Chapter 2 Proposed Action and Alternatives

In this Chapter:

- Proposed Action
- The Use of Existing Facilities Alternative
- The No Action Alternative
- Alternatives Eliminated from Consideration

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The Final EIS includes a new alternative.

BPA, BIA and the Nez Perce Tribe are proposing a supplementation program in the Clearwater River Subbasin to rebuild Clearwater chinook populations to sustainable levels. The Proposed Action proposes building chinook salmon incubation and rearing facilities and satellite facilities, and includes juvenile release and adult collection sites, a monitoring and evaluation plan, harvest plan, and other management activities.

The Use of Existing Facilities Alternative proposes using existing production hatcheries and the proposed satellite facilities in the Proposed Action to meet the need. Facilities at Dworshak National Fish Hatchery, Kooskia National Fish Hatchery, Hagerman National Fish Hatchery, and Sweetwater Springs would be used as central incubation and rearing facilities.

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 Proposed Action is a supplementation program that would rear and release spring 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 would have three phases. The first (1-5 years) and second phases (6-10 years) of the program are the primary focus of this 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 (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 2.1.3.7, **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 and river 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.

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.

Fall chinook would be reared at the Cherrylane hatchery and at Sweetwater Springs Central Incubation and Rearing Facility until they reach fingerling size. They would then be moved to acclimation rearing ponds within these facilities where a portion would be released as ***subyearling smolts*** directly into the Clearwater River during late spring or early summer. Remaining fish would be moved to other acclimation sites. They would be reared and imprinted on that source of water prior to being

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Adaptive management *uses management actions as part of an experimental design to refine understanding concerning scientific questions. As a result of these experiments, management should adapt, resulting in improved response to environmental problems. (Return to the River, ISG, 1996).*

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.*

Fingerling

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.*

Table 2-1
Summary of NPTH Facilities

Site	Program (Note 1)	Release Goals			Fish Culture Components (Note 2)							Site Area	Physical Components						Water Needs	Available GW (Note 4)	Available SW (Note 4)	SW Source
		Number	#/kg (#/lb)	metric tons (tons)	C-p	B-s	I-c	R-r-F	R-r-S	A-c	R-i	hectares (acres)	Adult Weir	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)	
Sweetwater Springs T33N, S4, R4W	FCH SCH					*	*	*	*			1 6 (4)			yes		16	45 (1600) /Bs 181 (6400) /RrF	3 4 (900) @ April	3 4 (900)	NA	Spring source
Luke's Gulch (South Fork Clearwater) T31N, S28, R4E	FCH SCH	400,000	110 (50)	3 63 (4)	*	*		*	*	*	*	1 2 (3)		yes		yes		85 (3000) /Bs 651 (23000) /Ac	7.9 (2100) @ June (reuse of water from Bs)	1 7 (450)	U	Clearwater River
Cedar Flats (Selway) T32N, S25, R7E	FCH SCH	400,000	110 (50)	3 63 (4)	*	*			*	*	*	1 2 (3)				yes		142 (5000) /Bs 595 (21000) /Ac	10 2 (2700) @ June	NA	U	Selway River
Cherrylane T37N, S35, R3W	FCH	1,500,000	110 (50)	13 61 (15)	*	*	*	*	*	*	*	6 (14)		yes		yes	48 FCH 18 SCH 66 total	198 (7000) /Ac 283 (10000) /RrF	25 (6600) FCH 5 3 (1400) SCH	18 9 (5000)	U	Clearwater River
North Lapwai Valley T36N, S20, R4W	FCH	500,000	110 (50)	4 54 (5)	*	*			*	*	*	1 2 (3)	yes	yes		yes		736 (26000) /Ac	8.3 (2200) @ June	2 5 (670)	91 7 (249000)	Lapwai Creek
		2,000,000		25.4(28)																		
Cherrylane T37N, S35, R3W	SCH	2,800,000				*	*	*	*			6 (14)		yes		yes	48 FCH 18 SCH 66 total	2180 (77000) /Ac 283 (10000) /RrF	25 (6600) FCH 5 3 (1400) SCH	18 9 (5000)	U	Clearwater River
Yoosa\Camp Creek (Lolo Creek) T35N, S12, R6E	SCH	150,000	44 (20)	3 4 (3.8)	*	*		*		*	*	0 8 (2)	yes		yes			57 (2000) /Bs 368 (13000) /Ac	3 8 (1000) (reuse of water from Bs)	NA	11 5 (3050)	Lowest flow 1990-1995
Mill Creek (Mill Creek) T29N, S34, R4E	SCH	40,000	44 (20)	0 91 (1)	*	*		*		*	*	0 8 (2)	yes		yes			1 (400) /Bs 113 (4000) /Ac	1 1 (300) (reuse of water from Bs)	NA	10 7 (2830)	Lowest flow 1990-1995
Newsome Creek T30N, S31, R7E	SCH	75,000	44 (20)	1 7 (1 88)	*	*		*		*	*	0 8 (2)	yes		yes			20 (700) /Bs 198 (7000) /Ac	2 3 (600) (reuse of water from Bs)	NA	9 5 (2500)	Lowest flow 1990-1995
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									
Eldorado Creek (Yoosa/Camp control)	SCH				*								yes									
John's Creek (Mill Creek control)	SCH				*								yes									
Tenmile 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. 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, Ri = 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.

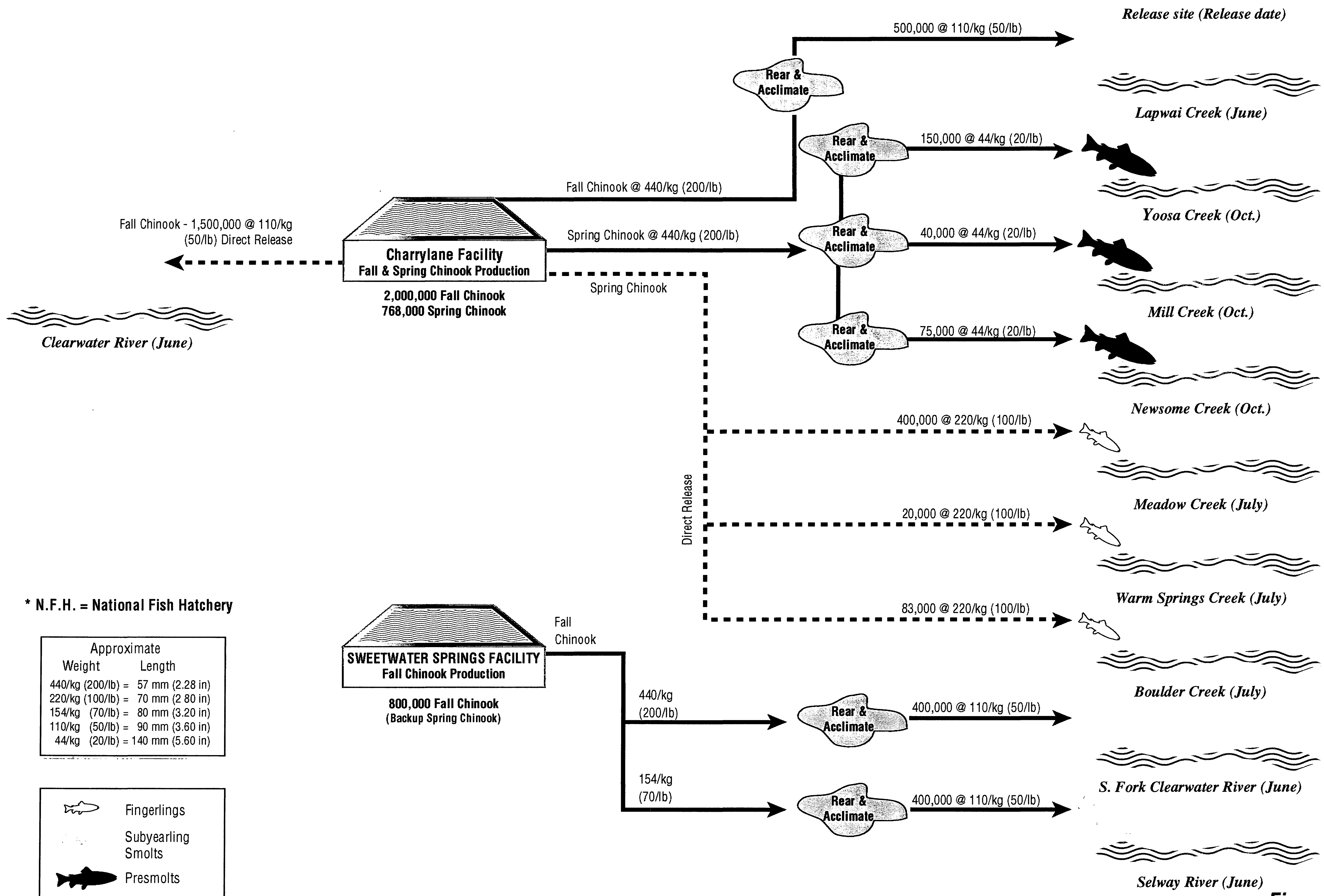

Figure 2-1
Proposed Action - Incubation, Rearing, Acclimation, and Release Sites

released as subyearling smolts in late spring or early summer. Fall chinook are expected to begin their seaward migration shortly after release.

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.

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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.*

A weir *is a fence placed in a stream to capture or count fish. See Photo 9.*

Several techniques would be used to count and capture adult chinook salmon returning from the sea such as temporary ***weirs***, fish ladders at acclimation sites, and trapping facilities at Lower Granite Dam. Some adults would be used for broodstock; the remainder would be returned to the stream to be harvested or to reproduce naturally.

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

- Supplementation spring chinook 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 other 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 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 Forests.

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

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, which is within the boundary of the Nez Perce Indian Reservation, 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.

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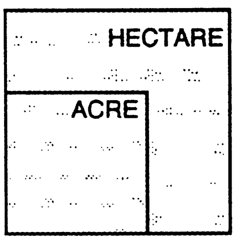


Hectare: about two and one-half acres

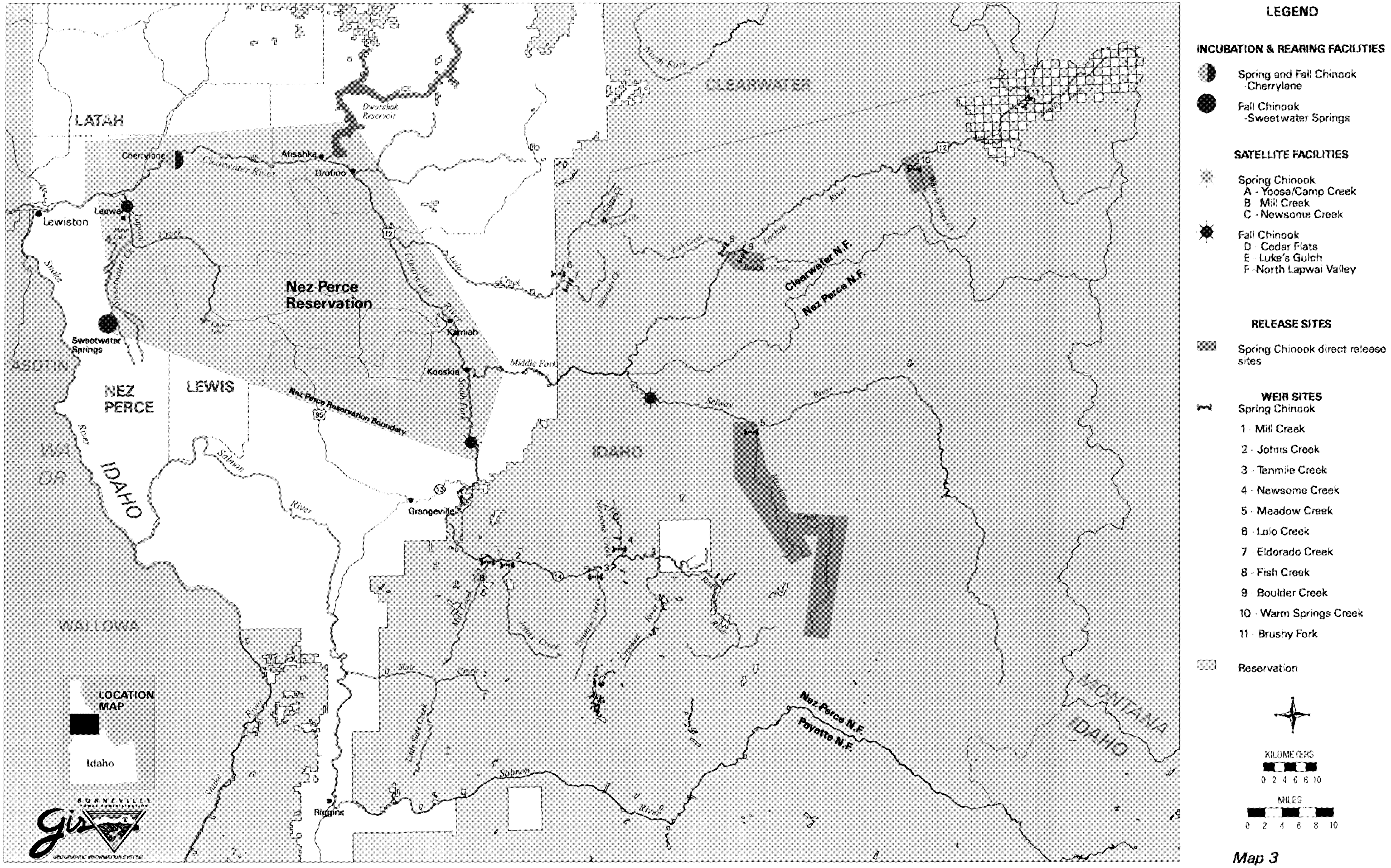
Facilities Planned — Figure 2-2 shows a preliminary design for the Cherrylane hatchery. A hatchery building, water treatment facilities, rearing containers, effluent ponds, an operations and shop building, and two staff residences would be built on the site. The hatchery building would accommodate the 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.

