Chief Joseph Hatchery Program

Biological Assessment

Action Agency: Bonneville Power Administration

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I. Introduction

This Biological Assessment was prepared for the proposed Chief Joseph Hatchery Program (CJHP). The Confederated Tribes of the Colville Reservation (Colville Tribes or CTCR) propose to construct a hatchery on the Columbia River and fish acclimation ponds on the Okanogan River and Omak Creek. The purpose of the proposed facilities is to enhance Chinook salmon populations in the Okanogan River and the reach of the Columbia River immediately below Chief Joseph Dam. The Bonneville Power Administration (BPA) would fund development and operation of these fisheries facilities. Enhancing stocks of summer/fall Chinook and reintroducing spring Chinook to these areas will be designed to return sufficient fish to meet the ceremonial and subsistence fishing targets of the Colville Tribes, targets that have not been achieved since Chinook salmon were extirpated from much of the Colville Reservation due to the construction of Grand Coulee Dam in 1941. The ultimate goal of this hatchery project is to increase the adult escapement of Chinook salmon past Wells Dam by at least 9,000 adults each year, and possibly up to 32,000 adults each year (depending on actual hatchery smolt survival rates).

Section 7 of the Endangered Species Act (ESA) of 1973 (as amended) directs federal departments and agencies to ensure that actions authorized, funded, and/or conducted by them are not likely to jeopardize the continued existence of any federally proposed or listed species, or result in destruction or adverse modification of critical habitat for such species. Section 7(c) of the ESA requires that federal agencies contact USFWS and NOAA Fisheries (NOAA Fisheries and USFWS are subsequently referred to as the Services) before beginning any construction activity to determine if federally listed threatened and endangered (T&E) species or designated critical habitat may be present in the vicinity of a proposed project. A Biological Evaluation/Assessment (BE/BA) must be prepared if actions by a federal agency or permits issued by a federal agency will result in construction and if the Services determine that T&E species may occur in the vicinity of a proposed project. With respect to the proposed action, the BPA is the federal agency funding the project and federal permits from the U.S. Army Corps of Engineers (USACE) will be needed to construct portions of the project. The Services have determined that T&E species, including Upper Columbia River (UCR) Spring Chinook salmon (endangered), UCR steelhead (endangered), Columbia River bull trout (threatened), gray wolf (threatened), Ute ladies'-tresses (threatened), and bald eagle (threatened) may be present in the project action area; therefore, this BA is required by the ESA to ensure that the proposed hatchery program will not jeopardize the continued existence or recovery of these listed species.

Proposed and candidate species that could potentially be affected by this program were also considered in the event that they become listed before the program is implemented. The only proposed or candidate species that may occur in the action area is the yellow-billed cuckoo (candidate).

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) includes a mandate that NOAA Fisheries identify Essential Fish Habitat (EFH) for federally managed marine fish. In addition, federal agencies must consult with NOAA Fisheries on all activities, or proposed activities, authorized, funded or undertaken by the agency that may adversely affect EFH. The Pacific Fisheries Management Council (PFMC) has designated EFH for the Pacific salmon fishery, federally managed ground fish and coastal pelagic fisheries. The ESA consultation process can be used to address EFH (see *Guidance for Integrating Magnuson-Stevens Fishery Conservation and Management Act EFH Consultations with Endangered Species Act Section 7 Consultations, National Marine Fisheries Service, January 2001*). This BA addresses EFH for Chinook and coho salmon, which are the MSA-managed species that have designated EFH in the action area.

A. Federal Action and Legal Authority

It is anticipated that the BPA will be the lead federal agency for this ESA consultation, as BPA will provide the majority of the funding for this project. Therefore, this BA was prepared following BPA's guidance. In addition, USACE permits will be required for part of the project construction; therefore, this BA follows the USACE BA template (http://www.nws.usace.army.mil/publicmenu/DOCUMENTS/BETemp.pdf). This template is also consistent with NOAA Fisheries most recent consultation guidance (http://www.cit.noaa.gov/nosign/BATemplate.asp) and the USFWS guidance (USFWS and NMFS 1998).

The objective of this BA was to review all pertinent and available information on the potential effects of the proposed program on MSA-managed species and EFH; ESA-listed, proposed and candidate T&E species; and proposed and designated critical habitats under NOAA Fisheries and USFWS jurisdiction. This BA is required by the ESA to ensure that proposed actions (including construction and long-term operation of the hatchery program) authorized and funded by BPA and the USACE are not likely to jeopardize the continued existence of any federally proposed or listed species, or result in destruction or adverse modification of critical habitat.

B. Project and Federal Action History

Regional Perspective

The decision by the Colville Tribes to pursue development of the CJHP is rooted in numerous historical and regulatory decisions and biological factors. Historically, the Colville Tribes were salmon people, sustained by bountiful fisheries in both the Columbia and Okanogan rivers. 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). Spring fishing encampments along the Okanogan River provided tribal members with enough salmon (their primary protein source) to last throughout the year.

Decimation of salmon populations began with intensive commercial harvesting to support Euro-American canneries on the Columbia River in the mid- to late-1800s. In addition, occupation of the upper Columbia and Okanogan valleys by Euro-Americans altered salmonid habitat through timber harvest, water withdrawals for agriculture, and other development-related causes. These changes placed further pressure on the declining salmon stocks, which were compounded in the early 1930s with the federal government authorizing the construction of the first of a succession of eleven major dams on the Columbia River. The result was the decline of summer/fall Chinook and extirpation of the spring Chinook populations in the Okanogan subbasin. Currently, the Okanogan River is the uppermost Columbia River tributary still accessible to returning anadromous fish.

In recognition of this loss, the U.S. Bureau of Reclamation (USBR) and the Washington Department of Fisheries reached an agreement in 1937. The agreement contained a mitigation plan to compensate for the loss of anadromous fish due specifically to construction of Grand Coulee Dam. Under this agreement, four hatcheries were to be constructed at Leavenworth, Entiat, Methow, and on the Okanogan River. The first three hatcheries were constructed and are operating; the Okanogan program was never implemented. In the 1980s, the Colville Tribes began inquiries about the promised Okanogan hatchery. The USBR, in 2000, agreed that mitigation facilities for Grand Coulee remained incomplete. The proposed CJHP evolved from acknowledgement of the federal government's abrogation of its trust responsibility to implement the final hatchery program on the Okanogan River.

The upper Columbia River region was also left out of provisions intended to mitigate for the impacts of building and operating the four lower Columbia River hydroelectric projects (Bonneville, McNary, The Dalles and John Day) operated as part of the Federal Columbia River Power System (FCRPS). While the impacts of these projects on the fisheries resources of the upper Columbia are not as severe as those of the Chief Joseph and Grand Coulee projects, they are considerable. It should be noted that in recent years, significant improvements have been made for juvenile salmon outmigrants and returning adults at the nine downstream dams.

The First Fish ceremony, a celebration of the first returning Chinook salmon, had been an important component of the Colville tribal legacy for hundreds of years; however, as a result of extirpation of spring Chinook from the reservation, the tribes were unable to perform this ceremony for many years. Since 2001, the Colville Tribes have conducted limited experimental releases of spring Chinook in the Okanogan subbasin, resulting in the return of some spring Chinook to the subbasin. In the spring 2005, the Colville Tribes were able to observe the First Fish celebration for the first time in decades.

Chief Joseph Hatchery Master Program

Over the last decade, the Colville Tribes and BPA have directed substantial resources toward protecting and restoring anadromous fish in the Okanogan subbasin. Efforts have included habitat protection measures, supplementation, public education, watershed planning and monitoring/evaluation programs. While these efforts are useful in helping to restore anadromous salmonid populations, they do not address the entire problem in a comprehensive or timely fashion. It has been clear from examination of population trends that the process must be "jump-started." A hatchery and implementation of hatchery programs would provide that jump-start.

Fish and wildlife projects submitted to BPA for funding must be reviewed and approved by the Northwest Power and Conservation Council (Council). Projects must be consistent with the Council's Columbia Basin Fish and Wildlife Program. The review is broken into three steps: Step 1 is preparation/review of a master plan; Step 2 involves preliminary design/cost development and NEPA and ESA compliance; and Step 3 comprises the project's final design.

Based on the Council's recommendations, BPA funded preparation of a master plan (Step 1) for enhancement of summer/fall Chinook in the Okanogan subbasin. At the Colville Tribes' request, BPA and the Council added sufficient funds to also examine restoration of spring Chinook in the same document. The resulting Chief Joseph Dam Hatchery Master Program was released in May 2004 for public review (CTCR 2004). This program defines a comprehensive management plan for 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 Council subsequently approved the Step 1 document and authorized funding through BPA to prepare an environmental review of the proposal (Step 2). This BA, in conjunction with the program EIS is the product of that Step 2 analysis.

C. Project Purpose and Objectives

The purpose of the proposed action is to fund construction of a hatchery and ancillary facilities to augment summer/fall and spring Chinook salmon populations in the Okanogan River system. The project is intended to or is an attempt to achieve two primary goals (note, these are draft, but will be updated when finalized in the EIS):

- The hatchery and acclimation program would improve the fitness, productivity, abundance, and life history diversity of Chinook salmon populations in the Okanogan subbasin This would contribute to satisfying BPAs need to mitigate effects on fish and wildlife affected by the FCRPS.

- Successful supplementation through facility construction, program management, and selective harvest methods would provide a population of fish for CTCR ceremonial and subsistence harvest purposes, and may also enable the State of Washington to establish a predictable recreational fishery for Chinook salmon in the Okanogan River.

II. Description of the Proposed Project

A. Hatchery Programs

Each year, the proposed Chief Joseph Hatchery Program would produce approximately 2 million summer/fall Chinook and 900,000 spring Chinook juveniles (combination of yearling and sub-yearlings) for release at the hatchery and acclimation facilities. The summer/fall Chinook components of the CJHP consist of two complementary programs:

- An integrated recovery program designed to increase abundance, distribution, and diversity of naturally spawning summer/fall Chinook salmon within their historical Okanogan subbasin habitat.

- An integrated harvest program designed to support a tribal ceremonial and subsistence fishery, and ultimately to increase recreational fishing opportunities for the general public.

The summer/fall Chinook population in the Okanogan River is at present supported by natural production and a single hatchery program that produces up to 576,000 yearling smolts annually. The proposed action would increase the annual production of juvenile summer/fall Chinook for the Okanogan River by 400,000 early-arriving and 700,000 later-arriving summer/fall Chinook juveniles (a combination of yearling and sub-yearlings).

The summer/fall Chinook integrated recovery program would be implemented through five conservation actions:

- Development of a local Okanogan River broodstock.

- Expansion of current broodstock collection by two months, in order to propagate the full historical run of summer/fall Chinook.

- Propagation of both the yearling and sub-yearling life histories to achieve full, natural diversity and provide necessary programmatic flexibility.

- Improvement of spawning distribution throughout the historical summer/fall Chinook habitat.

- Control the proportion of hatchery-origin fish spawning in the wild.

The summer/fall integrated harvest program is designed to support a tribal ceremonial and subsistence fishery and to provide increased recreational fishing opportunities for the general public. To support the integrated harvest objectives, 500,000 early-arriving, and 400,000 later-arriving summer/fall Chinook juveniles would be released at Chief Joseph Hatchery. Total new production to meet these recovery objectives and harvest purposes would be 2,000,000 summer/fall Chinook.

The proposed spring Chinook component includes two complementary parts:

- An integrated recovery program designed to restore naturally spawning spring Chinook populations to their historical habitats in the waters in and around the Colville Reservation; and

- An isolated harvest program designed to restore a stable ceremonial and subsistence fishery, and to provide increased recreational fishing opportunities for the general public.

Implementation of the two-phase spring Chinook program would also contribute to the recovery of the listed Upper Columbia River Spring Chinook ESU.

In the first phase of the spring Chinook program, expected to last nine years, Carson stock spring Chinook would be used as broodstock (CTCR 2004). Carson stock spring

Chinook are currently collected between mid-May and mid-July at the Leavenworth National Fish Hatchery (NFH). The proposed project would shift the collection period to the early portion of the run when water temperatures in the Okanogan River would be favorable to returning adult salmon. Eventually, broodstock for the isolated harvest program would be randomly collected from the CJH fish ladder; broodstock for the integrated recovery program would be collected at the Omak Creek weir, and supplemented as needed with fish collected (in priority order) at Zosel Dam, in the Okanogan River with live-capture gear, or at CJH. The spring Chinook Hatchery Genetic Management Plan (HGMP) presents the broodstock collection protocol for natural-origin fish in Omak Creek at various escapement levels. In the second phase of the program, Methow composite stock, excess to production needs at Methow State Hatchery and Winthrop NFH, may replace the Carson stock. The Methow composite stock has evolved in the subbasin closest to the Okanogan and may harbor some of the genetic material from spring Chinook historically present in the Okanogan subbasin.

During the initial years of the spring Chinook program, fish would be reared at Little White Salmon and Willard NFHs for a portion of their life cycle (CTCR 2004). Low-density incubation and rearing has been incorporated into the CJHP conceptual design. During the 5-6 months that fish would spend in acclimation ponds, they would be reared at very low densities. The Colville Tribes would also investigate placing temporary structures in the acclimation ponds to mimic natural rearing conditions and lower avian predation (CTCR 2004).

The spring Chinook programs would increase production of Carson-stock spring Chinook destined for the Okanogan subbasin and Chief Joseph Hatchery to 900,000 juveniles. The spring Chinook integrated recovery program would initially reintroduce naturally spawning populations of Carson-stock spring Chinook into Omak Creek on the Colville Reservation. The isolated harvest program would support selective fisheries in the Okanogan and Similkameen rivers, in the tailrace of Chief Joseph Dam, in Lake Pateros, and near the confluence of the Okanogan River. These fisheries would target the Carson-stock spring Chinook produced in the program.

The spring Chinook program is experimental and includes mechanisms to identify any potentially adverse interactions with summer/fall Chinook, steelhead, and Methow River spring Chinook populations and to document the extent of tribal and recreational harvest (see section II(F), Program Monitoring). Information collected through monitoring and evaluation in the early phases of the program would be used to adapt and refine secondary phases of the program. Specifically, the information would be used to determine if the Carson-stock spring Chinook should be replaced with the ESA-listed Upper Columbia River Spring Chinook to aid in the recovery of the ESU.

B. Project Facilities

Under the proposed action, a new fish hatchery would be constructed on the Columbia River adjacent to Chief Joseph Dam in Okanogan County. Chinook salmon incubated and reared here either would be released from the hatchery or transported to five acclimation ponds along the Okanogan River and Omak Creek for rearing and release (Figure 1). Both summer/fall and spring Chinook salmon would be spawned and reared in these facilities. The proposed action would include constructing three houses for hatchery employees, developing water systems to supply the hatchery and the houses, modifying two existing irrigation settling ponds for fish acclimation, upgrading one existing acclimation pond, and constructing two new ponds for fish acclimation.

Chief Joseph Hatchery

The primary components of the hatchery would be constructed at River Mile (RM) 543 on the right bank of the Columbia River between Chief Joseph Dam and State Highway 17 on a 24.5-acre site. As shown on Figure 2, the 24.5-acre site is on a plateau that is between 70 to 120 feet above the Columbia River. The entire hatchery site was regraded after completion of Chief Joseph Dam. The grassy plateau and riprap river bank are currently undeveloped except for a tribal fishing access site and paved trail.

Primary hatchery structures would include three sets of concrete raceways, a support building, a small administration/visitor facility, a fish ladder and broodstock holding raceways (Figure 3). The raceways consist of three sets of channels, totaling 60 troughs, each of which is 10 feet wide by 110 feet long. Each set of raceways would have inlet supply channels and outlet drain channels, bringing the total length to about 120 feet. The raceways would be built below grade and would cover approximately 79,500 square feet. Each set of raceways would be at a different elevation, terraced into the existing site with about a 4-foot difference between each set. With this elevation difference, low-head oxygenators can be used between sets of raceways for serial re-use of water during emergency or low-water conditions. Immediately east of the raceways, a single story 20,000-square-foot main hatchery building would enclose the incubation area, water treatment equipment, start tanks, laboratory, fish food storage, workshop, staff offices, and rest rooms. A 3,000-square-foot head box structure would be located a short distance east of the main hatchery building. A 2,000 to 4,000-square-foot administration and visitor facility would be located at the east end of the hatchery complex and adjacent to it, parking space would be provided.

A short fish ladder would be constructed at the east end of the hatchery site, extending from a base elevation of about 772 feet to about 792 feet. Fish entering the ladder would negotiate several 90 degree turns on their way to the four adult holding ponds. Each pond would be about 10 feet wide by 80 feet long (Figure 3). The ladder and ponds would permanently occupy an area approximately 200 feet long by 100 feet wide along the river bank. The 40 to 50 cfs attraction flows would be supplied by a combination of treated hatchery effluent and overflow from the adult holding ponds.

Water would be supplied to the hatchery from up to three sources: (1) Rufus Woods Lake, (2) a relief tunnel that collects seepage from the abutment of Chief Joseph Dam, and (3) groundwater wells. Potable water is expected to be obtained from the same well field that would be developed to supply the hatchery and conveyed in the same pipeline. Water would be conveyed to the hatchery via three buried pipelines.

