❖North Coast

Overview

This region includes the coastal drainages west of—and including—the Hoko River and north of Grays Harbor. For the purposes of this review, the HSRG reviewed the hatchery programs involving each identified regional salmonid stock (for example, Hoko River Fall Chinook). The review included a consideration of the program's effects on all other hatchery and naturally spawning regional salmonid stocks (see table below under Stock Status). This chapter provides an overview of the North Coast region, followed by reviews and recommendations for each salmonid stock that has an associated hatchery program.

FISHERIES[29]

Washington's salmon and steelhead fisheries are managed cooperatively in a unique government-to-government relationship. One government is the State of Washington, and the other governments are Indian tribes, whose rights were established in treaties signed with the federal government in the 1850s. A 1974 federal court case (decided by Judge Boldt) reaffirmed the tribes' rights to harvest salmon and steelhead and established them as co-managers of Washington fisheries. State and tribal managers cooperate in setting annual fisheries in federal and inland waters, in restoring fish habitat, and in hatchery production. The guidance from the Fish and Wildlife Commission's North of Falcon Policy shall provide additional, general guidance for North Coast fishery planning. WDFW will continue managing for adequate hatchery coho Chinook and steelhead egg take needs to continue future, programmed hatchery release levels.

CONSERVATION[30]

Since 1990, West Coast salmon fisheries have been modified to accommodate special requirements for the protection of salmon species listed under the ESA. The conservation objectives for salmon in the Queets, Hoh and Quillayute rivers were developed as ranges intended to bracket the current best estimates of maximum sustainable yield (MSY) escapement. The range of each objective reflects the degree of uncertainty inherent by using the high estimate of recruits per spawner and low estimate of carrying capacity for the lower bound, and the low estimate of recruits per spawner with the high estimate of smolt carrying capacity for the upper end of the range. The ranges were subsequently adjusted upward for risk aversion, and again for habitat considerations by 26%–184% (Lestelle et al. 1984). Wild steelhead escapement goals have been established for most North Coast rivers. Goals were developed using the Washington Department of Game (now WDFW) "Methodology for Determining MSH Steelhead Spawning Escapement Requirements" report authored by Robert Gibbons, et al, 1985. WDFW, by developing the Wild Salmonid Policy (harvest and hatcheries elements are part of the Statewide Strategy to Recover Salmon) is providing substantial commitment to fish management actions that ensure sufficient wild spawners escape fisheries and reach spawning grounds.

[29] *Information provided by Jack Tipping and Ron Warren, WDFW.*
[30] *Ibid.*

HABITAT[31]

The North Coast region comprises of the western portion of WRIA (Water Resource Inventory Area) 19, along with WRIAs 20 and 21. Most of the land base within this region consists of public and private timberlands, Indian reservations and Olympic National Park. The region is sparsely inhabited, with the City of Forks representing the largest population center.

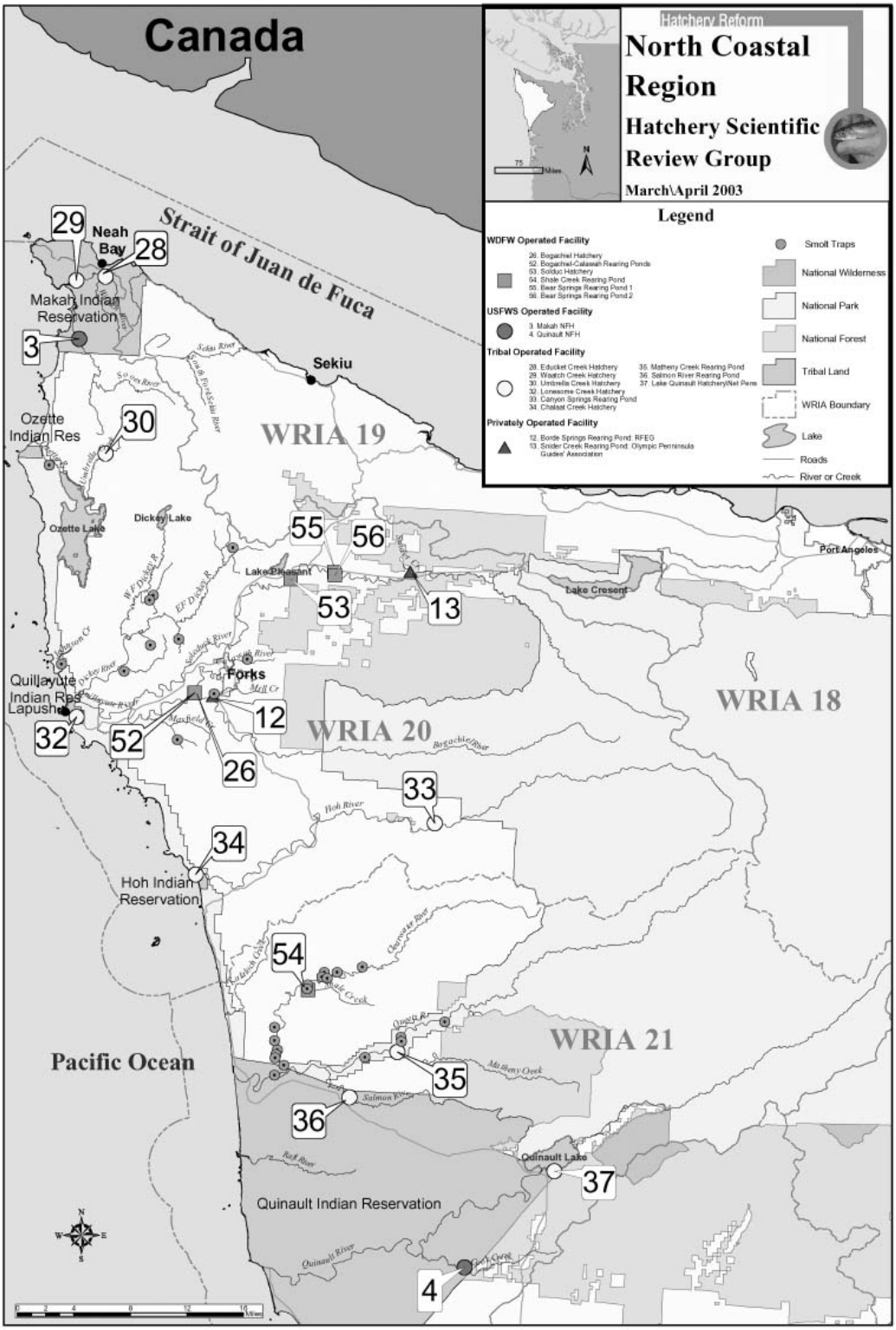
The western Strait of Juan de Fuca (western WRIA 19) includes the area between the Hoko River and Cape Flattery. The largest watersheds in this group are the Hoko and Sekiu rivers. In addition, there are numerous small, independent streams that flow northerly, draining the foothills of the Olympic Mountains into the Strait of Juan de Fuca. The region is characterized by a cool, maritime climate with annual precipitation increasing as one moves either west or upward in elevation (McHenry et al. 1996). Annual precipitation typically ranges from 80"–130" in the headwaters of these streams. Olympic Peninsula streams in the Twin River formation, which includes all of western WRIA 19, have high natural erosion rates, due to a geology of sedimentary rocks, sandstones and siltstones, which quickly breakdown in the heavy rainfall climate (SCS 1984; Benda 1993). The stream channels in the region change quickly, due to variations in flow and sediment inputs. The Hoko and Sekiu have tidal influence that extends upstream for several miles (Phinney and Bucknell 1975). Other streams have little estuary area.

WRIA 20 includes all streams that drain into the Pacific Ocean from Cape Flattery south to, and excluding, Kalaloch Creek. The largest basin in the WRIA is the Quillayute, with its four major sub-basins: the Dickey, Calawah, Bogachiel and Soleduck Rivers. Other basins in the WRIA include the Wa'atch, Sooes, Ozette and Hoh systems, as well as several small, independent streams. Within this WRIA are 569 streams and 1,355 stream miles (Phinney and Bucknell 1975). Annual rainfall in the basin is the highest in the state, and ranges from 80" near the coast to 240" in the Olympic Mountains (McHenry et al. 1996). This region is often exposed to high wind and heavy rainstorms, which play important roles in current habitat problems located in disturbed (logged or developed) areas. Unlike many other areas of the state, this region has a significant portion of unlogged land that is located in the Olympic National Park. In these undisturbed areas, temperate rainforests of coniferous old-growth are dominated by Sitka spruce in the lowlands and western hemlock with silver fir in the higher elevations. Big leaf maple is also a component of the rainforests. The old-growth conifers can reach up to 200' in height, and are characterized by somewhat open canopies and low densities. The ratio of deciduous to conifer trees is 1:1000 in unmanaged areas (Kuchler 1964). These areas provide refugia for fish, playing an important role in maintaining a greater proportion of "healthy" salmon populations in this region, compared to other areas in Washington state.

The presence of larger areas of undisturbed forest also allows comparison between managed (timber harvest) and unmanaged conditions within the same sub-basin, providing insight into habitat conditions needed by salmon. From the 1960s through the 1980s, extensive clear-cutting and road construction occurred throughout the WRIA, except in the Olympic National Park, which has remained undisturbed. Present timber harvest practices have improved to increase riparian buffers and reduce road impacts. However, problems from past harvest practices continue to impact salmonid habitat.

[31] *Information provided by Dan Dafoe and Randy Johnson, WDFW.*

WRIA 21 comprises the Queets and Quinault watersheds, along with several smaller drainages. The climate is temperate maritime, with an average annual precipitation of 120”–200”. Winter storms commonly deliver over ten inches of precipitation in a single event. The Sitka spruce zone extends along the coast and inland up the Queets and Quinault river valleys, while the western hemlock zone dominates from sea level to approximately 2,000’ in elevation. The Pacific silver fir zone exists from 2,000’–4,000’ in elevation, and extends upwards to the sub-alpine forest in the Olympic Mountains.


Canada
Strait of Juan de Fuca
Pacific Ocean
Hatchery Reform
North Coastal Region
Hatchery Scientific Review Group
March\April 2003
Legend
WDFW Operated Facility
26. Bogachiel Hatchery
52. Bogachiel-Calawah Rearing Ponds
53. Solduc Hatchery
54. Shale Creek Rearing Pond
55. Bear Springs Rearing Pond 1
56. Bear Springs Rearing Pond 2
USFWS Operated Facility
3. Makah NFH
4. Quinault NFH
Tribal Operated Facility
28. Educket Creek Hatchery
29. Waatch Creek Hatchery
30. Umbrella Creek Hatchery
32. Lonesome Creek Hatchery
33. Canyon Springs Rearing Pond
34. Chalaat Creek Hatchery
35. Matheny Creek Rearing Pond
36. Salmon River Rearing Pond
37. Lake Quinault Hatchery\Net Pens
Privately Operated Facility
12. Borde Springs Rearing Pond: RFEG
13. Snider Creek Rearing Pond: Olympic Peninsula Guides' Association
Smolt Traps
National Wilderness
National Park
National Forest
Tribal Land
WRIA Boundary
Lake
Roads
River or Creek
WRIA 19
WRIA 20
WRIA 21
WRIA 18
Neah Bay
Makah Indian Reservation
Sekiu
Ozette Indian Res
Ozette Lake
Dickey Lake
Lake Pleasant
Lake Crescent
Port Angeles
Forks
Quillayute Indian Res
Lapush
Hoh Indian Reservation
Quinault Indian Reservation
Quinault Lake
29
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12
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STOCK STATUS[32]

Stocks	Hatchery Program?	Biological Significance (L=Low, M =Intermediate, H =High)			Population Viability (L=Critical, M = At Risk, H = Healthy)			Habitat (L = Inadequate, M = Limiting, H = Healthy)			Harvest Opportunity (0 = None, L = Occasional, M = Most years, H = Each year)		
			Goals			Goals			Goals			Goals	
		Now	Short-Term	Long-Term	Now	Short-Term	Long-Term	Now	Short-Term	Long-Term	Now	Short-Term	Long-Term
Educket Creek Hatchery Fall Chinook	Y	L	L	L	M	M	M	M	M	M	H	H	H
Hoh River Fall Chinook	N	M	M	M	M	M	H	M	M	H	H	H	H
Hoko River Fall Chinook	Y	M	M	M	L	L	M	M	M	M	0	L	H
Queets System Fall Chinook	Y	M	M	M	M	M	M	H	H	H	H	H	H
Quillayute System Fall Chinook	N	M	M	M	H	H	H	M	M	M	H	H	H
Quinault River Fall Chinook	Y	M	M	M	M	M	M	M/H	M/H	M/H	H	H	H
Sekiu River Fall Chinook	N	M	M	M	M	M	H	M	M	M/H	0	0	L
Sooes River Fall Chinook	Y	M	M	M	L	L	L	L/M	L/M	L/M	H	H	H
Quillayute System Summer Chinook	Y	M	M	M	M	M	M/H	M	M	H	H	H	H
Hoh River Spring/Summer Chinook	N	M	M	M	M	M	H	M	M	M	H	H	H
Queets System Spring Chinook	N	?	?	?	?	?	?	H	H	H	?	?	?
Quillayute System Hatchery Spring Chinook	Y	L	L	L	M	M	M	M	M	H	H	H	H
Copalis Coho	N	H	H	H	M	M	M	M	M	H	M	M	M
Educket Creek Hatchery Coho	Y	L	L	L	M	M	M	M	M	M	H	H	H
Goodman and Mosquito Creek Coho	N	M	M	M	M	M	M	M	M	H	0	0	L
Hoho River Coho	N	M	M	M	M	M	M	M	M	H	H	H	H
Hoko River Coho	N	M	M	M	M	M	H	M	M	M	0	L	H
Moclips Coho	N	H	H	H	M	M	M	M	M	M	M	M	M
Ozette Coho	N	M	M	M	M	M	M	M	M	M	0	0	0
Queets River Coho	Y	M	M	M	M	M	M	M/H	M/H	H	H	H	H
Queets/Salmon Hatchery Coho	Y	L	L	L	H	H	H	H	H	H	H	H	H
Quillayute System Fall Coho	Y	M	M	M	H	H	H	M	M	H	H	H	H
Quillayute System Summer Coho	Y	H	H	H	M	M	M	H	H	H	H	H	H
Quinault River Coho	N	L	L	L	H	H	H	M/H	M/H	H	H	H	H
Quinault River Hatchery Coho	Y	L	L	L	H	H	H	M/H	M/H	H	H	H	H
Sooes River Coho	Y	L	L	L	L	L	L	L/M	L/M	M	H	H	H
Lake Ozette Sockeye	Y	H	H	H	M	M	H	L	L	M	0	0	L
Quillayute System Sockeye	N	H	H	H	M	M	M	M	M	M	H	H	H
Quinault River Sockeye	Y	H	H	H	M	M	H	M/H	M/H	H	M	M	M
Hoko River Chum	N	L	L	L	L	L	L	M	M	M	0	0	0
Other Chum	N	L	L	L	L	L	L	L	L	L	L	L	L
Quinault River Chum	N	L	L	L	L	L	L	M	M	M/H	H	H	H
Quinault River Hatchery Chum	Y	M	M	M	H	H	H	M	M	M/H	H	H	H
Copalis Winter Steelhead	N	L	L	L	L	L	L	M	M	M	M	M	M
Educket Creek Hatchery Winter Steelhead	Y	L	L	L	M	M	M	M	M	M	H	H	H
Goodman Creek Hatchery Winter Steelhead	Y	L	L	L	M	M	H	M	M	M	M	M	M
Goodman Creek Winter Steelhead	N	M	M	M	L	L	L	M	M	M	M	M	M
Hoh River Hatchery Winter Steelhead	Y	L	L	L	H	H	H	H	H	H	H	H	H
Hoh River Summer Steelhead	N	M	M	M	L	L	L	M	M	H	H	H	H
Hoh River Winter Steelhead	N	M	M	M	M	M	M	M	M	H	H	H	H
Hoko River Hatchery Winter Steelhead	Y	L	L	L	M	M	M	H	H	H	H	H	H
Hoko River Winter Steelhead	N	M	M	M	M	M	M	M	M	M	M	M	M
Moclips River Winter Steelhead	N	L	L	L	L	L	L	M	M	M	M	M	M
Mosquito and Kalaloch Creek Winter Steelhead	N	L	L	L	L	L	L	M	M	H	H	H	H
Ozette Winter Steelhead	N	M	M	M	L	L	L	M	M	M	0	0	L
Queets System Hatchery Winter Steelhead	Y	L	L	L	H	H	H	H	H	H	H	H	H
Queets System Summer Steelhead	N	?	?	?	?	?	?	?	?	?	?	?	?
Queets System Winter Steelhead	N	M	M	M	M	M	H	M/H	M/H	H	H	H	H
Quillayute System Hatchery Summer Steelhead	Y	L	L	L	M	M	M	M	M	H	H	H	H
Quillayute System Hatchery Winter Steelhead	Y	L	L	L	H	H	H	M	M	H	H	H	H

