HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	**Cedar Creek Hatchery / Rhoades Pond (STEP) Fall Chinook Salmon Program**
Species or Hatchery Stock:	**Fall Chinook Salmon *Oncorhynchus tshawytscha*, Stock-47**
Agency/Operator:	**Oregon Department of Fish and Wildlife**
Watershed and Region:	**North Coast Watershed District**
Date Submitted: **First Update Submitted:** **Second Update Submitted:**	**June 17, 2004** **July 14, 2008** **July 22, 2016**
Date Last Updated:	**July 22, 2016**

SECTION 1

GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Cedar Creek Hatchery / Rhoades Pond STEP fall Chinook Salmon program.

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

Fall Chinook Salmon *Oncorhynchus tshawytscha*, Nestucca River population (stock 47). The Nestucca River fall Chinook Salmon population are part of the Oregon Coast Chinook Evolutionary Significant Units (ESU), and were determined to not warrant listing under the Federal Endangered Species Act (ESA) on March 9, 1998 (Federal Register Notice 1998).

1.3) Responsible organization and individuals.

Lead Contact:

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Lead Management Contact:
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Name (and title):	Joshua Rist, Acting Hatchery Manager
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Name (and title):	Dave Morrison, Hatchery Manager
Agency or Tribe:	Nestucca Anglers
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1.4) Funding source, staffing level, and annual hatchery program operational costs.

- Funding for this program is a mix of several sources.
- Cedar Creek Hatchery has a staff of three permanent employees.
- The estimated annual cost for the Cedar Creek Hatchery portion of the program is provided in Table 1-1
- After initial rearing fish are transferred to Rhoades Pond under a STEP rearing program. Cost information is provided in Table 1-2.

Table 1-1. Cedar Creek Hatchery Fall Chinook Program Annual Budget.

Brood Year	Total Budget	Fall Chinook Budget	Percent of Total	Fingerling Produced [1]
2004	$255,478	$1,073	0.42%	106,066
2005	$262,560	$1,103	0.42%	106,815
2006	$262,560	$1,103	0.40%	100,033
2007	$266,274	$319	0.12%	31,738[2]

Data Source: Fish Division (2004)

1. Number of fingerling transferred to Rhoades Pond for volunteer rearing.
2. Number of fry ponded

Table 1-2. Rhoades Pond Annual Costs (STEP Volunteer Facility).

Brood Year	Release Year	Operational Costs [1]	Volunteer Contribution [2]	Total STEP Volunteer Contribution	Fall Chinook Smolts
2003	2004	$8,119	$59,845	$67,964	74,770
2004	2005	$5,131	$61,516	$66,647	104,754
2005	2006	$5,525	$64,005	$69,530	102,840
2006	2007	$5,387	$70,388	$75,775	79,130

Data Source: Nestucca Anglers, District files

1. Feed, equipment, maintenance, etc.
2. Volunteer labor contribution (feeding, pond cleaning, marking, etc.)

Figures represent STEP volunteer costs and contribution from transfer into Rhoades Pond through release, excluding trucking costs.

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

Adult Collection: Cedar Creek Hatchery and the Three Rivers trap are located in the Nestucca River watershed, 1.5 miles east of Hebo, off Highway 22, and adjacent to Three Rivers, a Nestucca River tributary. It is at an elevation of 43 feet, at a latitude of 45º 12' 57" N and a longitude of 123º 50' 43" W. The total land area of the hatchery is about

35.33 acres. Adults may also be collected by seining below the trap facility, or in the Nestucca River by volunteer anglers.

Spawning, egg incubation, and early rearing: Adults are spawned at the hatchery in November and early December and eggs are incubated on site. All phases of hatchery operation, including adult broodstock holding through early rearing, occur at Cedar Creek Hatchery before juveniles are transferred to Rhoades Pond.

Rhoades Pond (rearing facility): Rhoades Pond is a volunteer run rearing facility located 5.5 miles east of Hebo, off Highway 22. It is in the NW ¼ of the NW ¼ of Section 4, Township 5 South, Range 9 West of the Willamette Meridian, Tillamook County, Oregon. Rhoades Pond is a lined earthen pond with a volume of 50,220 cubic feet. Once transferred from Cedar Creek Hatchery, the fall Chinook complete rearing, are marked and released as smolts in September into Three Rivers and the Nestucca River.

1.6) Type of program.

Isolated Harvest Program – To increase sport harvest opportunities by releasing artificially propagated fall Chinook Salmon smolts. This is a primary intent of the program and applies each year.

Salmon andTrout Enhancement Program (STEP) – This is also an Isolated Harvest Program to increase sport harvest opportunities and is done through streamside incubators (hatch-boxes) and unfed fry releases.

1.7) Purpose (Goal) of program.

The primary goal of this smolt rearing program is to provide hatchery produced fish for sport and commercial harvest in the ocean and sport harvest in the freshwater environment.

Volunteer involvement in the Salmon Trout Enhancement Program (STEP) increases natural resource awareness and provides a volunteer base of individuals, and organizations, desiring to assist ODFW with natural resource program implementation activities.

1.8) Justification for the program.

Cedar Creek Hatchery / Rhoades Pond Program: The local freshwater salmon fishery takes place in the areas primarily in the Nestucca Bay and River, and in Three Rivers. These fish also contribute to ocean sport and commercial fisheries. There has been increased fishing pressure on fall Chinook Salmon in the freshwater systems. Public concern from increased fishing pressure, social issues, and potential over harvest of wild fall Chinook Salmon, resulted in angling regulations restricting weekly and seasonal take of fall Chinook in aggregate with the Tillamook Bay and Nehalem systems. The historic Cedar Creek Hatchery fall Chinook Salmon program was terminated in the early 1990's as a cost saving measure during budget shortfalls. This cooperative program on fall

Chinook Salmon provides fish for sport and commercial harvest and to reduce harvest impacts on existing wild populations. This program releases sub-yearling (smolts) that are 100% marked starting with the 2004 releases (brood year 2003).

Salmon and Trout Enhancement Program (STEP): Up to 50,000 (total) unfed fry are released annually as part of the STEP program (hatchboxes and classroom incubators). The Classroom Incubator Program teaches salmonid life history and habitat needs to students. The STEP hatchbox program is allowed under STEP OAR's (Oregon Administrative Rules) and ORS's (Oregon Revised Statutes). Fry from the hatchbox program are not marked.

1.9 – 1.10) List of program "Performance Standards" and "Performance Indicators", designated by "benefits and "risks".

("Benefits" that the hatchery program will provide to the listed species, or in meeting harvest objectives while protecting listed species; and "risks" to listed fish that may be posed by the hatchery program, including indicators that respond to uncertainties regarding program effects associated with a lack of data.)

Harvest

Standard 1.1: Provide adult hatchery produced fall Chinook Salmon for harvest in such a way that impacts to wild fall Chinook and Coho Salmon populations will be minimized. **(Benefit)**.

Indicator: Number of hatchery fall Chinook Salmon caught, and number of angler days generated associated with this program. **(Benefit)**

Indicator: Estimated number of wild Coho Salmon caught and released during the fall Chinook Salmon fishery. **(Risk - unknown)**

Standard 1.2: All stock 47 hatchery fall Chinook Salmon smolts will be externally marked. (**Benefit)**

Indicator: Pre-release quality checks indicate 95 percent retention of identifiable marks. **(Benefit)**

***Indicator*:** Mark rate by mark type for each release group. **(Benefit)**

Life History Characteristics (Broodstock)

Standard 2.1: The fall Chinook Salmon broodstock will be managed to maintain genetic fitness: A goal of at least 74 fish spawned each year; a 1-to-1, male-to-female broodstock sex ratio, and may use adult hatchery progeny with incorporation of wild fish in the broodstock each year. Adult hatchery progeny shall not exceed 70% of the total broodstock used. **(Benefit)**

Indicator: Number of hatchery fish spawned each year by gender. **(Risk – unknown)**

Indicator: Number of wild fish spawned each year, by gender. **(Risk – unknown)**

Standard 2.2: Fall Chinook broodstock will be collected in a manner that approximates the distribution in timing, age, and size of hatchery fish returning to Cedar Creek Hatchery. However, pending further genetic guidance, jacks typically make up no more than 5 percent of males spawned. **(Benefit)**

Indicator: Temporal distribution of Cedar Creek Hatchery adult fall Chinook Salmon returns and adults collected for broodstock**. (Risk – unknown)**

Indicator: Size distribution of Cedar Creek Hatchery adult fall Chinook Salmon returns and adults collected for broodstock. **(Risk – unknown)**

***Indicator*:** Age distribution of Cedar Creek Hatchery adult fall Chinook Salmon returns and broodstock spawned based on scale analysis of fish. **(Benefit)**

Genetic and Ecological Characteristics

Standard 3.1: The criterion in the Native Fish Conservation Policy for reproductive independence (at least 90% of natural spawners are naturally produced and not hatchery produced fish) will be met. **(Benefit)**

Indicator: Estimated abundance of naturally spawning fall Chinook Salmon in the Nestucca Basin. **(Benefit)**

***Indicator*:** Estimated abundance of naturally spawning fall Chinook Salmon in Nestucca Basin that are of hatchery origin based on marks or tags. **(Benefit)**

Standard 3.2: Only wild Nestucca fall Chinook or adult returns from smolts released for this program, will be used for the 47 stock fall Chinook broodstock program component. **(Risk - unknown)**

Indicator: Location of broodstock collection. **(Risk - unknown)**

Indicator: Fin clips, if any, on fish collected for broodstock. **(Benefit)**

Standard 3.3: All stock 47 fall Chinook Salmon from Rhoades Pond will be released as sub-yearling smolts. **(Benefit)**

Indicator: Size and length frequency of fall Chinook smolts released. **(Benefit)**

Operation of Artificial Production Facilities

Standard 4.1: The Cedar Creek Hatchery / Rhoades Pond 47 stock fall Chinook Salmon program will be operated in compliance with ODFW's Hatchery Management Policy, and the IHOT fish health guidelines (IHOT 1995). **(Benefit)**.

Indicator: Number of broodstock sampled and pathogens observed. **(Benefit)**

Indicator: Rearing survival rates, egg to fry, and fry to smolt. Results of fish health examinations. **(Benefit)**

Indicator: Number of juveniles sampled and pathogens observed immediately prior to release. **(Benefit)**

Standard 4.2: Cedar Creek Hatchery water discharges will comply with the conditions and water quality limitations identified in the current NPDES permit. **(Benefit)**

Indicator: Water samples collected and results reported. **(Benefit)**

Indicator: Results within accepted criteria. **(Benefit)**

Standard 4.3: Cedar Creek Hatchery and Rhoades Pond water withdrawals will comply with National Oceanic and Atmospheric Administration (NOAA) Fisheries juvenile screening criteria. **(Benefit)**

Indicator: Screens inspected and are either in, or are brought into, compliance. **(Benefit)**

Standard 4.4: Stock 47 fall Chinook Salmon carcass placements for stream enrichment will comply with ODFW established guidelines or as regulated by DEQ. **(Benefit)**

Indicator: Number and location of fall Chinook Salmon carcasses distributed. **(Benefit)**

Indicator: Number of carcasses sampled and pathogens observed. **(Benefit)**

Standard 4.5: Releases of stock 47 fall chinook will limit impacts to naturally produced juvenile salmonids through control of hatchery release numbers and by minimizing spatial and temporal overlap with naturally produced juvenile salmonids. Smolt releases will in September. Any fry or fingerlings in excess of needs for smolt production may be released into standing bodies of water without natural coho production or may be destroyed. **(Benefit)**

Indicator: Location of juvenile fall Chinook Salmon releases. **(Risk – unknown)**

Indicator: Beginning and ending dates of stock 47 hatchery fall Chinook Salmon releases. **(Risk – unknown)**

***Indicator*:** Number of stock 47 hatchery fall Chinook released. **(Risk – unknown)**

Standard 4.6: Fall Chinook and Coho Salmon adults and jacks that enter the Cedar Creek Hatchery adult trap or collected by other means (seining or angling), are handled and released in a manner that minimizes stress, injury, mortality, and delay in migration. **(Risk)**

Indicator: Number of adult fall Chinook and Coho Salmon (marked and unmarked) collected and released alive above Cedar Creek Hatchery weir on Three Rivers, or from any other identified collection activities. **(Risk – unknown)**

Indicator: Number of adult fall Chinook and Coho Salmon mortalities at Cedar Creek Hatchery during operation of the hatchery adult trap, or at any off station collection activities. **(Risk)**

Indicator: Dates of trap(s) operation and frequency of handling trapped fall Chinook and Coho Salmon. **(Benefit)**

Socio-Economic Effectiveness

Standard 5.1: Estimated harvest benefits will equal or exceed hatchery production costs for stock 47 hatchery fall Chinook, based on the benefit-cost model in ODFW (1999) or an updated version of that model. **(Benefit)**

Indicator: Annual budget expenditures. **(Benefit)**

Indicator: Estimated harvest benefits. **(Benefit)**

1.11) Expected size of program.

Annual smolts production and release of fall Chinook Salmon for this program has a target of 100,000 yearlings, and a cap of 50,000 unfed fry (STEP) for release into the Nestucca Basin.

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

Broodstock needs for the 100,000 smolt program and Salmon and Trout Enhancement Program (STEP) eyed egg requests (50,000 egg maximum) are a minimum of 37 females and 37 males.

Additional fish may be collected and held as necessary to cover shortages resulting from, but not limited to, fecundity variations, early egg mortality, positive disease tests, etc. Any additional fish not used will be released back into the wild to spawn naturally.

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

Table 1-3. Proposed Annual Fish Release Levels.

