HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

DRAFT

Hatchery Program	Rick's Pond Fall Chinook Program
Species or Hatchery Stock	Fall Chinook (*Oncorhynchus tshawytscha*) Hood Canal
Agency/Operator	Washington Department of Fish and Wildlife
Watershed and Region	Hood Canal, Puget Sound
Date Submitted	August 04, 2005
Date Last Updated	July 25, 2005

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Ricks' Pond Fall Chinook Program

1.2) Species and population (or stock) under propagation, and ESA status.

George Adams Fall Chinook (*Oncorhynchus tshawytscha*) – listed as "threatened" June 2005.

1.3) Responsible organization and individuals

Name (and title):	Rick Endicott, Hatchery Manager	
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Name (and title):	Ron Warren, Region 6 Fish Program Manager	
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Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program:

The above listed groups are the principle parties involved with this program.

1.4) Funding source, staffing level, and annual hatchery program operational costs.

Operational Information	Number
Annual operating cost (dollars)	$20,098
The above information for annual operating cost applies to Rick's Pond yearling fall chinook program funded by the Puget Sound Recreational Enhancement Fund.	

1.5) Location(s) of hatchery and associated facilities.

Broodstock Collection; Incubation and Rearing:
George Adams Hatchery: Located at RM 1.0 of Purdy Cr. (16.0005), a tributary of the lower Skokomish River (16.0001) that flows into Hood Canal in southwestern Puget Sound near Union, Washington. Basin name: Hood Canal

Rearing:
Lilliwaup Hatchery (Long Live the Kings): Located at RM 0.6 on Lilliwaup Cr. (16.0230) near the town of Lilliwaup, Washington. Basin name: Hood Canal

Rearing and Release:
Rick's Pond (Long Live the Kings): Located near the mouth of an unnamed trib (16.xxxx) of the lower Skokomish R. (16.0001) at RM 2.9 near Union, Washington. Basin name: Hood Canal.

1.6) Type of program.

Integrated harvest. The proposed integrated strategy for this program is based on WDFW's assessment of the genetic characteristics of the hatchery stock and local natural populations, the current and anticipated productivity of the habitat used by the populations, the potential for successfully implementing programs as integrated, and NOAA's final listing determinations (64 FR 14308, June 28, 2005). Modification of the proposed strategy may occur as additional information is collected and analyzed.

1.7) Purpose (Goal) of program.

The goal is release 120,000 yearling fish that generally have a higher survival rate to adult than fingerlings and that contribute highly to the Puget Sound and Hood Canal recreational fisheries (in accordance with the legislatively mandated Puget Sound Recreational Enhancement Program). Also, the Skokomish Tribe, whose reservation is located near the mouth of the river, has a reserved treaty right to harvest chinook salmon (*US v Washington*).

1.8) Justification for the program.

This program will be operated to provide fish for harvest while minimizing adverse effects on listed fish. This will be accomplished in the following manner:
1) Yearling chinook will be released as smolts to foster rapid migration to saltwater thereby minimizing potential competition with and predation on natural-origin listed fish.

2) Yearling chinook will be released at the appropriate time to minimize potential adverse interactions with natural-origin listed fish.

3) Yearling chinook will be 100% identified to allow for evaluating fishery contribution, survival rates and possible straying to other watersheds. 100,000 will be adipose-fin clip/coded-wire tagged and the remaining 20,000 will be mass marked.

4) Adult chinook produced from this program will be harvested at a rate that allows adequate escapement of listed chinook.

To minimize impacts on listed fish by WDFW facilities operation and the Rick's Pond chinook program, the following Risk Aversions are included in this HGMP:

Table 1. Summary of risk aversion measures for the Rick's Pond chinook program

Potential Hazard	HGMP Reference	Risk Aversion Measures
Water Withdrawal	4.2	Water for Rick's Pond comes from an unnamed spring that feeds the pond with flows of approximately 2 cfs.
Intake Screening	4.2	No intake screens needed.
Effluent Discharge	4.2	No NPDES permit required
Broodstock Collection & Adult Passage	5.1, 7.9, 2.2.3	No broodstock collected at site. No listed fish can access site.
Disease Transmission	9.2.7	Co-Managers Fish Disease Policy. Details hatchery practices and operations designed to stop the introduction and/or spread of any diseases.
Competition & Predation	2.2.3, 10.11	See sections 2.2.3 & 10.11

1.9) List of program "Performance Standards".

See section 1.10

1.10) List of program "Performance Indicators."

Benefits:

Benefits		
Performance Standard	**Performance Indicator**	**Monitoring & Evaluation**
Assure that hatchery operations support Puget Sound Salmon Management Plan (*US v Washington*), the Shared Strategy for Salmon Recovery, production and harvest objectives.	Contribute to a meaningful harvest for sport, tribal and commercial fisheries. Achieve a 10-year average of 0.33% smolt-to-adult survival that includes harvest plus escapement.	Survival and contribution to fisheries will be estimated for each brood year released. Work with co-managers to manage adult fish returning in excess of broodstock need.
Maintain outreach to enhance public understanding, participation and support of WDFW hatchery programs.	Provide information about agency programs to internal and external audiences. For example, local schools and special interest groups tour the facility to better understand hatchery operations. Off-station efforts may include festivals, classroom participation, stream adoptions and fairs.	Evaluate use and/or exposure of program materials and exhibits as they help support goals of the information and education program. Record on-station organized education and outreach events.
Program contributes to fulfilling tribal trust responsibility mandates and treaty rights.	Follow pertinent laws, agreements, policies and executive and judicial orders on consultation and coordination with Native American tribal governments.	Participate in annual coordination between co-managers to identify and report on issues of interest, coordinate management, and review programs (FBD process).
Implement measures for broodstock management to maintain integrity and genetic diversity. Maintain effective population size.	A minimum of 500 adults are collected throughout the spawning run in proportion to timing, age and sex composition of return. (broodstock taken at George Adams facility – 2,900).	Annual run timing, age and sex composition and return timing data are collected. Adhere to HSRG (2004) and WDFW spawning guidelines (WDFW 1983).
Region-wide, groups are marked in a manner consistent with information needs and protocols to estimate impacts on natural and hatchery-origin fish.	Beginning in 2003 (release in 2004), 100% of the fall chinook yearlings will be identified by an adipose-fin clipped/coded-wire tag (100,000) and an adipose-fin clip only mark (20,000) to allow for evaluation of fishery contribution, survival rates and stray levels to other Puget Sound watersheds.	Returning fish are sampled throughout their return for length, sex, and CWTs.

Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens. Follow Co-managers Fish Health Disease Policy (1998).	Necropsies of fish to assess health, nutritional status and culture conditions.	WDFW Fish Health Section inspects adult broodstock yearly for pathogens and monitor juvenile fish on a monthly basis to assess health and detect potential disease problems. As necessary, WDFW's Fish Health Section recommends remedial or preventative measures to prevent or treat disease, with administration of therapeutic and prophylactic treatments as deemed necessary. A fish health database will be maintained to identify trends in fish health and disease and implement fish health management plans based on findings.
	Release and/or transfer exams for pathogens and parasites.	1 to 6 weeks prior to transfer or release, fish are examined in accordance with the Co-managers Fish Health Policy.
	Inspection of adult brood-stock for pathogens and parasites.	At spawning, lots of 60 adult broodstock are examined for pathogens.
	Inspection of off-station fish/eggs prior to transfer to hatchery for pathogens and parasites.	Control of specific fish pathogens through eggs/fish movements is conducted in accordance to Co-managers Fish Health Disease Policy.

Risks:

Risks		
Performance Standard	**Performance Indicator**	**Monitoring & Evaluation**
Minimize impacts and/or interactions to ESA listed fish	Hatchery operations comply with all state and federal regulations. Hatchery juveniles are raised to smolt size (8 fish/lb) and released at a time that fosters rapid migration downstream	Monitor size, number, date of release and mass mark quality. Additional WDFW projects: straying, in-stream evaluations of juvenile and adult behaviors, NOR/HOR ratio on the spawning grounds, fish health documented.
Artificial production facilities are operated in compliance with all applicable fish health guidelines, facility operation standards and protocols including HOPPS, Co-managers Fish Health Policy and drug usage mandates from the Federal Food and Drug Administration.	Hatchery goal is to prevent the introduction, amplification or spread of fish pathogens that might negatively affect the health of both hatchery and naturally reproducing stocks and to produce healthy smolts that will contribute to the goals of this facility.	Pathologists from WDFW's Fish Health Section monitor program monthly. Exams performed at each life stage may include tests for virus, bacteria, parasites and/or pathological changes, as needed.
Ensure hatchery operations comply with state and federal water quality and quantity standards through proper environmental monitoring.	NPDES permit compliance WDFW water right permit compliance	Flow and discharge reported in monthly NPDES reports.
Water withdrawals and in-stream water diversion structures for hatchery facility will not affect spawning behavior of natural populations or impact juveniles.	Hatchery intake structures meet state and federal guidelines where located in fish bearing streams.	Barrier and intake structure compliance assessed and needed fixes are prioritized.
Hatchery operations comply with ESA responsibilities	WDFW completes an HGMP and is issued a federal and state permit when applicable.	Identified in HGMP and Biological Opinion for hatchery operations.
Harvest of hatchery-produced fish minimizes impact to wild populations.	Harvest is regulated to meet appropriate biological assessment criteria.	Agencies and tribes to provide up-to-date information monitor harvests.

1.11) Expected size of program.

1.11.1) Proposed annual broodstock collection level (maximum number of adult fish).

To produce a release of 120,000 yearlings: achieve the egg take goal of 135,000 green eggs at George Adams Hatchery, a maximum of 76 fall chinook adults and 1 jack will need to be collected. This assumes a 10 % pre-spawning mortality, a 91% egg-to-smolt survival (Fuss and Ashbrook 1995), average fecundity of 3,500 eggs per female and a 1:1 sex ratio. Adults in excess of egg take goals will be killed and sold.

1.11.2) Proposed annual fish release levels (maximum number) by life stage and location.

Life Stage	Release Location	Annual Release Level
Eyed Eggs		
Unfed Fry		
Fry		
Fingerling		
Yearling	Skokomish R. (16.0001)	120,000

1.12) Current program performance, including estimated smolt-to-adult survival rates, adult production levels, and escapement levels. Indicate the source of these data.

