HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

DRAFT

Hatchery Program	Washougal Hatchery Cooperative Projects - Remote Site Egg Incubators (RSIs) in Clark County
Species or Hatchery Stock	Washougal River Type N Coho (*Oncorhynchus kisutch*)
Agency/Operator	Washington Department of Fish and Wildlife
Watershed and Region	WRIA 28 Salmon Creek/Washougal Basin/Lower Columbia Province
Date Submitted	-
Date Last Updated	January 18, 2005

Section 1: General Program Description

1.1 Name of hatchery or program.

Washougal Hatchery Cooperative RSI Programs

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

Coho Salmon (*Oncorhynchus kisutch*)

ESA Status: Type N coho from Washougal Hatchery are included in the NOAA Inventory for the LCR coho ESU but are not considered to be integrated with the historical population (NOAA 69 FR 33101; 6/14/2004). Lewis River Type N coho are integrated with the historical population in the Lewis River and currently provide eggs for one of the RSI projects.

1.3 Responsible organization and individuals.

Name (and title):	Richard Johnson
	Washougal-Skamania Hatcheries Complex Manager
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Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program.

Co-operators	Role
National Marine Fisheries Service	Manager of Mitchell Act Funding Source Relative to Broodstock Supplementation for Mitchell Act Hatcheries
Clark Public Utilities (CPU)/ Clark County District 5 Fire Fighters/ Syverson Project	Local Governmnet, Non-Profit Education, Community Support Organizations and Private Landowners

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

Funding Sources
Mitchell Act (Supplemental Funds for Broodstock Programs of Local Mitchell Act Hatcheries) - Full-time equivalent staff and annual operating cost are cumulative to Washougal or Lewis River Hatchery Anadromous Fish Programs and cannot be broken out specifically by program for providing eyed eggs for these projects.
Columbia Springs Environmental Education Center and Clark Public Utilities - Expenses relative to Clark Public Utiltiy, Columbia Springs Environmental Education Center (CSEEC) which was created in partnership of Clark Public Utilities, along with volunteer expenses is unknown.

1.5 Location(s) of hatchery and associated facilities.

Broodstock source	Washougal/Lewis Hatchery Type N Coho
Broodstock collection location (stream, RKm, subbasin)	Washougal Hatchery/Washougal River/RKm 32.2/Washougal & Lewis River Hatchery Trap/North Fork Lewis River/RKm 20.9/Lewis; and Merwin Trap/North Fork Lewis River/RKm 25.8/Lewis
Adult holding location (stream, RKm, subbasin)	Washougal Hatchery/Washougal River/RKm 32.2/Washougal & Lewis River Hatchery Trap/North Fork Lewis River/RKm 20.9/Lewis
Spawning location (stream, RKm, subbasin)	Washougal Hatchery/Washougal River/RKm 32.2/Washougal & Lewis River Hatchery Trap/North Fork Lewis River/RKm 20.9/Lewis
Incubation location (facility name, stream, RKm, subbasin)*	Washougal Hatchery/Washougal River/RKm 32.2/Washougal & Lewis River Hatchery Trap/North Fork Lewis River/RKm 20.9/Lewis

*Once the eggs are eyed, the Columbia Springs Environmental Education Center and Washougal Hatchery (Lewis River Hatchery for Syverson Project) coordinates with volunteers for egg transfers to the projects.

Clark Public Utilities Sites

The following RSI sites are scheduled for 2004/2005 (WDFW Future Brood Document-FBD). They are located at seven landowner sites. The Whipple Creek (Buss) project is a tributary of Lake River. 70,000 eyed eggs at 10,000 eggs per RSI are incubated at seven (7) sites:

- Alki Middle School (Buss Project) – RSI location is on an unamed left bank tributary of Whipple Creek at approximately RKm 7.0.
- Roscoe Project – RSI location is on a left bank unnamed tributary to Salmon Creek at approximately RKm 13.2.
- Kinney (Bishop Project) – RSI is located on Curtin Creek approximately one half mile above the confluence with Salmon Creek located at approximately RKm 14.8.
- Hogg Project (Casee Center)– RSI location is on a left bank tributary that merges with Salmon Creek in the vicinity of NE 149th Street in Brush Prairie at approximately RKm 17.8 .
- Meadow Glade Elementary (McNabb Project) – RSI is located on an unnamed right bank tributary of Salmon Creek located at approximately RKm 22.7.
- Sorenson Project – RSI is located on Little Salmon Creek approximately one half mile above the confluence of Little Salmon Creek with Salmon Creek at approximately RKm 48.3.
- Orander Project – RSI location is on an unnamed right bank tributary entering Salmon Creek at RKm 38.4.

District 5 Firefighters (Clark County)

Clark County District 5 Firefighters RSI Site is located on an unnamed right bank tributary which enters Salmon Creek at approximately RKm 48.3 a short distance upstream of the confluence with Little Salmon Creek. Up to twelve RSIs totaling 90,000 eyed eggs are scheduled for incubation in an off-channel pond adjacent to the creek.

Syverson Project

Syverson RSI Project is maintained on Little Salmon Creek, located at RKm 49.6 approximately

1.6 RKm below Salmon Falls. A total of 5,000 eggs are incubated at this site.

1.6 Type of program.

Integrated Recovery

1.7 Purpose (Goal) of program.

Remote Site Incubators (RSI) are used to incubate, hatch, and release coho fry which results in community stewardship of Salmon Creek and Lake River watersheds. Harvest is not a goal but some contribution to the existing coho population could occurr. The goal of this program is to supplement the lost natural production in the watershed with Remote Site Incubators (RSI) in conjunction with nutrient enhancement, educational, and habitat restoration efforts.

1.8 Justification for the program.

Currently, NOAA's hatchery listing proposals do not consider Washougal or Lewis River eggs used in the RSI programs to be integrated with the historical (Salmon Creek) population (NOAA Hatchery Listings May 28, 2004). Use of coho eggs from Washougal and/or Lewis River Hatcheries are currently under discussion for continued use in Salmon Creek system. Under the Columbia River Development program in the 1950s, off station planting was common place, with most significant streams having received coho plantings. The result is a widely mixed coho stock with Salmon Creek populations considered a "mixed" stock with "composite" production (**SaSI** 2002, Draft). Since 1958, coho fry have been introduced in this system with Washougal River contributing most of the eggs from 1960-1992 and from 1995 to present (Draft - Lower Columbia River Coho Salmon Historical Demographically Independent Populations, TRT 2004).

The Washington Department of Fish and Wildlife supports the use of unfed fry programs only in certain areas and under certain specific conditions. The areas where RSIs are most likely to be appropriate are streams historically inhabited by the juvenile fish of the species of interest, but where they are not now present or have lost significant useabe habitat. In some cases, RSIs can be used in stream areas with partial or significant passage barriers. RSIs may be used to supplement existing populations only if information from a physical and biological survey of the stream suggests that the local population is extremely depressed and that there is sufficient habitat available to support the a level of unfed fry without having a detrimental effect on the local population. Although the main goal for this progam is education and watershed stewardship, some smolt contribution from RSI projects of .275% has been documented in studies on the Lewis River (pers. comm. John Weinhemer 2004).