NEZ PERCE TRIBAL HATCHERY



Map 3

Facilities and Release Sites

Photo 1
Cherrylane Site

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.

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 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.

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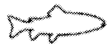
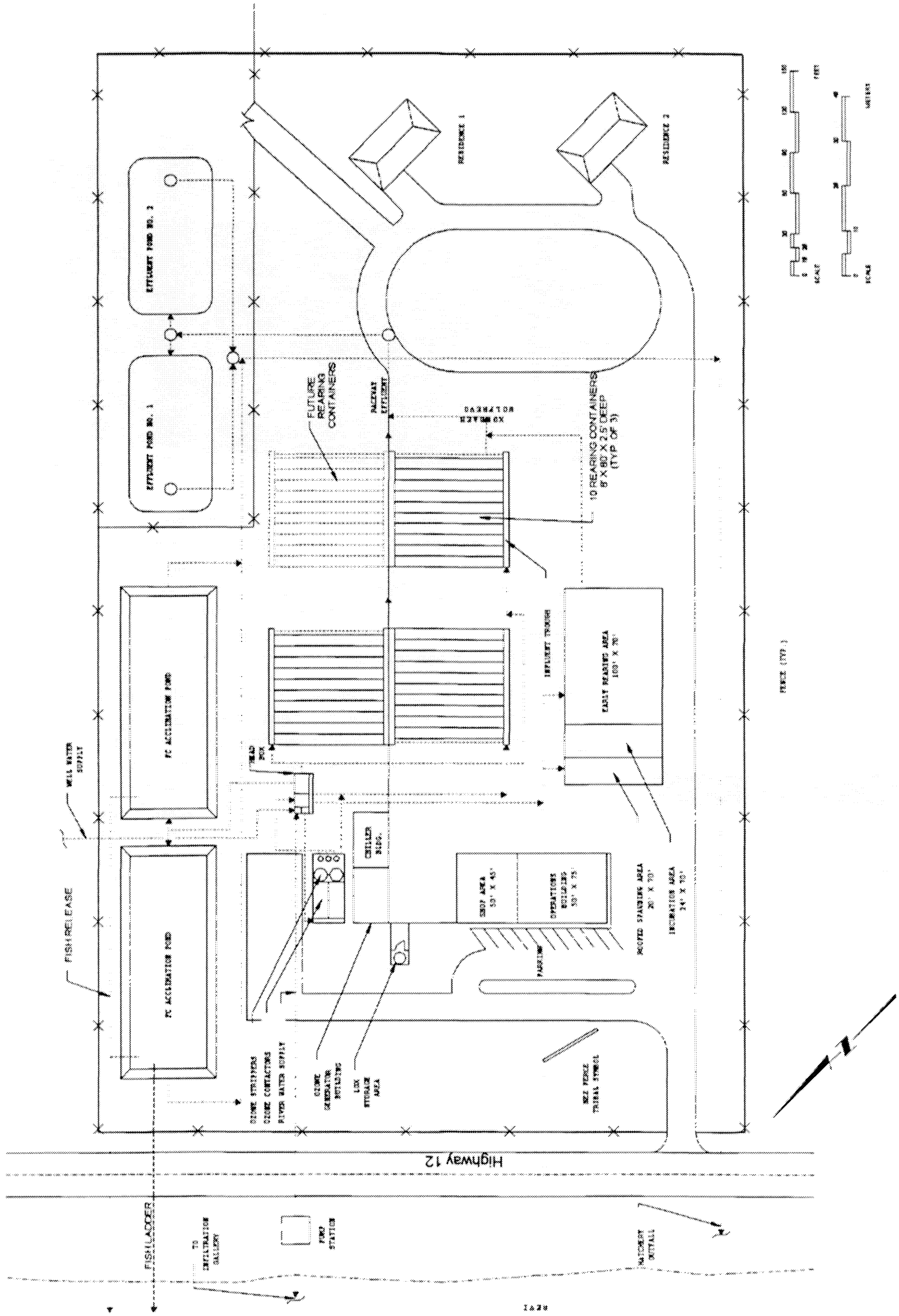
Water hardening *is the process of placing fertilized eggs in water so that the egg absorbs the water that accumulates in the space between the egg yolk and outer membrane.*

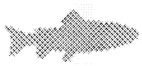
In February, about 500,000 fall chinook would be moved as fingerlings from the Cherrylane hatchery to the North Lapwai Valley satellite facility and reared and acclimated until release in May or June. The remaining 1,500,000 fall chinook would be moved to the acclimation ponds within Cherrylane itself.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



Fingerling



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



Subyearling smolt

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 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.

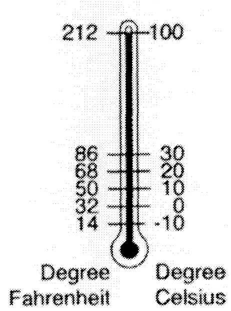
Water sterilization using ***ozonation*** is planned to ensure water from the river is free from waterborne pathogens. The proposed ozone system would inject ozone gas in an oxygen feed source into the water supply from the river. Residual ozone control and dissolved gas control would be managed by a 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.

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.

➲ For Your Information

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

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.*



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 would require an accelerated incubation and growth schedule to produce mature subyearling smolts in May and June. The warmer groundwater would be tempered by chillers or mixed with ozone sterilized river water to provide rapid growth.

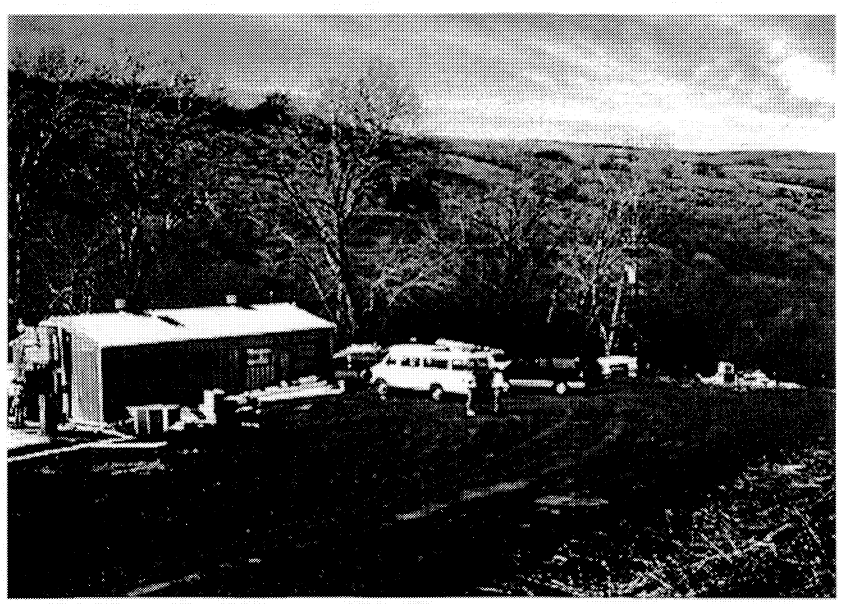
Access and Utilities — The site is next to U.S. Highway 12. Power from Washington Water Power is available.

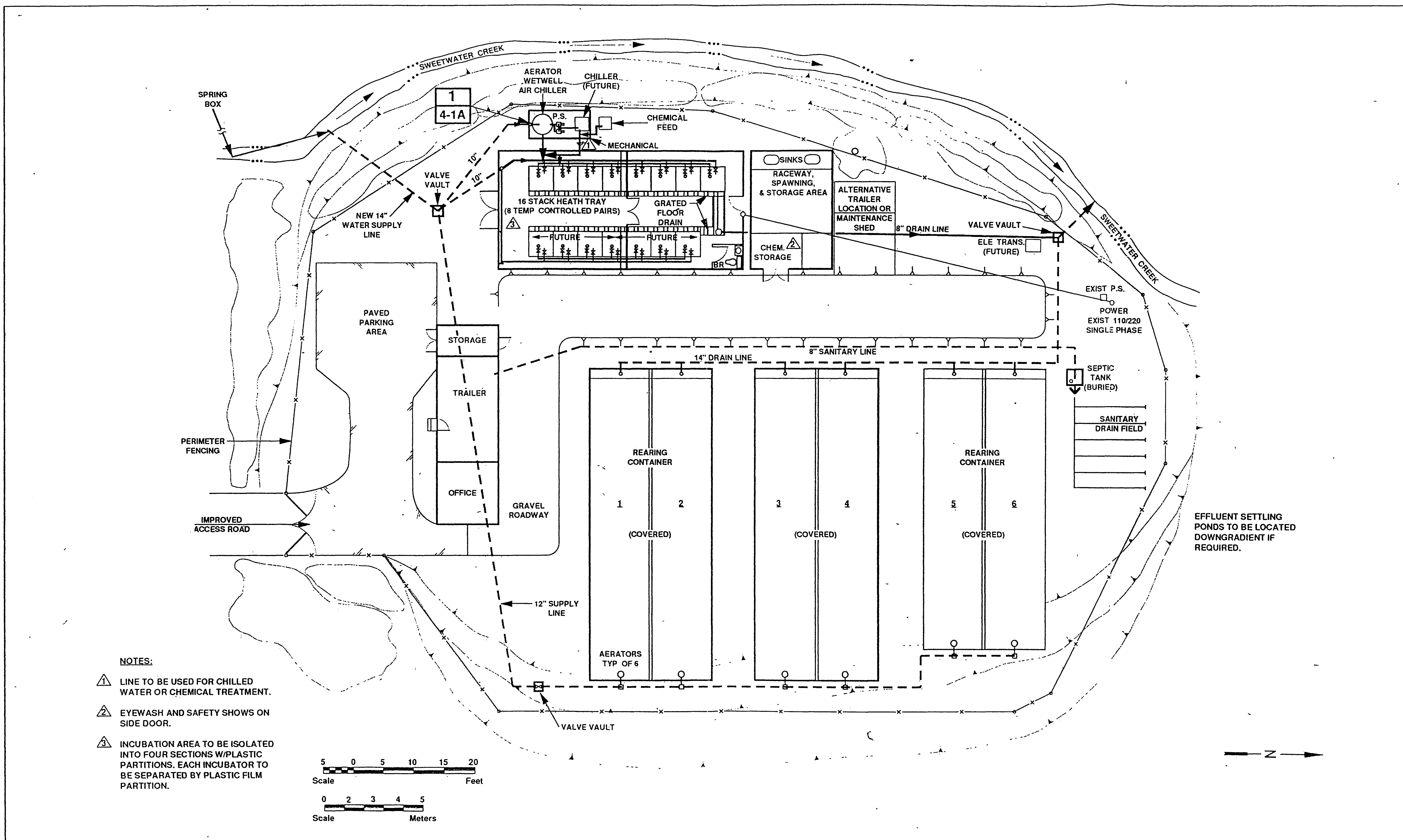
Waste — Two effluent settling ponds would be used to collect water when raceways are cleaned. Solids would be separated by two-hour gravity settling. Solids collected would be dried and applied to land or disposed of at an approved sanitary landfill. About 9 metric tons (10 tons) of fish waste would be produced based on 9 kg (20 lb) of waste/fish. 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 principal water

Photo 2
Sweetwater Springs Site





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

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 were left in place. 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.

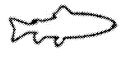
BPA is negotiating with IDFG to purchase the site.

Facilities Planned — While it has been possible to use the existing facilities temporarily, improvements would be needed to meet 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 fall 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



Fingerling

facility. In April, the remaining 400,000 fall chinook would be moved to the Cedar Flats satellite facility when they are about 154 fish/kg (70 fish/lb).

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 is 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. A sanitary sewer is already provided at the site. 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

➲ For Your Information

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

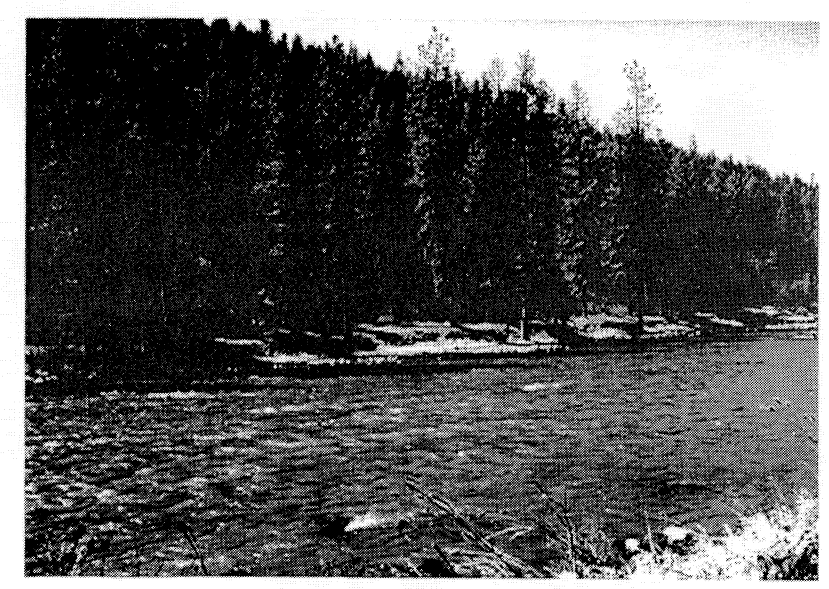
Luke's Gulch is on a flat bench above the South Fork Clearwater River upstream from Kooskia at River KM 13 (Mile 8). The site is forested and is ***tribal land***. See Photo 3.

