HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	**Cedar Creek Hatchery Summer Steelhead Program**
Species or Hatchery Stock:	**Summer Steelhead *Oncorhynchus mykiss* (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:** **Third Update Submitted:**	**April 18, 2006** **July 14, 2008** **October 21, 2014** **July 18, 2016**
Date Last Updated:	**August 18, 2016**

SECTION 1

GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Cedar Creek Hatchery stock 47 summer steelhead program.

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

Summer steelhead *Oncorynchus mykiss* of stock 47 will be propagated under this program. The Nestucca River summer steelhead are part of the Oregon Coast Steelhead Evolutionary Significant Unit (ESU), which was designated as a species of concern under the Federal Endangered Species Act (ESA) on April 15, 2004 (Federal Register Notice 2004). These fish are also a sensitive species under Oregon's Sensitive Species Rule (OAR 635-100-0040).

1.3) Responsible organization and individuals.

Lead Contact:

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

Cedar Creek Hatchery is funded by a combination of Oregon State funding sources.

The estimated operational budget for Cedar Creek Hatchery for 2015 is $372,442.

Note: Stock 47 summer steelhead production represents approximately 37% of the production (by pounds) at Cedar Creek Hatchery. Based on this percentage, overall cost for stock 47 summer steelhead in 2015 is estimated to be $122,000 annually for the current production of 100,000 smolts.

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

Cedar Creek Hatchery is located in the Nestucca River watershed, approximately 1.5 miles east of the town of Hebo on Highway 22. The hatchery facility is located on the Three Rivers at River Mile (RM) 2.25. The hatchery site is 35.33 acres in size, at an elevation of 43 feet above sea level at latitude 45º 12' 57'' N and longitude 123º 50' 43'' W. The regional mark processing code for Cedar Creek Hatchery is 5F22206 H6 21. All fish propagation activities for this hatchery summer steelhead program (adult collection, spawning, egg incubation, and juvenile rearing) occur at Cedar Creek Hatchery and the adjacent Three Rivers trapping facility.

Stock 47 summer steelhead are released in the Nestucca River basin and in the Wilson River basin. The ODFW waterbody code for the Nestucca River is 0100400000. The ODFW waterbody code for Three Rivers is 0100420000. The ODFW waterbody code for the Wilson River is 010012000. The ODFW waterbody code for the South Fork Wilson River is 0100125000.

Hughey Creek acclimation site is located on the Wilson River (River Mile [RM] 6.5). The facility is an above-ground raceway with a vinyl liner supported by a galvanized steel frame. The outside dimensions are 83 feet by 8 feet by 4 feet 9 inches. The approximate volume is 2,324 cubic feet or 17,600 gallons. This facility may be used to acclimate a portion of the releases into the Wilson River basin.

NOTE: Trask Hatchery reared stock 47 summer steelhead production for the Wilson River during the 2002 and 2003 brood years while Cedar Creek hatchery addressed DEQ permit issues. Biological data for those years at Trask are provided in appropriate sections; however, because this was a temporary modification no facility data etc. for Trask Hatchery is provided. It is anticipated that Cedar Creek Hatchery will retain the complete production and Trask Hatchery will no longer rear summer steelhead.

1.6) Type of program.

Harvest Augmentation – To increase sport harvest opportunities by releasing artificially propagated steelhead smolts.

Salmon Trout Enhancement Program (STEP) – The program uses stream side or classroom incubators and rearing facilities to provide educational/learning opportunities to students and the public. In addition, volunteer involvement in STEP increases natural resource awareness and provides a volunteer base of individuals, and organizations, desiring to assist ODFW with natural resource program implementation activities.

1.7) Purpose (Goal) of program.

The purpose of this program is to release 100,000 hatchery summer steelhead smolts in the Nestucca River and Wilson River watersheds (50,000 each) with the primary goal to provide hatchery summer steelhead adults for recreational harvest in these basins.

An additional purpose of this program is to provide educational learning opportunities to students and to encourage volunteer involvement from the public with natural resources through STEP activities. A portion of those activities may include the incubation of summer steelhead eggs and release of unfed fry. The stock 47 summer steelhead program may provide up to 2,000 eggs to the STEP program for use in classroom incubators. The primary purpose of the classroom incubator program, when used, is to teach students about salmonid life history and their habitat requirements. Fry from classroom incubator programs are not marked.

1.8) Justification for the program.

Stock 47 hatchery summer steelhead were introduced to the Nestucca and Wilson River basins for the purpose of providing the angling public with a recreational fishery opportunity. Although there is overlap with other fisheries (spring and fall Chinook Salmon and winter steelhead), stock 47 summer steelhead provide anglers with a consumptive fishery opportunity during a time of year (late summer, early fall) when few other consumptive opportunities are available. Steelhead fisheries in the Nestucca River and Wilson River basins are managed conservatively to reduce impacts to naturally produced steelhead populations. Retention of sport caught steelhead (winter and summer) in these basins is limited to adipose fin-clipped hatchery fish at this time. This program is therefore designed to support a consumptive recreational fishery in the Nestucca River and Wilson River basins.

This program releases yearling smolts to encourage rapid migration to the ocean, which should minimize residualism and ecological interactions with naturally produced juvenile steelhead and other naturally produced salmonid juveniles. Most releases occur in locations that are low in the watershed and separate from naturally produced steelhead juvenile primary rearing areas to further minimize these types of interactions. Standard fish health inspections are done for both adult and juvenile steelhead in this program, to minimize potential disease concerns. The hatchery-reared steelhead are mass marked to allow positive identification of hatchery fish throughout their life cycle. The basins where this program releases hatchery steelhead are managed for selective harvest of marked (hatchery) steelhead adults, and require that all unmarked steelhead caught must be released unharmed.

Stock 47 hatchery summer steelhead may also be used in the STEP classroom incubator program. Low numbers of unfed fry are released from these STEP classroom incubator education programs. Small numbers and release locations isolated from primary natural production areas are assumed to minimize impacts to any native species in the respective basins.

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

Indicator 1 – Harvest

Standard 1.1: Provide adult hatchery summer steelhead for harvest in such a way that impacts to naturally produced salmonid populations are minimized during the summer steelhead sport fishery. **(Benefit)**

Indicator: Number of hatchery summer steelhead caught and number of angler days generated associated with this program. **(Benefit)**

Indicator: Estimated number or rate of naturally produced coho and steelhead caught and released during the summer steelhead fishery. **(Risk)**

Standard 1.2: All stock 47 hatchery juvenile summer steelhead will be externally marked. **(Benefit)**

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

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

Indicator 2 – Life History Characteristics

Standard 2.1: Summer steelhead broodstock will be collected in a manner that approximates the distribution in timing, age, and size of hatchery fish returning to Cedar Creek Hatchery. Jacks (one-salt adults) will be used when available. **(Benefit)**

Indicator: Temporal distribution of Cedar Creek Hatchery adult summer steelhead returns and adults collected. **(Risk – unknown)**

Indicator: Age and size distribution of Cedar Creek Hatchery adult summer steelhead returns and broodstock spawned. **(Benefit)**

Standard 2.2: Releases of stock 47 hatchery summer steelhead smolts will minimize impacts to naturally produced salmonids through control of hatchery release numbers and timing by minimizing spatial and temporal overlap with natural populations. **(Risk)**

Indicator: Number of stock 47 hatchery summer steelhead released. **(Risk)**

Indicator: Dates of stock 47 hatchery summer steelhead releases. **(Risk)**

Indicator: Location of stock 47 hatchery summer steelhead releases. **(Risk)**

Standard 2.3: All stock 47 hatchery summer steelhead smolts will be released as yearlings. **(Risk - unknown)**

Indicator: Beginning and ending dates of stock 47 hatchery summer steelhead releases. **(Risk - unknown)**

Indicator: Size and length frequency of summer steelhead smolts released. **(Risk - unknown)**

Standard 2.4: Stock 47 hatchery summer steelhead in excess of production needs will be released during times and at locations that reduce impacts to naturally rearing steelhead and coho. Any stock 47 summer steelhead fry or fingerlings in excess of needs for smolt production may be released into standing water bodies; or they may be destroyed. **(Benefit)**

