

## Chapter 3 Affected Environment

In this Chapter:

- Existing human and natural resources
- Protected Resources

This chapter describes the existing environment that would be affected by the alternatives. For most resources, the facilities proposed in the Use of Existing Facilities Alternative are not included in the Affected Environment because these facilities have been developed previously and resources such as land use, soils, etc. have been disturbed or otherwise affected.

### ➔ For Your Information

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

*Map 2 shows the Nez Perce territory.*

### 3.1 Nez Perce Tribe

#### 3.1.1 Importance of Salmon to the Nez Perce Tribe

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

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

Industrialization brought on the decline of salmon runs through intensive salmon canning operations, dams, irrigation, mining, and timber harvest. Salmon runs have been drastically reduced and harvest occurs in only a few specific areas. Nevertheless, salmon remain important to Nez Perce culture and subsistence. The Nez Perce Tribe regulates tribal member harvest within the reservation, ceded lands, and usual and accustomed

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

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

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

➔ For Your Information

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

fishing areas by opening and closing seasons and setting harvest limits and gear restrictions. Table 3-1 shows recent salmon harvests by the NPT in the Columbia River and at upriver hatcheries.

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

### 3.1.1.1 Treaty Fishing Rights

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

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

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

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

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

In 1905, the United States vs. Winans case established what a “right” implied. The case involved a non-tribal member who attempted to prevent tribal members from fishing at a traditional site by buying and then claiming absolute title to the land (American Indian Resource Institute, 1988). The Supreme Court ruled against this claim and established two important precedents. First, hunting and fishing rights are not rights granted by the government to tribal signatories, but rather they are rights reserved by the tribes in exchange for lands (American Indian Resource Institute, 1988). Second, tribal members cannot be barred from accessing their usual and accustomed fishing sites since their reserved right is essentially an easement over private as well as public lands (Cohen, 1982).

In 1974, a case tried in Washington Federal District Court established what was meant by the right of tribes to harvest fish “in common” with the citizens of the territory. Judge Boldt’s decision relied heavily on understanding the situation under which the treaties were written. The court determined two distinct entities were involved during treaty making, Indian tribes and the United States. The separation of two political entities effectively denied the state’s assertion that all citizens have the same rights with respect to harvesting fish. In their treaties ceding land to the United States, these specific tribes had reserved the right to harvest fish in a manner that allows them to maintain their way of life.

The understanding that there are only two entities involved, was then applied to actual allocation of harvestable fish. The court’s interpretation was that harvest “in common” meant equal distribution between the two entities, or that each is allowed a 50/50 share (American Indian Resource Institute, 1988). Judge Belloni applied the 50/50 principle to Columbia River fisheries in U.S. v. Oregon in 1975 (Nez Perce Tribe, et al., 1995).

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

### 3.1.2 Demographics and Employment

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

#### ➔ For Your Information

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

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

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

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

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

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

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

## 3.2 Cultural Resources

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

### 3.2.1 Prehistory

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

### 3.2.2 History

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

#### For Your Information

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

In 1836, Henry Spalding established a mission near Lapwai at the request of the Nez Perce (Ruby and Brown, 1986). The missionaries taught reading and writing and introduced farming to the area (Haines, 1955). In 1838, the Smiths opened a short-lived mission around Kamiah. In 1855, the Nez Perce signed a treaty with the United States. Gold was discovered in the North Fork of the Clearwater in 1861 and this ushered in the mining period and the resulting influx of Euro-Americans. Lewiston and other mining camps developed during this time, though the mining activity and townsites were in trespass on the Nez Perce Reservation (Mattson, et al., 1983). The result of this intrusion was that the Nez Perce were forced to sign another treaty in 1863 that created the reservation boundaries existing today.

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

### 3.2.3 Study Area

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

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

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

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

#### ➔ Reminder

*The existing hatcheries proposed in the Use of Existing Facilities Alternative were not included in the study area because the land has been disturbed.*

### 3.3 Geology and Soils

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

#### 3.3.1 Geology

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

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

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

##### 3.3.1.1 Central Incubation and Rearing Facilities

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

##### 3.3.1.2 Satellite Facilities

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

#### ➔ For Your Information

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

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

### 3.3.1.3 Spring Chinook Direct Release Sites and Weir Sites

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

### 3.3.1.4 Seismic Hazard

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

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

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

## 3.3.2 Soils

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

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

### 3.3.2.1 Central Incubation and Rearing Facilities

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

 **Reminder**

The existing hatcheries proposed in the Use of Existing Facilities Alternative were not included in the study area because the land has been disturbed.

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

### 3.3.2.2 Satellite Facilities

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

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

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

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

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

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

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

### 3.3.2.3 Spring Chinook Direct Release Sites and Weir Sites

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

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

#### ➔ For Your Information

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

## 3.4 Water Resources

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

### 3.4.1 Groundwater

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

#### 3.4.1.1 Central Incubation and Rearing Facilities

At Cherrylane, two wells can provide 18.9 m<sup>3</sup>/min for the proposed facilities (see Table 2-1). Projected depth to water (drawdown) for wells at this pumping rate is less than 30 m

 **Reminder**

The existing hatcheries proposed in the Use of Existing Facilities Alternative were not included in this section because water is currently being used at the hatcheries (see Section 2.2.1, Facilities Description and Operations Summary).

(100 ft) after 100 days of pumping. Water quality, quantity and temperature would remain relatively constant even if a well is operated year-round. Groundwater temperature at the site is relatively warm, 17 degrees C (62 degrees F), and would be mixed with surface water in the winter and summer to provide temperature control. The water supply at Cherrylane is of acceptable quality and quantity for fish culture purposes.

Groundwater (spring flow) is currently used at the Sweetwater Springs facility and is of acceptable quality and quantity for fish culture purposes. The spring provides approximately 3.4 m<sup>3</sup>/min of 9-10 degree C (48-50 degree F) water year-round (Montgomery Watson, 1994). This spring serves existing hatchery facilities and has been shown to be adequate for incubation and salmon rearing. The existing spring would be the only source of water supply at this site. The proposed facility lies upstream of Sweetwater Diversion Dam, which diverts water into Reservoir A (Mann Lake). Both of these facilities are part of the Bureau of Reclamation's Lewiston Orchards Project, which provides irrigation, municipal, and industrial water to the Lewiston Orchards Irrigation District.