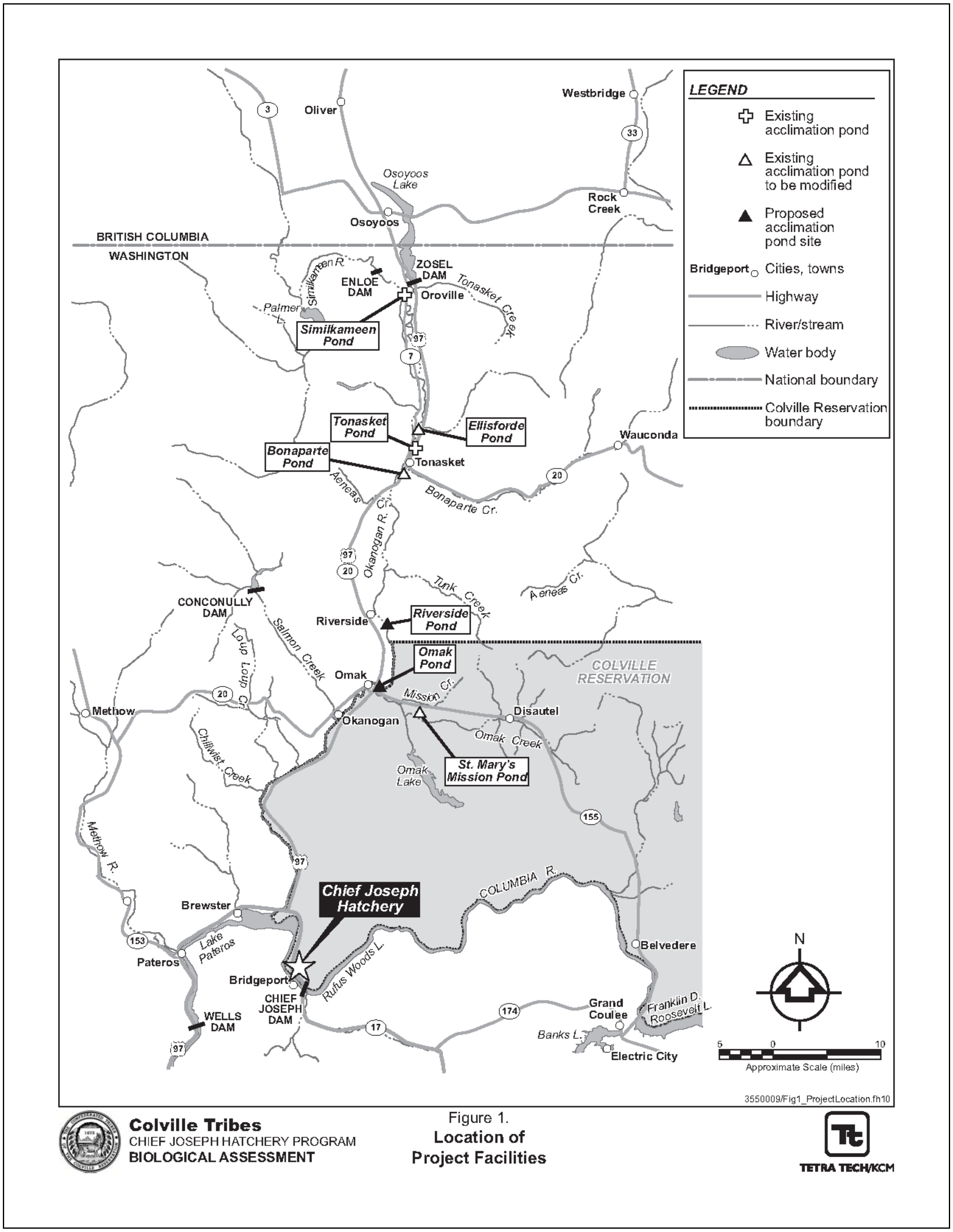

Figure 1. Location of Project Facilities

Figure 2. Proposed Chief Joseph Hatchery Site

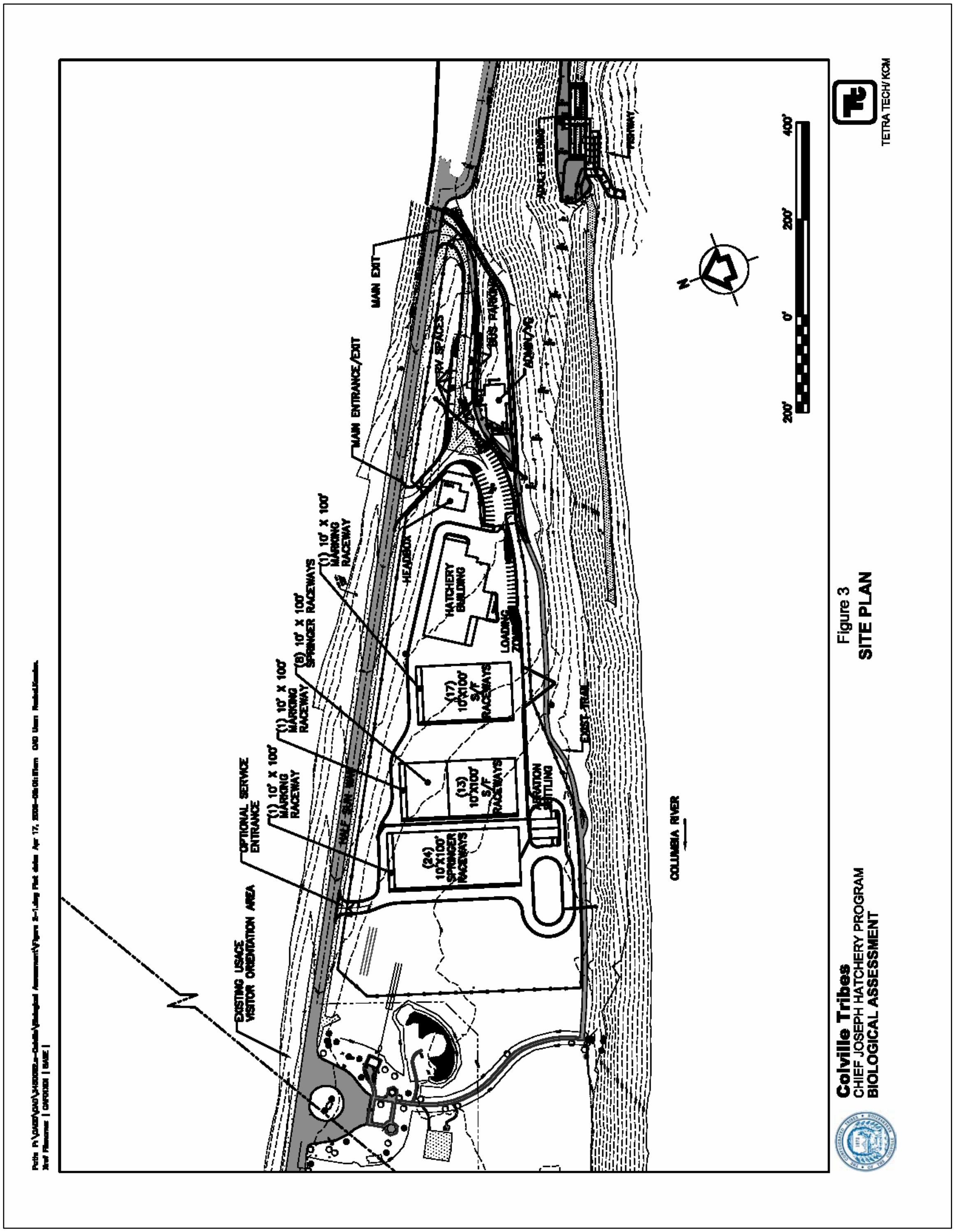

Figure 3. Hatchery Site Plan

Flows diverted from Rufus Woods Lake would be collected through a block-out in the dam. Coarse screening would be installed to exclude reservoir debris. A fish screen (meeting current NOAA Fisheries criteria) and shutoff valve for pipeline dewatering also would be provided at the existing dam inlet. Flow diverted from Rufus Woods Lake would be routed through a tunnel and placed in a common trench with the relief tunnel pipelines.

Flows from the relief tunnel would be collected in a new wet well located on the right bank of the river immediately downstream of the dam, and pumped through a 20- to 24-inch-diameter pipeline routed to the head box.

It is estimated that up to 20 groundwater wells may be required for hatchery and potable needs. A 24.5-acre well field would be developed adjacent to the Lake Woods Golf Course (Figure 4). Exact well locations depend upon the results of the groundwater analysis and well tests. Wells are expected to be located in undeveloped areas along existing roads to facilitate construction and maintenance access and minimize costs. Production wells, approximately 12 inches in diameter, would be drilled at a spacing that minimizes hydraulic interference. The size and spacing between wells would be determined by evaluating the results of initial test pumping in early 2006. A 2.5-mile-long, 30-inch-diameter pipeline would extend from the proposed well field to the hatchery site. The alignment would follow Half-Sun Way to a point shown on Figure 4 where the final 1,500 feet would transition downslope to the hatchery headbox structure.

The hatchery waste treatment systems would consist of aeration and settling ponds, and would be made of concrete slabs and walls. These facilities would be sited well above the high water elevation of the river (Figure 3). Hatchery waste would be treated primarily via an approximately 75-by 100-foot dual cell concrete aeration and settling pond downslope of the western-most raceway. After the solids have settled, flow would be mixed with raceway effluent and directed via a 48-inch-diameter 1,600-foot buried pipeline to the adult holding ponds from where it would be released to the river via the fish ladder.

Housing and Other Facilities

Housing would be constructed for hatchery personnel to ensure that staff is in close proximity at all times during operations. The proposed site, on Washington State Parks and Recreation Commission land, is approximately two miles northeast of the hatchery on Half-Sun Way (Figure 5). This 11-acre vacant parcel is adjacent to the Lake Woods Golf Course. Three permanent residences would be constructed, each 2,000 square feet and occupying a one-acre lot. Utility hook-ups would be provided on an additional one-acre parcel to support up to four RVs or camp trailers. It is expected that the covered RV sites would be used by construction personnel and by seasonal personnel during peak hatchery operations. Potable water, sewer, power and communications connections would be needed to each RV site.

It is anticipated that a single well would be used to provide potable water to the permanent residences and RV sites. Sanitary wastes would be treated and disposed of through individual septic tank/drainfield systems for each residence and a common system for the RV sites.

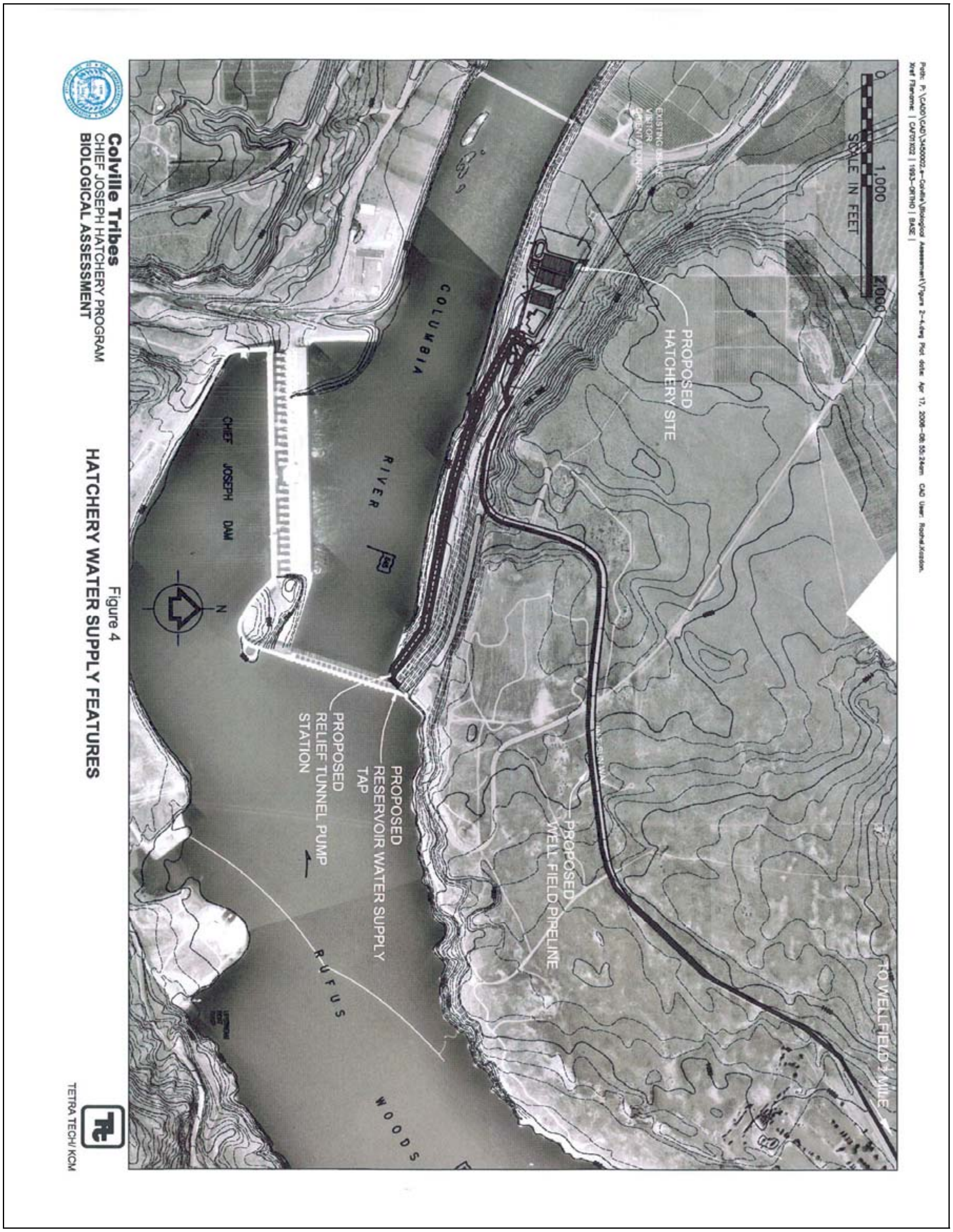

Figure 4. Hatchery Water Supply Features

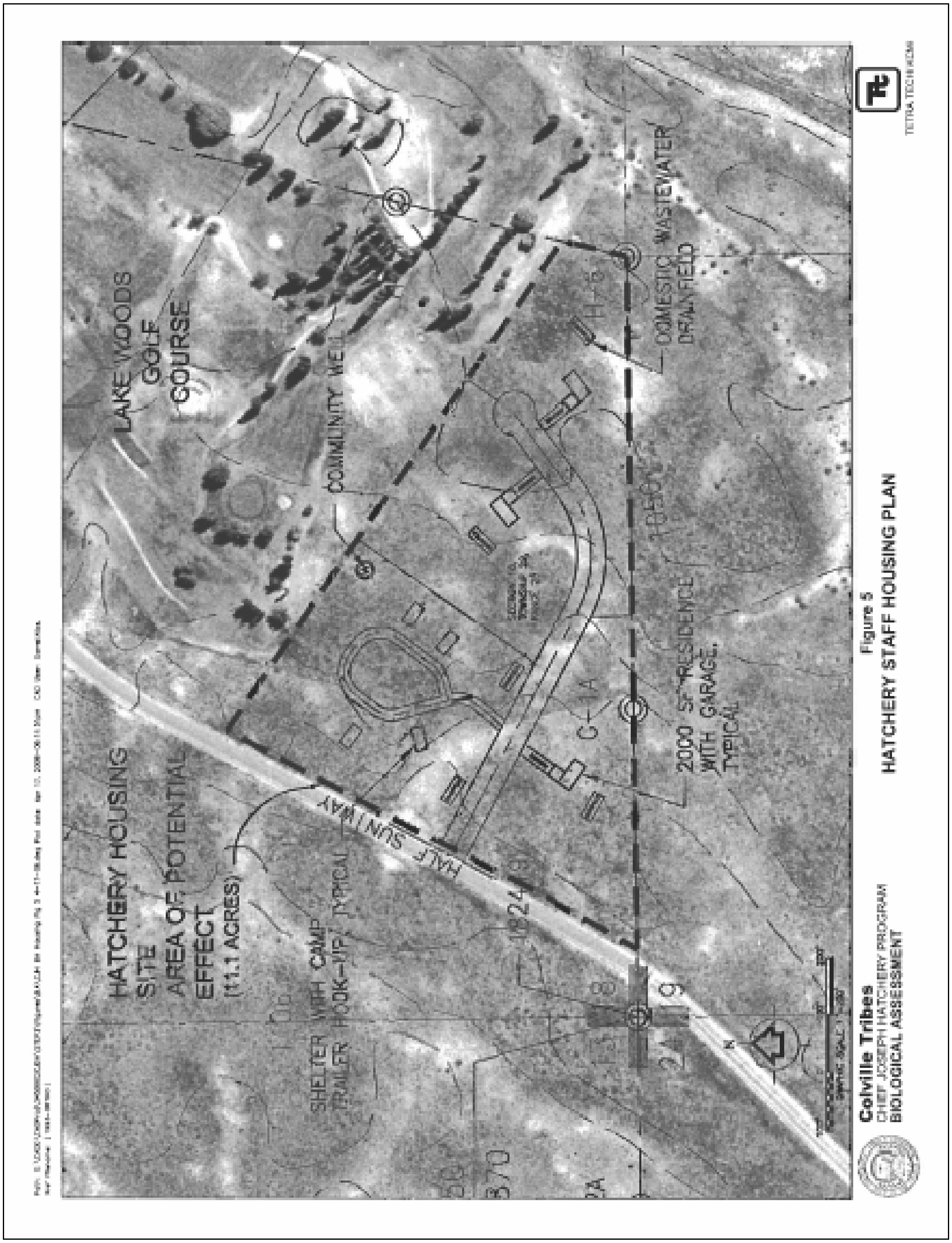

Figure 5. Hatchery Staff Housing Site Plan

A 2,000 to 4,000-square-foot single story structure is proposed to house both hatchery administration offices and a display area for visitors. It would be constructed at the east end of the hatchery site near Half-Sun Way, as shown on Figure 3. An adjacent parking area would accommodate buses and large vehicles.

The USACE's existing paved trail would be relocated to accommodate the new hatchery facilities. Approximately 300 lineal feet of trail would be realigned along the southern edge of the hatchery site plateau, maintaining access to the river. The existing trail would be incorporated into an entry plaza at the proposed visitor center. The tribal fishing site adjacent to the dam would be retained, although use may be restricted near the ladder entrance when hatchery broodstock is being collected.

Acclimation Ponds

The CJHP would use five acclimations sites located strategically along the Okanogan River. Some acclimation facilities currently exist, while others would need to be constructed.

1. Tonasket Pond is an existing Oroville/Tonasket Irrigation District (OTID) irrigation settling pond located at RM 59.0 of the Okanogan River (Figure 6). It has recently been converted for fish rearing purposes. The pond withdraws 25 cfs from the Okanogan River and has a capacity of 74,300 cubic feet.

2. Bonaparte Pond is an existing OTID irrigation settling pond located at RM 56.0 of the Okanogan River, adjacent to Highway 97 (Figure 7). It has been adapted for fish acclimation, but would be upgraded by improving drainage and cleaning mechanisms and adding radio telemetry linked to the CJH and the Colville Tribe's Omak office. Facilities to release fish are present and would not require modification. This pond withdraws 25 cfs from the Okanogan River to supply a useable rearing area of 65,300 cubic feet.

3. Riverside Pond would be constructed at RM 41.0 near the Town of Riverside (Figure 8). It would have a volume of 55,000 cubic feet to be supplied by seasonally diverting 15 cfs from the Okanogan River.

4. St. Mary's Mission Pond, also known as the Omak Creek Pond, was constructed by the Colville Tribes to acclimate spring Chinook. It is located at RM 5.0 of Omak Creek, which discharges to the Okanogan River at approximately RM 32 (Figure 9). Up to 2 cfs is seasonally withdrawn from Omak Creek to supply this facility.

5. Omak Pond would be constructed at RM 32.0 in the City of Omak near the confluence of Omak Creek with the Okanogan River (Figure 10). It would have a volume of 55,000 cubic feet to be supplied by seasonally diverting 15 cfs from the Okanogan River. The surface area of the pond would be approximately 25,000 square feet.

As a contingency site, Ellisforde Pond may be used for the program if one of the other facilities listed above proves infeasible. It is an existing OTID irrigation settling pond located at RM 62.0 of the Okanogan River (Figure 11). It already has been adapted for fish acclimation; therefore modifications would be limited to improving drainage for smoother volitional release of fish and ease of maintenance. The open pond withdraws 25 cfs from the Okanogan River to supply a useable rearing area of 121,500 cubic feet. A telemetry system also would be installed that is linked to the hatchery.