Indicator: Location, number, and timing of stock 47 hatchery summer steelhead fry and fingerling releases. **(Benefit)**

Indicator 3 – Genetic Characteristics

Standard 3.1: The percent hatchery origin spawners (pHOS) in the Nestucca and Wilson river basins will be consistent with goals identified in ODFW's Coastal Multi-Species Conservation and Management Plan **(Benefit)**

Indicator: Estimated percent of hatchery summer steelhead in the naturally spawning steelhead populations in the Nestucca and Tillamook basins. **(Risk)**

Indicator: Estimated temporal and spatial distribution of naturally produced winter steelhead and hatchery summer steelhead natural spawners. **(Risk)**

Standard 3.2: Stock 47 summer steelhead, or adult returns from smolts released for this program, will be used for Cedar Creek Hatchery stock 47 summer steelhead broodstock program component. **(Risk - unknown)**

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

Indicator: Fin clips, or marks, on fish collected for broodstock. **(Benefit)**

Standard 3.3: Eggs from the Siletz (stock 33) summer steelhead program may be incorporated, if available, into the Nestucca summer steelhead program as a portion of the program production for genetic diversity. The target for incorporation is approximately 33% of eyed egg needs annually. **(Risk)**

Indicator: Number and percentage of stock 33 eyed eggs used annually, if available, for the program. **(Risk)**

Standard 3.4: Stock 47 summer steelhead broodstock will be spawned following appropriate mating and spawning protocols to maintain genetic diversity of the population. **(Benefit)**

Indicator: Number and ratio of males and females spawned. **(Benefit)**

Indicator: Matings will follow procedures as outlined and appropriate for the stock size, in the Fish Hatchery Management Policy, Fish Health Management Policy, Integrated Hatchery Operations Team (IHOT) fish health document, or as directed by the ODFW staff. **(Benefit)**

Indicator 4 – Operation of Artificial Production Program

Standard 4.1: The stock 47 summer steelhead program will be operated in compliance with the ODFW Fish Hatchery Management Policy, Fish Health Management Policy, and IHOT fish health guidelines. See Attachment A. **(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)**

Indicator: Release of full-term smolts at the target size of 6 fish per pound. **(Benefit)**

Standard 4.2: Cedar Creek Hatchery effluent will comply with the conditions and water quality limitations identified in the current NPDES permit as required by the Oregon Department of Environmental Quality (ODEQ). **(Benefit)**

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

Indicator: Results within permit requirements. **(Benefit)**

Standard 4.3: Cedar Creek Hatchery water withdrawals will comply with NOAA Fisheries juvenile screening criteria. **(Benefit)**

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

Standard 4.4: Cedar Creek Hatchery stock 47 summer steelhead carcass placements for stream nutrient enrichment comply with ODFW approved guidelines (or as permitted by DEQ). **(Benefit)**

Indicator: Number and location of summer steelhead carcasses distributed. **(Benefit)**

Indicator: Examine carcass health and use only pathogen free carcasses. **(Benefit)**

Standard 4.5: Naturally produced salmonids that enter the Cedar Creek Hatchery, or off-station trapping facility adult traps, are handled and released in a manner that minimizes stress, injury, mortality, and delay in migration. **(Risk)**

Indicator: Number and disposition of unmarked adult salmonids collected and released alive from identified trapping facilities. **(Risk)**

Indicator: Number and disposition of unmarked adult salmonid mortalities at identified trapping facilities during operation of the adult traps. **(Risk)**

Indicator: Dates of trap(s) operation and frequency of handling trapped adult salmonids. **(Benefit)**

Standard 4.6: Releases of stock 47 hatchery summer steelhead smolts will limit predation impacts to naturally produced salmonids through control of hatchery release numbers and by minimizing spatial and temporal overlap with naturally produced salmonid juveniles. **(Risk – unknown)**

Indicator: Location, dates and sizes of stock 47 hatchery summer steelhead releases. **(Risk – unknown)**

Indicator 5 - Socio-Economic Effectiveness

Standard 5.1: Estimated harvest benefits will equal or exceed hatchery production costs for stock 47 hatchery steelhead, 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.

The program goal is to produce a total of 100,000 full-term smolts for release annually with 50,000 each to the Wilson and Nestucca rivers.

Up to 2,000 eggs may be provided to the STEP program annually for use in classroom incubators. Releases will vary annually depending on egg survival.

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

The existing program requires a minimum of 60 females and 60 males of stock 47 summer steelhead for broodstock. Approximately 33% of the production is provided by eggs from the Siletz River stock 33 summer steelhead program to retain genetic diversity in the stock. Information for the Siletz stock is covered in the Siletz Summer Steelhead HGMP and is not addressed in this document.

Additional fish may be collected and held as necessary to cover shortages resulting from, but not limited to, adult holding mortality, fecundity variations, early egg mortality, positive disease tests, etc.

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

Table 1-1. Proposed Annual Fish Release Levels.

Life Stage	Release Location	Annual Release Level
Eyed Eggs		
Unfed Fry [1]	Standing water bodies	Varies annually
Unfed Fry – STEP [2]	Nestucca and/or Wilson Rivers, or standing water bodies	≤2,000 – STEP clasroom incubators
Fry/Fingerling [1]	Standing water bodies	Varies annually
Yearling	Nestucca River basin	50,000
Yearling	Wilson River basin	50,000

Data source: ODFW Annual Hatchery Production Schedules

1. This program does not produce unfed fry or fingerling for release as a program goal. In any given year there may be surplus unfed fry and fingerling at the time of ponding (typically resulting from below average egg and swim-up mortality); there may be surplus fingerling at the time of marking (typically resulting from above average fry and fingerling survival). All releases are into standing water bodies
2. Summer steelhead are only occasionally used in classroom incubators. It is difficult to predict a "proposed" release level, however up to 2,000 eggs may be provided annually for this program.

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

Estimates of adult summer steelhead production from the Cedar Creek hatchery summer steelhead smolts released in the Nestucca and Wilson Rivers, of the last 12 years are presented in Table 1-2 and Table 1-3, respectively. Data reflects program performance in relation to the production of fish for harvest. The estimated number of total adult hatchery summer steelhead produced was derived from a variety of data sources.

The "Freshwater Sport" column is based on punch card estimates of catch in the Nestucca and Tillamook Basins. The 1992 to 2003 run years total estimated catch is adjusted for age composition based on an average of the 1983-84 to 1991-92 fishery scale data. The "Hatchery Return" column in Table 1-2 (Nestucca Basin releases) is the actual count of adult summer steelhead returns at Cedar Creek hatchery, with the adult age composition based on an average of the 1983-84 to 1991-92 fishery scale data. There are no data available for the "Hatchery Return" column in Table 1-3 for Wilson River releases during this period of record, as smolt releases in the South Fork Wilson were not initated until 2003, with first adult returns in 2005. Estimates are not available of the number of hatchery summer steelhead that strayed to natural spawning areas in the Nestucca or Tillamook Basins. Smolt to adult survival is calculated as the sum of the prior 3 columns divided by the "Smolt Release" column.

Table 1-2. Estimated Adult Summer Steelhead Produced by Cedar Creek Hatchery Summer Steelhead Smolts (Stock 47) Released in the Nestucca Basin, 1990 to 2001 Brood Years. n.a. = not available. Data in italics is incomplete, because it is missing 3-salt returns.

Brood Year	Smolt Release	2-Salt Return Year	Estimated Adult Hatchery STS (2-salt + 3-salt)			
			Freshwater Sport [1]	Hatchery Return [2]	Spawning grounds	Smolt to Adult Survival
1990	70,206	1992-93	1,648	545	n.a.	3.12%
1991	70,987	1993-94	730	185	n.a.	1.29%
1992	70,326	1994-95	940	288	n.a.	1.75%
1993	66,251	1995-96	507	448	n.a.	1.44%
1994	77,518	1996-97	581	306	n.a.	1.14%
1995	73,827	1997-98	389	451	n.a.	1.14%
1996	67,997	1998-99	512	864	n.a.	2.02%
1997	49,426	1999-00	518	651	n.a.	2.37%
1998	69,467	2000-01	715	1,072	n.a.	2.57%
1999	60,750	2001-02	827	1,327	n.a.	3.54%
2000	62,719	2002-03	871	1,626	n.a.	3.98%
2001	65,035	2003-04	*687*	2,467	n.a.	4.85%

Data Source: Hatchery Management Information System (HMIS), District files

[1] Nestucca basin catch, based on harvest card returns. Although differentially marked, all hatchery steelhead are recorded the same on harvest cards. Thus, no estimate of catch is available for individual stocks. Hatchery/wild and age composition estimated, based on average of the 1983-84 to 1991-92 scale data.