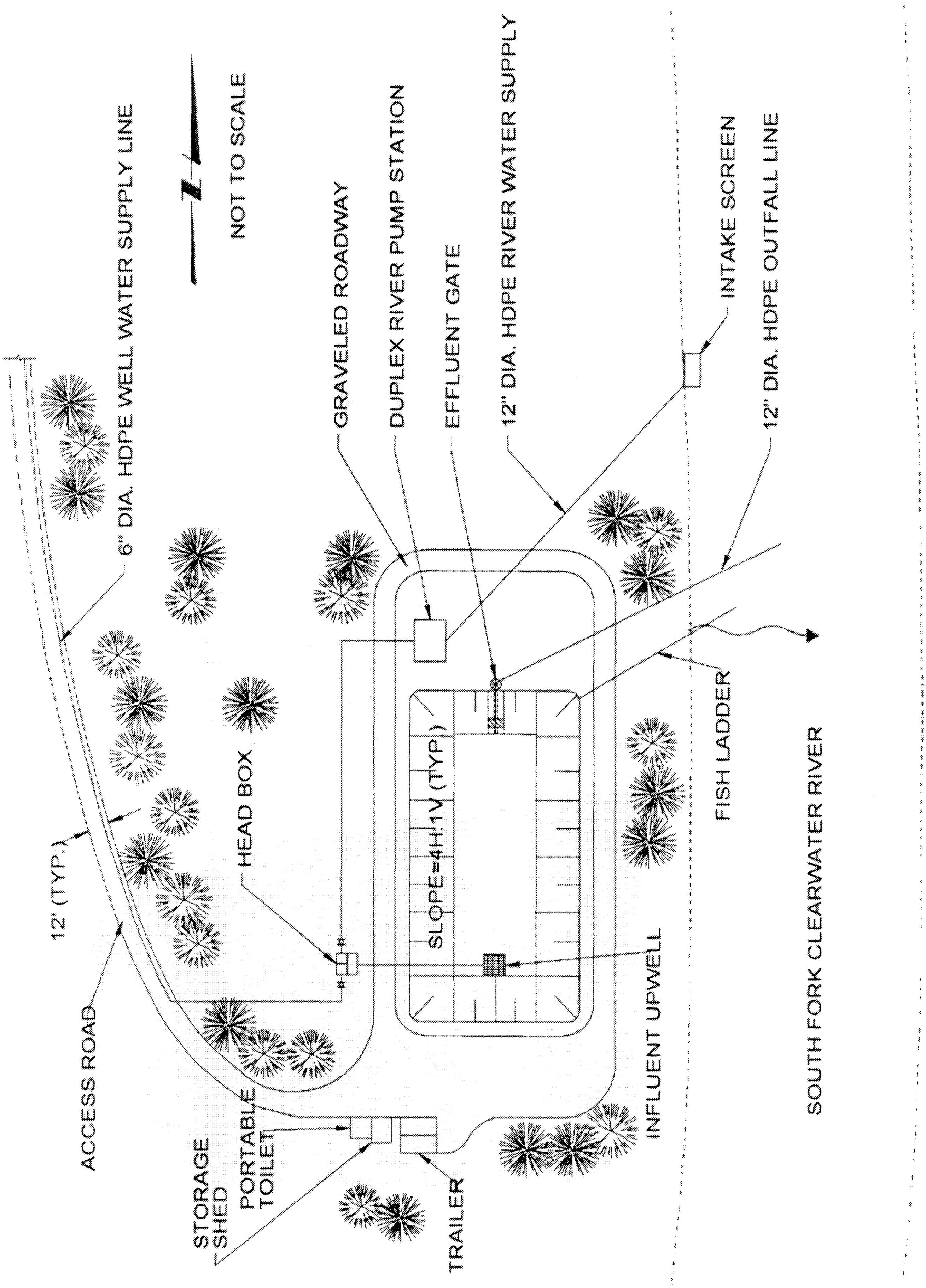
Facilities Planned — Site development will encompass approximately 1.2 ha (3 acres). The pond at Luke's Gulch would rear, acclimate, and release juveniles and hold and spawn adults that return to the satellite. The design for the pond has not been chosen, but it could be reinforced concrete with vertical 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

Photo 3

Luke's Gulch Site

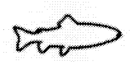




NEZ PERCE TRIBAL HATCHERY
LUKE'S GULCH SATELLITE FACILITY CONCEPTUAL LAYOUT
FIGURE 2-4

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.

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

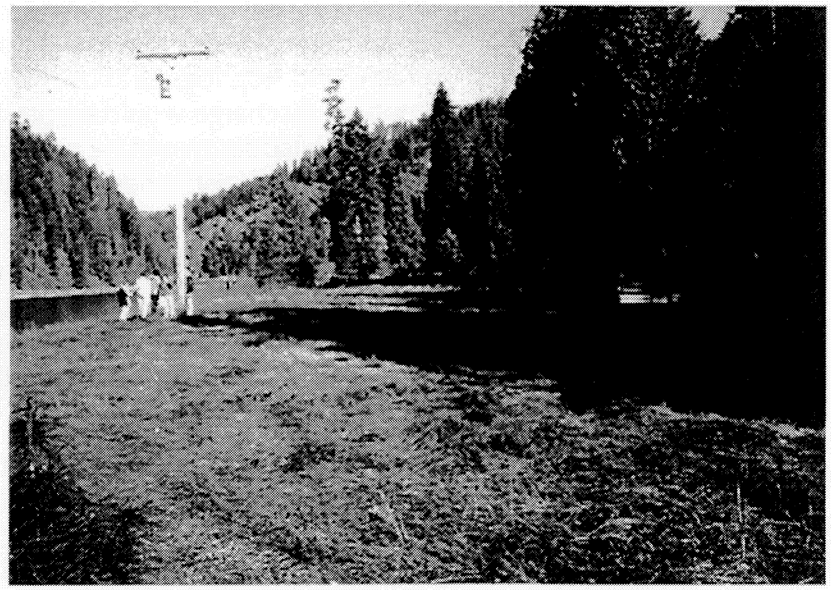
Fish — In February, the Luke's Gulch satellite facility would receive about 400,000 fall chinook fingerlings at 440 fish/kg (200 fish/lb) from the Sweetwater Springs hatchery. The fingerlings would be reared through June and released into the South Fork Clearwater River when they are at 110 fish/kg (50 fish/lb). Returning adults would be captured or induced to return by the fishway into the pond. They would be held from September through November 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. About 2.4 metric tons (2.7 tons) of fish waste would be produced based on 9 kg (20 lb) of waste/fish. 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

Photo 4
Cedar Flats Site



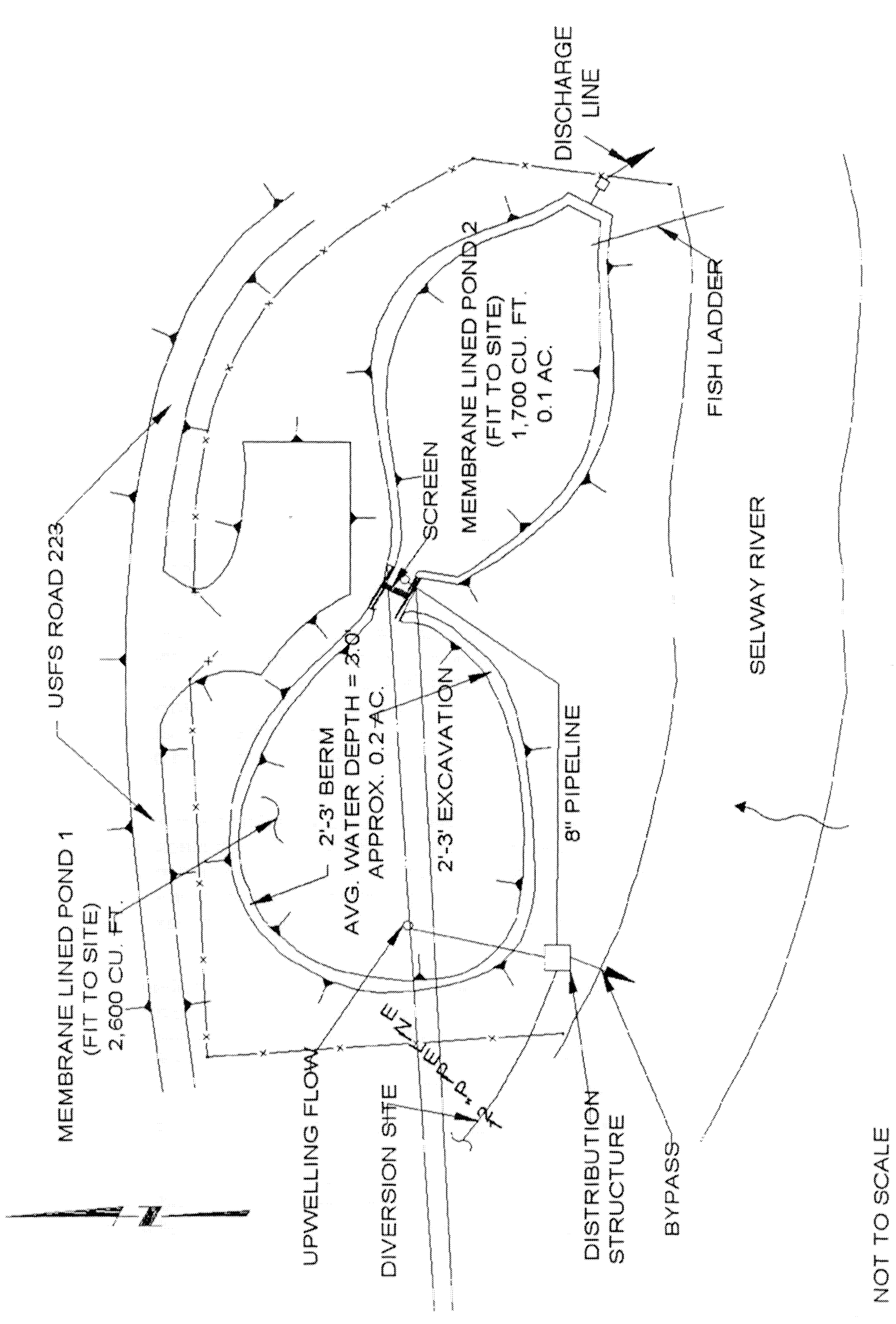
would be cleaned at the end of each rearing cycle. Solids collected would be dried and applied to land or disposed of at an approved sanitary landfill. Any chemicals used would be handled, applied and disposed of in accordance with state and federal regulations. Fish carcasses would be disposed of at 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.

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.

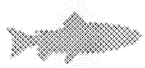


NEZ PERCE TRIBAL HATCHERY
CEDAR FLATS SATELLITE FACILITY CONCEPTUAL LAYOUT
FIGURE 2-5

Acclimation 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. 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.

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

Fingerling



Subyearling smolt

Fish — In April, the Cedar Flats satellite facility would receive about 400,000 fall 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.

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 September, fall 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 September through November 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. About 2.4 metric tons (2.7 tons) of fish waste would be produced based on 9 kg (20 lb) of waste/fish. 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 1.3 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.