The Columbia Springs Environmental Education Center with support from Clark Public utilities provides coordination and educational support to local citizens in helping restore the Salmon Creek and Lake River watersheds. This includes operation of the Vancouver Trout Hatchery in cooperation with the Washington Department of Fish & Wildlife, educational programs for children, such as 48 school aquarium projects for the Salmon in the Classroom (SIC), and to to encourage overall environmental awareness. Educational benefits are on-going with restoration of riparian habitat with tree plantings and other bank stabilization efforts. Remote Site Incubators are part of the community based effort to help educate and improve the overall watershed health of Salmon Creek. Along with efforts to remove barriers to increase spawner access, additional adult escapement is needed along with restoration efforts to increase salmonid productivity in this system.

1.9 List of program "Performance Standards".

See Section 1.10

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

Benefits		
Performance Standard	**Performance Indicator**	**Monitoring & Evaluation**
Benefits include partnerships and education with local government and local citizens	CPU and the Columbia Springs Environmental Education Center coordinates ongoing and future cooperative projects	Volunteer involvement is tracked yearly and total hours committed are recorded.
Augment naturally spawning populations using RSI technology.	Use available evaluation and contribution studies of wild smolts and adults to systems	WDFW monitors Cedar Creek with results used to evaluate similar RSI projects.
RSI programs operate per Cooperative Fish and Wildlife Project Memorandum of Understanding Fish Production Agreement	Cooperator reviews and submits MOU to WDFW for each year involved in the project.	WDFW compiles MOU and manages volunteer and partnership program reporting procedures
Individual RSI programs sites are highly successful at hatching eggs and swim-up fry.	RSI programs achieve a 95% eyed egg to hatch and 90% swim-up survival rate.	Cooperator submits yearly WDFW Volunteer Fish production Project Release and Planting Record Form that includes details on success of program. WDFW reviews and recommends changes if needed.
RSIs minimize impacts and/or interactions to ESA listed fish. See also Risks below.	Individual RSI projects and numbers of eggs incubated are consistent with the WDFW FBD.	Cooperator submits yearly WDFW Volunteer Fish production Project Release and Planting Record Form that includes details on fish released, date of releases and location of projects.
Risks		
Performance Standard	**Performance Indicator**	**Monitoring & Evaluation**
Augment naturally spawning populations using RSI technology.	Use available evaluation and contribution studies of wild smolts and adults to systems	WDFW monitors Cedar Creek with results used to evaluate similar RSI projects.
Minimize impacts and/or interactions to ESA listed fish	RSI projects and numbers of eggs incubated are consistent with the WDFW FBD	FBD is reviewed annually by WDFW Staff for stock, size, number, date of release and location of projects.
RSI units operate in compliance with all applicable fish health protocols.	Egg/Fish health documented. Goal is to prevent the introduction, amplification or spread of fish pathogens that might negatively affect the health of both hatchery and naturally reproducing stock.	RSI Project leads and coordinators communicate regularly with Region 5 staff. Dead eggs are removed and disposed of properly to prevent fungal incidence (*Saprolegniasis).*
Ensure RSI operations comply with state and federal water quality and quantity standards through proper environmental monitoring	MOU Section 4. The Cooperator shall also be responsible for obtaining and complying with any and all necessary permits to conduct the project(s) described in the attached Exhibit(s), which may include but are not limited to: Hydraulic Project Approvals (HPA), State Environmental Protection Act checklist (SEPA), National Pollution	The Cooperator complies with all permits required and submits MOU to WDFW for each year involved in the project before project is approved.

	Discharge Elimination System (NPDES), Water Rights, local construction, grading, or filling permits, etc, with the exception of federal ESA compliance, which can only be deferred upon WDFW or the Treaty Tribes of Washington. MOU Section 4. The Cooperator shall also be responsible for obtaining and complying with any and all necessary permits to conduct the project(s) described in the attached Exhibit(s), which may include but are not limited to: Hydraulic Project Approvals (HPA), State Environmental Protection Act checklist (SEPA), National Pollution Discharge Elimination System (NPDES), Water Rights, local construction, grading, or filling permits, etc, with the exception of federal ESA compliance, which can only be deferred upon WDFW or the Treaty Tribes of Washington.	
Water useage and in-stream water diversion structures for RSI will not affect spawning behavior of natural populations or impact juveniles.	WDFW staff provides technical site evaluation and operational support to minimize impacts of RSI water intakes (PVC pipe intake) or screen material for floating RSIs.	The Cooperator submits yearly WDFW Volunteer Fish production Project Release and Planting Record Form that includes details success or operational concerns.

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

For 177,000 eyed eggs, approximately 192,300 green eggs (10% loss from green to eyed egg) are needed from approximately 120 adults spawned at a 1:1 male to female ratio at Washougal Hatchery. For Syverson project, two spawning pairs would be needed at Lewis River hatchery for 5,000 eyed eggs.

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

Age Class	Max. No.	Size (ffp)	Release Date	Location			
				Stream	Release Point (RKm)	Major Water-shed	Eco-province
Fry	70,000	1,500	April	Salmon Creek /Lake River Basin	See Section 1.5	Salmon Creek	Lower Columbia
Fry	90,000	1,500	April	Salmon Creek	See Section 1.5	Salmon Creek	Lower Columbia
Fry	5,000	1,500	April	Salmon Creek	See Section 1.5	Salmon Creek	Lower Columbia

Additionally up to 12,000 fed fry are planted from forty eight (48) Salmon in the Classroom (SIC) schools. Each school aquarium receives 250 eggs. Approximately half of those fry plants are made in Salmon Creek watershed with others planted to numerous other Clark County streams.

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

Program performance for the incubation and operational success of these projects are based on expectations that RSI programs should exceed 90% eyed-egg to swim-up fry success. Smolt productivity or adult contribution from this program are not known because eggs are not otolith marked nor monitored at this time.

While RSIs in this program are not otolith marked, the wild coho eggs used in RSIs in Cedar Creek system are marked which could give some idea of contribution (Fish First Wild Coho RSI HGMP, DRAFT 2005). Cedar Creek is the major spawning tributary for the Lewis River (Lewis Subbasin Summary (NPPC), DRAFT, May 17, 2002). Recent WDFW smolt monitoring work on otolith marked RSI coho eggs in Cedar Creek, indicates RSI contributions in 2002 of a .275% (eyed egg to smolt survival) equating to 1,100 smolts (approximately 2.98% of the captured run) from the 400,000 egg RSI program in that system This does not include potential contribution from fry or fingerlings that migrated out of the tributaries before or after the sampling period and reared to smolt stage in other areas in the N.F. or mainstem Lewis River. Contribution estimates could be based on the Cedar Creek research if the productivity of the tributaries in this RSI program were similar.