[2] Used average age composition from fishery scales to assign age to Cedar Creek Hatchery returns.

Table 1-3. Estimated Adult Summer Steelhead Produced by Cedar Creek Hatchery Summer Steelhead Smolts (Stock 47) Released in the Wilson River Basin, 1990 to 2001 Brood Years. n.a. = not available. Data in italics is incomplete, because it is missing 3-salt returns.

Brood Year	Smolt Release	2-Salt Return Year	Estimated Adult Hatchery STS (2-salt + 3-salt)			
			Freshwater Sport [1]	Hatchery Return	Spawning grounds	Smolt to Adult Survival
1990	61,445	1992-93	1,119	n.a.	n.a.	1.82%
1991	60,233	1993-94	571	n.a.	n.a.	0.95%
1992	60,137	1994-95	652	n.a.	n.a.	1.08%
1993	43,063	1995-96	322	n.a.	n.a.	0.75%
1994	55,648	1996-97	366	n.a.	n.a.	0.66%
1995	50,811	1997-98	263	n.a.	n.a.	0.52%
1996	50,201	1998-99	465	n.a.	n.a.	0.93%
1997	29,785	1999-00	390	n.a.	n.a.	1.31%
1998	30,298	2000-01	549	n.a.	n.a.	1.81%
1999	34,875	2001-02	716	n.a.	n.a.	2.05%
2000	41,067	2002-03	901	n.a.	n.a.	2.19%
2001	44,986	2003-04	*702*	n.a.	n.a.	*1.56%*

Data Source: HMIS, District files.

[1] Tillamook basin catch, based on harvest card returns. Hatchery/wild and age composition estimated, based on average of the 1983-84 to 1991-92 scale data.

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

The stock 47 hatchery summer steelhead program started in 1963 with naturally produced Siletz River stock being used as the broodstock source. First smolt releases were in 1965, and program has since operated continuously.

1.14) Expected duration of program.

The Cedar Creek Hatchery summer steelhead program is ongoing.

1.15) Watersheds targeted by program.

Nestucca River, a tributary to the Pacific Ocean on the north Oregon coast

Three Rivers, a tributary to the Nestucca River.

Wilson River, a tributary to Tillamook Bay.

South Fork Wilson River, a tributary to the Wilson River.

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.

1. Introduction of summer steelhead to the Nestucca and Wilson River basins - There are no natural populations of summer steelhead in the Nestucca or Wilson basins. Stock 47 summer steelhead are derived from the introduction of Siletz stock 33 (one of three coastal summer steelhead populations, but the only natural coastal summer steelhead population confined to the Coast Range). The program currently uses returning 47 stock adults for the majority of the production, with approximately 33% of egg needs supplied by eggs from the Siletz stock 33 program. No other summer steelhead stocks (coastal or interior) are considered suitable. The program exists solely to provide a consumptive recreational fishery benefit to the public. The stock 47 hatchery summer steelhead program may have some impacts to naturally produced salmonid populations in the respective basins.

2. Hatchery smolt release locations – Stock 47 hatchery summer steelhead releases in the Nestucca River basin occur in Three Rivers and in the mainstem Nestucca River up to approximately river mile (RM) 19. ODFW has utilized a tributary release strategy for stock 47 and stock 47W winter steelhead smolts in the Nestucca River basin to facilitate an evaluation of those hatchery programs. Future releases of hatchery summer steelhead smolts may be made utilizing a similar strategy. This action could disperse fish over a wider area of the basin and enhance angling opportunity, while serving to reduce interactions with naturally produced salmonids. This strategy would be similar to the stock 47 hatchery summer steelhead smolt releases in the Wilson River basin. Wilson River releases are split between the lower Wilson River and the South Fork Wilson River, This strategy attempts to maximize exposure of returning hatchery summer steelhead adults to the sport fishery while reducing interactions with naturally produced salmonids.

3. Three Rivers Weir- The weir spanning Three Rivers provides a mechanism for separating hatchery fish from naturally produced fish by preventing the upstream migration of hatchery fish. Opportunity for unrestricted passage of naturally produced fish is reduced, and the need to physically handle by trapping and passing is increased. The weir may restrict passage at low flows, even if lowered to allow passage. Juvenile passage is also impacted, particularly upstream movement. These issues are being addressed part of the reforms and investments discussed in Section 1.16.3. See Attachment B.

1.16.2) **Potential alternatives to the current program.**

Alternative 1- Utilize 100% Siletz stock 33 summer steelhead for releases in the Nestucca River and Wilson River basins.

Description and Implications- The program was originally founded with broodstock from the Siletz. The stock 47 program was developed from adults returning to the Nestucca River basin. Beginning in the late 1990's, eggs from the Siletz program have been used to supply approximately 33% of the Cedar Creek program needs to provide genetic

variability. This alternative would maintain the consumptive summer steelhead sport fishery in the identified basins. Siletz stock 33 broodstock is readily available, although workloads may increase to collect additional fish if needed for broodstock. Use of stock 33 broodstock would revert back to the original introduction of an out-of-basin stock, and may negate any adaptions of the current stock to the Nestucca and Wilson basins. Straying of hatchery adults to the Siletz or other coastal basins may increase. Biological concerns associated with the use of an out-of-basin stock are not resolved.

Alternative 2- Discontinue use of Siletz stock 33 summer steelhead eggs for stock 47 summer steelhead program.

Description and Implications- The program was originally founded with broodstock from the Siletz. The stock 47 program was developed from adults returning to the Nestucca River basin. Beginning in the late 1990's, eggs from the Siletz program have been used to supply approximately 33% of the Cedar Creek program needs to provide genetic variability. This alternative would maintain the consumptive summer steelhead sport fishery in the identified basins. Discontinuing the use of stock 33 eggs may decrease the gentic diversity of the population. Any adaptions of the current stock to the Nestucca and Wilson basins may be maintained. Straying of hatchery adults to the Siletz or other coastal basins may decrease. Biological concerns associated with the use of an out-of-basin stock are not resolved.

Alternative 3- Increase the size and/or scope of the current production program.

Description and Implications- This alternative would increase the size of the program and/or expand the program into other basins. Increasing the size of the program may increase the number of returning adults available to anglers. Expanding the program would increase angling opportunity. Suitable release streams would need to be identified. Hatchery operating costs and workload would increase, and additional rearing space would be necessary (may need to reduce other programs). Impacts to naturally produced fish species from the hatchery program would likely increase. Biological concerns associated with the use of an out of basin stock are not resolved.

Alternative 4- Reduce size and/or scope of existing program.

Description and Implications- This alternative would decrease the size of the program and/or reduce the extent of the program. Decreasing the size of the program may decrease the number of returning adults available to anglers. Reducing the extent of the program may decrease angling opportunity. Hatchery operating costs and workload would decrease. Hatchery rearing space could be decreased (may be able to use for other programs). Impacts to naturally produced fish species from the hatchery program would likely decrease (or be eliminated if releases were discontinued in a particular basin). Biological concerns associated with the use of an out of basin stock are not resolved.

Alternative 5- Eliminate the hatchery summer steelhead propagation program.

Descriptions and Implications- This alternative would eliminate the hatchery summer steelhead program in the Nestucca and Wilson river basins. The consumptive sport fishery opportunity provided by this program would be eliminated. Hatchery operating costs could decrease, and additional rearing space would be available. Biological

concerns associated with the use of an out of basin stock would be resolved. Impacts to naturally produced fish species from this hatchery program would be eliminated.

Note: The alternatives listed are draft. They are presented here as forum for further discussion. This list is not exhaustive, other ideas are welcome. The alternatives listed may not represent final decisions by ODFW.

