HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

DRAFT

Hatchery Program	Cedar River Sockeye Program
Species or Hatchery Stock	Sockeye (*Oncorhynchus nerka*) Cedar River
Agency/Operator	Washington Department of Fish and Wildlife
Watershed and Region	Cedar River (Lake Washington) Puget Sound
Date Submitted	August 04, 2005
Date Last Updated	August 3, 2005

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Cedar River Sockeye Program

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

Cedar River Sockeye Salmon (*Oncorhynchus nerka*) - not listed

1.3) Responsible organization and individuals

Name (and title):	Chuck Phillips, Region 4 Fish Program Manager Brody Antipa, Complex Manager	
Agency or Tribe:	Washington Department of Fish and Wildlife	
Address:	600 Capitol Way North, Olympia, WA. 98501-1091	
Telephone:	(425) 775-1311 Ext 120	(253) 840-4790
Fax:	(425) 338-1066	(253) 840-4724
Email:	**phillcep@dfw.wa.gov**	**antipbja@dfw.wa.gov**

Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program:

The Muckleshoot Indian Tribe has co-management authority for the Lake Washington system.

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

The funding source for the project is General Fund – Local (City of Seattle) with an annual budget of $233,356 (FY 05), with cost of living increase adjustments.

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

Broodstock, Incubation & Release:

Cedar River Hatchery:	Located on the Cedar River (08.0299) at RM 21.7. The broodstock collection weir is located at RM 6.4.

1.6) Type of program.

Integrated harvest

1.7) Purpose (Goal) of program.

Conservation & harvest

The program goal of the Cedar River sockeye program is volitionally release 16,000,000 sockeye fry to increase the number of fry entering Lake Washington and ultimately increase the number of returning sockeye adults on an annual basis for harvest opportunity.

1.8) Justification for the program.

This program operates to mitigate for spawning habitat loss because of the reservoir and Landsberg Dam and maximizes the conservation of this stock by providing man-made propagation alternatives for this stock.

To minimize impacts on listed fish by WDFW facilities operation and the Cedar River sockeye salmon program, the following Risk Aversions are included in this HGMP:

Table 1. Summary of risk aversion measures for the Cedar River sockeye program.

Potential Hazard	HGMP Reference	Risk Aversion Measures
Water Withdrawal	4.2	Water is obtained from four surface springs (water right permit # S1-27123) and routed back to the Cedar River.
Intake Screening	4.2	No listed salmonid species are present within the water source.
Effluent Discharge	4.2	No effluents are discharged from this program (incubation only).
Broodstock Collection & Adult Passage	2.2.3, 7.9	Broodstock are collected at a temporary weir at RM 6.4. Protocols are in effect to minimize potential impacts to chinook. The weir will only be operated when sockeye broodstock must be collected; otherwise, the weir is left open to allow passage of chinook salmon. During the 3-4 days of weir operation per week, operational protocols require checking the trap 2-3 times per day. If chinook are observed aggregating below the weir, it will be opened to promote upstream passage of returning adults.
Disease Transmission	9.2.7	Co-managers Fish Health Policy. Details hatchery practices and operations designed to stop the introduction and/or spread of any diseases.
Competition & Predation	2.2.3, 10.11	Life history, feeding habits, and behavioral attributes of sockeye salmon are expected to result in limited competitive and predatory interactions with listed chinook salmon. The Species Interaction Workgroup (SIWG) (1984) identified sockeye as posing a low risk of competition and predation to naturally produced chinook in freshwater.

1.9) List of program "Performance Standards".

See section 1.10.

1.10) List of program “Performance Indicators”, designated by "benefits" and "risks."

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 and tribal fisheries. Achieve annual escapement goal that assures long-term productivity of this stock and increases the number of fry entering Lake Washington.	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 needs.
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 meetings between the 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	Minimum of 12,000 adults is collected throughout the spawning run in proportion to timing, age, and sex composition of return.	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 to natural and hatchery-origin fish.	All fry released are otolith marked to allow for evaluating the program for fisheries contribution and overall survival.	Returning fish are sampled throughout their return for length, sex, and otolith marks.