Rough contribution or estimates could be based on the Cedar Creek research if Salmon Creek productivity was similar to the productivity in Cedar Creek basin. Sitings of spawning cohorts in the immediate vicinity of the RSIs also have been reported by the landowners involved in the projects.

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

RSI programs in Clark County started in 1995. The program became popular due to outreach efforts and additional RSI projects in Salmon Creek basin have been requested for the near future. WDFW will be reviewing the continued use of RSIs and require that any additional sites or increases in numbers of eggs follow Future Brood Document (FBD) policy review submittal.

1.14 Expected duration of program.

On-going program until monitoring can determine that self-sustaining population densities are achieved or are re-evaluated by fisheries co-managers in Washington.

1.15 Watersheds targeted by program.

Salmon Creek/Lake River Subbasin/Lower Columbia Province

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

1.16.1) Brief Overview of Key Issues

The Clark County Public Utility (CPU) program is a Remote Site Incubator (RSI) program with seven boxes at seven different sites where land owners have allowed CPU to perform habitat restoration work on their property. This program is also associated with the Salmon In The Class Room (SIC) sponsored by CPU, with 48 aquariums in classrooms through out Clark County. The Fire District 5 program involves an additional RSI site in upper Salmon Creek with a connection

to habitat restoration. School children visit the site on field trips. The Syverson project is one RSI on Little Salmon Creek. The Syverson project has been identified as one of the propagation programs included in the proposed listing for the Lower Columbia ESU (NOAA 69 FR 33101; 6/14/2004) as eggs are currently from Lewis River. WDFW has had additional requests for RSI projects. Additional projects would be dependent on the FBD policy application, review and approval.

1.16.2 Potential Alternatives to the Current Program

Alternative 1: Release coho adults into the tributaries so they can naturally seed the habitat. The success of this alternative would need to be examined to determine if it is viable.

Alternative 2. Discontinue this program. The wild fish will utilize the habitat improvements and the population will increase over time. WDFW does not support the elimination of this program. This is a valuable educational program that promotes habitat awareness and improvement. It is unknown if the wild coho returning to these tributaries is any where near carrying capacity. WDFW would review new proposals for RSIs and require that any additional sites or increase in numbers of eggs follow Future Brood Document (FBD) policy review submittal.

Alternative 3. Change to Type S coho.

1.16.3 Potential Reforms and Investments

Reform/Investment 1: Monitoring and evaluation of the interaction, production, and the carrying capacity of listed species in these tributaries should be implemented.

Reform/Investment 2: A comprehensive otolith marking and adult recapture program would allow separation from the wild stock.

Reform/Investment 3: Upgrade the barrier/blockage at Highway 99 Bridge. This item is a county wide issue for Salmon Creek fish passage and for monitoring and evaluation of all stocks in the creek. The issue has been engineered and priced out with funds for local City and County folks. The cost to fix is a consideration for current I- 5 work in the area. It would help evaluate and implement recovery of all stocks in the Salmon Creek area.

Section 2: Program Effects on ESA-Listed Salmonid Populations

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

Cooperative programs are part of the Washougal Hatchery Cooperative projects as identified in the Biological Opinion on Artificial Propagation in the Columbia River Basin (NMFS, 1999).

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

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

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

Coho salmon within the Lower Columbia River/Southwest Washington Evolutionary Significant Unit (ESU) were proposed as threatened under the federal Endangered Species Act in 2004. Eggs for the RSI programs from Washougal Hatchery are not considered to be integrated with the historical population although WDFW will propose to integrate the Washougal Coho programs which supplies eggs to these programs. The Syverson project has been identified as one of the artificial propagation programs included in the proposed listing for the Lower Columbia ESU (NOAA 69 FR 33101; 6/14/2004) as eggs are currently from Lewis River.

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

Listed salmon and steelhead present in LCR include lower Columbia River chinook salmon ESU (threatened effective May 24, 1999), lower Columbia River chum salmon ESU (threatened effective May 24, 1999), and lower Columbia River steelhead ESU (threatened effective May 18, 1998). Columbia Basin DPS Bull Trout were listed as threatened on June 10, 1998 (63 FR 31647).

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.

The following species exist in the immediate target area. Planning goals and population thresholds have been established for these ESUs and the populations within them (LCFRB Basin Plans 2004). Projected take actions or levels of take on listed fish are unknown.

Lower Columbia River coho salmon *(Onchorhychus kisutch)*.

Salmon Creek coho stock status is considered "depressed" based on chronically low production (SaSi 2002, Draft). Known coho distribution extends throughout most of Salmon Creek and its tributaries, and into the lower reaches of Whipple and Burnt Bridge Creeks. Current smolt contribution of RSIs to this system is unknown although RSI contribution from otolith research on the Lewis system indicated approximately 3.0% of the production from Cedar Creek was from RSI program eggs.

WDF (1951) estimated coho escapement for all WRIA 28 tributaries, other than the Washougal River, at 2,050 fish. Salmon Creek likely produced a significant proportion of this estimated coho escapement, considering that the creek and its tributaries form the second largest stream system within WRIA 28, and the watershed contains a large amount of low gradient habitat that coho prefer (Harvester and Wille, 1989). The Salmon Creek/Lake River watershed has experienced a decline in adult productivity for all species in the Salmon Creek subbasin besides coho. Declines in adult productivity (from historical levels) range from 79% for fall Chinook to greater than 90% for winter steelhead. Similarly, adult abundance levels have declined for all

species. Current estimates of abundance are only 21% of historical levels for fall chinook, 13% of historical levels for winter steelhead, 15% of historical levels for coho (772 adults) and 0% of historical levels for chum, as they are functionally extirpated from the basin. Current coho smolt productivity estimates are at 14% of historical levels (17,887).

Lower Columbia River fall chinook salmon *(Onchorhychus.tshawytsch*a)
The Lower Columbia River fall chinook salmon within the Evolutionary Significant Unit (ESU) are federally listed as "threatened" under the Endangered Species Act. In Washington, the LCR chinook ESU includes all naturally spawned chinook populations from the mouth of the Columbia River to the Cascade Crest. Escapement surveys in 1936 reported 19 fall chinook spawning in Salmon Creek. In 1951, fall chinook escapement to Salmon Creek was estimated at 100 fish. EDT results indicate a decline in adult productivity of 79% for fall Chinook to with current estimates of abundance only 21% of historical levels for fall Chinook. Current smolt productivity estimates are between 12% and 37% of historical productivity. For adult abundance, restoration of PFC conditions would increase current returns by 353% for fall Chinook (LCFRB Basin Plans 2004).

