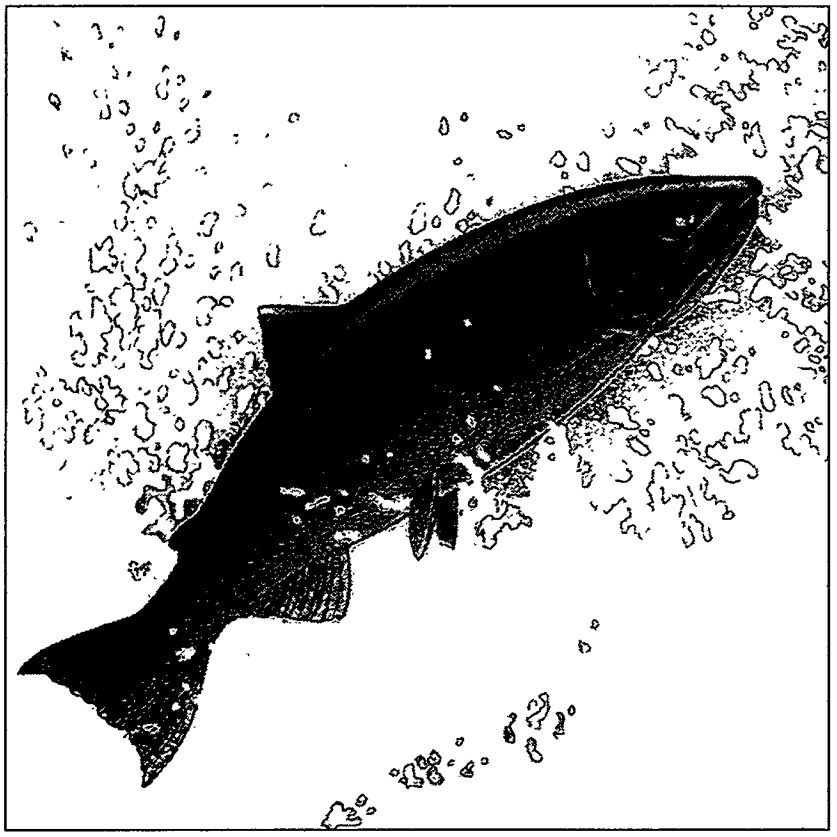
BONNEVILLE POWER ADMINISTRATION

JUNE 1996

DOE/BP--2884

NEZ PERCE TRIBAL HATCHERY PROGRAM

DRAFT ENVIRONMENTAL IMPACT STATEMENT



Draft Environmental Impact Statement
Nez Perce Tribal Hatchery Program

Bonneville Power Administration

U.S. Department of Energy

Bureau of Indian Affairs

U.S. Department of the Interior

Nez Perce Tribe

June 1996

Draft Environmental Impact Statement

Responsible Agencies: U.S. Department of Energy, Bonneville Power Administration (BPA); U.S. Department of the Interior, Bureau of Indian Affairs (BIA); Nez Perce Tribe (NPT).

Title of Proposed Action: Nez Perce Tribal Hatchery Program.

States Involved: Idaho.

Abstract: Bonneville Power Administration, the Bureau of Indian Affairs, and the Nez Perce Tribe propose a supplementation program to restore chinook salmon to the Clearwater River Subbasin in Idaho. The Clearwater River is a tributary to the Snake River, which empties into the Columbia River. The Nez Perce Tribe would build and operate two central incubation and rearing hatcheries and six satellite facilities. Spring, summer and fall chinook salmon would be reared and acclimated to different areas in the Subbasin and released at the hatchery and satellite sites or in other watercourses throughout the Subbasin. The supplementation program differs from other hatchery programs because the fish would be released at different sizes and would return to reproduce naturally in the areas where they are released.

Several environmental issues were identified during scoping: the possibility that the project would fail if mainstem Columbia River juvenile and adult passage problems are not solved; genetic risks to fish listed as endangered or threatened; potential impacts to wild and resident fish stocks because of increased competition for food and space; and water quality.

The Proposed Action would affect several important aspects of Nez Perce tribal life, primarily salmon harvest, employment, and fisheries management. Impacts to cultural resources can be avoided so impacts would be low. Soil impacts would be localized and their effects would be local and temporary during construction. Impacts to water quality would be low. Mitigation would be used if impacts to groundwater or surface water are greater than anticipated. No impacts to floodplains are expected.

Impacts to all categories of fish range from no to high impacts. Potential impacts to fish are greatest from trapping for adult collection and counting, broodstock selection and maintenance, release methods and numbers, and fish interactions. Impacts to wildlife would be from construction and would be temporary. No threatened or endangered wildlife would be adversely impacted. Vegetation would be removed during construction, but impacts would be temporary. Low impacts are expected to two wetlands, but mitigation would reduce these impacts. No threatened or endangered plants would be affected. Some land uses would be changed. Sites on U.S. Forest Service land conform to existing forest plans. Vegetative screens could be used at most sites, but some sites would have moderate visual impacts.

The Proposed Action would have beneficial impacts to the local economy, as it would increase employment and if successful, would increase the number of anglers seeking fishing and other recreation opportunities in the area. The Proposed Action would benefit endangered fall chinook populations.

The Draft EIS is being mailed to about 500 agencies, groups, and individuals (see Chapter 7). Public comment is being accepted through August 16, 1996. Public meetings are scheduled for July 10 and July 11, 1996.

To request additional copies of the EIS please contact BPA's document request line: 1-800-622-4520 or write to:

Public Involvement Manager
Bonneville Power Administration
P. O. Box 12999
Portland, Oregon 97212

For more information about the EIS please contact:

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503-230-7692
or

Ed Larson, Director of Fisheries Production Division, Nez Perce Tribe
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Lapwai, ID 83540
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For more information on DOE NEPA activities contact:

Carol Borgstrom, Director
Office of NEPA Oversight, EH-25
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, DC 20585
1-800-472-2756

Dear Reviewer:

Bonneville Power Administration, the Bureau of Indian Affairs and the Nez Perce Tribe are sending you the draft environmental impact statement (EIS) for the Nez Perce Tribal Hatchery Project. The draft EIS and the comments we receive about the information contained in the draft will help us decide whether to implement this project.

Suggestions for reviewing the draft EIS follow this letter.

You can comment on the draft EIS by calling, writing, or attending an open house. The open houses will be held:

Wednesday, July 10, 4:00-7:00 p.m.
Red Lion - Downtown
Cottonwood Room
1800 Fairview
Boise, Idaho

Thursday, July 11, 4:00-7:00 p.m.
Pinee Was Community Center
Gymnasium
Highway 95
Lapwai, Idaho

You may also call and leave your comments on a toll-free line, 1-800-622-4519, or submit comments to BPA via our Internet address: comment@bpa.gov.

You may send written comments to
Public Involvement Manager - CKP
Bonneville Power Administration
P. O. Box 12999
Portland, Oregon 97212

You may also comment on the enclosed comment form. Comments will be accepted until August 16, 1996. We will evaluate all comments we receive. Our response to your comments will be in the final EIS.

If you need more copies of the draft EIS, please call and leave a message at 800-622-4520.

Thank you for your interest in this project.

Here are some suggestions to help you review the draft EIS on the Nez Perce Tribal Hatchery Program. For your convenience, words and acronyms defined in the glossary are in bold and italics; also, a conversion chart with metric and English equivalents is on the back cover of the draft EIS.

Specific terms and references are highlighted in sidebars and with icons if they occur many times throughout the document.

1. You can use these questions to guide you through the draft EIS.

Why are BPA, BIA, and the Nez Perce Tribe considering taking some action? *Chapter 1 explains the need for the action.*

What action is proposed? *Chapter 2 describes the Proposed Action, facilities needed to complete the project and alternatives.*

How would proposed actions affect the environment? *Chapter 3 describes the existing environment in the area. Chapter 4 describes the expected impacts from the proposed action and alternative.*

2. Please help us consider other questions.

Does the Proposed Action balance environmental, economic, and technical objectives?

Are there other ways to meet the need that were not considered in the draft EIS? What are they?

Can environmental impacts be reduced? If so, how?

3. Give us your comments about the Proposed Action and the draft EIS.

Attend an open house in Boise or Lapwai, Idaho;

Phone toll-free 800-622-4519

Write to:

Public Involvement Manager - CKP
Bonneville Power Administration
P. O. Box 12999
Portland, Oregon 97212

Fill in and mail the enclosed comment form.

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Chapter 1 Purpose and Need

In this Chapter:

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- Finding Solutions
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- Other Issues

➲ For Your Information

Words and acronyms in bold and italics are defined in Chapter 9, **Glossary and Acronyms. Some are also defined in sidebars.*

***Naturally-reproducing** salmon are adult fish that spawn in a stream or river.*
***Wild** salmon are the progeny of naturally-reproducing salmon regardless of parentage. The offspring of naturally reproducing fish that have been raised in a hatchery are considered wild.*

***Steelhead** are the sea going rainbow trout, reclassified as Pacific Salmon in 1989.*
***Anadromous fish** migrate from fresh to saltwater when young, spend the majority of their adult life in the ocean, and then return to their ancestral drainage to spawn.*

***Columbia River Basin** is the drainage of the Columbia River which includes parts of Canada, the Pacific Northwest, and parts of Montana, Wyoming, and Nevada.*

Chapter 1 explains a need to restore ***naturally-reproducing**** salmon in the Clearwater River ***Subbasin*** in north central Idaho. (See Map 1.) This chapter describes the conditions and actions that created the need for action. This chapter also describes how the Nez Perce Tribe (***NPT***), the Bonneville Power Administration (***BPA***), the Bureau of Indian Affairs (***BIA***), the Northwest Power Planning Council (***Council***) and other interested parties developed the Nez Perce Tribal Hatchery program to meet the need.

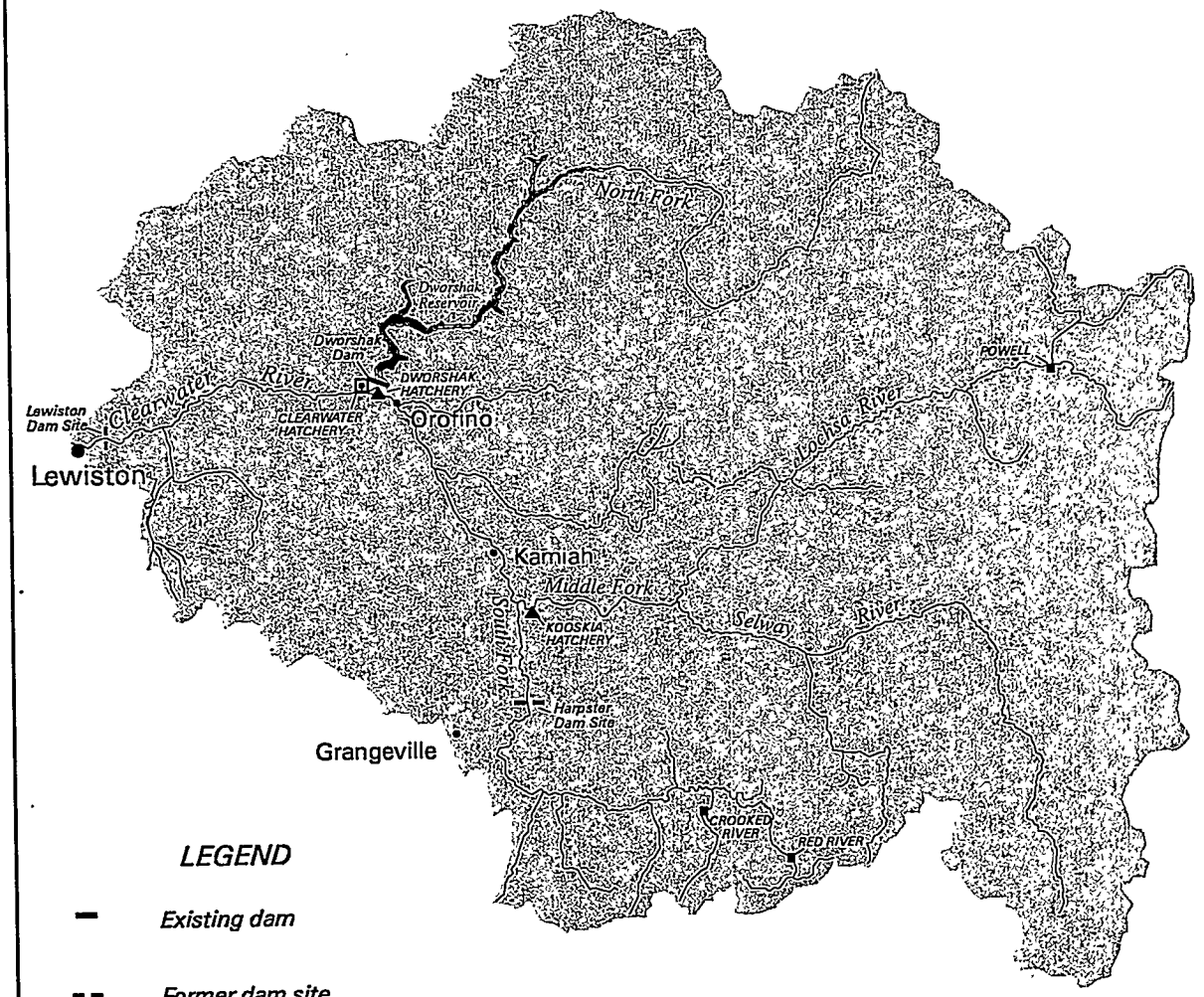
1.1 Need For Action

The Nez Perce Tribal Hatchery program responds directly to a need to restore naturally-reproducing salmon to the Clearwater River Subbasin.

Salmon and ***steelhead*** are ***anadromous*** fish that migrate from freshwater to saltwater as juveniles, and back to freshwater again to spawn as adults. A century ago, as many as 16 million salmon and steelhead returned from the sea to spawn in the ***Columbia River Basin*** each year. Now, fewer than 2.5 million salmon and steelhead return annually: most return to hatcheries in the lower Columbia River; few return to spawn in the Clearwater River Subbasin. Naturally-reproducing salmon are critical to the ongoing survival of the species. Though there have been attempts to reestablish salmon runs using traditional hatchery practices, low adult returns indicate new methods are needed to help restore these runs.

Fewer salmon and steelhead return to the Columbia River Basin for many reasons. Natural events such as fire and floods altered the landscape, and streams and rivers used by fish. But human activities such as road building, mining, logging, land development, farming and ranching have caused the principal

Nez Perce Tribal Hatchery
Project Study Area



LEGEND

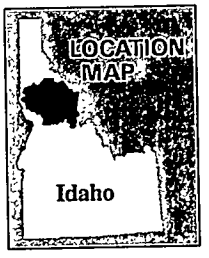
- *Existing dam*
- *Former dam site (dam removed)*

EXISTING ANADROMOUS FACILITIES

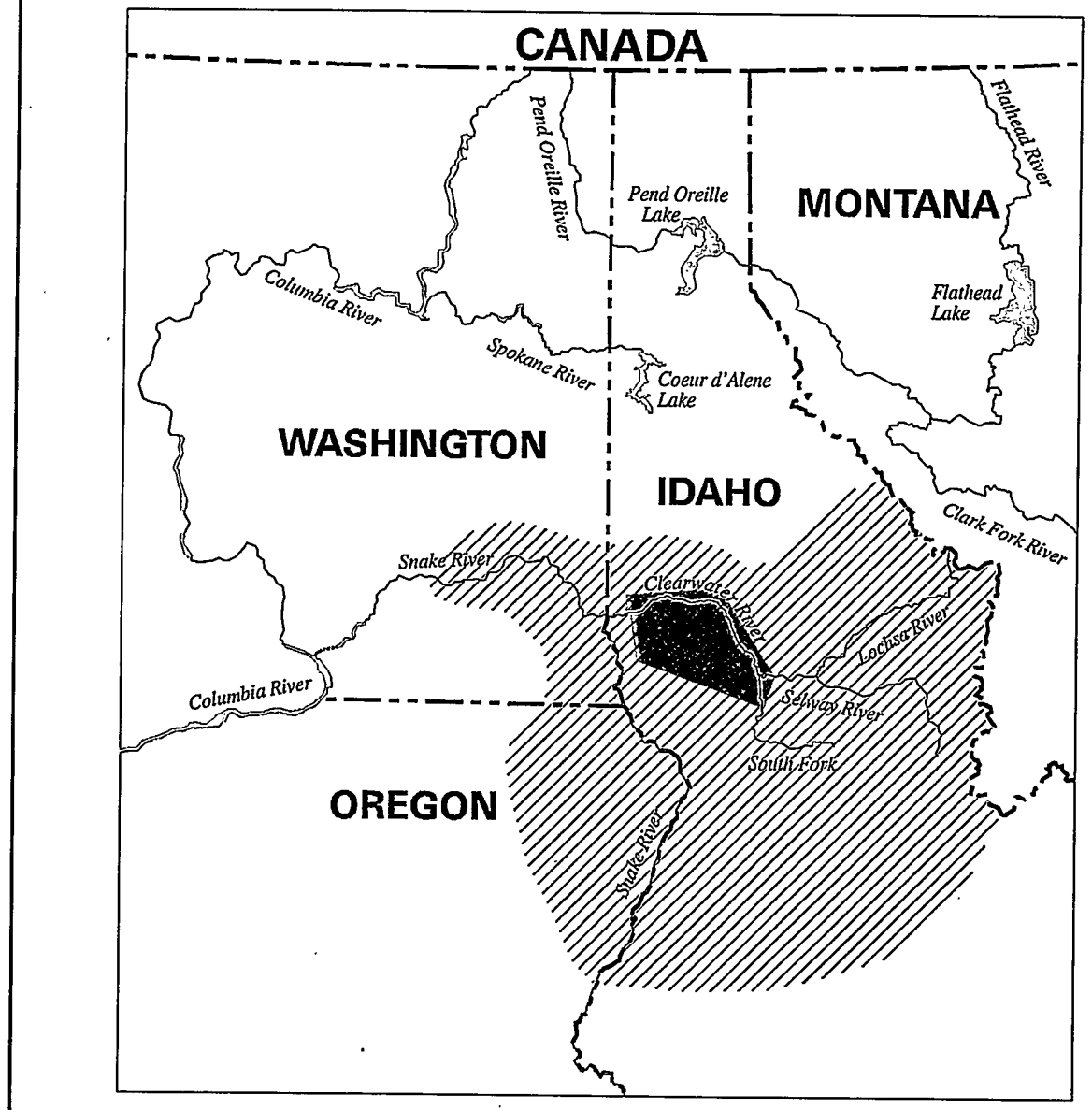
- *USFWS hatchery*
- *IDFG hatchery*
- *IDFG satellite facility*

KILOMETERS
0 10 20 30 40 50

MILES
0 10 20 30 40 50



Map 1
Clearwater River Subbasin



LEGEND

Nez Perce Reservation from Treaty of 1855.

Present day Nez Perce Reservation.

KILOMETERS
0 20 40 60

MILES
0 20 40 60

Map 2
Nez Perce Reservation

➲ For Your Information

***Chinook** salmon are the largest salmon. The chinook has a greenish back, silver sides and belly. Chinook are long distance swimmers and travel to the farthest reaches of the Columbia Basin to spawn. The fish return from the ocean to the Columbia River in the spring, summer, and fall and are differentiated by the time of year they return. The term summer chinook is used in this document to refer to an early fall spawning, ocean-type chinook, similar to those currently found in the mid-Columbia River.*

***Coho** salmon are also called silver salmon.*

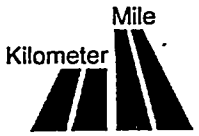
change in natural habitat used by fish and other species. Dams on the Columbia and Snake rivers and their tributaries created migration barriers for fish and permanently altered the free-flowing nature and environment of the largest Northwest rivers. Also since the 1800s, commercial fishermen have overharvested ***chinook***, ***coho***, and to a lesser extent steelhead in the ocean and in the Columbia River. Many salmon runs were depleted by overfishing by the first half of the twentieth century.

1.1.1 The Clearwater River Subbasin

The Clearwater River empties into the Snake River, which flows into the Columbia River (see Map 2). Of course, all harvest impacts and changes in the migratory conditions of the river system downstream affected the runs in the Clearwater River Subbasin, but environmental conditions within the subbasin itself have acted to destroy the native anadromous fish runs.

Hydroelectric and flood control dams eliminated most of the Clearwater River salmon. In 1910, the Harpster Dam was built on the South Fork of the Clearwater River at Harpster (about 32 kilometers [20 miles] up the South Fork). Harpster Dam eliminated salmon runs from the high quality spawning areas in this major tributary. In 1927, Lewiston Dam was built at the mouth of the ***mainstem*** of the Clearwater River. Lewiston Dam prevented passage of spring, summer and fall chinook from at least 1927 to 1940, although steelhead were evidently able to pass. Passage facilities were upgraded in the 1950s, but counts of chinook salmon between 1950 and 1957 ranged from only 7 to 63 fish, indicating that the indigenous run was probably eliminated by then. Harpster Dam was removed in 1963, which reopened the South Fork Clearwater. But Dworshak Dam was built at the mouth of the North Fork Clearwater River in 1974 and it blocked fish passage from that large river. Lewiston Dam was eventually removed in the winter of 1972-73, making most of the Clearwater once again a free-flowing system.

BPA uses metric measurements to comply with Public Law 100-418. See metric conversion chart on the inside of the back cover.



Other human-caused and natural events have shaped the character of the Clearwater River Subbasin. Much of the upper, forested headwaters were burned by catastrophic fires from 1910 to 1930, which contributed to increased erosion and sediment in streams from the surrounding burned-over hillsides. Also, early in the century large scale mining operations scoured many of the best spawning areas of the South Fork and North Fork Clearwater. Agricultural activities are concentrated in the lower subbasin and have resulted in high runoffs, altered streamflows, increased sediments and nutrients, and reduced the amount of ***riparian*** habitat in the lower mainstem and its tributaries. Timber harvest, and the road construction associated with it, have concentrated on the unburned portions of the forested watersheds, and have

***Riparian** habitat occurs along the banks of natural watercourses. The quality of riparian habitat is important to fish production.*

➲ For Your Information

Substate is the material on the bed of a stream.

caused detrimental impacts to riparian habitat, runoff and stream ***substrate*** quality.

1.1.1.1 The Clearwater River Fish Community

salmonids belong to the family salmonidae, i.e., salmon, trout, steelhead, whitefish.

Historically, ***salmonids***, sculpins, dace, and suckers dominated the Clearwater River fish community. Because of their physical size and prolific nature, salmon and steelhead were the most abundant and visible aquatic residents. They, along with older bull and cutthroat trout, dominated the fish community from the mouth of the mainstem Clearwater River up into its upper tributaries. Salmon and steelhead would go as far into the tributaries as possible while resident fish, like smaller cutthroat and bull trout, would live above the log jams and waterfalls, deep within the myriad of smaller streams. Suckers, dace and sculpins were most abundant in the lower mainstem reaches and their tributaries.

The Clearwater River today has lost the diversity that was part of the historic fish community. Most notably, indigenous chinook salmon populations are gone from the Clearwater River. Cutthroat and bull trout populations are in decline. Formerly abundant, Pacific lamprey now return in very low numbers. Steelhead, which managed to hang on during the dam building era, are no longer abundant nor distributed as widely. In addition, non-native brook trout, non-native rainbow and cutthroat trout have been introduced in headwater streams to establish sport fisheries and have altered the fish community through competition, predation, and reproduction. In the lower mainstem, non-native predators such as bass are present.

The loss of salmon has diminished the supply of nutrients in the Clearwater River.

Salmon once had a major role in the ecosystem of the Clearwater River Subbasin. The loss of salmon from its role has had and will continue to have dramatic effects. The biological niche of young chinook as prey and competitor, and of adult chinook as a nutrient source remains vacant. The loss of biomass provided by large salmon carcasses has made the overall aquatic ecosystem less productive. For thousands of years, while salmon runs were plentiful, the Clearwater River was supplied with nutrients brought in by returning adults from July through December, year after year. Within the last 100 years, that organic source has been shut off and most nutrients are now derived solely from streamside sources. Aquatic and terrestrial organisms that had evolved to depend on that nutrient source have been affected.

There exists a biological need to restore this vital component of the Pacific Northwest ecosystem back into the Clearwater Subbasin's rivers and streams.

For Your Information

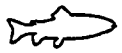
All hatcheries in the Clearwater River Subbasin are shown on Map 1.

***Outplanting** is the process by which artificially propagated fish are released into a natural system.*

***Eyed-eggs** are the life stage of a fertilized egg between the time the eyes become visible and hatching occurs.*

***Fry** emerge from the yolk sack after the yolk is gone and are about 4 cm (1.6 inch) long.*

***Fingerlings** are juvenile fish varying in length from 38 mm to 114 mm (1.5 to 4.5 inches).*



Fingerling

***Smolts** are young salmon that are physiologically ready for the transition to saltwater.*

See Section 1.6.4 for more discussion of the Lower Snake River Compensation Plan.

Presmolts
Juvenile spring chinook salmon that are 100-150 mm (4-6 inches) long in the fall. They smolt and migrate to the ocean the following spring.

Presmolt

***Egg take** is the number of eggs needed to produce the next generation of adults.*

1.1.1.2 Hatchery Fish Production in the Clearwater Subbasin

Many attempts have been made to increase the populations of salmon and steelhead in the Clearwater River Subbasin. Beginning in the 1950s, spring, summer, fall chinook and coho salmon were ***outplanted*** in the subbasin in an attempt to reintroduce these runs. Primarily ***eyed-eggs*** were planted, but ***fry***, ***fingerlings*** and ***smolts*** were also planted. Although reintroduction attempts met with some success, runs continued to decline after stocking ceased.

Kooskia National Fish Hatchery — Major hatchery construction began in the Clearwater River Subbasin in the 1960s. Kooskia National Fish Hatchery was built near the mouth of Clear Creek on the Middle Fork Clearwater River. (See Map 1.) Built in 1966, this hatchery is operated by the U.S. Fish and Wildlife Service (***USFWS***) and was originally designed to produce 2 million spring chinook smolts and 1 million steelhead smolts. Water quality problems, however, limit production to 800,000 chinook smolts (Nez Perce Tribe and Idaho Department of Fish and Game, 1990). Since 1978, Kooskia Hatchery has been operated as a complex with Dworshak Hatchery, sharing space to rear and hold chinook salmon and steelhead. In general, chinook are reared in the hatchery until smolt stage (1-1/2 years) and released directly into Clear Creek. Six hundred adults are needed to fully seed the hatchery. From 1984 to 1994, returns have ranged from 232 to 1,180, with an average of about 600, indicating that the hatchery is just meeting its production goals.

Dworshak National Fish Hatchery — Dworshak National Fish Hatchery is also operated by the USFWS and was built in 1969 to mitigate for the loss of the steelhead run caused by the construction of Dworshak Dam. The hatchery is on the north bank of the Clearwater River just upstream of the mouth of the North Fork. Originally built to produce only steelhead, it was expanded in 1981 under the Lower Snake River Compensation Plan (***LSRCP***) to rear chinook smolts as well. LSRCP production is intended to mitigate for anadromous fish losses caused by four Snake River dams. Slated production is for 2.3 million steelhead smolts and 1.3 million chinook smolts. In most years, chinook smolts are released at Dworshak in order to return enough adults to fill hatchery production. When surplus fry, ***presmolts*** or smolts are available, releases have been made in Lolo Creek and tributaries of the South Fork Clearwater River. Steelhead releases have also been predominantly at the hatchery with surplus production being distributed primarily in the South Fork Clearwater River.

Over the years, Dworshak steelhead returns have been good, while chinook returns have been slightly less than the numbers needed for eggs. Under ideal situations, Dworshak's ***egg-take*** needs are 3,000-4,000 adults when spawning ratios of 1:1 are used. However, the hatchery has managed with as few as

1,800 adults by using males 2-3 times. This number fills not only Dworshak, but also provides 1.6 million eggs to Magic Valley State Hatchery and 1.1 million eggs to the LSRCP Clearwater Hatchery (USFWS, February 1996). Over 6,000 steelhead return on average each year. From 1984 to 1994, numbers of adult chinook returning to Dworshak ranged from 74 to 2,042, with an average of 900 fish. About 1,200 adults are needed to fill the hatchery to capacity.

Clearwater Fish Hatchery — Clearwater Fish Hatchery was constructed as a mitigation hatchery under the LSRCP and is operated by the Idaho Department of Fish and Game (***IDFG***). It is a relatively new hatchery completed in 1992. Its major facility is a central incubation and rearing hatchery located across the North Fork Clearwater from Dworshak Hatchery. It also has three satellite rearing ponds at Powell, located in the headwaters of the Lochsa River, and at Crooked River and Red River, which are in the headwaters of the South Fork Clearwater River. A specific production plan for the hatchery has not been developed, but the design criteria for the LSRCP gives an indication of general production goals.

Clearwater Hatchery is slated to produce about 1.3 million spring chinook smolts and 1.7 million steelhead smolts. The satellite ponds were built to receive and ***acclimate*** all of the spring chinook and a portion of the steelhead from the central incubation and rearing facility. Some chinook are transported to the acclimation facilities to be reared and released as presmolts and others are to remain at the facility and be transferred to the satellites for release as smolts. Salmon transported prior to smolting are more likely to return to the release site than to the site of their initial rearing. Broodstock for the hatchery will come from adults returning to the satellites. Steelhead will be outplanted in the Clearwater River. Adult steelhead broodstock will be captured from the satellite sites and surplus adult returns to Dworshak Hatchery.

__Acclimate__ is to subject fish to environmental conditions for a period of time so the fish can adapt, and obtain and develop the capability to return as adults to their natal stream. Environmental conditions include temperature, chemical smells, and visual, celestial, and geomagnetic cues.

Hatchery Practices — Traditional hatcheries, such as Dworshak and Kooskia, focus on ***harvest augmentation.*** Adults are available to be harvested in the mainstem river corridors and ocean when forecasted adult returns exceed hatchery broodstock needs. Such hatchery operations do not emphasize rearing or spawning in the natural environment. Typically, most steelhead adults do not return to the hatchery because they are harvested by sportsmen and tribal fishers. To date, the vast majority of spring chinook return to hatcheries because there is no significant directed harvest (USFWS, February 1996). ***Homing*** in anadromous fish is acute, and adults that return to the hatchery, are spawned and continue the cycle.

__Harvest augmentation__ is producing fish principally for harvest.

__Homing__ is navigational behavior that guides species during migrations.

Over the years, traditional hatchery practices have been found to have drawbacks. Hatchery practices have altered genetic and

morphological characteristics by selecting against natural traits. For example, hatchery practices have affected spawn timing, size and age at return, and ability to migrate long distances. Raceway rearing domesticates fish, reducing their ability to forage or seek protection in the natural environment. When fish are released off-site, they are released at inappropriate times, in unsuitable habitat, and with little or no acclimation. As a consequence, early mortality has been substantial and homing ***imprinting*** has been incomplete. The proportion of hatchery adults that stray into different watersheds increases as a result. Traditional hatchery practices have not been an effective means of restoring runs into the natural environment.

➲ For Your Information

Imprinting *is the physiological and behavioral process by which migrating fish assimilate environmental cues to aid their return to their stream of origin as adults.*

There exists a technological need to increase runs of naturally-reproducing salmon with the aid of hatcheries.

The need for novel rearing and breeding techniques is stated clearly in the *Draft Recovery Plan for Snake River Salmon* (U.S. Department of Commerce, National Marine Fisheries Service, 1995). In the Plan, the National Marine Fisheries Service (***NMFS***) has suggested that traditional hatchery practices may not be the most effective means to restore natural populations. Rather, NMFS has supported restoring natural populations using hatcheries in conjunction with well-defined ***supplementation*** programs. NMFS suggested revising rearing and breeding techniques to improve the quality of smolts. Such strategies include manipulating water temperatures, and diets to emulate natural growth patterns during rearing. NMFS also suggests decreasing rearing densities, using acclimation ponds and voluntary release strategies, and incorporating shade, substrate, cover, and structure in rearing containers. Training fish to forage, evade predators, and use other post-release survival skills is also suggested.

Supplementation *is the use of artificial propagation to maintain or increase natural production while maintaining the long-term fitness of the target population, and while keeping the ecological and genetic impacts on non-target populations within specified biological limits.*

1.1.2 The Nez Perce Tribe

Map 2 shows the Nez Perce territory and present day reservation.

The Nez Perce once were one of the largest Plateau tribes in the Northwest (Walker, D., 1978). They occupied a territory that included north central Idaho, southeastern Washington and northeastern Oregon.

Section 3.1, ***Nez Perce Tribe*** *has a detailed description of Nez Perce Tribal history and culture.*

Salmon and other migratory fish species are an invaluable food resource and an integral part of the Nez Perce Tribe's culture. Anadromous fish have always made up the bulk of the Nez Perce tribal diet and this dependence on salmon was recognized in the treaties made with the Tribe by the United States. The historic economic, social, and religious significance of the fish to the Nez Perce Tribe continues to this day, which

makes the decline of fish populations in the Columbia River Basin a substantial detrimental impact to the Nez Perce way of life.

Therefore, the Nez Perce Tribe has a cultural need to restore salmon runs within its treaty lands.

1.2 Finding Solutions

In 1980, Congress passed the Northwest Power Act. The Northwest Power Act created the Northwest Power Planning Council and directed the Council to develop the Columbia River Basin Fish and Wildlife Program. The program is designed primarily to address the impacts of the federal hydroelectric system on the fish and wildlife resources of the Columbia River Basin.

BPA has become the primary funding and implementing agency of the program. Under the Act, BPA has the responsibility to protect, mitigate impacts to, and enhance anadromous fish populations in the Columbia River Basin.

The Council recognized the opportunity to mitigate impacts to salmon runs in the Clearwater River Subbasin. In 1982, the Council authorized design and construction plans for fish production facilities on the Nez Perce Indian Reservation, and listed the facility in the Council's *1987 Fish and Wildlife Program* (Action Item 703(g)(2)).

In 1987, the Council established an interim goal of doubling current salmon and steelhead runs to 5 million adult fish in the Columbia River Basin without losing biological diversity. The Council then asked fishery agencies and Indian Tribes to develop plans and management strategies to achieve the Council's interim goal. The Nez Perce Tribe played a key role in this process. The fishery agencies and Tribes produced an Integrated System Plan in June 1991.

Icons represent the many reports developed for this program and are added beside information from a specific report.

The Integrated System Plan, though not formally adopted, included a strategy for the Salmon and Clearwater rivers. A part of the strategy was to try using a central hatchery to artificially propagate fish, and smaller satellite facilities to rear the fish. The Nez Perce Tribe then developed the *Nez Perce Tribal Hatchery Master Plan* (Larson and Mobrand, 1992). The Master Plan describes the Nez Perce Tribal Hatchery (***NPTH***), which uses supplementation in its program.

Supplementation has been defined as the use of artificial propagation in the attempt to maintain or increase natural production while maintaining the long-term fitness of the target population and while keeping the ecological and genetic impacts on non-target populations within specified biological limits (U.S. Department of Commerce, NMFS, 1995). Thus, supplementation

For Your Information

NEPA requires that proposed major federal actions which may have significant impacts on the environment be examined in an environmental impact statement. NEPA helps public officials make decisions that consider environmental consequences.

is a mechanism of intervening in a natural population with the purpose of halting decline or increasing natural production (U.S. Department of Commerce, NMFS, 1995). The basis for supplementation is that hatcheries can provide a higher survival in the egg-to-fry and egg-to-smolt life stages than occurs naturally (U.S. Department of Commerce, NMFS, 1995).

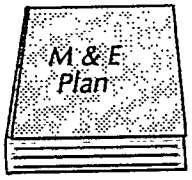
In May 1992, the Council approved the *Nez Perce Tribal Hatchery Master Plan.* The Council called on BPA and the Tribe to resolve some technical uncertainties before carrying out the Master Plan. The Council also asked the Tribe and agencies to begin the environmental analysis process to evaluate environmental impacts as required by the National Environmental Policy Act of 1969 (***NEPA***).

BPA and the Tribe met the Council's requirements. In 1992, the Tribe completed the *Genetic Risk Assessment of the Nez Perce Tribal Hatchery Master Plan,* (***NPTH GRA***) (Cramer and Neeley, 1992). The NPTH GRA assessed the genetic origins and uniqueness of the chinook population in each of the major Clearwater tributaries. It also identified genetic risks of the proposed supplementation program and offered recommendations for reducing those risks.

In 1994, the *Nez Perce Tribal Hatchery Predesign Study* (Montgomery Watson, 1994) was completed. The study evaluated proposed sites for the capability of the sites to grow fish. The study also defined preliminary development costs for carrying out the program.

In 1995, the Tribe completed the *Selway River Genetic Resource Assessment* (***Selway GRA***) (Cramer, 1995). The Selway GRA assesses the genetic origins and uniqueness of the chinook populations in the Selway River Subbasin, and identifies the possible genetic risks from operation of hatchery satellite facilities in that subbasin. It serves as a supplement to the NPTH GRA.

The Tribe also developed the *Nez Perce Tribal Hatchery Monitoring and Evaluation Plan* (***M & E Plan***) (Steward, 1996). The M & E Plan describes short- and long-term monitoring and evaluation activities to help managers decide how effective supplementation is in restoring chinook salmon production in the Clearwater River Subbasin. Monitoring needs, procedures, and products are discussed as they relate to supplementation theory, program goals and objectives, and to program-specific performance criteria.



In 1995, the Tribe evaluated new information from the NPTH GRA, the Selway GRA, the Predesign Study, the M & E Plan, and an Endangered Species Act (***ESA***) listing (see Section 1.6.1, **Endangered Species Act**) and made changes to the Master Plan. These changes are described in the *1995 Supplement to the Master Plan* (***1995 Supplement***).

Finally, analysts used the information from these studies to refine the supplementation program and to complete the environmental analysis.

1.2.1 Nez Perce Tribal Hatchery Program

The Nez Perce Tribal Hatchery Program was developed using the results of the Tribe's studies. NPTH would use supplementation to ***mitigate*** for and rebuild natural runs of chinook salmon. NPTH would use innovative incubation and rearing techniques to provide as much survival benefit as possible when fish are released into the wild. Water temperatures, rearing environment, and size of life stage of fish when released would be controlled to best fit with existing natural conditions. Fish would be released in under-used stream or river habitat and would return to spawn in that habitat rather than return to spawn in a hatchery.

Mitigate To take steps to lessen the effects of an action. Steps may include reducing the impact, avoiding it completely, or compensating for the impact.

The mating protocols would mix returns from hatchery releases and naturally-spawning fish to maintain the ***long-term genetic fitness*** of the spring, summer and fall chinook populations. At the same time, release numbers from NPTH would be controlled to keep ecological and genetic impacts to other fish populations within acceptable limits.

long-term genetic fitness is a measure of the ability of a population to survive natural selection over a number of generations.

NPTH would be a long-term supplementation program. It is designed to aid natural production until such time that overall migratory passage conditions improve to where runs can perpetuate themselves and provide a harvest.

NPTH managers would try to produce enough salmon returning to spawn within 20 years after the start of the program so that some salmon could be harvested. Twenty years was selected as the goal because it is four chinook generations and it is a reasonable milestone for financing and expected harvest. To meet this goal, enough spring/summer and fall chinook will need to disperse into suitable habitats, survive to spawn in the wild, and produce enough viable offspring to allow some harvest.

*Chapter 2, **Proposed Action and Alternatives**, has a complete description of the supplementation program.*

1.3 Purpose

Decision makers will use these purposes to evaluate the alternatives proposed to meet the need:

- Protect, mitigate, and enhance Columbia River Basin anadromous fish resources.
- Develop, increase, and reintroduce natural spawning populations of salmon within the Clearwater River Subbasin.
- Provide long-term harvest opportunities for Tribal and non-

Tribal anglers within Nez Perce Treaty lands within four salmon generations (20 years) following project completion.

- Sustain long-term fitness and genetic integrity of targeted fish populations.
- Keep ecological and genetic impacts to non-targeted fish populations within acceptable limits.
- Promote Nez Perce Tribal management of Nez Perce Tribal Hatchery facilities and production areas within Nez Perce Treaty lands.

1.4 Scoping and Major Issues

Scoping refers to a time when the public has a chance to express which issues they think should be considered in an environmental impact statement (***EIS***). BPA and BIA jointly published a Notice of Intent on April 29; 1994 to prepare an EIS, to provide notification for Floodplain and Wetlands Involvement, and to conduct public scoping meetings for the program (59 FR 22155). Public scoping meetings were held on May 24, 1994, in Boise, Idaho, and on May 25, 1994, in Spalding, Idaho. About 15 people attended each of the public meetings. BPA and BIA received 28 sets of written comments during scoping. Commentors raised these issues:

- The possibility that the program would fail if mainstream Columbia River juvenile and adult passage problems are not solved.
- Genetic risks and the potential impact of the program on the genetic diversity of wild fish stocks, particularly ESA-listed Snake River salmon species.
- Hatchery fish may adversely impact wild anadromous and resident fish stocks through competition for space and food and transfer of diseases in the natural environment.
- The effectiveness of supplementation technology.
- Water quality impacts from hatchery effluent and construction.
- The effect of excessive ocean and in-river harvest practices on the survival of weak stocks.
- The cost effectiveness of undertaking such a mitigation program given that anadromous fish runs continue to decline in the region.

Mainstem passage is being addressed in many other forums (see Section 1.7, **Issues Beyond the Scope of this EIS**). Consequently,

an analysis and discussion of mainstem passage issues are not included for detailed evaluation within the scope of this EIS. Also, facilities in the Salmon River Subbasin have been eliminated from consideration in this EIS because of complications with salmon stocks listed as threatened under the Endangered Species Act. (See Sections 1.6.1, **Endangered Species Act**, and 2.3, **Alternatives Eliminated From Consideration.**)

Other issues raised during scoping and many added concerns are addressed in Chapter 4, **Environmental Consequences.**

1.5 Decisions to be Made

When a project or program could involve more than one federal agency, those agencies work together during the planning and decision-making process. BPA and BIA are co-lead federal agencies on this program. The Nez Perce Tribe, though not a federal agency, acts as the primary cooperating agency. The U.S. Forest Service (***USFS***) and the USFWS are cooperating federal agencies.

A program of this size contains different alternatives and options for decision makers to consider. For this program, the following decisions must be made.

- BPA must decide whether to fund construction, operation, and maintenance of program facilities.
- BIA, as trustee for tribal trust resources, must decide whether to fund cyclical maintenance and rehabilitation of hatchery facilities. The decision whether to fund will be based on annual budget constraints and availability of funds.
- The Nez Perce Tribe must decide whether to accept the outcome in the Record of Decision developed after the environmental impact statement is completed.
- The USFS (Clearwater and Nez Perce National Forests) must decide if the program complies with currently approved forest plans and if special use permits for construction, operation, and maintenance of program facilities should be approved. If the program does not comply, forest plan(s) may need to be amended. The effects to other national forest uses, such as recreation, timber, mining, and grazing are discussed under land use in Chapter 4, **Environmental Consequences**, of this EIS.
- The USFWS will assess the impacts of the program on listed wildlife and plant species as written in the ***Biological Assessment*** and will determine if they concur with the assessment of the level of impacts on listed species.

*The **Biological Assessment** will be part of the final EIS and the Record of Decision, which is written after the final environmental impact statement has been completed and reviewed.*

- Though the NMFS is not a cooperating agency, it will review the determination of effect on listed populations of Snake River chinook salmon addressed in the Biological Assessment.

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See Chapter 5 for consultation and permits requirements specific to NPTH.

More information about federal, state, and local consultations and permits for this program is in Chapter 5, **Environmental Consultation Review and Permit Requirements.**

1.6 Relationship to Other Fish Plans, Programs and Projects Affecting the Clearwater River Subbasin

Many plans, programs and projects are related to this program. These are described in this section.

1.6.1 Endangered Species Act

In June 1990, NMFS was petitioned to list Snake River populations of spring, summer, and fall chinook as threatened and endangered under the Endangered Species Act. In their status review, NMFS determined that the abundance of Snake River spring/summer chinook (the two races were determined to be a single species under the ESA) and fall chinook had declined to levels warranting protection under the Act. After initially being listed as threatened, Snake River spring/summer and fall chinook were reclassified as endangered species on August 18, 1994 (*Federal Register*, August 1994). When this emergency rule expired, their listed status reverted to threatened.

Evolutionary significant unit *A population or group of populations that is considered distinct for purposes of conservation under the ESA.*

NMFS finds that the Snake River fall chinook ***Evolutionary Significant Unit (ESU)*** is made up of a single population which spawns in the mainstem Snake River and in the lower reaches of major tributaries downstream from Hells Canyon Dam, including the Clearwater River. The Lyon's Ferry Hatchery fall chinook population, which was derived from natural stock, is also considered part of the ESU. NMFS designated the section of the Clearwater River extending from its mouth upstream to Lolo Creek (about 85 km [53 miles]) as ***Critical Habitat*** for fall chinook.

Critical habitat *is the minimum amount of habitat necessary for survival and enough area for the species to expand and recover to healthy population levels.*

NMFS also determined that the Snake River spring/summer chinook is an ESU. The run is made up of more than 30 subpopulations located in 12 major subbasins and Salmon River tributaries. NMFS concluded that populations of spring chinook that exist in the Clearwater River are not part of the Snake River ESU and therefore are not subject to the provisions of the Act (Matthews and Waples, 1991). Clearwater River spring chinook were excluded because the indigenous populations had been eliminated by Lewiston Dam. The spring chinook found in the drainage today can be traced to ancestors from outside the

Clearwater River Subbasin (see Section 3.6, **Fish**). NMFS also elected not to designate portions of the Clearwater River Subbasin as Critical Habitat for spring chinook because "... the spring and summer chinook salmon inhabiting the Clearwater River Basin are not considered part of the evolutionary significant unit comprising Snake River spring/summer chinook listed under the ESA." (*Federal Register*, December 28, 1993.)

Because NMFS has listed Snake River spring/summer and fall chinook as threatened, potential Nez Perce Tribal Hatchery production facilities in the Salmon River Subbasin were eliminated from consideration. (See Section 2.3, **Alternatives Eliminated From Consideration.**) Facilities in the Salmon River Subbasin may be considered in the future. Additional environmental analysis would be completed if the facilities are considered again.

Other than Snake River fall chinook (found in the lower Clearwater River), no other species of fish residing in the Clearwater River Subbasin has been listed as threatened or endangered. Summer steelhead populations within the Snake River drainage, including the Clearwater River Subbasin, are being considered for listing as a threatened or endangered species. Steelhead have been classified as ***Sensitive*** by the USFS and as a ***Species of Concern*** by IDFG. NMFS is currently reviewing their status under the ESA. Cutthroat trout and bull trout are considered Species of Special Concern by IDFG and a Sensitive Species by the USFS.

The USFWS completed a status review for bull trout in Idaho and determined "... listing this species is warranted but precluded due to other higher priority listing actions..." (*Federal Register*, June 12, 1995).

1.6.2 The Proposed Recovery Plan for Snake River Salmon

The ESA requires that recovery plans be developed and implemented for threatened and endangered species. NMFS is the agency responsible for developing a recovery plan for Snake River salmon and issued its Proposed Recovery Plan in March 1995. A final Recovery Plan is expected to be issued in 1997, and it will contain provisions to prevent further declines in the near term and affect the recovery of the species in the long term.

The success of the NPTH, other upriver hatchery or natural runs of salmon, whether the salmon are listed or not, ultimately depends on the Snake River Recovery Plan. In order for the plan to yield at least a stable, non-declining run, there must be an improvement made in the relationship between the number of smolts that leave the system to the number of adults that return. This smolt-to-adult survival rate for salmon must be increased by at least two fold. Improvements in smolt-to-adult survival will

naturally focus on those aspects of the environment that humans control, such as harvest rates and downstream and upstream passage over dams. The efforts made to improve survival for listed endangered stocks will benefit hatchery and non-listed stocks in the same manner.

The NPTH was designed assuming smolt-to-adult survival rates would be better than existing rates. Now that the ESA has come into play, and deliberate attention will be focused on improving survival, the prospects for rebuilding a naturally-reproducing spawning population in the Clearwater River have an improved potential for success. Actions taken now by the proposed NPTH to ***jump start*** populations in underseeded habitat would be simultaneously aided by coordinated efforts down river to improve passage conditions.

Jump start *Starting or setting in motion a stalled system or process.*

The NPTH program is consistent with many of the principles of the proposed Recovery Plan, supporting several of its objectives, but it is also at odds with a few specific measures. Because the measures included in the final Recovery Plan are unknown, further discussion on consistency is premature. However, some of the more underlying principles of the Recovery strategy that are addressed by NPTH are:

- The Recovery Plan calls for limitation of releases of anadromous salmonids from Snake River hatcheries to 20.2 million smolts but that "... Production to support recovery (currently 1.24 million fish) is exempt from this limit." Production of fall chinook from Lyon's Ferry Hatchery is designed to support natural production of endangered Snake River salmon and appears to qualify for exemption from the limit. Spring chinook production is included within the hatchery cap. Summer chinook production would exceed the hatchery cap.

- The Recovery Plan calls for fisheries agencies and Tribes to design and carry out production-scale experiments at appropriate Columbia River Basin hatcheries to test individual release strategies and evaluate smolt quality indices believed to improve smolt quality. Such alternative release strategies and evaluations are an integral part of the NPTH Master Plan and M & E Plan.

- The Recovery Plan calls for reintroduction of spring/summer chinook salmon in the Lochsa and Selway rivers once an appropriate stock is identified. As a part of the NPTH planning process, two GRAs have been completed that present detailed evaluations of the stock histories and genetic risks associated with alternative brood sources for spring/summer chinook in the Clearwater River Subbasin. The 1995 Supplement stipulates that brood sources and brood-taking guidelines recommended in these genetic risk assessments would be adopted.

The Nez Perce Tribe, BPA, BIA, and others will continue to consult with NMFS as this EIS progresses, and as the Proposed Recovery Plan is reviewed and revised. (See Section 5.2, **Endangered and Threatened Species**, for more information about consultations.) Broodstock sources, construction and operation of facilities and other program-related activities would be evaluated in formal consultation with NMFS to determine whether they constitute a threat to the continued existence or habitat of listed species, or in some way interfere with their recovery. Impacts expected to any listed species are identified in Chapter 4, **Environmental Consequences.**

1.6.3 Interactions of Hatchery and Naturally Spawning Salmon and Steelhead in the Columbia River Basin Programmatic EIS

This EIS is being prepared by NMFS, USFWS, and BPA in coordination with the Columbia Basin Fish and Wildlife Authority (***CBFWA***). CBFWA is a coordinating body for fish and wildlife agencies and the Native American Tribes who have fisheries management authority in the basin.

The EIS will assess the cumulative impacts of all anadromous fish culture programs in the Columbia River Basin on natural production of salmon and steelhead. It focuses on impacts that occur in the mainstem Columbia and Snake rivers and the Pacific Ocean. Its purpose is to examine strategies for outplanting of artificially produced salmon and steelhead in the Columbia Basin that better allocate the Basin's fish production capabilities while eliminating or minimizing risks to stock biodiversity. The results will influence NPTH and/or other fish production strategies, but because it is in draft form, the extent of influence is unknown.

1.6.4 Lower Snake River Fish and Wildlife Compensation Plan (Additional Mitigation of Upstream Spawning)

A portion of the fall chinook production occurring at Lyon's Ferry Fish Hatchery has been slated to go upstream in an effort to enhance the run of naturally-reproducing fish above Lower Granite Dam. A cooperative proposal was developed by NPT, USFWS and the Washington Department of Fish and Wildlife to acclimate fish to the river reaches using temporary acclimation facilities. Yearling smolts, which are larger than the fall chinook proposed in NPTH, would be released. They exhibit much higher adult return rates than do subyearling smolts, and would rebuild the runs more quickly. Temporary acclimation facilities are being considered in the Snake, Clearwater, Grande Ronde, Imnaha and lower Salmon rivers.

During the spring of 1996, the Tribe and COE set up a satellite rearing facility at Pittsburgh Landing on the Snake River. Approximately 113,000 yearling chinook from Lyon's Ferry Hatchery were acclimated and released at the site.

Two acclimation facility locations are being considered for the Clearwater River for 1998 and beyond. One potential acclimation and release location would be at the NPTH central hatchery site, the other would be upstream. Should the NPTH central hatchery site be selected, its environmental effects will be evaluated in a separate NEPA document.

1.6.5 Idaho Department of Fish and Game Anadromous Fish Management Plan

Supplementation of chinook populations in the Clearwater River Subbasin is part of the IDFG's *Anadromous Fish Management Plan for 1992-96*. There are differences and areas of consistency between the plan and NPTH. The management plan was developed with the proposed NPTH in mind, and consequently, IDFG specifically mentioned supporting tribal hatchery operations in the watersheds originally slated for production, that is, Lolo Creek and Newsome Creek. The Management Plan does not mention summer chinook production in the Selway or South Fork Clearwater, or fall chinook production in the mainstem Clearwater.

Where hatchery production is discussed, an emphasis of the plan is to "... Work with the Nez Perce Tribe to develop hatchery fish release programs that preserve and protect genetic resources of naturally spawning chinook and steelhead populations." The Tribe has investigated the most appropriate stocks to use for the NPTH (Cramer, 1992 and 1995) in the Clearwater River Subbasin and believes this goal is met. NPTH fall chinook broodstock would be taken from the existing Snake River Basin population. Summer chinook would most likely be derived from Mid-Columbia tributary stocks. Spring chinook broodstock would come from locally adapted stocks.

A difference in management strategies regarding hatchery production in Fish Creek may occur in the future. The Management Plan specifically calls for not supplementing Fish Creek with either chinook or steelhead. Fish Creek has been designated as a control stream for NPTH, and as such, would not be outplanted during the near term. However, if supplementation proves effective, the Tribe may choose to use Fish Creek in the future.

1.6.6 Idaho Salmon Supplementation Studies

The Idaho Salmon Supplementation Study (***ISS***) is closely aligned with and partially dependent on the proposed NPTH program, but evaluation and production strategies differ between the two programs. The ISS is a cooperative effort among state, federal, and tribal agencies to assess what broodstock and release strategies are best for supplementing natural or depleted spring and summer chinook salmon populations, and what effect supplementation has on these populations. Evaluation of treatment and control streams focuses on ***parr*** densities, juvenile yield, and ***redd*** counts. NPTH would facilitate the studies by providing supplementation fish to Newsome Creek and Lolo Creek.

Parr *Juvenile salmonids develop bar-shaped marks on their sides called parr marks, between becoming fry and smolting.*

Redd *The reproductive nest dug in gravels by the female fish.*

The NPTH M & E Plan would use some of the control streams used by the ISS, but methods of evaluation differ. Additionally, outplant strategies, species reared, and rearing techniques proposed for NPTH are different from those used by the ISS.

1.6.7 Columbia River Fish Management Plan (*CRFMP*)

The Columbia River Fish Management Plan resulted as part of the settlement between the parties in U.S. vs. Oregon, a case addressing treaty fishing rights in the Columbia River Basin. The Parties to the settlement are the United States of America acting through the Secretary of the Interior and the Secretary of Commerce; the Nez Perce Tribe; the Confederated Tribes of the Umatilla Indian Reservation; the Confederated Tribes of the Warm Springs Reservation of Oregon; the Confederated Tribes and Bands of the Yakama Indian Nation; and the states of Oregon and Washington. BPA was not a party in U.S. vs. Oregon and is not a participant in the CRFMP. The plan is a framework for these parties to protect, rebuild, and enhance Columbia River fish runs while providing fish for both treaty Indian and non-Indian fisheries. The agreement establishes procedures to facilitate communication and resolve disputes. Two committees have been set up to guide management decisions. The Production Advisory Committee (PAC) responds to hatchery production issues; the Technical Advisory Committee (TAC) responds to harvest issues. The NPTH program would be undertaken as a measure under the Northwest Power Act and is independent of the United States' CRFMP duties.

NPTH managers would consult with CRFMP parties on harvest in the ocean and mainstem Columbia River. They will consult with the state of Idaho on harvest in the Clearwater River.

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Biological Opinion *Document stating the opinion of the USFWS or NMFS on whether a federal action is likely to jeopardize a listed species, or destroy critical habitat.*

Jeopardy *To jeopardize the continued existence of or to reduce the likelihood of the survival and recovery of a listed species.*

1.6.8 Biological Opinion on 1995-1998 Hatchery Operations in the Columbia River Basin

NMFS' approach for determining whether a proposed action jeopardizes the continued existence of listed Snake River salmon is described in this Biological Opinion. NMFS determined that proposed hatchery operations described by USFWS, NMFS, BPA, the Corps, and BIA at federal hatcheries are likely to jeopardize the continued existence of listed Snake River sockeye salmon, Snake River spring/summer chinook salmon, and Snake River fall chinook salmon. NMFS described a reasonable and prudent alternative to hatchery operations that will reduce impacts on endangered chinook and sockeye salmon. The alternative included those measures addressed in the Proposed Recovery Plan for Snake River Salmon.

NPTH was not included in the Biological Opinion, and therefore another Biological Opinion must be filed by NMFS.

1.6.9 PACFISH

PACFISH is a management strategy developed by the USFS and the U.S. Bureau of Land Management for anadromous fish-producing watersheds on federal lands (U.S. Department of Agriculture, U.S. Forest Service, 1995). PACFISH established goals to maintain or restore water quality, riparian areas, and associated fish habitats in order to provide healthy, functioning watersheds. Interim Riparian Management Objectives (***RMOs***) for stream channel conditions were defined to provide the criteria which "attainment, or progress toward attainment, of the riparian goals is measured." Interim Riparian Habitat Conservation Areas (***RHCA***) were established for all perennial and intermittent streams to achieve riparian management goals and objectives. PACFISH limits most riparian alterations (i.e., vegetative removal and soil disturbing activities) within 300 feet of perennial fish bearing streams and 150 feet of smaller non-fish bearing perennial streams. PACFISH states that modifications to the RHCA's usually requires completion of a Watershed Analysis to provide the ecological basis for the change.

The PACFISH Amendment, now part of the Nez Perce and Clearwater Forest Plans applies to all proposed projects and ongoing projects and activities that pose an unacceptable risk to anadromous fish. This directive supersedes the existing forest plan where the amendment provides more protection for anadromous fish habitat.

The Lochsa, Selway and South Fork Clearwater rivers and Lolo Creek are considered anadromous watersheds under PACFISH. Construction of some proposed facilities for NPTH could require removing vegetation and disturbing soil in riparian conservation

areas on federal land, an activity regulated by PACFISH guidelines. Construction activities proposed on national forest land would be evaluated at each site to determine if the specific activities meet PACFISH objectives. However, because both PACFISH and NPTH have the mutual goal of increasing natural production, it is unlikely that they will be in conflict.

1.6.10 Summary of Upstream Salmon Report

On November 8, 1995 the National Research Council, part of the National Academy of Sciences, released a scientific study on Pacific salmon with recommendations for establishing a sustainable future for salmon in the Pacific Northwest. The study emphasizes the importance of genetic diversity.

The report calls for:

- continued use of transportation while scientists research fish passage downstream through the reservoirs and dams.
- reductions in harvest to increase spawning escapement
- changing roles of hatcheries from mitigation for dam mortality and production for fisheries to assisting recovery and providing an opportunity for genetic expression of wild populations
- protection and rehabilitation of salmon spawning and rearing habitat.

In principle, NPTH would be the type of hatchery advocated for in this document because the emphasis of NPTH is to supplement naturally-reproducing populations.

1.6.11 Wy-Kan-Ush-Mi-Wa-Kish-Wit: The Columbia River Anadromous Fish Restoration Plan of the Nez Perce Tribe, Umatilla, Warm Springs, and Yakama Tribes

This Tribal Recovery Plan focuses more on restoring salmon runs to their historic abundance, not on preserving the genetic purity of the remaining populations. The plan emphasizes keeping fish in the rivers and maintaining all habitats encountered during the life cycle in as natural a condition as possible. It calls for using supplementation hatcheries to restore runs, to make the mainstem Columbia and Snake rivers hydrosystems function more as a river, and to allow more fish of Columbia River origin to be harvested in the Columbia River. NPTH is one of the supplementation hatcheries proposed in the plan.

1.7 Issues Beyond the Scope of this EIS

During scoping, several concerns were raised about fish passage in the mainstem of the Columbia River. Specific comments were received about the need to improve passage, survival, and transportation technology (barging) for juvenile and adult salmonids on the Columbia River to successfully enhance fish runs in the Columbia Basin. Though mainstem passage is fundamental to the long-term success of the NPTH program, it is a difficult issue to analyze in the context of this EIS and it is outside the scope of this EIS because NPTH managers cannot control mainstem improvements. Many fisheries and other management agencies are directing studies about this issue and substantive improvements in mainstem passage conditions are expected:

- The System Operation Review, developed by BPA, the Corps and the Bureau of Reclamation;
- The System Configuration Study, developed by the Corps;
- The Lower Granite Dam Experimental Drawdown EIS, developed by the Corps and NMFS;
- The Supplemental EIS on Interim Columbia and Snake River Flow Improvement Measures for Salmon, developed by BPA, the Corps of Engineers and the Bureau of Reclamation; and
- The NMFS Biological Opinion on Federal Columbia River Power System Operations.

Concerns were also expressed during scoping about hydropower production at dams on the Columbia River and about fish habitat. Decisions about hydropower production are made in other forums; land management agencies make decisions about habitat management. These issues are outside the scope of this EIS.

Also outside the purview of this EIS is a concern about how harvest limits of chinook salmon in the ocean and the Columbia Basin are determined. Harvest limits are outside the control of the Nez Perce Tribe and others proposing the Nez Perce Tribal Hatchery.

1.8 Organization of the Draft EIS

This environmental impact statement includes information necessary for public officials to make decisions based on the environmental consequences of federal actions.

Federal regulations specify the kinds of information decision-makers should have to make good decisions. This document follows those recommendations.

- Chapter 1 states the purpose and need for the program. Purpose and need are the first screen alternatives must go through to be considered.
- Chapter 2 describes the proposed action and alternatives, including taking no action.
- Chapter 3 explains the state of the existing environment that could be affected by the program. The existing environment includes human, natural and other resources.
- Chapter 4 is the heart of the EIS. In this chapter, specialists predict the possible consequences of the proposed action and alternatives. Impacts can range from no or low impact to high impact.
- Chapter 5 reveals the licenses, permits and other approvals or conditions the proposed action must obtain or meet.
- Other chapters list individuals who helped prepare the EIS, references used, individuals, agencies, and groups the EIS will be sent to, a glossary, an index, and supporting technical information in appendices.

Chapter 2 Proposed Action and Alternatives

In this Chapter:

- Proposed Action
- The No Action Alternative
- Alternatives Eliminated from Consideration

BPA, BIA and the Nez Perce Tribe are proposing the Nez Perce Tribal Hatchery in the Clearwater River Subbasin to assist the recovery of Clearwater chinook populations to sustainable levels. This supplementation program includes chinook salmon incubation and rearing facilities, satellite facilities, juvenile release and adult collection sites, a monitoring and evaluation plan, harvest plan, and other management activities.

A No Action Alternative is also being considered. The National Environmental Policy Act requires federal agencies to analyze the consequences of taking no action, in this case, not meeting the needs that the supplementation program would fulfill.

This chapter also describes other alternatives that have been considered but eliminated from further consideration because they do not meet the purpose and need for the program.

2.1 Proposed Action

The Nez Perce Tribal Hatchery is a supplementation program that would rear and release spring, summer, and fall chinook (***Oncorhynchus tshawytscha***), biologically similar to wild fish, to reproduce in the Clearwater River Subbasin. Program managers propose techniques that are compatible with existing aquatic and riparian ecosystems and would integrate hatchery-produced salmon into the stream and river environments needed to complete their life cycle. Wild characteristics would be maintained, diseases would be controlled, fish would be adapted to the streams they are released into, and would be released using methods that maximize their survival in the wild.

The supplementation program has three phases. The first (1-5 years) and second phases (6-10 years) of the program are the primary focus of this draft EIS. Phase I would begin outplanting efforts to reestablish naturally-reproducing salmon in selected tributaries of the Clearwater River Subbasin. Phase II would continue the effort using those returning adults to increase and stabilize production in project streams. Phase III

➲ For Your Information

***Adaptive management** is responding to new information with program changes.*

(11-20 years) would create an opportunity for harvest, and would use ***adaptive management*** for specific actions based on the success of the first and second phases. Subsequent environmental documents would be prepared for Phase III as necessary.

The proposed program has many steps. First, eggs and sperm would be taken from broodstock. During Phase I, broodstock would be obtained from selected hatchery stocks identified in the program's genetic risk assessments (see Section 2.1.3.6, **Broodstock Management**). During Phase II, adults returning as a result of the supplementation actions would provide broodstock used for egg take. The fertilized eggs would then be incubated in two central hatcheries. Fish would be reared for a short time at the central hatcheries and then moved to acclimation facilities located on various rivers and streams to condition them to the natural environment. The specific stream reaches were chosen because they have suitable chinook habitat and are consistent with aboriginal fishing areas. Release locations, time of release, and age at release were selected to maximize survival and natural production. Table 2-1 summarizes the dimensions and requirements of NPTH facilities and Figure 2-1 provides a summary of operations.

***Central Incubation and Rearing Facility** A fish hatchery in a central location distinguished by incubation and early rearing facilities that serves multiple fish stocks and satellite-stream locations. Usually located on the basis of water resources, climate, geography, central location, economy, and management needs.*

Spring chinook would be reared at the Cherrylane Central Incubation and Rearing Facility until they are fingerling size. A portion of these fish would be outplanted as fingerlings in early summer into three different streams. The remaining spring chinook would be moved to acclimation ponds on three other streams to be reared until autumn when they would be released as presmolts. The spring chinook from both release strategies would then smolt and migrate downstream during spring of the following year.

Fingerling

Summer chinook would be reared at the Sweetwater Springs Central Incubation and Rearing Facility until they reach fingerling size. They would then be moved to one or two acclimation facilities to continue rearing for several months and to imprint on the river water. They would be released as ***subyearling smolts*** in late spring or early summer and are expected to begin their seaward migration shortly thereafter.

