rights (Groundwater and surface water)	CCT and WA Dept of Ecology	1 year
NPDES for Hatchery Discharge	EPA	6 months – 1 year
Corps Clean Water Act Sections 404/10	Corps of Engineers	6 months – 1 year
ESA and Intake Screening	NOAA Fisheries USFWS	6 months
Water Quality Certification (Section 401)	CCT WDOE	90 days
NPDES Stormwater General Permit for Construction	EPA WDOE	45 days (not required until construction begins)
Hydraulic Project Approval	CCT WDFW	6 months – 1 year
Floodplain Approval	CCT Okanogan County	120 days
Shoreline Substantial Development Permit	CCT Okanogan County	120 days
Land Use/Building Permits	CCT Okanogan County	120 days
Utility Franchise	Okanogan County	90 days
Railroad Crossing	Cascade Columbia River Railroad	6 months – 1 year

4.5.2 Clean Water Act

The Clean Water Act of 1977 (33 U.S.C. 1251 et seq.) is the principal federal law governing water pollution control. It regulates discharges into waters of the United States. Two of the primary instruments for implementing this act are the National Pollutant Discharge Elimination System (NPDES) and the state water quality certification program, both of which are delegated by the federal government to WDOE to administer. The NPDES will be required to operate hatchery facilities while the water quality certification program will define specific construction-related mitigation measures that contractors must follow. Applications will be made to WDOE for both permits when final facility design is developed, including firm construction schedules and quantities and quality of hatchery discharges. In addition, a Section 404 permit will be sought from the USACE for the discharge of dredged or fill material into waters of the United States.

4.5.3 Farmland Protection Policy Act

The Farmland Protection Policy Act (7 U.S.C. 4201 et seq.) (FPPA) directs federal agencies to identify and quantify adverse effects of federal programs on farmlands. The

purpose of the act is to minimize the number of programs that unnecessarily contribute to the conversion of agricultural land to non-agricultural purposes.

Two project facilities, the Riverside and the Omak acclimation ponds, would be constructed on lands currently used for agriculture. A third site, St. Mary's Mission Pond, is located within the perimeter of a fallow field; however, modifications would affect very little of this field and would not preclude agricultural use from occurring on the remainder of the site. Other project facilities would not affect farmland.

The Riverside Pond site, owned by BPA, is part of a 60 acre parcel that has been used in the past for hay and grass production, although it currently lies fallow. About 15 acres of this parcel would be disturbed temporarily by construction activities, and about 4 acres would be permanently converted from farmland to an acclimation pond, access road, pump station, etc. The rest of the parcel could be leased or managed for continued agricultural production or to provide wildlife forage and cover.

The Omak Pond site is a four acre field that once may have been in productive agricultural use, but currently lies fallow. This parcel is designated by the Colville Tribes as Rural and also is within the tribal Shoreline Management planning area. Two acres of this parcel would be permanently converted from farmland use to an acclimation pond, access road, and pump station. The conversion of this farmland to other uses would be inconsistent with the tribal planning guidance for rural areas.

4.5.4 Noise Control Act

The Noise Control Act of 1972 (42 U.S.C.490 et seq.) promotes an environment free from noise that jeopardizes human health and welfare. Federal and state regulations establish guidelines that implement the intent of the act. No local noise standards exist for areas that would be affected by the proposed action. No noise in excess of state, federal and tribal standards is expected from this project (Section 3.10). Temporary construction noise during daylight hours is exempt from state and federal standards.

4.5.5 Clean Air Act

Emissions produced by construction and operation of the proposed project facilities must meet standards of the Clean Air Act and the amendments of 1970 (42 USC 741 et seq.). In Washington, the authority for ensuring compliance with this act is delegated to WDOE. The proposed action would not violate current clean air standards, as described in Section 3.10.