Life Stage	Release Location	Annual Release Level
Eyed Eggs	NA	NA
Unfed Fry	Nestucca River	<50,000 - STEP hatchboxes
Fry	NA	NA
Fingerling	Standing waters	Varies, excess [1]
Yearling	Nestucca River	70,000 [2]
Yearling	Three Rivers	30,000 [2]

Data source: HMS

1. This program does not produce fingerling for release as a program goal 47 stock fall Chinook. In any given year there may be surplus fingerling at the time transfer to Rhoades Pond (typically resulting from above average fry and fingerling survival).
2. Total production is set at 100,000 smolts. Individual splits in release systems are subject to final numbers and flow conditions at the time of release and may be adjusted over time.

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

Cedar Creek Hatchery fall Chinook Salmon smolts were marked with a coded-wire tag (CWT) in only 2 of the last 17 brood years. The CWT data shows an estimated ocean

catch of 57 fish and 208 fish for the 1991 and 1992 brood years, respectively. Total survival for the 1991 and 1992 Nestucca fall chinook CWT groups was 0.08% and 0.34%, respectively. Over the last 17 years of available data (1988 through 2004) Nestucca Basin fall Chinook Salmon catch, based on punch cards, averaged 3,517 fish, and ranged from 1,207 to 6,376. However, punch card estimates of catch in the Nestucca Basin is not separated into hatchery and wild fish and the majority of the catch is believed to be wild fish. Fall Chinook adult collections at Cedar Creek hatchery have averaged 196, and ranged from 3 to 517 over the 1988 through 2003 (preliminary) run years. Again, not all of these fish can be separated into hatchery and wild fish, and the trap is not operated in such a way as to collect all fish passing the facility.

Table 1-4. **Nestucca Basin fall Chinook Salmon catch and hatchery collections, based on harvest card and hatchery data.**

Run Year	Adult Harvest	Hatchery Collections	
		Jacks	Adults
1988	3,695	11	352
1989	3,424	36	517
1990	2,546	34	231
1991	2,503	15	215
1992	3,205	65	287
1993	3,692	2	312
1994	4,406	7	117
1995	5,744	6	142
1996	4,782	0	150
1997	2,861	0	7
1998 [1]	2,446	1	3
1999 [1]	2,763	6	82
2000 [1]	2,250	4	78
2001 [1]	1,207	23	24
2002	3,875	44	262
2003	*4,020*	*14*	*352*
2004	*6,376*	*6*	*162*
2005	*Not Available*	*0*	*110*
2006	*Not Available*	*2*	*68*
2007	*Not Available*	*0*	*35*

Data Source: HMIS

1. 1999 through 2001 were return years with no hatchery component.

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

Historical records for Cedar Creek Hatchery are incomplete; it does indicate Chinook release in 1955 through 1959 however it does not specify the run (spring or fall). Fall Chinook Salmon smolts releases appear annually beginning in 1975. Cedar Creek Hatchery operated a fall Chinook program until 1993 when it was terminated for budget shortfall adjustments. The current cooperative program (Cedar Creek Hatchery / Rhoades Pond STEP) started with adult collection in the fall of 1999. The first smolt releases were in August of 2000.

1.14) Expected duration of program.

The Cedar Creek Hatchery / Rhoades Pond STEP fall Chinook Salmon program is ongoing and is expected to continue.

1.15) Watersheds targeted by program.

Three Rivers, a tributary to the Nestucca River; and Nestucca River, a tributary to Nestucca Bay.

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.

- Wild fall Chinook Salmon stock health and its ability to support a consumptive fishery, and potential elimination of hatchery / STEP rearing program: The issue revolves around the naturally produced stocks population and its apparent ability to support a consumptive fishery; and the need, or desire, to provide hatchery fish to supplement a consumptive fishery.
- Restricted passage of naturally produced and hatchery origin fall Chinook Salmon above the Three Rivers weir. The issue is restricting passage of adult fall Chinook above the weir and allowing them to spawn naturally in Three Rivers. There are concerns about allowing these hatchery fish to spawn naturally, as well as concerns about not allowing them to spawn naturally as they are only one generation removed from the wild population.

1.16.2) Potential alternatives to the current program.

Note: The alternatives listed are draft. This list is not exhaustive and the alternatives listed may not represent final decisions by ODFW.

Alternative 1: Direct all fall Chinook production for the Nestucca basin to take place at Cedar Creek hatchery by ODFW hatchery staff.

Description and Implications: Historically, all aspects of the fall chinook program for the Nestucca basin were conducted at Cedar Creek Hatchery. In response to a budget shortfall, the fall chinook program was dropped after 1993. This alternative would allow for all production aspects of the program to once again be located in one facility. However, the Cedar Creek facility may not currently have sufficient staff to implement the complete program. In addition, Cedar Creek Hatchery may not have on station rearing space under current production, water, and pond space abilities. Cedar Creek hatchery's current budget is insufficient to operate the complete program. Also, reacquiring the program from volunteers could potentially disenfranchise local area volunteers.

Alternative 2: Direct all production activities to STEP volunteers operating the program at Rhoades Pond.

Description and Implications: The current STEP Rhoades Pond fall Chinook program began with the 1999 brood year. It operates in conjunction with Cedar Creek Hatchery with hatchery staff responsible for spawning, incubation and early rearing of juvenile fall Chinook, with considerable assistance from volunteers. Juvenile fish are transferred to Rhoades Pond for rearing, marking, and release by volunteers. This alternative would allow all production aspects of the program to be located in one facility. It could provide significant "buy in" by local and out of area volunteers and would reduce the workload on Cedar Creek Hatchery staff (spawning, incubation, early rearing, etc.). This alternative would also not be affected by potential future state agency budget cuts. Rhoades Pond facility is not currently set up to incubate eggs. Broodstock collection might still require use of Three Rivers trap facility and staff to collect broodstock. Although there would still be some level of District / hatchery oversight (spawning, disease issues, etc.) as applicable to all STEP programs, the success of the program would be dependent on maintaining appropriate levels of volunteer effort and significant training.

Alternative 3: Elimination of the Nestucca Basin hatchery fall Chinook program.

Description and Implications: The complete elimination of the fall Chinook program from the Nestucca Basin would slightly reduce the budget at Cedar Creek Hatchery and allow savings to be used elsewhere for other programs. In addition, it would eliminate impacts of hatchery fall Chinook on wild populations. This option is not likely to decrease angling pressure, and loss of hatchery fish for harvest may result in an overall increased harvest of naturally produced fish from the basin with unknown impacts in the long term. In addition, disenfranchisement of local and out of area volunteers may occur. The potential impacts to ocean sport and commercial fisheries is unknown.

Alternative 4: Pass all fall Chinook Salmon not needed for broodstock above the weir on Three Rivers.

Description and Implications: Currently, unmarked fish in excess of those needed for broodstock, when trapped, are passed above the weir to spawn naturally. A portion of marked fall Chinook adults may be retained for broodstock as well. Those marked fish not needed for broodstock that are green (unripe) may be recycled through the mainstem fishery. Ripe marked fish not utilized for broodstock are dispatched and used for stream enrichment. The alternative listed above may improve angling opportunities for fall Chinook in the upper portion of Three Rivers. In addition, it potentially reduces the handling of excess fall Chinook which is associated with recycling. This alternative would likely provide sufficient broodstock to seed upper Three Rivers. Passing all excess fall Chinook would allow large numbers of hatchery fish into a system with limited public angling access. These large numbers of returning Chinook Salmon may have detrimental effects to other naturally produced salmonids passed above the weir to spawn.

1.16.3) Potential reforms and investments.

Cedar Creek Hatchery:
The ladder and trapping facility on Three Rivers has been identified for major modifications. The present configuration of the facility does not provide for Three Rivers water to flow through the ladder; it receives all its flow from Cedar Creek water. The ability to use either water source, or to combine them, to operate the ladder would be expected to increase the ability to attract fish to the ladder and trap. It would also allow the option to open the ladder and allow fish to directly bypass the weir facility during periods when hatchery fish are present in low numbers and it is desirable to allow passage of wild fish above the facility without additional handling. The current trap and holding facility consist of two small concrete ponds, one associated with the trap, the other across an alleyway as a holding pond. The holding pond is divisible, but small, so when multiple species are present some stocks must be handled and transported up to additional ponds on the hatchery proper. In September, 2006 ODFW teamed with U.S. Fish & Wildlife, NOAA and an independent engineering consultant; Tetra Tech/ KCM to develop the Three Rivers Trap & Passage study. This study outlines needs and options for a trapping, holding and passage facility to replace the existing trap. The design would incorporate Three Rivers attractant water as well as Cedar Creek water with options to separate or mix flows as needed. While several options were covered in this study, the main goals were to minimize handling of wild stocks, allow for downstream migration and separate out hatchery stocks. Cost estimates were around $1.9 million.

Rhoades Pond Facility:
For the complete program to be moved to Rhoades Pond and carried out by volunteers, the facility would need, at a minimum, incubation and early rearing facilities and equipment. These improvements would include, but are not limited to, construction of an incubation building (including but not limited to, water source plumbing, electrical, and incubation equipment, alarms, etc.); and early rearing containers (Canadian troughs, may be made part of incubation building). Development of an adult holding pond would be advantageous (including plumbing, screening, etc.) No plans or cost estimates are presently available.

Rhoades Pond facilities are screened but don't currently meet NOAA's criteria. Upgrading screens has been identified as a priority.

General
Alternative hatchery operations, facilities and techniques, in regard to conservation and restoration of wild fish populations, will be one of the areas of research questions at ODFW's proposed Hatchery Research Center. In the future, the results of this and other research efforts, may lead to additional reforms and investments at Cedar Creek hatchery and its satellite facilities, and STEP rearing facilities.

SECTION 2

PROGRAM EFFECTS ON ESA-LISTED SALMONID POPULATIONS

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

The HGMP for this program was submitted to NMFS on 6/17/2004 for ESA permit or take authorization. This is an updated version of the previously submitted HGMP.

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

Any take associated with this program is limited to incidental unmarked fish that would enter the trapping facilities at Cedar Creek Hatchery, or be collected in seining operations below the facility during low water years. The category would be "captured, handled, released" for any fish trapped or seined. Any unmarked listed natural Coho Salmon collected would be identified and immediately released back into the river or released above the weir on Three Rivers. Sport angling is also used for broodstock collection, if there are not enough fish collected in Three Rivers via the trap or seining. Collection by angling typically does not encounter Coho Salmon, however, if any are caught they are released immediately in compliance with established sport angling regulations for the basin.

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

Oregon coastal Coho Salmon populations currently are listed under the ESA as *Threatened*. The listed natural Coho Salmon also inhabit the Nestucca River basin which may be indirectly affected by the stock 47 fall Chinook Salmon program through competitive interactions for food and space, and water withdrawal for hatchery operations. Direct take of listed natural Coho Salmon is not intended due to this fall Chinook Salmon propagation program, but incidental take may occur during fall Chinook brood collection.

Also, the OCN Coho Salmon populations of Tillamook Complex and the Siletz Complex may be indirectly affected by this program.

Nestucca Complex

The Nestucca Complex consists of streams that are inhabited by listed natural Coho Salmon and is located between Cape Lookout on the north and Cascade Head on the south (Nickelson 2001). These streams also include the Nestucca River, Sand Lake tributaries, and Neskowin Creek. There is an estimated 190 miles of spawning habitat available to wild Coho Salmon of this complex.

Coho Salmon Life History

Adult Coho Salmon migrate into fresh water in the fall to spawn. Spawning of wild Coho Salmon usually occurs from mid-November through February. Adult spawning Coho Salmon are typically 3 years old and are often accompanied by 2-year-old jacks (precocious males) from the next brood. Spawning occurs primarily in small tributaries located throughout coastal basins. The parents normally exhibit strong homing to their natal stream. The female digs a nest (redd) in the gravel and lays her eggs, which are immediately fertilized by accompanying adult males or jacks. The eggs are covered by digging and displacing gravel from the upstream edge of the nest. Each female lays about 2,500 eggs. The adults die soon after spawning. Sex ratios of spawning adults tend to average around 50:50 at most locations (Table 2-1). However, Moring and Lantz (1975) observed 77 percent males in three small Alsea River tributaries over a period of 14 years. They concluded that males tend to move around a lot and visit multiple streams.

The eggs hatch in about 35 to 50 days, depending upon water temperature (warm temperature speeds hatching). The alevins remain in the gravel 2 or 3 weeks until the yolk is absorbed and then emerge as fry to actively feed in the spring. Most juvenile Coho Salmon spend one summer and one winter in fresh water. The following spring, approximately one year after emergence, they undergo physiological changes that allow them to survive in seawater. They then migrate to the ocean as silvery smolts about 10 to 12 centimeters (cm) in length.

Table 2-1. Observations of Coho Salmon Sex Ratio at Adult Traps

Population Complex	Percent Males	Percent Females	Location	Run Years	Data Source
Nehalem	52%	48%	North Fork trap	1998-1999	Life Cycle Monitoring
Siletz	50%	50%	Mill Creek trap	1997-1999	Life Cycle Monitoring
Yaquina	51%	49%	Mill Creek trap	1997-1999	Life Cycle Monitoring
Alsea	77%	23%	Drift Creek tributaries	1959-1972	Moring & Lantz (1975)
	50%	50%	Cascade Creek trap	1997-1999	Life Cycle Monitoring
Umpqua	55%	45%	Smith River trap	1999	Life Cycle Monitoring
Coos	63%	37%	South Coos River, Winchester Creek, and Fall Creek	1999	Oregon Plan Monitoring

The smolts undergo rapid growth in the ocean, reaching about 40 to 50 cm by fall. Little is known of the ocean migrations of Coho Salmon from Oregon coastal streams. However, based on what is known, it appears migrations are mostly limited to coastal waters. Initial ocean migration appears to be to the north of their natal stream (Fisher and Pearcy 1985; Hartt and Dell 1986). After the first summer in the ocean, a small proportion of the males attain sexual maturity and return to spawn as jacks. Migration patterns during the fall and winter are unknown. Those fish remaining at sea grow little during winter but feed voraciously during the next spring and summer, growing to about 60 to 80 cm in length. During this second summer in the ocean, a substantial percentage of these maturing adults are caught in ocean troll and sport fisheries, usually to the south

of their natal stream (Lewis 2000). The survivors return to their home streams or neighboring streams where they spawn and die to complete the life cycle.