Lower Columbia River steelhead *(Onchorhychus mykis*s)
There are no adequate abundance trend data available for Salmon Creek winter steelhead, so status is unknown although Salmon Creek has a winter steelhead escapement goal of 400 wild adults (SaSI 2002, Draft). Winter steelhead are distributed throughout Salmon Creek, the lower reaches of Gee, Whipple, and Burnt Bridge Creek, and portions of the Lake River. In 1989, wild winter steelhead spawner surveys on Salmon Creek estimated 80 adult spawners. Hatchery winter steelhead have been planted in the basin since 1957 from Skamania and Beaver Creek Hatcheries. Both stocks are derivatives of Chambers Hatchery fish and are believed to contribute little to natural winter steelhead production in the Salmon Creek (LCFRB Basin Plans 2004). Plants of up to 20,000 fish are made from Klineline Pond Net Pens into Salmon Creek below I-5. Key reaches for winter steelhead in the Salmon Creek basin are located primarily in the middle and upper mainstem. Also, Cowlitz River stocks may have strayed to Salmon Creek after the 1980 eruption of Mt. St. Helens. Along with other speices in the Salmon Creek system, adult steelhead productivity has been greatly reduced (13% of historical levels for winter steelhead). Current smolt productivity is at approximately 25% compared to historical levels (LCFRB Basin Plans 2004).

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.

Hatchery activities are identified in the ESA Section 7 Consultation "Biological Opinion on Artificial Propagation in the Columbia River Basin" (NMFS, 1999). All activities accept for take of listed broodstock cannot be quantified.

1) Broodstock Collection: Broodstock for RSI programs are collected at Washougal and Lewis River Hatcheries (See Washougal or Lewis River Hatchery HGMPs also). Take for proposed coho if they are listed are located at the end of the HGMP.

2) Operation of Hatchery Facilities: All RSI units are "floating units" that are temporally anchored and have been sited in stream reaches that meet conditions for flow and depth. Most anchor points avoid the streambed and are fastened to stream bank structures. They are used for approximately 2-3 months, then dismantled and removed from the stream after fry have vacated the unit. A Cooperative Fish and Wildlife Project Memorandum of Understanding Fish Production Agreement for the Salmon Creek RSI projects are used as a condition of operation with cooperative programs for impacts except ESA compliance. The units are screened to keep

emergent alevins in the unit the unit until swim up which also may prevent wild fish from entering the unit. Indirect take on any listed fish is unknown.

3) Genetic introgression: NOAAs proposed listings of hatchery populations do not consider the Washougal Hatchery stock integrated with the historical population in the Washougal Basin or Salmon Creek (NOAA Proposed Hatchery Listing Determinations May 28, 2004). WDFW will be reviewing continued use of these stocks along with alternatives discussed in section 1.16.

Type N coho from Washougal Hatchery are mostly used for these programs although currently the Syverson project receives Lewis River eggs. For the future, WDFW is proposing to integrate Washougal and Lewis River coho programs, which could include eggs used for the Clark County programs. Coho stocks for both Salmon Creek and Washougal are located in WRIA 28 and are grouped within the Cascade Crest Stratum (Draft Lower Columbia River Coho Salmon Historical Demographically Independent Populations, TRT 2004). Type N coho populations are typically later returning, an advantage for upstream migration during fall stream recharging. Indirect take from genetic introgression is unknown. Future upgrades with the barrier at the Highway 99 Bridge will eliminate adult passage that is dependent on higher stream flows.

4) Hatchery Production/Density-Dependent Effects: RSI units can hatch and produce up to 95% swim up fry from the units. Compared to wild spawning and swim up rates of 5-20% depending on habitat, RSIs can initially boost numbers of fry to the system although productivity of the system determines smolt production and any adults produced. Productivity could be increased six fold based on preservation and restoration properly functioning conditions (PFC) with current smolt productivity of 17,877 fish (LCFRB Basin Plans 2004). Contribution from the RSIs could add approximately 400 – 500 smolts to the smolt productivity if productivity was similar to RSI contribution in the Cedar Creek (Lewis River). Indirect take due to hatchery density dependent effects is unknown.

5) Disease: Eyed eggs have been incubated at Washougal and Lewis River hatchery under IHOT Fish Health guidelines. Eyed eggs have been shocked and picked to egg transfers to the RSI sites and volunteers regularly remove dead eggs from the RSI units to prevent fungal spread (*Saprolegniasis)* from dead eggs to healthy eggs.

6) Competition: RSI incubation techniques can have egg-to-fry survival rates of well over 95%, a significant increase over values reported for naturally incubated eggs. Releasing un-fed fry into reduced rearing habitat due to reduced summer flows could increase competition for food and habitat. Currently habitat productivity in Salmon Creek is considered low due to development and habitat limiting factors. The RSI program is designed to temporarily jump-start and re-colonize areas where habitat improvement work is being conducted. Indirect effects on listed fish is unknown.

7) Predation: Coho released from the RSIs at approximately 1,500 FPP (30-35mm fl) starting in March-April of the year. During the first year, coho fry will feed in competition with natural origin fish but as the first of year life stage is the same for salmonids there is no predator prey size advantage during the first year. Fall Chinook if they exist in the system will be emigrating from the system from March through August with known spawning occurring in the lower 8.0 RKm (LCFRB Basin Plans 2004). Naturally produced coho or steelhead life cycles include fry to fingerling to sub yearling and yearling stages through the following year. There would be no predator prey advantage with fish of similar sub-yearling to yearling life stage cycle. Listed steelhead spawn from March to June (LCFRB Basin Planning 2004) with emergence approximately 50 – 70 days later depending on temperature units. It is unknown what predation impacts sub yearling or yearling smolts would have on listed fish in the system.

8) Dates of Releases: Coho fry are released from RSI projects beginning in late March and could

continue through April. RSI coordinators set dates to coincide with school education programs in order for students to help with planting groups of fish from the RSIs. This is done in the general vicinity of the RSI site.

9) Residualism: It is unknown if residualism occurs with these programs since they are only hatched out and then released.

10) Migration Corridor/Ocean: It is unknown due to the small number of eggs and fish involved with this program if there is any impact.

Associated Monitoring Activities – Baseline monitoring of adults or smolt is not done in Salmon Creek basin. The following monitoring activities are also conducted in the Lower Columbia Management Area (LCMA) for adult steelhead and salmon. Included are redd surveys conducted for winter steelhead in the SF Toutle, Coweeman, EF Lewis and Washougal rivers. Redd surveys are also conducted in the Cowlitz River for fall and spring chinook. Mark-recapture carcass surveys are conducted to estimate populations of chinook salmon in Grays, Elochoman, Coweeman, SF Toutle, Green, Kalama, NF Lewis, EF Lewis rivers and Skamokawa, Mill, Abernathy, and Germany creeks and for all chum salmon populations. Snorkel surveys are conducted for summer steelhead in the EF Lewis and Washougal rivers. Trap counts are conducted on the Cowlitz, NF Toutle, Kalama, and Wind rivers and on Cedar Creek, a tributary of the NF Lewis River. All sampling of carcasses and trapped fish include recovery of coded wide tagged (CWT) fish for hatchery and wild stock evaluation. Any take associated with monitoring activities is unknown but all follow scientific protocols designed to minimize impact.

Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken, and observed injury or mortality levels for listed fish.
See take tables at the end of this document.

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 tables at the end of this document.