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 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 broodstock 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 (2,000 fpp) and released at a time that fosters rapid migration downstream.	Monitor size, number and date of release. 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 needed to monitor harvests.

1.11) Expected size of program.

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

12,000 adults (6,000 females and 6000 males).

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	Cedar River (08.0299)	16,000,000
Fry		
Fingerling		
Yearling		

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

The escapement levels just back to the Cedar River between 1995 and 2003 have been 22,000, 230,000, 104,000, 49,588, 22,138, 148,225, 119,000, 194,600 and 110,404, respectively. The last three years are stream survey based estimates and not weir-based.

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

1991

1.14) Expected duration of program.

Ongoing

1.15) Watersheds targeted by program.

Lake Washington watershed (08)
-Cedar River (08.0299)

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

The future hatchery program is specified in the recently signed, 50-year Habitat Conservation Plan (HCP), a legal agreement between the city, state and federal governments. The program will mitigate potential spawning habitat not available because of the reservoir and Landsberg Dam. The planned program will expand the range of releases up to 34 million unfed fry. The Cedar River program is designed to integrate the hatchery- and natural-origin spawning segments of the population such that they freely interbreed with one another and that domestication and other effects of hatchery culture is minimized. The hatchery broodstock is planned to include both and is designed so that hatchery-origin recruits will contribute to natural reproduction without detriment to the natural-origin segment of the population.

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 the Cedar River complex for authorization under the 4 (d) rule of the ESA.

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.**

None.

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

Issaquah (Lake Washington) Summer/Fall Chinook

Most naturally-spawned Lake Washington chinook migrate to salt water after spending only a few months in freshwater. Arrival of both hatchery and naturally-produced smolts in the estuary peaks in late May, and after a few weeks, most begin moving to near-shore feeding grounds in Puget Sound and the Pacific Ocean. Sexually mature fish begin arriving back at the Ballard Locks as early as June. The peak counts at the Chittenden Locks is usually in early to mid-August.

N. Lake Washington Tribs Summer/Fall Chinook, Cedar River Summer/Fall Chinook

There are naturally spawning adult chinook in tributaries throughout the Lake Washington basin, however, their genetic origin is uncertain. Currently, analysis is being done to determine if there is genetically distinct chinook in the Cedar River. Adults spawn in the mainstem Cedar River from about river mile 1.0 in Renton to the City of Seattle water pipeline crossing at river mile 21.3. In 1999, 81% of the chinook redds were observed above river mile 6.5 and the first redd observed was on August 18. Spawning activity peaks in early October and is generally complete by early to mid-November. Big Bear/Cottage, Issaquah, and Kelsey Creeks also have significant numbers of spawners. Recent genetic testing (Marshall 1999) of Bear Creek chinook indicates that they are very similar to the Issaquah Hatchery stock.

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

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

A preliminary viable population threshold for Lake Washington chinook under ESA has been determined by the Co-manager's (Puget Sound) Technical Review Team (PSTRT) to be at 1,550 (PSTRT 2003). No critical population threshold has been identified. For Cedar River, preliminary critical and viable population thresholds under ESA have been determined to be at 200 and 1,200, respectively (PSTRT 2003). The SaSI report (draft 2002, WDFW) determined this population (Issaquah Summer/ Fall Chinook) status to be "healthy" while the North Lake Washington tributaries and Cedar River Summer/Fall chinook are "unknown".

- 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.

The table below provides the Lake Washington chinook broodyear live count Area Under the Curve index spawning escapement, subsequent reconstructed run size and return per spawner. This information is for natural spawners in Bear/Cottage and the Cedar River mainstem. The sources of these data are from WDFW run reconstruction tables.