Habitat Use and Freshwater Distribution

Spawning and rearing of juvenile Coho Salmon generally take place in small low gradient (generally less than 3 percent) tributary streams, although rearing may also take place in lakes where available. Coho Salmon require clean gravel for spawning and cool water temperatures (53° to 58°F preferred, 68°F maximum) for rearing (Reiser and Bjornn 1979). Fry emerge from February to early June (Moring and Lantz 1975) and occupy backwater pools and the stream margins (Mundie 1969; Lister and Genoe 1970; Nickelson et al. 1992a).

During summer, Coho Salmon fry prefer pools in small streams; whereas during winter, they prefer off-channel alcoves, beaver ponds, and dam pools with complex cover (Nickelson et al. 1992a, 1992b). Habitat complexity, primarily in the form of large and small wood is an important element of productive Coho Salmon streams (Nickelson et al. 1992b; Rodgers et al. 1993). Little is known about residence time or habitat use of estuaries during seaward migration. It is usually assumed that Coho Salmon spend only a short time in the estuary before entering the ocean. However, recent research is finding that rearing in the upper ends of tidal reaches can be extensive.

The distribution of Coho Salmon within a basin is primarily determined by two factors: marine survival, and the distribution of freshwater habitat of different levels of quality. When marine survival has been very poor, coho will be found in only the highest quality habitats. Coastwide, these habitats comprise about 22 percent of the habitat (Nickelson 1998). When marine survival increases, as could occur with a changing climate regime, coho will redistribute into freshwater habitats of lower quality. Thus Coho Salmon population dynamics function with a classic “source-sink” relationship among stream reaches.

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

The program has no intent to directly take any listed natural Coho Salmon.

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

Indirect or incidental take of listed Coho Salmon may occur due to competitive interactions for food and space between the program fish and listed coho. Minimal indirect impact to listed coho may also occur due to water withdrawal for hatchery operations, and a few incidental take (catch and release) of listed coho may occur during fall Chinook Salmon brood collection. Oregon coast steelhead populations are considered a “species of concern”, and may also be indirectly affected by this program. There are no other ESA listed populations in the basin affected by this program.

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

The Oregon Native Fish Stock Status Report (ODFW 2005) includes the status of coastal Coho Salmon populations. The following information about the status of the Nestucca Complex's coho population was taken from Nickelson (2001), which is consistent with the coho population status described in the Oregon Native Fish Stock Status Report.

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

The Nestucca Complex consists of Coho Salmon inhabiting streams located between Cape Lookout on the north and Cascade Head on the south. These include the Nestucca River, Sand Lake tributaries, and Neskowin Creek. There is an estimated 190 miles of spawning habitat available to the Coho Salmon of this complex. The critical population level for the Nestucca Complex is 800 adult spawners (Nickelson 2001).

- Provide the most recent 12 year annual spawning abundance estimates, or any other abundance information. Indicate the source of data.

The abundance of Coho Salmon spawners of the Nestucca Complex has ranged from less than 400 to about 10,100 and has averaged nearly 3,400 since 2003 (Figure 2-1 and Table 2-2). In two of those years, spawner abundance fell below the critical threshold of 800 fish.

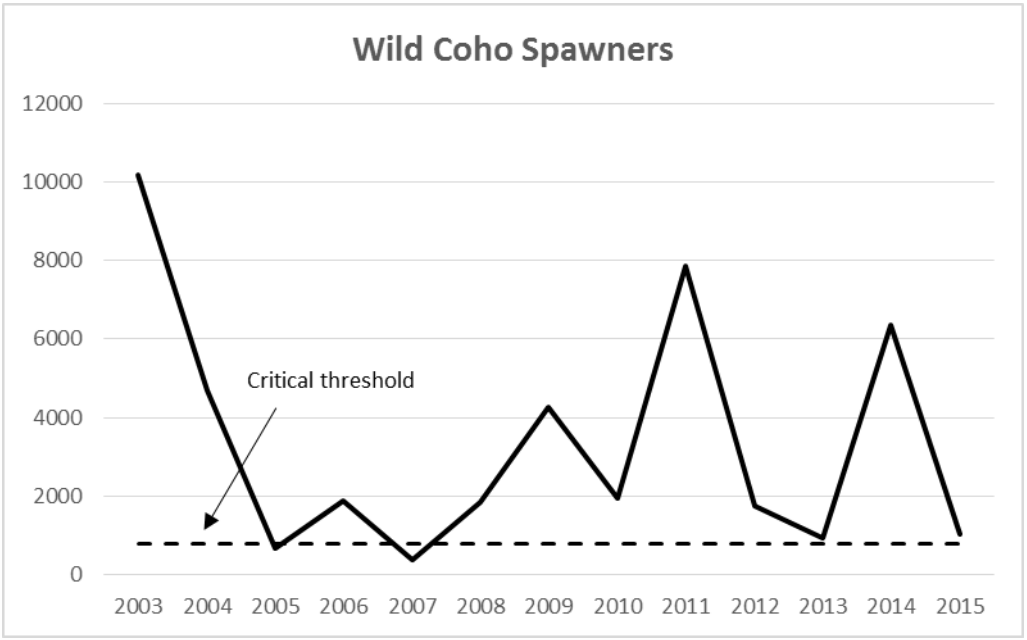

Figure 2-1. Trend in adult wild Coho Salmon spawner abundance relative to the critical population level for the Nestucca Complex, 2003-2015.

Table 2-2. Population parameters of Coho Salmon showing recruit per spawner for the Nestucca Complex, 2003-2015.

Year	Wild Spawners	Hatchery Spawners	Percent Hatchery Spawners	Pre-harvest Wild Population	Recruits Per Spawner
2003	10,194	109	1%	11,080	9.1
2004	4,695	73	2%	5,087	1.2
2005	686	9	1%	718	0.04
2006	1,876	19	1%	2,030	0.2
2007	394	5	1%	447	0.1
2008	1,844	0	0%	1,880	2.7
2009	4,252	0	0%	4,557	2.4
2010	1,947	93	5%	2,039	5.2
2011	7,857	0	0%	8,350	4.5
2012	1,751	0	0%	2,143	0.5
2013	946	37	4%	1,104	0.6
2014	6,369	0	0%	7,440	0.9
2015	1,029	0	0%	1,285	0.7
Avg.	**3,372**	**27**	**1.1%**	**3,704**	**2.2**

Smolt production was estimated for the 1997 through 1999 broods. Estimated smolt abundance ranged from 29,000 to 89,000 for the Nestucca Complex (Table 2-3).

Table 2-3. Estimates of the Abundance of Coho Salmon Juveniles of Different Life Stages Based on Spawner Abundance in Nestucca Complex.

Population	1997 Brood (millions)				1998 Brood (millions)				1999 Brood (millions)			
Complex	Eggs	Fry	Parr	Smolts	Eggs	Fry	Parr	Smolts	Eggs	Fry	Parr	Smolts
Nestucca	0.415	0.270	0.105	0.036	0.211	0.137	0.084	0.029	2.694	1.751	0.315	0.089
Data source: Nickelson (2001)												

- Provide the most 12 year progeny-to-parent ratios, survival data by life stge, or other measures of productivity for the listed population. Indicate the source of data.

Recruits per wild spawner have been highly variable, with seven of the last thirteen broods falling to one or below (Table 2-2 above and Figure 2-2 below).

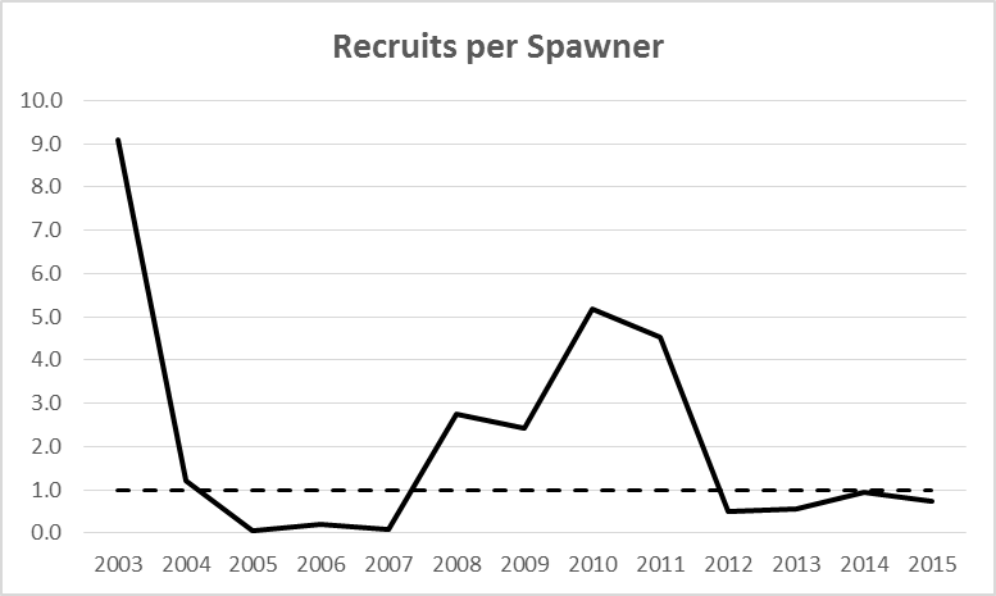

Figure 2-2. Trends in Recruits per Spawner for Nestucca Complex Wild Coho Salmon, 2003-2015.

- Provide the most recent 12 year estimates of annual proportions of direct hatchery-origin fish and listed natural-origin fish on natural spawning grounds, if available.

Hatchery Coho Salmon production in the Nestucca Basin was terminated in 1992. Hatchery fish are still observed at times on the spawning grounds. Surveys since 2003 have averaged about 1% hatchery coho observed on spawning grounds. In all years during that period, hatchery fish made up 5% or less of the fish sampled, with no hatchery fish observed in six of the thirteen years (Table 2-2). No data is available for the progeny of naturally spawning hatchery-origin Coho Salmon in natural rearing areas.

Also, sufficient data of the proportion hatchery-origin fall Chinook Salmon to natural spawning grounds (pHOS) are not available because the monitoring of naturally spawning fall Chinook Salmon is not routinely conducted. A rough estimate of the proportion of hatchery-origin fall Chinook carcasses recovered was in the range of 6-12% annually during the 2013-2015 post spawning surveys.

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

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

Past and future hatchery activities that have potential impacts to a listed species include:

- It is conceivable that even though intake screening on the Three Rivers pump meets NOAA Fisheries criteria, an occasional juvenile coho may be taken as a result of

pumping activities. Pumping is used sparingly during low flow periods and is often not necessary.

- It is possible that a few downstream migrant juveniles—or smolts—may be injured or killed crossing the full spanning weir structure during low-flow years.
- Trapping activities for fall Chinook Salmon brodstock may encounter adults of listed natural Coho Salmon. Unmarked fish that are trapped are released above the weir structure, however, recent history has shown very few Coho Salmon entering the system or entering the trap during the collection period. In extreme low water years it is necessary to seine holding pools below the hatchery, and on occasion unmarked coho are collected. They are immediately released when encountered. Large mesh seines are used and juveniles can escape through the openings. Angling may also be used for broodstock collection if necessary. Coho Salmon are rarely encountered in these activities; however, if they are caught they are released immediately. Current angling regulations prohibit retention of any Coho Salmon.

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

Adult Coho Salmon are occasionally present in very low numbers during trapping or seining periods for fall Chinook in Three Rivers; therefore, impacts resulting from broodstock collection are expected to be minimal. Data on past take is shown in Table 2-4 for the return years 1998-99 to 2007-08. The unmarked Coho Salmon that were trapped in the past are presented below (Table 2-4), and these are not the cumulative take levels but the total take for the entire are trapping season (all stocks combined). Limited fall Chinook Salmon adult collection by angling has not encountered any Coho Salmon. These activities take place during an existing open fishery (fall Chinook and steelhead) and impacts are expected to be minimal.

Potential juvenile impacts have been listed above; however, there have been no observations or reports of any mortality or injury from those activities.

Return Year	Unmarked Adult Coho Trapped [1]
1998-1999	0
1999-2000	6
2000-2001	3
2001-2002	2
2002-2003	6
2003-2004	26
2004-2005	8

2005-2006	3
2006-2007	2
2007-2008	6
Data Source: ODFW HMS database, Hatchery Files [1] All unmarked coho were passed above the Three Rivers weir.	

Table 2-4. Number of unmarked Coho Salmon captured in the past at Cedar Creek Hatchery trap.

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

See below Table 2-5 for the projected annual take levels of listed natural Coho Salmon due to this program.

Table 2-5. Estimated Listed Salmonid Take Levels by Hatchery Activity

Listed Species Affected:	Coho Salmon	**ESU/Population:**	Oregon Coast Coho ESU	**Activity:**	ChF Broodstock Trapping / Seining / Angling
Location of Hatchery Activity:	Cedar Creek Hatchery	**Dates of Activity:**	Sept. 15 – November 30	**Hatchery Program Operator:**	ODFW

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)		0-100	0 - 200	
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)		<10	<10	
Other Take (specify) h)				

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.

