

Chapter 4 Environmental Consequences

In this Chapter:

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

This chapter discusses the potential impacts of the alternatives on the environment.

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

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

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

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

4.1 Nez Perce Tribe

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

4.1.1 Proposed Action

4.1.1.1 Tribal Harvest

The Proposed Action could increase salmon runs so tribal harvest can be sustained into the future. The Master Plan describes a gradual increase in harvest corresponding to an increase in runs after broodstock needs and natural spawning goals are met. Table 2-2 shows the predicted levels of harvest after the program has been operating for 15-20 years. More than 300 spring chinook and 1,000 fall chinook would be available for tribal and non-tribal member harvest.

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

4.1.1.2 Tribal Employment

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

4.1.1.3 Fisheries Management

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

A primary goal of the Proposed Action is to provide for harvest of surplus adults by getting production into underseeded habitat and coupling that with production from fish reared in a more typical hatchery setting to help overcome poor adult return rates. Success in achieving this goal would require adaptive management (see Section 2.1.5, Monitoring and Evaluation Plan). The best mechanism to incubate and rear fish to mimic natural production needs to be determined. Optimum release timing and fish size need to be determined. Beneficial and adverse effects of supplementation on existing populations need to be monitored and the results fed back to hatchery production specialists. Evaluation of returns and establishment of harvest strategies are

**Table 4-1
Estimated Number
of Positions and
Employees Needed**

Facility	DHO	HM	AHM	SOF	HT	ST (Part time)	ST (Full time)	M&E
Cherrylane	0.5	1	1		1	1		6
Sweetwater Springs		1				2	1	
Yoosa/Camp				0.5		2	1	
Mill Cr.				0.5		2		
Newsome Cr.				0.5		2		
Cedar Flats				0.5		2		
Luke's Gulch				0.5		2		
North Lapwai Valley				0.5		2		
Total	0.5	2	1	3	1	15	2	6
DHO - Director of Hatchery Operations HM - Hatchery Manager AHM - Assistant Hatchery Manager SOF - Satellite Operations Foreman HT - Hatchery Technicians ST - Satellite Technicians M&E - Monitoring and Evaluation								

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

Rights guaranteed in treaties to harvest fish in a manner consistent with a traditional livelihood would be furthered by improving the Tribe's ability to directly produce salmon.

Overall impact from implementation of this alternative on the Nez Perce Tribe would be high.

4.1.2 Use of Existing Facilities Alternative

4.1.2.1 Tribal Harvest

The Existing Facilities Alternative would result in fewer fish for harvest than the Proposed Action. Table 2-5 shows that 54 spring chinook and 487 fall chinook could be harvested at 20 years in the future. Because this alternative would not be very successful, supplementation would probably not proceed into other drainages.

4.1.2.2 Tribal Employment

The Existing Facilities Alternative would increase employment. Tribal members would be employed in construction and operation and management of the facilities. However, fewer tribal employees would be needed in this alternative because of the lack of facilities at Cherrylane. These include a half-time director of hatchery operations, full-time hatchery manager, assistant hatchery manager, and hatchery technician, and a part-time satellite technician.

4.1.2.3 Fisheries Management

This alternative would result in a more limited amount of fisheries management participation by the Nez Perce Tribe than would occur with the Proposed Action. The NPT would have input on incubation and rearing fish, however, the ultimate responsibility for scheduling and producing fish would be in the hands of the existing facilities managers. Novel incubation and early-rearing strategies would be undertaken only so far as their ability to be incorporated into the overall management and purposes of the facilities. The NPT would have to lobby with the hatchery managers for specific actions to occur, rather than simply make them based on the judgment of their own professionals and monitoring and evaluation results. At the satellite facilities, this alternative would be the same as the Proposed Action.

Overall impact from implementation of this alternative on the Nez Perce Tribe would be moderate.

4.1.3 No Action Alternative

4.1.3.1 Tribal Harvest

Under the No Action Alternative, tribal harvest would continue as described in Section 3.1.2, or diminish with restrictions from implementing the ESA. In most years, fall chinook harvest conducted in the Zone 6 fishery on the Columbia River would probably remain the most abundant catch. This run is supplemented by hatchery production in the upper Columbia River Basin. Spring chinook harvest in the Clearwater River should increase when Clearwater Fish Hatchery begins to return its mitigation numbers; the predicted harvestable return would number about 1,000 with a smolt-to-adult return rate of 0.20 percent. Present smolt-to-adult return for this hatchery has been about 0.10 percent. Additional harvest could also occur from returns to Dworshak and Kooskia National Fish Hatcheries. Current smolt return rate for these hatcheries average 0.09 percent

for Dworshak and 0.08 percent for Kooskia. Assuming the salmon recovery efforts prove successful and return rates are doubled, these facilities could generate approximately 1,200 and 400 salmon, respectively, for harvest beyond their egg take needs.

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

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

4.1.3.2 Tribal Employment

The effects of the No Action Alternative would be no increase in employment prior to the initiation of the hatchery program. No employees would be hired to help operate and manage the program. In 1994, BPA contracted with Tribal members to assist in the gathering of data to develop this EIS. Whether Tribal employment levels would return to the levels that existed prior to the initiation of the hatchery program would depend on other factors unrelated to this EIS.

4.1.3.3 Fisheries Management

By implementing the No Action Alternative, fisheries management would proceed as it is. The Nez Perce Tribe is involved in all arenas of management involving Columbia Basin anadromous fisheries. The Tribe provides input on production, habitat, harvest and hydrosystem issues. Within the last 10-15 years, the Nez Perce, and other Columbia Basin tribes, have assumed a co-management role of the fisheries resource (see Section 1.6.7, Columbia River Fish Management Plan). However, the Tribe does not have the facility support to directly affect production within its own reservation, or its usual and accustomed fishing grounds.

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

hatcheries in the Clearwater River Subbasin also falls under the Columbia River Fish Management Plan (see Section 1.6.7). Species and production numbers follow this program closely.

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

4.2 Cultural Resources

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

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

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

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

4.2.1 Proposed Action

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

Most of these sites can be avoided by use of alternative locations or locating activity away from the cultural resource, therefore impacts would be low. In instances where avoidance is

not feasible, mitigative plans would need to be developed in accordance with NHPA. Development should be coordinated with the Nez Perce Cultural Resource Program and the Idaho SHPO should be consulted.

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

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

4.2.2 Use of Existing Facilities Alternative

This alternative would also have low impacts on cultural resources. The same satellite facilities, and Sweetwater Springs would be used, as well as the same monitoring and mitigative measures. The potential for impacts would be less than that in the Proposed Action because the Cherrylane facility would not be built.

4.2.3 No Action Alternative

Under the No Action Alternative, federal agencies would continue to comply with applicable laws and agreements as necessary.

4.2.4 Cumulative Impacts

No cumulative impacts are expected.

4.3 Geology and Soils

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

Analysts defined the impact levels using these definitions:

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

- Where road or facility construction and/or clearing are required on sites prone to slides or erosion with a high susceptibility to erosion.
- Soil properties or site features are so unfavorable or difficult that standard mitigation measure would not work.
- Accelerated erosion, sedimentation, or slides would create long-term impacts.

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

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

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

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

4.3.1 Proposed Action

4.3.1.1 Geologic Hazards

Seismic hazards have been identified for the Cherrylane site. Seismic hazards for this site would be considered when the facilities are designed. All facilities would be designed to withstand earthquake intensities of V or as identified by the local and state earthquake building codes. No seismic hazards were identified at the Sweetwater Springs facility.

No seismic hazards have been identified for the satellite sites. All other sites under this alternative are for monitoring or release purposes only and would not cause any permanent impacts to the surrounding geology or soils.

The Proposed Action would have low overall impacts on geology. No mitigation is necessary.

4.3.1.2 Soils

Construction and maintenance of hatchery facilities can impact soils in many ways. Disturbance of the ground surface and subsurface, and vegetation removal during site clearing, road building and facility construction increase the risk of soil erosion and may change soil physical characteristics. Areas most vulnerable include soils prone to erosion, mass movement or compaction, steep slopes, and areas where extensive clearing is required. Most impacts are from construction and would be short term. Impacts are greatest during and immediately after construction or until revegetation, drainage, and erosion controls are established. Long-term impacts could be caused by local changes in erosion and runoff rates from site or road construction. Site restoration and mitigation would reduce both short-and long-term impacts and the effect erosion, sedimentation, and soil compaction could have on other resources such as water, fisheries, and vegetation.

Stream channels adjacent or close to the North Lapwai Valley, Yoosa/Camp Creek, Newsome Creek and Mill Creek satellite sites would be altered by channel excavation and bank riprap used to establish intake structures, to place instream boulder anchors and perhaps bank anchors to support fish weirs, and to place tripods and fence panels for weirs.

River channels adjacent or close to Cherrylane, Luke's Gulch and Cedar Flats would be altered by channel excavation and bank riprap used to establish intake structures and fish ladders, to place instream boulder anchors and perhaps bank anchors to support fish weirs, and to place tripods and fence panels for weirs.

Stream channels in Meadow Creek, Boulder Creek, Warm Springs Creek, Johns Creek, Eldorado Creek, and Tenmile Creek would be altered to place instream boulder anchors and perhaps bank anchors to support fish weirs, and to place tripods and fence panels for weirs.

Central Incubation and Rearing Facilities — The primary construction activities at Sweetwater Springs and Cherrylane would include land disturbances to improve access, cut and fill on some sites, and pipe installation. Secondary activities would include minor grading, excavation, and placement of aggregate. These activities would not significantly change existing topography. In all instances, erosion control procedures and requirements would be implemented during all construction activities to limit impacts due to soil erosion and slope instability. Impacts to soils would be low.

Specific concerns for the Cherrylane site include a high erosion potential because of the soil characteristics in that region. Since the site is relatively flat and has been in agricultural production for some time, the erosion potential is considered to be minor. During access

road improvements, specific requirements for road construction erosion control would be implemented to avoid any adverse impacts.

Satellite Facilities — The primary soil disturbance at all satellite facilities would result from road construction and improvement, and recontouring land for placing ponds. Easily erodible surface soils and steep slopes dominate this region, and the Luke's Gulch, Mill Creek, and Newsome Creek sites within the South Fork Clearwater River drainage are of particular concern. If borrow sites are needed for fill material for facilities on USFS land, they would be identified and approved by the USFS. During access road improvements and earth moving for ponds, silt barriers, water control, and ditches with hay bales for road construction erosion control would be used to minimize the potential for soil erosion. Other activities that may disturb soils include the construction of water supply conveyance facilities from the nearby stream to acclimation structures and construction of water intake facilities along streams. All instream work would have sufficient mitigation to reduce short-term water quality degradation to a minimum. No other disturbances to soils at the satellite facilities is anticipated. Impacts to soils would be low.

Spring Chinook Direct Release Sites and Weir Sites — Helicopters would be used to fly fish in to all direct release sites. No construction or effect on soils would occur. Minor instream disturbance should be expected at all weir sites within the South Fork Clearwater River, Selway, and Lochsa drainages, but the soil properties would not change.

Mitigation — Short-term construction related soil erosion would be controlled by standard quality construction practices. Erosion control measures such as sediment fences and straw bales would be used to control erosion during construction. These devices would be left in place until revegetation (with native grasses and forbs) of all disturbed areas has occurred. The contractor working in and around streams would be required to submit a construction dewatering and erosion control plan prior to initiating any work. This plan and its implementation would become part of the contractor's contract and incorporated into the permitting provision (see Chapter 5 for permit requirements).

4.3.2 Use of Existing Facilities Alternative

4.3.2.1 Geologic Hazards

Seismic hazards at Cherrylane would not have to be considered in this alternative because the Cherrylane facility would not be built.

4.3.2.2 Soils

Soil disturbance associated with construction and hatchery operations at Cherrylane would be eliminated with this alternative. Otherwise, impacts would be the same as the Proposed Action. Overall impacts are low.

4.3.3 No Action Alternative

Under the No Action Alternative, no soil disturbance would occur at any site. There would be no change in soils from existing conditions.

4.3.4 Cumulative Impacts

No significant, long-term adverse impacts on soils are expected from the Proposed Action or the Existing Facilities Alternative. Soil impacts would be localized and their effects would be manifest only at the individual sites. No cumulative impacts would occur.

4.4 Water Resources

The water resources section describes potential program-related impacts for groundwater and surface water quantity, temperature and water quality criteria, and streamflow diversions. The methods used to analyze impacts to groundwater include a review of hydrogeological analyses for production well development at the Cherrylane, North Lapwai Valley and Luke's Gulch sites. Methods used to analyze impacts for surface water include evaluation of stream gauge measurements for flow and water quality.

The water quality, flow requirements, and groundwater production were reviewed to determine levels of impact from each alternative. Each issue received an impact level of no, low, moderate, or high using the following definitions to determine impact levels:

A **high** impact is expected under these conditions.

- A high-quality water body that supports fish, waterfowl, and animal habitat, and/or human uses such as drinking water would be extensively altered so as to affect its uses or integrity.
- A facility is constructed with extensive clearing and road building in highly erodible soils near high-quality water bodies, without appropriate mitigation.

Table 4-2 Water Available and Water Needed

Water Available										
Facility	Total Available			Groundwater			Surface Water			
	cubic meters/min	gpm	cfs	cubic meters/min	gpm	cfs	cubic meters/min	gpm	cfs	
Cherrylane (1)	59,474.70	15,714,085	35011	18.9	5,000	11.4	59,455.70	157,090,850	35,000	
Sweetwater Springs	3.4	900	2.1	3.4	900	2.1	0.00	0	0	
Luke's Gulch (1)	681.2	179,982	401	1.7	450	1	679.50	179,532	400	
Cedar Flats (1)	5,096.20	1,346,493	3000	0	0	0	5,096.20	1,346,493	3,000	
N. Lapwai Valley (2)	94.3	24,907	55.5	2.5	670	1.5	91.70	24,237	54	
Yoosa/Camp (3)	11.6	3,052	6.8	0	0	0	11.60	3,052	6.80	
Mill (3)	10.7	2,828	6.3	0	0	0	10.70	2,828	6.30	
Newsome (3)	9.5	2,513	5.6	0	0	0	9.50	2,513	5.60	
Water Needed										
Facility	Total Needed			Groundwater			Surface Water			% Surface Water Needed
	cubic meters/min	gpm	cfs	cubic meters/min	gpm	cfs	cubic meters/min	gpm	cfs	
Cherrylane	30.3	8,000	18	18.9	5,000	11.4	11.4	3,000	6.8	0%
Sweetwater Springs	3.4	900	2	3.4	900	2.1	0	0	0	0%
Luke's Gulch	7.9	2,100	5	1.7	450	1	6.2	1,650	3.8	1%
Cedar Flats	10.2	2,700	6	0	0	0	10.2	2,700	6.2	0%
N. Lapwai Valley	8.3	2,200	5	2.5	670	1.5	5.8	1,530	3.5	6%
Yoosa/Camp	3.8	1,000	2	0	0	0	3.8	1,000	2.3	34%
Mill	1.1	300	1	0	0	0	1.1	300	0.7	11%
Newsome (3)	2.3	600	1	0	0	0	2.3	600	1.4	24%
Surface Water Available References (1) - NPTH DEIS - Flow at greatest demand period for surface water by NPTH (2) - USGS Data - 1974-94 (3) - Lowest flow measured over 5 years; 1990-95, NPT data.										

A **moderate** impact is expected under these conditions.

- The quality of a water body would be affected locally, or if effects could be partially mitigated.
- Structures are located on erodible soils near a good-quality water body with mitigation, and any pollution that entered water is dispersed and diluted, not affecting overall water quality.
- Some removal of shade would affect the immediate habitat of water, but not the integrity of the water body as a whole.

A **low** impact would be expected under these conditions.

- Impacts to water quality could be almost completely mitigated.
- Facilities are near water bodies in stable soils and on even terrain, with little or no clearing.
- Structures are away from water banks and little or no sediments reach the water.

There would be **no impact** where water quality would be unchanged.

4.4.1 Proposed Action

The total water available and the total water needed for the Proposed Action are shown in Table 4-2.