[32] *This table contains ratings for all the salmonid stocks in the region, as provided by the managers. For a more detailed definition of these ratings, see HSRG Principles and Recommendations Report, Benefit/Risk Tool appendix.*

Stocks	Hatchery Program?	Biological Significance (L=Low, M =Intermediate, H =High)			Population Viability (L=Critical, M = At Risk, H = Healthy)			Habitat (L = Inadequate, M = Limiting, H = Healthy)			Harvest Opportunity (0 = None, L = Occasional, M = Most years, H = Each year)		
		Now	Goals		Now	Goals		Now	Goals		Now	Goals	
			Short-Term	Long-Term		Short-Term	Long-Term		Short-Term	Long-Term		Short-Term	Long-Term
Quillayute System Summer Steelhead	N	M	M	M	L	L	L	M	M	H	H	H	H
Quillayute System Winter Steelhead	Y	M	M	M	M	M	H	M	M	H	H	H	H
Quinault River Hatchery Winter Steelhead	Y	L	L	L	H	H	H	H	H	H	H	H	H
Quinault River Summer Steelhead	N	M	M	M	M	M	M	M	M	M	M	M	M
Quinault River Winter Steelhead	N	M	M	M	M	M	M	M/H	M/H	H	H	H	H
Lake Quinault Net Pen Winter Steelhead	Y	M	M	M	M	M	M	M/H	M/H	H	H	H	H
Sooes River Hatchery Winter Steelhead	Y	L	L	L	M	M	M	M	M	M	H	H	H
Sooes River Winter Steelhead	N	L	L	L	L	L	L	M	M	M	M	M	M
Hoho River Bull Trout	N	M	M	L	M	M	M	M/H	M/H	M/H	0	0	L
Joe Creek Bull Trout	N	M	M	L	L	L	M	M	M	M	0	0	L
Moclips Bull Trout	N	M	M	L	L	L	M	M	M	M	0	0	L
Queets System Bull Trout	N	M	M	L	L	L	M	M	M	M	0	0	L
Quinault River Bull Trout	N	M	M	L	L	L	M	M	M	M	0	0	L
Moclips Copalis Cutthroat	N	L	L	L	M	M	M	M	M	M	H	H	H
North Coast Searun Cutthroat	N	L	L	L	M	M	M	M	M	M	0	0	L

Biological significance *is determined by considering a number of specific factors relating to stock origin, biological attributes and population subdivisions, with the stock defined as being of either* low, intermediate *or* high *significance.*

Population viability *is determined by considering a number of specific factors such as age class structure, spawner escapement and proportion of hatchery-origin fish in natural spawning, with the stock's viability defined as being either* critical, at risk *or* healthy. *This rating refers to the stock's ability to sustain itself in the natural environment (except in the case of a segregated harvest program, in which case the ratings are* low, medium *and* high *and refer to the stock's ability to sustain itself in the culture environment).*

The stock's spawning, freshwater, migration and estuarine ***habitat*** *is rated as either* inadequate *(target stock is unproductive and the population will go extinct, even without terminal harvest),* limiting *(target stock is productive enough for the population to sustain itself at a low level terminal harvest) or* healthy *(productivity of the stock is high and the population is capable of growth and supporting significant terminal harvest).*

Harvest opportunity *is rated according to whether the goal is to provide* no *directed harvest opportunity,* occasional *opportunity, opportunity* most years, *or opportunity* each year.

HATCHERIES[33]

Bear Springs Ponds

Bear Springs is located on river mile 36 on the Soleduck River, 5 miles north of the Sol Duc Hatchery. It is leased from the Department of Natural Resources and operated by WDFW. The property has one residence and a two-bay shop with office space. The pond is 215' x 50' x 4' with a gravel bottom. The water supply is spring water that percolates through the pond bottom. During late fall, the flow drops to 1,500 gallons per minute. It increases to over 3,000 gallons per minute during winter months.

Bogachiel Hatchery

This hatchery began operation in 1976 as a rearing-only facility. In later years, a small incubation building was added, making it possible for the hatchery to conduct spawning and incubation on-site. The incubation building has both shallow troughs and vertical incubators. Rearing containers consist of ten 16' fiberglass raceways and three large, earthen ponds. All water supplies for Bogachiel originate from springs. Depending on the season, total water available ranges from 4–36 cubic feet per second.

Hoko Falls Hatchery

This hatchery is located on the Hoko River (river mile 10.0). It is operated by the Makah Tribal Council. The water sources are Rights Creek (WRIA 19.0174) and Brownes Creek (WRIA) 19.0170). The hatchery was constructed from1982–91 and began operations in 1984. Hatchery facilities and equipment include an incubation building, hatchery office, shop/garage, two covered, concrete block raceways, and a subdivided, one-half acre, asphalt rearing pond. The facility is on ten acres that are leased from Rayonier Timberlands.

Lake Quinault Tribal Hatchery

Lake Quinault Tribal Hatchery is owned and operated by the Quinault Indian Nation. The facility is located on the Southwest shore of Lake Quinault (WRIA number 21.0398) on the Olympic Peninsula. Lake Quinault is part of the mainstem Quinault River at river mile 33. There are three buildings on the site, with a net pen complex approximately 1,000 feet off shore of the hatchery/office.

Makah National Fish Hatchery

The Makah National Fish Hatchery (NFH) is located on the Makah Indian Reservation, at the extreme northwest tip of the Olympic Peninsula. The Hatchery is situated on the Sooes River, about three miles upstream from its confluence with the Pacific Ocean. The lower four miles of the Sooes River watershed are on the Reservation, while the upper reaches are located on private timber lands. Makah NFH is operated and funded by USFWS. Makah NFH leases approximately 80 acres from the Makah Tribe. The facility consists of 29 11' x 80' production raceways, 24 96 cubic foot start tanks, 4 5' x 40' multi-purpose raceways, a spawning building with five adult holding ponds, a main hatchery building (containing egg incubation, start tanks, two large generators, sand filters, welding shop, feed freezer, egg rinsing room, visitor center and offices), a river pump house (containing six

[33] *Information provided by Joseph Hinton, Caroline Peter Schmidt, Makah Tribe; Steve Meadows, Quinault Indian Nation; Scott Williams, WDFW; and Tom Kane, USFWS.*

river water pumps), three storage buildings, a egg isolation building, a one acre settling basin, and an effluent basin with a serpentine channel.

Quinault National Fish Hatchery

Quinault NFH is located in the west side of the Olympic Peninsula, approximately 30 miles north by northwest of Aberdeen, in Grays Harbor County. The Hatchery is located on the Quinault Indian Reservation, Section 30 and 31, T22N, R10W, on the north bank of Cook Creek, about five miles from its confluence with the Quinault River. The hatchery can be reached by vehicle by traveling five miles west on Moclips Highway, after turning off Highway 101 at mile marker 120. Cook Creek is within WRIA 21. There are 79.9 acres of USFWS-owned land within the Quinault Indian Reservation boundary. Cook Creek (4.5 miles long) is a tributary of the Quinault River (16 miles to the ocean). Buildings include an administrative office, visitor center, hatchery building, spawning building, vehicle storage building, maintenance shop and fish feed building, electric fish barrier, and egg isolation building (under construction).

Salmon River Fish Culture Facility

The Salmon River Fish Culture Facility is owned and operated by the Quinault Indian Nation. The facility is sited at river mile 4.0 on the Salmon River (WRIA 21.0139), a lower main tributary to the Queets River (WRIA 21.0016). The Queets River is located near the middle of Washington's north coast. There are two buildings on the site, housing feed storage, office space, employee quarters and hatchery incubation units.

Snider Creek Pond

This facility is a one-quarter acre, gravity-fed rearing pond at the confluence of Snider Creek and the Soleduck River at river mile 44, near the US Forest Service Ranger Station. There is no on-site residence. The facility is overseen by the Olympic Guides Association.

Sol Duc Hatchery

Sol Duc Hatchery is located on the Soleduck River at river mile 30, 12.5 miles north of the town of Forks, off Highway 101. It is owned and operated by WDFW. The property spans 43 acres and consists of an incubation building with office, shop and freezer, a four-bay storage building, interpretative center, a pump building and three residences.

Umbrella Creek Hatchery and Remote Site Incubators

The Umbrella Creek and Elk Lake facilities are located in remote areas classified as commercial forest and have few amenities such as electricity or land line phone service. These facilities are operated by the Makah Tribal Council. The water source is Umbrella Creek (WRIA 20.0056). The facility was constructed in 1982 and began operations in 1983. The land is leased from Crown Pacific. The Tribe was granted permission for the Stony Creek remote site incubator (RSI) site by a private land owner.

Educket Creek Hatchery Fall Chinook

Makah Tribe

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Low	Low	Low
Population Viability[34]	Medium	Medium	Medium
Habitat	Limiting	Limiting	Limiting
Harvest Opportunity	Each Year	Each Year	Each Year
Purpose	Harvest		
Type	Segregated		

PROGRAM DESCRIPTION

This program started in 1995 and operates only in years when the fall Chinook production needs at the Makah National Fish Hatchery (NFH) are met (to date this includes 1995, 1998, 1999 and 2002). The program uses a Sooes River fall Chinook stock obtained from the Makah NFH. In each year of operation, 100,000 fish at 500 fish per pound are transferred to Educket Creek Hatchery in March. The fish are reared at Educket Creek until June, at which point they are released at a size of 55 fish per pound.

OPERATIONAL CONSIDERATIONS

- Releases are volitional, but are not marked or tagged.
- Initial rearing at Educket Creek is in a fiberglass container, but final rearing is under natural conditions in an enclosure within the creek.
- Returning adults that escape the fisheries are not removed from the system at Educket Creek.
- There is apparently no natural fall Chinook population in the Educket/Wa'atch drainage.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?
The program is being operated in a manner consistent with its short- and long-term goals.

B. Likelihood of attaining goals?
The program is providing both tribal and non-tribal harvest benefits, but data on the actual size of the harvest are lacking.

C. Consistent with goals for other stocks?

[34] *In the case of a segregated harvest program, population viability ratings are low, medium and high and refer to the stock's ability to sustain itself in the culture environment.*

There is a risk of competition with other juvenile salmon in the drainage but, considering the numbers of fish released and their size at release, the risk of significant predation is likely low. The absence of a natural fall Chinook population in the drainage means that the program does not pose a genetic risk in the drainage.

RECOMMENDATIONS

- Continue the program, but monitor the unmarked/untagged Chinook catch in the Educket/ Wa'atch drainage, to evaluate benefits from the program.

COMMENTS

- Normally, in a segregated program, one would use tagged fish to provide a means of evaluating the degree to which unwanted interactions with other stocks might be occurring and to quantify benefits of the program. However, in the present program, in which natural populations of Chinook are not thought to occur in the Educket/Wa'atch drainage, this requirement can be dispensed with because of the unlikelihood of any genetic introgression with another Chinook stock. In addition, under these conditions, reasonably accurate estimates of the program's harvest benefit should be possible by simply counting untagged Chinook harvested in the Educket/ Wa'atch drainage. Straying to other drainages, if it occurs, would most likely be to the nearby Sooes River, the original source of this fall Chinook stock.

MANAGERS RESPONSE

The Makah Tribe supports the recommendations of the HSRG, with the notation that if current monitoring needs to be expanded to accommodate this recommendation, additional funding may be needed

Hoko River Fall Chinook

Makah Tribe

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Intermediate	Intermediate	Intermediate
Population Viability	Critical	Critical	At Risk
Habitat	Limiting	Limiting	Limiting
Harvest Opportunity	None	Occasional	Each Year
Purpose	Conservation		
Type	Integrated		

PROGRAM DESCRIPTION

The hatchery broodstock is a mixture of natural and hatchery origin adults captured from the Hoko River. WDFW plants prior to 1974 included fish from the Elwha River, Finch Creek and Hood Canal stocks. No broodstock characteristics are known to have changed due to any hatchery selection processes. This stock is the only stock in the Western Strait Chinook GDU. The current program was initiated in 1982. The egg take goal for this program is 500,000. Adults are collected with gillnets in the river. They are spawned, incubated and reared at Hoko River Hatchery. Program releases are 200,000 smolts to the Hoko River at river mile ten for a US/Canada indicator stock, 100,000 smolts to the Hoko River at river mile 16, 50,000 to the Little Hoko River, and the rest at river mile ten. Future plans for this stock include plantings in the Sekiu and Pysht Rivers.

OPERATIONAL CONSIDERATIONS

- Broodstock is collected by gillnet in lower river holding areas.
- Once a self-sustaining population (850 natural spawners per year) is established, this stock will be used for restoration of Sekiu and Pysht fall Chinook.
- Since 1988, the proportion of naturally-spawning, hatchery-origin fish has averaged 48%, with a minimum and maximum contribution of six percent and 81%, respectively.
- Natural-origin fish have been included in the broodstock at an average rate of 31% since 1991, with a minimum and maximum contribution of eight percent and 64%, respectively.
- Since the inception of the program, hatchery releases have been continuously coded wire tagged as a US/Canada indicator stock, with the exception of broodyear 1988.
- The average total survival rate from broodyears 1990–97 has been 0.4%, contributing an average of 505 adults to the spawning population each year.
- Fish are force-released.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?