Instructions:

1. An entry for a fish to be taken should be in the take category that describes the greatest impact.

2. Each take to be entered in the table should be in one take category only (there should not be more than one entry for the same sampling event).

3. If an individual fish is to be taken more than once on separate occasions, each take must be entered in the 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.

The Three Rivers (Cedar Creek Hatchery) weir and pump facility procedures will be modified immediately if wild Coho Salmon mortality appears to be related to operation of the facility. This may include, but is not limited to, review of procedures and operation, additional screening modifications, trap modifications, weir operations, cessation of trapping, modified operation(s) by hatchery personnel, improved training, etc.

When broodstock collection requires seining or angling methods, Coho Salmon encounters are monitored. If take approaches projected take levels operations will be immediately modified or stopped. If continued collection of broodstock is necessary to meet production needs Fish Division and NOAA Fisheries will be consulted for program status evaluation and direction.

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.

Oregon Plan for Salmon and Watersheds: The program is consistent with measures identified for hatchery programs in the *Oregon Plan for Salmon and Watersheds*.

Native Fish Conservation Policy - The Oregon Fish and Wildlife Commission has approved the Native Fish Conservation Policy (NFCP). Accordingly, the ODFW has completed an Oregon Native Fish Stock Status Report 2005. The NFCP required the development of a conservation plan which was completed in 2014 (CMP) and is described below.

Coastal Multi-Species Conservation and Management Plan (CMP) – This plan addresses conservation and management of anadromous salmonids (salmon, steelhead and trout) on the Oregon coast from Cape Blanco to Seaside. The CMP is unique from other conservation plans in that it addresses both conservation and utilization of six distinct groups of fish species, none of which are listed under the ESA. In addition to meeting requirements of the Native Fish Conservation Policy, the CMP provides long-term management direction for species which are relatively healthy, with the intent to help ensure the continued existence of wild fish and the fisheries which wild and hatchery fish support. And the conservation plan illustrated options for the responsible use of hatchery-produced fish within the SMU. The Cedar Creek Hatchery spring Chinook Salmon hatchery program is consistent with ODFW's CMP 2014.

Fish Hatchery Management Policy (FHMP) – This policy provides guidance for the responsible use of hatchery-produced fish. It outlines the best management practices for hatchery programs to ensure conservation and management of both naturally produced native fish and hatchery produced fish in Oregon. The FHMP calls for the development of Hatchery Program Management Plans (HPMPs) to outline the hatchery practices that will be followed for each hatchery program. A HPMP may be a Hatchery and Genetic Management Plan (HGMP) or an aspect of conservation plan developed under the Native NFCP.

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

Oregon Plan for Salmon and Watersheds (Executive Order 99-01).

The Oregon Plan for Salmon and Watersheds is a prescriptive set of measures for recovering threatened and endangered salmon and steelhead, and meeting federal water

quality standards, established by Executive Order of the Governor. The Oregon Plan includes measures linked to the hatchery production of fall chinook in the Nestucca Basin including nutrient enrichment, acclimation and other separations of hatchery and wild production, terminal fisheries that reduce harvest impacts on wild coho, and monitoring of hatchery and wild runs.

The Rhoades Pond STEP component of the program operates under an ODFW approved STEP Fish Propagation Project Proposal. Projects are permitted for a 5-year period and must be renewed for program continuance. A copy of the proposal is on file at the North Coast Watershed District Office, 4907 Third Street, Tillamook, OR 97141.

The Rhoades Pond facility is ODFW property. Nestucca River Anglers lease this facility from ODFW for the purpose of rearing fall Chinook as outlined under the STEP Project Proposal. A copy of the lease is on file at ODFW Headquarters, Realty Section, 3406 Cherry Ave. NE, Salem, OR 97303-4924.

3.3) Relationship to harvest objectives.

The fall Chinook Salmon artificial production program is designed to minimize biological impacts to listed species. Likewise, fish culture practices are designed and carried out to rear full-term smolts to limit impacts to naturally rearing Coho Salmon.

These hatchery fall Chinook Salmon smolts are mass marked (100%), beginning with 2004 smolt releases, as a means of integration of hatchery and harvest management. Prior releases (1999- 2003) were marked at a rate of 50% with the exception of the 2001 releases. The 2001 production was significantly smaller, and as a result provided opportunity for a 100% mark rate. Mass marking will allow for better monitoring and control of impacts of the hatchery program to wild fall Chinook populations. Incidental take of wild Nestucca Basin Coho Salmon in harvests is limited by the ESA Section 4(d) rule. The 4(d) rule requires development of Fishery Management and Evaluation Plans (FMEPs). Such plans are under development and will be guided by the Pacific Coast Salmon Plan, specifically Amendment 13 (PFMC 1997). Under Amendment 13 (PFMC 1997) annual take figures are derived from a matrix based on parent spawner abundance and an index of marine survival (hatchery jacks/smolts released). The allowable harvest rate currently ranges from 10% to 35% as described in the matrix. This standard is adopted as adequate for controlling incidental harvest impacts in this plan, pending completion of FMEPs. All further address of harvest impacts will occur under the FMEPs. Estimated harvest impacts (ocean and freshwater combined) on wild Coho Salmon for the period 1994 through 1999 averaged 9.2 percent and ranged from 6.8 percent to 12.4 percent.

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

The inland fall Chinook Salmon sport fishery will benefit from this program, as well as ocean sport and commercial fisheries. This program currently produces smolts for the Nestucca River system, including Three Rivers. The estimated number of adult fall

Chinook Salmon harvested in the Nestucca Basin for run years 1988-89 to 2003-04 is reported in the Table 1-2 in Section 1.12.

3.4) Relationship to habitat protection and recovery strategies.

This harvest augmentation program is not directly related to habitat protection or recovery. It is designed to provide hatchery fall Chinook Salmon for harvest in ocean sport and commercial fisheries and freshwater sport fisheries, while other actions are taken to protect and restore habitat. Management of the hatchery program will focus on attaining harvest objectives using methods that minimize impacts to wild fish and their habitats.

Major factors effecting natural production in the Nestucca Basin are unknown; however, it is suspected that ocean survival may be the largest contributing factor. In general, habitat condition in these basins is good and improving. A series of fires in the mid- to late-1930s (Tillamook Burn) drastically impacted habitat with loss of shade, increased sedimentation, and loss of stream complexity in portions of the upper Nestucca Basin. The Nestucca Basin also suffered habitat degradation similar to that of the Tillamook Burn from a number of separate fires in that basin during the same general timeframe. The basin is now recovering to a forest condition with shade and sedimentation impacts greatly reduced; however, there is still a lack of instream complexity throughout the system. Unfavorable natural events (flooding) are common in the basins and can have detrimental effects on egg depositions and juvenile rearing.

Habitat restoration projects over the past seventeen years (on state, federal, and private timberlands, which make up the majority of the basin ownership) have worked to address instream complexity concerns. Watershed council volunteers have been active in addressing and implementing riparian improvements on private lands within the basin. Fish passage structures believed to impede migrations (primarily culverts) are evaluated and being addressed on these lands as well as on major highways and county road systems.

3.5) Ecological interactions.

(1) Species that could negatively impact program:

Competition for food between Stock 47 hatchery fall chinook smolts and other hatchery and naturally produced salmon smolts in the Nestucca estuary and near shore ocean environment may negatively impact this program. Avian and marine mammal predation may also negatively impact this program.

(2) Species that be negatively impacted by program:

Competition for food between Stock 47 hatchery fall Chinook smolts and wild salmon and steelhead juveniles in the Nestucca estuary and near shore ocean environment may negatively impact the wild juveniles. Straying of Stock 47 fall Chinook adults to natural spawning areas could negatively impact populations through interbreeding and reduced genetic fitness. Large concentrations of hatchery fish may attract predators causing increased predation on hatchery and wild salmon

and steelhead juveniles. Increased angling pressure on adult hatchery fall Chinook may increase incidental mortality on naturally produced coho, steelhead, and chum stocks present in the Nestucca basin. Release of unfed fry from the STEP hatchbox program may also negatively impact wild juveniles through competition for habitat and food resources and possible attraction of predators.

(3) Species that could positively impact program:

Increased abundance of naturally produced fall Chinook may positively impact this program by easing management concerns and by providing wild fish for incorporation into the hatchery broodstock.

(4) Species that could be positively impacted by program:

Hatchery-produced stock 47 fall Chinook Salmon carcasses are used in stream enrichment programs. The nutrients provided by these carcasses should benefit salmonid and non-salmonid fishes in the streams where the carcasses are placed.

General Information

Interactions between migrating hatchery smolts and listed Oregon Coast Coho Salmon are likely to be minimal. Fall Chinook from Rhoades Pond are reared to smolt size and expected to migrate upon, or soon after, release in the fall. Smolt releases are confined to lower sections of the main-stem Nestucca River (RM 15 and lower). These are typically areas with limited rearing of wild juvenile Coho Salmon in the fall.

Target release size is 12 fish per pound with release timing in September. Releases prior to the 2004 were in late July. All fish are sampled and disease tested by ODFW Fish Pathologist and cleared before release. It is possible that some may residualize after release, but it is anticipated that interaction(s) between remaining fall Chinook smolts and rearing Coho juveniles, and other salmonids, are minimal based upon their species specific rearing and life history characteristics. No outmigrant monitoring is currently being done in the Nestucca Basin.

Unfed stock 47 fall Chinook fry from hatchery production may be released into habitat locations (standing water) that are unlikely to overlap with rearing coho fry/fingerling, or they may destroyed. Hatchery broodstock carcasses are used in the stream enrichment program in the Nestucca Basin.

Carcass recoveries of fall Chinook Salmon occur during salmon spawning ground surveys conducted in the Nestucca River basin annually. Hatchery-origin fall Chinook smolts on the north coast are mass marked with an adipose fin clip. This provides for identification of hatchery fall Chinook Salmon on spawning ground surveys. However, these surveys are not designed to estimate the total proportion of hatchery fall Chinook Salmon spawning naturally, so that data is not available. The proportion of hatchery-origin fall Chinook carcasses recovered was in the range of 6-12% annually during the 2013-2015 period.

STEP Program

The ODFW has had a Salmon and Trout Enhancement Program (STEP) in place and operational since 1981. A portion of the program (STEP hatchbox program) is the

incubation of eggs and release of unfed fry by public participants. Egg requests are handled as part of annual hatchery production operations. Early stage eyed eggs are given to volunteers for incubation in streamside hatchboxes. Direct stream releases are made when fish are in the late "button up" stage. Typical releases are directed to a basin area, or tributaries in a basin, and are distributed at a varying number of "sites" within the identified area. Use of fall Chinook eggs in the STEP hatchbox program has been rather limited in comparison with other species use in the hatchbox program within the District. Limited use of fall Chinook eggs in classroom incubators has been done in the past. Timing for egg pickup and holiday schedules make this a less than desirable stock to work with in schools. Ecological impacts from these hatchbox programs are anticipated to be low. Fry are released low in the system and overall numbers are low relative to the probable natural production in the basin. Hatchbox programs will be reviewed and evaluated as part of the development process for conservation plans under the Native Fish Conservation Policy.

Habitat above Trapping Facilities

Trapping operations are typically used as a means to collect broodstock, or to remove excess hatchery fish from systems. They also provide the opportunity to collect and pass wild stocks into available habitat above the facility while limiting the competition from hatchery stocks. Following are assessments of the habitat available above trapping facilities associated with this program.

Three Rivers

There has been no ODFW aquatic habitat inventory completed on Three Rivers above the hatchery weir site. The USFS had done some minor survey work on headwater tributaries of Three Rivers that are on Federal land; however, these areas are small and not representative of the basin as a whole.

In general, Three Rivers above the weir/trap facility, including Alder Creek, provide approximately 12 to 14 miles of mainstem type habitat for salmonids. Overall gradient is low to moderate in most of the area. The area typically lacks deep holding pools but does appear to have a reasonable amount of shallower pools. Substrate is a mix of gravels and cobbles suitable for use by Cutthroat Trout, Coho Salmon, steelhead, and Chinook Salmon. Most of the system is paralleled by State Route 22, a significant arterial highway from the Willamette Valley to the coast area. Much of the area has residential development along the system. The system lacks large wood in any significant amount. Development and the highway placement have heavily impacted the riparian vegetation.

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.

Cedar Creek Hatchery has two different surface water supplies: Cedar Creek which supplies year-round flow to the facility; and Three Rivers where 2,000 gallons per minute (gpm) may be pumped during low flow periods each year. The facility has current water rights for 110.9 cubic feet per second (cfs) from Cedar Creek, and 5 cubic cfs (approx. 2,250 gpm) from Three Rivers. The facility is in compliance with the water right permits, water withdrawals, and annual water uses reporting to Oregon Department of Water Resource.

The Three Rivers pumping facility and the Main Intake No. 1 on Cedar Creek are in compliance with NOAA Fisheries fish screening criteria.

During the winter months, Cedar Creek's water source fluctuates in water quality and temperature. During major freshets, there may be heavy silt accumulation in the rearing ponds and raceways. Operational procedures during pond cleaning include utilizing abatement pond and lawns for filtering sand and silt before returning water back to Cedar Creek. Water temperature fluctuates between 40º and 50ºF.

During the summer months, Cedar Creek's water source consists of Cedar Creek and 2,000 gpm supplementation pumped from Three Rivers if needed. Water temperature fluctuates between 50º and 67ºF. Pond cleaning operations are similar to winter. Fall chinook are not on-station during the summer and fall at Cedar Creek Hatchery.