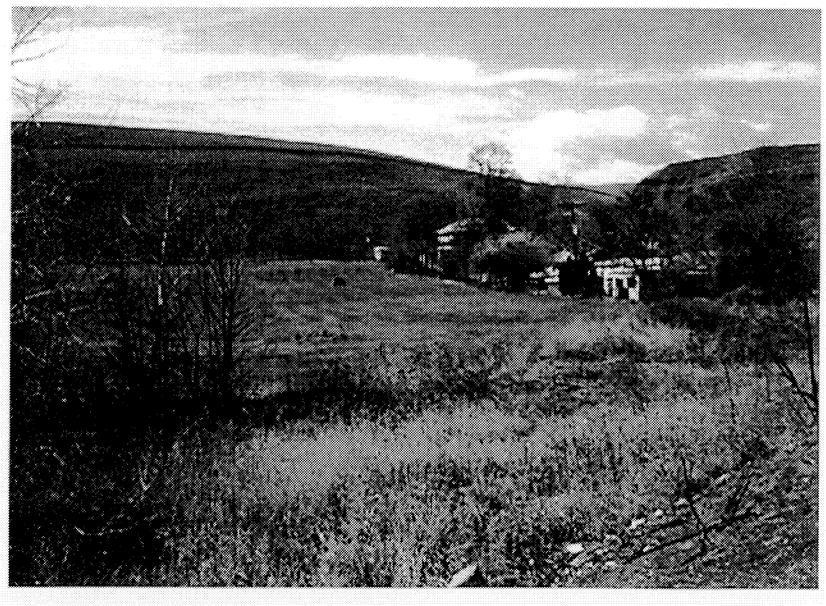
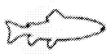
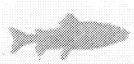


Photo 5
North Lapwai Valley Site



Fingerling



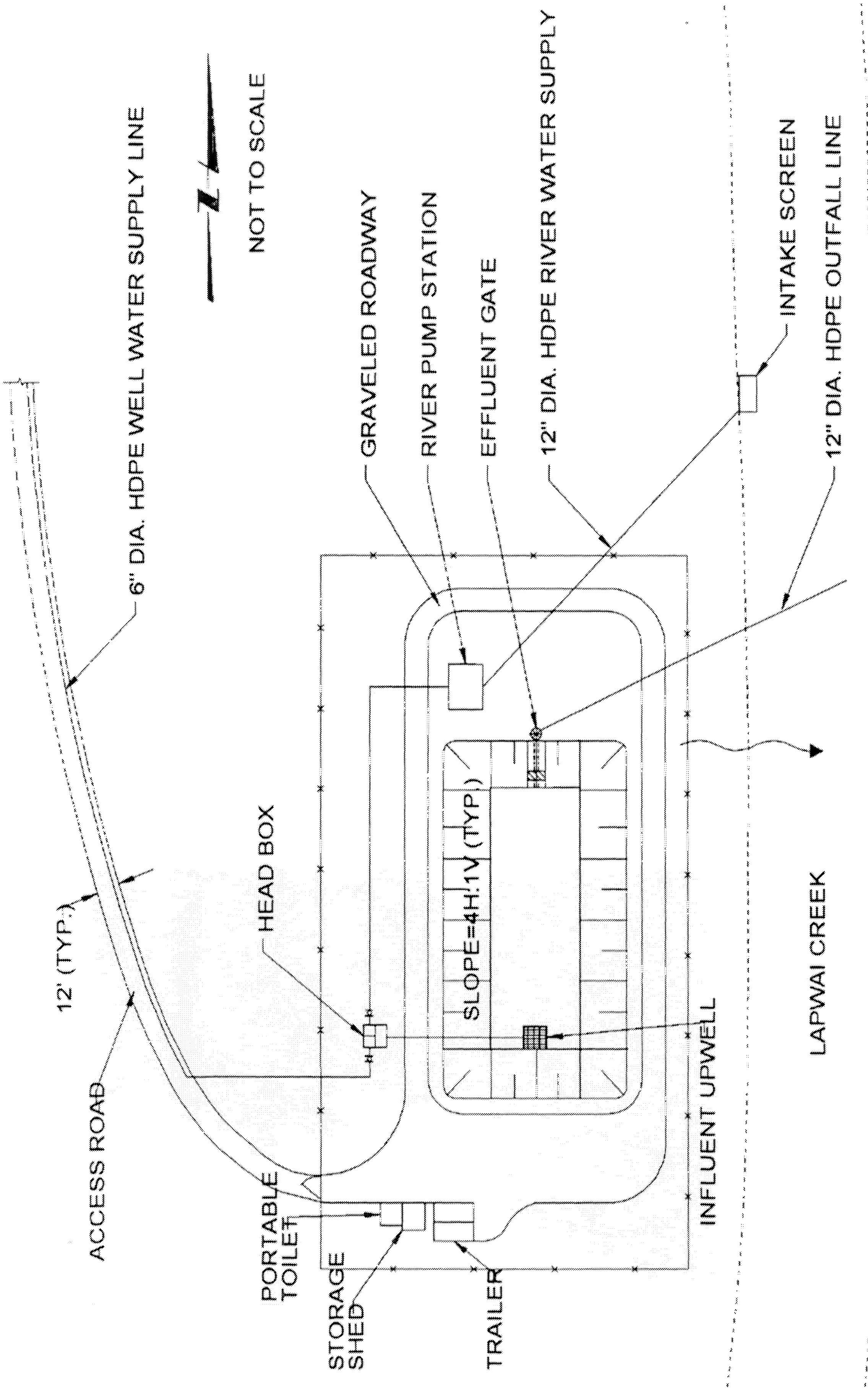
Subyearling smolt

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 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. About 3 metric tons (3.4 tons) of fish waste would be produced based on 9 kg (20 lb) of waste/fish. Except for limited



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

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.

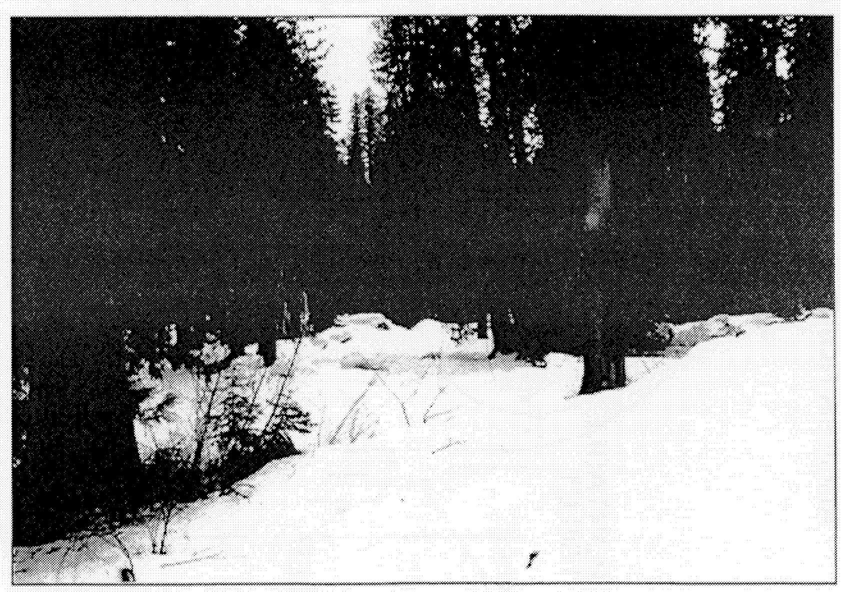
2.1.2.4 Yoosa/Camp Creek

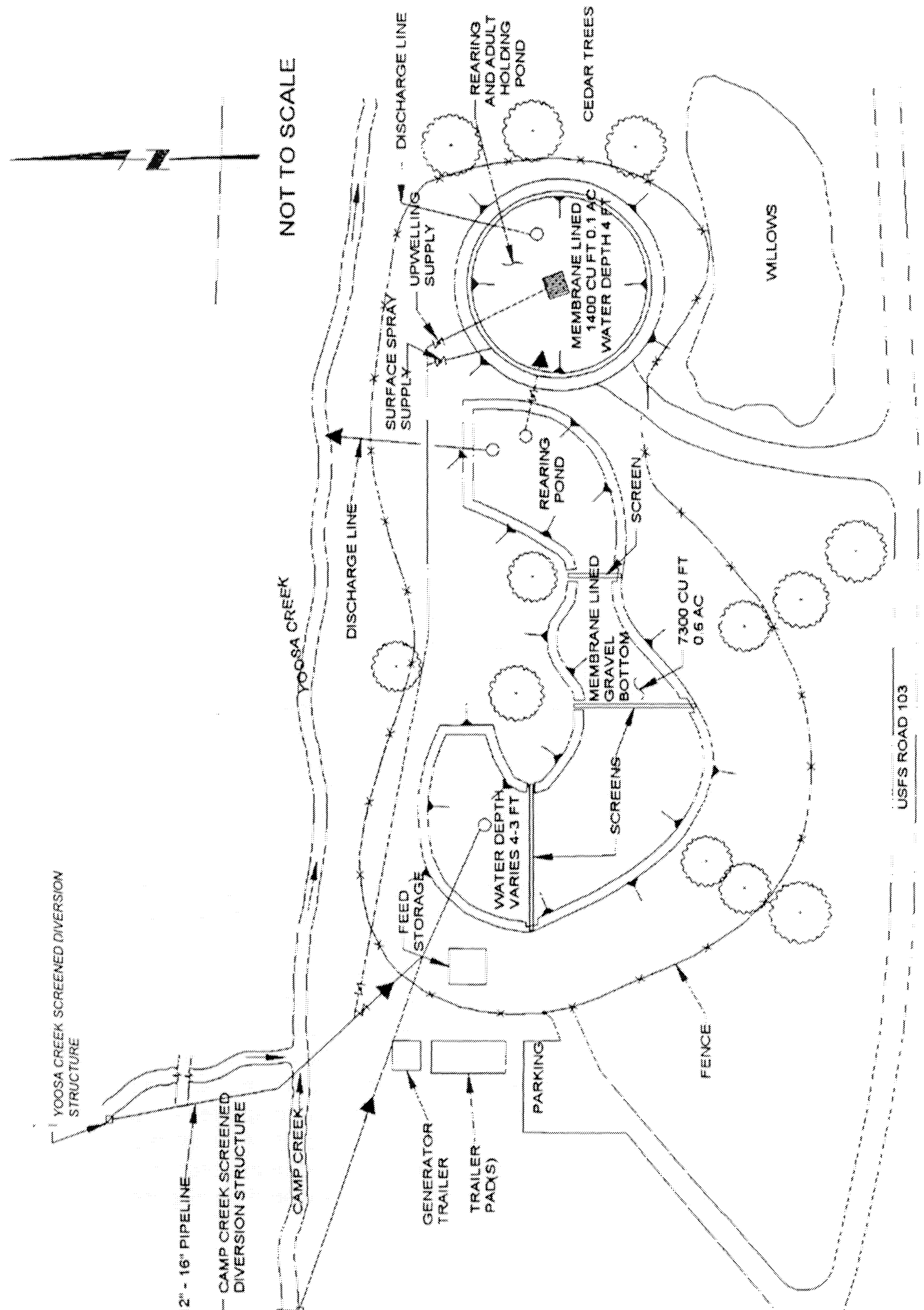
The Yoosa/Camp Creek site is next to U.S. Forest Service Road No. 103, southwest of the Musselshell Camp in the Clearwater National Forest. The site is located in a stand of cedar and pine on the western bank of Yoosa Creek about 10 m (33 ft) downstream of the confluence of Yoosa and Camp creeks. Yoosa 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.

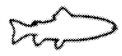
Photo 6

Yoosa/Camp Creek Site





NEZ PERCE TRIBAL HATCHERY
YOOSA/CAMP CREEK SATELLITE FACILITY CONCEPTUAL LAYOUT
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 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.

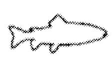
Waste — No sanitary sewer system would be developed at the site. Portable construction-type domestic wastewater facilities would be maintained by a commercial vendor during periods of construction and seasonal operations. Effluent settling ponds are unnecessary because a limited mass of fish would be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

Photo 7
Mill Creek Site

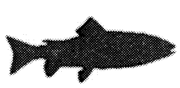
2.1.2.5 Mill Creek

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 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.



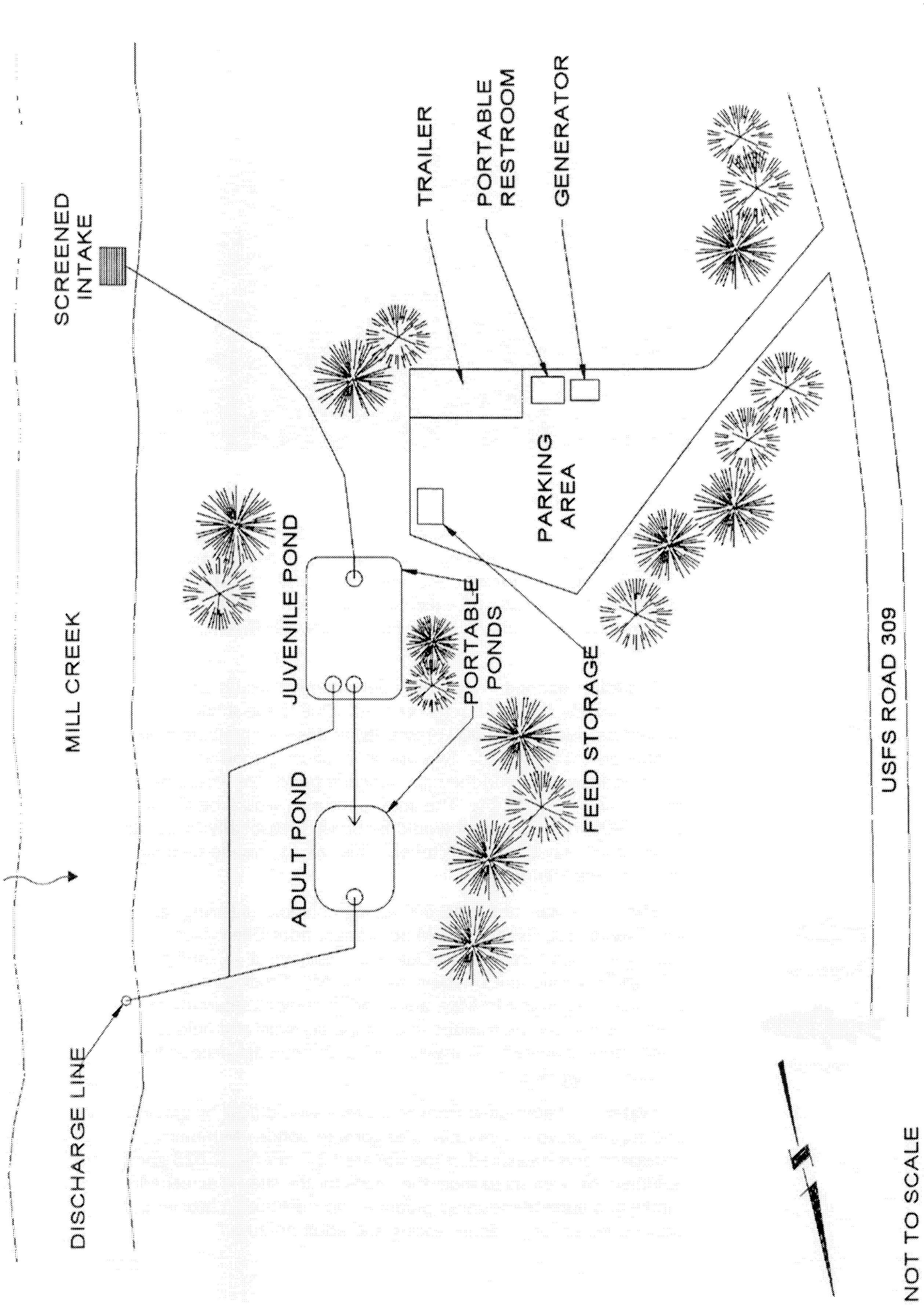
Fingerling



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.