Return Year	Run Size	Brood Year Index Escapement	Return/ Spawner
1988	2,769	1,252	2.2117
1989	1,832	949	1.9305
1990	1,214	1,470	0.8259
1991	1,517	2,038	0.7444
1992	1,407	792	1.7765
1993	321	1,011	0.3175
1994	924	787	1.1741
1995	969	661	1.4660
1996	345	790	0.4367
1997	305	245	1.2449
1998	700	888	0.7883
1999	791	930	0.8387
2000		336	
2001		294	
2002		697	
2003		778	

- 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.

Live count Area Under the Curve index spawning escapement estimates for the Cedar River mainstem, Bear Creek and Cottage Lake creeks. There is no expansion to un-surveyed sections or for fish not seen (WDFW data).

Return Year	Cedar	Cottage	Bear	System Total
1983	788	403	141	1332
1984	898	264	90	1252
1985	766	124	59	949
1986	942	386	142	1470
1987	1540	226	272	2038
1988	559	50	183	792
1989	558	208	245	1011
1990	469	161	157	787
1991	508	93	60	661
1992	525	75	190	790
1993	156	44	45	245
1994	452	186	250	888
1995	681	143	106	930
1996	303	6	19	328
1997	227	42	25	294
1998	432	192	73	697
1999	241	258	279	778
2000	120	97	130	347
2001	810	239	220	1269
2002	369	146	122	637
2003	562	144	68	774

- 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.

There are no estimates of direct hatchery-origin chinook on the spawning grounds. There are no recent coded-wire tag releases in the Lake Washington system, therefore, there are no adipose-fin clipped released chinook. The 2000 releases were mass marked (adipose-fin clip only) so the hatchery percentages may be available in the future. It is assumed that a high percentage of natural spawners in Issaquah Creek are of hatchery origin.

2.2.3) <u>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</u>.

- 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.

Broodstock Collection:

Collection directed at sockeye salmon has a potential to take listed chinook salmon, through migrational delay, capture, handling, and upstream release, during trap operation on the Cedar River. Protocols are in effect to minimize potential impacts to chinook. The weir will only be operated when sockeye broodstock must be collected; otherwise, the weir is left open to allow passage of chinook salmon. During the 3-4 days of weir operation per week, operational protocols require checking the trap 2-3 times per day. If chinook salmon are observed aggregating below the weir, it will be opened to promote upstream passage of returning adults. The weir is managed so that upstream migrational delay to chinook is no greater than 24 hours.

Disease Effects:

Sockeye are carriers of the IHN virus, so strict disinfection and isolation procedures are in effect. All spawning and hauling gear is disinfected with a 100 parts per million (ppm) iodophor solution to control the virus. The spawning and holding area is isolated from the incubation area.

Juvenile Releases:

Life history, feeding habits, and behavioral attributes of sockeye salmon are expected to result in limited competitive and predatory interactions with listed chinook salmon. The Species Interaction Workgroup (SIWG) (1984) identified sockeye as posing a low risk of competition and predation to naturally produced chinook in freshwater.

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

Unknown. No direct mortality of chinook has been observed at the collection weir.

- 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).

See "take" table

- 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.

For listed chinook, if significant numbers are observed impacted by this program operation, then staff would inform the WDFW District Biologist who along with the Hatchery Complex Manager would determine an appropriate plan and consult with NOAA fisheries, if needed.

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 Cedar River sockeye salmon program HGMP is included as one of 46 WDFW-managed plans under the co-managers' non-chinook Resource Management Plan (RMP) for Puget Sound region non-chinook salmon hatcheries. This HGMP is in alignment with the RMP, which serves as the overarching comprehensive plan for state and tribal non-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. 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).

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 (2004).

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).

Stock Transfer Guidelines. This document provides guidance in determining allowable stocks for release from 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).

Salmonid Disease Control Policy of the Fisheries Co-Managers of Washington State. This policy designates and delineates Fish Health Management Zones and defines inter and intra-zone transfer policies and guidelines for eggs and fish. These are designed to limiting the spread of fish pathogens between and within watersheds (WDFW, NWIFC 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.