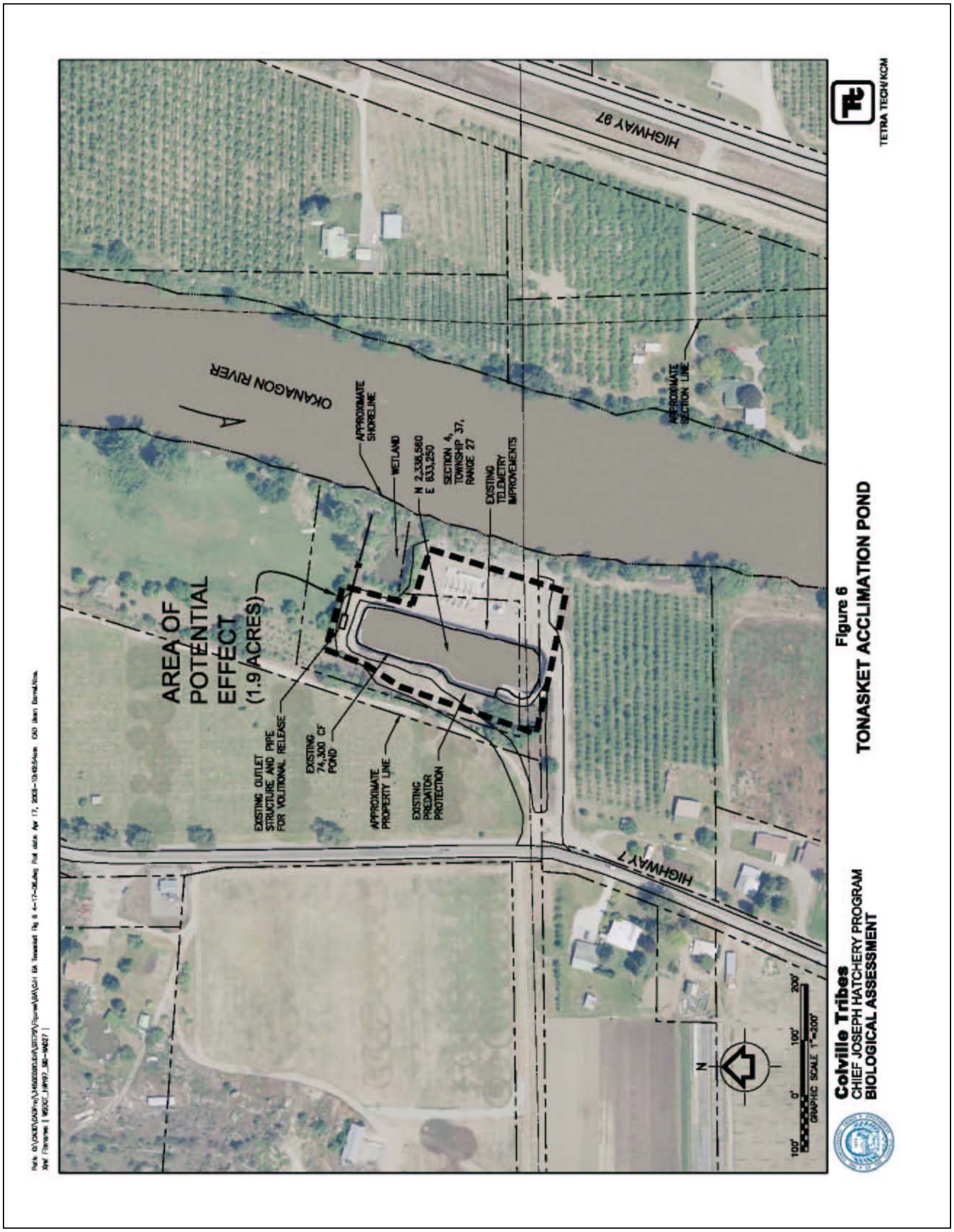

Figure 6. Tonasket Acclimation Pond

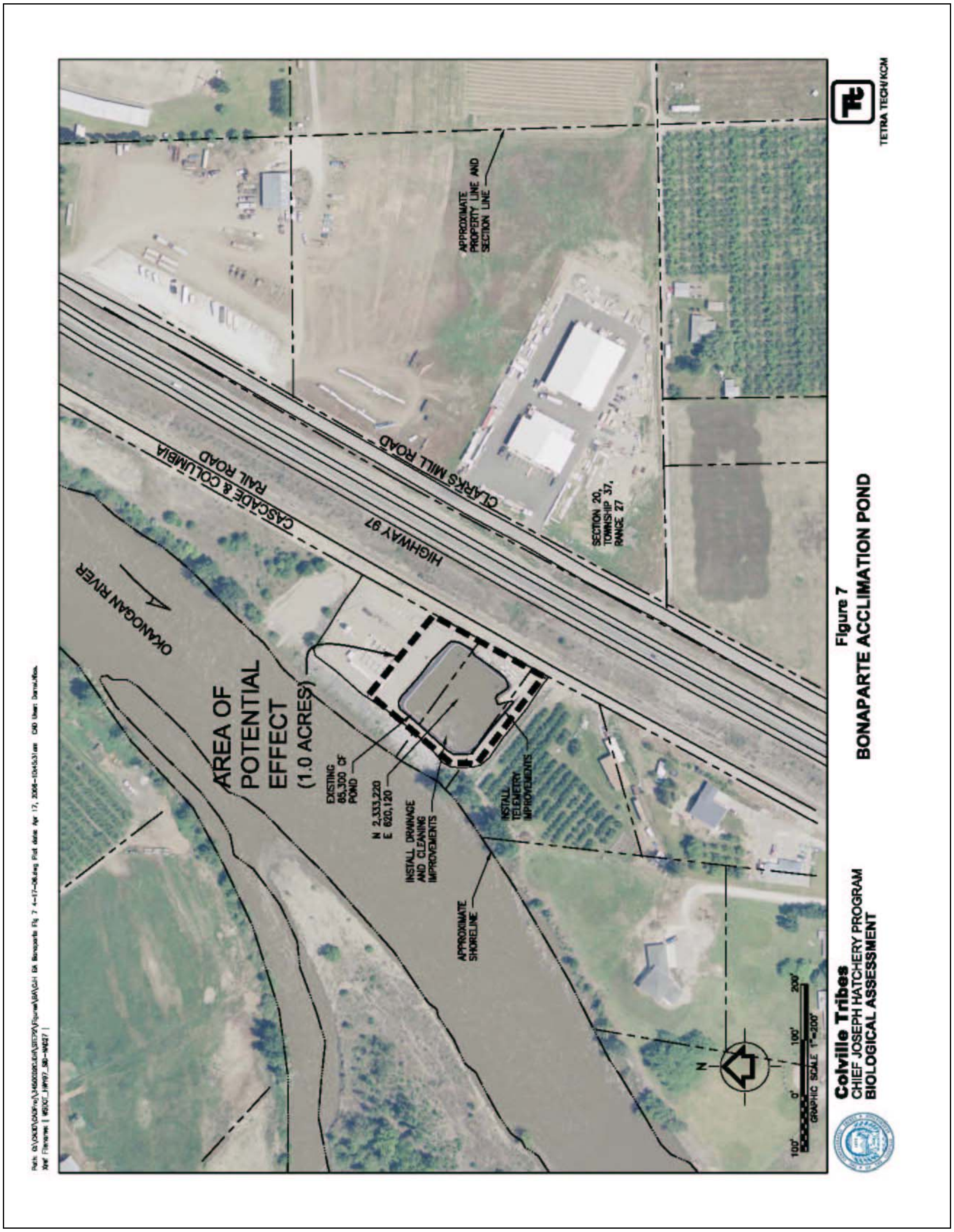

Figure 7. Bonaparte Acclimation Pond

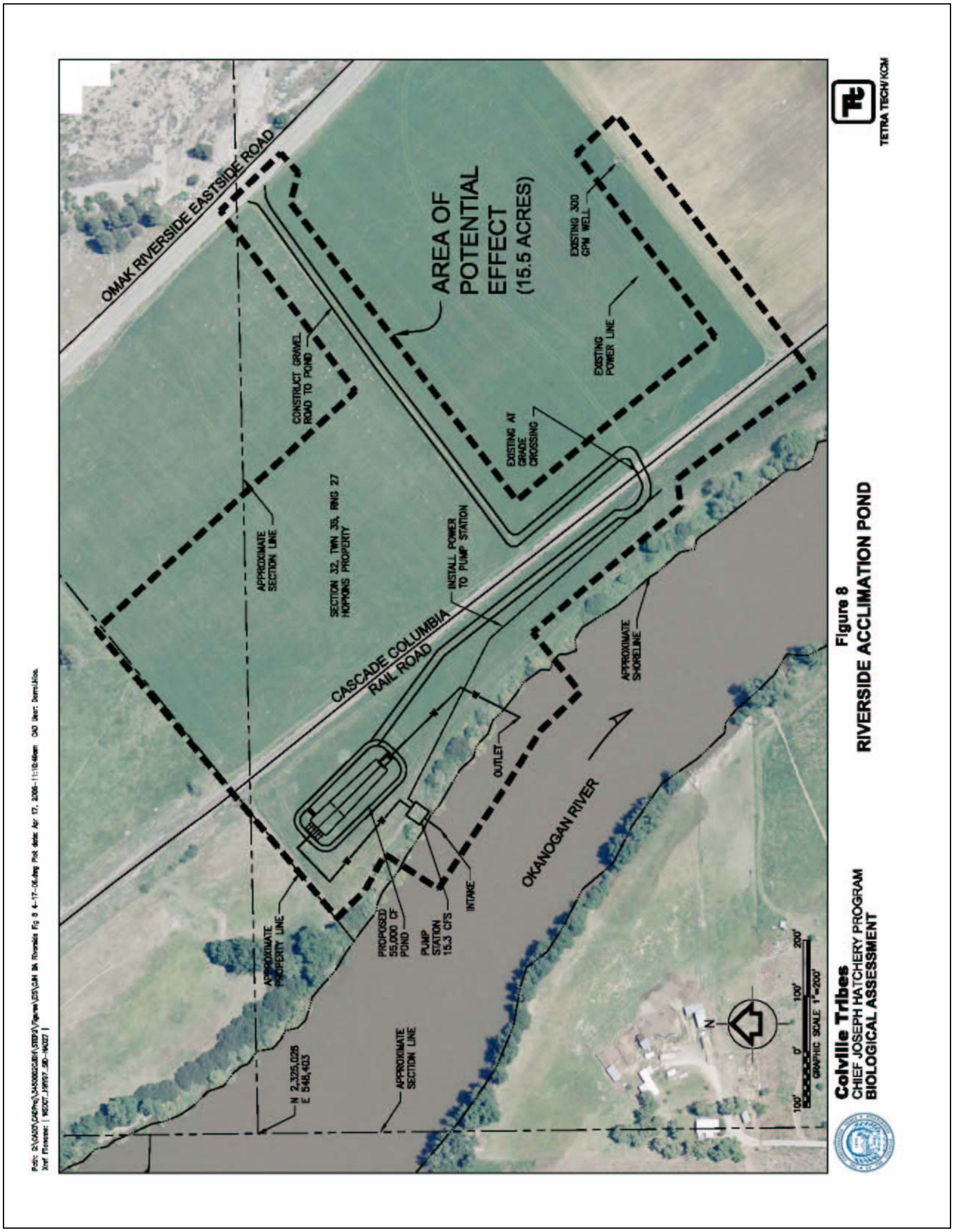

Figure 8. **Riverside Acclimation Pond**

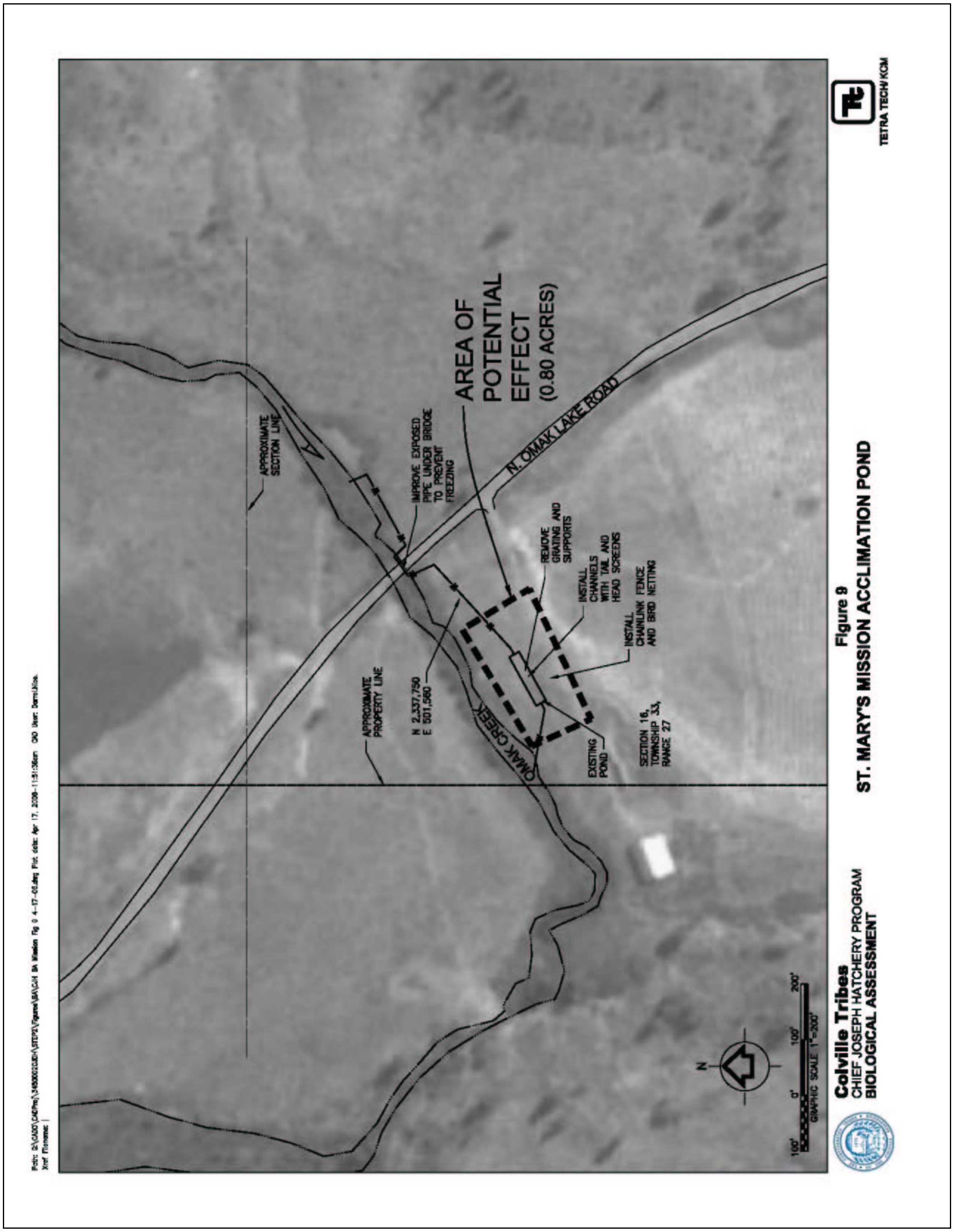

Figure 9. St. Mary's Mission Acclimation Pond

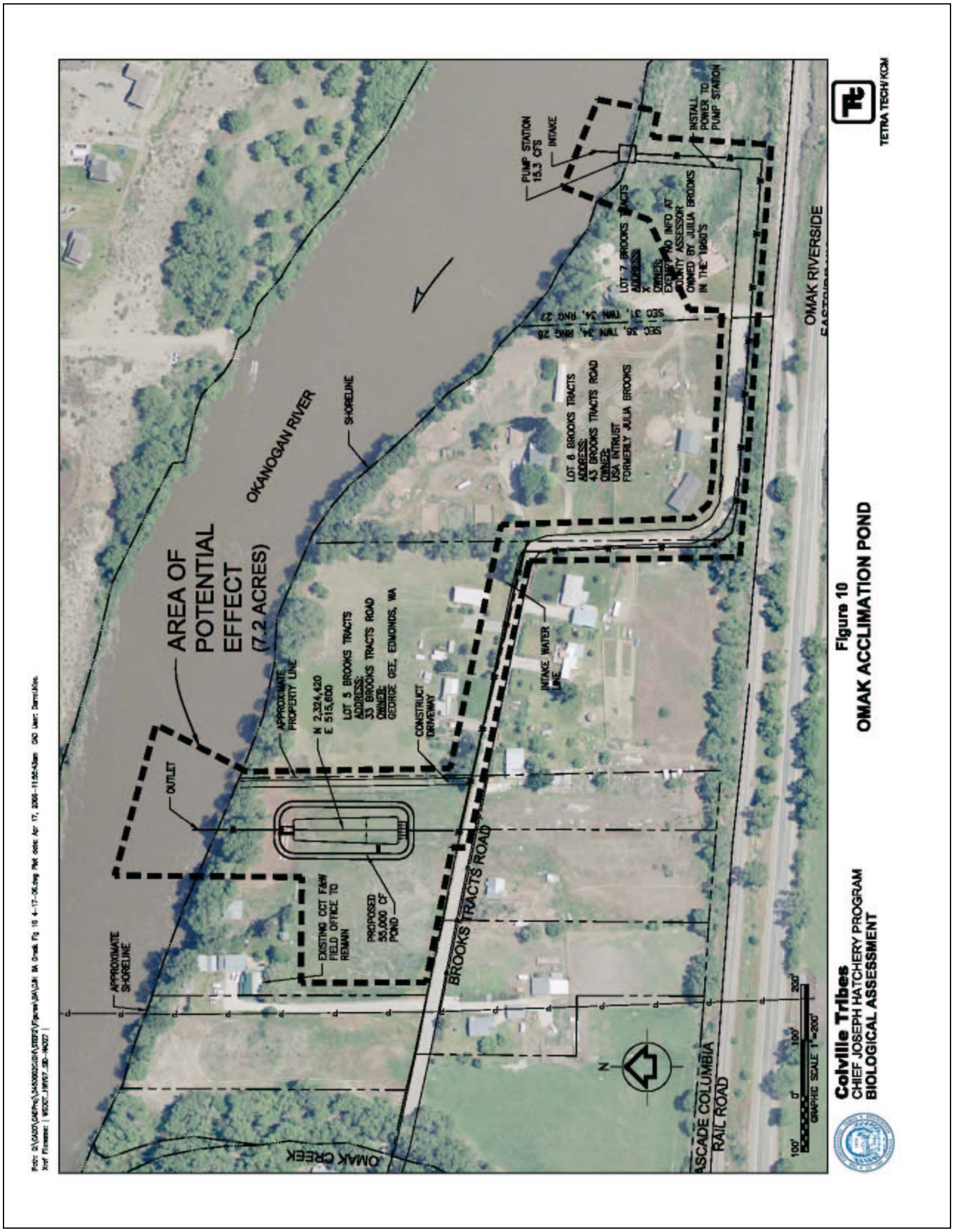

Figure 10. **Omak Acclimation Pond**

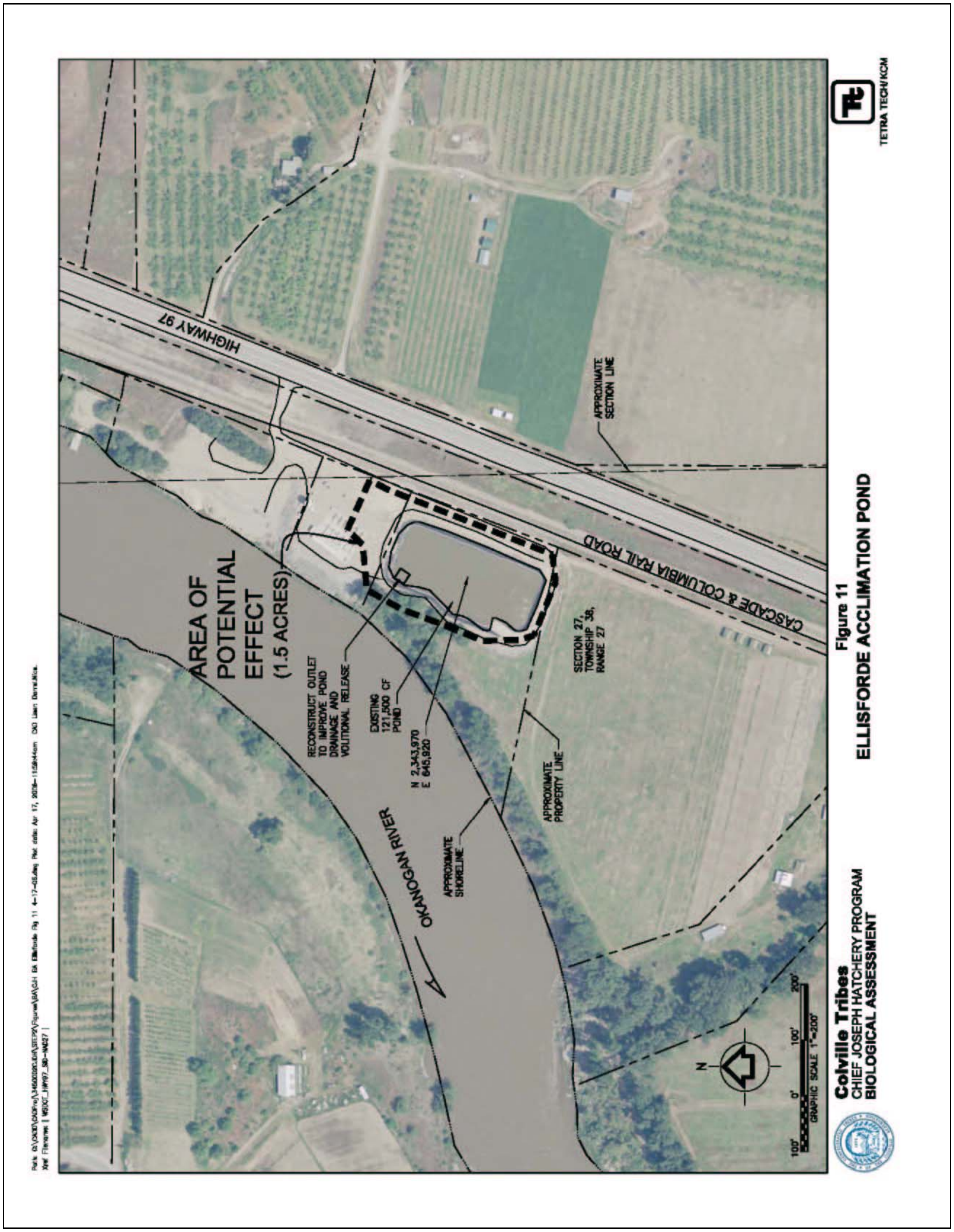

Figure 11. Ellisforde Acclimation Pond

C. Facility Construction

Chief Joseph Hatchery

The gently sloping, relatively uniform topography of the hatchery site lends itself to economical construction. Shallow cuts and fills would be used to partially level the site prior to structural improvements. Soil conditions appear suitable for building foundations. These would be spread footings, with concrete slab on grade construction. The head box, raceways, fish ladder and aeration/settling structure will have cast-in-place concrete walls, extending a few feet above grade. Construction at the main hatchery site would occur over a two year period, probably in 2008 and 2009.

The entrance to the fish ladder would be constructed three to five feet below low water elevation on the north bank of the Columbia River. A temporary cofferdam would be used to dewater approximately 200 square feet of river bank for construction of the in-water portion of the ladder. In-water work would require about two months.

The water supply and utility systems would be installed as part of the main hatchery construction over one or more years. Most of the water supply systems are not adjacent to surface waters, and erosion control measures would target stormwater erosion protection of disturbed surfaces along the pipeline routes.

Special considerations would be taken at the Rufus Woods Lake intake and the relief tunnel pump station. At the lake intake, stoplogs would be placed in existing slots on the upstream face of the dam to dewater the new tap and eliminate in-water construction in the reservoir pool. A masonry wall on the downstream face of the dam would be penetrated with a 30-inch pipe that would be attached to the face of the dam then routed underground. A trash rack and fish screen would be installed in existing slots in front of the tap location to protect the intake after the stoplogs are removed. Work would be performed from the deck of the dam and from the downstream embankment.

A pump station would be required to move accumulated water from the relief tunnel to the hatchery. If the pump station is installed in the right bank of the river at the downstream end of the right training wall, the below grade portions of the structure would be dewatered, probably using sheet piling and dewatering pumps. If the pump station is installed in the fill behind the right training wall, similar dewatering would be required to greater depths using grout injection, shotcrete lining, and possibly sheet piling. Final decisions on the pump station location and installation methods will be made during the detailed design phase. In either case, applicable standards would be met for control and management of dewatering flows.

The trench to convey the water supply pipelines would be approximately 10 to 12 feet wide, excavated along the service road to the adult return area, then up the slope to the head box. The buried pipelines to the hatchery would be installed in a manner that minimizes the possibility of leakage or damage to slopes along the route.

Housing and Other Facilities

To complete the hatchery residence construction, up to ten acres of vacant land would be temporarily disturbed, with five acres permanently altered. Development of the property would require excavation of the road bed, utility trenches, and house foundations. Excavated material would be stockpiled on the eleven acre site out of the way of other construction activities. Excess excavated material would be removed from the site and spread at an approved location. The housing sites would be graded and revegetated, with final surfacing that includes paved roads, concrete driveways, and grass lawns.

Construction of the three residences, the RV sites and their associated street and utilities improvements would occur during the same period. Water and sewer systems would be installed first followed by the street, power and communications. After the infrastructure is placed, the RV sites would be constructed. Residential construction would follow, with homes constructed sequentially. Construction would take place over an approximately 7-month period.

For the visitor area, up to two acres of vacant land would be temporarily disturbed by construction, with one acre permanently altered. Development of the property would require excavation for parking, utility trenches, and structure foundations. Excess excavated material would be removed from the site and spread at an approved location. Portions of the site would be graded and revegetated; other portions would be surfaced for parking, trails, sidewalks and small landscaped areas.

Acclimation Ponds

No construction would be performed at the Tonasket Pond site other than installing telemetry equipment. At Bonaparte Pond, a few minor modifications are proposed to accommodate acclimation of summer/fall Chinook, but disturbance would be confined within the existing lined pond and gravel parking area.

At the proposed Riverside Pond, up to 15 acres of pasture would be temporarily disturbed by construction, with four acres permanently altered. Development would require construction of an access road, power, piping, intake, pump station, the pond, volitional release structure, predator protection, controls and telemetry. In place of bird netting, a roof is being evaluated and a final decision will be based on funding priorities. Construction at the Riverside site would occur over a one year period.