The program has provided a benefit as a US/Canada indicator stock. It has also been effective in increasing the total number of spawners in the Hoko River, but has not led to an increase in the number of natural-origin adults spawning. Hatchery-origin recruits have made up more than 50% of natural spawning fish in seven of the eight return years since 1995. Adults from this program also comprise a high percentage of the broodstock collected each year to continue the program.

B. Likelihood of attaining goals?
The fact that natural origin recruits have not increased over the 20 year life of the program brings into question the validity of the goal of attaining 850 natural origin spawners as a benchmark prior to developing recovery programs in the Sekiu or Pysht Rivers. Continuing this size of program, or a larger program, in the Hoko River creates a risk that the high contribution of program fish may lead to a loss of viability from domestication to the natural spawning population. The uncertainty about the migratory status of forced hatchery releases also means that a risk of competition to the naturally-produced fall Chinook component cannot be ruled out.

C. Consistent with goals for other stocks?
The program appears to be consistent with the goals for other stocks in the Hoko River.

RECOMMENDATIONS

- Reduce the number of fish released into the lower Hoko River, and monitor the sustainability of the run.
- Initiate plans for a conservation program in either the Pysht or Sekiu, depending on an estimate of the quantity and quality of Chinook habitat available in these systems.
- Implement a volitional release strategy for the Hoko releases, to reduce the potential competition risk with naturally-produced fall Chinook.

COMMENTS

- The HSRG does not disagree with the continued use of this program to provide an indicator stock.

MANAGERS RESPONSE

The Makah Tribe is greatly concerned about the implication that the Hoko can support no more than 850 returning spawners and their progeny. While this goal was first presented in 1978 in WDFW Technical Report 29, the Tribe feels that a thoughtful re-evaluation of this goal would be timely, as habitat protection and land management practices are much improved over the conditions found in 1978. In addition, the habitat has benefited from the positive effects of restoration projects that have been implemented in this watershed.

The Tribe supports the recommendation that supplementation efforts should be emphasized in the upper Hoko River and those tributaries that are suitable Chinook habitat. Along with supplementation efforts in this area, the population response to these program adaptations will be monitored in the same manner as the Tribe's initial effort in the lower Hoko River.

The Tribe supports the recommendation of the HSRG to initiate plans for a conservation program in either the Pysht or Sekiu rivers. Discussions and project planning are underway with WDFW, the

Elwha Tribe, NOAA Fisheries and area landowners regarding reintroduction of fall Chinook into one or both of these rivers. Funding is being sought to support these projects, and to implement the operational recommendations of the HSRG.

The Tribe supports the recommendation of the HSRG to implement a volitional release strategy for the Hoko River releases. The Makah NFH has submitted a grant application to replace the existing fish ladder. The Tribe and USFWS are incorporating elements into the new fish ladder's design that will make the volitional release of Hoko Fall Chinook fingerlings more feasible and attractive to the outmigrating fingerlings.

Queets System Fall Chinook

Quinault Indian Nation

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Intermediate	Intermediate	Intermediate
Population Viability	At Risk	At Risk	At Risk
Habitat	Healthy	Healthy	Healthy
Harvest Opportunity	Each Year	Each Year	Each Year
Purpose	Harvest		
Type	Integrated		

PROGRAM DESCRIPTION

The naturally spawning population in this system is considered native. Since 1974, non-native stock transfers into the Salmon River Hatchery stock include some fish from 1978–81 and 1985. This stock is one of 13 stocks in the North Coast Fall Chinook GDU. For the program, adults (60–65 pairs) are collected with gill nets upstream of the Salmon River in the Queets and Clearwater mainstems. The egg take goal is 365,000. Spawning, incubation and rearing occur on-station. The program goal is for 250,000 smolts to be released on-station in August at 35–40 fish per pound. An additional 200,000 smolts are reared and released as a US/Canada indicator stock.

OPERATIONAL CONSIDERATIONS

- Broodstock is collected by gillnet in the Queets and Clearwater rivers.
- Yearly broodstock collection includes only natural-origin recruits.
- Broodstock collection with eight-inch gillnets eliminates jacks from the spawning population.
- Program fish make up on average ten percent of the natural spawning population (the range has been 2–26.9%).
- Hatchery releases are coded wire tagged as a US/Canada indicator stock.
- The annual contribution to in-river harvest from the program averages 239 fish (approximately nine percent of the catch).
- Fish are released volitionally in August at a similar size to naturally-produced Chinook.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?

This program provides a small, annual harvest consistent with the goal described, and also provides benefits as an indicator stock. Considering the size and the operations of this program, it is not likely to pose a risk to the naturally produced component of the stock.

B. Likelihood of attaining goals?

Goals for harvest and obtaining management information are being met.

C. Consistent with goals for other stocks?
Considering the size and the operations of this program, it is not likely to pose any significant risks to other stocks in the drainage.

RECOMMENDATIONS

- Modify collection methods to allow collection of jacks for inclusion into the broodstock.

COMMENTS

- Like all integrated hatchery programs, success will depend on good habitat being available to both the hatchery- and natural-origin components of the integrated population (see HSRG system-wide recommendation about productive habitat).

MANAGERS RESPONSE

The Quinault Indian Nation generally agrees with the recommendation, although with the current program, and the broodstock now including multiple age classes, the impacts to other species may outweigh the benefits to including jacks. QIN looks at ways to allow for inclusion of jacks into the broodstock without increasing impacts to other species.

Quinault River Fall Chinook

Quinault Indian Nation and US Fish and Wildlife Service

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Intermediate	Intermediate	Intermediate
Population Viability	At Risk	At Risk	At Risk
Habitat	Limiting/Healthy	Limiting/Healthy	Limiting/Healthy
Harvest Opportunity	Each Year	Each Year	Each Year
Purpose	Harvest		
Type	Integrated		

PROGRAM DESCRIPTION

This is a native stock with wild production. Multiple stocks were used to begin the Quinault River fall Chinook program including Quinault, Queets and Hoh river stocks, as well as introductions from Puget Sound (Green, Deschutes and Samish rivers and Finch Creek) and Willapa Bay (Willapa and Nemah rivers.)This stock is one of 13 stocks in the North Coast Fall Chinook GDU. Broodstock is collected from adults returning to Quinault National Fish Hatchery (NFH) and by gillnet in Lake Quinault (up to 300 adults). For the Lake Quinault Hatchery portion of the program, the egg-take goal is 1.3 million. For the Quinault NFH portion, the egg-take goal is 700,000. Up to 450,000 eyed eggs are transferred to Quinault NFH from Lake Quinault, to make up for shortfalls at Quinault NFH. Spawning, incubation, rearing and release take place at each facility. The program's release goals are 600,000 at 40 fish per pound in July from Quinault NFH, and 400,000 at 15 fish per pound from Lake Quinault. Another 100,000 are released from pens at Lake Quinault in September.

OPERATIONAL CONSIDERATIONS

- Coded wire tag analysis indicates that the broodstock is approximately 75% hatchery-origin and 25% natural-origin.
- Hatchery-origin recruits make up 30% or less of the natural spawning population.
- The mating scheme at Quinault NFH uses single family pairing.
- The mating scheme for the Lake Quinault program uses modified factorial mating.
- 200,000 fish from Quinault NFH are adipose fin clipped and coded wire tagged.
- 40,000 fish are marked and coded wire tagged for in-river management.
- Total survival for the Quinault NFH program has averaged approximately 0.75% for broodyears 1973–96, and 0.25% for broodyears 1990–96.
- The average catch contribution for the Quinault NFH program has been approximately 2,800 fish per year for broodyears 1973–96, and approximately 900 fish per year for broodyears 1990–96.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?

The program is making consistent contributions to harvest, although it has not appeared to be as successful in recent years as it has historically. The composition of the natural spawning component, as well as the composition of fish collected for hatchery broodstock, is consistent with a properly integrated program.

B. Likelihood of attaining goals?
Both the harvest and conservation goals for the stock are currently being met.

C. Consistent with goals for other stocks?
The program appears to be consistent with goals for other stocks.

RECOMMENDATIONS

- Maintain the current proportion of hatchery- and natural-origin fish in the broodstock and on the spawning grounds, to maintain proper integration with the natural stock.

COMMENTS

- Like all integrated hatchery programs, success will depend on good habitat being available to both the hatchery- and natural-origin components of the integrated population (see HSRG system-wide recommendation about productive habitat).

MANAGERS RESPONSE

The Quinault Indian Nation generally agrees with the HSRG recommendation.

See also Appendix B: US Fish and Wildlife Service Response to HSRG Recommendations.

Sooes River Fall Chinook

Makah Tribe and US Fish and Wildlife Service

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Intermediate	Intermediate	Intermediate
Population Viability	Critical	Critical	Critical
Habitat	Inadequate/ Limiting	Inadequate/ Limiting	Inadequate/ Limiting
Harvest Opportunity	Each Year	Each Year	Each Year
Purpose	Harvest		
Type	Integrated		

PROGRAM DESCRIPTION

This is a native stock, with hatchery and wild production. Deschutes River and Soos Creek stocks were released for one or two years in the 1960s; Minter Creek stock was released for one year in the 1970s; Quinault stock was released for one year in the 1980s (there is some uncertainty about these releases). This stock is one of 13 stocks in the North Coast Fall Chinook GDU. Broodstock is collected from rack returns to the Makah National Fish Hatchery (NFH). Adult collection, spawning, incubation and rearing occur on-station. The egg take goal is 3.85 million. 100,000 fish are transferred to Educket Creek Hatchery in March at 500 fish per pound. On-station releases are 3.2 million at 70 fish per pound.

OPERATIONAL CONSIDERATIONS

- When available, approximately 300 adults are passed upstream of the hatchery rack for natural spawning.
- Approximately 260,000 fish are adipose fin clipped and coded wire tagged, as a US/Canada indicator stock.
- The composition of hatchery returns and natural escapement is unknown, since the level of marking does not allow identification of the stock components.
- Total survival for the Makah NFH portion of the program has averaged 0.14% for brood years 1985–97.
- The average catch contribution for the Quinault NFH portion of the program has been approximately 720 fish per year for brood years 1985–97.
- During rearing, the flow index exceeds recommended guidelines by approximately 30%, and the density index exceeds recommended guidelines by approximately 50%.
- Fish are force-released at approximately 75 fish per pound, similar in size to naturally produced fall Chinook.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?
The program is making a relatively small contribution to harvest, given its size. Total survival has been poor, leading to small contributions to harvest and difficulties in meeting escapement goals for the program. Returns in 2001 and 2002, however, provided the opportunity for more harvest than actually occurred. The program is not being operated consistent with the HSRG's guidelines for integrated programs (see System-Wide Recommendations).

B. Likelihood of attaining goals?
Limited capacity and current conditions make the Sooes unsuitable to support a large Chinook core population. Therefore, it appears unlikely that the system can support a properly integrated program at this program's current size. It is unclear why contribution to harvest has been poor. Operational changes suggested below may improve overall survival. However, the possibility also exists that the program is oversized for the quantity and quality of the receiving habitat. If this is the case, harvest goals might be achieved by reducing the size of the program.

C. Consistent with goals for other stocks?
Since there appears to be no sustained natural fall Chinook population in the watershed, the fish released by this program pose no significant ecological or genetic risks. The segregated approach described below would be consistent with the goal of rebuilding a naturally spawning Chinook population in the Sooes River.

RECOMMENDATIONS

- Reduce program size to meet agency flow and density index recommendations.
- Employ volitional releases to increase the success of the hatchery program and reduce the number of fish occupying limited receiving habitat during a limited time frame. This will require structural modifications of pond outlets.
- Dispose of mortalities in a manner that reduces the likelihood of pathogen transmission to the receiving watershed; for example, by burying them.

COMMENTS

- The actions recommended may improve survival enough for the program to make an important contribution to cultural and fishery needs in the North Coast region. Despite improvements, however, the success of this program may be limited by water quality and quantity problems.
- The program could be maintained near its present size (and therefore provide the current harvest benefit) if it were managed as a segregated harvest program using its capacity to remove excess hatchery adults from the system when necessary.
- Like all integrated hatchery programs, success will depend on good habitat being available to both the hatchery- and natural-origin components of the integrated population (see HSRG system-wide recommendation about productive habitat).

MANAGERS RESPONSE

The Makah Tribe understands the importance of adjusting rearing conditions to optimize the productivity of the hatchery stock and looks forward to meeting with USFWS to discuss production

capacity, operational considerations, and options for future changes and improvements. Scheduling for this meeting is currently in progress.

See also Appendix B: US Fish and Wildlife Service Response to HSRG Recommendations.

Quillayute System Summer Chinook

Quileute Tribe and Washington Department of Fish and Wildlife

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Intermediate	Intermediate	Intermediate
Population Viability	At Risk	At Risk	At Risk/Healthy
Habitat	Limiting	Limiting	Healthy
Harvest Opportunity	Each Year	Each Year	Each Year
Purpose	Harvest and Conservation		
Type	Integrated		

PROGRAM DESCRIPTION

This is a wild stock with natural production and is one of eight stocks in the North Coast GDU. This program has an egg take goal of 400,000 from the Soleduck River, with incubation to the eyed stage at Sol Duc Hatchery, and the remainder at Lonesome Creek Hatchery. Early rearing occurs at Lonesome Creek. Fish are transferred at 200 fish per pound to Bear Springs rearing pond at Soleduck river mile 37 and released volitionally at 15 fish per pound in September.

OPERATIONAL CONSIDERATIONS

- Broodstock is collected by small mesh gillnet in the mainstem Soleduck River.
- The broodstock collection goal is 125 pairs.
- The planned program size is 250,000 smolts, but the actual program size has averaged 175,000 smolts for release years 1989–99.
- The proportion of hatchery- versus natural-origin fish in the broodstock is unknown.
- The contribution of hatchery-origin recruits to harvest and natural spawning is generally unknown.
- Preliminary genetic samples indicate that the stock is genetically similar to Sol Duc hatchery spring Chinook (Dungeness/Cowlitz/Umpqua origins).
- Peak entry of summer Chinook has apparently shifted from mid-July to mid-June.
- Density indexes during early rearing are approximately twice the recommended guideline.
- Fish are released during the natural downstream migration period of summer Chinook.
- It is unclear if the release procedure for these fish actually constitutes a volitional release, or if pond manipulation acts to create a forced release.
- Hatchery releases are not marked or coded wire tagged.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?

Since program releases are unmarked and untagged, it is not possible to determine if this program is making any contribution to the harvest or conservation goals for the stock. This poses a risk of broodstock mining if survival and spawning success of hatchery-origin fish is less than the natural-origin component. The lack of information regarding the composition of the natural spawning population means that a risk of loss of viability to the naturally spawning component of the population cannot be ruled out.