4.4.1.1 Groundwater

Under the Proposed Action the main impacts to groundwater would occur at the hatchery sites and at the North Lapwai Valley and Luke's Gulch satellite sites. Discharges would meet federal and state water quality standards and guidelines, and would satisfy all permit requirements. Hatchery effluents would be routinely monitored to assure compliance with water quality standards. Overall impacts on groundwater quality are low and no mitigation is necessary. Potential impacts at specific facility sites are discussed below.

Central Incubation and Rearing Facilities — Groundwater production wells would be used at Cherrylane, and would not adversely affect groundwater quantity or quality at the site. Because of the small amounts of water used at this facility, the volume would be easily replaced by groundwater recharge. No conflicting groundwater uses have been identified. No adjacent domestic or agricultural wells have been identified that would be impacted by the proposal.

The Sweetwater Springs facility would use existing springs for facility operations with no significant effect. Other than delivery improvements, no changes in the spring source are proposed. No consumptive water use would occur and discharges would meet federal and state water quality standards. The facility would have no effect on the U.S. Bureau of Reclamation's Lewiston Orchard Project.

Satellite Facilities — Groundwater production wells would be used at Luke's Gulch. The drawdown created by the wells could cause groundwater levels to decline in nearby existing domestic and stock wells, with impacts greater in nearby dug wells than drilled wells. This volume would be easily replaced through groundwater recharge due to the nature of the soils and rivers nearby. Mitigation may be necessary for these impacts to nearby wells depending on severity. Use of groundwater at Luke's Gulch would not significantly or adversely affect groundwater quantity or quality at the site. If static water levels in any adjacent wells are affected, the Tribe would either lower the pump bowl setting or increase the well depth for the owner.

The use of groundwater at the North Lapwai Valley site is not anticipated to impact adjacent groundwater users. All fish would be released by the middle of May which is the beginning of the irrigation season in the Lapwai Valley area and the period of maximum seasonal recharge for the aquifer.

Spring Chinook Direct Release Sites and Weir Sites — These sites require no groundwater.

4.4.1.2 Surface Water

Construction of the central incubation and rearing facilities and satellite ponds would disturb the ground and add impervious surfaces to the sites, which may lead to increased or rerouted runoff and sediment carried into streams. Increased runoff is expected to be short-lived and is not expected to exceed a stream's ability to carry sediment away from the site. It is not expected to change a stream's substrate. Some bankside and riparian vegetation would be removed or disturbed that may affect shade on a very limited scale. No change in water temperatures is expected. Most construction activities would occur away from the channel, and would be mitigated by erosion control, removing the least amount of trees as possible, and revegetating the site after construction. Impacts would be low and short term.

Stream channels adjacent or close to the North Lapwai Valley, Yoosa/Camp Creek, Newsome Creek and Mill Creek satellite sites would be altered by channel excavation and bank riprap used to establish intake structures, to place instream boulder anchors and perhaps bank anchors to support fish weirs, and to place tripods and fence panels for weirs.

River channels adjacent or close to Cherrylane, Luke's Gulch and Cedar Flats would be altered by channel excavation and bank riprap used to establish intake structures and fish ladders.

Stream channels in Meadow Creek, Boulder Creek, Warm Springs Creek, Johns Creek, Eldorado Creek, and Tenmile Creek would be altered to place instream boulder anchors and perhaps bank anchors to support fish weirs, and to place tripods and fence panels for weirs.

Hatchery operations are expected to cause low impacts to water quality. Discharges of chemical and organic pollutants would meet federal and state water quality standards and guidelines, and would satisfy all permit requirements. Important physical properties and chemical constituents in hatchery effluent would be routinely monitored to assure compliance with water quality standards. Chemicals used to prevent or treat fish diseases would be handled, applied, and disposed of in accordance with state and federal regulations.

Hatchery practices would be conducted to minimize the amount of uneaten food and discharge of organic wastes into the natural environment. Adult fish carcasses would either be used for food fertilizer, or disposed of at local landfills. Satellite ponds would be cleaned at the end of the rearing cycle and wastes would be disposed of at local landfills. Effluent from the Cherrylane facility would be routed through effluent ponds where it can settle, be treated, and removed before the liquid is discharged. Once treated, effluent discharged from the settling ponds would rapidly dilute and disperse in the lower Clearwater River.

The amount of fish held at all satellite facilities is below the threshold limit for state and federal regulations that require water quality monitoring. The Tribe would monitor influent and effluent bimonthly during the operating period for total suspended solids, settled solids and dissolved oxygen. Spot sampling for nutrients may be implemented based on loading, water quality conditions observed or other criteria.

Central Incubation and Rearing Facilities — The quantity of water withdrawn from the Clearwater River at Cherrylane is insignificant relative to the amount of flow available (see Table 4-2). Water used would be non-consumptive, and is expected to have no effect on water rights holders.

Water discharged from the Cherrylane and Sweetwater Springs facilities is expected to be somewhat cooler than the receiving stream, since chillers would be used to maintain incubation and early rearing temperatures in the hatchery at below ambient levels. Thermal changes would be negligible because rapid mixing of hatchery and stream or river water downstream of production facilities should minimize temperature-related impacts.

Satellite Facilities — No impacts to surface water quantity are expected at Luke’s Gulch or Cedar Flats, because the flows used are minor compared to the flow available. Water used would be non-consumptive, and is expected to have no effect on water rights holders. Water used at the North Lapwai Valley, Yoosa/Camp Creek, Newsome Creek and Mill Creek sites would reduce ambient flows by 6 percent, 34 percent, 24 percent, and 11 percent respectively, for a distance of up to 300 m (984 ft) of stream (see Table 4-2). The Proposed Action states that no more than one half of either Yoosa or Camp creeks would be diverted for rearing purposes so as not to adversely impact instream habitat. Water needs are greatest in relation to overall streamflow during September for the spring chinook facilities and during May for North Lapwai Valley. Streamflow characteristics would not be changed upstream or downstream of the sites but stream transport capability would be decreased and water temperatures might be increased within the reach of altered streamflow. Therefore, impacts to surface water could be low to moderate.

Spring Chinook Direct Release Sites and Weir Sites — These sites require no additional surface water and depend on existing streamflow volume. At the weir sites, surface water impacts could be low to moderate due to installation of the weirs and potentially diverting water if a concrete sill is installed. Impacts would be short-term (see Section 4.3, **Geology and Soils**).

Mitigation — As mitigation, it is recommended that all facility sites be gauged for flow and temperatures to determine the amount of changes caused at the sites. Should they be determined to have adverse impacts, an adjustment in facility operations would be made.

4.4.2 Use of Existing Facilities Alternative

4.4.2.1 Groundwater

Because Cherrylane facility is not part of this alternative, this alternative would have fewer effects on groundwater than the Proposed Action. Impacts associated with the satellite sites at Luke’s Gulch and North Lapwai Valley would be the same as the Proposed Action. Overall impact would be low.

4.4.2.2 Surface Water

Because the Cherrylane facility is not part of this alternative, this alternative would have fewer impacts on surface water quality caused by construction activities, the establishment of hatchery support structures (e.g., water intakes, fish ladder), and the release of chilled water used for incubation and rearing than the Proposed Action. The quantity of water withdrawn from the

Clearwater would also be less. Impacts caused by hatchery practices should be the same, as the same water quality standards would apply in both alternatives. All other water quality and quantity impacts would be the same as those described for the Proposed Action. Overall impacts would be low, and the same mitigation would apply.

4.4.3 No Action Alternative

This alternative would leave the area as is with no impacts to ground and surface waters. No mitigation would be necessary.

4.4.4 Cumulative Impacts

No cumulative effects are anticipated. Impacts would be limited to the facility sites and would not cause an overall change in conditions of either the receiving streams or the Clearwater River Subbasin. Surface water use would be non-consumptive so there would be little or no loss.

4.5 Floodplains

An impact would be expected to floodplains if facilities or permanent roads encroach on designated floodplains and increase the potential for flooding, or which might result in the loss of human life, personal property, or natural resources within the floodplain.

No impacts are expected where floodplains are avoided, spanned, or standard mitigation would effectively eliminate impacts.

4.5.1 Proposed Action

The proposed program would require the construction of structures adjacent to or in the floodplain (hatchery and satellite facilities) and/or within the active stream channel (weirs). In general, all facilities within the 100-year floodplain would be designed to be either temporary, non-obstructive to floodwaters, or both.

4.5.1.1 Central Incubation and Rearing Facilities

Intake and outlet structures for facility water supply and discharge at both the Cherrylane and Sweetwater Springs central incubation and rearing facilities would, of necessity, be located

within the 100-year floodplain. Other hatchery structures and related site development at both sites would be outside the 100-year floodplain.

At Cherrylane, the inlet and outlet structures would be permanent structures located within the bank of the Clearwater River with adequate protection (riprap) to prevent bank erosion or structural damage during high river flows. They would be designed to cause no significant rise in flood elevation through the creation of a backwater. A detailed storm water and drainage study would be included as part of the facility design. As previously mentioned, no other site development would occur within the 100-year floodplain. As a result, there would be no impact on the floodplain of the Clearwater River at the Cherrylane site.

At Sweetwater Springs, the water collection system is within the 100-year floodplain. A storm water runoff analysis would be completed prior to designing the permanent structures. Any new structures that could sustain damage if unusual runoff occurs would be floodproofed. Improvements to this existing facility would have no impact on floodplains.

4.5.1.2 Satellite Facilities

FEMA has not mapped the areas where the satellite facilities are proposed. The 100-year flood elevation at each site was estimated.

The Luke's Gulch, North Lapwai Valley and Yoosa/Camp Creek sites are located outside the 100-year floodplain based on these estimates. The only construction within the 100-year floodplain would be for the inlet and outlet structures. These would be permanent structures located in the river bank with adequate protection (riprap) to prevent bank erosion or structural damage during high river flows. They would not contribute to any significant rise in flood elevation through the creation of a backwater. Though the North Lapwai Valley site has a high probability of flooding because it has a large, developed and channeled drainage area upstream, it was not inundated by the 1996 northern Idaho floods. The Yoosa/Camp Creek site would not be used during the normal high runoff period (March-early May). No impacts on floodplains are expected at these sites.

The Newsome Creek, Mill Creek and Cedar Flats sites would have facilities estimated to be within the elevation of the 100-year floodplain. Fill would be placed where necessary to support structures but would not create an elevated area that would divert or impede floodwaters. Inlet and outlet structures would be permanent structures and would be placed in the river bank with adequate protection (riprap) to prevent bank erosion or structural

damage during high river flows. They would not create a backwater and would not contribute to any significant rise in flood elevation. Fish ponds at these sites would generally be low to the ground and would be repaired or replaced if damaged by floodwaters, rather than floodproofed. They would not contribute to any significant rise in the flood elevation. Displacement of floodwaters by structures is not expected to alter floodplain storage volume or cause a local increase in the flood stage. The Mill Creek and Newsome Creek sites would not be used during the normal high runoff period. No impacts on floodplains are expected at these sites.

Mobile trailers for facility personnel would be required at all satellite facilities. If possible, their placement would be outside the 100-year floodplain. In general, the trailers would be removed should flooding occur or threaten a satellite site. If placed within the floodplain, they would not impede the flow of floodwaters because they would be raised off the ground and any flooding would pass beneath them.

4.5.1.3 Spring Chinook Direct Release Sites and Weir Sites

No new construction or placement of structures within floodplains is planned for any direct release sites. Therefore, no impacts on floodplains are expected at any release site.

Weir sites would be within the active stream channel and would be designed to minimize impacts on stream hydraulics. Weirs would typically be installed by hand within the stream channel and would be designed to wash out in the event of a flood.

Permanent anchoring points on either stream bank would be required at each weir site. These could range from concrete anchors placed flush with the bank surface to steel members driven into the bank. In all cases the anchoring points would have adequate protection (through riprap or burial) to prevent bank erosion or structural damage during high river flows. They would not create a backwater and would not contribute to any significant rise in flood elevation. The weir anchoring structures would have no impact on floodplains.

A sill in the streambed would likely be required at some of the weir sites. Specific weir sites requiring a sill would be identified during the design phase. The sill would be placed along the bottom of the stream channel and would have a low vertical profile. No significant backwater would be created by the sill. No impact on floodplains would be expected.

4.5.1.4 Mitigation

While final facility design completed for each site would determine the actual risk of flooding and the facilities that need to be protected, a number of general conditions will be established for all sites.

- All facilities will be as high above active drainages as possible.
- No flood flow barriers will be built.
- Damage to riparian vegetation will be avoided where possible.
- Piping will be buried where possible.
- Electrical equipment will be portable where possible.
- Portable equipment will be removed at the end of the season.

4.5.2 Use of Existing Facilities Alternative

Without the Cherrylane facility, there would be no water inlet and outlet structures described in the Proposed Action. Otherwise all other effects and mitigation would be the same as described in the Proposed Action. No impacts are expected to the floodplain.

4.5.3 No Action Alternative

Under the No Action Alternative, no effects on floodplains would occur.

4.5.4 Cumulative Impacts

No cumulative impacts on floodplains are expected.

4.6 Fish

4.6.1 Proposed Action

Program activities would cause a variety of effects on the environment and its fisheries. Effects, both detrimental and beneficial, would come from four major sources:

- the design, siting, and construction of hatchery facilities;
- hatchery operations and management;
- fish interactions; and
- human-fish interactions.

Design, siting, and construction of hatchery facilities would, in the near-term, have an immediate effect on the local environment and associated biota. Most physical impacts would be away from the channel, and would be primarily limited to the hatchery facilities' sites. Effects of disturbances can be directly or indirectly transferred to the aquatic community in nearby streams.

Hatchery operations and management would produce water, fish, and environmental contaminants once facilities are built and begin operating. The probability that they would have adverse environmental consequences depends on the techniques used to propagate and release hatchery fish, the effort made to minimize or mitigate for unwanted impacts, and the characteristics of the receiving environment.

Fish interactions between hatchery-reared chinook, their wild counterparts, and other species of fish would create impacts. The primary types of interactions involving NPTH chinook and other species of fish are competition, predation (either preying on or being preyed upon by other species), reproduction (including genetic *introgression*), and disease transmission. The strength and outcome of these types of interactions would depend not only on biological attributes of the species involved, but also on the carrying capacity of the environment.

Human-fish interactions created as a response or a consequence of the proposed program could impact targeted chinook and perhaps other fish populations. If successful, the NPTH may evoke certain responses from resource managers and users such as increased fishing opportunities and pressure on targeted and non-targeted stocks.

The broad categories of effects can be further broken down into associated *causal factors* shown in Table 4-3. They are described in detail in this section, and fisheries impacts are addressed in relation to these causal factors.

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introgression Loss of, or changes in, population identity including loss of diversity among populations, characteristics of adaptation with populations, or of other evolved features of genetic organization (may occur through crossbreeding or inadvertent effects of artificial selection).

Causal factors are subcategories of general impacts.

**Table 4-3
Categories of
Impacts and Causal
Factors Evaluated**

Facility and Construction	Hatchery Operations and Management
Site Disturbances	Water Gains and Losses
Channel Alterations	Water Quality
Water Intake and Discharge Structures	Fish Traps, Live Boxes, Ladders, and Weirs
	Broodstock Selection and Maintenance
	Mating Protocols
	Incubation and Rearing Practices
	Fish Health Management
	Fish Releases
Fish Interactions	Human-Fish Interactions
Competition	Non-Tribal Management Actions
Predation	Fishing
Reproduction and Genetic Exchange	
Disease Transmission	

4.6.1.1 Method for Evaluating Impacts

A process based on expert consultation was used to determine the nature and extent of environmental impacts that may result from NPTH activities. The process was structured to elicit the best scientific judgment from a panel of experts familiar with the project and the associated environment. The process consisted of several steps:

- Impact Assessment Team (IAT) Selection
- Impact Assessment Strategy
- Scoring Impacts
- Team Review

Selection of an Impact Assessment Team — The team was composed of the following fisheries biologists, a resource manager, and an engineer familiar with the project and affected resources.