Subyearling smolt

***Subyearling smolts** are juvenile salmonids that physiologically mature and migrate to the ocean when less than one year old; e.g., certain stocks of fall and summer chinook salmon.*

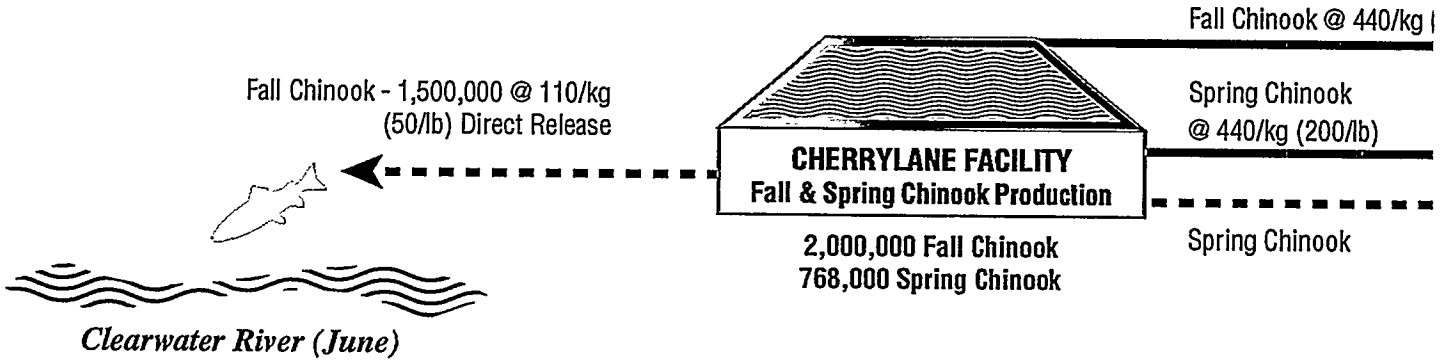
Fall chinook would be reared at the Cherrylane hatchery until they reach fingerling size. Most of the fish would be moved to acclimation rearing ponds within the facility itself and would be released as subyearling smolts directly into the Clearwater River during late spring or early summer. Remaining fish would be moved to another acclimation site located farther downstream. They would be reared and imprinted on that source of water prior to being released as subyearling smolts in late spring or early summer. Fall chinook are also expected to begin their seaward migration shortly after release.

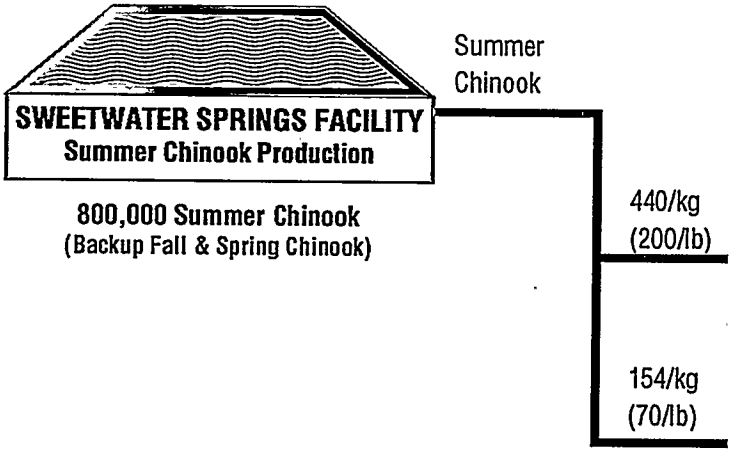
Physical Components						Water Needs	Available GW (Note 4)	Available SW (Note 4)	SW Source
eir	Wells	Gravity Intake	Pump Station	Incubation (16 stacks) (Note 3)	cubic meters (cubic feet)/ rearing species	cubic meters/min (gpm)	cubic meters/min (gpm)	cubic meters/min (gpm)	
		yes		16	45 (1600) /Bs 181 (6400) /RrF	3.4 (900) ● April	3.4 (900)	NA	Spring source
	yes		yes		85 (3000) /Bs 651 (23000) /Ac	7.9 (2100) ● June (reuse of water from Bs)	1.7 (450)	U	Clearwater River
			yes		142 (5000) /Bs 595 (21000) /Ac	10.2 (2700) ● June	NA	U	Selway River
	yes		yes	48 FCH 18 SCH 66 total	198 (7000) /Ac 283 (10000) /RrF	25 (6600) FCH 5.3 (1400) SCH 30.3 (8000) ● June	18.9 (5000)	U	Clearwater River
	yes		yes		736 (26000) /Ac	8.3 (2200) ● June	2.5 (670)	91.7 (249000)	Lapwai Creek
	yes		yes	48 FCH 18 SCH 66 total	2180 (77000) /Ac 283 (10000) /RrF	25 (6600) FCH 5.3 (1400) SCH 30.3 (8000) ● June	18.9 (5000)	U	Clearwater River
		yes			57 (2000) /Bs 368 (13000) /Ac	3.8 (1000) (reuse of water from Bs)	NA	11.5 (3050)	Lowest flow 1990-1995
		yes			1 (400) /Bs 113 (4000) /Ac	1.1 (300) (reuse of water from Bs)	NA	10.7 (2830)	Lowest flow 1990-1995
		yes			20 (700) /Bs 198 (7000) /Ac	2.3 (600) (reuse of water from Bs)	NA	9.5 (2500)	Lowest flow 1990-1995

Table 2-1 Summary of NPTH Facilities

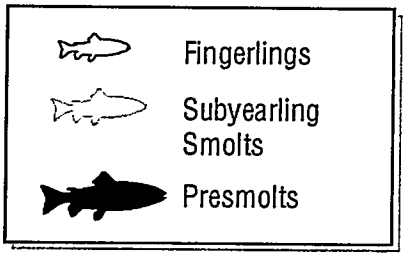
Site	Program (Note 1)	Release Goals			Fish Culture Components (Note 2)							Site Area	
		Number	#/kg (#/lb)	metric tons (tons)	Cp	Bs	Ic	RrF	RrS	Ac	Rl	hectares (acres)	Adult W
Sweetwater Springs T33N, S4, R4W	SuCh					*	*	*	*			1.6 (4)	
Luke's Gulch (South Fork Clearwater) T31N, S28, R4E	SuCh	400,000	110 (50)	3.63 (4)	*	*		*	*	*	*	1.2 (3)	
Cedar Flats (Selway) T32N, S25, R7E	SuCh	400,000	110 (50)	3.63 (4)	*	*			*	*	*	1.2 (3)	
		800,000		7.26 (8)									
Cherrylane T37N, S35, R3W	FCH	1,500,000	110 (50)	13.61 (15)	*	*	*	*	*	*	*	6 (14)	
North Lapwai Valley T36N, S20, R4W	FCH	500,000	110 (50)	4.54 (5)	*	*			*	*	*	1.2 (3)	yes
		2,000,000		18.14(20)									
Cherrylane T37N, S35, R3W	SCH					*	*	*	*			6 (14)	
Yoosa\Camp Creek (Lolo Creek) T35N, S12, R6E	SCH	150,000	44 (20)	3.4 (3.8)	*	*		*		*	*	0.8 (2)	yes
Mill Creek (Mill Creek) T29N, S34, R4E	SCH	40,000	44 (20)	0.91 (1)	*	*		*		*	*	0.8 (2)	yes
Newsome Creek T30N, S31, R7E	SCH	75,000	44 (20)	1.7 (1.88)	*	*		*		*	*	0.8 (2)	yes
Boulder Creek (Lochsa)	SCH	83,000	220 (100)	0.377 (0.415)	*						*		yes
Warm Springs Creek (Lochsa)	SCH	20,000	220 (100)	0.09 (0.10)	*						*		yes
Meadow Creek (Selway)	SCH	400,000	220 (100)	1.81 (2)	*						*		yes
Cedar Flats (holding for adults captured at Meadow Creek)	SCH					*							yes
Elderado Creek (Yoosa/Camp control)	SCH				*								yes
John's Creek (Mill Creek control)	SCH				*								yes
Tennile Creek (Newsome Creek control)	SCH				*								yes
Fish Creek (Boulder Creek control)	SCH				:*								yes
Brushy Fork (Warm Springs Creek control)	SCH				:*								yes
		768,000		8.29 (9.14)									

1. SuCh = Summer Chinook, FCH = Fall Chinook, SCH = Spring Chinook
2. Cp = Capture Adults, Bs = Hold Broodstock, Ic = Incubation, RrF = Rear Fry/Fingerlings, RrS = Rear Smolts, Ac = Acclimate Smolts, Rl = Release Site.
3. Combined Program for FCH and SCH: Overlap between incubation for FCH and SCH and overlap between rearing of SCH and acclimation of FCH.
4. GW = Groundwater, SW = Surface Water, U = Unlimited Supply, NA = Not Applicable.
5. Water information from NPT data, lowest flow measured over five years, 1990-95. North Lapwai Valley from USGS 1974-94.





Approximate Weight	Length
440/kg (200/lb) =	57 mm (2.28 in)
220/kg (100/lb) =	70 mm (2.80 in)
154/kg (70/lb) =	80 mm (3.20 in)
110/kg (50/lb) =	90 mm (3.60 in)
44/kg (20/lb) =	140 mm (5.60 in)



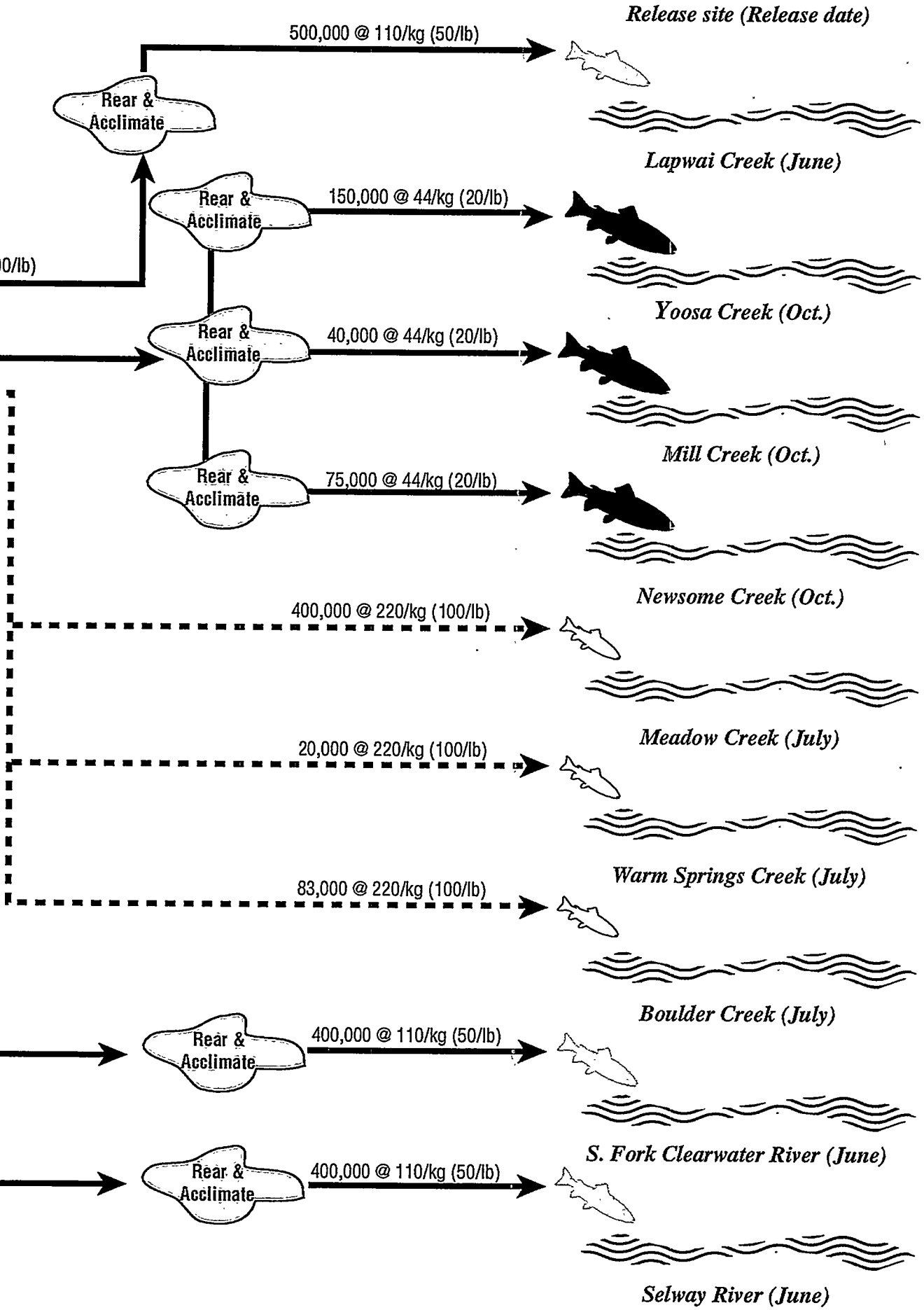


Figure 2-1
Incubation, Rearing, Acclimation, and Release Sites

The number of hatchery chinook released would be limited so that, when added to the number of wild chinook, the total would not exceed the amount of habitat available for that species. Each year, numbers for release would be recalculated, based on the results of the monitoring and evaluation program, to avoid exceeding the stream's ***carrying capacity***. All fish released would be marked with fin clips, coded wire tags, ***PIT tags***, visual implant tags or other forms of benign biological marks so that the hatchery fish can be distinguished from wild fish and the success of the program evaluated. Marking would also help track any fish that stray to other watersheds.

__Carrying Capacity__ refers to the maximum number or biomass of fish that could potentially be supported by a given habitat, as determined by prevailing physical, chemical, and biological conditions.

Several techniques such as temporary ***weirs***, traps and ***seines*** would be used to count and capture adult chinook salmon returning from the sea. Some adults would be used for broodstock; the remainder would be returned to the stream to be harvested or to reproduce naturally.

__A weir__ is a fence placed in a stream to capture or count fish. See Photo 9.

__A seine__ is a large fishing net with weights at the lower edge and floats at the top.

The actions proposed differ from traditional hatchery practices in the following ways:

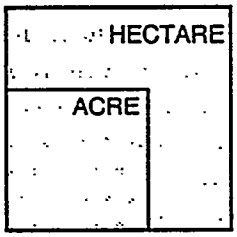
- Supplementation fish would be the offspring of cross-bred hatchery and wild adults in each generation.
- Spring chinook eggs would be incubated at ambient water temperatures to encourage natural rates of development.
- Fish would be reared in semi-natural ponds to increase survival in the environment. They would be conditioned by high velocity flows, exposure to natural feeds, minimal human contact and other elements of the natural environment.
- Fish would be released at different life stages to increase survival and minimize impacts to natural living fish.
- Fish would be released in several mainstem and tributary areas to establish spawning returns throughout the natural environment and optimize natural production.

2.1.1 NPTH Facility Description and Operations Summary

The Proposed Action has the components described in the following sections. Specifics about each of the sites, such as exact location of water source and discharge lines, orientation and location of ponds and housing facilities, location of temporary weirs and access road locations have not been developed. They will be determined when the final engineering designs are completed. At that time, more in-depth consultation will be required, specifically with the U.S. Forest Service, on development activities within National Forest lands.

Some proposed facilities may be changed or dropped if new information suggests modifications are required. The program is designed to be flexible and to allow changes over its life through adaptive management.

2.1.1.1 Cherrylane



Hectare: about two and one-half acres

The Cherrylane hatchery site is on a flat bench on the south bank of the Clearwater River about 32 km (20 miles) east of Lewiston and adjacent to Highway 12 (see Map 3 and Photo 1). The site is about 6 hectares (*ha*) (14 acres) and is used for agricultural production. The land is privately owned and the owners have signed contracts with BPA that secure a 3-year option for a 25-year renewable lease to develop a hatchery. This lease period is considered long enough to reestablish natural production to meet program goals and objectives and is renewable for additional periods.

Facilities Planned — Figure 2-2 shows a preliminary design for the Cherrylane hatchery. A hatchery building, water treatment facilities, rearing containers, effluent ponds, an operations and shop building, and two staff residences would be built on the site. The hatchery building would accommodate the spawning shelter, incubation room and early rearing area. The spawning shelter would be roofed with open sides and have receiving, fertilization and disinfection equipment. The incubation room would hold 66 double height ***Heath tray*** stacks and the early rearing area would contain rearing containers. Final design will provide stock isolation and quarantine sections in incubation and rearing.

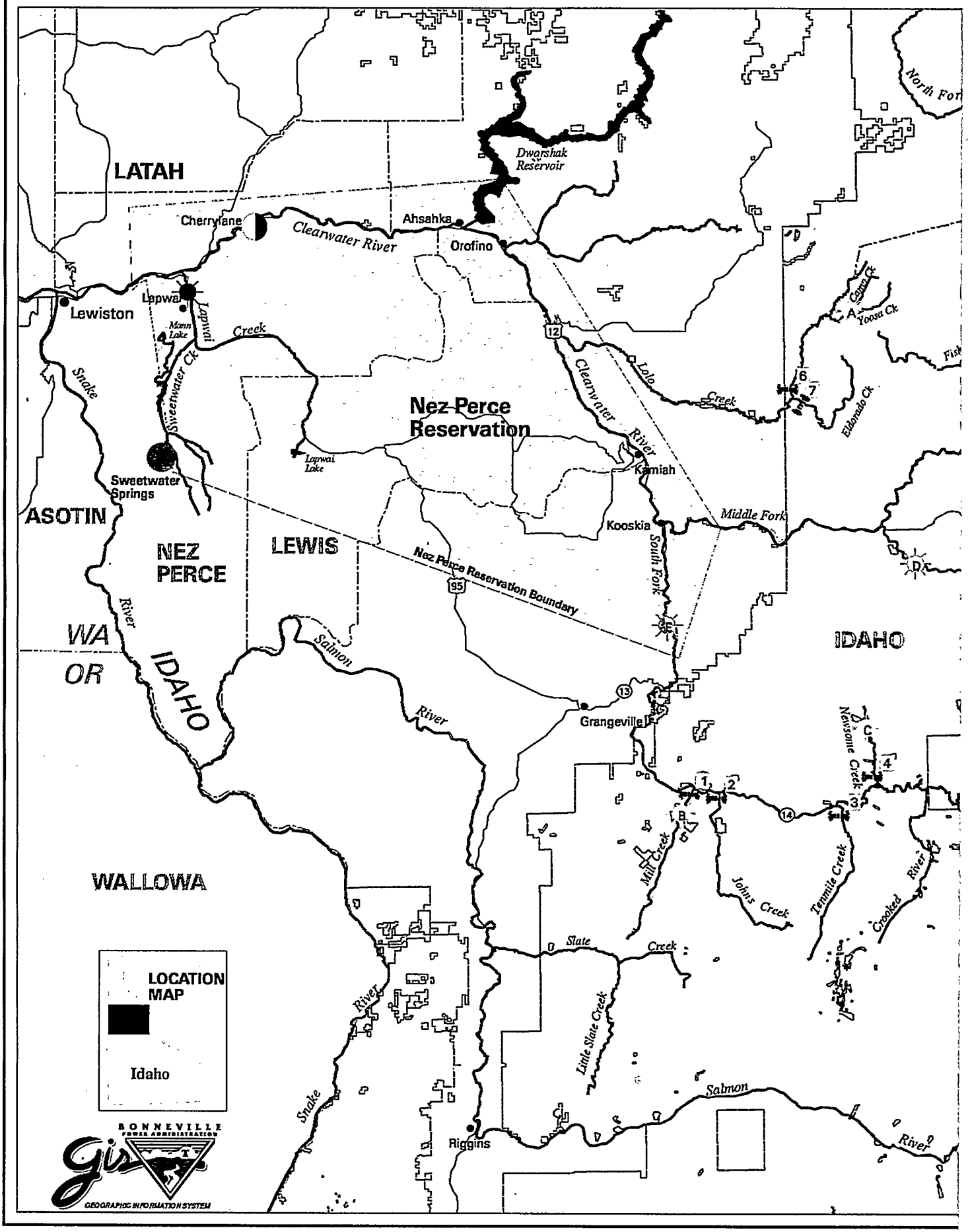
Heath Tray Stacks
A commercial incubation unit consisting of eight or sixteen trays stacked above each other. One to two female's eggs can be incubated in each tray. Stock segregation and isolation can be done in units of eight or sixteen trays.

Rearing containers, raceways, and ponds (circular or conventional) would be used to rear spring and fall chinook. Volume of space required for spring and fall chinook are 283 m^3 and 2181 m^3 (10,000 ft^3 and 77,000 ft^3), respectively. Chinook would be early reared in approximately 32 circular ponds/ raceway containers before being transferred to satellite facilities or directly released. Final rearing and release of 1,500,000 fall chinook would take place in on-site acclimation ponds.

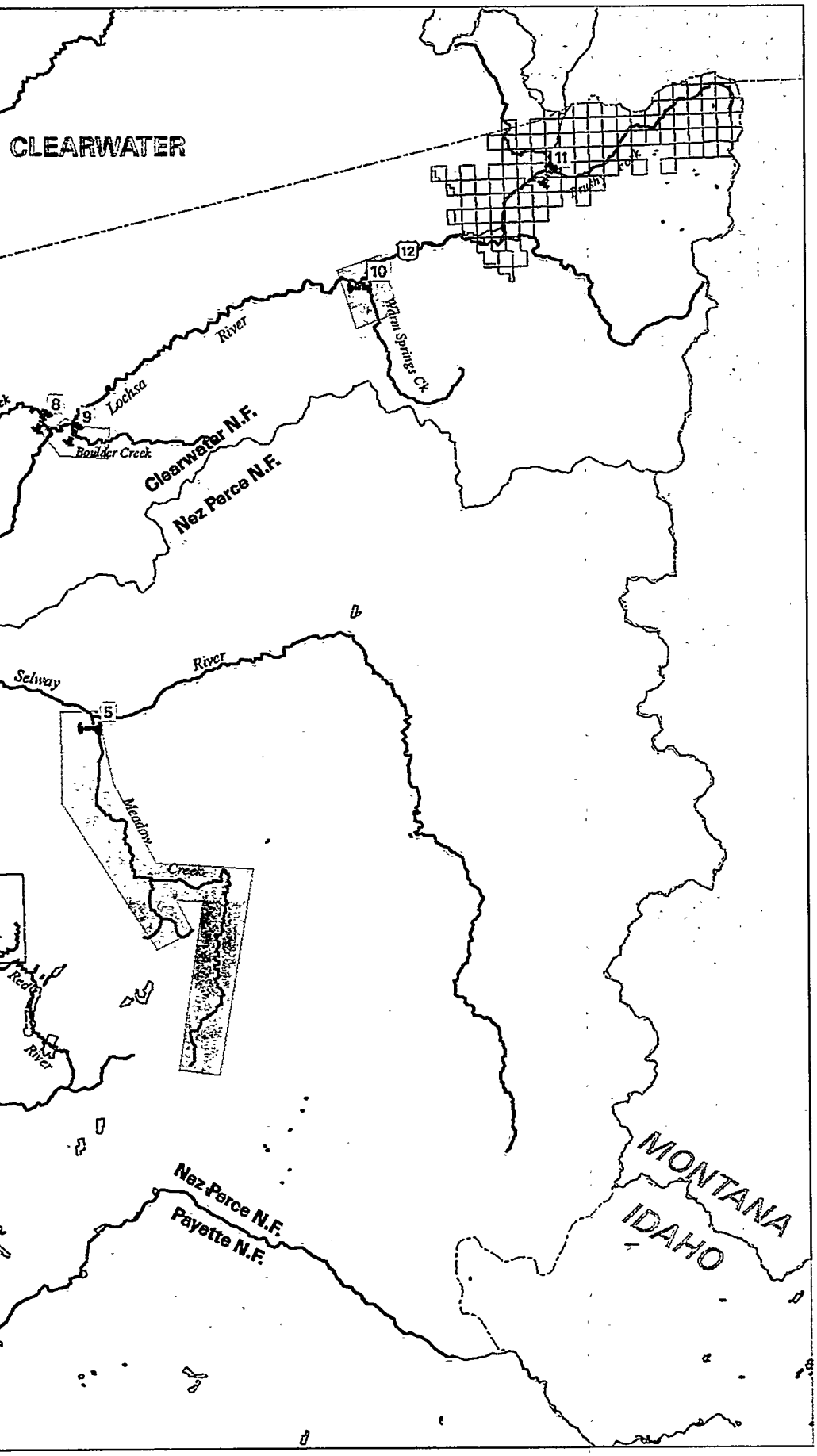
Precautions would be taken to prevent bird predation, provide shading and cover, provide acclimation flows to condition fish before release, and prevent and control diseases when they occur. A fishway or fish ladder would also allow fall chinook adults imprinted to hatchery discharge water to return to the hatchery.

The operations and shop building would have an office, day room, washrooms, feed storage, chemical storage, laboratory, vehicle and tool storage, and shop work areas. Staff residences would be single-family, frame construction patterned after similar hatchery residences used in the Northwest. The site would be fenced and resident personnel would provide around-the-clock security to the hatchery grounds.

NEZ PERCE TRIE



AL HATCHERY



LEGEND

INCUBATION & REARING FACILITIES

- Spring and Fall Chinook -Cherrylane
- Summer Chinook -Sweetwater Springs

SATELLITE FACILITIES

- Spring Chinook
  - A - Yoosa/Camp Creek
  - B - Mill Creek
  - C - Newsome Creek
- Summer Chinook
  - D - Cedar Flats
  - E - Luke's Gulch
- Fall Chinook
  - F -North Lapwai Valley

RELEASE SITES

- Spring Chinook direct release sites

WEIR SITES

Spring Chinook

1 - Mill Creek
2 - Johns Creek
3 - Tenmile Creek
4 - Newsome Creek
5 - Meadow Creek
6 - Lolo Creek
7 - Eldorado Creek
8 - Fish Creek
9 - Boulder Creek
10 - Warm Springs Creek
11 - Brushy Fork

- Reservation

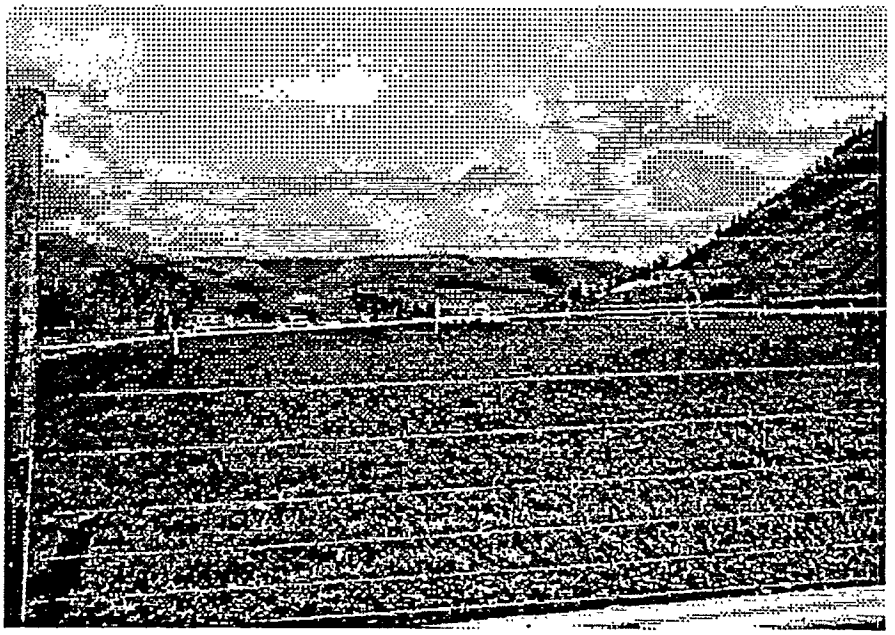
KILOMETERS
0 2 4 6 8 10

MILES
0 2 4 6 8 10

Map 3

Facilities and Release Sites

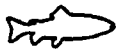
Photo 1
Cherrylane Site



Fish — About 768,000 spring and 2,000,000 fall chinook would be incubated and reared at Cherrylane. Beginning in August, spring chinook eggs would be received for incubation. Then in November and December, fall chinook eggs would be spawned, and their eggs incubated. Chinook eggs started at Cherrylane would be disinfected, fertilized and ***water hardened.*** Fish would be incubated in the hatchery building in Heath trays. Each incubator tray would contain only the eggs of one female as a precaution against disease. Following incubation, fingerlings would be reared in containers until they reach their target weight for final rearing at satellite facilities or direct release to streams.

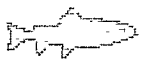
Water hardening *is the process of placing fertilized eggs in water so that the egg absorbs the water that accumulates in the space between the egg yolk and outer membrane.*

In February, about 500,000 fall chinook would be moved as fingerlings from the Cherrylane hatchery to the North Lapwai Valley satellite facility and reared and acclimated until release in May or June. The remaining 1,500,000 fall chinook would be moved to the acclimation ponds within Cherrylane itself. In May-June, about 265,000 of the spring chinook would be moved from the rearing containers to satellite facilities located on Yoosa/ Camp, Mill and Newsome creeks. In June, the remaining 503,000 spring chinook would be released directly into three streams (Boulder, Warm Springs, and Meadow creeks) to complete final rearing in a natural environment.

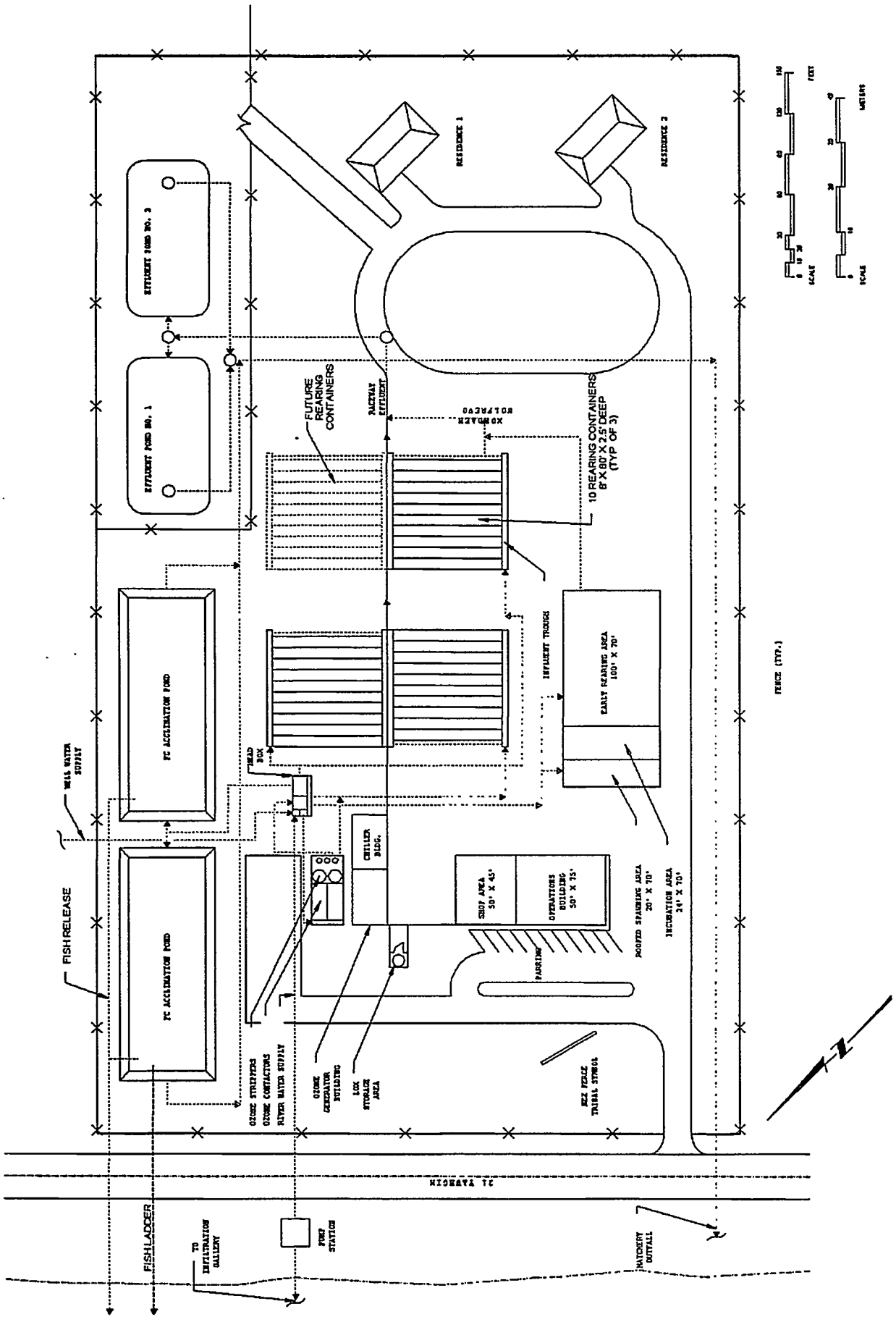


Fingerling

Also in June, the 1,500,000 fall chinook held on-site would be released from Cherrylane directly into the lower Clearwater River as subyearling smolts. The fall chinook would be released through a pipe from a collection area in the outdoor rearing ponds to a site in the river downstream of the water intake structure. Fish would be released in a controlled manner over an



Subyearling smolt



NEZ PERCE TRIBAL HATCHERY
CHERRYLANE CENTRAL INCUBATION AND REARING FACILITY
FACILITY LAYOUT
FIGURE 2-2

extended period of time to avoid short-term crowding, allow for some natural dispersal and to keep predators from concentrating in the release area.

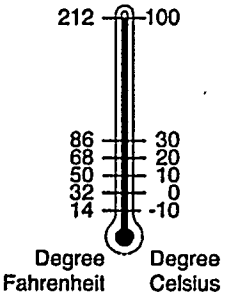
Adult fall chinook returning to the Clearwater River would be held at Cherrylane from September through December and spawned on-site. Approximately 1,020 adults would be needed for maximum egg take.

Water — The facility would require a maximum of 30.3 m^3/min (8,000 gpm) of water. Water would be supplied from two sources: wells and the Clearwater River. Incubation, early rearing and potable water would be obtained from two on-site wells. One well can produce 7.5 m^3/min (2,000 gpm); the other can produce 11.4 m^3/min (3,000 gpm) (Sprenke and Ralston, 1992). A river water supply of about 11.4 m^3/min (3,000 gpm) would also be developed. A river intake using a deep, screened pipe or ***infiltration gallery*** is recommended for cold weather. No dam or diversion structure would be used. Groundwater could be pumped to the river intake to keep ice from clogging the line.

Infiltration Gallery *A water collection structure located in the gravels beneath the riverbed which allows collection of silt-free water.*

Water sterilization using ***ozonation*** is planned to ensure water from the river is free from waterborne pathogens. The proposed ozone system would inject ozone gas in an oxygen feed source into the water supply from the river. Residual ozone control and dissolved gas control would be managed by a forced air degassing/air stripping column. Control would be maintained through dissolved ozone monitoring and automatic control over the output of the ozonator. All disinfection equipment would have redundant units with automatic switches to ensure that all surface water is disinfected and degassed prior to use.

Ozonation *is used to prevent diseases in juvenile fish prior to development of their immune systems which occurs after they become fingerling size. Hyperactivated oxygen, ozone (O_3), oxidizes any organic material including pathogens found in the water.*



Water temperatures would be carefully controlled to reduce infections that could occur prior to the development of fish immune systems and to control growth and development. Groundwater at Cherrylane facility is 17 degrees C (60-62 degrees F). While this water is warm, it provides a pathogen free water source for incubation and early rearing. Chillers would be used to control the water temperatures to about 3 degrees C (38 degrees F) when needed. Clean groundwater chilled and used in small amounts in recirculated incubation systems will provide environmental conditions that mimic those in each of the receiving satellite facilities or direct release areas.

In the event that additional growth is needed to adjust size at time of release or to treat certain diseases, the Cherrylane groundwater offers thermal advantages. Fall chinook will require an accelerated incubation and growth schedule to produce mature subyearling smolts in May and June. The warmer groundwater will be tempered by chillers or mixed with ozone sterilized river water to provide rapid growth.

Access and Utilities — The site is next to U.S. Highway 12. Power from Washington Water Power is available.

Waste — Two effluent settling ponds would be used to collect water when raceways are cleaned. Solids would be separated by two-hour gravity settling. Solids collected would be dried and applied to land or disposed of at an approved sanitary landfill. Liquid effluent would be discharged to the Clearwater River downstream of the hatchery's water intake. Fish carcasses would be disposed of at a landfill or could be used as fertilizer. A septic system would be provided for human wastes. Any chemicals used would be handled, applied and disposed of in accordance with state and federal regulations.

2.1.1.2 Sweetwater Springs

Sweetwater Springs is located approximately 20 km (12 miles) southeast of Lewiston, Idaho. The proposed hatchery site is on land owned by IDFG and would occupy about 1.6 ha (4 acres) of the total 6 ha (15 acres) of property. The site contains an existing hatchery building with a spring-fed source. It is a small, relatively flat shelf of land at the headwaters of the westernmost fork of Sweetwater Creek. See Photo 2. The spring is the principle water source for this fork of Sweetwater Creek, and the stream eventually enters a canal which supplies water to the Lewiston Orchards Irrigation District Reservoir, Mann's Lake.

The IDFG used Sweetwater Springs as an incubation station for spring chinook during the 1970s. When the IDFG ceased operations at Sweetwater Springs, the original 12 m x 24 m (18' x 40') metal building and a variety of equipment was left in place.

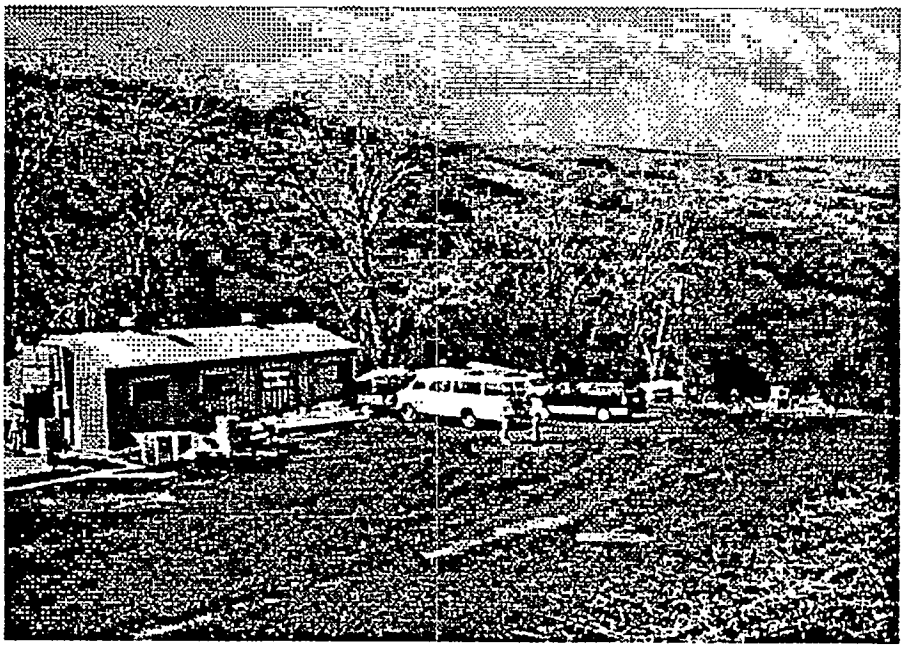
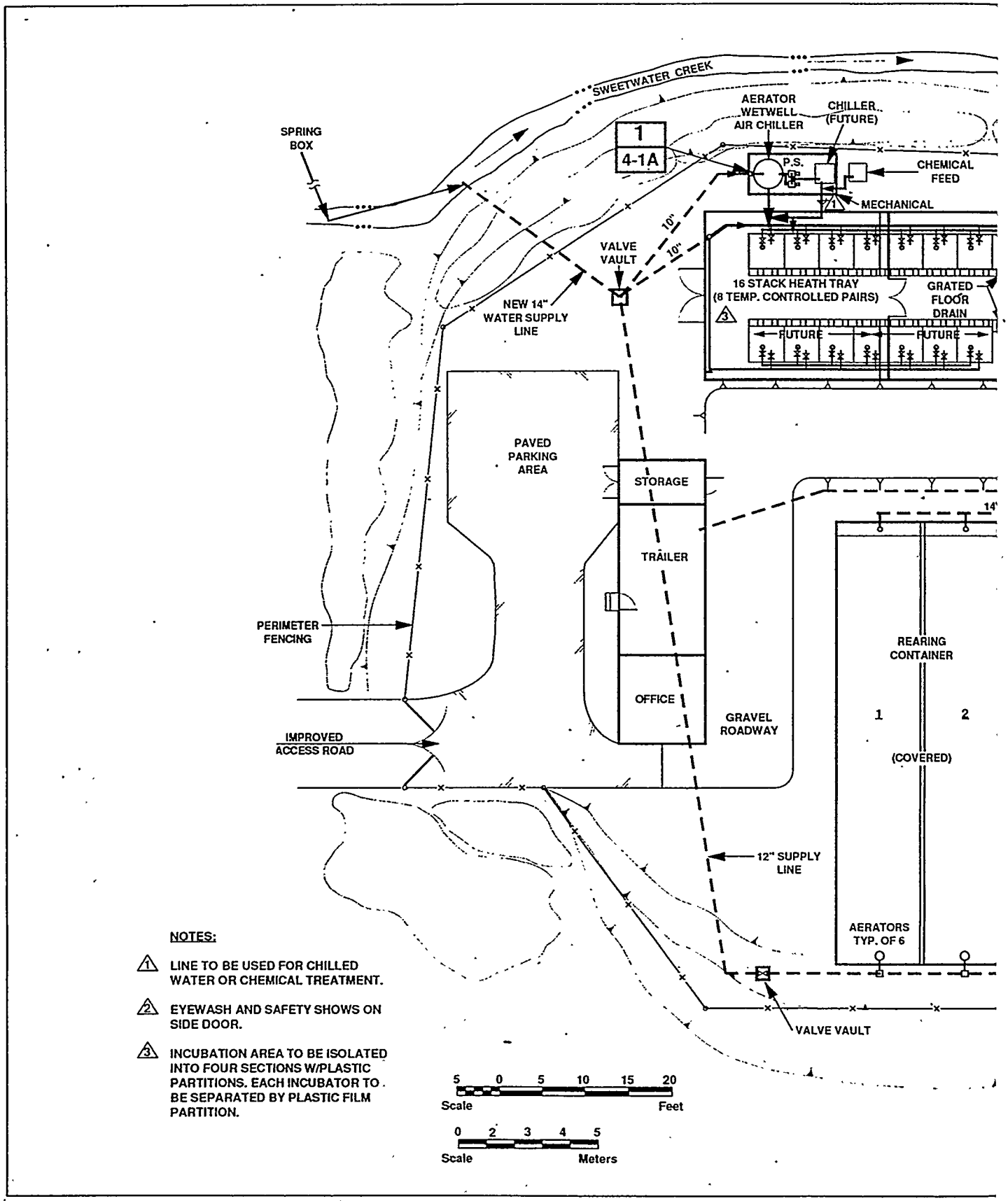
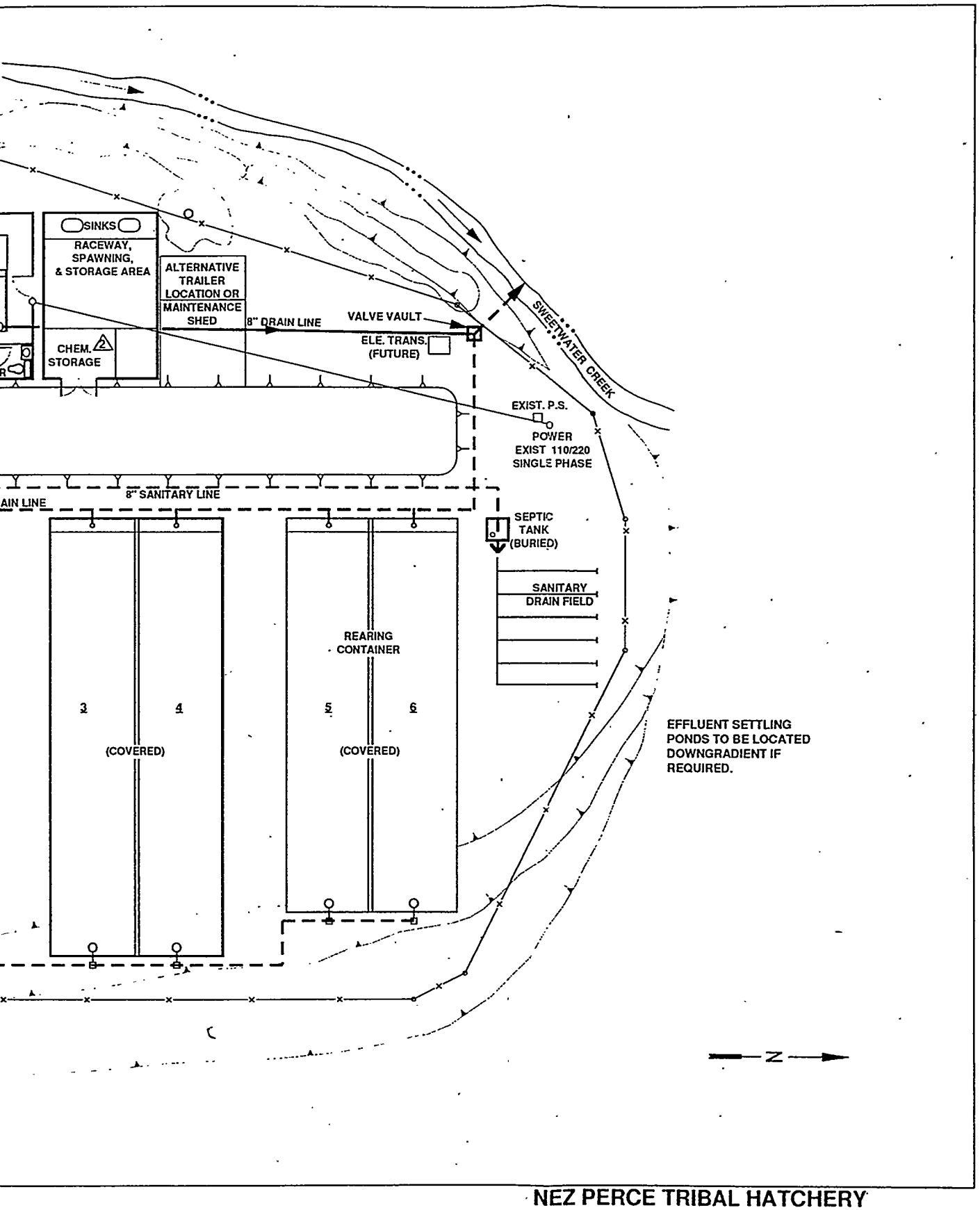


Photo 2
Sweetwater Springs Site



NOTES:

1. LINE TO BE USED FOR CHILLED WATER OR CHEMICAL TREATMENT.
2. EYEWASH AND SAFETY SHOWS ON SIDE DOOR.
3. INCUBATION AREA TO BE ISOLATED INTO FOUR SECTIONS W/PLASTIC PARTITIONS. EACH INCUBATOR TO BE SEPARATED BY PLASTIC FILM PARTITION.



NEZ PERCE TRIBAL HATCHERY
SWEETWATER SPRINGS HATCHERY SITE PLAN
CONCEPTUAL FACILITY LAYOUT
FIGURE 2-3

In 1994, the IDFG gave the Nez Perce Tribe permission to improve the site and use it to rear spring chinook. In 1994 and 1995, the Tribe made a number of improvements to the original facilities including adding a new 305 mm (12- inch) water supply pipeline and flow control valve assembly to supplement the old 150 mm (6-inch) pipeline, and installing borrowed temporary rearing tanks. With these improvements the Tribe incubated, reared and outplanted approximately 435,000 Rapid River spring chinook in 1994 and 600,000 Cascade Hatchery stock coho salmon in 1995.

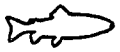
BPA is negotiating with IDFG to purchase the site.

Facilities Planned — While it has been possible to use the existing facilities temporarily, improvements would be needed to meet NPTH production goals. Facility improvements include upgrading the water supply and distribution system, installing an incubation water chilling system, new isolation incubation units, rearing containers, staff housing, and storage, lab, and equipment space. (See Figure 2-3.)

Because of its cool, spring water source, Sweetwater Springs has the potential to serve as a backup facility for the Cherrylane hatchery or as an advanced rearing or adult holding facility. It would be designed with flexibility to function in different roles. It would have rearing containers to raise young fish and hold a limited number of adult broodstock for extended periods. Multiple containers would be used to isolate different fish stocks. Forty-five cubic meters (1,600 ft^3) of space would be allocated to hold broodstock and 181 m^3 (6,400 ft^3) of space would be used for rearing fry. Containers would be permanently covered and screened to prevent birds from eating the fish.

No permanent residences would be built for the hatchery. Two or more small house trailers would be placed on concrete pads near the existing building. Electrical services would be provided. Bottled water would be used for domestic purposes. A new on-site septic tank and drainfield would be provided for wastewater service.

Fish — The principal production planned at Sweetwater Springs is to incubate and rear about 800,000 summer chinook. During Phase I, eyed-eggs would be imported to Sweetwater Springs in October to begin incubation. After hatching, fry would be early-reared at the site. In February, 400,000 fish reared to fingerlings at 440 fish/kg (200 fish/lb) would be transferred to the Luke's Gulch satellite facility. In April, the remaining 400,000 summer chinook would be moved to the Cedar Flats satellite facility when they are about 154 fish/kg (70 fish/lb).



Fingerling

Water — The water supply originates from within a large concrete spring box that collects water from a hillside spring. The spring box prevents contaminants from entering a pipeline that flows directly to the hatchery. An estimated 3.4 m^3/min (900 gpm) water supply can be developed with improvements. Water temperature varies

between 9-10 degrees C (48-50 degrees F) year-round. Water quality is suitable for rearing fish without treatment. Future improvements include enhancing access and security of the spring cistern, stabilizing the new pipeline, replacing the old pipeline, installing a new hatchery supply headbox (minor storage prior to distribution), adding aeration/chilling equipment, and installing a distribution system leading to and from incubation and rearing containers. Diverted water would be returned to the creek.

Access and Utilities — The Waha Highway leads south from Lewiston, Idaho to within 3 km (2 miles) of Sweetwater Springs. Final access is by a Nez Perce County-maintained gravel road and a private gravel road 0.8 km (0.5 mile) long. While access has been maintained during the 1994 and 1995 winters, the access road would need to be partially relocated and resurfaced with gravel to provide more secure seasonal access. Existing electrical utilities at the site would need to be upgraded from 220 volt single phase power to three phase 440-460 volt power. Phone service and sanitary sewer are already provided at the site.

Waste — Effluent settling ponds are unnecessary because a limited mass of fish would be reared at the site. Except for limited starter food programs, little fish waste would be discharged. Rearing containers would be cleaned at the end of each rearing cycle. Solids collected would be dried and applied to land or disposed of at an approved sanitary landfill. Liquid effluent from the incubation and rearing units would be directed back to Sweetwater Creek. Any chemicals used would be handled, applied and disposed of in accordance with state and federal regulations.

2.1.2 Satellite Facilities

Six satellite facilities would be developed to acclimate and release young fish, and to capture and hold returning adult broodstock. (See Map 3.) The extended rearing period and acclimation at the satellite facilities is designed to ensure juvenile imprinting and adult return to river reaches associated with the satellites. Adults returning to satellites would be trapped by weirs or small fish ladders at their outfall.

The basic facility includes the following components: water intake(s), water transfer pipeline, juvenile rearing ponds, adult holding ponds, water outfall line, personnel living quarters (trailer), and fish food storage. Facilities would be developed as close to streams as possible, usually within 50 m (165 ft), of the streambank. Site reclamation and landscape planning would be part of each site plan. The existing character of each area would be maintained as much as possible.

Specific components for each site are described in this section.

2.1.2.1 Luke's Gulch

Tribal land is collectively owned by the Nez Perce Tribal Government.

Luke's Gulch is on a flat bench above the South Fork Clearwater River upstream from Kooskia at River KM 13 (Mile 8). The site is forested and is ***tribal land.*** See Photo 3.

Facilities Planned — Site development will encompass approximately 1.2 ha (3 acres). The pond at Luke's Gulch would rear, acclimate, and release juveniles and hold and spawn adults that return to the satellite. The design for the pond has not been chosen, but it could be reinforced concrete with vertical or sloped sides, asphalt with sloped sides, earthen lined, or a membrane with sloped sides. Reinforced concrete ponds are expensive, smooth membrane-lined ponds can be a safety hazard, and unlined earthen ponds are difficult to clean. A textured membrane with side slopes of 4:1 would be easy to maintain and would allow safe access to the pond for workers. See Figure 2-4.

Whatever the final design, the pond would provide about 650 m^3 (23,000 ft^3) of space. A center channel would have removable fiberglass pickets so that adults could be held and sorted separately. The discharge structure for the ponds would be on the opposite end from the water supply and would have screens and stop logs to allow fish to leave the pond on their own. A bottom discharge would be provided to flush fish. A small fishway or ladder would be built from the pond outlet to the river to capture adult fish when they return to spawn and as a release channel for juveniles.

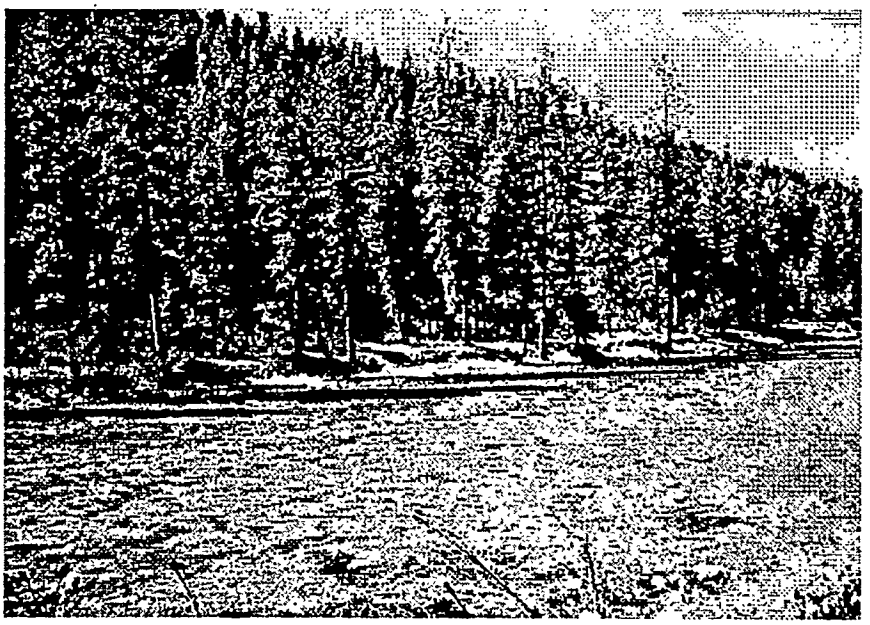
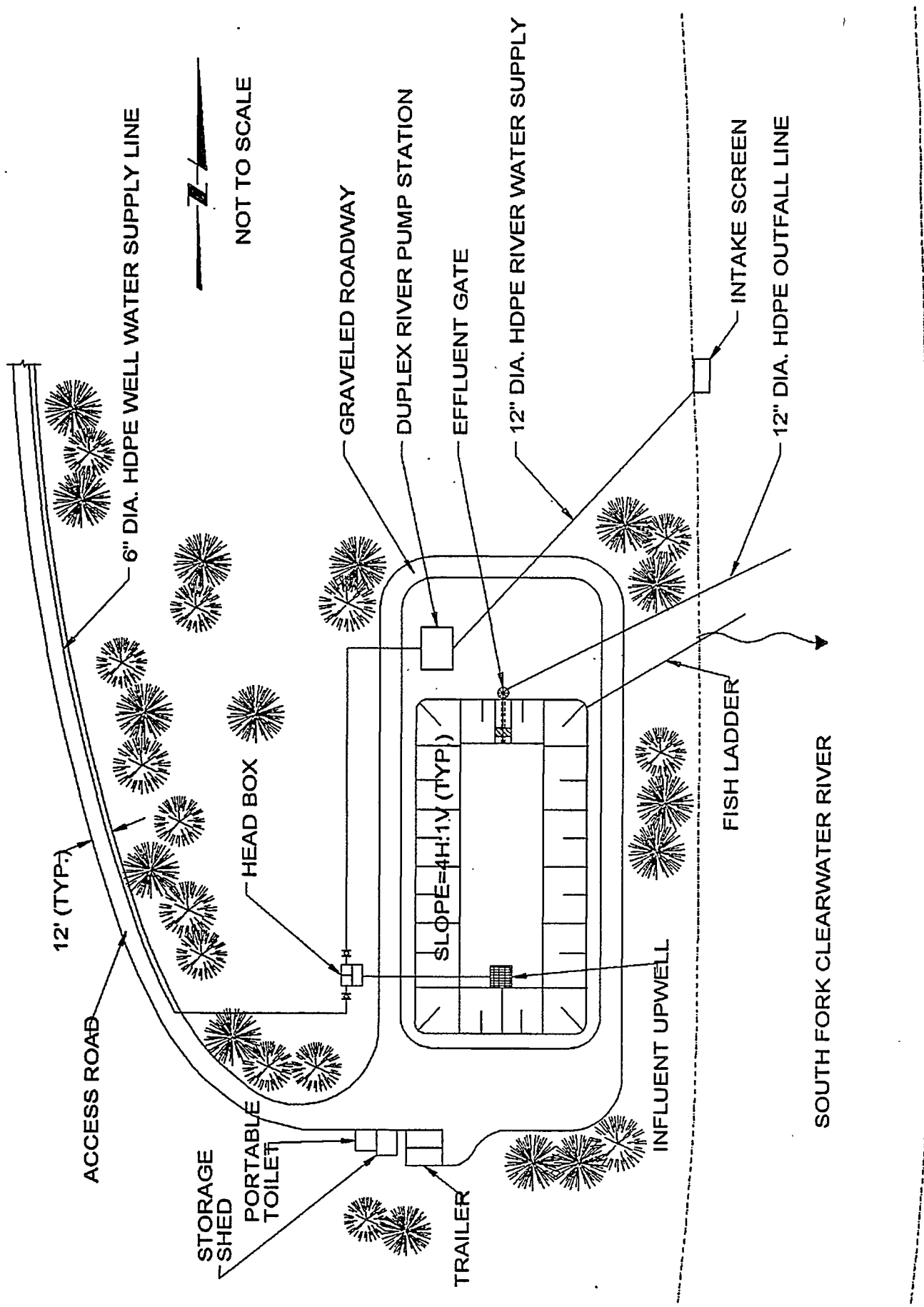


Photo 3
Luke's Gulch Site



NEZ PERCE TRIBAL HATCHERY
LUKE'S GULCH SATELLITE FACILITY CONCEPTUAL LAYOUT
FIGURE 2-4

One trailer would be provided for staff. The trailer would be placed on a concrete pad, about 6 m x 6 m (20' x 20'). The trailer would have water, on-site wastewater containment, telephone and electricity. Potable water and portable waste water facilities would be provided.

Fingerling

Subyearling smolt

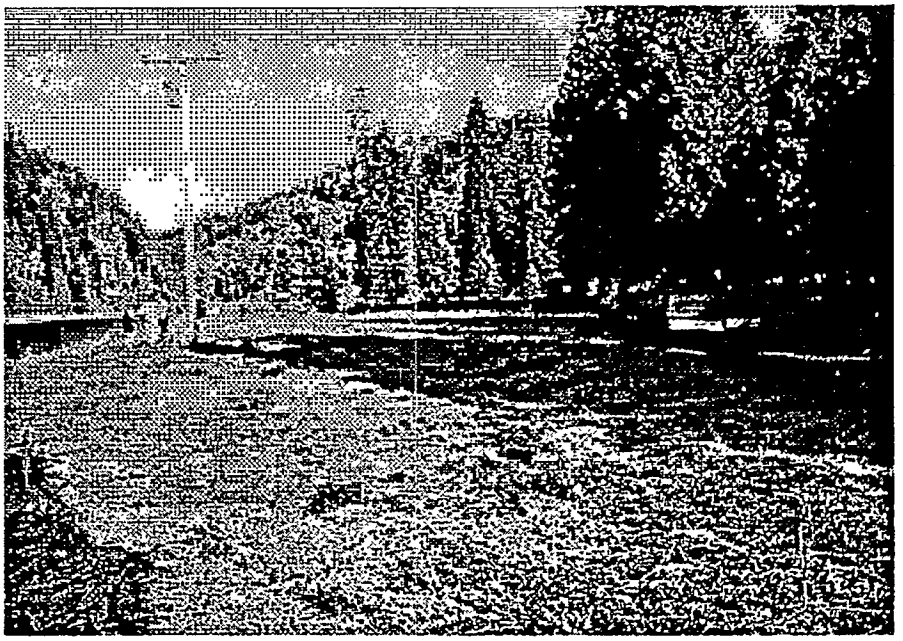
Fish — In February, the Luke's Gulch satellite facility would receive about 400,000 summer chinook fingerlings at 440 fish/kg (200 fish/lb) from the Sweetwater Springs hatchery. The fingerlings would be reared through June and released into the South Fork Clearwater River when they are at 110 fish/kg (50 fish/lb). Returning adults would be captured or induced to return by the fishway into the pond. They would be held from July through October and spawned on-site. Two hundred-seventy-two adults would be needed for maximum egg take from this site.

Water — To rear the fish proposed for this satellite would require 7.9 m^3/min (2,100 gpm) of water. A combination of well and river water would be used to rear fish. Two wells have been developed at the site that supply a total of 1.7 m^3/min (450 gpm) at 17 degrees C (62 degrees F) (Ralston and Sprenke, 1992). Well water would be the initial water source. Later, river water would be gradually mixed and exchanged for groundwater to imprint and acclimate the fish to this river area. A 6.2 m^3/min (1,650 gpm) river water intake would be developed. Water would be pumped from a screened intake to the holding pond inlet structure. The inlet structure would provide a gravity supply to the rearing/adult holding ponds. A combination of groundwater and river water would be used as an attractant for adults and to moderate holding pond temperatures. Water quality and supply are adequate for the program.

Access and Utilities — A paved highway at Stites, Idaho, ends about 8 km (5 miles) from the site. From the paved road a gravel county road leads to within 0.8 km (0.5 mile) of the site. About 0.8 km of old and new gravelled road would be developed to provide year-round access to the site. Electrical power and telephone service are available near the site.

Waste — Effluent settling ponds are unnecessary because a limited mass of fish would be reared at the site. Except for limited starter food programs, little fish waste would be discharged. Liquid effluent from the rearing units would be discharged back to the river. Rearing containers would be cleaned at the end of each rearing cycle. Solids collected would be dried and applied to land or disposed of at an approved sanitary landfill. Any chemicals used would be handled, applied and disposed of in accordance with state and federal regulations. Fish carcasses would be disposed of at a landfill or could be used as fertilizer. The staff trailer would have on-site waste containment facilities that would be periodically pumped out by a licensed contractor and disposed of at a local sewage treatment plant.

Photo 4
Cedar Flats Site



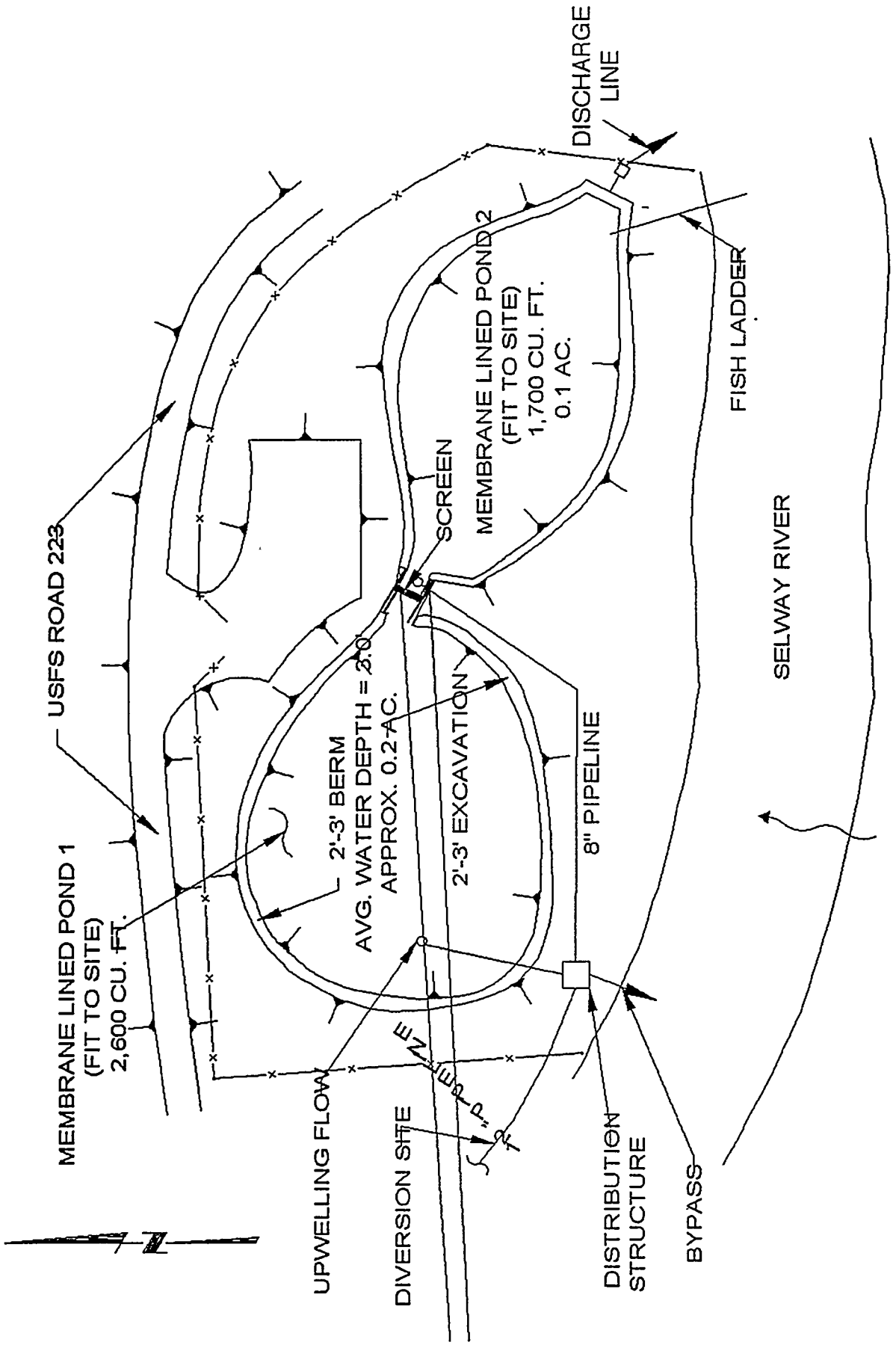
2.1.2.2 Cedar Flats

Cedar Flats is a developed site about 1.6 km (1 mile) immediately east of the USFS Selway District Ranger Station. The site is on a flat bench next to the Selway River at River KM 8 (Mile 5) in part of an old Job Corps facility being used by the USFS. The site has an existing water supply intake, wastewater treatment facility, power and other necessary utilities. See Photo 4.

Facilities Planned — Site development will encompass approximately 1.2 ha (3 acres) of land. A new river water intake, acclimation holding ponds and working facilities would be needed. See Figure 2-5. The facility would use the old pump house at the site but its infiltration line would need to be enlarged.

The portion of the Selway River that flows past the site is designated a *Recreational River* in the Wild and Scenic Rivers System. The facilities planned would be designed with the USFS to blend with other existing uses and not conflict with seasonal float boaters.