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

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.

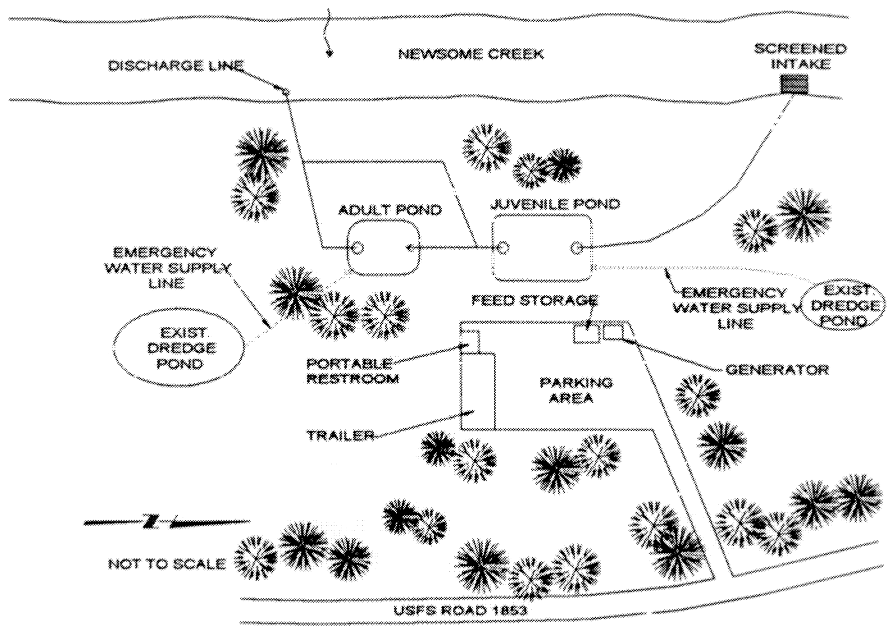
Waste — No sanitary sewer system would be developed at the site. Portable construction-type domestic wastewater facilities would be maintained by a commercial vendor during periods of construction and seasonal operations. Effluent settling ponds are unnecessary because a limited mass of fish would be reared at the site. About 324 kg (720 lb) of fish waste would be produced based on 9 kg (20 lb) of waste/fish. 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.

2.1.2.6 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.

Photo 8

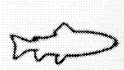
Newsome Creek Site

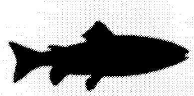


NEZ PERCE TRIBAL HATCHERY
NEWSOME CREEK SATELLITE FACILITY CONCEPTUAL LAYOUT
FIGURE 2-9

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 (160 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

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. About 620 kg (1,380 lb) of fish waste would be produced based on 9 kg (20 lb) of waste/fish. 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 conventional 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 at the central incubation and rearing facilities during the early life stages, controlling water temperature to reduce infections, controlling incubation densities, controlling the incidence of disease in the hatchery, 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) (see Section 1.6.12). 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 2.1.3.7, **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 chinook would 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 chinook subyearling smolts would be programmed to grow to a mature size sooner using the warmer groundwater. They would 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.

For Your Information

NATURES is a natural rearing system that employs overhead cover, instream structure and substrate and unintrusive feed delivery systems.

After incubation and emergence, spring chinook fry would be kept in the early rearing containers until they are able to swim and take feed (about 3 weeks). In March to April, they would be moved to the outdoor early rearing areas containing circular or raceway type rearing vessels which would incorporate the use of NATURES type rearing designs:

- substrate
- subsurface feeding
- shading
- exposure to natural food
- velocity alteration to enhance swimming ability
- instream cover
- exposure to predators.

They would be reared in these containers until transferred to satellite facilities in May and June or released directly into the streams as fingerlings in June and July.

Fall chinook would spend two to four weeks in the early rearing area after incubation and emergence in mid-January. In February they would be moved to the acclimation ponds at Cherrylane or to the North Lapwai Valley satellite.

During final rearing, the fish will be kept in ponds designed and operated to further incorporate NATURES rearing strategies and 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.

For Your Information

The Piper Index is a formula cited in Piper, et al., (1982) that describes, for fish hatcheries, the relationship between the size of fish and density (pounds of fish per cubic foot of rearing space).

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 spring chinook in the Columbia River Basin hatcheries at a density which does not exceed 9.6 kg/m^3 (Piper Index of 0.13). The Master Plan calls for final rearing fish at a Piper Index of 0.10 density which is less than that needed to meet NMFS recommendations and should impart economic efficiency to the hatchery by enhancing overall survival of 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 creeks.

Recent literature reviews and experiments conducted by NMFS evaluate improvements in post-release survival by fish reared using these novel techniques. Maynard, et al. (1995) conducted a review of semi-natural culture strategies for enhancing the post release survival of anadromous salmonids. They discuss the difference in post release survival of fish reared in semi-natural and conventional hatchery settings. They found that fish reared in earthen ponds and in tanks with substrate, cover, and instream structure had better cryptic coloration for the stream environment into which they were released than did fish reared in barren grey tanks, similar to the surroundings in conventional raceways. Maynard, et al., (1995) reported that these semi-naturally reared fish had almost 50 percent higher post release survival than did their conventional reared counterparts. They reported that predator avoidance strategies resulted in increased survival by hatchery fish as did some sort of exercise regime. Maynard, et al. (1996c) conducted a study which suggested that a typical hatchery diet of fish pellets supplemented with live-food could enhance the post-release forage ability and survival of cultured fish used for supplementation and stock enhancement. NMFS researchers (Maynard, et al. 1996b) also conducted experiments using NATURES. They found that post release survival was markedly improved for fall chinook (51 percent higher) and spring chinook (24 percent higher) than for fish reared in conventional rearing settings.

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 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 would 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 and 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 Returns

Table 2-2 displays the expected returns for NPTH at 20 years into the future. The numbers were generated by a spreadsheet model. The model follows hatchery and naturally-produced spawners through their life cycle, calculating juveniles produced in natal streams and subtracting out mortalities accrued as the fish grow, leave the streams, travel out into the ocean and back again to the natal streams or hatchery satellite. It also incorporates the hatchery:wild spawning protocols recommended for NPTH.

The adult return model uses a series of assumed survival rates by life stage within its iterations:

Spring Chinook Parr-To-Smolt Survival — The assumed survival rate to smolt for spring chinook released from satellite ponds is 19.5 percent. This is based on a 65 percent post-release survival and a 30 percent overwinter survival. The post-release survival was based on information presented in Maynard, et. al (1995) for facilities using natural-type rearing strategies. The overwinter survival rate is based on information presented in the Idaho Salmon Supplementation Studies (Bowles and Leitzinger, 1991).

The assumed survival rate for spring chinook to smolt from direct stream releases is approximately 10 percent. This is based on a 65 percent post-release survival, a 72 percent fingerling to parr survival, and a 30 percent overwinter survival in addition to considering the carrying capacity of the receiving stream and the number of natural parr present (Maynard, et. al, 1995; Leitzinger and Bowles, 1991).

Spring Chinook Smolt-to-Adult Survival — The assumed survival rate for smolt-to-adult for spring chinook from satellite facilities is 0.4 percent (essentially double the current smolt-to-adult survival for Rapid River Hatchery fish at 0.2 percent). Smolt-to-adult survival rates were doubled because it is assumed that recovery efforts will be successful and that migratory passage conditions will be improved such that at least a 1:1 replacement rate occurs. Rapid River return rate was used because it is assumed that the Cherrylane facility would be more similar to Rapid River than to a conventional, concrete style hatchery. The Rapid River Hatchery uses earthen ponds which could reflect the benefits accrued from early rearing in more natural type setting.

The assumed survival rate for smolt-to-adult for spring chinook from direct stream releases is 0.6 percent (triple the current smolt-to-adult survival rate for Rapid River fish). Smolt-to-adult survival rates were tripled for spring chinook with direct releases because along with benefits accrued by recovery efforts, it is assumed that these fish would have an acquired fitness advantage by their extended rearing in the natural environment.

Fall Chinook Subsmolt-to-Smolt Survival — The assumed subsmolt-to-smolt survival rate for fall chinook is 50 percent, which is essentially the post-release survival, and is based on a natural-type early rearing strategy.

Fall Chinook Smolt-to-Adult Survival — The assumed survival rate for smolt-to-adult for fall chinook is 0.8 percent (double the current 0.4 percent smolt-to-adult survival from Lyons Ferry 1984-1986 brood coded wire tag returns). Survival rates were doubled because it is assumed that recovery efforts will be successful and that migratory passage conditions will be improved such that at least a 1:1 replacement rate occurs. Lyons Ferry Hatchery return

Table 2-2 Expected Adult Salmon Returns from Hatchery and Wild Fish

Stream	Total Adult Returns	Adults Available for Broodstock	Adults Available for Natural Reproduction	Adults Available for Harvest
Spring Chinook				
Lolo Creek (1)	329	136	63	130
Mill Creek (1)	95	36	46	13
Newsome Creek (1)	171	69	42	60
Boulder Creek (2)	146	67	58	21
Warm Springs (2)	35	16	14	5
Meadow (Selway) (2)	676	322	248	106
Number at 20 years	**1,452**	**646**	**471**	**335**
Early Run Fall Chinook				
Luke's Gulch (3)	574	272	154	148
Cedar Flats (3)	574	272	154	148
Fall Chinook				
Cherrylane	2,213	1,020	620	573
North Lapwai Valley (3)	739	340	208	191
Number of fall chinook at 20 years	**4,100**	**1,904**	**1,136**	**1,060**

(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 triple 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.

rates were used because this facility also uses earthen rearing ponds, which are assumed to be closer to a natural setting than typical concrete facilities.

2.1.3.6 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. 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 would be operated from late May through mid-September.

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

Photo 9

Temporary Weir

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 would 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.

Fall chinook broodstock would be obtained from adults ascending the fish ladders at Cherrylane, Cedar Flats and Luke's Gulch and from adults captured at the weir on Lapwai Creek. Permanent adult collection systems - fishways or fish ladders - are 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. The adults ascending Lapwai Creek would encounter a weir near the satellite site, be captured and transported to Cherrylane.

A portion of the fall chinook broodstock might also be captured at Lower Granite Dam. Collection of fish at Lower Granite would concentrate on unmarked, wild returning spawners. These fish would be cross-bred with fish returning to the central incubation and rearing facilities or satellite facilities. The exact portion of the run that can be used for NPTH would require coordination with other agencies. Recently, fisheries managers in the U.S. v. Oregon Production Advisory Committee have proposed that a small percentage (5 percent) of the unmarked fall chinook run crossing the dam be used to cross-breed with adults returning to Lyons Ferry Hatchery (Larson, 1997). Should production activities currently underway for fall chinook, including NPTH, and other recovery efforts result in a dramatic increase in unmarked returns over the dam, then it is likely that a portion would be taken into NPTH for spawning in a similar manner as are the fish for Lyons Ferry. Impacts to the naturally-spawning population would be determined in the multi-agency quorums responsible for recovering the run.

Figure 2-10 shows adult collection methods and numbers for the Proposed Action. 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.

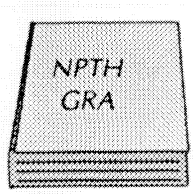
2.1.3.7 Broodstock Source and Management

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, Clearwater and Lookingglass hatcheries and the Kooskia Hatchery; and,
- fall chinook – Lyon's Ferry Hatchery stock.

Final selection of the donor stock to use in NPTH would depend on coordination with NMFS, IDFG, and the U.S. v. Oregon Production Advisory Committee of the Columbia River Fish Management Plan. Acquisition of broodstock would also be determined through negotiation by the NPT within these forums. During Phase I of the implementation, it is assumed that broodstock acquisition would be coordinated annually. 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 2.1.3.6, **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.

Spring Chinook — 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 1995a) (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 below 12 pair per stream. 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. Run forecasting in conjunction with baseline data on return rates to each stream would be used to predict if the runs are likely to drop below 12 pairs. Hatchery fish would be marked (See Section 2.1, **Proposed Action**).

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 C.