Rhoades Pond has a gravity fed water supply system and pumping has not been necessary. During the April to mid September rearing period water flow through Rhoades Pond averages 1,200 gpm. The temperature range for this time period is 48 to 62 degrees F.

STEP projects, including Rhoades Pond and hatchboxes, are not required to obtain a water right. While there are several different types or styles of hatchboxes, the design is geared to operate with a flow of 4 to 5 gpm through the box. Systems are gravity fed and rely on ambient water temperature.

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

Risk of take at the Cedar Creek facility is minimized because listed fish are not present in the Cedar Creek drainage upstream from Intake No. 1. During the summer months when pumping from Three Rivers, risk is minimized because pumps are protected with 3/32-inch mesh screens which meet the NOAA Fisheries screening criteria. Pumping activity is further limited only to periods where additional flow is necessary for continued rearing

of stocks in production at Cedar Creek Hatchery. Fall Chinook Salmon are not on-station when pumping is necessary.

Risk of take at Rhoades Pond is minimized because the intake structure is screened and has a fish bypass pipe incorporated into the screenbox structure. Although screened, Rhoades Pond facility does not currently meet NOAA's screening criteria. Effluent water passes through a settling pond before returning to the river.

STEP hatchbox operations also have screened water withdrawals designed to reduce impacts to juvenile fish.

All Cedar Creek Hatchery effluent is monitored and reported quarterly under a National Pollutant Discharge Elimination System (300J) permit. All conditions of the permit are administered within ODFW and regulated by the Oregon Department of Environmental Quality. Cedar Creek Hatchery has had a significant number of violations in the past, however upon review a very high percentage of those were found to be errors in reporting and procedural errors associated with sampling. Actual effluent violations (TSS and SS exceedence) have been limited and many are coupled with periods of high flow events, and have varied with locations on the facility. Effluent discharge from the rearing lakes was also a point of some violations. There have been no violations at the facility since December 2002. Since January 2003 the NW Region has instituted a process of checks and balances, as well as necessary training, to assure proper sampling procedures and reporting practices are followed.

At Cedar Creek hatchery, fall Chinook Salmon fry are reared for a short time in rearing tanks inside the hatchery building and are transferred to Rhoades Pond when densities near maximum levels. Generally, no further rearing takes place at Cedar Creek Hatchery, thus the probability of violations occurring as a result of the fall Chinook Salmon program are low.

Operation of Rhoades Pond is not subject to NPDES 300J permitting as the poundage of fish reared is relatively small. Volunteers do monitor flow, and temperature. Dissolved oxygen is occasionally monitored during warm water / low flow periods. The pond is vacuumed approximately once a month, or as needed, to remove solids and waste materials which are pumped onto adjacent uplands. Procedures for crowding of fish for loading and release are used that do not require complete drawdown of the pond and result in minimal effluent discharge during the operation.

SECTION 5
FACILITIES

5.1) Broodstock collection facilities (or methods).

Cedar Creek Hatchery and the Three Rivers trap facility are located in the Nestucca River watershed 1.5 miles east of Hebo off Highway 22. It is at an elevation of 43 feet, at latitude 45ºF 12' 57" N and longitude 123ºF 50' 43" W. The hatchery facility and rearing ponds are located on the north side of Highway 22; the trap and weir facility on Three Rivers is located on the south side of Highway 22 immediately adjacent to the hatchery. Beginning in late September or early October (depending on river flows), adults return to the Three Rivers trap and are collected for broodstock and held until spawning in October through November.

The Three Rivers trap and ladder utilizes water from Cedar Creek. Fish enter the trap via an adjacent ladder. Fish are manually sorted, transported, and held in the Pond 6 (on the hatchery grounds proper) until spawning in October through November. Adults are collected and spawned throughout the entire run in an effort to preserve run timing and spawn timing.

On extreme low water years it is sometimes necessary to seine holding pools below the hatchery. Two seines are used, one blocking the downstream end of the pool, the second being worked down from the head of the pool. Crowding is limited to the amount necessary to physically collect the adult fall chinook and put them in a wet burlap bag to be carried to a transport tank a short distance away. Unmarked Coho Salmon are immediately released when encountered. The large mesh net used to seine allows juvenile salmonids present to escape through the openings.

Fall Chinook Salmon broodstock are also collected by volunteers via angling. Volunteer anglers are equipped with a live box with recirculation system to keep the fish alive and in good condition and water is exchanged on a regular basis. Fish are either taken directly to Cedar Creek Hatchery or are picked up at access sites along the river and transported in a portable tank on a truck. The truck transport tank is also equipped with a recirculation system and oxygen. Unmarked Coho Salmon are not generally encountered but would be immediately released unharmed by anglers if encountered.

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

Currently, Cedar Creek Hatchery and volunteers utilize multiple types of fish transportation equipment for the transportation of juveniles and adult fish. District has two transport tanks that can be used for STEP.

1. A typical fish liberation unit is a flatbed truck with a 1,000-gallon fiberglass tank. The unit has a 12-inch outlet for releasing adults. It also is equipped with recirculation pumps and an oxygen injection system. The governing factors that determine the loading densities are: water temperature in the truck, water

temperatures at the receiving water body, duration of transit, and size and species of fish to be hauled.

2. A portable fish liberation unit, which consist of a 300-gallon slip tank that fits onto the bed of a 1-ton pickup truck. The portable liberation unit is equipped with an electric aeration system and an oxygen injection system. The governing factors determining loading densities are the same as identified for the 1,000-gallon liberation unit.

3. A 2,000-3,000 gallon tractor-trailer unit which consists of a tractor unit and a stainless steel tank on a fifth-wheel trailer. The tank trailer is equipped with electric aerators for circulation. In addition, there is bottled oxygen with carbon diffusing stones for oxygen replenishment.

4. A portable 200-gallon fiberglass tank from the Tillamook Fish District or a 430 gallon aluminum trailer mounted tank, equipped with oxygen diffusers and an electric aerator are used for transport when necessary.

5. Stock 47 adult fall chinook collected by angling, when necessary, are typically held and transported in stainless steel boxes (with lids), or in large capacity plastic coolers. Boxes are approximately 20 gallon capacity (estimated 15 gal useable), coolers are approximately 21 gallon capacity (estimated 17 useable). Both containers use battery powered recirculating pumps, and water is changed as necessary during transport.

6. STEP volunteers use the hatchbox tray from their facility and cover the eyed eggs with wet burlap to transport eggs from the hatchery to their hatchbox. Fry releases may take several methods depending on release location. Those released at the hatchbox site are usually carried to the stream in a bucket and poured in. If release is to be remote from the site fry are transported in coolers and equipped with a battery operated aerator/circulation pumps.

5.3) Broodstock holding and spawning facilities.

Adult facilities consist of a trap that is located on Three Rivers across Highway 22 from the main hatchery facility and four ponds on the hatchery grounds. The trap consists of two concrete tanks (approximately 10 feet by 20 feet). One tank is used as the trapping facility. The trapped fish are sorted and transferred to a pond on the main hatchery grounds. The tanks are supplied with gravity fed water from Cedar Creek. Water flow can be adjusted but is normally supplied at 3.2 cfs. The holding pond is supplied with 408 gpm. Water flows exit through the adjacent trap and fish ladder. Water flow measurements are taken and the trap monitored regularly. The trap and tanks are located in an approximately 30-foot by 50-foot building. The building has a concrete floor and metal walls and roof. The building can be secured to protect fish and equipment. The building has electrical service for lighting. Auxiliary pumps can supply additional water during low-flow periods. Fall Chinook Salmon broodstock are typically sorted and spawned in a small outbuilding at the hatchery.

There are additional adult holding ponds, if needed, on the hatchery proper. Two of these ponds can be divided in half. These ponds have the capacity to hold a total of 2,000 adults.

5.4) Incubation facilities.

The incubation room is approximately 43 feet by 38.5 feet. It is a wooden structure on a concrete foundation with a composition roof. The building receives gravity fed water from Cedar Creek. The facility contains 6 shallow troughs, each having a capacity of eleven baskets; and 15 stacks of vertical incubator trays. Each stack contains 14 trays. The facility has the capacity to incubate 2.3 million eggs. Discharge water is returned to Cedar Creek.

STEP hatchboxes come in a variety of sizes and shapes; however, most are in the style of typical hatchery incubation troughs and sized to hold two baskets approximately 20 by 10 by 8 inches. Troughs are a flow-through design and baffled to keep velocities down and provide correct flow patterns; they are covered with a secured lid.

5.5) Rearing facilities.

The incubation building also contains multiple concrete and fiberglass troughs. These facilities are used to start fish on feed. The concrete tanks have a rearing capacity of 90 pounds each. The fiberglass troughs have a rearing capacity of 50 pounds; one has a rearing capacity of 100 pounds. Prior to reaching maximum densities of one pound per square foot in the starter tanks, the fingerlings are generally transferred to Rhoades Pond. The fish are transferred in mid April in portable fiberglass tanks.

Rhoades Pond is a concrete lined pond with an approximate volume of 50,220 cubic feet with a gravity-fed water supply system. Upon transfer to Rhoades Pond, the fry are contained to the upper 20% of the pond by divider seines. The fish are held in this portion of the pond for approximately one month after which they are released into the entire pond. The maximum density reached at Rhoades pond is 0.16 pounds per cubic foot due to the large volume of the pond. In certain situations, such as low production numbers, fish may be reared entirely at Cedar Creek Hatchery as room allows. In such an event, fish would be transferred to a concrete raceway to complete rearing. Volunteers will still be responsible for the rearing of these fish should that occur.

5.6) Acclimation/release facilities.

There are no significant direct or volitional releases from the facility, however, some remaining fish, (typically <1,000) may be directly released from the pond to reduce capture and hauling stress. Typically these fish are hard to seine and capture in a large pond setting and repeated efforts result in high mortality. Generally, release of fall chinook smolts is by direct release from liberation trucks.

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

Current production uses all the shallow trough incubators and six stacks of vertical incubators. Egg and fry mortality continues to be high because of the high silt content in the water, particularly during large storm events. The extreme rainfall during the years 1996, 1998, 2006 and 2007 created severe flooding events and caused operational difficulties. Around-the-clock pumping of sand and silt from intakes and sand traps are necessary to maintain flows to ponds and avert catastrophic losses.

It is not uncommon to have high mortalities at times associated with STEP hatchboxes. Most common are water flow related problems, usually a plugged intake line from detritus and on occasion from freezing. Because they normally are set close to streams, they are also vulnerable during flood events. Losses at times may also be attributable to lack of routine picking of dead eggs, hatching mortalities related to storm events, and the ensuing fungus outbreaks on the mortalities in the baskets.

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 fish are under propagation in this program. However, equipment failures or other events, at the hatchery facilities could potentially lead to juvenile releases which may impact rearing juvenile Coho Salmon in the Nestucca river system.

The hatchery facility is staffed full-time, 24 hours per day. A computerized alarm system allows instantaneous notice of a system failure. Each rearing container has a float-activated switch tied into our central alarm system. Currently, in use are hand-held alarm radios that have a range up to five miles. The transmitter is programmed to call hatchery staff cell phones and home phones. The radios also allow for two-way communication between employees, which has been tested and used effectively. The facility is equipped with a backup propane operated pump, utilized in the event of power or equipment failure. Operating procedures include running the propane pump regularly and topping the 500-gallon fuel tank as needed.

Rhoades Pond does not have an alarm system at present. When fish are present in the pond there is an on site host as well as twice daily feeding and fish checks by volunteers. Volunteers do have the availability of a submersible aerator and air stones in case of a loss of water flow. In a power outage event a generator would be used to supply power to the aerators if they were required.

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.

The original source of fall Chinook Salmon broodstock used in Cedar Creek Hatchery is unknown. Since at least the mid 1970s broodstock has been collected from fish returning to Three Rivers, the trap facility, or from the mainstem Nestucca. The historic Cedar Creek hatchery fall Chinook broodstock was discontinued after the 1992 brood year releases. The current program was begun in 1999 with the collection of unmarked fall chinook from the Nestucca Basin as broodstock.

6.2) Supporting information.

6.2.1) History.

Historical information on the fall Chinook Salmon broodstock for the Nestucca Basin is unknown. In the *Evaluation of Trask Hatchery* by Wallis, (Wallis, 1963), records are presented indicating fall chinook eggs being transferred from "Nestucca" in 1927 to 1932. Unfortunately, there is no further information as to the actual source. The report further shows that only in 1930 there was a transfer back to the Nestucca, which is assumed to be fry or fingerling. As early as at least the early to mid 1970s, it is known that Cedar Creek Hatchery was collecting broodstock from Three Rivers and on occasion from the mainstem Nestucca for spawning, rearing, and release into the Nestucca Basin (Schroder, Pers. Comm.). This historic hatchery fall Chinook broodstock was eliminated after the 1992 brood year releases with adult returns through 1998 (age 6). The current program was begun in 1999 with the collection of unmarked fall Chinook from the Nestucca Basin as broodstock. It is assumed these were naturally produced Nestucca Basin fall Chinook Salmon. Although they may have include some genetic linkage to the historic hatchery broodstock through interbreeding in the wild of hatchery and wild fish from the prior hatchery program.

6.2.2) Annual size.

Current production goals for this fall chinook program requires a broodstock of approximately 74 fish (37 male and 37 female) to meet genetic and timing guidelines for a production goal of 100,000 smolts and STEP eyed-egg requests (currently 50,000 eggs). Additional fish may be collected and held as necessary to cover shortages resulting from, but not limited to, fecundity variations, early egg mortality, positive disease test, etc.