#### **3.4.1.2 Satellite Facilities**

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

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

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

Surface water would be used at all other satellite facilities.

#### **3.4.1.3 Spring Chinook Direct Release Sites and Weir Sites**

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

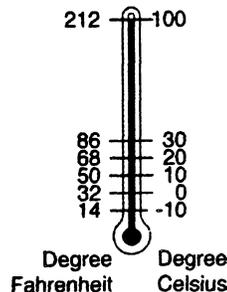
### 3.4.2 Surface Water

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

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

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

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



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

#### 3.4.2.1 Central Incubation and Rearing Facilities

The Cherrylane site is on the mainstem of the Clearwater River. Monthly average minimum river flows at Spalding, which is 9.6 km (8 miles) downstream, typically range from a minimum of 18.9 m<sup>3</sup>/min (5,000 cfs) in October to a maximum of 59 455 m<sup>3</sup>/min (35,000 cfs) in June (Arnsberg, et al., 1992). About 11.4 m<sup>3</sup>/min is needed to add to the available groundwater at the site. This site could potentially be exposed to contamination from spills on U.S. Highway 12.

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

#### **3.4.2.2 Satellite Facilities**

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

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

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

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

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

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

The Yoosa/Camp Creek site is at the convergence of Yoosa and Camp creeks. The proposed facility would withdraw a portion of its water supply from each stream. As neither of these streams appears to have been gauged, monthly flow was estimated using data from lower in the Lolo Creek system at the Section 6 Bridge.

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

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

The Mill Creek site is about 3.2 km (2 miles) from the mouth of the creek at the Clearwater River. Mill Creek has not been gauged in the past so it was necessary to estimate the monthly streamflow using an estimate based on Fish Creek. Fish Creek near Lowell, Idaho, has a similar drainage area, elevation, and forest cover as Mill Creek. The flow data are based on Fish Creek, adjusted by the ratio of drainage areas for the two basins. Due to site-specific differences in precipitation and runoff, true streamflow at this site could vary significantly from predicted values. Available streamflow at the Mill Creek site appears to be adequate for the required facility flows, 1.1 m<sup>3</sup>/min (300 gpm), for any month during the year.

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

### ➔ For Your Information

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

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

The Newsome Creek site is upstream from the confluence of Newsome and Beaver creeks. The site is on dredged tailing deposits from upstream mines. Although Newsome Creek was extensively dredge mined, the USFS has worked to mitigate the effects or potential effects from an abandoned placer mine upstream over the last 20 years. BPA and USFS also have been actively restoring and enhancing riparian habitat along Newsome Creek. The USFS has been attempting to trap sediment and keep it from entering Newsome Creek since 1985. The agency has recently implemented a rehabilitation plan to keep sediment out of the creek. The project involves maintaining and reinforcing existing sediment traps to prevent sediment from reaching the waterway. The rehabilitation of the **gloryhole** is necessary to reduce the potential for a major catastrophic event, according to the USFS. This proposed project is scheduled to be completed in 1997. The water quality in Newsome Creek is considered good.

Streamflows were estimated for Newsome Creek using a hydrological estimate based on Fish Creek. Streamflow is adequate for the required flows, 2.3 m<sup>3</sup>/min (600 gpm), for the alternatives.

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

#### **3.4.2.3 Spring Chinook Direct Release Sites and Weir Sites**

All spring chinook direct release sites and weir sites are in the upper reaches of the South Fork Clearwater, Selway, and Lochsa rivers and their tributaries. These sites were selected because they have acceptable water quality, instream habitat, and streamflows for natural production. In general, similar water quality is expected at the Yoosa/Camp Creek, Cedar Flats, Mill Creek, and Newsome Creek sites, which are also located in the upland region. At these satellite sites, water temperature was the primary water quality characteristic of concern. Water temperature is expected to be within recommended standards during the periods when the facilities are operating.

### **3.5 Floodplains**

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

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

#### **3.5.1 Floodplain Determination Methods**

FEMA has not prepared floodplain maps for any of the proposed facility sites. To determine the 100-year floodplain at each site, the 100-year flood elevation was estimated and compared to the elevation at the site. Analysts used existing U.S. Geological Survey stream gauge records at stream locations as close to each site as possible to determine channel characteristics

at each site: slope; channel roughness; bottom width, and top width. The data were then used to determine a channel's flood capacity.

### 3.5.2 Central Incubation and Rearing Facilities

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

#### ➔ Reminder

The existing hatcheries proposed in the Use of Existing Facilities Alternative were not included because the land has been disturbed.

### 3.5.3 Satellite Facilities

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

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

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

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

### 3.5.4 Spring Chinook Direct Release Sites and Weir Sites

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

## 3.6 Fish

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

### 3.6.1 Overview of Historical and Contemporary Fish Communities

The historical fish community in the Clearwater River Subbasin was structured from headwater to lower elevation reaches. Species diversity and **biomass** generally increases downstream in response to increased water temperatures, productivity, habitat size, and niche diversity (substrate, food types, etc.). Fish species in headwater reaches such as cutthroat and bull trout, generally require cooler water temperatures, feed primarily on aquatic and terrestrial insects, and are limited in numbers by physical factors such as the availability of pools and cover. Species found at lower elevations tend to be more temperature tolerant, are either **omnivorous** or large invertebrate-fish predators, and are regulated in number to a greater degree by biological rather than by physical factors (Li, et al., 1987).

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

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

#### ➔ For Your Information

**biomass** *Total weight of organisms per unit volume.*

**omnivorous** *Eating both plant and animal substances.*

**thermal regime** *Temperature regime.*

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

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

#### ***3.6.1.1 Causes of Change in the Fish Community***

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

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

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

**Human Disturbances** — The activities of humans, including land development and use, resource extraction, recreation, dam construction, water withdrawals and diversions have altered the natural condition of the Clearwater River Subbasin. The result has been the loss, degradation, and simplification of aquatic habitat.

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

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

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

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

Many of the physical changes have been so severe and have occurred so fast that the resident biota and natural recovery processes have been unable to adjust and compensate. For example, logging, road building, mining, and agricultural activities are known to cause many adverse effects including higher water temperatures, increased erosion and sediment input to streams, and decreased instream and streambank cover. These types of disturbances have a much greater impact on the aquatic environment because they occur over a larger area and at much more frequent intervals than does fire.