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.
Take levels will not exceed levels described in this plan. The amount of adults taken for this program is set through the FBD process.

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.

Cooperative programs are aligned though hatchery programs and these RSI are intended to integrate with restoration and nutrient enhancement programs in the Salmon Creek/Lake River watersheds. Washougal and Lewis Hatchery provide the eggs for these programs and 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 Columbia River 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). Also, *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (Genetic Policy Chapter 5, IHOT 1995).

Spawning Guidelines for Washington Department of Fisheries Hatcheries. Assembled to complement the above genetics manual, these guidelines define spawning criteria to be use to maintain genetic variability within the hatchery populations (Seidel 1983). Also, *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (Genetic Policy Chapter 7, IHOT 1995).

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 in the Columbia Basin. Details hatchery practices and operations designed to stop the introduction and/or spread of any diseases within the Columbia Basin. Also, *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (Genetic Policy Chapter 5, IHOT 1995).

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.

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

Cooperative Fish and Wildlife Project Memorandum of Understanding (MOU) Fish Production Agreement:

A Cooperative Fish and Wildlife Project Memorandum of Understanding Fish Production Agreement is used to monitor volunteer cooperative programs. Among the important operational concerns, the Cooperator is be responsible for: a) obtaining permission to work on private property; b) maintaining a list of volunteer workers and their hours of work; and c) submitting completed annual planting slips to the Department within 30 days of release. The

Cooperator shall also be responsible for obtaining and complying with any and all necessary permits to conduct the project(s) described in the attached Exhibit(s), which may include but are not limited to: Hydraulic Project Approvals (HPA), State Environmental Protection Act checklist (SEPA), National Pollution Discharge Elimination System (NPDES), Water Rights, local construction, grading, or filling permits, etc, with the exception of federal ESA compliance, which can only be deferred upon WDFW or the Treaty Tribes of Washington.

RSI Programs in Legislative code:
RSI programs described are in Legislative code: CW 77.95.200 "Remote site incubator program" formally RCW 75.50.190 - The legislature finds that trout and salmon populations are depleted in many state waters. Restoration of these populations to a healthy status requires improved protection of these species and their habitats. However, in some instances restoration of self-sustaining populations also requires the reintroduction of the fish into their native habitat. Remote site incubators have been shown to be a cost-effective means of bypassing the early period of high mortality experienced by salmonid eggs that are naturally spawned in streams. In addition, remote site incubators provide an efficient method for reintroduction of fish into areas that are not seeded by natural spawning. The technology for remote site incubators is well developed, and their application is easily accomplished in a wide variety of habitat by persons with a moderate level of training. It is a goal of the remote site incubator program to assist the reestablishment of wild salmon and trout populations that are self-sustaining through natural spawning. In other cases, where the habitat has been permanently damaged and natural populations cannot sustain themselves, the remote site incubator program may become a cost-effective long-term solution for supplementation of fish populations.

Partnership with CPU and the Columbia Springs Environmental Education Center (CSEEC):
The partnership with CPU is a cooperative effort with an important education benefit to bring back natural production in the Salmon Creek system. The coordination of this effort is through the Columbia Springs Environmental Education Center (CSEEC) which was created in partnership of Clark Public Utilities, Evergreen School District, the Washington Department of Fish and Wildlife, City of Vancouver/Clark County, and Clark College in 1997. The goal is to provide environmental education for local students in grades K-12 and college.

Salmon in the Classroom program (SIC):
A large and well-coordinated Salmon in the Classroom program (SIC) also operates in Clark County. SIC was created in 1991 by the Washington Department of Fish and Wildlife to provide students an opportunity for hands-on environmental education. By studying salmon habitat, water quality, and the salmon themselves, students can learn about the interrelationships of species within their local watershed. In learning how to protect the salmon's environment, the students are ultimately learning how to protect their own environment.

3.3 Relationship to harvest objectives.

Fish are not marked in any way to contribute to harvest objectives. Any adults produced from the RSI educational programs would be protected by harvest rules on wild coho. There is no sport salmon harvest in Salmon Creek and no hatchery coho are released with adipose fin clips.

3.4 Relationship to habitat protection and recovery strategies.

Clark Public Utilities RSI projects were aligned with private landowners who have agreed to work with CPU on habitat restoration work on their property at no cost to them. Habitat restoration or preservation priorities have been identified by Ecosytem Diagnosis Treatment (EDT) in WRIA 28 (LCRFRB Basin Plans). In some areas, the RSI sites might not be in the highest priority area but are still important from a basin wide approach of working on multiple tributaries for a cumulative affects approach to the overall health of the system. A WRIA 28 limiting factors report (Wade, 2001) is also used to identify areas that need restoration. The Salmon Creek/Lake River watersheds is the second largest system in WRIA 28 which includes the Washougal River. Recovery strategies for WRIA 28 and other Lower Columbia River ESU (WRIA's 25-29) is coordinated through the Lower Columbia Fish Recovery Board. WDFW fish and habitat programs staff participates in the LCFRB process as well as HPA permitting and hatchery programs.

3.5 Ecological interactions.

Below are discussions on both negative and positive impacts relative to the Lewis River coho programs and are taken from the Puget Sound listed and non-listed HGMP template (WDFW and NOAA 2003).

(1) Salmonid and non-salmonid fishes or species that could negatively impact the program: Coho fry, fingerlings and smolts can be preyed upon throughout the entire Salmon Creek system by resident trout and larger salmon and steelhead as well as numerous resident species in the system. When emigrating, from the migration corridor to the main stem Columbia River and estuary, Northern pikeminnows and introduced spiny rays along the Columbia main stem sloughs can prey on coho smolts. Avian predators, including gulls, mergansers, cormorants, belted kingfishers, great blue herons and night herons prey on coho smolts. Mammals that can take a heavy toll on migrating smolts include river otters, while returning adults are preyed upon by harbor seals, sea lions and Orcas.

(2) Salmonid and non-salmonid fishes or species that could be negatively impacted by the program: Co-occurring natural salmon and steelhead populations in Salmon Creek and tributary areas could be negatively impacted by program fish. Target populations would be the ESA listed endangered and threatened salmonids: Lower Columbia River Chinook salmon ESU (threatened), Columbia River chum salmon ESU (threatened), Lower Columbia River steelhead ESU (threatened) and proposed Lower Columbia Coho (candidate). Listed fish can be impacted thru a complex web of short and long term processes and over multiple time periods which makes evaluation of this a net effect difficult. WDFW is unaware of studies directly evaluating adverse ecological effects to listed salmon. RSI programs both in the size of the numbers and fry stage released is not believed to have significant impacts. See also Section 2.2.3 Predation and Competition.

3) Salmonid and non-salmonid fishes or other species that could positively impact the program. Spawning Chinook, coho and winter steelhead occurs in this system. Non-salmonid fishes such as sculpins, lampreys and sucker also occur and could be potential prey items at larval stages. Carcasses from the returning adult salmonids 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).