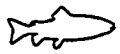
A lined pond(s) would provide 736 m^3 (26,000 ft^3) of space. The pond would be designed to be visually compatible with the existing environment. The head box and discharge structure would be cast-in-place concrete and the pond would be lined with a textured membrane. The pond would have an outlet pipeline, channel or other means to release fish and a small fishway to allow adults to return to the site.



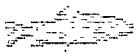
NEZ PERCE TRIBAL HATCHERY
CEDAR FLATS SATELLITE FACILITY CONCEPTUAL LAYOUT
FIGURE 2-5

A trailer for staff and temporary storage units would be located at the trailer court nearby.

Fish — In April, the Cedar Flats satellite facility would receive about 400,000 summer chinook fingerlings (154 fish/kg [70 fish/lb]) from Sweetwater Springs. They would be received at a later date and larger size than those going to Luke's Gulch because only cold river water (7 degrees C [45 degrees F]) is available at the site. The fingerlings would be reared through early June and released at 110 fish/kg (50 fish/lb) into the Selway River. Fish would be released through an outlet pipe or other structure and would be paced to avoid a buildup of fish in the area and to enhance dispersal. The pond would have a small fishway to capture adult fish that are induced to return to spawn. Hatchery managers would use a unique chemical odor or other means to imprint juvenile fish so they will return to the facility as adults.



Fingerling



Subyearling smolt

Beginning in May, adult spring chinook captured at the Meadow Creek weir would be transported down to the ponds at Cedar Flats. Approximately 405 spring chinook would be held there through spawning in September. The broodstock would provide the eggs needed for production at Meadow Creek, Warms Springs Creek and Boulder Creek and the fish would be spawned on-site.

In June, summer chinook adults would be returning to the Selway River. Adults captured from the river and those returning directly to the facility by the fishway would be held in the ponds from June through October and spawned on site. Two hundred seventy-two adults would be needed for maximum egg take.

Water — The existing water supply for USFS facilities cannot provide enough water (10.2 m^3/min [2,700 gpm]) to rear the fingerlings and hold the adults. The method to obtain sufficient water for the satellite has not been chosen. Options for obtaining the required flow rate include the following:

- Extend or replace the existing infiltration gallery farther out under the river bed. A minimum of 46 m (150 ft) of added perforated pipe would be necessary beneath the river. Extensions would be multiple laterals perpendicular to the river, or one extension parallel to the river tied into the existing system.
- Extend the infiltration gallery farther out into the river and install an intake structure in the river.
- Replace the existing infiltration gallery with a new infiltration gallery parallel to the river. The new system would need to be as close to the river as possible and at least 61 m (200 ft) long.
- Install multiple production wells next to the river.

Access and Utilities — The proposed site is between the Selway Ranger District office wastewater treatment facilities and the water supply intake pump station. The site was last improved as part of the Jobs Corps facility. Access to the site is by developed dirt road off Forest Service Road 223. The access road needs to be graded and gravelled.

Electrical power for the maintenance site, lighting, and pumping is available from both single and three-phase sources servicing the river intake pump station and wastewater treatment plant. Standby emergency power would be provided during the operating period for the intake station to supply water to the ponds.

Telephone lines are available nearby.

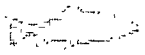
Waste — Effluent settling ponds are unnecessary because a limited mass of fish would be reared at the site. Except for limited starter food programs, little fish waste would be discharged. Liquid effluent from the rearing units would be discharged back to the river. Rearing containers would be cleaned at the end of each rearing cycle. Solids collected would be dried and applied to land or disposed of at an approved sanitary landfill. Any chemicals used would be handled, applied and disposed of in accordance with state and federal regulations. Fish carcasses would be disposed of at a landfill or could be used as fertilizer. The existing wastewater treatment facility operated by the USFS would be used for domestic wastewater.

2.1.2.3 North Lapwai Valley

The North Lapwai Valley site is an alfalfa field on the west bank of Lapwai Creek about 1.6 km (0.8 mile) upstream from its mouth at the Clearwater River (River Mile 12). The flat, 10 ha (25 acre) site is owned by the Nez Perce Tribe. Less than 1.2 ha (3 acres) would be required for the satellite facility. See Photo 5.

Facilities Planned — The rearing pond(s) would be similar to the design used at Luke's Gulch and would provide 780 m^3 (26,000 ft^3) of space. The site is close to the town of Lapwai, so no permanent on-site housing is planned. Workers would use a small trailer while fish are being reared. The site would be fenced to provide security. See Figure 2-6.

Fingerling



Subyearling smolt

Fish — In February, this satellite facility would receive about 500,000 fall chinook fingerlings at 440 fish/kg (200 fish/lb) from Cherrylane. Fish would be reared through June and released at 110 fish/kg (50 fish/lb) through a pipeline, channel or other structure into Lapwai Creek. Beginning in late September, returning adult fall chinook would be captured by a temporary weir at the facility site. After capture, adults would be placed in

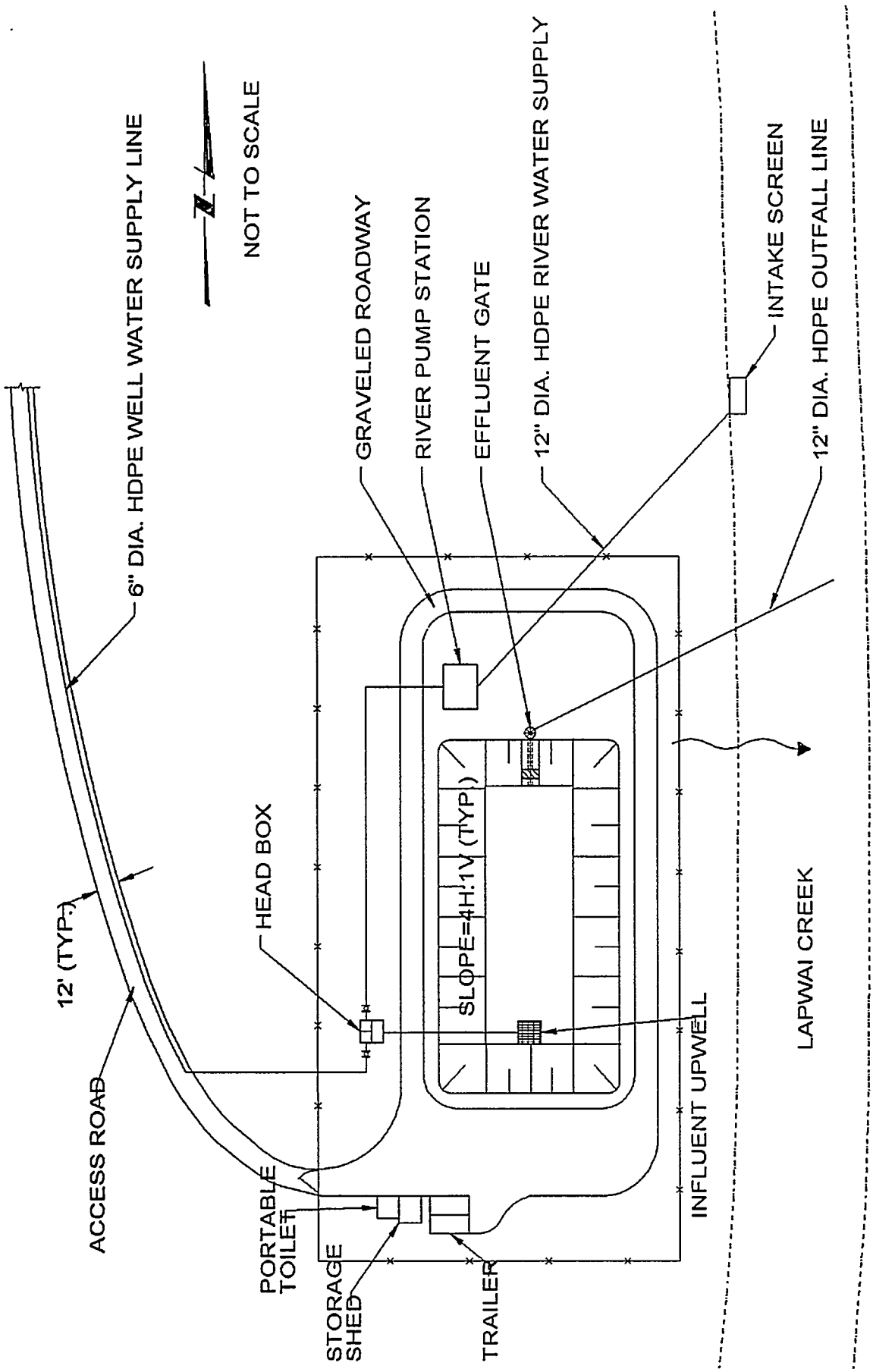
Photo 5
North Lapwai Valley Site

containers, transported to Cherrylane where they would be held in ponds until mature, and then spawned. Three hundred-forty adults are needed for maximum egg take at this site.

Water — The maximum quantity required at this site is 8.3 m^3/min (2,200 gpm). Ground and surface water would be used. Initially, well water would be used for rearing. Later, water from Lapwai Creek would be mixed with groundwater to imprint and acclimate fish to this area and to moderate the water temperature. Approximately 5.8 m^3/min (1,530 gpm) of surface water will be needed for maximum production during late May and June.

Access and Utilities — The site is next to U.S. Highway 95. A gravel county road leads into the site; about 152 m (500 ft) of gravel road would need to be developed. Electrical and telephone utilities are available.

Waste — No sanitary sewer system would be developed at the site. Portable construction-type domestic wastewater facilities would be maintained by a commercial vendor during periods of construction and seasonal operations. Effluent settling ponds are unnecessary because a limited mass of fish would be reared at the site. Except for limited starter food programs, little fish waste would be discharged. Liquid effluent from the rearing units would be discharged back to the creek. Rearing containers would be cleaned at the end of each rearing cycle. Solids collected would be dried and applied to land or disposed of at an approved sanitary landfill. Any chemicals used would be handled, applied and disposed of in accordance with state and federal regulations.

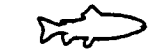


NEZ PERCE TRIBAL HATCHERY
NORTH LAPWAI VALLEY SATELLITE FACILITY CONCEPTUAL LAYOUT
FIGURE 2-6

2.1.2.4 Yoosa/Camp Creek

The Yoosa/Camp Creek site is next to U.S. Forest Service Road No. 103, southwest of the Musselshell Camp in the Clearwater National Forest. The site is located in a stand of cedar and pine on the western bank of Yoosa Creek about 10 m (33 ft) downstream of the confluence of Yoosa and Camp creeks. Yoosa Creek flows into Lolo Creek at stream km 72 (Mile 45). See Photo No. 6.

Facilities Planned — The satellite facility would require 0.8 ha (2 acres) of development. Total pond volume needed is 425 m^3 (15,000 ft^3); (368 m^3 [13,000 ft^3] for acclimation and 57 m^3 [2,000 ft^3] for holding broodstock). Ponds with irregular shapes are planned to conform with the site and to avoid removing large trees. Some excavation would be done, but most of the ponds would be made using fill material. The fill material would be stabilized with vegetation or other materials after construction. A house trailer would be provided for seasonal workers. See Figure 2-7.



Fingerling

Presmolt

Fish — In May, about 150,000 spring chinook fingerlings from Cherrylane at 440 fish/kg (200 fish/lb) would be brought to this site. The fish would be acclimated for an early October release before the onset of winter. When the fish are at 44 fish/kg (20 fish/lb), they would be allowed to exit on their own into Yoosa Creek through a pipeline, channel or other structure. The site would also be used to hold returning adults captured at the Lolo Creek weir site. Adults

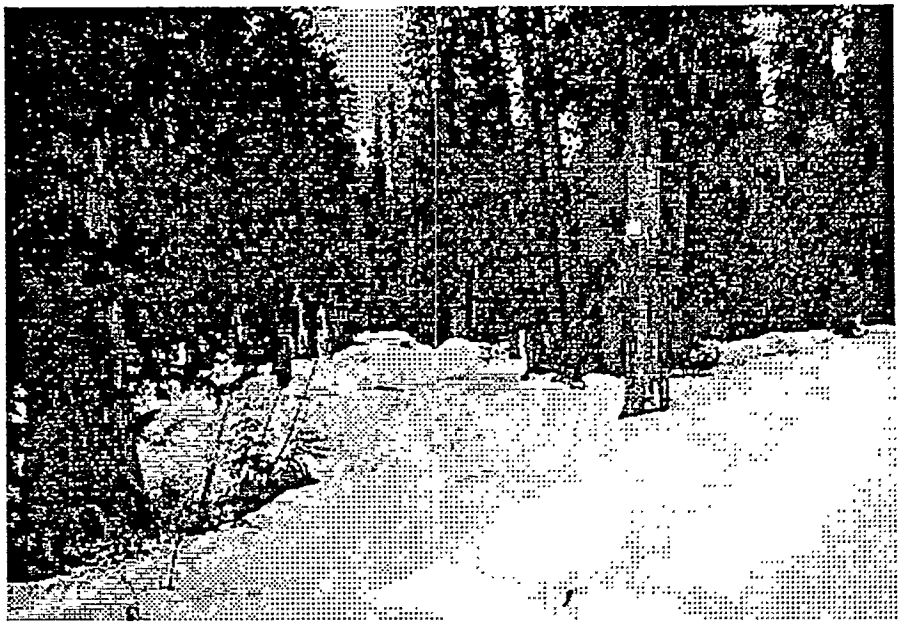
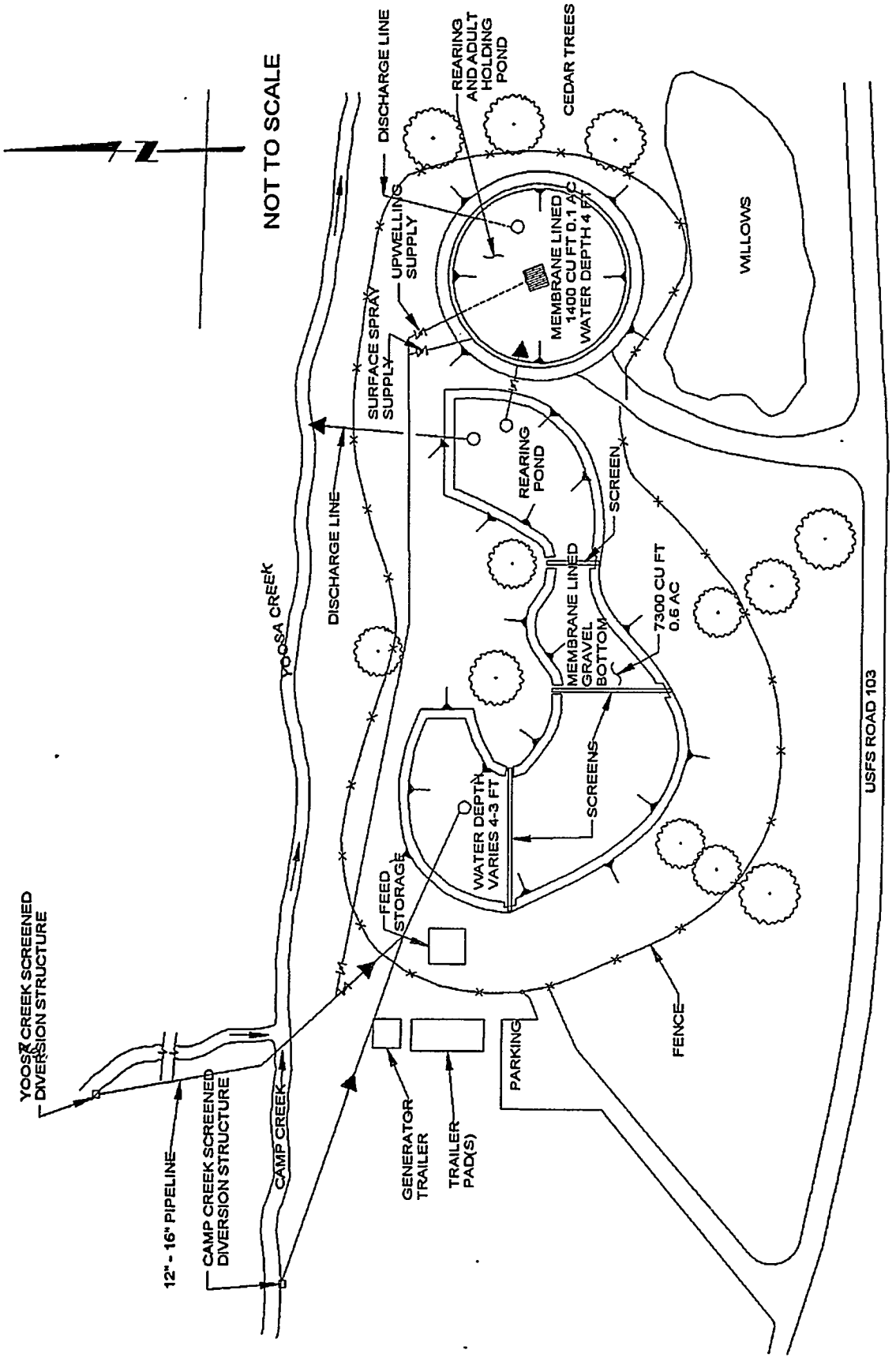


Photo 6
Yoosa/Camp Creek Site



NEZ PERCE TRIBAL HATCHERY
YOOSA/CAMP CREEK SATELLITE FACILITY CONCEPTUAL LAYOUT
FIGURE 2-7

would be held from May through September and spawned on-site. One hundred thirty-six spring chinook are needed for maximum egg take.

Water — All water for this site would be diverted from surface flows from both creeks through a low pressure line to a headbox. The maximum flow required at this site is estimated at 3.8 m^3/min (1,000 gpm). Minimum instream flows measured at the site are 11.5 m^3/min (3,050 gpm). Sufficient flow exists to meet the needs for the site. No more than one half of either creek would be diverted for rearing purposes so as not to adversely impact the instream habitat.

Access and Utilities — A portable generator would provide power. Communications would be by radio if a suitable relay station is found. Potable water would be brought to the site to support seasonal (May through October) staff living in small house trailers. On-site graveled road access would be developed off USFS Road No. 103. Due to weight limitations on paved forest roads in the months of May and June (to avoid road damage), alternate routes may be proposed to transfer the fingerlings to the satellite facility. The Tribe would obtain a special use permit from the USFS for the trailer and would agree to comply with the requirements on that permit, including removing the trailer following the completion of the program.

Waste — No sanitary sewer system would be developed at the site. Portable construction-type domestic wastewater facilities would be maintained by a commercial vendor during periods of construction and seasonal operations. Effluent settling ponds are unnecessary because a limited mass of fish would be reared at the site. Except for limited starter food programs, little fish waste would be discharged. Liquid effluent would be discharged to the creek. Rearing containers would be cleaned at the end of each rearing cycle. Solids collected would be dried and applied to land or disposed of at an approved sanitary landfill. Any chemicals used would be handled, applied and disposed of in accordance with state and federal regulations. Fish carcasses would be disposed of at a landfill or could be used as fertilizer.

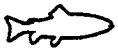
2.1.2.5 Mill Creek

The Mill Creek site is next to U.S. Forest Service Road No. 309, Hungry Ridge Road, between the west bank of Mill Creek and the road. The site is a forested inclined bench less than 100 m (330 ft) wide, next to Mill Creek, about 3.2 km (2 miles) upstream of its confluence with the South Fork Clearwater River. See Photo No. 7.

Facilities Planned — Facilities development would affect approximately 0.8 ha (2 acres) of land. Due to the small size and limited production (40,000 presmolts) at this site, portable type

Photo 7
Mill Creek Site

containers may be used. Two ponds, a juvenile pond and an adult pond would hold the fish. Juvenile pond size would be about 112 m^3 (4,000 ft^3). The adult pond size would be about 11 m^3 (400 ft^3). Personnel would be housed seasonally in a small trailer from May through October. This would provide security at the site. See Figure 2-8.



Fingerling

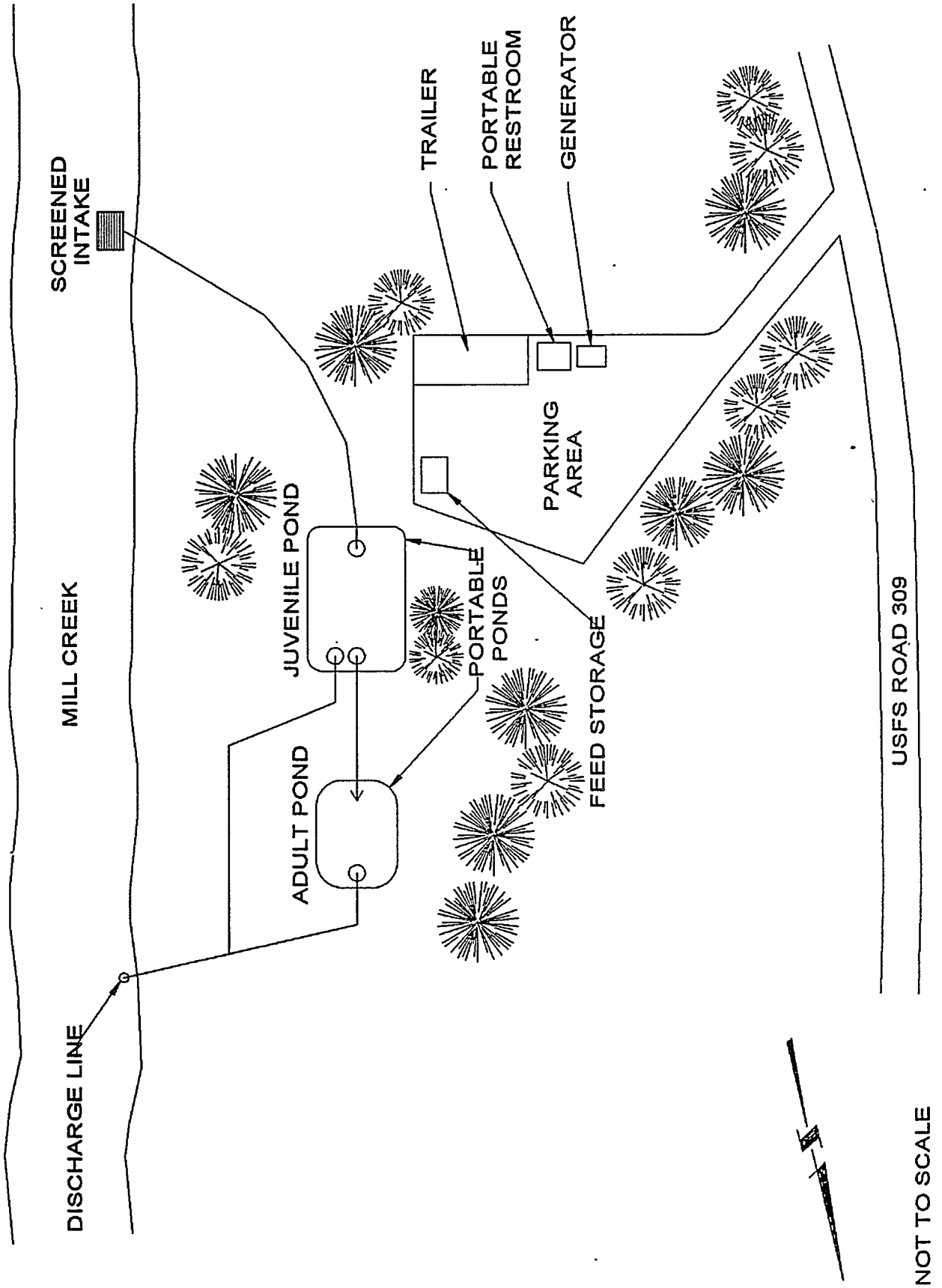
Presmolt

Fish — In May, about 40,000 spring chinook fingerlings at 440 fish/kg (200 fish/lb) would be brought from Cherrylane for rearing through October. In October, presmolts at 44 fish/kg (20 fish/lb) would exit on their own into Mill Creek through a pipeline. Beginning in May, adult spring chinook returning to Mill Creek would be trapped in a temporary weir and held in ponds until spawned. Thirty-six spring chinook are needed for maximum egg take.

Water — Water taken from Mill Creek would flow by gravity and supply up to 1.1 m^3/min (300 gpm) to ponds. Minimum instream flows measured at the site are 10.7 m^3/min (2,828 gpm). Sufficient flow exists to meet the needs for the site. A screened intake and surface mounted pipeline and distribution box would provide water for juvenile rearing and adult holding.

Access and Utilities — No utilities are available at the site. All utility services would be portable and supplied from May through October. A 100 m (330 ft) access road would be needed.

Waste — No sanitary sewer system would be developed at the site. Portable construction-type domestic wastewater facilities would be maintained by a commercial vendor during periods of construction and seasonal operations. Effluent settling ponds are unnecessary because a limited mass of fish would be reared at the site. Except for limited starter food programs, little fish waste



NEZ PERCE TRIBAL HATCHERY
MILL CREEK SATELLITE FACILITY CONCEPTUAL LAYOUT
FIGURE 2-8

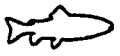
would be discharged. Liquid effluent would be discharged to the creek. Rearing containers would be cleaned at the end of each rearing cycle. Solids collected would be dried and applied to land or disposed of at an approved sanitary landfill. Any chemicals used would be handled, applied and disposed of in accordance with state and federal regulations. Fish carcasses would be disposed of at a landfill or could be used as fertilizer.

2.1.2.6 Newsome Creek

This site is along the east bank of Newsome Creek about 70 m (230 ft) upstream of the confluence of Beaver Creek. The site is next to U.S. Forest Service Road No. 1853 and is about 5 km (3 miles) upstream from the confluence of the South Fork Clearwater. The site was dredge mined in the early 1900s and has been graded into a level plateau. See Photo 8.

Facilities Planned — Facilities development would require about 0.8 ha (2 acres) of land. Ponds for adults and juveniles would be constructed in the bench next to Newsome Creek.

One juvenile and one adult pond would be built at the site in the dredge tailing plain less than 50 meters (15 ft) from the stream. The juvenile pond must have a usable volume of not less than 210 m^3 (7,000 ft^3). The adult pond would contain a volume of 21 m^3 (700 ft^3). Adults would be trapped in a seasonal weir near the stream mouth and trucked to the site. A temporary trailer with a small generator would be provided at the site. See Figure 2-9.

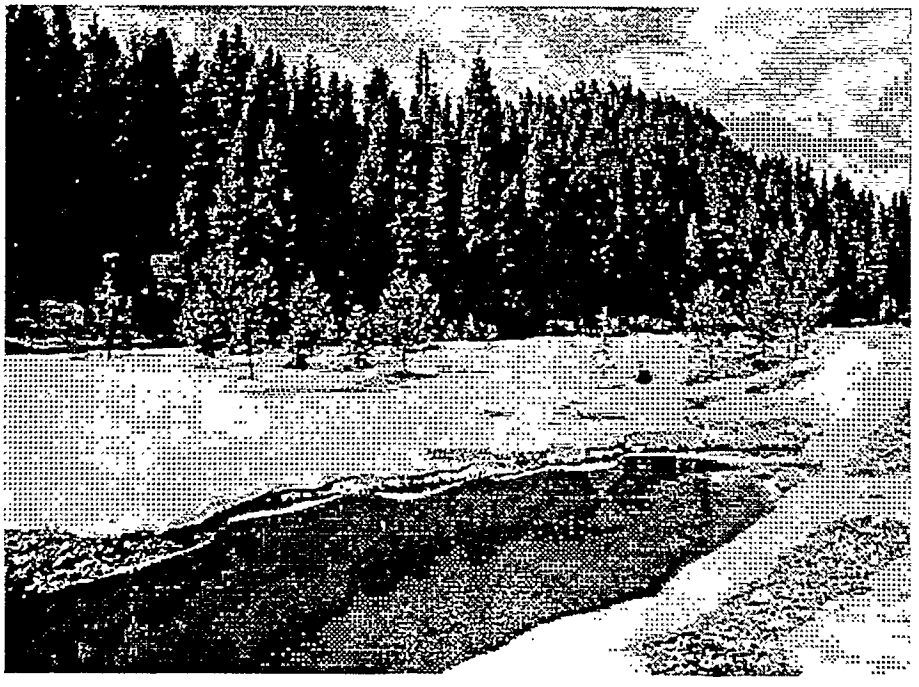


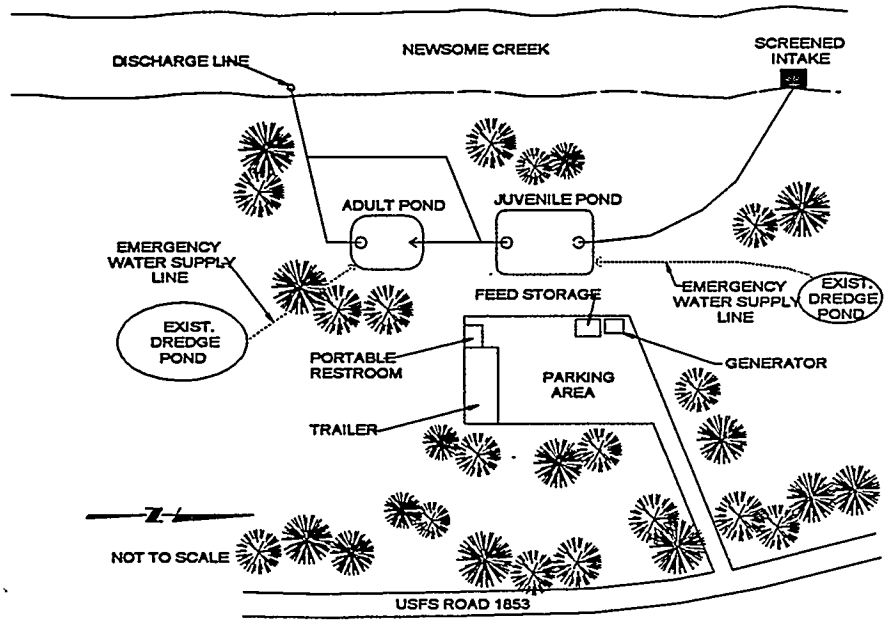
Fingerling

Presmolt

Photo 8

Newsome Creek Site





NEZ PERCE TRIBAL HATCHERY
NEWSOME CREEK SATELLITE FACILITY CONCEPTUAL LAYOUT
FIGURE 2-9

Fish — In May, about 75,000 spring chinook fingerlings at 440 fish/kg (200 fish/lb) would be brought from Cherrylane for rearing through October. In October, presmolts at 44 fish/kg (20 fish/lb) would exit the pond on their own into Newsome Creek. Presmolts would exit through the effluent pipeline. Returning adults would be held at the site also. They would be captured from May through September and spawned on-site. Sixty-eight adult spring chinook are needed for maximum egg take.

Water — Water for the site would be taken from Newsome Creek through a screened intake and surface mounted pipeline and distribution box. The water would flow by gravity to rearing containers. A supply up to 2.3 m^3/min (600 gpm) is needed. Minimum instream flows measured at the site is 9.5 m^3/min (2,513 gpm). Sufficient flow exists to meet the needs for the site.

Because the area upstream of the site has been mined, the site is at risk if sediment is released from an abandoned placer mine. In an emergency, the Newsome Creek satellite facility can be protected from sediment releases from the mine by using water from existing ponds in Newsome Creek's floodplain. These ponds are separated from Newsome Creek and would prevent silt from the placer mine from entering the satellite facility.

Access and Utilities — No utilities are available at the site. All utility services would be portable and would be on site from May through October. The site is next to Forest Service Road No. 1853. A gravel spur road about 200 m (660 ft) long will be used for access to the site. No additional fill material would be needed.

Waste — No sanitary sewer system would be developed at the site. Portable construction-type domestic wastewater facilities would be maintained by a commercial vendor during periods of construction and seasonal operations. Effluent settling ponds are unnecessary because a limited mass of fish would be reared at the site. Except for limited starter food programs, little fish waste

would be discharged. Liquid effluent would be discharged to the creek. Rearing containers would be cleaned at the end of each rearing cycle. Solids collected would be dried and applied to land or disposed of at an approved sanitary landfill. Any chemicals used would be handled, applied and disposed of in accordance with state and federal regulations. Fish carcasses would be disposed of at a landfill or could be used as fertilizer.

2.1.3 Hatchery Operations

2.1.3.1 Disease Management

Both wild and hatchery fish can have or carry a variety of diseases. Some diseases spread easily in a traditional hatchery environment. Although there is limited research on disease transmission among fish, there is a concern that some hatchery fish have spread diseases to wild fish populations (Steward and Bjornn, 1990).

Nez Perce hatchery managers would guard against the transmission of disease from hatchery to wild fish and from hatchery fish to hatchery fish using many measures. These include screening broodstock for disease, disinfecting water before use where necessary, controlling water temperature to reduce infections, controlling incubation densities, controlling the incidence of disease in the hatchery, cleaning effluent where necessary, and by ensuring that fish slated for release into the natural environment have met strict fish health quality standards. Fish would be inspected before transfer to satellite facilities and again before they are released into streams. Common diseases such as bacterial kidney disease would be monitored routinely in hatchery and wild populations. Less common diseases would be monitored as necessary.

Disease control and monitoring practice would conform with standards developed by the Nez Perce Tribe Fish Health Policy (1994) and the Integrated Hatchery Operations Team (***IHOT***) (IHOT, 1994). The Nez Perce Tribe Fish Health Policy defines policies, goals, and performance standards for fish health management, including measures to minimize the impacts to wild fish.

2.1.3.2 Egg Take and Incubation

During Phase I of the program, eggs would be imported from other hatcheries. Chinook production would follow specific management protocols to ensure that healthy fish are produced for reintroduction in the Clearwater River Subbasin. Fish would be supplied either as gametes shipped to the site and held in

quarantine until disease testing and screening are completed, or as eyed-eggs imported from a certified quarantine incubation facility outside of the Clearwater River Subbasin.

At the hatchery, all eggs would be disinfected. Stocks would be isolated from each other to limit the potential for transferring disease. Incubation density would be limited to one female per tray, and disease sanitation procedures would be routinely followed. Fish health inspections would be conducted at least twice, one prior to transfer to satellite facilities and again prior to release from the satellite facilities into the river.

After adults start returning (Phase II), egg take would occur at the various satellite facilities and Cherrylane. Broodstock would be screened for specific pathogens. When ready to spawn, gametes from males and females would be taken and kept separate. Care would be taken to have as antiseptic conditions as possible. Sperm and eggs would be kept on ice and transported within eight hours to the central hatcheries for fertilization. Mixing of gametes would follow the mating protocols described in Section 2.1.3.6, **Broodstock Source and Management.** Once at the hatchery, procedures would follow those described above.

2.1.3.3 Rearing Techniques

The NPTH would use innovative rearing techniques that have not been used as standard methods by other hatchery programs in the Columbia River Basin. Incubation and rearing water temperatures, rearing containers, rearing densities, release strategies, and broodstock management are different from those conventionally used in most facilities. The overall goal is to produce and release a fish that will survive to adulthood, spawn in the Clearwater River Subbasin and produce viable offspring.

Water temperatures in incubation and rearing containers would be controlled to best suit supplementation goals. Fall and summer chinook will require an accelerated incubation and growth schedule to produce mature subyearling smolts in May and June. Naturally-produced subyearling smolts in the Clearwater River grow slowly in the cold river water and typically do not emigrate until July or August when lower Snake River flows and dam passage conditions are not as beneficial to their downstream migration. NPTH fall and summer chinook subyearling smolts would be programmed to grow to a mature size sooner using the warmer groundwater. They will then be of a suitable size to migrate in June when flow through the Snake and Columbia River hydrosystem is currently managed to benefit chinook survival.

Spring chinook will be incubated and reared in water that approximates the temperature regime of the streams where fish would eventually be released. This stock of chinook spends more

time rearing in the Clearwater River Subbasin than do the subyearling migrants, and their natural emigration dates correspond to periods when hydrosystem operation facilitates passage. Consequently, temperatures in their rearing environment will be controlled to maintain growth rates consistent with those in their receiving streams.

During final rearing, the fish will be kept in ponds designed and operated to simulate natural conditions. Ponds would be designed without hard, straight lines. Artificial features such as undercut banks, logs and other structures would be placed in the ponds and fish would have a place to hide and learn to avoid other fish. Predator response would be induced by exposing the fish to birds and fish released into ponds (e.g., seagulls, mergansers, bull trout or squawfish). Human activity around the ponds would be discouraged, and shading and overspray will be used to obscure overhead vision. Shading would also moderate warm summer water temperatures. Underwater feeding options would be pursued to avoid conditioning young fish to be fed by humans. Water flows in ponds would be increased to exercise and build physical stamina of fish to adapt to stream or river conditions following release.

Fish would be reared at relatively low densities. The NMFS (1995) describe problems in rearing fish at high densities such as increased fingerling mortality from disease and increased smolt mortality after release. They recommend future rearing of fish in the Columbia River Basin hatcheries at a density which does not exceed 9.6 kg/m^3. The Master Plan calls for rearing fish at a density which is a third as much as those needed to meet NMFS recommendations and should impart economic efficiency to the hatchery and enhanced survival to NPTH fish. Lower rearing densities will also provide a means for reducing temperature induced stress during the warmer summer periods, particularly for those fish kept through the summer at Yoosa/Camp, Mill and Newsome Creek.

2.1.3.4 Release Techniques

Hatchery fish would be released at several different life stages to optimize survival, to evaluate different strategies, and/or be consistent with natural migratory behavior.

Fall chinook and summer chinook would be released as subyearling smolts. This migratory behavior is typical of lower elevation, larger river spawners. The fish would be released into the rivers during spring runoff in May and June when they weigh about 110 fish/kg (50 fish/lb). They would either join other outmigrants in the high flows or would reside in the river for awhile, and move downstream as water temperatures warm.

Most spring chinook would be released directly into stream habitats as fingerlings. Meadow, Warm Springs and Boulder creeks were selected for outplanting sites. These streams provide quality

habitat. Fish would be released into these streams in June and July when they would be about 220 fish/kg (100 fish/lb). They would be transported to the streams by truck, and distributed by helicopters throughout the reaches of accessible spring chinook habitat. The Tribe would work with the USFS to minimize any impacts from the helicopters to the wilderness resource. The proposed size and timing of release were selected to correspond to favorable stream conditions for growth and survival. Fish released directly into the streams are expected to sustain higher mortality during the summer than ponded fish, but survivors are expected to gain a long-term fitness advantage through their experience of living under natural conditions.

The remaining spring chinook production would be moved in May at 440 fish/kg (200 fish/lb) to acclimation ponds at Yoosa Creek, Mill Creek and Newsome Creek. Fish would be confined in the acclimation ponds until September, and from that point on would be allowed to exit the ponds on their own free will. At this time, the fish would average about 44 fish/kg (20 fish/lb). The ponds would be drained in mid-October, and the remaining fish would be forced to enter the receiving streams. The September-October timeframe corresponds to the fall migratory pulse that occurs naturally in Idaho's spring chinook populations. This migratory pulse is stimulated by decreasing day lengths and cooler water temperatures and appears to be related to chinook seeking more favorable overwinter conditions in the mainstem rivers. The migratory pulse has been found through monitoring and evaluation trapping in Lolo and Meadow creeks in 1993-95 and is known in the Imnaha, South Fork Clearwater River and South Fork Salmon River from other smolt monitoring projects (NPT, 1996). The proposed release strategy will increase survival during the growing season, reduce competition among hatchery and wild fish for limited food resources, and better prepare pond-reared fish for living under natural conditions following their release.

Fish released directly into stream and pre-smolt releases would sustain higher mortality than fish reared in a conventional hatchery for the same period of time. Hatcheries offer control over environmental conditions to a great extent, allowing survival to be high. However, hatchery fish sustain considerable mortality following release into the river. This is understandable since they have had no chance to develop the "natural" behaviors that allow them to survive. The NPTH release strategy is designed to focus on producing more fit fish by subjecting them to environmental conditions for more of their lives. In the end, the strategy may even be more cost-effective than conventional hatcheries because the cost of raising fish for 6 months to 1 year longer in the hatchery may not be justified by increased returns.

NPTH hatchery fish would be released over a large geographic area to maximize the use of available rearing habitat in the Clearwater River Subbasin and to avoid overwhelming local anadromous and resident fish populations. Releases of fall chinook would occur in the mainstem lower Clearwater River. Summer chinook would be released 48-96 km (30-60 miles) upstream in the larger tributaries, the Selway and South Fork Clearwater rivers. Spring chinook would be released in the smaller tributaries of the mainstem Clearwater, Lochsa, Selway and South Fork Clearwater rivers.

2.1.3.5 Adult Collection

Collecting adults would provide information about the success of the program in addition to providing broodstock. The number of returning adults would be used to calculate smolt-to-adult and adult-to-smolt (or parr) survival rates. Adult salmon produced by the NPTH program are expected to be abundant enough in 5-10 years to begin collecting them for use as hatchery broodstock (Phase II). Adults would be captured near satellite facilities using various methods.

Temporary weirs and adult traps would be placed in 11 streams that would either receive outplants of hatchery fish or would serve as experimental controls. Additional weirs and traps would be used to collect summer and fall chinook in the vicinity of hatchery and release sites. The purpose of the structures is to count and sample returning adults so that supplementation success can be evaluated and to secure enough hatchery and wild fish for broodstock purposes. Depending on the species, weirs will be operated from late May through early December.

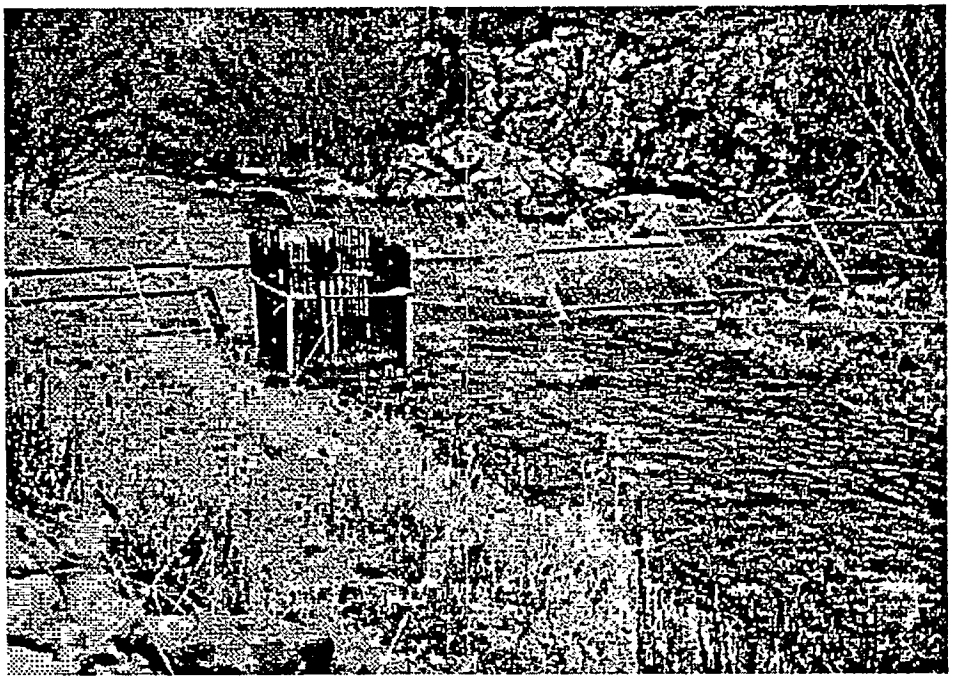
Portable weirs (see Photo 9) are made of wood and/or metal and have angled guide fences supported by frames. Fence panels are closely spaced pickets that run vertically through the frame and contact either a permanent concrete sill or the undisturbed streambed. Permanent anchoring points on either stream bank would be required at each weir site. These could range from existing boulders to concrete anchors placed flush with the bank surface or steel members driven into the bank. In all cases, the anchoring points would have adequate protection (through riprap or burial) to prevent bank erosion or structural damage during high river flows.

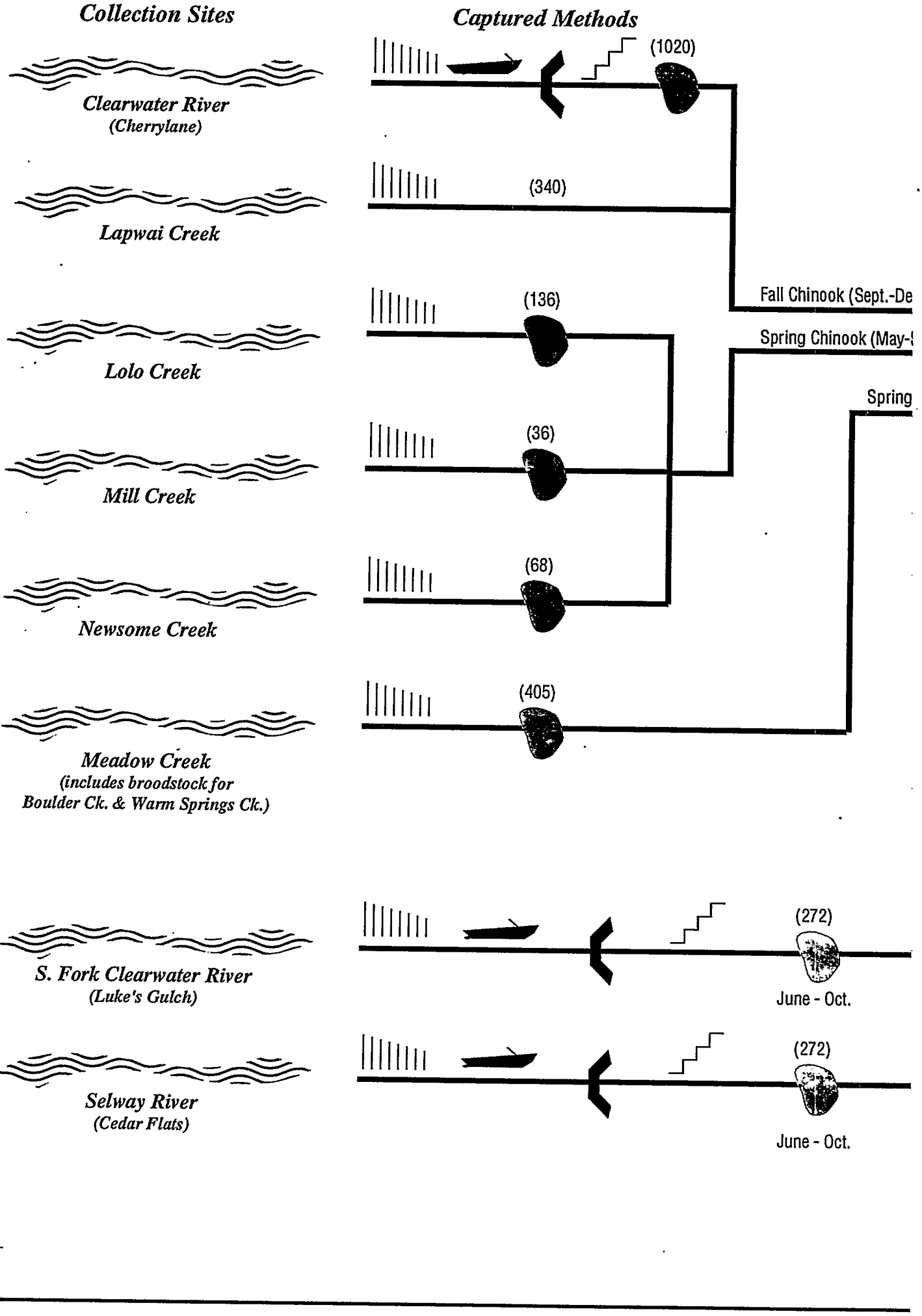
Preliminary weir site selection was based on similar drainage characteristics, streams with existing operating weirs, and accessibility. The Tribe would consult with the USFS on final locations for weir sites to avoid conflicts with any resources. The Tribe would abide with the terms and conditions of any special use permits including removing weirs after the program is completed unless otherwise directed by the USFS.

The weirs divert upstream migrating adults into traps (live-boxes) where they are held until released or transported to the adult holding ponds. Fish not needed for broodstock will be released upstream of the weirs within 12 hours. During the trapping period, the weirs would require continual monitoring. Fisheries technicians would be stationed at the sites to operate the weirs around-the-clock, seven days a week.

A variety of collection methods would be explored for wild and hatchery-produced fall and summer chinook. These fish are mainstem river spawners and full-length weirs spanning the rivers are unfeasible. However, partial weirs may be possible on side channel habitats found on river islands. Other options would be to collect a portion of the returning adults as they pass Lower Granite Dam or to use boat seines. Visual implant tags in conjunction with adipose fin clips could be used to identify the adults at Lower Granite Dam. Permanent adult collection systems – fishways or fish ladders – are also proposed for the Cherrylane, Cedar Flats and Luke's Gulch facilities. These would allow those adults imprinted to the water source or chemical attractants to return to the facilities directly for broodstock. Figure 2-10 shows adult collection methods and numbers. Table 2-2 shows predicted annual adult salmon returns, adults available for broodstock, natural production and harvest in 20 years. Weir sites are shown on Map 3.

Photo 9
Temporary Weir




Collection Sites
Captured Methods
Clearwater River
(Cherrylane)
(1020)
Lapwai Creek
(340)
Lolo Creek
(136)
Fall Chinook (Sept.-De
Spring Chinook (May-
Mill Creek
(36)
Spring
Newsome Creek
(68)
Meadow Creek
(includes broodstock for
Boulder Ck. & Warm Springs Ck.)
(405)
S. Fork Clearwater River
(Luke's Gulch)
(272)
June - Oct.
Selway River
(Cedar Flats)
(272)
June - Oct.

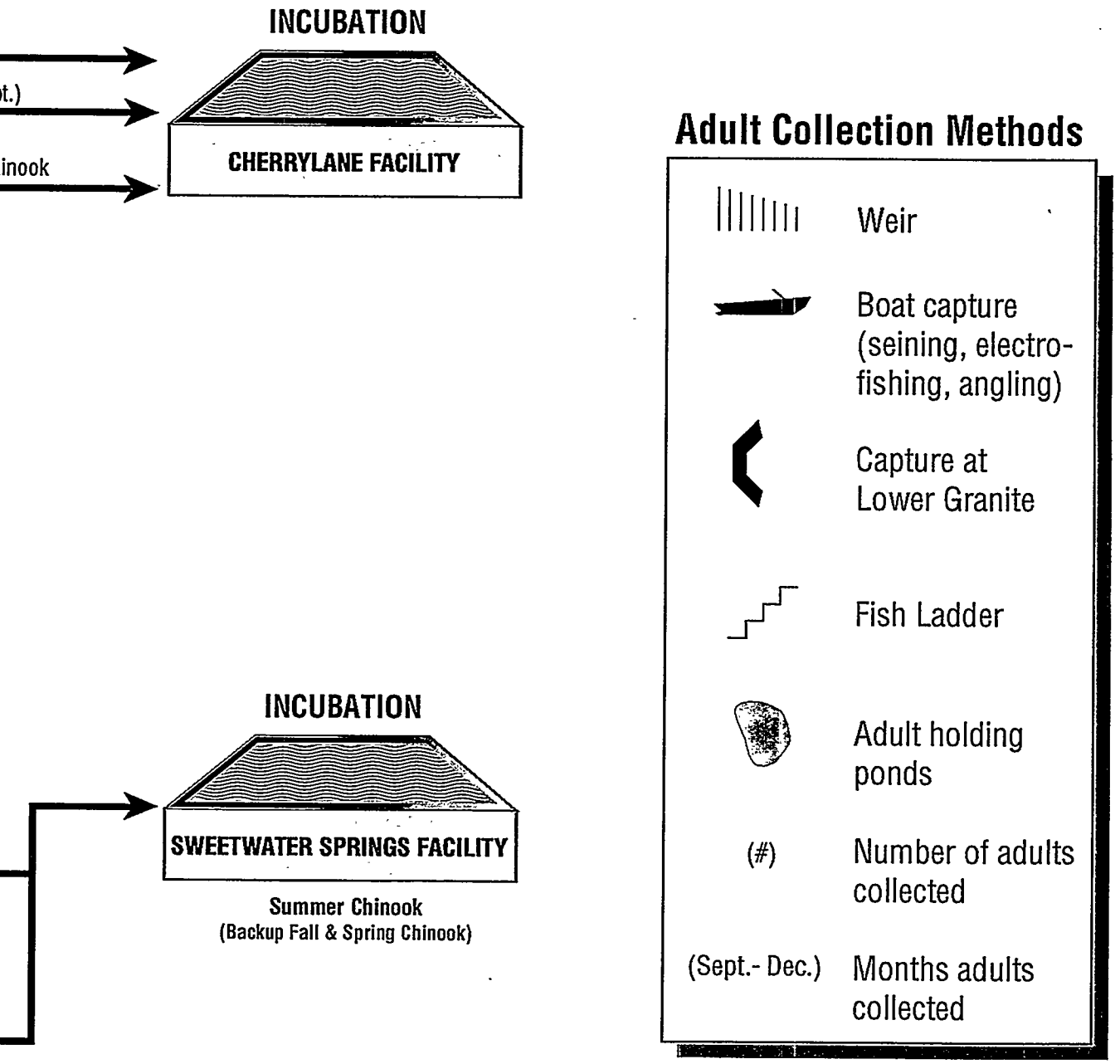


Figure 2-10
Adult Collection

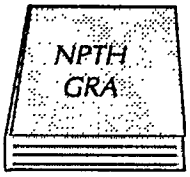
2.1.3.6 Broodstock Source and Management

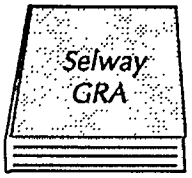
Since not enough wild chinook salmon return to the Clearwater River Subbasin today to serve as a source of broodstock, the supplementation program would use broodstock from other locations. The following sources – all hatcheries – are being considered for broodstock during Phase I:

- spring chinook – Rapid River stock, which includes Rapid River, Dworshak, and Clearwater hatcheries and the Kooskia Hatchery;
- summer chinook – mid-Columbia stock; and,
- fall chinook – Lyon's Ferry Hatchery stock.

Final selection of the donor stock to use in NPTH will depend on coordination with NMFS, IDFG, and the U.S. vs. Oregon Production Advisory Committee of the Columbia River Management Plan. Acquisition of broodstock will also be determined through negotiation by the NPT within these forums. During Phase I of the implementation, it is assumed that broodstock acquisition will be coordinated on an annual basis. Eggs would then be distributed to the central hatcheries.

When the first generation fish return as adults, they would be collected using weirs to trap them (see Section 2.1.3.5, **Adult Collection**). The adults would then be trucked or moved to the nearest adult holding pond for that species. Adults would be held in adequate space and water flow to alleviate stress that could occur from overcrowding and temperature. The standard rule of thumb for holding adults at hatcheries is to have a flow rate of not less than 0.004 m^3/min (1 gpm) per adult and to provide space of not less than 0.283 m^3 (10 ft^3) per adult (Senn, et al., 1984). NPTH can hold fish in flows of 0.012-0.016 m^3/min (3-4 gpm) per adult and in space of at least 0.283 m^3 (10 ft^3) per adult. These holding criteria should provide a safety measure to alleviate outbreak of stress related effects.





The NPTH is designed to ensure a balance of hatchery and wild spawners in both hatchery and streams. Some returning hatchery fish would be permitted to spawn with wild fish in the river or streams. Likewise, some returning wild fish would be spawned in the hatchery. The Nez Perce Tribe would use a sliding scale based on the abundance of adult chinooks returning to the Clearwater River Subbasin to determine the ratio of hatchery-to-wild fish used for broodstock and mating protocols (Cramer, 1992 and 1995) (see Table 2-3). The ratios favor wild fish for natural spawning as the wild population increases. However, the proportion of hatchery fish that spawn naturally would be allowed to increase if the wild chinook population falls

Table 2-2 Expected Adult Salmon Returns

Stream	Total Adult Returns	Adults Available for Broodstock	Adults Available for Natural Reproduction	Adults Available for Harvest
Spring Chinook				
Lolo Creek (1)	373	136	162	75
Mill Creek (1)	95	36	46	13
Newsome Creek (1)	173	68	51	54
Boulder Creek (2)	147	67	60	20
Warm Springs (2)	34	16	14	4
Meadow (Selway) (2)	684	322	244	118
Number at 20 years	**1,506**	**645**	**577**	**284**
Summer Chinook				
Luke's Gulch (3)	743	276	298	169
Cedar Flats (3)	743	276	298	169
Number at 20 years	**1,486**	**552**	**596**	**338**
Fall Chinook				
Cherrylane (3)	2,359	788	960	611
North Lapwai Valley (3)	780	258	320	202
Number at 20 years	**3,139**	**1,046**	**1,280**	**813**

(1) Assumes postrelease survival is 65% and smolt-to-adult survival is double the current rate.
(2) Assumes postrelease survival is 65% and smolt-to-adult survival is double the current rate (because fish have acquired a fitness advantage due to extended rearing in the wild).
(3) Assumes postrelease survival is 50% and smolt-to-adult survival is double the current rate.

below 12 pairs. In this case, wild fish would be brought into the hatchery to spawn so that the remaining gene pool would have the advantages offered by increased survival during early rearing.

The sliding scale was developed to protect the genetic resources in the small populations of chinook salmon in the Clearwater River Subbasin yet allow for population growth. The sliding scale is discussed in more detail in Appendix A.

Table 2-3 Hatchery (H) To Wild (W) Spawner Ratios

Natural Returns	Brood for Hatchery	Fertilization Procedure	Spawners for Wild
Greater than Broodstock Goal for Hatchery	At least 50% W	Random, H x W	At least 33% W.
Fewer than Broodstock Goal for Hatchery	At least 33% W	Random, H x W to extent possible	At least 25% W. 12 pair minimum
Between 12 to 24 Pairs	Keep all W males: Male ratio = 3H:1W H females equivalent to H + W males	Split-cross W males; each to two H females.	Release all W females. Female ratio = 3H:1W H males equivalent to H+W females.
Fewer than 12 Pairs	Keep all W fish + capacity H fish. Spawn and rear H + W separately. Smolt release for W + captive brood.	Matrix for W. Random for H.	100% H up to spawning habitat capacity

2.1.4 Harvest Management

An important goal of the supplementation program is to produce surplus adult fish for harvest. Harvest rates would be regulated to sustain wild and hatchery production. Population growth may be slow, requiring 20 years or longer before harvest can occur.

Tribal ceremonial harvest may occur at a controlled level to provide for the cultural and religious needs of the Nez Perce people. Tribal subsistence and non-tribal recreational fishing would be permitted only after predicted run sizes indicate that natural spawning and broodstock collection goals would be met. Surplus hatchery fish would be targeted, allowing weaker wild stocks to rebuild to self-sustaining levels. The returns were predicted by a model that follows fish from release, through downriver emigration, into the ocean and back up to the spawning areas. It allocates hatchery and naturally-derived spawners into the wild and hatchery as discussed in the mating protocols and uses density dependent functions to adjust for natural production and survival in the wild.

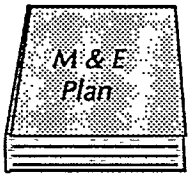
Fishing would be limited to designated areas and times, using techniques that avoid or minimize impacts on non-target stocks. Such techniques include run size forecasting, setting harvest rates

that vary with in-season natural spawning estimates, fishing in tributaries or other areas where only one stock is available or above a weir where monitoring and broodstock collection occur, selectively harvesting externally marked hatchery fish, and imposing gear and catch and release restrictions.

The Nez Perce Tribe would coordinate harvest management with other fisheries agencies in the basin. The U.S. vs. Oregon Technical Advisory Committee determines harvest allocation on the Columbia River and ocean fisheries. (See Section 1.6.7, **Columbia River Fish Management Plan.**) Washington Department of Fisheries, Oregon Department of Fish and Wildlife, IDFG and the Nez Perce Tribe coordinate to determine harvest in the Snake River. Harvest in the Clearwater River would be a coordinated action between IDFG and the Nez Perce Tribe. Harvest levels would be based on adult returns, subject to spawning escapement and broodstock requirements.

2.1.5 Monitoring and Evaluation Plan

Monitoring and evaluation would enable managers to determine whether the supplementation program is achieving its stated goals, and would provide information that can be used to revise program goals and supplementation strategies.



A monitoring and evaluation plan was developed for the proposed program (Steward, 1996). The plan uses risk assessment and prioritization techniques to define the magnitude and significance of risks associated with the program, then proposes strategies for avoiding undesirable impacts and collecting the information necessary to evaluate program success. A *Before-After, Treatment-Control* stream experimental design is proposed as the most effective approach to determining whether supplementation causes increased numbers of returning spring chinook in treated (supplemented) streams. *Before-After* refers to observations made pre- and post-supplementation. *Treatment and Control* refers to supplemented and non-supplemented streams respectively.

Five pairs of treatment and control streams have been identified for monitoring and evaluating the success of spring chinook supplementation. (See Table 2-4 and Map 3.) Temporary weirs and adult traps would be used to count and compare adult returns. In treatment streams, the number of returning adults would then be used to calculate smolt-to-adult and adult-to-smolt (or parr) survival rates. An estimate of natural production resulting from adult spawning in the streams would be used to adjust the number of fish outplanted from the hatcheries.

The treatment streams would be planted annually with juvenile spring chinook. Control streams would not be planted until some determination can be made of program success. Information gained during Phases I and II would be used to make the decision. This is an example of the adaptive management aspect of this program.

Overall success of the program would be evaluated by adult returns. Specifically, staff would count marked adult chinooks returning over Lower Granite Dam and to weirs downstream of spawning areas. Fish biologists would use the counts as a measure of population status and trends. Additionally, late summer parr densities and redd counts would be selectively used to evaluate program success. Several genetic, demographic, and life history parameters would be monitored to ensure that hatchery-reared chinook perform as expected and that interactions with resident fish are not detrimental.

Meadow Creek is an experimental unit separate from the treatment and control streams. Its purpose is to study short-term experiments that evaluate different release techniques in hopes that adaptive management can be more effective in implementing recovery of fish populations.

The M & E Plan offers techniques that would not only evaluate the performance of hatchery fish, but would determine their impacts on wild fish and other aquatic biota. These data and other information would be used by program managers to continuously upgrade NPTH goals, objectives, and operations. Fish marking and the monitoring plan would determine whether straying is within acceptable limits.

Table 2-4
Treatment/Control Stream Pairs

Treatment Stream	Control Stream
Lolo Creek	Eldorado Creek
Mill Creek	Johns Creek
Newsome Creek	Tenmile Creek
Boulder Creek	Fish Creek
Warm Springs Creek	Brushy Fork Creek

2.1.6 Costs

Capital construction would cost about $18-20 million (1995 dollars). Annual operations and maintenance costs after all facilities are fully developed would cost about $800,000 (1995 dollars) and monitoring and evaluation would cost about $500,000 (1995 dollars) annually. Harvest management is not included in the cost estimate.

2.2 No Action Alternative

The No Action Alternative is traditionally defined as the no build alternative. This No Action Alternative assumes that new facilities would not be built and that the supplementation program would not be carried out. The Nez Perce Tribe, BPA, BIA, the Council and others would rely on fish recovery actions taken by other parties to achieve reestablishment of chinook fish runs in the Clearwater River Subbasin. This part of the Council's Fish and Wildlife Program would not be implemented.

2.3 Alternatives Eliminated From Consideration

BPA, BIA, the Nez Perce Tribe and others studied a variety of alternatives to meet the need. After study, the following alternatives were eliminated from further consideration.

2.3.1 Salmon River Acclimation Facilities

The NPTH Master Plan included the Salmon River as a potential subbasin for acclimation facilities. Slate Creek, a tributary to the lower Salmon River, was targeted to receive spring chinook produced at Cherrylane. Slate Creek was eliminated from consideration after Snake River spring and summer chinook were reclassified as threatened under the Endangered Species Act and concerns were raised about the origin of stock in the Salmon River Subbasin.

Though hatchery and wild fish mix elsewhere in the Snake River drainage, it is unlikely that NMFS would authorize the release of NPTH fish into Slate Creek without two conditions being met. First, the genetic identity and evolutionary legacy of Slate Creek spring chinook would need to be determined. Second, special provisions would need to be made to obtain compatible broodstock and to rear and release hatchery fish into Slate Creek. Given the existing stock separating techniques and the small number of fish available for genetic sampling, it is unlikely that the identity and number of Slate Creek chinook will be known soon. The time and effort required to meet these conditions would prevent the supplementation program from moving forward on its present schedule, so this alternative would

not meet the need for the program. Therefore, it was eliminated from detailed consideration (Johnson, et al., 1995). The Nez Perce Tribe may consider using Slate Creek again in the future if conditions change or if new information or new technology becomes available.

2.3.2 Use of Existing Production Hatcheries

This alternative would use surplus capacity, if any was available, at existing hatchery facilities to restore chinook salmon in the Clearwater River Subbasin. Existing facilities are described in Section 1.1.1.2, **Hatchery Production in the Clearwater Subbasin.** However, the USFWS, IDFG and the Nez Perce Tribe prefer that the capacity at existing facilities be reserved for agreed-to mitigation obligations under the Lower Snake River Compensation Program (Wagner, 1990). The Lower Snake River Compensation Program has not met its goals because of lower than expected fish survival rates. These hatcheries will accommodate necessary adjustments in the program to improve survival and/or increase production in the future. Because these hatcheries are not available, this alternative was eliminated from further consideration.

2.3.3 Natural Habitat Enhancement and Restoration

Like most drainages in the interior Pacific Northwest, the Clearwater River Subbasin has been subjected to human disturbances that have diminished salmon production. In particular, the amount of inorganic sediments and chemical pollutants have increased as a consequence of logging, mining, agriculture, urban development, road building, recreation and other human activities. Many of these activities and their associated impacts will be mitigated or avoided through implementation of natural resource management plans that are sensitive to the needs of anadromous fish.

Under this alternative, natural processes and ongoing rehabilitation efforts would be allowed to proceed with the goal of restoring chinook populations to the Clearwater River Subbasin. Improvements in habitat quality and availability would presumably lead to increases in salmon production. Potential habitat enhancement measures include selective releases of water from Dworshak Dam, removal or alteration of natural or human-caused barriers to fish migration, pollution abatement, improvement in road construction and logging methods, revegetation of riparian areas and instream enhancement. With regard to the latter, a large number of instream habitat improvement projects have been completed within the Clearwater River Subbasin over the last two decades. (Baer,

1990; Espinosa and Lee, 1991; Siddal, 1992.) These projects improved living conditions for resident and anadromous fish but did not result in appreciable increases in local populations.

Natural seeding in streams is extremely low because adult escapement is poor. Sufficient high quality habitat is currently available in the Nez Perce Tribal ceded territory to meet the Tribal objectives if the salmon returns were sufficient to seed the streams. Habitat improvement by itself cannot recover severely depressed stocks to levels of abundant surpluses. Without supplementation, seeding levels may never reach a point at which natural populations could be self sustaining. Therefore, this alternative was eliminated from further consideration because it would not meet the purpose and need.

