❖Eastern Straits

Overview

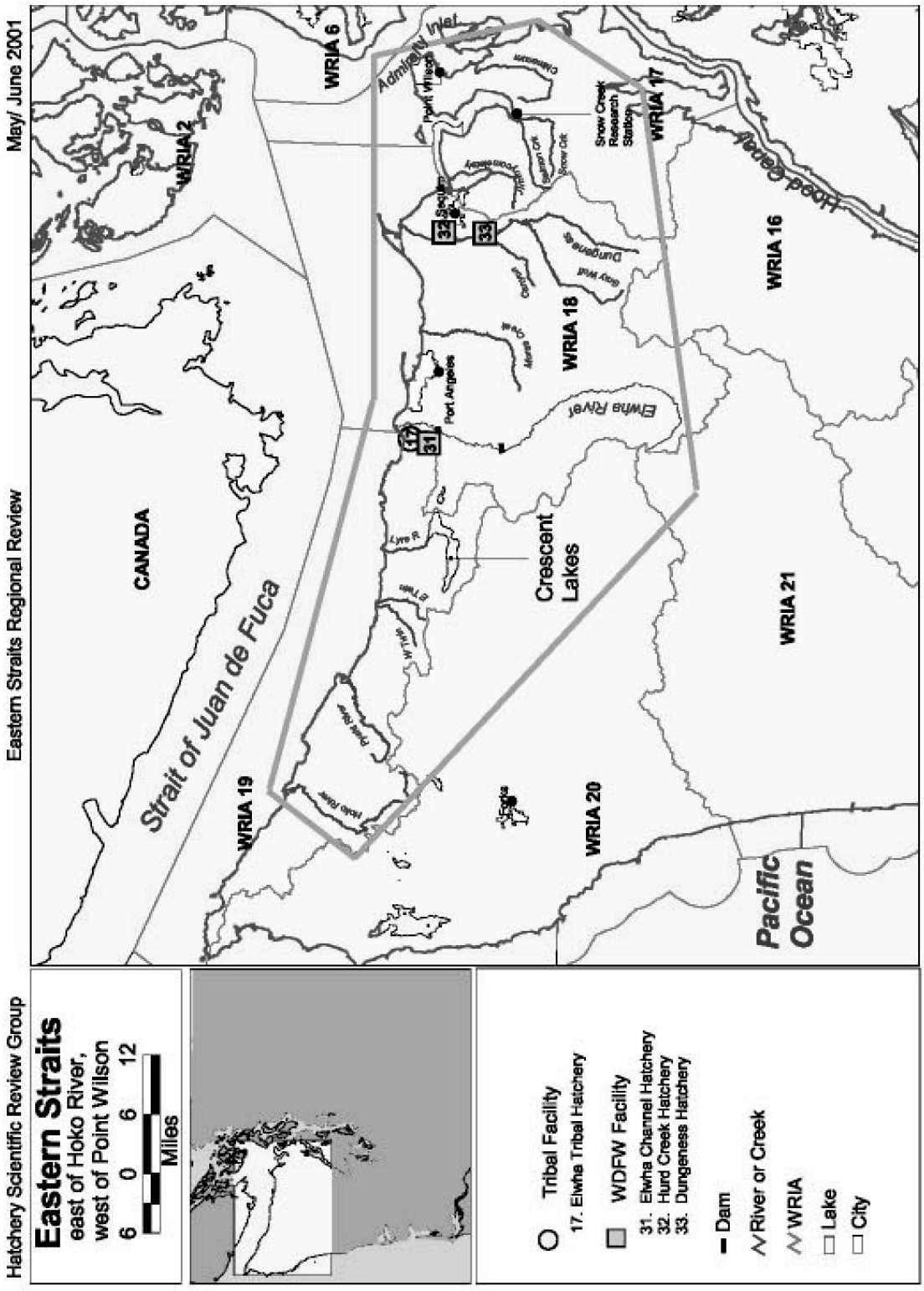
This region includes the eastern portion of the Strait of Juan de Fuca, from Point Wilson to the Hoko River. For the purposes of this review, the Scientific Group and the regional managers divided the region into three sub-regions and reviewed the hatchery programs involving each identified sub-regional salmonid stock (for example, Dungeness chinook). The review included a consideration of the program's effects on all other hatchery and naturally spawning sub-regional salmonid stocks (see table in sub-regional overviews). The sub-regions identified for this region include:

1. Dungeness River Watershed
2. Elwha River Watershed
3. Smaller Watersheds

This chapter provides a general overview of the Eastern Straits and each sub-region, followed by reviews and recommendations for each salmonid stock that has an associated hatchery program.

Habitat in the Eastern Straits is expected to be worse or the same in the short-term, but better in the medium- and, especially, long-term. There are ongoing efforts to modify the Dungeness River dikes to return the river to its meander channels. The upper Elwha River is scheduled to be available as salmon habitat, with the removal of two major dams. The Dungeness River Management Team, the Forest and Fish Initiative, the Critical Areas Ordinance of the Clallam County Growth Management Act, as well as more critical review of projects via the Shorelines Management Act and State Environmental Policy Act, should all combine to slow or reverse the habitat losses of the past. In addition, Jimmycomelately Creek has a lower stream channel and estuary restoration project that will significantly improve conditions for summer chum. Although all these sub-regions currently have much poor quality habitat, they are still producing coho, cutthroat and steelhead, at some level, over a large portion of each sub-region.[10]

[10] *Chris Byrnes, Washington State Department of Fish and Wildlife, May 1, 2001*


Hatchery Scientific Review Group
Eastern Straits Regional Review
May/ June 2001
Eastern Straits
east of Hoko River,
west of Point Wilson
6 0 6 12
Miles
CANADA
Strait of Juan de Fuca
Pacific Ocean
WRIA 2
WRIA 6
WRIA 17
WRIA 16
WRIA 18
WRIA 19
WRIA 20
WRIA 21
Crescent Lakes
Port Angeles
Elwha River
Admiralty Inlet
Point Wilson
Snow Creek Research Station
Head Canal
Tribal Facility
17. Elwha Tribal Hatchery
WDFW Facility
31. Elwha Channel Hatchery
32. Hurd Creek Hatchery
33. Dungeness Hatchery
Dam
River or Creek
WRIA
Lake
City

DUNGENESS

Overview

STOCK STATUS[11]

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
Dungeness Chinook	Y	H	H	H	M	M	H	M	M	H	0	L	M
Dungeness Hatchery Coho	Y	M	M	M	M	M	M	M	M	M	H	H	H
Dungeness Fall Pink	Y	H	H	H	L	L	M	L	L	M	0	0	L
Dungeness Summer Pink	N	H	H	H	M	M	H	M	M	M	0	0	L
Dungeness Chum	N	?	?	?	L	L	?	L	L	M	0	0	0
Dungeness Hatchery Winter Steelhead	Y	M	M	H	L	L	M	M	M	H	L	L	M
Dungeness Summer Steelhead	N	?	?	?	L	L	?	M	M	H	0	0	?