At the Riverside Pond site, About 55,000 cubic feet of native soil would be excavated, stockpiled and reused as fill. The surface area of the pond would be approximately 100 feet by 250 feet. Powerline improvements would be needed, likely within the property boundary.

A pump station would be constructed at the Riverside Pond site, three to five feet below low water elevation on the left bank of the Okanogan River. A temporary sandbag cofferdam would be constructed to dewater approximately 1,000 square feet to allow the in-water portion of the pump station to be constructed. In-water work would require about two months. The remainder of the pump station would be constructed over an approximately six month period. A 1,500-foot-long pipeline from an existing well would likely need to be replaced with higher quality pipe at a frost free depth. The existing irrigation pipe would be used for cooling fish rearing water and pump station operation.

At St. Mary's Mission Pond, several modifications are proposed to accommodate acclimation of spring Chinook. The intake in Omak Creek would be improved by adding an instream concrete wing wall constructed of three ecology blocks. The blocks would be placed with a truck-mounted crane without disturbing the adjacent stream banks. Security fencing, bird netting, channels with tail and head screens inside the pond, and a water level alarm with telemetry linkage also would be added. Upgrades would be accomplished over an approximately two-month period.

At Omak Pond, up to three acres of pasture would be temporarily disturbed by construction, with two acres permanently occupied by the new facilities. The pond would be designed essentially the same as described above for the Riverside Pond although somewhat smaller, and the water supply pipeline would be only 1,000 feet in length.

If a contingency site is needed, a few minor modifications would be made to Ellisforde Pond to accommodate acclimation of summer/fall Chinook. Minor land disturbance would occur between the pond embankment and the bank of the Okanogan River where a concrete outlet structure would be constructed. A 10-square-foot area would be excavated adjacent to the pond and 20 feet back from the shoreline. The embankment between the pond and the river is riprap. This construction would occur in the winter months, most likely October through December, when the pond is not in use for irrigation.

D. Facility Operations

Chief Joseph Hatchery

Some of the hatchery broodstock would be collected by volitional entry into the fish ladder; others would be collected at remote sites and transferred by truck to the holding ponds. If unwanted fish attempt to enter the ladder, they would be sorted and promptly returned to the river, or if needed, screening may be used to prevent their entry. Fish would be sorted and monitored until they are ready to be spawned. The eggs and milt would be collected in a spawning shed located at the adult holding raceways, where the eggs would be fertilized and water-hardened before being transferred by truck to the incubation facilities in the main hatchery building.

Several months later, the fry would be transferred from the incubators to temporary fry holding tanks, or directly to the outdoor raceways. As they mature into smolts, they would be marked (fin-clipped) and moved into larger raceways at appropriate rearing densities. Operations during the rearing period would include feeding the fish a pelletized diet, and cleaning the raceways to remove feces and un-eaten feed. Some fish would be released directly from the hatchery to the Columbia River. Others would be trucked to various acclimation ponds for ultimate release to the Okanogan River. Fish culture programs would be operated to ensure that collected broodstock and released fish survive at high rates.

As stated previously, the hatchery water supply would be provided from a combination of three sources. Water use would vary significantly week to week due to the variety of rearing programs planned for the facility, using a combined maximum from all sources of 50 cfs. Water from the groundwater wells and relief tunnel is considered to be pathogen-free, but would need to be gas-stabilized at the head box to remove excess nitrogen and add oxygen prior to use in the hatchery. Water from Rufus Woods Lake is expected to require filtration to eliminate water-borne contaminants. Drum filters are proposed to remove particulates from the reservoir. Depending on the temperature and availability of groundwater, a small amount of Rufus Woods Lake water may be treated with finer filtration and UV disinfection, a system designed to process 3 to 4 cfs. Relief tunnel flow may need to be chilled to provide suitable temperatures to incubate eggs. This would be accomplished by constructing a 200- to 250-ton chiller and tower that would cool from 500 to 730 gallons per minute.

Waste cleaned from the raceways would be evacuated at a rate of about 50 gallons per minute to the settling pond downslope of the western-most raceway. When solids have settled, flow would be released to the river via the fish ladder. The dual cell arrangement of the waste pond would allow one pond to be dewatered and cleaned while the other cell remains in use. Concentrated wastes would be removed from the cells approximately once a year and disposed of at an approved dry land location, possibly as fertilizer for agricultural use.

Housing and Other Facilities

Each single family home would be occupied year round. Some or all of the RV sites would be used by temporary hatchery staff during peak operations, primarily during egg takes (August 15 – November 15) and smolt transfers (April and June).

The administrative building would be used year round for hatchery operations. When closed, the entrance and exit would be gated and locked. Occasional guided tours would be conducted, expected to accommodate up to 30 students at the visitor center.

Acclimation Ponds

Tonasket and Bonaparte ponds would be used to acclimate fish from October until April. When not in use for fish acclimation, these ponds would continue to be used for irrigation purposes. When fish are present, hatchery staff would visit the ponds daily to feed fish, check intake screens and pumps, and periodically clean the ponds. Cleaning waste would be vacuumed from the pond bottom and stored in an off-line settling pond per State of Washington environmental regulations.

Riverside and St. Mary's Mission ponds would be operated in a similar manner. Fish would be acclimated from October until April, after which the ponds would be drained and cleaned.

Omak Pond would be used to acclimate late arriving summer/fall Chinook from October until early April. In addition, a sub-yearling group of late arriving summer/fall Chinook would be transferred to Omak Pond from the hatchery in April for release in late June.

Ellisforde Pond (if needed) would be used as described for Tonasket and Bonaparte ponds.

E. Proposed Conservation Measures

Conservation measures presented below are 1) components of the proposed action and, 2) requirements of contractors during construction of the facilities. The following measures are intended to minimize potential impacts to listed species and designated critical habitat.

Facility Construction

- Sedimentation and erosion control measures, such as silt fencing, straw bales, and covering exposed soils with plastic sheeting, jute matting or mulching to minimize erosion, shall be utilized to prevent sediments from entering waterways and wetland habitats.

- Construction contracts would stipulate that all heavy equipment should use synthetic hydraulic oil. Equipment would be maintained to prevent fluid leaks and would be serviced outside the riparian corridor.

- Disturbance to riparian vegetation would be the minimum necessary to achieve construction objectives, minimizing habitat alteration and the effects of erosion and sedimentation.

- Site design would incorporate measures such as retaining riparian vegetation, landscaping with native plants, and shielding facility lighting.

- Clearing limits would be identified on all construction drawings and established with silt fences or orange construction fencing prior to the initiation of staging or construction activities.

- Temporary sediment ponds would be constructed as a first step in grading and would be made functional before any additional soil disturbance occurs.

- A grading plan and a temporary erosion and sedimentation control plan would be implemented before site work begins to ensure earthwork impacts are minimized. Cut and fill volumes would be balanced to the extent feasible within each site to reduce the need for either imported or exported soil.

- During clearing, grading, and construction activities, all exposed areas at final grade or remaining bare for any period of time would be protected from erosion using weed-free straw mulch, plastic covering or a similar method.

- If possible, snags and perch trees would be left in place (no significant trees have been identified for removal).

- Instream structures and screens would meet applicable NOAA Fisheries and USFWS design requirements.

- Instream work would be performed in compliance with applicable regulations and permits, and would be conducted within the agency(s)' specified work window.

- Water pumped out of instream work areas would be routed through a settling basin (or similar sediment treatment device) prior to discharge back into the river.

- At existing pond sites, construction would be staged to accommodate existing operations and reduce environmental impacts.

- Project design and construction would meet all other environmental requirements and would incorporate industry standard Best Management Practices (BMPs) such as erosion control, hazardous material handling, waste management, dust control, weed management, fire prevention, and work hour and noise considerations.

Program Operations

Conservation measures that are included in program operations to minimize effects to listed UCR spring Chinook, UCR steelhead and bull trout include:

- All facilities would be designed to achieve low density rearing.

- Developing live-capture, selective fishing gear to collect Chinook broodstock that would allow release of non-target species promptly and safely. Gear would be used in locations when and where incidental take of UCR spring Chinook and bull trout should be minimal. Capture of UCR steelhead is expected during August through November broodstock collection. Particular attention would be taken to release listed steelhead unharmed with little or no handling.

- Sorting and promptly releasing any listed steelhead that might enter the hatchery ladder and adult holding facilities.

- Adipose fin clipping all juvenile Chinook to distinguish them from UCR spring Chinook produced in the Methow River.

- Volitionally releasing Chinook from the hatchery and acclimation ponds to promote rapid migration and minimize competition with listed species.

- Altering program operations as needed to ensure no significant straying of Carson stock spring Chinook into the Methow River.

- Balancing numbers of Chinook released into the Okanogan River and Columbia River based on monitored effects to the listed steelhead in the Okanogan River.

F. Program Monitoring

The program would include comprehensive monitoring and evaluation (M&E) that would be integrated into an ongoing baseline M&E program in the Okanogan River. The M&E program would annually collect necessary data to assess program risks and benefits.

Performance measures have been established to guide program assessment. Potential impacts to listed species are a priority within the M&E program.

A conceptual M&E program for the Chief Joseph Hatchery Program was created and included as Appendix H in the Step 1 Master Plan. A detailed M&E Program has been scheduled for formulation in Step 3 planning to coincide with final hatchery design and construction. The Colville Tribes did not want to create a costly, detailed M&E plan prior to approval of the hatchery program.

The conceptual M&E program was designed to function in concert with the recently initiated Okanogan Baseline M&E Program. The conceptual Chief Joseph Hatchery M&E Program is designed to gather the critical data to evaluate the benefits of the program in increasing the health and viability of the naturally spawning summer/fall Chinook, the benefits of the summer/fall Chinook production to tribal and recreational harvest, the benefits of spring Chinook reintroduction and finally the benefits of spring Chinook production to tribal and recreational fisheries. Equally important, the conceptual M&E programs will specifies the critical data that must be collected to evaluate the potential risks of the hatchery program to naturally spawning populations of summer/fall Chinook, spring Chinook and steelhead.

The conceptual M&E program (Appendix H of the Master Plan) specifies M&E goals, fourteen objectives, performance indicators, tasks, biological variables to be monitored, general monitoring methods, and basic sample sizes. The statistical methods and design for the M&E program have been deferred to Step 3 development. The M&E plan describes information that must be gathered in the field and within the hatchery to ensure adequate evaluations.

Finally, the final M&E plan will be integrated into a larger framework for M&E and research to ensure cost effective collection of information needed for regional fish management goals at the provincial and basin-wide levels.

G. Relation of Proposed Project to other Federal Actions

This section summarizes other federal actions and programs that are occurring or are proposed in the vicinity of the CJHP facilities and that may be relevant to the Chinook salmon restoration effort.

Okanogan Subbasin Planning

Numerous efforts are underway to coordinate and prioritize conservation and recovery activities in Columbia River subbasins. In the Okanogan subbasin, these activities include the BPA-funded Okanogan Subbasin Plan which was completed in May 2004. The plan is used to select habitat-related projects to improve stream habitat and salmonid performance within the Okanogan River subbasins.

The Okanogan Subbasin Plan outlines a number of objectives for the management of summer/fall and spring Chinook which are incorporated into the CJHP. These specifically address the health of natural Chinook populations, artificial propagation, and harvest. If implemented, the proposed project would improve productivity, diversity and sustainability of Chinook salmon in the Okanogan subbasin.

Salmon and Steelhead Limiting Factors Assessment Watershed Resource Inventory 49: Okanogan Watershed

The limiting factors assessment (LFA) watershed resource inventory for the Okanogan watershed was completed in 2004 (Entrix et al. 2004). The Okanogan LFA summarized current understanding of habitat conditions in the Okanogan River and its tributaries based on the 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 sub-watershed to address the identified limiting factors. State, tribal, and federal agencies are using the plan to develop salmon enhancement actions and programs for the Okanogan subbasin. The Chinook salmon population enhancement measures proposed in the CJHP, including the use of acclimation facilities spread throughout the reach of the Okanogan River in the US, are consistent with the objectives to more fully utilize available habitat.

Biological Assessment and Management Plan: Mid-Columbia River Hatchery Program

Development of the mid-Columbia Habitat Conservation Plans (HCPs) included a Biological Assessment and Management Plan (BAMP) for the mid-Columbia River hatchery program. The BAMP is a plan for operation and evaluation of anadromous salmonid hatcheries on the Columbia River upstream of the Yakima River. It includes broadly supported genetic and ecologic assessments of summer/fall Chinook, spring Chinook, sockeye, and steelhead.

The BAMP outlines a phased approach to increasing artificial production of summer/fall Chinook in the mid-Columbia region in order to make progress toward a “no net impact” objective for the operations of mid-Columbia Public Utility Districts’ (PUDs) facilities. The document recommends production increases intended to be consistent with conservation of low-risk, natural populations and recovery of listed species. The BAMP approach relies on phased production in order to minimize negative effects of collecting broodstock on natural populations and to allow for possible adaptation of the program based on monitoring results. At this time, the BAMP has not been formally approved.

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 designees from Chelan, Douglas, and Okanogan counties, the Colville Tribes, and the Yakama Nation. The UCSRB coordinates and oversees regional recovery planning for the State of 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 provide guidance to 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 work in the region. Technical guidance developed by the RTT was taken into consideration in the development of the summer/fall Chinook Habitat 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 guide 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. The efforts of the Okanogan Lead Entity focus primarily on the grant process and Okanogan County's related contractual work with the WDFW. Each designated Lead Entity maintains a separate Citizen Committee and conducts a project prioritization process. During the last three years the Upper Columbia Lead Entities have coordinated salmon recovery efforts in the Upper Columbia by submitting an integrated regional project list.

Colville Tribes' Anadromous Fish Management Plan

The Colville Tribes are currently 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. Central 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 Summer/Fall and Spring Chinook Hatchery and 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 clearly 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.

H. Project Area and Action Area Defined

The action area includes all areas to be affected directly or indirectly by the proposed federal action and not merely the immediate area involved in the action (50 CFR 402-02).

For specific construction-related impacts, the action area is defined as a one-mile radius around each construction site. This one-mile radius was chosen in order to be consistent with WDFW bald eagle construction timing recommendations, which are based on distance to nesting and roosting sites. It is anticipated that a one-mile action area around project construction sites is also more than sufficient to encompass small and temporary increases in turbidity during in-water work and other shorter and long-term impacts caused by project construction and operation.

Because the program proposes to release a large number of hatchery fish each year, there is a chance that hatchery fish may compete for resources with listed fish. Returning hatchery fish carcasses also have the potential to degrade water quality. Therefore, the action area for assessing impacts of hatchery fish releases on listed fish species and the environment, encompasses the Okanogan River (in particular the mainstem Okanogan River and Omak Creek), and the Columbia River from Chief Joseph Dam to Wells Dam has been considered in past consultations, such as for UCR steelhead hatchery programs (NOAA Fisheries 2003). We briefly describe the landscape setting of the action area, including the Okanogan River, Omak Creek, and the Columbia River from Chief Joseph Dam to Wells Dam in the sections that follow. A detailed discussion of the environmental baseline is presented in section IV.

The major factors influencing the environmental baseline within the action area include the presence and operation of large hydroelectric dams, and land uses, primarily agriculture, grazing, and timber harvests. These land uses have degraded water quality by increasing water temperature; reduced habitat access by not providing fish passage at dams; degraded aquatic habitat elements by increasing sedimentation and erosion; altered channel condition and dynamics through dam operations and levee construction; altered stream flows through dam operations and irrigation withdrawals; and degraded the overall watershed condition through wide scale habitat conversion of land uses such as irrigated agriculture.

Okanogan River

The Okanogan River originates in British Columbia, Canada, and flows through a series of large lakes (both natural and manmade) before reaching the United States. The climate is semi-arid with cold winters and warm summers. Native vegetation is dominated by shrub-steppe communities. The watershed encompasses about 2,600 square miles within the State of Washington, but the majority of the subbasin (approximately 6,300 square miles) is in British Columbia (WDOE 1995). The mainstem Okanogan River within Washington State flows for approximately 79 miles from the outlet of Osoyoos Lake to the Columbia River (Lake Pateros) at RM 533.5 near Brewster, Washington (Entrix et al. 2004). Osoyoos Lake occupies the northernmost 4 miles of the valley floor and extends several miles into Canada.

The proposed acclimation ponds would be located adjacent to the Okanogan River and Omak Creek; the hatchery would be adjacent to the Columbia River at Chief Joseph Dam. The Okanogan River valley is a rural region, characterized by large fruit orchards, farms, ranches, and small communities. Primary industrial activities in the area are fruit-packing and processing facilities and a lumber mill near Omak. The river valleys in the action area support important irrigated orchards and other crops while the uplands are used for pasturage and open range for livestock. The floodplain of the Okanogan River valley averages about a mile in width and descends from 920 feet in elevation at the international boundary to 780 feet at the river's confluence with the Columbia River. Wells Dam backs up Columbia River waters into the Okanogan River to approximately RM 15.1.

Omak Creek

The Omak Creek subbasin is wholly contained within the Colville Reservation in Okanogan County. The creek, which is 22 miles long and has a drainage area of more than 140 square miles, 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 and the associated climate varies from arid to montane, with an average annual precipitation of 12 inches in the lower elevations to over 45 inches at Moses Mountain.

The Omak Creek watershed has 63,565 acres of commercial forest managed by the CTCR (NRCS 1995). Livestock producers use most of the forest and range areas in the watershed for grazing. Sixty percent of the rangeland in the watershed is heavily grazed, often in riparian areas (NRCS 1995). Physical habitat conditions within the watershed are beginning to be addressed through restoration practices implemented by the CTCR. Improvements have included a reduction in road density, removing two fish passage barriers, installing instream habitat structures, planting riparian vegetation and implementing livestock management practices.

Columbia River

The Columbia River upstream of Chief Joseph Dam is known as Rufus Woods Lake. Below the dam, the impoundment formed by Wells Dam is Lake Pateros. Lake Pateros extends 30 miles upstream of Wells Dam to the tailrace of Chief Joseph Dam and has a surface area of 9,740 acres. The Methow and Okanogan rivers are major tributaries to Lake Pateros. Rufus Woods Lake is 51 miles long, extending from Chief Joseph Dam upstream to Grand Coulee Dam with a surface area of approximately 8,000 acres. The Nespelem River is the major tributary entering Rufus Woods Lake. Precipitation in the upper mid-Columbia area ranges from 7 to 20 inches annually, with about 1.5 inches per month in the winter and 0.5 inches per month in the summer. Snowfall occurs from October to March.

III. Status of Species and Critical Habitat

A. Species Lists from the Services

A list of federally endangered, threatened, proposed, and candidate species, and critical habitat that may occur in the action area was compiled using the NOAA Fisheries and USFWS electronic species list websites and critical habitat designations. In addition, a request for information was made to the Washington Department of Fish and Wildlife Priority Habitats and Species (PHS) program in order to obtain official PHS maps of the action area, which show sensitive species information such as bald eagle nest locations and priority fish habitats.

Identification of Listed Species ESU/DPS

Table 1 summarizes the federally listed, proposed, and candidate fish and wildlife species that are know to occur or may potentially occur in the action area. The table also indicates whether critical habitat or essential fish habitat (EFH) has been designated or proposed for each species.

On March 24, 1999, NOAA Fisheries listed the UCR Spring Chinook ESU as endangered under the ESA (64 FR 14308). The UCR steelhead Distinct Population Segment (DPS), formerly listed as endangered under the ESA, was listed as threatened on January 5, 2006, with an effective date of February 6, 2006 (71 FR 834). The Columbia River bull trout DPS was designated threatened under the ESA on June 10, 1998 by the USFWS. In 1978, the bald eagle was federally listed as endangered throughout the lower 48 states except in Michigan, Minnesota, Wisconsin, Washington, and Oregon, where it was designated as threatened. In July, 1995, the USFWS reclassified the bald eagle to threatened throughout the lower 48 states. Gray wolves in the species' western DPS are a federally listed threatened species (68 FR 15803). The USFWS issued an "advanced notice" for delisting wolves in Montana, Idaho, Wyoming, the eastern third of Washington and Oregon and a portion of north-central Utah on February 2, 2006. This action triggered a 60 day comment period prior to formal delisting proceedings. Ute ladies'-tresses was listed as threatened on January 17, 1992 throughout its entire range (57 FR 2053). The yellow-billed cuckoo was designated a federal candidate species on July 18, 2001 (66 FR 38611); the USFWS concluded that listing of this species as threatened is warranted, but precluded by higher priority listing actions.

Table 1. Summary of ESA species that may occur in the action area.

Species	ESA Status (Listing Unit)	Designated ESA Critical Habitat	Proposed ESA Critical Habitat	MSA[3] Managed with EFH
Spring Chinook salmon (*Oncorhynchus tshawytscha*)	Endangered (UCR Spring Chinook ESU[1])	YES	N/A	Yes
Summer Steelhead (*Oncorhynchus mykiss)*	Endangered (UCR Steelhead ESU)	YES	N/A	NO
Bull trout (*Salvelinus confluentus*)	Threatened (Columbia River DPS[2])	Yes, but not in Action Area	N/A	NO

Gray Wolf (*Canis lupus*)	Threatened (Western DPS)	Yes, but not in Action Area	NO	N/A
Bald eagle (*Haliaeetus leucocephalus*)	Threatened (lower 48 states)	NO	NO	N/A
Ute ladies'-tresses *Spiranthes diluvialis*)	Threatened (entire range)	NO	NO	N/A
Yellow-Billed Cuckoo (*Coccyzus americanus*)	Candidate (entire range)	N/A	N/A	N/A

[1]Evolutionary Significant Unit
[2]Distinct Population Segment
[3]Magnuson Stevens Act

Identification of Designated and Proposed Critical Habitat

NOAA Fisheries designated final critical habitat for 19 ESUs on September 2, 2005 (70 FR 52630), effective January 2, 2006. The only designed critical habitat within the action area of the proposed project for UCR spring Chinook is the mainstem Columbia River downstream from the confluence with the Methow River to Wells Dam. All portions of the action area are designated as critical habitat for UCR steelhead.