1.16.3) **Potential reforms and investments.**

Reform 1. Cedar Creek Hatchery's 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 may also allow the option to open the ladder and allow fish to directly bypass the weir facility (if addition of Three Rivers water is via a new ladder that can be set up to bypass the trap) 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 improve trapping efficiency while minimizing handling of wild stocks, improve upstream and downstream passage, and improved handling and holding of hatchery stocks. Cost estimates were approximately $1.9 million.

Reform 2. Cedar Creek Hatchery has two large, asphalt lined, rearing lakes. The largest lake (approximately 360,000 cubic feet) is not currently in use for rearing because of effluent discharge issues related to discharge permit compliance and reductions in programs. This pond has recently been converted to a settling / abatement pond. A pump station was installed in the existing abatement pond with a pipeline running up to the large asphalt pond. Cleaning water from production ponds will be diverted to the old abatement pond and pumped to large pond. This modification will allow for more efficient pond cleaning to meet discharge requirements.

Reform 3. Modify auxiliary intake screens- Auxiliary intake screens on Cedar Creek do not currently meet NOAA criteria. These intakes are typically used during low flow periods to supplement flow to the hatchery. No coho are present in Cedar Creek above the intakes, so there is no risk to listed fish. There is no cost estimate available for this modification at this time.

Reform 4. Alternative hatchery operations, facilities and techniques, in regard to conservation and restoration of natural fish populations, will be one of the areas of research questions at the Oregon 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/or its satellite facilities.

Note: The reforms and investments listed are draft. They are presented here as a forum for further discussion. This list is not exhaustive, other ideas are welcome. The reforms and investments listed may not represent final decisions by ODFW.

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 hatchery program was submitted to NMFS on 4/18/2006 for ESA permit and take authorization. This is an updated version of the previously submitted HGMP and is consistent with the ODFW's Coastal Multi-Species Conservation and Management Plan 2014.

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

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

Oregon coastal Coho Salmon currently are listed under the ESA as *Threatened*. The program has no intent to directly take any ESA-listed Coho Salmon, but incidental and/or indirect take occur due to this program. Oregon coastal Coho Salmon populations inhabiting the Nestucca Basin and the Tillamook Bay Basin may be indirectly affected by the stock 47 summer steelhead program due to competitive interactions for food and space.

Nestucca Complex

The Nestucca Complex consists of Coho Salmon inhabiting streams located between Cape Lookout on the north and Cascade Head on the south (Nickelson 2001). 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.

Tillamook Complex

The Tillamook Complex consists of Coho Salmon inhabiting the tributaries to Tillamook and Netarts bays and one small direct ocean tributary to the north of Tillamook Bay (Nickelson 2001). There is an estimated 250 miles of spawning habitat available to the 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 emerge as fry to actively feed in the spring. Most juvenile Coho Salmon spend 1 summer and 1 winter in fresh water. The following spring, approximately 1 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%	S. 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. Ocean, 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 (53º 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 the summer, coho 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 as in recent years, coho will be found in only the highest quality habitats. Coast-wide, 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 <u>directly</u> affected by the program.

This steelhead hatchery program has no intent to directly take any ESA-listed Coho Salmon. Oregon coast steelhead populations are considered a "*Species of Concern*" and may also be affected by this program.

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

Incidental take of listed Coho Salmon may occur due to steelhead brood collection. Also, the listed Coho Salmon may be indirectly affected through competitive interactions for food and space between hatchery fish and listed coho within the program areas (Nestucca and Tillamook basins). Water withdrawal due to hatchery operations may have indirect impacts on coho population in the Nestucca River.

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

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

The Oregon Native Fish Stock Status Report (ODFW 2005) includes the status of coastal Coho Salmon. Some of 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.

Nestucca Complex

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.

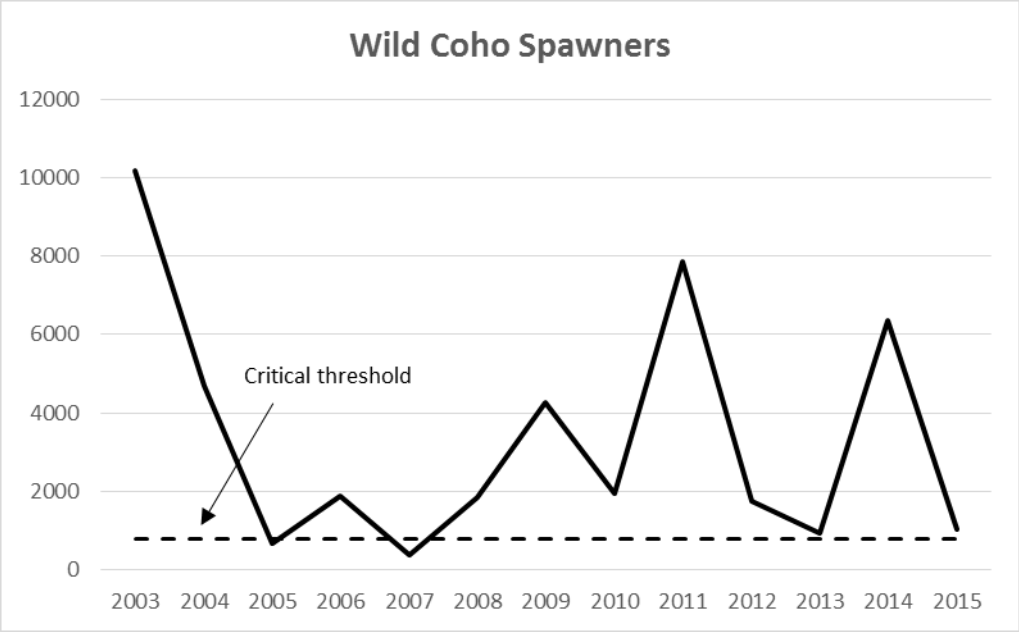

Figure 2-1. Trend in adult wild Coho Salmon spawner abundance relative to the critical population level for the Nestucca Complex, 2003-2015.

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 Abundance of Juvenile 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 nd Figure 2-2 below).

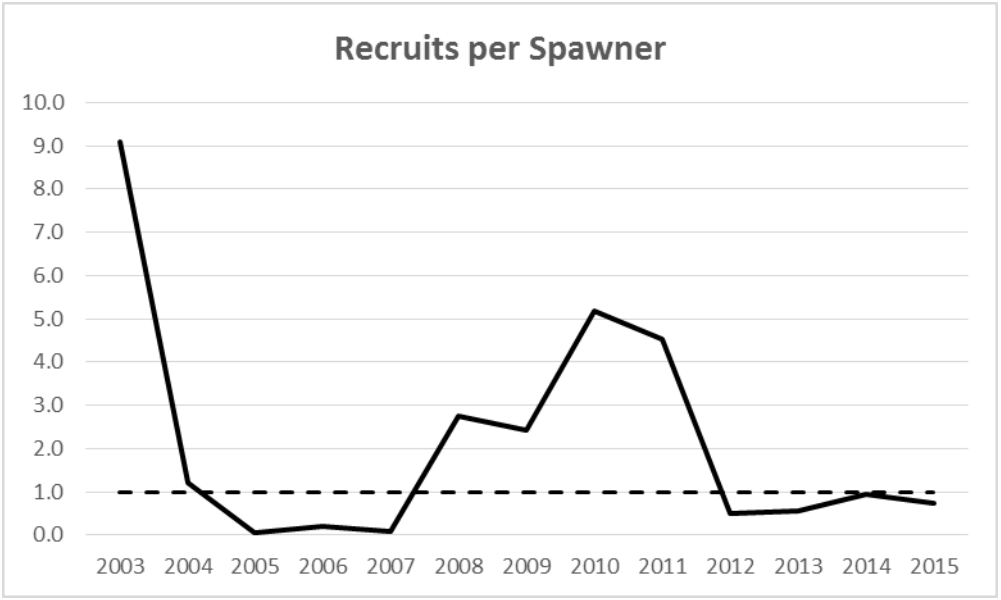

Figure 2-2. Trends in Recruits per Spawner for Nestucca Complex Wild Coho Salmon, 2003-2015.

- 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 progeny of naturally spawning hatchery coho rearing in the wild.