HABITAT

Salmonid habitat condition in the mainstem Dungeness River is currently fair to poor. Major habitat concerns include the diversion of instream flow for irrigation, loss of functional floodplain and estuary in the lower watershed, lack of habitat complexity, substrate instability, and poor riparian condition. Habitat conditions on lower watershed tributaries are also currently impaired. On McDonald, Seibert and Bagley Creeks, habitat concerns include fish access, substrate quality, use of stream for irrigation conveyance, and effects on some tributaries. The mouth of each of these streams is isolated from saltwater during summer months by formation of a natural sandbar across the mouth. This likely effectively limits access and production from these streams.

Upper watershed tributaries in Olympic National Park remain in good condition. There are significant habitat restoration efforts underway in the watershed. Improvements in instream flow have been made in recent years. An evaluation of feasibility of floodplain and estuary restoration in the lower river is currently underway. There have been significant efforts to improve substrate stability and quality. Several projects are reintroducing habitat complexity. Currently impaired habitat conditions in US Forest Service-managed areas in the upper watershed are expected to significantly improve with implementation of the Forest Plan. There are mainstem and tributary "islands" of high-quality habitat that warrant protection or have high restoration potential. With anticipated habitat restoration actions, future watershed potential to produce naturally spawning salmonids is considered to be good[12].

[11] *This table contains ratings for all salmonid stocks in the sub-region, as provided by the managers. For definitions of these ratings, see the* Components of This Report *section of the Introduction.*

[12] *Donald Haring, Washington Conservation Commission, March 19, 2001.*

HATCHERIES

Dungeness Hatchery

Dungeness Hatchery is located six miles southwest of Sequim on the Dungeness River. The total hatching capacity is approximately 7.5 million fry. Release capacity for the station is approximately two million fish, depending upon the size of the fish.

Hurd Creek Hatchery

Hurd Creek Hatchery is located approximately four miles north of Sequim on Hurd Creek, a Dungeness River tributary. It is operated as a satellite to the Dungeness Hatchery. It was originally built to support the Dungeness and Elwha hatcheries. In recent years, considerable capital investment has been made at Hurd Creek Hatchery specifically aimed at providing optimum stock recovery capacity. The 1997 brood year was the last year that naturally spawning-origin Dungeness chinook were brought into the facility. It is anticipated that by 2003, all but a small group of captive brood fish will have matured. [13]

[13] *Washington State Department of Fish and Wildlife Dungeness/Hurd Creek hatcheries staff.*

Dungeness Chinook

Washington Department of Fish and Wildlife

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

PROGRAM DESCRIPTION

The Dungeness chinook stock was derived from pumping wild fish redds and seining of juveniles in the Dungeness River from 1992–97. This stock is maintained through a captive brood program at Hurd Creek Hatchery. Dungeness chinook salmon are one of two stocks in the Eastern Strait Chinook GDU. The purpose of this program is to conserve this biologically significant population of ESA-listed chinook. The resulting offspring are maintained in captivity to adulthood at the Hurd Creek Hatchery. Offspring from the captive-bred fish are incubated at Hurd Creek Hatchery and transferred to the Dungeness Hatchery until release as sub-yearling juvenile salmon. This program is being phased out. The current and future program size is limited to the 1,028 remaining captive broodstock (of 1995–97 brood year classes) currently on hand.

The present program includes releases into the Dungeness River of 200,000 sub-yearlings at 450 fish per pound (fpp) in May, 400,000 at 200 fpp in July and 775,000 at 80 fpp in August. Approximately 200,000–400,000 fish at 250 fpp and 80 fpp are released from an acclimation pond on the Gray Wolf River (upper Dungeness watershed). Additionally, 200,000 sub-yearlings at 450 fpp are released in May at various locations along the Gray Wolf River.

OPERATIONAL CONSIDERATIONS

- The annual average chinook spawner escapement estimate from 1986–99 is 147 adults, ranging from 45–335. Dungeness River chinook recruit-to-spawner ratio has been less than 1:1 in five years, greater than 1:1 in five other years, and 1:1 in one year.
- Release of Dungeness chinook as sub-yearlings presupposes that the predominant juvenile life history pattern of natural fish is less than one year of freshwater residence, and that out migration is as zero-age fish. Owing to low water temperatures at the Dungeness Hatchery, chinook do not attain the preferred release size of seven to ten grams until after the optimum release time in June, and are not released until late July or August.
- Natural sub-yearlings migrate seaward and reside in the lower river, and/or adjacent estuary, for an unknown period before leaving the Dungeness Delta area.

BENEFITS AND RISKS

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

The short-term goals of maintaining the Dungeness chinook in protective custody, while maintaining genetic characteristics of the stock, in order to protect the stock from extinction, are likely being met. However, the program has not been successful to date in rebuilding runs and the stated goals for short- and long-term viability of naturally produced chinook in the system are a cause for concern. The offspring of the captive-bred Dungeness chinook, released as fry or small sub-yearling fish, will probably not exhibit survivals sufficient to attain conservation goals. The carrying capacity of the river and near-shore estuary appears to be unknown. This is of concern, considering the number and biomass of released sub-yearlings originating from the captive broodstock program and released from the Dungeness Hatchery.

B. Likelihood of attaining goals?

Chinook habitat in the mainstem Dungeness River is degraded due to diversion of instream flow for irrigation, loss of functional floodplain and estuary in the lower watershed, lack of habitat complexity, substrate instability, and poor riparian condition. This fair to poor habitat condition and the poor short-term outlook for improvement decreases the chances for recovery.

C. Consistent with goals for other stocks?

The program to conserve and enhance this stock appears to be consistent with the goals for other salmonid stocks in the Dungeness River Basin.

RECOMMENDATIONS

- Initiate a field study to describe the life history patterns of Dungeness chinook, including a description of juvenile and adult life history phases, and their distribution, abundance and migratory movements into, within and out of the river and estuary. A careful study in relation to habitat quality and type will be invaluable in determining the carrying capacity for chinook juveniles in the Dungeness River and for designing future hatchery-based recovery programs.
- Continue the restorative captive broodstock program with broodstock on hand. Size the hatchery program (adults used, smolts released) to match riverine carrying capacity. Discontinue zero age releases in July and August. Provide the capability to produce a mix of zero-age and yearling chinook.
- Develop an alternate recovery plan. Consider phase-in of a new hatchery program that does not involve captive broodstock, but continues the goal of maintaining genetic resources and reduces the risk of extinction.
- Seek new water source(s) to provide warmer rearing water than presently exists at the Dungeness Hatchery.
- Remove the intake barrier at Canyon Creek to allow passage of adult and juvenile chinook to historic spawning/rearing habitat. Open the side channel above and across the river from Canyon Creek and near the current Dungeness River intake at the Dungeness Hatchery, to provide important off-channel rearing habitat for chinook juveniles.
- Address long-term habitat improvement issues. The hatchery program will be successful only if the post-release environment is able to support the population.

COMMENTS

- Evidence for the existence of an alternate life history pattern was seen in studies conducted in 1996–97 (Jamestown S'Klallam Life History Study). Sampling of wild and captive broodstock offspring in this study began in June and was completed in October of 1996 and September of 1997. The authors concluded that the dominant life history pattern of out-migration was in the form of sub-yearling migrants that left the system or migrated to the lower river in the spring of their first year. Few yearling individuals were observed. However, yearlings do not typically out-migrate that late in the year and, if present, would have likely left the Dungeness system prior to commencement of the sampling program. Recent evidence gathered during snorkel surveys in the lower Elwha River indicate the presence of large, yearling chinook salmon residing in that river system as well. Yearling chinook smoltification and out-migration may not be a numerically important life history form in these two river systems, but may nevertheless constitute an important alternate life history form important to survival, and should be included in future fish culture programs.