B. Likelihood of attaining goals?
Both the historic and current contribution of natural-origin fish to the hatchery broodstock is unknown. Since there has been no planned infusion of natural-origin recruits in the hatchery broodstock, there is a risk that the hatchery component of this population has diverged from the natural component. This creates a risk of loss of viability from domestication to the naturally spawning component. Hatchery releases also create a potential competition risk to naturally produced summer Chinook, and a predation risk on naturally-produced summer and fall Chinook.

C. Consistent with goals for other stocks?
The program creates a potential predation risk to naturally produced summer and fall Chinook, coho and steelhead.

RECOMMENDATIONS

- Meet recommended flow and density guidelines by adjusting the size of the program and/or providing additional rearing facilities.
- Mark all hatchery releases, so that the contribution of hatchery-origin adults to natural spawning can be estimated, the number of hatchery-origin recruits in the spawning population can be limited to a maximum of 30%, and 10–20% natural-origin fish can be incorporated into the hatchery broodstock.
- Reinstitute tagging of this stock, to evaluate the contribution to harvest.
- Implement rearing and release protocols, to produce smolts that rapidly migrate during the normal outmigration period.
- Consider semi-natural rearing, to increase survival and perhaps reduce domestication.

COMMENTS

- Like all integrated hatchery programs, success will depend on good habitat being available to both the hatchery- and natural-origin components of the integrated population (see HSRG system-wide recommendation about productive habitat).

MANAGERS RESPONSE

WDFW generally supports the recommendations of the HSRG, but notes that implementation of marking and tagging will require additional funding.

The Quileute Tribe is supportive of the HSRG recommendations to improve the rearing conditions for this stock through facility improvements. We would also restate the need to better understand the current genetic composition of the spring and summer Chinook stocks in the Quillayute system as well as the need for the co-managers to review the goals for these stocks in future discussions.

Quillayute System Hatchery Spring Chinook

Washington Department of Fish and Wildlife

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Low	Low	Low
Population Viability[35]	Medium	Medium	Medium
Habitat	Limiting	Limiting	Healthy
Harvest Opportunity	Each Year	Each Year	Each Year
Purpose	Harvest		
Type	Segregated		

PROGRAM DESCRIPTION

This program began in 1971. It uses an introduced, locally-adapted, composite stock influenced by genes from various sources: spring Chinook from the Cowlitz, Umpqua and Dungeness rivers, and Soleduck River summer Chinook. 240,000 eggs are collected for this program at Sol Duc Hatchery, from adults returning to the hatchery. Egg incubation, juvenile rearing and smolt release (200,000 smolts at four fish per pound) occur on-station.

OPERATIONAL CONSIDERATIONS

- Adults collected for broodstock represent the early and mid portions of the run, so as to avoid using summer Chinook, which overlap in their run timing with the latter part of the spring Chinook run.
- All adults are collected; none are passed upstream to spawn.
- Adults suffer high losses (up to 50%), despite precautions taken (treatment with five percent salt to remove leeches, treatment with injected antibiotics to control bacterial kidney and other diseases, ripening in tubes, and holding in pathogen-free water).
- Spawning protocols involve the use of pooled gametes (five-by-five) and jacks at no more than two percent of the males and females spawned.
- Releases are adipose fin-clipped.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?

The program is carried out in a manner consistent with the short- and long-term goals for harvest.

B. Likelihood of attaining goals?

[35] *In the case of a segregated harvest program, population viability ratings are low, medium and high and refer to the stock's ability to sustain itself in the culture environment.*

The program provides fish for harvest. During the last ten years ending in 2002, annual tribal and sports harvest has averaged 607 fish (ranging from 280–1,397 fish).

C. Consistent for goals for other stocks?

Considering the size of fish at release, the program poses a potential predation risk to juvenile salmonids in the system. Competition risks are unknown, as data apparently do not exist regarding the speed with which the releases exit the system. A high rate of straying in the wild creates a significant genetic risk to the native summer run Chinook. In 1991–95, for example, spring Chinook were estimated to account for 37–52% of Chinook spawning in the wild in the Soleduck River. Although these percentages may be on the high side as a result of the small sample sizes collected, the straying rate likely far exceeds the five percent limit recommended by the HSRG for a segregated hatchery stock spawning in the wild with natural-origin fish. Genetic evidence also supports this conclusion.

RECOMMENDATIONS

- Discontinue the program, unless measures can be implemented to prevent the excessive straying.

COMMENTS

- Consider meeting harvest goals using the summer Chinook program.

MANAGERS RESPONSE

WDFW supports the recommendation of the HSRG.

The Quileute Tribe recognizes the concern of the HSRG about straying from this program and its effect on summer Chinook in the Quillayute system. However, the Tribe feels that a better understanding of the current genetic composition of the spring and summer stocks and the degree of hybridization that has already occurred is necessary before substantial reductions or elimination of this program should occur. Collecting this information would allow the co-managers to make a more informed decision about the current stock status, as well as developing future goals for this stock(s). The Tribe suggests that the co-managers should re-evaluate the stock goals that were the basis for this review in future co-manager discussions.

Educket Creek Hatchery Coho

Makah Tribe and US Fish and Wildlife Service

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Low	Low	Low
Population Viability[36]	Medium	Medium	Medium
Habitat	Limiting	Limiting	Limiting
Harvest Opportunity	Each Year	Each Year	Each Year
Purpose	Harvest		
Type	Segregated		

PROGRAM DESCRIPTION

This program started in 1988. It uses a Sooes River coho stock obtained from Makah National Fish Hatchery (NFH). Each year, 50,000 fish at 18 fish per pound are transferred to Educket Creek Hatchery in March. The fish are reared at Educket Creek until April, at which point they are released at a size of 15 fish per pound.

OPERATIONAL CONSIDERATIONS

- Releases are forced in some years (to make room for fall Chinook) and are adipose fin clipped, but not coded-wire tagged.
- Rearing at Educket Creek is in an enclosure within the creek, under natural conditions.
- Returning adults that escape the fisheries are not removed from the system at Educket Creek.
- There is apparently no natural coho population in the Educket/Wa'atch drainage.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?
The program is being operated in a manner consistent with its short- and long-term goals.

B. Likelihood of achieving goals.
The program is providing both tribal and non-tribal harvest benefits, but no data on harvest size were provided.

C. Consistent with goals for other stocks?
There is a risk of competition with other juvenile salmon in the drainage, but, considering the numbers of fish released and their size at release, the risk of significant predation is likely low. The

[36] *In the case of a segregated harvest program, population viability ratings are low, medium and high and refer to the stock's ability to sustain itself in the culture environment.*

absence of a natural coho population in the drainage means that the program does not pose a genetic risk in the drainage

RECOMMENDATIONS

- Monitor coho catches in the Educket/Wa'atch drainage in order to evaluate harvest benefits.

COMMENTS

- Normally, in a segregated program, one would use tagged fish to provide a means of evaluating the degree to which unwanted interactions with other stocks might be occurring and to quantify benefits of the program. However, in the present program, in which natural populations of coho do not occur in the Educket/Wa'atch drainage, this requirement can be dispensed with because of the unlikelihood of any genetic introgression with another coho stock. In addition, under these conditions, reasonably accurate estimates of the program's harvest benefit should be possible by simply counting the untagged (but adipose fin clipped) coho harvested in the Educket/Wa'atch drainage. Any straying that occurs is likely to be to the nearby Sooes River, the original source of this coho stock.

MANAGERS RESPONSE

The Makah Tribe supports the recommendations of the HSRG, with the notation that if current monitoring needs to be expanded to accommodate this recommendation that additional funding may be needed.

Queets River Coho

Quinault Indian Nation

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Intermediate	Intermediate	Intermediate
Population Viability	At Risk	At Risk	At Risk
Habitat	Limiting/Healthy	Limiting/Healthy	Healthy
Harvest Opportunity	Each Year	Each Year	Each Year
Purpose	Conservation		
Type	Integrated		

PROGRAM DESCRIPTION

This is a native stock supplemented with hatchery progeny from wild broodstock. The egg take goal for this program is 150,000 from natural-origin broodstock in the river. Incubation and early rearing occur at the Salmon River Fish Culture Facility. Fish are taken to acclimation ponds in late February/ early March. The program has a planting goal of 120,000 at 18 fish per pound from the Queets River ponds and the Clearwater River.

OPERATIONAL CONSIDERATIONS

- None.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?
There is no apparent conservation benefit from this program; there may be a modest demographic effect on a healthy population.

B. Likelihood of attaining goals?
The program is not likely to contribute to a conservation goal. There are potential risks to the target stock.

C. Consistent with goals for other stocks?
Yes.

RECOMMENDATIONS

- Suspend the program and develop a set of criteria for restarting if a conservation need is identified.
- Continue monitoring the status of the natural coho population.

COMMENTS

- None.

MANAGERS RESPONSE

The Quinault Indian Nation disagrees with the recommendation to suspend this supplementation program. QIN will develop criteria for supplementation, but will maintain the current program until these criteria are developed, reviewed and implemented.

Queets/Salmon Hatchery Coho

Quinault Indian Nation

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Low	Low	Low
Population Viability[37]	High	High	High
Habitat	Healthy	Healthy	Healthy
Harvest Opportunity	Each Year	Each Year	Each Year
Purpose	Harvest		
Type	Segregated		

PROGRAM DESCRIPTION

This program began in1976. It uses an introduced hatchery stock primarily of Quinault National Fish Hatchery (NFH) origin. 950, 000 eggs are collected from adults returning to the rack at the Salmon River Fish Culture Facility. Incubation and rearing occur on-station. The goal is to release on-station 850,000 smolts at 15 fish per pound.

OPERATIONAL CONSIDERATIONS

- Rack returns satisfy egg-take needs.
- The largest fish are selected for broodstock purposes.
- Not all releases are tagged.
- Releases are fully volitional.
- No active measures are taken to prevent straying and interbreeding with wild coho.
- Releases are monitored at smolt traps downstream of the release site.
- Run timing of the hatchery population is earlier than that of the natural coho population, permitting a targeted fishery on the segregated stock.

BENEFITS AND RISKS

A. Consistent with short and long-term goals?

The program is conducted in a manner consistent with the short- and long-term goals of providing for harvest (especially in-river, tribal harvest).

B. Likelihood of attaining goals?

The program provides a harvest benefit. Data on harvest indicate a catch of approximately 3,000–10,000 fish per year over the last five years.

[37] *In the case of a segregated harvest program, population viability ratings are low, medium and high and refer to the stock's ability to sustain itself in the culture environment.*

C. Consistent with goals for other stocks?

During the last six years, hatchery returnees accounted for an average of less than one percent of the coho spawning in the wild in the Queets and Clearwater rivers. Considering the large size of the program and the size of fish at release, there are potential competition and predation risks to juveniles of other salmon stocks in the river.

RECOMMENDATIONS

- Continue to monitor and evaluate stray rates from this program, to ensure they remain within acceptable levels.
- Periodically evaluate the program's size and adjust it to be consistent with harvest goals and goals for other stocks. Since the program currently produces unharvested returns that exceed escapement needs, it should either be reduced or additional harvest options should be explored that take full advantage of harvest opportunities (including mass marking to allow selective fisheries).
- Increase the use of jacks to ten percent of the males used for spawning.

COMMENTS

- The co-managers are to be complimented for the efforts they have put into gathering quantitative data on various aspects of the coho runs in the Queets River system.

MANAGERS RESPONSE

The Quinault Indian Nation generally agrees with the HSRG recommendations.

Quillayute System Fall Coho

Washington Department of Fish and Wildlife

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Intermediate	Intermediate	Intermediate
Population Viability	Healthy	Healthy	Healthy
Habitat	Limiting	Limiting	Healthy
Harvest Opportunity	Each Year	Each Year	Each Year
Purpose	Harvest		
Type	Integrated		

PROGRAM DESCRIPTION

Dungeness Hatchery stock composed most of the early plants for this program. The stock changed over to Quillayute system-origin fish in the early 1970s, when Sol Duc Hatchery began raising the releases. A hatchery fall coho program has been operated consistently since the 1950s in the Soleduck River, with outplantings to other portions of the watershed until about 1990. Since then, releases have been confined to the Soleduck. This program has an egg take goal of 700,000 at Sol Duc. Fish are spawned, incubated reared and released at Sol Duc. The release goal is 600,000 at 15 fish per pound in April.

OPERATIONAL CONSIDERATIONS

- All fish are marked and/or tagged.
- Fish are not volitionally released, due to facility limitations.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?
There is a harvest benefit. However, stray rates are not well documented and less than ten percent of natural-origin recruits are included in the hatchery broodstock. In addition, the size of the program is larger than needed to meet current harvest demand.

B. Likelihood of attaining goals?
Past success suggests a likelihood of meeting harvest goals.

C. Consistent with goals for other stocks?
Fish from this program create predation risks to natural Chinook populations.

RECOMMENDATIONS

- Implement HSRG guidelines for properly integrated hatchery programs.

- Increase the use of jacks to ten percent of the males used for spawning.
- Conduct necessary spawning surveys to evaluate hatchery straying and the number of natural origin spawners.
- Periodically evaluate the program's size and adjust to be consistent with harvest goals and goals for other stocks. Since the program currently produces unharvested returns that exceed escapement needs, it should either be reduced or additional harvest options should be explored that take full advantage of harvest opportunities (including mass marking to allow selective fisheries).
- Provide facilities necessary to accommodate volitional release.

COMMENTS

- Look at ways to separate summer coho from spawning with fall coho.
- Like all integrated hatchery programs, success will depend on good habitat being available to both the hatchery- and natural-origin components of the integrated population (see HSRG system-wide recommendation about productive habitat).

MANAGERS RESPONSE

WDFW generally supports the recommendations of the HSRG, but notes that additional funding will be required to:

- modify facilities to facilitate volitional releases;
- quantify the abundance of hatchery and natural-origin spawners; and
- integrate natural-origin adults into the broodstock.

The Quileute Tribe agrees with the HSRG's recommendation to evaluate the level of straying from this program and suggests that both fall and summer coho receive a unique mark to allow identification of this from each program. The Tribe also agrees that program size should be periodically reviewed to ensure that harvest and stock conservation goals are being met.

Quillayute System Summer Coho

Washington Department of Fish and Wildlife

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	High	High	High
Population Viability	At Risk	At Risk	At Risk
Habitat	Healthy	Healthy	Healthy
Harvest Opportunity	Each Year	Each Year	Each Year
Purpose	Harvest		
Type	Integrated		

PROGRAM DESCRIPTION

This stock was derived from the native stock of summer coho, and no other stocks have been transferred in or released. The egg take goal for this program is 236,000 from returns to Sol Duc Hatchery. Spawning, incubation, rearing and release occur at Sol Duc. The program's release goal is 200,000 smolts at 15 fish per pound.

OPERATIONAL CONSIDERATIONS

- None.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?
The program is providing a harvest benefit.