Tillamook Complex

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

The status of coastal Coho Salmon has been documented by the Oregon Department of Fish and Wildlife in the Oregon Coastal Coho Conservation Plan, in addition to the previously developed Oregon Native Fish Stock Status Report. The following information about the status of the Tillamook Complex coho population was taken from Nickelson (2001), which is consistent with the coho population status described in the Oregon Coastal Coho Conservation Plan and the Oregon Native Fish Stock Status Report.

The critical population level of Coho Salmon for the Tillamook Complex is 1,000 adult spawners. However, this complex was not considered to be viable because high-quality habitat is estimated to be present in only 12 miles of stream, below the 15-mile threshold needed to support a viable population.

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

The abundance of wild Coho Salmon spawners in the Tillamook Complex has ranged from about 1,300 to 20,000 and has averaged about 8,500 since 2003 (Figure 2-3 and Table 2-4).

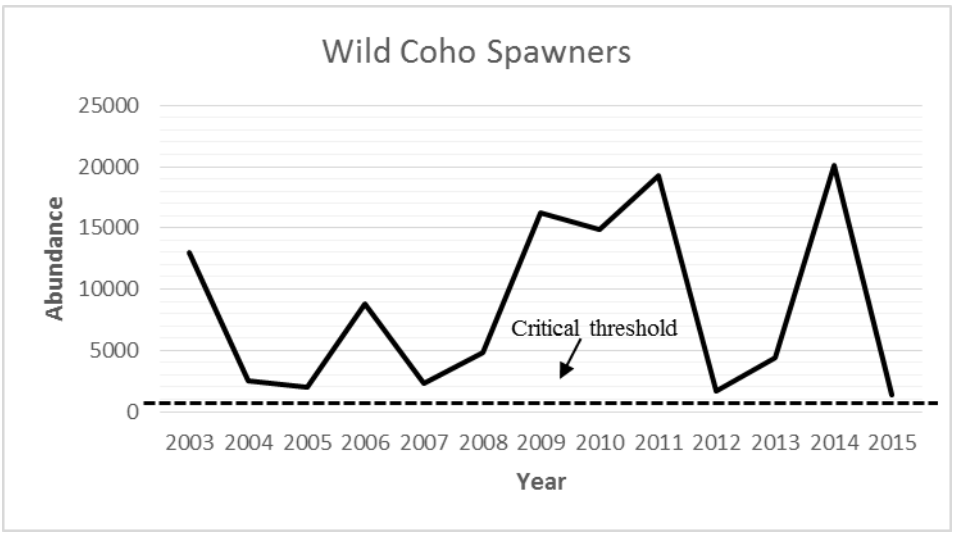

Figure 2-3. Trend in adult wild Coho Salmon spawner abundance relative to the critical population level for the Tillamook Complex, 2003-2015.

Table 2-4. Population Parameters of Coho Salmon showing recruit per spawner for the Tillamook Complex, 2003-2015.

Year	Wild Spawners	Hatchery Spawners	Percent Hatchery Spawners	Pre-harvest Wild Population	Recruits Per Spawner
2003	13,008	121	1%	14,139	6.5
2004	2,532	828	25%	2,743	1.4
2005	1,995	0	0%	2,087	0.2
2006	8,774	0	0%	9,496	0.7
2007	2,295	134	6%	2,602	1.0
2008	4,828	78	2%	4,922	2.5
2009	16,251	560	3%	17,418	2.0
2010	14,890	110	1%	15,592	6.8
2011	19,250	0	0%	20,457	4.2
2012	1,686	0	0%	2,064	0.1
2013	4,402	304	6%	5,137	0.3
2014	20,090	460	2%	23,470	1.2
2015	1,345	16	1%	1,679	1.0
Avg.	**8,565**	**201**	**3.6%**	**9,370**	**2.2**

Source: OASIS; District files

Estimated spawner abundance did not fall below the critical threshold of 1,000 fish in any year during this period. Nickelson (1998) estimated that 2,000 spawners were needed to seed productive freshwater rearing habitat during periods of poor marine survival and 5,700 were needed during periods of good marine survival.

Wild smolt production was estimated for the 1997 through 1999 broods. Estimated smolt abundance ranged from 34,000 to 85,000 for the Tillamook Complex (Table 2-5).

Table 2-5. Estimates of Abundance of Juvenile Coho Salmon Life Stages Based on Spawner Abundance for Tillamook Complex.

Population Complex	1997 Brood (millions)				1998 Brood (millions)				1999 Brood (millions)			
	Eggs	Fry	Parr	Smolts	Eggs	Fry	Parr	Smolts	Eggs	Fry	Parr	Smolts
Tillamook	0.423	0.275	0.110	0.037	0.339	0.220	0.102	0.034	2.721	1.769	0.286	0.085
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 Coho Salmon spawner have been highly variable, with six of the last 13 broods falling to one or below (Table 2-4 above and Figure 2-4).

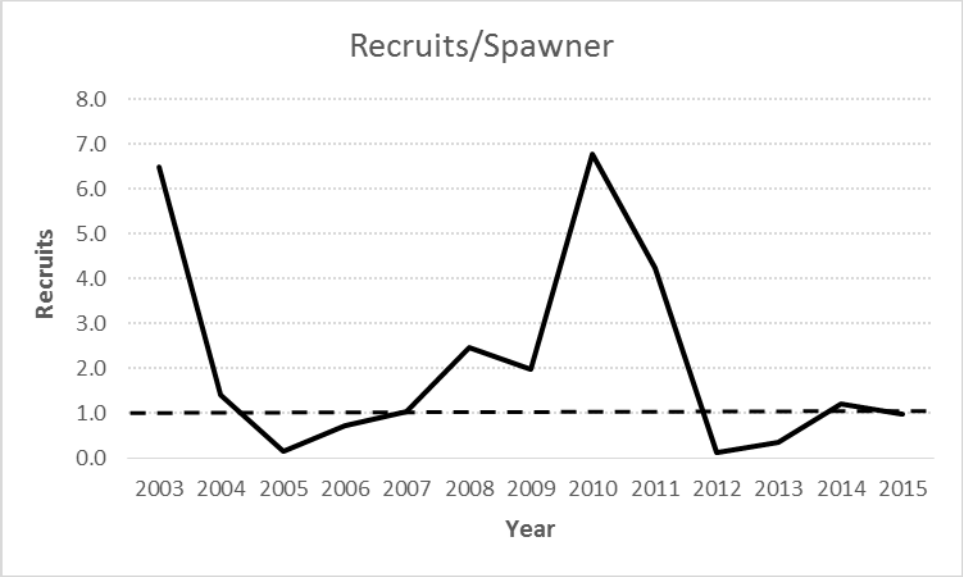

Figure 2-4. Trends in Recruits per Spawner of Wild Coho Salmon for Tillamook Complex, 2003-2015.

- 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.

Since 2003, hatchery strays have typically comprised a small portion of the Tillamook Complex Coho Salmon population observed on spawning grounds (Table 2-4). The decline is likely related to substantial decreases in hatchery coho production by the early 2000's, and ceasing to utilize the East Fork Trask Pond for rearing. No data is available for progeny of naturally spawning hatchery coho rearing in the wild.

2.2.2) 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:

The trap facilities on Three Riversand the S.F. Wilson River capture some hatchery and naturally produced coho. Coho have also been collected at the trap site on Bays Creek during the winter steelhaed evaluation (refer to the Cedar Creek Hatchery Stock 47 and 47W Winter Steelhead HGMP for further details). Any hatchery coho (fin-clipped) are out-of-basin strays which are dispatched and disposed of by burial or sent to a landfill. Any naturally produced coho encountered are immediately released alive above the dam/trap facilities or transported a short distance upstream if flow conditions warrant. Potential take of coho is low and is through migrational delay, capture, handling, and upstream release associated with the trapping operations.

The Nestucca winter steelhead program is currently operating a trapping facility on Bays Creek, a tributary in the mid Nestucca, during an evaluation of that program, which is scheduled to conclude at the end of May, 2009. During its' operation it is concievable that this trap may collect summer steelhead also. In the future summer steelhead releases may be made in Bays Creek (or another suitable tributary) with the possibility of trapping and removal from the system, or concentrating returning adults in a localized area. The following information is provided to cover the potential operation of that facility for hatchery summer steelhead trapping, however its' primary function at this time is trapping and monitoring of hatchery winter steelhead stocks as discusssed in the Cedar Creek Hatchery Winter Steelhead Stock 47 & 47W HGMP.