MANAGERS RESPONSE

WDFW supports the recommendations of the HSRG and has taken the following actions:

- Rearing strategy now targets the release of age-zero chinook prior to July.
- Test wells are being drilled to evaluate the opportunities to obtain warmer water and facilitate the removal of the intake barrier at Canyon Creek.
- Additional funding will be required to conduct studies to characterize the life history of this stock and identify habitat factors limiting stock productivity.

The Jamestown S'Klallam Tribe generally supports the recommendations of the HSRG (the Tribe's full comments are appended to this document). Many of the recommendations are consistent with those the co-managers have discussed for years.

- The study of freshwater life history patterns can be implemented in both the freshwater and marine environments, but we note that additional funding will be necessary to accomplish this task.
- Hatchery release strategies must be evaluated through analysis of coded wire tag recoveries. Evaluation of yearling release strategies will begin this year.
- Efforts to develop a recovery plan that moves the managers beyond the captive broodstock program will begin this year.
- Plans to develop well water sources for Dungeness hatchery are underway.
- Restoration of Canyon Creek can begin immediately if an alternate ground supply is secured by WDFW.
- Opening of the Dungeness side channel will be evaluated by experts in river hydrology.

Dungeness Hatchery Coho

Washington Department of Fish and Wildlife

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Intermediate	Intermediate	Intermediate
Population Viability[14]	Medium	Medium	Medium
Habitat	Limiting	Limiting	Limiting
Harvest Opportunity	Each Year	Each Year	Each Year
Hatchery Program:			
Purpose	Harvest		
Type	Segregated		

PROGRAM DESCRIPTION

The Dungeness Hatchery coho stock originated primarily from wild spawners in the Dungeness River, with a few introductions from the Elwha River. This stock has been maintained primarily from returnees to the Dungeness Hatchery since 1902. The goal of this program is to provide for harvest. Natural stock conservation is not currently a goal of the program. To this end, 500,000 coho yearlings are released from the Dungeness Hatchery each year. Eggs are collected and incubated on-station. Fish are reared and released on-station.

OPERATIONAL CONSIDERATIONS

- The operations of this program are consistent with guidelines for a segregated harvest program, particularly since conservation goals for the natural coho stock are considered secondary to meeting harvest goals in this watershed.
- The program has also taken reasonable steps to reduce potential ecological interactions with pink salmon by delaying release of hatchery coho during pink years.
- The program has recently reduced production from 800,000 yearlings to the current level of 500,000 yearlings, primarily because of concern about negative ecological interactions with depressed natural stocks in the basin.
- Because conservation goals are currently secondary to harvest goals, there is currently little or no monitoring of the natural coho populations in the Dungeness River.

BENEFITS AND RISKS

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

This program is meeting regional harvest goals by providing a high level of terminal area fishing and contributing to pre-terminal harvest. The fishery supported by this program's production is currently the only significant fishery in Dungeness Bay and the Dungeness River. However, the goals stated for

[14] *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.*

short- and long-term biological significance and viability of naturally produced coho in this system indicate that there is reason to be concerned about the effects of this program on the natural stock, including straying and ecological risks.

B. Likelihood of attaining goals?
If the goal is to maintain the natural population as a segregated population (that is, with the natural escapement goal of 500 fish being primarily natural origin recruits), strays from the hatchery program are likely to be inconsistent with that goal and in the long-term may result in a reduction in biological significance and population diversity.

C. Consistent with goals for other stocks?
Risks to other populations include predation risks to Dungeness chinook, summer and fall pink salmon, and risks from competition and genetic interactions with naturally produced coho stocks in the region. There are also potential risks from harvest activities directed at this stock on naturally produced coho originating from other independent Eastern Straits tributaries. Naturally spawning, hatchery origin coho may be posing significant risks to chinook and pink redds in the Dungeness River.

RECOMMENDATIONS

- Determine the status and define goals for the natural coho stock in the Dungeness River.
- Do not increase the size of the program above its current level because of the concern for negative ecological interactions with other important stocks within the basin.
- Evaluate whether the program could be modified into an integrated harvest program, incorporating natural origin recruits into the hatchery broodstock, to reduce the genetic risk from hatchery straying.
- Evaluate the effects of naturally spawning, hatchery-origin coho on the stability of chinook and pink salmon redds in the Dungeness River and modify the program to address this concern.

COMMENTS

None.

MANAGERS RESPONSE

WDFW supports the recommendations of the HSRG, but notes that additional funding will be required to evaluate the status of the natural coho stock and the effects of naturally spawning, hatchery-origin coho on chinook and pink redds.

The Jamestown S'Klallam Tribe generally supports the recommendations and comments of the HSRG (the Tribe's full comments are appended to this document). Of particular importance is the recognition of the contribution of this program to the culture and economy of the Tribe.

- Evaluation of the status of the natural coho run and the interaction of smolt releases with natural stocks can be implemented in conjunction with the evaluation of life history strategies of Dungeness chinook. Additional funding will be necessary to accomplish this task.
- Efforts to assess the origin and distribution of coho spawners, and potential interactions with chinook and pink salmon spawning have begun.

- A better understanding of the current size and productivity of the natural coho stock as suggested in the HSRG's first recommendation is necessary to evaluate the possibility of successful incorporation of natural spawners into the hatchery broodstock.

Dungeness Fall Pink

Washington Department of Fish and Wildlife

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

PROGRAM DESCRIPTION

The Dungeness fall pink stock derives from, and is maintained by, wild adults trapped and genetically identified as fall (versus summer) in the Dungeness River. This program began in 1995. Dungeness fall pink salmon return in odd years and are the only stock within the Lower Dungeness GDU. The objective of this program is to conserve the fall pink stock (which has experienced significant declines) and to achieve this without genetic introgression from summer pinks (which use different sections of the river, but overlap somewhat in spawn timing). To this end, up to 1,200 adults are captured for spawning. Eggs are incubated at Hurd Creek and fry are released off-station.

OPERATIONAL CONSIDERATIONS

- Fall-run adults are collected via a weir or trap in the lower reach and transported to Hurd Creek Hatchery.
- All individuals are typed by DNA to ensure only fall run individuals are included. Individuals identified as summer run, or those with indistinguishable genotypes, are excluded.
- Incubation and rearing occurs in pathogen-free well water.
- Development and ponding times are manipulated to achieve the characteristics of the natural run.
- Individuals are transported to river mile 2.2 and released in May.

BENEFITS AND RISKS

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

Habitat in the Lower Dungeness River is currently poor, due to diversion of instream flow and loss of floodplain. This is not expected to change in the short-term. The fall-run pink salmon population is highly significant, representing the only stock in the GDU. Its viability is at a critical level. Given the condition of the habitat, the program is consistent with the stated goals.