4) Salmonid and non-salmonid fishes or species that could be positively impacted by the program. Salmon Creek coho fry, fingerlings and smolts can be preyed upon through out the rearing or migration period from the river subbasin to the mainstem Columbia River and estuary. Listed salmon, northern pikeminnows and introduced spiny rays in the Columbia mainstem sloughs can prey on coho fry and smolts as well as avian predators, including gulls, mergansers, cormorants, belted kingfishers, great blue herons and night herons. Mammals that benefit from migrating smolts include river otters, while returning adults benefit harbor seals, sea lions and Orcas.

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.

RSI programs operate in Salmon Creek system from January to April. By mid-winter Salmon Creek has been recharged and higher flow events have flushed surface run-off from impervious dominated areas through the system. RSI sites have been located in areas where riparian restoration projects have taken place and where conditions for short-term incubation could be successful. The highly urbanized Salmon Creek basin experiences water quality concerns including elevated water temperatures but the RSI program operates successfully in window of time during the incubation and fry release period. Salmon Creek has a mean flow in December of nearly 450 cubic feet per second cfs and a mean flow in late summer of less than 25 cfs (LCFRB Basin Plans 2004). Salmon Creek fecal coliform and water temperatures do not attain water quality standards and are on the Department of Ecology 303 (d) list. The hydrologic regime of the Lake River basin has been highly impacted by urban and rural development, especially Burnt Bridge Creek, which exhibits the flashy flow typical of urban basins. The watershed is primarily a low elevation, rain-dominated system; with the headwaters reaching an elevation of 1,998 ft. Total area of the watershed in the rain-on-snow zone is minimal. Because of the high levels of impervious surface, low levels of hydrological mature forest cover, and high road densities found in this predominately developed area, local and watershed level hydrologic conditions are generally impaired throughout the majority of the watershed (Wade, 2001).

To reach smolt stage, coho need to rear until the following spring in the system. Watershed development and water withdrawals have likely reduced stream flows to below historical levels. Mean monthly flows in Salmon Creek fell below 12 cfs in five of the 10 years on record. Observations indicate that Mill Creek was perennial throughout its length prior to 1960; now it typically dries up by mid-July (Wade, 2001). Low flow problems exist in the Salmon Creek tributaries Morgan Creek, Mud Creek, and Baker Creek. In stream flow analysis using the toe-width method revealed that, on Salmon Creek tributaries and in Whipple Creek, flows in the fall were considerably below optimum for salmonid spawning and rearing (Caldwell et al. 1999).

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.

- RSI sites have been chosen to provide a consistent source of water with minimal siltation problems.
- RSI incubator units are screened to prevent listed fish from entering incubators.
- Dead eggs or hatched fry can be removed and are disposed to prevent transmission through the discharge pipe.
- RSIs have landowner agreements that allows RSI to be checked regularly or more if needed due to significant rain events.

Section 5. Facilities

5.1 Broodstock collection facilities (or methods).

Adult collection, spawning and early incubation occurs at Washougal Hatchery and Lewis River Hatchery (Syverson Project).

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

Eggs are incubated to eyed stage at the Washougal and Lewis River Hatcheries. By early February, eggs have developed to and eyed stage. Staff at the Columbia Springs Environmental Education Center (CSEEC) and a coordinator for the District 5 Firefighters coordinate and arrange to pick up egg allotments for the RSI programs. Eyed eggs are transported in wet burlap sacks by car or truck to the site.

5.3 Broodstock holding and spawning facilities.

Broodstock collection and spawning facilties are held at Washougal or Lewis River Hatcheries.

5.4 Incubation facilities.

Green eggs are incubated at Washougal and Lewis River Hatcheries in deep troughs and vertical stack incubators to an eyed egg stage. Eyed eggs are transferred to the Salmon Creek RSI sites and placed in a 28” x 36” inch floating plywood incubator. These incubators can hold up to 10,000 eggs each. Each incubator contains 4 trays divided into three compartments. 10,000 eggs are split evenly among the compartments.

5.5 Rearing facilities.

The floating RSI units are anchored in the stream. The RSI is constructed within a box with screen that forms the front and rear of the incubator. Water flows through the incubator trays by orienting the incubator front end upstream and anchoring the position of the RSI so water flows thru the incubator in one direction. Eyed eggs on the screened trays hatch and disperse within the trays and artificial substrate, which provides an appropriate environment for hatching sac fry. Upon yolk absorption, egressing fry can move out of the trays but are confined within the incubator until the release of fish is coordinated with education field trips.

5.6 Acclimation/release facilities.

Release of the fry is coordinated with area schools. Fry are removed from individual RSIs and distributed among the students to select areas upstream and downstream of the immediate RSI site. See Section 1.5 for specific sites.

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

Flow disruption or debris accumulation in front of the anchored RSIs can cause significant mortalities but no problems of this type have been reported.

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.

- RSI sites have been chosen to provide a consistent source of water with minimal siltation problems.
- The RSI is screened to prevent debris or fish from entering the incubator and designed to keep alevins within the incubator until swim-up.
- Multiple RSI sites are used: 6 for the CPU and up to 12 for the District 5 Firefighters program and one for the Syverson project.
- RSI's are compartmentalized (12) to separate individual program into smaller groups of eggs at each site therefore reducing risk of dead eggs potentially spreading fungal problems to adjacent healthy eggs.
- Dead eggs or hatched fry can be removed and are disposed to prevent transmission.
- RSIs are checked regularly or more if needed due to significant rain events.

Section 6. Broodstock Origin and Identity

6.1 Source.

Adults from Washougal Type N coho have been used for Washougal Co-op programs. The Syverson project uses Lewis River type N eggs.

6.2.1 History.

See Washougal or Lewis River Type N coho HGMP

6.2.2 Annual size.

165,000 eyed eggs are needed for fulfilling the RSI programs. With 10% green to eyed egg loss, approximately 124 spawning pair are needed to cover these programs. In the past two years, adult escapements to Washougal and Lewis River Hatcheries have been substantial with 78,740 adults returning in 2002 and 23,465 adults returning in 2003 (WDFW Escapement Reports). Between the two facilities, egg take goal for all programs is 5,800,000 eggs (FBD 2004). Up to 4,000 spawning cohorts at 1:1 female to male ratio is needed for these programs. The RSI adults and egg takes are a portion from this group.

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

WDFW is proposing to integrate coho broodstock programs at Lewis and Washougal Hatcheries. The level of integration is unknown at this time but hatcheries will maximize use of natural origin fish that enter hatchery facilities. In the past, only hatchery identified fish were used for broodstock.

6.2.4 Genetic or ecological differences.

The makeup or status of listed fish in the Salmon Creek basin is unknown.

6.2.5 Reasons for choosing.

Salmon Creek and Washougal system are located in WRIA 28 and Washougal Type N coho would be an appropriate candidate for contributing to a locally adapted coho stock in the Salmon Creek system.

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.

For broodstock risk aversions for Washougal or Lewis River Hatchery coho programs refer to those HGMPs.