For the three-tagged broodyears, 95-97, the average survival rate was 0.33%. See 3.3.1 for catch distribution.

Escapement of naturally spawning chinook in the Skokomish, Hamma Hamma, Dosewallips and the Duckabush rivers has averaged 1,811 adults from 1999 through 2003.

Based on the average smolt-to-adult survival rate of 0.33% and a programmed release goal of 120,000, the estimated adult production (goal) level would be 396.

1.13) Date program started (years in operation), or is expected to start.

Production from Rick's Pond and Lilliwaup Hatchery began with the 1995 brood chinook. Releases from Rick's Pond are supplemented with a fish transfer from the Long Live the Kings' Lilliwaup Hatchery. The transferred fish are acclimated and imprinted for 6 weeks at Ricks Pond prior to release from that site.

1.14) Expected duration of program.

Ongoing

1.15) Watersheds targeted by program.

Purdy Creek (16.0005)
Skokomish River (16.0001)

1.16) Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed.

With generally higher juvenile to adult survival rate for yearlings relative to fingerlings and the higher contribution rate to PS and Hood Canal sport fisheries for chinook yearlings compared to fingerlings, an alternative plan for attaining program goals has not been considered. Also, the program is implemented in accordance with the legislatively mandated Puget Sound Recreational Enhancement Program as well as for providing adults for sustainable fisheries (Magnuson/Stevens Act) and tribal harvest opportunity (*US v. Washington*).

As per any alternative actions to the program, the Puget Sound Salmon Management Plan (PSSMP) (1985) and the Hood Canal Salmon Management Plan (HCSMP) are federal court orders that currently control both the harvest management rules and production schedules for salmon in Hood Canal under the *U.S. v. Washington* management framework. The PSSMP explicitly states that "no change may be made to the Equilibrium Brood Document (production goals) without prior agreement of the affected parties."

SECTION 2. PROGRAM EFFECTS ON ESA-LISTED SALMONID POPULATIONS.

2.1) List all ESA permits or authorizations in hand for the hatchery program.

During 2004-05, WDFW is writing HGMP's to cover all stock/programs produced at Rick's Pond for authorization under the 4(d) rule of the ESA.

Harvest management of chinook populations within Puget Sound is implemented through the draft Puget Sound Comprehensive Chinook Management Plan (PSCCMP) - Harvest Management Component (Puget Sound Indian Tribes and WDFW, March 2004).

2.2) Provide descriptions, status, and projected take actions and levels for ESA-listed natural populations in the target area.

2.2.1) Description of ESA-listed salmonid population(s) affected by the program.

- Identify the ESA-listed population(s) that will be directly affected by the program.

- Identify the ESA-listed population(s) that may be incidentally affected by the program.

Puget Sound ESU chinook (Skokomish chinook; mid Hood Canal chinook (draft SaSI, WDFW, 2002)):

Watersheds flowing into Hood Canal from the west, draining out of the Olympic Mountains, are high gradient rivers with limited access to anadromous fish due to natural barriers; major watersheds include the Hamma Hamma, Duckabush and Dosewallips rivers. Watersheds flowing into Hood Canal from the east, off the Kitsap Peninsula, are lower gradient, smaller systems; these include the Union, Dewatto, and Tahuya rivers. The Skokomish River, including the South and North forks, is the largest watershed and enters Hood Canal from the southwest. Natural salmon production occurs throughout the Hood Canal basin, but chinook salmon occur in only these few streams. In Hood Canal, most natural chinook spawning occurs in the Skokomish River (including the South and North forks) (Skokomish chinook), with smaller populations in the Dosewallips, Duckabush, and Hamma Hamma rivers (mid-Hood Canal chinook). Small numbers of chinook spawners have been periodically observed in the Union, Dewatto and Tahuya rivers, but it is unknown whether these streams historically supported naturally sustainable chinook populations.

We have little information on the adult age structure, sex ratio, size range or smolt distribution and emigration timing of wild chinook in Hood Canal streams. We do not know to what extent that George Adams hatchery-origin yearling fall chinook interact with wild Hood Canal chinook. Hood Canal wild chinook are thought to emigrate mainly as sub-yearlings, probably from April through early June. The summer flows in the

South Fork Skokomish River may be too low to support chinook through the summer, though some areas in the Lower North Fork do have sufficient water (C. Baranski, WDFW, personal communication, March 2000). Hood Canal fall chinook spawn from mid-September through October with a peak in mid-October (WDFW and WWTIT 1992). Chinook spawning occurs in the mainstem Skokomish River, the lower South Fork Skokomish and tributaries such as Vance Creek, lower North Fork Skokomish and tributaries, and the lower reaches (below anadromous barriers) of Lilliwaup Creek, John Creek, the Duckabush, Dosewallips, Big and Little Quilcene Rivers, and the lower Union, Tahuya and Dewatto Rivers. Chinook spawning in many of these streams may be largely the result of hatchery releases.

In 2002, WDFW (SaSI, unpublished data) classified Hood Canal summer/fall chinook as two stocks (see above) of mixed origin (both native and non-native) with composite production (sustained by wild and artificial production) (WDFW and WWTTT 1992). The combination of recent low abundances (in all tributaries except the Skokomish River) and widespread use of hatchery stocks (primarily originating from sources outside Hood Canal) led to the conclusion in SASSI (1992) that there were no remaining genetically unique, indigenous populations of chinook in Hood Canal. However, a sampling effort is currently under way (led by WDFW in cooperation with NMFS and Treaty Tribes) to collect genetic information from chinook juveniles and adults in the tributaries of Hood Canal. This investigation is intended to provide further information on the genetic source and status of existing chinook populations. The current distinction between these two populations is based on spawning distribution as per SaSI in 2002 (WDFW, unpublished data).

Genetic characterization of the Skokomish chinook stocks has, to date, been limited to comparison of adults and juveniles collected from the Skokomish River with adults from other Hood Canal and Puget Sound populations. Genetic collections were made during 1998 and 1999 in the Skokomish River and there appeared to be no significant genetic differentiation between natural spawners and the local hatchery populations. It appears that Hood Canal area populations may have formed a group differentiated from south Puget Sound populations, possibly indicating that some level of adaptation may be occurring following the cessation of transfers from south Puget Sound hatcheries (Anne Marshall, WDFW memo dated May 31, 2000). Current adult returns are a composite of natural- and hatchery-origin fish. During 1998 and 1999, known hatchery-origin fish comprised from 13% to 41% of the samples collected on the natural spawning grounds. Genetic analysis of samples collected from Lake Cushman was inconclusive as to stock origin, and exhibits low genetic variability (Marshall, WDFW memo dated April 14, 1995).

Genetic characterization of the mid-Hood Canal stocks has, to date, been limited to comparison of adults returning to the Hamma Hamma River in 1999 with other Hood Canal and Puget Sound populations. These studies, although not conclusive, suggest that Hamma Hamma returns are not genetically distinct from the Skokomish River returns, or recent George Adams and Hoodsport hatchery broodstock (A. Marshall, WDFW unpublished data). The reasons for this similarity are unclear, but straying of chinook

that originate from streams further south in Hood Canal, and hatchery stocking, could be contributing causes. Analysis of GSI collections made during 2002 is pending.

Because there is no specific information on wild smolt temporal and spatial distribution in Hood Canal streams, the extent to which they might interact with hatchery chinook released locally is unknown.

Hood Canal Summer Chum:

The following is paraphrased from life history information for Hood Canal and Strait of Juan de Fuca summer chum presented in the Summer Chum Salmon Conservation Initiative (SCSCI) (WDFW and PNPTT, 2000):

Hood Canal and Strait of Juan de Fuca summer chum populations are one of three genetically distinct lineages of chum salmon in the Pacific Northwest region; and were designated as an evolutionary significant unit (ESU) based upon distinctive life history and genetic traits. The uniqueness of the summer chum life history is best characterized by their late summer entry into freshwater spawning areas, and their late winter/early spring arrival in the estuaries as seaward-migrating juveniles. A significantly different migration and escapement timing and geographic separation from other chum stocks have afforded reproductive isolation.

Summer chum spawning occurs from late August through late October. Eggs eye in redds after about 4 to 6 weeks incubation and hatch about 8 weeks after spawning. Fry emerge from redds, usually with darkness, between February and late May and immediately commence migration downstream to estuarine areas. Summer chum fry initially inhabit nearshore areas and occupy sub-littoral sea grass beds for about one week and are thought to be concentrated in the top few meters of the water column both day and night. Upon reaching a size of 45-50 millimeters (mm), fry move to deeper offshore areas. Migrating at a rate of 7-14 kilometers (km) per day, the southernmost out-migrating summer chum fry population in Hood Canal would exit the Canal 14 days after entering seawater (90% of population exits by April 28 each year, on average); and Strait of Juan de Fuca summer chum would exit the Discovery Bay area 13 days after entering seawater (90% completion by June 8 each year, on average).

In the SCSCI (WDFW et al., 2000) the most recent information on historical and current summer chum salmon distribution and on the genetic profiles of the populations has been reviewed. This analysis has resulted in an updated list of 16 summer chum stocks, which form the basic population units used throughout the recovery plan. Six current summer chum stocks have been identified in Hood Canal: Quilcene, Dosewallips, Duckabush, Hamma Hamma, Lilliwaup, and Union. Six additional stocks are identified as recent extinctions: Skokomish, Finch, Tahuya, Dewatto, Anderson and Big Beef. In the Strait of Juan de Fuca, three currently existing stocks have been identified: Snow/Salmon, Jimmycomelately and Dungeness. Chimacum is noted as a recent extinction.

In Hood Canal streams, the continuous and cumulative reduction in habitat productivity and capacity has influenced summer chum salmon by lowering survival rates and population resiliency, and reducing potential population size. Net fisheries in Hood Canal, when combined with harvests in Puget Sound and the Strait of Juan de Fuca, began to catch a high percentage of returning summer chum salmon in 1980, contributing to low escapements through the 1980s. At the same time, oceanic climate changes influenced regional weather patterns, resulting in unfavorable stream flows during the winter egg incubation season. Fall spawning flows dropped substantially in 1986 (also likely climate related), contributing to the poor status of these stocks. The current low production of Hood Canal summer chum salmon appears to be the result of the combined effects of lower survivals caused by habitat degradation, climate change and increases in harvest. The Summer Chum Conservation Initiative (SCSCI) requires that no hatchery fish releases are to occur prior to April 1 as a protection measure during out-migration of listed Hood Canal summer chum.