The trap site on Bays Creek has collected low numbers of naturally produced coho (refer to the Cedar Creek Hatchery Stock 47 and 47W Winter Steelhead HGMP for further details). Spawning escapement figures for this system are limited, however peak counts on those surveys completed show low counts of coho. Recent Rapid Bio Assessment juvenile surveys indicate that a small percentage of the Nestucca basin coho population utilizes Bays Creek (Trask 2004). The trapping and passing of unmarked coho at this site should have minimal impact on natural stocks within the Nestucca Basin. Potential take of coho is believed to be low, but may occur through migrational delay, capture, handling, and upstream release associated with trapping operation.

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

Data on past take is shown for return years 1998-99 to 2007-08 and is provided in Table 2-6 and 2-7. The 1998-99 run-year was the first year that returning hatchery coho adults were mass marked and could be differentiated from naturally produced coho. Note: Cedar Creek Hatchery (and Tuffy Creek trap) also traps winter steelhead, spring chinook and

fall chinook. The unmarked coho trap figures presented (Table 2-6 and 2-7) are not cumulative take but are total take for the trapping season (all stocks combined).

Table 2-6. **Number of unmarked Coho Salmon collected at Cedar Creek Hatchery.**

Return Year	Unmarked Coho[1]
1998-99	0
1999-00	6
2000-01	3
2001-02	2
2002-03	6
2003-04	26
2004-05	8
2005-06	3
2006-07	2
2007-08	6

Data Source: HMIS; hatchery files

[1] includes jacks

Note: The unmarked coho trap figures are not cumulative take, but are total take for the trapping season. Collection occurs during trapping of spring chinook, fall chinook, summer steelhead and winter steelhead. The number of unmarked coho handled represents a season total, and is not additive to numbers presented in other HGMP's.

Table 2-7. **Number of unmarked Coho Salmon collected at the South Fork Wilson River trap.**

Return Year	Unmarked Coho[1]
1998-99	0[2]
1999-00	50
2000-01	198
2001-02	58
2002-03	206
2003-04	62
2004-05	63
2005-06	115
2006-07	131
2007-08	181

Data Source: HMIS; hatchery files

[1] includes jacks

2 Trapping began late in the season, after coho had passed

Note: The unmarked coho trap figures are not cumulative take, but are total take for the trapping season. Collection occurs during trapping of spring chinook, fall chinook, summer steelhead and winter steelhead. The number of unmarked coho handled represents a season total, and is not additive to numbers presented in other HGMP's.

Under certain high flow conditions, the hydraulic weir assembly at Cedar Creek Hatchery will drop as a safety feature. Also, during high flows it is possible for fish to pass over the intake dam on the South Fork Wilson River. It is entirely possible that during these type events additional fish passed the facilities. All unmarked coho trapped are immediately passed above the weir facilities. Generally, fish are hand carried (usually in a soft cotton net or a wet cloth bag) from the trap above the weir/dam and released. Occasionally fish may be transported further upstream (sometimes up to two miles) and released if flow conditions warrant. No injury or mortality has been noted on passed fish.

- Provideprojected 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 Tables 2-8 and 2-9.

- 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) and Tuffy Creek (South Fork Wilson River), or any off-station trap facilities and handling procedures will be modified immediately if naturally produced coho mortality appears in, or near, the trap and appears to be related to operation of the facility. This may include, but is not limited to, trap modifications,

cessation of trapping, or modified operation by hatchery personnel, improved training, etc.

Table 2-8
Estimated Listed Salmonid Take Levels by Hatchery Activity

Listed Species Affected:	**Coho Salmon**	**ESU/Population:**	**Oregon Coast**	**Activity:**	**StS Trapping**
Location of Hatchery Activity:	**Cedar Creek Hatchery**	**Dates of Activity:**	**April 1 – February 15**	**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.

*** Juvenile coho are typically not handled during hatchery operations, but are present and could occasionally be encountered**

**** All unmarked, naturally produced coho adults trapped are passed upstream of the hatchery facility.**
***** No direct mortalities have been observed during trap and pass operations.**

Note: The take figures are not cumulative take but are total take for the trapping season. Collection occurs during trapping of spring chinook, fall chinook, summer steelhead and winter steelhead. The number of unmarked coho handled represents an annual total, and is not additive to numbers presented in other HGMP's.

Table 2-9
Estimated Listed Salmonid Take Levels by Hatchery Activity

Listed Species Affected:	**Coho Salmon**	**ESU/Population:**	**Oregon Coast**	**Activity:**	**StS Trapping**
Location of Hatchery Activity:	**Trask Hatchery and Tuffy Creek (SF Wilson River)**	**Dates of Activity:**	**October 1 – May 15**	**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*	0-750**	
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)			0-110	
Intentional lethal take f)				
Unintentional lethal take g)		<10*	<10***	
Other Take (specify) h)				

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

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

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

l) 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.

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

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

o) 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.

p) Other takes not identified above as a category.

*** Juvenile coho are typically not handled during hatchery operations, but are present and could occasionally be encountered**

**** All unmarked, naturally produced coho adults trapped are passed upstream of the trapping facility.**
***** No direct mortalities have been observed during trap and pass operations.**

Note: The take figures are not cumulative take but are total take for the trapping season. Collection occurs during trapping of fall chinook, summer steelhead and winter steelhead. The number of unmarked coho handled represents an annual total, and is not additive to numbers presented in other HGMP's.

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 Pan for Salmon and Watershed: 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). The NFCP requires the development of a conservation plan for each native stock within the species management unit (SMU). The conservation plan for salmon and steelhead stocks in the Nestucca and Wilson basins was completed in 2014 and is described below.

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.

Coastal Multi-Species Conservation and Management Plan – 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.

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, Governors Executive Order EO 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 summer steelhead in the Nestucca

River watershed, including nutrient enrichment, acclimation and other separations of hatchery and natural production, and monitoring of hatchery and naturally produced runs.

Stream Enrichment:
The placement of hatchery carcasses for stream enrichment is conducted following ODFW approved guidelines (or as permitted by DEQ). This activity is not necessary for operation of the program, only to allow for disposition of carcasses into designated streams.

NPDES Permit:
The Cedar Creek Hatchery is operated under the NPDES 300-J general permit to maintain environmental standards of hatchery effluents.

3.3) Relationship to harvest objectives.

Cedar Creek stock 47 hatchery summer steelhead are mass marked as a means of integration of hatchery and harvest management. Mass marking will allow for selective harvest of hatchery fish while requiring release of all naturally produced steelhead. Mass marking will also allow for better monitoring and control of impacts of the hatchery program on naturally produced steelhead populations. Incidental take of naturally produced Nestucca and Tillamook Bay basin coho in harvests is limited by the ESA Section 4(d) rule. The 4(d) rule requires development of Fishery Management and Evaluation Plans (FMEP). Such plans have been developed are guided by the Pacific Coast Salmon Plan, specifically Amendment 13 (Pacific Fisheries Management Council [PFMC] 1999). Under recent conditions of marine survival and abundance, the allowed take has been between 8-30% of the total pre-harvest Oregon Coast ESU natural coho abundance. Take could increase to 35% if conditions improve (PFMC 1999). 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 naturally produced coho for the period 1994 through 1999 averaged 9.2% and ranged from 6.8% to 12.4% (PFMC 1999). Adult coho are likely encountered at a relatively low rate by anglers targeting hatchery summer steelhead because adult coho usually do not enter the Nestucca and Tillamook Bay basins until late in the summer steelhead sport fishery. The Nestucca River and Wilson River are currently closed to angling for non fin-clipped coho salmon above tidewater.

The summer steelhead artificial production program is designed to have minimal biological impacts to naturally produced species. Likewise, fish culture practices are designed and carried out to rear full-term smolts to limit impacts to naturally rearing fish species.

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

Freshwater recreational fisheries in the Nestucca River and Wilson River basin benefit from this program. Freshwater recreational summer steelhead fisheries are currently selective for marked hatchery fish. Therefore this program supports the only consumptive harvest opportunity for summer steelhead in these basins. This program also provides a consumptive fishery opportunity in these basins during a time of year

(summer/early fall) during which no other consumptive fishery opportunity is currently available. Past harvest data is presented in Table 1-2.