- William Blaylock - Aquatic biologist, Montgomery Watson
- John Colt - Engineer, Montgomery Watson
- Steve Cramer - Consulting fisheries biologist
- Dave Johnson - Fisheries biologist, NPT
- Ed Larson - Hatchery production manager, NPT
- Cleve Steward - Consulting fisheries biologist

Impact Assessment Strategy — Team members compiled and reviewed existing information relating to hatchery configuration, operations, and affected resources, including material developed

for this program, that related to potential impacts of hatcheries and hatchery fish on the environment. The team facilitator conducted two meetings in which IAT members discussed project impacts and familiarized themselves with the assessment approach. The team used the causal factors of effects shown in Table 4-3 to independently evaluate and score the impacts on four categories of fish, using four levels of impact. The fish categories and impact levels are described below.

Fish Categories

Targeted chinook are the hatchery chinook produced by the NPTH and the wild populations from which they are drawn or introduced.

- For spring chinook, this includes hatchery fish released into Lolo, Newsome, Mill, Meadow, Boulder and Warm Springs creeks, fish produced by adults returning from the hatchery releases that spawn in the wild, and fish produced from any unsupplemented runs that occur in a stream before the Proposed Action begins.
- For fall chinook, this includes the hatchery fish released into the mainstem Clearwater River at Cherrylane and Lapwai Creek, the South Fork Clearwater at Luke's Gulch and the Selway River at Cedar Flats, fish produced by adults returning from outplants that spawn in the wild, and fish produced in the mainstem Clearwater River before the Proposed Action begins.

Non-targeted chinook are non-NPTH chinook (both hatchery or wild) originating within and outside the Clearwater River system encountered during outmigration, in the ocean, or on the return to the Clearwater River Subbasin.

- For spring chinook this includes fish encountered during outmigration, in the ocean, or in Clearwater River tributaries or hatcheries that were not derived from streams occupied by targeted spring chinook.
- For fall chinook, this category of fish includes those fish encountered during outmigration, while in the ocean, or during return to rivers other than the Clearwater that were not derived from outplants of targeted chinook.

Other salmon and trout includes steelhead, bull trout, cutthroat trout, and brook trout. Effects to this category of fish are primarily discussed relative to streams that are the focus of the targeted spring chinook populations.

Non-salmonids are all other fish species. Effects to this category of fish are discussed relative to streams and rivers that are the focus of the targeted spring and fall chinook populations.

Impact Levels

The concept of *population viability* was used as a measure of project related impacts. Here, viability is taken to mean the probability that the population would perpetuate itself into the future. This probability is a function of the fitness of individuals in the population, their abundance and genetic makeup, and the environment and if these individual fish are more or less likely to survive and spawn when exposed to the Proposed Action. For purposes of this assessment, population viability is indexed by the anticipated status (abundance) and trend of the population over time. Impacts were scored as none, low, moderate, and high based on the following criteria:

No impact would occur if the Proposed Action would not affect fish abundance and would result in no change from existing conditions.

A **low impact** would occur if the Proposed Action is likely to result in a small change in abundance, but the amount of change would fall within the normal range of year-to-year variability observed for the species, and therefore would not ultimately affect population viability.

A **moderate impact** would occur if the Proposed Action is likely to produce a moderate change in abundance. The amount of change would be similar in magnitude to the response exhibited under atypical conditions, such as during drought years or in years where run sizes are outside the normal range. Should conditions or impacts persist, population viability may be affected.

A **high impact** would occur if the Proposed Action is likely to cause a large change in abundance. The magnitude of the change would be similar to that caused by severe natural disturbances, such as a landslide occurring or being removed that would block or add to the range of accessible habitat. Population viability of the fish within the specific drainage would be affected.

Impacts were evaluated within different geographical and temporal scales. Because chinook salmon complete their life cycle by sequentially inhabiting tributary (spring chinook), mainstem, estuarine, and marine habitats, the nature and extent of impacts within these areas would be influenced by the scale of the associated system. Some impacts are limited to facility sites in the Clearwater River Subbasin. They would have relatively large direct and indirect effects. Other impacts would be distributed over larger geographic areas, defined by the migratory routes of

the target species. In these cases, effects caused by the Proposed Action would be more of a cumulative nature and much harder to discern or predict.

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

Scoring Impacts — After evaluators scored the impacts for each category of fish, the qualitative scores were assigned a numerical value, summed and averaged for an overall score. On individual evaluators tables, scores ranged from 0-3, with 0 equalling no impact and 3 equalling a high impact. Summary results of the impact scoring process are in Table 4-4.

Team Review — After the initial scoring, the IAT discussed the scores, identified and reconciled differences of opinion, and reached consensus on the level and type of impacts. There was broad agreement on most scores, so it was not necessary to repeat the scoring procedure.

4.6.1.2 Impacts

Siting and Construction of Hatchery Facilities — Hatchery facilities would necessarily be situated close to stream channels. The construction of NPTH facilities would have physical impacts that relate to site disturbances, channel alterations, and the placement of water intake, conveyance, and discharge structures.

Site Disturbances

Construction of the central incubation and rearing facilities and satellite ponds would disturb the ground and add impervious surfaces to the sites, which may lead to increased or rerouted runoff and sediment carried into streams. Increased runoff is expected to be short-lived and is not expected to exceed a stream's ability to carry sediment away from the site. It is not expected to change a stream's substrate. Some amount of bankside and riparian vegetation would be removed or disturbed which may affect fish cover, source of food, and shade on a very limited scale. Most construction activities would occur away from the channel, and would be mitigated by erosion control, removing the least amount of trees possible, and revegetating the site after construction.

Site disturbances may change the behavior and disrupt the distribution of individual fish adjacent to and downstream of the sites, but the overall biological impact to targeted chinook, other salmonids and non-salmonid populations is expected to be low.

Table 4-4 Summary Results of the Impact Scoring Process

Causal Factors	Targeted Chinook	Non-Targeted Chinook	Other Salmonids	Non-Salmonids
Siting and Construction of Hatchery Facilities				
Site Disturbances	Low	None	Low	Low
Channel Alterations	None	None	None	None
Water Intake and Discharge Structures	Low	None	Low	Low
Hatchery Operations and Management				
Water Gains and Losses	Low	None	Low	Low
Water Quality	Low	None	Low	Low
Fish Traps, Live Boxes, Ladders, and Weirs	Moderate	Moderate	Moderate	Low
Broodstock Selection and Maintenance	Moderate	Low	None	None
Mating Protocols	Low	Low	None	None
Incubation and Rearing Practices	Low	None	None	Low
Fish Health Management	Low	Low	Low	Low
Release Methods and Numbers	High	Moderate	Low	Moderate
Fish Interactions				
Competition	Low	Low	Moderate	Low
Chinook as Predator	Low	Low	Low	Low
Chinook as Prey	Low	Low	Low	None
Reproduction and Genetic Exchange	Moderate	Low	None	None
Disease Transmission	Low	Low	Low	Low
Human-Fish Interactions				
Non-Tribal Management Actions	Low	Low	Low	Low
Fishing	Low	Low	Low	Low

The amount of habitat and number of fish affected by these changes would be small relative to the total habitat available. No significant change in abundance or trend in fish populations is expected. Non-targeted chinook are not present in the receiving streams, and therefore would not be impacted.

No cumulative impacts from site disturbances at facility sites are anticipated. Impacts are expected to be localized and short-lived.

Channel Alterations

Stream channels adjacent or close to the North Lapwai Valley, Yoosa/Camp Creek, Newsome Creek and Mill Creek satellite sites would be altered by channel excavation and bank riprap used to establish intake structures, to place instream boulder anchors and perhaps bank anchors to support fish weirs, and to place tripods and fence panels for weirs. River channels adjacent or close to Cherrylane, Luke's Gulch and Cedar Flats would be altered by channel excavation and bank riprap used to establish intake structures and fish ladders. Stream channels in Meadow Creek, Boulder Creek, Warm Springs Creek, Johns Creek, Eldorado Creek, and Tenmile Creek would be altered to place instream boulder anchors and perhaps bank anchors to support fish weirs, and to place tripods and fence panels for weirs.

During construction, fish residing within the area of activity would be displaced, and some might be killed. Longer-term impacts caused by the structures may include disrupting the behavior and distribution of individual fish next to and downstream of the sites. (The operation of weirs and fish ladders and their effects on fish are discussed more fully in **Hatchery Operations and Management**.) But construction and placement of channel structures is not expected to incur significant biological impacts for targeted chinook, non-targeted chinook, other salmonids and non-salmonid populations. No change in abundance or trend in fish populations is expected. Impacts are expected to be localized and short-lived.

No cumulative impacts are anticipated by channel alterations at facility sites.

Water Intake and Discharge Structures

Water intake, conveyance, and discharge structures would be permanent fixtures at NPTH production sites. The structures would be screened to prevent fish from entering or leaving the facilities. Construction would disturb near-channel and in-channel areas, causing sediment delivery to the stream, removal or disturbance of streambank vegetation and disturbance of the stream substrate. Increased runoff is not expected to

exceed a stream's ability to carry sediment away from the site and should not change the stream's substrate. The amount of bankside and riparian vegetation that would be removed or disturbed would be small.

If structure screens fail, non-hatchery fish may enter and hatchery fish may exit the facility. Unintentional releases of hatchery fish from screen failure are not expected. Any non-hatchery fish that enter the hatchery because of screen failure in the flow distribution system would either be reared along with hatchery fish, returned to the stream, or retained for broodstock.

Site disturbances may disrupt the behavior and distribution of individual fish adjacent to and downstream of the sites, but the overall biological impact to targeted chinook, other salmonids and non-salmonid populations would be localized and short-lived. The amount of habitat and number of fish affected by these changes would be small relative to the total habitat available. No significant change in abundance or trend in fish populations is expected. Impacts would be low.

Non-targeted chinook are not present in the receiving streams, and therefore would not be impacted.

No cumulative impacts are expected at facility sites.

Hatchery Operations and Management — The central incubation and rearing facilities at Cherrylane and Sweetwater Springs, and the six satellite rearing facilities would release water, fish, organic and inorganic wastes, and pathogens. The IAT considered the potential impacts of diverting water from nearby watercourses and the effects of changes in water quantity and quality on the receiving stream and associated biota. The team also assessed the impacts of management decisions and practices associated with collecting, mating, rearing chinook in a hatchery and subsequently releasing them into the natural environment.

Water Gains and Losses

The IAT compared the water requirements of the various hatchery facilities with the amount of water available and concluded that the potential for adverse fisheries impacts is greatest at the Yoosa/Camp Creek, Newsome Creek and Mill Creek sites (see Tables 2-1 and 4-2). These are smaller streams that would have their flows reduced by 34 percent, 24 percent, and 11 percent, respectively, for a distance of up to 300 m (984 ft) of stream. The amount of habitat available, passage conditions, and food production would be negatively impacted in these reaches, particularly during September, when water needs are greatest in relation to overall streamflow. Larger systems, such as Lapwai Creek, the Selway, South Fork Clearwater, and lower mainstem

Clearwater, would not be affected to any great extent since the amount of water withdrawn would be a small fraction of the total streamflow.

The IAT concluded that flow alterations caused by hatchery operations would not significantly affect the viability of any fish population. Because of the location and the relatively small area affected, fish are expected to move either upstream or downstream, or exist at smaller densities within the impacted segment. However, because a decrease of fish abundance within the impacted stream reaches is predicted for Yoosa Creek, Newsome Creek and Mill Creek, the impact to targeted chinook, other salmonids and non-salmonids for these sites was rated as moderate. No impact is expected on targeted chinook, other salmonids, and non-salmonids at other release and satellite sites. Consequently, the combined impact to these categories of fish from water gains and losses is rated low. No impact is expected on non-targeted chinook in any area.

Water diversions at all facility sites would not cause any change in status or trend of fish populations so no cumulative impacts are expected.

Water Quality

Discharges of chemical and organic pollutants would meet or exceed federal and state water quality standards and guidelines, and would satisfy all permit requirements. Important physical properties and chemical constituents in hatchery effluent would be routinely monitored to assure compliance with water quality standards. Chemicals used to prevent or treat fish diseases would be handled, applied, and disposed of in accordance with state and federal regulations.

Hatchery practices would be conducted to minimize the amount of uneaten food and discharge of organic wastes into the natural environment. Adult fish carcasses would be used for fertilizer, or disposed of at local landfills. Satellite ponds would be cleaned at the end of the rearing cycle and wastes would be disposed of at local landfills. At Cherrylane, effluent would settle and be treated in effluent ponds, and hatchery wastes would be removed before liquids are discharged into the lower Clearwater River. Effluent would rapidly dilute and disperse in the river.

Water discharged from the Cherrylane and Sweetwater Springs facilities is expected to be somewhat cooler than the receiving stream, since chillers would be used to maintain incubation and early rearing temperatures in the hatchery at below-ambient levels. Water released would mix rapidly with the stream and river water downstream of the facilities. Temperature changes would be minor.

Any water quality changes resulting from the proposed facilities may disrupt the behavior and distribution of individual fish adjacent to and downstream of the sites, but the overall biological impact to targeted chinook, other salmonids and non-salmonid populations is expected to be low. The amount of habitat and number of fish affected by these changes would be small relative to the total habitat available. Non-targeted chinook are not present in the receiving streams, and therefore would not be impacted.

No cumulative biological impacts to fisheries status or trend would result from the addition of nutrients from facility discharges.

Fish Traps, Ladders, and Weirs

Fish Traps — Juvenile fish that emigrate from Lolo Creek and Meadow Creek would be collected by rotary screw traps and held in live boxes until sampled. Depending on the amount of flow, 5-70 percent of the fish passing the trap on any given day can be captured. The capture efficiency approaches 70 percent during the fall when water is at base flow, and is 5 percent or less during spring runoff. Staff would check the traps daily, or more frequently if there is a pulse of migrating fish. Trapping, handling, weighing, measuring, and tagging these fish would cause mortality. The Nez Perce Tribe has operated screw traps at these sites since 1994. During this time, 50,124 fish were trapped, of which 369 were dead. No estimates of mortality were made after fish were released, but information from PIT tag studies shows an additional 2 percent might be expected to die shortly after release. Fish impacts on Lolo and Meadow creeks were rated as moderate for targeted chinook, other salmonids and non-salmonids. No impact is expected to the four fish categories at any other site.

The traps operated on Lolo and Meadow creeks would add to cumulative impacts to targeted chinook and other salmonids (particularly steelhead) that emigrate from these drainages. Traps are operated by other management agencies farther down in the Clearwater, Snake, and Columbia river systems, in addition to those operated on the fish bypass and transport systems at the mainstem dams. Repeated trapping and sampling of the same individual fish might cumulatively increase the rate of mortality.

Fish Ladders — Cherrylane, Luke's Gulch, and Cedar Flats facilities would be equipped with fish ladders so that managers may collect returning hatchery adults on an as-needed basis. No detrimental impacts are expected to be caused by the ladders themselves. However, non-hatchery fish may commingle with hatchery spawners and ascend the fish ladder as part of a group. Depending on the mating protocols, they may be kept in the facility to be spawned, or released to the river. If kept in the

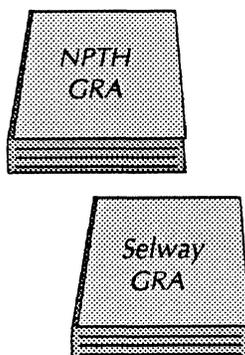
hatchery, their progeny would be returned to the rivers with fish reared at NPTH facilities. No impact is expected to occur to any of the four fish categories by the fish ladders.

Fish Weirs — Operating fish weirs may block, delay, or otherwise disrupt the movements and distribution of fish. These include returning adult chinook, late run steelhead, late run cutthroat trout, late run suckers, or early running bull trout. Juvenile life stages, and other fish species, are less likely to be affected. Weirs can stress, injure, or kill fish if improperly designed and operated. Weirs may also prevent adults that have temporarily strayed above the weir (dip-ins) from returning downstream and migrating to other areas to spawn.