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

While little is known about the broodstock for the historical program at Cedar Creek it appears likely that naturally produced stock from the basin was used initially. Because these fish were not marked, and their origin cannot be determined from scale reading, it is a reasonable assumption that the broodstock used over time was a mix of hatchery and naturally produced adults.

All adults collected for the fall Chinook Salmon program in 1999 were from natural stocks. Since only 50% of the hatchery smolts released in 2000, 2001 and 2003 were marked, it is assumed that broodstock fish being collected from this point on, although unmarked, are a mixture of returning hatchery fish and naturally produced adults. Since 2004 releases, smolts are now 100% marked. The program seeks to use a minimum of 30% natural origin broodstock annually. This may vary depending on availability of wild and/or hatchery fish or by genetic guidelines established by ODFW or other entities (i.e. the Hatchery Scientific Review Group).

6.2.4) Genetic or ecological differences.

The fall Chinook Salmon broodstock is expected to exhibit similar genetic and ecological traits to naturally produced fall Chinook because they are collected throughout the run from naturally produced adults, or adults derived from hatchery progeny of, Nestucca basin stock.

6.2.5) Reasons for choosing.

Unmarked Nestucca Basin fall Chinook Salmon were chosen because they are the naturally reproducing stock indigenous to the basin.

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.

This program is for fall Chinook Salmon and will have no genetic or ecological effects on listed natural Coho Salmon as a result of broodstock selection practices.

SECTION 7

BROODSTOCK COLLECTION

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

A minimum of seventy-four adult fall Chinook Salmon (37 males and 37 females) are needed to meet the proposed objective of 100,000 smolts, STEP eyed egg requests (currently 50,000 eggs), and genetic guidelines. Additional fish may be collected and held as necessary to cover shortages resulting from, but not limited to, fecundity variations, early egg mortality, positive disease tests, etc.

7.2) Collection or sampling design.

Beginning in late September or early October, adults return to the Three Rivers trap and are collected for broodstock and held until spawning in November through early December. Broodstock are collected from throughout the run with a portion being held from each trap run during the return period. During low flow years it is sometimes necessary to seine a portion of the broodstock from resting holes in Three Rivers. In addition, volunteer anglers also collect broodstock by means of hook and line out of the Nestucca River basin. When collected by anglers, fish are maintained in live boxes with aeration systems until transported to Cedar Creek Hatchery. Adults are collected throughout the return period regardless of method used.

7.3) Identity.

Program startup in 1999 collected unmarked adult fall chinook, there were no returning fall chinook from previous programs. Smolt releases during the first 5 years of the program received an external mark at a 50% rate with the exception of 2002. In 2002 a significant production shortage (39,125 production) allowed for 100% mark. Beginning with the 2004 production, smolts were released 100% marked with maxillary bone clips to distinguish them from naturally produced fish. Beginning in 2007, the external mark was changed to an adipose fin clip, with a goal of 100% of the smolts being released clipped for identification.

7.4) Proposed number to be collected:

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

Approximately 74 adult fall Chinook Salmon broodstock (37 males, 37 females) must be collected to achieve the current project's smolt production goal of 100,000 smolts, STEP eyed egg requests, and genetic guidelines. Jacks may be used but will not exceed 5% of the male broodstock component spawned. Adults are matrix spawned at a one-to-one, male-to-female ratio. In times of broodstock shortage, this ratio may be subject to change.

7.4.2) Broodstock collection levels for the last twelve years (e.g. 1990-99), or for the most recent years available:

Table 7-1. Broodstock Collection Levels of the Past.

Brood Year	Adults			Total	
	Females	Males	Jacks	Eggs[1]	Juveniles[2]
1999[3]	40	42	6	118,834	97,825
2000	35	43	4	147,019	106,013
2001	9	13	5	42,193	39,972
2002	30	35	2	142,771	106,609
2003	55	69	1	168,087	107,928
2004	70	93	6	170,616	107,551
2005	45	65	0	126,943	108,238
2006	21	21	1	126,516	100,649
2007	18	17	0	55,058	31,738

Data source: ODFW HMS database, Salem

[1] Total egg take, including STEP, hatchery production, and genetic take.

[2] Fry ponded.

[3] Program terminated in 1992 due to budget cuts. Program re-established as a STEP project in 1999.

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

Program releases from 1999 – 2003 were only 50% marked with exception of 2002 which was 100% marked. Fall Chinook Salmon collected for hatchery broodstock at the Three Rivers trap facility in excess of production needs are handled as follows:

- Unmarked adults will be passed above the weir/trap facility.
- Ripe, marked hatchery adults will be dispatched and utilized for Stream Enrichment or donated to food programs.
- Unripe, marked hatchery adults may be recycled in the mainstem Nestucca.

Adult collection by seining may be used if insufficient numbers of broodstock, (hatchery or wild) are being collected by trapping and/or angling. Typically in these situations these fish will not directly contribute to significant surplus broodstock collected.

A small number of excess adults may result from collection and holding of broodstock. Marked hatchery fish will be killed and used for stream enrichment. Unmarked fish may be released to spawn naturally, or killed, as determined by fish health condition on case by case basis.

7.6) Fish transportation and holding methods.

Adult hatchery fall Chinook Salmon collected at the Three Rivers trap, or seined in Three Rivers, are transferred and held in an on-station pond until ready to spawn. Transport time typically ranges from 15 to 30 minutes, including loading time, but may on occasion exceed one hour. Adult fall Chinook Salmon collected by angling are transported by volunteers in aerated tanks to Cedar Creek Hatchery. Transport time typically ranges from 30 to 60 minutes, but may exceed that on occasion. All spawning activities take place in the spawning building. Any transportation utilizes equipment described in Section 5.2.

7.7) Describe fish health maintenance and sanitation procedures applied.

Broodstock and developing eggs receive regular treatments with hydrogen peroxide or other approved chemicals to prevent/control fungus (*Saprolegnia parasitica*) outbreaks. The spawning area and equipment are routinely disinfected with an iodine solution to prevent disease outbreaks. Green eggs are water-hardened in an iodine solution to prevent disease or viral contamination. See Attachment A for further fish health details.

7.8) Disposition of carcasses.

Spawned hatchery fall Chinook carcasses are used for stream enrichment activities in the Nestucca Basin following specific criteria and guidelines for operation developed by ODFW. Pond and trap mortalities are buried or disposed of in a landfill.

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.

There should be minimal likelihood for adverse genetic or ecological effects to listed fish as a result of broodstock collection. The following measures will be used to minimize adverse genetic or ecological effects to Nestucca Basin listed natural Coho Salmon:

Wild Coho Salmon that enter the Three Rivers (Cedar Creek Hatchery) trap will be immediately released alive above the trapping facility, or trucked a short distance above if flow conditions dictate. The hatchery trap will be visually checked at least daily, and fish sorted at least weekly (or as needed) to minimize delay and potential harm to wild coho. The weir and trap facility is further being operated as indicated in the attached letter from Tom Stahl to Lance Kruzic (Attachment B).

Coho may be present in the system when seining is necessary to collect fall Chinook Salmon broodstock. The seine is pursed only to the point that fish are contained and are removed individually by hand. Any wild Coho Salmon collected are immediately released outside the seine. Any juvenile Coho Salmon that may be present can easily escape the large-mesh seine net used.

Collection of fall Chinook Salmon by angling should pose little or no impacts to listed Coho Salmon. Angling is done only in those areas and times open to salmon or steelhead

angling, and any Coho caught must be immediately release unharmed. Similar collection programs indicate virtually no interception of Coho Salmon.

SECTION 8
MATING

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

8.1) Selection method.

Collection of fall Chinook Salmon is throughout the entire run. Individual fish are collected at approximately a 1:1 sex ratio throughout the run. Fish are spawned randomly as they ripen.

8.2) Males.

Males are generally used only once during spawning. If necessary, in the case of a shortage of males, individual fish may be spawned more than once. Jacks are included in the broodstock when available and at the proportional rate they are collected, but typically will not exceed 5% of the males spawned

8.3) Fertilization.

Fall Chinook Salmon are kill-spawned with the goal of a 1:1 (male-to-female) ratio. Each fish is only used once in spawning, however if necessary, in the case of a shortage of males, individual fish may be spawned more than once. Fish are spawned using a matrix. The individual family groups are kept separate. Broodstock is sampled for IHN to facilitate culling if either or both parents have a high titer for virus. Tissue samples and seral samples are taken on all fish.

Parents are wiped down with an iodine solution and females are bled prior to spawning. Ovarian fluid and sperm samples are collected for viral analysis. Fertilized eggs are water-hardened in an iodine solution prior to placement in incubators.

8.4) Cryopreserved gametes.

Cryopreservation of fall chinook gametes is not used in the stock 47 fall chinook program.

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.

Not applicable; we anticipate no genetic or ecological risks to wild Coho Salmon from the mating techniques used in this fall Chinook Salmon program.

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.

Table 9-1. Eggs Taken and Survival Rates.

Year	Egg Take	Eyed Eggs for Program [1]	Percent Survival to Eye-up
1999[2]	118,834	107,992	90.9%
2000	147,019	135,426	92.1%
2001	42,756	40,156	93.9%
2002	142,771	136,910	95.9%
2003	168,087	161,320	95.9%
2004	170,616	155,848	91.3%
2005	126,943	109,398	86.2%
2006	126,516	103,907	82.1%
2007	55,058	32,571	59.2%[3]

Data Source: ODFW HMS database

[1]1999 all eyed eggs were held and excess were culled off as unfed fry. In 2000,culling was done at the eyed-egg stage.

[2] Program terminated in 1992 due to budget cuts. Program re-established as a STEP project in 1999.

[3] High loss in one egg group due to siltation during flood event.

9.1.2) Cause for and disposition of surplus egg takes.

Stock 47 fall Chinook Salmon egg take is managed to compensate for egg to smolt mortality and genetic considerations, such as increased family size to promote genetic diversity, etc. Surplus eggs may be destroyed at the time of inventory. As necessary, eggs are culled on a percentage basis across all family groups to retain diversity among those adults spawned. Mortality and culled eggs are all disposed of by freezing and then buried or sent to the landfill.

9.1.3) Loading densities applied during incubation.

The average size of fall Chinook Salmon eggs is 49 eggs per ounce, and the average fecundity is approximately 4,500 eggs. Shallow trough type egg incubators are generally used and have a water flow of 12 gpm. Each incubator basket typically receives approximately 13,500 eggs.

Criteria for STEP hatchboxes varies with the design of hatchboxes being used. In general they incubate 5,000 to 7,000 eggs per basket; two baskets per box. Water flow rate is typically 4 to 5 gpm through the system.

Loading densities for STEP classroom incubators varies with the size and setup of equipment being used but typically runs from 200 to 1,000 eggs. A standard aquarium recirculating type pump supplies flow. No flow rates have been calculated but it is believed that flow is sufficient for the small number of eggs used in these programs.

9.1.4) Incubation conditions.

The water supply to the egg incubator is monitored for flow and temperature daily. The incubating eggs are held in water that is 45º to 52ºF. The dissolved oxygen (DO) for the influent water ranges between 10 to 11 ppm. No data is available for the effluent water.

STEP hatchbox eggs are incubated at ambient stream temperatures. Flow is checked daily but not measured. Dissolved oxygen and temperature are seldom monitored unless incubation problems are identified by the operator and assistance is requested.

Students will sometimes monitor temperature in the STEP classroom incubators; however, it is likely to vary significantly between incubators, rooms, and schools. Typically, these systems run at ambient room temperatures with ice added daily to keep temperatures in the optimum range of 50 to 60º F., below the prolonged exposure lethal level of 63º degrees F. A standard aquarium recirculating type pump supplies flow.

9.1.5) Ponding.

Fry are physically relocated from the incubator trays to rearing tanks when the fry are 100 percent buttoned up. This occurs with approximately 1,950 temperature units. At the time of ponding, the fall Chinook Salmon fry size averages 700-750 fish per pound.

9.1.6) Fish health maintenance and monitoring.

See Attachment A regarding state approved fish health protocols.

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.

No listed fish are incubated by this program and no adverse effects to listed species are expected during the incubation process.

9.2) Rearing:

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

Table 9-2. Survival Rate Data

Brood Year	Percent Survival of Fry at Cedar Creek[1]	Percent Survival of Fry at Rhoades Pond[2]
1999[3]	98.8	96.2
2000	99.1	98.4
2001	99.3	98.6
2002	99.0	99.6
2003	99.5	69.6
2004	98.6	98.8
2005	98.6	96.3
2006	99.4	79.1

Data Source: ODFW HMS database, District files

1. Represents fry survival from ponding until transfer to Rhoades Pond for 1999 - 2006.
2. Represents survival from transfer into Rhoades Pond until release.
3. Program terminated in 1992 due to budget cuts. Program re-established as a STEP project in 1999.

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

The stock 47 fall Chinook Salmon are ponded in March in rearing tanks inside the hatchery building, then transferred to Rhoades pond in April when they reach maximum density of one pound per cubic foot of rearing space in the rearing tanks.

Upon transfer to Rhoades Pond the fish are contained in approximately 20% (approximately 10,044 cubic feet) of the pond. The maximum density during this phase of rearing is 0.13 pounds per cubic foot. At the time of fin clipping in June the fish are released into the entire pond, which is 50,220 cubic feet. The maximum density at release is 0.16 pounds per cubic foot. Target density for pond loading by volume is 1 lb. per cubic foot, but can vary with flow. Target loading densities based on flow is 8 lbs. per gpm. The maximum loading for Rhoades Pond is approximately 8.75 lbs per gpm.

9.2.3) Fish rearing conditions.