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

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

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

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

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

**Fishing** — Fishing was another major cause of change in the relative abundance of salmon and trout in the Clearwater River system. Chinook, coho, sockeye, and, to a lesser extent steelhead from the Columbia River were harvested in ocean and freshwater commercial fisheries that grew rapidly in the later parts of the 1800s. The annual catch of Columbia River salmon peaked in 1883 at 20 400 metric tons (21,400 tons), declined to around 11 900 metric tons (12,500 tons) by 1890, and fluctuated about this level for the next quarter century (Beiningen, 1976). At an average of 9 kg/fish (20 pounds/fish), this equals 1.5 to 2.5 million fish a year. The apparent stability of the fishery belied the over-exploitation and rapid decline in abundance of spring and summer chinook that occurred during this period. As stocks of spring and summer chinook were depleted, the fishery began to target fall chinook. Until Lewiston Dam was built, Clearwater chinook populations were probably affected to the same extent by these activities as other Snake River tributary populations (Craig and Hacker, 1940).

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

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

In the past, non-native resident rainbow trout and cutthroat trout were raised in hatcheries and released into Clearwater streams and lakes by the IDFG with the goal of augmenting the

recreational fishery. There is no evidence that these fish have established viable populations, but they may have hybridized with locally adapted fish. They also attracted anglers who killed juvenile steelhead, chinook, and bull trout.

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

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

## **3.6.2 Fish Biology**

### **3.6.2.1 Chinook Salmon**

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

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

The best available scientific information indicates that Snake River spring chinook and summer chinook make up a single species or ESU (Matthews and Waples, 1991) that is distinct from the Snake River fall chinook ESU (Waples, et al., 1991). Snake River spring/summer chinook (henceforth referred to as spring chinook) are stream-type chinook. Snake River fall chinook are ocean-type chinook. Spring chinook are readily differentiated from fall chinook salmon. Fall chinook salmon pass Bonneville

Dam in August through October, spawn later in the fall, spawn and rear in mainstem areas rather than in tributaries, outmigrate in their first year of life, and possess unique genetic characteristics.

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

**Spring Chinook Salmon** — Adult spring chinook, primarily 4-year olds but ranging in age from 3 to 5 years, return to the Clearwater River Subbasin from May through September. They typically hold in deep pools until spawning in late August or September. Early arriving spawners tend to spawn earlier and at higher elevations than late arriving spawners. Spring chinook spawn in cool, low to moderate gradient streams that provide good summer-long rearing conditions for juvenile fish. Spawning and rearing habitat includes most tributaries of the upper Clearwater River Subbasin (see Map 4). As is typical of salmonids, eggs are deposited in redds dug in suitable spawning gravel. There are no similar-sized fish spawning at the same time as the salmon, so hybridization is unlikely and competition for spawning and incubation habitat is between similar salmon.

Depending on water temperatures, spring chinook fry in the tributaries of the Clearwater River usually hatch in December and emerge from the gravel in late February and March, but they may emerge as late as June (U.S. Department of Commerce, NMFS, 1995). Emergent fry disperse downstream into pools and other low velocity areas. As they grow larger, juvenile chinook live closer to the head of the pools where there is better access to drifting food. Aquatic and terrestrial immature and adult insects are the primary food of juvenile chinook.

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

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

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

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

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

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

- Hatchery records from the early 1900s indicate that a late spawning (early September to end of October), subyearling outmigrant form of wild summer chinook historically

occurred in the Grande Ronde River, a nearby tributary to the Snake River that is similar in size to the Clearwater River;

- A similar race of ocean-type summer chinook salmon presently returns to tributaries of the mid-Columbia River and,
- Ocean-type summer chinook have the spawning times and juvenile life histories that are best matched to the temperature regimes found in the mainstem Clearwater River and lower portions of its major tributaries.

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



The type and quality of habitat present in the system suggests that summer chinook production is possible. Cramer (1995a) examined the temperature regimes of upper Clearwater and Selway rivers and found that mean monthly temperatures in those streams generally drop to 2 degrees C (36 degrees F) by mid-to-late November. Studies indicated that spawning cannot occur before water temperatures have dropped below 14 degrees C (52 degrees F), which is the tolerance limit of freshly spawned eggs. Spawning must also occur early enough for the eggs to develop to a stage at which they can tolerate near-freezing temperatures. Embryonic development must progress to the eyed stage before temperatures reach 2-5 degrees C (36-41 degrees F) if the eggs are to avoid excessive mortality (Beacham and Murray, 1987). Cramer (1995) compared the temperature data with the biological tolerances of chinook and the substrate conditions to determine that a summer chinook would be suitable to outplant in the lower Selway River (see Map 4). The progeny of summer chinook that spawn in these areas would migrate to sea in their first summer of life to avoid high water temperatures in the upper Clearwater during summer.

**Fall Chinook Salmon** — Snake River fall chinook (which includes those bound for the Clearwater) usually pass Bonneville Dam beginning in August and Lower Granite Dam by mid-August. They spawn predominantly in the Snake River, but also in lower reaches of its larger tributaries, the Clearwater, Grand

Ronde, Imnaha and Salmon rivers. Recent redd counts show that approximately one quarter of the fall chinook spawning in the Snake River Basin above Lower Granite Reservoir occurs in the Clearwater River (Table 3-3). Spawning occurs from October through November. Age at spawning varies from 2 to 5 years, and is usually 3-4 years. No other large fish spawn on the gravel bars of larger rivers in the fall, which indicates there is little competition and chance for hybridization.

In the Clearwater, fall chinook fry emerge in April through May which is approximately one month later than fry emerging in the Snake River (Connor, et al., 1993). Juvenile fall chinook disperse into low-velocity, near-shore areas where they rear for several weeks before smolting and actively migrating downriver. In the Snake River, if an area of the mainstem is at carrying capacity, densities of fall chinook smolts could be expected to range from 180 fish/100 m<sup>2</sup> in good habitat to 66 fish/100 m<sup>2</sup> in fair habitat (NPT and IDFG, 1990). In these areas, they compete for space with similar sized shiners, suckers, and dace. Zooplankton, and later, macro-invertebrates predominate in juvenile fall chinook diets.