The pattern of decline of summer chum salmon in Strait of Juan de Fuca streams is similar to the Hood Canal experience, however, the drop in escapements occurred ten years later, in 1989. The combined effects of reductions in habitat quality, stream flows, and fishery harvests have resulted in low summer chum salmon production in the Strait of Juan de Fuca region.

There have been a number of factors that are positive for summer chum salmon recovery. One is the successful reduction in harvests within Hood Canal fishing areas, averaging less than 2% of the runs during the 1993-1997 seasons. Successful supplementation projects are increasing the numbers of returning summer chum adults to two streams, and are providing eggs for reintroducing summer chum to two other streams. There have also been meaningful changes in the production of hatchery fish in the region, designed to reduce negative interactions with summer chum juveniles. The combined effects of these changes have contributed to some higher summer chum escapements in recent years. However, additional measures, particularly with respect to habitat protection and restoration, are required for successful recovery of summer chum salmon.

Puget Sound Bull Trout (South Fork Skokomish stock (WDFW 1998)):

There is little or no information on adult age class structure, sex ratio, juvenile life history strategy or smolt emigration timing. Hood Canal Ranger District (Olympic National Forest) staff recently conducted a radio-tagging study of (presumed) bull trout in the South Fork Skokomish River (Ogg and Taiber 1999). The objectives of the study were to examine seasonal migration patterns and to identify spawning grounds and spawning times. In addition, Forest Service staffs have been conducting trapping, snorkeling and electrofishing surveys for bull trout in the South Fork. They believe that fluvial and resident life history forms are present. There is no evidence from their work of an anadromous life history form, though anadromous fish may be present. Sexually mature fluvial fish range from 38 to 59 cm. During the course of the telemetry study, spawning migration activity in fluvial fish began in late October when the water temperature dropped below 7EC and river flow increased. Spawning time appears to be from late

October through late November. Spawning grounds have tentatively been identified in the mainstem South Fork from RM 18 through RM 23.5 and in Church, LeBar and Brown Creeks. Juvenile rearing areas include, but should not be considered restricted to, RM 19 through RM 23.5.

In general, chinook are not seen above the Gorge of the South Fork beginning at RM 7 (C. Baranski, WDFW, personal communication, March, 2000) so interactions between hatchery chinook and bull trout are not expected unless fluvial or anadromous fish, if any, move downstream into the lower South Fork or the mainstem Skokomish River.

2.2.2) Status of ESA-listed salmonid population(s) affected by the program.

- Describe the status of the listed natural population(s) relative to "critical" and "viable" population thresholds

Preliminary critical and viable population thresholds for the Skokomish River under the ESA have been determined by the Co-managers (Puget Sound) Technical Review Team (PSTRT) to be at 1,300 and 3,650, respectively. Also, critical and viable population thresholds under ESA for the mid-Hood Canal have been determined by the PSTRT to be at 400 and 750, respectively. WDFW SaSI document (2002) lists the following:

Summer/Fall chinook in the Skokomish is *depressed.* The mid-Hood Canal stock status is *critical.*

Hood Canal summer chum stocks (WDFW and PNPTC 2000):

1. Union River, *healthy*
2. Lilliwaup and Jimmycomelately creeks, *critical*
3. Hamma Hamma, Duckabush, Dosewallips, Big/Little Quilcene, and Salmon/Snow Creek, *depressed*

Puget Sound bull trout in Hood Canal are *viable.*

- Provide the most recent 12-year (e.g. 1988-present) progeny-to-parent ratios, survival data by life-stage, or other measures of productivity for the listed population. Indicate the source of these data.

No estimates of productivity are available for Puget Sound chinook or for Puget Sound bull trout in the Hood Canal region.

No good estimates of Hood Canal summer chum productivity are available because age data are not available. Recruit-per-spawner estimates done by WDFW, the NWIFC and PNPTC range from 1.5 to 1.8, but none of these are reliable at present (J. Ames, WDFW, personnel communication, February 2000).

- Provide the most recent 12-year (e.g. 1988-1999) annual spawning abundance estimates, or any other abundance information. Indicate the source of these data.

Table 2. 1988-2003 spawner abundance data for Hood Canal fall chinook, Hood Canal summer chum and Lake Cushman bull trout/Dolly Varden.

Year	Fall Chinook	Summer Chum	Bull Trout/Dolly Varden
1988	2,772	2,967	152
1989	1,425	598	174
1990	724	429	299
1991	1,858	747	299
1992	940	2,377	285
1993	1,172	756	412
1994	1,072	2,492	281
1995	1,999	9,462	250
1996	1,028	20,490	292
1997	492	8,972	No data collected
1998	1,803	4,001	119
1999	3,020	4,114	90
2000	1,690	8,649	93
2001	2,883	12,041	87
2002	1,725	11,454	93
2003	1,512	35,696	

Chinook data are from WDFW chinook run reconstruction through 2002 and WDFW files (T. Johnson, personal comm). Summer chum data are from WDFW and PNPTT (2003) (J. Ames (WDFW), letter to NOAA Fisheries dated Dec 24, 2003). Bull trout data are from WDFW (1998) through 1996 and from D.Collins (WDFW, personnel communication) thereafter.

- Provide the most recent 12 year (e.g. 1988-1999) estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.

The proportions of direct George Adams Hatchery-origin fall chinook and listed Puget Sound wild chinook on natural spawning grounds are unknown at this time Consequently, hatchery and wild fish are often indistinguishable on spawning grounds. However, in recent years hatchery-origin chinook, identified by adipose-fin clips (DIT group) and scale patterns, have been recovered from spawning grounds in the mainstem Skokomish River during sampling for genetic analysis. In 1998, 61 chinook spawners were sampled, ten of which were coded-wire tagged. They originated from George Adams hatchery (n=3), Hoodsport Hatchery (n=2), Long Live the Kings releases from Rick's Pond (n=4) and the now-defunct Sund Rock net pens (n=1). Seven of these fish had been released as yearlings and three as fingerlings. Since George Adams releases only fingerlings, the yearlings would probably have come from the Long Live the Kings project, Hoodsport Hatchery or net pens in Hood Canal. Scale analysis of the untagged adults in the genetics sample showed that an additional 16 fish had hatchery yearling scale patterns. Thus hatchery-origin fish comprised at least 43% of the sample. More fish in the sample may have been of hatchery origin, but chinook released, as fingerlings

would have scale patterns indistinguishable from those of wild chinook, which out-migrate mainly as fingerlings.

2.2.3) Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of listed fish in the target area, and provide estimated annual levels of take

- Describe hatchery activities that may lead to the take of listed salmonid populations in the target area, including how, where, and when the takes may occur, the risk potential for their occurrence, and the likely effects of the take.

Fall Chinook: Risks and benefits posed by hatchery-origin juvenile and adult chinook to wild juvenile and adult chinook will depend on the number, size, release time and stream residence time of the hatchery fish. Rick's Pond releases approximately 120,000 yearling smolts annually and production will be managed to minimize potential adverse effects to listed fall chinook.

Broodstock Collection: Collection of George Adams and Hoodsport fall chinook may result in take of listed Puget Sound fall chinook through capture at the traps in Purdy and Finch Creeks from August 1 through mid-September. Entry into the trap may result in injury to listed chinook. Listed wild chinook cannot be distinguished from unmarked hatchery fish, so they cannot be returned to Purdy Creek or the Skokomish River. The principal effect of this take is to remove listed chinook from the wild spawning population. The risk of this take is unknown because we do not know how many wild chinook are likely to enter Purdy Creek and reach the hatchery trap. Contact with chinook during spawner escapement surveys (August through October), carcass recovery programs (September and October) and other monitoring and evaluation programs have a potential to take listed chinook. Care is taken to not harm, harass, or otherwise disturb chinook spawners. The WDFW contact for Hood Canal-area surveys is Thom Johnson (johnsthi@dfw.wa.gov).

Competition and Predation: George Adams and Rick's Pond smolts are expected to migrate quickly to Puget Sound, however their actual stream residence time and freshwater competition between them and natural-origin Skokomish-basin chinook have not been examined. These smolts are released between a range of 80-168 mm in April and June when wild Skokomish smolts are expected to be about 60 to 80 mm long (D. Seiler, WDFW, personal communications, February, 2000). The USFWS (1994) has suggested that juvenile salmonids can consume fish which are one-third or less their own body length. Given this rule of thumb and approximate sizes of hatchery and wild fish at the time George Adams and Rick's Pond chinook are released, predation by hatchery smolts is not expected to be a significant problem.

The numbers of wild chinook smolts have been estimated for the Skokomish basin and all of Hood Canal and are compared with numbers of hatchery chinook released in the table below.

Table 3. Comparison of wild and hatchery chinook smolts in the Skokomish River and in all of Hood Canal. Hatchery chinook include those released from George Adams, Hoodsport and Long Live the Kings U of W at Big Beef Creek program release of 200,000 eliminated in 2004; Hoodsport release decrease by 200,000 fingerlings). Numbers for the Skokomish permit a direct comparison of wild production with George Adams and enhancement group releases.

Area	Wild Smolts[1]	Hatchery Smolts	Hatchery Yearlings
Skokomish	104,400	3,830,000	120,000
Hood Canal	132,000	2,910,000[2]	250,000

[1]Wild smolt numbers were estimated by averaging the 1995-1998 wild escapements in Hood Canal, halving that number to estimate the number of female spawners, applying a fecundity of 4,000 eggs per female (Bill Tweit, WDFW, personal communication) to estimate the total number of eggs produced, then applying a freshwater survival rate of 5% (Bill Tweit, WDFW, personal communication) to the egg estimate to estimate the number of surviving smolts.

[2]Includes 110,000 chinook released into the Hamma Hamma and 2,800,000 fingerlings released from Hoodsport Hatchery into Finch Creek by WDFW (eliminated Big Beef Cr. release of 200,000 (2004) and reduced Hoodsport release by 200,000 (2004)).

The Species Interaction Working Group (SIWG) (1984) categorized various risks to wild salmon species and steelhead from hatchery-origin salmon species and steelhead. Their assessment of risks to wild chinook from hatchery chinook is summarized below.

Table 4. Risks posed by hatchery-origin chinook to wild chinook. Data from SIWG (1984).