B. Likelihood of attaining goals?
There is potentially a significant biological risk associated with separating fall and summer coho.

C. Consistent with goals for other stocks?
There is risk associated with spawning overlap with fall coho. There are also concerns with inadequate monitoring of strays.

RECOMMENDATIONS

- Mark the summer coho to distinguish them from fall coho.
- Release volitionally.
- Follow HSRG guidelines for integrated population management.
- Increase the use of jacks to ten percent of the males used for spawning.
- Monitor hatchery straying.

COMMENTS

- Like all integrated hatchery programs, success will depend on good habitat being available to both the hatchery- and natural-origin components of the integrated population (see HSRG system-wide recommendation about productive habitat).

MANAGERS RESPONSE

WDFW generally supports the recommendations of the HSRG, but notes that additional funding will be required to:

- modify facilities to facilitate volitional releases;
- mark summer coho;
- quantify the abundance of hatchery and natural origin spawners; and
- integrate natural origin adults in the broodstock.

The Quileute Tribe agrees with the HSRG's recommendation to evaluate the level of straying from this program and suggests that both fall and summer coho receive a unique mark to allow identification of this from each program. The Tribe also agrees that program size should be periodically reviewed to ensure that harvest and stock conservation goals are being met.

Quinault River Hatchery Coho

Quinault Indian Nation and US Fish and Wildlife Service

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Low	Low	Low
Population Viability[38]	High	High	High
Habitat	Limiting/Healthy	Limiting/Healthy	Healthy
Harvest Opportunity	Each Year	Each Year	Each Year
Purpose	Harvest		
Type	Segregated		

PROGRAM DESCRIPTION

Skagit River gametes were crossed with local stock in 1975, and Queets River stock was released with the 1983 brood. The egg take goal is 700,000. Spawning, incubation and rearing are at Quinault National Fish Hatchery (NFH). The program goal is 600,000 fish released as yearlings, on-station at 15–20 fish per pound, and 60,000 released from Camp 7 Pond adjacent to the Quinault River.

OPERATIONAL CONSIDERATIONS

- This is a US/Canada double index stock.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?
There is a harvest benefit.

B. Likelihood of attaining goals?
The program is providing harvest.

C. Consistent with goals for other stocks?
Hatchery adults returning to the tribal hatchery on Lake Quinault may have contributed to some wild production above and around Lake Quinault. Interbreeding between the native and non-native stocks is thought to have occurred, creating a biological and genetic risk from straying. However, the managers indicate that the biological significance of this natural stock is low, and they have specified no conservation goals for that stock.

[38] *In the case of a segregated harvest program, population viability ratings are low, medium and high and refer to the stock's ability to sustain itself in the culture environment.*

RECOMMENDATIONS

- Monitor and evaluate the contribution of hatchery-origin spawners to natural coho spawning in the river.
- Use HSRG guidelines for properly segregated programs if the goal for the natural Quinault coho stock is to maintain its current viability.
- Increase the use of jacks to ten percent of the males used for spawning.
- Mark the hatchery fish to evaluate stray rates.

COMMENTS

- Long-term goals might be more readily achieved by developing a viable, naturally-spawning coho stock in the Quinault River as a resource to be used as habitat improves in the future. This could be accomplished by: 1) operating a segregated program that controls straying, so that the hatchery stock does not drive adaptation of the naturally spawning stock (see HSRG System-Wide Recommendations), or 2) operating an integrated program. Both of these options need not be in conflict with maintaining the full harvest benefit from the hatchery program.
- If the natural stock in this watershed is determined to be of higher significance, it will be necessary to ensure that straying from this program is kept within the levels required for a properly segregated program.

MANAGERS RESPONSE

The Quinault Indian Nation generally agrees with the HSRG's recommendations. Currently, QIN is unable to monitor the natural coho due to fiscal constraints. QIN will review options for the operation of the hatchery to meet HSRG guidelines. Hatchery fish are currently marked and could be used for evaluating stray rates, but QIN is unable to do so, due to fiscal constraints.

See also Appendix B: US Fish and Wildlife Service Response to HSRG Recommendations.

Sooes River Coho

Makah Tribe and US Fish and Wildlife Service

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Low	Low	Low
Population Viability	Critical	Critical	Critical
Habitat	Inadequate/ Limiting	Inadequate/ Limiting	Limiting
Harvest Opportunity	Each Year	Each Year	Each Year
Purpose	Harvest		
Type	Integrated		

PROGRAM DESCRIPTION

Broodstock from this program was derived from natural spawners in the Sooes River. The program has an egg take goal 450,000 from returns to Makah National Fish Hatchery (NFH). Spawning, incubation, rearing and release take place on-station. The program goal is for 50,000 fish to be transferred to Educket Creek Hatchery at 18 fish per pound in March and 250,000 released on-station at 15–20 fish per pound in April.

OPERATIONAL CONSIDERATIONS

- Outplants into the Sooes River from Quilcene and Quinault NFHs occurred during the 1970s and 1980s, prior to the operation of the Makah NFH.
- Fish from this program are all adipose fin clipped.
- Fish in excess of the program's needs are released on-station as fry.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?
There is a harvest benefit. There is a genetic risk associated with improper stock integration management.

B. Likelihood of attaining goals?
The program's size is exceeding flow and density indices at the hatchery.

C. Consistent with goals for other stocks?
Yes.

RECOMMENDATIONS

- Develop and execute a management plan to create a naturally spawning population capable of supporting a properly integrated hatchery program. Once established, take steps to integrate this population into the hatchery broodstock and maintain proper integration using HSRG guidelines.
- Increase the use of jacks to ten percent of the males used for spawning.
- Reduce the program's size to meet flow and density indices.
- Dispose of mortalities off-site, to reduce disease risk.
- Quantify the contribution of this program to terminal harvest (including subsistence harvest).
- Release fish volitionally.

COMMENTS

- Like all integrated hatchery programs, success will depend on good habitat being available to both the hatchery- and natural-origin components of the integrated population (see HSRG system-wide recommendation about productive habitat).

MANAGERS RESPONSE

The Makah Tribe understands the importance of adjusting rearing conditions to optimize the productivity of hatchery stock, and looks forward to meeting with USFWS to discuss production capacity, operational considerations and options for future changes and improvements. Scheduling for this meeting is currently in progress.

See also Appendix B: US Fish and Wildlife Service Response to HSRG Recommendations.

Lake Ozette Sockeye

Makah Tribe and US Fish and Wildlife Service

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	High	High	High
Population Viability	At Risk	At Risk	Healthy
Habitat	Inadequate	Inadequate	Limiting
Harvest Opportunity	None	None	Occasional
Purpose	Conservation		
Type	Integrated		

PROGRAM DESCRIPTION

This is a native stock with little or no history of fish transfers into the basin, and no evidence of interbreeding. Artificial production has occurred to some extent, but has involved small egg takes and limited broodstock collection (an average of 98 fish per year). This is the only stock within the Ozette Sockeye GDU. Adults are captured in a trap located at river mile one on Umbrella Creek. They are transported to Umbrella Creek Hatchery at river mile 4.6 and held there until ripe. Ripe adults are taken to the Makah Tribal "staging building" in Neah Bay to be spawned. Unfertilized gametes are taken to Makah National Fish Hatchery (NFH). The egg take goal is 305,000. Incubation and otolith marking occur at Makah NFH. Eyed eggs are taken to Umbrella Creek (122,000) and to Stony Creek Hatchery (183,000 in remote site incubators, or RSI, plus fiberglass troughs). Planting goals are 122,000 at 450 fish per pound into Umbrella Creek (Elk Lake RSI), 91,500 at 900 fish per pound and 91,500 at 450 fish per pound into Stony Creek.

OPERATIONAL CONSIDERATIONS

- This stock is listed as endangered under the Endangered Species Act (ESA). The purpose of the program is to: 1) augment the river spawner component of the population to increase the life history diversity and productivity of the lake system; 2) establish self-sustaining river runs in Lake Ozette tributaries; and 3) de-list the population.
- Genetics studies indicate no evidence of interbreeding of native stocks with any planted stocks.
- The fish are too small at release to be coded wire tagged and are therefore 100% otolith marked.
- The stock is not harvested in any known fishery.
- The spawning protocol is to use a four-by-four factorial process.
- The Umbrella Creek program is operated under a Lake Ozette Sockeye Hatchery and Genetic Management Plan (HGMP) prepared by the Makah Tribe in 2000.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?

Recent stock reintroductions into underused habitat in Lake Ozette tributaries have been increasingly successful in reestablishing tributary spawning aggregations. Domestication selection risk is reduced by the small size and early life history stage at which the fish are released from the Hatchery. There is an increased potential for predation on the juvenile hatchery fish by native cutthroat as the sockeye population expands.

B. Likelihood of attaining goals?

Overall, there is a significant conservation benefit to this ESA-listed stock, insofar as the riverine life history has been re-established and the size of the spawner population appears to be increasing. Whether the population will become self-sustaining remains to be seen.

C. Consistent with goals for other stocks?

There are no detectable negative effects to the natural population from the increased run size.

RECOMMENDATIONS

- Continue the program as designed.

COMMENTS

- The HSRG commends the project managers on this well-designed and efficiently-operated program.
- The HSRG recognizes that sockeye salmon propagated through the Umbrella Creek program are included as part of the Ozette Lake sockeye salmon ESU, but juvenile and first generation adult fish produced by the program are not. In its ESA listing determination for the ESU, NMFS determined that the tributary sockeye salmon aggregation propagated under the HGMP is not essential for recovery, but if conditions warrant, the stock is not precluded from playing a role in recovery of the beach spawning component (64 FR 14528).
- Like all integrated hatchery programs, success will depend on good habitat being available to both the hatchery- and natural-origin components of the integrated population (see HSRG system-wide recommendation about productive habitat).

MANAGERS RESPONSE

The Makah Tribe agrees with the recommendations of the HSRG and appreciates the complimentary remarks on this program.

Quinault River Sockeye

Quinault Indian Nation

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	High	High	High
Population Viability	At Risk	At Risk	Healthy
Habitat	Limiting/Healthy	Limiting/Healthy	Healthy
Harvest Opportunity	Most Years	Most Years	Most Years
Purpose	Conservation		
Type	Integrated		

PROGRAM DESCRIPTION

This is a native stock with few transfers into the system. From 1914–47, records indicate that eggs were from Quinault River sockeye, except on five occasions. This is the only stock within the Quinault Sockeye GDU. Eggs for this program are collected from adults on the spawning ground, and spawned on site. The egg take goal is one million. Incubation and rearing occur at Lake Quinault Hatchery. The planting goal is 900,000 unfed fry at 3,500 fish per pound, and 100,000 at 150 fish per pound, both into Lake Quinault.

OPERATIONAL CONSIDERATIONS

- This hatchery program is best described as an intermittent conservation program, with the goal of providing a safety valve population of natural tributary spawners in the event the stock declines.
- The hatchery stock is now 100% otolith marked, and 100,000 are adipose fin clipped. Unfed fry and zero-age juveniles are differentially marked.
- Lake Quinault hatchery sockeye is an index stock.
- IHNv has been problematic, most notably in 2003.
- All hatchery escapement is allowed to spawn naturally.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?

Having been initiated in 1999, the program is too new to determine if there has been a conservation benefit. However, the population trend of this hatchery stock has been upward or stable in recent years, which brings into question the need for a conservation program.

B. Likelihood of attaining goals?

There is a risk with this, as with all sockeye propagation programs, of loss due to IHNv disease. There is also a risk of loss of population diversity due to broodstock mining during years of low abundance.

C. Consistent with goals for other stocks?
Operation of this hatchery program presents no apparent risk to other stocks or species in the region.

RECOMMENDATIONS

- Implement the existing conservation plan, which will reduce or suspend the program when: 1) total survival is sufficient to replace the spawning stock for five consecutive broodyears; or 2) monitoring shows that fry recruitment to Lake Quinault is at or near the capacity of the lake to support growth and survival.
- Closely monitor the natural population status and the contribution of hatchery fish to the population. There is a need to evaluate the hatchery program in terms of the contribution of hatchery-origin fish to natural spawning.
- The conservation program should be considered as experimental and operated accordingly. Various alternate rearing and release strategies should be investigated, including experimental releases of larger smolts, and the use of disease-free water to control IHN during early rearing.
- Spawning protocols should follow those described in HSRG System-Wide Recommendations.

COMMENTS

- The need for converting the program to the experimental mode was based on HSRG concerns that an ongoing production-scale conservation program was unnecessary for a stock that is large and increasing. It was reasoned that a contingency plan could be developed, through a modest research program, and would be used only during emergencies. The contingency plan could be held in abeyance and invoked whenever the need arose during periods of low stock abundance. The "safety valve" technology might be the production and release of large (ten gram plus) smolts, giving higher survival during periods of low productivity. The process might require a supply of disease-free water during the early culture stages, in order to avoid IHNv.
- Like all integrated hatchery programs, success will depend on good habitat being available to both the hatchery- and natural-origin components of the integrated population (see HSRG system-wide recommendation about productive habitat).

MANAGERS RESPONSE

The Quinault Indian Nation generally agrees with the HSRG's recommendations, except for the experimental operation of the program. The program was designed to supplement natural-origin fry into the Lake. The program and the lake fertilization are intended to assist in recovery and improve the productivity of the stock. QIN currently has monitoring programs for adult production from both the natural- and hatchery-origin components. In addition, QIN monitors and evaluates trophic level productivity in Lake Quinault as it pertains to sockeye stock recovery.

Quinault River Hatchery Chum

Quinault Indian Nation and US Fish and Wildlife Service

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Intermediate	Intermediate	Intermediate
Population Viability[39]	High	High	High
Habitat	Limiting	Limiting	Limiting/Healthy
Harvest Opportunity	Each Year	Each Year	Each Year
Purpose	Harvest		
Type	Segregated		

PROGRAM DESCRIPTION

The founding broodstock was native to the local area near the Quinault National Fish Hatchery (NFH) over 30 years ago, but there have been introductions, particularly from Walcott Slough (Hood Canal). The genetic persistence of these introductions is unknown. This stock is one of five stocks within the North Coast Washington Fall Chum GDU. For this program, fall chum adults are collected at Quinault NFH from rack returns. Eggs are spawned, incubated, reared and released on site. The egg take goal is 1.8 million and the planting goal is 1.5 million at 500 fish per pound in April.

OPERATIONAL CONSIDERATIONS

- The program's goal is to support harvest on a hatchery stock segregated from wild chum in other watersheds.
- 900 pairs of mostly age-three and age-four chum are spawned as they return to the rack (effective population size approaches 1,000).
- Spawning is via the random pairing of adults and one-to-one matings; they are pooled only after activation.
- Silt in the incubation water is a major operational problem.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?

The harvest goal is being met, as there are 1,000–3,000 fish for harvest each year. It is not known how many hatchery- versus natural-origin chums are in that harvest.