Cedar Creek Hatchery uses Cedar Creek water for rearing. Water temperatures range from 40º to 56ºF during the fall and winter when fall Chinook juveniles are rearing on station in rearing tanks. The DO level coming into the facility is between 10 ppm and 10.5 ppm in the fall and winter months.

Rhoades Pond uses water from Three Rivers for rearing. Water temperatures range from 42 to 66 degrees during the rearing period. The DO levels entering the pond are between 10 ppm and 10.5 ppm during the rearing period.

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.

Weight samples are collected for inclusion in monthly pond reports while fish are on station. Similar data is collected by STEP volunteers for rearing completed at Rhoades Pond and is kept in District files. Length frequency measurements are made at the time of liberation. Mark quality observation is also made at this time. Table 9-3 shows monthly average weights for the program from ponding to release for the prior two years by facility.

Table 9-3. Average Monthly Fish Size for Cedar Creek /Rhoades Pond Fall chinook. Sizes are number of fish/pound.

Week	Cedar Creek	Rhoades Pond	Life Stage
Ponding	737		fry
Week 4	473		fry
Week 8		204	fry
Week 12		99	fingerling
Week 16		50	fingerling
Week 20		30	fingerling
Week 24		20	smolt
Week 28 or release		12	smolt
Data Source: HMIS, District files Fish ponded at Cedar Creek Hatchery then transferred to Rhoades Pond to complete rearing.			

Table 9-4. Average Fork Length Frequency Percentages (2005 release).

Fork Length Size Range	47 Stock ChF Releases
< 14 cm.	1.8 %
14 – 17 cm.	97.5 %
> 17 cm.	0.7 %
Data Source: District files	

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

Once the fry have been ponded, their weight generally doubles each month, but begins to slow as they reach presmolt and smolt sizes.

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).

Fall Chinook Salmon juveniles reared at Cedar Creek Hatchery and Rhoades Pond are fed a standard fish food diet at a rate and frequency that varies with fish size. For the first 90 days following ponding, the fish are fed 8 to 12 times per day. For the next 90 days, they are fed 4 to 6 times per day. For the remainder of rearing the fish are fed 2 or 3 times per day. The last four weeks of rearing, prior to release, the fish feed ration is reduced to a slow rate of growth and or maintenance diet depending on fish per pound and condition factor. The average overall food conversion is approximately 1.2.

Percent body weight fed per day varies from 0.5% for a maintenance diet to 5.0% for aggressive growth. Specific percentage diet figures vary by water temperature, life stage, and production schedule needs within any monthly period as conditions dictate.

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

Fish health of rearing juvenile fall chinook is monitored regularly by an ODFW fish pathologist. The fish pathologist diagnoses disease problems and prescribes the appropriate treatments to eliminate or control disease. An iodine antiseptic is routinely used to sanitize hatchery equipment and prevent the incidence or spread of disease. For further description see Attachment A.

Once the fish are transferred to Rhoades Pond an ODFW pathologist will check fish during fish health checks at Cedar Creek Hatchery or if there are indications of disease problems. Hatchery staff is accessible to volunteers to provide technical assistance on disease identification and assist with any treatments prescribed by the fish pathologist in the event of a disease outbreak.

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

Weight samples of the fish are taken weekly during early rearing, and monthly during later stage rearing to ensure proper growth rate. Prior to release, length frequencies are taken. A visual check for mark quality is completed on a representative sample of the fish being released.

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

No natural rearing methods are intentionally used for fall Chinook Salmon under propagation. However, Rhoades Pond is a large lake-type structure and it is anticipated that rearing Chinook may experience minor components of natural rearing such as insect and natural food availability.

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

Not applicable; no listed fish are under propagation.

SECTION 10
RELEASE

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

10.1) Proposed fish levels.

Table 10-1. Proposed Fish Release Levels.

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Eggs				
Unfed Fry [1]	Excess, varies		March Annually	Standing water bodies
STEP Unfed Fry [2]	50,000		March Annually	Nestucca River
Fry				
Fingerling				
Yearling [3]	70,000	12	September Annually	Nestucca River
Yearling [3]	30,000	12	September Annually	Three Rivers

Data source: Production schedules and District files.

1. This program does not produce unfed fry for release as a program goal for stock 47 fall chinook. In any given year there may be surplus unfed fry at the time of ponding (typically resulting from below average egg and swim-up mortality).
2. Unfed fry from STEP hatchboxes. Presently fall chinook are seldom used in classroom incubators. Timing with egg pickup and fry release often conflict with Christmas and / or Spring breaks and have been problematic with teachers.
3. Release numbers may vary annually with less in Three Rivers and more in Nestucca. Flexibility is necessary to address water flow and temperature conditions at time of release. No more than 30,000 will be released in Three Rivers.

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

Stream, river, or watercourse:	Nestucca River
Release point:	Between RM 7.25 and 15.5. Numbers and specific sites vary annually with flow conditions and water temperatures.
Major watershed:	Nestucca River
Basin or region:	Nestucca Basin

Stream, river, or watercourse:	Three Rivers
Release point:	RM 2.25 (up to 30,000) immediately below hatchery weir. A small portion may be released directly at Rhoades Pond (RM 6.5) if seining cannot easily capture pond remnants.
Major watershed:	Nestucca River
Basin or region:	Nestucca Basin

STEP Fry Releases:

Unfed fry from hatchboxes has varied significantly over time depending on the number of volunteers that have chosen to become involved and available eggs. As such, it is hard to predict a "proposed" release level. The proposed release level presented represents the average egg request during the late 1980's when volunteer hatchboxes were widespread, and also reflects current involvement. This figure (50,000) represents a cap on current hatchbox programs as directed by Fish Division in 2000. Hatchbox release numbers typically show wide variation in survival rates usually resulting from high flow events or operational problems (plugged intakes, etc.).

Release sites are normally low in systems where hatchery fall Chinook Salmon are already released in the system. Additional data is provided in Section 10.3

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

Table10-2. Past Releases of Fall Chinook Salmon through Cedar Creek Hatchery/Rhodes Pond (STEP) Program (including STEP unfed fry).

Brood Year	STEP Unfed Fry	Avg. Size	Fry	Avg. Size	Fingerling [1]	Avg. Size	Smolt [2]	Avg. Size
1999	0	na			96,646	382	95,852	13.5
2000	24,538	na			105,081	473	103,448	16.2
2001	0				39,672	287	39,125	13.4
2002	27,610	na			105,519	419	105,085	13.6
2003	51,280	na			107,371	360	74,770	11.6
2004	44,915	na			106,066	354	104,754	10.3
2005	26,300	na			106,815	350	102,840	15.3
2006	0				100,033	540	79,130	13.5
2007	0				31,675	200	31,646	16.3
2008	0				50,134	300	25,073	5.8
2009	38,097	na			109,393	300	101,315	11.0
2010	46,288	na			104,136	340	103,194	15.1
2011	53,309	na			108,871	305	67,306	17.4
2012	0				98,414	254	97,600	12.8
2013	25,092	na			113,670	366	110,264	13.4
2014					110,235	318	105,116	17.1
Average	**22,495**				**93,358**	**341**	**84,157**	**13.3**

Data source: ODFW HMS database.

[1]Fingerling production (beginning 1999) at Cedar Creek hatchery for Rhoades Pond STEP Project. These fingerling are transferred to Rhoades Pond for rearing to smolts and release. There are no fingerling releases into flowing waters.

[2]Cedar Creek Hatchery Fall Chinook production program was terminated in 1992 due to budget cuts. Production did not resume until 1999 when the Rhoades Pond STEP program began.

For brood years 1999-2002, smolts were released in July. Starting with brood year 2003, the release date for smolts was changed to September to reduce impacts to wild fish.

Table 10-3. STEP Fry Release Summary

Brood Year	# of Eggs	# of Fry	Stream
2000	15,800	14,000	Nestucca River
	11,178	10,538	Three Rivers
2002	14,000	13,849	Nestucca River
	13,910	13,761	Three Rivers
2003	25,812	25,628	Nestucca River
	25,952	25,652	Three Rivers
2004	25,016	24,915	Nestucca River
	20,880	20,000	Three Rivers
2005	27,372	26,300	Nestucca River
2009	38,578	38,097	Nestucca River
2010	48,306	46,288	Nestucca River
2011	53,760	53,309	Nestucca River
2013	25,992	25,092	Nestucca River

No releases reported after 2013

The above data represents the only STEP unfed fall Chinook Salmon fry releases in the last 12 years. Eggs are made available to STEP hatchbox operators only after Rhoades Pond production is met. In many years, a shortage in broodstock means no eggs are available for hatchboxes.

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

Table 10-4. Rhoades Pond Release Dates and Protocols

Release Year	Date Ranges	Nestucca River Release Totals	Three Rivers Release Totals
2000	August 8th	65,262 trucked, direct release	30,590 trucked, direct release
2001	August 3rd	73,740 trucked, direct release	29,708 trucked, direct release
2002	August 5th	17,377 trucked, direct release	21,748 trucked, direct release
2003	August 12th	76,545 trucked, direct release	28,540 trucked, direct release
2004	September 8th	57,960 trucked, direct release	16,810 trucked. direct release
2005	September 19th	74,646 trucked, direct release	30,108 trucked, direct release
2006	September 7th	72,810 trucked, direct release	30,030 trucked, direct release
2007	September 5th	59,580 trucked, direct release	19,550 trucked, direct release
2008	September 2nd	15,157 trucked, direct release	16,489 trucked, direct release
2009	September 14th	22,753 trucked, direct release	2,320 trucked, direct release
2010	September 14th	78,921 trucked, direct release	22,394 trucked, direct release
2011	August 16th	73,492 trucked, direct release	29,702 trucked, direct release
2012	August 14th	67,306 trucked, direct release	no release
2013	August 29th	75,520 trucked, direct release	22,080 trucked, direct release
2014	August 28th	58,160 trucked, direct release	52,143 trucked, direct release
2015	August 11th	80,371 trucked, direct release	24,795 trucked, direct release

Data Source: HMS, District files

No program releases from 1993-1999.

STEP fry are usually released around early March, dependent on incubation water temperatures. Direct releases are normally made at the hatchbox site. Occasionally fry are released at remote sites; these are also direct stream releases.

10.5) Fish transportation procedures, if applicable.

Fall Chinook Salmon smolts are transported from Rhoades Pond and released into local streams. Average hauling time is less than one hour. Two to four liberation trucks are typically used each year. Each truck transports up to four loads per day depending on release numbers and locations. Transport equipment is discussed in Section 5.2.

STEP fry transportation is typically done in a set of buckets to the site for a direct release into the stream. When transported to a remote location, large coolers with recirculation or aeration are generally used. Transportation time is typically 20 to 30 minutes, but may be as high as 60 minutes in some instances, with fish directly released into the stream.

10.6) Acclimation procedures.

No acclimation is practiced in the fall Chinook Salmon program.

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

From 1999 through 2003 fall Chinook Salmon from Rhoades Pond were marked with a Right Maxillary (RM) mark. Mark rate was targeted at 50%, except in 2002 when fish were marked at 100% rate as a result of a production shortage that year. Beginning with 2004 releases the mark rate goal was 100% with a Right Maxillary (RM) mark. In 2007, the external mark was changed to adipose fin clip with a target of 100% marked.

STEP unfed fry are unmarked.

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

Releases have been within the programmed and approved levels.

10.9) Fish health certification procedures applied pre-release.

See Attachment A.

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

Cedar Creek Hatchery is equipped with a back-up propane operated pump, utilized in the event of power or equipment failure. Operating procedures include running the propane pump routinely and topping the 500-gallon fuel tank as needed.

In the event of a water system failure any emergency release of fall Chinook Salmon juveniles will only occur after:

- The hatchery crew has exhausted all possibilities for retaining the fish.
- The hatchery crew has consulted with the ODFW District Biologist.
- Releases will be into the Nestucca, Three Rivers, or into a closed body of water.

Rhoades Pond is a gravity feed water supply and is checked at least daily when fish are present. In the event of a water system failure any emergency release of fall chinook juveniles will follow the same steps described above beginning with the volunteers contacting the hatchery for assistance or immediate direction for actions to allow retention of fish.

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.

- Prior to 2004 fall Chinook Salmon releases were in late July. Fall Chinook releases beginning in 2004 will be in September. Given the life history characteristics for chinook of fingerling migration and estuary rearing, any adverse genetic or ecological impacts to coho are anticipated to be minimal.
- All smolts are released into mainstem river areas. Nestucca River fish are released within approximately 0.25 to 5.75 river miles above the head of tide. Three Rivers fish are released approximately 4.75 river miles above the head of tide.

These two release strategies minimize potential interactions and adverse ecological effects that may occur between hatchery fall Chinook Salmon and any juvenile Coho Salmon rearing in the main-stem of the Nestucca River.

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.

Information for Nestucca Basin wild and hatchery fall Chinook Salmon spawner abundance, proportion of hatchery strays, smolt size, and timing will be obtained from OPSW monitoring projects: Salmonid Life-Cycle Monitoring project (Solazzi et al. 2000) and Coastal Salmonid Inventory project (Jacobs, et al. 2000). Information on the freshwater catch of fall Chinook is compiled from returned salmon / steelhead harvest tags and is available from Fish Division in the Salem Headquarters. Volunteers will also be distributing creel logbooks to anglers to collect catch data. Specific economic data for sport caught fish is not routinely developed for all stocks. Economic data that is compiled is available in the Salem Headquarters.