Type of Risk	Level of Risk
Freshwater predation	Unknown
Freshwater competition	High potential
Early marine predation	Unknown
Early marine competition	High potential

The high risk of competition assumes significant temporal and spatial overlap between hatchery and wild juvenile chinook and increases when numbers of hatchery fish released are far larger than numbers of wild fish (SIWG 1984). We have no information on hatchery-wild overlaps in the Skokomish basin or in the waters of Hood Canal. Clearly the number of juvenile hatchery chinook greatly exceeds the estimated number of wild juveniles in the Skokomish basin and throughout Hood Canal that may increase the risk of competition or attraction of fish and avian predators.

Releases of hatchery chinook may confer some benefits to wild chinook. If hatchery and wild chinook juveniles occupy the lower Skokomish and the same areas of Hood Canal at the same time, the large excess of hatchery fish may provide wild chinook with some protection from fish and avian predators.

Behavior modification: If large numbers of hatchery chinook are released into watersheds containing younger and/or smaller wild juveniles, they can stimulate premature out-migration in wild fish via a Pied Piper effect (Hillman and Mullan 1989). Premature out-migration can reduce survival of wild fish because they would be smaller than normal size, making them more vulnerable to predation, and they may not have completed the physiological changes required to adapt to life in salt water. We do not know if this is a concern in the Skokomish basin.

Disease Transmission: It is possible that hatchery fish that have been infected by transmissible pathogens could infect wild fish. However, the water source for Rick's Pond is pathogen-free spring water so disease transmission from hatchery to wild fish does not appear to be of concern. As indicated by Steward and Bjornn (1990), hatchery populations can be considered to be reservoirs for disease pathogens because of their elevated exposure to high rearing densities and stress, but there is little evidence to suggest that diseases are routinely transmitted from hatchery to wild fish.

Adult Interactions: The ecological interactions between wild and hatchery adult chinook of special concern are competition for spawning areas and competition for mates. We have no specific information on possible competition. We know (see Section 2.2.2 above) that George Adams chinook do stray onto wild spawning grounds in the Skokomish basin, however, we do not know to what extent they compete with wild chinook.

Summer Chum: The Rick's Pond on-station fall chinook program is conducted in a manner consistent with the Hood Canal Summer Chum Conservation Initiative (SCSCI) (WDFW and PNPTC 2000). Specifically, chinook are not released until after April 1 in order to reduce potential interactions with listed Hood Canal summer chum. There are no summer chum in the Skokomish River. Those from Lilliwaup Creek are expected to migrate to salt water in February and March and then to swim seaward quickly (Tynan 1992). They are expected to clear the area well before the release of Rick's Pond chinook in mid-April and June. WDFW considers that both juveniles and returning adults from the on-station program pose low risk for competition or predation to summer chum (Tynan 1999).

Bull Trout: We have no information on interactions between George Adams and Rick's Pond chinook and wild bull trout in the Skokomish (the only watershed in the Hood Canal currently known to have native char). The risk of competition between hatchery chinook juveniles and bull trout is unknown. Presumably competition can occur where wild and hatchery fish overlap, and space or food is limiting, but juvenile distribution of bull trout in the South Fork Skokomish is not known in detail. South Fork Skokomish bull trout are found over-wintering as far down as the confluence with the North Fork (L. Ogg, USFWS, Hood Canal Ranger District, personal communication, February, 2000). Whether they overlap with George Adams chinook when these fish are released in May is unknown. Predation risks to bull trout from hatchery chinook are likely to be low, since the smallest native char juveniles are likely to be found in the uppermost portions of the Skokomish watershed. By the time South Fork fluvial or possibly anadromous char reach

lower river reaches where they are more likely to overlap with hatchery juveniles, they may be too large to be preyed upon. Spawning grounds of South Fork bull trout have not been identified in detail, but are unlikely to overlap with those of fall chinook, so competitive interactions on spawning grounds are unlikely to occur.

Bull trout from the North Fork Skokomish (Lake Cushman and Upper North Fork stocks) are unlikely to pass through the hydropower projects to interact with George Adams chinook.

- Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken, and observed injury or mortality levels for listed fish.

Because hatchery-origin (not 100 % marked) and listed wild chinook can't generally be distinguished, it is not possible to reasonably estimate the take of listed chinook (if any). Beginning with the 2002 BY (2004 release), all hatchery-origin fish at Rick's Pond were mass marked (20,000) as well as AD+CWT (100,000). Depending on the outcome of marking at George Adams, WDFW and tribes may be able to differentiate hatchery and natural-origin chinook on the spawning grounds (HOR's/NOR's) as well as at any trap.

Provide projected annual take levels for listed fish by life stage (juvenile and adult) quantified (to the extent feasible) by the type of take resulting from the hatchery program (e.g. capture, handling, tagging, injury, or lethal take).

Annual take of listed wild Puget Sound chinook cannot be quantified since they cannot be distinguished from previously unmarked George Adams, Hoodsport and Rick's Pond chinook. If listed chinook are included in the hatchery broodstock, the likely sources of take resulting from George Adams, Hoodsport or Rick's Pond operations are broodstock collection, injury or mortality during spawning of adults, sampling of carcasses for scales, genetic stock identification, and routine monitoring and evaluation activities, incubation and rearing, injury or mortality during egg or fry transport to school or other co-operative programs, injury or mortality during rearing in co-operative programs, injury or mortality during on-station or off-station release.

- Indicate contingency plans for addressing situations where take levels within a given year have exceeded, or are projected to exceed, take levels described in this plan for the program.

Contingency plans to limit take to pre-determine numbers are too mass mark 100% of the chinook in Hood Canal. This will provide the means to differentiate hatchery and natural-origin fish returning to the hatchery (George Adams and/or Hoodsport)) and on the spawning grounds (see section 10.7). Need approval by the co-manager's for this to occur.

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

3.1) Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted policies (e.g. the NPPC *Annual Production Review* Report and Recommendations - NPPC document 99-15). Explain any proposed deviations from the plan or policies.

The yearling fall chinook salmon HGMP for Rick's Pond is included as one of 29 WDFW-managed plans under the co-managers' Resource Management Plan (RMP) for Puget Sound region chinook salmon hatcheries. This HGMP is in alignment with the RMP, which serves as the overarching comprehensive plan for state and tribal chinook salmon hatchery operations in the region.

As affirmed in the co-managers' RMP, WDFW hatchery programs in Puget Sound must adhere to a number of guidelines, policies and permit requirements in order to operate. These constraints are designed to limit adverse effects on cultured fish, wild fish and the environment that might result from hatchery practices. Following is a list of guidelines, policies and permit requirements that govern WDFW hatchery operations:

Genetic Manual and Guidelines for Pacific Salmon Hatcheries in Washington. These guidelines define practices that promote maintenance of genetic variability in propagated salmon (Hershberger and Iwamoto 1981).

Spawning Guidelines for Washington Department of Fisheries Hatcheries. Assembled to complement the above genetics manual, these guidelines define spawning criteria to be used to maintain genetic variability within the hatchery populations (Seidel 1983).

Hatchery Reform- Principles and Recommendations of the Hatchery Scientific Review Group. This report provides a detailed description of the HSRG's scientific framework, tools and resources developed for evaluating hatchery programs, the processes used to apply these tools, and the resulting principles, system-wide recommendations, and program-specific recommendations to reform.

Stock Transfer Guidelines. This document provides guidance in determining allowable stocks for release for each hatchery. It is designed to foster development of locally adapted broodstock and to minimize changes in stock characteristics brought on by transfer of non-local salmonids (WDF 1991).

Fish Health Policy of the Co-managers of Washington State. This policy designates zones limiting the spread of fish pathogens between watersheds, thereby further limiting the transfer of eggs and fish in Puget Sound that are not indigenous to the regions (WDFW, NWIFC, WSFWS 1998).

National Pollutant Discharge Elimination System Permit Requirements This permit sets forth allowable discharge criteria for hatchery effluent and defines acceptable practices for hatchery operations to ensure that the quality of receiving waters and ecosystems associated with those waters are not impaired.

In 1999, several PS and coastal stocks were listed as threatened under the federal Endangered Species Act (ESA). State, tribal and federal managers need to ensure that their hatcheries do not present a risk to listed species. Through this Hatchery Reform Project, the managers have sought to go beyond merely complying with ESA directives. The new approach is to reform hatchery programs to provide benefits to wild salmon recovery and sustainable fisheries. Hatchery management decisions will be based on system-wide, scientific recommendations, providing an important model that can be replicated in other areas.

In addition, the Legislature, in 1999, created the Salmon Recovery Funding Board (SRFB) and the Shared Strategy for Salmon Recovery. Both are collaborative efforts to protect and restore salmon runs across Puget Sound. They bring together the experience and viewpoints of citizens, major state and federal natural resource agencies, local governments, non-government organizations and Puget Sound Tribes. The SRFB provides grant funds to protect or restore salmon habitat and assist related activities that produce sustainable and measurable benefits for fish and their habitat. The Shared Strategy process helps identify what is needed in each watershed to recover salmon habitat through a watershed recovery plan (see section 3.4 for more details).

3.2) List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates.

This hatchery program, and all other anadromous salmon hatchery programs within the Puget Sound Chinook ESU, operates under *U.S v Washington* and the Puget Sound Salmon Management Plan (PSSMP)(1985). This program also operates under the Hood Canal Salmon Management Plan (HCSMP). The salmon resource co-management process affirmed through these court orders, and under the court approved plan, requires that both the State of Washington and the Puget Sound Tribe(s) develop *Equilibrium Broodstock Programs*. Two documents are completed each year, describing agreed hatchery fish production levels for each brood year. The "Future Brood Document" is a detailed listing of agreed annual juvenile fish production goals. This document is reviewed and updated each spring, and finalized in July. The "Current Brood Document" presents actual juvenile fish production levels relative to the annual production goals. This second document is developed in the spring after eggs spawned that year have been enumerated and actual resultant juvenile fish production levels can be estimated. Through this process, the co-managers document their agreement on the function, purpose and release strategies for all Puget Sound region hatchery programs. The parties to the SCSCI recognize that it may be necessary to modify these plans in order to implement the recommendations that will result from the SCSCI. However, the provisions of the PSSMP and HCSMP will remain in effect until modified through court order by mutual agreement

3.3) Relationship to harvest objectives.