B. Likelihood of attaining goals?

Program risks to the fall-run pink salmon population include potential genetic divergence of the hatchery population from the naturally spawning population, decrease in effective population number,

and incorporation of summer-run genes into the fall-run gene pool. Procedures are available to minimize these risks (see Recommendations).

C. Consistent with goals for other stocks?
Potential risks to other stocks in the watershed include trapping mortality and handling stress to Dungeness chinook and summer-run pink salmon. Summer-run pink salmon may also experience delayed migration as a result of DNA testing.

RECOMMENDATIONS

- Conduct a risk assessment analysis of the hatchery operations to evaluate the demographic and genetic benefits and risks.
- Increase the probability of separating fall-run from summer-run individuals through improved genetic identification or other marking techniques.
- Minimize potential genetic divergence between the hatchery and naturally spawning population.
- Follow mating protocols that maximize effective population size.
- Consider acclimation procedures to improve imprinting and survival.
- Review procedures to ensure the security of the stock.
- Address long-term habitat improvement issues. The hatchery program will be successful only if the post-release environment is able to support the population.

COMMENTS

- DNA identification can correctly discriminate approximately 75% of individuals belong to the fall run. Therefore, the program will tend to amplify those genotypes that are the most divergent from the summer run, a form of directional selection. An increase in the number of markers to reduce the proportion of unidentifiable genotypes could improve the classification ability. Alternative types of external marks with improved coverage should also be investigated.
- Current program operations collect a large proportion of the total individuals belonging to the Lower Dungeness GDU. This places the unique gene pool at risk, should a catastrophic failure occur. Protocols and facilities should be reviewed to ensure sufficient redundancy and security.

MANAGERS RESPONSE

WDFW supports the recommendations of the HSRG.

The Jamestown S'Klallam Tribe generally supports the recommendations and comments of the HSRG (the Tribe's full comments are appended to this document).

- A risk assessment analysis of the demographic and genetics risks and benefits of the hatchery program, including an assessment of the current habitat's ability to support this population, is appropriate.
- In 2001, analytical tools used for stock separation improved measurably. Different marking and tagging methods for cultured fish are currently being considered.

Dungeness Hatchery Winter Steelhead

Washington Department of Fish and Wildlife

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Intermediate	Intermediate	High
Population Viability[15]	Low	Low	Medium
Habitat	Limiting	Limiting	Healthy
Harvest Opportunity	Occasional	Occasional	Most Years
Hatchery Program:			
Purpose	Harvest		
Type	Segregated		

PROGRAM DESCRIPTION

The Dungeness hatchery winter steelhead stock derives from Bogachiel Hatchery Chambers Creek (Puget Sound) stock. The program began in 1994. It is maintained through fish returning to the Dungeness Hatchery and through annual supplementation of fish or eggs from Bogachiel Hatchery. The objective of this program is to provide for harvest without impacting other stocks, including naturally spawning steelhead (if they exist), in the watershed. To this end, 10,000 winter steelhead juveniles returning to the Dungeness Hatchery are reared at Hurd Creek Hatchery and released from Dungeness Hatchery.

OPERATIONAL CONSIDERATIONS

- Low water temperatures at the Dungeness Hatchery inhibit the ability to culture steelhead to the desired size for release at the appropriate time.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?
Program is consistent with the short-term goal of occasional harvest opportunity.

B. Likelihood of attaining goals?
Short-term harvest goals seem achievable; achieving long-term goals will depend upon implementation of the wild steelhead management zones plan described below.

C. Consistent with goals for other stocks?
Low release numbers pose negligible risk to other stocks. The HSRG has concerns about potential genetic interactions (outbreeding depression), predation and competition with other steelhead stocks, particularly naturally spawning stocks.

[15] *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 Area-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 streams to represent a balance of large and small streams, productivity, etc. Hatchery production may need to be increased in streams selected for hatchery harvest. The HSRG encourages the use of locally-adapted stocks for those streams.
- Minimize interaction with naturally spawning steelhead when implementing a segregated steelhead program through such tools as differential timing and a decision on benefits versus risks on outplanting in freshwater habitat. In addition, adult collection procedures should be designed to capture as many adults from the returning segregated population as possible.
- Organize a workshop to develop this concept.
- Include monitoring and evaluation as a basic component of the concept, for both wild steelhead management zones and hatchery harvest streams.
- Release hatchery yearling steelhead smolts between May 1 and May 15, at a target size of six to the pound, and at a condition factor of less than 1.0.
- Remove intake barrier at Canyon Creek.
- Switch to well water, if possible, to address water temperature problems.

COMMENTS

None.

MANAGERS RESPONSE

WDFW supports the recommendations of the HSRG, but notes the following:

- Implementing a regional system of wild steelhead management zones has a number of implications that will require discussion with the affected tribes and the Fish and Wildlife Commission.
- Test wells are being drilled to evaluate the opportunities to obtain warmer water and facilitate the removal of the intake barrier at Canyon Creek. Achieving the target release size and date for yearling steelhead smolts will be difficult until that water supply is available.

The Jamestown S'Klallam Tribe generally supports the recommendations and comments of the HSRG (the Tribe's full comments are appended to this document), but notes the following:

- Implementation of region-wide, wild steelhead management zones must be carefully evaluated based on biological factors and contribution to sustainable tribal fisheries.
- Regional differences in appropriate release sizes and times may exist that warrant analysis of available size and time release data.
- Dam removal and additional restoration of Canyon Creek likely represent some of the best tributary spawning habitat for steelhead, cutthroat, and coho.
- Plans to develop well water sources for Dungeness hatchery are underway. If this source of water becomes available, all aspects of incubation and initial rearing should be improved.

ELWHA

Overview

STOCK STATUS[16]

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
Elwha Chinook	Y	H	H	H	M	M	H	L	M	H	0	0	M
Elwha Coho	Y	M	M	H	M	M	H	L	M	H	H	L	H
Elwha Pink	N	M	M	H	L	M	H	L	M	H	0	0	M
Elwha Chum	Y	M	M	H	L	M	H	L	M	H	0	0	M
Elwha Hatchery Winter Steelhead	Y	M	M	H	M	M	H	L	M	H	H	M	H
Elwha Summer Steelhead	N	L	?	?	L	?	?	L	M	H	L	L	?