Chapter 3 Affected Environment

In this Chapter:

- Existing human and natural resources
- Protected Resources

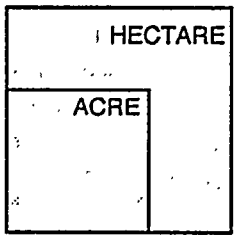
This chapter describes the existing environment that would be affected by the alternatives.

3.1 Nez Perce Tribe

3.1.1 Background

➲ For Your Information

Map 2 shows the Nez Perce territory.



Hectare: about two and one-half acres

Historically, the Nez Perce were one of the largest Plateau tribes in the Northwest (Walker, D., 1978). The Nez Perce occupied a territory that included north central Idaho, southeastern Washington, and northeastern Oregon. Original lands of the Nez Perce Tribe covered 5.3 million ha (13 million acres) (Nez Perce Tribe, 1992). Outside these lands, the Nez Perce people extended their hunting, fishing, trading, and other food gathering activities westward down the Columbia River and east to the area now the state of Montana.

The Nez Perce lived in small villages or bands of 30 to 200 individuals of several related extended families. They lived along many main river tributaries such as the South and North Forks of the Clearwater River, and the Grande Ronde, Snake and Salmon rivers. Smaller groups formed larger bands centered around Kamiah, Lapwai, the Grande Ronde and Alpowai (Walker, D., 1978). They occupied a diverse environment, which included dry river bottoms, river breaks, shortgrass palouse country, and the forested Blue and Bitterroot Mountains.

The Nez Perce fished for chinook, silver, and sockeye salmon, steelhead, and bull, cutthroat, and rainbow trout. They also ate non-salmonids: suckers, lampreys, whitefish, squawfish, and sturgeon. Camas and other roots such as bitterroot, kouse, wild carrot, and wild onion roots were a mainstay of their diet. Berries, such as huckleberries, serviceberries, currants, and chokecherries, were harvested in the late summer and fall. Pine nuts, sunflower seeds, and black moss were also eaten. The Nez Perce hunted big game within their country including deer, moose, elk, sheep, and black and grizzly bears, and small game and birds (Walker, D., 1978).

Nez Perce life evolved around the seasons. In the early spring, when food stores were gone, the Nez Perce ventured from their winter villages on snowshoe hunts or forays down the Columbia River to fish early salmon runs. They fished and traded with many Columbia River tribes. When the fish moved into the Nez Perce country, the people fished their own sites, usually at the mouths of tributaries using communal traps and weirs, nets, spears, and hook and line. Head fishers guided most communal fishing, distributed the catch, and performed the proper ceremonies to insure the continuance of the runs (Walker, D., 1978).

➲ For Your Information

The Nez Perce fished for salmon along the Columbia River and in the Clearwater River Subbasin.

Also in the spring and early summer, groups of women and children dug and gathered roots, while others split, dried, and stored the fish taken by the men. As summer progressed, they followed the fish runs upstream where later growing roots and berries were also available. During the fall, salmon runs were fished with greater intensity and hunters sought big game for the winter. By November, the bands had moved back down river to the warmer climate in the river bottoms and settled into large lodges for the winter (Walker, D., 1978).

The Nez Perce signed their first treaty in 1855. Isaac Stevens, Governor of the Washington territory and Indian agent for the Northwest, was traveling throughout the territory to map a route for a transcontinental railroad. He contacted several tribes at Walla Walla to segregate Indian tribes from white settlers and reduce the potential for conflict (Ruby and Brown, 1981). At Walla Walla, the Nez Perce defined the boundaries of their territory and a 3.1 million-ha (7.7 million-acre) reservation was established (see Map 2). The United States gained possession of the remaining 2 million ha (5 million acres) of Nez Perce territory. In exchange for the treaty and the lands, the United States promised to deliver various articles of civilization, including schools, agricultural implements and money (Johnson, 1990).

The Treaty of 1855 was not in effect long. By 1860, the United States finally made good on its promises and delivered some of the articles described in the treaty (Haines, 1855). That year gold was discovered on the Nez Perce reservation near Orofino, Idaho. Trespassers created conflicts and disputes between Indians and whites (Haines, 1955). Lewiston, Idaho was established and it depended on the gold trade. Townspeople, fueled by "manifest destiny," and a fear of lost profits, encouraged more trespass and settlement on Indian land (Haines, 1955).

To accommodate the desires of whites for Nez Perce land, a new treaty was drawn up between some tribal leaders and the United States (Haines, 1955). This 1863 treaty reduced Nez Perce lands to 316 000 ha (780,000 acres). Not all bands were party to the treaty, however (Haines, 1955). Nez Perce leaders who did

No comma is used in the metric system to mark groups of three digits in large numbers.

not participate in the 1863 treaty distrusted the United States because they would suffer a direct loss of their band's territory (Haines, 1955). Some bands were forced to move from Oregon.

The Nez Perce War occurred in the late part of the 1870s. In 1873, a treaty was drawn up for some Nez Perce bands in the Wallowa country of northeastern Oregon, but it was withdrawn two years later. Consequently, in 1877 Nez Perce bands in the Wallowa country were ordered to relocate to the reservation delineated in the 1863 treaty (Haines, 1955). These bands were moving to the new reservation when several young men attacked and killed settlers in the White Bird country along the lower Salmon River (Haines, 1955). The bands, with more than 500 people under the leadership of Looking Glass, White Bird and Joseph, feared repercussions and fled from the country. They first attempted to join with ally tribal bands in Montana, but then moved on toward Canada. The Army pursued them for four months and the Nez Perce made a last stand a short distance from the Canadian border in the Bear Paw Mountains of Montana. The Army captured 375 Nez Perce and sent them to Indian Territory in Oklahoma (Ruby and Brown, 1986).

After the war, the Nez Perce lost much of the reservation during the Allotment Era (Johnson D., 1990). In the late 1880s, a federal policy known as the General Allotment Act, or Dawes Act, was implemented. The Act sought to turn Indian people from traditional vocations to agriculture and to provide cheap land to non-Indian settlers. Through the Dawes Act the Nez Perce kept only 73 109 ha (180,657 acres) of their reservation and the United States took 222 399 ha (549,559 acres) for settlement by non-Indians, contrary to provisions of earlier treaties. Today, the acreage owned by the Nez Perce is about 34 500 ha (85,248 acres), or 12 percent of their reservation (Nez Perce Tribe, 1992).

The Nez Perce Tribe is governed by the Nez Perce Tribal Executive Committee (***NPTEC***), which has eight councilmen and a chairman. Though the Nez Perce did not organize under the Indian Reorganization Act of 1934, the Tribe did enact a constitution and bylaws, which were approved by the United States in 1948 (Ruby and Brown, 1986). Tribal council members are elected, in staggered terms, by enrolled tribal members during May. Seven subcommittees are responsible for issues such as fish and wildlife, law and order, and budget and finance (Johnson, 1990). In addition, the Tribe has an internal staff responsible for implementing NPTEC policy direction.

As for most tribes, staff directors of the various departments report to their respective subcommittees for guidance and program review. Decisions requiring resolutions for tribal policy are first proposed by tribal staff to the appropriate subcommittee.

If the subcommittee approves, the issues then go to the executive committee for approval and signature by the Chairman (D. Johnson, 1990).

3.1.2 Importance of Salmon to the Nez Perce Tribe

The Nez Perce have always been fishers. Abundant salmon runs in the Northwest have served as the mainstay for sustenance and cultural activities. Salmon are a staple and are essential to tribal ceremonies and feasts, in addition to funerals and weddings. The presence of salmon in salmon streams is also important to tribal appreciation for the circle of life, the interconnection of all beings created in the country Nez Perce call home.

The Council estimates that during the 1850s a population of 4,000 Nez Perce consumed about 1220 metric tons (1290 tons) of salmon annually (Northwest Power Planning Council, 1985). The Council's estimates were based on historic references of population size, caloric intake, and daily tribal harvests. At an average fish weight of 9 kilograms (20 pounds), this estimate equals about 129,200 fish. This value appears to be low however, because the Council finds that the estimate does not consider salmon used for dog food, fuel, and trade, so the estimated catch is a minimum.

Industrialization brought on the decline of salmon runs through intensive salmon canning operations, dams, irrigation, mining, and timber harvest. Salmon runs have been drastically reduced and harvest occurs in only a few specific areas. Nevertheless, salmon remain important to Nez Perce culture and subsistence. The Nez Perce Tribe regulates tribal member harvest within the reservation, ceded lands, and usual and accustomed fishing areas by opening and closing seasons and setting harvest limits and gear restrictions. Table 3-1 shows recent salmon harvests by the NPT in the Columbia River and at upriver hatcheries.

➲ For Your Information

Zone 6 is the Treaty Indian Set-Net fishery from Bonneville Dam to McNary Dam, 140 miles of river open to commercial fishing.

The average annual harvest can be used to estimate total present day harvest by Nez Perce tribal members. Annual commercial harvest for salmon in the *Zone 6* fishery on the Columbia River averages about 2,900 fish. The ceremonial and subsistence fishery averages 1,350 fish. Rapid River salmon catch averages 1,500 fish and the Clearwater fishery averages about 290 fish. Therefore, the total estimated catch is about 6,000 salmon annually. Compared to the historic harvest of salmon (129,200 fish annually), recent harvests have been only about 5 percent of traditional harvest.

Table 3-1
Recent Salmon Harvest by Nez Perce Tribal Members

Year	Zone 6 Commercial* (1)	Zone 6 Ceremonial and Subsistence (2)	Rapid River - Circle C Hatchery (3)	North Fork Clearwater River - Dworshak National Fish Hatchery and Clear Creek - Kooksia National Fish Hatchery (4)
1980	1087	NA	NA	NA
1981	1630	NA	NA	NA
1982	1525	NA	NA	NA
1983	1448	NA	NA	NA
1984	2372	NA	NA	NA
1985	3082	NA	2023	NA
1986	4717	NA	1855	NA
1987	7343	1219	2430	210
1988	NA	NA	3520	312
1989	NA	1244	544	404
1990	NA	1581	980	644
1991	NA	NA	0	0
1992	NA	NA	643	160

* Zone 6 commercial fishery targets upper Columbia River fall chinook, all other fisheries reported for spring/summer chinook.
NA means data were unavailable.
(1) From: Mauney (1987)
(2) From: Villalobos and Mauney (1988), Mauney (1989), and Mauney (1991)
(3) From: Mauney (1992a)
(4) From: Mauney (1992b)

3.1.2.1 Treaty Fishing Rights

The importance of fishing to the Nez Perce Tribe is not only substantiated by anthropological evidence, but rights reserved in treaties specifically address and guarantee the ability of the Tribe to harvest fish.

Hunting and fishing rights guaranteed in treaties are among the most powerful promises the United States government can make. Indian treaties are agreements drawn up through negotiation between tribes and the United States similar to those between the United States and any foreign government (Cohen, 1982). Treaties were signed to guarantee special rights and compensation, including rights to hunt and fish, in exchange for cession of Indian land (Cohen, 1982).

Among the items reserved by tribes in exchange for land are the right to hunt and fish in a manner that allows the tribes to maintain their way of life. For example, the 1855 treaty with the Nez Perce in Article 3 states:

> The exclusive right of taking fish in all the streams where running through or bordering said reservation is further secured to said Indians; as also the right of taking fish at all usual and accustomed places in common with citizens of the Territory; and of erecting temporary buildings for curing, together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land.

Tribal members have the exclusive right to hunt and fish on the lands reserved by them unless the rights were clearly relinquished by later treaty or modified by statute (Cohen, 1982). This is based on the premise that reservations created specifically for tribal use must also include the ability for tribal members to derive their subsistence from its resources (Cohen, 1982).

Many Northwest tribes that historically relied on fishing have language in their treaties that also secures "...the right of taking fish at all usual and accustomed grounds and stations... in common with citizens of the territory." This is an important concept in regards to the Indian fishery off-reservation and in the Columbia River.

In 1905, the United States vs. Winans case established what a "right" implied. The case involved a non-tribal member who attempted to prevent tribal members from fishing at a traditional site by buying and then claiming absolute title to the land (American Indian Resource Institute, 1988). The Supreme Court ruled against this claim and established two important precedents. First, hunting and fishing rights are not rights granted by the

government to tribal signatories, but rather they are rights reserved by the tribes in exchange for lands (American Indian Resource Institute, 1988). Second, tribal members cannot be barred from accessing their usual and accustomed fishing sites since their reserved right is essentially an easement over private as well as public lands (Cohen, 1982).

In 1975, a case tried in Washington Federal District Court established what was meant by the right of tribes to harvest fish "in common" with the citizens of the territory. Judge Boldt's decision relied heavily on understanding the situation under which the treaties were written. The court determined two distinct entities were involved during treaty making, Indian tribes and the United States. The separation of two political entities effectively denied the state's assertion that all citizens have the same rights with respect to harvesting fish. In their treaties ceding land to the United States, these specific tribes had reserved the right to harvest fish in a manner that allows them to maintain their way of life.

The understanding that there are only two entities involved, was then applied to actual allocation of harvestable fish. The court's interpretation was that harvest "in common" meant equal distribution between the two entities, or that each is allowed a 50/50 share (American Indian Resource Institute, 1988). Judge Boldt's decision was reaffirmed by the Supreme Court in 1979.

In summary, the Nez Perce Tribe is a recognized sovereign government with historic and legal connections to the condition of salmon runs in the Columbia Basin. The Tribe has pursued avenues to increase salmon runs throughout the years to maintain this cultural heritage, including planning and researching the Proposed Action over the last 12 years.

3.1.3 Demographics and Employment

The Nez Perce Reservation covers about 303 500 ha (750,000 acres) and crosses five counties of north central Idaho: Nez Perce, Lewis, Idaho, Latah, and Clearwater. Two major highways cross the reservation. U.S. Highway 12 travels east to west along the Clearwater River, connecting Montana and Washington; and U.S. Highway 95 travels north and south, connecting Boise, Lewiston, and Coeur d'Alene.

*Additional information can be found in Section 3.10, **Socioeconomics.***

Reservation population is 17,867 (Simone Wilson, 1995). The number of enrolled Nez Perce tribal members is 2,871, of which 1,595 live on the reservation (Simone Wilson, 1995). An additional 300 members of other tribes also live on the reservation (Simone Wilson, 1995). Total Indian population (Nez Perce tribal members and members of other tribes) living within this area is about 11 percent of the reservation population.

The reservation has several small towns, each with some tribal members. The three most important in terms of tribal membership and employment are Lapwai, Kamiah and Orofino (Nez Perce Tribe, 1992).

Lapwai is on the western side of the reservation nearest to Lewiston (see Map 3). About 80 percent of Nez Perce tribal members live in Lapwai since it is the employment hub including central Nez Perce tribal offices, the BIA and Indian Health Service (*IHS*) Unit for Northern Idaho, and the Nez Perce National Historical Park (Nez Perce Tribe, 1992). About 330 people are employed by various federal and tribal government operations in and around Lapwai.

Kamiah, Idaho, is 97 km (60 miles) up the Clearwater River from Lapwai and is where various field offices administered by the Tribe, IHS, and BIA are located (see Map 3). About 15 percent of enrolled tribal members live in and around Kamiah and there are about 62 employees for governmental field offices in the Kamiah area (Nez Perce Tribe, 1992).

About 5 percent of enrolled tribal members live in and around Orofino, Idaho (Nez Perce Tribe, 1992) (see Map 3). Orofino is about 48 km (30 miles) upstream of Lapwai and it is, or has been, the location of field offices for Tribal Head Start, Community Health Representatives, and Tribal Fisheries. Some 20-25 employees of tribal fisheries work in Orofino. The Head Start and Community Health offices have not been open recently. Other Nez Perce tribal members live off the reservation in surrounding communities such as Lewiston, Clarkston and Grangeville.

The Nez Perce Tribal Employment and Training Department has 1,227 tribal members on its work force list (Nez Perce Tribe, 1992). About 65 percent are unskilled and need training or education (Nez Perce Tribe, 1992). Training assistance waiting lists have an average of 135 individuals (Nez Perce Tribe, 1992). Though the seasonally adjusted unemployment rate within the reservation boundaries is 10 percent, Nez Perce tribal members have a seasonally adjusted unemployment rate of about 40 percent, with a high of about 60 percent during winter when seasonal work is unavailable (Nez Perce Tribe, 1992). Similarly, the poverty rate affecting members of the Nez Perce Tribe is about 46 percent, according to figures provided by BIA (Nez Perce Tribe, 1992).

3.2 Cultural Resources

Cultural resources are ***nonrenewable*** evidence of human occupation or activity in any district, site, building, structure, artifact, ruin, object, work of art, architecture, or natural feature important in human history at the national, state, or local level. Cultural resources are important for their potential to provide an understanding of long-term human adaptation as well as information regarding patterns of history and culture. Cultural resources are recorded as historic properties, which include any prehistoric or historic resource included, or eligible for inclusion in, the National Register of Historic Places (***NRHP***). Eligible properties include both properties formally determined as such by the Secretary of the Interior and all other properties that meet NRHP listing criteria (36 CFR 60.4).

3.2.1 Prehistory

*See Section 3.1, **Nez Perce Tribe** for more information about the Nez Perce tribal culture.*

The prehistoric record of the Clearwater River Subbasin is divided into four periods defined by development from a foraging culture to evidence of semi-subterranean houses about 6,000 years ago. Beginning about 3,000 years ago, many traditional Nez Perce patterns appear in the archaeological record and are continually represented since that time (Sappington, 1994). Coeur d'Alene groups also may have reached into the upper North Fork and Little North Fork of the Clearwater River (Chalfant, 1974). The Flathead groups are documented as visiting the eastern headwaters of the drainage (Teit, 1930). Unlike these tribes, the Nez Perce have no migration stories, and other tribes have not claimed to have permanently lived in the Clearwater drainage (Sappington, 1994). This overlapping use of peripheral areas is consistent with land use patterns noted in literature of the broader region.

3.2.2 History

The first historic accounts of this area come from the Lewis and Clark Expedition, which passed through the area in 1805 and 1806. The Nez Perce helped the members of the expedition recuperate before the expedition continued. In 1812-13, a fur trading post was operated by the Pacific Fur company near the confluence of the Clearwater and Snake rivers (Josephy, 1983). The next contact was in 1835 when Samuel Parker entered the area.

In 1836, Henry Spalding established a mission near Lapwai at the request of the Nez Perce (Ruby and Brown, 1986). The missionaries taught reading and writing and introduced farming to the area (Haines, 1955). In 1838, the Smiths opened a short-lived

mission around Kamiah. In 1855, the Nez Perce signed a treaty with the United States. Gold was discovered in the North Fork of the Clearwater in 1861 and this ushered in the mining period and the resulting influx of Euro-Americans. Lewiston and other mining camps developed during this time, though the mining activity and townsites were in trespass on the Nez Perce Reservation (Mattson, et al., 1983). The result of this intrusion was that the Nez Perce were forced to sign another treaty in 1863 that created the reservation boundaries existing today.

In 1900, the railroad reached into the Clearwater drainage as far as Stuart (Kooskia) and a number of stations were located in the drainage. Logging, agriculture, and other forms of industry developed around this time and have persisted.

3.2.3 Study Area

The study area surveyed for cultural resources included the Cherrylane and Sweetwater Springs proposed central hatchery sites, the satellite facilities sites and the general area of the spring chinook direct release sites. Background research, review of previous surveys, an archaeological survey, and test excavations at select areas were done under a contract to the Nez Perce Cultural Resource Program. This work surveyed all of the lands in question and identified cultural resources within the area. Consultation with the Idaho State Historic Preservation Officer (***SHPO***) is ongoing.

Research identified five sites within the study area. All sites are prehistoric and possess characteristics that appear to make them eligible for inclusion in the National Register of Historic Places under Criterion d, scientific information. Cherrylane, Sweetwater Springs, North Lapwai Valley, Cedar Flats, and Luke's Gulch sites had artifacts.

The Sweetwater Springs site may have artifacts that are 9,000 years old, with three possible prehistoric occupations of the site.

Surveying would continue until design is complete and final locations of facilities and road improvements are known.

3.3 Geology and Soils

This section describes existing geologic formations, soil types, geologic hazards including ***seismicity***, ***fault zones***, slope stability, and site-specific erosion characteristics of the soils at proposed facility sites in the Clearwater River Subbasin.

3.3.1 Geology

Geologic forces gradually uplifted the Clearwater River Subbasin between 1 and 13 million years ago and formed the Bitterroot Mountains. Continuous erosion of the uplifted basalt and underlying granite created the web of rivers, streams, and canyons that drain the basin. Erosion has created steep and unstable slopes. Gravity and water have transported slope debris to valley bottoms and floodplains. Other landforms created within the Clearwater River Subbasin include ***breaklands***, upland basins, rolling hills, deep canyons, mountain peaks, and alpine ridges.

➲ For Your Information

__Breaklands__ are relatively steeply sloping, typically have basalt outcrops, and represent a transitional zone between valley bottoms and upland basins.

Breaklands are transitional slopes underlain with basalt between valley bottoms and upland basins. Slopes and soils vary, with some basalt outcropping at the surface and the erosion potential of soils varying.

Deep canyons formed where rocks and soils eroded down to underlying granite. Wind erosion formed upland basins and rolling hills by transporting and depositing eroded materials. The upland basins and rolling hills make up the Palouse steppe and include most of the upland drainage on top of the basalt breaklands. Farther upstream and upslope are mountain peaks and alpine ridges formed as wind, water and temperature weathered rocks made of granite, ***gneiss*** and ***schist***.

__Gneiss__ is a banded metamorphic rock with the same composition as granite. __Schist__ is a metamorphic rock consisting of laminated, often flaky, parallel layers.

3.3.1.1 Central Incubation and Rearing Facilities

The Cherrylane site is on depositional debris from nearby canyons and the Clearwater River in the valley bottom. Sweetwater Springs is in a canyon shielded by breaklands.

3.3.1.2 Satellite Facilities

The North Lapwai Valley site is on the valley bottom along Lapwai Creek near the mainstem of the Clearwater River. The remaining five satellite sites are in canyons formed by rivers and streams in upland basins. Nearby slopes at these sites are breaklands or upland basin landforms.

3.3.1.3 Spring Chinook Direct Release Sites and Weir Sites

The spring chinook direct release sites are in upland basins along extended reaches of tributaries to the Lochsa and Selway rivers. Similarly, all weir sites are on tributaries to the Clearwater, South Fork Clearwater, Selway, and Lochsa rivers in canyons of upland basins.

3.3.1:4 Seismic Hazard

All proposed facilities are within the Clearwater River Subbasin. Although no major geologic faults have been located within the subbasin, 11 seismic events have been recorded since 1800. The events were felt by many individuals, but structural damage was slight.

Cherrylane is the only proposed facility near a known seismic activity zone, the minor Cherrylane fault. This fault is a zone of high permeability due to rock fracturing or from ancient stream channels following the fault (Sprenke and Breckenridge, 1992). No specific engineering design requirements exist beyond adherence to the Uniform Building Code for seismic protection.

No other proposed facilities are within a known seismic activity zone.

3.3.2 Soils

Soils within the Clearwater River Subbasin vary in composition and characteristics, but generally range from very deep (greater than 1.5 m [60 inches]) and well drained ***silty-loams***, to sandy subsurface soils, and rock outcrops. Unique features of the breaklands and the granitic mountain geology discussed previously include a severe erosion potential. Weathering breaks down the basalt or granitic rocks easily into smaller particles.

Because of their moderate to steep (60 to 90 percent) slopes, the breaklands have a moderate rating for potential ***mass failure*** such as landslides. Building and road construction on these slopes require additional measures to control or minimize erosion or slide potential.

3.3.2.1 Central Incubation and Rearing Facilities

The Cherrylane site is on soils of the Uhlig Silt Loam soil complex that originate on alluvial terraces, and are very deep and well-drained. The soils have moderate permeability and high water capacity. The soils have a potential for erosion with rapid water runoff. The Cherrylane site is relatively flat, however, which reduces the erosion potential.

The Sweetwater Springs site is on soils in the Lapwai-Bridgewater soil complex that originate on stream terraces with very deep and well-drained silty-loams. These soils have moderate permeability and hold water for later use by vegetation. The site is on a flat terrace and erosion potential is low.

3.3.2.2 Satellite Facilities

The Luke's Gulch site is on soils of the Klickson-Suloaf soil complex that are in very steep, north facing canyons. Soil composition is 45 percent silt-loam and 25 percent cobbly-silt loam, with the remaining soil a combination of gravelly-loam, rock outcrop and other similar soils. The Klickson silt loam drains well and has moderate permeability, but in combination with slope and other soil properties, rapid runoff, slope instability (landslide) and severe surface erosion are possible. The Luke's Gulch site is on a flat terrace below a steep slope so the erosion potential is reduced.

The Cedar Flats site is on a variety of soil types that are generally fine textured with low to moderate erosion potential. Specific information describing the drainage characteristics, permeability and water capacity are not available, requiring on-site soil testing prior to construction. Nearby slopes (across the road) are moderate to steep, but the site itself is on a flat terrace.

The North Lapwai Valley site is on soils in the Lapwai-Bridgewater soil complex on a stream terrace with very deep and well-drained silty-loams. These soils have moderate permeability and flooding and erosion of surface soils would be rare.

The Yoosa/Camp Creek site soils are dark brown silty loams with decomposed organic material in the top 26 cm (10 inches). Soils display characteristics of seasonal saturation.

loess Fined grained material, dominated by silt-sized particles and deposited by wind.

The Mill Creek site is on surface soils that formed in volcanic ash-influenced *loess*, a type of wind deposit mixed with underlying highly-stratified sandy deposits. These soils are well or moderately well-drained. The site is in a shallow V-shaped draw bottom, and adjacent slopes are moderate to steep (60 to 90 percent). The soil type on the slopes has a high erosion potential, particularly for road building.

Newsome Creek was extensively mined in the past and the site is mostly mined stream rubble and sediment. Soils near the site have characteristics similar to the Mill Creek site. Stratified, sandy subsoil deposits are common in this region, and adjacent slopes could be unstable and erode if disturbed.

3.3.2.3 Spring Chinook Direct Release Sites and Weir Sites

Spring chinook direct release sites and weir sites are all located in the upland region of the Clearwater River Subbasin or upper drainages and tributaries of the South Fork Clearwater River, Selway River, and the Lochsa River.

This region has similar soil and slope characteristics that include very steep breaklands with dense mineral soil derived from hard crystalline rocks (schist, gneiss and granite). Surface soils were formed by the volcanic-ash influenced loess and mixed with the underlying sandy material. The dominant slopes are moderate to steep and have a northerly aspect. As discussed previously, disturbed or exposed soils in this region with these soil characteristics tend to ***slump*** and erode. Road construction and other activities on steep slopes increase the potential for debris avalanches and ***mass wasting***. The Lochsa River drainage has greater susceptibility to these events because of soil properties and the degree of weathering within this region. Proposed facilities within this drainage area would be limited to temporary monitoring weirs or spring chinook direct release sites.

mass wasting *The slow downward slope of rock debris.*

3.4 Water Resources

This section includes a description of existing groundwater and surface water conditions in the Clearwater River Subbasin of Idaho. Major topics of the groundwater section include a discussion of temperature and quantity in the overall region and at the specific facility sites that require groundwater. The surface water section includes a discussion of river flows, temperature, and quality in the overall region and at specific sites.

3.4.1 Groundwater

Proposed facility sites are next to streams and the flow of groundwater at these sites is generally hydraulically linked to surface water flow. The major advantage for groundwater use at the sites is its relatively constant temperature, about 16 degrees C (60 degrees F). This water can be used to temper the extreme cold surface water temperatures found in the region during November through March and warm summer flows. Groundwater is also considered to be free of pathogens that affect fish.

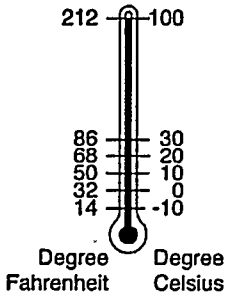
3.4.1.1 Central Incubation and Rearing Facilities

At Cherrylane, two wells can provide 18.9 m^3/min for the proposed facilities (see Table 2-1). Projected depth to water (drawdown) for wells at this pumping rate is less than 30 m (100 ft) after 100 days of pumping. Water quality, quantity and temperature would remain relatively constant even if a well is operated year-round. Groundwater temperature at the site is relatively warm, 17 degrees C (62 degrees F), and would be mixed with surface water in the winter and summer to provide temperature control. The water supply at Cherrylane is of acceptable quality and quantity for fish culture purposes.

Groundwater (spring flow) is currently used at the Sweetwater Springs facility and is of acceptable quality and quantity for fish culture purposes. The spring provides approximately 3.4 m^3/min of 9-10 degree C (48-50 degree F) water year-round (Montgomery Watson, 1994). This spring serves existing hatchery facilities and has been shown to be adequate for incubation and salmon rearing. The existing spring would be the only source of water supply at this site.

3.4.1.2 Satellite Facilities

The Luke's Gulch site would require groundwater for fish production. Groundwater information for this site was obtained from Ralston (1992). Results of groundwater testing indicate that a water supply 1.7 m^3/min (450 gpm) can be obtained from two production wells at the site.



Water quality of the groundwater obtained from two test wells appears to be acceptable for salmon culture. The temperatures remain relatively constant at 17 degrees C (62 degrees F). Mixing with surface water would be required in the spring and summer to achieve desired temperatures.

Groundwater would also be used at the proposed North Lapwai Valley site. Three deep wells have been developed and yield 2.5 m^3/min (670 gpm) of 16-17 degrees C (59-62 degrees F) water. The well water is free from diseases that affect fish.

Surface water would be used at all other satellite facilities.

3.4.1.3 Spring Chinook Direct Release Sites and Weir Sites

The spring chinook direct release sites and weir sites do not require groundwater.

3.4.2 Surface Water

The Clearwater River Subbasin provides approximately one-third of Snake River flow and has a drainage area of approximately 24 980 km^2 (9,645 mi^2). The Clearwater River mainstem joins the Snake River 224 km (139 miles) upstream of the Columbia River. The major tributaries of the Clearwater are the North Fork Clearwater, South Fork Clearwater, Middle Fork Clearwater, Lochsa, and Selway rivers.

Based on available flow information, the average river flows at most of the facility sites are more than adequate, however, large annual flow variations can occur due to varying degrees of snowpack (Nez Perce Tribe and Idaho Department of Fish and Game, 1990.)

Overall water quality in the Subbasin is good, particularly in the Lochsa and Selway rivers' drainages. The water quality for streams draining the Clearwater and Nez Perce National Forests is considered to be very good to excellent.

Water quality in the mainstem Clearwater River and its tributaries has been affected in the past by agriculture, forestry, mining and residential development, with sediment the major pollutant. However, impacts tend to be site-specific and are normally caused by high runoff events (rain or rain-on-snow). Localized erosion and sedimentation are attributed to livestock grazing, road construction, farming, and natural slumps. Fish pathogens are always found in natural flowing waters. Sediments and fish pathogens can be drawn into hatchery facilities that use surface water.

Elevated stream temperatures, especially associated with low streamflow, can constrain fish production in the mainstem of the smaller drainages and the smaller tributaries of the mainstem, lower South Fork, and Middle Fork Clearwater River drainages. The recommended range of rearing temperatures for salmon is between 5-16 degrees C (40-60 degrees F). Stream temperatures exceeding 16 degrees C (60 degrees F) are typically encountered during July and August.

3.4.2.1 Central Incubation and Rearing Facilities

The Cherrylane site is on the mainstem of the Clearwater River. Monthly average minimum river flows at Spalding, which is 9.6 km (8 miles) downstream, typically range from a minimum of 18.9 m^3/min (5,000 cfs) in October to a maximum of 59 455 m^3/min (35,000 cfs) in June (Arnsburg, et al., 1989). About 11.4 m^3/min is needed to add to the available groundwater at the site. This site could potentially be exposed to contamination from spills on U.S. Highway 12.

Recommended production water temperatures are typically exceeded during July and August, and sometimes in June. Fish eggs in the facility during August would be in water cooled by chillers.

3.4.2.2 Satellite Facilities

The Luke's Gulch site is on the South Fork Clearwater River at River KM 14 (River Mile 9), approximately 6 km (4 miles) upstream from the town of Stites. Monthly average minimum river flow typically ranges from 187 m^3/min (110 cfs) in October to 1614 m^3/min (950 cfs) in May. A 6.2 m^3/min (1,650 gpm) river water intake would be developed. This site could potentially be exposed to contamination from spills on State Highway 13.

Recommended production water temperature is typically acceptable during the proposed rearing period (February through June). Surface water temperatures would be moderated by groundwater flow from July through September when adults would be held.

The Cedar Flats site is on the Selway River at River KM 8 (River Mile 5). Monthly average minimum river flow typically ranges from a minimum of 552 m^3/min (325 cfs) in October to a maximum of 13 507 m^3/min (7,950 cfs) in May. About 10.2 m^3/min (2,700 gpm) of surface water is needed at this facility.

Recommended production water temperature is typically exceeded during July and August, and sometimes in June and September when adults would be held. However, pond shading, adequate flow and low densities would moderate stress caused by increased temperatures.

The North Lapwai Valley site is on Lapwai Creek, 0.8 km (0.5 mile) upstream from the confluence with the Clearwater River. Stream flow will be used at this facility in conjunction with groundwater. The greatest need for facility flow is during June. Monthly average stream flow during June is 91.6 m^3/min (53.9 cfs). Approximately 5.8 m^3/min (1,530 gpm) of surface water will be needed for maximum production during late May and June.

Recommended water temperatures would not be exceeded during the February through May rearing period. Seasonal sedimentation and pathogens could occur at this site because it is surrounded by land used for agriculture. This site could potentially be exposed to contamination from spills on U.S. Highway 95.

The Yoosa/Camp Creek site is at the convergence of Yoosa and Camp creeks. The proposed facility would withdraw a portion of its water supply from each stream. As neither of these streams appears to have been gauged, monthly flow was estimated using a hydrologically similar drainage basin. The most suitable drainage to base this comparison on was Fish Creek near Lowell, Idaho, which has a similar drainage area, elevation, and forest cover. The flow data are based on Fish Creek, adjusted by the ratio of drainage areas for the two basins. Due to site-specific differences in precipitation and runoff, true streamflow at this site could vary significantly from predicted values.

The Proposed Action states that no more than one half of either creek would be diverted for rearing purposes so as not to adversely impact instream habitat. The measured streamflows at this site indicate that it should be possible to provide the required facility flows, 3.8 m^3/min (1,000 gpm), without exceeding one half of available streamflow.

Water temperatures at Yoosa/Camp Creek are low due to the elevation and forest cover, and are expected to be ideal for rearing during the operational months of the facility (May through October).

The Mill Creek site is about 3.2 km (2 miles) from the mouth of the creek at the Clearwater River. Mill Creek has not been gauged in the past so it was necessary to estimate the monthly streamflow using an estimate based on Fish Creek, similar to the method used for the Yoosa/Camp Creek site. Available streamflow at the Mill Creek site appears to be adequate for the required facility flows, 1.1 m^3/min (300 gpm), for any month during the year.

Water temperatures at the Mill Creek site are expected to be satisfactory during the anticipated operating period (May through October) because of cover and elevation, low densities and adequate water flows.

The Newsome Creek site is upstream from the confluence of Newsome and Beaver creeks. The site is on dredged tailing deposits from upstream mines. Although Newsome Creek was extensively dredge mined, the USFS has worked to mitigate the effects or potential effects from an abandoned placer mine upstream over the last 20 years. BPA and USFS also have been actively restoring and enhancing riparian habitat along Newsome Creek. The USFS has been attempting to trap sediment and keep it from entering Newsome Creek since 1985. The agency has recently implemented a rehabilitation plan to keep sediment out of the creek. The project involves maintaining and reinforcing existing sediment traps to prevent sediment from reaching the waterway. The rehabilitation of the ***gloryhole*** is necessary to reduce the potential for a major catastrophic event, according to the USFS. This proposed project is scheduled to be completed in 1996. The water quality in Newsome Creek is considered good.

*See Section 3.9, **Land Use**, for more information.*

gloryhole *A term used for an hydraulic placer mine.*

Streamflows were estimated for Newsome Creek using a hydrological estimate based on Fish Creek, similar to the method used for the Yoosa/Camp Creek and Mill Creek sites. Streamflow is adequate for the required flows, 2.3 m^3/min (600 gpm), for the Proposed Action.

Water temperatures at the Newsome Creek site are expected to be within the minimum recommended standard for rearing when the facility would be in operation because of the elevation.

3.4.2.3 Spring Chinook Direct Release Sites and Weir Sites

All spring chinook direct release sites and weir sites are in the upper reaches of the South Fork Clearwater, Selway, and Lochsa rivers and their tributaries. These sites were selected because they have acceptable water quality, instream habitat, and streamflows

for natural production. In general, similar water quality is expected as at the Yoosa/Camp Creek, Cedar Flats, Mill Creek, and Newsome Creek sites, which are also located in the upland region. At these satellite sites, water temperature was the primary water quality characteristic of concern. Water temperature is expected to be within the recommended standards during the periods when the facilities are operating.

3.5 Floodplains

The Federal Emergency Management Agency (FEMA) identifies a ***100-year floodplain*** as an area that has a 1 percent chance of being flooded in 100 years. Restrictions are placed on certain developments within floodplains and mitigation measures are sometimes required. A development can be built in the floodplain if the proposal depends on the river (e.g., a hatchery) and measures are taken to assure that the flood level would not rise.

Floods in north central Idaho are created by high spring runoff from melting snowpacks, warm winter rain on snow or a combination of rain on melting snowpacks. Juvenile salmonids would be acclimated at satellite facilities during the spring runoff, from the end of May through the first part of June.

3.5.1 Floodplain Determination Methods

FEMA has not prepared floodplain maps for any of the proposed facility sites. To determine the 100-year floodplain at each site, the 100-year flood elevation was estimated and compared to the elevation at the site. Analysts used existing U.S. Geological Survey stream gauge records at stream locations as close to each site as possible to determine channel characteristics at each site: slope; channel roughness; bottom width, and top width. The data were then used to determine a channel's flood capacity.

3.5.2 Central Incubation and Rearing Facilities

The Cherrylane and Sweetwater Springs sites are estimated to be outside the 100-year flood elevation. Water inlets and outlet structures would be located within the stream channel.

3.5.3 Satellite Facilities

The Luke's Gulch, Yoosa/Camp Creek, and North Lapwai Valley sites are estimated to be outside the 100-year floodplain.

Based on the natural topography at the site and the deposits in the river upstream and downstream of the site, Cedar Flats would be within the 100-year floodplain and would be impacted by a flood of this magnitude.

At Mill Creek, some or all of the facility could potentially be within the 100-year floodplain, because available flat space is limited due to the topography.

At Newsome Creek, some or all of the facility could potentially be within the 100-year floodplain. However, it may be possible to locate the facility high enough or far enough from the creek to be outside the 100-year floodplain. Final facility design would evaluate the site topography to determine if this is possible.

3.5.4 Spring Chinook Direct Release Sites and Weir Sites

FEMA has not mapped the areas of the spring chinook direct release sites or weir sites. Direct release sites require no development, and potential for impact is minimal. All weirs would be located within the active stream channel. These structures are designed to minimize changes in stream hydraulics and result in no backwater upstream of the weir sites.

3.6 Fish

This resource section is divided into three general sections. The first section presents an overview of the historical and contemporary species composition of the Clearwater River Subbasin. The second section discusses fish biology and the third section describes the existing condition of habitat areas that may be directly and indirectly affected by the Proposed Action.

3.6.1 Overview of Historical and Contemporary Fish Communities

biomass *Total weight of organisms per unit volume.*

The historical fish community in the Clearwater River Subbasin was structured from headwater to lower elevation reaches. Species diversity and ***biomass*** generally increases downstream in response to increased water temperatures, productivity, habitat size, and niche diversity (substrate, food types, etc.). Fish species in headwater reaches such as cutthroat and bull trout, generally require cooler water temperatures, feed primarily on aquatic and terrestrial insects, and are limited in numbers by physical factors such as the availability of pools and cover. Species found at lower elevations tend to be more temperature tolerant, are either

omnivorous or large invertebrate-fish predators, and are regulated in number to a greater degree by biological rather than by physical factors (Li, et al., 1987).

Most tributaries to the South Fork Clearwater, North Fork Clearwater, Selway and Lochsa meander through high altitude meadows before cutting steeply down through wooded canyons bisecting the main river valley. If accessible, these upstream areas were likely used at one time by anadromous chinook and steelhead since they typically contain excellent spawning and rearing habitat. Farther upstream, westslope cutthroat trout and sculpins predominated. Bull trout and the infrequent dace and sucker were in the upstream reaches of fish-bearing streams in the Clearwater River system.

Downstream of the headwater zone and extending all the way to the tributary mouth, the fish assemblage transitioned to one dominated by steelhead, chinook salmon, older cutthroat and bull trout, and mountain whitefish. The change appears to be a function of the local ***thermal regime***. Coho salmon may also have been present, however, the evidence for this is inconclusive. Accounts of coho returning to the Clearwater drainage by Nez Perce Indians and early non-Indian residents are reported by Lane, et al., (1981) and Schoning (1940). Sculpins and longnose dace were widely distributed, living close to the bottom and in backwater pools. Suckers scoured the stream bottom for food.

Low elevation mainstem and tributary reaches of the Clearwater River supported a mix of Pacific lamprey, suckers, redside shiners, sculpins, mountain whitefish, and, less commonly, adult salmonids. These fish may have been abundant as well in lower elevation tributaries where low streamflows cause high water temperatures.

The fish community found in the Clearwater today differs in several important respects from the historical assemblage. Some species have either dropped out entirely or exist as remnant populations (see Table 3-2). Most notably, indigenous populations of salmon have been eliminated from the Clearwater River. The spring and fall chinook that spawn naturally in the Subbasin today are hatchery fish, the descendants of hatchery fish, or the descendants of fish from other areas that strayed into the subbasin at some time in the past. Coho salmon are believed to be extinct (NPT and IDFG, 1990). Cutthroat and bull trout populations are also in decline. The formerly abundant Pacific lamprey presently returns to the Clearwater in very low numbers. Steelhead were once found in all streams that contained suitable spawning habitat; they, too, are no longer as abundant nor distributed as widely as they were under pristine conditions.

Table 3-2
Status of Native Fish of Free-Flowing Sections of the Clearwater River

A-run steelhead *return to the drainage in the fall and spawn in small, lower elevation streams in the late winter and early spring. The larger-bodied* ***B-run steelhead*** *return in the fall or the spring and spawn in medium-size, higher elevation streams from March to June.*

Species	Status	
	Historical	Current
Spring Chinook Salmon *Oncorhynchus tshawytscha*	Abundant	Rare
Summer Chinook Salmon *Oncorhynchus tshawytscha*	Unknown	Extinct
Fall Chinook Salmon *Oncorhynchus tshawytscha*	Common	Rare
A-run Steelhead *Oncorhynchus mykiss*	Abundant	Rare
B-run Steelhead *Oncorhynchus mykiss*	Abundant	Rare
Coho Salmon *Oncorhynchus kisutch*	Unknown	Extinct
Westslope cutthroat trout *Oncorhynchus clarki*	Abundant	Common
Bull Trout *Salvelinus confluentus*	Common	Rare
Mountain Whitefish *Prosopsium williamsoni*	Common	Common
Piute Sculpin *Cottus beldingi*	Abundant	Abundant
White Sturgeon *Acipenser transmontanus*	Rare	Rare
Shorthead Sculpin *Cottus confusus*	Common	Common
Torrent Sculpin *Cottus rhotheus*	Common	Common
Mottled sculpin *Cottus bairdi*	Common	Common
Pacific Lamprey *Lampetra tridentata*	Common	Rare
Northern Squawfish *Ptychocheilus oregonensis*	Common	Common
Longnose Dace *Rhinichthys cataractae*	Common	Common
Speckled Dace *Rhinichthys osculus*	Abundant	Abundant
Redside Shiner *Richardsonius balteatus*	Common	Common
Bridgelip Sucker *atostomus columbianus*	Common	Common
Largescale Sucker *Catostomus macrocheilus*	Rare	Rare
Chiselmouth *Acrocheilus alutaceus*	Rare	Rare
Sand Roller *Percopsis transmontana*	Unknown	Unknown

Source: Maughan, 1971; IDFG, 1991; Nez Perce Tribe unpublished data; USFWS, 1996.

3.6.1.1 Causes of Change in the Fish Community

The Clearwater fish community has changed in composition over time due to natural and human disturbances.

Natural Disturbances — Natural events such as glaciation, changing climate regimes, volcanic eruptions, and on a shorter time scale, floods, fire, and landslides have altered the terrestrial landscape, and with it the aquatic ecosystem. For example, in the past 100 years, fire has denuded large tracts of land in the Clearwater River Subbasin at least three times. Vegetation loss due to fire has increased erosion, runoff rates, sedimentation, and water temperatures. These physical processes and variables affect species composition, aquatic productivity, and the quality and availability of fish habitat.

Natural disturbances can cause a temporary decline in salmon populations, but over the long run they usually act to maintain environmental heterogeneity and stimulate salmon production. Pacific salmon evolved in unstable freshwater environments. They can adjust to natural disturbances if they are not too severe and enough time exists for them to recover between successive events.

Human Disturbances — The activities of humans, including land development and use, resource extraction, recreation, dam construction, water withdrawals and diversions have altered the natural condition of the Clearwater River Subbasin. The result has been the loss, degradation, and simplification of aquatic habitat. Many of the physical changes have been so severe and have occurred so fast that the resident biota and natural recovery processes have been unable to adjust and compensate. For example, logging, road building, mining, and agricultural activities are known to cause many adverse effects including higher water temperatures, increased erosion and sediment input to streams, and decreased instream and streambank cover. These types of disturbances have a much greater impact on the aquatic environment because they occur over a larger area and at much more frequent intervals than does fire.

Other examples of human-related activities that have diminished aquatic habitat in the Clearwater River Subbasin include dredge and hydraulic mining in the upper South Fork Clearwater drainage, log driving in the mainstem Clearwater and the lower ends of its principle tributaries, and residential development along lower portions of the Clearwater River. These activities, acting concurrently with other natural and human disturbances, have influenced the composition of the Clearwater fish community and contributed to a decline in the productivity of many species.

Habitat losses notwithstanding, the principal factor responsible for recent declines of anadromous salmon and steelhead in the Clearwater River Subbasin was the construction and operation of large multipurpose dams along the migratory route of these species. The dams were constructed to generate power, control floods, facilitate navigation, and transport logs to mills. Over 20 dams were built in the Clearwater River Subbasin alone. Three have had a dramatic impact on fish resources: Lewiston Dam, built at the mouth of the Clearwater near Lewiston in 1927; Harpster Dam, built on the South Fork near the town of Stites in 1910; and Dworshak Dam, built at the mouth of the North Fork Clearwater River in 1974. These three dams eliminated chinook in hundreds of miles of formerly accessible habitat. Harpster Dam and Dworshak Dam completely blocked access to upstream areas on the South Fork and North Fork. Lewiston Dam and Harpster Dam were removed, but Dworshak Dam remains. There are currently no plans to reconfigure Dworshak Dam to provide passage for anadromous fish.

Eight run-of-the-river hydroelectric dams have been built on the mainstem Snake and Columbia rivers downriver from Lewiston. The first was Bonneville Dam, the lowermost project, in 1937. Lower Granite Dam, the last and farthest upriver of the eight dams, was completed in 1975. These dams created a series of slackwater impoundments and barriers to migration that have reduced smolt-to-adult survival to the point that, on average, fewer than two fish return for every pair of fish that spawned in the previous generation. Dams, in combination with other human impacts, led to the extinction of Clearwater chinook and the listing of chinook populations from the Snake River Basin as threatened under the ESA.

Certain human activities have generated substantial fisheries benefits within the Clearwater River Subbasin. Artificial propagation, habitat enhancement, and other fisheries management actions have helped restore and protect chinook salmon populations in many areas of the watershed, and support a nationally-known steelhead sport fishery.

An average of 14,000 steelhead are caught each year in the Clearwater by tribal and non-tribal fishermen. Up to 50 percent of the steelhead produced by Dworshak Hatchery are outplanted in the South Fork Clearwater to support the sport fishery between Orofino and Kooskia, and to supplement natural production. Similar efforts have failed to increase chinook production to sustainable levels.

Fishing — Fishing was another major cause of change in the relative abundance of salmon and trout in the Clearwater River system. Chinook, coho, sockeye, and, to a lesser extent steelhead from the Columbia River were harvested in ocean and freshwater commercial fisheries that grew rapidly in the later parts of the

1800s. The annual catch of Columbia River salmon peaked in 1883 at 20 400 metric tons (21,400 tons), declined to around 11 900 metric tons (12,500 tons) by 1890, and fluctuated about this level for the next quarter century (Beiningen, 1976). At an average of 9 kg/fish (20 pounds/fish), this equals 1.5 to 2.5 million fish a year. The apparent stability of the fishery belied the over-exploitation and rapid decline in abundance of spring and summer chinook that occurred during this period. As stocks of spring and summer chinook were depleted, the fishery began to target fall chinook. Up until Lewiston Dam was built, Clearwater chinook populations were probably affected to the same extent by these activities as other Snake River tributary populations (Craig and Hacker, 1940).

Commercial, sport, and Tribal fishers today catch fewer Snake River chinook and a much smaller percentage of the total upriver fish than they did previously.

Introductions and Invasions of Non-Native Species — The introduction and spread of non-native species in the watershed was also partly responsible for recent changes in the Clearwater River fish community. Some of these species are now so abundant that they will undoubtedly interact with juvenile chinook through competition, predation or other means. Brook trout, for example, were introduced as a sport fish in the early part of the century, and have subsequently spread throughout the Clearwater system. Brook trout compete directly with chinook, bull trout, and cutthroat trout for food and space in headwaters. They also reproduce with bull trout that live in similar habitats.

In the past, non-native resident rainbow trout and cutthroat trout were raised in hatcheries and released into Clearwater streams and lakes by the IDFG with the goal of augmenting the recreational fishery. There is no evidence that these fish have established viable populations, but they may have hybridized with locally adapted fish. They also attracted anglers who killed juvenile steelhead, chinook, and bull trout.

Non-native populations of smallmouth bass were recorded in Lewiston Dam counts in 1928, and so have long been a component of the fish community. The creation of reservoir habitat by mainstem dams and recent increases in water temperatures caused by logging, urban and agricultural development, and fires have helped smallmouth bass and other warmwater species spread into the Clearwater River system.

Other non-native populations include carp, rainbows, kokanee, largemouth bass, tench, yellow perch, pumpkinseed, black crappie, and brown bullhead.

3.6.2 Fish Biology

3.6.2.1 Chinook Salmon

Chinook salmon exhibit two basic life history strategies called stream-type and ocean-type (Gilbert, 1912), depending on the length of time the juveniles spend in freshwater before migrating to sea. Stream-type chinook populations are typically found in colder streams and rivers, either at higher elevations or in interior drainages of the Pacific Northwest and rear for one or more years in freshwater. Ocean-type chinook occur in warmer coastal streams and mainstem reaches of large rivers such as the Snake and Columbia and migrate before the end of the first year.

Chinook populations are further differentiated into spring, summer, fall, and winter-run races based on the time of year that adults return to freshwater to begin their upstream spawning run (Johnson, et al., 1991). All but winter chinook occur in the Columbia River Basin; the distribution of winter chinook is limited to a few California river systems. Migration timing is useful for management purposes, but is an unreliable indicator of taxonomic status or evolutionary relationship. Other factors such as genetic similarities, spawning location and time, length of freshwater residency, and timing of juvenile outmigration need to be considered in differentiating chinook salmon stocks.

The best available scientific information indicates that Snake River spring chinook and summer chinook make up a single species or ESU (Matthews and Waples, 1991) that is distinct from the Snake River fall chinook ESU (Waples, et al., 1991). Snake River spring/summer chinook (henceforth referred to as spring chinook) are stream-type chinook. Snake River fall chinook are ocean-type chinook. Spring chinook are readily differentiated from fall chinook salmon. Fall chinook salmon pass Bonneville Dam in August through October, spawn later in the fall, spawn and rear in mainstem areas rather than in tributaries, outmigrate in their first year of life, and possess unique genetic characteristics.

Although summer chinook are aggregated with spring chinook in the Snake River, distinct populations of fall spawning, ocean-type summer chinook occur in several large tributaries to the mid-Columbia River. There is evidence that a similar race of chinook existed at one time in lower reaches of the Grande Ronde and possibly in other large tributaries to the Snake River (Cramer, 1995). The term summer chinook is used in this document to refer to an early fall spawning, ocean-type chinook, similar to those currently found in the mid-Columbia River.

Spring Chinook Salmon — Adult spring chinook, primarily 4-year olds but ranging in age from 3 to 5 years, return to the Clearwater River Subbasin from May through September. They

typically hold in deep pools until spawning in late August or September. Early arriving spawners tend to spawn earlier and at higher elevations than late arriving spawners. Spring chinook spawn in cool, low to moderate gradient streams that provide good summer-long rearing conditions for juvenile fish. Spawning and rearing habitat includes most tributaries of the upper Clearwater River Subbasin (see Map 4). As is typical of salmonids, eggs are deposited in redds dug in suitable spawning gravel. There are no similar-sized fish spawning at the same time as the salmon, so hybridization is unlikely and competition for spawning and incubation habitat is between similar salmon.

Depending on water temperatures, spring chinook fry in the Clearwater River usually hatch in December and emerge from the gravel in late February and March, but they may emerge as late as June. Emergent fry disperse downstream into pools and other low velocity areas. As they grow larger, juvenile chinook live closer to the head of the pools where there is better access to drifting food. Aquatic and terrestrial immature and adult insects are the primary food of juvenile chinook.

In Idaho, if a stream was at carrying capacity, densities of spring chinook fingerlings (parr) could be expected to range from 90 fish/100 m^2 in excellent habitat to 10 fish/100 m^2 in poor habitats (NPT and IDFG, 1990). These densities are very high and indicate that salmon were and could be the dominant fish species in mountain stream habitats of the Pacific Northwest. Because salmon and steelhead are usually the most common inhabitants of these habitats, they have adopted mechanisms to coexist. The chinook fry emerge earlier than steelhead fry, so they are generally not competitors when they are very small. As they grow larger, the chinook tend to congregate in the pools and reside throughout the water column, whereas similar-sized steelhead occupy more swift areas found in runs and riffle habitat. Larger steelhead coexist with smaller chinook in pools, but differences in body size and habitat tend to minimize competition.

Spring chinook typically rear for a year in freshwater before starting their seaward migration. However, many parr migrate from nursery to overwintering areas in lower tributary and mainstem reaches in the fall. The onset of morphological and physiological changes associated with smolting and seaward migration of yearling spring chinook usually occurs in early spring. Emigration peaks in April and May, typically just prior to the peak runoff period in the Snake River Basin. Migratory timing and behavior is controlled by genetic and environmental factors (Randall, et al., 1987). Time of entry into saltwater depends on river flows and whether fish are collected and transported by barge to release points downstream of Bonneville Dam.

Spring chinook spend relatively little time in the Columbia River estuary before migrating offshore where they spend one to three years rearing before returning to freshwater to spawn (Howell, et al., 1985). Information on estuarine residence times and the marine distribution of spring chinook is limited. Snake River-bound adult spring chinook pass Bonneville Dam between late February and June, peaking in late April and early May. Fish destined for higher elevation streams tend to be the first to arrive on the spawning grounds (Matthews and Waples, 1991).

Summer Chinook Salmon — Adult Snake River chinook that migrate past Bonneville Dam in June through July and spawn in tributaries have traditionally been called summer chinook. However, as mentioned earlier, Snake River spring and summer chinook are now considered a single species by federal fisheries managers for purposes of administration of the ESA.

The type of summer chinook referred to as Snake River summer chinook in pre-ESA documents probably existed at one time in the Clearwater River Subbasin, but appears to be absent from the existing species complex. There is compelling evidence that another form of summer chinook, an ocean-type fish that spawned later in the autumn than spring chinook but earlier than fall chinook, may also have existed within the Subbasin in the recent past. This form of summer chinook still exists in several larger tributaries to the mid-Columbia River. It would have spawned at intermediate elevations and, unlike Snake River spring/summer chinook, would have migrated to the ocean as subyearling, ocean-type chinook. The densities of summer chinook smolts from the existing mid-Columbia populations are very high, like those of the fall chinook, because they begin outmigration soon after emerging from the gravel.

Although direct evidence is lacking, the historical existence of an ocean-type summer chinook in the Clearwater River is based on three observations:

- Hatchery records from the early 1900s indicate that a late spawning (early September to end of October), subyearling outmigrant form of wild summer chinook historically occurred in the Grande Ronde River, a nearby tributary to the Snake River that is similar in size to the Clearwater River;
- A similar race of ocean-type summer chinook salmon presently returns to tributaries of the mid-Columbia River and,
- Ocean-type summer chinook have the spawning times and juvenile life histories that are best matched to the temperature regimes found in the mainstem Clearwater River and lower portions of its major tributaries.

It is not clear what may have eliminated summer chinook from the Snake River Basin, but the most plausible cause is that the populations were overfished to the point that they could not sustain themselves. Harvest rates on summer chinook averaged 89 percent during 1938-1944 and, although accurate estimates are not available, probably ranged much higher earlier in the century (WDF and ODFW, 1992). It is also possible that intense fishing pressure caused a genetic shift towards earlier and later migration and spawning times, that is, toward spring and fall chinook life history types, among the survivors. A similar response to over harvest was documented for coho salmon from the Clackamas River (Cramer, et al., 1991).

The type and quality of habitat present in the system suggests that summer chinook production is possible. Cramer (1995) examined the temperature regimes of upper Clearwater and Selway rivers and found that mean monthly temperatures in those streams generally drop to 2 degrees C (36 degrees F) by mid-to-late November. Studies indicated that spawning cannot occur before water temperatures have dropped below 14 degrees C (37 degrees F) (the upper tolerance limit of freshly spawned eggs). Spawning must also occur early enough for the eggs to develop to a stage at which they can tolerate near-freezing temperatures. Embryonic development must progress to the eyed stage before temperatures reach 2-5 degrees C (36-41 F) if the eggs are to avoid excessive mortality (Beacham and Murray, 1990). Cramer (1995) compared the temperature data with the biological tolerances of chinook and the substrate conditions to determine that a summer chinook would be suitable to outplant in the lower Selway River (see Map 4). The progeny of summer chinook that spawn in these areas would migrate to sea in their first summer of life to avoid high water temperatures in the upper Clearwater during summer.

Fall Chinook Salmon — Snake River fall chinook (which includes those bound for the Clearwater) usually pass Bonneville Dam beginning in August and Lower Granite Dam by mid-August. They spawn predominantly in the Snake River, but also in lower reaches of its larger tributaries, the Clearwater, Grand Ronde, Imnaha and Salmon rivers. Recent redd counts show that approximately one quarter of the fall chinook spawning in the Snake River Basin above Lower Granite Reservoir occurs in the Clearwater River (Table 3-3). Spawning occurs from October through November. Age at spawning varies from 2 to 5 years, and is usually 3-4 years. No other large fish spawns on the gravel bars of larger rivers in the fall, which indicates there is little competition and chance for hybridization.

In the Clearwater, fall chinook fry emerge in April through May which is approximately one month later than fry emerging in the Snake River (Connor, et al., 1993). Juvenile fall chinook disperse into low-velocity, near-shore areas where they rear for several weeks before smolting and actively migrating downriver. In the

Table 3-3 Fall Chinook Redd Counts

Fall Chinook Redd Counts by Aerial Surveys, 1986-1995									
	Snake		Clearwater		Grande Ronde		Imnaha		
Year	Count	Percent of Total	Count	Percent of Total	Count	Percent of total	Count	Percent of Total	Total
1986					0				0
1987	59				7		1		67
1988	43	65%	21	32%	1	2%	1	2%	66
1989	47	81%	10	17%	0	0%	1	2%	58
1990	29	78%	4	11%	1	3%	3	8%	37
1991	41	84%	4	8%	0	0%	4	8%	49
1992	45	57%	26	33%	5	6%	3	4%	79
1993	59	40%	36	24%	49	33%	4	3%	148
1994	51	50%	37	36%	15	15%	0	0%	103
1995	41	49%	20	24%	18	22%	4	5%	83
Average (1988-1995)	44.5	0.63	19.75	23%	11.1	10%	2.5	4%	77.9

Snake River counts 1987-1993: Rondorf, C.W. and K.F. Tiffan. 1994 Identification of the spawning, rearing, and migratory requirements of fall chinook salmon in the Columbia River Basin. Annual Report 1993. Prepared for U.S. Department of Energy, Bonneville Power Administration, Division of Fish and Wildlife. Project Number 91-029, Contract Number DE-AI79-91BP21708.
Snake River Counts 1994-1995: Aaron Garcia, IFRO, Personal Communication. 1996.
Clearwater River Counts 1988-1995: Bill Arnsberg, NPT - Personal Communication. 1996.
Grande Ronde and Imnaha River Counts 1986-1995: Aaron Garcia, IFRO, Personal Communication. 1996.

Snake River, if an area of the mainstem is at carrying capacity, densities of fall chinook smolts could be expected to range from 180 fish/100 m^2 in good habitat to 66 fish/100 m^2 in fair habitat (NPT and IDFG, 1990). In these areas, they compete for space with similar sized shiners, suckers, and dace. Zooplankton, and later, macro-invertebrates predominate in juvenile fall chinook diets.

In normal years, the peak dates of passage of juvenile wild fall chinook at Lower Granite Dam occur in late June and early July (Chapman, et al., 1991). Fall chinook are collected at Snake and Columbia River collector dams and transported to release sites below Bonneville Dam. However, they are not collected as readily as spring and summer chinook. The Clearwater River fall chinook, because of their later emergence time, pass Lower Granite in late July and August. Reservoirs upstream of Snake River dams warm quickly during the summer which poses problems for July and August migrants. Because of warmer river conditions and later emergence time, Clearwater fall chinook may seek cool water refuge during the summer and migrate out in the following spring; thus adopting more of a "stream-type" life history characteristic typical of spring chinook (Arnsberg, 1996).

Snake River fall chinook spend 1 to 4 years (usually 3) in the ocean before returning to freshwater to spawn. No reliable information is available regarding the ocean distribution of Clearwater River fall chinook. However, if it is assumed that their distribution is reflected by the pattern of recoveries of tagged Lyon's Ferry Hatchery fall chinook in the ocean fishery, then over 95 percent of Clearwater

fish rear off the coasts of Washington, Oregon, and California (Busack, 1991). They are subjected to intense fisheries in the ocean and in the lower Columbia River. Ocean and inriver harvest rates of wild Snake River fall chinook have decreased in recent years. For example, the 1988-1990 ocean harvest averaged 16.9 percent compared with 13.9 percent in 1991. Inriver harvest averaged 47 percent for 1988-1990, 27 percent in 1991, and 20 percent in 1992.

There is no evidence that Snake River fall chinook are subdivided into multiple subpopulations as appears to be the case for spring chinook (Waples, et al., 1991). Even under pristine conditions, the Clearwater River fall chinook population was probably not subdivided since spawning and rearing habitat in the Subbasin is unfragmented. It is probable, however, that early spawning fall chinook spawned higher up in the drainage than late-arriving spawners.

3.6.2.2 Steelhead

Clearwater River steelhead are divided into two life history types that are differentiated by genetic, morphological, and run timing differences. A-run steelhead return to the drainage in the fall and spawn in small, lower elevation streams in the late winter and early spring. The larger-bodied B-run steelhead return in the fall or the spring and spawn in medium-size, higher elevation streams from March to June. Most of the B-run fish are destined for the Lochsa and Selway river drainages.

Juvenile steelhead rear in a variety of habitat types, moving into progressively faster and deeper water as they increase in size. Highest densities are found in moderate-to-steep gradient stream channels. In Idaho, if a stream is at carrying capacity, densities of steelhead smolts could be expected to range from 10 fish/100 m^2 in excellent habitat to 3 fish /100 m^2 in poor habitat (NPT and IDFG, 1990). Steelhead smolt after one to three (typically two) years of stream residency; the length of time depends on growing conditions. A small percentage of juvenile steelhead do not smolt and remain lifetime residents in freshwater. The smolt outmigration period extends from mid-March to June. Steelhead spend one to two years (A- and B-run fish), and sometimes three years (B-run fish) in the ocean before returning to freshwater. Repeat spawning, a relatively common occurrence among coastal populations of summer steelhead, is uncommon among Snake River steelhead.

Although the indigenous strain of steelhead remains intact and scattered throughout the Clearwater system, wild fish have declined in number and are less widely dispersed than in former times. Most of the steelhead that spawn naturally are wild fish; few if any hatchery fish contribute to natural production. Runs of naturally-spawning adult summer steelhead to the Subbasin have ranged from

a low of near 1,000 in 1975-77 to a high of 8-9,000 in 1982-83 (NPT and IDFG, 1990). Approximately 2,700 and 1,000 B-run steelhead are estimated to have passed Lower Granite Dam in the 1994-95 and 1995-96 run years (IDFG data). The percentage going into and spawning in the Clearwater and Salmon river subbasins is unknown.

3.6.2.3 Cutthroat Trout

The westslope cutthroat trout is common throughout the Clearwater River Subbasin, particularly in smaller tributaries higher up in the system. Both non-migratory (resident) and migratory (***adfluvial***) forms of westslope cutthroat trout are present. The resident form is the more common of the two. They spawn, rear, and complete their life cycle within a limited geographic range, usually in headwater reaches upstream of barriers to anadromous fish. Densities of cutthroat from streams characterized as having strong populations, average 2-10 per 100 m^2 (Rieman and Apperson, 1990).

Adfluvial cutthroat spawn and rear for two or three years in natal streams, then migrate to main rivers (or lakes) where food is more plentiful to spend most of their adult lives. This life history type is most likely to overlap and compete with chinook and other anadromous fish for food and space.

Westslope cutthroat are considered to be a *Species of Special Concern* by IDFG and a *Sensitive Species* by the USFS. The species is sensitive to habitat modification, needing clean gravel and water to spawn and incubate. Westslope cutthroat are easy to catch, and so are prone to over-harvest. They also readily reproduce with similar-sized rainbow trout and other subspecies of cutthroat trout.

3.6.2.4 Bull Trout

This member of the genus *Salvelinus* is distinguished by being a large fish-eating predator with an adfluvial life history. They have comparatively narrow habitat preferences, and are long lived, highly mobile, and have been targeted in a fishing program because they eat other fish. Historically, bull trout ranged throughout the upper Clearwater drainage downstream of migration barriers. They prefer to spawn and rear in localized areas, in small, cold, high altitude streams. As juveniles, bull trout coexist with cutthroat and brook trout, but they are a relatively minor component of the assemblage. Densities from streams where the Proposed Action would occur are less than one fish/ 100 m^2. As they grow in size, they prefer larger stream or river habitats and feed on juvenile chinook and other small fishes. Young chinook, steelhead and cutthroat are common in their

diets. After reaching sexual maturity (5-8 years), bull trout return to spawn in natal streams. Mature bull trout reside in mainstem reaches at least as far downstream as the Middle Fork Clearwater near Kooskia, Idaho. Some fish move into the lower ends of small tributaries in the summer to avoid higher mainstem temperatures.