Tribal and non-Indian commercial and recreational fisheries directed at fall chinook and other species produced through hatchery releases will be managed to minimize incidental effects to listed chinook salmon and summer chum salmon. Time and area, gear-type restrictions, and chinook and summer chum release requirements will be applied to reduce takes of listed salmon in the Hood Canal mainstem, extreme terminal marine area, and river areas where these fisheries directed at other hatchery species occur. Compliance with the fisheries management strategy defined in the SCSCI will lead to fisheries on WDFW hatchery-origin stocks that are not likely to adversely affect listed chinook or listed summer chum.

Each year, state, federal and tribal fishery managers plan the Northwest's recreational and commercial salmon fisheries. This pre-season planning process is generally known as the North of Falcon process, which involves a series of public meetings between federal, state, tribal and industry representatives and other concerned citizens. The North of Falcon planning process coincides with meetings of the Pacific Fishery Management Council, which sets the ocean salmon seasons at these meetings.

For example, during 2000 as an outcome of the North of Falcon process, the state/tribal Puget Sound Chinook Harvest Management Plan (enclosed in letter from Billy Frank, Jr., NWIFC and Jeff Koenings, WDFW to Will Stelle, NMFS, dated February 15, 2000) contained proposals for the 2000/2001 fishing season. The proposed fisheries are designed to target George Adams (including Ricks' Pond) and Hoodsport Hatchery chinook while minimizing catch of wild chinook. The state/tribal FRAM for 2000/2001 fisheries projects a southern U.S. exploitation rate of <15% on mid-Hood Canal (Hamma Hamma, Duckabush and Dosewallips) wild chinook and <15% southern U.S. pre-terminal exploitation rate on Skokomish wild chinook. Final estimated southern U.S. exploitation rate on mid-Hood Canal wild chinook was 12.4% in FRAM run # 0700 dated 4-6-2000 (T Johnson, WDFW, personal communication).

For the 2001-02 and 2002-03 seasons, the co-manager's prepared a Harvest Management Plan for Puget Sound Chinook Salmon. The Plan states specific objectives for harvest of the 15 Puget Sound management units, the technical bases for these objectives, and procedures for their implementation. The Plan assures that the survival and recovery of the Puget Sound ESU will not be impeded by fisheries-related mortality. The Plan was submitted and NOAA Fisheries reached a finding, based on the conditions stated in the 4(d) rule, that fisheries-related take in Washington waters is exempt from prohibition under Section 9 of the ESA. NOAA Fisheries is currently reviewing a five-year Plan submitted by the co-managers for the 2004-05 through 2008-09 seasons.

3.3.1) Describe fisheries benefiting from the program, and indicate harvest levels and rates for program-origin fish for the last twelve years (1988-99), if available.

For the chinook released from Ricks' Pond as yearlings, the catch distribution was:

1995 brood catch distribution:

Wash. escapement:	76%
Wash. catch:	17%
sport:	78%
comm:	22%
Oregon/Canadian:	7%

1996 brood catch distribution:

Wash. escapement:	28%
Wash. catch:	58%
sport:	91%
comm:	9%
Canadian:	14%

1997 brood catch distribution:

Wash. escapement:	29%
Wash. catch:	56%
sport:	68%
comm:	32%
Oregon/Canadian:	15%

NOAA Fisheries Section 7 consultation on the 2000-01 through 2003-04 PFMC, Fraser Panel and Puget Sound marine and freshwater fisheries resulted in approval of the fisheries proposed in the Puget Sound Chinook Harvest Management Plan. NOAA Fisheries is currently reviewing a five-year Plan submitted by the co-managers for the 2004-05 through 2008-09 seasons.

3.4) Relationship to habitat protection and recovery strategies.

The co-managers' resource management plans for artificial production in Puget Sound are expected to be one component of a recovery plan for Puget Sound chinook under development through the Shared Strategy process. Several important analyses have been completed, including the identification of populations of Puget Sound chinook, but further development of the plan may result in an improved understanding of the habitat, harvest, and hatchery actions required for recovery of Puget Sound chinook.

Hood Canal chinook: Limiting factors analyses have not been completed specifically for Hood Canal natural chinook stocks and factors for decline and recovery are not currently available. Limiting factors analyses have recently been completed for streams and nearshore areas in WRIA 16 (Skokomish, Dosewallips, Duckabush and Hamma Hamma

rivers) and WRIA 17 by the Washington State Conservation Commission (2002-03); these reports will provide information useful for identifying factors limiting chinook populations in Hood Canal. In addition, since listed chinook and listed summer chum utilize similar habitats, habitat protection and recovery strategies designed to recover summer chum (see below) will also aid in the recovery of listed Hood Canal chinook.

Summer chum: Summer chum supplementation, habitat restoration and harvest management measures are integrated as presented in the Summer Chum Salmon Conservation Initiative (WDFW and PNPTT 2000). The SCSCI provides a standardized approach to determine freshwater and estuarine limiting factors in each summer chum watershed. Habitat factors for decline and recovery for each watershed are described. In addition, at the summer chum ESU scale, protection and restoration strategies for each limiting factor for decline are provided. The goal of the habitat protections and restoration strategy is to maintain and recover the full array of watershed and estuarine-nearshore processes critical to the survival of summer chum across all life stages.

Bull trout: Bull trout in the Hood Canal region are found in the South Fork Skokomish, Lake Cushman and the upper North Fork Skokomish above Staircase Falls. The condition of the South Fork is poor, as mentioned above. Lake Cushman is now a reservoir, and the water level in the one-half mile of the North Fork Skokomish just above the reservoir fluctuates too much to provide stable spawning habitat. Further, the upper and lower Cushman dams have eliminated the anadromous life history form from the North Fork. However, most of the North Fork above Lake Cushman is in the Olympic National Park, and the habitat is essentially pristine.

Other Habitat Protection Efforts and Probable Benefits:

Habitat protection efforts include the Northwest Forest Plan, adopted by the Forest Service and the Bureau of Land Management in the Northwest in 1994. The plan requires increased stream buffers to protect stream habitat for salmonids and limits road construction and some forms of logging on steep/unstable slopes. Most of the Olympic National Forest is in Late Successional Reserves that limits logging to thinning in stands under 80 years old and severely limits or prohibits logging in older stands. The Forest Service is updating road inventories and embarking on a long-term program to improve or close some of the roads that pose the greatest threats to slope stability and streams. Within Washington State, Washington Legislature accepted the Forests and Fish Report, prepared by the USFWS, NOAA Fisheries, EPA, Office of the Governor of the State of Washington, WA DNR, WDFW, WA DOE, the Colville Tribes, Washington counties, and timber industry groups, in 1999. The emergency forest practices rules that were developed from the Report will result in some improvements in state and private forest-land management including increased stream buffers and some reduction in logging in riparian areas and unstable upslope areas. Both the federal and state and private forest plans will result in habitat improvements, but are far from ideal for fish. The resulting improvements in fish habitat, such as increased large woody debris in streams, may not be realized for decades given the very poor current conditions of many fish-bearing streams and their riparian areas.

The George Adams Hatchery is making a modest contribution to habitat improvement by donating fish carcasses which cannot be donated to food banks or sold to a contracted buyer to an Olympic National Forest Service (Hood Canal District) crew which places the carcasses in streams and riparian areas for nutrient enhancement. In 1997 and 1998, a total of nearly 1,500 George Adams fall chinook were donated to the nutrient enhancement program.

The Legislature, in 1999, created the Salmon Recovery Funding Board (SRFB) and, as indicated earlier, the Shared Strategy for Salmon Recovery. Both are collaborative efforts to protect and restore salmon runs across Puget Sound. They bring together the experience and viewpoints of citizens, major state and federal natural resource agencies, local governments, non-government organizations and Puget Sound Tribes. The SRFB provides grant funds to protect or restore salmon habitat and assist related activities that produce sustainable and measurable benefits for fish and their habitat. The Shared Strategy process helps identify what is needed in each watershed to recover salmon habitat through a watershed recovery plan.

Shared Strategy

The Shared Strategy is based on the conviction that:
1) People in Puget Sound have the creativity, knowledge, and motivation to find lasting solutions to complex ecological, economic, and cultural challenges;
2) Watershed groups that represent diverse communities are essential to the success of salmon recovery;
3) Effective stewardship occurs only when all levels of government coordinate their efforts;
4) The health and vitality of Puget Sound depends on timely planning for ecosystem health and strong local and regional economies; and
5) The health of salmon are an indicator of the health of our region salmon recovery will benefit both human and natural communities.
The 5-Step Shared Strategy
1) Identify what should be in a recovery plan and assess how current efforts can support the plan.
2) Set recovery targets and ranges for each watershed.
3) Identify actions needed at the watershed level to meet targets.
4) Determine if identified actions add up to recovery. If not, identify needed adjustments.
5) Finalize the plan and actions and commitment necessary for successful implementation.

Salmon Recovery Funding Board

Composed of five citizens appointed by the Governor and five state agency directors, the Board provides grant funds to protect or restore salmon habitat and assist related activities. It works closely with local watershed groups known as lead entities (see below). SRFB has helped finance over 500 projects. The Board supports salmon recovery by funding habitat protection and restoration projects. It

also supports related programs and activities that produce sustainable and measurable benefits for fish and their habitat.

Lead Entities

Lead entities are voluntary organizations under contract with the Washington State Department of Fish and Wildlife (WDFW). Lead entities define their geographic scope and are encouraged to largely match watershed boundaries. Lead entities are essential in ensuring the best projects are proposed to the Board for funding in its annual grant process.

All lead entities have a set of technical experts that assist in development of strategies, and identification and prioritization of projects. The lead entity citizen committee is responsible under state law for developing the final prioritized project list and submitting it to the SRFB for funding consideration. Lead entity technical experts and citizen committees perform important unique and complementary roles. Local technical experts are often the most knowledgeable about watershed, habitat and fish conditions. Their expertise is invaluable to ensure priorities and projects are based on ecological conditions and processes. They also can be the best judges of the technical merits and certainty of project technical success. Citizen committees are critical to ensure that priorities and projects have the necessary community support for success. They are often the best judges of current levels of community interests in salmon recovery and how to increase community support over time with the implementation of habitat projects. The complementary roles of both lead entity technical experts and citizen committees is essential to ensure the best projects are proposed for salmon recovery and that the projects will increase the technical and community support for an expanded and ever increasing effectiveness of lead entities at the local and regional level. (http://www.iac.wa.gov/srfb/leadentities.htm).