4.5.6 Resource Conservation and Recovery Act (RCRA), Toxic Substances Control Act (TSCA) and Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)

The federal Resource Conservation and Recovery Act (42 USC 692 et seq.) regulates the disposal of hazardous wastes. The Toxic Substances Control Act (15 USC 2601) gives authority to the EPA to regulate substances that present unreasonable risks to public health and the environment. The federal Insecticide, Fungicide and Rodenticide Act (7 USC 136 et seq.) authorized the EPA to prescribe conditions for use of pesticides. Construction, operation and maintenance of the proposed facilities would meet the

guidelines for use, handling, storage, and disposal of such hazardous substances (Sections 3.6 and 3.10. Necessary permits would be obtained if regulated pesticide products are used.

4.5.7 Environmental Justice

Executive Order 12898 directs federal agencies to consider the effects of their programs, policies and activities on minority and low-income populations. Federal agencies are required to assess environmental justice concerns in the NEPA analysis. The potential for the Chief Joseph Hatchery Project to affect low-income communities and minority populations is summarized in Section 3.8.3.

CHAPTER 5: LIST OF PREPARERS AND REVIEWERS

Preparers

Boyce, Jeff Meridian Environmental, Inc.	Lead: Land Use, Transportation, Air, Noise	15 yrs interdisciplinary planning and analysis M.S. Forest Resources Management B.S. Forest Management
Corsini, Amy Meridian Environmental, Inc.	Document Production	6 yrs environmental and engineering document production M.B.A. in progress B.S. Business, Project Management
Grant, Paul PanGeo, Inc.	Geology, Hydrogeology, Soils	30 yrs geotechnical and earthquake engineering M.B.A. Business M.S. Civil Engineering B.S. Civil Engineering
McGlenn, John TetraTech-KCM	Manager: P.E. Engineering	30 yrs civil and structural design, project management M.S. Civil Engineering B.S. Ceramic Engineering
McLanahan, Eileen Meridian Environmental, Inc.	Senior Reviewing Terrestrial Biologist	25 yrs evaluation of effects of water resources projects on terrestrial species M.S. Biology B.A. Biology
Malone, Kevin Mobrand-Jones & Stokes	Lead: Fisheries Biology	21 yrs fisheries issue analysis, predictive modeling M.S. Biology B.A. Biology
Nice, Darrel TetraTech-KCM	Civil Engineering	14 yrs project engineering, design, inspection, surveying and construction B.S. Mechanical Engineering
Nichol, Joan Meridian Environmental, Inc.	NEPA Coordinator	25 yrs environmental planning and permitting B.A. Zoology (in progress)
Olsen, Darryll Pacific Northwest Project, Inc.	Socioeconomics	25 yrs regional resource economics management and planning Ph.D. Applied Energy Studies M.A. Quantitative Analysis History B.A. History and Philosophy
Portman, Dan TetraTech-KCM	Graphics	14 yrs technical editor and illustrator B.A. Communications B.S. Aerospace Engineering

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Boyce, Jeff Meridian Environmental, Inc.	Lead: Land Use, Transportation, Air, Noise	15 yrs interdisciplinary planning and analysis M.S. Forest Resources Management B.S. Forest Management
Corsini, Amy Meridian Environmental, Inc.	Document Production	6 yrs environmental and engineering document production M.B.A. in progress B.S. Business, Project Management
Grant, Paul PanGeo, Inc.	Geology, Hydrogeology, Soils	30 yrs geotechnical and earthquake engineering M.B.A. Business M.S. Civil Engineering B.S. Civil Engineering
McGlenn, John TetraTech-KCM	Manager: P.E. Engineering	30 yrs civil and structural design, project management M.S. Civil Engineering B.S. Ceramic Engineering
McLanahan, Eileen Meridian Environmental, Inc.	Senior Reviewing Terrestrial Biologist	25 yrs evaluation of effects of water resources projects on terrestrial species M.S. Biology B.A. Biology
Malone, Kevin Mobrand-Jones & Stokes	Lead: Fisheries Biology	21 yrs fisheries issue analysis, predictive modeling M.S. Biology B.A. Biology
Nice, Darrel TetraTech-KCM	Civil Engineering	14 yrs project engineering, design, inspection, surveying and construction B.S. Mechanical Engineering
Nichol, Joan Meridian Environmental, Inc.	NEPA Coordinator	25 yrs environmental planning and permitting B.A. Zoology (in progress)
Olsen, Darryll Pacific Northwest Project, Inc.	Socioeconomics	25 yrs regional resource economics management and planning Ph.D. Applied Energy Studies M.A. Quantitative Analysis History B.A. History and Philosophy
Portman, Dan TetraTech-KCM	Graphics	14 yrs technical editor and illustrator B.A. Communications B.S. Aerospace Engineering