HABITAT

Salmonid production in the Elwha River watershed is currently severely impaired due to the presence of the Elwha and Glines Canyon dams. Although habitat in the upper watershed is within the Olympic National Park and remains pristine, fish access is limited to only the lower 4.9 miles of what was historically a 77-mile range. Removal of the dam(s) has been authorized by Congress. Habitat condition downstream of Elwha Dam is poor (severely impaired) due to loss of suitable spawning substrate and loss of channel complexity. Some remaining floodplain side channels in the lower watershed have high-quality habitat. Potential to produce naturally spawning salmonids in the future is high, once the dams are removed and the associated habitat restoration matures. However, hatchery operations to maintain genetic integrity are imperative until habitat productivity is restored.[17]

HATCHERIES

Lower Elwha Hatchery

The coho program at the Lower Elwha Fish Hatchery began in 1978 using Elwha River broodstock. Facility water is a mix of surface and ground water. Water quality of the facility is similar to that found in the Elwha River. Groundwater is collected using two wells located on the facility. Fish enter the facility by means of an outfall creek constructed for the hatchery. Holding facilities consist of a three-quarter acre earthen pond divided into three sections: the trap, a section for females, and a section for males. Spawning facilities consist of two sheds. The program uses an incubation facility located on the hatchery grounds with a maximum instantaneous incubational capacity of 6.7 million

[16] *This table contains ratings for all salmonid stocks in the sub-region, as provided by the managers. For definitions of these ratings, see the* Components of This Report *section of the Introduction.*

[17] *Donald Haring, Washington Conservation Commission, March 19, 2001.*

eggs. The hatchery's rearing facility consists of 24 concrete raceways, eight fiberglass circular tanks, four asphalted rearing ponds and an earthen rearing pond. Fish are released directly from rearing ponds.[18]

Elwha Rearing Channel

The Elwha Rearing Channel was built in 1974 to maintain and enhance the run of fall chinook salmon indigenous to the Elwha River system. Since its inception, this facility has attained the goal of maintaining this stock and forestalling further decline in numbers. However, some factors limit the success of this facility. These include poor and limited natural habitat, pre-spawning adult mortality caused by the protozoan Dermocystidium (sp.), hatchery juvenile mortality as result of air bladder fungus (Phoma), and an inability to secure enough broodstock from the river (via trapping, netting and/or gaffing). In recent years, winter steelhead or coho salmon rearing has also taken place.

The Channel is located on the Elwha River, approximately seven miles west of Port Angeles, at river mile 2.9. The unscreened river intake is owned and operated by the city of Port Angeles. The Channel itself is 1400' x 50' and is divided into two sections by means of screens and stop logs. It was originally built as a spawning channel, but was never effective in that capacity, so it was modified into a rearing channel. A 125' x 50' adult trapping/holding area is located directly below the Channel outfall and is equipped with a 20' x 15' spawning shed. A 16½ stack incubation system covered by 28' x 21' canvas Quonset hut is available for incubation of eggs that cannot be transferred off-station.[19]

(Note: See descriptions of Dungeness and Hurd Creek hatcheries, which are involved in Elwha sub-regional programs, in the Dungeness Overview)

[18] *Larry Ward, Elwha Klallam Tribal staff, May 2001.*

[19] *Greg Travers, WDFW Hatchery Specialist, with edits by Darrell Mills, WDFW, April 27, 2001.*

Elwha Chinook

Washington Department of Fish and Wildlife

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

PROGRAM DESCRIPTION

The Elwha chinook salmon stock derives from fish captured in the Elwha River during the 1920s, and has been supplemented with primarily Dungeness and Satsop (Chehalis basin) hatchery stocks. This stock is maintained through adults returning to the hatchery trap and through netting or gaffing adults on the spawning grounds. Elwha chinook salmon are one of two stocks in the Eastern Strait Chinook GDU. The primary purpose of this program is to maintain existing genetic resources in support of natural production in the basin, including the re-colonization of the upper watershed following dam removals. To this end, the program calls for the take of 4.3 million eggs (some adults are trapped at the Elwha Rearing Channel; most are collected in the Elwha River). Gametes are taken to the Hurd Creek Hatchery where they are eyed and then transferred to Soleduck Hatchery for hatching and early rearing. Final rearing occurs at the Elwha Rearing Channel. About 3.8 million sub-yearling smolts are released into the Elwha River.

OPERATIONAL CONSIDERATIONS

- Brood stock management (collection and holding) is particularly challenging in this basin.
- Current facilities require transfer of eggs and juveniles out of basin.
- Rearing conditions and protocols do not simulate those in the naturally spawning environment with respect to temperature, growth pattern, release size and age.

BENEFITS AND RISKS

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

The use of a single, large-scale rearing and release strategy puts the short- and long-term conservation goals at some risk, especially in light of the poor smolt-to-adult survival. Transfers of eggs and juveniles are potentially costly to the health and fitness of the population.

B. Likelihood of attaining goals?
Recruits per spawner hovers around one, with no recent surplus for harvest. The likelihood of meeting short- and long-term goals would increase if the program were better tailored to the gene conservation and re-colonization objectives, with greater emphasis on quality and diversity.

C. Consistent with goals for other stocks?
The program is consistent with goals for other Elwha River stocks, as significant adverse effects on these stocks appear unlikely. Ecological interaction among stocks should be a consideration in the development of the Elwha Restoration Plan.

RECOMMENDATIONS

- Review the current program. A revised program may be more consistent with the conservation and re-colonization goals for the chinook stock. Maintain program size to provide an effective number of breeders of at least 500–1,000 adults per year. The program's primary focus should be on improved quality and diversity of smolts. Success should not be equated with the number of juveniles reared and released, but rather on achieving the necessary effective number of adult broodstock (the HSRG has drafted a white paper on the subject of smolt quality).
- Reduce or eliminate the need for transport of eggs and fry outside the watershed. This will require new or expanded facilities for incubation and early rearing.
- Mimic natural life history patterns of the stock using a combination of release strategies, including yearling releases, growth modulation and natural rearing.
- Ensure security of the stock through diverse rearing and release strategies and redundancy of facilities and systems.
- Develop an explicit schedule that takes into account both genetic and demographic risks as a function of spawner abundance, composition and population trends. This will benefit broodstock management.
- Address long-term habitat improvement issues. The hatchery program will be successful only if the post-release environment is able to support the population.

COMMENTS

- This program has succeeded in preserving the Elwha chinook stock over a long period of time, under challenging conditions.
- The review above is based on the current program. The HSRG is aware of current efforts to develop a plan for the recovery of chinook and other salmonids following the removal of two dams. The HSRG has provided informal comments on preliminary drafts of this plan. Specifically, the HSRG has suggested that this plan include contingencies for custody of the genetic resource under different environmental scenarios, including a schedule for disposition of returning adults as a function of run size. The HSRG has also urged the managers to consider the out-planting of adults into the upper watershed as a part of the recovery strategy. The plan should also emphasize the critical importance of monitoring and evaluation as a key component of a strategy for success. Additional consultation between the Elwha Recovery Team and the HSRG would likely be beneficial for development and refinement of the restoration and recovery plan.

MANAGERS RESPONSE

WDFW supports the recommendations of the HSRG and notes the following:

- The Elwha Fish Restoration Team is evaluating options to ensure the security of the stock during removal of the dams and reintroduction of the stock into the upper watershed.
- Additional funding will be required to provide the facilities necessary to implement the recommendations.

The Elwha Tribe generally supports the recommendations of the HSRG and notes the following:

- The program will maintain a program size to provide greater than the recommended effective number of breeders of 500–1,000 adults per year. This approach will ensure stock maintenance and survival during dam removal.
- Recommendations to focus on smolt quality are consistent with our current effort to evaluate enhanced rearing environments for possible incorporation into restoration efforts.