The Lead Entity for the Hood Canal basin is the Hood Canal Coordinating Council. It oversees an area that is 62 miles long (Hood Canal) and covering about 358 miles of shoreline. Land ownership in the watershed is 48% federal and includes portions of Olympic National Park and Olympic National Forest, 39% private, 12% state and local, and 1% Tribal trust lands. Major projects are underway to restore critical estuarine habitat. These include removal of levees, ditches and tide gates to allow disconnected and degraded salt marshes to recover in the Skokomish, Union and Dosewallips estuaries. Natural functions and processes are being restored in the Chimacum Creek estuary through removal of fill and riprap.

3.5) Ecological interactions.

(1) Salmonid and non-salmonid fishes or other species that could negatively impact the program.

Negative impacts by fishes and other species on the Rick's Pond yearling chinook program could occur directly through predation on program fish, or indirectly through food resource competition, genetic effects, or other ecological interactions. In particular,

fishes and other species could negatively impact chinook survival rates through predation on newly released, emigrating juvenile fish in the freshwater and marine areas. Certain avian and mammalian species may also prey on juvenile chinook while the fish are rearing at the hatchery site, if these species are not excluded from the rearing areas. Species that could negatively impact juvenile chinook through predation include the following:

- Avian predators, including mergansers, cormorants, belted kingfishers, great blue herons, and night herons
- Mammalian predators, including mink, river otters, harbor seals, and sea lions
- Cutthroat trout

Rearing and migrating adult chinook originating through the program may also serve as prey for large, mammalian predators in marine areas, nearshore marine areas and in the Skokomish River watershed to the detriment of population abundance and the program's success in augmenting harvest. Species that may negatively impact program fish through predation may include:

- Orcas
- Sea lions
- Harbor seals
- River otters

(2) Salmonid and non-salmonid fishes or other species that could be negatively impacted by the program (focus is on listed and candidate salmonid species).

- Summer chum
- Puget Sound chinook
- Bull trout

(*3) Salmonid and non-salmonid fishes or other species that could positively impact the program.*

Fish species that could positively impact the program may include other salmonid species and trout present in the Skokomish River watershed through natural and hatchery production. Juvenile fish of these species may serve as prey items for the chinook during their downstream migration in freshwater and into the marine area. Decaying carcasses of spawned adult fish may contribute nutrients that increase productivity in the watershed, providing food resources for the emigrating chinook. Chinook adults that return to the river may provide a source of nutrients and stimulate stream productivity. Many watersheds in the Pacific Northwest appear to be nutrient-limited (Gregory et al. 1987; Kline et al. 1997) and salmonid carcasses can be an important source of marine derived nutrients (Levy 1997). Carcasses from returning adult salmon have been found to elevate stream productivity through several pathways, including: 1) the releases of nutrients from decaying carcasses has been observed to stimulate primary productivity (Wipfli et al. 1998); 2) the decaying carcasses have been found to enrich the food base of

aquatic invertebrates (Mathisen et al. 1988); and 3) juvenile salmonids have been observed to feed directly on the carcasses (Bilby et al. 1996). Addition of nutrients has been observed to increase the production of salmonids (Slaney and Ward 1993; Slaney et al. 2003; Ward et al. 2003). With integrated spawning and any carcass seeding efforts, 1,500-3,000 adult chinook carcasses could contribute, assuming average size of adult chinook is 15 pounds, approximately 22,500 - 45,000 pounds of marine derived nutrients to organisms in the river.

(4) Salmonid and non-salmonid fishes or other species that could be positively impacted by the program.

The chinook program could positively impact freshwater and marine fish species that prey on juvenile fish. Nutrients provided by decaying chinook carcasses may also benefit fish in freshwater. These species include:

- Northern pikeminnow
- Coho salmon
- Cutthroat trout
- Steelhead
- Pacific staghorn sculpin
- Numerous marine pelagic fish species

SECTION 4. WATER SOURCE

4.1) Provide a quantitative and narrative description of the water source (spring, well, surface), water quality profile, and natural limitations to production attributable to the water source.

Lilliwaup Hatchery: Water for Lilliwaup Hatchery comes from an unnamed spring that feeds Lilliwaup Creek. Water temperatures range from 45 to 50 degrees. Water flows average 3 CFS. Water quality is extremely good.

One group of 45,000 fall chinook yearlings is reared on spring water at Lilliwaup Hatchery from May through mid-April of the following year when they are transferred to Rick's Pond for acclimation and release, approximately June 1. An NPDES permit is not required at Lilliwaup Hatchery. Intake screens meet NMFS screening guidelines.

Rick's Pond: Water for Rick's Pond comes from an unnamed spring that feeds the lower Skokomish River (16.0001). Water flows average 2 CFS and temperatures vary from 45 degrees to 50 degrees. A group of 75,000 Hood Canal fall chinook yearlings is reared at Rick's Pond from May 1 to mid-April of the following year when they are released on-site. An NPDES permit is not required at Rick's Pond. Outlet screens meet NMFS screening guidelines.

For George Adams Hatchery water source refer to the George Adams Hatchery chinook HGMP.

4.2) Indicate risk aversion measures that will be applied to minimize the likelihood for the take of listed natural fish as a result of hatchery water withdrawal, screening, or effluent discharge.

No listed fish can access the site and exist in the water source. No NPDES permit is required as the amount of fish produced is below the permit minimum requirements.

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods).

No broodstock collected at Rick's Pond. See George Adams Hatchery Chinook HGMP.

5.2) Fish transportation equipment (description of pen, tank truck, or container used).

Juveniles are transported in tank trucks equipped with water circulation pumps and supplemental oxygen. Tanks are of various sizes.

5.3) Broodstock holding and spawning facilities.

Broodstock are not collected at Lilliwaup or Rick's Pond.

5.4) Incubation facilities.

Eggs incubated at George Adams Hatchery. See George Adams Chinook HGMP.

5.5) Rearing facilities.

George Adams Hatchery: The yearling portion of the Hood Canal fall chinook program at George Adams is started and reared with the fingerling portion of the program until tagging is necessary. Then the population for the yearling program is set-aside in a standard raceway.

Lilliwaup Hatchery: The yearling fall chinook are reared in 8- 20 ft. circular ponds.

Rick's Pond: This is a dirt-bottomed release pond. The first group of fall chinook is reared in this pond from May 15 through release on April 15 of the following year. The second group is transferred in from Lilliwaup Hatchery and reared from April 15 until their scheduled release on June 1.

5.6) Acclimation/release facilities.

Rick's Pond: The first group of yearlings (75,000) is reared short-term at George Adams, then transferred to Rick's Pond around May 15 where they are reared until release around April 15 of the following year. The second group of yearlings (45,000) is reared short-term at George Adams, then transferred to Lilliwaup Hatchery. They are reared at Lilliwaup until April 15 when they are transferred to Rick's Pond. At Rick's Pond they are held until June1 and then released.

5.7) Describe operational difficulties or disasters that led to significant fish mortality.

None.

5.8) Indicate available back-up systems, and risk aversion measures that will be applied, that minimize the likelihood for the take of listed natural fish that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.

Lilliwaup Hatchery has a backup water supply in the event that they lose their main water supply. There is no backup water supply at Rick's Pond. Water source is a spring that is pathogen-free and has no natural-origin chinook in or above it. All water is gravity-fed to the ponds and no flooding has taken place.

SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

Describe the origin and identity of broodstock used in the program, its ESA-listing status, annual collection goals, and relationship to wild fish of the same species/population.

6.1) Source.

George Adams fall chinook originated in 1961 from the Hoodsport Hatchery stock. The Hoodsport stock was started in 1952 with a release of Dungeness spring/summer chinook. This was followed by several years of Soos Creek stock (Green River) releases until the stock became self-sustaining. Additional inputs include chinook from Tumwater Falls (largely derived from Green River stock), Voights Creek (Puyallup basin), Big Beef Creek, Minter Creek and Trask River, Oregon hatchery populations. The actual contribution of these hatcheries stocks to the George Adams/Hoodsport stocks is unclear. Genetic analysis of the Hoodsport population showed similarities to the Marblemount (Skagit) Hatchery fall chinook population, which may reflect the mixed origin of both populations.

George Adams stock shall be used to meet the program needs of the Rick's Pond yearling releases.

6.2) Supporting information.

6.2.1) History.

The Green River fall chinook stock originated from adults collected in the Green River. The stock was propagated at the Soos Creek Hatchery and disseminated widely throughout Puget Sound hatcheries. The hatchery began operation in 1901.

Dungeness chinook are a spring/summer stock native to the Dungeness. They were not successfully introduced at Hoodsport and may not have contributed significantly to the George Adams/Hoodsport stock.

The Voights Creek stock originated from Voights Creek chinook but had significant infusions of Green River stock. The Minter Creek fall chinook stock is a Green River derivative. The Trask River chinook stock was derived from native Tillamook Bay stocks. These fish were incorporated into the Hoodsport stock because they tend to be large. Trask River stock apparently did not prosper.

There have not yet been three consecutive generations of chinook releases from George Adams based solely on adult returns to the hatchery. There are frequent egg transfers from Hoodsport Hatchery if George Adams fails to make its egg take goal. Consequently, the George Adams stock is considered introduced and not locally adapted at George Adams. A genetic analysis of George Adams chinook was done during 1999 and no significant differences were found overall between George Adams and Hoodsport hatcheries. It did appear that Hood Canal area populations formed a group differentiated from south Puget Sound populations, although at a relatively low level. This is noteworthy given the history of stock transfers between the two years (memo from Anne Marshall, WDFW, 31 May 2000) and may indicate local adaptation is occurring in the Hood Canal hatchery stocks.

No intentional selection for any characters such as size or run timing has been conducted.

In most years, insufficient chinook returns to the hatchery to achieve the egg take goal (4.57 million eggs), so nearly all chinook returning to the hatchery are spawned and it is unlikely that any consistent inadvertent selection has occurred.

6.2.2) Annual size.

76 adults are needed to satisfy the egg take goal for the yearling program.

6.2.3) Past and proposed level of natural fish in broodstock.

Wild chinook are not intentionally collected for broodstock at George Adams Hatchery. Since all the chinook are not mass marked, it is not possible to distinguish wild chinook from unmarked hatchery fish, so if wild chinook enter the trap and adult holding pond, they will likely be spawned. The number of wild fish spawned, if any, is not known.