The project is a component of the City of Seattle Habitat Conservation Plan for the Cedar River Watershed. It is overseen by the Cedar River Anadromous Fish Committee.

This hatchery, as well as other WDFW hatcheries within the Puget Sound Chinook ESU, operates under *U.S v Washington* that provides the legal framework for coordinating these programs, defining artificial production objectives, and maintaining treaty-fishing rights through the court-ordered Puget Sound Salmon Management Plan (1985). This co-management process requires that both the State of Washington and the relevant Puget Sound Tribe(s) develop *Equilibrium Broodstock Programs* (two brood documents are reviewed and agreed to annually). The Future Brood Document is a detailed listing of annual production goals. This is reviewed and updated each spring and finalized in July. The Current Brood Document reflects actual production relative to the annual production goals. It is developed in the spring after eggs are collected) and enter into agreement the function, purpose and release strategies of all hatchery programs.

3.3) Relationship to harvest objectives.

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.

There were recreational and tribal fisheries in Lake Washington for sockeye in 1996, 2000 and 2004. The harvest of hatchery sockeye in the 1996 and 2000 fisheries is not known. All of the hatchery adults returning during the 2004 Lake Washington fishery had thermally-marked otoliths. Preliminary data shows that the contribution rates of the Cedar River sockeye program were approximately 15% to the tribal fishery and 22% to the sport fishery.

There is some overlap between program-origin sockeye and listed chinook. Fishing openings will be scheduled in July and early August well before chinook numbers in the lake peak. Any harvest opportunity for sockeye in Lake Washington by recreational anglers will require the release of chinook. Tribal net fisheries will be relatively short in duration and early in the chinook timing to minimize chinook encounters. Both fisheries will be monitored to assure that takes are within acceptable limits.

3.4) Relationship to habitat protection and recovery strategies.

One of the major factors affecting the natural production of sockeye in the system appears to be losses from gravel movement during high flows. Much of the main stem Cedar River is channelized, providing little protection for incubating eggs during high winter flows. Information collected by monitoring fry production in the Cedar River indicates a strong inverse relationship between peak winter flows above a minimum threshold and egg to fry survival.

Other possible factors affecting natural production is zooplankton production, in-lake predation, and losses at the Chittenden Locks at Ballard during smolt out-migration. Improvements have been made at the Ballard Locks to reduce injury rates. Two spill gates in the dam have been fitted with smolt passage flumes. These offer safe passage for smolts. By slowing the fill of the large locks fewer smolts seem to be entrained in the first place.

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.

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 Issaquah Creek (Sammamish Lake watershed) is King County (WRIA 8). It also covers the Cedar River watershed and Lake Washington. As work is completed (state and local resource management jurisdictions) on assessing the habitat factors limiting natural production and identifying and implementing habitat restoration and protection strategies in the Lake Washington watershed, WDFW will incorporate relevant information into this document.

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 Cedar River sockeye salmon 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 sockeye salmon survival rates through predation on newly released, emigrating juvenile fish in the marine and nearshore areas. Certain avian and mammalian species may also prey on juvenile sockeye while the fish are at the hatchery site, if these species are not excluded from the area. Species that could negatively impact juvenile sockeye 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
- Coho salmon
- Steelhead
- Chinook salmon

Rearing and migrating adult sockeye salmon originating through the program may also serve as prey for large, mammalian predators in marine and nearshore marine areas 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).

- Chinook salmon

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

Decaying carcasses of spawned adult fish may contribute nutrients that increase productivity in the watershed, providing food resources for the emigrating sockeye salmon.

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

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

- Northern Pikeminnow
- Coho salmon
- Cutthroat trout
- Chinook salmon
- Steelhead
- Pacific staghorn sculpin
- Numerous marine pelagic fish species
- Warmwater species (e.g. smallmouth bass)

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.