Elwha Coho

Lower Elwha Klallam Tribe

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

PROGRAM DESCRIPTION

The Elwha coho stock originated from wild stock in the Elwha River and has been supplemented with one-time introductions from the Satsop and Dungeness rivers. This stock is maintained through natural- and hatchery-origin fish that volunteer into the Lower Elwha Hatchery. Elwha coho belong to the Puget Sound/Strait of Georgia ESU. The goal of this program is the provision of harvest and simultaneous conservation of the stock for restoration of naturally spawning coho in the Elwha River after the dams are removed and habitat is restored. To this end, the program calls for the take of 1.2 million eggs from 1,250 returning adults and 250 wild spawners. All incubation and rearing occurs onsite at the Lower Elwha Hatchery. 750,000 smolts are released from the Lower Elwha Hatchery.

OPERATIONAL CONSIDERATIONS

- The program takes eggs from all parts of the run and culls down to an appropriate size.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?
The program has been self-sustaining, importing eggs only once in the past three decades. Performance has been consistent with the goal of annual harvest.

B. Likelihood of attaining goals?
The program is likely to succeed in maintaining a viable population of coho in the lower river and some annual harvest.

C. Consistent with goals for other stocks?
There is the potential for coho to prey on chum fry, but there are no data suggesting that this is occurring here. The program is otherwise consistent with goals for other Elwha River stocks, as significant adverse effects on other stocks appear unlikely. Ecological interaction among stocks should be a consideration in the development of the Elwha Restoration Plan.

RECOMMENDATIONS

- Continue and strengthen the use of natural rearing.
- Incorporate marking and tagging as a necessary tool for evaluation of program practices.
- Control and retard domestication in broodstock by purposeful incorporation of natural-origin returns in each generation.
- Estimate the proportion of hatchery-origin fish among the natural spawners.
- Address long-term habitat improvement issues. The hatchery program will be successful only if the post-release environment is able to support the population.

COMMENTS

- This is a good example of a natural rearing hatchery program.
- The review above is based on the current program. The HSRG is aware of current efforts to develop a plan for the recovery of salmonids following the removal of two dams. The HSRG has provided informal comments on preliminary drafts of this plan. Specifically, the HSRG has suggested that this plan include contingencies for custody of the genetic resource under different environmental scenarios, including a schedule for disposition of returning adults as a function of run size. The HSRG has also urged the managers to consider the out-planting of adults into the upper watershed as a part of the recovery strategy. The plan should also emphasize the critical importance of monitoring and evaluation as a key component of a strategy for success. Additional consultation between the Elwha Recovery Team and the HSRG would likely be beneficial for development and refinement of the restoration and recovery plan.

MANAGERS RESPONSE

The Elwha Tribe supports the recommendations of the HSRG to continue the use of natural rearing, incorporation of marking/tagging for program evaluation, incorporation of natural origin recruits into the hatchery broodstock, and monitoring the origin of natural spawners.

WDFW supports the recommendations of the HSRG.

Elwha Chum

Lower Elwha Klallam Tribe

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Intermediate	Intermediate	High
Population Viability	Critical	At Risk	Healthy
Habitat	Inadequate	Limiting	Healthy
Harvest Opportunity	No Harvest	No Harvest	Most Years
Hatchery Program:			
Purpose	Conservation		
Type	Integrated		

PROGRAM DESCRIPTION

The original Lower Elwha chum salmon program began in 1976 and continued through 1985, using broodstock from Walcott Slough in Hood Canal, Enetai Creek, Lyre River, and the Elwha River. Only eggs from the Elwha River were used after 1981. Based on genetic information, the early portion of the run appears to be closest to the native gene pool. The current program began in 1995 and is maintained by annually capturing wild fish from the Elwha River spawning grounds. Elwha River chum salmon belong to the Strait of Juan de Fuca fall-run GDU. There are five additional stocks in this GDU. The objective of the program is to conserve the existing Elwha River chum stock, which has been on the decline for years and is now chronically depressed. To this end, 75,000 eyed eggs are out-planted annually. The eggs are incubated to the eyed stage at the Lower Elwha Hatchery.

OPERATIONAL CONSIDERATIONS

- Though the early timed portion of the run is native, there is a history of introduced broodstock not native to the Elwha River.
- The use of Hood Canal stocks resulted in chum with a later run timing than that of native Elwha River chum.
- The program is experiencing difficulties in obtaining the needed number of adults.
- Outplants are not tagged or marked.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?
The program is consistent with the short- and long-term goals for the stock. However, a small effective population size constitutes a potential genetic risk.

B. Likelihood of attaining goals?
There is a reasonable likelihood of attaining the program's goals, particularly if harvest is held to zero currently and in the near-term (as planned), and if habitat improves to "healthy" in the long-term (as anticipated).

C. Consistent with goals for other stocks?
The program is consistent with goals for other Elwha River stocks, as significant adverse effects on other stocks appear unlikely.

RECOMMENDATIONS

- Develop and implement a plan to increase effective broodstock size.
- Focus broodstock collections on the early part of the run, to produce a run timing more akin to that of the original Elwha stock. If necessary, use another Strait of Juan de Fuca chum source, should the present early Elwha chum run prove unable to meet program needs.
- Outplant not only eyed eggs, but also fry that have been hatchery-reared to about one gram in size.
- Time fry outplants to avoid predation from coho, chinook and steelhead in the Elwha River.
- Use some form of marking, so that success of the program and its release strategies can be evaluated.
- Address long-term habitat improvement issues. The hatchery program will be successful only if the post-release environment is able to support the population.

COMMENTS

- Fry releases are likely to increase the program's chances of success.
- Take precautions to minimize the likelihood of introducing exotic pathogens with any chum stock used for satisfying the second recommendation, above.
- The review above is based on the current program. The HSRG is aware of current efforts to develop a plan for the recovery of salmonids following the removal of two dams. The HSRG has provided informal comments on preliminary drafts of this plan. Specifically, the HSRG has suggested that this plan include contingencies for custody of the genetic resource under different environmental scenarios, including a schedule for disposition of returning adults as a function of run size. The HSRG has also urged the managers to consider the out-planting of adults into the upper watershed as a part of the recovery strategy. The plan should also emphasize the critical importance of monitoring and evaluation as a key component of a strategy for success. Additional consultation between the Elwha Recovery Team and the HSRG would likely be beneficial for development and refinement of the restoration and recovery plan.

MANAGERS RESPONSE

The Elwha Tribe generally agrees with the recommendations of the HSRG and notes the following:
- Broodstock collection currently targets the early portion of the return timing as recommended by the HSRG.
- The Elwha Fish Restoration Team will evaluate the use of fry outplants in addition to the current eyed egg plants.
- Marking will be incorporated into the evaluation of the chum program if resources are available for implementation.

WDFW supports the recommendations of the HSRG.

Elwha Hatchery Winter Steelhead

Lower Elwha Klallam Tribe

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Intermediate	Intermediate	High
Population Viability[20]	Medium	Medium	High
Habitat	Inadequate	Limiting	Healthy
Harvest Opportunity	Each Year	Most Years	Each Year
Hatchery Program:			
Purpose	Harvest and Conservation		
Type	Segregated		

PROGRAM DESCRIPTION

The Elwha hatchery winter steelhead stock derives from a variety of sources, with the primary stocks being Chambers and Bogachiel (Puget Sound derivatives). This program has been maintained with adult returns to the Lower Elwha Hatchery since 1977. The objective of the program is to provide for harvest, while conserving winter steelhead in the Elwha River. To this end, 120,000 smolts are reared annually for release into the Elwha River.