Final critical habitat was designated by the USFWS for the Columbia River bull trout DPS on September 26, 2005 (70 FR 56212). The action area for the proposed project is not designated or proposed critical habitat for bull trout, bald eagle, yellow-billed cuckoo, gray wolf, or Ute ladies'-tresses.

B. USFWS-Managed Species Excluded from Further Analysis: Proposed Action is "not likely to adversely affect"

Of the federally listed, proposed, and candidate species found on the WDFW Priority Habitats and Species List and that are managed by the USFWS, only the bald eagle, yellow-billed cuckoo, gray wolf, Ute ladies'-tresses and bull trout may occur in the project action area (M. Miller, USFWS, personal communication, July 15, 2005). Based on the best available species occurrence and life history data and considering potential project effects, we conclude that the proposed project "may affect, but is not likely to adversely affect" these species or designated/proposed critical habitat, and therefore, these species are not discussed further in this BA. The rational for each species determination is presented below.

Gray Wolf

Wolves 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 20 years, wolf populations in western North America have increased and 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); however, expansion of their range further south in the subbasin is impeded by intensive development.

Although there have been occasional reports of individual wolves in Washington, no breeding pairs or packs of wild wolves are currently known to reside in the state. Sightings are believed to be of animals that have wandered from Canada or Idaho, or wolf-dog hybrids that have been released into the wild (http://www.wdfw.wa.gov/factshts/wolves_fact_jan06.htm). Six sightings were reported in the Okanogan River subbasin from 1981 to 1998; each were listed as "moderately reliable"; no "highly reliable" or "verified" sightings were reported (http://www.pacificbio.org/ESIN/MapImages/ graywolf.jpg)

Wolves are not expected to be present in the project vicinity due to the amount of development in the area. More suitable habitat, i.e. large tracts of land with less human development, occurs outside the action area. Our conclusion is that the proposed program "may affect, but is not likely to adversely affect" the gray wolf because current information suggests that wolves are transient in the Okanogan subbasin. In addition, program activities under the proposed action are not likely to have significant effects on the prey base for wolves or result in increased risk of wolf mortality.

Critical habitat is designated for the gray wolf. None is within the action area of the proposed program; therefore, we conclude that the CJHP would not destroy or adversely modify gray wolf critical habitat.

Bald Eagle

Bald eagles feed extensively on anadromous fish, kokanee, whitefish, northern pikeminnow, carp, suckers, tui chub, and trout. At Columbia River reservoirs, coots, mallards, and chukars are the most important food items for bald eagles. Bald eagles are opportunistic feeders and will also eat carrion. The historical distribution of the bald eagle is unknown in the upper Columbia River..

Bald eagles prefer 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. In the Okanogan River subbasin, they prefer ponderosa pine and black cottonwood, due to their availability, height, and lack of leaves in the winter. In open areas, eagles may use cottonwoods or willows for night roosting.

Bald eagles are known to over-winter along the Columbia River near Chief Joseph Dam and throughout the Okanogan subbasin. Wintering concentrations of up to 40 eagles have been documented along Lake Pateros (WDFW 2005); however, little nesting activity has been documented near CJHP facilities. A potential nest (based on size and structure) was reported in 2003 approximately 5 miles north of Ellisforde Pond (no eagles were observed, however). A second nest site was reported in 1995 approximately 2 miles northwest of the Riverside Pond site, but the nest was reported as gone in 2002 (WDFW 2005). A third nest site was reported in 2005 approximately 2 miles southwest of the Omak Pond site, at the south end of the City of Omak. No other nests were reported near proposed CJHP facilities by the WDFW priority habitats and species database (WDFW 2005).

Under the proposed action, construction activities would comply with the WDFW and USFWS bald eagle nesting work time restrictions, when necessary. Generally, construction noise restriction are recommended if projects are within 0.25 miles of a nest site. All proposed facilities would be over 2 miles from known bald eagle nest sites. Regardless, if during construction, bald eagle nesting, roosting, or foraging is observed within 0.25 miles of facility construction site, WDFW and the USFWS would be contacted. In addition, large trees or snags that could potentially be used for nesting or roosting would not be removed.

By following work timing restrictions (when necessary) and preserving large trees or snags, the proposed action "may affect, but is not likely to adversely affect" bald eagles. Critical habitat is not designated or proposed for the bald eagle and therefore, would not be affected. However, the proposed action may beneficially affect bald eagles in the action area by increasing the abundance of returning adult salmon, the carcasses of which are a preferred forage item.

Ute ladies'-tresses

Ute ladies'-tresses, a terrestrial orchid species, is endemic to wet meadows and open riparian habitats that are typically inundated early in the year, and with soils that remain moist throughout the growing season (USFWS 1995). Vegetation at most known sites used by this species is dominated by grasses and/or forbs, but the species does not successfully compete with emergent plants such as cattails, or with aggressive, densely-growing grasses, such as reed canarygrass. The reproductive rate is very low; it may take from 5 to 10 years to reach reproductive maturity, and mature plants do not flower every year.

Until 1997, the species had only been documented in Colorado, Idaho, Montana, Nebraska, Utah and Wyoming. The 1997 discovery of a population near Wannacut Lake in Okanogan County, Washington, about 95 miles northwest of the project area, extended the range of the species much farther north and west than previously had been known. Currently, there are four populations of this orchid 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, Washington (WDNR 2005).

Project facilities would be located between 770 and 920 feet in elevation, within the elevation band that the Ute ladies'-tresses is known to occur. Although Ute ladies'-tresses potentially may occur in the action area, the species is unlikely at the hatchery site because the disturbed nature of the habitat from the construction of Chief Joseph Dam. The two new acclimation sites likely do not support this species as they are used for pasture (Omak Pond) or are actively farmed (Riverside Pond). Two of the existing acclimation ponds (Bonaparte and Tonasket) occupy grounds that are graveled and maintained as plant-free. The St. Mary's Mission Pond is located on pasture lands and Ellisforde Pond is an existing facility; both sites likely do not support this species due to their disturbed nature.

Although it is unlikely that Ute ladies'-tresses inhabit the program area due to habitat alteration, an inventory would be conducted during the flowering season (from August to early September) to verify the absence of this plant at all sites before construction. In the unlikely event that it is found at a particular construction site, appropriate steps would be taken in consultation with the USFWS to conserve the species. Therefore, the proposed action "may affect, but is not likely to adversely affect" Ute ladies'-tresses. Critical habitat is not designated or proposed for the Ute ladies'-tresses.

Yellow-billed Cuckoo

The yellow-billed cuckoo is a federal candidate species. The cuckoo disappeared from most of its breeding range in the 1930s (WDFW 1991) and has not been documented by the WDFW Priority Habitats and Species database as occurring in the CJHP vicinity. Yellow-billed cuckoos breed from mid-June to mid-August, nesting in deciduous forested riparian and wetland habitats with dense foliage within 30 feet of the ground (WDFW 1991). They exclusively eat insects and require very large territories; few cuckoos have been documented in riparian areas less than 300 feet wide and 4 acres in area (WDFW 1991). 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 (WDFW 1991), but studies in California reveal that availability of riparian habitat and food are limiting. None of these habitat types would be affected directly or indirectly by the long-term operations of the proposed fish culture facilities. Therefore, the proposed CJHP "may affect, but is not likely to adversely affect" the yellow-billed cuckoo. Critical habitat designations are not applicable to candidate species.

Columbia River Bull Trout

Bull trout, members of the family Salmonidae, are a char native to the Pacific Northwest and western Canada. Bull trout historically occurred in major river drainages in the Pacific Northwest from about 41°N to 60°N latitude, from the southern limits in the McCloud River in northern California and the Jarbidge River in Nevada to the headwaters of the Yukon River in Northwest Territories, Canada (Cavender 1978; Bond 1992).

Bull trout appear to have more specific habitat requirements than other salmonids (Rieman and McIntyre 1993), requiring cold clean water and a high degree of habitat complexity. Habitat characteristics including water temperature, stream size, stream gradient, substrate composition, hydraulic complexity, and large wood have been associated with juvenile and resident bull trout distribution and abundance (Dambacher et al. 1992; Rieman and McIntyre 1993). Water temperatures over approximately 50°F are thought to limit their distribution.

Local bull trout populations are not known to occur in the Okanogan River subbasin within the United States, but have been documented within Canada (McPhail and Carveth 1992). The Upper Columbia Recovery Unit Team recommended that expanded surveys be conducted in the Okanogan River subbasin to verify the status and distribution of bull trout. Only one bull trout was documented within the lower portion of the Okanogan River in 2002. There is no other substantiated documentation of bull trout in the

Okanogan subbasin. The nearest local bull trout populations spawn in the Methow River subbasin.

In 2001, Chelan County Public Utility District began a radio telemetry study, tagging 39 large migratory bull trout captured at Rock Island, Rocky Reach, and Wells dams (Kreiter 2001). During this study, one of the tagged bull trout ventured into the lower Okanogan River. This bull trout was tagged and released on June 3, 2002. The fish then moved upstream and was detected in the tailrace of Wells Dam on June 6, passing Wells Dam on June 18. On June 22, this fish was detected at a fixed telemetry station on the Okanogan River at RM 5.6. The next day the bull trout was detected at the mouth of the Methow River. By August 1, the bull trout had moved into the headwaters of the Twisp River, presumably to spawn. The radio tag for this bull trout was recovered on September 12, 2002 in the Twisp River headwaters. No carcass was found., and the tag showed no obvious signs of predation.

This information indicates that an occasional individual bull trout may migrate into the lower Okanogan River and the Columbia River below Chief Joseph Dam. Due to the apparent infrequent occurrence of bull trout in the CJHP vicinity, it is very unlikely that facility construction would result in take of bull trout.

Areas to be affected by construction are not designated as critical habitat, nor is the Okanogan River designated as a core area under the draft bull trout recovery plan. Any small and permanent impact to aquatic habitat within the Okanogan River subbasin and at the hatchery site on the Columbia River would not likely have a measurable impact on bull trout foraging, migration, or over-wintering habitat use. Additionally, spawning and rearing within the action area are not likely due to high summer and fall water temperatures (exceeding 50°F). The program would, at most, have negligible effects on listed bull trout. Therefore, the proposed action "may affect, but is not likely to adversely affect" Columbia River bull trout.

The proposed project may have a beneficial effect on bull trout by increasing forage for the species. It is known that some migratory bull trout from core areas such as the Methow and Wenatchee river subbasins forage in the mainstem Columbia River near the confluence of these rivers in the winter and spring. Large migratory bull trout are thought to be highly piscivorous, targeting juvenile salmon, among other species, as forage. It is thought that the widespread decline of salmon within the Columbia River basin has contributed to the decline of bull trout. Releasing thousands of hatchery smolts into the Columbia River could increase the forage base for any large migratory bull trout that over-winter and forage in the mainstem Columbia River.

Critical habitat is designated for the Columbia River bull trout; however, there is no critical habitat within the action area of the proposed project. Therefore, the proposed project would not destroy or adversely modify bull trout critical habitat.

C. Description of NOAA Fisheries-Managed Species to be Analyzed for Formal Consultation: Proposed Action is "likely to adversely affect"

Based on the best available information, the proposed program may have adverse effects on UCR Spring Chinook and UCR steelhead. The status, occurrence in the action area, local population and ESU trends, life history, and factors for decline of these species are summarized below.

UCR Spring Chinook Salmon

Upper Columbia spring Chinook salmon, considered extinct from the Okanogan subbasin, recently have been reintroduced into the subbasin. Approximately 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). The fish from this hatchery program are not considered part of the listed UCR spring Chinook ESU. Similarly, spring Chinook cultured under the proposed action would not be considered part of the listed ESU.

The UCR spring Chinook ESU includes all naturally-spawned populations of spring Chinook salmon in accessible reaches of Columbia River tributaries between Rock Island and Chief Joseph dams, including the Wenatchee, Entiat, and Methow River basins, but excluding the Okanogan River basin. The spring Chinook components of the following hatchery stocks are also listed: Chiwawa, Methow, Twisp, Chewuch, and White rivers and Nason Creek.

NOAA Fisheries designated final critical habitat for UCR spring Chinook on September 2, 2005 (70 FR 52630), effective January 2, 2006. The only habitat within the action area of the proposed project designated as critical habitat for UCR spring Chinook is the mainstem Columbia River downstream from the confluence with the Methow River to Wells Dam.

UCR Spring Chinook in the Action Area

Based upon creel census data, no spring Chinook salmon were harvested from 1994 through 1996, or from 1998 through 2000. The only known harvest of spring Chinook salmon at the Chief Joseph Dam tailrace fishery prior to 2001 occurred during 1997. The 4 coded-wire-tagged spring Chinook salmon harvested during 1997 were from the Clearwater River drainage (1 from the Crooked River; 3 from the Dworshak National Fish Hatchery), which are not listed. Prior to 2001, no UCR hatchery-origin spring Chinook salmon had ever been observed in the fishery. In 2002, out of 706 Chinook sampled during July and August at the Chief Joseph tailrace, 3 fish were hatchery-origin spring Chinook (1 listed Winthrop 1998 brood spring Chinook; 1 unlisted Winthrop 1998 brood spring Chinook; 1 Methow 1997 brood spring Chinook). Out of an estimated total harvest of 2,189 summer Chinook during July to August, 2002, 9 were estimated to be hatchery origin UCR spring Chinook. Out of these 9 fish, only an estimated 6 fish were listed and all were observed in the month of July, when, due to the unusually large run in

2002, a few fish were still present in the action area (Chris Fisher, CTWR, personal communication).

Life History

UCR spring Chinook salmon exhibit classic stream-type life history strategies, emigrating from freshwater as yearling smolts and undertaking extensive offshore ocean migrations. The majority of these fish mature at age four and return to the Columbia River from March through mid-May. Adult Chinook salmon that migrate past Wells Dam from May through the end of June are considered spring Chinook. Spawning occurs primarily in August. Chinook salmon require clean gravel, 0.5 to 4 inches in diameter for spawning (Reiser and Bjornn 1979). Preferred water temperatures for Chinook salmon spawning ranges from 42 and 58°F (Reiser and Bjornn 1979). The recommended incubation temperatures range between 41 to 60°F, with an optimal egg and fry temperature of 51.8°F (Reiser and Bjornn 1979).

Juvenile Chinook salmon are typically associated with low gradient, meandering, unconstrained stream reaches (Lee et al. 1996), and require abundant habitat complexity with accumulations of large wood and overhanging vegetation (USDI 1996). Juvenile Chinook salmon often move into side channels, beaver ponds, and sloughs for over-wintering habitat. Optimal temperature for Chinook salmon juveniles is between around 55 to 60°F (Seymour 1956), with an upper lethal tolerance limit of 77°F (Scott and Crossman 1973; Brett 1952).

ESU Trends

On April 4, 2002, NOAA Fisheries defined interim abundance recovery targets for each spawning aggregation in this ESU. These numbers are intended to be an interim surrogate for the number and productivity of naturally produced spawners that may be needed for recovery, in the context of whatever take or mortality is occurring. They should not be considered in isolation, as they represent the numbers that, taken together, may be needed for the population to be self-sustaining in its natural ecosystem. For UCR spring Chinook salmon, the interim recovery levels are 3,750 spawners in the Wenatchee River, 500 spawners in the Entiat River, and 2,000 spawners in the Methow River.

Recently, the average escapement for the ESU has been less than 5,000 hatchery-origin plus wild Chinook salmon. All three of the existing UCR spring Chinook salmon populations have exhibited similar trends and patterns in abundance over the past 40 years. Based on redd count data series, spawning escapements for the Wenatchee, Entiat, and Methow rivers have declined an average of 5.6 percent, 4.8 percent, and 6.3 percent per year, respectively, since 1958 (NOAA Fisheries 2003). The 5-year geometric mean (1997-2001) spawning escapements were 273 for the Wenatchee population, 65 for the Entiat population, and 282 for the Methow population. NOAA Fisheries (2003) concluded "assuming that population growth rates were to continue at 1980-2000 levels, UCR spring Chinook salmon populations are projected to have very high probabilities of decline within 50 years (87 percent to 100 percent), and the ESU is likely to go extinct".

Factors for Decline

Spring Chinook salmon runs were extirpated from the Okanogan River by the 1930s due to construction of impassable dams, irrigation withdrawals, and over-harvest. Historically, Salmon Creek and its tributaries were the primary spring Chinook salmon spawning areas in the U.S. portion of the Okanogan River subbasin. This area became inaccessible over 80 years ago with construction of Conconully Dam and the Okanogan Irrigation District diversion dam at RM 4.3 (NPCC 2004). There is insufficient flow below the irrigation diversion dam to provide fish habitat. Throughout the ESU, major factors for decline include hydropower dams and operations, past hatchery practices, over harvest, habitat alteration and destruction, increased predation, in conjunction with poor ocean conditions.

UCR Steelhead

The UCR steelhead 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 2005b). NOAA Fisheries originally identified three important spawning populations within this ESU, the Wenatchee, Entiat, and Methow populations. However, the Interior Columbia Basin Technical Review Team recently listed the Okanogan River subbasin summer steelhead as an independent population (NPCC 2004). The State of Washington manages steelhead in the Okanogan and Methow rivers as a composite stock, i.e. the same population (CTCR 2005a).

NOAA Fisheries designated final critical habitat for UCR steelhead on September 2, 2005 (70 FR 52630), effective January 2, 2006. All portions of the action area for the CJHP are designated as critical habitat for UCR steelhead.

UCR Steelhead in the Action Area

Summer steelhead use the Columbia River and the mainstem Okanogan River for rearing and as a migration corridor. Steelhead redds have been documented in the Okanogan and Similkameen rivers, as well as Salmon, Omak, Tunk, Bonaparte, Ninemile, Tonasket, and Vaseux creeks (CTCR 2005b). Most of the steelhead in the Okanogan River are Wells Dam hatchery fish. Between 1991 and 2000, only 6.5 percent of the adults passing Wells Dam were natural-origin fish. Between 1975 and 1991, the wild adult-to-adult survival ratios of the Methow/Okanogan populations were estimated to be between 0.05:1 and 0.35:1 (CTCR 2004).

There is insufficient data available to determine trends in abundance, timing, and distribution of summer steelhead in the Okanogan subbasin (CTCR 2005b). During surveys conducted in 2005 by the Colville Tribes, 470 steelhead redds were documented in the mainstem habitats of 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 Highway 97 Bridge at Oroville. Other high steelhead redd concentration areas were observed in the vicinity of the confluence of the Okanogan and Similkameen rivers as well as the mainstem Okanogan at Janis Rapids and McAllister

Rapids and in other mainstem areas with relatively steep gradient, high water velocity, and moderate-sized substrate. In tributaries located within the United States, 164 redds were observed.

Omak Creek up to Mission Falls (RM 5.6) and Bonaparte Creek are currently the primary spawning tributaries located in the U.S. segment of the subbasin. In 2004, the steelhead escapement to Omak Creek was 104 fish. A few redds have also been documented in Mission Creek above Mission Falls (CTCR 2005b). Based upon observations and adult steelhead collected at a picket-weir in lower Omak Creek, summer steelhead return to Omak Creek beginning the last week of March through April, with the peak occurring during the first week of April (CTCR 2002).

Life History

Steelhead, the anadromous form of rainbow trout *Oncorhynchus mykiss*, can be divided into two reproductive ecotypes based on their state of sexual maturity at the time of river entry and duration of their spawning migration. These two ecotypes are termed "stream maturing" (summer steelhead) and "ocean maturing" (winter steelhead). Summer steelhead enter freshwater during the summer and require several months of maturation before they spawn. Winter steelhead enter freshwater ready to spawn in late winter or early spring.

Adults UCR steelhead typically return to the Columbia River between May and October and are considered summer steelhead. Based on limited data, steelhead from the Wenatchee and Entiat rivers return to freshwater after one year in salt water, whereas Methow (and presumably Okanogan) River steelhead primarily return after two years in salt water (NOAA Fisheries 2003). Adult summer steelhead migrate past Wells Dam from July through November with peak passage occurring from late-August through September. Spawning occurs from late March through mid-May, peaking mid-April through late-April. The optimum spawning temperature for steelhead is about 45°F, but they have been reported spawning at temperatures from 39 to 55°F (Barnhart 1991). Adults may remain in freshwater up to a year before spawning, and, unlike salmon, some adult steelhead survive spawning and attempt to migrate back to the ocean. A small number of these fish, known as kelts, may survive their post-spawn emigration and return again to spawn in their natal stream.

Eggs incubate for 1.5 to 4 months, depending on water temperature, before hatching. In their first year of life most steelhead live in riffles, but some larger fish also inhabit pools or deep fast runs (Barnhart 1991). Instream cover such as large rocks, logs, root wads, and aquatic vegetation are very important for juvenile steelhead. The preferred water temperature for rearing steelhead ranges from 50 to 55°F (Bjornn and Reiser 1991). Juveniles generally migrate downstream to the ocean from early spring through June after 2 to 3 of years rearing in freshwater. Some of the oldest smolt ages for steelhead, up to 7 years, are reported from the UCR steelhead ESU (Peven 2002).