Currently, the eggs for the Salmon Creek RSI program are under discussion. NOAAs listings of hatchery populations do not consider the stock integrated with the historical population in Salmon Creek (NOAA Proposed Hatchery Listing Determinations May 28, 2004).

Section 7. Broodstock Collection

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

Adults are collected at Washougal or Lewis River hatcheries. This section should be referred to in those HGMPs.

7.2 Collection or sampling design

Adults are trapped from November to February. Multiple spawning dates for Type N coho occurs from mid-November to the end of December.

7.3 Identity.

In the past, 100% of the hatchery fish are marked so that they can be distinguished from the natural population. WDFW is currently proposing to integrating coho programs for Washougal and Lewis River programs. Eggs for the Washougal RSI programs are a random mix of spawners and egg takes.

7.4 Proposed number to be collected:

7.4.1 Program goal (assuming 1:1 sex ratio for adults):
See Washougal or Lewis River Type N coho HGMP.

7.4.2 Broodstock collection levels for the last twelve years (e.g. 1990-2001), or for most recent years available.
See Washougal or Lewis River Type N coho HGMP.

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

See Washougal or Lewis River Type N coho HGMP.

7.6 Fish transportation and holding methods.

NA

7.7 Describe fish health maintenance and sanitation procedures applied.

NA

7.8 Disposition of carcasses.

See Washougal or Lewis River Type N coho HGMP

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.

Type N Coho trapping occurs from October to January at the hatcheries. Encounters with listed fish is minimized as listed fall Chinook run has occurred earlier and the window for coho is earlier than listed winter steelhead stocks. Chinook if encountered in the coho broodstock program are released back to stream when and if they are trapped as are any wild steelhead.

Section 8. Mating

8.1 Selection method.

See Washougal or Lewis River Type N coho HGMP

8.2 Males.

See Washougal or Lewis River Type N coho HGMP

8.3 Fertilization.

See Washougal or Lewis River Type N coho HGMP

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 Washougal or Lewis River Type N coho HGMP

Section 9. Incubation and Rearing.

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

See Washougal or Lewis River Type N coho HGMP

9.1.2 Cause for, and disposition of surplus egg takes.

The program guidelines for annual broodstock/eggtake collection is managed to prevent surpluses. At times, shortfalls in eggtake occur at other Lower Columbia hatcheries, and surplus eggs would be transferred to these hatchey programs to meet egg take/program objectives. Otherwise, in cases of egg surplus, regional manager would be contacted, and instructions would be given for disposition of the surplus in accordance with regional policy and guidelines set forth in management plans/agreements and ESA permits.

9.1.3 Loading densities applied during incubation.

The CPU and District 5 Firefighters RSIs are loaded at 10,000 eggs per incubator with eggs divided among twelve compartments. The compartments serve to separate eggs through out the incubator with four individual trays divided by three compartments. This configuration reduces density problems as alevins will bunch to one corner which could result in possible suffocation. The Syverson project incubates 5,000 eggs in a single five gallon bucket. Both loading densities in the incubators are deemed within acceptable guidelines as determined by WDFW for RSIs.

9.1.4 Incubation conditions.

The program uses the instream Salmon Creek water source that result in hatching emergence timing similar to that of the naturally produced population. Program is subject to ambient temperatures and fluctuations in water quantity and quality depending on weather events and surrounding watershed influences. Landowner or volunteers check for debris that would block the screen area and suffocate the eggs or alevins.

9.1.5 Ponding.

Eggs are incubated in the RSI units which allows development to a free swimming stage. Stream gravel or artificial substrate is used to provide alevin development substrate. Fry are released when all fish appear to be free swimming.

9.1.6 Fish health maintenance and monitoring.

Prior to transfer to the RSI sites, disinfection procedures are implemented during incubation at Washougal and Lewis River hatcheries that prevent pathogen transmission between stocks of fish on site. Following eye-up stage, eggs are inventoried, and dead or undeveloped eggs removed and disposed of in a manner that prevents transmission to receiving watershed.

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.

- RSI sites have been chosen to provide a consistent source of water with minimal siltation problems.
- The RSI is screened to prevent debris or fish from entering the incubator and designed to keep alevins within the incubator until swim-up.
- RSI's are compartmentalized (12) to separate the program into smaller groups of eggs at each site therefore reducing risk of dead eggs potentially spreading fungal problems to adjacent healthy eggs.
- Dead eggs or hatched fry can be removed and are disposed to prevent transmission.
- RSIs are checked regularly or more if needed due to significant rain events.

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 (1990-2001), or for years dependable data are available.

Since program inception, average success of incubating eyed eggs to swim-up fry in the RSI units is approximately 95% for the program (pers. Comm. Gary Loomis 04). Data for survival from fry to fingerling and smolt stage is unknown.

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

Incubation and loading capacities are 100% of the incubator capacity design.

9.2.3 Fish rearing conditions.

Within the RSI units, alevin develop until swim-up stage. In the RSIs, a small amount of starter feed can be used for early developing fry. After complete swim-up, fry releases can be coordinated with schools or group participation. Daily stream temperatures are monitored along with the progress of the eggs and subsequent alevin to fry development. CPU volunteers monitor flow and debris which can block flow through the RSI units.

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.

Research from RSI projects on Snow and Andrews Creek located on the Olympic Penninsula indicate that coho fingerlings lengths reach 50 mm fl by mid-May and 60 mm fl by mid-June. Growth rates on RSI coho in the Lewis River system is dependent on water temperature and productivity specific to individual tributaries. Larger coho trapped from mid-April to early May indicate larger coho to be 85 – 105 mm fl.

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

Not applicable. Coho as swim up fry are approximately 1500 –1200 fpp.

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*).

CPU volunteers report using some starter mash feeding of fry. This is done to get most fish at a swimup stage so school classes can schedule field trips and participate in releasing fry from the RSIs.

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

CPU volunteers monitor eggs for fungal problems and communicate with Region 5 staff if needed. Subsequent egg or alevin mortality is disposed of to prevent transmission to the stream. After the program has concluded for the year, the RSI units are removed, cleaned, disinfected and dried.

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

NA

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

The program only incubates eyed eggs to swim-up stage. Fry need to grow to a smolt stage within the Salmon Creek system until the following year as yearlings.

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.

- RSI tributaries have had historical coho utilization.
- RSI sites have been chosen to provide a consistent source of water with minimal siltation problems.
- The RSI is screened to prevent debris or fish from entering the incubator and designed to keep alevins within the incubator unitl swim-up.
- RSI's are compartmentalized (12) to separate the program into smaller groups of eggs at each site therefore reducing risk of dead eggs potentially spreading fungal problems to adjacent healthy eggs.
- Dead eggs or hatched fry can be removed and are disposed to prevent transmission.
- RSIs are checked regularly or more if needed due to significant rain events.