B. Likelihood of attaining goals?

Annual harvest is, and probably will continue to be, achieved.

[39] *In the case of a segregated harvest program, population viability ratings are low, medium and high and refer to the stock's ability to sustain itself in the culture environment.*

C. Consistent with goals for other stocks?

There is a possibility of genetic and ecological interactions with the natural population. However, the managers indicate that the biological significance of this natural stock is low, and they have specified no conservation goals for the stock. Straying to other watersheds is unknown, but probably not significant.

RECOMMENDATIONS

- Monitor and evaluate this program's contribution to harvest.
- Monitor and evaluate straying of program adults into neighboring watersheds.

COMMENTS

- If the natural stock in this watershed is determined to be of higher significance, it will be necessary to ensure that straying from this program is kept within acceptable levels for a properly segregated program (see HSRG System-Wide Recommendations).
- Briefing information provided to the HSRG states that this stock's, "… traits appear to be typical of other wild stocks within the GDU." However, managment staff reports that return timing for this stock is a month earlier. If true, this could be because the natural Quinault River stock has an earlier timing. Or it could be that hatchery practices have encouraged earlier run timing.

MANAGERS RESPONSE

The Quinault Indian Nation generally agrees with the HSRG's recommendations, but due to fiscal constraints is unable to implement a monitoring program.

See also Appendix B: US Fish and Wildlife Service Response to HSRG Recommendations.

Educket Creek Hatchery Winter Steelhead

Makah Tribe

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Low	Low	Low
Population Viability[40]	Medium	Medium	Medium
Habitat	Limiting	Limiting	Limiting
Harvest Opportunity	Each Year	Each Year	Each Year
Purpose	Harvest		
Type	Segregated		

PROGRAM DESCRIPTION

This is a hatchery stock originating from the Makah National Fish Hatchery (NFH) on the Sooes River. 25,000 Sooes River smolts are transferred in March from Makah NFH at seven fish per pound. Fish are released on-station from mid-April to mid-May at six fish per pound.

OPERATIONAL CONSIDERATIONS

- Releases are not adipose fin clipped.
- Single pair matings are used.
- The program has no adult collection capability.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?
The program is being operated in a manner consistent with its short- and long-term goals. It is providing a valuable harvest opportunity.

B. Likelihood of attaining goals?
There is a strong likelihood that the harvest goals will continue to be met. Coastal steelhead stocks have experienced relatively good survival in recent years.

C. Consistent with goals for other stocks?
Since no viable wild stock is present, lack of an adult collection facility does not pose a risk to other steelhead stocks.

[40] *In the case of a segregated harvest program, population viability ratings are low, medium and high and refer to the stock's ability to sustain itself in the culture environment.*

RECOMMENDATIONS

- Implement System-Wide Recommendations regarding establishing a regional system of wild steelhead management zones, where streams are not planted with hatchery fish and are instead managed for native stocks. Fishing for steelhead in these zones would not be incompatible with this approach, but no hatchery-produced steelhead should be introduced. Such zones would reduce the risk of naturally spawning fish interbreeding with hatchery fish, and provide native stocks for future fisheries programs.
- Select both wild and hatchery streams based on stock status and a balance of large and small streams and habitat types.
- Use locally-adapted hatchery stocks for those streams. Actions such as harvest restrictions should be implemented to achieve 100% local broodstock if necessary.
- Manage the hatchery stock to maintain its early spawn timing and reduce the likelihood of interaction with naturally spawning steelhead.
- Size the hatchery program in a manner that achieves harvest goals with minimal impact on wild populations.
- Adipose mark releases to maximize harvest opportunity and monitor stray rates.
- Release hatchery yearling steelhead smolts between April 15 and May 15 at target size of six fish to the pound, and a condition factor of less than 1.0.
- Conduct a workshop to implement this wild steelhead management zones concept.
- Implement monitoring and evaluation as a basic component, of both wild steelhead management zones and hatchery harvest streams.

COMMENTS

- Establishment of wild steelhead management zones should reduce the chances of ecological and genetic interactions with hatchery steelhead and help to ensure the availability of founding stocks for hatchery purposes should the need for such stocks arise.

MANAGERS RESPONSE

The Makah Tribe supports the philosophy and general recommendations of the HSRG for management of hatchery and wild steelhead stocks. The Tribe agrees with the principle of maintaining wild steelhead management zones. However, the Tribe feels that it is extremely important that the zones be established in a manner consistent with the co-managers harvest, stock and habitat goals.

The Makah Tribe supports the development and holding of a workshop to implement the wild steelhead management zone concept. The Tribe also supports monitoring and evaluation of wild stock status in regional watersheds prior to designation as wild steelhead management zones. The Tribe notes, however, that additional survey and monitoring efforts may be required to achieve this and that additional funding will be needed to support this activity.

Goodman Creek Hatchery Winter Steelhead

Washington Department of Fish and Wildlife

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Low	Low	Low
Population Viability[41]	Medium	Medium	High
Habitat	Limiting	Limiting	Limiting
Harvest Opportunity	Most Years	Most Years	Most Years
Purpose	Harvest		
Type	Segregated		

PROGRAM DESCRIPTION

This is an early-timed hatchery stock originating from Bogachiel Hatchery. For this program, 20,000 fish are released at five fish per pound from late April to mid-May.

OPERATIONAL CONSIDERATIONS

- All releases are adipose fin clipped.
- Five-by-five pooled matings are used.
- No adult collection facility exists on Goodman Creek.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?
The program is providing a valuable harvest opportunity. Interbreeding of the hatchery stock with the naturally spawning stock is minimized by the differences in spawn time, but no adult collection facility exists.

B. Likelihood of attaining goals?
There is a strong likelihood that harvest goals will continue to be met. Coastal steelhead stocks have experienced relatively good survival in recent years.

C. Consistent with goals for other stocks?
There is the potential for genetic interaction with naturally spawning winter steelhead, due to the lack of adult collection capabilities.

RECOMMENDATIONS

- Discontinue releases in Goodman Creek, due to the lack of an adult collection facility.

[41] *In the case of a segregated harvest program, population viability ratings are low, medium and high and refer to the stock's ability to sustain itself in the culture environment.*

COMMENTS

- None.

MANAGERS RESPONSE

WDFW appreciates the HSRG recommendations on Wild Steelhead Management Zones, but believes that a "white paper" on this topic could increase our understanding of HSRG concerns and recommended remedies. In particular, it would be helpful to include an explanation of why adult collection is required for all segregated hatchery steelhead programs. WDFW conducted a steelhead workshop in 2003 to discuss recent research, performance of the hatchery programs, and management options (including integrated and segregated programs). Information gathered during this workshop and HSRG recommendations will be used in 2004 to develop an implementation plan for improved steelhead programs.

Hoh River Hatchery Winter Steelhead

Hoh Tribe and US Fish and Wildlife Service

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Low	Low	Low
Population Viability[42]	High	High	High
Habitat	Healthy	Healthy	Healthy
Harvest Opportunity	Each Year	Each Year	Each Year
Purpose	Harvest		
Type	Segregated		

PROGRAM DESCRIPTION

This is an early timed hatchery stock with current production from Quinault National Fish Hatchery (NFH). For this program, 50,000 Quinault hatchery winter steelhead are transferred to Chalaat Hatchery at 15 fish per pound in February. 50,000 smolts are outplanted from Chalaat Creek into the Hoh River at river mile 0.25 at five fish per pound in May. An additional 50,000 are reared full term at Quinault NFH and outplanted into the Hoh River at river mile 15 in May at five fish per pound.

OPERATIONAL CONSIDERATIONS

- Releases are adipose fin clipped.
- Single pair matings are used.
- No adult collection facilities exist on the Hoh River.
- Coded wire tag groups are released each year.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?
The program is providing a valuable harvest opportunity. Interbreeding of the hatchery stock with the naturally spawning stock is minimized by the differences in spawn time, but no adult collection facility exists.

B. Likelihood of attaining goals?
There is a strong likelihood that harvest goals will continue to be met. Coastal steelhead stocks have experienced relatively good survival in recent year.

C. Consistent with goals for other stocks?

[42] *In the case of a segregated harvest program, population viability ratings are low, medium and high and refer to the stock's ability to sustain itself in the culture environment.*

There is the potential for genetic interaction with naturally spawning winter steelhead, due to lack of adult collection capabilities.

RECOMMENDATIONS

- Implement System-Wide Recommendations regarding establishing a regional system of wild steelhead management zones where streams are not planted with hatchery fish and are instead managed for native stocks. Fishing for steelhead in these zones would not be incompatible with this approach, but no hatchery-produced steelhead should be introduced. Such zones would reduce the risk of naturally spawning fish interbreeding with hatchery fish, and provide native stocks for future fisheries programs. To meet harvest goals, hatchery releases may be increased in those streams selected for hatchery production.
- Select both wild and hatchery streams based on stock status and a balance of large and small streams and habitat types.
- Use locally-adapted hatchery stock for those streams. Actions such as harvest restrictions should be implemented to achieve 100% local broodstock if necessary.
- Manage the hatchery stock to maintain its early spawn timing and reduce the likelihood of interaction with naturally spawning steelhead.
- Include adult collection capability wherever steelhead are released, to capture as many adults from the returning segregated population as possible. Discontinue releases where adults cannot be collected at return.
- Size the hatchery program in a manner that achieves harvest goals with minimal impact on wild populations.
- Adipose mark releases to maximize harvest opportunity and monitor stray rates.
- Release hatchery yearling steelhead smolts between April 15 and May 15 at target size of six fish to the pound, and a condition factor of less than 1.0.
- Conduct a workshop to implement this wild steelhead management zones concept.
- Implement monitoring and evaluation as a basic component, of both wild steelhead management zones and hatchery harvest streams.

- Discontinue releases of segregated hatchery stock into the Hoh River, due to the lack of adult collection capability. Consider one of the following options as an alternative:
  1) Develop acclimation pond(s) or release site(s), such as have been proposed for Owl Creek, with adult collection capabilities;
  2) Switch to integrated hatchery stock management.

  With either alternative, change initial rearing from Quinault NFH to a different location (such as Bogachiel), so that the habitat above Quinault NFH can be used by naturally spawning stocks.

COMMENTS

- Establishment of wild steelhead management zones should reduce the chances of ecological and genetic interactions with hatchery steelhead and help to ensure the availability of founding stocks for hatchery purposes should the need for such stocks arise.

MANAGERS RESPONSE

WDFW appreciates the HSRG recommendations on Wild Steelhead Management Zones, but believes that a “white paper” on this topic could increase our understanding of HSRG concerns and

recommended remedies. In particular, it would be helpful to include an explanation of why adult collection is required for all segregated hatchery steelhead programs. WDFW conducted a steelhead workshop in 2003 to discuss recent research, performance of the hatchery programs, and management options (including integrated and segregated programs). Information gathered during this workshop and HSRG recommendations will be used in 2004 to develop an implementation plan for improved steelhead programs. Substantial program modifications, such as rearing at a location on the Bogachiel River and the development of an acclimation pond, may require additional funding to implement.

The Hoh Tribe agrees with the recommendations of the HSRG to develop a facility on the Hoh River that could be operated to reduce the concerns associated with the current program. The Tribe believes that once this occurs, it would be feasible to develop either a segregated or integrated steelhead program, depending on several technical and policy issues. In either case, the preferred alternative should be a facility that could operate independent of any other facilities. Once this is accomplished, further discussions should occur on the use of habitat above the Quinault NFH.

Hoko River Hatchery Winter Steelhead

Makah Tribe

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Low	Low	Low
Population Viability[43]	Medium	Medium	Medium
Habitat	Healthy	Healthy	Healthy
Harvest Opportunity	Each Year	Each Year	Each Year
Purpose	Harvest		
Type	Segregated		

PROGRAM DESCRIPTION

The current program has been derived from locally-adapted Hoko River adult returns of Chambers Creek origin since 1990. Prior to 1990, the Hoko River program was stocked by Bogachiel Hatchery. This is an early-timed hatchery stock. The natural stock is one of 33 stocks within the North Coast Steelhead GDU. The program has an egg take of 60,000 from returns to Hoko River Hatchery. Incubation and rearing occur on-station. 20,000 smolts are released at Hoko River; 10,000 are outplanted at Sekiu; 7,500 are outplanted at the Sail River. In addition, 5,000 fingerlings are released in Makah Reservation streams.

OPERATIONAL CONSIDERATIONS

- Fish are released at 4.5–6.5 per pound from late April to mid-May.
- Four-by-four factorial matings are used.
- Sekiu, Sail and on-reservation release sites do not have adult collection facilities.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?
The program is providing a harvest opportunity. Interbreeding of the hatchery stock with the naturally spawning stock is minimized by the difference in spawn time, but adult collection capability is lacking for the off station releases.

B. Likelihood of attaining goals?
There is a strong likelihood that harvest goals will continue to be met. Coastal steelhead stocks have experienced relatively good survival in recent years.

C. Consistent with goals for other stocks?

[43] *In the case of a segregated harvest program, population viability ratings are low, medium and high and refer to the stock's ability to sustain itself in the culture environment.*

There is the potential for genetic interaction with naturally spawning winter steelhead due to lack of adult collection capabilities.

RECOMMENDATIONS

- Implement System-Wide Recommendation regarding establishing a regional system of wild steelhead management zones, where streams are not planted with hatchery fish and are instead managed for native stocks. Fishing for steelhead in these zones would not be incompatible with this approach, but no hatchery-produced steelhead should be introduced. Such zones would reduce the risk of naturally spawning fish interbreeding with hatchery fish, and provide native stocks for future fisheries programs. To meet harvest goals, hatchery releases may be increased in those streams selected for hatchery production.
- Select both wild and hatchery streams based on stock status and a balance of large and small streams and habitat types.
- Use locally adapted hatchery stock for those streams. Actions such as harvest restrictions should be implemented to achieve 100% local broodstock if necessary.
- Manage the hatchery stock to maintain its early spawn timing and reduce the likelihood of interaction with naturally spawning steelhead.
- Include adult collection capability wherever steelhead are released, to capture as many adults from the returning segregated population as possible. Discontinue releases where adults cannot be collected at return.
- Size the hatchery program in a manner that achieves harvest goals with minimal impact on wild populations.
- Adipose mark releases to maximize harvest opportunity and monitor stray rates.
- Release hatchery yearling steelhead smolts between April 15 and May 15 at target size of six fish to the pound, and a condition factor of less than 1.0.
- Conduct a workshop to implement this wild steelhead management zones concept.
- Implement monitoring and evaluation as a basic component, of both wild steelhead management zones and hatchery harvest streams.

- Discontinue releases into the Sekiu River, Sail River and reservation streams, due to lack of adult collection capability.

COMMENTS

- Establishment of wild steelhead management zones should reduce the chances of ecological and genetic interactions with hatchery steelhead and help to ensure the availability of founding stocks for hatchery purposes, should the need for such stocks arise.