As mitigation, several items are necessary. Vigilant monitoring and cleaning of weirs, and checking areas downstream of the weirs by snorkeling to determine if adults are holding up or spawning downstream is necessary. Handling protocols must be established for adults trapped. Downstream passage must be allowed using a downstream trap. Finally, corrective actions that favor the survival of naturally-reproducing adults must be immediately applied should problems occur with the weirs.

The IAT rated impacts of weir operation and overall effects of this category as moderate to targeted chinook, other salmonids and non-targeted chinook (fish returning to control streams - Johns Creek, Tenmile Creek, and Eldorado Creek, or straying fish). No impact is predicted for non-salmonids.

The proposed weirs would have cumulative impacts to spring chinook and other salmonids in the Clearwater River Subbasin. Under existing conditions, weirs are operated on several streams (Big Canyon Creek, Clear Creek, Crooked River, Red River, Walton Creek, Fish Creek, Running Creek, and historically, the upper Lochsa, and Brushy Fork Creek) in the Subbasin to conduct research and collect hatchery broodstock. Adding at least eight weirs would cause adverse impacts to be spread over a wider geographical range. Should the adverse impacts become the rule and not the exception, a decrease in run size and redistribution of spawning, perhaps to less favorable areas downstream, might occur.



Broodstock Selection and Maintenance

Two genetic resource assessments were completed as part of the Proposed Action (Cramer, 1995a; Cramer and Neeley, 1992). These resource assessments evaluated the effects of broodstock selection for NPTH activities in the Clearwater River Subbasin and made recommendations for broodstock sources (see Section 2.1.3.7, Broodstock Source and Management). The

Proposed Action would follow the recommendations, thus limiting potential detrimental effects on targeted and non-targeted chinook populations.

Broodstock maintenance activities can pose four types of genetic risk: extinction; loss of within-population genetic variability; loss of, or changes in, population identity; and domestication selection (Busack, 1991; Cramer and Neeley, 1992; Kapuscinski, et al., 1993). NPTH broodstock operations have the potential to simultaneously incur one or more of these risks. The threat of extinction of the targeted or non-targeted population poses a risk to very small populations. A reduction in genetic diversity within targeted populations can occur whenever the number of fish spawning in the wild or in the hatchery falls below certain levels or mating is not random. Loss of population identity can occur whenever genetically dissimilar fish are included in hatchery broodstock or wild spawning populations. The risk of domestication selection increases whenever broodstock collection accentuates differences between hatchery and wild components of the targeted populations.

The broodstock maintenance program developed for the spring chinook portion of the Proposed Action protects targeted populations from extinction, loss of genetic variability and domestication selection by using wild-to-hatchery spawner ratios that permit wild runs to build to sustainable levels within a reasonable period of time (see Section 2.1.3.Z, **Broodstock Source and Management**, and Appendix C). Once well-established, wild fish from the targeted population would provide up to 50 percent of the hatchery broodstock. Until such time, variable wild:hatchery ratios would be permitted so that the percentage of wild fish in hatchery and naturally-reproducing populations increases as the number of returning wild fish increases. Regardless of escapement level, wild fish would be incorporated into hatchery broodstock at slightly higher percentages than in the naturally-reproducing population to provide added protection against the risk of domestication selection in the hatchery. To minimize the risk of extinction, proportionately greater numbers of hatchery fish would be allowed to spawn naturally if the wild population drops to critically low levels.

Fall chinook would not have the immediate benefit of cross-breeding wild and natural adults, but institutional regulations will protect adverse impacts from occurring to naturally-spawning fish. Allowing a portion of the fall chinook run to spawn in the environment would continue other efforts currently underway in the basin to supplement this stock upstream of Lower Granite dam (see Section 1.6.4, Lower Snake River Fish and Wildlife Compensation Plan).

Fish from Lyons Ferry, which is the egg bank program for the Snake River run, have been used to increase the return of naturally spawning fall chinook upstream of the hatchery. Fish were captured for the egg bank program from those bound for the Snake River and blocked by Hells Canyon Dam. They are probably more genetically similar to the historic Snake River population than those wild fish currently spawning. This is because out-of-basin fish have strayed into the Snake throughout the years and are assumed to have crossbred with Snake River origin fish in the wild.

The genetic effects of the supplementation efforts would largely depend on the broodstock maintenance program at Lyons Ferry, and eventually NPTH. When Lyons Ferry fall chinook outplanted from the NPTH acclimation sites return to spawn, the progeny would be considered to be wild fish, and these are protected by the Endangered Species Act. It is assumed that the hatcheries would be required to conduct their brood taking and spawning combinations from the entire portion of the run and encourage the integrity of the Snake River stock. Because Lyons Ferry serves as an egg bank, and is also being used to supplement a threatened species, it receives critical attention from NMFS on its husbandry techniques. These procedures and scrutiny would be carried forth on practices of NPTH. Hatchery practices would not be allowed to jeopardize the further existence of the species. Receiving such attention by the foremost experts in genetics would result in having as few adverse effects on the population of fall chinook currently spawning in the Clearwater as can be expected.

Despite actions taken to minimize impacts, broodstock selection and maintenance has the potential to adversely affect targeted and non-targeted chinook populations. IAT members projected that should they occur, they would have moderate impacts for targeted chinook, and low impacts for non-targeted chinook. Other salmonids and non-salmonids would not be affected.

The overall risks of change in genetic structure can affect any fish hatchery that releases fish to eventually spawn. Using broodstock recommended in the resource assessments and using the wild:hatchery ratios, the Proposed Action would decrease this potential for cumulative impacts to salmon populations.

Adult Holding and Spawning

Spawning fish in a hatchery entails risks that may affect targeted and non-targeted chinook populations. Most hatcheries experience a pre-spawning mortality rate of 10-15 percent of all adult fish captured. NPTH proposes to use higher flow rates in adult holding facilities than are commonly used by hatcheries to

alleviate pre-spawning stress. Nonetheless, adult mortalities would occur. Unmarked strays (non-targeted chinook), possibly from listed populations, could also die if they find their way into the facilities.

IAT members rated the potential impacts to targeted and non-targeted chinook populations as low. Although individual adults would die, overall abundance of targeted populations is still expected to increase by the supplementation program. Straying of non-targeted chinook into NPTH facilities is not expected to be significant. No impacts are expected to other salmonid and non-salmonid populations.

The Proposed Action would add to adult mortalities caused by holding and spawning operations of other hatcheries in the Columbia River Basin. Because hatchery intervention is more likely to cause an increase in populations by decreasing mortality at younger ages, cumulative impacts are not expected to be significant.

Incubation and Rearing Practices

Rearing conditions and practices can strongly influence the physiological, morphological, and behavioral characteristics of hatchery fish. These characteristics in turn would affect the magnitude and types of interactions between hatchery and wild chinook and their ability to survive in the wild. The size of fish released is an important consideration since hatchery fish, if larger than wild fish, may enjoy a competitive advantage and reduce the survival of wild fish (Solazzi, et al., 1983). Hatchery fish that are too small are less likely to develop on schedule and have life history patterns that are consistent with the targeted population.

NPTH has been designed to incubate and rear fish under as natural conditions as possible to maximize their survival following release. Rearing density, temperature, light, water velocity, feeding, and other environmental attributes would be maintained at levels that foster the development and expression of wild-type behaviors and other survival related traits among hatchery fish. Because of the use of techniques to maintain wild-type characteristics among hatchery fish, the IAT ranked the potential impact on targeted populations as low. Non-targeted chinook, other salmonids and non-salmonids are not expected to be affected. Cumulative impacts are not expected.

Fish Health Management

Hatcheries may introduce diseases into the natural environment either by direct contact or through contaminated wastes. Free-living fish may be exposed to increased levels of pathogens and may contract diseases when they come in contact

with pathogen-bearing water. Some past releases of hatchery fish have introduced pathogens into the natural environment, leading to novel or additional health risks for wild fish (Hastein and Lindstad, 1991; Hindar, et al., 1991). However, the extent of disease transmission from hatchery to non-hatchery fish is believed to be low since the pathogens responsible are already present in both groups of fish, and environmental conditions generally do not favor outbreaks of disease in the wild.

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

The annual operating plan would describe the comprehensive and detailed management of fish health and disease. Fish health technical services would be provided by either a federal agency (USFWS), or be developed by the NPT in accordance with Pacific Northwest Fish Health Protection Committee, IHOT, and NPT guidelines.

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

Fish rearing practices, waste removal, and prophylactic treatment of disease outbreaks within the hatchery would help maintain acceptable pathogen levels. Even if disease were to be transmitted, the overall impact would probably be negligible since wild fish are widely dispersed and tend to be disease-resistant. Consequently, the impact of transmitting diseases from hatchery to non-hatchery fish (all four categories of fish) is considered low. No cumulative impacts are anticipated.

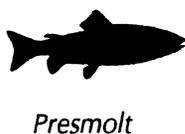
Methods and Magnitude of Release

The location, method, timing, and magnitude of release would influence the frequency and kinds of interactions possible between hatchery chinook and resident fish. Releasing fish in the wrong place or at the wrong time can increase the potential for adverse interactions. Releasing too many fish may overwhelm the carrying capacity of the natural environment, depleting the amount food available. Selection of an inappropriate method of release may result in excessive concentrations of fish, increased stress, and lower survival of chinook and other species alike.

The design of NPTH considered carrying capacity and quality of the streams to be supplemented, the method to be used to transport and outplant hatchery fish, the time of year at which fish would be released, and the density and absolute number of fish to be released in each location. Habitat quality and quantity available for outplanting spring chinook were explicitly considered in establishing production and stocking goals. Each targeted stream would be outplanted with a number of hatchery chinook which, when added to the wild fish chinook, would not surpass 70-100 percent of the carrying capacity for that species.

The magnitude of release is probably the most important factor affecting status and trend of targeted chinook populations. Release number can result in an increase in populations similar to the most significant natural events.

Release methods were designed to impart “wildness” to released fish. NPTH would release spring chinook that do not have an extended period of residency typical of most hatcheries. By reducing hatchery residence time, natural selection would be given the opportunity to undo any damage caused by domestication selection in the hatchery. Acclimation strategies would allow juveniles to adjust to the natural environment and recover from stress caused by handling and transportation. This should lead to higher post-release survival and at the same time reduce the potential for adverse interactions between hatchery chinook and wild fish.



The timing of hatchery releases would be calibrated to maximize use of available rearing habitat and to avoid overwhelming local resources. Subyearling smolts (fall chinook) would probably not interact to any great extent with their wild counterparts because they would be more likely to begin their downstream migration shortly after release. Spring chinook fry releases would be scheduled for times when food and temperature conditions favor rapid growth. Spring chinook presmolts would be released near the end of the growing season to minimize competition with resident wild fish. They would exit on their own from acclimation ponds over a period of several weeks, thus spreading their impact on resident biota over time.

The IAT concluded that the location, method, timing, and magnitude of release of chinook would have high biological impacts on targeted chinook, low impacts on non-targeted chinook and moderate impacts to other salmonids and non-salmonids. High impact was given to targeted chinook because this activity could cause a dramatic increase in population status and trend over time. Impact to non-targeted populations is not predicted to cause a long-term increase or decrease in their abundance or trend over time. A moderate impact was assigned to other salmonids and non-salmonids because a reduction in abundance of these fish populations could occur if supplementation becomes successful and chinook once again become the most common inhabitant of salmon streams.

Cumulative impacts expected include an increase in salmon populations and a redistribution of other fish populations based on resources available within the streams and rivers targeted for supplementation. Non-targeted chinook could also be affected (see **Fish Interactions** below).

Fish Interactions — As competitors, predators, prey, and disease vectors, NPTH chinook have the potential to alter trophic relationships and abundance of other fish populations in tributary, mainstem, and ocean habitats. Because of their complexity, impacts that derive from competition, predation, and reproduction/genetic exchange are discussed under separate headings below for targeted chinook populations, non-targeted chinook populations, resident salmonid species, and non-salmonid fish species. Disease-related impacts were discussed above in *Fish Health Management*.

Competition

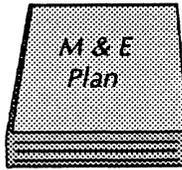
Targeted Chinook Populations — Competitive interactions would be greatest when hatchery and wild fish overlap in time and space, and contested resources are in short supply relative to demand. Food and habitat shortages are more likely in freshwater environments than in the ocean, and in rearing areas more often than in migratory corridors. In addition to affecting behavior, growth and survival, *intraspecific* competition may result in increased activity and stress, which in turn would predispose fish to higher levels of predation and disease (Sosiak, et al., 1979; Dickson and MacCrimmon, 1982; Suboski and Templeton, 1989).

As described above, the number of spring chinook outplanted each year would be calibrated so that the sum of hatchery and wild fish does not exceed the carrying capacity of the receiving stream. Additionally, competition would be contained by spreading hatchery releases out in time and space, and releasing many of the hatchery fish after the summer growing season when production bottlenecks typically occur. Hatchery fish released

➔ For Your Information

Intraspecific is within a species.

earlier would go into streams after wild chinook have emerged, dispersed, and established territories, so the potential for displacement of wild fish into suboptimal habitats would be low. Spring chinook would be reared in conditions that attempt to simulate those found in the wild, so they should not enjoy a size advantage (see Section 2.1.3.3, **Rearing Techniques**).



The M & E Plan recommends research to determine whether hatchery and wild spring chinook compete equally well for limited resources, and whether intraspecific competition appears to be an important factor regulating production within NPTH streams. This research is part of the adaptive management planned for this alternative. Answers to these questions would be used to modify rearing and release strategies to minimize adverse impacts and take full advantage of the production potential of the streams.

Fall chinook releases are not expected to compete with their wild counterparts. They would likely be larger than most subyearling migrants rearing in the Clearwater, but would also migrate sooner. Should the supplementation strategy be effective, it is predicted that there would be two pulses of migration by subyearling chinook from the Clearwater. An earlier outmigration period would occur by NPTH releases that are more closely aligned with the descending peak of runoff in June. A later subyearling outmigration pulse is expected from July to August that would result from natural spawning in the river by NPTH returning adults and non-NPTH adults.

The IAT concluded that the overall impact of competition on the targeted population would be low, and limited primarily to spring chinook in freshwater habitats. Cumulative impacts are not anticipated.

Non-Targeted Chinook Populations — The National Marine Fisheries Service has argued that effects of competition between hatchery and natural fish stocks in the mainstem and estuary habitats have posed a detriment to natural populations. Because much of the free-flowing nature of the Columbia and Snake River systems has changed to a series of reservoirs, the runoff timing, food resources, numbers of predators, competitors and exotic species have been altered. NMFS believes the carrying capacity for anadromous fish in these habitats has been reduced and that competition under conditions of reduced carrying capacity has resulted in detrimental impacts to wild anadromous stocks. The primary source for competition is the release of almost 200 million hatchery salmon and steelhead annually in the Columbia River Basin. Although NMFS also finds that there is little definitive information on carrying capacity and density dependent (competitive) effects within the mainstem, estuary, and ocean, it recommends a cap on hatchery production as a safeguard. The hatchery cap limits chinook production to the

numbers produced in 1994 (20.2 million in the Snake River Basin) with the exception of production to support recovery of listed threatened or endangered stocks.

Competition between NPTH-produced chinook and non-targeted chinook populations would be limited to areas where they commingle and vie for the same resources. These areas would include the mainstem river, estuary, ocean, and, in the event that significant straying occurs, on spawning grounds in non-targeted tributaries.

The IAT evaluated the potential for direct and indirect effects and concluded that NPTH chinook would have a low impact on non-targeted chinook populations. The total number of hatchery and wild fish produced under NPTH would not exceed the natural production capacity of the Clearwater system, and therefore should not cause a disproportionate reduction in the amount of food and space available to commingled stocks.