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 summer steelhead for harvest in freshwater 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 naturally produced fish and their habitats.

There are several factors affecting natural production in the Nestucca and Wilson Rivers; however, ocean survival may be the largest contributing factor. Freshwater habitat condition is also important. In general, habitat condition in these basins is slowly improving. The Nestucca watershed has been subject to forest fires of varying severity. Several fires occurred from the mid 1800's to the early 1930's, including the 50,000 acre Hebo fire in 1910 (McDonald and Schneider, 1992). A series of fires in the mid- to late-1930s (Tillamook Burns) drastically impacted habitat with loss of shade, increased sedimentation, and loss of stream complexity in the Wilson Basin, and also in portions of the upper Nestucca Basin. The basins are 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. Natural events (flooding) are common in the basins and can have short term detrimental effects on egg depositions and juvenile rearing. Long term benefits, such as gravel and large wood debris recruitment, can be derived from these events.

Habitat restoration projects over the past 25 years (on federal and private timberlands, which make up the majority of the basin ownership) have begun to address in-stream complexity concerns. Fish passage structures believed to impede migrations (primarily culverts) are being evaluated on most county, state, federal and private lands (private and corporate timberlands, agricultural lands, etc.). Major highways and county road systems have been inventoried and priority ranked. Some sites have been addressed and others are in various planning stages; however, all are subject to funding availability. Oregon fish passage laws require fish passage to be addressed at all impediments to migration when a passage "trigger" occurs. As such, fish passage in these basins is likely to continue to improve over time.

3.5) Ecological interactions.

1. Negatively impact program:
Competition for food between stock 47 summer steelhead smolts and other salmonids (naturally produced and hatchery) in release streams, their estuaries, and near shore ocean environment may negatively impact this program. Avian and marine mammal predation may negatively impact this program also.

2. Be negatively impacted by program:
Competition for food between stock 47 summer steelhead smolts and naturally produced salmonid juveniles in release streams, their estuaries, and near shore ocean environment may negatively impact naturally rearing salmonids. Large concentrations of hatchery reared fish may attract predators, which may cause increased predation on naturally

produced salmonid juveniles. Increased angling pressure on hatchery summer steelhead may increase incidental mortality of other naturally produced salmonids.

3. Positively impact program:
Increased abundance of naturally produced adult salmonids, primarily chinook and coho salmon, and their eventual death after spawning, will increase stream nutrient levels and biomass productivity of the prey base used by hatchery and naturally produced fish. Use of hatchery salmon and steelhead carcasses for stream enrichment activities will further enhance this nutrient base and positively influence the summer steelhead program.

4. Be positively impacted by program:
Adult stock 47 summer steelhead carcasses are used in stream enrichment activities. The nutrients provided by these carcasses will benefit salmonid and non-salmonid fishes in the streams where the carcasses are placed. Carcasses are used in the stream enrichment program under ODFW approved guidelines (or as permitted by DEQ).

General Information:
Summer steelhead are not indigenous to the Nestucca or Wilson basins, and releases since the inception of the program (1965) have failed to establish self sustaining populations. Interactions between migrating hatchery summer steelhead smolts and listed Oregon Coast coho, winter steelhead, or other naturally produced species are likely to be minimal. Steelhead are reared to smolt size and expected to migrate upon, or soon after, release. It is possible that some may residualize after release, but it is anticipated that interactions between remaining steelhead and rearing coho are minimal based upon their species-specific rearing and life history characteristics. All hatchery fish releases are sampled and disease tested by ODFW fish health staff and cleared before release.

Target release size for hatchery summer steelhead smolts is 6 fish per pound (average fork length [FL], 200 mm), which is larger than naturally produced steelhead juvenile outmigrants (average FL, 111 mm and 102 mm; treatment and control streams respectively), and naturally produced coho smolts (average FL, 104 mm and 101 mm; treatment and control stream respectively) trapped in East Creek (treatment) and Moon Creek (control) Research Study 1988 – 1995 (Johnson, S.L. ODFW Newport, personal communication). East and Moon Creeks are tributaries to the Nestucca River. Juvenile steelhead outmigrants collected at the Life Cycle Monitoring site on the Little North Fork Wilson River also average somewhat smaller than hatchery smolts (Wiley, D. ODFW Tillamook, personal communication).

Stock 47 hatchery summer steelhead smolt releases typically take place in late March or April. East Creek and Moon Creek juvenile monitoring showed a natural outmigration timing for the 1988-1995 trapping seasons with a range of late April to mid May with peak movement the first week of May for steelhead, and a range of early April to early May with a peak movement the first week of May for coho (Johnson, S.L. ODFW Newport, personal communication).

In addition, unfed fry and fingerlings from hatchery production are released into habitat locations (standing water) that are unlikely to overlap with rearing salmonid fry/fingerling. Hatchery summer steelhead carcasses are used in the stream enrichment program, under ODFW approved guidelines (or as permitted by DEQ).

ODFW conducts steelhead spawning surveys across north coast basins annually. Surveys are designed to sample across the north coast strata, and are not applicable to the population scale. Therefore, no population specific estimate of the proportion of hatchery steelhead spawning naturally is available. Observations of hatchery steelhead (based on adipose fin-clips observed on live fish and carcasses) during spawning surveys has averaged about 11% since 2003. However, steelhead hatchery releases were modified in 2015 with the implementation of the Coastal Multi-Species Management Plan. Thus, in the future the proportion of hatchery fish may differ from the previous surveys. No data will be available for several years until returns include all year classes from these modified hatchery releases. Origin (summer or winter) of live hatchery steelhead observed cannot be determined (and few carcasses are recovered), so no data is available specific to the composition of summer vs. winter hatchery steelhead that are spawning naturally.

STEP Program:

ODFW has had a Salmon and Trout Enhancement Program 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 (Note: The use of hatchboxes on the North Coast is being phased out over the next 10 years as part of actions adopted in the Coastal Multi-Species Conservation and Management Plan). Egg requests are handled as part of annual hatchery production operations. Early stage eyed eggs are given to volunteers for incubation in classroom incubators for educational purposes. Direct stream releases are made when fish are in the late "button-up" stage. Releases are directed into locations that are close to participating schools (in the basins in which this program operates), and generally low in the chosen river system. Summer steelhead are only used in classroom incubators.

Habitat Above Hatchery Facilities

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 14 miles of 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, coho, steelhead, and chinook. 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.

ODFW has worked cooperatively with the local watershed council and landowner(s) in the basin on habitat enhancement projects and will continue to conduct habitat enhancement projects in conjunction with timber management operations. It is expected

that habitat conditions will generally improve over time under current forest management practices.

Bays Creek:

There is no ODFW aquatic habitat inventory completed on Bays Creek. The USFS contracted a habitat survey in 1995. The survey was done in several sections with the mainstem comprising one section and several tributaries comprising the remaining sections. Fish use was observed in only four of nine tributaries. This use was limited, with coho use found only in the mainstem section. In general the basin covers approximately 3,150 acres with predominant land use of timberland, but also supports a small amount of agriculture and residential use mostly in the lower reaches. Gradient ranges from 3 to 5 % with channel entrenchment ranging from moderate to deep. Mixed hardwoods and conifers with dense shrub / forb understory comprise the riparian areas. Road densities are low. Most timber harvest in the basin occurred in the early to mid 1980's (Lind, 1995).

Because most fish use observed was in the mainstem the discussion will review that section. Surveyed length was approximately 8,350 feet. Gradient in the section averaged 3%. Riffles make up 61% of the habitat type and pools make up 37%. Mainstem habitat was categorized having 83% in lesser quality status consisting of shallow low gradient riffles, rapids, and straight scour pools lacking depth and complexity and generally of low quality. Large Woody Debris (LWD) was poor. Cobble and gravel dominate the substrate; however spawning gravel quality was poor and very limited. Much of the gravel was embedded with sand and fines; bedrock intrusions were common. Summer water temperatures ranged form 52º to 60ºF.