The water source for the incubation facility is derived from a series of 4 surface springs that are both pumped and gravity fed into a tower where water is distributed to incubators. Total water usage at the incubation area is approximately 700 gallons per minute (gpm). Chillers are used to otolith mark all fry at the facility. The water source at the adult ponds is derived from four surface springs and is both gravity and pumped. Total use at the 4 adult holding ponds is approximately 1200 gpm during peak usage.

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.

Any water withdrawals for hatchery use occur through screen buckets with 1/16" intake holes. Water is withdrawn with portable trash pumps during daylight hours only to fill fry and adult hauling trucks and for fry acclimation ponds.

The water right permit number for the 4 surface springs is S1-27123. No NPDES permit is needed as no effluents are discharged from this program (incubation only). No listed species are present in the water source.

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods).

Adults are collected with a rack and picket weir (located at RM 6.4) with V entrances containing two 8' X 10' collection boxes. Fish are netted and sorted by hand inside the cages. The weir contains removable picket sections that are lifted to pass all species of fish when sockeye collection is not necessary. In the initial years of the hatchery program gillnets were used to capture broodstock. This method is no longer used if adult chinook are present in the river system.

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

Fish are hauled in two different 300-gallon tank trucks equipped with oxygen and air stones.

5.3) Broodstock holding and spawning facilities.

Broodstock are held in 4 different 13' diameter circular ponds fed with spring water. Adults are spawned pond side at the adult holding area.

5.4) Incubation facilities.

Incubation facilities consist of 20 half stack vertical incubators and 53 Kitoi box upwelling incubators.

5.5) Rearing facilities.

To date, rearing has only occurred on a small, experimental basis and has not yet been incorporated into permanent production.

5.6) Acclimation/release facilities.

Fry are acclimated in four 6' diameter circular holding ponds. Fry are released into 3 separate sites on the Cedar River; directly from the ponds at the hatchery, and from sites in the lower river at RM 2.3 and RM .5. The lower river releases are hauled via 300-gallon tank truck and released directly into the river. All sockeye fry are released one hour after official posted sunset time to mimic the out-migration timing of naturally produced fry.

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

Chilling events occur up to 10 times on each incubator; human error has caused fish mortality in incubators when water flows were not properly adjusted.

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.

No listed species exist within the water source, but sockeye are carriers of the IHN virus, so strict disinfection and isolation procedures are in effect. All spawning and hauling gear is disinfected with a 100 parts per million (ppm) iodophor solution to control the virus. The spawning and holding area is isolated from the incubation area. All incubators are tested for the presence of IHN virus. If any incubators test positive for IHN they are culled and the eggs are destroyed.

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.

Source of broodstock is sockeye returning to the Cedar River trap.

6.2) Supporting information.

6.2.1) History.

This program started in 1991 with naturally spawning fish returning to the Cedar River. The program is now maintained with adults returning to the Cedar River but their origin (hatchery-enhanced or wild) is uncertain. The Lake Washington/Cedar River sockeye were introduced from the Baker River, Washington, beginning in 1935 and from Cultus Lake (B.C. Canada), in 1944, 1950 and 1954. The population has maintained itself, without further introductions, since 1955.

6.2.2) Annual size.

The goal is 6000 females and 6000 males (18,800,000 egg take goal). The annual run size just to the Cedar River can range from 24,000 to 300,000.

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

100% in the past and will consist of all returnees in the future regardless of origin. Hatchery produced adults are indistinguishable from naturally produced fish (see section 6.2.4 below).

6.2.4) Genetic or ecological differences.

The Cedar River program is designed to integrate the hatchery- and natural-origin spawning segments of the population such that they freely interbreed with one another and that domestication and other effects of hatchery culture is minimized. The hatchery broodstock is planned to include both and is designed so that hatchery-origin recruits will contribute to natural reproduction without detriment to the natural-origin segment of the population.

6.2.5) Reasons for choosing.

The Cedar River sockeye is the strongest run of sockeye in the lower 48 states. The stock maintains a long entry and spawn timing in the Cedar River.

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.