6.2.4) Genetic or ecological differences.

There are no known genetic or ecological differences between either the hatchery stock and natural listed stock in the sub-basin.

6.2.5) Reasons for choosing.

The George Adams/Hoodsport Hatchery broodstock are the in-basin stock. With stock transfer limitations imposed beginning in the early 1990s, the two hatcheries have become more self-sufficient, securing chinook adults that return to the hatcheries needed to fill their production programs, and thereby minimizing the risk of out-breeding depression that may result from out-of-basin transfers.

6.3) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish that may occur as a result of broodstock selection practices.

Since hatchery and natural-origin fish can not be distinguished at this time, it is appropriate to mass mark all hatchery fish (risk aversion measure) to differentiate hatchery and natural-origin chinook on the spawning grounds and at the George Adams trap at the time of broodstock selection. Contingency plans to limit take to pre-determine numbers are too mass mark 100% of the chinook in Hood Canal. This will provide the means to differentiate hatchery and natural-origin fish returning to the hatchery (George Adams and/or Hoodsport)) and on the spawning grounds (see section 10.7). Need approval by the co-manager's for this to occur.

SECTION 7. BROODSTOCK COLLECTION

7.1) Life-history stage to be collected (adults, eggs, or juveniles).

Adults (see George Adams HGMP).

7.2) Collection or sampling design.

WDFW shall procure gametes from adults volunteering to George Adams to affect this program.

At George Adams Hatchery the adult trap (a wooden picket trap) is opened by August 1 each year. Fall chinook return to George Adams from early August through mid-September with a peak in early September. Fish enter the adult holding/juvenile release pond and are held until they are ready to spawn, typically about a week. The trap is only closed when the maximum carrying capacity for broodstock has been reached. The trap is effective in trapping returning adults, however, some natural spawning does occur below the trap on low-water years.

There are no known features of the trap that would lead to collection of a non-representative sample of chinook. As mentioned earlier, numbers of chinook entering the trap are usually insufficient to meet egg take goals. Consequently, nearly all chinook are spawned, making it unlikely that a timing bias has been introduced into broodstock collection.

7.3) Identity.

Unmarked hatchery-origin chinook cannot presently be distinguished from wild fish.

7.4) Proposed number to be collected:

7.4.1) Program goal (assuming 1:1 sex ratio for adults):

No broodstock collected at Rick's Pond.

Broodstock for this program is collected at George Adams. To produce a release of 120,000 yearlings from 135,000 green eggs at George Adams Hatchery, a maximum of 76-fall chinook adults and 1 jack will need to be collected.

7.4.2) Broodstock collection levels for the last twelve years (e.g. 1988-99), or for most recent years available:
(At George Adams)

Year	Adults Females	Adults Males	Adults Jacks	Eggs	Juveniles
1992	103	191	3	443,000	
1993	290	322	4	1,174,000	
1994	109	386	2	464,000	
1995	1,599	1,563	34	6,821,000	
1996	1,347	1,300	12	5,281,600	
1997	762	733	3	2,814,000	
1998	863	911	30	3,002,000	
1999	1,144	1,152		4,500,000	
2000	979	857	14	4,349,900	
2001	1,309	1,300	7	5,668,100	
2002	951	864	6	4,629,000	
2003	969	973	6	4,583,800	

7.5) Disposition of hatchery-origin fish collected in surplus of broodstock needs.

Chinook collected in excess of egg take needs at George Adams are killed rather than passed upstream. There are currently no upstream escapement goals for Purdy Creek. In 1995, 173 males, 78 females and 15 jacks were hauled from George Adams to the Skokomish River to spawn naturally, but this was an exception. See below for information on carcass disposal.

7.6) Fish transportation and holding methods.

George Adams adult chinook are not generally transported. When they are, hauling is carried out using WDFW loading rate guidelines that specify densities for salmon of different species and sizes, salinity and disinfection procedures (WDFW undated).

7.7) Describe fish health maintenance and sanitation procedures applied.

Fish health measures are consistent with the Co-managers Fish Health Policy (NWIFC and WDFW 1998).

7.8) Disposition of carcasses.

The disposition of chinook carcasses at George Adams depends upon the condition of the carcasses and whether the fish had been treated with drugs. Drug-treated fish are buried on station or in a local landfill. Carcasses of untreated fish, both spawned and un-spawned may be sold to a contracted buyer, donated to a food bank, tribe or used as part of an approved nutrient enhancement program

7.9) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the broodstock collection program.

See George Adams chinook HGMP.

SECTION 8. MATING

Describe fish mating procedures that will be used, including those applied to meet performance indicators identified previously.

8.1) Selection method.

No broodstock collected at Rick's Pond. At George Adams, all ripe fish are selected randomly for spawning from available broodstock**.**

8.2) Males.

At George Adams, males are selected randomly and mated 5X5 with the females.

8.3) Fertilization.

At the George Adams Hatchery, eggs and milt are mixed (5 X 5) and allowed to sit for a minute. Fertilized eggs are pooled and taken to the hatchery for distribution into the incubators.

8.4) Cryopreserved gametes.

NA

8.5) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the mating scheme.

See George Adams chinook HGMP.

SECTION 9. INCUBATION AND REARING -

Specify any management *goals* (e.g. "egg to smolt survival") that the hatchery is currently operating under for the hatchery stock in the appropriate sections below. Provide data on the success of meeting the desired hatchery goals.

9.1) Incubation:

9.1.1) Number of eggs taken and survival rates to eye-up and/or ponding.

No eggs taken at Rick's Pond.
George Adams:
Green eggs to fry survival: Range of 82.7% to 99.2%
Fry to fingerling smolt survival: Range of 95.8% to 99.2%

9.1.2) Cause for, and disposition of surplus egg takes.

Egg takes at George Adams Hatchery shall be managed to limit the likelihood of surplus eggs.

9.1.3) Loading densities applied during incubation.

At George Adams green eggs are bulk eyed in deep troughs. At the eyed-egg stage, they are hatched in vertical incubators at a rate of 5.5 pounds (lbs.) of eggs per tray.

9.1.4) Incubation conditions.

At the George Adams Hatchery, eggs are incubated on well water.

9.1.5) Ponding.

At George Adams Hatchery, fry are force ponded when yolk absorption is 95%+ complete.

9.1.6) Fish health maintenance and monitoring.

The Area Fish Health Specialist monitors fish health on a routine basis. If needed, treatment plans are prescribed in accordance with the WDFW and Tribal Fish Health Manual and Policies (1996, 1998).

9.1.7) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish during incubation.

See George Adams chinook HGMP.

9.2) <u>Rearing</u>:

9.2.1) Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling to smolt) for the most recent twelve years (1988-99), or for years dependable data are available.

Not available.

9.2.2) Density and loading criteria (goals and actual levels).

In general, loading and density levels conform to standards set forth in Fish Hatchery Management (Piper et al. 1982).

9.2.3) Fish rearing conditions

Release ponds cannot be cleaned. Pond flows are measured weekly and feed levels adjusted accordingly. Mortality is removed daily and screens are cleaned daily. Maximum and minimum temperatures are also measured daily. Loadings are kept at or below standards set forth in Fish Hatchery Management (Piper et al.1982).

9.2.4) Indicate biweekly or monthly fish growth information (*average program performance*), including length, weight, and condition factor data collected during rearing, if available.

Fish are weight sampled weekly and feed rates are adjusted to provide a proper size and time of release.

9.2.5) Indicate monthly fish growth rate and energy reserve data (*average program performance*), if available.

No information available.

9.2.6) Indicate food type used, daily application schedule, feeding rate range (e.g. % B.W./day and lbs/gpm inflow), and estimates of total food conversion efficiency during rearing (*average program performance*).

Rick's Pond fall chinook yearling program fish are started on BioDiet Starter and switched to BioDiet Grower. Manufacturer recommendations are followed regarding when to switch pellet sizes. Feed is fed by hand. Daily feeding frequency is gradually decreased from 5 times per day at ponding to 1 time per day/5 days per week at release.

9.2.7) Fish health monitoring, disease treatment, and sanitation procedures.

The Area Fish Health Specialist monitors fish health on a routine basis. If needed, treatment plans are prescribed in accordance with the WDFW and Tribal Fish Health Manual and Policies (1996, 1998).

9.2.8) Smolt development indices (e.g. gill ATPase activity), if applicable.

Gill ATPase activity is not monitored. Physical appearance and behavior are used to judge smolt development.

9.2.9) Indicate the use of "natural" rearing methods as applied in the program.

Fish are reared and released from earthen ponds fed by spring water.

9.2.10) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish under propagation.

Fish are reared on pathogen-free spring water. The Area Fish Health Specialist monitors fish health on a routine basis during rearing. If needed, treatment plans are prescribed in accordance with the Co-managers Fish Health Manual and Policies (1996, 1998).

SECTION 10. RELEASE

Describe fish release levels, and release practices applied through the hatchery program.

10.1) Proposed fish release levels. The program shall be limited to 120,000 yearlings to help retain, and not forestall, potential future options for the recovery of the listed chinook ESU.

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Eggs				
Unfed Fry				
Fry				
Fingerling				
Yearling	75,000 45,000	8 8	April 15 June 1	Ricks Pond (Skokomish R.) Ricks Pond (16.0001)

Note: 8 fpp ~ 168 mm fork length

10.2) Specific location(s) of proposed release(s).

Stream, river, or watercourse:) Skokomish River (WRIA 16.0001)
Release location: Skokomish River; RM 2.9
Major watershed: Hood Canal
Basin or Region: Puget Sound

10.3) Actual numbers and sizes of fish released by age class through the program.

Release year	Eggs/ Unfed Fry	Avg size	Fry	Avg size	Fingerling	Avg size	Yearling	Avg size
1995								
1996					28,500	80		
1997								
1998							195,000	8
1999					35,000	85	175,000	8
2000								
2001							0	
2002							122,000	8
2003								
Average							164,000	8

* For 2000, 2001 and 2003 release years, no data was received.

10.4) Actual dates of release and description of release protocols.

At Rick's Pond both groups of fall chinook yearlings are released at night. The first group of fish is released in mid-April. The second group, transferred from Lilliwaup, is released on June 1 after a 6-week acclimation period.

10.5) Fish transportation procedures, if applicable.