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

Snake River fall chinook spend 1 to 4 years (usually 3) in the ocean before returning to freshwater to spawn. No reliable information is available regarding the ocean distribution of Clearwater River fall chinook. However, if it is assumed that their distribution is reflected by the pattern of recoveries of tagged Lyon’s Ferry Hatchery fall chinook in the ocean fishery, then over 95 percent of Clearwater fish rear off the coasts of Washington, Oregon, and California (Busack, 1991). They are subjected to intense fisheries in the ocean and in the lower Columbia River. Ocean and inriver harvest rates of wild Snake River fall chinook have decreased in recent years. For example, the 1988-1990 ocean harvest averaged 16.9 percent compared with 13.9 percent in 1991. Inriver harvest averaged 47 percent for 1988-1990, 27 percent in 1991, and 20 percent in 1992.

**Table 3-3 Fall Chinook Redd Counts**

Fall Chinook Redd Counts by Aerial Surveys, 1986-1995									
Year	Snake		Clearwater		Grande Ronde		Imnaha		Total
	Count	Percent of Total	Count	Percent of Total	Count	Percent of total	Count	Percent of Total	
1986					0				0
1987	59				7		1		67
1988	43	65%	21	32%	1	2%	1	2%	66
1989	47	81%	10	17%	0	0%	1	2%	58
1990	29	78%	4	11%	1	3%	3	8%	37
1991	41	84%	4	8%	0	0%	4	8%	49
1992	45	57%	26	33%	5	6%	3	4%	79
1993	59	40%	36	24%	49	33%	4	3%	148
1994	51	50%	37	36%	15	15%	0	0%	103
1995	41	49%	20	24%	18	22%	4	5%	83
Average (1988-1995)	44.5	63%	19.75	23%	11.1	10%	2.5	4%	77.9

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

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

### 3.6.2.2 Steelhead

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

Juvenile steelhead rear in a variety of habitat types, moving into progressively faster and deeper water as they increase in size. Highest densities are found in moderate-to-steep gradient stream channels. In Idaho, if a stream is at carrying capacity, densities of steelhead smolts could be expected to range from 10 fish/100 m<sup>2</sup> in excellent habitat to 3 fish /100 m<sup>2</sup> in poor habitat (NPT and IDFG, 1990). Steelhead smolt after one to three (typically two) years of stream residency; the length of time depends on growing conditions. A small percentage of juvenile steelhead do not

smolt and remain lifetime residents in freshwater. The smolt outmigration period extends from mid-March to June. Steelhead spend one to two years (A- and B-run fish), and sometimes three years (B-run fish) in the ocean before returning to freshwater. Repeat spawning, a relatively common occurrence among coastal populations of summer steelhead, is uncommon among Snake River steelhead.

Although the indigenous strain of steelhead remains intact and scattered throughout the Clearwater system, wild fish have declined in number and are less widely dispersed than in former times. Most of the steelhead that spawn naturally are wild fish; few if any hatchery fish contribute to natural production. Runs of naturally-spawning adult summer steelhead to the Subbasin have ranged from a low of near 1,000 in 1975-77 to a high of 8-9,000 in 1982-83 (NPT and IDFG, 1990). Approximately 2,700 and 1,000 B-run steelhead are estimated to have passed Lower Granite Dam in the 1994-95 and 1995-96 run years (IDFG data). The percentage going into and spawning in the Clearwater and Salmon river subbasins is unknown.

### **3.6.2.3 Cutthroat Trout**

The westslope cutthroat trout is common throughout the Clearwater River Subbasin, particularly in smaller tributaries higher up in the system. Both non-migratory (resident) and migratory (*adfluvial*) forms of westslope cutthroat trout are present. The resident form is the more common of the two. They spawn, rear, and complete their life cycle within a limited geographic range, usually in headwater reaches upstream of barriers to anadromous fish. Densities of cutthroat from streams characterized as having strong populations, average 2-10 per 100 m<sup>2</sup> (Rieman and Apperson, 1989).

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

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

#### 3.6.2.4 Bull Trout

This member of the genus *Salvelinus* is distinguished by being a large fish-eating predator with an adfluvial life history. They have comparatively narrow habitat preferences, and are long lived, highly mobile, and have been targeted in a fishing program because they eat other fish. Historically, bull trout ranged throughout the upper Clearwater drainage downstream of migration barriers. They prefer to spawn and rear in localized areas, in small, cold, high altitude streams. As juveniles, bull trout coexist with cutthroat and brook trout, but they are a relatively minor component of the assemblage. Densities from streams where the alternatives would occur are less than one fish/100 m<sup>2</sup>. As they grow in size, they prefer larger stream or river habitats and feed on juvenile chinook and other small fishes. Young chinook, steelhead and cutthroat are common in their diets. After reaching sexual maturity (5-8 years), bull trout return to spawn in natal streams. Mature bull trout reside in mainstem reaches at least as far downstream as the Middle Fork Clearwater near Kooskia, Idaho. Some fish move into the lower ends of small tributaries in the summer to avoid higher mainstem temperatures.

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

In June 1997, the USFWS proposed the bull trout for listing as threatened in the Columbia River. The USFWS is now taking public comment on the proposed listing. No formal federal restoration effort has yet been developed. A description of the relationship of the state of Idaho's bull trout conservation plan with NPTH is presented below.

Idaho Governor Phil E. Batt proposed a State of Idaho Bull Trout Conservation Plan in 1996. The conservation plan focuses on bull trout recovery within select key watersheds. Most NPTH treatment and control streams (with the exception of Lolo and Eldorado Creek) are within sselect key watershed areas. Principal conservation activities have not yet been developed, but the plan indicates that they will focus on alleviating human-caused habitat related impacts such as sediment sources, loss of bank cover and stability, migration barriers and poaching. The plan states that the loss of anadromous fish runs has led to a lack of prey for bull trout. Consequently, supplementation of chinook could increase that prey base serving to enhance bull trout populations.