Like cutthroat, bull trout are also listed as a *Species of Special Concern* and a *Sensitive Species.* They risk hybridization with brook trout because they can be close in size and spawn in the same habitats in the fall. The result is sterile offspring, and loss of genetic contribution from all adults. Bull trout require very cold, clean waters to spawn, and both of these characteristics can be altered by riparian timber harvest and road building.

3.6.2.5 Brook Trout

Though well-established today in the upper reaches of many Clearwater tributaries, brook trout are not native to the drainage. They were deliberately introduced into the Clearwater River system over 50 years ago. The temperature preferences of brook trout relegate them to headwater reaches, essentially the same areas occupied by cutthroat and juvenile bull trout. They tend to be more abundant in moderate to low gradient channels, particularly in degraded watersheds. Huntington (1995) reported a mean density of about 3 brook trout/100 m^2 in channels in these watersheds.

3.6.2.6 Mountain Whitefish

The mountain whitefish is distantly related to salmon and trout, belonging to the subfamily *Coregoninae* of the family *Salmonidae.* In terms of biomass, this rapidly growing, mobile species dominates the fish assemblage in many mid-to-upper elevation rivers in the Clearwater River Subbasin. Large schools of adult whitefish, often numbering in the hundreds, migrate between overwintering habitat, summer feeding stations, and fall spawning areas on an annual basis (Pettit and Wallace, 1975). Whitefish spawn en masse, without digging redds, in low gradient riffles in October through December. Juveniles rear individually or in small groups in nursery streams. They feed primarily on bottom-dwelling organisms, which limits competition with chinook and steelhead. As they grow larger, they disperse downstream to occupy the pools and deeper water in lower tributary mainstem reaches. Whitefish provide a modest winter fishery.

3.6.2.7 Other Species of Fish

Sculpins of all sizes (maximum length approximately 150 mm [6 inches]) are found throughout the Clearwater River Subbasin. Their body shape and bottom orientation make them well suited to life in higher velocity runs and riffles of small to medium-size streams. Sculpins are omnivorous; larger individuals readily prey on post-emergent chinook and other small fish trapped in confined spaces.

Longnose dace are a common inhabitant of all but the smallest streams in the subbasin. Large numbers of young dace can be readily located in low velocity, depositional areas (e.g., backwater pools) near the stream's margin. Larger dace (up to 140 mm [5.6 inches] or so) are solitary nomads; they gradually take up residence in fast water, mid-channel habitats where they scour the stream bed in search of food.

Northern squawfish, largescale suckers, bridgelip suckers, smallmouth bass (non-native), and redside shiners are found in varying degrees of abundance in the lower river, but are less common in areas containing high densities of juvenile salmonids other than fall chinook salmon. The proximity of Lower Granite reservoir may contribute to higher densities of these species in the lower Clearwater River. Of these species, squawfish and smallmouth bass are significant predators, and redside shiners are significant competitors, of juvenile chinook salmon.

White sturgeon are relatively common in Lower Granite Reservoir and in free-flowing reaches of the Snake River so they probably occur in limited numbers in the lower Clearwater River. Although no data are available, it is likely that small numbers of subadult sturgeon move into the lower Clearwater in search of food. Sturgeon are primarily bottom feeders, but larger fish may prey upon smaller fishes, such as subyearling fall chinook salmon.

Pacific lamprey were at one time distributed widely in the Clearwater River and constituted a major source of food for the Nez Perce Indians. Large numbers of adult lamprey were observed in the Lewiston Dam fish ladder during early years of observation (Schoning, 1940). Although accurate estimates of population numbers are unavailable, the general consensus is that lamprey populations in the Columbia and Snake rivers have declined significantly. Mainstem dams and degradation of spawning and rearing habitat are thought to be major causes for the decline.

The sedentary lamprey larvae remain buried for five or more years in soft substrate, slackwater areas in the main channel and low elevation tributaries before metamorphosing and emigrating to the ocean in the spring. They spend 12 to 20 months in the

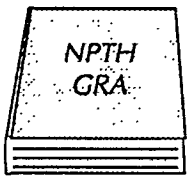
ocean living as parasites on other fish before entering freshwater in April to August. Lampreys mature sexually over winter and spawn in March.

3.6.3 Existing Condition of Fisheries

The geographic location of the affected environment for this document is confined to the Clearwater River Subbasin, specifically, the mainstem rivers: Clearwater, Lochsa, Selway and South Fork Clearwater; and the tributary streams proposed for outplanting spring chinook. Because they are anadromous species, chinook salmon would interact with a host of species during their migratory journey. After leaving the Clearwater, the effects of the fish produced by implementing the Proposed Action would be mingled with those of all other wild and hatchery produced salmon and steelhead.

3.6.3.1 Tributary Streams (Spring Chinook Habitat)

Most, if not all, of the spring chinook salmon indigenous to the Clearwater River are believed to have been eliminated by Lewiston Dam. Fulton (1970) stated the dam prevented passage during the 14 years 1927-1940, until a new fishway restored passage in 1940. Spring and summer chinook were counted in only 3 years prior to 1950 (Holmes, 1961). Those counts were 311 chinook in 1928, 102 chinook in 1929 and 7 chinook in 1930. Once counting at Lewiston Dam was resumed in 1950, counts of spring chinook for the next seven years ranged from only 7 to 63 fish. Considering the vast size of the Clearwater River Subbasin, this small number of fish must have been strays (Cramer and Neeley, 1992).



Efforts to reintroduce spring chinook into the Clearwater River began in 1947 with the outplanting of juvenile chinook reared from eggs obtained from wild Salmon River stock. Between 1961 and 1987, nearly 50 million spring chinook eggs were outplanted into Selway and South Fork incubation channels (Horner and Bjornn, 1981; Chapman, et al., 1991). An additional 7,300 hatchery spring chinook adults and over 20 million hatchery spring chinook fry, fingerlings, and smolts were outplanted into natural production areas during the same time period. The adults were surplus broodstock from Rapid River and Kooskia hatcheries released in the South Fork drainage. The eggs and juveniles were obtained from several within-basin and out-of-basin sources, including adults of mixed parentage that were trapped at Bonneville Dam, wild adults from various Salmon River populations, and hatchery adults returning to several Columbia Basin hatcheries, notably Rapid River, Dworshak, and Kooskia hatcheries. Hatchery production and supplementation since 1987

has emphasized the development of within-basin broodstock to encourage the establishment of locally adapted, self-perpetuating populations throughout the Subbasin.

Spring chinook returning to the Clearwater River Subbasin today originated from a hatchery, so the runs of naturally-reproducing adults are the result of those outplanting efforts. Annual returns of spring chinook to existing hatchery and satellite facilities in the Clearwater River Subbasin along with an estimated number of naturally-reproducing adults are summarized in Table 3-4. The wild return was derived from annual redd counts made in index areas of major watersheds. The adult spring chinook return at Dworshak and Kooskia was moderately strong in 1993 (2003 fish) but the 1994 and 1995 returns were the lowest on record. Although the 1995 basinwide redd count data has not yet been compiled, natural returns are as depressed as those to the hatcheries.

Wild populations, or at least sporadic aggregations of naturally-reproducing spring chinook salmon, presently occur in Lolo Creek, and in the Lochsa, Selway, and South Fork Clearwater river drainages (see Map 4). Table 3-5 presents the redd count data from the Lochsa, Selway and South Fork Clearwater since 1973.

NPTH Streams — There are 11 streams that would be specifically affected by the Proposed Action. Ten of these are treatment and control streams; Meadow Creek would be used as a stream to evaluate release strategies (see Table 2-4).

Of the five NPTH streams slated for supplementation with spring chinook, only Lolo Creek and Newsome Creek have been surveyed for redds on a regular basis; Newsome Creek since 1974 and Lolo Creek since 1987 (see Table 3-6). Both streams have been supplemented heavily, so redd counts reflect both hatchery outplanting and natural production. Redd counts for Newsome Creek have ranged from a high of 55 in 1993 when adults from Rapid River Hatchery were outplanted in the stream, to several years of no returns. Redd counts for Lolo Creek have ranged from a low of 7 redds in 1994 to a high of 31 redds in both 1987 and 1988. Redd surveys were initiated on two of the NPTH treatment streams, Boulder Creek and Warm Springs Creek, in 1995 and no redds were found. Mill Creek was surveyed by NPT fish biologists in 1993, 1994 and 1995 and no redds were found.

Spring chinook redd surveys have also been conducted on a regular basis in two of the NPTH control streams, Eldorado Creek and Brushy Fork Creek. No spring chinook redds have been observed in Eldorado Creek since 1989, when spawner surveys

Table 3-4
Estimated Spring Chinook Adult Returns for the Clearwater River 1973-1994

Year	Dworshak	Kooskia	Red River	Crooked River	Powell	Total Hatchery	Redd #'s Index Areas*	Total Wild**	Total Clearwater
1973		50				50	354	5,206	5,256
1974		37				37	100	1,471	1,508
1975		221				221	33	485	706
1976		801				801	112	1,647	2,448
1977		3,023				3,023	167	2,456	5,479
1978		2,045				2,045	175	2,574	4,619
1976		382				382	32	471	853
1980		68				68	66	971	1,039
1981		268				268	86	1,265	1,533
1982		255				255	83	1,221	1,476
1983		365				365	45	662	1,027
1984	82	341	111			534	70	1,029	1,563
1985	334	529	126			989	83	1,221	2,210
1986	516	283	NA			799	77	1,132	1,931
1987	2,017	687	519			3,223	79	1,162	4,385
1988	1,972	595	394			2,961	95	1,397	4,358
1989	1,700	973	104		154	2,931	23	338	3,269
1990	2,042	1,141	53	29	179	3,444	37	544	3,988
1991	165	467	18	20	33	703	30	441	1,144
1992	370	312	39	228	270	1,219	49	721	1,940
1993	823	1,180	139	402	500	3,044	85	1,250	4,294
1994	74	232	31	26	86	449	22	324	773
Average	918	648	139	141	204	1,264	87	1,272	2,536

1973-1983 data from Lindland and Bowler, 1986
Hatchery returns to Dworshak from Hatchery Evaluation Team. Dworshak-Kooskia NFHS. 1995
Redd counts from 1982-1992 from Hassemer, 1993.
Redd counts for 1993-1994 from Elms-Cockrum, T., E. Leitzinger, and C. Petrosky. 1995.
*Redd Extrapolation data is from a regression estimate in Lindland and Bowler, 1986. (Redd #/0.068)
**Wild return is calculated by number of redds in index area divided by 0.068.

Table 3-5
Redd Counts in the Clearwater River Subbasin
Since 1973

Year	Selway River	Bear Creek	Running Creek	Whitecap Creek	Moose Creek	Selway Total	Crooked Fork	Brushy Fork	Lochsa Total	Newsome Creek	Crooked River	Red River	American River	South Fork Total	Clearwater Total
1973	261	26	NC	7	32	326	60	NC	60	NC	NC	NC	NC	0	396
1974	66	10	NC	2	15	93	22	6	28	3	5	12	NC	20	141
1975	21	5	NC	1	4	31	6	4	10	10	41	20	NC	71	112
1976	58	14	NC	4	15	91	36	13	49	5	13	15	NC	33	173
1977	97	18	NC	1	23	139	51	15	66	17	50	50	NC	117	322
1978	125	13	NC	NC	17	155	37	25	62	22	23	52	NC	97	314
1976	21	3	NC	2	4	30	6	12	18	9	4	20	NC	33	81
1980	40	7	NC	3	4	54	16	10	26	7	8	31	7	53	133
1981	47	8	NC	4	6	65	27	25	52	7	9	47	12	75	192
1982	38	8	NC	3	5	54	34	17	51	5	4	82	21	112	217
1983	26	8	NC	4	6	44	7	6	13	7	12	85	9	113	170
1984	30	6	NC	6	7	49	28	9	37	1	22	65	NC	88	174
1985	36	NC	NC	NC	NC	36	47	14	61	7	10	92	23	132	229
1986	30	10	NC	7	9	56	30	11	41	6	9	82	14	111	208
1987	36	9	4	6	8	63	28	10	38	15	17	81	31	144	245
1988	38	10	2	5	7	62	42	9	51	20	27	51	12	110	223
1989	5	7	0	3	3	18	8	9	17	4	3	45	1	53	88
1990	13	6	1	2	2	24	16	4	20	0	10	66	2	78	122
1991	12	8	0	1	2	23	9	1	10	0	NC	5	1	6	39
1992	18	9	0	0	2	29	22	1	23	0	NC	46	1	47	99
1993	33	13	0	5	10	61	34	29	63	64	27	43	75	209	333
1994	10	9	0	2	0	21	1	0	1	0	4	11	1	16	38
Average	48	9	1	3	9	69	26	11	36	10	16	48	15	78	184

NC means not counted.
1973-1984 from Lindland and Bowler (1986)
1985-1992 from Hassemer (1993)
1993-1994 from Elms-Cockrum, T., E. Leitzinger, and C. Petrosky. 1995.

Table 3-6
Chinook Salmon Redd Counts in
NPTH Treatment and Control Streams Since 1987

Stream	Year								
	1987	1988	1989	1990	1991	1992	1993	1994	Data Source
Boulder	NC	NC	NC	NC	NC	NC	NC	NC	
Brushy Fork A	10	9	9	4	1	1	29	0	1,6
Brushy Fork B	26	29	6	6	5	9	28	4	1,6
Eldorado	NC	NC	0	0	0	0	0	0	2,3
Fish	NC	NC	NC	NC	NC	NC	NC	NC	
Johns	NC	NC	NC	NC	NC	NC	NC	NC	
Lolo	31	31	24	25	14	19	24	7	2,3
Meadow	NC	NC	NC	NC	NC	NC	3	3	4
Mill	NC	NC	NC	NC	NC	NC	0	0	4
Newsome	15	20	4	0	0	2	55	0	1,3,5
Tenmile	NC	NC	NC	NC	NC	NC	NC	NC	
Warm Springs	NC	NC	NC	NC	NC	NC	NC	NC	

NC = Not counted.
Brushy Fork A = Traditional trend analysis area.
Brushy Fork B = Counts conducted outside traditional trend analysis area.
Newsome Creek 55 redds in 1993 are from adult outplant.
Sources:

1. Hassemer, P.F. 1993. Salmon spawning ground surveys, 1989-1992. Project F-73 - R-15. Idaho Department of Fish and Game.
2. Murphy, Pat. U.S.F.S. Clearwater National Forest. 1995. Personal communication. Table 2. Six year comparison of spring chinook redd counts in the Lolo Creek Drainage 1987-1992.
3. Hesse, J.A. and B.D. Arnsberg. 1994. Salmon supplementation studies in Idaho rivers. Annual Report. 1993.
4. Nez Perce Tribe. Unpublished data.
5. Arnsberg, B.D. 1993. Salmon supplementation studies in Idaho rivers. Annual work summary.
6. Elms-Cockrum, T., E. Leitzinger, and C. Petrosky. 1995. Salmon spawning ground surveys, 1994. Idaho Dept. of Fish and Game Report IDFG 95-38.

were initiated. Redd counts for Brushy Fork Creek, which have been recorded since 1972, have ranged from 4 in 1994 to a high of 57 in 1993 (see Table 3-6).

Some measurements of juvenile salmonid densities have been made in all treatment and control streams (see Table 3-7). In most instances, steelhead are the predominant salmonid present with an average of about 5 fish/100 m^2. Of the streams to be outplanted with NPTH chinook, Boulder Creek, Fish Creek, Newsome Creek and Mill Creek contain comparatively large densities of juvenile steelhead. Densities of chinook are low in most areas (less than 1 fish/100 m^2) with the exception of Newsome Creek and Tenmile Creek, which were surveyed after they were outplanted with hatchery fish. Westslope cutthroat are the next most abundant fish species, averaging 1 fish/100 m^2. Bull trout and brook trout are more uncommon in mainstem habitats occupied by chinook. Data used for background purposes in compiling Table 3-7 were taken from stream surveys in larger habitat. Juvenile bull trout and especially cutthroat have a much greater relative abundance in the smaller tributary feeder streams.

Potential Production — Potential production, that is, the capacity of a stream to produce fish under existing or future conditions, was estimated by applying the Smolt Density Model (***SDM***) developed by the Northwest Power Planning Council (Monitoring and Evaluation Group, 1989), to habitat data compiled for the Clearwater River system. For each stream segment, the SDM calculates the total surface area of habitat available for chinook (and steelhead) parr, and uses an adjustment factor that takes habitat quality and use into account to convert habitat surface area to number of parr. Estimates are summed across stream segments to estimate total stream production. Parr abundance is often converted to smolt yield by applying a suitable parr-to-smolt survival rate.

The SDM was applied to all NPTH spring chinook streams to estimate the number of spring chinook parr and smolts that might conceivably be produced under existing conditions if all available habitat were fully used. Results for NPTH streams are presented in Table 3-8. The number of chinook that might be produced by all treatment streams is similar to what might be produced by control streams; however individual streams vary widely in production potential due to their size and accessibility to anadromous fish. Stream carrying capacities range from 17,000 to 157,000 spring chinook smolts. The percentage of the calculated carrying capacity presently used by juvenile spring chinook, based on recent parr density data, ranges from 0-9 percent.

Table 3-7

Juvenile Salmon Densities from NPTH Treatment and Control Streams

Fish Density (#/100 square meters)							
Stream	Chinook	Trout Fry	Rainbow Steelhead	Cutthroat	Bull	Brook	Data Source
Boulder		2.53	15.41			0.35	1,2
Brushy Fork	2.34	6.20	1.70	0.10	0.18		3
Eldorado	0.16	1.70	1.08	2.17			4
Fish	0.02	5.22	9.28	0.82			5
Johns	0.03	3.95	4.33	0.35			6
Lolo	0.96	3.06	1.69	0.91		0.02	7,8
Lolo (Yoosa)	0.16	1.41	1.87	2.63		0.03	9
Lolo (Camp)		1.80	2.50	1.54		3.40	9
Meadow	0.67	0.37	1.96	0.32			10
Mill	0.03	6.85	7.54	1.90			11
Newsome	16.10	2.91	9.77	0.31	0.07		12
Tenmile	3.94	1.78	4.80	0.04	0.02		13
Warm Springs	0.51	2.35	2.56	1.03	0.08		14

* In determining existing population estimates, the densities from recent stream surveys were used. Numbers from all habitat types (e.g. pool, riffle, and run) were combined for an average density. Because of inconsistencies in data reported, all rainbow steelhead, cutthroat, bull trout, and brook trout fry were combined in a single "fry" category. All fish aged 1,2,3, and older were combined into a single species category. Densities were taken from stream surveys conducted in areas accessible to spring chinook.

Sources:

1. Clearwater BioStudies, Inc. 1993. Habitat conditions and salmonid abundance in Boulder and Huckleberry Creeks, Lochsa Ranger District, Summer 1993.
2. Clearwater BioStudies, Inc. 1994. Habitat conditions and salmonid abundance in the upper Boulder Creek Drainage, Lochsa Ranger District, Summer1994.
3. Clearwater BioStudies, Inc. 1993. Habitat conditions and salmonid abundance in Brushy Fork Creek, Powell Ranger District, Summer 1993.
4. Clearwater BioStudies, Inc. 1993. Habitat conditions and salmonid abundance in Eldorado Creek, Pierce Ranger District, Summer 1992.
5. Clearwater BioStudies, Inc. 1993. Habitat conditions and salmonid abundance in the Fish Creek Drainage, Lochsa Ranger District, Summer 1993.
6. U.S.F.S. Nez Perce National Forest. 1991. Draft 1991 Johns Creek Survey.
7. Inter-fluve, Inc. 1993. Lolo Creek, final habitat typing report. Prepared for Bureau of Land Management Cottonwood Resource Area.
8. Clearwater BioStudies, Inc. 1993. Habitat conditions and salmonid abundance in Lolo Creek, Pierce Ranger District, Summer 1993.
9. Clearwater BioStudies, Inc. 1993. Habitat conditions and salmonid abundance in Yoosa and Camp Creeks, Pierce Ranger District, Summer 1992.
10. IDFG database for 1988-1994 at two sites.
11. U.S.F.S. Nez Perce National Forest. 1990. Draft 1990 Mill Creek Survey.
12. IDFG database for 1987-1992 at four sites.
13. IDFG database for 1985-1994 at two sites.
14. IDFG database for 1989-1994 at the mouth of Warm Springs Creek.

Table 3-8

Potential Spring Chinook Parr and Smolt Production under Existing Conditions and Percent of Available Habitat Presently Used in NPTH Experimental Streams

Stream	Parr Capacity	Smolt Capacity	Percent Utilized
Treatment Streams			
Lolo Creek (1)	234,989	157,443	4
Mill Creek	N/A	N/A	N/A
Newsome Creek	71,367	47,816	0
Boulder Creek	98,889	66,256	0
Warm Springs	25,303	16,953	1
Total Production Potential	**430,548**	**288,468**	
Control Streams			
Eldorado Creek	97,194	65,120	0
John's Creek	50,235	33,657	0
Tenmile Creek	60,313	40,410	9
Fish Creek	169,718	113,711	0
Brushy Fork Creek (2)	116,590	78,115	7
Meadow Creek	497,182	333,112	1
Total Production Potential	**927,730**	**621,580**	

Predicted by the Smolt Density Model (MEG, 1989). Percent utilized estimates were provided by the NPT.
(1) Does not include Eldorado Creek
(2) Includes Spruce Creek

As is true of all salmon-bearing streams in Idaho, the amount of rearing habitat available to juvenile chinook in the Clearwater River Subbasin far exceeds current levels of use. For example, chinook parr densities in Lolo Creek for the 5-year period ending in 1989 averaged only 26 percent of carrying capacity, though the stream was heavily supplemented at the time. Spring chinook parr densities in the Lochsa and Selway subbasins over the same period were estimated to be 8 percent and 2 percent, respectively, of carrying capacity (Scully and Petrosky, 1991).

3.6.3.2 Mainstem Rivers (Fall and Summer Chinook Habitat)

Anecdotal evidence suggests that a late spawning race of chinook salmon, most likely fall chinook, were indigenous to the Clearwater River Subbasin. But because of the Lewiston Dam, lack of biological study, and effects of the turn of the century commercial fishery downriver, the characteristics of the run are unknown. The biologist R.W. Schoning reported that the Clearwater River historically supported runs of fall chinook (Schoning, 1940). He recounts conversations with Lewiston residents who observed chinook trying to ascend Lewiston Dam as late as mid-October or remember spearing fall chinook in the Selway River just before freeze up in years prior to dam construction. Interviews with NPT members who observed fishing or fished for salmon themselves in the Clearwater River before Lewiston Dam was built also indicate that chinook salmon supported a viable aboriginal fisheries well into November (Lane, et al., 1981).

As with spring chinook, egg-incubation channels were used as the primary method for reintroducing fall chinook to the Clearwater River Subbasin. Between 1960-1967, over 6 million eyed-eggs were planted in hatching channels in the lower Selway River near Selway Ranger Station (Cramer, 1995). An additional 550,000 fall chinook fry were outplanted into the Middle Fork Clearwater in 1967 and some 300,000 eggs were placed in Warm Springs Creek in the upper Lochsa River in 1960 and 1961 (NPT and IDFG, 1990). All but 700,000 of the eggs were from lower Columbia River origin (Spring Creek Hatchery). The reintroduction efforts were discontinued in 1968 due to insignificant returns (Hoss, 1970). The poor returns of fall chinook are not at all surprising, given that a lower Columbia stock was used for brood source and was probably poorly adapted for survival in the Clearwater basin (Cramer, 1995). The one year that Snake River stock were used did produce some adult returns, 122 fish (Richards, 1967). Additionally, predation and silting at the hatching channels reduced success of emerging fry (Cramer, 1995).

Fall chinook counts were discontinued after the removal of Lewiston Dam in 1973. No further estimates of fall chinook abundance were obtained until 1988 when Nez Perce and USFWS biologists began to conduct annual aerial spawning surveys. Since then, an average of 20 redds per year have been counted in the

Table 3-9
Fall Chinook Redds Counted in the Clearwater River 1988-94

Year	Number
1988	21
1989	10
1990	10
1991	4
1992	26
1993	36
1994	37

* 1988 - 1993 from Biological Assessment - South Fork Clearwater River. USFS, Nez Perce National Forest.1995.
* 1994 from Bill Arnsberg, NPT. Personal communication.

Clearwater River (See Table 3-9). The redds are distributed rather evenly from the confluence of the North Fork to the confluence with the Snake, with the greatest number found on the island just upstream of Cherrylane (Arnsberg, 1996).

NPTH Mainstem — The mainstem Clearwater River serves as a migratory corridor and holding area for adult anadromous salmonids. Adult steelhead occupy the mainstem river from October until May. Spring chinook travel through the river rather quickly, but will occupy deeper holes in their spawning streams from July through September. Fall chinook will linger in the lower mainstem in October, November and December.

The mainstem Clearwater River also provides overwinter and early rearing habitat for salmon and steelhead. From evidence found in outmigration studies, a significant portion of the juvenile steelhead and spring chinook occupy the mainstem river from November until smolting in the spring. Fall chinook incubate and spend 1-3 months in the mainstem river before beginning their downstream migrations. During the summer, most salmonids are absent from the mainstem. Water temperatures become too warm in lower reaches of the Clearwater River to permit high rates of growth and survival. In addition, juvenile salmonids do not fare well in association with warmwater fish species, many of which compete for the same resources or prey upon smaller salmonids.

The fish component of the mainstem Clearwater River has been evaluated in recent studies by the Nez Perce Tribe (Connor, 1989, and Arnsberg, et al., 1992). Connor (1989) reported that, in 1989, chinook parr were uncommon. Steelhead parr and residualized hatchery smolts were more abundant, but still in the low range

(less than 1 fish/100 m^2). Redside shiners, largescale suckers and mountain whitefish were the most abundant species observed in their study.

Arnsberg, et al. (1992) found higher chinook and steelhead densities in 1990, but still less than 0.5 fish/100 m^2. Redside shiners were the most abundant species, with whitefish and suckers being the next most abundant. They reported that whitefish and suckers outnumbered all juvenile salmonids by 10 to 1 in 1898 and 1990.

Some habitat use data was compiled by Connor (1989). The residualized steelhead hatchery smolts were observed in high velocity areas, close to the bottom and shallower depths (around 1.2 m [4 ft]). The young shiners occupied low velocity areas adjacent to the slow water. Largescale suckers selected moderate velocity areas, deeper in the river and whitefish selected positions near the bottom in water less than 1 m (3.3 ft) deep.

Potential Production — The potential production of large river habitats is more difficult to assess than for smaller. There are no reliable ways of determining existing or potential densities in a river habitat, or measuring the amount of habitat available. Computer model simulations have been used to predict the amount of habitat area for spawning and rearing salmon in river habitats at different flows, and information on the Clearwater River comes from such studies. Arnsberg, et al. (1992) reported modelling that indicates the lower mainstem Clearwater River can provide habitat for as many as 90,000 chinook salmon redds, which they also believe is an overestimate. But if a more realistic accounting of spawning area could support even half that amount, the production potential in the Clearwater would be enormous. Assuming there are 45,000 redds, with 4,000 eggs per redd, and that a quarter of those survive to smolt, a rough estimate is that as many as 45 million chinook smolts could be produced in the lower river. Arnsberg, et al. (1992) reported that the habitat modelling shows the river does not have a large amount of fry habitat because of the high velocities. But fry from large river spawners, such as fall chinook, migrate during their first year anyway. Larger rivers are underseeded now and the potential for production for a subyearling migrant is vast.

3.7 Wildlife

Wildlife that use riparian habitats in the area can be divided into seven major groups: waterfowl, upland game birds, raptors, aquatic furbearers, big game, other wildlife groups, and threatened, endangered, and U.S. Forest Service designated sensitive species. Each group is discussed in this section.

3.7.1 Waterfowl

The proposed sites at Cherrylane on the lower Clearwater River, Cedar Flats on the Selway River and Luke's Gulch site on the South Fork Clearwater River are near riparian habitats used by waterfowl. Because of warmwater temperatures, waterfowl use the islands upstream (Fir Island) and downstream (Cottonwood, Turkey, and Hog Islands) of the Cherrylane site for nesting. Wintering waterfowl, mostly Mallard ducks and Canada geese, are the most abundant wildlife in these habitats (Asherin and Orme, 1978). Waterfowl also use the riparian habitats in upriver tributaries occasionally and during migrations.

3.7.2 Upland Game Birds

Upland game birds such as ring-necked pheasant, mourning doves, chukar partridges, and valley quail occasionally use the riparian habitats near the Cherrylane, North Lapwai Valley, and Sweetwater Springs sites (Asherin and Orme, 1978). Riparian vegetation in the lower Clearwater and Salmon rivers provide nesting cover and winter food sources for game birds. Blue and ruffed grouse make transitory use of upland riparian habitats associated with the spring chinook satellite facilities. The Cherrylane, North Lapwai Valley, and Sweetwater Springs sites have been previously disturbed and much of the bird habitat has been altered by agricultural activities and existing fish hatchery facilities.

3.7.3 Aquatic Fur Bearers

Aquatic fur bearers such as beaver, muskrat, fisher, mink, and river otter occur in the lower Clearwater River corridor and in upland watersheds. In general, these animals depend on riverine areas, bays, ponds, tributaries, and riparian forests for den sites and foraging areas. Water barriers around den sites provide essential protection from predators. Beaver and river otter are common in the Lolo-Eldorado watersheds. Beaver distribution is strongly related to the presence of riparian food sources such as cottonwood trees and willows plus protected areas such as sloughs, inlets, and ponds (Asherin and Orme, 1978). Mink and river otter use slackwater habitats for foraging and denning. Otters can be expected to occur near all sites associated with NPTH. Fishers generally use mid-to-late successional forests and riparian zones. These forest types have multilayered canopies which help regulate temperatures and provide suitable denning sites (cavities and downed logs).

Riparian zones serve as dispersal and travel corridors as well as an ample prey base (Jones, et al., 1994). Fishers might be expected in the streams used for treatment and control.

3.7.4 Big Game

Big game species such as white-tailed deer, mule deer, elk, black bear, cougar, and moose occur in the program area. These species sometimes use riparian corridors to move between summer and winter ranges and can use the sites for calving and fawning. Moose are often observed foraging in riparian areas and are expected at Cedar Flats, Meadow Creek, Newsome Creek, and Yoosa/Camp Creek sites. During severe winters, riparian habitats can provide cover necessary for survival. In the lower Clearwater River Valley and South Fork Clearwater, low densities of animals are expected because of development. However, during the winter, deer are common near Cherrylane, Sweetwater Springs, Cedar Flats and the South Fork Clearwater.

3.7.5 Raptors

According to Asherin and Claar (1976) and Asherin and Orme (1978), riparian forests and wetlands along the Columbia, Snake, and Clearwater rivers provide perching and nesting opportunities and concentrated prey for up to 24 raptor species. Of these, only the osprey, northern harrier, and bald eagle are directly associated with riparian and wetland habitats. The bald eagle is discussed in Section 3.7.7, **Threatened and Endangered Species.**

Osprey nest along the corridors of the Clearwater, Lochsa, Selway and South Fork Clearwater rivers, and although there may be some transitory use of tributaries of the mainstem rivers, osprey are not known to nest there. They are associated more with large bodies of open water. Large ponderosa pine and cottonwood trees provide nesting and roost sites. Fish populations of the mainstem rivers provide a forage base for the osprey.

Harriers such as the marsh hawk use meadow areas near the satellite facilities located in Lolo, Eldorado, Yoosa, and Meadow creeks (South Fork Clearwater River). These birds feed mostly on rodents (Asherin and Orme, 1978).

3.7.6 Other Wildlife

Other riparian-dependent species use the habitats of the lower Clearwater River corridor and upland watersheds. Blue heron, kingfishers, dippers, and raccoons are the more predominant species. Blue heron forage and nest along mainstem rivers. Occasionally, they are observed in the larger tributaries of the upland drainages. Kingfishers, dippers, and raccoons use the riparian and stream habitats of tributaries. Kingfishers and dippers are common in all tributaries of the area. They forage on aquatic insects and fish and nest in streambanks or nearby slopes.

Raccoons also frequent the stream and riparian habitats of the tributaries and forage on fish and mussels found in the tributary streams.

3.7.7 Threatened and Endangered Wildlife

The bald eagle, a species listed as threatened by the U.S. Fish and Wildlife Service, is known to inhabit the mainstem corridor of the Clearwater, lower Selway, and South Fork Clearwater rivers (Asherin and Orme, 1978) and are commonly observed on Fir Island just upstream from the Cherrylane site. Bald eagles use the mainstem corridor during the winter, which provides suitable winter habitat in the form of perch sites, roost sites, and access to prey. There are no known nesting or roosting trees at other sites (Asherin and Orme, 1978; D. Davis, 1994; S. Blair, March 1995), and eagles are not known to frequent the upland tributary networks to any significant degree. These watersheds are small and usually frozen-over during winter.

Other federally-listed wildlife species found or potentially occurring in upland tributary watersheds are the grizzly bear (threatened), peregrine falcon (endangered) and the gray wolf (endangered). These species historically used the lowland and upland habitats of the area. There have been no confirmed reports of grizzly bears on the Clearwater National Forest since 1956 (D. Davis, 1994). Similarly, there have been no confirmed reports of the species in the watersheds of the Nez Perce National Forest (S. Blair, 1995). The area is not considered suitable grizzly bear habitat. Current policy direction indicates that no additional land use restrictions are needed at this time in the Bitterroot ecosystem to provide for the recovery of the grizzly bear until an EIS is completed by the U.S. Fish and Wildlife Service (Dan Davis, 1994; USDA, Swiftwater Draft EIS, 1993).

The peregrine falcon is found in the Snake and Salmon river drainages where it nests on cliff sites along the rivers or secondary drainages. Peregrines feed and winter in open country where prey concentrate, such as marshes and river bottomlands. Peregrines often depend on riparian habitats for food such as waterfowl, shorebirds and upland bird life (Bechard, Beig, and Howard, 1989). None of the proposed sites are considered probable nesting areas due to lack of suitable habitat.

The gray wolf has been listed as endangered on the Clearwater and Nez Perce National Forests. The U.S. Fish and Wildlife Service currently considers the gray wolf nonessential experimental status, according to Section 10(j) of the ESA of 1973, as amended. Nonessential experimental animals located outside national park lands and national wildlife refuges are treated for

purposes of Section 7 of the Act as if they were only proposed for listing (*Federal Register*, November 22, 1994). (See Section 5.2, **Endangered and Threatened Species** for more information.)

There have been reports of wolf sightings in some of the tributary drainages near the NPTH satellite sites (e.g., Lolo Creek and Selway Ranger District). Between 2-5 wolves might live in the Clearwater National Forest (USDA, Orogrande EA, 1994). A radio-collared male wolf has been observed and monitored along the Clearwater River (Kelly Creek drainage) from January 1992 to September 1993 (USDA, Orogrande Environmental Assessment, 1994). Wolves may also live in the Nez Perce National Forest. Fifteen reports of probable wolf sightings or wolf signs have been made on the Selway Ranger District (USDA, Swiftwater Draft EIS, 1993). There have been no confirmed reports of breeding pairs, pack formation, young pups, or denning on the Clearwater or Nez Perce National Forests (USDA, Orogrande EA, 1994, and Swiftwater Draft EIS, 1993), though there is sufficient habitat and prey in both forests. The U.S. Fish and Wildlife Service believes that few restrictions on land use are necessary to promote recovery, and the gray wolf restrictions would not be applied until wolf packs are present.

3.7.7.1 Sensitive Species (U.S. Forest Service Designated)

Several sensitive species (including plants) are found in riparian habitats of the upland areas. Sensitive wildlife species that may frequent the riparian habitats of satellite sites are the Harlequin duck and the Coeur d' Alene salamander. Harlequin ducks have been observed in the Lochsa and Selway rivers and their larger tributaries. Harlequin ducks are diving ducks that winter along the Pacific coast and then migrate inland to nest along forested, mountain streams. Harlequin ducks prefer streams in canyons, or meandering and braided streams. They prefer dense riparian vegetation for cover (USDA, Swiftwater Draft EIS, 1993) and undisturbed, pristine areas are considered prime habitat for Harlequin duck nesting and brood-rearing activities.

Harlequin duck observations on the Nez Perce National Forest are rare, and breeding has not been documented on the Forest (USDA, Swiftwater Draft EIS, 1993). More frequent observations have been documented in the upper Lochsa River area. A breeding pair was observed about 1.6 km (1 mile) upstream from the mouth of Papoose Creek in 1992 (USDA, West Fork Papoose EIS, 1994). For the most part, harlequin ducks have been observed outside the areas where satellite facilities might be constructed.

Coeur d' Alene salamanders are known to occur on the Clearwater and Nez Perce National Forests (USDA, Orogrande EA, 1994 and Swiftwater Draft EIS, 1993). In fact, salamanders have been found along tributaries of the Selway River and the Meadow

Creek (satellite site) drainage (USDA, Swiftwater Draft EIS, 1993). They have also been observed in the Lolo Creek watershed (D. Davis, 1994). These salamanders are typically associated with disjunct coastal biota of the Rocky Mountains primarily north of the Salmon River. The Coeur d' Alene salamander is most often observed in moist, forested areas at moderate elevations below 1500 m (4950 ft). Typical habitat features favored by the salamander are fractured bedrock or gravel, often under a dense tree canopy, near cascading water. Salamanders feed on aquatic and semiaquatic insects (USDA, Swiftwater Draft EIS, 1993). On the lower Selway River, the salamanders are found generally below 800 m (2640 ft) elevation in three major habitat types: spring seeps, waterfall spray zones, and riparian areas of small cascading creeks (USDA, Swiftwater Draft EIS, 1993).

3.8 Vegetation

*A **province** is an area of land less extensive than a region having a characteristic plant and animal population.*

The Clearwater River Subbasin is within two major subcontinental areas with broad similarities generally referred to as ***provinces.*** Each province is made up of smaller areas that correspond to broad vegetation regions having fairly uniform climate. Upland vegetation in the Subbasin varies considerably between the two provinces. In the Semiarid Steppe Lowlands Province, which includes the stream breaklands and the Palouse and Camas prairies in the mainstem and South Fork Clearwater drainages, the climax vegetation ranges from grasslands with some ponderosa pine and Douglas fir to forests of grand fir, Douglas fir and ponderosa pine. Agriculture, forestry and residential development have drastically altered the upland vegetation in this province (NPT and IDFG, 1990).

The Columbia Forest Highland Province, which includes the Lochsa, Selway, upper South Fork and upper half of the Middle Fork-Clearwater drainages, is divided into two sections. One section includes the breaklands along the drainage mainstem up to the mountains and includes climax vegetation of hemlock, cedar, grand fir, Douglas fir, spruce, subalpine fir and ponderosa pine. The other section consists of alpine ridges, peaks and glacier cirques and includes climax vegetation of subalpine fir, whitebark pine with inclusions of alpine meadows and alpine larch.

Past forest fires, especially from 1910 through 1934, have set back the vegetative succession in large areas of the Lochsa and Selway drainages. Today, brush fields are dominant on the south slopes in these burned areas. Timber harvest has also changed the upland vegetative conditions. Harvest has occurred and is planned in the lower Selway, South Fork, Middle Fork, and lower and upper Lochsa drainages (NPT and IDFG, 1990).

Riparian zones are found next to watercourses such as streams, rivers, springs, ponds, lakes, or tidewaters and represent the connection between terrestrial and aquatic environments. The riparian zone has vegetation that extends from the water's edge landward to the edge of the vegetative canopy (O'Connell, et al., 1993). The condition of the riparian vegetation in the Clearwater River Subbasin ranges from pristine in the Selway and Lochsa drainages to severely degraded and/or absent in parts of the mainstem and South Fork Clearwater drainages (Nez Perce Tribe and Idaho Fish and Game, 1990). Both natural phenomena such as forest fires and human activities such as road building and mining have degraded the riparian vegetation. The following sections describe general riparian vegetation conditions at the proposed facility sites.

3.8.1 Central Incubation and Rearing Facilities

3.8.1.1 Cherrylane

The Cherrylane facility site is a flat parcel on the south side of the Clearwater River. The site is developed agricultural land presently used for hay production. After the hay crops have been harvested, the site is used for fall pasture. Highway 12 runs along the length of the site and separates it from the Clearwater River. A narrow riparian zone exists along the banks of the Clearwater River across Highway 12 from the Cherrylane site. Riparian vegetation is dominated by black cottonwood with associated overstory species, including: box-elder, black locust, white alder, Coyote willow and Wood's rose. Weedy understory species include crab grass, reed canarygrass and horsetail.

3.8.1.2 Sweetwater Springs

The Sweetwater Springs site is vegetated with sparse black cottonwood, Ponderosa pine and Wood's rose. Bluebunch wheatgrass is the native understory grass though yellow star-thistle has invaded the area due to disturbance by livestock grazing. Cheat grass and bulbous bluegrass also are common.

3.8.2 Satellite Facilities

3.8.2.1 Luke's Gulch

The Luke's Gulch site is along the South Fork of the Clearwater River. Vegetation is dominated by black cottonwood, Ponderosa pine, Douglas fir, and hawthorn in the overstory growing up to

the edge of the river. The understory is composed of grasses and forbs including reed canarygrass, horsetail, bluebunch wheatgrass, Kentucky bluegrass, cheat grass and common yarrow.

The hillside and flat bench at the base of the slope display seasonal wetland characteristics. Wood's rose and hawthorn dominate the slope overstory vegetation. The herbaceous layer on the hillside is dominated by moss and strawberry. The site was dry during the September site investigation, but approximately 0.2 to 0.4 ha (0.5 to 1 acre) of this area shows indications of a seasonal wetland resulting from apparent hillside springs or seeps.

3.8.2.2 Cedar Flats

The Cedar Flats site is along the Selway River. The site itself is disturbed and dominated by grass-like species. Riparian forest vegetation surrounds the site. The forest is dominated by western red cedar with minor amounts of grand fir, Douglas fir and Engelmann spruce in the overstory. Common shrubs are huckleberry, common snowberry and twinflower. Understory species include queencup beadlily, western goldthread, ladyfern, and arrowleaf groundsel. The site is in a USFS-designated Riparian Habitat Conservation Area.

3.8.2.3 North Lapwai Valley

Riparian vegetation is absent from the reach of Lapwai Creek bordering the North Lapwai Valley site. The creek has been channelized and the banks diked and lined with riprap. Cottonwood and willow are sparse along the creek. The fields next to the creek are in agricultural production.

3.8.2.4 Yoosa/Camp Creek

__jurisdictional wetlands__ are those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

The Yoosa/Camp Creek site is an undisturbed, forested jurisdictional wetland covering an estimated 0.6 to 0.8 ha (1.5 to 2 acres). The dominant community type is western red cedar-ladyfern. These are wetland plants that satisfy the vegetation criteria for a ***jurisdictional wetland.*** Associated species include grand fir, Engelmann spruce, mountain ash, willow, common snowberry, dogwood, Sitka alder, Devil's club, western thimbleberry, queencup beadlily, arrowleaf groundsel, star-flowered Solomon plume and pinegrass. The site is in a USFS-designated Riparian Habitat Conservation Area.

3.8.2.5 Mill Creek and Newsome Creek

The Mill Creek and Newsome Creek satellite sites are along the South Fork Clearwater River drainage. Mining operations from the 1860s to the 1950s have damaged riparian zones at the Newsome Creek site so the vegetation is limited. Forest vegetation at these sites includes grand fir, Douglas fir, Engelmann spruce and western larch in the overstory; Pacific yew and fool's huckleberry, in the shrub layer; and queencup beadlily, wild ginger, beargrass, and star flowered Solomon plume in the herbaceous layer. The sites are in USFS-designated Riparian Habitat Conservation Areas.

3.8.3 Spring Chinook Direct Release Sites and Weir Sites

Spring chinook direct release and weir sites are located in the headwater drainages of Lolo Creek, and the Lochsa, Selway and South Fork Clearwater rivers. The condition of the riparian vegetation in these drainages ranges from natural in undeveloped watersheds to severely altered in drainages subjected to mining and timber harvest. Overall, riparian vegetation is in good condition at these sites.

3.8.3.1 Lolo Creek Sites

Two weir sites are located along Lolo Creek and Eldorado Creek, a tributary of Lolo Creek. Riparian vegetation along Lolo Creek is dominated by western red cedar. Associated tree species include Douglas fir, grand fir, and Engelmann spruce. Understory species include thimbleberry, dogwood, snowberry, ladyfern, arrowleaf groundsel and pinegrass.

3.8.3.2 Lochsa River Sites

Lochsa River sites include the Boulder Creek and Warm Springs Creek release and weir sites and three other weir sites in Fish Creek, Lake Creek, and Brushy Creek. Lochsa River riparian forest vegetation includes western red cedar, grand fir, Douglas fir and western larch in the overstory; and ninebark and other various shrubs in the understory. The herbaceous layer includes wild ginger, arrowleaf groundsel, queencup beadlily and pinegrass.

The Warm Springs Creek and Brushy Creek weir sites are upstream on the Lochsa River, northeast of the Fish Creek and Boulder Creek sites. Riparian forest vegetation at these sites includes grand fir, Douglas fir and Engelmann spruce in the overstory. Shrubs include common snowberry, prickly currant and Rocky Mountain maple. Understory species include queencup beadlily, ladyfern, arrowleaf groundsel and pinegrass.

3.8.3.3 Selway River Sites

The Meadow Creek release and weir site is in the southern Selway River drainage. Riparian forest vegetation at this site includes western red cedar, grand fir, western white pine and Engelmann spruce in the overstory. The most common shrub is fool's huckleberry. Understory species are queencup beadlily, western goldthread, ladyfern, and arrowleaf groundsel.

3.8.3.4 South Fork Clearwater River Sites

The Johns Creek and Tenmile Creek weir sites are along the South Fork Clearwater River drainage. Forest vegetation at these sites include grand fir, Douglas fir, Engelmann spruce and western larch in the overstory; Pacific yew, and fool's huckleberry in the shrub layer; and queencup beadlily, wild ginger, beargrass, and star flowered Solomon plume in the herbaceous layer.

3.8.4 Wetlands

Throughout the Clearwater River Subbasin, wetlands can be found in areas along streams and rivers. A high water table near streams and soils that are often saturated allow water-loving plants such as ladyfern, sedges, Devil's club, and willows to grow. Such habitats can extend through an entire drainage system from the smallest intermittent headwater streams to the large mainstem rivers.

Wetlands are found at two proposed sites. At the Yoosa/Camp Creek site, there is a forested wetland about 0.8 ha (2 acres). A perched water table causes the soils to be saturated for much of the growing season and vegetation is dominated by western red cedar and ladyfern.

At Luke's Gulch a perennial spring is upslope from the proposed site. Development of the site would require access road improvements across a seasonal wetland that receives surface water from the springs located on the hillside and a flat bench at the base of the slope. Vegetation is dominated by Wood's rose and hawthorn, and the herbaceous layer is dominated by moss and strawberry.

3.8.5 Threatened and Endangered Plant Species

Threatened and endangered plant species are native plants that have been given special status because of concern over their continued existence. Species in danger of extinction are classified as endangered. Species at risk of becoming endangered are listed as threatened. *Howellia aquatilis* (Water howellia),

listed threatened, and *Mirabilis macfarlanei* (Macfarlane's four-o'clock), listed endangered, are the two federally-listed plants occurring in Idaho. These plant species are not known to occur in the project area.

National Forest sensitive plant species could occur in the upland riparian areas of the Clearwater and Nez Perce Forests where satellite facilities would be constructed. Many of these species are found in and associated with riparian areas. However, USFS records indicate that no sensitive plants species are present on the proposed sites.

3.9 Land Use

The proposed Nez Perce Tribal hatchery facilities are in a 8000 km² (3,200 mi²) geographic area of north-central Idaho. This geographic area includes portions of Nez Perce, Lewis, Clearwater and Idaho counties. Program facilities would be developed on private lands, tribal lands, and public lands within the Clearwater and Nez Perce National Forests. Two spring chinook direct release sites are proposed within the Nez Perce National Forest and one in the Clearwater National Forest. Weir sites are proposed throughout both national forests. Most lands within these two national forests are under the control of the federal government, but private lands are also found within the forests' boundaries.

The Clearwater River Subbasin has evolved since the mid-1800s from exclusive Nez Perce Tribal occupancy to one of a number of political subdivisions that include incorporated and unincorporated communities, counties, national forests, the Nez Perce Reservation, and private property within what is now the state of Idaho. Major landholders in the Subbasin include the federal government with 60 percent of the land, private property owners with 32 percent, and the state of Idaho with 5 percent. Tribal and other lands comprise the remainder, approximately 3.0 percent. (See Table 3-10.)

Table 3-10

Land Ownership

Landowner	Percentage
Federal Government	60
Private	32
State of Idaho	5
Tribal Lands	1.5
Other	1.5
Total	100

Land use activities within the Subbasin include forestry, mining and grazing in the national forests and on private lands. Other land uses relate to farming and urban development. A well-developed transportation network serves the area.

➲ For Your Information

NFMA passed in 1976 as amendments to the Forest and Rangeland Renewable Resources Planning Act and requires the preparation of regional and forest plans and the preparation of regulations to guide that development.

Both the Clearwater and Nez Perce National Forests have adopted forest plans. These forest plans were developed in accordance with the National Forest Management Act (*NFMA*) of 1976. Forest plans are intended to guide all natural resource management activities within the forests and establish management standards as well as the suitability of lands for resource development. Forest plans are valid until revised, and typically commit forest managers to a course of action no longer than 15 years. The forest plans take state and local regulations

into effect as well as federal law so as to avoid, or at least to minimize, potential conflicts with other agencies and plans. Both forest plans were adopted in 1987.

Of the four counties in the program area, only Nez Perce County has a comprehensive plan and a zoning ordinance.

3.9.1 Central Incubation and Rearing Facilities

3.9.1.1 Cherrylane

The Cherrylane site is on private land. The site is in an unincorporated portion of Nez Perce County and is zoned A (Agriculture, 20-acre minimum). The 6 ha (14 acre) site is a portion of a larger tract of land in agricultural use. The property is currently being used to grow hay and is irrigated. Title to the property is held by Cherrylane Ranches, an Idaho Corporation. The proposed site is designated by the U.S. Natural Resources Conservation Service (*NRCS*) as prime farmland (see Section 5.6, **Farmland Protection Policy Act**).

Title to the parcel immediately west of the subject site is held by the Potlatch Cherrylane Seed Orchard Facility (Potlatch). Potlatch grows grafted conifer trees at this location to produce seeds for their reforestation program. To protect the cones containing the seeds from insect damage, Potlatch applies pesticides during the spring and summer months. These chemicals are currently applied from the air by helicopters. In addition, according to company representatives, other pesticides and herbicides are applied infrequently by ground spray as needed. Potlatch has requested assurance that the proposed hatchery facility will not prevent their use of pesticides and herbicides. In addition, the company has requested assurance that the Proposed Action not affect the groundwater aquifer in a way that would jeopardize their water supply (Boling, June 1994).

3.9.1.2 Sweetwater Springs

The Sweetwater Springs site is on state-owned land in a portion of unincorporated Nez Perce County. The parcel is presently zoned AR (Agricultural-Residential, 5-acre minimum) by Nez Perce County. IDFG acquired the parcel in 1960. The site is currently being used by the Nez Perce Tribe to raise salmon.

3.9.2 Satellite Facilities

The proposed satellite facilities are spread throughout the Subbasin. These facilities, as they relate to land use, are discussed next.

3.9.2.1 Luke's Gulch

The Luke's Gulch site is on tribal land within unincorporated Idaho County. The proposed site is immediately adjacent to a parcel of private land, and is accessed by crossing this parcel over an existing easement. This adjacent property is unimproved but currently has a mobile home that is occupied infrequently.

3.9.2.2 Cedar Flats

The proposed Cedar Flats site is within the administrative area of the Selway Ranger Station within the Nez Perce National Forest. The proposed site lies on the north bank of the Selway River, which is designated as a *Recreational River* in the ***Wild and Scenic River System.*** The site is about 11 km (7 miles) upstream from the Middlefork Clearwater River, and is accessed by Forest Service Road No. 223, a road that is open year-round. The site is in the Riparian Habitat Conservation Area of the Selway River, and is within Management Unit 8.2A. Management Unit 8.2A is managed for "...Outstandingly remarkable values and free-flowing river conditions as specified in the Wild and Scenic Rivers Act of 1968, as amended." The Nez Perce Forest has determined that some waterways within the forest are more important than others in maintaining the fishery/water quality objective, and protecting the fishery habitat of those waterways. With respect to the Selway River, at the proposed Cedar Flats site, the Forest Plan recommends maintaining the habitat potential at 100 percent, the most restrictive objective.

3.9.2.3 North Lapwai Valley

The North Lapwai Valley site is on tribal land in unincorporated Nez Perce County. The site is currently being used to grow grass hay.

3.9.2.4 Yoosa/Camp Creek

The Yoosa/Camp Creek site is in the Clearwater National Forest within Management Unit M2. This management unit is the largest management unit in the Forest, containing over a half million acres. The main emphasis of this management unit is to provide a sustained production of wood products and to maintain

viable populations of big game and resident fish along with adequate protection of soil and water quality. Big game, primarily elk, are to be managed through limited road closures. Dispersed recreation and livestock grazing will be provided if found to be compatible with timber management goals. No timber sales are currently underway, but five timber sales are proposed during the next 5 years: Knoll Creek, Camp Creek, Relaskop Creek, Prism, and Snowy Summit. In addition, some not yet identified small salvage sales may be located upstream from the facility. The site is also in a Riparian Habitat Conservation Area.

3.9.2.5 Mill Creek

The Mill Creek site is within the Clearwater District of the Nez Perce National Forest. The proposed site lies on the west bank of lower Mill Creek, and is designated as Management Unit 16C in the Nez Perce National Forest Plan. The purpose of Management Unit 16 is to increase usable forage for elk and deer on potential winter range. The fishery/water quality objective for this area (designated C) was to maintain a fishery habitat potential of 80 percent however, because chinook salmon are present, the Forest Plan fishery/water quality objective will be corrected from 80 percent to 90 percent (U.S. Department of Agriculture, Forest Service, Hungry Mill Timber Sales DEIS, 1993). No timber sales are currently underway in the management unit, but the Hungry Mill timber sale should occur within the next 10 years, and two grazing allotments are currently in effect, totaling 900 animals (cows and calves). The site is also in a Riparian Habitat Conservation Area.

3.9.2.6 Newsome Creek

The Newsome Creek site is in the Nez Perce National Forest, within the riparian area of Management Unit 17B. Management Unit 17 is managed for timber production and other multiple uses on a sustained yield basis while meeting visual quality objectives of retention or partial retention. Two grazing allotments are currently in effect within the watershed, totalling 170 cow/calf pairs. No timber sales are being entertained at the present time until improvement of the stream conditions are evident. The *B* designation in the management unit means that the Forest intends to maintain a 90 percent fishery/water quality objective for fishery habitat in the management area. The site is also in a Riparian Habitat Conservation Area.

➲ For Your Information

Visual Quality Objectives are explained in Section 3.11, ***Visual Resources.***

The Newsome Creek site is about 4 km (2.5 miles) from the Haysfork Gloryhole, an abandoned hydraulic placer mine that ceased operation in 1915. This gloryhole, also referred to as the Montana Placer, is the single largest sediment producer in the

Gloryhole *is a term used for an hydraulic placer mine.*

Newsome Creek watershed according to the USFS. It has been estimated that over 508 metric tons (500 tons) of sediment leave the gloryhole annually. The USFS has been attempting to trap the sediment and keep it from entering Newsome Creek since 1985. The agency has recently implemented a rehabilitation plan to keep sediment out of the creek. The project involves maintaining and reinforcing existing sediment traps to prevent sediment from reaching the waterway. The rehabilitation of the gloryhole is necessary to reduce the potential for a major catastrophic event, according to the USFS. This proposed project is scheduled to be completed in 1996.

Although the Haysfork Gloryhole has been abandoned, mining continues on a smaller scale in the area.

3.9.3 Spring Chinook Direct Release Sites and Weir Sites

Three spring chinook direct release sites are proposed within the Clearwater and Nez Perce National Forests. These sites are within Boulder, Warm Springs and Meadow creeks.

Boulder Creek drains an area of 14 000 ha (57 mi^2), and approximately three quarters of the watershed lies within the Selway-Bitterroot Wilderness. The watershed is entirely publicly owned, and is administered by the USFS. Land use is primarily recreation. The Wilderness Gateway Campground lies at the mouth of Boulder Creek, at the confluence of Boulder Creek and the Lochsa River.

Warm Springs Creek drains an area of approximately 17 000 ha (64 mi^2), two thirds of which lies in the Selway-Bitterroot Wilderness. Land use is primarily recreation. Johnson Hot Springs is 0.4 km (1/4 mile) from its confluence with the Lochsa River.

Meadow Creek drains approximately 62 000 ha (240 mi^2). The drainage is entirely held in public ownership (USFS), and is primarily used for recreation. Meadow Creek lies within the largest designated roadless area on the Nez Perce National Forest. Meadow Creek has experienced little mining activity over the years. Mining was confined to two tributaries of Meadow Creek: Three Prong Creek, and Eastfork Meadow Creek.

Weir sites are proposed in both national forests.

3.9.4 Recreation Resources

The recreational opportunities within north-central Idaho are numerous, particularly within the area's two national forests, the Clearwater and the Nez Perce. These recreational opportunities include both developed and dispersed recreation. Developed recreation is recreation that occurs where improvements enhance recreational opportunities and accommodate intensive recreation activities within a defined area. An example of developed recreation is a developed campground. Dispersed recreation is outdoor recreation which occurs outside of developed sites in both the roaded and roadless forest environment as well as on private land. Hunting and cross-country skiing are examples of dispersed recreation.

The recreational opportunities (both developed and dispersed) in the area include a wide range of activities. An example of the recreational opportunities available include:

- hunting and fishing;
- camping and hiking;
- boating and rafting;
- mushrooming and berry-picking;
- cross-country skiing and snowmobiling;
- gold panning and rock collecting;
- bird watching;
- photography; and
- sightseeing, which enhances the quality of all recreational experiences.

Recreational activities depend on access and a well developed transportation network exists in the area. A study undertaken by the University of Idaho in 1987 found that north-central Idaho was the destination for over 10 percent of the leisure travelers in the state (The 1987 Idaho Leisure Travel and Recreation Study, 1988). Tourism and recreational pursuits as an industry is growing in Idaho as it is nationwide. Tourism is currently the third largest industry in Idaho (Robb, 1995).

The following describes the recreational resources close to the proposed sites.

3.9.4.1 Cherrylane

An important steelhead fishery occurs from fall through spring in the mainstem of the Clearwater River near the Cherrylane site. Rafting and swimming are common activities during the summer.

Also, the lower Clearwater River from Lewiston to Myrtle is known as one of the few areas in the world to find sillimanite, a gem-quality mineral (Nez Perce Comprehensive Plan, 1979). Other than fishing, swimming, rafting, and rock hounding on the Clearwater River, no other recreational opportunities exist in the immediate vicinity of the proposed site, except hunting, if permitted by the property owners in the area.

3.9.4.2 Sweetwater Springs

The only recreation opportunity in the immediate vicinity of the Sweetwater Springs site is hunting for upland game birds and deer, if allowed by the property owners in the area.

3.9.4.3 Luke's Gulch

Recreational opportunities in the vicinity of this site include steelhead fishing during the fall through the spring, and rafting and swimming in the summer. Anglers will usually fish from the bank on the opposite side of the river near highway pullouts.

3.9.4.4 Cedar Flats

The portion of the Selway River that flows past the Cedar Flats site is designated a Recreational River in the Wild and Scenic Rivers System. The river is used seasonally by anglers and float boaters for day use parking. This site is the first available parking below O'Hara Campground.

3.9.4.5 North Lapwai Valley

Recreational opportunities nearby include the Visitors Center of the Nez Perce National Historical Park at Spalding, about 1.6 km (1 mile) north on U.S. Highway 95. Picnickers also use the park located just below the Visitors Center.

3.9.4.6 Yoosa/Camp Creek

The primary recreational opportunity in the vicinity of Yoosa/ Camp Creek is elk hunting. Other recreational opportunities in the area include hiking, camping, fishing, gold panning, and berry-picking (U.S. Department of Agriculture, Forest Service, Mox Remains Timber Sale Environmental Assessment, 1993).

There are several undeveloped campsites located along system roads within the area and one established forest trail. Forest trail No. 48 (the Austin Ridge Trail), which traverses through the area, is open to all terrain vehicle (ATV) use. The trail passes within

1 km (0.5 mile) of the proposed satellite facility at its closest point. Trail No. 40 (the Nee-Me-Poo Trail), registered as a National Historic Trail, is not open to any motorized vehicle use. This trail traverses the ridge north of Yoosa Creek, and passes within 1.6 km (1 mile) of the site at its closest point. Both of these trails receive light use throughout the summer and early fall months. There are also a few trails that traverse the ridges along the eastern and southern boundaries. These trails receive light use during the fall for the purpose of big game hunting and are not maintained. There is one outfitter (Burlingame Outfitters, Kamiah, Idaho) permitted within this portion of Yoosa Creek drainage.

3.9.4.7 Mill Creek

The Mill Creek site would be reached off the Hungry Ridge Road, a road that is open most of the year. The closest recreational site is the South Fork Campground, about 2 km (1.2 miles) northeast of the proposed facility on the South Fork Clearwater River. Facilities at the campground include picnic facilities, trailer parking, potable water station, sanitation facilities including trailer sanitation facilities, and fishing access. Big game habitat also exists in the area surrounding the site, particularly elk habitat. Recreational opportunities in the area include hunting, fishing, camping, and picnicking.

3.9.4.8 Newsome Creek

The Newsome Creek site is near the Newsome Recreation Area. The Newsome Recreation Area is used as an area for dispersed camp sites. The area is improved with sanitation facilities. The road to the Newsome Creek site, Forest Service Road No. 1858, is open year-round. Recreational opportunities in the area in addition to camping include hunting, fishing, sightseeing, snowmobiling, bicycling, and gold panning. The area has been totally altered by hydraulic and placer mining; some sediments in the area are 6 m (20 ft) thick (U.S. Department of Agriculture, Forest Service, 1994).

3.9.4.9 Spring Chinook Direct Release Sites and Weir Sites

All the spring chinook direct release sites and weir sites are within wilderness or roadless areas. These areas are used by a variety of recreationists for activities such as hunting, fishing, backpacking, float boating, camping, and panning for gold and other minerals. Increased recreational use is anticipated in the future.

3.10 Socioeconomics

The Proposed Action would take place in north-central Idaho, immediately below the state's panhandle. This area is called the Seaport Area because it is connected to the Pacific Ocean by the Columbia and Snake rivers. The program area is in Clearwater, Lewis, Nez Perce and Idaho counties.

North-central Idaho has a rich history that includes thousands of years of Native American habitation and subsequent settlement by others in the mid-1800s in search of gold. Today the area's principal export base depends on its most valuable natural resource, timber. The lumber and wood products industry, including paper and related products, provide the bulk of manufacturing employment in the area.

Because the Proposed Action would impact the Nez Perce Tribe, existing population and other socioeconomic characteristics of the area are divided into general and Native American sections.

3.10.1 Population

The population of the four county area has changed little since the early 1980s, expanding by less than 5 percent to 65,000 persons while the state's population as a whole grew by 20 percent (see Table 3-11). The primary reason for this relatively low population expansion in the area is high outmigration during the 1980s as residents sought employment opportunities elsewhere. The four counties lost population during the 1980s. The increase in population during the past 15 years has largely occurred since 1990 (Idaho Department of Employment, February 1995, and U.S. Department of Commerce, Bureau of the Census, Population Estimate Branch, 1990).

The Native American population in the area is concentrated primarily in Nez Perce County (see Table 3-12). As of 1990, approximately 2,400 Native Americans lived in the four county area, with 1,865 living on the Nez Perce Reservation and tribal lands. Native Americans are the largest minority group in the area, making up about four percent of the general population. The median age of this population group was 25.3 years (1990), compared to 31.5 years for the state as a whole (Bureau of the Census, 1990).

3.10.2 Employment

The civilian labor force is the number of people in a population group who are over 16 years of age and who are either working or actively seeking work. Over two-thirds of the

Table 3-11
General Population of North Central Idaho 1980-1994

County	1980	1990	1994	Percent change 1980-1994
Nez Perce	33,220	33,750	37,430	13
Clearwater	10,390	8,500	9,060	13
Lewis	4,120	3,500	3,910	5
Idaho	14,770	13,780	14,980	1
County Totals	62,500	59,550	65,380	5
State Totals	944,130	1,006,750	1,133,030	20

Source: Idaho Department of Employment, 1995

Table 3-12
Native American Population of North Central Idaho 1990

County	All Persons	Native Americans	Percent Native Americans of Total Population
Nez Perce	33,750	1,680	5
Clearwater	8,500	180	2
Lewis	3,520	170	5
Idaho	13,780	350	3
County Totals	59,550	2,380	4

Source: Idaho Department of Employment, Regional Economic Profiles, 1994.

Table 3-13
Labor Force Data for the Four-County Area 1990

	General Population	Native American Population
Civilian Labor Force	30,790	743
Employment	28,910	549
Unemployment	1,880	194
Unemployment Rate	6.10%	26.10%

Source: Idaho Department of Employment and 1990 Census of Population, Social and Economic Characteristics, American Indian and Alaskan Native Areas.

area's labor force resides in Nez Perce County (see Table 3-13). The labor force participation rate for Native Americans in the area during 1990, the most recent information available, was 59 percent. This compared to a labor force participation rate of 60 percent for the general population, and 65.5 percent for the state as a whole (U.S. Department of Commerce, 1990 Census of Population, Social and Economic Characteristics, State of Idaho, and U.S. Department of Commerce, 1990 Census of Population, Social and Economic Characteristics, American Indian and Alaska Native Areas).

Lumber and wood products employment contribute to the major share of employment in the manufacturing sector of the local area, although the employment base is also heavily dependent on the local government and trade sectors. Employment in the lumber and wood products industry typically yields a high value to the federal and local economy, since the products produced bring in resources from outside the local area, and the wages paid are relatively high. Traditionally the trade and government sectors are not at the high end of the wage scale. The employment sectors that offer the most covered employment in the four county area, that is, covered by the employment insurance program, are trade (24%), manufacturing (22%), government (21.5%), and services (19%). This employment pattern is markedly different from the employment pattern of the Native Americans living and working in the area. Of this population group, 45 percent were employed by the government sector, 23 percent were employed in the manufacturing sector, and 8.6 percent were employed in the agricultural, forestry and fisheries (U.S. Department of Commerce, 1990 Census of Population, Social and Economic Characteristics, State of Idaho,

and U.S. Department of Commerce, 1990 Census of Population, Social and Economic Characteristics, American Indian and Alaska Native Areas). This employment pattern reveals unusually high employment in the government sector, an employment sector that pays relatively low wages.