OPERATIONAL CONSIDERATIONS

None.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?
This segregated program is consistent with short- and long-term harvest goals. Use of this early running, non-native broodstock is not consistent with the long-term conservation goals.

B. Likelihood of attaining goals?
The current program is likely to attain harvest goals but not conservation goals.

C. Consistent with goals for other stocks?
The relatively large number of smolt releases of a segregated hatchery stock will pose significant risk to a native population that may be residualized above dams and used as a possible core for recolonization. Large out-plants of smolts are likely to pose a risk of predation on other salmonids in the watershed.

[20] *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 Area-Wide Recommendations for establishing a regional system of "wild steelhead management zones," consistent with the Elwha Restoration Plan, 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 streams to represent a balance of large and small streams, productivity, etc. Hatchery production may need to be increased in streams selected for hatchery harvest. The HSRG encourages the use of locally-adapted stocks for those streams.
- Minimize interaction with naturally spawning steelhead when implementing a segregated steelhead program through such tools as differential timing and a decision on benefits versus risks on outplanting in freshwater habitat. In addition, adult collection procedures should be designed to capture as many adults from the returning segregated population as possible.
- Organize a workshop to develop this concept.
- Include monitoring and evaluation as a basic component of the concept, for both wild steelhead management zones and hatchery harvest streams.
- If a conservation program is desired, it will need to be considered separately, using a more appropriate broodstock.
- Release hatchery yearling steelhead smolts between May 1 and May 15, at a target size of six to the pound, and at a condition factor of less than 1.0.

COMMENTS

- The HSRG believes this is an inappropriate stock for recolonization of the upper watershed.
- The review above is based on the current program. The HSRG is aware of current efforts to develop a plan for the recovery of salmonids following the removal of two dams. The HSRG has provided informal comments on preliminary drafts of this plan. Specifically, the HSRG has suggested that this plan include contingencies for custody of the genetic resource under different environmental scenarios, including a schedule for disposition of returning adults as a function of run size. The HSRG has also urged the managers to consider the out-planting of adults into the upper watershed as a part of the recovery strategy. The plan should also emphasize the critical importance of monitoring and evaluation as a key component of a strategy for success. Additional consultation between the Elwha Recovery Team and the HSRG would likely be beneficial for development and refinement of the restoration and recovery plan.

MANAGERS RESPONSE

The Elwha Tribe generally agrees with the recommendations of the HSRG and notes the following:

- The Wild Steelhead Management zones are a good concept. This is currently implemented to some degree in the Strait region.
- Alternate broodstock sources are being considered for use in the Elwha Restoration Plan.
- Additional consultation has occurred between the Elwha Fisheries Technical Group and the HSRG. Further consultation would be beneficial to the planning process.

WDFW supports the recommendations of the HSRG.

SMALLER WATERSHEDS

Overview

STOCK STATUS[21]

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
Smaller Watersheds Summer Chum	Y	H	H	H	L	L	M	L	L	M	0	0	L
Smaller Watersheds Win. Steelhead	Y	M	M	M	L	L	M	M	M	M	M	M	M
Snow Creek Coho	Y	M	M	M	L	L	M	L	L	M	0	0	L
Smaller Watersheds Other Coho	Y	L	L	L	L	L	L	M	M	M	0	0	0

HABITAT

The major tributaries to Discovery Bay are Snow and Salmon Creeks. Minor tributaries include Contractors Creek and Eagle Creek. Minor tributaries to Sequim Bay include Jimmycomelately Creek, Johnson Creek, and Chicken Coop Creek. Habitat in the largest of these tributaries, Jimmycomelately Creek as currently poor, with severe channel confinement, lack of floodplain connectivity, and loss of estuarine function. Habitat conditions in the Morse Creek watershed are currently poor. Morse Creek has a small population of summer chum. Chinook are likely extirpated in the creek. Ennis Creek is the smallest of the snow-fed streams on the north Olympic Peninsula. Although considered to be the healthiest of the Port Angeles urban streams, overall habitat condition would probably be considered to be only fair. Bell Creek drains a rapidly urbanizing area in Sequim. Habitat conditions are generally poor, except where habitat has been restored. Gierin Creek habitat conditions are generally fair to good, due in large part to the management of a large wetland area in the lower watershed (Graysmarsh) for the benefit of fish and wildlife. Casselery and Cooper Creeks offer limited salmonid production potential. Each of the creek systems has a significant wetland upstream of the mouth, although these wetland areas may have been naturally isolated from saltwater by presence of a natural sandbar.

Habitat conditions are generally poor in Port Angeles urban streams (Lees Creek, Peabody Creek, Valley Creek, Tumwater Creek, Dry Creek). The larger watersheds that drain into the Strait of Juan de Fuca, bounded by Colville Creek to the east and the mouth of the Strait of Juan de Fuca to the west, include the Hoko, Seiku, Pysht, Clallam, and Lyre Rivers. Fall chinook salmon were historically abundant throughout many of the larger watersheds, but currently, the only large population spawns in the Hoko River, and that stock is considered to be "depressed." Small numbers are sometimes recorded in the Lyre River, Seiku River, and the Pysht River. Historically, chinook were also noted in the Clallam River, Salt Creek, Bullman Creek, Sail River, and Deep Creek, but this

[21] *This table contains ratings for all salmonid stocks in the sub-region, as provided by the managers. For definitions of these ratings, see the* Components of This Report *section of the Introduction.*

species has not been documented in these streams for several years. Chum salmon have been documented in the Sail River, Bullman Creek, Seiku River, Hoko River, Clallam River, Pysht River, Deep Creek, Twin Rivers, Lyre River, and Salt Creek. However in recent years, chum salmon have not been noted in Salt Creek, and the levels in Deep Creek have sharply declined. Coho salmon and winter steelhead trout are distributed throughout all of the drainages discussed below, with steep declines for both species in Deep Creek. Small numbers of pink salmon have been seen in the Lyre River.[22]

HATCHERIES

No hatchery facilities are located within this sub-region.

[22] *Donald Haring, Washington Conservation Commission, March 19, 2001*.

Smaller Watersheds Summer Chum

Washington Department of Fish and Wildlife

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

PROGRAM DESCRIPTION

The Smaller Watersheds summer chum stock derives from Salmon and Jimmycomelately creeks and is maintained through yearly collection of green eggs from these creeks. The eggs are placed in remote site incubators (RSI). Salmon and Jimmycomelately are the only stocks in the Strait of Juan de Fuca Summer Chum GDU. The purpose of this program is summer chum salmon restoration. To this end, 200,000 green eggs are taken at Salmon Creek and eyed at Dungeness Hatchery. The planting goal is 80,000 fish between 350–650 fish per pound released into Chimicum Creek and 91,000 fish between 350-650 fish per pound into Discovery Bay. 90,000 green eggs are taken at Jimmycomelately Creek, incubated and ponded at Hurd Creek Hatchery and at Jimmycomelately. The planting goal is 86,000 fish at 450 fish per pound into Jimmycomelately Creek.