Shappart, Jason Meridian Environmental, Inc.	Lead: Water Quality	10 yrs fish and aquatic habitat effects analysis B.S. Fisheries
Torell, Betsy Mobrand-Jones & Stokes	Lead: Terrestrial Biology	13 yrs wildlife, wetlands, fisheries issues analysis, predictive modeling B.S. Wildlife Science
Warren, Dan D.J. Warren and Associates	Project Manager	25 yrs project management, salmon enhancement, hatchery programs M.B.A. Project Management B.A. Fisheries
Watts, Stacey TetraTech-KCM	Aesthetic Resources, Architecture	21 yrs industrial and commercial facility design B.A. Architecture

Reviewers

Austin, Robert BPA	Deputy Manager, Fish and Wildlife Program
Carter, Mickey BPA	Environmental Protection Specialist
Egerdahl, Ryan BPA	Risk Analyst
Hermeston, Linda BPA	Fish and Wildlife Project Manager
Marco, Jerry Confederated Tribes of the Colville Reservation	Fish and Wildlife Department
Peone, Joe Confederated Tribes of the Colville Reservation	Fish and Wildlife Director
Pierce, Kathy BPA	NEPA Compliance Officer
Smith, Steve Stephen Smith Fisheries Consulting	Fisheries and Hatchery Technical Advisor
Weintraub, Nancy BPA	Environmental Protection Specialists, Team Lead for Fish and Wildlife Project Environmental Compliance

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CHAPTER 7: INDEX

GLOSSARY

Ambient	surrounding or all around, as in ambient air temperature
Eutrophic	refers to water that has an excess of nutrients which can lead to high biological oxygen demand. This in turn may result in depleted oxygen in the water and lethal conditions for fish and other aquatic organisms.
Flashy	pertains to streams whose flow increases and decreases rapidly
Forebay	the portion of the reservoir immediately upstream of a dam's turbine intakes
Glacial till	sediments carried or deposited by glaciers, usually very fine particles
Granitic	composed of granite or granite-like rock
Hydrograph	a graph showing the stage, flow, velocity, or other water-related properties in relation to time
Lacustrine	pertaining to or originating from lakes
Metamorphic	rocks which have been changed by pressure, heat, or chemical processes to another form of rock; usually occurs in rock layers below the influence of weathering
Morainal	pertaining to the ridge of rock and soil deposited at the end and sides of glaciers
Phytoplankton	small plants (often one-celled) that float or drift in water
Piscivorous	fish-eating
Redd	the nest dug in the gravel substrates of streams for egg deposition during spawning by salmonids
Riparian	adjacent to or living on river banks
Riprap	broken rock used to stabilize river banks from flows and wave action
Smolt	juvenile anadromous salmonids that have completed their freshwater rearing phase and are preparing to migrate to saltwater
Stream-type	Chinook salmon juveniles that reside in their natal streams for at least one year

Appendix A

List of Agencies, Organizations and Persons Contacted

APPENDIX A
LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS CONTACTED

The project mailing list contains about 200 contacts, including tribes; public officials; local, state and federal agencies; news media; potentially interested or affected landowners; interest groups; businesses; special districts; libraries; and the media. They have directly received or have been instructed on how to receive all project information made available so far, and they will have an opportunity to review the Draft EIS.