MANAGERS RESPONSE

The Makah Tribe generally supports the recommendations of the HSRG. While the Tribe agrees with the principle of maintaining wild steelhead management zones, it is extremely important that the zones be established in a manner consistent with the co-managers harvest, stock and habitat goals.

Please also see comments made previously under Educket Creek Hatchery Steelhead.

Queets System Hatchery Winter Steelhead

Quinault Indian Nation

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Low	Low	Low
Population Viability[44]	High	High	High
Habitat	Healthy	Healthy	Healthy
Harvest Opportunity	Each Year	Each Year	Each Year
Purpose	Harvest		
Type	Segregated		

PROGRAM DESCRIPTION

Quinault River winter steelhead were released from the Salmon River Hatchery to establish a segregated hatchery run. Locally-adapted (Lake Quinault, Cook Creek origin), early winter hatchery broodstock have been used since 1998. Adults for this program are captured at the Salmon River Fish Cultural Facility. The egg take goal is 200,000. Spawning, incubation, rearing and release take place on-station. The program goal is for release of 150,000 smolts at five to six fish per pound on April 15.

OPERATIONAL CONSIDERATIONS

- Releases are not adipose fin clipped.
- Single pair matings are used.
- 30,000 fish are coded wire tagged each year.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?
The program is being operated in a manner consistent with short- and long-term goals for the stock. It is providing valuable harvest opportunity. Interbreeding of the hatchery stock with the naturally spawning stock is minimized by the differences in spawn time, and adult capture capability.

B. Likelihood of attaining goals?
There is a strong likelihood that harvest goals will continue to be met. Costal steelhead stocks have experience relatively good survival in recent years.

C. Consistent with goals for other stocks?
There is the potential for genetic interaction with naturally spawning winter steelhead, but this is likely to be minimized for the reason stated in A, above.

[44] *In the case of a segregated harvest program, population viability ratings are low, medium and high and refer to the stock's ability to sustain itself in the culture environment.*

RECOMMENDATIONS

- Implement System-Wide Recommendations regarding establishing a regional system of wild steelhead management zones, where streams are not planted with hatchery fish and are instead managed for native stocks. Fishing for steelhead in these zones would not be incompatible with this approach, but no hatchery-produced steelhead should be introduced. Such zones would reduce the risk of naturally spawning fish interbreeding with hatchery fish, and provide native stocks for future fisheries programs. To meet harvest goals, hatchery releases may be increased in those streams selected for hatchery production.
- Select both wild and hatchery streams based on stock status and a balance of large and small streams and habitat types
- Use locally-adapted hatchery stock for those streams. Decrease reliance on other facilities to backfill shortages in locally adapting hatchery stock. Actions such as harvest restrictions should be implemented to achieve 100% local broodstock if necessary
- Manage the hatchery stock to maintain its early spawn timing and reduce the likelihood of interaction with naturally spawning steelhead.
- Include adult collection capability wherever steelhead are released, to capture as many adults from the returning segregated population as possible. Discontinue releases where adults cannot be collected at return.
- Size the hatchery program in a manner that achieves harvest goals with minimal impact on wild populations.
- Adipose mark releases to maximize harvest opportunity and monitor stray rates.
- Release hatchery yearling steelhead smolts between April 15 and May 15 at target size of six fish to the pound, and a condition factor of less than 1.0.
- Conduct a workshop to implement this wild steelhead management zones concept.
- Implement monitoring and evaluation as a basic component, of both wild steelhead management zones and hatchery harvest streams.

COMMENTS

- Establishment of wild steelhead management zones should reduce the chances of ecological and genetic interactions with hatchery steelhead and help to ensure the availability of founding stocks for hatchery purposes should the need for such stocks arise.

MANAGERS RESPONSE

The Quinault Indian Nation generally agrees with the HSRG's recommendations. QIN is willing to participate with the appropriate co-managers in regional management discussion to develop steelhead management strategies.

Quillayute System Hatchery Summer Steelhead

Washington Department of Fish and Wildlife

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Low	Low	Low
Population Viability[45]	Medium	Medium	Medium
Habitat	Limiting	Limiting	Healthy
Harvest Opportunity	Each Year	Each Year	Each Year
Purpose	Harvest		
Type	Segregated		

PROGRAM DESCRIPTION

This stock originated from Skamania Hatchery on the Washougal River, a Columbia River tributary. Adults returning to the hatcheries are used for broodstock. The egg take goal is 190,000 from rack returns. Adults are captured just below the North Calawah Pond. Spawning, hatching, incubation and rearing take place at Bogachiel Hatchery. The planting goal (from late April to mid-May at 4.5–6.5 fish per pound) is as follows: 30,000 to the Calawah River, 10,000 to the Lyre River, and 20,000 to the Soleduck River.

OPERATIONAL CONSIDERATIONS

- All releases are adipose fin clipped.
- Five-by-five pooled matings are used.
- The Lyre and Soleduck river release sites do not have adult collection facilities.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?

The program is being operated in a manner consistent with its short- and long-term goals. It is providing a valuable harvest opportunity. Interbreeding of the hatchery stock with the naturally-spawning stock is a concern, both within the basin and with Hoh River summer steelhead.

B. Likelihood of attaining goals?

There is a strong likelihood that harvest goals will continue to be met. Coastal steelhead stocks have experienced relatively good survival in recent years.

C. Consistent with goals for other stocks?

[45] *In the case of a segregated harvest program, population viability ratings are low, medium and high and refer to the stock's ability to sustain itself in the culture environment.*

There is a potential for genetic interaction with naturally-spawning summer steelhead, within the basin and with Hoh River summer steelhead.

RECOMMENDATIONS

- Implement System-Wide Recommendations regarding establishing a regional system of wild steelhead management zones, where streams are not planted with hatchery fish and are instead managed for native stocks. Fishing for steelhead in these zones would not be incompatible with this approach, but no hatchery-produced steelhead should be introduced. Such zones would reduce the risk of naturally spawning fish interbreeding with hatchery fish, and provide native stocks for future fisheries programs. To meet harvest goals, hatchery releases may be increased in those streams selected for hatchery production.
- Select both wild and hatchery streams based on stock status and a balance of large and small streams and habitat types.
- Use locally-adapted hatchery stock (of Skamania origin) for those streams. Decrease reliance on other facilities to backfill shortages in locally adapting hatchery stock. Actions such as harvest restriction should be implemented to achieve 100% local broodstock if necessary.
- Manage the hatchery stock to maintain its early spawn timing and reduce the likelihood of interaction with naturally spawning steelhead.
- Include adult collection capability wherever steelhead are released, to capture as many adults from the returning segregated population as possible. Discontinue releases where adults cannot be collected at return.
- Use single pair matings.
- Size the hatchery program in a manner that achieves harvest goals with minimal impact on wild populations.
- Adipose mark releases to maximize harvest opportunity and monitor stray rates.
- Release hatchery yearling steelhead smolts between April 15 and May 15 at target size of six fish to the pound, and a condition factor of less than 1.0.
- Conduct a workshop to implement this wild steelhead management zones concept.
- Implement monitoring and evaluation as a basic component, both of wild steelhead management zones and hatchery harvest streams.

- Discontinue outplants in the Lyre and Soleduck rivers, due to the lack of adult collection capabilities at these sites.
- Increase adult collection capabilities at North Calawah Pond.

COMMENTS

- Consider acclimation and release from Sol Duc Hatchery, to replace outplanting. This will require evaluation of adult returns and stray rates.
- Establishment of wild steelhead management zones should reduce the chances of ecological and genetic interactions with hatchery steelhead and help to ensure the availability of founding stocks for hatchery purposes should the need for such stocks arise.

MANAGERS RESPONSE

WDFW appreciates the HSRG recommendations on Wild Steelhead Management Zones, but believes that a “white paper” on this topic could increase our understanding of HSRG concerns and

recommended remedies. In particular, it would be helpful to include an explanation of why adult collection is required for all segregated hatchery steelhead programs. WDFW conducted a steelhead workshop in 2003 to discuss recent research, performance of the hatchery programs, and management options (including integrated and segregated programs). Information gathered during this workshop and HSRG recommendations will be used in 2004 to develop an implementation plan for improved steelhead programs. Substantial program modifications, such as the development of improved adult collection capabilities, may require additional funding to implement.

Quillayute System Hatchery Winter Steelhead

Washington Department of Fish and Wildlife

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Low	Low	Low
Population Viability[46]	High	High	High
Habitat	Limiting	Limiting	Healthy
Harvest Opportunity	Each Year	Each Year	Each Year
Purpose	Harvest		
Type	Segregated		

PROGRAM DESCRIPTION

This stock is a locally-adapted, early timed Chambers Creek-origin stock. The egg take goal is 900,000 from rack returns. Spawning and eyeing take place on station at Bogachiel Hatchery. The eyed egg transfer goal is 140,000 to Lonesome Creek Hatchery, 185,000 to Sol Duc Hatchery. Hatching and early rearing take place at Sol Duc and Lonesome Creek. 120,000 fish are transferred back from Lonesome Creek and 175,000 from Sol Duc in July at 150 fish per pound. On-station release at Bogachiel is 100,000 at five fish per pound in April. Off-station plants in April at five fish per pound are as follows: 50,000 to the Calawah River, 5,000 to the Clallam River, 20,000 to Goodman Creek, 25,000 to the Lyre River, 5,000 to Morse Creek, and 10,000 to the Pysht River.

OPERATIONAL CONSIDERATIONS

- All releases are adipose fin clipped.
- Five-by-five pooled matings are used.
- The Calawah, Clallam, Lyre, Pysht, Goodman and Morse release sites do not have adult collection facilities.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?

The program is being operated in a manner consistent with its short- and long-term goals. It is providing a valuable harvest opportunity. Interbreeding of the hatchery stock with the naturally-spawning stock is a concern where adult capture capability does not exist.

B. Likelihood of attaining goals?

There is a strong likelihood that harvest goals will continue to be met. Coastal steelhead stocks have experienced relatively good survival in recent years.

[46] *In the case of a segregated harvest program, population viability ratings are low, medium and high and refer to the stock's ability to sustain itself in the culture environment.*

C. Consistent with goals for other stocks?
There is the potential for genetic interaction with naturally-spawning winter steelhead, due to lack of adult removal capability for off-station releases.

RECOMMENDATIONS

- Implement System-Wide Recommendations regarding establishing a regional system of wild steelhead management zones, where streams are not planted with hatchery fish and are instead managed for native stocks. Fishing for steelhead in these zones would not be incompatible with this approach, but no hatchery-produced steelhead should be introduced. Such zones would reduce the risk of naturally spawning fish interbreeding with hatchery fish, and provide native stocks for future fisheries programs. To meet harvest goals, hatchery releases may be increased in those streams selected for hatchery production.
- Select both wild and hatchery streams based on stock status and a balance of large and small streams and habitat types.
- Use locally-adapted stock for those streams. Decrease reliance on other facilities to backfill shortages in locally adapting hatchery stock. Actions such as harvest restrictions should be implemented to achieve 100% local broodstock if necessary.
- Manage the hatchery stock to maintain its early spawn timing and reduce the likelihood of interaction with naturally spawning steelhead.
- Include adult collection capability wherever steelhead are released, to capture as many adults from the returning segregated population as possible. Discontinue releases where adults cannot be collected at return.
- Size the hatchery program in a manner that achieves harvest goals with minimal impact on wild populations.
- Adipose mark releases to maximize harvest opportunity and monitor stray rate.
- Use single pair matings.
- Release hatchery yearling steelhead smolts between April 15 and May 15 at target size of six fish to the pound, and a condition factor of less than 1.0.
- Conduct a workshop to implement this wild steelhead management zones concept.
- Implement monitoring and evaluations as a basic component, of both wild steelhead management zones and hatchery harvest streams.

- Discontinue releases at the Calawah, Clallam, Lyre and Pysht rivers, and at Goodman and Morse creeks, due to the lack of adult collection capabilities at these sites.
- Increase the volitional release time period, prior to forced release.
- Improve adult collection capabilities at Bogachiel.

COMMENTS

- Discontinuing off-station releases would allow this facility to support the Hoh River winter steelhead program (see that program's write-up)
- Establishment of wild steelhead management zones should reduce the chances of ecological and genetic interactions with hatchery steelhead and help to ensure the availability of founding stocks for hatchery purposes should the need for such stocks arise.

MANAGERS RESPONSE

WDFW appreciates the HSRG recommendations on Wild Steelhead Management Zones, but believes that a "white paper" on this topic could increase our understanding of HSRG concerns and recommended remedies. In particular, it would be helpful to include an explanation of why adult collection is required for all segregated hatchery steelhead programs. WDFW conducted a steelhead workshop in 2003 to discuss recent research, performance of the hatchery programs, and management options (including integrated and segregated programs). Information gathered during this workshop and HSRG recommendations will be used in 2004 to develop an implementation plan for improved steelhead programs. Substantial program modifications, such as the development of improved adult collection capabilities, may require additional funding to implement.

The Quileute Tribe has concerns about the inter-drainage transfer of fish that would occur if the Hoh Tribe elected to develop an integrated program and use Bogachiel facilities for rearing (See Hoh River hatchery winter steelhead recommendations).

Quillayute System Winter Steelhead

Olympic Peninsula Guides Association and Washington Department of Fish and Wildlife

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Intermediate	Intermediate	Intermediate
Population Viability	At Risk	At Risk	Healthy
Habitat	Limiting	Limiting	Healthy
Harvest Opportunity	Each Year	Each Year	Each Year
Purpose	Harvest		
Type	Integrated		

PROGRAM DESCRIPTION

This is a native stock with natural production and is one of 33 stocks within the North Coast Steelhead GDU. Natural-origin broodstock is taken for this program from the Soleduck River via hook and line. The egg take goal is 80,000. Adults are held and spawned at Sol Duc Hatchery. Resulting offspring are incubated and early reared at Sol Duc. 70,000 fish are shipped to Snider Creek at 100 fish per pound in October, and released there in April at five fish per pound.

OPERATIONAL CONSIDERATIONS

- This program is conducted by the Olympic Peninsula Guides Association.
- Broodstock is taken from December 1–January 31, to enhance the early portion of the run.
- All releases are ventral fin clipped.
- Five-by-five pooled matings are used.
- Broodstock is collected from natural-origin fish each generation, although two hatchery-origin fish may be used, as long as they are mated with spawners of natural origin.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?
The program is providing a harvest benefit.

B. Likelihood of attaining goals?
Amplifying a portion of a run is not consistent with a properly integrated program. However, since few of the returning adults are retained for broodstock, the risk is minimal.

C. Consistent with goals for other stocks?
The program is consistent with the goals for local, natural-origin steelhead stocks, as it confers no significant risks.