Selection is directed only at sockeye salmon. But during collection there is a potential to take listed chinook salmon, through migrational delay, capture, handling, and upstream release, during trap operation on the Cedar River. Protocols are in effect to minimize potential impacts to chinook. The weir will only be operated when sockeye broodstock must be collected; otherwise, the weir is left open to allow passage of chinook salmon. During the 3-4 days of weir operation per week, operational protocols require checking the trap 2-3 times per day. If chinook salmon are observed aggregating below the weir, it will be opened to promote upstream passage of returning adults. The weir is managed so that upstream migrational delay to chinook is no greater than 24 hours.

SECTION 7. BROODSTOCK COLLECTION

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

Adults

7.2) Collection or sampling design.

Adults are collected with a rack and picket weir that contains two 8' X 10' collection boxes. The weir is typically installed after Labor Day in September and is typically in operation until Thanksgiving. Every effort is made to capture a full representation of the run timing as environmental conditions allow. In years where the weir is lost to floods or high water, the later run timing fish are not well represented in the broodstock collection. Gillnets have been used in the past to capture some of the later returning fish after the weir is lost.

7.3) Identity.

Otolith marks are the only way to differentiate between hatchery and wild fish. This is not a visible mark, so the two cannot be differentiated at the time of collection.

7.4) Proposed number to be collected:

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

6,000 females; 6000 males.

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

Year	Adults			Eggs	Juveniles
	Females	Males	Jacks		
1995	1,773	1,550		5,319,000	
1996	4,752	4,441		14,718,000	
1997	3,359	2,432		10,736,000	
1998	3,296	2,507		10,520,000	
1999	967	853		3,174,000	
2000	5,370	4,921		17,171,000	
2001	3,789	2,957		12,113,000	
2002	5,330	5,142		17,044,000	
2003	3,261	2,366		10,424,000	

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

All fish, if not used for broodstock, are allowed to pass the collection weir and spawn naturally, regardless of origin.

7.6) Fish transportation and holding methods.

All fish captured at the weir are hauled via tanker truck to holding ponds at Landsburg. The haul takes approximately 20 minutes. No anesthetic is used. Fish are typically held between 2 and 14 days before spawning.

7.7) Describe fish health maintenance and sanitation procedures applied.

Sockeye are carriers of the IHN virus, so strict disinfection and isolation procedures are in effect. All spawning and hauling gear is disinfected with a 100 parts per million (ppm) iodophor solution to control the virus. The spawning and holding area is isolated from the incubation area.

7.8) Disposition of carcasses.

All spawned and un-spawned carcasses are returned to the Cedar River for nutrient enhancement.

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.

Protocols are in effect to minimize potential impacts to chinook. The weir will only be operated when sockeye broodstock must be collected; otherwise, the weir is left open to allow passage of chinook salmon. During the 3-4 days of weir operation per week, operational protocols require checking the trap 2-3 times per day. If chinook salmon are observed aggregating below the weir, it will be opened to promote upstream passage of returning adults.

SECTION 8. MATING

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

8.1) Selection method.

Spawners are selected randomly at the collection weir to match the natural run entry timing of the population. They are selected on spawning days depending on ripeness.

8.2) Males.

Every female receives a primary male and backup male. Jacks are used when available.

8.3) Fertilization.

All matings are individual 1:1 with a backup male. All fertilization occurs in individual plastic bowls. A teaspoon of water is used as a sperm activator. All eggs are washed, disinfected, and water hardened in a 100 parts per million (ppm) iodophor solution.

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.

NA

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.

Egg take has ranged from a low of 2 million to a high of 18.5 million. Green to eyed survival rates are typically over 90%.

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

NA

9.1.3) Loading densities applied during incubation.

Eggs are typically 8 eggs per gram. Kitoi incubators are set at 10 gpm and loaded with 250,000 eggs on average. Vertical incubators are set at 4 gpm and loaded at 13,000 eggs per tray.

9.1.4) Incubation conditions.