Tribes or Tribal Groups

Burns Paiute Tribe
Coeur d'Alene Tribe
Columbia River Intertribal Fish Commission
Confederated Tribes and Bands of the Yakama Nation
Confederated Tribes of the Colville Reservation
Confederated Tribes of the Umatilla Indian Reservation
Confederated Tribes of the Warm Springs Reservation
Kalispel Indian Community of the Kalispel Reservation
Kootenai Tribe of Idaho
Nez Perce Tribe
Nisqually Indian Tribe
Shoshone-Bannock Tribes of Fort Hall
Spokane Tribe of Indians
Tulalip Tribes of the Tulalip Reservation
Upper Columbia United Tribes

Washington Public Officials

Governor Christine Gregoire
US Senator Maria Cantwell
US Senator Pat Murray
US Representative Cathy McMorris
State Senator Linda Evans-Parlette
State Senator Bob Morton
State Representative Mike Armstrong
State Representative Cary Condotta
State Representative Joel Kretz
State Representative Bob Sump

Local Governments

Okanogan County, WA
Cities, WA
- Brewster
- Bridgeport
- Okanogan
- Omak

Tonasket

Washington State Government

Department of Ecology
Department of Natural Resources
Department of Fish & Wildlife
Parks and Recreation Commission
Department of Transportation
Department of Water Resources

Federal Agencies

Army Corps of Engineers
Bonneville Power Administration
Bureau of Indian Affairs
Bureau of Land Management
Bureau of Reclamation
Department of Energy
Environmental Protection Agency
Federal Emergency Management Agency
Fish and Wildlife Service
Forest Service
NOAA National Marine Fisheries Service
Natural Resources Conservation Service

News Media

The Columbia Basin Bulletin
The Okanogan County Chronicle, Omak WA
The Spokesman Review, Spokane WA
The Wenatchee World, Wenatchee WA
Various radio stations covering the Okanogan Subbasin and the greater project area

Libraries

Brewster Library
Bridgeport Library
Coulee City Library
East Wenatchee Library
Grand Coulee Library
Leavenworth Library
Okanogan Library
Omak Library
Oroville Library
Pateros Library
Wenatchee Library

Businesses, Special Interests, and Other Organizations

American Rivers
Blue Bird, Inc.
Cascade and Columbia River Railroad
Chelan County PUD
Colville Tribal Enterprises Corporation
Conservation Northwest
Douglas County PUD
Grant County PUD
H J Properties
Lakewood Golf Club, Inc.
Longanecker Orchards, Inc.
Midway Oroville Building Supply
Native Fish Society
Northwest Power and Conservation Council
Nespelem Valley Electric Cooperative
Okanogan County PUD
Okanogan Tourism Council
Save Our Wild Salmon Coalition
Sierra Club
Trout Unlimited
V and B Properties LLC
Whitestone Cattle Company LLC

Other Interested or Potentially Affected Parties, including Local Landowners

Approximately 100 separate contacts

Appendix B

Fish, Wildlife and Plant Species in the General Project Area

APPENDIX B
FISH, WILDLIFE AND PLANT SPECIES IN THE GENERAL AREA

Table B-1. Fish Species Occurring in the Okanogan River Subbasin and the Columbia River between Wells and Chief Joseph Dams

Okanogan River Subbasin	Columbia River	Common Name	Scientific Name	Federal Status	State Status	Resident or Introduced
	X	White sturgeon	*Acipenser tranmontanus*			R
	X	Lake whitefish	*Coreganus clupeaformis*			R
X		Westslope cutthroat trout	*Onchorhynchus clarki lewisi*	SoC		R
X		Lahonton cutthroat trout	*Onchorhynchus clarki lewisi*			I
X	X	Rainbow trout	*Onchorhynchus mykiss*			R
X	X	Redband trout	*Onchorhynchus mykiss*	SoC		R
X	X	Upper Columbia River summer steelhead trout	*Onchorhynchus mykiss*	T	C	R
X	X	Sockeye salmon	*Onchorhynchus nerka*			R
X	X	Kokanee	*Onchorhynchus nerka*			R
X	X	Upper Columbia River summer/fall Chinook salmon	*Onchorhynchus tshawytscha*	N	C	R
X	X	Upper Columbia spring Chinook salmon	*Onchorhynchus tshawytscha*	E	C	R
X		Pygmy whitefish	*Prosopium coulteri*	SoC	S	R
X	X	Mountain whitefish	*Prosopium williamsoni*			R
	X	Brown trout	*Salmo trutta*			I
	X	Bull trout	*Salvelinus confluentus*	T	C	R
X		Brook trout	*Salvelinus fontinalis*			I
X		Lake trout	*Salvelinus namaycush*			I
X	X	Chiselmouth	*Acrocheilus alutaceus*			R
X		Grass carp	*Ctenopharyngodon idella*			I
	X	Common carp	*Cyprinus carpio*			I
X	X	Peamouth	*Mylocheilus caurinus*			R
X	X	Northern pikeminnow	*Ptychocheilus oregonensis*			R
X	X	Longnose dace	*Rhinichthys cataractae*			R
X	X	Leopard dace	*Rhinichthys falcatus*	none	C	R