ESU Trends

Returns of both hatchery and naturally-produced UCR steelhead to the upper Columbia River have increased in recent years from, increasing from an average of 7,800 fish (1992 to 1995) past Priest Rapids dam to 12,900 fish (1997 to 2001). For UCR steelhead, interim NOAA Fisheries recovery levels are 2,500 spawners in the Wenatchee River, 500 spawners in the Entiat River, and 2,500 spawners in the Methow River (NOAA Fisheries 2003). The WDFW escapement goal for Methow/Okanogan stock is 2,300. Although returns of both hatchery and naturally produced UCR steelhead returns to Columbia River have increased in recent years, natural production remains well below desired levels. Taken as a whole, available data indicate productivity problems and suggest that interim recovery goals will not be attained within the foreseeable future (NOAA Fisheries 2003).

Factors for Decline

Natural steelhead production is severely reduced in the Okanogan River subbasin due to tributary habitat degradation, construction of dams, and water withdrawals for irrigation. Throughout the ESU, major factors for decline include hydropower dams and operations, past hatchery practices, over harvest, habitat alteration and destruction, increased predation, in conjunction with poor ocean conditions.

IV. Environmental Baseline Matrix

The environmental baseline includes the past and present impacts of all federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process 50 CFR § 402.02(d). The baseline provides a reference for NOAA Fisheries and the USFWS to evaluate the species' current status in relationship to the proposed action.

For proposed actions that affect freshwater habitat, the Services usually define the biological requirements for listed species in terms of a concept called properly functioning condition (PFC). PFC is the sustained presence of natural habitat-forming processes in a watershed (e.g., riparian community succession, bedload transport, precipitation runoff pattern, channel migration) that are necessary for the long-term survival of the species through the full range of environmental variation. PFC, then, constitutes the habitat component of a species' biological requirements. The indicators of PFC vary between different landscapes based on unique physiographic and geologic features. For example, aquatic habitats on timberlands in glacial mountain valleys are controlled by natural processes operating at different scales and rates than are habitats on low-elevation coastal rivers or arid desert river systems.

In the NOAA Fisheries PFC framework, baseline environmental conditions are described as "properly functioning" (PFC), "at risk" (AR), or "not properly functioning" (NPF). The PFC concept includes a recognition that natural patterns of habitat disturbance will continue to occur. For example, floods, landslides, wind damage, and wildfires result in spatial and temporal variability in habitat characteristics, as will anthropogenic perturbations. If a proposed project would be likely to impair properly functioning habitat, appreciably reduce the functioning of already impaired habitat, or retard the long-term progress of impaired habitat toward PFC, it will usually be found likely to jeopardize the continued existence of the species or adversely modify its critical habitat, or both, depending upon the specific considerations of the analysis. Such considerations may include, for example, the species' status, the condition of the environmental baseline, the particular reasons for listing the species, any new threats that have arisen since listing, and the quality of the available information.

In this section of the BA, we summarize existing environmental conditions and parameters for the action area, and present the status of each indicator as PFC, AR, or NPF following the NOAA Fisheries "pathways and indicators" matrix (Table 2). Criteria for PFC, AR and NPF are described in detail in NMFS (1996b). A summary of each indicator follows Table 2, along with a justification for the status of each indicator in the action area. The effects that the proposed program may have on each environmental indicator are analyzed subsequently in Section V (D).

Table 2. Matrix of indicators and pathways for documenting the environmental baseline of relevant indicators.

	Baseline Environmental Conditions		
Pathway *Indicators*	Function	Description	Cause of Degradation from PFC
Water Quality			
Temperature	NPF	High water temperatures present during Chinook spawning, rearing and migration period in Okanogan R. and Omak Cr.	Loss of riparian vegetation due to development; natural low watershed elevation; large lakes present upstream in Canada
Sediment/Turbidity	NPF	High sediment loads Omak Creek	Grazing and other land uses have caused bank erosion and sedimentation
Chemical Contamination/Nutrients	NPF	Several 303(d) listed reaches	Chemical contamination likely from agricultural runoff
Habitat Access			
Physical Barriers	NPF	Man-made barriers without fish passage are present	No passage is provided at Grand Coulee and Chief Joseph dams; several barriers are present within the Okanogan subbasin
Habitat Elements			
Substrate	NPF	High fine sediment loads in Omak Cr., limited spawning gravel in Okanogan R., fine sediment accumulation in mainstem Columbia R.	Grazing and roads have increased fine sediment in Omak Cr., dams have reduced gravel recruitment in the Okanogan and Columbia rivers
Large Woody Debris	NPF	Little if any LWD in Okanogan R., Omak Cr. or Columbia R.	Development, historic wood removal, loss of riparian forest
Pool Frequency and Quality	NPF	Likely few pools with lack of complexity in Omak Cr., Okanogan, and Columbia R.	Stream channelization, and loss of LWD have reduced pools. Dams have caused inundation of the Columbia R., and backwatered the Okanogan R.
Off-Channel Habitat	NPF	Off-channel habitat access limited	Flood control practices have reduced access during high flows; ditching and agriculture have filled wetlands and altered off-channel habitats
Refugia	NPF	No pristine PFC aquatic habitat present in the action area	Wide scale land uses, primarily agriculture, timber harvest, hydropower, and grazing, has degraded the watershed
Channel Condition/Dynamics			
Width/Depth Ratio	NPF	Omak Cr. incised in some areas, eroding banks increase ratio	Over-grazing, channelization, and inundation due to dams

	Baseline Environmental Conditions		
Pathway Indicators	Function	Description	Cause of Degradation from PFC
Streambank Condition	NPF	Extensive actively eroding streambanks in Omak Cr., loss of riparian vegetation in the action area	Shoreline armoring along the Columbia, over-grazing and agriculture in Omak Cr. and Okanogan R.
Floodplain Connectivity	NPF	Limited floodplain connectivity	Loss of connectivity due primarily to flood control operations on Columbia and upper Okanogan R.
Flow/Hydrology			
Change in Peak/Base Flow	NPF	Peak flows are lower, base flows are higher in Okanogan River	Change in hydrology due primarily to dam operations on Columbia and upper Okanogan R.
Increase in Drainage Network	AR	Fine sediment problems in Omak Creek suggest AR	Road density contributing fine sediments
Watershed Conditions			
Road Density and Location	NPF	High road density	Agriculture and timber harvest road networks
Disturbance History	NPF	Land uses have converted large areas of habitat	Primarily agriculture, timber harvest, and grazing
Riparian Reserves	NPF	Lack of woody vegetation in riparian areas along Omak Cr., Okanogan, and Columbia R.	Widespread clearing and grazing, and agriculture

NA = Not Applicable

It is important to note that the current status of a particular environmental indicator may not be related to a proposed project. For example, road density in the Omak Creek basin may rate as “not properly functioning” under existing conditions even though the proposed program has no influence on this indicator. In addition, the NMFS (1996b) matrix was originally designed by the U.S. Forest Service to evaluate timber harvest activities on rangeland watersheds. Therefore, not all of the parameters are necessarily applicable to the spatial scale of the proposed CJHP, although it is still a useful tool in characterizing the baseline conditions and summarizing the potential effects of the proposed project.

A. Water Quality

Water Temperature

For Chinook salmon, NMFS (1996b) defines PFC as water temperatures ranging from 50 to 57°F. AR conditions range from 57 to 60°F for spawning and from 57 to 64°F for migration and rearing. NPF is defined as greater than 60°F for spawning and greater than 64°F for rearing. NPF is defined as temperatures outside the above criteria, with rearing areas and migration corridor temperatures over 59°F.

WDOE's 1998 - 303(d) list noted that late summer water temperatures consistently exceeded 64°F (annual violations from 1983-1993) (WDOE 1997) in the Okanogan River. The 2004 -303(d) list noted that temperatures at the Malott station exceeded the standard 13 times out of 55 samples collected between 1993 and 2001, usually in July, August, and September. These occurrences are partly a result of natural phenomena (low gradient and solar radiation on the upstream lakes), but are exacerbated by summer low flows caused by dam operations, irrigation, and poor riparian conditions (Entrix et al. 2004).

Data from Omak Creek is limited; however, CTCR data described in the 1998 - 303(d) list showed that water temperatures exceeded 64°F numerous times at Mission Falls during the summer of 1990, and peak water temperatures exceeded 75°F between 1997 and 2002, with the highest water temperature (80°F) recorded in 1997 (Entrix et al. 2004). Poor riparian condition due to livestock grazing on streambanks was identified as one of the main factors affecting water quality in the creek.

For the Columbia River near Chief Joseph Dam, surface water temperatures range over 70°F in late summer as measured at the forebay above Chief Joseph Dam (Univ. of Washington 2000). Full-year temperature data are not available for the reach downstream of the dam (USACE 2000).

Under the NMFS (1996b) criteria, temperature values would rate as NPF for Chinook spawning, rearing and migration.

Sediment/Turbidity

NMFS (1996b) defines PFC as containing less than 12 percent fines in gravel, and NPF is defined as having greater than 17 percent fines on the surface of the substrate.

Accelerated sediment yield from livestock grazing on the uplands and streambanks was identified as one of the main factors affecting water quality in Omak Creek (NRCS 1995 in NMFS 2002). Roads were also identified as a significant source of sediment to Omak Creek and connected tributaries (Entrix et al. 2004). Surveys conducted by CTCR during 1995 also identified excessive sediment deposition (embeddedness ranging from 56.8 to 79.8 percent) in a tributary of Omak Creek.

Sediment and turbidity levels in the Okanogan River leaving Osoyoos Lake are well within state standards. This is most likely because large lakes act as very effective sediment traps. Turbidity in the mainstem Okanogan River is primarily influenced by Similkameen River flows. Turbidity spikes occur during the peak runoff in the spring (up to approximately 80 NTU), but generally turbidity is less than 10 NTU as measured at Malott. No data regarding fine sediments within the Okanogan River were found; however, tributaries to the Okanogan are experiencing increased sedimentation and erosion, likely resulting in increased fine sediment deposition into the mainstem Okanogan River.

Sediment and turbidity in Rufus Woods Lake are generally low; however, spring runoff is likely to be characterized by somewhat elevated levels of suspended solids carried by snowmelt, which generally results in increased turbidity (USACE 2000). Dams generally trap sediments, and therefore, there is likely a fine sediment build-up within the Columbia River upstream of Wells Dam in the action area.

Based on the documentation of increased erosion and sedimentation in Omak Creek and prevailing land uses, such as grazing and timber harvest in the Okanogan subbasin, this indicator is likely NPF.

Chemical Contamination/Nutrients

NMFS (1996b) defines PFC as characterized by low levels of contamination with no 303(d)-designated reaches, and NPF is defined as high levels of chemical contamination and nutrients and more than one 303(d)-listed reach.

Reaches within the Okanogan River subbasin were on the WDOE 1998 - 303(d) list for not meeting PCB, dissolved oxygen, DDE, and DDD criteria (Entrix et al. 2004).

In Omak Creek, fecal coliform bacteria has exceeded Colville Tribes' standards. Livestock and septic tanks are thought to be the reason why Washington State standards for nutrients (nitrate, phosphate) and ammonia have been exceeded in both the lower and upper reaches of Omak Creek.

Total dissolved gas (TDG) can exceed state standards in the Chief Joseph Dam vicinity and the upper Columbia River generally. TDG spikes reaching 140 percent have been observed in Rufus Woods Lake (USACE 2000), influenced primarily by Grand Coulee operations.

Based on known water quality degradation and number of reaches listed on the WDOE 303(d) list, this indicator rates as NPF in the action area.

B. Habitat Access

Physical Barriers

NMFS (1996b) defines PFC as man-made barriers that allow upstream and downstream passage at all flows without significant levels of mortality or delay, and NPF as man-made barriers that do not allow upstream and downstream fish passage at a range of flows.

There is currently a partial barrier to fish passage on the mainstem of Omak Creek at Mission Falls (RM 5.1), a remnant of a rail system constructed in the 1920s (NOAA Fisheries 2004). However, during the spring of 2002, adult steelhead were observed several miles upstream of the falls. As a result, upstream fish passage is functioning at risk (CTCR 2002). A barrier to fish passage exists on Salmon Creek, tributary to the Okanogan River. The barrier is created by diversion of all stream flows about 4 miles above the mouth of Salmon Creek. Chief Joseph Dam does not provide upstream fish passage facilities.

Because manmade barriers that prevent upstream and/or downstream fish passage at a range of flows are present in the action are, this indicator rates as not properly functioning.

C. Habitat Elements

Substrate

NMFS (1996b) defines PFC as reach embeddedness of less than 20 percent and NPF as embeddedness greater than 30 percent.

When the Columbia River was transformed into a series of slow moving reservoirs, much of the historic habitat was inundated and most riverine habitat functions were lost (NMFS 2000). Due to low water velocities and the presence of dams, sediment transport has been restricted to the extent that fine materials (silt and sand) settle out of the water column in the reservoirs instead of being flushed downstream causing sedimentation (NMFS 1996a). In addition, the physical presence of the dams (both upstream and in the action area) act to trap larger gravel substrates, preventing downstream gravel recruitment and reducing salmon spawning habitat (NMFS 1996a).

Due to evidence of fine sediment deposition and loss of spawning gravel recruitment caused by the presence of dams, this indicator is likely not properly functioning in the action area.

Large Woody Debris

NMFS (1996b) defines PFC as greater than 80 pieces of wood per mile, which are greater than 24 inches in diameter and greater than 50 feet long. NPF is defined as wood that does not meet the criteria of PFC and sources of LWD recruitment are lacking.

LWD is substantially deficient in Omak Creek from RM 1.5 to RM 5.0 as a result of livestock overgrazing in riparian areas (NOAA Fisheries 2004). A habitat enhancement project placed over 1,500 pieces of LWD in the lower creek, yet NMFS (NOAA Fisheries 2004) concluded that it was still not properly functioning habitat in terms of LWD, although vastly improved. LWD in the Okanogan River likely does not meet PFC due to loss of riparian trees, reducing LWD recruitment potential. Columbia River dams reduce LWD movement downstream. Therefore, this indicator is likely NPF in the action area.

Pool Frequency/Quality

NMFS (1996b) defines PFC for pool frequency based on channel width. Pool quality for PFC is defined as pools with good cover, only a minor reduction in volume caused by fine sediments, and many pools greater than 1 meter deep. NPF is defined as pool frequency that is considerably less than under PFC, cover and temperature that is inadequate, with high fine sediment loads, and no pool greater than 3 feet deep.

The frequency of pools in lower Omak Creek was reported as functioning at risk by NMFS (NOAA Fisheries 2004). Pool frequency and quality is likely impaired in the Okanogan River due lack of LWD recruitment. In addition, backwatering from Wells

Dam has inundated the lower Okanogan River for approximately 15 miles. Pools were eliminated from the mainstem Columbia when the river was converted into a slow moving reservoir due to dam construction. Therefore, this indicator is likely not property functioning.

Off-channel Habitat

NMFS (1996b) defines PFC for off-channel habitat as many backwaters with cover and low energy, and off-channel areas that include ponds and oxbows. NPF is defined as the watershed with few or none of these habitat types.

Mainstem Columbia reservoirs have inundated off-channel habitats and wetlands. Flood control operations from upstream dams on the Okanogan River have reduced peak flows, limiting off-channel habitat access. Wide-spread agriculture within the Okanogan River floodplain has likely filled off-channel habitats and wetlands. Therefore, this indicator is likely not properly functioning.

Refugia

NMFS (1996b) defines PFC for refugia as habitat refugia that exists and is adequately buffered by intact riparian reserves; existing refugia are sufficient in size, number and connectivity to maintain viable populations and subpopulations. NPF is defined as adequate habitat refugia that do not exist.

The action area has been extensively altered due to the presence of Columbia River dams and land uses, such as timber harvest and agriculture that have resulted in a large conversion of habitat. The extirpation of UCR spring Chinook from the Okanogan River and listing of UCR steelhead as endangered is evidence that habitat refugia does not exist to maintain viable populations. Therefore, this indicator rates as not properly functioning.

D. Channel Condition/Dynamics

Width/Depth Ratio

NMFS (1996b) defines PFC for the average width/depth ratio as less than or equal to 10 and for NPF as greater than 20.

Over-grazing and channel incision has occurred on Omak Creek (Entrix et al. 2004). The mainstem Columbia River has been converted to a reservoir, and the lower 15 miles of the Okanogan River are affected by reservoir inundation and pool fluctuation as well. Therefore, this indicator rates as not properly functioning.

Streambank Condition

NMFS (1996b) defines PFC as greater than 90 percent of any stream reach of which 90 percent or more is stable. NPF is defined as less than 80 percent stability.

Although, no specific data was found, the limited amount of woody vegetation on the stream banks along the Okanogan River and Omak Creek are increasing the rate of severe erosion (Entrix et al. 2004). Therefore, this indicator rates as not properly functioning.

Floodplain Connectivity

NMFS (1996b) defines PFC as well-connected, off-channel areas with overbank flows of sufficient frequency to maintain function. NPF is defined as a severe reduction in hydrologic connection with off-channel habitats.

Dam operations, flow (reservoir) management, and the related inundation of off-channel rearing and floodplain areas have reduced the size, quality, and function of floodplains along the Columbia River (NMFS 2000). Flood control on the Okanogan River has reduced peak flows, limiting connection to the floodplain. Parts of Omak Creek are incised (Entrix et al. 2004). Therefore, this indicator rates as not properly functioning.

E. Flow/Hydrology

Change in Peak/Base Flows

NMFS (1996b) defines PFC for the watershed hydrograph as being similar in terms of peak flow, base flow, and timing characteristics to an undisturbed watershed with similar geology and geography. NPF is defined as pronounced changes in various hydrologic parameters.

Okanogan River flow is regulated by dams at three lake outlets: Osoyoos in the United States, and Skaha and Okanagan in Canada. These dams regulate the river flow to meet several objectives including flood control, preferred lake elevations, and enhancement of fish production (CTCR 2005a). Average annual flows on the Okanogan and Similkameen rivers have not changed significantly since gauging began in 1911 (WDOE 1995); however, seasonal timing and duration of flows have changed substantially. Due to flow regulation by the three dams on the Okanogan River, peak flows are lower and low flows are higher than occurred historically under unregulated conditions.

Chief Joseph Dam is a run-of-river hydroelectric project; however, upstream dams are used for flood control purposed to reduce the magnitude of flood flows, but which also increases the flood flow duration. Power peaking at Columbia River dams results in unnatural river stage fluctuations. Therefore, because pronounced changes have occurred in the natural hydrograph of the action area over pre-development conditions, this indicator is not properly functioning.

Increase in Drainage Network

NMFS (1996b) defines PFC as zero to minimal increases in the drainage network due to roads. That is, the construction of roads and their companion drainage systems do not increase the total number of drainage routes to the river, potentially increasing input of sediment and contaminants, and altering hydrology. NPF is defined as significant increases in drainage network density due to roads (20 to 25 percent).

The Omak Creek watershed contains over 900 miles of road, with a drainage network of over 141 square miles (Entrix et al. 2004). Roads and road density are probably the leading factors contributing to sediment in Omak Creek (NOAA Fisheries 2004). Current road densities in the vicinity of the action area greatly exceed NOAA Fisheries guidelines of less than 2 miles of road per square mile (NOAA Fisheries 2004).

In addition to roads, irrigation networks have increased the drainage network in the basin. There are nine irrigation districts, reclamation districts and canal companies operating in the Okanogan Watershed. These water providers comprise the bulk of irrigation water delivery from surface water sources to approximately 24,710 irrigated acres (Entrix et al. 2004).

Based on this data, there has likely been a substantial increase in the watershed drainage network within the action area; therefore, this indicator is likely at risk, and may be not properly functioning.

F. Watershed Conditions

Road Density and Location

NMFS (1996b) defines PFC as less than 1 mile of road per square mile with no valley bottom roads and NPF as greater than 2.4 miles of road per square mile with many valley bottom roads.

Road density in the Omak Creek watershed is 6.38 miles of road per square miles (NRCS 1995). Road density in most sub-basins in the Okanogan River subbasin exceeds 4 miles of road per square mile (Entrix et al. 2004). In addition, there are over 330 miles of road within 200 feet of a stream in the Okanogan River subbasin. Therefore, this indicator is not properly functioning due to high road densities.

Disturbance History

NMFS (1996b) defines PFC as having less than 15 percent equivalent clear-cut area (entire watershed) with no concentration of disturbance in unstable or potentially unstable areas, and/or refugia, and/or riparian area; and for Northwest Forest Plan areas (except adaptive management areas), 15 percent retention of late successional old growth timber in the watershed.

While the Okanogan River subbasin is not overly developed, wide spread habitat conversion to agriculture and timber harvest has occurred. The watershed contains approximately 36,000 to 40,000 acres of irrigated area, and timber harvest is prevalent in the upper elevations. Due to the wide scale habitat conversion within the subbasin, this indicator is not properly functioning.

Riparian Reserves

NMFS (1996b) defines PFC as a riparian reserve system that provides adequate shade, LWD recruitment, habitat protection, and connectivity to all sub-watersheds. This reserve must be greater than 80 percent intact and at least 50 percent of the vegetation must be similar to the potential natural community composition.