Incubators are checked daily by hatchery personnel. Temperature at the incubation facility is between 45-48 degrees Fahrenheit. Silt is minimal due to spring water source. The incubators are flushed occasionally to remove any organic buildup. Temperature is monitored daily. Dissolved oxygen is not monitored frequently but is generally saturated.

9.1.5) Ponding.

Fry are ponded at an average KD index factor of 1.82 or at a Temperature Unit (TU) average between 1700 and 1800. Fry typically are around 2800 fish per pound (fpp) with an average length of 29 millimeters (mm) at ponding. Ponding is forced and is typically around 126 days post fertilization.

9.1.6) Fish health maintenance and monitoring.

Fungus is controlled with daily formalin treatments. Egg mortality is removed when eggs are shocked and picked at 700 TU's. All incubators are sampled for the presence of IHN virus.

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.

Sockeye are carriers of the IHN virus, so strict disinfection and isolation procedures are in effect. All spawning and hauling gear is disinfected with a 100 parts per million (ppm) iodophor solution to control the virus. The spawning and holding area is isolated from the incubation area.

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..

NA

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

Fry rearing has only been experimental to date; loading level was 1 pound per cubic foot.

9.2.3) Fish rearing conditions

NA

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.

NA

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

NA

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*).

NA

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

NA

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

Gill ATPase activity is not monitored.

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

NA

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.

NA (no rearing takes place).

SECTION 10. RELEASE

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

10.1) Proposed fish release levels.

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Eggs				
Unfed Fry	16,000,000	2,000	January-April	Cedar River
Fry				
Fingerling				
Yearling				

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

Stream, river, or watercourse: Cedar River (08.0299)
Release point: Cedar River (RM 21.7, 2.3, 0.5)
Major watershed: Lake Washington
Basin or Region: Puget Sound

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

Release	Eggs/ Unfed	Avg size	Fry	Avg size	Fingerling	Avg size	Yearling	Avg size
1995	7,182,522	3,088						
1996	5,592,000	3,088						
1997	15,204,000	3,088						
1998	9,800,300	2,775						
1999	9,627,000	2,700						
2000	3,346,000	2,600						
2001	17,149,000	2,740						
2002	12,532,000	2,657						
2003	15,957,000	2,852						
Average	10,709,980	2,843						

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

Release date is dependent on stage of development and KD index factor. Fish are forced released from the acclimation ponds or tanker truck. Releases typically occur from the third week in January through the end of April.

10.5) Fish transportation procedures, if applicable.

Fish are hauled to down river release sites via 300-gallon tanker trucks and all fish are released one hour after sunset to mimic natural out-migration timing.

10.6) Acclimation procedures.

Fish are acclimated to Cedar River water for 8-12 hours on the day of release.

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

All fry released are otolith marked.

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

NA

10.9) Fish health certification procedures applied pre-release.

All incubators are tested for the presence of IHN virus. Any incubators testing positive for IHN are culled and the eggs are destroyed.

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

Emergency release in response to flooding events is highly dependent on the situation and development stage of the eggs/fry.

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.

Life history, feeding habits, and behavioral attributes of sockeye salmon are expected to result in limited competitive and predatory interactions with listed chinook salmon. The Species Interaction Workgroup (SIWG) (1984) identified sockeye as posing a low risk of competition and predation to naturally produced chinook in freshwater.

SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

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

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

A comprehensive monitoring and adaptive management plan is under development by the Cedar River Anadromous Fish Committee.

The co-managers conduct numerous ongoing monitor programs, including catch, escapement, marking, tagging, and fish health testing. The focus of enhanced monitoring and evaluation programs will be on the risks posed by ecological interactions with listed species. WDFW is proceeding on four tracks:

1) An ongoing research program conducted by Duffy et al. (2002) is assessing the nearshore distribution, size structure, and trophic interactions of juvenile salmon, and potential predators and competitors, in northern and southern Puget Sound. Funding is provided through the federal Hatchery Scientific Review Group. Preliminary results by Duffy et al. (2005, HSRG Research Workshop) indicated that the dominant predator of salmonids in the nearshore and estuary environments is cutthroat trout. Chinook were found to prey largely on herring and sandlance. The biggest prey item for coho was marine plankton and pink and chum salmon.