Okanogan River Subbasin	Columbia River	Common Name	Scientific Name	Federal Status	State Status	Resident or Introduced
X	X	Umatilla dace	*Rhinichthys umatilla*	none	C	R
X	X	Speckled dace	*Rhinichthys osculus*			R
X	X	Redside shiner	*Richardsonius balteatus*			R
X	X	Longnose sucker	*Catostomus catostomus*			R
X	X	Bridgelip sucker	*Catostomus columbianus*			R
X	X	Largescale sucker	*Catostomus macrocheilus*			R
X	X	Burbot	*Lota lota*			R
	X	Pumpkinseed	*Lepomis gibbosus*			I
X	X	Smallmouth bass	*Micropterus dolomieu*			I
X	X	Largemouth bass	*Micropterus salmoides*			I
	X	Black crappie	*Pomoxis nigromaculatus*			I
	X	Yellow perch	*Perca flavescens*			I
	X	Walleye	*Stizostedion vitreum vitreum*			I
X	X	Prickly sculpin	*Cottus asper*			R
	X	Mottled sculpin	*Cottus bairdi*			R
X	X	Torrent sculpin	*Cottus rhotheus*			R

Sources: WDFW 2005; Wydoski and Whitney 2003

E – Federal endangered species
T – Federal threatened species
SoC – Federal species of concern
S – Washington State sensitive species
C – Washington State candidate species
N – Not warranted

Table B-2. Wildlife Species and Associated Habitats in the General Area

Common Name	Scientific Name	Associated Habitats in Project Vicinity
BIRDS		
Canada Goose	*Branta canadensis*	A, OW, W, R
Brandt	*Brant bernicala*	OW, R, W
Mallard	*Anas platyrhynchos*	OW, R, W
Common Loon	*Gavia immer*	OW, R, W
Green-winged Teal	*Anas crecca*	OW, R, W
Lesser Scaup	*Aythay affinis*	OW, R, W
Greater Scaup	*Aythya marila*	OW, R, W
Barrow's Goldeneye	*Bucephala islandica*	OW, R, W
Common Goldeneye	*Bucephala clangula*	OW, R, W
Hooded Merganser	*Lophodytes cucullatus*	OW, R, W
Common Merganser	*Mergus merganser*	OW, R, W
Bufflehead	*Bucephala albeola*	OW, R, W
Wood Duck	*Aix spousa*	OW, R, W
Northern Pintail	*Anas acuta*	OW, R, W
Redhead	*Aythya americana*	OW, R, W
American Widgeon	*Anas americana*	OW, R, W
Gadwall	*Anas strepera*	OW, R, W
Canvasback	*Aythya valisineria*	OW, R, W
Ringneck Duck	*Aythya collaris*	OW, R, W
Killdeer	*Charadrius vociferous*	OW, R, W, A, MD
Great Blue Heron	*Ardea herodias*	W, R, A
Ring-billed Gull	*Larus delawarensis*	OW, R, MD
California Gull	*L. californicus*	OW, R, MD
Bald Eagle	*Haliaetus leucocephalus*	R, OW, W
Golden Eagle	*Aquila chrysaetos*	S-S
Osprey	*Pandion haliaetus*	OW, R
Red-tailed Hawk	*Buteo jamaicensis*	A, R
Swainson's Hawk	*B. swainsoni*	A
American Kestrel	*Falco sparverius*	A, S-S
Northern Harrier	*Circus cyaneus*	A, S-S
Loggerhead Shrike	*Lanius ludovicianus*	S-S
Turkey Vulture	*Cathartes aura*	A, S-S, OW
Burrowing Owl	*Athene cunicularia*	S-S
Short-eared Owl	*Asio flammeus*	S-S
Great Horned Owl	*Bubo virginianus*	S-S
California Quail	*Callipepla californica*	A, S-S, R
Gray Partridge	*Perdix perdix*	A, S-S