Fall Chinook — For the near future, the breeding of hatchery-reared and wild spawners applies only to spring chinook. Capture methods for obtaining fall chinook in the natural environment would require further exploration before it becomes feasible to cross-breed a significant portion of the wild run with hatchery fish. The obvious method for capturing wild fall chinook would be to take fish as they cross Lower Granite Dam. However, it is unlikely that fisheries managers in the basin would permit a significant portion of the wild run to be taken into a hatchery. Consequently, breeding of wild and hatchery fall chinook spawners would be limited until such time that the unmarked run increases to a much higher level.

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

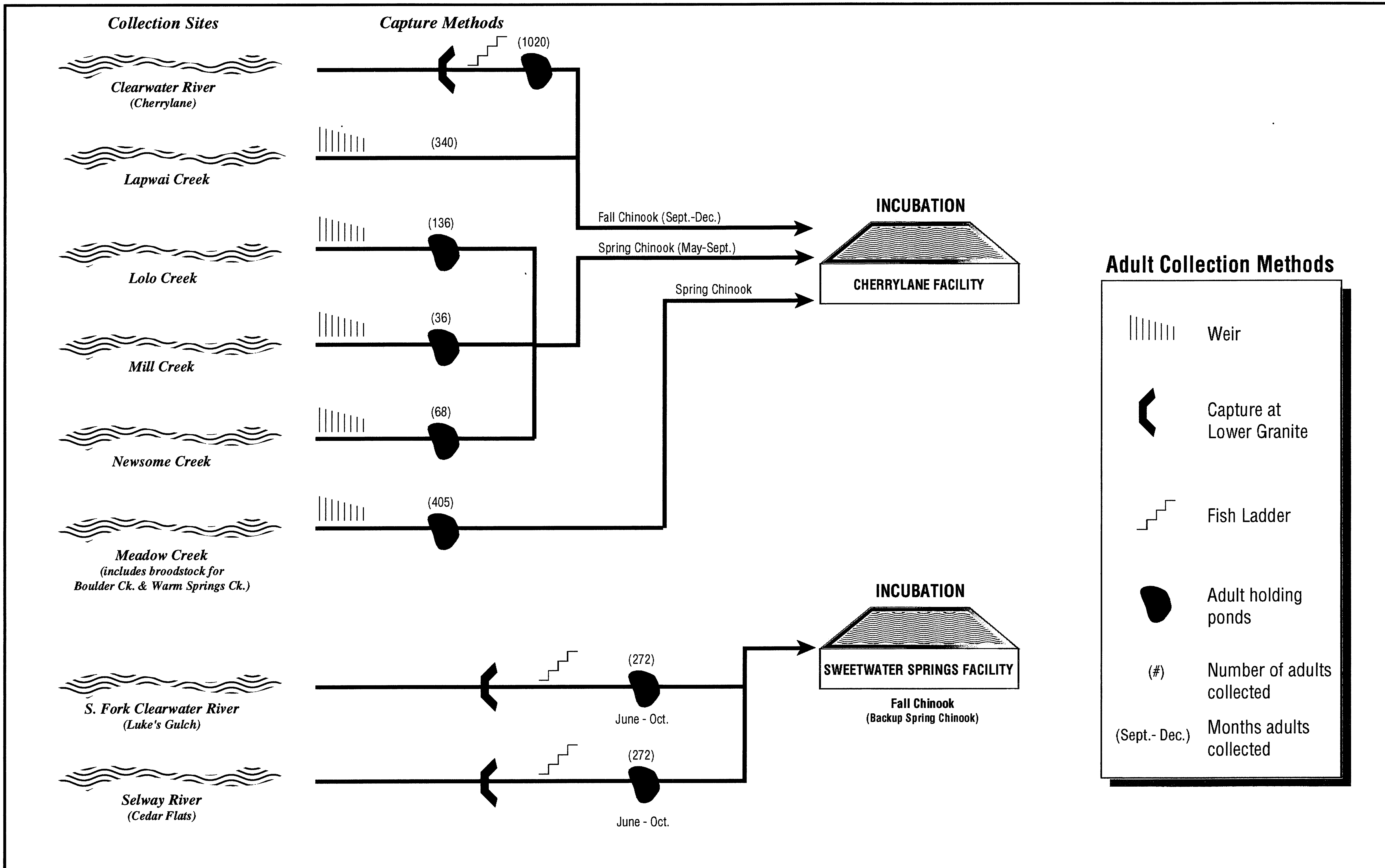


Figure 2-10
Proposed Action - Adult Collection

In Phase II, it is expected that most of NPTH fall chinook broodstock would come from hatchery adults returns to Cherrylane or the satellites. A gradual blending of wild fish into NPTH broodstock would occur in time. It is anticipated that a program similar to that proposed for Lyons Ferry would be adopted by NPTH. This program proposes capture and cross-breeding of a limited number of wild fall chinook at Lower Granite with Lyons Ferry hatchery fish. Exact numbers of fish and the impacts to the wild run would be considered by the fisheries managers in the Columbia Basin before such a program can occur. Appropriate environmental documents would be prepared as required by funding agencies.

Fish released from the Cedar Flats and Luke's Gulch satellite facilities would have to return as an early fall spawner (early September to end of October) to successfully incubate and rear in the South Fork Clearwater and the Selway River. Presently, most fall chinook spawning in the Clearwater occurs from October through November. Therefore, the early spawning portion of the fall chinook run would be most likely to reestablish a naturally spawning and rearing group of fish in these upper reaches.

2.1.4 Harvest Management

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

The Nez Perce Tribe would coordinate harvest management with other fisheries agencies in the basin. The U.S. v. 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.

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 discussed in Section 2.1.3.5, **Adult Returns.**

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.

2.1.5 Monitoring and Evaluation Plan

The Proposed Action would use adaptive management to guide hatchery operations. Monitoring and evaluation is a key part of adaptive management.

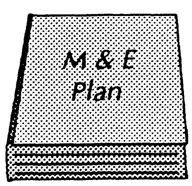
The concept of adaptive management has been recently discussed in the Return to the River (ISG, 1996). Their definition states "Adaptive management uses management actions as part of an experimental design to refine understanding concerning scientific questions. As a result of these experiments, management should adapt, resulting in improved response to environmental problems." The Fish and Wildlife Program document for the Council, the Yakima Fisheries Project Final Environmental Impact Statement (BPA, 1996) and the Tribal Restoration (Nez Perce Tribe, et al., 1995) use the concept to promote action in the face of significant scientific uncertainties (ISG, 1996). There are any number of scientific uncertainties in relation to hatchery supplementation that need to be assessed during operational efforts to restore natural runs of fish. For example, the best mechanism to incubate and rear fish to mimic natural production needs to be determined, as well as optimum fish size for release and release timing. Beneficial and adverse effects of supplementation to existing populations need to be monitored and the results incorporated into production strategies. Monitoring of returns, spawning success and harvest are also aspects of hatchery management that would feed back into and revise the supplementation program. These production and harvest strategies require scientific testing of hypotheses to determine which management action is most suitable for meeting program goals. Management actions can then be revised in accordance with the results. The Monitoring and Evaluation Plan provides the backbone of experimental hypotheses.

After reviewing the Nez Perce Tribal Hatchery Master Plan, the Council directed the Tribe to develop a Monitoring and Evaluation Plan that met the following criteria:

1. Employed an ecosystem approach
2. Assessed ecological risks

- Identified critical uncertainties
- Focused on genetic resources, survival, reproductive success, and ecological interactions
- Evaluated cumulative impacts.

3. Included baseline biological and habitat surveys.
4. Identified facilities needed to conduct M & E.
5. Integrated with other research programs; in particular, the Idaho Supplementation Studies (Idaho Department of Fish and Game) and the Snake River Genetics Monitoring Program (National Marine Fisheries Service).
6. Considered the recommendations and methods developed under the Regional Assessment of Supplementation project.
7. Consulted with the NMFS and other agencies regarding:
   - Endangered species management
   - Hatchery policy
   - Hydrosystem operation and water quality
   - Other potential management actions



Each of these concerns was addressed in the development of the M & E Plan. A copy of the Executive Summary for the M & E Plan is presented as Appendix D. In general, 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.

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

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. Overall success of the program would be evaluated by adult returns. Specifically, staff would count marked adult chinook salmon 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 used to evaluate program success. Several genetic, demographic, and life history parameters would be monitored to check if hatchery-reared chinook perform as expected and that interactions with resident fish are not detrimental. Additional environmental documents and coordination with state and other agencies would be completed before outplanting control streams.

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.

2.1.6 Costs

Capital construction would cost about $16 million (1997 dollars). Annual operations and maintenance costs after all facilities are fully developed would cost about $1,000,000 (1997 dollars) and monitoring and evaluation would cost about $500,000 (1997 dollars) annually. Harvest management is not included in the cost estimate.

2.2 Use of Existing Facilities Alternative

The use of existing facilities was considered but then eliminated from the Draft EIS because an agreement was reached in 1990 not to use the facilities in place of the NPTH (Wagner, 1990) and none of the managers of the hatcheries indicated in NEPA team meetings or during the scoping process that there was room available to rear additional fish. However, commentors to the Draft EIS asked that existing facilities be reexamined as an alternative to construction of the Cherrylane central incubation and rearing facility. Additional information was gathered to respond to these comments. BPA and NPT asked those responsible for the existing facilities described below for information that could be used to describe this alternative and evaluate it.

This alternative would use space at existing hatchery facilities to incubate and rear chinook salmon for restoration in the Clearwater River Subbasin. Facilities at Dworshak National Fish Hatchery, Kooskia National Fish Hatchery, Hagerman National Fish Hatchery, and Clearwater Hatchery were considered. The Sweetwater Springs central incubation and rearing facility, and satellite facilities described for the Proposed Action would also be built and used. Discussion presented in Section 2.1.1, **Facility Description and Operations Summary** would be the same for these facilities.

The facilities would be required to amend their existing authorization for chinook production to incorporate additional production for NPTH. Dworshak and Clearwater are authorized to produce chinook salmon to mitigate for losses of *adult fish* caused by the construction of the four dams on the Lower Snake River. Both these facilities are far from meeting their mitigation requirements, and will not meet them without an eight-fold increase in either smolt-to-adult survival or juvenile production (Murphy and Johnson, 1990). For example, Dworshak National Fish Hatchery is designed to return 9,135 spring chinook salmon by the production of 1.4 million juveniles. As described in Section 1.1.1.2, **Hatchery Production in the Clearwater Subbasin**, this facility has an average return of only 900 adults, which does not meet its egg take and is far from its mitigation requirement. Therefore, this alternative would add fish production to a facility that is unable to meet its existing mitigation purposes because of limited juvenile production.

Existing facilities are described briefly in Section 1.1.1.2, **Hatchery Production in the Clearwater Subbasin**. More specific information on the facilities is given below.

2.2.1 Facilities Description and Operations Summary

2.2.1.1 Dworshak National Fish Hatchery

Dworshak National Fish Hatchery is located at the confluence of the North Fork Clearwater River and the mainstem Clearwater River near the unincorporated town of Ahsahka, in north-central Idaho. (See Map 1.) The facility consists of 84 Burrows ponds, 42 raceways, 3 adult holding ponds, 128 deep troughs, and 45 stacks of vertical incubators. Water use ranges from 102-315 m^3/min (27,000 to 83,000 gpm) from the North Fork Clearwater River below Dworshak Dam via a direct line from the dam and water pumped from the river directly adjacent to the hatchery.

2.2.1.2 Hagerman National Fish Hatchery

Hagerman National Fish Hatchery is next to the Snake River in southern Idaho, about 8 km (5 miles) southeast of the town of Hagerman (see Map 1). The facility consists of 102 raceways, 66 starter tanks and a display pond. It currently rears summer steelhead for off-station release into the Salmon and Snake rivers as part of the LSRCP and rainbow trout for Dworshak reservoir mitigation. Water temperature is a constant 15 degrees C (59 degrees F). Raceways are organized into two systems, each system with three tiers for serial re-use of water. The amount claimed is 2.6 m^3/sec (92.5 ft^3/sec) from six major collecting structures.

2.2.1.3 Kooskia National Fish Hatchery

Kooskia National Fish Hatchery is located in north-central Idaho, about 120 km (75 miles) southeast of Lewiston in northwest Idaho County. The hatchery is in a narrow valley of Clear Creek, just upstream of the confluence with the Middle Fork Clearwater River. The facility consists of 12 raceways, 6 Burrows ponds, 42 circular starter tanks, 32 rectangular starter tanks, and 1 adult holding pond. Water rights total 51 m^3/min (13,456 gpm) from six wells and Clear Creek. Just over half the water is from Clear Creek. Water available for hatchery use ranges from 17-

32 m^3/min (4,389 gpm to 8,527 gpm), with the majority supplied from Clear Creek. The hatchery is operated with a water re-use system that incorporates bio-filters between uses.

Kooskia National Fish Hatchery is not a stand alone facility. It is operated as a satellite facility of Dworshak NFH. Adults are trapped at Kooskia NFH, however, because of warm Clear Creek temperatures, fish must be transferred to Dworshak NFH for maturation and spawning. Eyed eggs are returned to Kooskia NFH in October.

2.2.1.4 Clearwater Hatchery and Satellites

The use of Clearwater Hatchery was dropped from consideration because the Nez Perce Tribe prefers to use surplus space at the hatchery to produce coho salmon.