3.10.3 Unemployment Rate

The unemployment rate for Native Americans in 1990 was extremely high at 26 percent. As an ethnic group, Native Americans registered the highest unemployment rate of all ethnic groups in the area. (See Table 3-13).

3.10.4 Income

Per capita income is the mean income computed for every man, woman and child in a particular population group. It is computed by dividing the total income by the total population. Table 3-14 reveals that both Nez Perce and Lewis counties have a higher per capita income than for the state as a whole. This is because of the value of the lumber and wood products industry on both local and state economies. Both Nez Perce and Lewis counties have relatively high employment in the lumber and wood products industries.

Table 3-15 shows the low per capita income the Native Americans had in north-central Idaho in 1990, the most recent information available. Per capita income among tribal members is less than 40 percent of that for non-tribal members in the local area, and also for the state as a whole.

3.11 Visual Resources

This section includes the following: an overview of visual resources in the region; information from the USFS about resources on its respective forestland; and a description of the existing visual resources in the area that could potentially be affected by the program. Visual resources on tribal and private land were determined by field work.

3.11.1 General

The Clearwater River Subbasin is characterized by farm and rangeland in the lowlands and forest in the highlands. Much of the forestland is owned by the federal government. This land is managed by the USFS and is divided into management units in its

Table 3-14
Per Capita Income North Central Idaho
1988-1992

County	1988 (1988 dollars)	1990 (1990 dollars)	1992 (1992 dollars)	Percent Change 1988-1992 (Nominal)
Nez Perce	$14,133	$16,372	$18,061	27.80%
Clearwater	$12,112	$14,065	$15,774	30.20%
Lewis	$13,225	$17,565	$17,122	29.50%
Idaho (County)	$11,245	$13,580	$14,625	30.10%
Four County Total	**$12,678**	**$15,395**	**$16,395**	**29.30%**
State Total	**$12,850**	**$15,304**	**$16,649**	**29.60%**

Source: Idaho Department of Employment, Regional Economic Profiles, 1994.

Table 3-15
Per Capita Income
Native American
Population
1990

County	1990
Nez Perce	$6,390
Clearwater	$4,250
Lewis	$7,640
Idaho (County)	$4,860
Reservation-Wide	$6,100

Source: U.S. Department of Commerce, Economics and Statistics Administration, Bureau of Census, Table 17 "Selected Social and Economic Characteristics for American Indian and Alaska Native Areas: 1990."

Forest Plans. Some of the units have been managed for timber and other resources; others have been managed as wilderness and maintained in a natural state except for trails.

The land able to be farmed or used as range has been managed and altered. Roads follow along rivers and creeks. Farmsteads, small agricultural and/or timber towns, and small villages dot the landscape and are far from each other. Ridges and plateaus provide sweeping vistas of farmland and mountains. Rivers and creeks wind through deep canyons.

The Selway River at the Cedar Flats site is designated a Recreational River in the Wild and Scenic River System. Some roads, though their primary use is transportation, are also designated scenic highways and are used heavily for access to recreation opportunities and for scenic enjoyment. The visual quality of the area is valued by hikers, bikers, float boaters, motorists and residents.

Much of the Nez Perce and Clearwater National Forests are natural-appearing forestlands. In some areas outside of the wildernesses, management activities are apparent. Examples of management activities include timber harvest, roads, gravel pits, recreation facilities, utility corridors, and some mining operations. Harvested timber land is in different stages of regrowth.

Planned USFS actions will change the forest landscape as roads are constructed into undeveloped areas and as timber management activities change the age and distribution of timber stands.

3.11.2 Visual Quality Objectives

The USFS has developed visual quality objectives (***VQOs***) for all of its forest management units. Visual quality objectives are visual resource management goals. Each VQO describes a different degree of acceptable alteration of the landscape. The degree of alteration is measured in terms of visual contrast with the surrounding natural landscape.

Initial VQOs were based on degree of scenic quality, visible areas, and aesthetic concerns of users using the Visual Management System (U.S. Department of Agriculture, Forest Service, 1974). There are five levels:

- ***preservation*** applies to wilderness and other special areas where the natural landscape should be unaltered by forest management activities;
- ***retention*** applies to areas where activities should not be evident to the casual forest visitor;

- ***partial retention*** applies to areas where activities may be evident but must remain subordinate to the natural landscape. These visually sensitive areas are along major state and federal highways, wild and scenic river corridors, and other high public use areas;
- ***modification*** and ***maximum modification*** apply to less visually-sensitive areas where changes can dominate the natural landscape but should look natural from a long distance.

The Forest Service developed mitigation measures to reduce the severity of impact and constrain management activities. See Section 4.11, **Visual Resources,** for potential impacts and mitigation.

3.11.3 Central Incubation and Rearing Facilities

3.11.3.1 Cherrylane

The proposed site is on private land used for irrigated agriculture. It is in a wide valley along the Clearwater River. The site is screened from the river by riparian vegetation, specifically cottonwoods. One residence is above the site and about 0.8 km (0.5 mile) upriver. The Potlatch Tree Farm abuts the site. Highway 12 is between the site and the river. The highway is four lanes at this location, but is mostly two lanes elsewhere. Between September to the end of May people fish for steelhead along the river. The site is not screened from the highway. Agricultural outbuildings, grain silos, etc. are nearby. See Photo No. 1 in Chapter 2.

3.11.3.2 Sweetwater Springs

The proposed site is on state-owned rangeland next to the springs. The site is in a canyon near the highway to Waha and cannot be seen from U.S. Highway 95. The area is of rolling hills, with grass-forbs, cottonwoods, and other riparian vegetation along the creek. The existing facility is located along a dirt and gravel farm road used by workers and occasionally hunters. The area to be used has already been cleared and its surfaced gravelled. See Photo No. 2 in Chapter 2.

3.11.4 Satellite Facilities

3.11.4.1 Luke's Gulch

The site is on a flat bench above the South Fork Clearwater River. Pine and fir trees grow on the bench. See Photo No. 3 in Chapter 2. The bench is at the base of a steep hill with deciduous riparian vegetation. One residence used as a vacation home for 1-2 weeks per year is nearby. Another residence is downriver about 0.6 km (0.25 mile) from the site and is high up the steep canyon. The site is visible from State Highway 13, which is across the river from the site. Anglers occasionally fish from the riverbank near the site.

3.11.4.2 Cedar Flats

This site is on a flat river plain of USFS administrative land along the Selway River, which is a designated Recreational River in the Wild and Scenic River System. The site is near Johnson Bar Campground. See Photo No. 4 in Chapter 2. The area is between the Selway Ranger District office wastewater treatment facilities and the water supply intake pump station. The site was improved as part of a Jobs Corps facility. An existing dirt access road runs through the site. The site is screened from Forest Service Road 223 by large cedars. The river is used by float boaters, campers, and others for recreation. O'Hara Creek Campground is 3.2 km (2 miles) upstream from the site. Anglers and float boaters use the site for parking and day use. The VQOs for the site are retention and preservation.

3.11.4.3 North Lapwai Valley

This site is on tribal land near the town of Lapwai. The site is along Lapwai Creek and Highway 95 in an agricultural field. The site is surrounded by rolling hills in rangeland, and riparian vegetation including cottonwoods and alders along the creek. See Photo No. 5 in Chapter 2. Highway 95, a Scenic Byway, is about 60 m (200 ft) from the site. One residence is within 90 m (300 ft) of the site. The site is 0.8 km (0.5 mile) from the Nez Perce National Historical Park.

3.11.4.4 Yoosa/Camp Creek

The site is in the Clearwater National Forest, in Forest Service management unit E-1. For foreground views, such as those seen from Forest Service Road 103, the VQO is retention, which means human activities are not evident to the casual forest observer. The

VQO for middleground views, such as those seen from the Nee-Me-Poo National Historical Trial, is modification, which means human activity should appear as a natural occurrence. The 0.4 ha (1 acre) site is dominated by large cedars and white pine. The site is along Forest Service Road 103 at mile marker 8. See Photo No. 6 in Chapter 2. The area is used occasionally by recreationists and there are dispersed camping areas near the site.

3.11.4.5 Mill Creek

This site has moss, Douglas Fir, swordfern and riparian vegetation. It is next to Mill Creek along Hungry Ridge Road on a bench beneath the road in a narrow canyon. See Photo No. 7 in Chapter 2. The road is used by loggers, hikers, ranchers, and others for commerce and recreation. Open grazing is allowed in the area. The site is in Nez Perce National Forest Management Area 16c. Although there is no visual quality objective within the Forest Plan for this management unit, the Forest Plan has a forest-wide objective that states: Dominant man-caused activities will be kept subordinate. They should be designed to appear natural to the casual observer. Visual resources should be retained for visual and recreational enjoyment.

3.11.4.6 Newsome Creek

The site is on Forest Service land along Forest Service Road 1858. The area is flat, near the confluence of Newsome and Beaver creeks. See Photo No. 8 in Chapter 2. The setting is a mountain stream with pine and alder along its banks and Douglas fir, grand fir, spruce and lodgepole pine on the surrounding hills. The area is made up of cobbles where mine tailings have been piled. There is no topsoil, except where the pine trees are growing.

The Elk City Trail (wagon road) is nearby. Camp sites are about 2.4 km (1.5 miles) down the road.

Although there are no designated visually-sensitive resources in this area, residents of Newsome and recreationists use Forest Service Road 1858 frequently.

3.11.5 Spring Chinook Direct Release Sites and Weir Sites

The spring chinook direct release sites and weir sites proposed are on remote national forestland. The Tribe will consult with the USFS on final location of the sites to avoid conflicts with recreation and other resources.

3.12 Air Quality

National Ambient Air Quality Standards (*NAAQS*) are established by the U.S. Environmental Protection Agency (*EPA*). The Federal Clear Air Act required EPA to:

- identify pollutants that may endanger public health;
- issue air quality criteria documents to reflect the latest scientific information about the effects of these pollutants have on human health or welfare; and
- set primary and secondary standards for these pollutants.

In Idaho, the state of Idaho, Department of Health and Welfare, Division of Environmental Quality is responsible for air quality management in parts of the counties containing proposed facilities. Air quality management at facilities located within national forest land is the responsibility of the EPA.

In general, existing air quality throughout the Clearwater River Subbasin is excellent. All potential site areas have air quality that falls within National Ambient Air Quality Standards.

3.13 Public Health and Safety

The proposed Cherrylane and Sweetwater Springs facilities and the satellite and release sites are in areas without fire protection services. If a fire occurred, no services would be provided (Tomberg, 1995). On-site water supply could be used for fire protection. In remote forested areas, state and federal agencies could be contacted for fire fighting if forests were threatened.

Medical and hazardous material response is available from the city of Lewiston for the Cherrylane site (Lynard, 1995). Emergency medical response is available from the nearby town of Waha for the Sweetwater Springs site. Lewiston and Orofino have hospitals. Most towns throughout the area have quick response emergency care available. Helicopter transport out of Spokane, Washington is available to serve St. Joseph's Regional Medical Center in Lewiston and the Clearwater Valley Hospital in Orofino.

The State Police, County Sheriffs, and tribal and federal agents police their respective jurisdictions.

Chapter 4 Environmental Consequences

In this Chapter:

- Specific impacts from alternatives
- Proposed mitigation
- Cumulative impacts
- Comparison of alternatives

This chapter discusses the potential impacts of the Proposed Action and the No Action Alternative on the environment.

To analyze potential impacts from construction, operation and maintenance activities, resource specialists analyzed actions using a scale with four impact levels: high, moderate, low and no impacts. Definitions of the impact levels vary with each resource. Impact definitions are given in the first part of each resource discussion.

Specialists considered direct, and indirect impacts in the short and long term. Direct impacts are caused by the action and occur at the same time and place. Indirect impacts are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Impacts can be beneficial or adverse. The impact discussion lists ***mitigation*** that could reduce impacts and ***cumulative impacts*** of the alternatives. Cumulative impacts are created by the incremental effect of an action when added to other past, present, and reasonably foreseeable future actions.

The level of detail for each affected resource depends on the character of that resource, the significance of the issue, and the scale of analysis most relevant for the affected resource. Additional detail can be found in appendices and program files.

Impacts were also assessed based on the premise that changes made to the salmon's environment as a result of overall recovery efforts launched by the Endangered Species Act will occur. These recovery efforts will result in wild spawning Snake River chinook salmon being able to return at a rate that, at the least, replaces themselves.

4.1 Nez Perce Tribe

The Proposed Action has the ability to affect several important aspects of tribal life. Primary are salmon harvest, and its associated cultural and subsistence implications, employment, and fisheries management.

4.1.1 Proposed Action

4.1.1.1 Tribal Harvest

The Proposed Action would increase salmon runs so tribal harvest can be sustained into the future. The Master Plan describes a gradual increase in harvest corresponding to an increase in runs after broodstock needs and natural spawning goals are met. Table 2-2 shows the predicted levels of harvest after the program has been operating for 15-20 years. More than 220 spring chinook, 600 summer chinook and 1,500 fall chinook would be available for tribal and non-tribal member harvest.

If monitoring and evaluation show the program is successful, supplementation would proceed in other drainages of the Clearwater River. Other salmon spawning habitats in the basin would be seeded. Salmon would regain its historical place as an important subsistence food for the Nez Perce.

4.1.1.2 Tribal Employment

The Proposed Action would increase employment. Tribal members could be employed in facility construction, operation and management. Thirteen full time and 15 part-time employees would be needed to operate and maintain the facilities and to conduct monitoring and evaluation studies (Walker, G., 1995) (see Table 4-1).

4.1.1.3 Fisheries Management

As manager of hatchery facilities, the Nez Perce Tribe would have a direct influence on fish runs returning to their homelands. Tribal hatchery managers, with input from fisheries co-managers in the region, would determine how, when and where to rear, release and harvest fish produced from the hatchery. The managers would select stocks best suited to program goals.

A primary goal of the Proposed Action is to provide for harvest of surplus adults by getting production into underseeded habitat and coupling that with production from fish reared in a more typical hatchery setting to help overcome poor adult return rates. Success in achieving this goal will require adaptive management. The best mechanism to incubate and rear fish to mimic natural production needs to be determined. Optimum release timing and fish size need to be determined. Beneficial and adverse effects of supplementation on existing populations need to be monitored and the results fed back to hatchery production specialists. Evaluation of returns and establishment of harvest strategies are

Table 4-1
Estimated Number of Positions and Employees Needed

Facility	DHO	HM	AHM	SOF	HT	ST (Part time)	ST (Full time)	M&E
Cherrylane	0.5	1	1		1	1		6
Sweetwater Springs		1				2	1	
Yoosa/Camp				0.5		2	1	
Mill Cr.				0.5		2		
Newsome Cr.				0.5		2		
Cedar Flats				0.5		2		
Luke's Gulch				0.5		2		
North Lapwai Valley				0.5		2		
Total	0.5	2	1	3	1	15	2	6

DHO - Director of Hatchery Operations
HM - Hatchery Manager
AHM - Assistant Hatchery Manager
SOF - Satellite Operations Foreman
HT - Hatchery Technicians
ST - Satellite Technicians
M&E - Monitoring and Evaluation

also aspects of hatchery management that need to occur to meet program goals. The Nez Perce Tribe, as hatchery managers, would be responsible for these actions and the success of the program.

Rights guaranteed in treaties to harvest fish in a manner consistent with a traditional livelihood would be furthered by improving the Tribe's ability to directly produce salmon. The Tribe would have an additional means to improve treaty fisheries.

4.1.2 No Action Alternative

4.1.2.1 Tribal Harvest

Under the No Action Alternative, tribal harvest would continue as described in Section 3.1.2, or diminish with restrictions from implementing the ESA. In most years, fall chinook harvest conducted in the Zone 6 fishery on the Columbia River would probably remain the most abundant catch. This run is supplemented by hatchery production in the upper Columbia River Basin. Spring chinook harvest in the Clearwater River should increase when Clearwater Fish

Hatchery begins to return its mitigation numbers; the predicted harvestable return would number about 1,000 adults (Murphy and Johnson, 1990). Additional harvest is not expected from Kooskia or Dworshak hatcheries until smolt-to-adult survival returns increase from improved migration corridor conditions.

In the short term, harvest would continue to focus on Zone 6, and three hatcheries: Rapid River, North Fork Clearwater, and Clear Creek. Success by the Clearwater Fish Hatchery would extend the spring chinook salmon run into sites for the satellite facilities: Walton Creek, in the upper Lochsa River drainage; and Red River and Crooked River in the upper South Fork Clearwater River drainage.

Under the No Action Alternative, without changes in stock production, chinook harvest would occur only during the early summer. Spring chinook is the only stock propagated in the basin. Though a small run of fall chinook is present in the Clearwater River, current, approved production strategies do not call for taking aggressive measures to increase the run to a harvestable level. Consequently, a fall chinook harvest is not expected.

4.1.2.2 Tribal Employment

Tribal employment is expected to decrease in the No Action Alternative. No employees would be hired to help operate and manage the program. The staff of 11 tribal employees working on collecting background monitoring data for the program and developing the EIS would no longer be employed.

4.1.2.3 Fisheries Management

By implementing the No Action Alternative, fisheries management would proceed as it is. The Nez Perce Tribe is involved in all arenas of management involving Columbia Basin anadromous fisheries. The Tribe provides input on production, habitat, harvest and hydrosystem issues. Within the last 10-15 years, the Nez Perce, and other Columbia Basin tribes, have assumed a co-management role of the fisheries resource, due in large part to Judge Boldt's decision (see Section 3.1.2.1, **Treaty Fishing Rights**), and the U.S. vs. Oregon lawsuit. However, the Tribe does not have the facility support to directly affect production within its own reservation, or its usual and accustomed fishing grounds.

There are three anadromous hatcheries within the Nez Perce Reservation. All are federally-funded facilities, and are managed by the USFWS and IDFG. The Nez Perce Tribe cooperates with these agencies on production issues, but decision-making has

been assigned through Congressional Acts. Production from the hatcheries in the Clearwater River Subbasin also falls under the Columbia River Fish Management Plan (see Section 1.6.7). Species and production numbers follow this program closely.

The No Action Alternative does not provide the Nez Perce Tribe with any direct management of anadromous fish runs within the borders of its own reservation and does not meet the Tribe's need to restore salmon runs within its treaty lands.

4.2 Cultural Resources

Protection of cultural properties is guided by 36 CFR 800 "Protection of Historic and Cultural Properties," which allows for the acceptance of adverse effects when no other alternative is practicable, mitigative measures are taken into account, and the Advisory Council is given the opportunity to comment.

Effects of an undertaking that would otherwise be found to be adverse may be considered as not being adverse when a historic property is of value only for its potential contribution to archaeological, historical, or architectural research, and when such value can be substantially preserved through the conduct of appropriate research, and when such research is conducted in accordance with applicable professional standards and guidelines (36 CFR 800.9). Avoidance of an historic property would be considered as having no effect.

Analysts used these impact definitions to determine the level of impact for the alternatives.

- A **high** impact would occur if direct physical disturbance of a cultural resource site is certain unless adequate avoidance measures are taken.
- A **moderate** impact would occur if direct physical disturbance is possible.
- A **low** impact would occur if direct physical disturbance is highly unlikely, or indirect forms of disturbances occur.

4.2.1 Proposed Action

Under this alternative, judicious design and choice of alternative sites would avoid any direct impacts to the five cultural properties identified. Monitoring of site locations during construction would minimize potential straying onto sites while allowing for immediate recognition of previously unknown/buried cultural deposits.

Most of these sites can be avoided by use of alternative locations or locating activity away from the cultural resource, therefore impacts would be low. In instances where avoidance is not feasible,

mitigative plans would need to be developed in accordance with NHPA. Development should be coordinated with the Nez Perce Cultural Resource Program and the Idaho SHPO should be consulted.

The Sweetwater Springs site could be used if no subsurface excavation is done within the site. Archaeological monitoring of construction in this area should be performed by a trained representative of the Nez Perce Tribe Cultural Resources Program to ensure no resources are disturbed.

In those cases where avoidance is not feasible, specific mitigation plans may be developed to insure that the appropriate scientific information is collected prior to site disturbance. Such work would be carried out under the National Historic Preservation Act of 1966, as amended, and its implementing regulations, (36 CFR 800), and the Archaeological Resources Protection Act of 1979, as amended, and the Native American Graves Protection and Repatriation Act of 1990.

4.2.2 No Action Alternative

Under the No Action Alternative no special considerations would be given to cultural resources. This does not mean that deterioration or destruction is a management option for historic properties on federal lands. Sites on private or state lands have different requirements, however, and may not be afforded such protection.

4.2.3 Cumulative Impacts

No cumulative impacts are expected.

4.3 Geology and Soils

This section discusses the potential impacts of the Proposed Action and the No Action Alternative on geology and soils. Analysts used soil survey data and published information to identify potential impacts. Impact levels of no, low, moderate, or high were used.

Analysts defined the impact levels using these definitions:

A **high** impact would occur under these conditions:

- Where road or facility construction and/or clearing are required on sites prone to slides or erosion with a high susceptibility to erosion.

- Soil properties or site features are so unfavorable or difficult that standard mitigation measure would not work.
- Accelerated erosion, sedimentation, or slides would create long-term impacts.

A **moderate** impact would occur under these conditions:

- Where road or facility construction and/or clearing takes place on soils with a moderate to high erosion potential.
- Soil properties and site features are such that a mitigation measure would be effective in controlling erosion and sedimentation with acceptable levels.
- Impacts would be primarily short term, with a significant increase in normal erosion rates for a few years following soil disturbance until erosion and drainage controls become effective.

A **low** impact occurs under these conditions:

- Where road and facility construction and clearing takes place on soils with a low to moderate erosion hazard, and the potential for successful mitigation is good using standard erosion and runoff control practices.
- Erosion and sedimentation levels would be held near normal during and following construction.

4.3.1 Proposed Action

4.3.1.1 Geologic Hazards

Seismic hazards have been identified for the Cherrylane site. Seismic hazards for this site would be considered when the facilities are designed. All facilities would be designed to withstand earthquake intensities of V or as identified by the local and state earthquake building codes. No seismic hazards were identified at the Sweetwater Springs facility.

No seismic hazards have been identified for the satellite sites. All other sites under this alternative are for monitoring or release purposes only and would not cause any permanent impacts to the surrounding geology or soils.

The Proposed Action would have low overall impacts on geology. No mitigation is required.

4.3.1.2 Soils

Construction and maintenance of hatchery facilities can impact soils in many ways. Disturbance of the ground surface and subsurface, and vegetation removal during site clearing, road building and facility construction increase the risk of soil erosion and may change soil physical characteristics. Areas most vulnerable include soils prone to erosion, mass movement or compaction, steep slopes, and areas where extensive clearing is required. Most impacts are from construction and would be short term. Impacts are greatest during and immediately after construction or until revegetation, drainage, and erosion controls are established. Long-term impacts could be caused by local changes in erosion and runoff rates from site or road construction. Site restoration and mitigation would reduce both short-and long-term impacts and the effect erosion, sedimentation, and soil compaction could have on other resources such as water, fisheries, and vegetation.

Stream channels adjacent or close to the North Lapwai Valley, Yoosa/Camp Creek, Newsome Creek and Mill Creek satellite sites would be altered by channel excavation and bank riprap used to establish intake structures, to place instream boulder anchors and perhaps bank anchors to support fish weirs, and to place tripods and fence panels for weirs.

River channels adjacent or close to Cherrylane, Luke's Gulch and Cedar Flats would be altered by channel excavation and bank riprap used to establish intake structures and fish ladders, to place instream boulder anchors and perhaps bank anchors to support fish weirs, and to place tripods and fence panels for weirs.

Stream channels in Meadow Creek, Boulder Creek, Warm Springs Creek, Johns Creek, Eldorado Creek, and Tenmile Creek would be altered to place instream boulder anchors and perhaps bank anchors to support fish weirs, and to place tripods and fence panels for weirs.

Central Incubation and Rearing Facilities — The primary construction activities at Sweetwater Springs and Cherrylane would include land disturbances to improve access, cut and fill on some sites, and pipe installation. Secondary activities would include minor grading, excavation, and placement of aggregate. These activities would not significantly change existing topography. In all instances, erosion control procedures and requirements would be implemented during all construction activities to limit impacts due to soil erosion and slope instability. Impacts to soils would be low.

Specific concerns for the Cherrylane site include a high erosion potential because of the soil characteristics in that region. Since the site is relatively flat and has been in agricultural production for some time, the erosion potential is considered to be minor.

During access road improvements, specific requirements for road construction erosion control would be implemented to avoid any adverse impacts.

Satellite Facilities — The primary soil disturbance at all satellite facilities would result from road construction and improvement, and recontouring land for placing ponds. Easily erodible surface soils and steep slopes dominate this region, and the Luke's Gulch, Mill Creek, and Newsome Creek sites within the South Fork Clearwater River drainage are of particular concern. If borrow sites are needed for fill material for facilities on USFS land, they would be identified and approved by the USFS. During access road improvements and earth moving for ponds, silt barriers, water control, and ditches with hay bales for road construction erosion control would be used to minimize the potential for soil erosion. Other activities that may disturb soils include the construction of water supply conveyance facilities from the nearby stream to acclimation structures and construction of water intake facilities along streams. All instream work would have sufficient mitigation to reduce short-term water quality degradation to a minimum. No other disturbances to soils at the satellite facilities is anticipated. Impacts to soils would be low.

Spring Chinook Direct Release Sites and Weir Sites — Helicopters would be used to fly fish in to all direct release sites. No construction or effect on soils would occur. Minor instream disturbance should be expected at all weir sites within the South Fork Clearwater River, Selway, and Lochsa drainages, but the soil properties would not change.

Mitigation — Short-term construction related soil erosion would be controlled by standard quality construction practices. Erosion control measures such as sediment fences and straw bales would be used to control erosion during construction. These devices would be left in place until revegetation (with native grasses and forbs) of all disturbed areas has occurred. The contractor working in and around streams would be required to submit a construction dewatering and erosion control plan prior to initiating any work. This plan and its implementation would become part of the contractor's contract and incorporated into the permitting provision (see Chapter 5 for permit requirements).

4.3.2 No Action Alternative

Under the No Action Alternative, no soil disturbance would occur at any site. There would be no change in soils from existing conditions.

4.3.3 Cumulative Impacts

No significant, long-term adverse impacts on soils are expected from the Proposed Action. Soil impacts would be localized and their effects would be manifest only at the individual sites. No cumulative impacts would occur.

4.4 Water Resources

The water resources section describes potential program-related impacts for groundwater and surface water quantity, temperature and water quality criteria, and streamflow diversions. The methods used to analyze impacts to groundwater include a review of hydrogeological analyses for production well development at the Cherrylane, North Lapwai Valley and Luke's Gulch sites. Methods used to analyze impacts for surface water include evaluation of stream gauge measurements for flow and water quality.

The water quality, flow requirements, and groundwater production were reviewed to determine levels of impact from each alternative. Each issue received an impact level of no, low, moderate, or high using the following definitions to determine impact levels:

A **high** impact is expected under these conditions.

- A high-quality water body that supports fish, waterfowl, and animal habitat, and/or human uses such as drinking water would be extensively altered so as to affect its uses or integrity.
- A facility is constructed with extensive clearing and road building in highly erodible soils near high-quality water bodies, without appropriate mitigation.

A **moderate** impact is expected under these conditions.

- The quality of a water body would be affected locally, or if effects could be partially mitigated.
- Structures are located on erodible soils near a good-quality water body with mitigation, and any pollution that entered water is dispersed and diluted, not affecting overall water quality.
- Some removal of shade would affect the immediate habitat of water, but not the integrity of the water body as a whole.

A **low** impact would be expected under these conditions.

- Impacts to water quality could be almost completely mitigated.

- Facilities are near water bodies in stable soils and on even terrain, with little or no clearing.
- Structures are away from water banks and little or no sediments reach the water.

There would be **no impact** where water quality would be unchanged.

4.4.1 Proposed Action

The total water available and the total water needed for the Proposed Action are shown in Table 4-2.

4.4.1.1 Groundwater

Under the Proposed Action the main impacts to groundwater would occur at the hatchery sites and at the North Lapwai Valley and Luke's Gulch satellite sites. Discharges would meet federal and state water quality standards and guidelines, and would satisfy all permit requirements. Hatchery effluents would be routinely monitored to assure compliance with water quality standards. Overall impacts on groundwater quality are low and no mitigation is required. Potential impacts at specific facility sites are discussed below.

Central Incubation and Rearing Facilities — Groundwater production wells would be used at Cherrylane, and would not adversely affect groundwater quantity or quality at the site. Because of the small amounts of water used at this facility, the volume would be easily replaced by groundwater recharge. No conflicting groundwater uses have been identified. No adjacent domestic or agricultural wells have been identified that would be impacted by the proposal.

The Sweetwater Springs facility would use existing springs for facility operations with no significant effect. Other than delivery improvements, no changes in the spring source are proposed.

Satellite Facilities — Groundwater production wells would be used at Luke's Gulch. The drawdown created by the wells could cause groundwater levels to decline in nearby existing domestic and stock wells, with impacts greater in nearby dug wells than drilled wells. This volume would be easily replaced through groundwater recharge due to the nature of the soils and rivers nearby. Mitigation may be required for these impacts to nearby wells depending on severity. Use of groundwater at Luke's Gulch would not significantly or adversely affect groundwater quantity or quality at the site. If static water levels in any adjacent wells are affected, the Tribe would either lower the pump bowl setting or increase the well depth for the owner.

Table 4-2 Water Available and Water Needed

Water Available

Facility	Total Available			Groundwater			Surface Water		
	cubic meters/min	gpm	cfs	cubic meters/min	gpm	cfs	cubic meters/min	gpm	cfs
Cherrylane (1)	59,474.70	15,714,085	35011	18.9	5,000	11.4	59,455.70	157,090,85	35,000
Sweetwater Springs	3.4	900	2.1	3.4	900	2.1	0.00	0	0
Luke's Gulch (1)	681.2	179,982	401	1.7	450	1	679.50	179,532	400
Cedar Flats (1)	5,096.20	1,346,493	3000	0	0	0	5,096.20	1,346,493	3,000
N. Lapwai Valley (2)	94.3	24,907	6	2.5	670	1.5	91.70	24,237	54
Yoosa/Camp (3)	11.6	3,052	6.8	0	0	0	11.60	3,052	6.80
Mill (3)	10.7	2,828	6.3	0	0	0	10.70	2,828	6.30
Newsome (3)	9.5	2,513	5.6	0	0	0	9.50	2,513	5.60

Water Needed

Facility	Total Needed			Groundwater			Surface Water			% Surface Water Needed
	cubic meters/min	gpm	cfs	cubic meters/min	gpm	cfs	cubic meters/min	gpm	cfs	
Cherrylane	30.3	8,000	18	18.9	5,000	11.4	11.4	3,000	6.8	0%
Sweetwater Springs	3.4	900	2	3.4	900	2.1	0	0	0	0%
Luke's Gulch	7.9	2,100	5	1.7	450	1	6.2	1,650	3.8	1%
Cedar Flats	10.2	2,700	6	0	0	0	10.2	2,700	6.2	0%
N. Lapwai Valley	8.3	2,200	5	2.5	670	1.5	5.8	1,530	3.5	6%
Yoosa/Camp	3.8	1,000	2	0	0	0	3.8	1,000	2.3	34%
Mill	1.1	300	1	0	0	0	1.1	300	0.7	11%
Newsome (3)	2.3	600	1	0	0	0	2.3	600	1.4	24%

Surface Water Available References
(1) - NPTH DEIS - Flow at greatest demand period for surface water by NPTH
(2) - USGS Data - 1974-94
(3) - Lowest flow measured over 5 years; 1990-95, NPT data.

The use of groundwater at the North Lapwai Valley site is not anticipated to impact adjacent groundwater users. All fish would be released by the middle of May which is the beginning of the irrigation season in the Lapwai Valley area and the period of maximum seasonal recharge for the aquifer.

Spring Chinook Direct Release Sites and Weir Sites — These sites require no groundwater.

4.4.1.2 Surface Water

Construction of the central incubation and rearing facilities and satellite ponds would disturb the ground and add impervious surfaces to the sites, which may lead to increased or rerouted runoff and sediment carried into streams. Increased runoff is expected to be short-lived and is not expected to exceed a stream's ability to carry sediment away from the site. It is not expected to change a stream's substrate. Some bankside and riparian vegetation would be removed or disturbed that may affect shade on a very limited scale. No change in water temperatures is expected. Most construction activities would occur away from the channel, and would be mitigated by erosion control, removing the least amount of trees as possible, and revegetating the site after construction. Impacts would be low and short term.

Stream channels adjacent or close to the North Lapwai Valley, Yoosa/Camp Creek, Newsome Creek and Mill Creek satellite sites would be altered by channel excavation and bank riprap used to establish intake structures, to place instream boulder anchors and perhaps bank anchors to support fish weirs, and to place tripods and fence panels for weirs.

River channels adjacent or close to Cherrylane, Luke's Gulch and Cedar Flats would be altered by channel excavation and bank riprap used to establish intake structures and fish ladders, to place instream boulder anchors and perhaps bank anchors to support fish weirs, and to place tripods and fence panels for weirs.

Stream channels in Meadow Creek, Boulder Creek, Warm Springs Creek, Johns Creek, Eldorado Creek, and Tenmile Creek would be altered to place instream boulder anchors and perhaps bank anchors to support fish weirs, and to place tripods and fence panels for weirs.

Hatchery operations are expected to cause low impacts to water quality. Discharges of chemical and organic pollutants would meet federal and state water quality standards and guidelines, and would satisfy all permit requirements. Important physical properties and chemical constituents in hatchery effluent would be routinely monitored to assure compliance with water quality standards. Chemicals used to prevent or treat fish diseases would be handled, applied, and disposed of in accordance with state and federal regulations.

Hatchery practices would be conducted to minimize the amount of uneaten food and discharge of organic wastes into the natural environment. Adult fish carcasses would either be used for food fertilizer, or disposed of at local landfills. Satellite ponds would be cleaned at the end of the rearing cycle and wastes would be disposed of at local landfills. Effluent from the Cherrylane facility would be routed through effluent ponds where it can settle, be treated, and removed before the liquid is discharged. Once treated, effluent discharged from the settling ponds would rapidly dilute and disperse in the lower Clearwater River.

The amount of fish held at all satellite facilities is below the threshold limit for state and federal regulations that require water quality monitoring. The Tribe will monitor influent and effluent bimonthly during the operating period for total suspended solids, settled solids and dissolved oxygen. Spot sampling for nutrients may be implemented based on loading, water quality conditions observed or other criteria.

Central Incubation and Rearing Facilities — The quantity of water withdrawn from the Clearwater River at Cherrylane is insignificant relative to the amount of flow available (see Table 4-2). Therefore, no impacts on surface water quantity are expected.

Water discharged from the Cherrylane and Sweetwater Springs facilities is expected to be somewhat cooler than the receiving stream, since chillers would be used to maintain incubation and early rearing temperatures in the hatchery at below-ambient levels. Thermal changes would be negligible because rapid mixing of hatchery and stream or river water downstream of production facilities should minimize temperature-related impacts.

Satellite Facilities — No impacts to surface water quantity are expected at Luke's Gulch or Cedar Flats, because the flows used are minor compared to the flow available. Water used at the North Lapwai Valley, Yoosa/Camp Creek, Newsome Creek and Mill Creek sites would reduce ambient flows by 6 percent, 34 percent, 24 percent, and 11 percent respectively, for a distance of up to 300 m (984 ft) of stream (see Table 4-2). The Proposed Action states that no more than one half of either Yoosa or Camp creeks would be diverted for rearing purposes so as not to adversely impact instream habitat. Water needs are greatest in relation to overall streamflow during September for the spring chinook facilities and during May for North Lapwai Valley. Streamflow characteristics would not be changed upstream or downstream of the sites but stream transport capability would be decreased and water temperatures might be increased within the reach of altered streamflow. Therefore, impacts to surface water could be low to moderate.

Camp Creek and Yoosa Creek are currently managed at a "high fish" standard within the forest plan. Any land management activities upstream of the Camp/Yoosa site, for example, timber sales, road construction, fish habitat enhancement, etc., will meet forest plan

standards for water quality. Any sediment production, transport, or delivery to streams as a result of management activities will be mitigated to avoid any adverse impacts to the streams and attain desired future conditions. Mitigation measures prescribed for management activities are designed to prevent any adverse impacts to the streams, arrest any declining trends from existing conditions, and improve existing conditions, where applicable.

Spring Chinook Direct Release Sites and Weir Sites — These sites require no additional surface water and depend on existing streamflow volume. At the weir sites, surface water impacts could be low to moderate due to installation of the weirs and having to potentially divert water if a concrete sill is installed. Impacts would be short-term (see Section 4.3, **Geology and Soils**).

Mitigation — As mitigation, it is recommended that all facility sites be gauged for flow and temperatures to determine the amount of changes caused at the sites. Should they be determined to have adverse impacts, an adjustment in facility operations would be made.

4.4.2 No Action Alternative

This alternative would leave the area as is with no impacts to ground and surface waters. No mitigation would be required.

4.4.3 Cumulative Impacts

No cumulative effects are anticipated. Impacts would be limited to the facility sites and would not cause an overall change in conditions of either the receiving streams or the Clearwater River Subbasin.

4.5 Floodplains

An impact would be expected to floodplains if facilities or permanent roads encroach on designated floodplains and increase the potential for flooding, or which might result in the loss of human life, personal property, or natural resources within the floodplain.

No impacts are expected where floodplains are avoided, spanned, or standard mitigation would effectively eliminate impacts.

4.5.1 Proposed Action

The proposed program would require the construction of structures adjacent to or in the floodplain (hatchery and satellite facilities) and/or within the active stream channel (weirs). In general, all facilities within the 100-year floodplain would be designed to be either temporary, non-obstructive to floodwaters, or both.

4.5.1.1 Central Incubation and Rearing Facilities

Intake and outlet structures for facility water supply and discharge at both the Cherrylane and Sweetwater Springs central incubation and rearing facilities would, of necessity, be located within the 100-year floodplain. Other hatchery structures and related site development at both sites would be outside the 100-year floodplain.

At Cherrylane, the inlet and outlet structures would be permanent structures located within the bank of the Clearwater River with adequate protection (riprap) to prevent bank erosion or structural damage during high river flows. They would be designed to cause no significant rise in flood elevation through the creation of a backwater. A detailed storm water and drainage study would be included as part of the facility design. As previously mentioned, no other site development would occur within the 100-year floodplain. As a result, there would be no impact on the floodplain of the Clearwater River at the Cherrylane site.

At Sweetwater Springs, the water collection system is within the 100-year floodplain. A storm water runoff analysis would be completed prior to designing the permanent structures. Any new structures that could sustain damage if unusual runoff occurs would be floodproofed. Improvements to this existing facility would have no impact on floodplains.

4.5.1.2 Satellite Facilities

FEMA has not mapped the areas where the satellite facilities are proposed. The 100-year flood elevation at each site was estimated.

The Luke's Gulch, North Lapwai Valley and Yoosa/Camp Creek sites are located outside the 100-year floodplain based on these estimates. The only construction within the 100-year floodplain would be for the inlet and outlet structures. These would be permanent structures located in the river bank with adequate protection (riprap) to prevent bank erosion or structural damage during high river flows. They would not contribute to

any significant rise in flood elevation through the creation of a backwater. Though the North Lapwai Valley site has a high probability of flooding because it has a large, developed and channeled drainage area upstream, it was not inundated by the 1996 northern Idaho floods. The Yoosa/Camp Creek site would not be used during the normal high runoff period (March-early May). No impacts on floodplains are expected at these sites.

The Newsome Creek, Mill Creek and Cedar Flats sites would have facilities estimated to be within the elevation of the 100-year floodplain. Fill would be placed where necessary to support structures but would not create an elevated area that would divert or impede floodwaters. Inlet and outlet structures would be permanent structures and would be placed in the river bank with adequate protection (riprap) to prevent bank erosion or structural damage during high river flows. They would not create a backwater and would not contribute to any significant rise in flood elevation. Fish ponds at these sites would generally be low to the ground and would be repaired or replaced if damaged by floodwaters, rather than floodproofed. They would not contribute to any significant rise in the flood elevation. Displacement of floodwaters by structures is not expected to alter floodplain storage volume or cause a local increase in the flood stage. The Mill Creek and Newsome Creek sites would not be used during the normal high runoff period. No impacts on floodplains are expected at these sites.

Mobile trailers for facility personnel would be required at all satellite facilities. If possible, their placement would be outside the 100-year floodplain. In general, the trailers would be removed should flooding occur or threaten a satellite site. If placed within the floodplain, they would not impede the flow of floodwaters because they would be raised off the ground and any flooding would pass beneath them.

4.5.1.3 Spring Chinook Direct Release Sites and Weir Sites

No new construction or placement of structures within floodplains is planned for any direct release sites. Therefore, no impacts on floodplains are expected at any release site.

Weir sites would be within the active stream channel and would be designed to minimize impacts on stream hydraulics. Weirs would typically be installed by hand within the stream channel and would be designed to wash out in the event of a flood.

Permanent anchoring points on either stream bank would be required at each weir site. These could range from concrete anchors placed flush with the bank surface to steel members driven into the bank. In all cases the anchoring points would

have adequate protection (through riprap or burial) to prevent bank erosion or structural damage during high river flows. They would not create a backwater and would not contribute to any significant rise in flood elevation. The weir anchoring structures would have no impact on floodplains.

A sill in the streambed would likely be required at some of the weir sites. Specific weir sites requiring a sill would be identified during the design phase. The sill would be placed along the bottom of the stream channel and would have a low vertical profile. No significant backwater would be created by the sill. No impact on floodplains would be expected.

4.5.1.4 Mitigation

While final facility design completed for each site would determine the actual risk of flooding and the facilities that need to be protected, a number of general conditions will be established for all sites.

- All facilities will be as high above active drainages as possible.
- No flood flow barriers will be built.
- Damage to riparian vegetation will be avoided where possible.
- Piping will be buried where possible.
- Electrical equipment will be portable where possible.
- Portable equipment will be removed at the end of the season.

4.5.2 No Action Alternative

Under the No Action Alternative, no effects on floodplains would occur.

4.5.3 Cumulative Impacts

No cumulative impacts on floodplains are expected.

4.6 Fish

4.6.1 Proposed Action

Program activities would cause a variety of effects on the environment and its fisheries. Effects, both detrimental and beneficial, would come from four major sources:

- the design, siting, and construction of hatchery facilities;
- hatchery operations and management;
- fish interactions; and
- human-fish interactions.

Design, siting, and construction of hatchery facilities would, in the near-term, have an immediate effect on the local environment and associated biota. Most physical impacts would be away from the channel, and would be primarily limited to the hatchery facilities' sites. Effects of disturbances can be directly or indirectly transferred to the aquatic community in nearby streams.

Hatchery operations and management would produce water, fish, and environmental contaminants once facilities are built and begin operating. The probability that they would have adverse environmental consequences depends on the techniques used to propagate and release hatchery fish, the effort made to minimize or mitigate for unwanted impacts, and the characteristics of the receiving environment.

Fish interactions between hatchery-reared chinook, their wild counterparts, and other species of fish would create impacts. The primary types of interactions involving NPTH chinook and other species of fish are competition, predation (either preying on or being preyed upon by other species), reproduction (including genetic ***introgression***), and disease transmission. The strength and outcome of these types of interactions would depend not only on biological attributes of the species involved, but also on the carrying capacity of the environment.

introgression *Incorporation of genes of one species into the gene pool of another via an interspecific hybrid.*

Human-fish interactions created as a response or a consequence of the proposed program could impact targeted chinook and perhaps other fish populations. If successful, the NPTH may evoke certain responses from resource managers and users such as increased fishing opportunities and pressure on targeted and non-targeted stocks.

The broad categories of effects can be further broken down into associated ***causal factors*** shown in Table 4-3. They are described in detail in this section, and fisheries impacts are addressed in relation to these causal factors.

Causal factors *are subcategories of general impacts.*

4.6.1.1 Method for Evaluating Impacts

A process based on expert consultation was used to determine the nature and extent of environmental impacts that may result from NPTH activities. The process was structured to elicit the best scientific judgment from a panel of experts familiar with the project and the associated environment. The process consisted of several steps:

- Impact Assessment Team (IAT) Selection
- Impact Assessment Strategy
- Scoring Impacts
- Team Review

Selection of an Impact Assessment Team — The team was composed of the following fisheries biologists, a resource manager, and an engineer familiar with the project and affected resources.

- William Blaylock - Aquatic biologist, Montgomery Watson
- John Colt - Engineer, Montgomery Watson
- Steve Cramer - Consulting fisheries biologist
- Dave Johnson - Fisheries biologist, NPT
- Ed Larson - Hatchery production manager, NPT
- Cleve Steward - Consulting fisheries biologist

Impact Assessment Strategy — Team members compiled and reviewed existing information relating to hatchery configuration, operations, and affected resources, including material developed for this program, that related to potential impacts of hatcheries and hatchery fish on the environment. The team facilitator conducted two meetings in which IAT members discussed project impacts and familiarized themselves with the assessment approach. The team used the causal factors of effects shown in Table 4-3 to independently evaluate and score the impacts on four categories of fish, using four levels of impact. The fish categories and impact levels are described below.

Fish Categories

Targeted chinook are the hatchery chinook produced by the NPTH and the wild populations from which they are drawn or introduced.

- For spring chinook, this includes hatchery fish released into Lolo, Newsome, Mill, Meadow, Boulder and Warm Springs creeks, fish produced by adults returning from the

Table 4-3
Categories of Impacts and Causal Factors Evaluated

Facility and Construction	Hatchery Operations and Management
Site Disturbances	Water Gains and Losses
Channel Alterations	Water Quality
Water Intake and Discharge Structures	Fish Traps, Live Boxes, Ladders, and Weirs
	Broodstock Selection and Maintenance
	Mating Protocols
	Incubation and Rearing Practices
	Fish Health Management
	Fish Releases
Fish Interactions	**Human-Fish Interactions**
Competition	Non-Tribal Management Actions
Predation	Fishing
Reproduction and Genetic Exchange	
Disease Transmission	

hatchery releases that spawn in the wild, and fish produced from any unsupplemented runs that occur in a stream before the Proposed Action begins.

- For fall chinook, this includes the hatchery fish released into the mainstem Clearwater River at Cherrylane and Lapwai Creek, fish produced by adults returning from outplants that spawn in the wild, and fish produced in the mainstem Clearwater River before the Proposed Action begins.
- For summer chinook, this includes hatchery fish released into the South Fork Clearwater at Luke's Gulch and the Selway River at Cedar Flats, and fish produced by adults returning from outplants that spawn in the wild.

Non-targeted chinook are non-NPTH chinook (both hatchery or wild) originating within and outside the Clearwater River system encountered during outmigration, in the ocean, or on the return to the Clearwater River Subbasin.

- For spring chinook this includes fish encountered during outmigration, in the ocean, or in Clearwater River tributaries or hatcheries that were not derived from streams occupied by targeted spring chinook.
- For summer and fall chinook, this category of fish includes those fish encountered during outmigration, while in the ocean, or during return to rivers other than the Clearwater that were not derived from outplants of targeted chinook.

Other salmon and trout includes steelhead, bull trout, cutthroat trout, and brook trout. Effects to this category of fish are primarily discussed relative to streams that are the focus of the targeted spring chinook populations.

Non-salmonids are all other fish species. Effects to this category of fish are discussed relative to streams and rivers that are the focus of the targeted spring, fall and summer chinook populations.

Impact Levels

The concept of ***population viability*** was used as a measure of project related impacts. Here, viability is taken to mean the probability that the population would perpetuate itself into the future. This probability is a function of the fitness of individuals in the population, their abundance and genetic makeup, and the environment and if these individual fish are more or less likely to survive and spawn when exposed to the Proposed Action. For purposes of this assessment, population viability is indexed by the anticipated status (abundance) and trend of the population over time. Impacts were scored as none, low, moderate, and high based on the following criteria:

No impact would occur if the Proposed Action would not affect fish abundance and would result in no change from existing conditions.

A **low impact** would occur if the Proposed Action is likely to result in a small change in abundance, but the amount of change would fall within the normal range of year-to-year variability observed for the species, and therefore would not ultimately affect population viability.

A **moderate impact** would occur if the Proposed Action is likely to produce a moderate change in abundance. The amount of change would be similar in magnitude to the response exhibited under atypical conditions, such as during drought years or in years where run sizes are outside the normal range. Should conditions or impacts persist, population viability may be affected.

A **high impact** would occur if the Proposed Action is likely to cause a large change in abundance. The magnitude of the change would be similar to that caused by severe natural disturbances, such as a landslide occurring or being removed that would block or add to the range of accessible habitat. Population viability of the fish within the specific drainage would be affected.

Impacts were evaluated within different geographical and temporal scales. Because chinook salmon complete their life cycle by sequentially inhabiting tributary (spring chinook), mainstem, estuarine, and marine habitats, the nature and extent of impacts within these areas would be influenced by the scale of the associated system. Some impacts are limited to facility sites in the Clearwater River Subbasin. They would have relatively large

direct and indirect effects. Other impacts would be distributed over larger geographic areas, defined by the migratory routes of the target species. In these cases, effects caused by the Proposed Action would be more of a cumulative nature and much harder to discern or predict.

Impacts were also assessed based on the premise that changes made to the salmon's environment as a result of overall recovery efforts launched by the Endangered Species Act will occur. These recovery efforts will result in wild spawning Snake River chinook salmon being able to return at a rate that, at the least, replaces themselves.

Scoring Impacts — After evaluators scored the impacts for each category of fish, the qualitative scores were assigned a numerical value, summed and averaged for an overall score. On individual evaluators tables, scores ranged from 0 - 3 with 0 equalling no impact and 3 equalling a high impact. Summary results of the impact scoring process are in Table 4-4.

Team Review — After the initial scoring, the IAT discussed the scores, identified and reconciled differences of opinion, and reached consensus on the level and type of impacts. There was broad agreement on most scores, so it was not necessary to repeat the scoring procedure.

4.6.1.2 Impacts

Siting and Construction of Hatchery Facilities — Hatchery facilities would necessarily be situated close to stream channels. The construction of NPTH facilities would have physical impacts that relate to site disturbances, channel alterations, and the placement of water intake, conveyance, and discharge structures.

Site Disturbances

Construction of the central incubation and rearing facilities and satellite ponds would disturb the ground and add impervious surfaces to the sites, which may lead to increased or rerouted runoff and sediment carried into streams. Increased runoff is expected to be short-lived and is not expected to exceed a stream's ability to carry sediment away from the site. It is not expected to change a stream's substrate. Some amount of bankside and riparian vegetation would be removed or disturbed which may affect fish cover, source of food, and shade on a very limited scale. Most construction activities would occur away from the channel, and would be mitigated by erosion control, removing the least amount of trees possible, and revegetating the site after construction.

Table 4-4 Summary Results of the Impact Scoring Process

Causal Factors	Targeted Chinook	Non-Targeted Chinook	Other Salmonids	Non-Salmonids
Siting and Construction of Hatchery Facilities				
Site Disturbances	Low	None	Low	Low
Channel Alterations	None	None	None	None
Water Intake and Discharge Structures	Low	None	Low	Low
Hatchery Operations and Management				
Water Gains and Losses	Low	None	Low	Low
Water Quality	Low	None	Low	Low
Fish Traps, Live Boxes, Ladders, and Weirs	Moderate	Moderate	Moderate	Low
Broodstock Selection and Maintenance	Moderate	Low	None	None
Mating Protocols	Low	Low	None	None
Incubation and Rearing Practices	Low	None	None	Low
Fish Health Management	Low	Low	Low	Low
Release Methods and Numbers	High	Moderate	Low	Moderate
Fish Interactions				
Competition	Low	Low	Moderate	Low
Chinook as Predator	Low	Low	Low	Low
Chinook as Prey	Low	Low	Low	None
Reproduction and Genetic Exchange	Moderate	Low	None	None
Disease Transmission	Low	Low	Low	Low
Human-Fish Interactions				
Non-Tribal Management Actions	Low	Low	Low	Low
Fishing	Low	Low	Low	Low

Site disturbances may change the behavior and disrupt the distribution of individual fish adjacent to and downstream of the sites, but the overall biological impact to targeted chinook, other salmonids and non-salmonid populations is expected to be low. The amount of habitat and number of fish affected by these changes would be small relative to the total habitat available. No significant change in abundance or trend in fish populations is expected. Non-targeted chinook are not present in the receiving streams, and therefore would not be impacted.

No cumulative impacts from site disturbances at facility sites are anticipated. Impacts are expected to be localized and short-lived.

Channel Alterations

Stream channels adjacent or close to the North Lapwai Valley, Yoosa/Camp Creek, Newsome Creek and Mill Creek satellite sites would be altered by channel excavation and bank riprap used to establish intake structures, to place instream boulder anchors and perhaps bank anchors to support fish weirs, and to place tripods and fence panels for weirs. River channels adjacent or close to Cherrylane, Luke's Gulch and Cedar Flats would be altered by channel excavation and bank riprap used to establish intake structures and fish ladders, to place instream boulder anchors and perhaps bank anchors to support fish weirs, and to place tripods and fence panels for weirs. Stream channels in Meadow Creek, Boulder Creek, Warm Springs Creek, Johns Creek, Eldorado Creek, and Tenmile Creek would be altered to place instream boulder anchors and perhaps bank anchors to support fish weirs, and to place tripods and fence panels for weirs.

During construction, fish residing within the area of activity would be displaced, and some might be killed. Longer-term impacts caused by the structures may include disrupting the behavior and distribution of individual fish next to and downstream of the sites. (The operation of weirs and fish ladders and their effects on fish are discussed more fully in **Hatchery Operations and Management.**) But construction and placement of channel structures is not expected to incur significant biological impacts for targeted chinook, non-targeted chinook, other salmonids and non-salmonid populations. No change in abundance or trend in fish populations is expected. Impacts are expected to be localized and short-lived.

No cumulative impacts are anticipated by channel alterations at facility sites.

Water Intake and Discharge Structures

Water intake, conveyance, and discharge structures would be permanent fixtures at NPTH production sites. The structures would be screened to prevent fish from entering or leaving the facilities. Construction would disturb near-channel and in-channel areas, causing sediment delivery to the stream, removal or disturbance of streambank vegetation and disturbance of the stream substrate. Increased runoff is not expected to exceed a stream's ability to carry sediment away from the site and should not change the stream's substrate. The amount of bankside and riparian vegetation that would be removed or disturbed would be small.

If structure screens fail, non-hatchery fish may enter and hatchery fish may exit the facility. Unintentional releases of hatchery fish from screen failure are not expected. Any non-hatchery fish that enter the hatchery because of screen failure in the flow distribution system would either be reared along with hatchery fish, returned to the stream, or retained for broodstock.

Site disturbances may disrupt the behavior and distribution of individual fish adjacent to and downstream of the sites, but the overall biological impact to targeted chinook, other salmonids and non-salmonid populations would be localized and short-lived. The amount of habitat and number of fish affected by these changes would be small relative to the total habitat available. No significant change in abundance or trend in fish populations is expected. Impacts would be low.

Non-targeted chinook are not present in the receiving streams, and therefore would not be impacted.

No cumulative impacts are expected at facility sites.

Hatchery Operations and Management — The central incubation and rearing facilities at Cherrylane and Sweetwater Springs, and the six satellite rearing facilities would release water, fish, organic and inorganic wastes, and pathogens. The IAT considered the potential impacts of diverting water from nearby watercourses and the effects of changes in water quantity and quality on the receiving stream and associated biota. The team also assessed the impacts of management decisions and practices associated with collecting, mating, rearing chinook in a hatchery and subsequently releasing them into the natural environment.

Water Gains and Losses

The IAT compared the water requirements of the various hatchery facilities with the amount of water available and concluded that the potential for adverse fisheries impacts is greatest at the Yoosa/Camp Creek, Newsome Creek and Mill Creek

sites (see Tables 2-1 and 4-2). These are smaller streams that would have their flows reduced by 34 percent, 24 percent, and 11 percent, respectively, for a distance of up to 300 m (984 ft) of stream. The amount of habitat available, passage conditions, and food production would be negatively impacted in these reaches, particularly during September, when water needs are greatest in relation to overall streamflow. Larger systems, such as Lapwai Creek, the Selway, South Fork Clearwater, and lower mainstem Clearwater, would not be affected to any great extent since the amount of water withdrawn would be a small fraction of the total streamflow.

The IAT concluded that flow alterations caused by hatchery operations would not significantly affect the viability of any fish population. Because of the location and the relatively small area affected, fish are expected to move either upstream or downstream, or exist at smaller densities within the impacted segment. However, because a decrease of fish abundance within the impacted stream reaches is predicted for Yoosa Creek, Newsome Creek and Mill Creek, the impact to targeted chinook, other salmonids and non-salmonids for these sites was rated as moderate. No impact is expected on targeted chinook, other salmonids, and non-salmonids at other release and satellite sites. Consequently, the combined impact to these categories of fish from water gains and losses is rated low. No impact is expected on non-targeted chinook in any area.

Water diversions at all facility sites would not cause any change in status or trend of fish populations so no cumulative impacts are expected.

Water Quality

Discharges of chemical and organic pollutants would meet or exceed federal and state water quality standards and guidelines, and would satisfy all permit requirements. Important physical properties and chemical constituents in hatchery effluent would be routinely monitored to assure compliance with water quality standards. Chemicals used to prevent or treat fish diseases would be handled, applied, and disposed of in accordance with state and federal regulations.

Hatchery practices would be conducted to minimize the amount of uneaten food and discharge of organic wastes into the natural environment. Adult fish carcasses would be used for fertilizer, or disposed of at local landfills. Satellite ponds would be cleaned at the end of the rearing cycle and wastes would be disposed of at local landfills. At Cherrylane, effluent would settle and be treated in effluent ponds, and hatchery wastes would be removed before liquids are discharged into the lower Clearwater River. Effluent would rapidly dilute and disperse in the river.

Water discharged from the Cherrylane and Sweetwater Springs facilities is expected to be somewhat cooler than the receiving stream, since chillers would be used to maintain incubation and early rearing temperatures in the hatchery at below-ambient levels. Water released would mix rapidly with the stream and river water downstream of the facilities. Temperature changes would be minor.

Any water quality changes resulting from the proposed facilities may disrupt the behavior and distribution of individual fish adjacent to and downstream of the sites, but the overall biological impact to targeted chinook, other salmonids and non-salmonid populations is expected to be low. The amount of habitat and number of fish affected by these changes would be small relative to the total habitat available. Non-targeted chinook are not present in the receiving streams, and therefore would not be impacted.

No cumulative biological impacts to fisheries status or trend would result from the addition of nutrients from facility discharges.

Fish Traps, Ladders, and Weirs

Fish Traps — Juvenile fish that emigrate from Lolo Creek and Meadow Creek would be collected by rotary screw traps and held in live boxes until sampled. Depending on the amount of flow, 5-70 percent of the fish passing the trap on any given day can be captured. The capture efficiency approaches 70 percent during the fall when water is at base flow, and is 5 percent or less during spring runoff. Staff would check the traps daily, or more frequently if there is a pulse of migrating fish. Trapping, handling, weighing, measuring, and tagging these fish would cause mortality. The Nez Perce Tribe has operated screw traps at these sites since 1994. During this time, 50,124 fish were trapped, of which 369 were dead. No estimates of mortality were made after fish were released, but information from PIT tag studies shows an additional 2 percent might be expected to die shortly after release. Fish impacts on Lolo and Meadow creeks were rated as moderate for targeted chinook, other salmonids and non-salmonids. No impact is expected to the four fish categories at any other site.

The traps operated on Lolo and Meadow creeks would add to cumulative impacts to targeted chinook and other salmonids (particularly steelhead) that emigrate from these drainages. Traps are operated by other management agencies farther down in the Clearwater, Snake, and Columbia river systems, in addition to those operated on the fish bypass and transport systems at the mainstem dams. Repeated trapping and sampling of the same individual fish might cumulatively increase the rate of mortality.

Fish Ladders — Cherrylane, Luke's Gulch, and Cedar Flats facilities would be equipped with fish ladders so that managers may collect returning hatchery adults on an as-needed basis. No detrimental impacts are expected to be caused by the ladders themselves. However, non-hatchery fish may commingle with hatchery spawners and ascend the fish ladder as part of a group. Depending on the mating protocols, they may be kept in the facility to be spawned, or released to the river. If kept in the hatchery, their progeny would be returned to the rivers with fish reared at NPTH facilities. No impact is expected to occur to any of the four fish categories by the fish ladders.

Fish Weirs — Operating fish weirs may block, delay, or otherwise disrupt the movements and distribution of fish. These include returning adult chinook, late run steelhead, late run cutthroat trout, late run suckers, or early running bull trout. Juvenile life stages, and other fish species, are less likely to be affected. Weirs can stress, injure, or kill fish if improperly designed and operated. Weirs may also prevent adults that have temporarily strayed above the weir (dip-ins) from returning downstream and migrating to other areas to spawn.

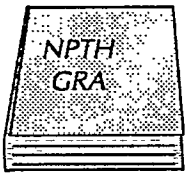
As mitigation, several items are required. Vigilant monitoring and cleaning of weirs, and checking areas downstream of the weirs by snorkeling to determine if adults are holding up or spawning downstream is necessary. Handling protocols must be established for adults trapped. Downstream passage must be allowed using a downstream trap. Finally, corrective actions that favor the survival of naturally-reproducing adults must be immediately applied should problems occur with the weirs.

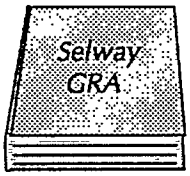
The IAT rated impacts of weir operation and overall effects of this category as moderate to targeted chinook, other salmonids and non-targeted chinook (fish returning to control streams - Johns Creek, Tenmile Creek, and Eldorado Creek, or straying fish). No impact is predicted for non-salmonids.

The proposed weirs would have cumulative impacts to spring chinook and other salmonids in the Clearwater River Subbasin. Under existing conditions, weirs are operated on several streams (Big Canyon Creek, Clear Creek, Crooked River, Red River, Walton Creek, Fish Creek, Running Creek, and historically, the upper Lochsa, and Brushy Fork Creek) in the Subbasin to conduct research and collect hatchery broodstock. Adding at least eight weirs would cause adverse impacts to be spread over a wider geographical range. Should the adverse impacts become the rule and not the exception, a decrease in run size and redistribution of spawning, perhaps to less favorable areas downstream, might occur.

Broodstock Selection and Maintenance

Decisions regarding the source and management of hatchery broodstock are critical to the success of the NPTH. Choosing a donor stock is a critical first step in the development of a supplementation program. The donor stock should possess genetic and ecological characteristics that are as similar to the wild, indigenous stock as possible. Since Clearwater chinook were eliminated, and not enough wild fish return to the Subbasin today to serve as a source of broodstock, the task becomes one of selecting donor stocks that either approximate recently established populations (e.g., Lyons Ferry fall chinook), or exhibit life history patterns and other fitness-related traits that are well-suited to the local environment.





Two genetic resource assessments were completed as part of the Proposed Action (Cramer, 1995; Cramer and Neeley, 1992). These resource assessments evaluated the effects of broodstock selection for NPTH activities in the Clearwater River Subbasin and made recommendations for broodstock sources. The Proposed Action would follow the recommendations, thus limiting potential detrimental effects on targeted and non-targeted chinook populations.

Broodstock maintenance activities can pose four types of genetic risk: extinction; loss of within-population genetic variability; loss of, or changes in, population identity; and domestication selection (Busack, 1991; Cramer and Neeley, 1992; Kapuscinski, et al., 1993). NPTH broodstock operations have the potential to simultaneously incur one or more of these risks. The threat of extinction of the targeted or non-targeted population poses a risk to very small populations. A reduction in genetic diversity within targeted populations can occur whenever the number of fish spawning in the wild or in the hatchery falls below certain levels or mating is not random. Loss of population identity can occur whenever genetically dissimilar fish are included in hatchery broodstock or wild spawning populations. The risk of domestication selection increases whenever broodstock collection accentuates differences between hatchery and wild components of the targeted populations.

The broodstock maintenance program developed for the Proposed Action protects targeted populations from extinction, loss of genetic variability and domestication selection by using wild-to-hatchery spawner ratios that permit wild runs to build to sustainable levels within a reasonable period of time (see Section 2.1.3.6, **Broodstock Source and Management**, and Appendix A). Once well-established, wild fish from the targeted population would provide up to 50 percent of the hatchery broodstock. Until such time, variable wild:hatchery ratios would be permitted so that the percentage of wild fish in hatchery and naturally-

reproducing populations increases as the number of returning wild fish increases. Regardless of escapement level, wild fish would be incorporated into hatchery broodstock at slightly higher percentages than in the naturally-reproducing population to provide added protection against the risk of domestication selection in the hatchery. To minimize the risk of extinction, proportionately greater numbers of hatchery fish would be allowed to spawn naturally if the wild population drops to critically low levels.

Despite actions taken to minimize impacts, broodstock selection and maintenance has the potential to adversely affect targeted and non-targeted chinook populations. IAT members projected that should they occur, they would have moderate impacts for targeted chinook, and low impacts for non-targeted chinook. Other salmonids and non-salmonids would not be affected.

The overall change in genetic structure posed by the risks discussed above can affect any fish hatchery that releases fish to eventually spawn. Using broodstock recommended in the resource assessments and using the wild:hatchery ratios, the Proposed Action would decrease potential cumulative impacts to salmon populations.

Adult Holding and Spawning

Spawning fish in a hatchery entails risks that may affect targeted and non-targeted chinook populations. Most hatcheries experience a pre-spawning mortality rate of 10-15 percent of all adult fish captured. NPTH proposes to use higher flow rates in adult holding facilities than are commonly used by hatcheries to alleviate pre-spawning stress. Nonetheless, adult mortalities would occur. Unmarked strays (non-targeted chinook), possibly from listed populations, could also die if they find their way into the facilities.

IAT members rated the potential impacts to targeted and non-targeted chinook populations as low. Although individual adults would die, overall abundance of targeted populations is still expected to increase by the supplementation program. Straying of non-targeted chinook into NPTH facilities is not expected to be significant. No impacts are expected to other salmonid and non-salmonid populations.

The Proposed Action would add to adult mortalities caused by holding and spawning operations of other hatcheries in the Columbia River Basin. Because hatchery intervention is more likely to cause an increase in populations by decreasing mortality at younger ages, cumulative impacts are not expected to be significant.