Common Name	Scientific Name	Associated Habitats in Project Vicinity
Chukar	*Alectoris chukar*	A, S-S, R
Ruffed Grouse	*Bonasa umbellus*	A, R
Ring-necked Pheasant	*Phasianus colchicus*	A
Merriam's Turkey	*Meleagris gallopavo*	A, S-S
Mourning Dove	*Zenaida macroura*	A, R
Downy Woodpecker	*Picoides pubescens*	R
Lewis' Woodpecker	*Melanerpes lewis*	R
Northern Flicker	*Colaptes aurates*	R
Yellow Warbler	*Dendroica petechia*	W
Northern Oriole	*Icterus galbula*	R
Black-capped Chickadee	*Parus atricapillus*	R
Western Kingbird	*Tyrannus veticalis*	W
House Finch	*Carpodacus mexicanus*	S-S, R, MD
Spotted Towhee	*Pipilo maculates*	R
Sage Thrasher	*Oreoscoptes montanus*	S-S
Sage Sparrow	*Amphispiza belli*	S-S
Brewer's Sparrow	*Spizella breweri*	S-S
Grasshopper Sparrow	*Ammodramus savannarum*	S-S
Belted Kingfisher	*Ceryle alcyon*	R, OW
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*	W
Red-winged Blackbird	*Agelaius phoeniceus*	R, W
Brewer's Blackbird	*Euphagus cyanocephalus*	OW, R, W
Blackbilled Magpie	*Pica pica*	OW, R, MD
American Crow	*Corvus brachyrhynchos*	OW, R, W, A, MD
Common Raven	*C. corax*	R, W, A
European Starling	*Sturnus vulgaris*	A, R, MD
MAMMALS		
Mule Deer	*Odocoileus hemionus*	A, S-S, R
White-tailed Deer	*O. virginianus* ssp. ochrourus	A, S-S, R
Bobcat	*Felis rufus*	S-S, W, R
Black Bear	*Ursus americanus*	R, W, MD, A
Coyote	*Canis latrans*	S-S, A, MD
Raccoon	*Procyon lotor*	S/I, R, MD
River Otter	*Lutra Canadensis*	S/I, R, OW
Muskrat	*Ondatra zibethicus*	S/I, R, OW
Beaver	*Castor canadensis*	S/I, R, OW
Mink	*Mustela vison*	S/I, R
Yellow-bellied Marmot	*Marmota flaviventris*	S-S
Porcupine	*Erethizon dorsatus*	S-S

Common Name	Scientific Name	Associated Habitats in Project Vicinity
Bushy Woodrat	*Neotoma cinerea*	S-S
Sage Vole	*Lemmiscus curtatus*	S-S
Water Vole	*Microtus richardsoni*	R
Merriam's Shrew	*Sorex merriami*	S-S
Water Shrew	*Sorex palustris*	R, W
Cottontail Rabbit	*Sylvilagus spp.*	A
Pallid Bat	*Antrozous pallidus*	OW, A
Western Pipistrelle (bat)	*Pipistrellus hesperus*	OW, A
Long-legged Bat	*Myotis volans*	OW, A
Spotted Bat	*Euderma maculata*	OW, A
REPTILES		
Sagebrush Lizard	*Sceloporus graciosus*	S-S
Northern Alligator Lizard	*Elgaria coerulea*	A
Western Fence Lizard	*S. occidentalis*	A
Western Skink	*Eumeces skiltoniamus*	A
Common Garter Snake	*Thamnophis sirtalis*	R, A, MD
Gopher Snake	*Pituophis melanoleucus*	R, A, MD
Western Rattlesnake	*Crotalus vividis*	SS, MD
Western Terrestrial Garter Snake	*Thamnophis elegans*	R, A, MD
Painted Turtle	*Chrysemys picta*	W, OW