Section 10. Release

10.1 Proposed fish release levels.

Age Class	Max. No.	Size (ffp)	Release Date	Location			
				Stream	Release Point (RKm)	Major Water-shed	Eco-province
Unfed Fry	165,000	1,500 – 1200	April	Salmon Creek /Lake River	See Section 1.5	Salmon Creek	Lower Col

*Up to 48 Salmon in the Classroom (SIC) projects are operating in Clark County. Individual locations could provided by WDFW upon request.

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

See section 1.11.2

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

Up to 148,500 fry at 1500 fpp total based on 90% survival.

10.4 Actual dates of release and description of release protocols.

Egressing fry are free swimming by late March. By late March or early April, area schools are involved in the release of fry that are dipped from the incubators and students are each given a group of fry to plant in the area.

10.5 Fish transportation procedures, if applicable.

NA

10.6 Acclimation procedures (*methods applied and length of time*).

Un-fed fry develop from hatch to swim-up stage at the incubator site. Fish are released in the immediate area and will spend a full year until yearling stage to smolt the following spring.

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

None applied although otolith marking could be employed in the future.

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

No surplus at the time of release. Only the “release” amount of eggs are allotted to each RSI site.

10.9 Fish health certification procedures applied pre-release.

Unusual problems with mortality or fungus is communicated to staff at Washougal Hatchery although eyed eggs are picked upon transfer and volunteers can remove individual dead eggs to keep fungal problems to a minimum.

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

None known at this time.

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.

- RSI tributary sites have had historical coho utilization.
- Washougal River Type N coho eggs have a life history that could adapt to the Salmon Creek watershed later run timing characteristics.
- WDFW is proposing to integrate the brood stock collection need for this program which will minimize non-local transfers used in future programs.
- Historical utilization has been greatly diminished and surviving fry will be able to utilize productive habitat created with habitat improvements reducing competition with wild stocks.
- Returning adults will add nutrients to Salmon Creek basin.
- See also section on Genetic Introgression in 2.2.3.

Section 11. Monitoring and Evaluation of Performance Indicators

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

Mandatory MOU and annual Volunteer Fish Production Project Records are tracked. Current RSI projects are not otolith marked but research on Cedar Creek (Lewis River) is ongoing using otolith marked eggs. WDFW will be able to RSI contribution of smolts and adults to the system and use those results to evaluate contribution of the Fish First RSIs in other parts of the Lewis River system.

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

WDFW staff and programs are intact to track volunteer efforts as they are an integral part of the department. The Cedar Creek research is on-going with PacifiCorp contributions.

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.

Coho populations both wild and hatchery stocks are proposed for listings (NOAA 69 FR 33101; 6/14/2004). Direct monitoring or evaluation actiivites are not proposed for these programs outside of section 1.10.

Section 12. Research

12.1 Objective or purpose.

No research is proposed. Results from research and monitoring on Cedar Creek (Lewis River) is on-going and RSI performance or contributions to Salmon Creek could be evaluated based on those findings. See Fish First Wild Coho RSI HGMP.

12.2 Cooperating and funding agencies.

Not applicable.

12.3 Principle investigator or project supervisor and staff.

Not applicable.

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

Not applicable.

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

Not applicable.

12.6 Dates or time periods in which research activity occurs.

Not applicable.

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

Not applicable.

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

Naot applicable.

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

Not applicable.

12.10 Alternative methods to achieve project objects.

Not applicable.

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

Not applicable.

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.

Not applicable.

Section 13. Attachments and Citations

13.1 Attachments and Citations

Bilby, R.E., B.R. Fransen, and P.A. Bisson. 1996. Incorporation of nitrogen and carbon from spawning coho salmon into the trophic system of small streams: evidence from stable isotopes. Can. J. Fish. Aquat. Scit. 53: 164-173.

Caldwell, B., J. Shedd, and H. Beecher. 1999. Washougal River fish habitat analysis using theinstream flow incremental methodology and the toe-width method for WRIAs 25, 26, 28, and 29. Washington Department of Ecology. Publication #99-153. June 1999.

Harvester, P., and S. Wille. 1989. A biological and physical inventory of the fish and habitat of the Salmon Creek basin; An adult and juvenile salmonid / population estimate and habitat evaluation in Salmon Creek and it's major tributaries: Final report. Clark County Conservation District, Washington Department of Ecology. Population assessments under different habitat conditions are useful for comparing fish trends and establishing recovery goals

IHOT (Integrated Hatchery Operations Team). 1995. Operation plans for anadromous fish production facilities in the Columbia River basin. Volume III-Washington. Annual Report 1995. Bonneville Power Administration, Portland Or. Project Number 92-043. 536 pp.

Lewis River Subbasin Plans, DRAFT May 17, 2002. Northwest Power Planning Council.

Lower Columbia Fish Recovery Board (LCFRB). 2004. Lower Columbia salmon and steelhead recovery and sub-basin plan. Lower Columbia Fish Recovery Board, Washington state.

Mathisen, O.A., P.L. Parker, J.J. Goering, T.C. Kline, P.H. Poe, and R.S. Scalan. 1988. Recycling of marine elements transported into freshwater systems by anadromous salmon. Verh. Int. Ver. Limnol. 23: 2249-2258.

NMFS (National Marine Fisheries Service). 1999. Smith, Biological Opinion On Artificial Propagation in the Columbia River Basin. National Marine Fisheries Service, Northwest Region

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

Slaney, P.A., and B.R. Ward. 1993. Experiment fertilization of nutrient deficient streams in British Columbia. p. 128-141 *in* G. Shooner et S. Asselin [éd.]. Le développement du Saumon atlantique au Québec: connaître les règles du jeu pour réussir. Colloque international de la Fédération québécoise pour le saumon atlantique. Québec, décembre 1992. Collection *Salmo salar* n°1: 201 p.

Wade, G. 2001. Salmon and Steelhead Habitat Limiting Factors, Water Resource Inventory Area 27, Washington State Conservation Commission-Final Report.

Washington Department of Fisheries (WDF). 1991. Stock Transfer Guidelines. Hatcheries Program, Washington Department of Fisheries. Olympia, Wa.

Washington State Department of Transportation (WDOT), March 2002, *Juvenile Coho Movement Study Research Project* T1803 Task 23 FishCulvert passage

Wipfli, M.S., J. Hudson, and J. Caouette. 1998 Influence of salmon carcasses on stream productivity: response of biofilm and benthic macroinvertebrates in southeastern Alaska, U.S.A. Can J. Fish. Aquat. Sci. 55: 1503-1511.

Section 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

14.1 Certification Language and Signature of Responsible Party

"I hereby certify that the information provided 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 1. Estimated listed salmonid take levels by hatchery activity.

Coho (proposed)

ESU/Population	Lower Columbia River Coho
Activity	Washougal Co-op Coho Program
Location of hatchery activity	Washougal Hatchery
Dates of activity	November– January
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)			Up to 124*	
Intentional lethal take (f)			Up to 124*	
Unintentional lethal take (g)	Up to 13,200**			
Other take (specify) (h)				

* Would include 120 adults from Washougal Hatchery and 4 adults from Lewis River Hatchery
**Based on 92% green egg to eyed egg survival.
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.