OPERATIONAL CONSIDERATIONS

- The summer chum salmon restoration programs include Salmon, Jimmycomelately, and Chimacum Creeks in the regional management goals. The program follows the guidelines of the Summer Chum Conservation Initiative[23], the goal of which is to restore healthy, natural self-sustaining, summer chum salmon populations.
- Conservation goals either maintain genetic characteristics of native stocks (i.e., Salmon, Jimmycomelately creeks), or will develop locally adapted broodstocks (initially using brood stock from the Salmon Creek project for Chimacum Creek).
- All programs recognize future options, with up to 12 years of an "integrated recovery" supplementation program. Directed harvests may occur after full recovery.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?
The program is consistent with short- and long-term goals.

[23] *Summer Chum Conservation Initiative, Washington State Department of Fish and Wildlife and Point No Point Treaty Tribes, April 2000.*

B. Likelihood of attaining goals?
The program, if executed correctly, is likely to achieve its goals.

C. Consistent with goals for other stocks?
Restoring chum would be consistent with goals for other stocks.

RECOMMENDATIONS

- Continue to conduct this program consistent with the Summer Chum Conservation Initiative.
- Address long-term habitat improvement issues. The hatchery program will be successful only if the post-release environment is able to support the population.

COMMENTS

- The conservation goals, harvest objectives, and social and cultural objectives are realistic and well thought out.

MANAGERS RESPONSE

WDFW supports the recommendations of the HSRG. The summer chum restoration programs are an example of the carefully designed and successfully implemented programs that WDFW believes can play an important role in the restoration of salmonid populations. Funding to undertake this program was provided under a special appropriation from the Washington Legislature.

Smaller Watersheds Hatchery Winter Steelhead

Washington Department of Fish and Wildlife

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Intermediate	Intermediate	Intermediate
Population Viability[24]	Low	Low	Medium
Habitat	Limiting	Limiting	Limiting
Harvest Opportunity	Most Years	Most Years	Most Years
Hatchery Program:			
Purpose	Harvest		
Type	Segregated		

PROGRAM DESCRIPTION

The Smaller Watersheds hatchery winter steelhead program relies on annual outplants from Bogachiel Hatchery. The stock originates from Chamber Creek. The purpose of the program is to provide for harvest, while avoiding adverse interactions with naturally spawning stocks. To this end, smolts are planted into the Lyre River (25,000), Pysht River (10,000) and Morse Creek (5,000).

OPERATIONAL CONSIDERATIONS

- Fish are incubated and reared at Bogachiel (a hatchery in a region not yet reviewed by the HSRG), so operations have not yet been evaluated.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?
The program is consistent with the short-term goal of occasional harvest opportunity.

B. Likelihood of attaining goals?
Short-term harvest goals seem achievable; achieving long-term goals will depend upon implementation of the wild steelhead management zones plan described below.

C. Consistent with goals for other stocks?
Low levels of spawning overlap between a segregated, early winter steelhead hatchery stock and late winter native stock may pose increasing risk over the long-term that could compromise the native stock. There may also be some predation risk to naturally produced chum.

[24] *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 Area-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 streams to represent a balance of large and small streams, productivity, etc. Hatchery production may need to be increased in streams selected for hatchery harvest. The HSRG encourages the use of locally-adapted stocks for those streams.
- Minimize interaction with naturally spawning steelhead when implementing a segregated steelhead program through such tools as differential timing and a decision on benefits versus risks on outplanting in freshwater habitat. In addition, adult collection procedures should be designed to capture as many adults from the returning segregated population as possible.
- Organize a workshop to develop this concept.
- Include monitoring and evaluation as a basic component of the concept, for both wild steelhead management zones and hatchery harvest streams.
- Release hatchery yearling steelhead smolts between May 1 and May 15, at a target size of six to the pound, and at a condition factor of less than 1.0.

COMMENTS

None.

MANAGERS RESPONSE

WDFW supports the recommendations of the HSRG, but notes that implementing a regional system of wild steelhead management zones has a number of implications that will require discussion with the affected tribes and the Fish and Wildlife Commission.

Snow Creek Coho

Washington Department of Fish and Wildlife

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

PROGRAM DESCRIPTION

The Snow Creek coho stock program at Hurd Creek Hatchery derives from and is maintained through returns to Snow Creek. This stock belongs to the Puget Sound/Strait of Georgia ESU. The objective of the program is to restore a healthy, natural, self-sustaining coho salmon population in Snow Creek. To this end, eggs from coho adults returning to Snow Creek are collected and outplanted in the watershed in remote satellite incubators, or are hatched and the resulting progeny hatchery-reared for release into the watershed at two different ages.

OPERATIONAL CONSIDERATIONS

- The program will be comprised of supplemented and naturally spawning fish, using Snow Creek natural-origin brood stock.
- The Snow Creek program also supports public education on salmon, and ceremonial and subsistence harvest in Discovery Bay.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?
B. Likelihood of attaining goals?
C. Consistent with goals for other stocks?

The program is consistent with short- and long-term goals and is likely to achieve these goals. There is some risk of predation on natural stocks, including chum.

RECOMMENDATIONS

- Continue conducting the program as designed.
- Address long-term habitat improvement issues. The hatchery program will be successful only if the post-release environment is able to support the population.

COMMENTS

- The conservation goals, harvest considerations, and educational objectives are realistic and well thought out. It is apparent that much productive effort has been put into program design, and collecting and analyzing data.

MANAGERS RESPONSE

WDFW supports the recommendations of the HSRG. The Snow Creek coho project is an example of the carefully designed and successfully implemented programs that WDFW believes can play an important role in the restoration of salmonid populations. While the project is an important tool for restoring coho salmon in Snow Creek, it could potentially play an even more important role in developing improved strategies for restoring depressed populations of coho salmon throughout the state. However, it is critically important that the HSRG maintain funding for this project, to assure that these goals are achieved.

Smaller Watersheds Other Hatchery Coho

Washington Department of Fish and Wildlife

Stock Goals:	Current	Short-Term	Long-Term
Biological Significance	Low	Low	Low
Population Viability	Low	Low	Low
Habitat	Limiting	Limiting	Limiting
Harvest Opportunity	None	None	None
Hatchery Program:			
Purpose	Education		
Type	Segregated		

PROGRAM DESCRIPTION

The Smaller Watersheds other hatchery coho program is used for an education project (eggs in the classroom) and rehabilitation for a local creek (Cooper Creek). This program relies on annual outplants from Hurd Creek Hatchery. The stock originates from the Dungeness River. The purpose of this program is education. To this end, 6,750 Dungeness River fry are provided from Hurd Creek Hatchery, reared in ten elementary and high school classroom aquaria, and released into Bell, Ennis, Matriotti, Tumwater and Valley creeks.

OPERATIONAL CONSIDERATIONS

None.

BENEFITS AND RISKS

A. Consistent with short-term and long-term goals?
B. Likelihood of attaining goals?
C. Consistent with goals for other stocks?

This program provides a valuable educational benefit. It is too small to produce significant risks.

RECOMMENDATIONS

- Continue these education programs.

COMMENTS

- These programs are using appropriate fish stocks.

MANAGERS RESPONSE

WDFW supports the recommendations of the HSRG to continue education programs. These programs are an essential component of our efforts to spark public interest, education, and participation in salmon recovery.