Proposed hatchery releases of spring and fall chinook would cause cumulative impacts to non-targeted chinook, but the effects would not be detrimental to the recovery of endangered chinook stocks. Spring chinook proposed for release are within the production cap recommended by NMFS. The cap was made for hatchery production from 1994. In that year, the NPT raised approximately 485,000 chinook for outplanting. An additional 420,000 chinook were secured by the NPT and reared by IDFG at Clearwater Hatchery for the tribal outplanting. It is assumed that the production cap was a necessary measure to cause no further harm to chinook species, and would allow for rebuilding of the runs. Because NPTH spring chinook releases proposed are within the cap set in 1994 (as NPT production) they should not interfere with rebuilding of the runs, nor cause harm to the listed stocks.

Fall chinook releases are not expected to cause cumulative detrimental impacts. The fall chinook stock proposed for NPT, Lyons Ferry fall chinook, are considered part of the Snake River fall chinook ESU, and would therefore be excluded from the production cap. Propagation of these fish would be similar to propagation of listed spring chinook or sockeye salmon in other areas of the Snake River Basin (e.g., Eagle Creek Hatchery, McCall Hatchery, or Sawtooth Hatchery). These stocks of fish are propagated for recovery purposes. They are part of the group of fish that are proposed to be protected from competition by the production cap. Consequently, no adverse impacts are anticipated that can be attributed to competition by their production and release from NPTH.

Other Salmonid Species — Competition between chinook and other species of salmonids, primarily young steelhead, cutthroat, and bull trout, could be expected to have detrimental effects if stream resources (food and space) were limited. However, steelhead and bull trout populations have not been increasing in

the streams proposed for outplanting or in the Clearwater River Subbasin as a whole. In fact, they are both being considered for listing under the Endangered Species Act. Their densities (see Table 3-7) do not suggest that they approach high levels of use in the outplanting streams, with the exception of steelhead in Boulder Creek. It is unlikely that the stream resources are so taxed that competition with chinook would detrimentally affect their populations. Furthermore, research has shown that juvenile chinook and steelhead occupy areas with different depths and velocities, thus limiting their direct competition for food or space (Everest and Chapman, 1972). Studies on bull trout/chinook interactions are more limited, but supplementation of hatchery chinook and steelhead did not produce long-lasting impacts on bull trout populations in three tributaries to the lower Snake River where the effects were evaluated (Underwood, et al., 1992).

Cutthroat and brook trout appear to have filled the ecological niche vacated by chinook when they were eliminated from the Clearwater River Subbasin. Young cutthroat and brook trout are found in relatively higher densities in the salmon habitat of upper Lolo Creek and Mill Creek. They may be cut off from resources to which they currently have access, and densities of these species may shrink as chinook become established in chinook habitats, but it is unlikely that the viability of these species would be threatened. Cutthroat are the dominant occupant of many of the smaller tributaries to Lolo Creek and Mill Creek, areas that are not preferred by larger anadromous species. It is unlikely that this condition would change.

The IAT determined that competitive interactions between chinook and other salmonids, primarily young cutthroat trout, would have moderate impacts. Due to their extensive use of mainstem habitats during outmigration, hatchery fall chinook are apt to interact less with these species and no impact is predicted.

Restoration of habitat use and reallocation of resources that existed prior to the elimination of salmon from salmon habitat could result and would be a cumulative impact.

Non-Salmonid Fish Species — The scientific literature contains few examples of direct competition for food and space between chinook salmon and non-salmonid species. Because they are generalists in their food preferences, chinook salmon may competitively interfere with other species that feed on aquatic invertebrates. Those species most apt to be affected are sculpins (*Cottus spp.*), longnose dace (*Rhinichthys cataractae*), and redbside shiner (*Richardsonius balteatus*).

The IAT rated potential competition-related impacts on resident non-salmonids as low. Although chinook may deplete food supplies in the short-term, especially in the immediate area of release, they are not expected to significantly reduce in number or otherwise lower the viability of resident fish species.

Restoring a salmon run and bringing in nutrients would be positive cumulative impacts.

Predation

Predation plays an important role in determining community structure and species abundance. Predators can reduce the abundance of prey species to the point that competition is inconsequential. NPTH chinook would fill the dual role of predator and prey in freshwater and marine ecosystems. Their impact on other species would depend on their respective trophic relationship, number, and spatial and temporal overlap. This section considers program-related impacts separately for prey and predator species.

NPTH Chinook as Predators — Chinook released by NPTH are unlikely to cause detrimental impacts to other fish species by acting as predators. Hatchery chinook would be released at times that favor the development of natural diets and feeding habits. They would establish feeding stations and prey on a variety of primarily invertebrate drift species. They are not expected to eat other fish until they attain a larger size (120 mm or so). For spring chinook, the gradual transformation to a fish-eating diet begins with their seaward migration as yearling smolts. Fall chinook begin their emigration at a smaller size, and thus do not begin to eat other fish until they have entered the ocean.

Chinook smolts actively feed during their downstream migration through the Snake and Columbia rivers. Their diets are dominated by local invertebrate species such as cladocerans, chironomids, and amphipods (Muir and Emmett, 1988). Although larger smolts may consume smaller fish, including other salmon, recent evidence suggests that fish comprise an insignificant fraction of the food consumed by migrating chinook salmon in the Snake and Columbia rivers (Muir and Coley, 1995).

The effects of NPTH chinook on predator-prey dynamics cannot be accurately predicted since little is known of the role of chinook in the ecology of the Columbia River estuary and Pacific Ocean. NPTH chinook would prey on other species of fish, but a change in status or trend of other species as a result of their predation is not expected because the numbers of NPTH chinook would be very small compared to the numbers of other fish in the ocean.

Overall, the potential impact of predation by NPTH fish on all categories of fish was rated as low. They are not expected to consume many fish while in freshwater and the effects of their predation on other fish in ocean is expected to be negligible.

Cumulative impacts are not anticipated for spring and fall chinook. The rationale described under cumulative competition effects for non-targeted chinook, that is, the hatchery cap, also applies here.

NPTH Chinook as Prey — Somewhat greater, but still minor impacts are expected from NPTH chinook as prey. Chinook would be released from NPTH facilities at sizes and under conditions that initially make them susceptible to predation. Populations of predator species such as bull trout, larger cutthroat, and northern squawfish should benefit from initial outplanting and an increase in run sizes due to supplementation.

Farther downstream, large concentrations of hatchery fish may adversely affect all four categories of fish by stimulating bird and fish predators at dams and river mouths. Shifts in predator type and abundance due in part to increased hatchery production have led to higher predation mortalities among wild juveniles during migration (Li, et al., 1987). The presence of hatchery fish may also affect the behavior of non-hatchery fish, increasing their vulnerability to predators in the process. If hatchery fish enable predator populations to expand, if they alter behavior patterns of non-hatchery fish, or if they physically displace or induce non-hatchery fish to use suboptimal habitats, then those fish populations may experience higher predation mortality.

On the other hand, hatchery fish would buffer non-hatchery fish from predation. Recently released hatchery fish often exhibit inappropriate competitive and foraging behaviors, and lack familiarity with their new surroundings, which may divert attention away from wild fish. The long-term increased forage base provided by supplemented runs could also buffer other prey populations.

The IAT determined that the direct and indirect impacts of chinook-as-prey on other fish resources would be low. The numerical abundance might stimulate and increase predator populations, but chinook would also be the principal prey for predators.

Reproduction and Genetic Exchange

Genetic introgression resulting from interbreeding among hatchery and wild chinook might lead to undesirable changes in the wild phenotype. The potential for adverse genetic impacts depends on the relative abundance of hatchery and wild fish, the extent of their reproductive interaction, their genetic compatibility and relative fitness, and the natural selection regime. The primary genetic impacts of concern are those that lower individual and population fitness.

Targeted Chinook Populations — The IAT concluded that reproductive and genetic impacts to the targeted population of spring chinook would be low. NPTH would use the spawning guidelines described in Section 2.1.3.7, **Broodstock Source and Management**. These practices should preserve the genetic integrity of wild populations. Rather than attempt to reproductively isolate hatchery fish from wild fish, the intent of the guidelines is to manage the reproductive contributions by members of both groups so that hatchery and natural production are fully integrated.

Genetic impacts to the targeted population of fall chinook could pose a moderate level of impact and would probably be more evident in the hatchery than in the wild. Potential to cross-breed and therefore eliminate some domestication effects would be limited. A gradual phasing-in of a program to increase the number of wild fish present in the hatchery population would occur in time, but would likely take a go-slow approach in the near term. Returns of wild fish over Lower Granite Dam are extremely low; any taking of these threatened fish for spawning in the hatchery would be limited and subject to agreement of the various management entities in the basin. Consequently, releases from NPTH would largely consist of hatchery-by-hatchery crossed fish. Risks posed to fish populations by hatchery programs operating with primarily hatchery broodstock, that is, domestication selection, would be inherent in this strategy.

An additional effect can be expected from the earlier fall chinook runs destined for the Selway River (Cedar Flats) and the South Fork Clearwater (Luke's Gulch). An earlier run upriver would expand the geographic range and spawn timing of fall chinook in the Clearwater. How such a change would affect the genetic blueprint of fall chinook is unknown. There would be no effects on the existing mainstem fall spawners in these river reaches because there are none presently. They may spawn with the primary fall chinook downstream of the North Fork Clearwater and encourage an earlier component of that run. On the other hand, they may also segregate into an earlier and later spawning population as is seen in other areas of the Columbia Basin. A principal example would be the spring and summer runs of chinook in the Salmon River. NMFS has determined that although the run timings and geographic locations of spawning differ, there is not enough genetic difference to separate the two runs of fish into different Evolutionarily Significant Units. Based on this premise, the adaptation or evolution of an earlier run of fish may be typical and consistent with different habitat characteristics. However, weighing the potential impacts on the conservative side, would require assessing a moderate level of impact to targeted chinook populations.

Non-Targeted Chinook Populations — Interbreeding between fish from targeted and non-targeted populations can have negative consequences if: (1) listed chinook are inadvertently collected for NPTH broodstock; and (2) NPTH chinook stray into other chinook-bearing streams or hatcheries. The incidental taking of non-targeted salmon would reduce the size of the naturally-reproducing population and would mix genetic material from two or more populations. If NPTH chinook stray, they might lower the reproductive success or long-term viability of recipient stocks. The potential for doing so depends on the genetic pedigrees involved and whether NPTH chinook interbreed or interfere with the reproduction of locally-adapted fish. As mitigation, all chinook released from NPTH facilities would be marked with fin clips, coded wire tags, PIT tags, visual implant tags or other forms of benign biological marks so that the hatchery fish can be readily identified and culled from other populations.

Impacts to non-targeted populations of spring chinook would be low. NPTH operations were designed to minimize gene flow (straying) into neighboring populations and vice-versa by using locally adapted populations as a source of broodstock. This should create greater homing fidelity than would otherwise be expected (McIssac and Quinn, 1988). NPTH spring chinook would also be acclimated within the streams that they are expected to return to as adults. The length of time spent acclimating to these streams should also increase their homing instinct.

No impacts are anticipated to non-targeted chinook from fall chinook releases. NPTH fall chinook would be derived from Snake River Basin stock. Should they stray, they are not expected to cause a loss of fitness to spawning populations in other mainstem areas (i.e., the Snake, Grande Ronde, Imnaha and lower Salmon rivers) because they are all the same stock.

Overall impact on non-targeted chinook stocks due to reproduction and genetic exchange is expected to be low. Cumulative impacts are not anticipated.

Other Salmonid Species — Cross-hybridization can cause deleterious effects by reducing fitness and the genetic contribution of all adults and producing sterile offspring. These occurrences are noted for brook trout:bull trout crosses and cutthroat:rainbow crosses in the Clearwater River.

No impacts are predicted from the Proposed Action. Steelhead and cutthroat trout are spring spawners and so do not overlap in time with chinook salmon spawning from late August into September. Bull trout and whitefish are fall spawners, but tend to spawn at higher elevations and later in the year (October) than do fall chinook and spring chinook, respectively (Underwood, et al., 1992). The tendency to segregate temporally

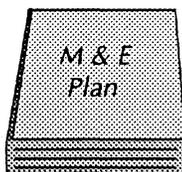
and spatially makes it unlikely that chinook would adversely impact the reproduction of any of these species. No cumulative impacts are expected.

Non-Salmonid Fish Species — No impacts are expected. There is no reason to believe that chinook salmon significantly affect the reproduction of non-salmonid species. No cumulative impacts are expected.

Human-Fish Interactions — This section assesses the effects on fish populations of human actions that are not directly linked to the operation and management of the Proposed Action, yet may influence activities and impacts in the future. The primary concern is with actions either prompted by or taken in response to the related changes in Clearwater chinook populations. These actions may exert pressure on NPTH chinook populations and, by extension, on non-targeted chinook, other salmonid, and non-salmonid populations. Most human-fish interactions of this type can be grouped into two categories: those related to natural resource management; and those related to fishing. The effects of external management initiatives, such as those imposed by the ESA or by forest management activities, are likely to be indirect, but could be significant. Fishing, on the other hand, is likely to cause impacts that are both immediate and direct in their effect. Because changes in either of these areas could produce significant impacts, they were included in the overall assessment of program impacts.

Non-NPT Management Actions

These management actions are decisions and actions taken by non-Nez Perce Tribal resource managers as a consequence of the development of the Proposed Action. The IAT assumed that future management actions would be consistent with NPTH goals, and are unlikely to be implemented if they pose a significant threat to fish resources. Therefore, the IAT assigned a low impact value to all resource categories. NPTH managers plan to coordinate activities with pertinent federal and state fisheries and natural resource agencies in the region to ensure efficiency and consistency across management agencies. Additionally, the M & E Plan calls for monitoring salmon recovery efforts, watershed development, mainstem hydrosystem operations, ocean and inriver harvest, and other management-driven activities to assess their potential impact on the Proposed Action.



Fishing

A primary goal of the NPTH program is to create opportunities to catch fish for recreation, sustenance, or cultural purposes. Some impacts may occur to targeted, non-targeted chinook and

other salmonids as a result. Fall chinook, because they are exploited to a greater extent than are spring chinook in commercial and recreational fisheries, are likely to suffer greater impacts. Unless protected by blanket restrictions on harvest that are meant to protect endangered species, Clearwater River Subbasin chinook are likely to be harvested at higher rates as their numbers increase, thereby affecting non-targeted and targeted populations.

NPTH managers intend to control tribal harvest, and to encourage state and federal managers to control non-tribal harvest, at levels that do not adversely affect fish resources. Harvest in the Clearwater River would be a coordinated action between IDFG and the Nez Perce Tribe. Harvest levels would be based on adult returns, subject to spawning escapement and broodstock requirements. Surplus hatchery fish would be targeted, allowing weaker wild stocks to rebuild to self-sustaining levels. Fishing would be limited to carefully designated areas and times, using techniques that reduce its adverse effects on non-targeted stocks, including listed species. Such techniques may include run size forecasting, setting harvest rates that vary with in-season escapement estimates, fishing in terminal areas, selectively harvesting externally marked hatchery fish, imposing gear restrictions, and catch and release.

The IAT rated overall impacts of increased fishing pressure caused by a larger numbers of returning salmon as low. Incidental catches of non-targeted chinook, other salmonid species, and non-salmonid fish species would likely result in diminished numbers, but a significant decrease in the viability of the populations is not expected. It is premature to suggest that fishing restrictions would be imposed to protect trout in these areas. Restrictions would only be imposed if it is necessary to protect the fish that would be returning, and it is premature to say if this would happen.

Potential Impacts on Listed Species — Chinook originating in the Clearwater River would not interact with listed sockeye or spring/summer chinook until they enter the Snake/Columbia River migration corridor. They could interact with listed fall chinook in the lower Clearwater River.

The primary risks to listed species from NPTH fish are communication of infectious disease and competition for food. The potential magnitude of these impacts is hard to predict, but management precautions and the environmental conditions under which NPTH and listed fish would coexist make it unlikely that listed species would be impacted. Unless straying of listed fish increases significantly, there is little danger that their inadvertent taking in broodstock collection and harvesting activities would accelerate their demise. Predation on outmigrating smolts and interbreeding and genetic exchange resulting from straying of

hatchery fish into other areas would pose minimal risk. Some of the same effects may occur in the Columbia River estuary, but conditions in the ocean make it unlikely that hatchery fish would impact listed fish either through competition, predation, reproduction, or disease transmission.