Note: OW = Open Water; W = Wetland; S/I = Shoreline; S-S = Shrub-Steppe; R = Riparian; MD = Mixed-use Development; A = Agriculture

Table B-3. Culturally Significant Plant Species Potentially Occurring in the General Area

Common Name	Scientific Name	Potential Habitats in Project Area
Desert-parsleys	*Lomatium* spp.	SS
Onions	*Allium* spp.	SS
Lilies	*Calochortus* spp.; *Fritillaria* spp.; *Lilium* spp.; *Erythronium* spp.	W, R
Sagebrush	*Artemesia* spp.	SS
Currants	*Ribes* spp.	R
Bitterroot	*Lewisia rediviva*	SS
Serviceberry	*Amelanchier alnifolia*	R
Hawthorn	*Crataegus* spp.	R
Bunchgrasses	*Agropyron* spp.; *Elymus* spp.	SS
Brodiaea	*Brodiaea* spp.	SS
Buttercup	*Ranunculus* spp.	W, R
Tules	*Scirpus* spp.	W, R
Willows	*Salix* spp.	W, R
Cottonwood	*Populus balsamifera* ssp. *trichopcarpa*	W, R
Rabbitbrush	*Chrysothamus* spp.	SS
Sumac	*Rhus glabra*	R
Yarrow	*Achillea millefolium*	SS, MD, A
Plantain	*Plantago* spp.	R, MD, A
Wild rose	*Rosa* spp.	W, R
Dogwood	*Cornus* spp.	W, R
Balsamroot	*Balsamorhiza sagittata*	SS
Buckwheat	*Eriogonum* spp.	SS
Ricegrass	*Oryzopsis* spp.	SS
Cherry	*Prunus* spp.	R
Alders	*Alnus* spp.	R
Asters	*Aster* spp.	SS
Thimbleberry	*Rubus parviflorus*	R
Horsetail	*Equisetum* spp.	R
Raspberry	*Rubus* spp.	R
Poison Ivy	*Toxicodendron radicans*	R
Elderberry	*Sambucus* spp.	R
Oregon grape	*Berberis aquifolium*	R
Arnica	*Arnica* spp.	R, SS
Angelica	*Angelica* spp.	W, R
Spirea	*Spiraea* spp.	W, R
Pachistima	*Pachistima myrsinites*	R
Vetch	*Vicia* spp.	R, A

Common Name	Scientific Name	Potential Habitats in Project Area
Bluebell	*Mertensia paniculata*	R
Lupine	*Lupinus* spp.	SS
Valarian	*Valeriana* spp.	R
Snowberry	*Symphoricarpos albus*	R
Solomon seal	*Smilacina* spp.	R
Fairybells	*Disporum* spp.	R
Stinging nettle	*Urtica dioica*	W, R
Prickly pears	*Opuntia* spp.	SS
Mint	*Mentha* spp.	W, R
Bedstraw	*Galium* spp.	R, MD
Strawberry	*Fragaria* spp.	R, MD
Mule ears	*Wyethia glabra*	R, S-S, MD
Mullein	*Verbascum thapsus*	SS, MD, A
Mountain sweet cicely	*Osmorhiza chilensis*	R
Ryegrass	*Lolium perenne*	MD, A
Dandelion	*Taraxacum* spp.	MD, A

Note: R = Riparian; W = Wetland; SS = Shrub-Steppe; A = Agriculture; MD = Mixed-use Development

Table B-4. Noxious Weeds Potentially Present in the Okanogan River Subbasin or Observed in the Project Area