### **3.6.2.5 Brook Trout**

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

### **3.6.2.6 Mountain Whitefish**

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

### **3.6.2.7 Other Species of Fish**

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

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

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

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

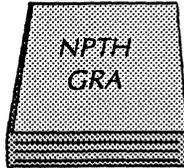
Pacific lamprey were at one time distributed widely in the Clearwater River and constituted a major source of food for the Nez Perce Indians. Large numbers of adult lamprey were observed in the Lewiston Dam fish ladder during early years of observation (Schoning, 1940). Although accurate estimates of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

The sedentary lamprey larvae remain buried for five or more years in soft substrate, slackwater areas in the main channel and low elevation tributaries before metamorphosing and emigrating to the ocean in the spring. They spend 12 to 20 months in the ocean living as parasites on other fish before entering freshwater in April to August. Lampreys mature sexually over winter and spawn from April to July.

### **3.6.3 Existing Condition of Fisheries**

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

### 3.6.3.1 Tributary Streams (Spring Chinook Habitat)



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

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

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

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

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

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

Spring chinook redd surveys have also been conducted on a regular basis in two of the NPTH control streams, Eldorado Creek and Brushy Fork Creek. No spring chinook redds have been observed in Eldorado Creek since 1989, when spawner surveys were initiated. Redd counts for Brushy Fork Creek, which have been recorded since 1972, have ranged from 4 in 1994 to a high of 57 in 1993 (see Table 3-6).

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

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

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

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

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

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

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

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

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

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

Sources:

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

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

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

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

### **3.6.3.2 Mainstem Rivers (Fall Chinook Habitat)**

Anecdotal evidence suggests that a late spawning race of chinook salmon, most likely fall chinook, were indigenous to the Clearwater River Subbasin. But because of the Lewiston Dam, lack of biological study, and effects of the turn of the century commercial fishery downriver, the characteristics of the run are unknown. The biologist R.W. Schoning reported that the Clearwater River historically supported runs of fall chinook (Schoning, 1940). He recounts conversations with Lewiston residents who observed chinook trying to ascend Lewiston Dam as late as mid-October or remember spearing fall chinook in the

**Table 3-7**  
**Juvenile Salmon Densities from NPTH Treatment and Control Streams**

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

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

Sources:

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

Table 3-8

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

Stream	Adult Spawners	Parr Capacity	Smolt Capacity	Percent Utilized
<b>Treatment Streams</b>				
Lolo Creek (1)	637	234,989	157,443	4
Mill Creek	193	N/A	N/A	N/A
Newsome Creek	108	71,367	47,816	0
Boulder Creek	268	98,889	66,256	0
Warm Springs	69	25,303	16,953	1
<b>Total Production Potential</b>	<b>1,275</b>	<b>430,548</b>	<b>288,468</b>	
<b>Control Streams</b>				
Eldorado Creek	263	97,194	65,120	0
John's Creek	136	50,235	33,657	0
Tenmile Creek	163	60,313	40,410	9
Fish Creek	460	169,718	113,711	0
Brushy Fork Creek (2)	316	116,590	78,115	7
Meadow Creek	1,347	497,182	333,112	1
<b>Total Production Potential</b>	<b>2,685</b>	<b>927,730</b>	<b>621,580</b>	
Predicted by the Smolt Density Model (MEG, 1989). Adult spawners back-calculated from Smolt Density Model. Percent utilized estimates were provided by the NPT. (1) Does not include Eldorado Creek (2) Includes Spruce Creek				

Selway River just before freeze up in years prior to dam construction. Interviews with NPT members who observed fishing or fished for salmon themselves in the Clearwater River before Lewiston Dam was built also indicate that chinook salmon supported a viable aboriginal fisheries well into November (Lane, et al., 1981).



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

Fall chinook counts were discontinued after the removal of Lewiston Dam in 1973. No further estimates of fall chinook abundance were obtained until 1988 when Nez Perce and USFWS biologists began to conduct annual aerial spawning surveys. Since then, an average of 20 redds per year have been counted in the Clearwater River (See Table 3-9). The redds are distributed rather evenly from the confluence of the North Fork to the confluence with the Snake, with the greatest number found on the island just upstream of Cherrylane (Arnsberg, 1996).

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

The mainstem Clearwater River also provides overwinter and early rearing habitat for salmon and steelhead. From evidence found in outmigration studies, a significant portion of the juvenile steelhead and spring chinook occupy the mainstem river from November until smolting in the spring. Fall chinook incubate and spend 1-3 months in the mainstem river before beginning their downstream migrations. During the summer, most salmonids are absent from the mainstem. Water temperatures become too warm in lower reaches of the Clearwater River to permit high rates of growth

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

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

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

and survival. In addition, juvenile salmonids do not fare well in association with warmwater fish species, many of which compete for the same resources or prey upon smaller salmonids.

The fish component of the mainstem Clearwater River has been evaluated in recent studies by the Nez Perce Tribe (Connor, 1989, and Arnsberg, et al., 1992). Connor (1989) reported that, in 1989, chinook parr were uncommon. Steelhead parr and residualized hatchery smolts were more abundant, but still in the low range (less than 1 fish/100 m<sup>2</sup>). Redside shiners, largescale suckers and mountain whitefish were the most abundant species observed in their study.

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

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

**Potential Production** — The potential production of large river habitats is more difficult to assess than for smaller. There are no reliable ways of determining existing or potential densities in a river habitat, or measuring the amount of habitat available. Computer model simulations have been used to predict the amount of habitat area for spawning and rearing salmon in river

habitats at different flows, and information on the Clearwater River comes from such studies. Arnsberg, et al. (1992) reported modelling that indicates the lower mainstem Clearwater River can provide habitat for as many as 90,000 chinook salmon redds, which they also believe is an overestimate. But if a more realistic accounting of spawning area could support even half that amount, the production potential in the Clearwater would be enormous. Assuming there are 45,000 redds, with 4,000 eggs per redd, and that a quarter of those survive to smolt, a rough estimate is that as many as 45 million chinook smolts could be produced in the lower river. Arnsberg, et al. (1992) reported that the habitat modelling shows the river does not have a large amount of fry habitat because of the high velocities. But fry from large river spawners, such as fall chinook, migrate during their first year anyway. Larger rivers are underseeded now and the potential for production for a subyearling migrant is vast.