Overall, no to low impacts on listed species are expected from the Proposed Action. The construction and operation of the hatchery would have little or no impact to fish mortality of listed fish, and would not interfere with recovery actions or otherwise impede the recovery of spring/summer chinook and sockeye salmon. Threatened fall chinook populations would be supplemented and increased by the NPTH program. Any incremental loss of individuals of listed species would be offset by the restoration of viable, productive, and self-perpetuating populations of wild chinook in the Clearwater River.

The Proposed Action would be modified to address ESA concerns by imposing harvest restrictions that minimize impacts on endangered Snake River salmon. Potential impacts would be reduced by limiting the harvest of fall chinook as much as possible to *terminal areas* or by requiring use of selective gear that permits release and passage of listed species.

4.6.2 Use of Existing Facilities Alternative

4.6.2.1 Impacts

Siting and Construction of Hatchery Facilities — The impacts would be the same as for the Proposed Action except that the impacts from building the Cherrylane facility would not occur.

Hatchery Operations and Management — The impacts would be the same as for the Proposed Action except that the facilities used would be different. Slightly more water would be pumped, but all discharge requirements would be met (Miller, May 23, 1997). Fish would be trucked from Hagerman National Fish Hatchery, and this could increase the risk of disease in the fish and also increase the stress for the fish during the 10-13 hour drive. Four-six trips would be required.

In this alternative, the broodstock maintenance strategy also results in decreasing the natural existing run of spring chinook present in the drainage. The reason is that the existing facilities have a poor success rate at encouraging survival of fish, especially with parr and presmolt releases. Thus, implementing the broodstock maintenance strategy, which calls for bringing all wild fish into the hatchery when the run sizes diminish to less than 12 pair, would result in further decreasing that run size. As shown in Table 2-5, run size of natural spawners would be 0 after 20 years.

Maynard, et al. (1995, 1996a, and 1996b) discuss the lack of success by supplementation programs in restoring naturally-spawning populations using conventional hatchery practices. They found that present practices are geared towards mass production under unnatural conditions (high stress producing densities, open, uniformed concrete bottomed raceways with no structure, and surface fed) results in inappropriate, unsuccessful foraging behaviors and interactions by hatchery released fish. Mortality upon release is substantial (typically 50- 60 percent) and is not necessarily compensated by the increase in survival that fish accrue while in a conventional hatchery setting.

The Use of Existing Facilities Alternative would result in a larger number of fish produced in a conventional setting. Mortality would be born primarily by the hatchery released fish themselves. There may be an increase in predation on natural dwelling conspecifics because of the behavior of released fish, but detrimental interactions with the natural fish would not be significant enough to result in a change in population. Impacts to targeted populations would be low. Non-targeted chinook, other salmonids and non-salmonids are not expected to be affected.

Model results depicting run size at 20 years into the future are in Table 2-5. As can be seen the increase in naturally-spawning population is not expected to occur with Existing Facilities Alternative. The model shows an increase in only those fish incubated and reared at Sweetwater Springs and Cedar Flats and Luke's Gulch. Consequently, this alternative would have a moderate impact to targeted fish populations (fall chinook). For other populations and release sites, no to low impacts would occur.

Fish Interactions — Impacts from this alternative would be the same as the Proposed Action except that no increase or restoration in the naturally-spawning population is predicted to occur, so cumulative impacts do not exist.

Human-Fish Interactions — Impacts would be the same as in the Proposed Action.

4.6.3 No Action Alternative

Under the No Action Alternative most of the fisheries effects would not occur. It is expected that runs to Dworshak, Kooskia and Clearwater fish hatcheries would increase with measures taken under the salmon recovery efforts to enhance migration. Eventually salmon runs may be increased and restored in the streams targeted for spring chinook releases, but at a much slower rate that is dependent on straying and colonization. Natural rebuilding of salmon runs would gradually change the interactions between salmon and other fish, but also at a much slower rate. Whether salmon reclaim their dominant role in fish

production in these streams would depend on their ability to recolonize underseeded habitat. Fall chinook would gradually be restored but their runs would be enhanced only by supplementation efforts upstream of Lyons Ferry Hatchery (see Section 1.6.4).

4.7 Wildlife

Analysts used these impact definitions for wildlife.

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

- Significant amounts of existing important wildlife habitat destroyed.
- Critical habitats are disturbed during breeding or winter stress periods.
- Threatened or endangered species are directly impacted.
- Heavy, uncontrolled human access is allowed.

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

- Important habitat outside of critical breeding or wintering periods is disturbed.
- A moderate amount of habitat is lost.
- Uncontrolled human access is light.

A **low** impact would be created by these conditions.

- Construction activities with only slight changes in habitat.
- Overall habitat loss is insignificant.
- Wildlife is displaced temporarily.
- Threatened and endangered species are not affected.

4.7.1 Proposed Action

Direct impacts from construction activities and operation of fish rearing and acclimation facilities can disturb wildlife, damage habitat and create temporary and/or permanent impacts to them. Prime impacts to wildlife include habitat damage or loss, increased human access into otherwise secure areas and human disturbance during construction. Clearing riparian or upland habitat creates the greatest potential impacts.

4.7 1.1 Waterfowl

The Cherrylane facility and lowland satellite facilities (Cedar Flats and Luke's Gulch) used by waterfowl are located in areas that have been previously disturbed and therefore pose no threat to waterfowl in the immediate and nearby areas. There is only transitory and occasional use of riparian habitats in the upriver areas where the rearing, acclimation and weir sites are proposed. No impacts are anticipated. The location of the central hatchery at Cherrylane, the satellite facilities at Cedar Flats and Luke's Gulch, and associated development activities pose no threat to waterfowl in immediate and nearby areas.

4.7.1.2 Upland Game Birds

Upland game bird habitat at Cherrylane, Sweetwater Springs and North Lapwai Valley has already been disturbed because of existing land uses. There may be additional disturbance caused by construction of hatchery facilities at these sites, but the overall quality and quantity of upland game bird habitat is not expected to change from the existing condition. Temporary displacement of upland game birds occupying the sites is expected during construction activities, but it is expected to be short term and would pose no significant impact to the population.

4.7.1.3 Aquatic Fur Bearers

Impacts to fur bearers are expected to be minimal and potentially beneficial. The central incubation and rearing facilities are not expected to cause impacts because they would be built in already disturbed streambanks, or bench areas away from denning habitat. In the upriver tributaries, construction activities associated with the satellite facilities may cause temporary animal displacement. But modification of habitat via construction is not expected to be significant because of the availability of adequate displacement habitat in adjacent aquatic and riparian areas.

Spring chinook satellite sites provide suitable habitat for fishers, which may be disturbed by construction activities. Should fisher activity be observed in the vicinity of the project, the Idaho Department of Fish and Game and the Nez Perce Tribe Wildlife Department would be consulted on means to avoid adverse impacts to fishers or on fisher habitat. As a result, impacts to fishers from program activities would be mitigated.

Beneficial effects are more likely to occur for some species because of the Proposed Action. If supplementation recovers salmon populations, the forage base for otter and mink would increase over a wide area. Problems could occur at the individual

satellite sites because of the increase in forage. Mink and otter may be attracted to the rearing and holding ponds for feeding. If so, the facilities may require modification to prevent excessive predation.

4.7.1.4 Big Game

There is little or no potential for conflict at Sweetwater Springs or Cherrylane due to the existing developed conditions and low density of animals in the lower Clearwater River valley. There is some potential for conflict in upland areas. For facilities that require construction and operational activities, there may be some local, temporary displacement of animals during disturbance. However, the impact would be insignificant because the size of the facilities is small, facilities would be built along existing, open roadways, and there is ample displacement habitat in upland watersheds. Black bear may be attracted to adult holding ponds, so modifications, such as fencing, may be necessary to cope with them.

4.7.1.5 Raptors

Raptors that would be associated with the program area are the osprey, northern harrier and the bald eagle. The bald eagle is discussed in Section 4.7.1.7, **Threatened and Endangered Species**.

Overall impacts to osprey and their habitat is expected to be beneficial. Physical disturbance of nesting sites because of construction or operation of the facilities is not expected. Implementing the Proposed Action would result in an immediate increase of forage for these raptors by the addition of hatchery-produced smolts migrating in the mainstem. If supplementation proves effective, long-term benefits would also occur as production of naturally-spawning fish and their progeny increases in mainstem rivers.

No impacts to harriers, such as the marsh hawk, are expected. There may be some temporary displacement during construction of satellite facilities.

4.7.1.6 Other Wildlife

Other riparian-dependent species inhabit the lower Clearwater River corridor such as blue herons, kingfishers, dippers and raccoons. At Sweetwater Springs and Cherrylane, little or no conflict is expected with the construction of the facilities. Facilities would be away from the river and the existing disturbance patterns at the sites would minimize any additional

conflict. In upland areas, development would temporarily disturb and displace these species. Impacts would be low because there is sufficient displacement riparian habitat.

Once facilities are constructed and in operation, there is some potential for conflict with some species such as the kingfisher, bald eagle and blue heron that might be attracted to fish rearing ponds and adult holding facilities. These facilities would have to be modified to minimize conflict.

If supplementation is successful and salmon populations recover, there could be a beneficial effect on wildlife that eat salmon. An increased food supply could lead to favorable growth and survival for such species as bald eagles, kingfishers, and blue herons.

4.7.1.7 Threatened and Endangered Species

Bald Eagle — The Proposed Action has three facility sites located within bald eagle winter habitat, but impacts to eagles are expected to be negligible. Construction and operation of the Cherrylane facility, and the Luke's Gulch and Cedar Flats satellite facilities would not disturb any eagle roost sites. The Clearwater River and U.S. Highway 12 lie in between the Cherrylane facility and the known roost site on Fir Island. Human activity and disturbance is already common at all three mainstem corridor sites, and this is not expected to change. Cherrylane has several residences, grain and hay farms, a tree farm and highway traffic occurring at the site. Luke's Gulch is across the river and just downstream from the community of Stites; highway traffic on State Highway 13 is common there also. Cedar Flats is also adjacent to year-round human activity. The Sweetwater Springs facility and other satellite facilities are located outside of mainstem river corridors occupied by bald eagles during the winter. Consequently, they pose no detrimental effects to bald eagles or their habitat.

The winter population of eagles on the Clearwater River could be affected if the Proposed Action recovers and sustains salmon populations. If supplementation is successful, tributary and mainstem salmon production would increase the potential food base for the eagles. The provision of a high quality prey base would undoubtedly increase the growth and survival of eagle populations in the lower Clearwater River Valley and would supplement carrion food sources of eagles along upper watershed areas.

Grizzly Bear — There would be no construction within the Selway Bitterroot Wilderness area. Construction and operations at the Cherrylane and Sweetwater Springs, and North Lapwai Valley and Luke's Gulch satellite sites are on private lands, well away

from the proposed recovery area. The proposed program would not increase road density within the proposed experimental non-essential boundaries although there would either be access roads constructed or existing access roads improved at the Yoosa/Camp, Mill Creek, Newsome Creek, and Cedar Flats satellite sites. Access road construction and/or improvements would be less than 500 m (1,640 ft) for all sites combined. Human activity such as recreation, logging, dredge mining and administrative uses occur at these sites. Thus, the areas are already disturbed by human activities. Disturbance of vegetative forage would be minor and short-lived at the satellite sites (during construction). Fish forage may be increased in the streams outplanted with salmon, which would result in a beneficial effect. The Proposed Action would not affect the existing harvest management of grizzly bears, and so no effect would occur.

Gray Wolf — The only land use restriction recognized in the experimental rules for wolves is focused on denning and rendezvous sites. Seasonal restrictions could be placed around these sites to allow the pups to be undisturbed until they can move off with the pack. This restriction would be done on a case-by-case basis. If ongoing activities are not disruptive to the den site, the activity may be better off being left alone. Dens are dug in April and May, which could happen near some program facilities before the site is occupied for seasonal use (late May and June) by fisheries personnel. This would have to be evaluated on a case-by-case basis. After there are 6 breeding pairs this would not be an issue. Wolves tend to avoid human activity and would be unlikely to develop a den or rendezvous sites near program activity areas. No direct mortality is expected to occur to gray wolves due to the implementation of the Proposed Action.

Peregrine Falcon — There would be no impacts to the Peregrine falcon because populations are outside the program area.

Sensitive Species — Harlequin ducks have been observed in the Lochsa and Selway Rivers and their larger tributaries, but for the most part, they have been observed outside the areas where satellite facilities would be constructed. There is some potential that Harlequin ducks could be disturbed and displaced from their occupied habitats during construction and operation of satellite facilities. However, Harlequin ducks prefer pristine, low gradient, undisturbed habitats, which abound in adjacent areas. Therefore, it is unlikely that construction and operation of fish facilities would have a significant adverse impact on Harlequins. Prior to any construction activity, coordination with the Forest Service would take place with reference to occupied Harlequin habitat. If there is a conflict, it is highly probable that it can be resolved in favor of the species.

Coeur d'Alene Salamander — The Proposed Action poses a moderate level of potential impact on localized Coeur d'Alene salamander populations. Their preferred habitat is spring seeps, waterfalls, spray zones and riparian areas of small cascading streams. Satellite facilities at Yoosa/Camp Creek and Mill Creek have the greatest potential for impacting the salamander habitat. Seeps or cascades could be altered by water withdrawals causing individual salamanders in these areas to be displaced or killed. The primary measure to prevent impacting salamanders would be to conduct surveys in suspected salamander habitat prior to construction activities and to design means to avoid detrimental impacts. In any case, the Proposed Action is not expected to affect the status of the Coeur d'Alene salamander population because construction impacts are small relative to the overall distribution of the salamander.

4.7.2 Use of Existing Facilities Alternative

The impacts would be similar to the Proposed Action except that the impacts from the Cherrylane facility would not occur, and smaller salmon returns would impact those species that are predicted to have a beneficial effect from the supplementation program such as raptors, bald eagle, grizzly bear and other wildlife.

4.7.3 No Action Alternative

Under the No Action Alternative, land management would remain the same. There would be no additional construction of fish cultural facilities within the Clearwater River Subbasin. Management of salmon stocks would continue along existing strategies. New efforts of supplementation would not be initiated. Wildlife resources within the study area would possibly remain the same. However, if salmon stocks continue to decline towards extinction under the present management scenarios, riparian-dependent species such as kingfishers, dippers, osprey, otter, and bald eagles could also be potentially harmed in response to a continued reduction of their food supply.

The No Action Alternative would create no new direct impacts. Indirectly, if present management efforts are not successful, riparian-dependent wildlife that forage on fish could be subjected to reduced growth and survival.

4.7.4 Cumulative Impacts

No cumulative impacts on the wildlife resources of the area would occur.

4.8 Vegetation

Vegetation resources can be adversely affected by construction of hatchery facilities. Some impacts, such as those that occur only during construction, can be short term or temporary and have minimal lasting effects on vegetation. Other impacts occur from permanent removal of vegetation and may be considered long-term.

Program-related impacts can be further categorized as direct or indirect. Direct impacts, such as vegetation clearing, are generally immediate and confined to facilities areas. Indirect or secondary impacts, such as soil compaction, increased stream temperatures, and noxious weed infestations, can occur outside the area and are not as evident.

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

- A **high** impact would occur if a national or regional vegetation resource is lost or damaged and adequate mitigation cannot be provided.
- A **moderate** impact would occur if a regional or local vegetation resource is disturbed and mitigation might not provide full compensation.
- A **low** impact would occur if effects are easy to mitigate and the resource affected is relatively abundant or already disturbed.

4.8.1 Proposed Action

Construction of the facilities would cause a variety of short-term and long-term impacts on vegetation. The short-term impacts would result from disturbance of vegetation that would be able to grow back in one season. The long-term impacts would result in permanent removal of vegetation. Because many of the facility sites are located in riparian zones, removal of vegetation could have moderate impacts. A biological evaluation would be completed at all sites on USFS lands if necessary before construction. The Yoosa/Camp Creek site is a jurisdictional forested wetland. Removal of vegetation would have moderate impacts because it is a vegetation community that took many years to develop.