Common Name[1]	Scientific Name	State Status[2]	County Status[3]
Russian knapweed	*Acroptilon repens*	B	B/C Reduction
Jointed goatgrass	*Aegilops cylindrica*	C	
Whitetop	*Cardaria draba*	C	B/C Reduction
Musk thistle	*Carduus nutans*	B3	New invader, B-designate
Spotted knapweed	*Centaurea biebersteinii*	B3	B/C Reduction
Diffuse knapweed	*Centaurea diffusa*	B	B/C Reduction
Yellow star thistle	*Centaurea solstitialis*	B3	New invader
Rush skeletonweed	*Chondrilla juncea*	B3	New invader
Canada thistle	*Cirsium arvense*	C	B/C Suppression
Poison hemlock	*Conium maculatum*	C	
Field bindweed	*Convolvulus arvensis*	C	
Common crupina	*Crupina vulgaris*	A	A
Scotch broom	*Cytisus scoparius*	B3	B-designate
Wolf's milk	*Euphorbia esula*	B3	B-designate
Orange hawkweed	*Hieracium aurantiacum*	B3	New invader
Meadow hawkweed	*Hieracium caespitosum*	B3	New invader
Dalmatian toadflax	*Linaria dalmatica*	B3	B-designate
Yellow toadflax	*Linaria vulgaris*	C	New invader, B/C Reduction
Purple loosestrife	*Lythrum salicaria*	B3	B-designate
Mat nardusgrass	*Nardus stricta*	Monitor	
Scotch thistle	*Onopordum acanthium*	B3	New invader, B-designate
Reed canarygrass	*Phalaris arundinacea*	C	
Russian thistle	*Salsola iberica Sennen*		B/C Suppression
Tansy ragwort	*Senecio jacobaea*	B3	B-designate
Silverleaf nightshade	*Solanum elaeagnifolium*	A	A
Buffalobur nightshade	*Solanum rostratum*	A	A
Johnsongrass	*Sorghum halepense*	A	A
Puncturevine	*Tribulus terrestris*	B	B/C Suppression
Mullein	*Verbascum thapsus*		B/C Suppression

[1] List of species potentially present based on Ashley and Stovall 2004.

[2] State Status, based on Washington State Noxious Weed Control Board, 2007
Class A weeds are non-native species with a limited distribution in the state. State law requires eradication.
Class B species are established in some regions of Washington, but are of limited distribution or not present in other regions of the state. Because of differences in distribution, treatment of Class B weeds varies by region.
Class B-designates are designated for control in Region 3, which includes Okanogan County.
Class C weeds are already widely established in Washington or are of special concern to agriculture. Designation by the state allows counties to enforce control locally, if desired.
Monitor species have no legal status, but the Washington State Noxious Weed Control Board believes the species is invasive or poses a threat to Washington, and additional information is needed about distribution, abundance, or biology.

[3] County status, based on Okanogan County Noxious Weed Control Board, 2007
New invaders: Okanogan County reserves the right to develop and/or coordinate control programs for these weeds, which may pose a very serious threat in the county, while not yet having been recognized by the state as Class A.
Class A: Okanogan County has adopted, by reference, the species listed as Class A at the state level.
Class B-designates: Okanogan County has adopted, as B-designates, the species listed as Class B in Region 3. Control for Class B-designates is defined as prevention of all seed production within a single program year, with the eventual goal being to reduce the total acreage of the plant to a point where eradication is possible.
Class B/C reduction: This classification includes Class B and Class C species that are too widespread to be immediately controlled or eradicated county-wide, but the long-term goal is also to reduce the area they occupy. Landowners are to concentrate initial reduction efforts in high-priority areas, such as roadways, driveways, and property boundaries.
Class B/C suppression: This classification includes Class B and Class C species that are so widely disseminated that prevention of seed reproduction within a single season is not practical. Nonetheless, the county encourages landowners to control them.

BONNEVILLE POWER ADMINISTRATION
PO BOX 3621 PORTLAND, OREGON 97208-3621

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