### **3.7 Wildlife**

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

#### **3.7.1 Waterfowl**

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

#### **3.7.2 Upland Game Birds**

Upland game birds such as ring-necked pheasant, mourning doves, chukar partridges, and valley quail occasionally use the riparian habitats near the Cherrylane, North Lapwai Valley, and Sweetwater Springs sites (Asherin and Orme, 1978). Riparian vegetation in the lower Clearwater and Salmon rivers provide nesting cover and winter food sources for game birds. Blue and ruffed grouse make transitory use of upland riparian habitats

associated with the spring chinook satellite facilities. The Cherrylane, North Lapwai Valley, and Sweetwater Springs sites have been previously disturbed and much of the bird habitat has been altered by agricultural activities and existing fish hatchery facilities.

### **3.7.3 Aquatic Fur Bearers**

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

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

### **3.7.4 Big Game**

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

### **3.7.5 Raptors**

According to Asherin and Claar (1976) and Asherin and Orme (1978), riparian forests and wetlands along the Columbia, Snake, and Clearwater rivers provide perching and nesting opportunities and concentrated prey for up to 24 raptor species. Of these, only the

osprey, northern harrier, and bald eagle are directly associated with riparian and wetland habitats. The bald eagle is discussed in Section 3.7.7, **Threatened and Endangered Wildlife**.

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

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

### **3.7.6 Other Wildlife**

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

### **3.7.7 Threatened and Endangered Wildlife**

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

Other federally-listed wildlife species found or potentially occurring in upland tributary watersheds are the grizzly bear (threatened), peregrine falcon (endangered) and the gray wolf

(endangered). These species historically used the lowland and upland habitats of the area. There have been no confirmed reports of grizzly bears on the Clearwater and Nez Perce National Forests since 1956 (Davis, 1994 and Blair, 1995). The Selway Bitterroot Wilderness, located in the Lochsa and Selway river watersheds, will be the likely proposed recovery area for the bear and the recovery area will be determined after release of the Final EIS for the grizzly bear recovery. The greatest potential impacts to the grizzly bear resulting from land/resource management activities would result from an increase in road density, substantial increase in human activity within a previously undisturbed habitat, reduction of forage, or directed hunting activities.

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

The gray wolf has been listed as endangered on the Clearwater and Nez Perce National Forests. The U.S. Fish and Wildlife Service currently considers the gray wolf nonessential experimental status, according to Section 10(j) of the ESA of 1973, as amended. Nonessential experimental animals located outside national park lands and national wildlife refuges are treated for purposes of Section 7 of the Act as if they were only proposed for listing (*Federal Register*, November 22, 1994). (See Section 5.2, **Endangered and Threatened Species** for more information.)

The project area for the NPTH lies completely within the Central Idaho Experimental Management Area for the recovery of the gray wolf in Idaho. Gray wolves were captured in Canada in 1995 and 1996. Fifteen wolves were released in Idaho in 1995 and 20 wolves in 1996. As of March 12, 1997, 28 wolves released under experimental rules outlined in the Federal Register (Vol. 59, No. 224, Endangered and Threatened Wildlife and Plants; Establishment of a Nonessential Experimental Population of Gray Wolves in Central Idaho and Southwestern Montana, pp. 60266 - 60281), remain free roaming within the recovery area (Idaho Wolf Updates, 1997). Of the 28 collared wolves in the recovery area, eight were last known to be north of the Salmon River. One pair found in the upper North Fork drainage has a collared wolf that joined with a non-collared wolf. One animal is found in the Oriole Creek drainage on the Idaho-Montana border, and one is in the White Sands Creek area. One pair was in the upper Selway Creek area. Locations can vary from week to week.

All project sites located in the upper drainages of the Clearwater River could fall within the home range of these free roaming wolves, however, none of the listed project sites are known to have denning or rendezvous sites located near them.

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

Several sensitive species (including plants) are found in riparian habitats of the upland areas. Sensitive wildlife species that may frequent the riparian habitats of satellite sites are the Harlequin duck and the Coeur d' Alene salamander. Harlequin ducks have been observed in the Lochsa and Selway rivers and their larger tributaries. Harlequin ducks are diving ducks that winter along the Pacific coast and then migrate inland to nest along forested, mountain streams. Harlequin ducks prefer streams in canyons, or meandering and braided streams. They prefer dense riparian vegetation for cover (USDA, Swiftwater EIS, 1995) and undisturbed, pristine areas are considered prime habitat for Harlequin duck nesting and brood-rearing activities.

Harlequin duck observations on the Nez Perce National Forest are rare, and breeding has not been documented on the Forest (USDA, Swiftwater EIS, 1995). More frequent observations have been documented in the upper Lochsa River area. A breeding pair was observed about 1.6 km (1 mile) upstream from the mouth of Papoose Creek in 1992 (USDA, West Fork Papoose EIS, 1995). For the most part, harlequin ducks have been observed outside the areas where satellite facilities might be constructed.

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

➔ For Your Information

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

### 3.8 Vegetation

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

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

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

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

### **3.8.1 Central Incubation and Rearing Facilities**

#### **3.8.1.1 *Cherrylane***

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

#### **3.8.1.2 *Sweetwater Springs***

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

### **3.8.2 Satellite Facilities**

#### **3.8.2.1 *Luke's Gulch***

The Luke's Gulch site is along the South Fork of the Clearwater River. Vegetation is dominated by black cottonwood, Ponderosa pine, Douglas fir, and hawthorn in the overstory growing up to the edge of the river. The understory is composed of grasses and forbs including reed canarygrass, horsetail, bluebunch wheatgrass, Kentucky bluegrass, cheat grass and common yarrow.

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

### 3.8.2.2 Cedar Flats

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

### 3.8.2.3 North Lapwai Valley

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

### 3.8.2.4 Yoosa/Camp Creek

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

#### ➡ For Your Information

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

### 3.8.2.5 Mill Creek and Newsome Creek

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

### **3.8.3 Spring Chinook Direct Release Sites and Weir Sites**

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

#### **3.8.3.1 Lolo Creek Sites**

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

#### **3.8.3.2 Lochsa River Sites**

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

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

#### **3.8.3.3 Selway River Sites**

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

#### 3.8.3.4 South Fork Clearwater River Sites

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

#### 3.8.4 Wetlands

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

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

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

#### 3.8.5 Threatened and Endangered Plant Species

Threatened and endangered plant species are native plants that have been given special status because of concern over their continued existence. Species in danger of extinction are classified as endangered. Species at risk of becoming endangered are listed as threatened. *Howellia aquatilis* (water howellia), listed threatened, is a federally-listed plant occurring in Idaho. There is one documented location of a water howellia in Idaho, in Bonner County (Blair, 1997). In order to germinate, the plant requires seasonally ponded wetlands such as sloughs and oxbows which dry out in the fall (Kibbler, 1997). Potential impacts to this plant could result from direct removal during construction, application of herbicide or by changing the hydrology of the area.