4.8.1.1 *Central Incubation and Rearing Facilities*

Construction of the river intake and discharge structures for the proposed Cherrylane hatchery would have minor impacts on riparian vegetation as a result of brush clearing, excavation, and

placement of these structures. Disturbed riparian areas would be replanted following construction. Construction of the facility would have low impacts on vegetation because the site is disturbed and has been in agricultural production for many years.

Construction at the Sweetwater Springs would be largely confined to previously developed land and should have no effect on existing riparian vegetation. Impacts at this site would be no to low.

4.8.1.2 Satellite Facilities

Construction of satellite facilities would disturb the riparian zones for placement of the intake and outlet structures, subgrade preparation for the ponds, and the access road. In general, the intake structures would require a cleared area of approximately 18-27 m² (200-300 ft²). In addition, a machinery working radius of approximately 12 m (40 ft) would be required around the intake site.

Impacts on riparian vegetation would be low at North Lapwai Valley, Cedar Flats, and Newsome Creek because the proposed sites have degraded riparian vegetation.

Some young Douglas firs would be removed from the Mill Creek site for construction of the facility. This vegetation type is plentiful and not unique to the area, therefore impacts would also be low.

Construction of the satellite facility at Yoosa/Camp Creek would result in the disturbance and removal of riparian vegetation for the intake and outlet structures, as well as removal of about 0.4-0.8 ha (1-2 acres) of forested wetland for construction of the facility and access road. Western red cedars and ladyfern dominate this wetland. The individual trees are considered old-growth, but the stand is not designated as an old-growth stand. Because of the removal of this habitat, impacts on vegetation would be moderate. Mitigation could replace the wetland, but it takes years to develop a forested wetland.

Construction of the satellite facility at Luke's Gulch would result in the disturbance and removal of riparian vegetation for the intake and outlet structures and the facility itself. Impacts would be low due to the small amount of riparian vegetation removed.

Operations at all the satellite facilities should have no other impacts on riparian vegetation.

4.8.1.3 Spring Chinook Direct Release Sites and Weir Sites

No impacts on riparian vegetation are expected at spring chinook direct release sites. Maintenance of existing access to the streams at the release sites would be required but this is not expected to produce any changes from existing conditions. Existing roads would be used for access. Where roads are not available, helicopters would be used to fly the fish to the release site.

Some minor clearing may be necessary at certain weir sites to gain access to the stream and clear the bank to install anchors for the weirs. This clearing would be limited in extent. Weirs would be installed and maintained by hand, with no use of machinery in the streams. Low impacts on riparian vegetation are expected.

4.8.1.4 Wetlands

The Yoosa/Camp Creek site is characterized as an undisturbed, forested jurisdictional wetland covering 0.6-0.8 ha (1.5-2 acres). This wetland stabilizes and intercepts sediment, acts as storage for floodwaters, and provides wildlife habitat. Development of this site would remove about 0.5 ha (1.2 acres) of wetland. Development would include installation of ponds and an access road. Impacts to the wetland would be moderate, depending on the number of trees removed and the amount of fill entering the wetland. A complete wetland delineation would be conducted to determine the amount of impacted area and mitigation strategies would be developed to have no net loss of wetland area and minimize impacts on any remaining wetlands. The amount of area impacted and mitigation strategies would be determined after final designs are completed. At that time locations for mitigation would be coordinated with the appropriate agencies and land managers.

At Luke's Gulch impacts to a seasonal wetland would be low. An access road would be built across the wetland which, depending on the length and amount of fill, could be authorized under an Army Corps of Engineers Nationwide Permit. Mitigation would be developed to minimize impacts. A wetland delineation would also be conducted.

4.8.1.5 Threatened and Endangered Species

There would be no impact to federally-listed or forest-listed threatened, endangered, or sensitive species. In order to germinate, the water howellia requires seasonally ponded wetlands such as sloughs and oxbows which dry out in the fall (Kibbler, 1997). Potential impacts to this plant would result from direct removal during construction, application of herbicide or by

changing the hydrology of the area. However, there are no oxbows, glacial ponds or sloughs that would be disturbed by the Proposed Action. The Yoosa/Camp satellite site is not in an oxbow or a slough, but it is characterized as an undisturbed, forested jurisdictional wetland. Water howellia is not known to exist at the site, but the site would be surveyed mid-summer for presence of the plant prior to construction activities.

No other federally-listed plant species are known to occur in the vicinity of the various program areas. The USFS has management requirements designed to protect sensitive plant species on their land, though records indicate no sensitive species are on the proposed sites. There has been and would continue to be coordination with the USFS to avoid any possible impacts on plant communities.

4.8.2 Use of Existing Facilities Alternative

Impacts would be similar to the Proposed Action, but the impacts from the Cherrylane facility would not occur.

4.8.3 No Action Alternative

The No Action Alternative would create no impacts to vegetation.

4.8.4 Cumulative Impacts

No cumulative impacts to vegetation are expected.

4.9 Land Use

The following describes the environmental consequences of the alternatives to land use. Land use conflicts could be created if the proposed facilities are incompatible with existing land uses. See also Section 4.4, **Water Resources**, and Section 4.12, **Air Quality**.

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

- A **high** impact would occur if the program changes existing land uses completely and permanently, and if there is little or no potential for mitigation.
- A **moderate** impact would occur if the program causes limited permanent changes in existing land uses or causes

extensive and lengthy temporary disturbances to existing land uses, and there is some potential for mitigation.

- A **low** impact would occur if the program leads to some brief, temporary disturbances to existing land uses that can be mostly mitigated.
- **No impact** would occur if the program does not trigger any changes in land use.

4.9.1 Proposed Action

The proposed Cherrylane, Sweetwater Springs, Luke's Gulch and North Lapwai Valley sites would change the existing land uses at those sites. The proposed satellite facilities, weir sites and control/treatment stream strategies located on national forest system lands are consistent with current forest plans. In addition, continued implementation of current and proposed activities identified in the forest plans, such as grazing, recreation, mining or timber sales would not be affected by the additional facilities and land uses proposed as long as forest plan standards are maintained; therefore, no amendments to forest plans are necessary.

4.9.1.1 Cherrylane

The current property owner, Cherrylane Ranches, has retained title to the 6 ha (14 acre) site, and issued BPA an option to lease the site for a period of 25 years, with an extension for an additional 25 years if BPA so chooses. Implementation of the proposed program would change the land use from agricultural to a governmental use. Construction of the facility would take 6 ha (14 acres) of prime farmland out of production. If BPA exercises its option and constructs the facility, it is unlikely this land would ever revert back to agricultural land.

The proposed use of the Cherrylane site would not conform to the existing zoning for the area; therefore, the county would normally require a conditional use permit to allow the change in use from agriculture to a hatchery facility (Clack, 1995). No conditional use permit would be required, however, because Nez Perce County, as a local government agency, would not have jurisdiction over BPA as a federal agency. BPA, would, however, meet or exceed all local government standards and requirements, as identified in Sections 4.0 and 6.0 of the Nez Perce County Zoning Ordinance. Section 3.8 of the Zoning Ordinance, entitled "Conditional Uses Permitted," states that, "...In an A zone all other uses may be permitted when authorized in accordance with standards and requirements in Sections 4.0 and 6.0." These requirements would become part of the proposed program (see **Mitigation**). Impacts would be moderate.

Because title to the proposed site would be leased, instead of being acquired in fee, the minimum lot size (8 ha [20 acres]) required by the county would not need to be adhered to.

Locating a fish hatchery immediately adjacent to a commercial seed cone operation may be incompatible if fugitive chemicals from the seed cone operation are allowed to drift onto the hatchery property. Potlatch applies herbicides and pesticides by air to its crop. Any herbicides and/or pesticides carried by wind or water onto the proposed hatchery facility could adversely affect hatchery stock. Herbicides could cause oxygen levels to be depleted in a watercourse and pesticides could introduce toxins that could kill hatchery stock.

Potlatch has requested assurance that the proposed hatchery facility would not prevent their use of pesticides and herbicides. In addition, the company has requested assurance that the proposed program would not affect the groundwater aquifer in a way that would jeopardize their water supply. To prevent any harm to the fish stock at the proposed hatchery facility, no pollutants should be allowed to migrate onto the proposed hatchery site.

Mitigation — BPA would meet or exceed the conditions stated in Section 4 and 6 of the Nez Perce County Zoning Ordinance with respect to obtaining a conditional use permit for the A Zone. These conditions include:

- landscaping would be provided (minimum of 5 percent) in the off-street parking area, as well as a three-foot landscaped buffer strip (including trees and shrubs) between U.S. Highway 12 and the proposed parking area that would serve the facility; and
- all signs used to notify the public of the proposed facility would conform to Section 4.11 of the Nez Perce County Zoning Ordinance, and the Idaho Department of Transportation requirements.

With respect to the prevention of airborne or waterborne pollutants from adversely affecting the hatchery stock at the proposed facility, Potlatch could take steps to assure that no pollutants are allowed to migrate onto the proposed site, if feasible. In addition, the Idaho Department of Health and Welfare, Division of Environmental Quality could be consulted for advice about how to prevent insecticides or herbicides used by the company from impacting the proposed hatchery facility. If the chemicals used by Potlatch are found to threaten the survival of hatchery or broodstock, and cessation of the use of these chemicals would prove to be infeasible to the continued operation of seed orchard facility, the proposed hatchery site could be moved an appropriate distance east, to provide a buffer between the hatchery facility and Potlatch, and a barrier could be

provided, such as a row of poplar trees so as to prevent, or at least to inhibit fugitive sprays from migrating onto the proposed hatchery site.

4.9.1.2 Sweetwater Springs

The proposed use of the Sweetwater Springs site is not an allowed use in the AR Zone. Normally a conditional use permit would be required to construct the proposed facility at the site. Because BPA is a federal agency, and local governments do not have jurisdiction over federal agencies, no conditional use permit would be required. BPA would, however, observe those conditions that would be imposed in the granting of a conditional use permit for the proposed facility, as contained in the Nez Perce County Zoning Ordinance.

For BPA to construct facilities at Sweetwater Springs, IDFG would need to either sell all or a portion of the site to BPA, or the agency would need to issue a land lease to BPA. As of the date of this draft document, no sale or lease has been prepared. Impacts would be moderate.

Mitigation — BPA would meet or exceed the conditions as stated in Section 4 and 6 of the Nez Perce County Zoning Ordinance with respect to obtaining a conditional use permit for the AR Zone, as stated for the Cherrylane facility, above. BPA, however, would not need to obtain a conditional use permit for the proposed facility.

4.9.1.3 Luke's Gulch

No land use conflicts are anticipated as a result of siting the proposed facility on tribal lands adjacent to the parcel on private land. If security becomes an issue following development of the proposed facility, a gate would be installed, and the affected landowner adjacent to the proposed facility would be given a key. Impacts would be moderate.

4.9.1.4 Cedar Flats

No land use conflicts are envisioned with respect to siting the proposed satellite facility at Cedar Flats as long as no liquid fuel other than propane and other toxicants are stored on the site and no refueling is done within the Riparian Habitat Conservation Area. If no alternatives are available, refueling must be approved by the USFS, and the Tribe would procure a spill containment plan from the land manager prior to refueling on site. Impacts would be low.

4.9.1.5 North Lapwai Valley

To convert the land from an agricultural use to one of a governmental use, the land use would change from agriculture to “public.” Implementation at the Lapwai site would convert about 0.5 ha (1.2 acres) of agricultural land to non-agricultural use. This change would likely be permanent. Impacts would be moderate.

4.9.1.6 Yoosa/Camp Creek

No land use conflicts are anticipated with siting the proposed facility. Impacts would be low.

4.9.1.7 Mill Creek

No land use conflicts are anticipated with siting a satellite facility on lower Mill Creek. The Hungry Mill Timber Sale Draft Environmental Impact Statement (DEIS), November 1993, includes logging west of the site in all four of its alternatives. This method of logging would minimally impact the fishery habitat of Mill Creek and would appear to not significantly impact the water quality as habitat for salmon. The DEIS stated, however, “...Adverse effects on fish habitat and water quality caused by timber harvest and related activities can be mitigated, but cannot entirely be avoided.” Impacts would be low.

4.9.1.8 Newsome Creek

Impacts would be low. Siting the satellite facility downstream of the abandoned Haysfork Gloryhole would be feasible from a land use standpoint only if the sediment expected to enter Newsome Creek in a year or so would be found not to adversely affect water quality to the detriment of the proposed facility, or if the water quality would be found to be detrimental to the fish, that the proposed South Fork Clearwater River Habitat Enhancement Project (Project 84-5) be approved, funded and implemented, prior to the proposed facility at Newsome Creek becoming operational. This proposed rehabilitation project is purported to provide a 50-year sediment storage capacity based on the current sediment accumulation rates (Leidenfrost, 1995). The project is scheduled to be completed in 1997. See also Section 4.4, **Water Resources**.

4.9.1.9 Spring Chinook Direct Release Sites and Weir Sites

No land use conflicts are anticipated with the spring chinook direct release sites or weir sites proposed. The location of the weir on Meadow Creek would be more than 425 m (1/4 mile) from the Selway River, a Recreational River under the Wild and Scenic River Act of 1968. No impacts are expected.

4.9.2 Use of Existing Facilities Alternative

Impacts would be similar to the Proposed Action, but the impacts from the Cherrylane facility would not occur.

4.9.3 No Action Alternative

If the No Action Alternative is implemented, there would be no change in land use, and no net loss in the amount of hay produced in the area.

4.9.4 Recreation

The proposed program would have a positive impact on recreational fishing in the area; however, this is not expected to occur until after the runs of chinook salmon have reestablished themselves in the Clearwater River Subbasin. Runs are expected in 15-20 years following program implementation. Prior to the onset of any recreational fishing for these returning salmon, the state of Idaho and the Nez Perce Tribe would set specific seasons and bag limits for each chinook run. The fish are expected to return to the Clearwater River Subbasin from June through November each year. Although it is not known at this time what the seasons and bag limits would be, any season and bag limit would be considered a positive impact to recreational fishers in the area.

4.9.4.1 Cherrylane

No adverse impacts to the recreation resource in the vicinity of the Cherrylane facility are envisioned as a result of constructing and operating the primary incubation and rearing facility at Cherrylane. Fishing for steelhead in the vicinity of the proposed site would be unaffected. After the salmon have reestablished themselves in the Clearwater River, a recreational fishery would likely be created that would attract recreationists to the area from June through November each year, a positive impact on the recreational resource.

Siting of the proposed hatchery facility at Cherrylane would not affect the gathering of sillimanite along the Clearwater River by recreationists.

4.9.4.2 Sweetwater Springs

No adverse impacts to the recreation resource in the vicinity of Sweetwater Springs is anticipated as a result of the construction and operation of the secondary hatchery facility at Sweetwater Springs. Reintroducing chinook salmon to the area would provide increased recreational opportunities to anglers who visit the area.

4.9.4.3 Cedar Flats

The facilities planned for this site would be designed with the USFS so they would not affect Selway River float boaters as they pass by. No adverse impacts to the recreation resource are envisioned as a result of constructing the satellite facility at Cedar Flats. Reintroducing chinook salmon to the area would provide increased recreational opportunities to anglers who visit the area. Water intake structures extended into the Selway River would be designed to have no effect on float boaters on the Selway River.

4.9.4.4 Luke's Gulch, North Lapwai Valley, Newsome Creek, Mill Creek, and Yoosa/Camp Creek Sites

No adverse impacts to recreation would be created by constructing facilities at these sites. Reintroducing chinook salmon to the area should provide increased recreational opportunities (after the runs establish themselves) to anglers who visit the area.

4.9.4.5 Spring Chinook Release Sites and Weir Sites

The Tribe will work with the USFS to minimize impacts to wilderness resources from helicopter trips. Impacts would be low due to the low number of trips required, release sites are located on the edge of the wildernesses, the amount of time the helicopters would be in the wilderness, and the fact that the helicopter would not land in the wildernesses unless an emergency occurs. The Tribe would consult with the USFS on final location of weir sites to avoid conflicts with recreation and other resources. Reintroducing salmon would create no adverse impacts to recreation. Salmon would provide increased esthetic benefits and fishing opportunities for recreationists.