Riparian areas along the Okanogan and Columbia rivers and Omak Creek have been highly disturbed though agriculture and grazing. CTCR (2002) rated riparian reserves in the Omak Creek watershed as not properly functioning. It is likely that this indicator is not properly functioning the in the action area of the proposed CJHP.

V. Effects of the Action

A. Direct Effects

In this section we analyze the direct effects of the proposed hatchery program on three primary elements that most likely may be influenced by the action. These elements are (1) direct effects on individual fish, such as harassment or actual mortality through contact with the construction equipment; (2) direct effects on habitat by physical disturbance during construction; and (3) effects on water quality during construction. Direct effects also include effects on listed fish during broodstock collection. Effects resulting from hatchery fish straying and competition are discussed under the indirect effects section (Section V.B.).

Construction Effects

Most of the proposed project facilities would be built in upland areas; however, in-stream construction would occur at the hatchery, Riverside Pond, Omak Pond, and St. Mary's Mission Pond (Table 3).

Table 3. Instream facilities associated with Chief Joseph Hatchery

Construction Site	Instream Facilities	Water body
Chief Joseph Hatchery	▪ Intake and effluent pipes ▪ Screens ▪ Fish ladder	Columbia River
Riverside Pond	▪ Water intake ▪ Pump station ▪ Release structure	Okanogan River
Omak Pond	▪ Water intake ▪ Pump station ▪ Release structure	Okanogan River
St. Mary's Mission Pond	▪ Ecology block wall	Omak Creek

Generic effects of instream construction can include temporary increases in runoff and sediment with attendant effects on downstream fish habitat, displacement of fish from usable habitat both in the short- and long-term, destruction of important fish use areas including spawning or rearing areas, temporary or permanent blockage of fish movements due to stream dewatering or construction of barriers, introduction of pollutants into streams from operation of heavy equipment within stream courses, and removal of or damage to riparian vegetation.

In-water Work Timing

Construction related to the proposed program would be conducted during low water periods to minimize impacts to water quality. In the case of St. Mary's Mission Pond on Omak Creek, installation of the concrete ecology blocks at the intake structure would occur during a two-week period; timing would be adjusted to avoid detrimental effects on migrating steelhead. Information received from the Colville Tribes and WDFW indicate that July, August, and September are months in which in-stream work has been permitted in the past (W. Meyer, WDFW, personal communication, January 9, 2006). Colville Tribes' information shows that steelhead, including kelts, migrate out of Omak Creek and the Okanogan River by July 1. WDFW guidelines for instream work indicate that the work window for the Okanogan River is July 1 through August 15, but on-site conditions may require adjustment of these dates. NOAA Fisheries has permitted instream work in this area in August and September. Placement of the ecology blocks would be scheduled to comply with agency requirements.

In-water work associated with the fish ladder entrance from the Columbia River to the hatchery would be conducted within the recommended WDFW and agency work times, further minimizing the chance of encountering spring Chinook or steelhead during construction of the hatchery ladder.

In-water Work Effects on Fish and Habitat

Temporary cofferdams and water diversion structures would be employed to route water around the work areas to minimize impacts to water quality. Portable pumps would be used to keep the work areas dry; pump discharge would flow through a settling basin prior to returning to the nearby water body. When appropriate, pump intakes would be screened to exclude fish. Silt fences, hay bales, and erosion control matting would be used to prevent erosion on portions of the riverbank disturbed during construction. NOAA Fisheries and USFWS design requirements would be applied to all instream structures. Construction timing would also be in accordance with agency requirements. All construction activities would be conducted using Best Management Practices (BMPs).

The hatchery site is located on the Columbia River about 11 miles upstream from the confluence of the Okanogan River, the closest subbasin supporting spawning and juvenile rearing UCR steelhead. The Methow subbasin is the closest watershed supporting UCR spring Chinook spawning and rearing and is located over 20 miles downstream of the hatchery site and much further from the acclimation pond sites on the Okanogan River. The only in-water work at the hatchery that is accessible to UCR spring Chinook and steelhead is at the fish ladder construction zone. Given these distances and the fast river currents near the ladder entrance, juvenile steelhead and spring Chinook should not be affected by the in-water work to construct the fish ladder. No spawning habitat for spring Chinook or steelhead is located within miles of the ladder area so construction should not affect adults of either species. UCR spring Chinook are considered to be extirpated from the Okanogan River; therefore, construction within the Okanogan River subbasin should have no effect on UCR spring Chinook.

UCR steelhead inhabiting areas to be dewatered or disturbed during construction would be temporarily displaced from the immediate work area. However, it is anticipated that adult and juvenile fish would avoid direct contact with construction equipment, and would not be physically injured or killed by the construction activities. Upon completion of construction, fish are expected to return to their previous habitats, presuming that disturbed areas are restored to suitable conditions. No temporary or permanent barriers would completely block the Okanogan River or Omak Creek. Instream structures would be associated with the adjacent bank occupying very little instream surface area. The limited areas occupied by the instream structures would be unavailable to fish on a permanent basis, and therefore, is considered destruction of UCR steelhead designated critical habitat, but the area of disturbance is very small. It is unknown if any of these small areas are important for actual steelhead use; however, it is expected that, due to their small footprint, the presence of the structures would have little or no effect on fish populations.

In-water Work Effects on Water Quality

Water quality effects are expected to be temporary, i.e. limited only to the construction period, and water quality should return to a pre-construction condition. It is not expected that construction would affect stream temperatures. In addition, riparian vegetation damaged or removed during construction would be replaced if it does not compromise operation of or access to the instream structures.

In-water work has the potential to degrade water quality though the spill of toxic substances, such as fuel or hydraulic fluid from construction equipment. This potential is best reduced by maintaining equipment in proper working condition and by maintaining a spill prevention control and countermeasure plan (SPCCP). Typically, a SPCCP would specify areas for equipment maintenance and refueling, spill prevention and emergency response strategies, requirements for keeping emergency response spill containment kits onsite, and for having trained personnel be onsite during in-water work. A SPCCP would be developed by the construction contractor and approved by appropriate agencies, such as the WDOE, before dredging occurs. Implementation of a SPCCP would limit the potential for toxic material spills during dredging.

Instream work would require a USACE Section 404 dredge-and-fill permit, WDOE Section 401 water quality certification, and Hydraulic Project Approval by WDFW. Local shoreline permits may be required from the County and/or the CTCR. Through the construction permitting process, conservation measures and Best Management Practices would be identified and approved by permitting agencies. Agency-approved measures would be employed during all instream work to reduce the potential for introducing toxic substances or fines into the rivers and creek. In addition, water quality would be monitored to assure compliance with the standards and to respond quickly to unsafe conditions.

Even with Best Management Practices and monitoring, a short-term decrease in water quality through inadvertent releases of sediment or petroleum products to the river may occur. Rain events increase the risk of water quality degradation due to soil erosion and introduction of stormwater runoff containing gasoline and oil from construction equipment. The risk would be greater if water treatment and containment facilities are overwhelmed during an unusually large rain event. These types of events are expected to be infrequent and limited in duration. Any substances entering surface waters would most likely be greatly diluted by the increased water volume in the water body during such an event.

Instream work has the potential to increase turbidity (i.e. reduce water clarity) and increase total suspended solids (TSS) within and near construction areas. Turbidity and TSS levels have been reported to cause physiological stress, reduce growth, and adversely affect salmonid survival. The potential for adverse effects depends upon several factors including: the duration of TSS increases, the area of the turbidity plume, the amount and velocity of ambient water (dilution factor), the size of suspended sediments, and other factors. In the case of the proposed program, increases in suspended sediments and turbidity would be localized at the point of construction and would last for only a short period.

Evidence suggests that salmonids are well adapted to short-term increases in turbidity, as such conditions occur in natural settings as a result of storms, landslides, or other natural phenomena (Redding et al. 1987; NMFS 2003). It is chronic exposure to turbidity that has been found to be the most potentially damaging to salmonids (The Watershed Company et al. 2000). Studies have found that when habitat space is not limiting, salmonids will move to avoid localized areas of increased turbidity, thereby alleviating the potential for adverse physiological impacts (Bisson and Bilby 1982; NOAA Fisheries 2003). Juvenile salmon and steelhead have been shown to avoid areas of unacceptably high turbidity (Servizi and Martens 1991), although they may seek out areas of moderate turbidity (10 to 80 NTU), presumably as cover against predation (Cyrus and Blaber 1987a, 1987b). Studies have found that fish that inhabit waters with elevated TSS may experience a reduction in predation from piscivorous fish and birds (Gregory and Levings 1998). In such cases, salmonids may actually increase foraging activity, as they use turbid water as a sort of cover from predators (Gregory 1993). However, feeding efficiency of juveniles is impaired by turbidity in excess of 70 NTU, well below sublethal stress levels (Bisson and Bilby 1982). Reduced preference by adult salmon and steelhead returning to spawn has been demonstrated where turbidity exceeds 30 NTU (20 mg/L suspended sediments); however, Chinook salmon exposed to 650 mg/L of suspended volcanic ash were still able to find their natal streams (Whitman et al. 1982). Due to the small areas of in-water work, it is unlikely that turbidity would rise above these thresholds for an extended period of time. Turbidity is not expected to rise to the levels that would harm UCR steelhead, although some fish may be temporarily displaced due to brief turbidity plumes during construction..

Operation Effects

Program operations could affect listed fish due to water quality impacts, intake structures and water use, introduction of fish diseases, operation of the fish ladder, and collection of broodstock.

Water Quality

Water quality effects can include sedimentation, impacts to nutrients, introduction of chemical pollutants, and altered water temperatures.

Sediment, fish food, and fish waste would be introduced into the Columbia River at the hatchery site. These introductions would be minimized by directing the drum filter backwash and effluents from rearing and raceway cleaning operations to an aeration/settling pond. Accumulated sediment from the aeration/settling pond would be removed as needed and disposed of in an appropriate upland location.

The acclimation sites would also be sources of nutrients and sediment. These sites would be used only between October and April, not year-round. Currently used acclimation sites appear to remain relatively “clean”. The water temperatures in the ponds are cold; the fish consume less food and produce less waste than at the hatchery (C. Fisher, CTCR, personal communication; November 3, 2005). The ground is frozen for most of the proposed use period and the influent water contains a low amount of suspended sediment. Removal of collected sediment occurs twice a year at the existing ponds. At the proposed facilities, effluent from pond cleaning would be discharged into a settling basin prior to entering the Okanogan River or Omak Creek. As with the hatchery, sediment would be removed once a year and disposed of in an appropriate upland location.

The types and amounts of chemicals used at a hatchery or rearing facility depends upon site-specific conditions, fish culture practices, species of fish, and types of parasites or disease organisms. 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 USDA, state, and other federal regulations to protect human and environmental health.

The hatchery facilities and acclimation ponds must comply with Washington State water quality standards administered by WDOE for effluent discharges from fish production facilities (WAC 173-221A). Therefore, by complying with WDOE NPDES requirements for hatchery effluent discharge, it is assumed that operations of the proposed project would minimize impacts on water quality and listed fish species.

Water at the hatchery must adhere to fish incubation requirements including appropriate temperatures. If the temperature of water removed from the river is too high, chillers may be used to cool it down. In this case, effluent water may be cooler than the receiving river water when it is returned to the Columbia River. The returned water is expected to mix rapidly with the ambient water after release downstream of the facility. Thermal effects would be minimal and confined to the area adjacent to the discharge pipe. The amount of water discharged from the hatchery to the Columbia River would be very small in relation to the volume of the river and would rapidly mix with receiving waters. The effect on the Columbia River would be negligible.

Water used at the hatchery and the ponds can also become warmer through solar heating in the raceways. However, Omak Creek and the Okanogan River are fairly wide, low gradient streams. Therefore, pond flow characteristics would be similar to the streams and the temperature of pond and hatchery waters are not expected to be above their associated stream.

All the hatchery facilities would have to comply with state and CTCR water quality anti-degradation standards and federal and state regulations on use of chemicals in fish food. The proposed facilities have been designed to meet those standards. In addition, water quality would be a focus of the monitoring program. Water quality problems would be quickly detected and remedied through adaptive management. Following these practices should minimize water quality effects within the action area, minimizing effects on listed UCR spring Chinook and steelhead to the extent practicable.

Fish Health

Hatchery effluents and the release of hatchery fish can increase the abundance and virulence of endemic pathogens present in receiving waters. The greatest potential for impacts may accrue to salmonids in the vicinity of the Chief Joseph Hatchery which would be operated year-round. CJH influent water from Rufus Wood Lake would pass through a drum filtration system and most likely an ultraviolet light system to reduce the number of pathogens prior to use in the hatchery and subsequent introduction into the Columbia River. Influent water from the proposed well field and relief tunnel is expected to be pathogen free. No water treatment would occur at the acclimation pond sites.

Little information is available on the relationship between hatcheries and disease outbreaks in natural populations of fish. 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 a hatchery setting.

Hatchery discharge water has the potential of introducing exotic pathogens into receiving waters. These pathogens could adversely affect listed salmonids as well as other fish. The Chief Joseph Hatchery operation would follow all state and federal protocols to reduce the transfer of disease to wild fish populations. At each release site, juvenile fish would be sampled for presence and virulence of pathogens prior to release. Fish carrying pathogens that do not exist in the natural population would not be released into the Okanogan River or Omak Creek. These practices should minimize disease effects on listed UCR spring Chinook and steelhead in the action area.

The Okanogan and Columbia rivers are already affected by a number of hatchery programs that must manage for fish diseases. In the Okanogan River, WDFW releases hatchery steelhead and summer Chinook. On the mainstem Columbia River several hatcheries (e.g. Wells Hatchery, Turtle Rock Hatchery, Priest Rapids Hatchery) operate summer/fall Chinook programs that release millions of fish directly into the Columbia River. While the CJHP proposes to release 2.9 million Chinook salmon, these numbers are relatively minor compared to current hatchery releases in the mainstem Columbia River and tributaries that total tens of millions.

Operations at Chief Joseph Hatchery would follow accepted disease management procedures of the fishery co-managers for the prevention, control, and treatment of fish diseases, including in serious disease situations, the removal and destruction of hatchery fish.

Fish Ladder

The proposed hatchery includes a fish ladder along the north bank of the Columbia River. Because it would not span the Columbia River and is immediately downstream of Chief Joseph Dam, the ladder would not impede fish movement. Furthermore, it would be designed to reduce disorientation of fish using it. Non-target fish, such as listed UCR spring Chinook and steelhead, could enter the ladder during operation (May through November). These individuals could be adversely affected by stress from handling and holding.

It is not known how many non-target fish may enter the ladder annually during its operation, but it may attract some wandering steelhead. The adult holding facilities would be designed to allow hatchery operators to promptly return all steelhead to the Columbia River uninjured and with minimal delay. Delays of up to a single day in the adult holding facility may occur.

Any non-target spring Chinook entering the ladder would most likely be a stray from the Methow River. State and federal hatchery managers would set handling protocols for returning these fish to the Columbia River or Methow subbasin, thereby minimizing effects on UCR spring Chinook.

Broodstock Collection

The current fish collection program takes unlisted summer/fall Chinook broodstock at Wells Dam. The broodstock is a mixed stock from the Methow and Okanogan rivers. The proposed program would continue the collection at Wells Dam only as a contingency action until sufficient broodstock could be collected from fish returning to the proposed fish hatchery ladder and from live-capture at various locations in the Columbia, Okanogan, and Similkameen rivers. Collection would occur from mid-July to mid-November (CTCR 2004).

Spring Chinook from the Methow River may be captured incidentally during early season broodstock collection in the Columbia River. UCR spring Chinook are considered extirpated from the Okanogan River, the uppermost Columbia River tributary accessible to anadromous fish. It is not likely that UCR spring Chinook would be affected by broodstock collection for summer/fall Chinook as the spring Chinook should all have entered the Methow River prior to initiation of summer/fall Chinook collection. If any Methow spring Chinook are collected in the broodstock gear, they would be released promptly to the Columbia River with minimal handling in the traps.

Steelhead return to the upper Columbia River starting in August. Many then over-winter in the Columbia River prior to entering the Okanogan River in March and April to spawn. Steelhead may be captured in the broodstock gear as it is fished for summer/fall Chinook. They would be released promptly with minimal handling.

Methods, timing, and locations of live capture gear have not yet been determined. Live capture methods can include tangle nets, fish wheels, fish traps, beach seines, and temporary weirs. Collection methods would be chosen on a site-specific basis to minimize adverse effects on non-target species (e.g. not using tangle net when steelhead are present) while efficiently collecting target species. Live capture efforts would comply with ESA Section 10 incidental take permit requirements. Injuries to fish listed under ESA Section 10 would be documented and reported.

Carson stock spring Chinook broodstock are currently collected at the Leavenworth National Fish Hatchery. The CJHP would use this source of broodstock in its initial phase (isolated harvest component). Once propagated at Chief Joseph Hatchery, Carson stock spring Chinook would return to the hatchery ladder. Broodstock needs then would be met from Chinook returning to Chief Joseph Hatchery. No ESA-listed fish population would be directly affected by this phase of the spring Chinook program (CTCR 2004). Eventually, excess escapement from the Methow Composite spring Chinook stock may be collected from the Methow State Hatchery and Winthrop National Fish Hatchery and used in integrated recovery programs in the Okanogan subbasin.

As part of the integrated recovery program, spring Chinook broodstock would also be collected from the semi-permanent Omak Creek weir. This weir was installed several years ago to facilitate broodstock collection for summer steelhead. Summer steelhead have returned to the weir between March 15 and late April; 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. In addition, there have been no observations of mortality among listed UCR steelhead or native resident fish since weir operation began. UCR spring Chinook would not be affected by this collection because they have been extirpated from the Okanogan subbasin.

Water Diversion Screens

Fish screens would be required on intakes to the five acclimation ponds and for the hatchery water supply intake in Rufus Woods Lake. The fish screens would be designed to current NOAA Fisheries and USFWS criteria. In the Okanogan River, only listed UCR steelhead juveniles might be at risk at pond intakes as there are no listed spring Chinook in the Okanogan River subbasin. Adult UCR steelhead would not be susceptible to impingement and injury at the screened intakes. The hatchery water supply intake is upstream of Chief Joseph Dam, a reach that is inaccessible to listed UCR spring Chinook and steelhead. Installing exclusionary screens at all water intakes accessible to listed fish species would minimize potential entrainment impacts.

Water Diversion Hydrology

Hatchery water would come from the Columbia River, relief tunnel, and groundwater wells and would be non-consumptive. Because the acclimation ponds and the hatchery raceways would be flow-through systems, there would be few effects on the surface water hydrology and habitat of the receiving waters.

Slightly more flow would be discharged to the Columbia River from the hatchery than is diverted from the river because the supply would be supplemented by well water. The increased discharge would, however, be miniscule compared to the Columbia River flow. For example, the amount of groundwater that would be pumped through the hatchery and ultimately discharged to the Columbia River would, at its highest in October, would be approximately 25 cfs. Minimum flows at Chief Joseph dam are generally greater than 50,000 cfs. The percent increase in Columbia River flows due to the well water discharge would be approximately 0.05 percent of the total flow. This slight increase in flow would likely have no negative effects on UCR spring Chinook or steelhead.

Although acclimation pond operations would be non-consumptive, flow would be reduced as water is diverted into the pond. The amount of flow reduction in each bypass reach equals the amount of flow diverted from the river for use at each pond site.

The effect of reduced flow depends on the reach length and percent of flow diverted. Ellisforde, Tonasket, and Bonaparte ponds would divert up to 25 cfs each; their bypass reaches would be less than 200 feet in length. The Riverside and Omak sites would divert up to 15 cfs each. The Riverside bypass reach would be approximately 50 feet long. The longest bypass reach (450 feet) would occur at the Omak Pond site. The minimum flow in the Okanogan River near the ponds (measured at the Tonasket gauge) has been approximately 400 cfs over the last ten years. Therefore, the diversion of water for the acclimation ponds would result in a flow reduction of approximately 4 to 6 percent at the Ellisforde, Tonasket, Bonaparte, Omak, and Riverside bypass reaches.

The diversion at the St. Mary's Mission Pond would bypass approximately 150 feet of Omak Creek. Up to 2 cfs would be withdrawn between October and April. Flows in the winter average near 10 to 15 cfs, but may drop to as low as 1 cfs. Therefore, on average, flows in the 150-foot-long bypass reach may be reduced by as much as 13 to 20 percent. During very low winter flows, the 2 cfs pond requirement may exceed the water available in the creek. If the full amount is diverted to the pond when Omak Creek is under very low winter flow conditions, 150 feet of creek may go dry. However, this would not be allowed. Operationally, this could be remedied by pumping pond outlet flow upstream 150 feet and discharging it into the creek at the diversion point. The St. Mary’s Mission Pond also could use supplemental well water to ensure that this reach of Omak Creek is not dewatered.

These flow reductions within the short by-pass reaches at each acclimation site are not expected to have a population-level effect on UCR steelhead. UCR spring Chinook are extirpated from the Okanogan River, and therefore, would not be affected by the non-consumptive water use at each acclimation site.

B. Indirect Effects

Indirect effects discussed below include (1) competition between hatchery fish and listed UCR spring Chinook and steelhead; (2) hatchery fish straying to other basins; (3) effects of harvesting hatchery fish; and (4) effects of hatchery fish carcass deposition on water quality.