Incubation and Rearing Practices

Rearing conditions and practices can strongly influence the physiological, morphological, and behavioral characteristics of hatchery fish. These characteristics in turn would affect the magnitude and types of interactions between hatchery and wild chinook and their ability to survive in the wild. The size of fish released is an important consideration since hatchery fish, if larger than wild fish, may enjoy a competitive advantage and reduce the survival of wild fish (Solazzi, et al., 1983). Hatchery fish that are too small are less likely to develop on schedule and have life history patterns that are consistent with the targeted population.

NPTH has been designed to incubate and rear fish under as natural conditions as possible to maximize their survival following release. Rearing density, temperature, light, water velocity, feeding, and other environmental attributes would be maintained at levels that foster the development and expression of wild-type behaviors and other survival related traits among hatchery fish. Because of the use of techniques to maintain wild-type characteristics among hatchery fish, the IAT ranked the potential impact on targeted populations as low. Non-targeted chinook, other salmonids and non-salmonids are not expected to be affected. Cumulative impacts are not expected.

Fish Health Management

Hatcheries may introduce diseases into the natural environment either by direct contact or through contaminated wastes. Free-living fish may be exposed to increased levels of pathogens and may contract diseases when they come in contact with pathogen-bearing water. Some past releases of hatchery fish have introduced pathogens into the natural environment, leading to novel or additional health risks for wild fish (Hastein and Lindstad, 1991; Hindar, et al., 1991). However, the extent of disease transmission from hatchery to non-hatchery fish is believed to be low since the pathogens responsible are already present in both groups of fish, and environmental conditions generally do not favor outbreaks of disease in the wild.

Nez Perce hatchery managers would guard against the transmission of disease from hatchery to wild fish and from hatchery fish to hatchery fish using many measures. These include screening broodstock for disease, disinfecting water before use where necessary, controlling water temperature to reduce infections, controlling incubation densities, controlling the incidence of disease in the hatchery, cleaning effluent where necessary, and by ensuring that fish slated for release into the natural environment have met strict fish health quality standards.

Fish would be inspected before transfer to satellite facilities and again before they are released into streams. Common diseases such as bacterial kidney disease would be monitored routinely in hatchery and wild populations. Less common diseases would be monitored as necessary.

Disease control and monitoring practice would conform with standards developed by the Nez Perce Tribe Fish Health Policy (1994) and the Integrated Hatchery Operations Team. The Nez Perce Tribe Fish Health Policy defines policies, goals, and performance standards for fish health management, including measures to minimize the impacts to wild fish.

Fish rearing practices, waste removal, and prophylactic treatment of disease outbreaks within the hatchery would help maintain acceptable pathogen levels. Even if disease were to be transmitted, the overall impact would probably be negligible since wild fish are widely dispersed and tend to be disease-resistant. Consequently, the impact of transmitting diseases from hatchery to non-hatchery fish (all four categories of fish) is considered low. No cumulative impacts are anticipated.

Methods and Magnitude of Release

The location, method, timing, and magnitude of release would influence the frequency and kinds of interactions possible between hatchery chinook and resident fish. Releasing fish in the wrong place or at the wrong time can increase the potential for adverse interactions. Releasing too many fish may overwhelm the carrying capacity of the natural environment, depleting the amount food available. Selection of an inappropriate method of release may result in excessive concentrations of fish, increased stress, and lower survival of chinook and other species alike.

The design of NPTH considered carrying capacity and quality of the streams and sections of river to be supplemented, the method to be used to transport and outplant hatchery fish, the time of year at which fish would be released, and the density and absolute number of fish to be released in each location. Habitat quality and quantity, in conjunction with the ecological requirements of the different races of chinook (i.e., spring, summer, or fall) available for outplanting, were explicitly considered in establishing production and stocking goals. Each targeted stream would be outplanted with a number of hatchery chinook which, when added to the wild fish chinook, would be equal to 70-100 percent of the carrying capacity for that species.

The magnitude of release is probably the most important factor affecting status and trend of targeted chinook populations. Release number can result in an increase in populations similar to the most significant natural events.

Release methods were designed to impart "wildness" to released fish. NPTH would release spring chinook that do not have an extended period of residency typical of most hatcheries. By reducing hatchery residence time, natural selection would be given the opportunity to undo any damage caused by domestication selection in the hatchery. Acclimation strategies would allow juveniles to adjust to the natural environment and recover from stress caused by handling and transportation. This should lead to higher post-release survival and at the same time reduce the potential for adverse interactions between hatchery chinook and wild fish.

Subyearling smolt

Presmolt

The timing of hatchery releases would be calibrated to maximize use of available rearing habitat and to avoid overwhelming local resources. Subyearling smolts (fall and summer chinook) would probably not interact to any great extent with their wild counterparts because they would be more likely to begin their downstream migration shortly after release. Spring chinook fry releases would be scheduled for times when food and temperature conditions favor rapid growth. Spring chinook presmolts would be released near the end of the growing season to minimize competition with resident wild fish. They would exit on their own from acclimation ponds over a period of several weeks, thus spreading their impact on resident biota over time.

The IAT concluded that the location, method, timing, and magnitude of release of chinook would have high biological impacts on targeted chinook, low impacts on non-targeted chinook and moderate impacts to other salmonids and non-salmonids. High impact was given to targeted chinook because this activity could cause a dramatic increase in population status and trend over time. Impact to non-targeted populations is not predicted to cause a long-term increase or decrease in their abundance or trend over time. A moderate impact was assigned to other salmonids and non-salmonids because a reduction in abundance of these fish populations could occur if supplementation becomes successful and chinook once again become the most common inhabitant of salmon streams.

Cumulative impacts expected include an increase in salmon populations and a redistribution of other fish populations based on resources available within the streams and rivers targeted for supplementation. Non-targeted chinook could also be affected (see **Fish Interactions** below).

Fish Interactions — As competitors, predators, prey, and disease vectors, NPTH chinook have the potential to alter trophic relationships and abundance of other fish populations in tributary, mainstem, and ocean habitats. Because of their complexity, impacts that derive from competition, predation, and reproduction/genetic exchange are discussed under separate headings below for targeted chinook populations, non-targeted

chinook populations, resident salmonid species, and non-salmonid fish species. Disease-related impacts were discussed above in *Fish Health Management.*

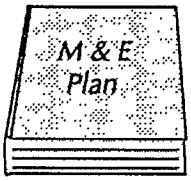
Competition

Targeted Chinook Populations — Competitive interactions would be greatest when hatchery and wild fish overlap in time and space, and contested resources are in short supply relative to demand. Food and habitat shortages are more likely in freshwater environments than in the ocean, and in rearing areas more often than in migratory corridors. In addition to affecting behavior, growth and survival, ***intraspecific*** competition may result in increased activity and stress, which in turn would predispose fish to higher levels of predation and disease (Sosiak, et al., 1979; Dickson and MacCrimmon, 1982; Suboski and Templeton, 1989).

➲ For Your Information

***Intraspecific** is within a species.*

As described above, the number of spring chinook outplanted each year would be calibrated so that the sum of hatchery and wild fish does not exceed the carrying capacity of the receiving stream. Additionally, competition would be contained by spreading hatchery releases out in time and space, and releasing many of the hatchery fish after the summer growing season when production bottlenecks typically occur. Hatchery fish released earlier would go into streams after wild chinook have emerged, dispersed, and established territories, so the potential for displacement of wild fish into suboptimal habitats would be low. Spring chinook would be reared in conditions that attempt to simulate those found in the wild, so they should not enjoy a size advantage (see Section 2.1.3.3, **Rearing Techniques**).



The M & E Plan recommends research to determine whether hatchery and wild spring chinook compete equally well for limited resources, and whether intraspecific competition appears to be an important factor regulating production within NPTH streams. Answers to these questions would be used to modify rearing and release strategies to minimize adverse impacts and take full advantage of the production potential of the streams.

Fall and summer chinook releases are not expected to compete with their wild counterparts. They would likely be larger than most subyearling migrants rearing in the Clearwater, but would also migrate sooner. Should the supplementation strategy be effective, it is predicted that there would be two pulses of migration by subyearling chinook from the Clearwater. An earlier outmigration period would occur by NPTH releases that are more closely aligned with the descending peak of runoff in June. A later subyearling outmigration pulse is expected from July to August that would result from natural spawning in the river by NPTH returning adults and non-NPTH adults.

The IAT concluded that the overall impact of competition on the targeted population would be low, and limited primarily to spring chinook in freshwater habitats. Cumulative impacts are not anticipated.

Non-Targeted Chinook Populations — The National Marine Fisheries Service has argued that effects of competition between hatchery and natural fish stocks in the mainstem and estuary habitats have posed a detriment to natural populations. Because much of the free-flowing nature of the Columbia and Snake River systems has changed to a series of reservoirs, the runoff timing, food resources, numbers of predators, competitors and exotic species have been altered. NMFS believes the carrying capacity for anadromous fish in these habitats has been reduced and that competition under conditions of reduced carrying capacity has resulted in detrimental impacts to wild anadromous stocks. The primary source for competition is the release of almost 200 million hatchery salmon and steelhead annually in the Columbia River Basin. Although NMFS also finds that there is little definitive information on carrying capacity and density dependent (competitive) effects within the mainstem, estuary, and ocean, it recommends a cap on hatchery production as a safeguard. The hatchery cap limits chinook production to the numbers produced in 1994 (20.2 million in the Snake River Basin) with the exception of production to support recovery of listed threatened or endangered stocks.

Competition between NPTH-produced chinook and non-targeted chinook populations would be limited to areas where they commingle and vie for the same resources. These areas would include the mainstem river, estuary, ocean, and, in the event that significant straying occurs, on spawning grounds in non-targeted tributaries.

The IAT evaluated the potential for direct and indirect effects and concluded that NPTH chinook would have a low impact on non-targeted chinook populations. The total number of hatchery and wild fish produced under NPTH would not exceed the natural production capacity of the Clearwater system, and therefore should not cause a disproportionate reduction in the amount of food and space available to commingled stocks.

Proposed hatchery releases of spring and fall chinook would cause cumulative impacts to non-targeted chinook, but the effects would not be detrimental to the recovery of endangered chinook stocks. Spring chinook proposed for release are within the production cap recommended by NMFS. The cap was made for hatchery production from 1994. In that year, the NPT raised approximately 485,000 chinook for outplanting. An additional 420,000 chinook were secured by the NPT and reared by IDFG at Clearwater Hatchery for the tribal outplanting. It is assumed that the production cap was a necessary measure to cause no further harm to chinook species, and would allow for rebuilding of the

runs. Because NPTH spring chinook releases proposed are within the cap set in 1994 (as NPT production) they should not interfere with rebuilding of the runs, nor cause harm to the listed stocks.

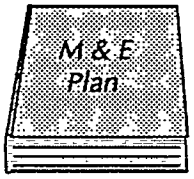
Fall chinook releases are not expected to cause cumulative detrimental impacts. The fall chinook stock proposed for NPT, Lyons Ferry fall chinook, are considered part of the Snake River fall chinook ESU, and would therefore be excluded from the production cap. Propagation of these fish would be similar to propagation of listed spring chinook or sockeye salmon in other areas of the Snake River Basin (e.g., Eagle Creek Hatchery, McCall Hatchery, or Sawtooth Hatchery). These stocks of fish are propagated for recovery purposes. They are part of the group of fish that are proposed to be protected from competition by the production cap. Consequently, no adverse impacts are anticipated that can be attributed to competition by their production and release from NPTH.

Summer chinook production would go beyond the NMFS production cap. Some cumulative detrimental impacts could occur as a result of competition with other salmonids when their release is considered in conjunction with other anadromous salmonid releases in the Columbia River Basin.

Other Salmonid Species — Competition between chinook and other species of salmonids, primarily young steelhead, cutthroat, and bull trout, could be expected to have detrimental effects if stream resources (food and space) were limited. However, steelhead and bull trout populations have not been increasing in the streams proposed for outplanting or in the Clearwater River Subbasin as a whole. In fact, they are both being considered for listing under the Endangered Species Act. Their densities (see Table 3-7) do not suggest that they approach high levels of use in the outplanting streams, with the exception of steelhead in Boulder Creek. It is unlikely that the stream resources are so taxed that competition with chinook would detrimentally affect their populations. Furthermore, research has shown that juvenile chinook and steelhead occupy areas with different depths and velocities, thus limiting their direct competition for food or space (Everest and Chapman, 1972). Studies on bull trout/chinook interactions are more limited, but supplementation of hatchery chinook and steelhead did not produce long-lasting impacts on bull trout populations in three tributaries to the lower Snake River where the effects were evaluated (Underwood, et al., 1992).

Cutthroat and brook trout appear to have filled the ecological niche vacated by chinook when they were eliminated from the Clearwater River Subbasin. Young cutthroat and brook trout are found in relatively higher densities in the salmon habitat of upper Lolo Creek and Mill Creek. They may be cut off from resources to which they currently have access, and densities of these species may shrink as chinook become established in chinook habitats,

but it is unlikely that the viability of these species would be threatened. Cutthroat are the dominant occupant of many of the smaller tributaries to Lolo Creek and Mill Creek, areas that are not preferred by larger anadromous species. It is unlikely that this condition would change.



Nevertheless, the M & E Plan contains specific provisions to evaluate the effects (e.g., on growth, survival, and abundance) of competition on coexisting fish species, including salmonids. This mitigation measure should be implemented and if negative impacts are detected, outplanting strategies should be revised as necessary.

The IAT determined that competitive interactions between chinook and other salmonids, primarily young cutthroat trout, would have moderate impacts. Due to their extensive use of mainstem habitats during outmigration, hatchery fall and summer chinook are apt to interact less with these species and no impact is predicted.

Restoration of habitat use and reallocation of resources that existed prior to the elimination of salmon from salmon habitat could result and would be a cumulative impact.

Non-Salmonid Fish Species — The scientific literature contains few examples of direct competition for food and space between chinook salmon and non-salmonid species. Because they are generalists in their food preferences, chinook salmon may competitively interfere with other species that feed on aquatic invertebrates. Those species most apt to be affected are sculpins (*Cottus spp.)*, longnose dace (*Rhinichthys cataractae*), and redside shiner (*Richardsonius balteatus*).

The IAT rated potential competition-related impacts on resident non-salmonids as low. Although chinook may deplete food supplies in the short-term, especially in the immediate area of release, they are not expected to significantly reduce in number or otherwise lower the viability of resident fish species.

Restoring a salmon run and bringing in nutrients would be positive cumulative impacts.

Predation

Predation plays an important role in determining community structure and species abundance. Predators can reduce the abundance of prey species to the point that competition is inconsequential. NPTH chinook would fill the dual role of predator and prey in freshwater and marine ecosystems. Their impact on other species would depend on their respective trophic

relationship, number, and spatial and temporal overlap. This section considers program-related impacts separately for prey and predator species.

NPTH Chinook as Predators — Chinook released by NPTH are unlikely to cause detrimental impacts to other fish species by acting as predators. Hatchery chinook would be released at times that favor the development of natural diets and feeding habits. They would establish feeding stations and prey on a variety of primarily invertebrate drift species. They are not expected to eat other fish until they attain a larger size (120 mm or so). For spring chinook, the gradual transformation to a fish-eating diet begins with their seaward migration as yearling smolts. Fall chinook begin their emigration at a smaller size, and thus do not begin to eat other fish until they have entered the ocean.

Chinook smolts actively feed during their downstream migration through the Snake and Columbia rivers. Their diets are dominated by local invertebrate species such as cladocerans, chironomids, and amphipods (Muir and Emmett, 1988). Although larger smolts may consume smaller fish, including other salmon, recent evidence suggests that fish comprise an insignificant fraction of the food consumed by migrating chinook salmon in the Snake and Columbia rivers (Muir and Coley, 1995).

The effects of NPTH chinook on predator-prey dynamics in the Columbia River estuary and ocean cannot be accurately predicted since little is known of the role of chinook in the ecology of these systems. NPTH chinook would prey on other species of fish in these areas but a change in status or trend of other species as a result of their predation is not expected.

Overall, the potential impact of predation by NPTH fish on all categories of fish was rated as low. They are not expected to consume many fish while in freshwater and the effects of their predation on other fish in ocean is expected to be negligible.

Cumulative impacts are not anticipated for spring and fall chinook. The rationale described under cumulative competition effects for non-targeted chinook, that is, the hatchery cap, also applies here. Summer chinook production would go beyond the cap and some detrimental cumulative impacts might be expected.

NPTH Chinook as Prey — Somewhat greater, but still minor impacts are expected from NPTH chinook as prey. Chinook would be released from NPTH facilities at sizes and under conditions that initially make them susceptible to predation. Populations of predator species such as bull trout, larger cutthroat, and northern squawfish should benefit from initial outplanting and an increase in run sizes due to supplementation.

Farther downstream, large concentrations of hatchery fish may adversely affect all four categories of fish by stimulating bird and fish predators at dams and river mouths. Shifts in predator type and abundance due in part to increased hatchery production have led to higher predation mortalities among wild juveniles during migration (Li, et al., 1987). The presence of hatchery fish may also affect the behavior of non-hatchery fish, increasing their vulnerability to predators in the process. If hatchery fish enable predator populations to expand, if they alter behavior patterns of non-hatchery fish, or if they physically displace or induce non-hatchery fish to use suboptimal habitats, then those fish populations may experience higher predation mortality.

On the other hand, hatchery fish would buffer non-hatchery fish from predation. Recently released hatchery fish often exhibit inappropriate competitive and foraging behaviors, and lack familiarity with their new surroundings, which may divert attention away from wild fish. The long-term increased forage base provided by supplemented runs could also buffer other prey populations.

The IAT determined that the direct and indirect impacts of chinook-as-prey on other fish resources would be low. The numerical abundance might stimulate and increase predator populations, but chinook would also be the principal prey for predators. However, effects caused by releases of summer chinook by NPTH combined with other hatchery releases in the Columbia River Basin, could add to predation risk for non-targeted chinook, a cumulative impact.

Reproduction and Genetic Exchange

Genetic introgression resulting from interbreeding among hatchery and wild chinook might lead to undesirable changes in the wild phenotype. The potential for adverse genetic impacts depends on the relative abundance of hatchery and wild fish, the extent of their reproductive interaction, their genetic compatibility and relative fitness, and the natural selection regime. The primary genetic impacts of concern are those that lower individual and population fitness.

Targeted Chinook Populations — The IAT concluded that reproductive and genetic impacts to the targeted population of spring and fall chinook would be low. NPTH would use the spawning guidelines described in Section 2.1.3.6, **Broodstock Source and Management.** These practices should preserve the genetic integrity of wild populations. Rather than attempt to reproductively isolate hatchery fish from wild fish, the intent of the guidelines is to manage the reproductive contributions by members of both groups so that hatchery and natural production are fully integrated.

NPTH summer chinook could pose a moderate level of impact to targeted fall chinook populations. Although the release areas for summer chinook are approximately 48 km (30 miles) upstream of the principal fall chinook spawning habitat, and the peak spawning period is separated by about one month, the latest running summer chinook might spawn with the earliest running fall chinook in the lower mainstem Clearwater River. The amount of "swamping" of fall chinook genes by summer chinook would depend on the run sizes. Both fall and summer chinook runs are expected to increase. Based on the size of the releases, more fall chinook should return than summer chinook, which would make the occasional mating of the two stocks an exception to the rule rather than the dominant mating strategy. However, run conditions may favor returns of one of the two stocks in any given year. Should summer chinook return at a greater rate and spawn later and lower in the basin than anticipated, and are not themselves "swamped" in later years, they may alter the genetic makeup of the fall chinook population.

Because of the potential for impact between summer chinook and fall chinook, the IAT assigned an overall impact for this category as moderate. Cumulative impacts are not expected.

Non-Targeted Chinook Populations — Interbreeding between fish from targeted and non-targeted populations can have negative consequences if: (1) listed chinook are inadvertently collected for NPTH broodstock; and (2) NPTH chinook stray into other chinook-bearing streams or hatcheries. The incidental taking of non-targeted salmon would reduce the size of the naturally-reproducing population and would mix genetic material from two or more populations. If NPTH chinook stray, they might lower the reproductive success or long-term viability of recipient stocks. The potential for doing so depends on the genetic pedigrees involved and whether NPTH chinook interbreed or interfere with the reproduction of locally-adapted fish. As mitigation, all chinook released from NPTH facilities would be marked with fin clips, coded wire tags, PIT tags, visual implant tags or other forms of benign biological marks so that the hatchery fish can be readily identified and culled from other populations.

Impacts to non-targeted populations of spring chinook would be low. NPTH operations were designed to minimize gene flow (straying) into neighboring populations and vice-versa by using locally adapted populations as a source of broodstock. This should create greater homing fidelity than would otherwise be expected (McIssac and Quinn, 1988). NPTH spring chinook would also be acclimated within the streams that they are expected to return to as adults. The length of time spent acclimating to these streams should also increase their homing instinct.

No impacts are anticipated to non-targeted chinook from fall chinook releases. NPTH fall chinook would be derived from Snake River Basin stock. Should they stray, they are not expected to cause a loss of fitness to spawning populations in other mainstem areas (i.e., the Snake, Grande Ronde, Imnaha and lower Salmon rivers) because they are all the same stock.

The effects of NPTH summer chinook straying are not expected to cause an adverse interaction with non-targeted populations. They are expected to remain segregated by spawning timing and location to the mainstem river habitats in the vicinity of their acclimation facilities. There are few if any other non-targeted chinook stocks using these habitats that could be at risk. Should strays spawn outside the Clearwater, it is unlikely that they would be so numerically dominant as to swamp other mainstem spawning populations.

Overall impact on non-targeted chinook stocks due to reproduction and genetic exchange is expected to be low. Cumulative impacts are not anticipated.

Other Salmonid Species — Cross-hybridization can cause deleterious effects by reducing fitness and the genetic contribution of all adults and producing sterile offspring. These occurrences are noted for brook trout:bull trout crosses and cutthroat:rainbow crosses in the Clearwater River.

No impacts are predicted from the Proposed Action. Steelhead and cutthroat trout are spring spawners and so do not overlap in time with chinook salmon spawning from late August into September. Bull trout and whitefish are fall spawners, but tend to spawn at higher elevations and later in the year (October) than do fall chinook and spring chinook, respectively (Underwood, et al., 1992). The tendency to segregate temporally and spatially makes it unlikely that chinook would adversely impact the reproduction of any of these species. No cumulative impacts are expected.

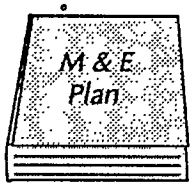
Non-Salmonid Fish Species — No impacts are expected. There is no reason to believe that chinook salmon significantly affect the reproduction of non-salmonid species. No cumulative impacts are expected.

Human-Fish Interactions — This section assesses the effects on fish populations of human actions that are not directly linked to the operation and management of the Proposed Action, yet may influence activities and impacts in the future. The primary concern is with actions either prompted by or taken in response to the related changes in Clearwater chinook populations. These actions may exert pressure on NPTH chinook populations and, by extension, on non-targeted chinook, other salmonid, and non-salmonid populations. Most human-fish interactions of this type can be grouped into two categories: those related to natural

resource management; and those related to fishing. The effects of external management initiatives, such as those imposed by the ESA or by forest management activities, are likely to be indirect, but could be significant. Fishing, on the other hand, is likely to cause impacts that are both immediate and direct in their effect. Because changes in either of these areas could produce significant impacts, they were included in the overall assessment of program impacts.

Non-NPT Management Actions

These management actions are decisions and actions taken by non-Nez Perce Tribal resource managers as a consequence of the development of the Proposed Action. The IAT assumed that future management actions would be consistent with NPTH goals, and are unlikely to be implemented if they pose a significant threat to fish resources. Therefore, the IAT assigned a low impact value to all resource categories. NPTH managers plan to coordinate activities with pertinent federal and state fisheries and natural resource agencies in the region to ensure efficiency and consistency across management agencies. Additionally, the M & E Plan calls for monitoring salmon recovery efforts, watershed development, mainstem hydrosystem operations, ocean and inriver harvest, and other management-driven activities to assess their potential impact on the Proposed Action.



Fishing

A primary goal of the NPTH program is to create opportunities to catch fish for recreation, sustenance, or cultural purposes. Some impacts may occur to targeted, non-targeted chinook and other salmonids as a result. Fall chinook, because they are exploited to a greater extent than are spring and summer chinook in commercial and recreational fisheries, are likely to suffer greater impacts. Unless protected by blanket restrictions on harvest that are meant to protect endangered species, Clearwater River Subbasin chinook are likely to be harvested at higher rates as their numbers increase, thereby affecting non-targeted and targeted populations.

NPTH managers intend to maintain tribal harvest, and to encourage state and federal managers to control non-tribal harvest at levels that do not adversely affect fish resources. Harvest in the Clearwater River would be a coordinated action between IDFG and the Nez Perce Tribe. Harvest levels would be based on adult returns, subject to spawning escapement and broodstock requirements. Surplus hatchery fish would be targeted, allowing weaker wild stocks to rebuild to self-sustaining levels. Fishing would be limited to carefully designated areas and times, using

techniques that reduce its adverse effects on non-targeted stocks, including listed species. Such techniques may include run size forecasting, setting harvest rates that vary with in-season escapement estimates, fishing in terminal areas, selectively harvesting externally marked hatchery fish, imposing gear restrictions, and catch and release.

The IAT rated overall impacts of increased fishing pressure caused by a larger numbers of returning salmon as low. Incidental catches of non-targeted chinook, other salmonid species, and non-salmonid fish species would likely result in diminished numbers, but a significant decrease in the viability of the populations is not expected. It is premature to suggest that fishing restrictions would be imposed to protect trout in these areas. Restrictions would only be imposed if it is necessary to protect the fish that would be returning, and it is premature to say if this would happen.

Potential Impacts on Listed Species — Chinook originating in the Clearwater River would not interact with listed sockeye or spring/summer chinook until they enter the Snake/Columbia River migration corridor. They could interact with listed fall chinook in the lower Clearwater River.

The primary risks to listed species from NPTH fish are communication of infectious disease and competition for food. The potential magnitude of these impacts is hard to predict, but management precautions and the environmental conditions under which NPTH and listed fish would coexist make it unlikely that listed species would be impacted. Unless straying of listed fish increases significantly, there is little danger that their inadvertent taking in broodstock collection and harvesting activities would accelerate their demise. Predation on outmigrating smolts and interbreeding and genetic exchange resulting from straying of hatchery fish into other areas would pose minimal risk. Some of the same effects may occur in the Columbia River estuary, but conditions in the ocean make it unlikely that hatchery fish would impact listed fish either through competition, predation, reproduction, or disease transmission.

Overall, no to low impacts on listed species are expected from the Proposed Action. The construction and operation of the hatchery would have little or no impact to fish mortality of listed fish, and would not interfere with recovery actions or otherwise impede the recovery of spring/summer chinook and sockeye salmon. Endangered fall chinook populations would be supplemented and increased by the NPTH program. Any incremental loss of individuals of listed species would be offset by the restoration of viable, productive, and self-perpetuating populations of wild chinook in the Clearwater River.

The Proposed Action would be modified to address ESA concerns by imposing harvest restrictions that minimize impacts on endangered Snake River salmon. Potential impacts would be reduced by limiting the harvest of fall chinook as much as possible to ***terminal areas*** or by requiring use of selective gear that permits release and passage of listed species.

4.6.2 No Action Alternative

Under the No Action Alternative most of the fisheries effects would not occur. It is expected that runs to Dworshak, Kooskia and Clearwater fish hatcheries would increase with measures taken under the Endangered Species Act to enhance migration. Eventually salmon runs may be increased and restored in the streams targeted for spring chinook releases, but at a much slower rate that is dependent on straying and colonization. Natural rebuilding of salmon runs would gradually change the interactions between salmon and other fish, but also at a much slower rate. Whether salmon reclaim their dominant role in fish production in these streams would depend on their ability to recolonize underseeded habitat. Fall chinook would gradually be restored but their runs would only be modestly enhanced by supplementation efforts upstream of Lyons Ferry Hatchery. It is doubtful that summer chinook would be present in the Clearwater River Subbasin unless an earlier portion of the fall chinook run moves farther and farther upstream to occupy the mainstem South Fork Clearwater and Selway River.

4.7 Wildlife

Analysts used these impact definitions for wildlife.

A **high** impact would occur under these conditions.

- Significant amounts of existing important wildlife habitat destroyed.
- Critical habitats are disturbed during breeding or winter stress periods.
- Threatened or endangered species are directly impacted.
- Heavy, uncontrolled human access is allowed.

A **moderate** impact would occur under these conditions.

- Important habitat outside of critical breeding or wintering periods is disturbed.
- A moderate amount of habitat is lost.
- Uncontrolled human access is light.

A **low** impact would be created by these conditions.

- Construction activities with only slight changes in habitat.
- Overall habitat loss is insignificant.
- Wildlife is displaced temporarily.
- Threatened and endangered species are not affected.

4.7.1 Proposed Action

Direct impacts from construction activities and operation of fish rearing and acclimation facilities can disturb wildlife, damage habitat and create temporary and/or permanent impacts to them. Prime impacts to wildlife include habitat damage or loss, increased human access into otherwise secure areas and human disturbance during construction. Clearing riparian or upland habitat creates the greatest potential impacts. The significance of the impacts depends on whether displacement and replacement habitat for riparian-dependent or upland species is available.

4.7.1.1 Waterfowl

The Cherrylane facility and lowland satellite facilities (Cedar Flats and Luke's Gulch) used by waterfowl are located in areas that have been previously disturbed and therefore pose no threat to waterfowl in the immediate and nearby areas. There is only transitory and occasional use of riparian habitats in the upriver areas where the rearing, acclimation and weir sites are proposed. No impacts are anticipated. The location of the central hatchery at Cherrylane, the satellite facilities at Cedar Flats and Luke's Gulch, and associated development activities pose no threat to waterfowl in immediate and nearby areas.

4.7.1.2 Upland Game Birds

Upland game bird habitat at Cherrylane, Sweetwater Springs and North Lapwai Valley has already been disturbed because of existing land uses. There may be additional disturbance caused by construction of hatchery facilities at these sites, but the overall quality and quantity of upland game bird habitat is not expected to change from the existing condition. Temporary displacement of upland game birds occupying the sites is expected during construction activities, but it is expected to be short term and would pose no significant impact to the population.

4.7.1.3 Aquatic Fur Bearers

Impacts to fur bearers are expected to be minimal and potentially beneficial. The central incubation and rearing facilities are not expected to cause impacts because they would be built in already disturbed streambanks, or bench areas away from denning habitat. In the upriver tributaries, construction activities associated with the satellite facilities may cause temporary animal displacement. But modification of habitat via construction is not expected to be significant because of the availability of adequate displacement habitat in adjacent aquatic and riparian areas.

Spring chinook satellite sites provide suitable habitat for fishers, which may be disturbed by construction activities. Should fisher activity be observed in the vicinity of the project, the Idaho Department of Fish and Game and the Nez Perce Tribe Wildlife Department would be consulted on means to avoid adverse impacts to fishers or on fisher habitat. As a result, impacts to fishers from program activities would be mitigated.

Beneficial effects are more likely to occur for some species because of the Proposed Action. If supplementation recovers salmon populations, the forage base for otter and mink would increase over a wide area. Problems could occur at the individual satellite sites because of the increase in forage. Mink and otter may be attracted to the rearing and holding ponds for feeding. If so, the facilities may require modification to prevent excessive predation.

4.7.1.4 Big Game

There is little or no potential for conflict at Sweetwater Springs or Cherrylane due to the existing developed conditions and low density of animals in the lower Clearwater River valley. There is some potential for conflict in upland areas. For facilities that require construction and operational activities, there may be some local, temporary displacement of animals during disturbance. However, the impact would be insignificant because the size of the facilities is small, facilities would be built along existing, open roadways, and there is ample displacement habitat in upland watersheds. Black bear may be attracted to adult holding ponds, so modifications may be necessary to cope with their interest.

4.7.1.5 Raptors

Raptors that would be associated with the program area are the osprey, northern harrier and the bald eagle. The bald eagle is discussed in Section 4.7.1.7, **Threatened and Endangered Species.**

Overall impacts to osprey and their habitat is expected to be beneficial. Physical disturbance of nesting sites because of construction or operation of the facilities is not expected. Implementing the Proposed Action would result in an immediate increase of forage for these raptors by the addition of hatchery-produced smolts migrating in the mainstem. If supplementation proves effective, long-term benefits would also occur as production of naturally-spawning fish and their progeny increases in mainstem rivers.

No impacts to harriers, such as the marsh hawk, are expected. There may be some temporary displacement during construction of satellite facilities.

4.7.1.6 Other Wildlife

Other riparian-dependent species inhabit the lower Clearwater River corridor such as blue herons, kingfishers, dippers and raccoons. At Sweetwater Springs and Cherrylane, little or no conflict is expected with the construction of the facilities. Facilities would be away from the river and the existing disturbance patterns at the sites would minimize any additional conflict. In upland areas, development would temporarily disturb and displace these species. Impacts would be low because there is sufficient displacement riparian habitat.

Once facilities are constructed and in operation, there is some potential for conflict with some species such as the kingfisher, bald eagle and blue heron that might be attracted to fish rearing ponds and adult holding facilities. These facilities would have to be modified to minimize conflict.

If supplementation is successful and salmon populations recover, there could be a beneficial effect on wildlife that eat salmon. An increased food supply could lead to favorable growth and survival for such species as bald eagles, kingfishers, and blue herons.

4.7.1.7 Threatened and Endangered Species

Bald Eagle — The Proposed Action has three facility sites located within bald eagle winter habitat, but impacts to eagles are expected to be negligible. Construction and operation of the Cherrylane facility, and the Luke's Gulch and Cedar Flats satellite facilities would not disturb any eagle roost sites. The Clearwater River and U.S. Highway 12 lie in-between the Cherrylane facility and the known roost site on Fir Island. Human activity and disturbance is already common at all three mainstem corridor sites, and this is not expected to change. Cherrylane has several residences, grain and hay farms, a tree farm and highway traffic

occurring at the site. Luke's Gulch is across the river and just downstream from the community of Stites; highway traffic on State Highway 13 is common there also. Cedar Flats is also adjacent to year-round human activity. The Sweetwater Springs facility and other satellite facilities are located outside of mainstem river corridors occupied by bald eagles during the winter. Consequently, they pose no detrimental effects to bald eagles or their habitat.

The winter population of eagles on the Clearwater River could be affected if the Proposed Action recovers and sustains salmon populations. If supplementation is successful, tributary and mainstem salmon production would increase the potential food base for the eagles. However, it would probably take place over a longer time-frame. The provision of a high quality prey base would undoubtedly increase the growth and survival of eagle populations in the lower Clearwater River Valley and would supplement carrion food sources of eagles along upper watershed areas. If adoption of the No Action Alternative fails to recover salmon populations, then eagle populations could be adversely affected by a reduced prey base. Bald eagles could leave the Clearwater corridor to seek winter habitats of higher quality.

Grizzly Bear — Although the grizzly bear has historically used the lowland and upland habitats of the Clearwater country, grizzly bears and wolves have long been eliminated from lowland habitats by civilization. There have been no confirmed reports of grizzly bears on the Clearwater and Nez Perce National Forests since 1956 (Dan Davis, 1994). The program areas are generally not considered as suitable habitat for grizzly bears, though the Cedar Flats site (along the Selway) is within the proposed grizzly recovery zone. The location of the site along the open Selway road reduces the probability for conflict. The proposed program would also not adversely impact the grizzly bear. There is a potential to benefit the grizzly bear via an enhanced food resource if supplementation is successful in recovering and sustaining the salmon populations. However, that beneficial effect is improbable because of the large amount of complexity and controversy associated with grizzly bear recovery.

Gray Wolf — Wolves are believed to inhabit the Clearwater and Nez Perce National Forests. There have been reports of gray wolf sightings in some of the tributary drainages where the satellite sites would be located (Lolo Creek and lower Selway River). However, there have been no confirmed reports of breeding pairs, pack formation, young pups, or denning within the area. Upland watershed sites are within wolf recovery areas, but pose no threat to the experimental population. Vast roadless areas containing suitable recovery habitat lie adjacent to the satellite sites, and it is believed that wolves prefer to occupy these areas.

Peregrine Falcon — There would be no impacts to the Peregrine falcon because populations are outside the program area.

Sensitive Species — Harlequin ducks have been observed in the Lochsa and Selway Rivers and their larger tributaries, but for the most part, they have been observed outside the areas where satellite facilities would be constructed. There is some potential that Harlequin ducks could be disturbed and displaced from their occupied habitats during construction and operation of satellite facilities. However, Harlequin ducks prefer pristine, low gradient, undisturbed habitats, which abound in adjacent areas. Therefore, it is unlikely that construction and operation of fish facilities would have a significant adverse impact on Harlequins. Prior to any construction activity, coordination with the Forest Service would take place with reference to occupied Harlequin habitat. If there is a conflict, it is highly probable that it can be resolved in favor of the species.

Coeur d'Alene Salamander — The Proposed Action poses a moderate level of potential impact on localized Coeur d'Alene salamander populations. Their preferred habitat is spring seeps, waterfalls, spray zones and riparian areas of small cascading streams. Satellite facilities at Yoosa/Camp Creek and Mill Creek have the greatest potential for impacting the salamander habitat. Seeps or cascades could be altered by water withdrawals causing individual salamanders in these areas to be displaced or killed. The primary measure to prevent impacting salamanders would be to conduct surveys in suspected salamander habitat prior to construction activities and to design means to avoid detrimental impacts. In any case, the Proposed Action is not expected to affect the status of the Coeur d'Alene salamander population because construction impacts are small relative to the overall distribution of the salamander.

4.7.2 No Action Alternative

Under the No Action Alternative, land management would remain the same. There would be no additional construction of fish cultural facilities within the Clearwater River Subbasin. Management of salmon stocks would continue along existing strategies. New efforts of supplementation would not be initiated. Wildlife resources within the study area would possibly remain the same. However, if salmon stocks continue to decline towards extinction under the present management scenarios, riparian-dependent species such as kingfishers, dippers, osprey, otter, and bald eagles could also be potentially harmed in response to a continued reduction of their food supply.

The No Action Alternative would create no new direct impacts. Indirectly, if present management efforts are not successful, riparian-dependent wildlife that forage on fish could be subjected to reduced growth and survival.

4.7.3 Cumulative Impacts

No cumulative impacts on the wildlife resources of the area would occur.

4.8 Vegetation

Vegetation resources can be adversely affected by construction of hatchery facilities. Some impacts, such as those that occur only during construction, can be short term or temporary and have minimal lasting effects on vegetation. Other impacts occur from permanent removal of vegetation and may be considered long-term.

Program-related impacts can be further categorized as direct or indirect. Direct impacts, such as vegetation clearing, are generally immediate and confined to facilities areas. Indirect or secondary impacts, such as soil compaction, increased stream temperatures, and noxious week infestations, can occur outside the area and are not as evident.

Analysts used these impact definitions to determine the level of impact for the alternatives.

- A **high** impact would occur if a national or regional vegetation resource is lost or damaged and adequate mitigation cannot be provided.
- A **moderate** impact would occur if a regional or local vegetation resource is disturbed and mitigation might not provide full compensation.
- A **low** impact would occur if effects are easy to mitigate and the resource affected is relatively abundant or already disturbed.

4.8.1 Proposed Action

Construction of the facilities would cause a variety of short-term and long-term impacts on vegetation. The short-term impacts would result from disturbance of vegetation that would be able to grow back in one season. The long-term impacts would result in permanent removal of vegetation. Because many of the facility sites are located in riparian zones, removal of vegetation could have moderate impacts. A biological evaluation

would be completed at all sites on USFS lands if necessary before construction. The Yoosa/Camp Creek site is a jurisdictional forested wetland. Removal of vegetation would have moderate impacts because it is a vegetation community that took many years to develop.

4.8.1.1 Central Incubation and Rearing Facilities

Construction of the river intake and discharge structures for the proposed Cherrylane hatchery would have minor impacts on riparian vegetation as a result of brush clearing, excavation, and placement of these structures. Disturbed riparian areas would be replanted following construction. Construction of the facility would have low impacts on vegetation because the site is disturbed and has been in agricultural production for many years.

Construction at the Sweetwater Springs would be largely confined to previously developed land and should have no effect on existing riparian vegetation. Impacts at this site would be no to low.

4.8.1.2 Satellite Facilities

Construction of satellite facilities would disturb the riparian zones for placement of the intake and outlet structures, subgrade preparation for the ponds, and the access road. In general, the intake structures would require a cleared area of approximately 18-27 m^2 (200-300 ft^2). In addition, a machinery working radius of approximately 12 m (40 ft) would be required around the intake site.

Impacts on riparian vegetation would be low at North Lapwai Valley, Cedar Flats, and Newsome Creek because the proposed sites have degraded riparian vegetation.

Some young Douglas firs would be removed from the Mill Creek site for construction of the facility. This vegetation type is plentiful and not unique to the area, therefore impacts would also be low.

Construction of the satellite facility at Yoosa/Camp Creek would result in the disturbance and removal of riparian vegetation for the intake and outlet structures, as well as removal of about 0.4-0.8 ha (1-2 acres) of forested wetland for construction of the facility and access road. Western red cedars and ladyfern dominate this wetland. The individual trees are considered old-growth, but the stand is not designated as an old-growth stand. Because of the removal of this habitat, impacts on vegetation would be moderate. Mitigation could replace the wetland, but it takes years to develop a forested wetland.

Construction of the satellite facility at Luke's Gulch would result in the disturbance and removal of riparian vegetation for the intake and outlet structures and the facility itself. Impacts would be low due to the small amount of riparian vegetation removed.

Operations at all the satellite facilities should have no other impacts on riparian vegetation.

4.8.1.3 Spring Chinook Direct Release Sites and Weir Sites

No impacts on riparian vegetation are expected at spring chinook direct release sites. Maintenance of existing access to the streams at the release sites would be required but this is not expected to produce any changes from existing conditions. Existing roads would be used for access. Where roads are not available, helicopters would be used to fly the fish to the release site.

Some minor clearing may be necessary at certain weir sites to gain access to the stream and clear the bank to install anchors for the weirs. This clearing would be limited in extent. Weirs would be installed and maintained by hand, with no use of machinery in the streams. Low impacts on riparian vegetation are expected.

4.8.1.4 Wetlands

The Yoosa/Camp Creek site is characterized as an undisturbed, forested jurisdictional wetland covering 0.6-0.8 ha (1.5-2 acres). This wetland stabilizes and intercepts sediment, acts as storage for floodwaters, and provides wildlife habitat. Development of this site would remove about 0.5 ha (1.2 acres) of wetland. Development would include installation of ponds and an access road. Impacts to the wetland would be moderate, depending on the number of trees removed and the amount of fill entering the wetland. A complete wetland delineation would be conducted to determine the amount of impacted area and mitigation strategies would be developed to have no net loss of wetland area and minimize impacts on any remaining wetlands.

At Luke's Gulch impacts to a seasonal wetland would be low. An access road would be built across the wetland which, depending on the length and amount of fill, could be authorized under an Army Corps of Engineers Nationwide Permit. Mitigation would be developed to minimize impacts. A wetland delineation would also be conducted.

4.8.1.5 Threatened and Endangered Species

There would be no impact to federally-listed or forest-listed threatened, endangered, or sensitive species. No federally-listed plant species are know to occur in the vicinity of the various program areas. The USFS has management requirements designed to protect sensitive plant species on their land, though records indicate no sensitive species are on the proposed sites. There has been and would continue to be coordination with the USFS to avoid any possible impacts on plant communities.

4.8.2 No Action Alternative

The No Action Alternative would create no impacts to vegetation.

4.8.3 Cumulative Impacts

No cumulative impacts to vegetation are expected.

4.9 Land Use

The following describes the environmental consequences of the Proposed Action and the No Action Alternative to land use. Land use conflicts could be created if the proposed facilities are incompatible with existing land uses. See also Section 4.4, **Water Resources**, and Section 4.12, **Air Quality**.

Analysts used these impact definitions to determine the level of impact for the alternatives.

- A **high** impact would occur if the program changes existing land uses completely and permanently, and if there is little or no potential for mitigation.
- A **moderate** impact would occur if the program causes limited permanent changes in existing land uses or causes extensive and lengthy temporary disturbances to existing land uses, and there is some potential for mitigation.
- A **low** impact would occur if the program leads to some brief, temporary disturbances to existing land uses that can be mostly mitigated.
- **No impact** would occur if the program does not trigger any changes in land use.

4.9.1 Proposed Action

The proposed Cherrylane, Sweetwater Springs, Luke's Gulch and North Lapwai Valley sites would change the existing land uses at those sites. The proposed satellite facilities, weir sites and control/treatment stream strategies located on national forest system lands are consistent with current forest plans. In addition, continued implementation of current and proposed activities identified in the forest plans, such as grazing, recreation, mining or timber sales would not be affected by the additional facilities and land uses proposed as long as forest plan standards are maintained; therefore, no amendments to forest plans are necessary.

4.9.1.1 Cherrylane

The current property owner, Cherrylane Ranches, has retained title to the 6 ha (14 acre) site, and issued BPA an option to lease the site for a period of 25 years, with an extension for an additional 25 years if BPA so chooses. Implementation of the proposed program would change the land use from agricultural to a governmental use. Construction of the facility would take 6 ha (14 acres) of prime farmland out of production. If BPA exercises its option and constructs the facility, it is unlikely this land would ever revert back to agricultural land.

The proposed use of the Cherrylane site would not conform to the existing zoning for the area; therefore, the county would normally require a conditional use permit to allow the change in use from agriculture to a hatchery facility (Clack, 1995). No conditional use permit would be required, however, because Nez Perce County, as a local government agency, would not have jurisdiction over BPA as a federal agency. BPA, would, however, meet or exceed all local government standards and requirements, as identified in Sections 4.0 and 6.0 of the Nez Perce County Zoning Ordinance. Section 3.8 of the Zoning Ordinance, entitled "Conditional Uses Permitted," states that, "...In an A zone all other uses may be permitted when authorized in accordance with standards and requirements in Sections 4.0 and 6.0." These requirements would become part of the proposed program (see **Mitigation**). Impacts would be moderate.

Because title to the proposed site would be leased, instead of being acquired in fee, the minimum lot size (8 ha [20 acres]) required by the county would not need to be adhered to.

Locating a fish hatchery immediately adjacent to a commercial seed cone operation may be incompatible if fugitive chemicals from the seed cone operation are allowed to drift onto the hatchery property. Potlatch applies herbicides and pesticides by air to its crop. Any herbicides and/or pesticides carried by wind

or water onto the proposed hatchery facility could adversely affect hatchery stock. Herbicides could cause oxygen levels to be depleted in a watercourse and pesticides could introduce toxins that could kill hatchery stock.

Potlatch has requested assurance that the proposed hatchery facility would not prevent their use of pesticides and herbicides. In addition, the company has requested assurance that the proposed program would not affect the groundwater aquifer in a way that would jeopardize their water supply. To prevent any harm to the fish stock at the proposed hatchery facility, no pollutants should be allowed to migrate onto the proposed hatchery site.

Mitigation — BPA would meet or exceed the conditions stated in Section 4 and 6 of the Nez Perce County Zoning Ordinance with respect to obtaining a conditional use permit for the A Zone. These conditions include:

- landscaping would be provided (minimum of 5 percent) in the off-street parking area, as well as a three-foot landscaped buffer strip (including trees and shrubs) between U.S. Highway 12 and the proposed parking area that would serve the facility; and
- all signs used to notify the public of the proposed facility would conform to Section 4.11 of the Nez Perce County Zoning Ordinance, and the Idaho Department of Transportation requirements.

With respect to the prevention of airborne or waterborne pollutants from adversely affecting the hatchery stock at the proposed facility, Potlatch could take steps to assure that no pollutants are allowed to migrate onto the proposed site, if feasible. In addition, the Idaho Department of Health and Welfare, Division of Environmental Quality could be consulted for advice aboout how to prevent insecticides or herbicides used by the company from impacting the proposed hatchery facility. If the chemicals used by Potlatch are found to threaten the survival of hatchery or broodstock, and cessation of the use of these chemicals would prove to be infeasible to the continued operation of seed orchard facility, the proposed hatchery site could be moved an appropriate distance east, to provide a buffer between the hatchery facility and Potlatch, and a barrier could be provided, such as a row of poplar trees so as to prevent, or at least to inhibit fugitive sprays from migrating onto the proposed hatchery site.

4.9.1.2 Sweetwater Springs

The proposed use of the Sweetwater Springs site is not an allowed use in the AR Zone. Normally a conditional use permit would be required to construct the proposed facility at the site. Because BPA is a federal agency, and local governments do not have jurisdiction over federal agencies, no conditional use permit would be required. BPA would, however, observe those conditions that would be imposed in the granting of a conditional use permit for the proposed facility, as contained in the Nez Perce County Zoning Ordinance. .

For BPA to construct facilities at Sweetwater Springs, IDFG would need to either sell all or a portion of the site to BPA, or the agency would need to issue a land lease to BPA. As of the date of this draft document, no sale or lease has been prepared. Impacts would be moderate.

Mitigation — BPA would meet or exceed the conditions as stated in Section 4 and 6 of the Nez Perce County Zoning Ordinance with respect to obtaining a conditional use permit for the AR Zone, as stated for the Cherrylane facility, above. BPA, however, would not need to obtain a conditional use permit for the proposed facility.

4.9.1.3 Luke's Gulch

No land use conflicts are anticipated as a result of siting the proposed facility on tribal lands adjacent to the parcel on private land. If security becomes an issue following development of the proposed facility, a gate would be installed, and the affected landowner adjacent to the proposed facility would be given a key. Impacts would be moderate.

4.9.1.4 Cedar Flats

No land use conflicts are envisioned with respect to siting the proposed satellite facility at Cedar Flats as long as no liquid fuel other than propane and other toxicants are stored on the site and no refueling is done within the Riparian Habitat Conservation Area. If no alternatives are available, refueling must be approved by the USFS, and the Tribe would procure a spill containment plan from the land manager prior to refueling on site. Impacts would be low.

4.9.1.5 North Lapwai Valley

To convert the land from an agricultural use to one of a governmental use, the land use would change from agriculture to "public." Implementation at the Lapwai site would convert about 0.5 ha (1.2 acres) of agricultural land to non-agricultural use. This change would likely be permanent. Impacts would be moderate.

4.9.1.6 Yoosa/Camp Creek

No land use conflicts are anticipated with siting the proposed facility, however, any proposed road associated with the timber sale at Camp Creek would need to be constructed so as to avoid siltation of Camp Creek. Impacts would be low.

4.9.1.7 Mill Creek

No land use conflicts are anticipated with siting a satellite facility on lower Mill Creek. The Hungry Mill Timber Sale Draft Environmental Impact Statement (DEIS), November 1993, includes logging west of the site in all four of its alternatives. This method of logging would minimally impact the fishery habitat of Mill Creek and would appear to not significantly impact the water quality as habitat for salmon. The DEIS stated, however, "...Adverse effects on fish habitat and water quality caused by timber harvest and related activities can be mitigated, but cannot entirely be avoided." Impacts would be low.

4.9.1.8 Newsome Creek

Impacts would be low. Siting the satellite facility downstream of the abandoned Haysfork Gloryhole would be feasible from a land use standpoint only if the sediment expected to enter Newsome Creek in a year or so would be found not to adversely affect water quality to the detriment of the proposed facility, or if the water quality would be found to be detrimental to the fish, that the proposed South Fork Clearwater River Habitat Enhancement Project (Project 84-5) be approved, funded and implemented, prior to the proposed facility at Newsome Creek becoming operational. This proposed rehabilitation project is purported to provide a 50-year sediment storage capacity based on the current sediment accumulation rates (Leidenfrost, 1995). The project is scheduled to be completed in 1996. See also Section 4.4, **Water Resources.**

4.9.1.9 Spring Chinook Direct Release Sites and Weir Sites

No land use conflicts are anticipated with the spring chinook direct release sites or weir sites proposed. The location of the weir on Meadow Creek would be more than 425 m (1/4 mile) from the Selway River, a Recreational River under the Wild and Scenic River Act of 1968. No impacts are expected.

4.9.2 No Action Alternative

If the No Action Alternative is implemented, there would be no change in land use, and no net loss in the amount of hay produced in the area.

4.9.3 Recreation

The proposed program would have a positive impact on recreational fishing in the area; however, this is not expected to occur until after the runs of chinook salmon have reestablished themselves in the Clearwater River Subbasin. Runs are expected in 15-20 years following program implementation. Prior to the onset of any recreational fishing for these returning salmon, the state of Idaho and the Nez Perce Tribe would set specific seasons and bag limits for each of the three runs of chinook. The fish are expected to return to the Clearwater River Subbasin from June through November each year. Although it is not known at this time what the seasons and bag limits would be, any season and bag limit would be considered a positive impact to recreational fishers in the area.

4.9.3.1 Cherrylane

No adverse impacts to the recreation resource in the vicinity of the Cherrylane facility are envisioned as a result of constructing and operating the primary incubation and rearing facility at Cherrylane. Fishing for steelhead in the vicinity of the proposed site would be unaffected. After the salmon have reestablished themselves in the Clearwater River, a recreational fishery would likely be created that would attract recreationists to the area from June through November each year, a positive impact on the recreational resource.

Siting of the proposed hatchery facility at Cherrylane would not affect the gathering of sillimanite along the Clearwater River by recreationists.

4.9.3.2 Sweetwater Springs

No adverse impacts to the recreation resource in the vicinity of Sweetwater Springs is anticipated as a result of the construction and operation of the secondary hatchery facility at Sweetwater Springs. Reintroducing chinook salmon to the area would provide increased recreational opportunities to anglers who visit the area.

4.9.3.3 Cedar Flats

The facilities planned for this site would be designed with the USFS so they would not affect Selway River float boaters as they pass by. No adverse impacts to the recreation resource are envisioned as a result of constructing the satellite facility at Cedar Flats. Reintroducing chinook salmon to the area would provide increased recreational opportunities to anglers who visit the area. Water intake structures extended into the Selway River would be designed to have no effect on float boaters on the Selway River.

4.9.3.4 Luke's Gulch, North Lapwai Valley, Newsome Creek, Mill Creek, and Yoosa/Camp Creek Sites

No adverse impacts to recreation would be created by constructing facilities at these sites. Reintroducing chinook salmon to the area should provide increased recreational opportunities (after the runs establish themselves) to anglers who visit the area.

4.9.3.5 Spring Chinook Release Sites and Weir Sites

The Tribe will work with the USFS to minimize impacts to wilderness resources from helicopter trips. Impacts would be low due to the low number of trips required, release sites are located on the edge of the wildernesses, the amount of time the helicopters would be in the wilderness, and the fact that the helicopter would not land in the wildernesses unless an emergency occurs. The Tribe would consult with the USFS on final location of weir sites to avoid conflicts with recreation and other resources. Reintroducing salmon would create no adverse impacts to recreation. Salmon would provide increased esthetic benefits and fishing opportunities for recreationists.

4.9.4 No Action Alternative

The recreation resource would be negatively affected by not having the spring, summer and fall runs of chinook salmon reestablished in the vicinity. Fewer fish would likely result in

fewer numbers of fishing days for the recreationist, and fewer fish for the Nez Perce Tribe. Also, there would be no increase in the number of facilities in the area used by the recreationist.

4.9.5 Cumulative Impacts

No cumulative impacts on land use in the area are expected. It is not anticipated that any future limitations would be placed on existing recreation opportunities from the Proposed Action.

4.10 Socioeconomics

Analysts used these impact definitions to determine the level of impact for the alternatives.

- A **high** impact would change current socioeconomic conditions and likely create adverse effects that could not be mitigated: regional reduction of quality or quantity of social or economic resources; a significant reduction of long-term economic productivity; or consumption of significant amounts of non-renewable resources.
- A **moderate** impact would change current socioeconomic conditions, but the effects could be mitigated: local reduction of social or economic resource; a marginal reduction of long-term economic productivity; consumption of moderate amounts of non-renewable resources.
- A **low** impact would create a small change in current socioeconomic conditions. No mitigation would be necessary.

4.10.1 Proposed Action

4.10.1.1 Short-term Construction Impacts

To implement the proposed program, the Nez Perce Tribe would likely put out an invitation for bid for a general contractor/ construction manager in the Lewiston/Boise/Spokane/Salt Lake City areas. The proposed facilities are anticipated to cost approximately $18-20 million, with an annual operating and maintenance budget of $1-1.5 million over its twenty-year life. The total cost, therefore, is estimated to range from $30 to $40 million.

It has been estimated that construction of the Cherrylane facility on the Clearwater River and the facility at Sweetwater Springs would require half of the program budget to be spent on construction wages and half to be used for supplies and equipment. Construction of the satellite facilities and the weirs would likely be more labor intensive, and, therefore, would require a higher proportion of the budget to be spent on labor, about 60 percent of the construction cost. While the general contractor could originate from outside the local area, it is anticipated that a number of the subcontractors needed to construct the facilities would be employed locally.

It is also likely that the major purchase of supplies and equipment for the proposed program would be purchased locally. Normally federal funds used to purchase supplies and materials by tribal members for a federal project would be exempt from state sales taxes; however, federal dollars used to purchase supplies and equipment by contractors would not be exempt. The state of Idaho currently assesses a 5 percent sales tax on goods and services purchased within the state. Although the entire state would benefit from any sales tax collected, the amount that would be returned back to the local jurisdictions from which the tax originated would be insignificant. There is no extra benefit paid directly to the city or county in which the additional tax is generated. The city or county in which the sales transactions occurred would benefit, however, in that its sales tax allocations would increase as would all other local government entities in the state sales tax allocations increase when the statewide sales tax collections increase (Husted, 1995).

While it is possible that the general contractor could originate from outside the local area, it is likely that a number of the subcontractors that would be needed for the proposed program would be hired locally. Employment of the local population, especially among tribal members, would benefit the local economy, and also would help improve the high unemployment situation in the local area, particularly among the Native-American population. With respect to the employment of non-local construction workers and in addition to the non-tax benefits from the local purchase of supplies and equipment in the local area, the non-local construction work force would purchase food, lodging and other consumer goods while employed in the area. Non-local construction workers usually spend 40 percent of their net pay locally (Mountain West Research Inc., 1982). It is important to note that following project completion, it is expected that most, if not all, outside contractors would leave the area.

4.10.1.2 Long-term Employment Impacts

Proposed facilities would require full-time permanent, and full and part-time temporary and seasonal workers. It is expected that most of these positions would be filled by tribal members. Federal contracting on reservations require that Native-American preference be given in employment for hiring, promotion, training, and all other aspects of employment, as well as in subcontracting (Nez Perce Resolution 79-165, 1979).

The Cherrylane facility would require seven or eight full-time employees and one part-time seasonal employee. Staffing of the Sweetwater Springs facility would require two full-time and two part-time workers. The satellite facilities would need to be staffed when fish are in the facilities. Staffing would be necessary to provide both husbandry and security for the salmon, particularly for the adult fish. Staffing of the satellite facilities then would require the hiring of temporary employees on a seasonal basis. It would be necessary to hire approximately 15 temporary workers to satisfy this need.

Total employment to operate all of the proposed facilities for the proposed program would, therefore, require the employment of approximately 30 people, half full-time and half part-time. This would be a positive impact in the area, and help reduce the high unemployment in the four county area, particularly with respect to the Native-American population.

4.10.1.3 Property Tax Impacts

The proposed program would increase property taxes collected by Nez Perce County for the Cherrylane facility. Although the proposed facilities themselves would be owned and maintained by the federal government, and would, therefore, be exempt from paying local property taxes, private land upon which the facilities would be located would be reassessed based on the proposed new use. This difference is substantial. Agricultural land (in agricultural use) in the Cherrylane area is currently valued at $3-400 an acre, while land for the proposed use would take on a higher value, about $10,000 an acre for the 5 ha (12 acre) site (Schieflebein, 1995). This increase in valuation would increase property taxes from the 1994-95 tax role of approximately $40 per year to $1,200 - $1,300 per year. This increase in property taxes received by the county would be a positive impact.

4.10.1.4 Economic Impacts

The proposed program would have positive economic impacts:

- the wages paid and the profits produced by the purchases of supplies and materials;
- the funds that would be spent by those who would be employed who had either been unemployed, or who had been employed elsewhere;
- the increase in local property and state sales taxes; and
- the increase in the number of recreationists that would be attracted to the area because of the runs of spring, summer and fall chinook that would return to the local area from June through November each year, following the reestablishment of the runs. The recreationists would add to the local economy through their purchases of goods and services, primarily consumer goods while in the local area. See also Section 3.9.4, **Recreation.**

4.10.2 No Action Alternative

Implementation of the No Action Alternative would not bring back runs of spring, summer and fall chinook to the Clearwater River Subbasin for present and future generations. The state of Idaho would not benefit as a result of the increase in sales taxes collected by the state. Local business in the area would not benefit as a result of the construction and operation/maintenance of the proposed facilities over the 20-year life of the proposed program. The positive impacts to the employment market in the area would not occur. Also, the unemployment rate of the Native American population group would not be reduced.

4.10.3 Cumulative Impacts

No cumulative impacts on socioeconomics in the area are expected.

4.11 Visual Resources

This section includes a description of the impacts to existing visual resources in the program area. Analysts used these impact definitions to determine the level of impact for the alternatives.

- A **high** impact would occur if a large number of people highly sensitive to their surroundings see the facilities in foreground or middle ground views; the facilities dominate views and/or appear uncoordinated or chaotic; or the area is officially recognized for its scenic or recreation values and facilities conflict with these values.
- A **moderate** impact would occur if a large number of people see the facilities but the facilities are not dominant elements in the landscape, views are partially screened, are seen for short periods and/or most views are in the middle ground; scarring from clearing or roads is evident but not extensive; or the facilities conflict with prevailing land patterns but are seen by few people or for short periods.
- A **low** impact would occur if few viewers see the facilities because they are isolated, screened or seen at a distance; existing conditions have impacted the area; clearing and roads do not detract from the setting; views are short-lived; or no visually sensitive resource would be affected.

4.11.1 Proposed Action

4.11.1.1 Cherrylane

The facilities would be visible from a nearby residence and from other residences. Motorists traveling along Highway 12 from west to east would have their views screened by the trees in the tree farm next to the site. Motorists travelling east to west would have brief views of the site. People traveling on or near the river would have their views screened by riparian vegetation. The impact is lessened by the large scale of the surrounding hills and ridges that edge the valley. Impact level would be moderate.

Mitigation — The Nez Perce Tribe would work with the owner of the nearest residence and screen as much of the facility as possible from the residence.

4.11.1.2 Sweetwater Springs

Because the site is in a deep canyon, along a creek and road with only occasional recreation use and farm use, the impact to the visual resource is low. The site cannot be seen from the nearest county road, and cannot be seen from any residences. Piping needed by the expanded facility would be screened by riparian vegetation. No riparian vegetation would be removed. The facilities would be screened by the surrounding rolling hills. Impact level would be low.

4.11.1.3 Luke's Gulch

To reach the site, an access road would be cut along the steep incline behind the site. Some pine and fir trees on this hill would be removed. At the site, some pine and fir trees would be removed for the ponds and trailer. Some vegetation along the existing road above the site may need to be removed. Building the access road on the hill above the site would create a change in the view from the river and highway. The road cut would be partially screened by trees left at the site. The facilities would be screened from the existing residence by trees and by the slope of the hill. Views from the highway in both directions would be brief. Impacts can be reduced by leaving as much vegetation in place as possible.

Anglers fishing along the bank in this area would have the nearest views. Impacts would be low to moderate.

4.11.1.4 Cedar Flats

On-site discussions with a USFS landscape architect, an easement administrator, other USFS employees and the NPT will determine the appropriate mix of natural vegetation and berming to assure that there is adequate screening for the proposed facilities. Any natural or other screens used would be compatible with the Recreational River designation and easement requirements of the Wild and Scenic Rivers Act. The house trailer and storage unit would be located at the Fenn Trailer Court, which is away from the site. Motorists on the road would have their views of the facility screened by existing trees. Impacts would be moderate.

4.11.1.5 North Lapwai Valley

During the summer existing trees would provide some screening of the facilities. The facilities would be seen from U.S. Highway 95 and several nearby residences. The views from the highway would be short-lived. No visually-sensitive resource

would be affected. Impacts to the residents of the homes nearby could be mitigated by screening their foreground views. Impacts would be moderate because the facilities conflict with existing land patterns but would be visible to few people or for short periods.

The Nez Perce Tribe is considering putting an interpretive sign along the highway in conjunction with the National Historical Park to explain the purpose of the facilities. Screening could be increased for nearby residents.

4.11.1.6 Yoosa/Camp Creek

The facilities would be built among and screened by cedar trees. The trailers and fences used on the site would be of muted or natural colors and would be screened from view from both the Nee-Me-Poo National Historic Trail and Forest Road No. 103. Travelers along the road would have brief views of the facilities. The area is relatively isolated. Impacts would be low.

4.11.1.7 Mill Creek

The proposed facilities would be screened by the fir trees at the site. Motorists using the road would see the facilities briefly. Impacts would be low.

4.11.1.8 Newsome Creek

Because the site has been disturbed by mining, there are no visually-sensitive resources in this area. The proposed ponds would be compatible with ponds left from mining. The Forest Service has improved the habitat of the stream by putting logs and other structures in the streambed, and the facility would not conflict visually with these efforts.

Forest Service Road 1853, used to access the site, is used by residents of Newsome, which is about 1.6 km (1 mile) up the road, and also by campers and other recreationists. The facilities would be visible from the road. Because the streambank has been disturbed, no vegetation is available to screen the facilities, but some could be planted if necessary. Expected impacts would be low.

4.11.1.9 Spring Chinook Direct Release Sites and Weir Sites

The proposed spring chinook direct release sites are in remote national forestland. The Tribe would consult with the USFS on final location of the proposed weir sites to avoid conflicts with recreation and other resources. No impacts are expected.

4.11.2 No Action Alternative

In the No Action Alternative, no changes are made to visual resources. No impacts would be expected.

4.11.3 Cumulative Impacts

No cumulative impacts to visual resources are expected.

4.12 Air Quality

New source performance standards were developed for new industrial developments that would be emitting large amounts of air pollutants. Such standards are not applicable for the proposed program because fish hatcheries and their associated satellite facilities do not emit large amounts of air pollutants.

Analysts used these impact definitions to determine the level of impact for the alternatives.

- A **moderate** impact would create an effect that could be partially mitigated or cause a local reduction in air quality; or create a possible, but unlikely risk to human health or safety.
- A **low** impact would create an effect that could be mitigated; reduce the air quality only near the site of the action; or create very unlikely health and safety risks.
- **No impact** would create no or fewer impacts than the low impact level.

4.12.1 Proposed Action

4.12.1.1 Central Incubation and Rearing Facilities

Short-term construction activities and longer-term operations would create short-term and long-term air pollutant emissions at Cherrylane and Sweetwater Springs.