4.9.5 No Action Alternative

The recreation resource would be negatively affected by not having the spring and fall runs of chinook salmon reestablished in the vicinity. Fewer fish would likely result in fewer numbers of

fishing days for the recreationist, and fewer fish for the Nez Perce Tribe. Also, there would be no increase in the number of facilities in the area used by the recreationist.

4.9.6 Cumulative Impacts

No cumulative impacts on land use in the area are expected. It is not anticipated that any future limitations would be placed on existing recreation opportunities from the action alternatives.

4.10 Socioeconomics

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

- A **high** impact would change current socioeconomic conditions and likely create adverse effects that could not be mitigated: regional reduction of quality or quantity of social or economic resources; a significant reduction of long-term economic productivity; or consumption of significant amounts of non-renewable resources.
- A **moderate** impact would change current socioeconomic conditions, but the effects could be mitigated: local reduction of social or economic resource; a marginal reduction of long-term economic productivity; consumption of moderate amounts of non-renewable resources.
- A **low** impact would create a small change in current socioeconomic conditions. No mitigation would be necessary.

4.10.1 Proposed Action

4.10.1.1 Short-term Construction Impacts

To implement the proposed program, the Nez Perce Tribe would likely put out an invitation for bid for a general contractor/construction manager in the Lewiston/Boise/Spokane/Salt Lake City areas. The proposed facilities are anticipated to cost approximately \$17 million, with an annual operating and maintenance budget of \$1-1.5 million over its twenty-year life. The total cost, therefore, is estimated to range from \$30 to \$40 million.

It has been estimated that construction of the Cherrylane facility on the Clearwater River and the facility at Sweetwater Springs would require half of the program budget to be spent on construction wages and half to be used for supplies and equipment. Construction of the satellite facilities and the weirs would likely be more labor intensive, and, therefore, would require a higher proportion of the budget to be spent on labor, about 60 percent of the construction cost. While the general contractor could originate from outside the local area, it is anticipated that a number of the subcontractors needed to construct the facilities would be employed locally.

It is also likely that the major purchase of supplies and equipment for the proposed program would be purchased locally. Normally federal funds used to purchase supplies and materials by tribal members for a federal project would be exempt from state sales taxes; however, federal dollars used to purchase supplies and equipment by contractors would not be exempt. The state of Idaho currently assesses a 5 percent sales tax on goods and services purchased within the state. Although the entire state would benefit from any sales tax collected, the amount that would be returned back to the local jurisdictions from which the tax originated would be insignificant. There is no extra benefit paid directly to the city or county in which the additional tax is generated. The city or county in which the sales transactions occurred would benefit, however, in that its sales tax allocations would increase as would all other local government entities in the state sales tax allocations increase when the statewide sales tax collections increase (Husted, 1995).

While it is possible that the general contractor could originate from outside the local area, it is likely that a number of the subcontractors that would be needed for the proposed program would be hired locally. Employment of the local population, especially among tribal members, would benefit the local economy, and also would help improve the high unemployment situation in the local area, particularly among the Native-American population. With respect to the employment of non-local construction workers and in addition to the non-tax benefits from the local purchase of supplies and equipment in the local area, the non-local construction work force would purchase food, lodging and other consumer goods while employed in the area. Non-local construction workers usually spend 40 percent of their net pay locally (Mountain West Research Inc., 1982). It is important to note that following project completion, it is expected that most, if not all, outside contractors would leave the area.

Construction impacts would be low.

4.10.1.2 Long-term Employment Impacts

Proposed facilities would require full-time permanent, and full and part-time temporary and seasonal workers. It is expected that most of these positions would be filled by tribal members. Federal contracting on reservations require that Native-American preference be given in employment for hiring, promotion, training, and all other aspects of employment, as well as in subcontracting (Indian Self Determination Act, 93-638).

The Cherrylane facility would require seven or eight full-time employees and one part-time seasonal employee. Staffing of the Sweetwater Springs facility would require two full-time and two part-time workers. The satellite facilities would need to be staffed when fish are in the facilities. Staffing would be necessary to provide both husbandry and security for the salmon, particularly for the adult fish. Staffing of the satellite facilities then would require the hiring of temporary employees on a seasonal basis. It would be necessary to hire approximately 15 temporary workers to satisfy this need.

Total employment to operate all of the proposed facilities for the proposed program would, therefore, require the employment of approximately 30 people, half full-time and half part-time. This would be a positive impact in the area, and help reduce the high unemployment in the four county area, particularly with respect to the Native-American population.

4.10.1.3 Property Tax Impacts

The proposed program would increase property taxes collected by Nez Perce County for the Cherrylane facility. Although the proposed facilities themselves would be owned and maintained by the federal government, and would, therefore, be exempt from paying local property taxes, private land upon which the facilities would be located would be reassessed based on the proposed new use. This difference is substantial. Agricultural land (in agricultural use) in the Cherrylane area is currently valued at \$3-400 an acre, while land for the proposed use would take on a higher value, about \$10,000 an acre for the 5 ha (12 acre) site (Schieflebein, 1995). This increase in valuation would increase property taxes from the 1994-95 tax role of approximately \$40 per year to \$1,200 - \$1,300 per year. This increase in property taxes received by the county would be a positive impact.

4.10.1.4 Economic Impacts

The proposed program would have positive economic impacts:

- the wages paid and the profits produced by the purchases of supplies and materials;

- the funds that would be spent by those who would be employed who had either been unemployed, or who had been employed elsewhere;
- the increase in local property and state sales taxes; and
- the increase in the number of recreationists that would be attracted to the area because of the runs of spring and fall chinook that would return to the local area from June through November each year, following the reestablishment of the runs. The recreationists would add to the local economy through their purchases of goods and services, primarily consumer goods while in the local area. See also Section 3.9.4, **Recreation**.

4.10.2 Use of Existing Facilities Alternative

Impacts would be similar to the Proposed Action, but fewer benefits would be realized because the cost of the project is lower. Impacts would be low.

4.10.3 No Action Alternative

Implementation of the No Action Alternative would not bring back runs of spring and fall chinook to the Clearwater River Subbasin for present and future generations. The state of Idaho would not benefit as a result of the increase in sales taxes collected by the state. Local business in the area would not benefit as a result of the construction and operation/maintenance of the proposed facilities over the 20-year life of the proposed program. The positive impacts to the employment market in the area would not occur. Also, there would be no increase in tribal employment.

4.10.4 Cumulative Impacts

No cumulative impacts on socioeconomics in the area are expected.

4.11 Visual Resources

This section includes a description of the impacts to existing visual resources in the program area. Analysts used these impact definitions to determine the level of impact for the alternatives.

- A **high** impact would occur if a large number of people highly sensitive to their surroundings see the facilities in

foreground or middle ground views; the facilities dominate views and/or appear uncoordinated or chaotic; or the area is officially recognized for its scenic or recreation values and facilities conflict with these values.

- A **moderate** impact would occur if a large number of people see the facilities but the facilities are not dominant elements in the landscape, views are partially screened, are seen for short periods and/or most views are in the middle ground; scarring from clearing or roads is evident but not extensive; or the facilities conflict with prevailing land patterns but are seen by few people or for short periods.
- A **low** impact would occur if few viewers see the facilities because they are isolated, screened or seen at a distance; existing conditions have impacted the area; clearing and roads do not detract from the setting; views are short-lived; or no visually sensitive resource would be affected.

4.11.1 Proposed Action

4.11.1.1 *Cherrylane*

The facilities would be visible from a nearby residence and from other residences. Motorists traveling along Highway 12 from west to east would have their views screened by the trees in the tree farm next to the site. Motorists travelling east to west would have brief views of the site. People traveling on or near the river would have their views screened by riparian vegetation. The impact is lessened by the large scale of the surrounding hills and ridges that edge the valley. Impact level would be moderate.

Mitigation — The Nez Perce Tribe would work with the owner of the nearest residence and screen as much of the facility as possible from the residence.

4.11.1.2 *Sweetwater Springs*

Because the site is in a deep canyon, along a creek and road with only occasional recreation use and farm use, the impact to the visual resource is low. The site cannot be seen from the nearest county road, and cannot be seen from any residences. Piping needed by the expanded facility would be screened by riparian vegetation. No riparian vegetation would be removed. The facilities would be screened by the surrounding rolling hills. Impact level would be low.

4.11.1.3 Luke's Gulch

To reach the site, an access road would be cut along the steep incline behind the site. Some pine and fir trees on this hill would be removed. At the site, some pine and fir trees would be removed for the ponds and trailer. Some vegetation along the existing road above the site may need to be removed. Building the access road on the hill above the site would create a change in the view from the river and highway. The road cut would be partially screened by trees left at the site. The facilities would be screened from the existing residence by trees and by the slope of the hill. Views from the highway in both directions would be brief. Impacts can be reduced by leaving as much vegetation in place as possible.

Anglers fishing along the bank in this area would have the nearest views. Impacts would be low to moderate.

4.11.1.4 Cedar Flats

On-site discussions with a USFS landscape architect, an easement administrator, other USFS employees and the NPT will determine the appropriate mix of natural vegetation and berming to assure that there is adequate screening for the proposed facilities. Any natural or other screens used would be compatible with the Recreational River designation and easement requirements of the Wild and Scenic Rivers Act. The house trailer and storage unit would be located at the Fenn Trailer Court, which is away from the site. Motorists on the road would have their views of the facility screened by existing trees. Impacts would be moderate.

4.11.1.5 North Lapwai Valley

During the summer existing trees would provide some screening of the facilities. The facilities would be seen from U.S. Highway 95 and several nearby residences. The views from the highway would be short-lived. No visually-sensitive resource would be affected. Impacts to the residents of the homes nearby could be mitigated by screening their foreground views. Impacts would be moderate because the facilities conflict with existing land patterns but would be visible to few people or for short periods.

The Nez Perce Tribe is considering putting an interpretive sign along the highway in conjunction with the National Historical Park to explain the purpose of the facilities. Screening could be increased for nearby residents.

4.11.1.6 Yoosa/Camp Creek

The facilities would be built among and screened by cedar trees. The trailers and fences used on the site would be of muted or natural colors and would be screened from view from the Nee-Me-Poo National Historic Trail. Travelers along Forest Road #103 would have brief views of the facilities. The area is relatively isolated. Impacts would be low.

4.11.1.7 Mill Creek

The proposed facilities would be screened by the fir trees at the site. Motorists using the road would see the facilities briefly. Impacts would be low.

4.11.1.8 Newsome Creek

Because the site has been disturbed by mining, there are no visually-sensitive resources in this area. The proposed ponds would be compatible with ponds left from mining. The Forest Service has improved the habitat of the stream by putting logs and other structures in the streambed, and the facility would not conflict visually with these efforts.

Forest Service Road 1853, used to access the site, is used by residents of Newsome, which is about 1.6 km (1 mile) up the road, and also by campers and other recreationists. The facilities would be visible from the road. Because the streambank has been disturbed, no vegetation is available to screen the facilities, but some could be planted if necessary. Expected impacts would be low.

4.11.1.9 Spring Chinook Direct Release Sites and Weir Sites

The proposed spring chinook direct release sites are in remote national forestland. The Tribe would consult with the USFS on final location of the proposed weir sites to avoid conflicts with recreation and other resources. No impacts are expected.

4.11.2 Use of Existing Facilities Alternative

Impacts would be similar to the Proposed Action, but the impacts from the Cherrylane facility would not occur.

4.11.3 No Action Alternative

In the No Action Alternative, no changes are made to visual resources. No impacts would be expected.

4.11.4 Cumulative Impacts

No cumulative impacts to visual resources are expected.

4.12 Air Quality

New source performance standards were developed for new industrial developments that would be emitting large amounts of air pollutants. Such standards are not applicable for the proposed program because fish hatcheries and their associated satellite facilities do not emit large amounts of air pollutants.

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

- A **moderate** impact would create an effect that could be partially mitigated or cause a local reduction in air quality; or create a possible, but unlikely risk to human health or safety.
- A **low** impact would create an effect that could be mitigated; reduce the air quality only near the site of the action; or create very unlikely health and safety risks.
- **No impact** would create no or fewer impacts than the low impact level.

4.12.1 Proposed Action

4.12.1.1 Central Incubation and Rearing Facilities

Short-term construction activities and longer-term operations would create short-term and long-term air pollutant emissions at Cherrylane and Sweetwater Springs.

Site clearing and excavation would create *particulates* (dust) for a short time near the construction site at Cherrylane. Major earth-moving and heavy construction activities would continue for 6 to 8 months. Impacts would decrease as construction is completed. Vehicles used for construction would also emit pollutants in the local area. Typical vehicle exhaust contains the following pollutants: *carbon monoxide, volatile organic compounds, nitrogen oxides, sulfur oxides*, and particulates. The levels produced would be minor and are expected to have no impact on air quality. Impacts to local air quality would be low. No air quality standards would be exceeded.

Construction activities at Sweetwater Springs would produce fewer particulates and vehicle emissions compared to Cherrylane since the Sweetwater Springs facility requires only modifications to its existing facilities. Overall air quality impacts from construction activities at Sweetwater Springs are low.

Operation of both Cherrylane and Sweetwater Springs would create vehicle exhaust emissions from facility operators driving to and from the sites. These impacts would be long term, but minor. Overall impacts to the air quality at the central hatcheries would be low.

4.12.1.2 *Satellite Facilities*

Construction of satellite facilities would produce the same kinds of impacts to air quality as described for the Cherrylane and Sweetwater Springs. Fewer pollutants and particulates would be expected since the surface area to be prepared at each satellite site is small and the time needed for construction would be shorter. No impacts to air quality are expected.

During operation, vehicle exhaust emissions would be released as vehicles travel to and from the satellite sites. No impacts to air quality are expected. At Luke's Gulch a generator would be used for the pump station. The on-site generator would operate two months of the year and would cause low impacts to air quality in the area.

4.12.1.3 *Spring Chinook Direct Release Sites and Weir Sites*

Vehicles used as workers travel to and from the sites are the only expected source of pollutants. No impacts on air quality are expected.

4.12.2 Use of Existing Facilities Alternative

Impacts would be similar to the Proposed Action, but the impacts from the Cherrylane facility would not occur.

4.12.3 No Action Alternative

No impacts to air quality are expected from the No Action Alternative.

4.12.4 Cumulative Impacts

No cumulative impacts to air quality are expected.

4.13 Public Health and Safety

4.13.1 Proposed Action

Development of facilities for the Proposed Action would not impact the levels of police, fire, and health services that exist throughout the Clearwater River area. Most personnel operating the facilities would be local and already use these services. Construction contractors may slightly impact these services in the unlikely event of the need for law enforcement or medical attention.

On-site security is planned for all facilities during construction and operation. This would minimize potential cases of vandalism. Fire protection for the facilities during construction and operation would use the on-site facility water source. Local health facilities are available if an accident occurs. Helicopter services are available to transport injured individuals to emergency care facilities.

The presence of new facilities and workers in otherwise rural and forested areas would increase the risk of fire.

4.13.2 Use of Existing Facilities Alternative

Impacts would be similar to the Proposed Action, but the impacts from the Cherrylane facility would not occur.

4.13.3 No Action Alternative

No development would occur and the possibility of fire introduced to an area as a result of that development would not occur.

4.13.4 Cumulative Impacts

No impacts are expected.

4.14 Comparison of Alternatives

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

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

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

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

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

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

The action alternatives would result in the same short-term level of displacement and disturbance on individual wildlife species during construction. The Proposed Action has the greatest potential for beneficial impacts to those species

dependent on fish for forage. The No Action Alternative will do nothing to improve the availability of forage, thus posing some detrimental impacts in comparison, although this alternative would not cause habitat disturbance by construction activities.

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

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

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

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

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

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

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

Table 2-7 provides a summary and comparison of the environmental consequences of each alternative. Table 2-8 provides a comparison of the alternatives against the purposes defined for the program.