2.2.2 Proposed Facility Production

2.2.2.1 Fall Chinook

The water at Dworshak National Fish Hatchery and Kooskia National Fish Hatchery is too cold for the accelerated growth needed for a June 1 release date with fish at 110 fish/kg (50 fish/lb). Instead, 500,000 fall chinook would be reared at Hagerman NFH to 110-130 fish/kg (50-60 fish/lb) by May 15. The fish would then be trucked up to the Clearwater and acclimated until released in June at the North Lapwai Valley satellite facility. Another facility would have to rear rainbow trout intended for Dworshak Reservoir mitigation that are currently reared at Hagerman NFH.

2.2.2.2 Spring Chinook

Kooskia National Fish Hatchery and Dworshak National Fish Hatchery would be used to rear about 800,000 spring chinook to fingerling/parr size 220-440 fish/kg (100-200 fish/lb). Fish would then be released into the direct release streams (Meadow Creek, Boulder Creek and Warm Springs Creek). The remainder would be moved to the spring chinook satellite sites for final rearing (see Figure 2-11.)

2.2.3 Facility Improvements

A 15-unit Heath incubator stack would be installed at Kooskia NFH and at least one unit of Dworshak NFH holding pond raceways would be converted to an adult holding pond. At

Dworshak NFH, about 20 tanks would be installed and the chillers would be upgraded. Fry could also be put in ponds and raçeways earlier at 550-880 kg/fish (250-400 fish/lb), which would require small mesh screens in the holding pond raceways.

At Hagerman NFH, to chill the eyed eggs, the existing chiller would be upgraded. A backup generator would be installed for the chiller.

2.2.4 Hatchery Operations

2.2.4.1 Disease Management

Currently used disease management measures would be used at the hatcheries. The USFWS has Fish Health Policy and Implementation Guidelines and disease prevention programs at all of its facilities (IHOT, 1996). These guidelines include disease control and disease prevention measures.

2.2.4.2 Egg Take and Incubation

During Phase I, fall chinook eggs would be imported as described in the Proposed Action. Spring chinook eggs would come from either returns to Dworshak/Kooskia or imported from Rapid River.

At the hatchery, different stocks from the different streams and mating strategies would not be isolated from each other. Incubation density would not necessarily be limited to one female per tray.

If the adult returns are sufficient for meeting broodstock needs in Phase II, egg take would occur at the various satellite facilities. Broodstock egg take, handling, and spawning protocols would be the same as those described for the Proposed Action.

2.2.4.3 Rearing Techniques

This alternative would employ rearing techniques commonly used for existing production at these facilities. The ability to accelerate fall chinook incubation and growth would be accomplished by incubating and rearing fish at Hagerman NFH. Upgrading the chillers at Dworshak and Kooskia would allow for incubating and early rearing spring chinook at water temperatures similar to those of the Proposed Action.

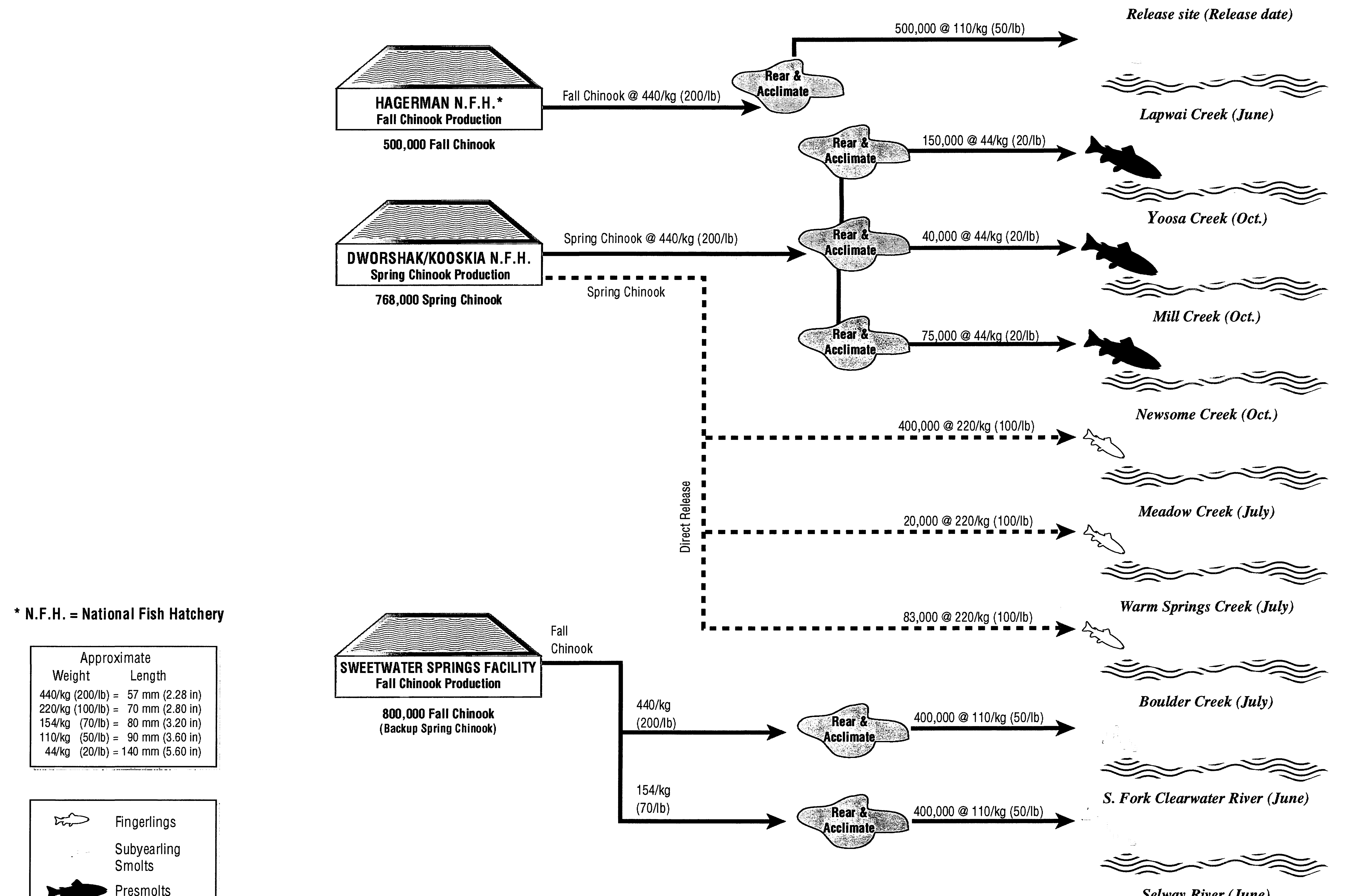


Figure 2-11
Existing Facilities Alternative - Incubation, Rearing, Acclimation, and Release Sites

After incubation and emergence, spring chinook fry will be kept in conventional raceways which would ***not*** be able to incorporate the use of:

- substrate
- subsurface feeding
- exposure to natural food
- velocity alteration to enhance swimming ability
- instream cover
- exposure to predators.

The only NATURES type rearing technique that could be employed at the existing facilities is shading (Miller, January 28, 1997). Spring chinook would be reared in the raceways until transferred to satellite facilities in May and June or released directly into the streams as fingerlings in June and July.

Fall chinook would likewise be reared in conventional raceways at Hagerman and then moved to the North Lapwai Valley satellite for final rearing before release.

During final rearing, at the satellites, the fish would be reared in the same conditions, using the same techniques as described in the Proposed Action.

Fish would not be reared at low densities until they are transferred to the satellite facilities. Typical rearing densities employed at the existing facilities would be used for fish during the early rearing portions of their life cycle. Thus, while the Proposed Action would rear 76-mm (3-inch) fish at a Piper Index of 0.10, the existing facilities would rear the same size fish at a density index of 0.35.

2.2.4.4 Release Techniques

Release techniques for this alternative would be the same as those described for the Proposed Action (see Section 2.1.3.4).

2.2.4.5 Adult Returns

The adult return model was applied to the production using existing facilities and the expected returns at 20 years into the future are shown in Table 2-5. There is considerable difference in returns using the two different alternatives. The Use of Existing Facilities Alternative does not produce enough returns to meet the broodstock needs for the program. The differences are caused by the lesser number of fall chinook in this alternative (500,000 at Hagerman versus 1,500,000 at Cherrylane) and the different survival rates applied to juvenile life stages for the fish produced at the existing facilities. Fall chinook returning from production at Sweetwater Springs, Cedar Flats and Luke's Gulch are the same as in the Proposed Action.

The differences and rationale for changes in juvenile survival rates are as follows:

Spring Chinook Parr-To-Smolt Survival — The assumed survival rate to smolt for spring chinook released from satellite ponds is 19.5 percent, which is the same as for the Proposed Action.

The assumed survival rate for spring chinook to smolt from direct stream releases is approximately 7 percent. This is less than that used for the Proposed Action because it is based on a 40 percent post-release survival (fingerling to parr and overwinter survival are the same as the Proposed Action). Maynard, et. al (1995) present information on the difference in survival rates between fish reared under NATURES and conventional hatchery raceways. Chinook released directly into the streams would have no NATURES conditions applied prior to release.

Spring Chinook Smolt-to-Adult Survival — The assumed survival rate for smolt-to-adult for spring chinook from satellite facilities is 0.18 percent (essentially double the current smolt-to-adult survival for Dworshak fish at 0.09 percent). Smolt-to-adult survival rates were doubled just as they were for the Proposed Action because it is assumed that measures taken for salmon recovery will be successful and that migratory passage conditions will be improved such that at least a 1:1 replacement rate occurs. The Dworshak NFH smolt-to-adult return rates were applied rather than those for Rapid River NFH because Dworshak NFH has its own record of returns.

The assumed survival rate for smolt-to-adult for spring chinook from direct stream releases is 0.27 percent (triple the current smolt-to-adult survival rate for Dworshak Hatchery fish). As in the Proposed Action, smolt-to-adult survival rates were tripled for spring chinook with direct releases because it is assumed that these fish would have an acquired fitness advantage by their extended rearing in the natural environment in addition to the benefits accrued by salmon recovery efforts.

Fall Chinook Subsmolt-to-Smolt Survival — The assumed subsmolt-to-smolt survival rate for fall chinook is the same as for the Proposed Action (50 percent) because the fish would be reared at North Lapwai Valley for a time under NATURES type circumstances.

Table 2-5 Expected Adult Salmon Returns from Hatchery and Wild Fish

Stream	Total Adult Returns	Adults Available for Broodstock	Adults Available for Natural Reproduction	Adults Available for Harvest
Spring Chinook				
Lolo Creek (1)	115	100	0	15
Mill Creek (1)	30	26	0	4
Newsome Creek (1)	58	50	0	8
Boulder Creek (2)	34	30	0	4
Warm Springs (2)	9	8	0	1
Meadow (Selway) (2)	164	142	0	22
Number at 20 years	**410**	**356**	**0**	**54**
Early Run Fall Chinook				
Luke's Gulch (3)	574	272	154	148
Cedar Flats (3)	574	272	154	148
Fall Chinook				
North Lapwai Valley (3)	739	340	208	191
Number of fall chinook at 20 years	**1,887**	**884**	**516**	**487**

(1) Assumes postrelease survival is 40% and smolt-to-adult survival is double the current rate.
(2) Assumes postrelease survival is 65% and smolt-to-adult survival is triple 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.

Fall Chinook Smolt-to-Adult Survival — The survival rate for smolt-to-adult for fall chinook is 0.18 percent (double the current 0.09 percent smolt-to-adult survival for Dworshak NFH spring chinook). Survival rates were doubled assuming salmon recovery efforts are successful.

2.2.4.6 Adult Collection

The adult collection program would be the same as for the Proposed Action, except as mentioned in Section 2.2.4.5, **Adult Returns**, broodstock needs would not be met. It is assumed that donor stock from some hatchery source would be provided to make up for the lack of eggs. (See Figure 2-12).

2.2.4.7 Broodstock Source and Management

The broodstock source and management would be the same as described for the Proposed Action.

2.2.4.8 Harvest Management

Harvest management would be as described under the Proposed Action.

2.2.4.9 Monitoring and Evaluation

Monitoring and Evaluation would be as described under the Proposed Action.

2.2.4.10 Costs

Costs for this alternative would be about $8 million (1997 dollars).

2.3 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 mitigation 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. Table 2-6 shows the expected adult salmon returns under this alternative.