The portions of the yearlings that are reared at Lilliwaup are transported to Rick's pond in tank trucks equipped with water circulation pumps and supplemental oxygen.

10.6) Acclimation procedures

At Rick's Pond, fish reared and transferred from Lilliwaup Hatchery, are held for 6 weeks in order to imprint them to the release site.

10.7) Marks applied, and proportions of the total hatchery population marked, to identify hatchery adults.

Ricks Pond releases: 1995 through 1997 broods 100% Ad+CWT'd
1998 and 1999 broods no marks

Beginning in 2003 (release in 2004, 2002 BY), 100% of the fall chinook yearlings were identified by an adipose-fin clipped/coded-wire tag (100,000) and an adipose-fin clip only mark (20,000) to allow for evaluation of fishery contribution, survival rates and stray levels to other Puget Sound watersheds.

10.8) Disposition plans for fish identified at the time of release as surplus to programmed or approved levels.

There are not likely to be a significant number of surplus fish as they will have been inventoried on several occasions earlier in their life history. In the event of an unforeseen surplus, surplus fish will be disposed of in consultation with the co-managers and NOAA Fisheries.

10.9) Fish health certification procedures applied pre-release.

A WDFW Fish Health Specialist prior to release or transfer, in accordance with the Co-managers Fish Health Policy, examines each lot of fish.

10.10) Emergency release procedures in response to flooding or water system failure.

No flooding has occurred at this site, as the water source is gravity fed spring water. In case of severe drought conditions, fish may be released early to prevent fish loss.

10.11) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from fish releases.

Rick's Pond smolts are expected to migrate quickly to Puget Sound, however their actual stream residence time and freshwater competition between them and natural-origin Skokomish-basin chinook have not been examined. These smolts are released between a range of 80-168 mm in April and June in the lower river when wild Skokomish smolts are expected to be about 60 to 80 mm long (D. Seiler, WDFW, personal communications, February, 2000). The USFWS (1994) has suggested that juvenile salmonids can consume fish which are one-third or less their own body length. Given this rule of thumb and approximate sizes of hatchery and wild fish at the time Rick's Pond chinook are released, predation by hatchery smolts is not expected to be a significant problem. Steward and Bjornn (1990) concluded that hatchery fish kept in the hatchery for extended periods before release as smolts (e.g. yearlings) may have different food and habitat preferences than wild fish, and that hatchery fish will be unlikely to out-compete wild fish.

We know little about saltwater interactions between hatchery chinook and listed wild chinook and summer chum, but we expect that wild summer chum would have cleared lower Hood Canal before the chinook are released. Specifically, chinook are not released until after April 1 in order to reduce potential interactions with listed Hood Canal summer chum. Those from Lilliwaup Creek are expected to migrate to salt water in February and March and then to swim seaward quickly (Tynan, 1992). They are expected to clear the area well before the release of Rick's Pond yearling chinook in mid April and May.

In addition, a rearing parameter of the yearling program is to attain a coefficient of variation (CV) for length of 10.0% or less in order to increase the likelihood that most of the fish are ready to migrate (Fuss and Ashbrook 1995). Such fish would be less likely to residualize in fresh water and interact with listed wild fish. No CV data is available.

SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

11.1) Monitoring and evaluation of "Performance Indicators" presented in Section 1.10.

Elements of the annual Monitoring and Evaluation plan for this program are identified in Section 1.10. The purpose of a monitoring program is to identify and evaluate the benefits and risks that may derive from the hatchery program. The monitoring program is designed to answer questions of whether the hatchery is providing the benefits intended, while also minimizing or eliminating the risks inherent in the program. A key tool in any monitoring program is having a mechanism to identify each hatchery production group.

Each production group is identified (see section 10.7) with distinct otolith marks, adipose clips, coded wire tags, blank wire tags or other identification methods as they become available, to allow for evaluation of each particular rearing and/or release strategy. This will allow for selective harvest on hatchery stocks when appropriate, monitoring of interactions of hatchery and wild fish wherever they co-mingle in riverine, estuarine and marine habitats and assessment of the status of the target population. WDFW shall monitor the chinook salmon escapement into the target and non-target chinook populations to estimate the number of tagged, un-tagged and marked fish escaping into the river each year and the stray rates of hatchery chinook into the rivers.

11.1.1) Describe plans and methods proposed to collect data necessary to respond to each "Performance Indicator" identified for the program.

Benefit Indicator 1: Achieve broodstock/egg take goals to provide fish for stable, predictable fishery

At George Adams Hatchery, the maximum number of spawners needed to meet the egg take has been determined to be 2,900 (1,450 females and 1,450 males). Because fish are not sorted by sex at the time they enter the adult pond from the trap, more than 2,900 chinook will be collected. The number of spawning days is planned in advance, based on typical return timing. The number of males and females to be spawned on each day can be determined. The risk is that the number of females will fall short of the number needed, and egg take will be less than required.

Egg takes are estimated at the time of spawning and refined after shocking and picking.

Benefit Indicator 2: Communicate within WDFW and with tribes, citizen groups, private citizens and federal agencies regarding program goals and production objectives. Meet ESA recovery requirements and Wild Salmonid Policy requirements.

WDFW staff and PNPTC/tribal staff communicate if production changes are proposed. Production changes involving the Regional Fish Enhancement Group (RFEG) or volunteer co-op groups are communicated through the WDFW's Region 6 office. The changes in goals and production levels that result from these discussions are reflected in

the Future Brood Document (FBD) compiled by WDFW. Recently NOAA Fisheries has also become involved in discussions of changes to production at George Adams affecting the regions' fish hatchery programs.

WDFW and NOAA Fisheries are engaged in discussions of hatchery chinook production and release in Hood Canal to ensure that agency hatchery programs are consistent with recovery requirements. WDFW staff assigned to implement the policy will review aspects of hatchery physical plant and operations that may conflict with the Wild Salmonid Policy.

Risk Indicator 1: Reduce interactions between hatchery and wild juvenile fish.

This would require monitoring of hatchery smolts following release into Skokomish River from Rick's Pond and determination of the temporal and spatial distribution of juvenile bull trout and wild chinook.

Risk Indicator 2: Meet disease prevention and control standards in co-managers Salmonid Disease Policy. This requires that measures prescribed for examining fish to be transferred or released be followed, that routine health inspections be conducted and that disease outbreaks be contained quickly.

Risk Indicator 3: Monitor discharge water quality.

11.1.2) Indicate whether funding, staffing, and other support logistics are available or committed to allow implementation of the monitoring and evaluation program.

Funding, staffing and other support logistics committed to allow implementation of the monitoring and evaluation of program:

1: Staff funding and manpower to count hatchery adult returns and determine egg takes needs are available at the current level.

2: Staff and funding are available to carry out discussions of production programs at George Adams and Rick's Pond to make changes to the Future Brood Document to reflect those changes.

Staff, funding and logistical support that are not available:

1: The staff, funding and logistical support are not available to undertake monitoring of hatchery smolts, determination of the extent to which they overlap with wild fish and the effect of the overlap.

2: Funding is not available to monitor chinook salmon escapement to the Skokomish River sites to estimate the number of tagged, untagged, and marked fish escaping to the river each year. This monitoring will allow for assessment of the status of the target population.

11.2) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from monitoring and evaluation activities.

Monitoring and evaluation will be undertaken in a manner that does not result in an unauthorized take of listed chinook.

SECTION 12. RESEARCH

12.1) Objective or purpose.

None.

12.2) Cooperating and funding agencies.

12.3) Principle investigator or project supervisor and staff.

12.4) Status of stock, particularly the group affected by project, if different than the stock(s) described in Section 2.

12.5) Techniques: include capture methods, drugs, samples collected, tags applied.

12.6) Dates or time period in which research activity occurs.

12.7) Care and maintenance of live fish or eggs, holding duration, transport methods.

12.8) Expected type and effects of take and potential for injury or mortality.

12.9) Level of take of listed fish: number or range of fish handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached "take table" (Table 1).

12.10) Alternative methods to achieve project objectives.

12.11) List species similar or related to the threatened species; provide number and causes of mortality related to this research project.

12.12) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury, or mortality to listed fish as a result of the proposed research activities.

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SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

"I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand that the information provided in this HGMP is submitted for the purpose of receiving limits from take prohibitions specified under the Endangered Species Act of 1973 (16 U.S.C.1531-1543) and regulations promulgated thereafter for the proposed hatchery program, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or penalties provided under the Endangered Species Act of 1973."

Name, Title, and Signature of Applicant:

Certified by_____ Date:_____

Take Table. Estimated listed salmonid take levels by hatchery activity.

Chinook

ESU/Population	Puget Sound Chinook *(Oncorhynchus tshawytscha)*- Hood Canal
Activity	Rick's Pond Fall Chinook Yearling Program
Location of hatchery activity*	George Adams Hatchery, Lilliwaup Hatchery, Rick's Pond- lower Skokomish R. (16.0001) at RM 2.9
Dates of activity	Yearlings: August-May
Hatchery Program Operator	WDFW

Type of Take	Annual Take of Listed Fish by life Stage (number of fish)			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass (a)	-	-	-	-
Collect for transport (b)	-	-	-	-
Capture, handle, and release (c)	-	-	-	
Capture, handle, tag/mark/tissue sample, and release (d)	-	-	-	-
Removal (e.g., broodstock (e)	-	-	-	-
Intentional lethal take (f)	-	-	-	-
Unintentional lethal take (g)	-	Unknown	-	-
Other take (indirect, unintentional) (h)	-	Unknown	-	-

*See George Adams fall chinook HGMP for broodstock, and incubation, take numbers.

a. Contact with listed fish through stream surveys, carcass and mark recovery projects, or migrational delay at weirs.

b. Take associated with weir or trapping operations where listed fish are captured and transported for release.

c. Take associated with weir or trapping operations where listed fish are captured, handled and released upstream or downstream.

d. Take occurring due to tagging and/or bio-sampling of fish collected through trapping operations prior to upstream or downstream release, or through carcass recovery programs.

e. Listed fish removed from the wild and collected for use as broodstock.

f. Intentional mortality of listed fish, usually as a result of spawning as broodstock.

g. Unintentional mortality of listed fish, including loss of fish during transport or holding prior to spawning or prior to release into the wild, or, for integrated programs, mortalities during incubation and rearing.

h. Other takes not identified above as a category.