RECOMMENDATIONS

- Implement System-Wide Recommendations regarding establishing a regional system of wild steelhead management zones, where streams are not planted with hatchery fish and are instead managed for native stocks. Fishing for steelhead in these zones would not be incompatible with this approach, but no hatchery-produced steelhead should be introduced. Such zones would reduce the risk of naturally spawning fish interbreeding with hatchery fish, and provide native stocks for future fisheries programs. To meet harvest goals, hatchery releases may be increased in those streams selected for hatchery production.
- Select both wild and hatchery streams based on stock status and a balance of large and small streams and habitat types.
- Use locally-adapted hatchery stock for those streams. Decrease reliance on other facilities to backfill shortages in locally adapting hatchery stock. Actions such as harvest restrictions should be implemented to achieve 100% local broodstock if necessary.
- Manage the hatchery stock to maintain its early spawn timing and reduce the likelihood of interaction with naturally spawning steelhead.
- Include adult collection capability wherever steelhead are released, to capture as many adults from the returning segregated population as possible. Discontinue releases where adults cannot be collected at return.
- Size the hatchery program in a manner that achieves harvest goals with minimal impact on wild populations.
- Use single pair matings.
- Release hatchery yearling steelhead smolts between April 15 and May 15 at target size of six fish to the pound, and a condition factor of less than 1.0.
- Conduct a workshop to implement this wild steelhead management zones concept.
- Implement monitoring and evaluation as a basic component, of both wild steelhead management zones and hatchery harvest streams.

- Increase volitional release time period, prior to forced release.
- Adjust the program's size to ensure that the majority of returning adults are harvested.
- Ensure that the program's operating protocols (source of broodstock and number collected, number of releases) are followed.

COMMENTS

- Establishment of wild steelhead management zones should reduce the chances of ecological and genetic interactions with hatchery steelhead and help to ensure the availability of founding stocks for hatchery purposes should the need for such stocks arise.
- Like all integrated hatchery programs, success will depend on good habitat being available to both the hatchery- and natural-origin components of the integrated population (see HSRG system-wide recommendation about productive habitat).

MANAGERS RESPONSE

WDFW appreciates the HSRG recommendations on Wild Steelhead Management Zones, but believes that a "white paper" on this topic could increase our understanding of HSRG concerns and recommended remedies. In particular, it would be helpful to include an explanation of why adult collection is required for all segregated hatchery steelhead programs. WDFW conducted a steelhead

workshop in 2003 to discuss recent research, performance of the hatchery programs, and management options (including integrated and segregated programs). Information gathered during this workshop and HSRG recommendations will be used in 2004 to develop an implementation plan for improved steelhead programs.

The Quileute Tribe questions whether supplementation of this healthy run is desirable. The Tribe is also not certain that the program's operating protocol that requires collection of all broodstock by January 31 is being followed. Further discussions with WDFW to clarify the operational approach may be necessary.

Quinault River Hatchery Winter Steelhead

Quinault Indian Nation and US Fish and Wildlife Service

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Low	Low	Low
Population Viability[47]	High	High	High
Habitat	Healthy	Healthy	Healthy
Harvest Opportunity	Each Year	Each Year	Each Year
Purpose	Harvest		
Type	Segregated		

PROGRAM DESCRIPTION

This is an early returning hatchery stock of uncertain origin. From 1969 through the present, only fish returning to Quinault National Fish Hatchery (NFH) have been used for broodstock. Spawning, incubation and rearing take place on-station. 190,000 are released on-station at five fish per pound in May.

OPERATIONAL CONSIDERATIONS

- Fish are released at 4.5–6.5 per pound from late April to mid-May.
- Releases are not adipose fin clipped.
- Single pair matings are used.
- 25,000 fish are coded wire tagged each year.
- This facility supports the Hoh River steelhead program, which lacks adult collection facilities.
- 6,000 fish are maintained on-station for a fishing derby in June.
- No adult fish passage is available above the hatchery rack.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?

The program is being operated in a manner consistent with its short- and long-term goals. It is providing harvest opportunity. Interbreeding of the hatchery stock with the naturally-spawning stock is minimized by the differences in spawn time and adult removal capability, except for Hoh River releases.

B. Likelihood of attaining goals?

There is likelihood that program goals will continue to be met. Coastal steelhead stocks have experienced relatively good survival in recent years.

[47] *In the case of a segregated harvest program, population viability ratings are low, medium and high and refer to the stock's ability to sustain itself in the culture environment.*

C. Consistent with goals for other stocks?

There is the potential for genetic interaction with naturally-spawning winter steelhead, but this is likely to be minimized for the reason stated in A, above. The Hoh River program represents a risk to other stocks because of the need to prevent adult fish passage above hatchery rack to maintain a "specific pathogen free" water supply. This results in a loss of 18 miles of good habitat for wild fish.

RECOMMENDATIONS

- Implement System-Wide Recommendations regarding establishing a regional system of wild steelhead management zones, where streams are not planted with hatchery fish and are instead managed for native stocks. Fishing for steelhead in these zones would not be incompatible with this approach, but no hatchery-produced steelhead should be introduced. Such zones would reduce the risk of naturally spawning fish interbreeding with hatchery fish, and provide native stocks for future fisheries programs. To meet harvest goals, hatchery releases may be increased in those streams selected for hatchery production.
- Select both wild and hatchery streams based on stock status and a balance of large and small streams and habitat types.
- Use locally-adapted hatchery stock for those streams. Decrease reliance on other facilities to backfill shortages in locally adapting hatchery stock. Actions such as harvest restrictions should be implemented to achieve 100% local broodstock if necessary.
- Manage the hatchery stock to maintain its early spawn timing and reduce the likelihood of interaction with naturally spawning steelhead.
- Include adult collection capability wherever steelhead are released, to capture as many adults from the returning segregated population as possible. Discontinue releases where adults cannot be collected at return.
- Size the hatchery program in a manner that achieves harvest goals with minimal impact on wild populations.
- Release hatchery yearling steelhead smolts between April 15 and May 15 at target size of six fish to the pound, and a condition factor of less than 1.0.
- Conduct a workshop to implement this wild steelhead management zones concept.
- Implement monitoring and evaluation as a basic component, of both wild steelhead management zones and hatchery harvest streams.

- Discontinue egg collection and rearing of Hoh River steelhead and allow passage of wild stocks upstream of the hatchery weir (see Hoh River hatchery winter steelhead).
- Increase volitional release timing prior to forced release.

COMMENTS

- Establishment of wild steelhead management zones should reduce the chances of ecological and genetic interactions with hatchery steelhead and help to ensure the availability of founding stocks for hatchery purposes should the need for such stocks arise.

MANAGERS RESPONSE

The Quinault Indian Nation general agrees with the HSRG's recommendations. QIN is willing to participate in regional discussions with appropriate co-mangers regarding steelhead management.

See also Appendix B: US Fish and Wildlife Service Response to HSRG Recommendations.

Lake Quinault Net Pen Winter Steelhead

Quinault Indian Nation

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Intermediate	Intermediate	Intermediate
Population Viability	At Risk	At Risk	At Risk
Habitat	Limiting/Healthy	Limiting/Healthy	Healthy
Harvest Opportunity	Each Year	Each Year	Each Year
Purpose	Harvest		
Type	Integrated		

PROGRAM DESCRIPTION

This is a native stock with natural production and is one of 33 stocks within the North Coast Steelhead GDU. Adults for the program are collected in set nets from Lake Quinault. Spawning, incubation and early rearing take place on-station at Lake Quinault Hatchery. The program has an egg take goal of 800,000. 200,000 fish are released from the Lake Quinault Net Pens at five fish per pound in April.

OPERATIONAL CONSIDERATIONS

- A portion of the releases are adipose fin clipped.
- 20,000–30,000 fish released annually are coded wire tagged.
- Single pair matings are used.
- There is no adult collection facility at the release site.
- The return timing of hatchery adults is earlier than natural spawners.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?
The program is being operated in a manner consistent with its short-and long-term goals. It is providing a valuable harvest opportunity. The lack of efficient adult capture capability is a concern.

B. Likelihood of attaining goals?
There is a strong likelihood that program goals will continue to be met. Coastal steelhead stocks have experienced relatively good survival in recent years.

C. Consistent with goals for other stocks?
Stray rates and potential genetic interaction with naturally-spawning stocks is a concern, due to earlier adult return timing of hatchery releases.

RECOMMENDATIONS

- Include an average of 10–20% natural-origin fish into the hatchery broodstock each year.
- Limit hatchery strays to less than 30% of wild stock returns.
- Capture a representative sample of the run for broodstock (size and time).

COMMENTS

- Like all integrated hatchery programs, success will depend on good habitat being available to both the hatchery- and natural-origin components of the integrated population (see HSRG system-wide recommendation about productive habitat).

MANAGERS RESPONSE

The Quinault Indian Nation generally agrees with the HSRG's recommendations. QIN is willing to participate in regional discussion with appropriate co-mangers regarding steelhead management. QIN is reviewing the program for monitoring of natural-origin recruits in the broodstock and timing of broodstock collection.

Sooes River Hatchery Winter Steelhead

Makah Tribe and United States Fish and Wildlife Service

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Low	Low	Low
Population Viability[48]	Medium	Medium	Medium
Habitat	Limiting	Limiting	Limiting
Harvest Opportunity	Each Year	Each Year	Each Year
Purpose	Harvest		
Type	Segregated		

PROGRAM DESCRIPTION

This is an early-timed, hatchery stock originating from Quinault River stock. The program's egg take goal is 250,000 from rack returns at Makah National Fish Hatchery (NFH). Spawning, incubation, rearing and release take place on-station. The transfer goal is 25,000 fish to Educket Creek in April at seven fish per pound. The planting goal is 175,000 into the Sooes River at 5.5 fish per pound in May.

OPERATIONAL CONSIDERATIONS

- The broodstock for this program is self-sustaining and locally-adapted.
- Releases are not adipose fin clipped or coded wire tagged, except for a recent, two-year diet study.
- Single pair matings are used.
- The program does include adult removal capability.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?
The program is being operated in a manner consistent with its short- and long-term goals. It is providing harvest opportunity. Interbreeding of the hatchery stock with the naturally-spawning stock is minimized by the differences in spawn time and adult removal capability.

B. Likelihood of attaining goals?
There is a strong likelihood that program goals will continue to be met. Coastal steelhead have experienced relatively good survival in recent years.

C. Consistent with goals for other stocks?

[48] *In the case of a segregated harvest program, population viability ratings are low, medium and high and refer to the stock's ability to sustain itself in the culture environment.*

There is the potential for genetic interactions with naturally-spawning winter steelhead, but this is likely to be minimized for the reason stated in A, above.

RECOMMENDATIONS

- Implement System-Wide Recommendations regarding establishing a regional system of wild steelhead management zones, where streams are not planted with hatchery fish and are instead managed for native stocks. Fishing for steelhead in these zones would not be incompatible with this approach, but no hatchery-produced steelhead should be introduced. Such zones would reduce the risk of naturally spawning fish interbreeding with hatchery fish, and provide native stocks for future fisheries programs. To meet harvest goals, hatchery releases may be increased in those streams selected for hatchery production.
- Select both wild and hatchery streams based on stock status and a balance of large and small streams and habitat types.
- Use locally-adapted hatchery stock for those streams. Decrease reliance on other facilities to backfill shortages in locally adapting hatchery stock. Actions such as harvest restrictions should be implemented to achieve 100% local broodstock if necessary.
- Manage the hatchery stock to maintain its early spawn timing and reduce the likelihood of interaction with naturally spawning steelhead.
- Include adult collection capability wherever steelhead are released, to capture as many adults from the returning segregated population as possible. Discontinue releases where adults cannot be collected at return.
- Adipose mark releases to maximize harvest opportunity and monitor stray rates.
- Size the hatchery program in a manner that achieves harvest goals with minimal impact on wild populations.
- Release hatchery yearling steelhead smolts between April 15 and May 15 at target size of six fish to the pound, and a condition factor of less than 1.0.
- Conduct a workshop to implement this wild steelhead management zones concept.
- Implement monitoring and evaluation as a basic component, of both wild steelhead management zones and hatchery harvest streams.

- Increase volitional release time period prior to forced release.

COMMENTS

- Establishment of wild steelhead management zones should reduce the chances of ecological and genetic interactions with hatchery steelhead and help to ensure the availability of founding stocks for hatchery purposes should the need for such stocks arise.

MANAGERS RESPONSE

The Makah Tribe generally supports the recommendations of the HSRG. The Tribe agrees with the principle of maintaining wild steelhead management zones which exclude hatchery releases, however, it is extremely important that the zones be established in a manner consistent with the co-managers' harvest, stock and habitat goals.

See also Appendix B: US Fish and Wildlife Service Response to HSRG Recommendations.

Facility and Regional Recommendations

Assembled below are the Hatchery Scientific Review Group's recommendations that involve capital improvements at hatchery facilities in the North Coast region.

ALL FACILITIES

- Improved rearing and incubation facilities across the region, as needed based on reprogramming decisions resulting from implementing HSRG recommendations
- Additional investment may be necessary to establish new steelhead adult collection sites across the region
- In order to maximize benefits from hatchery production, take into account facility water and space availability in determining the optimum species mix.
- Provide the needed equipment for fish culture and biological sampling (fish pumps, crowders, sorting facilities, abatement ponds, etc.).
- In order for hatcheries to adequately follow the general principles of scientific defensibility and informed decision making, the HSRG supports the need for increased monitoring and evaluation capabilities. This would include the acquisition of the equipment necessary for these activities. Examples would include the following:
  - Equipment for adult handling to improve both the recovery of evaluation data and to facilitate safe passage upstream of natural-origin fish.
  - Equipment to facilitate adult collection for inclusion in integrated hatchery brood stock population management.
  - Equipment for monitoring and evaluating the population status of integrated hatchery stocks and associated natural spawning populations.
  - Equipment for improving hatchery inventory, monitoring and predator control.
  - Opportunities to process data collections such as otolith reading, genetic sampling and mark recovery activities.

BOGACHIEL HATCHERY

- Provide fish pumps for Hoh steelhead (to be shared with Sol Duc Hatchery).
- Upgrade adult collection.
- Develop a predator control program.
- Upgrade screens to prevent escapes.

HOKO REARING PONDS

- Improve fish passage and adult collection facilities.
- Replace intake structure and provide passage above the structure.
- Develop acclimation ponds on the Pysht and Sekiu rivers, including adult collection capability.
- Rebuild the hatchery water intake on Wright's Creek.

MAKAH NATIONAL FISH HATCHERY

- Reconstruct the fish release system.
- Provide a water chiller to resolve temperature problems.

QUINAULT NATIONAL FISH HATCHERY

- Provide fish pumps.
- Install pre-settling chambers.
- Improve adult spawning and holding facilities.
- Expand the hatchery building for early rearing.
- Provide a water chiller to resolve temperature problems.
- Modify raceways to allow volitional release.

SALMON RIVER FISH CULTURE FACILITY

- Improve the intake.

SOL DUC HATCHERY

- Install an adult counter.
- Improve predator control.
- Improve the intake.
- Improve adult spawning and holding facilities.
- Convert Burrows Ponds into raceways
- Provide for volitional release.

UMBRELLA CREEK HATCHERY

- Upgrade the security and communications systems to protect listed juveniles.