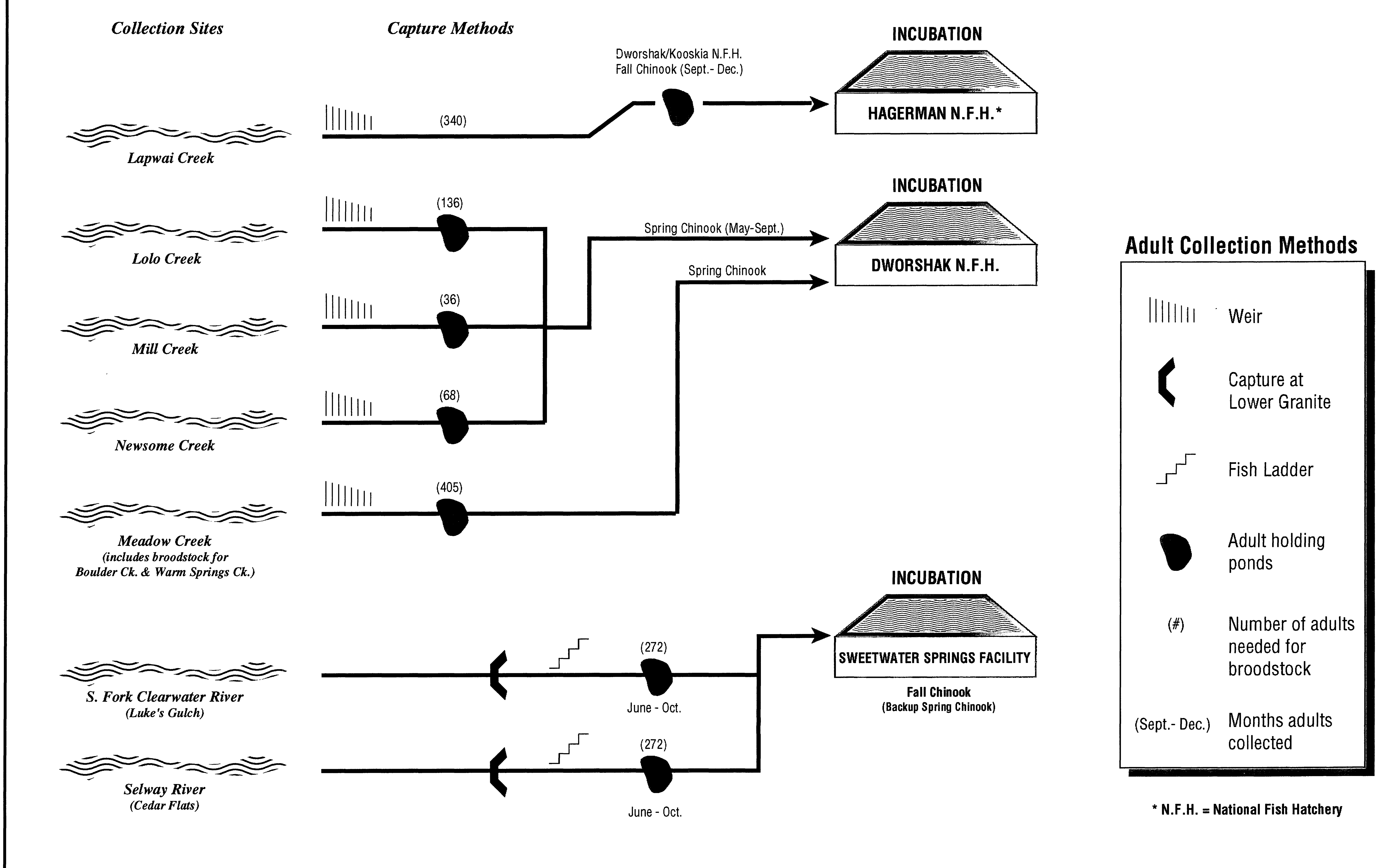


Figure 2-12
Existing Facilities Alternative - Adult Collection

Table 2-6 Expected Adult Returns from the No Action Alternative

Stream	Total Adult Returns (1, 2)	Adults Available for Broodstock	Adults Available for Natural Reproduction	Adults Available for Harvest
Spring Chinook				
Lolo Creek	56	0	48	7
Mill Creek	0	0	0	0
Newsome Creek	51	0	44	7
Boulder Creek	0	0	0	0
Warm Springs	0	0	0	0
Meadow (Selway)	65	0	56	8
Number at 20 years	**172**	**0**	**148**	**22**
Early Run Fall Chinook				
Luke's Gulch	0	0	0	0
Cedar Flats	0	0	0	0
Fall Chinook				
North Lapwai Valley	0	0	0	0
Number of fall chinook at 20 years	**0**	**0**	**0**	**0**

(1) Assumes spring chinook natural smolt-to-adult survival is triple current rate from Rapid River Hatchery.
(2) Assumes fall chinook natural smolt-to-adult survival rate is triple current rate from Lyons Ferry.

2.4 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.

2.4.1 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. 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.

2.4.2 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 would 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 have been undertaken in all of the streams (Lolo Creek, Mill Creek, and Newsome Creek) proposed for spring chinook satellite facilities for NPTH. Other spring chinook streams are partially or entirely within wilderness or roadless areas and habitat management impacts in their watersheds are few (Meadow Creek, Tenmile Creek, Johns Creek, Boulder Creek and Warm Springs Creek). Although these streams have been subject to fire, woody debris recruitment to the streams and the improved habitat complexity associated with wood, will occur through the reestablishment of a mature riparian canopy. Because of their roadless or wilderness nature, there are few opportunities or needs to actively improve habitat quality for fish.

There have been many different measures taken to improve fisheries habitat in those streams where habitat enhancement actions have occurred. They have focused on eliminating barriers to passage, abatement of road derived sediment, placement of instream structures and bank stabilization. Many of these habitat enhancement projects were implemented during the last 15 years as a result of the Northwest Power Act and the Columbia River Basin Fish and Wildlife Program.

Habitat improvement efforts continue. The Forest Service has an active fish habitat and watershed improvement program. They implement projects on an annual basis, concentrating on those roaded areas most affected by resource management activities. In addition, the Nez Perce Tribe has been funded to implement habitat improvement actions through BPA's Early Action Watershed program. These projects focus on road obliteration, fencing, passage improvement and sediment abatement in Lolo Creek, Eldorado Creek and Newsome Creek and other drainages in the Clearwater and Salmon River Basins. Future projects are also likely to be completed in Mill Creek and other non-NPTH streams. In summary, efforts to improve habitat in many streams in the Clearwater Subbasin are ongoing, but these efforts do not take direct action to restore natural seeding of salmon habitat.

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 purpose and need 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.

2.5 Comparison of Alternatives and Summary of Impacts

Table 2-7 provides a summary and comparison of the environmental consequences of each alternative based on the assumptions used in this EIS. Table 2-8 provides a comparison of the alternatives against the purposes defined for the program.

The Proposed Action would have the greatest amount of tribal harvest, employment, and management autonomy for the Nez Perce Tribe. The Existing Facilities Alternative would have lesser amounts and the No Action Alternative would result in no change in tribal harvest and management, and would create a loss in employment.

Potential for disturbance of cultural resources is greatest in the Proposed Action, less in the Existing Facilities Alternative and the least in the No Action Alternative. In any action alternative, the impact would be low because of monitoring and the ability to apply mitigative plans.

Impacts on geology and soils are expected to be low and short-lived for the Proposed Action and the Existing Facilities Alternative. Because of the additional construction at Cherrylane under the Proposed Action, impacts are expected to be greater in magnitude than for the Existing Facilities Alternative, but would still be low. No impacts are expected from the No Action Alternative.

Impacts to groundwater and surface water quantity and quality would be low for the Proposed Action and the Existing Facilities Alternative, although more groundwater would be used in the Proposed Action. No impacts to groundwater or surface water would result from implementation of the No Action Alternative.

Cherrylane is located outside the floodplain. Impacts from both action alternatives would be the same and are expected to have no effect on the floodplain. Although water collection systems and some satellite sites are within the 100-year floodplain, no rise in flood elevation, displacement of flood waters, storage volume or local increase in flood stage would be caused by either alternative. No impacts to the floodplain are expected from the No Action Alternative.

Eighteen categories of impacts were evaluated for the fisheries resource and they ranged in magnitude from none to moderate. The greatest impacts would occur from implementation of the Proposed Action. This alternative has the greatest potential for restoring naturally-spawning and rearing populations of salmon in the Clearwater Subbasin than the other alternatives. As a result, the aquatic ecosystem could return more toward a dependence on salmon as a principal component of the ecosystem.

Table 2-7 Summary of Impacts from Alternatives

Resources	Proposed Action	Existing Facilities Alternative	No Action Alternative
Nez Perce Tribe	High	Moderate	None -
Cultural Resources	Low +	Low	None
Geology and Soils	Low +	Low	None
Water Resources	Low +	Low	None
Floodplains	None	None	None
Fish	Moderate	Low	None -
Wildlife	Low +	Low	None
Vegetation	Moderate +	Moderate	None
Land Use	Moderate +, Low	Moderate, Low	None
Socioeconomics	Moderate +	Moderate	None -
Visual Resources	Moderate +, Low	Moderate, Low	None
Air Quality	Low +	Low	None
Public Health and Safety	Low +	Low	None
Costs	$17 million	$8 million	
+/- is weighting within that level of impact			

Table 2-8 Comparison of Alternatives to the Purposes

Purpose	Proposed Action	Existing Facilities Alternative	No Action Alternative
Protect, mitigate, and enhance Columbia River Basin anadromous fish resources.	Would meet to the greatest extent. Its genetic management plan coupled with the M&E Plan would serve to protect anadromous fish resources. In addition, this alternative results in the largest predicted adult returns and increase in natural spawning populations which would serve to meet the mitigation and enhancement goals.	Would meet to a lesser extent than the Proposed Action. Would apply the same protection elements, yet predicted adult returns would not be as great.	Would take no action to protect, mitigate and enhance fish resources.
Develop, increase, and reintroduce natural-spawning populations of salmon within the Clearwater River Subbasin.	Would meet this purpose to the greatest extent. As described above, this alternative would result in the largest predicted increase in naturally-spawning populations. Many of the returns would occur in streams or river reaches where historic populations have been eliminated or exist at remnant levels.	Would meet this purpose to a lesser extent because of the lower predicted returns. All activities are also within the Clearwater River Subbasin.	Would not meet the purpose. Any increase or reintroduction of spawning populations of salmon would occur only through natural rates of straying and colonization.
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.	Meets this purpose to the greatest extent because of the larger predicted returns.	Would meet this purpose to a lesser extent than the Proposed Action.	Would not meet this purpose.
Sustain long-term fitness and genetic integrity of targeted fish populations.	The broodstock management plan and M&E Plan would sustain the long-term genetic fitness and integrity of fish returns. Naturally-spawning chinook populations would be more abundant in this alternative and would be incorporated into the broodstock to a larger extent.	The broodstock management plan and M&E Plan would sustain the long-term genetic fitness and integrity of fish returns.	Would not meet this purpose.
Keep ecological and genetic impacts to non-targeted fish populations within acceptable limits.	The carrying capacity criteria, natural type rearing strategies, and acclimation to the return sites would serve to limit ecological impacts to non-targeted fish species. Larger returns of anadromous fish, and greater juvenile production would result in restoring the ecological balance of the salmon rivers and streams to a greater extent.	The carrying capacity criteria, natural type rearing strategies, and acclimation to the return sites would serve to limit ecological impacts to non-targeted fish species.	Would not meet this purpose.
Promote Nez Perce Tribal management of Nez Perce Tribal Hatchery facilities and production areas within Nez Perce Treaty lands.	Meets this purpose to the greatest extent.	Will not meet this purpose because it would continue non-Nez Perce management within the Nez Perce reservation boundaries by keeping the primary juvenile production at USFWS facilities.	Would not meet this purpose.

The action alternatives would result in the same short-term level of displacement and disturbance on individual wildlife species during construction. The Proposed Action has the greatest potential for beneficial impacts to those species dependent on fish for forage. The No Action Alternative will do nothing to improve the availability of forage, thus posing some detrimental impacts in comparison, although this alternative would not cause habitat disturbance by construction activities.

Moderate impacts are expected to vegetation as a result of either action alternatives and would stem from the removal of riparian vegetation for satellite and central incubation and rearing facilities construction. Impacts to the wetland at Yoosa/Camp Creek site would be moderate, depending on the number of trees removed and the amount of fill entering the wetland. The amount of area impacted and mitigation strategies would be determined after final designs are completed. At that time locations for mitigation would be coordinated with the appropriate agencies and land managers. At Luke's Gulch impacts to a seasonal wetland would be low. The No Action Alternative would have no impacts on vegetation.

Land use would change at all sites affected by implementation of the action alternatives. Moderate levels of impacts are assessed for those sites at which land use changes from agriculture to fish production (Cherrylane, North Lapwai Valley, Luke's Gulch). Land use changes at other satellite sites would be low. Impacts would be smaller in magnitude in the Existing Facilities Alternative than the Proposed Action because of the elimination of the Cherrylane site. No impacts are expected with the No Action Alternative.

Recreational use changes would result from an increase in fishing associated with larger fish runs in the action alternatives. Again, greater change in fishing might be expected with the Proposed Action. No changes would result from the No Action Alternative.

Socioeconomic impacts resulting from short-term construction, long-term employment, changes in property and sales taxes and the revenue brought in by greater fishing opportunities would be beneficial and greater with implementation of the Proposed Action than the Existing Facilities Alternative. No economic impacts would be accrued with the No Action Alternative.

Moderate impacts to visual resources would occur at Cherrylane, Luke's Gulch, and North Lapwai Valley. Low impacts are expected at the other satellite sites and at Sweetwater Springs. Because of the inclusion of Cherrylane, greater impacts are expected from the Proposed Action than the Existing Facilities Alternative. No impacts are expected from the No Action Alternative.

Low impacts to air quality are expected from implementation of the action alternatives and would be caused by vehicle emissions, construction activities and pumps. No impacts are expected from the No Action Alternative.

An increase risk of fire caused by new facilities and workers in otherwise rural and forested areas could result from the implementation of the action alternatives. Because of the inclusion of Cherrylane, greater impacts would occur from the Proposed Action than the Existing Facilities Alternative. No impacts are expected from the No Action Alternative.