2) A three-year study of the estuarine and early marine use of Sinclair Inlet by juvenile salmonids is nearing completion. The project has four objectives:

a) Assess the spatial and temporal use of littoral habitats by juvenile chinook throughout the time these fish are available in the inlet;
b) Assess the use of offshore (i.e., non-littoral) habitats by juvenile chinook;
c) Determine how long cohorts of juvenile chinook salmon are present in Sinclair inlet;
d) Examine the trophic ecology of juvenile chinook in Sinclair Inlet. This will consist of evaluating the diets of wild chinook salmon and some of their potential predators and competitors. Funding is provided by the USDD-Navy.

3) WDFW is developing the design for a research project to assess the risks of predation on listed species by coho salmon and steelhead released from artificial production programs. Questions that this project will address include:

a) How do trucking and the source of fish (within watershed or out of watershed) affect the migration rate of juvenile steelhead?
b) How many juvenile chinook salmon of natural origin do coho salmon and steelhead consume?
c) What is the rate of residualism of steelhead in Puget Sound Rivers?
Funding needs have not yet been quantified, but would likely be met through a combination of federal and state sources.

4) WDFW is assisting the Hatchery Scientific Review Group in the development of a template for a regional monitoring plan. The template will provide an integrated assessment of hatchery and wild populations.

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 will be provided through the Cedar River HCP. See section above.

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.

Risk aversion measures will be developed in conjunction with the monitoring plan.

SECTION 12. RESEARCH

12.1) Objective or purpose.

Not applicable.

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.

SECTION 13. ATTACHMENTS AND CITATIONS

Duffy, E.J., D.A. Beauchamp and R.L. Buckley. 2002. Marine distribution and trophic demand of juvenile salmon in the Puget Sound. Washington Cooperative Fisheries and Wildlife Research Unit, Washington Department of Fish and Wildlife. Olympia, WA.

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Hershberger, W.K., and R.N. Iwamoto. 1981. Genetics Manual and Guidelines for the Pacific Salmon Hatcheries of Washington. Univ. of Wash. College of Fisheries. Seattle, WA. 83

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Salmon and Steelhead Inventory (SaSI). 2002. Salmon and steelhead inventory - 2002. Introduction, Summary Tables, and North Puget Sound, South Puget Sound, Hood Canal and Strait of Juan de Fuca volumes. Fish Program, Science Division. Washington Department of Fish and Wildlife. Olympia, WA.

Seidel, Paul.1983. Spawning Guidelines for Washington Department of Fish and Wildlife Hatcheries, Washington Department of Fish and Wildlife, Olympia, WA.

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U.S. District Court of Western Washington. 1976. United States v. Washington, 384 F, Supp. 312.

United States v. Washington, No. 9213 Phase 1 (sub no. 85-2) Order Adopting Puget Sound Management Plan, 1985

Washington Department of Fisheries. 1991. Stock Transfer Guidelines. Hatcheries Program, Washington Department of Fisheries. Olympia, WA.

Washington Department of Fish and Wildlife. 1996. Fish Health Manual. Hatcheries Program, Fish Health Division, Washington Department of Fish and Wildlife, Olympia, WA.

Washington Department of Fish and Wildlife and Western Washington Treaty Indian Tribes. 1998. Salmonid Disease Control Policy of the Fisheries Co-Managers of Washington State. Olympia, WA.

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)- Cedar River*
Activity	Cedar River Sockeye Program
Location of hatchery activity	Cedar River Hatchery, RM 21.7 of Cedar River (08.0299)
Dates of activity	August- April
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)	-	-	-	-
Other take (indirect, unintentional) (h)	-	Unknown	-	-

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.