National Forest sensitive plant species could occur in the upland riparian areas of the Clearwater and Nez Perce Forests where satellite facilities would be constructed. Many of these

species are found in and associated with riparian areas. However, USFS records indicate that no sensitive plants species are present on the proposed sites.

### 3.9 Land Use

The proposed Nez Perce Tribal hatchery facilities would be sited in a 8000 km<sup>2</sup> (3,200 mi<sup>2</sup>) geographic area of north-central Idaho. This geographic area includes portions of Nez Perce, Lewis, Clearwater and Idaho counties. Program facilities would be developed on private lands, tribal lands, and public lands within the Clearwater and Nez Perce National Forests. Two spring chinook direct release sites are proposed within the Nez Perce National Forest and one in the Clearwater National Forest. Weir sites are proposed throughout both national forests. Most lands within these two national forests are under the control of the federal government, but private lands are also found within the forests' boundaries.

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

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

Both the Clearwater and Nez Perce National Forests have adopted forest plans. These forest plans were developed in accordance with the National Forest Management Act (*NFMA*) of 1976. Forest plans are intended to guide all natural resource management activities within the forests and establish management standards as well as the suitability of lands for resource development. Forest plans are valid until revised, and typically commit forest managers to a course of action no longer than 15 years. The forest plans take state and local regulations into effect as well as federal law so as to avoid, or at least to minimize, potential conflicts with other agencies and plans. Both forest plans were adopted in 1987.

Of the four counties in the program area, Clearwater County and Nez Perce County have comprehensive plans and zoning ordinances.

**Table 3-10**  
**Land Ownership**

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

#### ➔ For Your Information

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

### **3.9.1 Central Incubation and Rearing Facilities**

#### **3.9.1.1 *Cherrylane***

The Cherrylane site is on private land. The site is in an unincorporated portion of Nez Perce County and is zoned in two zoning districts: Agriculture, 20-acre minimum (A) and Agriculture/Residential (A/R). Ninety-five percent of the property is located in Section 34, T37N, R3W, and is zoned A (20-acre minimum). The remainder of the property is in Section 35 and is zoned A/R, five-acre minimum (Ruse, December 1996). The 6 ha (14 acre) site is a portion of a larger tract of land in agricultural use. The property is currently being used to grow hay and is irrigated. Title to the property is held by Cherrylane Ranches, an Idaho Corporation. The proposed site is designated by the U.S. Natural Resources Conservation Service (*NRCS*) as prime farmland (see Section 5.6, *Farmland Protection Policy Act*).

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

#### **3.9.1.2 *Sweetwater Springs***

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

### **3.9.2 Satellite Facilities**

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

### 3.9.2.1 *Luke's Gulch*

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

### 3.9.2.2 *Cedar Flats*

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

### 3.9.2.3 *North Lapwai Valley*

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

### 3.9.2.4 *Yoosa/Camp Creek*

The Yoosa/Camp Creek site is in the Clearwater National Forest within Management Units E1 and M2. E1 is the largest management unit in the Forest, containing over a half million acres. The main emphasis of this management unit is to provide a sustained production of wood products and to maintain viable populations of big game and resident fish along with adequate protection of soil and water quality. Big game, primarily elk, are to be managed through limited road closures. Dispersed recreation and livestock grazing will be provided if found to be compatible with timber management goals. No timber sales are currently underway, but five timber sales are proposed during the next 5 years: Knoll Creek, Camp Creek, Relaskop Creek, Prism,

and Snowy Summit. In addition, some not yet identified small salvage sales may be located upstream from the facility. The site is also in a Riparian Habitat Conservation Area.

The M2 Management Area is associated with riparian areas, wetlands, floodplains, etc. M2 consists of only those riparian areas in the Forest that are associated with specific management areas, including the E-1 Management area, that are suitable for timber management. The Forest Plan states that these narrow corridors (100-foot wide strips of land on either side of aquatic zones) should be considered an integral part of surrounding or adjacent lands. The Forest Plan states that riparian areas which exist in other management areas will be managed in accordance with the management direction for those management areas.

The Forest Plan contains a number of standards for facilities proposed within the M2 Management Area:

- requiring that drainage structures and erosion control measures be installed or constructed and reconstructed prior to the normal wet season;
- avoiding new construction near or adjacent to streams except specified crossings;
- designing mitigation measures that will effectively reduce sediment from road construction, use and maintenance; and,
- designing road fills, landings, tanker fills etc., that will maintain the functions of the riparian areas, including flood moderation, and prevent direct resource damage.

#### **3.9.2.5 Mill Creek**

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

### ➔ For Your Information

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

#### 3.9.2.6 Newsome Creek

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

The Newsome Creek site is about 4 km (2.5 miles) from the Haysfork Gloryhole, an abandoned hydraulic placer mine that ceased operation in 1915. This gloryhole, also referred to as the Montana Placer, is the single largest sediment producer in the Newsome Creek watershed according to the USFS. It has been estimated that over 508 metric tons (500 tons) of sediment leave the gloryhole annually. The USFS has been attempting to trap the sediment and keep it from entering Newsome Creek since 1985. The agency has recently implemented a rehabilitation plan to keep sediment out of the creek. The project involves maintaining and reinforcing existing sediment traps to prevent sediment from reaching the waterway. The rehabilitation of the gloryhole is necessary to reduce the potential for a major catastrophic event, according to the USFS. This proposed project was scheduled to be completed in 1996, but because of weather-related delays, work will continue in summer 1997.

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

#### 3.9.3 Spring Chinook Direct Release Sites and Weir Sites

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

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

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

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

Weir sites are proposed in both national forests.