Site clearing and excavation would create ***particulates*** (dust) for a short time near the construction site at Cherrylane. Major earth-moving and heavy construction activities would continue for 6 to 8 months. Impacts would decrease as construction is completed. Vehicles used for construction would also emit pollutants in the local area. Typical vehicle exhaust contains the following pollutants: ***carbon monoxide, volatile organic compounds, nitrogen oxides, sulfur oxides,*** and particulates. The levels produced would be minor and are expected to have no impact on air quality. Impacts to local air quality would be low. No air quality standards would be exceeded.

Construction activities at Sweetwater Springs would produce fewer particulates and vehicle emissions compared to Cherrylane since the Sweetwater Springs facility requires only modifications to its existing facilities. Overall air quality impacts from construction activities at Sweetwater Springs are low.

Operation of both Cherrylane and Sweetwater Springs would create vehicle exhaust emissions from facility operators driving to and from the sites. These impacts would be long term, but minor. Overall impacts to the air quality at the central hatcheries would be low.

4.12.1.2 Satellite Facilities

Construction of satellite facilities would produce the same kinds of impacts to air quality as described for the Cherrylane and Sweetwater Springs. Fewer pollutants and particulates would be expected since the surface area to be prepared at each satellite site is small and the time needed for construction would be shorter. No impacts to air quality are expected.

During operation, vehicle exhaust emissions would be released as vehicles travel to and from the satellite sites. No impacts to air quality are expected. At Luke's Gulch a generator would be used for the pump station. The on-site generator would operate two months of the year and would cause low impacts to air quality in the area.

4.12.1.3 Spring Chinook Direct Release Sites and Weir Sites

Vehicles used as workers travel to and from the sites are the only expected source of pollutants. No impacts on air quality are expected.

4.12.2 No Action Alternative

No impacts to air quality are expected from the No Action Alternative.

4.12.3 Cumulative Impacts

No cumulative impacts to air quality are expected.

4.13 Public Health and Safety

4.13.1 Proposed Action

Development of facilities for the Proposed Action would not impact the levels of police, fire, and health services that exist throughout the Clearwater River area. Most personnel operating the facilities would be local and already use these services. Construction contractors may slightly impact these services in the unlikely event of the need for law enforcement or medical attention.

On-site security is planned for all facilities during construction and operation. This would minimize potential cases of vandalism. Fire protection for the facilities during construction and operation would use the on-site facility water source. Local health facilities are available if an accident occurs. Helicopter services are available to transport injured individuals to emergency care facilities.

The presence of new facilities and workers in otherwise rural and forested areas would increase the risk of fire.

4.13.2 No Action Alternative

No development would occur and the possibility of fire introduced to an area as a result of that development would not occur.

4.12.3 Cumulative Impacts

No impacts are expected.

4.14 Comparison of Alternatives

4.14.1 Proposed Action

Implementation of the Proposed Action would create low to moderate impacts to resources and increase risks associated with releasing hatchery-reared fish into the natural environment.

The Proposed Action would reach program goals within 20 years. The immediate and sustained introduction of hatchery fish would lead to self-sustaining chinook populations within 2 to 5 generations, and a rapid expansion of natural production in other areas of the Clearwater River Subbasin shortly thereafter. Population status reviews, hatchery performance audits, and adaptive management techniques would be used to minimize program risks and, if necessary, revise program goals and objectives. The Proposed Action would help restore and maintain the biological diversity and productivity of the Clearwater River ecosystem.

4.14.2 No Action Alternative

Implementation of the No Action Alternative would preclude impacts to resources associated with the construction and operation of hatchery facilities, and preclude risks related to the introduction of hatchery-reared fish into the natural environment.

The No Action Alternative would not achieve program goals. Existing facilities and production strategies would be unable to produce the number or type of hatchery fish specified in the NPTH goal statements. The state, federal, and tribal agencies responsible for the management of Clearwater fish populations and associated habitat have been unable to protect existing resources and restore natural production to sustainable levels. Management prescriptions identified in the Proposed Recovery Plan for Snake River Salmon, in various Biological Opinions issued by the NMFS, in the Clearwater and Nez Perce National Forest Management Plans, in court-ordered settlements, and in other planning and regulatory documents may eventually halt the decline and enable the recovery of Snake River chinook populations. However, the time it would take for populations to naturally colonize unused habitats in the Clearwater River and to increase to levels that would permit harvest without jeopardizing natural production would be long.

Chapter 5 Environmental Consultation, Review, and Permit Requirements

In this Chapter:

- Laws and procedures to be met
- Actions taken
- Consultations

Several federal laws and administrative procedures must be met by the alternatives. This chapter lists and briefly describes requirements that will apply to elements of this project, actions taken to assure compliance with these requirements, and the status of consultations or permit applications.

5.1 National Environmental Policy Act

This Draft EIS was prepared according to NEPA (42 USC 4321 et seq.). NEPA is the national charter for protection of the environment. NEPA applies to all federal projects or projects that require federal involvement. BPA will take into account potential environmental consequences and will take action to protect, restore, and enhance the environment.

5.2 Endangered and Threatened Species

The Endangered Species Act (16 USC 1536) provides for conserving endangered and threatened species of fish, wildlife and plants. Federal agencies must ensure proposed actions do not jeopardize the continued existence of any endangered or threatened species, or cause the destruction or adverse modification of their habitat. When conducting any environmental impact analysis for specific projects, agencies must identify practicable alternatives to conserve or enhance such species.

Possible impacts of the proposed facilities to known or suspected occurrences of state or federal threatened, or endangered species are discussed here and in Chapter 4 of the Draft EIS.

5.2.1 Federal List

BPA asked the USFWS and NMFS to list the threatened and endangered species occurring within the vicinity of the proposed project. Four federally-listed threatened and endangered species

potentially occurring within the project vicinity were listed: the bald eagle, the Gray wolf, Snake River sockeye salmon, and Snake River chinook salmon. No proposed species were listed (see Appendix B for a copy of the letter from the USFWS).

USFWS and NMFS require that a biological assessment be prepared if threatened or endangered species might be impacted by a federal action. BPA and the Tribe will continue to consult with both agencies on impacts to listed species. A Biological Assessment is being completed and will be available in the Final EIS.

Potential impacts to species are discussed in Section 4.7.1.7, **Threatened and Endangered Species.**

No federally-listed plants occur in the program study area.

5.2.2 State List

The IDFG lists the following threatened and endangered species potentially occurring in the project area: spring/summer/fall chinook salmon; bald eagle; peregrine falcon; and Gray wolf. Cutthroat trout, steelhead, and bull trout are listed as priority species.

5.3 Fish and Wildlife Conservation

The Fish and Wildlife Conservation Act of 1980 (16 USC 2901 et seq.) encourages federal agencies to conserve and promote conservation of non-game fish and wildlife species and their habitats. In addition, the Fish and Wildlife Coordination Act (16 USC 661 et seq.) requires federal agencies undertaking projects affecting water resources to consult with the USFWS and the state agency responsible for fish and wildlife resources.

Currently, BPA is in the process of consulting with the USFWS and IDFG. BPA has also requested a formal consultation with NMFS.

Mitigation measures designed to conserve fish and wildlife and their habitat are in Chapter 4.

5.4 Heritage Conservation

Congress passed many federal laws to protect the nation's cultural resources. These include the National Historic Preservation Act, the Archeological Resources Protection Act, the American Indian Religious Freedom Act, the National Landmarks Program, and the World Heritage List. Preserving cultural resources allows Americans to have an understanding and appreciation of their origins and history. A cultural resource is an object, structure, building, site or district that provides irreplaceable evidence of natural or human history of national, state or local significance. Cultural resources

include National Landmarks, archeological sites, and properties listed (or eligible for listing) on the National Register of Historic Places.

Construction, and operation and maintenance of proposed facilities could potentially affect historic properties and other cultural resources. A cultural survey of each site and access roads has been done to determine if any cultural resources are present and would be impacted. Five prehistoric sites have been identified.

The National Historic Preservation Act of 1966, as amended, requires that the agency official consider the effects an undertaking may have on historic properties and provide an opportunity for the State Historic Preservation Officer (SHPO) and/or the Advisory Council (AC) to comment on such effects. BPA and BIA are jointly consulting with SHPO and AC on this specific project. If any alternative would affect a historic property, specific mitigation plans would be developed and reviewed by the SHPO and AC. All excavation on federal lands must be done under an Archaeological Resource Protection Act of 1979. Excavation on non-federal lands may require permits or approvals from private landholders, the state of Idaho, or the Nez Perce Tribe depending on land status. Further, all excavation is bound by the Native American Graves Protection and Repatriation Act of 1990.

Through the design process, BPA would try and avoid all sites. If some sites cannot be avoided, BPA will work with the State Historic Preservation Officer of Idaho to determine if those sites are eligible for a listing under the NRHP. If they are, effects will be evaluated and appropriate mitigation measures initiated.

If previously unidentified cultural resources are found during construction which would be adversely affected by the proposed project, BPA would follow all required procedures set forth in the following regulations, laws, and guidelines: Section 106 (36 CFR Part 800) of the National Historic Preservation Act of 1966 as amended (16 USC Section 470); the National Environmental Policy Act of 1969 (42 USC Sections 4321-4327); the American Indian Religious Freedom Act of 1978 (PL 95-341); the Archaeological Resources Protection Act of 1979 (16 USC 470a-470m); and the Native American Graves Protection and Repatriation Act of 1990 (PL 101 -601).

5.5 State, Areawide and Local Plan and Program Consistency

No conflict with state, areawide or local plans are anticipated. The proposed activities would be consistent with the Nez Perce County Comprehensive Plan and the Clearwater and Nez Perce National Forest Plans. The Nez Perce County Comprehensive Plan is applicable to all parts of the county, except incorporated communities, federal lands and Nez Perce tribal lands. Forest plans guide

natural resource management activities and establish management standards for areas within national forests.

The proposed satellite facilities, weir sites and control/treatment stream strategies, located on national forest system lands, are consistent with the current forest plans. In addition, continued implementation of current and proposed activities identified in the forest plans, such as grazing, recreation, mining or timber sales would not be affected by the additional facilities and land uses proposed in the DEIS, as long as forest plan standards are maintained; therefore, no amendments to the forest plans are necessary. The Tribe will work with the USFS while designing and locating the proposed facilities, and will comply with all special use permits required and USFS PACFISH management objectives.

5.5.1 Proposed Central Incubation and Rearing Facilities

The two central incubation and rearing facilities would be built to provide the hatchery stock for the proposed project. The Cherrylane facility is proposed for a site on private land on the Nez Perce Reservation, and the Sweetwater Springs facility is proposed for a site on state land off of the reservation. Both of these facilities would be within unincorporated Nez Perce County. The Nez Perce County Comprehensive Plan identifies, as one of its goals, to conserve natural resources so as to provide for future as well as present needs.

5.5.2 Proposed Satellite Facilities, Spring Chinook Direct Release and Weir Sites

The Nez Perce Tribal Hatchery program proposes six satellite rearing facilities for supporting production capacity at Cherrylane and Sweetwater Springs. Four of these facilities are located in the two national forests, that is, one in the Clearwater National Forest (Yoosa/Camp Creek) and three within the Nez Perce National Forest (Mill Creek, Newsome Creek and Cedar Flats). Luke's Gulch is located on tribal land on the Nez Perce Reservation. Three spring chinook direct release sites and 11 weir sites are proposed in the national forests.

One of the goals of the Nez Perce National Forest Plan is to "... provide and maintain a diversity and quality of habitat that *ensures* a harvestable surplus of resident and anadromous fish species." The forest plan specifies that the fish habitat potential be increased to 87% throughout the forest through four measures:

- direct habitat improvement,
- soil and water resource improvement,

- use of fish/water quality objectives for individual drainages; and,
- maintenance of current high habitat levels in areas designated to remain roadless.

The forest plan points out that these improvement measures would benefit sensitive fish species (such as chinook salmon). The Clearwater Forest Plan identifies a similar goal to "... manage the forest's streams to achieve optimum levels of fish production."

The goal of the Nez Perce Tribal Hatchery Program is to produce enough salmon returning to spawn, within 20 years following project initiation, so that some salmon could be harvested. This goal supports the finding that the proposed project is consistent with these forest plans.

5.5.3 Water Appropriation

The U.S. has filed for reserved water rights for the Nez Perce Tribe; however, it is anticipated to be years before these water rights are adjudicated by Idaho state courts. Before any surface waters could be used for the program, these rights need to be granted. The Nez Perce Tribe is presently working with the state of Idaho in an attempt to use the water in advance of the anticipated court degree. In the absence of the Tribe being granted the use of the water, BPA would apply for water rights for Cherrylane, Sweetwater Springs and each satellite facility requiring one. No water rights would be needed for the spring chinook direct release sites and weir sites.

Although there is a moratorium within the Clearwater River Subbasin at the present time, surface water used for hatchery facilities is considered nonconsumptive. Furthermore, the purpose of the moratorium is to conserve surface water for the fish, and since the purpose of the NPTH is to restore salmon runs in the Clearwater River Subbasin, the proposed water rights would likely be exempt from the moratorium. BPA would not proceed with expending the funds necessary to construct the proposed facilities without first obtaining the appropriate water rights to operate these facilities. The water rights would be obtained for both surface water and groundwater.

5.6 Farmland Protection Policy Act

The Farmland Protection Policy Act (7 USC 4201 et seq.) directs federal agencies to identify and quantify adverse impacts of federal programs on farmlands. The Act's purpose is to minimize the number of federal programs that contribute to the unnecessary and irreversible conversion of agricultural land to non-agricultural uses.

The proposed action is in accordance with the Farmland Protection Policy Act, (7 USC 4201 et. seq.). The Sweetwater Springs and North Lapwai Valley sites would not affect any prime, unique, or other important farmland as designated by the Natural Resources Conservation Service (Gariglio, 1995).

The proposed hatchery site at Cherrylane is located on soils designated by the NRCS as prime farmland. The proposed hatchery has special siting requirements that this location satisfies. Site requirements include proximity to the Clearwater River, level terrain, and land availability. Alternative sites do not meet the siting requirements or do not affect farmland of lower relative value than the Cherrylane site. In addition, evaluation of the proposed site according to criteria set forth in the Act show the site to score relatively close to those sites which are to be given minimum consideration for protection.

5.7 Recreation Resources

BPA reviewed the Wild and Scenic River inventory of listed and proposed rivers (16 USC Sec. 127 (b)) qualifying for Wild, Scenic, or Recreational River status to determine the status of proposed sites for the program. The portion of the Selway River adjacent to the Cedar Flats site, and the mouth of Meadow Creek, are designated as a Recreational River in the Wild and Scenic Rivers system. The Selway River drains the Selway-Bitterroot Wilderness of northeastern Idaho. The proposed Cedar Flats facility is in the viewshed for the recreation use which occurs above the Ranger Station, including access to wilderness trailheads. The river is used by float boaters primarily during the spring and summer seasons. Other recreational activities along the river include camping, fishing, swimming, photography, hiking and driving for pleasure.

A National Historic Trail was identified in the National Trail System (16 USC Sec. 1242-1245) on Trail No. 40 (the Nee-Me-Poo Trail) in the area of the Yoosa/Camp Creek site.

5.8 Floodplain/Wetlands Assessment

In accordance with U.S. Department of Energy regulations on Compliance with Floodplain/ Wetlands Environmental Review Requirements (10 CFR 1022.12), an assessment of program impacts on floodplains and wetlands has been prepared. BPA published a notice of floodplain/wetlands involvement for this program in the *Federal Register* on April 29, 1994.

5.8.1 Project Description

The purpose and need for the proposed program are described in Chapter 1. Locations of 100-year floodplains were determined from Flood Insurance Rate Maps published by the Federal Emergency Management Agency, U.S. Department of Housing and Urban Development. For those facility and weir sites not mapped by FEMA, the 100-year flood elevation was estimated and compared to the elevation at the site. Analysts reviewed flood frequencies using existing U.S. Geological Survey stream gauge records at stream locations as close to each site as possible to determine channel characteristics at each site: slope; channel roughness; bottom width, and top width. The data were used to determine the channel's flood capacity using existing topographic maps of the area.

Wetlands that would be affected by the proposed program were identified from National Wetlands Inventory maps prepared by the U.S. Fish and Wildlife Service, and from field inspections. Wetlands are generally considered a unique resource in the United States because of the limited total acreage of unaffected wetland habitat in comparison to total upland habitat. In acknowledgment of the value of wetland resources, jurisdictional wetlands have been placed under federal protection through Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbor Act. Section 404 is jointly administered by the Army Corps of Engineers and the Environmental Protection Agency, and covers all fills placed in "...waters of the United States, including lakes, rivers, streams, marshes, swamps and bogs." Section 404 permits cover stream alterations and diversions, and a wide variety of other land disturbing activities that take place in, or affect, these waters. As of September 1993, Section 404 also covers drainage, excavation and other procedures that affect wetlands. All necessary permits/conditions required for project activities to take place would be obtained or complied with.

Federal policy for determining mitigation for impacts to wetlands, which requires a Section 404 permit, was developed in the Memorandum of Agreement (MOA) between the EPA and the Corps. The MOA expresses the goal of no overall net loss of wetland functions and values and defines the sequence of review for wetland mitigation. The review of projects under the MOA involving activities impacting waters of the United States is predicated on the Council of Environmental Quality (CEQ) regulations as 40 CFR 1508.20 which defines mitigation to include: (1) avoidance of impacts, (2) minimizing impacts, (3) rectifying impacts, (4) reducing impacts over time, and (5) compensation for remaining impacts.

5.8.2 Floodplain/Wetlands Effects

Floodplain impacts are discussed in Chapter 4. Based on preliminary engineering design, three satellite facilities and 11 weirs would be placed within the 100-year floodplain.

Intake and outlet structures for facility water supply/discharge at all facilities would be located within the 100-year floodplain. These would be permanent structures located in the riverbank with adequate protection to prevent streambank erosion or structural damage during high river flows. They would not contribute to any significant rise in flood elevation through the creation of a backwater.

Five of the satellite facilities would have fish acclimation ponds within the 100-year floodplain, including Newsome Creek, Cedar Flats, and Mill Creek. The ponds would generally be low to the ground offering little resistance to floodwaters and thereby would not contribute to any significant rise in the flood elevation. Ponds would be repaired or replaced if damaged by floodwaters.

Mobile trailers for facility personnel would be required at the three satellite facilities listed above. If possible, their placement would be outside the 100-year floodplain.

Eleven weirs would be placed within the stream channel as part of the Proposed Action. Their purpose is for adult broodstock collection or monitoring and evaluation. Weirs would be placed within the active stream channel and would be designed to minimize changes in stream hydraulics and to wash out in the event of a flood. Permanent anchoring points on either streambank would be required at each weir site. These could range from concrete anchors placed flush with the bank surface to steel members driven into the bank. The anchoring points would have adequate protection to prevent bank erosion or structural damage during high river flows. A sill in the streambed would likely be required at some of the weir sites. Specific weir sites requiring a sill would be identified during the design phase. The sill would be placed along the bottom of the stream channel and would have a low vertical profile. It would not create a backwater and would not contribute to any significant rise in flood elevation. No impact on floodplains would be expected.

Placement of structures and improvement of access roads in the floodplain would not significantly increase the risk of flooding or flood damage. Displacement of floodwaters by structures is not expected to alter floodplain storage volume nor cause a local increase in the flood stage. Soil and vegetation disturbance at structure sites would not adversely impact the floodplain. Fill would be placed where necessary to support structures but would not generally create an elevated area that would divert or impede floodwaters.

The Yoosa/Camp Creek site has been identified as a possible jurisdictional wetland. The site is forested with the dominant community type being western red cedar-ladyfern. The soils are dark brown silty loams with decomposed organic material in the top 0-25 cm (0-

10 inches). Three soil test pits were dug during field investigations of the site. The soils display characteristics of seasonal saturation and anaerobic conditions. Hydrology indicates a perched water table.

Development of the Yoosa/Camp Creek satellite facility would result in the removal of approximately 0.5 ha (1.2 acres) of forested wetland. A wetland delineation would be conducted to determine exact boundaries and total area impacted. The cedar trees are old but the stand is not considered old growth. The wetland provides good wildlife habitat and helps stabilize the sediment. The soils hold water and trap sediments in the event of a flood. These values would be lost with the removal of the vegetation. Mitigation would be developed with the Corps and the state to replace the wetlands impacted by the project. A mitigation plan would also be developed to insure impacts to remaining wetlands would be minimized to the fullest extent possible during construction. The plan could include minimizing the number of trees cut and using sediment barriers during earth-disturbing activities.

Development of the Luke's Gulch satellite facility would require access road improvements across a wet area that receives surface water flow from upslope springs. The area affected would be less than 0.2 ha (0.5 acre).

Permits would be required from the Corps for these activities (see Section 5.12, **Discharge Permits under the Clean Water Act**).

5.8.3 Alternatives

Under Executive Orders 11988 and 11990, developments on floodplains and in wetlands are discouraged whenever there is a practical alternative. Because the proposed project requires being next to creeks and rivers, there are no practical alternatives.

The No Action Alternative would not directly impact wetlands or floodplains.

5.8.4 Mitigation

Mitigation for site-specific impacts is discussed in Chapter 4. Mitigation for wetland impacts at the Yoosa/Camp Creek site would be discussed with the Corps and the state and could potentially include replacement, enhancement or creation of wetlands.

5.9 Global Warming

In a worst case scenario, proposed construction would clear about 2-4 ha (5-10 acres) of forest, releasing about 300-600 kilograms (660-1320 lb) of carbon to the atmosphere fairly rapidly through debris burning or decay. This carbon release would be partially mitigated by replanting cleared areas with native vegetation and by using harvested logs for lumber or for utility poles. Clearing would have no impact on global warming.

The amount of vehicle exhaust released during and after construction would have no impact on global warming.

5.10 Pollution Control at Federal Facilities

Several pollution control acts apply to this project:

5.10.1 Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA), as amended, is designed to provide a program for managing and controlling hazardous waste by imposing requirements on generators and transporters of this waste, and on owners and operators of treatment, storage, and disposal (TSD) facilities. Each TSD facility owner or operator is required to have a permit issued by EPA or the state. Construction and maintenance activities in BPA's experience have generated small amounts of hazardous waste. These typically include: solvents, pesticides, paint products, motor and lubricating oils, and cleaners.

The proposed project would not generate large amounts of solid waste. Small amounts of listed hazardous wastes may be generated by the project. These materials would be disposed of according to state law and RCRA.

5.10.2 Toxic Substances Control Act (TSCA)

This Act is intended to protect human health and the environment from toxic chemicals. Chemical usage will be restricted to the central incubation and rearing facilities. All chemicals to be used have been used at other existing fish hatcheries. Their manufacture and use is in accordance with TSCA. This program would comply with the Act.

5.10.3 Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)

This Act registers and regulates pesticides. There will be no insecticides or rodenticides used in the project, however formalin, which is a fungicide, will be used to treat eggs during incubation in accordance with the Act.

5.11 Noise Control Act

Local, state and federal regulations and guidelines protect residents and workers from excessive noise. The Federal Noise Control Act of 1972 (42 USC 4901) requires that federal entities, such as BPA, comply with state and local requirements regarding noise. However, there would be no noise impacts that would exceed state and local requirements, only usual noise such as generators, trucks, people and construction.

5.12 Discharge Permits under the Clean Water Act

The Clean Water Act (CWA) regulates discharges of dredged or fill material into waters of the United States.

BPA would acquire National Pollutant Discharge Elimination System (NPDES) permits from EPA, Region 10, as required, for the point discharge of any pollutant regulated under the CWA (33 USC 1251 et seq.) to the Clearwater River or its tributaries from NPTH facilities. Under Section 401 of the CWA, a federal permit to conduct an activity that results in discharges into navigable waters is issued only after the affected state certifies that existing water quality standards would not be violated if the permit were issued. The EPA and the state of Idaho (ID Code 39118) recognize five different categories of aquaculture facilities for processing cold water fish. The NPTH facilities fall into the bottom range for a Type C facility. However, facilities under 9070 kg (20,000 lb) annual production are currently excluded from NPDES requirements (40 CFR, Part 122). Based on this classification, only the Cherrylane facility with a fall chinook on-site production of 13 605 kg (30,000 lb) would be regulated under the federal/state water quality permitting program. The current Cherrylane proposal would use off-line treatment of cleaning flow. Solids would be collected either by a decant system off the raceway or by microscreens from the fall chinook holding/ acclimation ponds.

Section 402 of the Clean Water Act authorizes storm water discharges associated with industrial activities under the NPDES. The Environmental Protection Agency, Region 10, has a general permit for federal facilities for discharges from construction

activities. BPA would issue a Notice of Intent to obtain coverage under the EPA general permit and would prepare a Storm Water Pollution Prevention Plan (SWPP). The SWPP Plan would help ensure that erosion and control measures would be implemented and maintained during construction. The SWPP Plan would address Best Management Practices for stabilization practices, structure practices, storm water management, and other controls.

Wetland management, regulation, and protection is related to several sections of the CWA, including Sections 401, 402, and 404, as well as a combination of other laws originally written for other uses. These are: The Coastal Zone Management Act, the Endangered Species Act, Historic Preservation Act, Rivers and Harbors Act, and the Wild and Scenic Rivers Act. Section 404 of the CWA (33 CFR 320-330) requires either review by the managing agencies or certification of consistency.

Compliance with these regulations is ensured by General Conditions for Nationwide Permits (***NWP***). Section 404 Conditions must also be complied with. The activities proposed by this project would most likely be authorized by the Corps' NWPs (33 CFR 330) under CWA Section 404, but would require notification and possibly State 401 water quality certification. The following NWP's could apply to the project:

NWP #7 - Outfall Structures

NWP # 13 - Bank Stabilization

NWP # 14 - Road Crossing

NWP # 18 - Minor Discharges

NWP # 33 - Temporary Construction, Access and Dewatering

All conditions for NWP's under Section 404 would be met. See Section 5.8 for the Floodplain/Wetlands Assessment.

5.13 Underground Injection Permits under the Safe Drinking Water Act

The Safe Drinking Water Act (42 USC Sec. 300f et seq.) is designed to protect the quality of public drinking water and its sources. In the state of Idaho, the Department of Health and Welfare, Division of Environmental Quality is responsible for implementing the rules and regulations of the Act. The proposed program would be designed to comply with local ordinances and laws and state water quality programs so as not to degrade the quality of aquifers nor jeopardize their use as a drinking water source.

A public drinking water permit would be required for Cherrylane and other facilities.

5.14 Permits from the State

A Stream Channel Alteration Permit would be required for all instream construction. This includes intake and outlet pipes placed within stream channels. EPA will coordinate with IDFG, the State Department of Water Resources and the Corps to determine what permit (Corps and Water Resources joint permit) forms will be required.

BPA would request 401 water quality certification from the Idaho Division of Environmental Quality for program activities.

Chapter 6 List of Preparers

BAUER, JERRY A., Fish Biologist/Bonneville Power Administration. Responsible for: Technical Review. Education: B.S. Fish and Wildlife. Experience: 44 years of experience in fisheries management, habitat, harvest, research and artificial propagation (hatcheries).

BLAYLOCK, BILL, Environmental Scientist/Montgomery Watson. Responsible for: EIS Technical coordination and review of physical and natural resource descriptions and impact analysis, author of riparian vegetation and air quality sections. Education: B.S. Biological Sciences, M.S. Biological Sciences. Experience: 15 years experience in environmental impact analysis, environmental planning and NEPA documentation.

BROWN, BECKY, Engineer/Montgomery Watson. Responsible for: Floodplain analysis. Education: B.S. Engineering. Experience: 9 years experience in hydraulic modeling.

COLT, JOHN, Engineer/Montgomery Watson. Responsible for: Water, space, and life support requirements for salmonid artificial production and supplementation. Education: B.S. Geophysical Engineering, M.S. Environmental Engineering, Ph.D. Environmental Engineering. Experience: 21 years experience in water quality research, development of water quality criteria, water quality maintenance, and fisheries facility planning.

CONCANNON, KATHLEEN, Writer-Editor/Concannon Creative Services. Responsible for: Writing and editing the EIS and visual resources section. Education: B.S. Geology. Experience: 20 years experience in environmental analysis, resource planning, NEPA process, and technical writing.

CRAMER, STEVE, Fish Biologist/S.P. Cramer & Associates, Inc. Responsible for: Fisheries analysis, genetic risk assessment, ESA impacts, species interactions. Education: B.S. Fisheries Science, M.A. Fisheries Science. Experience: 21 years experience in salmonid fisheries research.

CROCKETT, BECKY, Environmental Scientist/Montgomery Watson. Responsible for: EIS technical coordination. Education: B.S. Environmental Science. Experience: 12 years experience in environmental impact analysis, environmental planning, and NEPA documentation.

CRYER, ED, Engineer/Montgomery Watson. Responsible for: Preliminary engineering for salmonid artificial production and supplementation. Education: B.S. Environmental Biology, M.S. Environmental Biology, M.S. Civil Engineering. Experience: 27 years experience in environmental engineering and planning water resource projects.

HECKMAN, LORA, Environmental Engineer/Montgomery Watson. Responsible for: Technical data compilation for geology and soils, and floodplains analyses. Education: B.S. Environmental Engineering. Experience: 2 years experience in environmental engineering on water projects.

JAMES, CHARLES D. III, Archaeologist/Bureau of Indian Affairs. Responsible for: Cultural Resources. Education: M.A. Anthropology. Experience: 26 years of experience in historic and prehistoric archaeology, history, Cultural Resource Management, historic preservation.

JOHNSON, DAVID, Senior Monitoring and Evaluation Biologist/Nez Perce Tribe. Responsible for: Author of Nez Perce Tribe section and provided technical review, NPTH objectives and requirements. Education: B.S. Biology, M.S. Biology. Experience: 13 years experience in fish biology.

KELLEHER, LESLIE, Biologist/Bonneville Power Administration. Responsible for: Project environmental coordination and completion of environmental impact statement. Education: B.A. Biology, M.A. Secondary Education/Environmental Science. Experience: 5 years experience in general environmental analyses, vegetation, floodplain and wetland analyses, and NEPA process.

LARSON, ROY E., Director of Natural and Hatchery Production/Nez Perce Tribe. Responsible for: Coordinating project for the Nez Perce Tribe, Technical advice and review. Education: B.S. Agriculture, M.S. Veterinary Science. Experience: 16 years experience in fisheries development and restoration, administration aquaculture and hatchery operations, and fish health management.

LEVY, STEVE, Fish and Wildlife Project Manager/Bonneville Power Administration. Responsible for: Coordination of NPTH project. Education: M.S. Environmental Studies. Experience: 20 years experience in natural resource management.

LYNARD, GENE, Environmental Specialist/Bonneville Power Administration. Responsible for: Land use, socioeconomics and recreation. Education: B.A. Geography, M. of City and Regional Planning. Experience: 18 years experience in land use development economics, and facility and environmental planning.

LYONS, JASON, Cultural Resources Archaeologist/Nez Perce Tribe. Responsible for: All aspects of Cultural Resources Management. Education: B.S. Anthropology. Experience: 4 years in all phases of archaeological excavation, survey and management.

MORROW, BOB, Environmental Scientist/Montgomery Watson. Responsible for: Contributing author for water resources, geology and soils, and floodplains analyses. Education: B.S. Biological Sciences. Experience: 13 years experience in environmental impact analysis, aquatic ecology, and NEPA documentation.

STEWARD, CLEVELAND, Fisheries Biologist/Steward Consulting. Responsible for: Fisheries analysis. Education: B.S. Wildlife, Aquatic Option, M.S. Fisheries. Experience: 17 years experience in aquatic resources, with emphasis on water management, watershed impacts, fisheries research and management.

TEDRICK, DOUG, Fish Biologist/Bureau of Indian Affairs. Responsible for: Technical review. Education: B.S. Biological Sciences. Experience: 10 years experience in natural resource management.

THIEMANN, ROB, Engineer/Montgomery Watson. Responsible for: Water quantity analysis for facility sites. Education: B.S. Mechanical Engineering. Experience: 4 years experience in the planning and design of fish production facilities.

WALKER, GRANT, Nez Perce Tribal Hatchery Manager/Nez Perce Tribe. Responsible for: Hatchery management, technical data, advice and review. Education: B.A. Biology. Experience: 13 years hatchery management, 5 years fisheries development and restoration.

Chapter 7 List of Agencies, Organizations, and Persons to Whom Copies of the EIS are Sent

The mailing list contains affected landowners, Tribes, local, state, and federal agencies, utility customers, public officials, interest groups, resource developers, members of the public and the media. They have directly received or have been given instructions on how to receive all project information made available so far and will have an opportunity to review the Draft and Final EIS.

7.1 Federal/Regional Agencies

US Army Corps of Engineers

USDA Forest Service

- Clearwater National Forest
- Nez Perce National Forest

USDA Natural Resources Conservation Service

USDOC National Marine Fisheries Service

USDOE Federal Energy Regulatory Commission

USDOI Bureau of Indian Affairs

USDOI Bureau of Land Management

USDOI Bureau of Reclamation

USDOI Fish and Wildlife Service

USDOI National Biological Service

Northwest Power Planning Council

Columbia River Inter-Tribal Fish Commission (CRITFC)

7.2 Foreign Agencies

Ministry of Environment, Canada

7.3 States

State of Alaska

- Department of Fish and Game

State of California

Department of Fish and Game

State of Idaho

Division of Environment

Division of Environmental Quality

Division of Natural Resources

Department of Fish and Game

Department of Health and Welfare

Department of Lands

Department of Water Resources

Office of Attorney General

State of Montana

Department of Fish, Wildlife, and Parks

State of Oregon

Department of Fish and Wildlife

State of Washington

Department of Fisheries

Department of Game

Department of Wildlife

Wildlife Commission

7.4 Local Governments

County of Ada

County of Boise

County of Clearwater

County of Idaho

County of Latah

County of Lewis

County of Nez Perce

County of Pend Oreille, WA

County of Spokane, WA

County of Whitman, WA

7.5 Tribes

Nez Perce Tribe

Shoshone-Bannock Tribes

Kalispel Indian Commission

Nisqually Indian Tribe

Confederated Salish and Kootenai Tribes

Confederated Tribes and Bands of Yakama Indian Nation

Confederated Tribes of the Shoshone Paiute

Confederated Tribes of Umatilla Reservation

Confederated Tribes of Warm Springs Council

7.6 Libraries

Montana State Library, Helena, MT

Tacoma Public Library, Tacoma, WA

State of Idaho Library, Boise, ID

State of Idaho Supreme Court Law Library, Boise, ID

City of Boise Public Library

City of Spokane Public Library

Columbia River Inter-Tribal Fish Commission Library

Southwestern Idaho Regional Library System

7.7 Utilities

Chelan County PUD, WA

Douglas County PUD, WA

Inland Power and Light, WA

Seattle City Light, WA

Skagit System Coop, WA

Tacoma Public Utility, WA

Washington Water Power Company, WA

West Kootenai Power and Light Company, WA

Idaho Power Company, ID

Salmon River Electric, ID

Mid Columbia PUD, OR

Montana Power Company, MT

7.8 Public Officials from Idaho

Governor Phil Batt

Senator Larry Craig

Senator Dirk Kempthorne

Representative Helen Chenowith

Representative Michael Crapo

7.9 Interest Groups/Businesses

American Fisheries Society

Aquafood Business

Aquatic Research Institute

Aqua Sierra

Aquatic Ecosystems

Battelle Pacific Northwest Laboratory

Citizens Utility Board of Oregon

Columbia Basin Fish & Wildlife Authority

Committee for Idaho's High Desert

Common Sensing, Inc.

Eagle Creek National Fish Hatchery

Environmental Defense Fund

Fish Protection, Inc.

Fisheries Experiment Station

Forestry Sciences Laboratory

Hells Canyon Guide Service

Ichthyological Association, Inc.

Idaho Conservation League

Idaho Mining Association

Idaho Sportsmen Coalition

Idaho Steelhead & Salmon Unlimited

Idaho Wildlife Federation
International Game Fish Association
Kaiser Aluminum and Chemical Corporation
Lafferty Transportation Company
LaSalle Construction
Mattole Salmon Group
North Coast Environmental Center
Northwest Business for Fish
Northwest Conservation Act Coalition
Northwest Economic Association
Northwest Fly Fishers
Northwest Indian Fisheries Commission
Northwest Timber Workers Association
Oak Ridge National Laboratory
Oregon Salmon Commission
Oregon Trout
Potlatch Corporation
Public Power Council
Ranger, Inc.
Resource Organization on Timber Supply
Richland Rod & Gun Club
Sierra Club
Sultan Sportsman Club
Sverdrup Corporation
Trout Unlimited
Warm Springs Fish Hatchery
Wildstone Resources
Yakima River Alliance

7.10 Media

KOZE Radio

KQVE Radio

7.11 Others

Universities, consultants and private individuals are also on the list.

Chapter 8 References

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Chapter 9 Glossary and Acronyms

This chapter contains a list of acronyms, abbreviations, and technical terms used in this EIS. Words that would be defined in a desk-size dictionary (for example, the College Edition of the American Heritage Dictionary) are not included.

Acronyms

BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BPA	Bonneville Power Administration
CBFWA	Columbia Basin Fish and Wildlife Authority
CEQ	Council of Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
cm	centimeter
Corps	U.S. Army Corps of Engineers
Council	Northwest Power Planning Council
CRFMP	Columbia River Fish Management Plan
CWA	Clean Water Act
dBA	decibels (A-weighted)
DEIS	Draft Environmental Impact Statement
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionary Significant Unit
FEMA	Federal Emergency Management Agency
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
ft	feet
gpm	gallons per minute
ha	hectares
IAT	Impact Assessment Team
IDFG	State of Idaho, Department of Fish and Game
IHOT	Integrated Hatchery Operations Team

IHS	Indian Health Service
ISS	Idaho Supplementation Studies
m	meter
mm	millimeter
m^3/min	cubic meters per minute
LSRCP	Lower Snake River Compensation Plan
M & E Plan	Monitoring and Evaluation Plan
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
NPT	Nez Perce Tribe
NPTEC	Nez Perce Tribal Executive Committee
NPTH	Nez Perce Tribal Hatchery
NPTH GRA	Nez Perce Tribal Hatchery Genetic Risk Assessment
NRCS	U.S. Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWP	Nationwide Permits
RCRA	Resource Conservation and Recovery Act
RHCA	Riparian Habitat Conservation Area
RMO	Riparian Management Objective
SDM	Smolt Density Model
Selway GRA	Selway Genetic Resource Assessment
SHPO	State Historic Preservation Office
SWPP	Storm Water Pollution Prevention Plan
TSCA	Toxic Substances Control Act
USBR	U.S. Bureau of Reclamation
USDOE	U.S. Department of Energy

USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VQO	Visual Quality Objectives

Technical Terms

acclimation Allowing fish to adjust to environmental variables. Older hatchery practices resulted in high mortalities because the young fish were released directly from the hatchery, without a chance for them to adjust to the natural stream environment. Acclimation is a process which is used to allow the fish to gradually adjust to a more natural environment and imprint on the area in which the acclimation site is located, rather than on the hatchery, so that the fish will return to the area to spawn.

acclimation site Sites at which young fish are held in artificial ponds to allow them to imprint so that they return to that place to spawn.

adaptation Genetic change over generations through natural selection that results in a population better suited to its environment.

adaptive management Responding to new information with program changes.

adfluvial A fish that spawns in a river and rears in lakes.

aggregate Multiple fish stocks within a species or race.

anadromous fish Fish that migrate from fresh to saltwater when young, spend the majority of their adult life in the ocean, and then return to their ancestral drainage to spawn.

backwater The water level controlled or determined by a downstream obstruction.

bankfull flow Considered to represent the dominant discharge associated with channel-forming events.

biological opinion Document stating the opinion of the U.S. Fish and Wildlife Service or the National Marine Fisheries Service on whether a federal action is likely to jeopardize the continued existence of listed species, or result in the destruction or adverse modification of critical habitat.

biomass Total weight of organisms per unit volume.

bottomland Nearly level land on the bottom of a valley that has a stream running through it. Subject to flooding and often referred to as a floodplain.

breaklands A landform of the region that is relatively steeply sloping, typically has basalt outcrops, and represents a transitional zone between the valley bottoms and upland basins.

broodstock Fish that will be spawned to create hatchery stock.

carbon monoxide An odorless and colorless gas formed from one atom of carbon and one atom of oxygen.

carrying capacity The maximum number or biomass of fish that could potentially be supported by a given habitat, as determined by prevailing physical, chemical, and biological conditions.

chinook (*Oncorhynchus tshawytscha*). Also called king, tule, or brights.

coho (*Oncorhynchus kisutch*). Also called silver salmon.

Columbia River Basin The drainage of the Columbia River which includes parts of Canada, the Pacific Northwest, and parts of Montana, Wyoming, and Nevada.

critical habitat Minimum amount of habitat necessary for survival and enough area for the species to expand and recover to healthy population levels.

cumulative impact Cumulative impacts are created by the incremental effect of an action when added to other past, present, and reasonably foreseeable future actions.

domestication selection Natural selection for traits which affect survival and reproduction in a human-controlled environment.

donor stock Specific stock from which broodstock are chosen.

egg-eyeing station Place where eggs are incubated.

egg take The number of eggs needed to produce the next generation of adults.

escapement Fish that are allowed to spawn naturally.

evolutionary significant unit A population or group of populations that is considered distinct (and hence a "species") for purposes of conservation under the ESA. To qualify as an ESU, a population must: (1) be reproductively isolated from other conspecific populations; and (2) represent an important component in the evolutionary legacy of the biological species.

eyed-eggs Life stage of a fertilized egg between the time the eyes become visible and hatching occurs.

facility Fish culture facility used for incubation and rearing of salmon and steelhead.

fault zones An area where two moving geologic formations come in contact with one another.

fingerling Juvenile salmonid; usually refers to presmolt fish.

floodplain Nearly level lands, consisting of stream sediments, that borders a stream and is subject to flooding unless protected artificially.

fry Juvenile salmonid life stage following absorption of yolk sac.

gamete A sex cell (i.e., sperm or egg cell).

gloryhole A term used for an hydraulic placer mine.

gneiss A banded metamorphic rock with the same composition as granite.

harvest augmentation Producing fish principally for harvest.

Heath tray A particular type of container for holding fertilized eggs in a fish hatchery during the period of incubation.

homing Navigational behavior that guides species during migrations.

igneous rock Rock that has been formed by the cooling of molten mineral material. (Examples: granite and basalt).

imprinting The physiological and behavioral process by which migrating fish assimilate environmental cues to aid their return to their stream of origin as adults.

infiltration gallery A water collection structure located in the gravels beneath the riverbed which allows collection of silt-free water.

introgression Incorporation of genes of one species into the gene pool of another via an interspecific hybrid.

jeopardy To jeopardize the continued existence of or to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species.

jump start Starting or setting in motion a stalled system or process.

jurisdictional wetlands Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

landslide Any mass-movement process characterized by downslide transport of soil and rock, under gravitational stress, by sliding over a discrete failure surface; or the resultant landform. Can also include other forms of mass wasting not involving sliding (rockfall, etc.).

loam Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

loess Fined grained material, dominated by silt-sized particles and deposited by wind. The particles originated from the ground-up rock and debris from glaciers, trapped and carried in ice, and deposited during ice melt.

long-term genetic fitness A measure of the ability of a population to survive natural selection over a number of generations.

mainstem The main section of a river.

mass failure An event occurring on steep slopes with physical characteristics that allow failure of stable landforms. Soil properties may include low permeability, high water content, and high slope resulting in large scale failure and movement of surface material.

mass wasting The slow downward slope of rock debris.

mitigate To take steps to lessen the effects predicted for each resource, as potentially caused by the proposed action or alternatives. Steps may include reducing the impact, avoiding it completely, or compensating for the impact.

modification and **maximum modification** The VQOs that apply to less visually-sensitive areas where changes can dominate the natural landscape but should look natural from a long distance.

nonrenewable A commodity or resource that is exhaustible or not replaceable.

natal Of or relating to the place of one's birth.

naturally reproducing Adult fish spawning in a stream or river regardless of how parents were spawned, specifically if spawned at a hatchery.

nitrogen oxides A group of compounds consisting of various combinations of nitrogen and oxygen atoms.

nominal Current value; not adjusted for inflation as in real dollars.

omnivorous Eating both plant and animal substances.

100-year floodplain That portion of a river valley adjacent to the stream channel which is covered with water when the stream overflows its banks during a 100-year flood event. A 100-year flood event is one that has a 1 in 100 chance of happening in any given year.

outplant Outplanting is the process by which artificially propagated fish are released into a natural system.

ozonation The process of using ozone gas as an oxidizing agent to kill disease-causing organisms in a water supply.

Palouse steppe A landform of the region consisting of the upland rolling hills and river drainages that lie at an elevation above the valley bottom and breaklands.

parr Juvenile salmonids develop bar-shaped marks on their sides called parr marks between becoming fry and smolting.

partial retention The VQO that applies to areas where activities may be evident but must remain subordinate to the natural landscape. These visually sensitive areas are along major state and federal highways, wild and scenic river corridors, and other high public use areas.

pathogen A disease-causing agent.

permeability The quality of a soil horizon that enables water or air to move through it. Terms used to describe permeability include; very slow, slow, moderately slow, moderate, moderately rapid, rapid, very rapid.

pH The symbol for the chemical measurement of the acidity or alkalinity of a solution.

PIT tag Short for passive integrated transponder, it is used to identify individual fish for monitoring and research. This miniature tag has an integrated microchip that contains information about the specific fish in which it is placed, and transmits that information from within the live fish.

piscivorous Fish eating.

placer A place where a deposit is washed to remove its mineral content.

population A group of individuals of a species living in a certain area.

population viability The overall condition and long-term probability of survival of the fish population.

predation The harm, destruction, or consumption of a prey organism by an animal predator.

preservation The VQO that applies to wilderness and other special areas where the natural landscape should be unaltered by forest management activities.

presmolts Juvenile spring chinook salmon that are 100-150 mm (4-6 inches) long in the fall. They smolt and migrate to the ocean the following spring.

production Number of individuals produced from a natural environment or fish culture facilities.

province An area of land less extensive than a region and having a characteristic plant and animal population.

race A group of individuals within a species, forming a permanent variety; a particular breed.

raceway Holding area or rearing facility for juvenile or adult salmonids in a hatchery.

ravel Downslide movement of noncohesive soil or rock particles under the influence of gravity. A form of soil creep.

recreational river A Wild and Scenic Rivers Act of 1968 designation that has specific criteria for the level of development.

redd A salmon nest.

reproduction The process of forming new individuals of a species by sexual or asexual methods.

retention The VQO that applies to areas where activities should not be evident to the casual forest visitor.

riparian habitat The zone of vegetation which extends from the water's edge landward to the edge of the vegetative canopy. Associated with watercourses such as streams, rivers, springs, ponds, lakes, or tidewater.

salmonid Belonging to the family salmonidae, i.e., salmon, trout, steelhead, whitefish.

satellite facility Fish culture facility used for rearing and acclimation of juvenile salmon or holding of adult broodstock.

schist A metamorphic rock consisting of laminated, often flaky parallel layers.

seine A large net used to catch fish.

seismicity Earthquake activity.

sensitive species Those plants and animals identified by the Regional Forester for which population viability is a concern as evidenced by significant current or predicted downward trend in populations or density and significant or predicted downward trend in habitat capability.

silt Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 mm) to the lower limit of very fine sand (0.05 mm).

silty-loams A mixture of silt and loam particles consisting of clay and sand mineral particles that range in diameter from less than 0.002 mm to 0.05 mm.

slump Deep, rotational landslide, generally producing coherent movement (back rotation) of blocks over a concave failure surface. Typically, slumps are triggered by the buildup of

pore water pressure in mechanically weak materials (deep soil or clay-rock rock).

smolt Juvenile salmon undergoing metamorphosis into a saltwater fish, usually during the downstream migration period.

species A group of interbreeding individuals not interbreeding with another such group; similar, and related species are grouped into a genus.

species of special concern Native species that are either low in number, limited in distribution, or have suffered significant population reductions due to habitat losses. The list includes three catagories of species:

a. Species which meet one or more of the criteria above and for which Idaho presently contains, or formerly constituted, a significant portion of their range (i.e. priority species);

b. Species which meet one or more of the criteria above, but whose populations in Idaho are on the edge of a range that falls largely outside the state (i.e. peripheral species);

c. Species that may be rare in the state but for which there is little information on their populations status, distribution, and/or habitat requirements (i.e., undetermined status species).

steelhead The sea going rainbow trout, reclassified as a Pacific Salmon in 1989.

stock A distinct management or genetic unit of fish.

subbasin Subdivision of a larger drainage basin. The drainage or catchment area of a stream which along with other subbasins make up the drainage basin of a larger stream.

substrate The material comprising the bed of a stream.

subyearling smolts Juvenile salmonids that physiologically mature and migrate to the ocean when less than one year old; e.g., certain stocks of fall and summer chinook.

sulfur oxides Various combinations of sulfur and oxygen; one of the most common being sulfur dioxide, which is a gas at normal temperatures and pressures in the atmosphere. Sulfur oxides combine with particulates and moisture to produce acid rain.

supplementation The use of artificial propagation in the attempt to maintain or increase natural production while maintaining the long-term fitness of the target population, and while keeping the ecological and genetic impacts on non-target populations within specified biological limits.

sympatric Coextensive distribution among animal and plant species.

terminal areas Harvest in the spawning streams to which adults return as opposed to harvest in the mainstem river.

terrace An old alluvial plain, ordinarily flat or undulating, bordering a river, lake or the sea. Stream terraces are frequently called second bottoms, as contrasted to floodplains, and are seldom subject to overflow.

thermal regime Temperature regime.

tribal land Land that is collectively owned by the Nez Perce Tribal Government.

volatile organic compounds (VOC) Compounds containing carbon that evaporates readily at normal room temperature and pressure. VOCs react with sunlight to form ozone.

water hardened Water hardening is the process of placing fertilized eggs in water so that the egg absorbs the water that accumulates in the space between the egg yolk and outer membrane.

weir A fence or a barrier placed in a stream to catch, retain or count fish.

wild fish A fish that has not spent any part of its life history in an artificial environment.

wild and scenic river A river within the national wild and scenic river system that offers outstanding scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values designated by Congress under the Wild and Scenic Rivers Act of 1968 for preservation of their free-flowing condition.

within population variability The quantity and variety of alleles, chromosomes, and arrangement of genes on the chromosomes that are present in populations.

zone 6 The Treaty Indian Set-Net fishery from Bonneville Dam to McNary Dam, 140 miles of river open to commercial fishing. Zones 1-5 are the drift gill-net fishery from Astoria to Bonneville Dam, 140 miles open to commercial fishing.

Appendix A

Guidelines for Hatchery:Natural Ratios

Selway River Genetic Resource Assessment, April 1995

Pages 69-74

GUIDELINES FOR HATCHERY: NATURAL RATIOS

The original NPTH Master Plan called for the ratio of hatchery to natural fish, both in the hatchery and in the wild, to not exceed 50:50. This guideline was intended to counterbalance the genetic risks of (1) losing genetic identity (adaptive fitness) through outbreeding in the natural population, (2) losing genetic diversity through inbreeding in the natural population, and (3) losing genetic diversity and identity in the hatchery population through domestication. The 50:50 guideline provides a conservative means for containing these risks; however, the guideline also limits the use of supplementation as a tool to combat the risk of extinction. Application of the 50:50 rule limits the growth in numbers of hatchery fish in both the hatchery and the natural environment.

The effect of the 50:50 rule on the rate of increase of hatchery and natural populations is determined by production capacity and survival in the hatchery and natural environments. If the production capacity of the natural habitat, in terms of returning adults, is equal to or less than the adult production capacity of the hatchery, strict adherence to the 50:50 guideline will prevent supplementation from assisting population growth. This is because the limiting factor will always be the availability of naturally produced fish, and any natural fish taken into the hatchery can only be replaced 1-for-1 with hatchery fish in the wild. However, if the natural production capacity exceeds that of the hatchery, then hatchery fish in excess of half the hatchery capacity can be allowed to spawn naturally at a greater than 1-for-1 replacement of naturally produced fish taken into the hatchery Regardless of the relative production capacities of the hatchery and natural environments, the survival rate of naturally produced fish, expressed as recruits per spawner, will determine how quickly the supplemented population grows.

Spawner escapement of chinook salmon in the Snake River Basin decreased sharply between 1970 and 1980, and has remained at a depressed level Thus, not only

is natural production low, but the number of recruited spawners per parent spawner has generally been one or less. Under these conditions, strict application of the 50:50 guideline to chinook supplementation in the Snake River Basin would render supplementation useless. This also means that, under the 50:50 guideline, supplementation could not be used to reduce the risk of extinction, even though supplementation may be the best tool to avert extinction. This paradox made it apparent that the 50:50 guideline, while valuable for healthy populations, was not appropriate for protecting genetic resources in a depressed population threatened with extirpation. Therefore, we developed an additional set of guidelines designed to allow for population growth while containing genetic risks, in situations where the population is depressed and natural recruitment rate is near or below the replacement level.

The effective number of breeders is less than 100 and probably less than 25 for most populations to be supplemented by NPTH. This small number of breeders will result in the eventual loss of genetic variability through inbreeding. Thus, supplementation with an adapted genetically robust stock will offer the benefit of increasing the effective population size and avoiding loss or deleterious combinations of rare alleles. Because natural spawning escapements are presently very low in the target populations, an escapement guideline is needed in the near term that will enable expansion of supplementation to the full production level as quickly as possible. I recommend a set of guidelines that is tiered to the number of returning natural spawners, such that, at lower levels of return, proportionately greater numbers of hatchery fish are allowed to spawn naturally, so as to minimize the risk of extinction.

The challenge in supplementing a depressed population is how to allocate enough naturalized fish to natural and hatchery populations to simultaneously enable recovery and avoid unwanted genetic impacts. Therefore, the guidelines we developed specify the minimum proportion of natural (N) fish, both in the hatchery and in the wild. We

recommend four tiers of guidelines, corresponding to four levels of abundance of natural spawners (Table 8). Inherent in these guidelines are the assumptions that the hatchery environment is likely to favor domestic traits among hatchery fish, but that natural selection will work to eliminate domestic traits when hatchery fish spawn naturally. Accordingly, a higher percentage of naturally produced spawners are needed among spawnings in the hatchery than in the wild.

Table 8. Summary of guidelines for natural:hatchery (N:H) ratios in the hatchery and in the wild. Guidelines change as the abundance of natural returns changes to compensate for increasing risk of extinction at low population sizes. These guidelines apply when the founding stock for the hatchery is not the indigenous stock.

Natural Returns	Brood for Hatchery	Fertilization Procedure	Spawners for Wild
>brood fish goal for hatchery	at least 50%N	random, NxH	at least 33%N
<brood fish goal for hatchery, but >25 pairs	at least 33%N	random, NxH to extent possible	at least 25%N, 12N pair minimum
Between 12 to 24 pairs	keep all N males, male ratio = 1N:3H females equivalent to H+N males	Split-cross N males each to 2 H females	release all N females, female ratio = 1N 3H H males equivalent to H+N females
<12 pairs	Keep all fish + capacity H fish Spawn and rear N and H separately Smolt release for N+ captive brood	Matrix for N Random for H	100%H up to spawning habitat capacity

At the first and most desirable level, the number of natural fish returning would exceed the total number of fish needed to achieve the egg-take goal for the hatchery. In this situation, there would be adequate returns to use natural fish for 50% of hatchery broodstock, and to allow enough escapement of naturally produced fish to maintain 33% natural returns among fish spawning naturally. In the hatchery, natural fish would be crossed with hatchery fish, in order to limit domestication selection Consideration should

be given to increasing the 33% guideline for naturally produced fish among spawners in the wild up to 50% after the first two generations, contingent on findings from the Monitoring and Evaluation Program.

The second level would include natural returns between 25 pairs and an equivalent of the brood fish goal for the hatchery. In this situation, there would not be sufficient natural spawners to use 50% natural spawners for full hatchery production, without taking more than 33% of the natural run into the hatchery. In this case, the required proportion of natural spawners used for hatchery broodstock would decrease to a minimum of 33%, and 25% would be required in the escapement to the wild. The stipulation that natural fish compose at least 33% of spawners is subjective (as is the 50% guideline) and reflects a strategy to protect against extinction by relaxing the controls on domestication selection. Progeny of naturally spawning hatchery fish (which carry half their genes from naturalized parents) would be exposed to the full gamut of natural selection in a single life cycle. Because of this steep natural selection gradient, the risk of passing on domesticated traits is less in the wild than it is in the hatchery.

Additionally at level two, the minimum number of natural fish left to spawn in the wild would be 12 pairs. This 12 pair rule is set to minimize the rate of loss of rare alleles to inbreeding. Simulations completed by Waples (1990) indicate that less than 10% of the rare alleles in a population would be lost over a 25 year period with only 24 breeders per generation (12 pairs)(see Figure 19). Thus, the number of breeders could be constrained to 25 fish for several generations before substantial losses of genetic variability would occur. We believe this is a wise risk to accept, given the benefits that can be realized by using naturalized fish as donor stock for the hatchery program. If the hatchery program functions as expected, the number of naturalized spawners should be back to and exceed the number required for hatchery broodstock within one or two generations. It should be noted that the use of 12 pairs per year, given an average generation time of 4 years, is

equivalent to 48 pairs per generation. We expect that the number of effective breeders per generation would be less than 48, because of prespawning mortality and unequal contribution between spawners.

The third tier of guidelines applies when natural returns are between 12 and 24 pairs. In this case, even the 12 pair rule for natural spawners in the wild limits the number of natural returns available for hatchery broodstock. To overcome this shortage, we recommend that all natural males be spawned in the hatchery, while all natural females be released to spawn naturally. The ratio of N:H would be relaxed to 1N:3H in both the hatchery and the wild. Each natural male would be spawned with two hatchery females. The procedure would be to fertilize eggs using the sperm from a natural male, followed by a second exposure to the sperm of a hatchery male. This would result in two females being fertilized by each natural male. The follow-up use of sperm from a hatchery male would protect against the occurrence of a nonfertile natural male. I recognize that mitochondrial DNA is maternally inherited and so would not be passed to hatchery fish by natural males. However, I view this as a small risk to the population viability.

The final tier is triggered when less than 12 natural pairs return to the racks. In this case, the risk of extinction is high, and all natural spawners should be taken into the hatchery. In order to preserve genetic identity and variability of the natural population; natural fish would be spawned with each other in a split-cross matrix design, and the progeny would be reared to the smolt stage for release (this would maximize survival to maturity in the wild). Additionally, a random sample of the progeny should be retained in captivity and reared to maturity to assure that the population would continue. Hatchery fish would be used to complete the egg take goal for the hatchery; their progeny would be cultured as usual. Because no natural fish would be released to spawn naturally, hatchery fish would be allowed to fill the spawning capacity of the stream. Given that survival of naturally produced fish has been so low as to push them to the verge of extinction, it is

unlikely that allowing hatchery fish to fill the spawning habitat to capacity will produce returns in the next cycle that are greater than those achieved by the natural fish reared and released as smolts from the hatchery. If this final tier were applied, the procedures for setting H:N ratios upon their return would differ from those outlined here, because the returning hatchery fish would be the only source of spawners with natural parents. Such a situation should be worked out by a panel of experts, once the specific details of the situation are known.

MONITORING AND EVALUATION

The Master Plan includes a Monitoring and Evaluation Plan that encompasses most of the uncertainties associated with genetic risks. Therefore, this section lists only those activities that require more specific definition than provided in the Master Plan. See the Master Plan for a description of experimental approach and specific objectives.

The Monitoring and Evaluation Plan must be designed to resolve uncertainties, so I begin this section by listing the uncertainties associated with genetic risk.

UNCERTAINTIES

Spring Chinook

1 Is the spawning time, and therefore the spawning distribution, of spring chinook that have naturalized in the basin genetically limited by the narrow window of spawning times from which the founding brood were taken?

2 Is spawning time of the donor stock properly timed to avoid mortality to eggs as a

Appendix B

U.S. Fish and Wildlife Service
Species List

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Idaho State Office, Ecological Services
4696 Overland Road, Room 576
Boise, Idaho 83705

March 8, 1995

Leslie Kelleher
Department of Energy
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Subject: Request For Species List-Funding Nez Perce Tribal Hatchery Salmon Supplementation Project Within Clearwater Subbasin
(File #501.1100 and 913.0212)
(Species List #1-4-95-SP-122)

Dear Ms. Kelleher:

The U.S. Fish and Wildlife Service (Service) is providing you with a list of endangered, threatened, candidate, and/or proposed species which may be present in the Clearwater Subbasin Salmon Supplement Project area. You requested this species list in a letter dated February 3, 1995, received by this office on February 8, 1995. This list fulfills requirements under Section 7(c) of the Endangered Species Act of 1973 (Act), as amended. The requirements for Federal agency compliance under the Act are outlined in Enclosure 2. If the project is not started within 180 days of this letter, regulations require that you request an updated list. Please refer to the number shown on the list (Enclosure 1) in all correspondence and reports.

Section 7 of the Act requires Federal agencies to assure that their actions are not likely to jeopardize the continued existence of endangered or threatened species. If a listed species appears on Enclosure 1, agencies are required to prepare a Biological Assessment. It would be prudent for you to consult informally with the Service in development of any Biological Assessment. If you determine that a listed species is likely to be affected adversely by the proposed project, the Act requires that you request formal Section 7 consultation through this office. If a proposed species is likely to be jeopardized by a Federal action, regulations require a conference between the Federal agency and the Service.

Candidate species that appear on Enclosure 1 have no protection under the Act, but are included for your early planning

consideration. Candidate species could be proposed or listed during the project planning period, and would then be covered under Section 7 of the Act. The Service advises an evaluation of potential effects on proposed and/or candidate species that may occur in the project area. It may be necessary for you to conduct surveys of the project area to determine the presence or absence and status of candidate species. If it is likely the project will adversely affect a candidate species, we recommend you consult informally with this office.

If you have any questions regarding Federal consultation responsibilities under the Act, please contact Bob Kibler of this office at 208/334-1931. For your information on future Idaho projects, our office in Boise is your contact for any activities on watersheds which drain to the Snake River system. Thank you for your continued interest in the Endangered Species Act.

Sincerely,

Susan B. Martin

for Charles H. Lobdell
State Supervisor - Ecological Services

Enclosures

cc: IDFG, Region II, Lewiston

ENCLOSURE 1

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES, AND CANDIDATE SPECIES, THAT MAY OCCUR WITHIN THE NEZ PERCE TRIBAL HATCHERY SALMON SUPPLEMENTAL PROJECT AREA
FWS-1-4-95-SP-122

LISTED SPECIES	COMMENTS
Bald Eagle (LE) (Haliaeetus leucocephalus)	Wintering Areas
Sockeye Salmon (LE) (Oncorhynchus nerka)	
Chinook Salmon (LE) (Oncorhynchus tshawytscha)	
Gray Wolf (LE) (Canis lupus)	Many Probable Sightings Experimental/ Nonessential Population
PROPOSED SPECIES	
None	None
CANDIDATE SPECIES	
Bull Trout (C1) (Salvelinus confluentus)	
Jessica's Aster (C1) (Aster jessicae)	
Broad-Fruit Mariposa (C1) (Calochortus nitidus)	
Northern Goshawk (C2) (Accipiter gentilis)	Nesting Territories
Long-Legged Myotis (C2) (Myotis volans)	Confirmed Sightings

Wolverine (C2) (Gulo gulo luscus)	Probable and Confirmed Sightings
Lynx (C2) (Lynx lynx)	Probable and Confirmed Sightings Confirmed Trapped Specimen
Mission Creek Oregonian (C2) (Cryptomastix magnidentata)	
Columbia Pebblesnail (C2) (Fluminicola columbiana)	
Payson's Milkvetch (C2) (Astragalus paysonii)	
Clustered Lady's-Slipper (C2) (Cypripedium fasciculatum)	
Idaho Douglasia (C2) (Douglasia idahoensis)	
Palouse Goldenweed (C2) (Haplopappus liatriformis)	
Hazel's Prickly Phlox (C2) (Leptodactylon pungens ssp. hazeliae)	
Spalding's Silene (C2) (Silene spaldingii)	

Candidate species and historic eyries for peregrine falcons that appear on Attachment A have no protection under the Endangered Species Act, but are included for early planning consideration.

C1 = Category 1 Taxa for which the U.S. Fish and Wildlife Service currently has substantial information on hand to support the biological appropriateness of proposing to list as endangered or threatened. Proposed rules have not been issued, but development and publication of such rules are anticipated.

C2 = Category 2 Taxa for which information now in possession of the U.S. Fish and Wildlife Service indicates that proposing to list as endangered or threatened is possibly appropriate, but for which conclusive data on biological vulnerability and threat are not currently available to support proposed rules. Further biological research and field study may be needed to ascertain the status of taxa in this category.

ENCLOSURE 2

FEDERAL AGENCIES' RESPONSIBILITY UNDER SECTIONS 7(a) AND (c) OF THE ENDANGERED SPECIES ACT

SECTION 7(a) - Consultation/Conference

Requires: 1) Federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species;

2) Consultation with FWS when a Federal action may affect a listed endangered or threatened species to insure that any action authorized, funded or carried out by a Federal agency is not likely to jeopardize the continued existence of listed species; or result in destruction or adverse modification of critical habitat. The process is initiated by the Federal agency after determining the action may affect a listed species; and

3) Conference with FWS when a Federal action is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical habitat.

SECTION 7(c) - Biological Assessment for Major Construction Activities [1/]

Requires Federal agencies or their designees to prepare Biological Assessment (BA) for major construction activities. The BA analyzes the effects of the action[2/] on listed and proposed species. The process begins with a Federal agency in requesting from FWS a list of proposed and listed threatened and endangered species (list attached). If the BA is not initiated within 90 days of receipt of the species list, the accuracy of the species list should be informally verified with our Service. The BA should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable). No irreversible commitment of resources is to be made during the BA process which would foreclose reasonable and prudent alternatives to protect endangered species. Planning, design, and administrative actions may be taken; however, no construction may begin.

We recommend the following for inclusion in the BA; an onsite inspection of the area to be affected by the proposal which may include a detailed survey of the area to determine if the species are present; a review of literature and scientific data to determine species' distribution, habitat needs, and other biological requirements; interviews with experts, including those within FWS, State conservation departments, universities and others who may have data not yet published in scientific literature; an analysis of the effects of the proposal on the species in terms of individuals and populations, including consideration of cumulative effects of the proposal on the species and its habitat; an analysis of alternative actions considered. The BA should document the results, including a discussion of study methods used, any problems encountered, and other relevant information. The BA should conclude whether or not a listed or proposed species will be affected. Upon completion, the BA should be forwarded to our office.

[1/] A major construction activity is a construction project (or other undertaking having similar physical impacts) which is a major action significantly affecting the quality of human environment as referred to in the NEPA (42 U.S.C. 4332 (2)(c).

[2/] "Effects of the action" refers to the direct and indirect effects on an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action.

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