Competition

Introduction of large numbers of fish into water bodies at one location and one time can lead to competition between the hatchery fish and natural fish for food and habitat. In addition, it can stimulate predation by natural fish on hatchery fish and vice versa. The proposed hatchery programs are designed to minimize the potential for competition and predation by distributing hatchery fish at several release locations and allowing for volitional release of fish on-site. The volitional releases would occur when fish are physiologically ready to migrate. It is expected that yearling fish would move rapidly downstream to the Columbia River estuary. Sub-yearling fish should migrate rapidly to the Columbia River and then remain to rear in the reservoirs or migrate on to the estuary. Thus, the hatchery fish are not expected to linger in the streams and the potential for competition with listed UCR steelhead juveniles should be minimized. The program also allows fish to exit the rearing facility over an extended period of time, avoiding large densities of fish at any one time, further minimizing competition and predation.

Summer/fall Chinook salmon would be released as yearling smolts at 10 fish per pound (fpp); spring Chinook would be released at 15 fpp. The outmigrating Chinook smolts are not expected to prey on UCR steelhead because yearling steelhead juveniles would generally be larger than the Chinook. Further, sub-yearling steelhead are usually found in tributaries, whereas Chinook prefer mainstem rivers; therefore, the juveniles of both species are most likely to be spatially separated from one another.

Some summer/fall Chinook would be released as sub-yearlings at 50 fpp in an effort to preserve life history diversity. These fish are expected to rear in Columbia River reservoirs or migrate directly to the estuary. These sub-yearlings would not be expected to compete with listed UCR spring Chinook and steelhead in the mainstem Columbia River as they would enter the Columbia after yearling listed fish have migrated.

Young-of-the-year UCR steelhead that rear in tributaries of the Okanogan River would not be exposed to competition or predation from hatchery Chinook. Steelhead fry that emerge from redds in the Okanogan River do so after nearly all the hatchery Chinook would have migrated from the river, particularly the larger yearling fish released in mid-April. Even the sub-yearling Chinook released in June would be from the lower Omak Pond, below mainstem steelhead spawning areas, thereby avoiding the overlap in space and time that could lead to direct competition and predation. Residualism of hatchery fish, almost all males, that might cause later predation of steelhead would not occur as the Okanogan River gets too warm in the summer months to support Chinook.

In accordance with HGMP standards, release numbers and escapement would be monitored to remain with the 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 minimize the potential for exceeding carrying capacity. Productivity rates would also be monitored to minimize any potential for UCR steelhead production to decline relative to hatchery-origin Chinook production.

While some unquantifiable amount of predation and competition with listed fish could occur from the proposed CJHP, these adverse effects would be minimized through the release strategies describe above, and are not expected to rise to a population level effect on UCR steelhead, as steelhead and spring Chinook occurred together in the Okanogan River for thousands of years prior to Euro-American development.

Straying

The potential for straying and interbreeding with other Columbia River stocks would likely occur, but is expected to be minimal. Fish would be acclimated to local conditions prior to being released on-site, 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.

However, introgression of Carson stock spring Chinook released from the proposed hatchery with those of the listed UCR spring Chinook ESU is a concern that would be evaluated. As the Carson stock fish would be the only adipose fin-clipped spring Chinook migrating above Wells Dam, they would be easily identifiable should they stray into the Methow River where all hatchery-origin and natural-origin spring Chinook are unclipped. The hatchery program includes contingencies should unacceptable numbers of Carson stock Chinook be found spawning in the Methow River during regularly scheduled surveys. In the worst case scenario, if introgression were to occur and could not be minimized, the Carson stock spring Chinook program would be terminated and all marked adults removed at the Wells Dam trap.

Given the planned acclimation of Carson stock spring Chinook to the Okanogan River subbasin, the location of the Okanogan River distantly upstream from the Methow River subbasin; the marking protocols and monitoring; and potential program modification or elimination if monitoring results are unacceptable, the risk of straying and adverse genetic introgression on listed UCR spring Chinook would minimized.

Harvest

One of the goals of the proposed project is to create a tribal and sport harvest of hatchery-origin Chinook in the Columbia River (Lake Pateros) and the Okanogan subbasin. Few non-target or listed spring Chinook would be exposed to the terminal fishery below Chief Joseph Dam. Some late-returning adult UCR spring Chinook may be exposed to harvest activities targeting the early portion of the summer/fall hatchery Chinook run. The harvest, however, would be selective—only harvesting fin-clipped hatchery fish. Natural origin (non fin-clipped) fish would be released.

It is anticipated that listed UCR steelhead could be incidentally affected in the long term by the increased fishing pressure within the Okanogan subbasin and in the Columbia River below Chief Joseph Dam. Listed steelhead must be released, but some individuals may die from injury or stress related to incidental catch.

Tribal and recreational 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 may be adjusted annually to manage hatchery-origin fish escapement, minimizing potential adverse impacts to natural populations. Selective fishing gear and timing and location of fisheries would be restricted if excessive harvest mortality occurs in non-target species such as UCR steelhead.

Salmon Carcass Deposition

Currently, the greatest density of summer/fall Chinook returning to the Okanogan subbasin spawn in a 1.2-mile reach of the Similkameen River near Similkameen Pond. This leaves a large portion of the subbasin underutilized by salmon. The proposed program would release fish from several locations and result in summer/fall Chinook being more evenly distributed throughout the subbasin.

Salmon carcasses that remain after spawning provide needed nutrients to the ecosystem. Historically, large numbers of salmon carcasses were present in the Okanogan subbasin and the nutrient content of the water was presumably quite high. The high nutrient content would have contributed to the availability of food organisms for juvenile salmon. Resident and anadromous fish as well as terrestrial animals and plants also 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. Increased primary production due to carcass deposition would provide increased forage for juvenile UCR steelhead.

C. Effects from Interdependent and Interrelated Actions

Interrelated actions are those that are part of a larger action and depend on the larger action for their justification (50 CFR 402.02). Interdependent actions are those that have no independent utility apart from the action under consideration (50 C.F.R. 402.02). In other words, if other fish propagation or management actions, or any other actions, would be implemented only as a result of implementing the CJHP, they would be analyzed in this section.

No interdependent or interrelated projects or actions (other than fish harvest actions discussed previously) have been identified in association with the proposed hatchery program.

D. Description of How the Environmental Baseline Would be Affected

As discussed previously, the PFC framework for ESA consultation characterizes baseline environmental conditions as “properly functioning,” “at risk,” or “not properly functioning.” If a proposed project is likely to impair properly functioning habitat (Impair), appreciably reduce the functioning of already impaired habitat (Reduce), or retard the long-term progress of impaired habitat toward PFC (Retard), it is usually found likely to jeopardize the continued existence of the species, or adversely modify its critical habitat, or both, depending on the specific consideration of the analysis. Such considerations may include, for example, the species’ status, the condition of the environmental baseline, the particular reasons for listing the species, any new threats that have arisen since listing, and the quality of available information. Actions that do not compromise a species’ biological requirements to the degree that appreciably reduces the species' viability and chances of survival in the action area are considered not to reduce or retard (NR). The effect of the proposed program on baseline environmental conditions (summarized from Section IV) is presented in Table 4.

Table 4. Analysis of the proposed CJHP effects on the environmental baseline.

Baseline Environmental Conditions			
Pathway Indicators	Baseline Function	Description	Effects of Proposed Action
Water Quality			
Temperature	NPF	Temperatures are primarily influenced by upstream conditions; hatchery operations should have a negligible impact on overall water temperature.	NR
Sediment/Turbidity	NPF	Following best management practices, sedimentation and turbidity would be minimized.	NR
Chemical Contamination/ Nutrients	NPF	A SPCCP would be prepared and approved by WDOE, which would limit potential chemical contamination during construction; long-term hatchery operations would comply with WDOE NPDES requirements.	NR
Habitat Access			
Physical Barriers	NPF	The project would not involve placement of fish passage barriers.	NR
Habitat Elements			
Substrate	NPF	The project would not influence substrate, although a few small areas would be permanently disturbed by placement of in-water structures at the acclimation ponds and the hatchery ladder.	NR
Large Woody Debris	NPF	No large trees would be affected and disturbed areas would be replanted.	NR
Pool Frequency and Quality	NPF	No pools would be disturbed during construction.	NR
Off-Channel Habitat	NPF	No off-channel habitat is present at the project sites.	NR
Refugia	NPF	No refugia exists at the project sites.	NR
Channel Conditions and Dynamics			
Width/Depth Ratio	NPF	The project would not alter overall river depth or width at the construction sites.	NR
Streambank Condition	NPF	All areas temporarily disturbed at each site would be planted and restored, and any eroding areas would be stabilized.	NR
Floodplain Connectivity	NPF	The project would not influence flood flows and facilities would be built in previously disturbed areas of the flood plain.	NR
Flow/Hydrology			
Change in Peak/Base Flow	NPF	Project water use is non-consumptive, but would cause a small reduction within short reaches between the pond intakes and outlets.	NR

Baseline Environmental Conditions			
Pathway Indicators	Baseline Function	Description	Effects of Proposed Action
Increase in Drainage Network	AR	Only short access drives would be installed.	NR
Watershed Conditions			
Road Density and Location	NPF	Only short access drives would be installed.	NR
Disturbance History	NPF	The project would be built in previously disturbed areas.	NR
Riparian Reserves	NPF	The project would be built in previously disturbed areas.	NR

IMPAIR = impair properly functioning habitat; REDUCE = appreciably reduce the functioning of already impaired habitat; RETARD = retard the long-term progress of impaired habitat towards properly functioning condition; NR = not reduce, retard, or impair future attainment of PFC; NPF = baseline not properly functioning; AR = baseline at risk; PFC = baseline properly functioning condition; NA = not applicable.

Based on the likely effects of constructing and operating the proposed hatchery, the proposed project would not reduce or retard long-term progress of the currently impaired habitat indicators towards attaining properly functioning conditions. The nutrients indicator may improve by increasing marine-derived nutrients in the action area, which may ultimately increase food availability for the aquatic community in the Okanogan River subbasin, and specifically juvenile UCR steelhead.

E. Effects on Designated Critical Habitat

NOAA Fisheries designated final critical habitat for 19 ESUs on September 2, 2005 (70 FR 52630), effective January 2, 2006. The only habitat within the action area of the proposed program designated as critical habitat for UCR spring Chinook is the mainstem Columbia River downstream from its confluence with the Methow River to Wells Dam. All portions of the action area for the CJHP are designated as critical habitat for UCR steelhead.

Effects on designated UCR spring Chinook critical habitat would be negligible. The nearest designated habitat is several miles downstream of the proposed facilities, at the confluence of the Methow River. The only effects that the proposed program may have on habitat many miles downstream is through alteration of hydrology or water quality. However, as analyzed previously, effects on hydrology of the Columbia River would be extremely minor because hatchery water use would be very minimal compared to the Columbia River flow. Water quality would be maintained by following hatchery design BMPs and by complying with WDOE - NPDES requirements. Water quality monitoring would occur to assure compliance with the state water quality standards.

Minimal in-water work would occur in areas designated as critical UCR steelhead habitat. In-water work areas would be small, less than a few hundred square feet individually (less than a few thousand square feet in total), and BMPs would be used to minimize and avoid water quality degradation during construction. However, this in-water construction would destroy a small amount of UCR steelhead critical habitat. This critical habitat is most likely used for rearing and migration. Through the WDFW permitting process, habitat conservation measures would be identified to off-set this small impact.

F. Cumulative Effects

Cumulative effects are defined in 50 CFR § 402.02 as "those effects of future State, tribal, local or private actions, not involving Federal activities, that are reasonably certain to occur in the action area." Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA; actions that will undergo their own ESA consultation are not to be considered as cumulative effects (USFWS and NMFS 1998).

The proposed Chief Joseph Hatchery Program region has been affected in the past by numerous actions that have and continue to affect fish and aquatic habitat, such as hydroelectric dams, agriculture, road building, and timber harvest in higher elevations of the subbasin, and hatchery projects. Many of these activities have negatively affected salmon and steelhead habitat. For example, grazing and poor riparian conditions have impaired water quality and fish habitat conditions in Omak Creek. Dams on the Columbia River affect fish habitat by substantially altering hydrology and water quality. More recently, habitat restoration and salmon recovery projects have occurred within the subbasin providing beneficial habitat effects, such as reducing erosion and sedimentation and increasing stream shade. In comparison with large landscape-altering activities such as agriculture and hydroelectric dam construction, the effects of the proposed program on listed UCR steelhead and Chinook and their habitats are considered to be locally minor.

Future state, tribal, and local government actions would likely be in the form of legislation, administrative rules, or policy initiatives. Government and private actions may include changes in land and water uses, including ownership and intensity, any of which could adversely affect listed species or their habitat. While specific government actions are subject to political, legislative, and fiscal uncertainties, changes in the economy have occurred in the last 15 years, and are likely to continue, with less large-scale resource extraction, more targeted resource extraction, and significant growth in other economic sectors. Growth in new businesses, primarily in the technology sector, is creating urbanization pressures and increased demands for buildable land, electricity, water supplies, waste-disposal sites, and other infrastructure. Economic diversification has contributed to population growth and movement, and this trend is likely to continue. Such population trends would result in greater demands for electricity, water, and buildable land in the action area, and would increase the need for transportation, communication, and other infrastructure. The result of these economic and population demands will probably affect fish habitat features such as water quality and quantity, which are important to the survival and recovery of the listed species. The overall effect of these cumulative actions will likely be negative, unless avoided or carefully planned for and mitigated.

The overall cumulative effect of the proposed hatchery program is expected to benefit salmonid populations in the Okanogan subbasin. The effect would be augmented by ongoing and proposed habitat projects and fisheries management throughout the region as described below.

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 CJHP would provide acclimation facilities to supplement juvenile salmonids which would increase the population of spring and summer/fall Chinook stocks in the Okanogan River subbasin. The comprehensive habitat rehabilitation program initiated by the State and Tribes in combination with the CJHP would have a net beneficial cumulative effect on the summer/fall and listed UCR spring Chinook stocks, as well as listed UCR steelhead, in the Okanogan River subbasin.

The Colville Tribes and the Okanogan 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). This collaborative recovery program, in combination with the CJHP, would have a net beneficial cumulative effect on the summer/fall and listed UCR spring Chinook stocks, as well as listed UCR steelhead, in the Okanogan River subbasin.

The State of Washington also has initiated habitat rehabilitation in other subbasins within the UCR spring Chinook and UCR steelhead ESUs (such as the Methow), with the goal of improving fish populations. The Chief Joseph Hatchery spring Chinook program may use the Methow Composite spring Chinook stock in the future. 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, would have a net beneficial effect on the recovery of listed UCR spring Chinook and UCR steelhead ESUs.

Public and private agencies and owners of hydroelectric projects on the mainstem Columbia River are conducting studies and implementing changes in project operations to improve downstream survival of juvenile salmonids with the intent of increasing adult returns (CTCR 2004). However, these actions involve separate federal ESA consultation and, therefore, cannot be considered under cumulative effects for this project except to intuitively conclude cumulative results should be beneficial compared to existing conditions.

Allowable tribal and recreational harvest levels in the Columbia and Okanogan rivers may increase in the future as fish escapement increases. The proposed CJHP would increase the number of Chinook adults returning to the Columbia River below Chief Joseph Dam and the Okanogan subbasin. The potential adverse impacts to non-target species, such as listed UCR steelhead, sockeye, and resident fish from increased harvest levels would not be offset by the proposed program. Commercial harvests may increase with the increase in fish production from the CJHP as well as habitat restoration/enhancement and increased spill from hydroelectric projects. If commercial harvest levels increase, close monitoring would be required to ensure that the benefits of increased fish runs are not negated by over-harvest of listed UCR spring Chinook and steelhead.

VI. Effects Determination for NOAA Fisheries-Managed Listed Species and Designated Critical Habitat

The primary objective of this BA is to determine the effect that the proposed project would have on ESA listed, proposed, and candidate species, and critical habitat in the action area. This determination will be used by NOAA Fisheries and USFWS to assess whether the proposed project is likely to jeopardize the continued existence of the listed species or to adversely modify their critical habitats (if applicable). To facilitate and standardize the determination of effects for ESA consultations, the Services use the following definitions for listed species (USFWS and NMFS 1998):

No effect: This determination is only appropriate "if the proposed project will literally have no effect whatsoever on the species and/or critical habitat, not a small effect or an effect that is unlikely to occur." Furthermore, actions that result in a "beneficial effect" do not qualify as a no-effect determination.

May affect, not likely to adversely affect: The appropriate conclusion when effects on the species or critical habitat are expected to be beneficial, discountable, or insignificant. Beneficial effects have contemporaneous positive effects without any adverse effects to the species or habitat.

May affect, likely to adversely affect: This is the appropriate conclusion when there is "more than a negligible potential to have adverse effects on the species or critical habitat." If incidental take is anticipated to occur as a result of the proposed action, a "likely to adversely affect" determination should be made. In the event the overall effect of the proposed project is beneficial to the listed species or critical habitat, but may also cause some adverse effects to individuals of the listed species or segments of the critical habitat, then the proposed project is "likely to adversely affect" the listed species or critical habitat.

Beneficial effects of the proposed action could include increasing marine derived nutrients that may potentially increase UCR steelhead productivity in the Okanogan River subbasin, and the expansion of listed UCR spring Chinook into the Okanogan subbasin (if Methow stock eventually replaces the Carson spring Chinook stock) would increase the viability of the UCR spring Chinook ESU by expanding its distribution and abundance.

Conversely, the risk of incidental adverse effects to individual UCR steelhead adults and to a much lesser degree UCR spring Chinook during broodstock collection cannot be entirely eliminated. Some straying of hatchery fish and introgression with UCR spring Chinook may occur, and some competition of hatchery Chinook juveniles with listed UCR spring Chinook and steelhead juveniles may occur. Incidental mortality of UCR spring Chinook and steelhead during the hatchery Chinook harvest may also occur. In addition, UCR spring Chinook and steelhead may enter the hatchery ladder and be handled and released back to the Columbia River. Therefore, some level of "take", while unquantifiable and minor, is probably unavoidable. Furthermore, the in-water work construction would adversely modify designated UCR steelhead critical habitat, although only slightly.

Therefore, in accordance with definitions contained in USFWS and NMFS (1998), as some level of take of UCR steelhead is probably unavoidable and UCR steelhead designated critical habitat would be adversely modified, the proposed CJHP "may affect", and is "likely to adversely affect" listed UCR steelhead.

Although, designated UCR spring Chinook critical habitat would not be destroyed or adversely modified by the proposed CJHP, some level of take of UCR spring Chinook is probably unavoidable. Therefore, in accordance with definitions contained in USFWS and NMFS (1998), the proposed CJHP is "likely to adversely affect" listed UCR spring Chinook.

Based on these determinations, formal Section 7 consultation between BPA and NOAA Fisheries is required to ensure that the proposed program is not likely to jeopardize the continued existence of the UCR spring Chinook and UCR steelhead ESUs.

VII. Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) established procedures designed to identify, conserve, and enhance Essential Fish Habitat (EFH) for those species regulated under a federal fisheries management plan. Pursuant to the MSA, federal agencies must consult with NOAA Fisheries on all actions or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (Section 305(b)(2)).

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or grow to maturity. For the purpose of interpreting this definition of EFH, waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas of historical use; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR 600.10). Adverse effect means any impact that reduces quality and/or quantity of EFH, and may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

Consultation with NOAA Fisheries is required for any federal action that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream and upslope activities. The objectives of this consultation are to determine whether the proposed project would adversely affect designated EFH and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH.

A. Description of the Proposed Action

The proposed project and action area are described in Section II of this document.

B. Appropriate Fisheries Management Plan(s)

Pursuant to the MSA, the Pacific Fisheries Management Council (PFMC) has designated EFH for three species of federally-managed Pacific salmon: Chinook, coho, and Puget Sound pink salmon (PFMC 1999). Freshwater EFH for Pacific salmon includes all streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers, and longstanding, naturally impassable barriers (PFMC 1999). Detailed descriptions and identification of EFH for salmon are found in Appendix A to Amendment 14 of the Pacific Coast Salmon Plan (PFMC 1999). In the action area for this project, EFH is designated for Chinook and coho salmon. It should be noted, however, that coho salmon do not occupy this portion of the Columbia River Basin.

C. Effects of the Proposed Action

As previously described in Sections V and VI of this document, the proposed program would modify designated steelhead critical habitat. The effects on designated Chinook and coho salmon EFH are the same as those described for steelhead critical habitat. Proposed construction activities could affect Chinook and coho salmon EFH through:

- Short-term potential for localized water quality impairment during construction.
- Long-term potential for localized water quality impairment during hatchery operations and returning adult fish carcass deposition.
- Temporary loss of small areas of aquatic habitat associated with the in-water construction.

D. Proposed Conservation Measures

Proposed conservation measures to minimize impacts to designated Chinook and coho salmon EFH are the same as those conservation measures described previously for the ESA consultation portion of this document.

E. Conclusion

Following the listed conservation measures outlined in this document, the proposed program may cause a short-term negligible increase in turbidity/suspended sediment in the Okanogan and Columbia rivers and in Omak Creek. It is anticipated that this potential impact would be so small that adverse effects on Chinook and coho salmon habitat should be considered discountable. The proposed program would result in a small, temporary loss of aquatic habitat at the in-water work sites; therefore, the CJHP may adversely affect designated EFH for Chinook and coho salmon. By employing the conservation measures listed in this BA, impacts to Chinook and coho salmon EFH would be minimized. Following these measures, the proposed program would not hinder a sustainable Pacific salmon fishery for either Chinook or coho. Implementing the hatchery program could enhance the Pacific salmon fishery to some degree by providing additional harvest opportunity for Chinook.

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