Monitoring of in-hatchery performance and adult returns to Cedar Creek Hatchery will be conducted by the hatchery crew. This information is stored on the ODFW mainframe computer in the Hatchery Management System (HMS) database. This will include at least the following information:

Adults

- The number of females, males, and jack fall ChinookSalmon collected at Cedar Creek Hatchery (Standard 2.1).
- The number of fall chinook females, males, and jack collected by seining and angling and brought to Cedar Creek Hatchery (Standard 2.1).
- Number of adult fall Chinook Salmon and wild Coho Salmon handled and released from Cedar Creek Hatchery (Standard 4.6).
- Any observed mortalities of adult fall Chinook Salmon and wild Coho Salmon at Cedar Creek Hatchery (Standard 4.6).
- Date of entry into the Cedar Creek Hatchery trap, or otherwise collected, specified by hatchery and wild fish for species collected (Standard 4.6).
- Date of entry into the Cedar Creek Hatchery trap for fall chinook retained for broodstock (Standard 4.6).
- Dates of fall chinook spawning at Cedar Creek Hatchery (Standards 2.1 & 2.2).
- The number of males, jacks, and female fall Chinook Salmon spawned (Standards 2.2 & 4.1).

- Fecundity of females spawned (Standard 4.1).
- Disposition (spawned, sold, stream enrichment, etc.) of all fall Chinook Salmon collected (Standard 4.4).
- Collection of adult fall Chinook Salmon straying data (Standard 3.1).
- Harvest of adult fall Chinook Salmon (Standards1.1 & 5.1).

Juvenile Rearing

- Monthly number of fall Chinook eggs/fish on hand, mortality, feeding rate, and growth (Standard 4.1).
- Results of fish health checks and any incidence of disease occurrence (Standard 4.1).
- Results of water quality sampling (Standard 4.2).

Release

- Number of fall Chinook released, by mark type (Standard 3.2).
- Fish size at release, average weight, and length frequency distribution (Standard 3.3).
- Location of releases (Standard 3.4).
- Date releases started and ended (Standard 3.4).

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 and staffing are available as part of normal hatchery operation for those activities associated with hatchery operations. Funding and staffing are currently in place for OPSW monitoring activities and are contingent on biennial budget reauthorization. At this time, no programs specific to fall Chinook Salmon monitoring are in place or operational. Volunteers will be used to assist with monitoring activities where feasible.

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 for the salmonid life-cycle monitoring project and the coastal salmonid inventory project are included under the NOAA Fisheries 4(d) rule as part of the OPSW Research and Monitoring Program. The in-hatchery monitoring program is not expected to increase risks to listed Coho Salmon above those imposed by operation of the program. Thus, risk aversion measures for the monitoring program are the same as those discussed under prior sections of this document.

SECTION 12
RESEARCH

There are no research programs conducted in direct association with the Cedar Creek Hatchery fall Chinook Salmon program described in this HGMP. Therefore, the answer to all questions in Section 12 is not applicable.

SECTION 13
ATTACHMENTS AND CITATIONS

References

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SECTION 14

CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

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

Name and Title of Applicant: Chris Knutsen, Watershed District Manager, West Region, ODFW

Signature: _____ Date: _____

Certified by: Scott Patterson, Fish Propagation Program Manager, ODFW, Salem

Signature: _____ Date:_____

Attachment A

Table A-1. Five Year Disease History[a] (1996 to 2001) by Fish Stock at Cedar Creek Hatchery.

Disease or Organism	47 CHS	47 STW	47 STS	33 STS[b]	33 STW[b]	72 Rb	47 CHF[c]
IHN Virus	No	No	No	No	No	No	No
EIBS Virus	No	No	No	No	No	No	No
Aeromonas salmonicida	No	Yes	Yes	No	No	No	No
Aeromonas/Pseudomonas	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Flavobacterium psychrophilum	Yes	Yes	Yes	No	No	Yes	No
Fl. columnare	No	No	No	No	No	No	No
Fl. branchiophilum	No	No	No	No	No	No	No
Renibacterium. salmoninarum	Yes	No	No	No	No	No	Yes
Yersinia ruckeri	No	No	No	No	No	No	No
Ichthyobodo	Yes	Yes	Yes	No	No	Yes	Yes
Gyrodactylus	No	Yes	Yes	No	No	Yes	No
Ichthyophthirius multifilis	No	Yes	Yes	No	No	Yes	No
Gill Ameba	No	No	No	No	No	No	No
Trichodinids	No	Yes	Yes	No	No	Yes	No
Loma sp	No	No	No	No	No	No	No
Nanophyetus salmincola	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Coagulated Yolk Disease	Yes	Yes	Yes	No	No	Yes	No
External Fungi.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Internal Fungi	Yes	Yes	No	No	No	Yes	No

[a] "Yes" indicates detection of the pathogen, but in many cases no disease or fish loss was associated with presence of the pathogen. "No" indicates the pathogen has not been detected in that stock.

[b] These stocks are held at Cedar Creek Hatchery as adults only.

[c] The Stock 47 fall chinook fry are reared at Cedar Creek Hatchery and then transferred to Rhoades Pond for further rearing until release.

CHS = Spring chinook Salmon

STW = Winter Steelhead

CHF = Fall chinook

STS = Summer Steelhead

Rb = Rainbow Trout

Stock 47 = Nestucca River

Stock 33 = Siletz River

Stock 72 = Roaring River

The fish health monitoring plan is identical to that developed by the Integrated Hatchery Operations Team for the Columbia Basin anadromous salmonid hatcheries (see Policies and Procedures for the Columbia Basin Anadromous Salmonid Hatcheries, Annual Report 1994. Bonneville Power Administration).

- All fish health monitoring will be conducted by a qualified fish health specialist.
- Annually examine brood stock for the presence of viral reportable pathogens. Number of individuals examined, usually 60 fish, will be great enough to assure a 95 percent chance of detection of a pathogen present in the population at the 5 percent level. American Fisheries Society "Fish Health Blue Book" procedures will be followed. With wild adult steelhead stocks generally all fish are sampled for viruses at spawning.
- Annually screen each salmon brood stock for the presence of *R. salmoninarum* (Rs). Methodology and effort will be at the discretion of the fish health specialist.
- Conduct examinations of juvenile fish at least monthly and more often as necessary. A representative sample of healthy and moribund fish from each lot of fish will be examined. The number of fish examined will be at the discretion of the fish health specialist.
- Investigate abnormal levels of fish loss when they occur.
- Determine fish health status prior to release or transfer to another facility. The exam may occur during the regular monthly monitoring visit; i.e. within 1 month of release.
- Appropriate actions including drug or chemical treatments will be recommended as necessary. If a bacterial pathogen requires treatment with antibiotics, a drug sensitivity profile will be generated when possible.
- Findings and results of fish health monitoring will be recorded on a standard fish health reporting form and maintained in a fish health database.
- Fish culture practices will be reviewed as necessary with facility personnel. Where and when pertinent, nutrition, water flow and chemistry, loading and density indices, handling, disinfecting procedures, and treatments will be discussed.

Disease Treatment

Treatments for disease at Cedar Creek Hatchery include: green eggs are routinely water hardened in diluted buffered iodophor; flush treatments of 1:600 formalin for 15 minutes given three to five times per week for fungi prevention on eggs; and juvenile fish are treated with formalin. Depending on species of fish, parasite treating and water temperature, formalin may be used at 1:15,000 to 1:6,000 for a one hour static bath for three to five consecutive days. Juvenile fish are treated for bacterial infections with oxytetracycline or Romet medicated feed according to label or under an Investigational New Animal Drug Permit (INAD). Each spring it is necessary to treat juvenile steelhead and rainbow trout with oxytetracycline medicated food for cold-water disease and opportunistic aeromonad/pseudomonad bacteria. During the summer, on rare occasions the winter and summer steelhead juveniles may require an oxytetracycline or Romet medicated food treatment for furunculosis. The steelhead broodstocks are given formalin bath treatments at 1:8,000 for one hour three to five times per week. The fall Chinook Salmon adults are given antibiotic injections of erythromycin and oxytetracycline under a veterinary prescription to prevent bacterial infections such as furunculosis and bacterial kidney disease. They may also be treated with hydrogen peroxide at 1:4,250 to 1:8,000 three to five times per week as needed for external fungi infections.

Attachment B

Oregon
Theodore R. Kulongoski
Governor

Department of Fish and Wildlife
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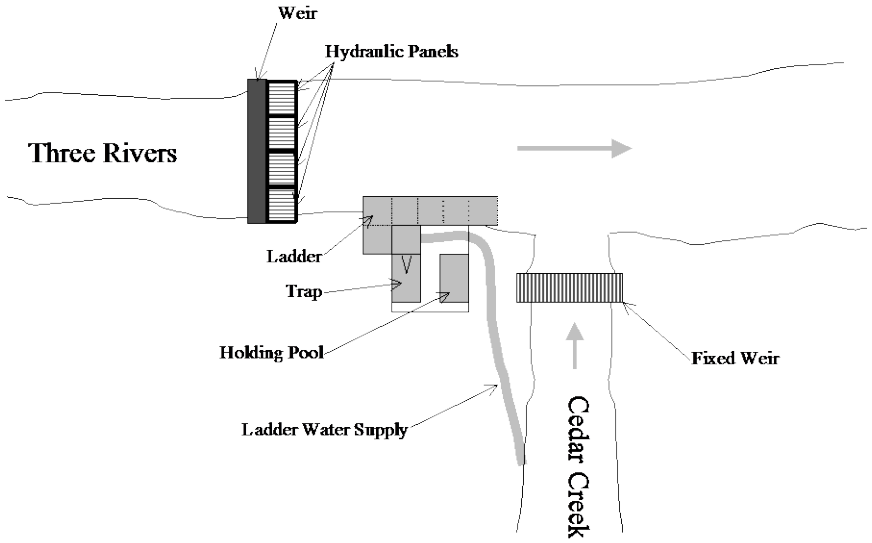
May 27, 2003

Lance Kruzic
NOAA Fisheries
lance.kruzic@noaa.gov

Dear Lance:

In your e-mail to Bill Otto dated 4/22/03, you asked if ODFW has done an operational assessment of the weir on Three Rivers associated with Cedar Creek Hatchery to determine whether it is being operated in the best manner possible for coho passage. At the local and Regional level, ODFW has thoroughly reviewed the operation of this weir and an internal, written operational plan was developed and distributed in late 2002 and early 2003. This operational plan put on paper the practices which have been in place for a number of years. After your correspondence with Bill, I was asked to review the operation of the weir from the perspective of the statewide fish passage program.

After reviewing the operational plan, talking with our local District Biologist and the Hatchery Manager, and visiting the site, I conclude that the weir is being operated in the best manner possible for passage of wild coho, as well as other wild native species, given the existing structures and hatchery fish management objectives. In fact, the weir is in place primarily for purposes of natural production (i.e., pass wild fish and prevent passage of hatchery fish) because it is our opinion that, without the weir, hatchery production needs could still be met with returns to the existing trap. A plan view (not to scale) of the structures involved follows:



With these structures, passage up Three Rivers is provided in several ways:

- At high flow levels, the weir automatically drops to prevent damage to it. Passage is possible and observed at these times, which last from one to several days.
- The hydraulic weir is lowered at certain times of the year and/or certain portions of days to allow wild fish passage. The weir's 4 panels can be operated independently to concentrate flows on one panel if needed.
- A portable denil fishway may be placed to span a lowered weir panel for very low flows. This concentrates flows and provides better water depth across the span.
- The ladder and trap operate year round with the exception of times where it is temporarily shut down for cleaning or repair. Any wild fish entering the trap are passed above the weir, or hauled up Three Rivers to a suitable release location, based on passage direction provided in the operational plan.
- If personal safety hazards are not too great, staff seine the pool directly below the weir to collect and pass fish if they are observed to be holding in the pool without passing.

Adult coho passage in Three Rivers starts in October with the initial fall rains and has been observed through later November, though passage continues in the rest of the Nestucca through late January. During parts or all of this period, fall chinook (hatchery and wild), winter steelhead (hatchery and wild), and hatchery summer steelhead (not indigenous) are or may be moving upstream as well. All of the methods described above are used to pass coho, with the exception of denil placement, which only occurs in early spring if low flow conditions necessitate. However, the weir is only lowered about twice a day (morning and evening) early in the migration when few hatchery steelhead are present. It is not lowered all of the time due to the possible presence of hatchery fish, which we do not want to move above the weir.

We feel that the lack of coho production in Three Rivers is not due to passage issues at the weir, but to a general lack of returns to Three Rivers. If steelhead and fall chinook can pass the weir when it is automatically or manually lowered, as is observed, then there is no reason to believe that coho could not pass the weir. In addition, very few coho have been observed or trapped in any part of Three Rivers. With recent improvement in wild coho returns, District personnel are considering options to supplement coho production in the Three Rivers sub-basin should adult returns remain low to this basin.

Although I believe our weir operation passes coho as effectively as possible given the circumstances, fish passage could definitely be improved at this site. In-stream passage over the weir is not ideal at all flows. The ladder "dead ends" into a trap (i.e., does not have the option of volitional in-ladder passage above the weir). The trap and holding pool are not user or fish friendly. The ladder does not have any attraction flow from Three Rivers. Given funding, we would clearly design trapping and passage at this site differently. Plans have even been made to address some of the concerns at this site, but given the lack of funds and all of the other hatchery upgrade/maintenance and fish passage needs across the state, they have not been implemented.

In summary, it is our intent to pass all wild fish above the Three Rivers weir and we are providing the best passage possible at this site given existing structures and management objectives. Operations have been worked out by our staff after years of experience. Only with very significant investment, which we are unable to make at this time, could passage be improved. Please let me know if you have any questions.

Sincerely,

Tom Stahl
Fish Passage Coordinator

cc: Wheaton, Otto, Klumph, Braun, Traynor, Krake, Thorpe, Hartlerode