### **3.9.4 Recreation Resources**

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

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

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

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

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

#### ***3.9.4.1 Cherrylane***

An important steelhead fishery occurs from fall through spring in the mainstem of the Clearwater River near the Cherrylane site. Rafting and swimming are common activities during the summer. Also, the lower Clearwater River from Lewiston to Myrtle is known as one of the few areas in the world to find sillimanite, a gem-quality mineral (Nez Perce Comprehensive Plan, 1979). Other than fishing, swimming, rafting, and rock hounding on the Clearwater River, no other recreational opportunities exist in the immediate vicinity of the proposed site, except hunting, if permitted by the property owners in the area.

#### ***3.9.4.2 Sweetwater Springs***

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

#### ***3.9.4.3 Luke's Gulch***

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

#### ***3.9.4.4 Cedar Flats***

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

#### **3.9.4.5 North Lapwai Valley**

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

#### **3.9.4.6 Yoosa/Camp Creek**

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

There are several undeveloped campsites located along system roads within the area and one established forest trail. Forest trail No. 48 (the Austin Ridge Trail), which traverses through the area, is open to all terrain vehicle (ATV) use. The trail passes within 1 km (0.5 mile) of the proposed satellite facility at its closest point. Trail No. 40 (the Nee-Me-Poo Trail), registered as a National Historic Trail, is not open to any motorized vehicle use. This trail traverses the ridge north of Yoosa Creek, and passes within 1.6 km (1 mile) of the site at its closest point. Both of these trails receive light use throughout the summer and early fall months. There are also a few trails that traverse the ridges along the eastern and southern boundaries. These trails receive light use during the fall for the purpose of big game hunting and are not maintained. There is one outfitter (Burlingame Outfitters, Kamiah, Idaho) permitted within this portion of Yoosa Creek drainage.

#### **3.9.4.7 Mill Creek**

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

#### **3.9.4.8 Newsome Creek**

The Newsome Creek site is near the Newsome Recreation Area. The Newsome Recreation Area is used as an area for dispersed camp sites. The area is improved with sanitation facilities. The

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

#### ***3.9.4.9 Spring Chinook Direct Release Sites and Weir Sites***

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

### **3.10 Socioeconomics**

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

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

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

#### **3.10.1 Population**

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

occurred since 1990 (Idaho Department of Employment, February 1995, and U.S. Department of Commerce, Bureau of the Census, Population Estimate Branch, 1990).

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

### **3.10.2 Employment**

The civilian labor force is the number of people in a population group who are over 16 years of age and who are either working or actively seeking work. Over two-thirds of the area's labor force resides in Nez Perce County (see Table 3-13). The labor force participation rate for Native Americans in the area during 1990, the most recent information available, was 59 percent. This compared to a labor force participation rate of 60 percent for the general population, and 65.5 percent for the state as a whole (U.S. Department of Commerce, 1990 Census of Population, Social and Economic Characteristics, State of Idaho, and U.S. Department of Commerce, 1990 Census of Population, Social and Economic Characteristics, American Indian and Alaska Native Areas).

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

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

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

Source: Idaho Department of Employment, 1995

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

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

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

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

	<b>General Population</b>	<b>Native American Population</b>
Civilian Labor Force	30,790	743
Employment	28,910	549
Unemployment	1,880	194
Unemployment Rate	6.10%	26.00%
Source: Idaho Department of Employment and 1990 Census of Population, Social and Economic Characteristics, American Indian and Alaskan Native Areas.		

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

### 3.10.3 Unemployment Rate

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

### 3.10.4 Income

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

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

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

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

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

**Table 3-15**  
**Per Capita Income**  
**Native American**  
**Population**  
**1990**

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

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

### **3.11 Visual Resources**

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

#### **3.11.1 General**

The Clearwater River Subbasin is characterized by farm and rangeland in the lowlands and forest in the highlands. Much of the forestland is owned by the federal government. This land is managed by the USFS and is divided into management units in its Forest Plans. Some of the units have been managed for timber and other resources; others have been managed as wilderness and maintained in a natural state except for trails.

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

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

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

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

#### **3.11.2 Visual Quality Objectives**

The USFS has developed visual quality objectives (VQOs) for all of its forest management units. Visual quality objectives are visual resource management goals. Each VQO describes a

different degree of acceptable alteration of the landscape. The degree of alteration is measured in terms of visual contrast with the surrounding natural landscape.

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

- **preservation** applies to wilderness and other special areas where the natural landscape should be unaltered by forest management activities;
- **retention** applies to areas where activities should not be evident to the casual forest visitor;
- **partial retention** applies to areas where activities may be evident but must remain subordinate to the natural landscape. These visually sensitive areas are along major state and federal highways, wild and scenic river corridors, and other high public use areas;
- **modification** and **maximum modification** apply to less visually-sensitive areas where changes can dominate the natural landscape but should look natural from a long distance.

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

### 3.11.3 Central Incubation and Rearing Facilities

#### 3.11.3.1 *Cherrylane*

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

### **3.11.3.2 Sweetwater Springs**

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

### **3.11.4 Satellite Facilities**

#### **3.11.4.1 Luke's Gulch**

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

#### **3.11.4.2 Cedar Flats**

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

#### **3.11.4.3 North Lapwai Valley**

This site is on tribal land near the town of Lapwai. The site is along Lapwai Creek and Highway 95 in an agricultural field. The site is surrounded by rolling hills in rangeland, and riparian vegetation including cottonwoods and alders along the creek. See Photo No. 5 in Chapter 2. Highway 95, a Scenic Byway, is about

different degree of acceptable alteration of the landscape. The degree of alteration is measured in terms of visual contrast with the surrounding natural landscape.

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

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

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#### **3.11.3.1 Cherylane**

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

### **3.11.3.2 Sweetwater Springs**

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

### **3.11.4 Satellite Facilities**

#### **3.11.4.1 Luke's Gulch**

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

#### **3.11.4.2 Cedar Flats**

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

#### **3.11.4.3 North Lapwai Valley**

This site is on tribal land near the town of Lapwai. The site is along Lapwai Creek and Highway 95 in an agricultural field. The site is surrounded by rolling hills in rangeland, and riparian vegetation including cottonwoods and alders along the creek. See Photo No. 5 in Chapter 2. Highway 95, a Scenic Byway, is about