Steelhead, cutthroat trout, and coho salmon juveniles were observed during the survey. Chinook salmon juveniles were not observed but do use the system. This was likely a function of the survey being completed in early August after most chinook fry / juveniles left the system. ODFW has a supplemental chinook spawning survey on Bays Creek and has documented use in Bays Creek.

Tuffy Creek Facility (South Fork Wilson River):

Aquatic inventory data for the South Fork Wilson River above the Tuffy Creek facility of the South Fork Wilson River indicates there is approximately 6,605 meters of good, low gradient stream (1.4 to 3.4% slope), and approximately 2,350 meters of stream averaging 7.1% slope. Residual pools, wood volume, and shade are all good to very good in the area. Pool percentage is low and rates poor; gravel falls between poor and good with an edge to the good (Moore et al., 1997).

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 approximately 2,000 gallons per minute (gpm) is pumped when necessary during low flow periods (generally July to as late as November). 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. Auxiliary intakes on Cedar Creek for the adult holding pond(s) and the hatchery trap are screened, but not to NOAA criteria. These intakes are used during low flow periods to supplement flow to these locations. No listed fish are present in Cedar Creek.

During the winter months, Cedar Creek's water source fluctuates in water quality and temperature. During major freshets, there is 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 approximately 2,000 gpm supplementation pumped from Three Rivers (when necessary). Water temperature fluctuates between 50º and 67ºF. Pond cleaning operations are similar to winter.

STEP hatchboxes or classroom incubators 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 from hatchery water withdrawals is minimized because listed fish are not present in Cedar Creek above the main hatchery intake. The main intake on Cedar Creek is screened, and the screens are in compliance with NOAA screening criteria. During low flow periods when the hatchery supplements the water supply by pumping from Three Rivers, risk of take is minimized because the pumping station is screened, and the pump screens are in compliance with NOAA screening criteria.

Cedar Creek Hatchery currently operates and discharges effluents under a NPDES 300-J 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 substantial 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 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 (used for steelhead production) was also a point of some violations.

In 2002 winter steelhead rearing in the rearing lakes was discontinued until methodology/practices were developed which allowed rearing and cleaning activities to maintain compliance with 300J permit standards. There have been no violations at the facility since December 2002.

Since January 2003 ODFW has instituted a process of checks and balances, as well as necessary training, to assure proper sampling procedures and reporting practices are followed.

SECTION 5
FACILITIES

5.1) Broodstock collection facilities (or methods).

Broodstock for the summer steelhead program are collected at the Three Rivers trap, and optionally at other trap sites (such as SF Wilson River) as needed to meet broodstock or stray rate objectives.

Three Rivers Trap:
The Cedar Creek Hatchery trap is located in the Three Rivers watershed approximately 1.5 miles east of Hebo off Highway 22 (RM 2.25). The hatchery sits at an elevation of 43 feet, at 45^{o} 12' 57" N latitude and 123^{o} 50' 43" W longitude. The adult fish ladder and trap is located at the hatchery and is supplied with water from Cedar Creek as an attractant. The entrance of the ladder is located downstream of a hydraulic weir facility spanning Three Rivers, which helps guide fish into the ladder/trap building.

South Fork Wilson River Trap:
The South Fork Wilson trap is located a short distance upstream of Tuffy Creek, a tributary of the S.F. Wilson at approximately river mile 1.5. The trap is incorporated in a fish ladder installed in a water intake dam spanning the stream. The ladder trap is supplied by water from the S.F. Wilson River. The trap is operated by Trask Hatchery personnel, with assistance from inmates at the Oregon Department of Corrections South Fork Prison Camp located adjacent to the dam/trap facility.

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

Broodstock are collected and held in the Cedar Creek Hatchery adult holding ponds, or in a separate holding pool within the trap facility. All off station transfers are done with the use of a large liberation truck or a portable liberation tank (see description below).

Eggs are transferred on station in buckets with lids shortly after spawning is complete. The transfer of juvenile fish from the hatch house to the raceway at the time of ponding is done via plastic garbage cans or other portable container as they are moved a very short distance.

Carcasses for stream enrichment are transported in plastic totes in the back of full size pickup trucks or on a trailer. Haul time varies depending on the location, but is usually less than 1 hour.

Adult and juvenile fish are transported in liberation trucks or in a portable liberation tank, either carried in a full-size pickup truck or trailer mounted. Liberation trucks are typically 1,000-2,500 gallon capacity units, either mounted on a large flatbed truck, or a tanker style truck. The lib trucks are equipped with oxygen diffusing systems, water re-circulation pumps, and may have dissolved oxygen meters. The portable liberation tank(s) has a capacity of 200-430 gallons of water, and is equipped with an oxygen diffusion system and circulation pump(s).

Adult fish passed upstream of the hatchery trap facility on Three Rivers (naturally produced Coho Salmon, fall Chinook Salmon, steelhead, and Cutthroat Trout) are

released immediately upstream of the weir facility by hand, or may be transported a short distance upstream in a liberation truck or portable tank (approximately 2 miles) and returned to the river. Adult fish recycled downstream are transported less than 10 miles, with a haul time generally less than 20 minutes.

Adult fish passed upstream of the trap facility on the South Fork Wilson River (naturally produced Coho, fall Chinook, steelhead, and Cutthroat) are released immediately upstream of the trap facility by hand. Adult fish recycled downstream are transported up to 30 miles, with a haul time generally less than one hour.

5.3) Broodstock holding and spawning facilities.

Adult facilities consist of a trap located on Three Rivers across Highway 22 from the main hatchery facility and two holding ponds on the hatchery grounds (of which only one is typically used for summer steelhead adults). The trap consists of two concrete tanks (approximately 10'x 20'x 5'). One tank is used as the trapping facility and the other to hold fish. The trap and tank can be subdivided. The tanks are supplied with gravity fed water from Cedar Creek. Water flow can be adjusted but is normally supplied at 2,000-2,500 gpm. Water flow exits through the adjacent trap and fish ladder. Water flow measurements are taken regularly. The trap facility is monitored on a regular basis, usually daily. 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. All necessary supplies for spawning can be stored in this building. The trap has a capacity of approximately 300-500 fish. Typically, all hatchery summer steelhead broodstock (collected in the trap or seined from Three Rivers) is transported to the holding pond on the main hatchery grounds. However, summer steelhead adults could be held in the hatchery trap facility if necessary.

There are two adult holding ponds located at the hatchery. One pond may be used to hold summer steelhead adults (the other is used to hold spring chinook adults). The ponds are 100'x20'x4', with flow of approximately 300-600 gpm. These ponds have the capacity to hold up to 1,000 adult summer steelhead.

5.4) Incubation facilities.

Egg incubation is conducted in a 43' x 38.5' building at the hatchery. It is a wooden structure on a concrete foundation with a composition roof. T he building receives gravity fed water from Cedar Creek. The facility contains 6 shallow aluminum troughs 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. Summer steelhead eggs are incubated in baskets suspended in the aluminum troughs, or sometimes in vertical stack incubation trays.

Incubation of eggs for the STEP classroom projects is done in small aquariums with a natural substrate bottom. Systems usually have a standard aquarium pump and filter setup. Temperature control is accomplished by insulation around the tank and the addition of bottles of frozen water as needed. Some classrooms are equipped with chiller

units which maintain a constant temperature. Water is partially changed on a regular basis to keep it "fresh".

5.5) Rearing facilities.

The incubation building contains multiple concrete tanks and fiberglass Canadian-style deep troughs. These facilities are used to start fish on feed. The concrete tanks have a rearing capacity of 90 pounds and the troughs 100 pounds. The hatchery also has seven concrete ponds and two asphalt lakes (one of which is currently in use). Three of the concrete ponds have a capacity of 10,000 cubic feet; three have a capacity of 8,000 cubic feet, and one a capacity of 4,500 cubic feet.

After hatching, swim-ups are typically transferred into Canadian style troughs in the hatch house, although the concrete starter tanks may be used if necessary. The Canadian troughs and the concrete tanks are approximately 14'x 3'x 2.25' each, with an approximate volume of 90-100 ft^3. Water is supplied at the rate of approximately 50 gpm.

After approximately one month, juvenile summer steelhead are transferred to an outside raceway. The raceways are single pass, with a solid center wall down the length of the pond, except for 8 feet at the head and tail ends of the pond. Thus, each pond can essentially be divided lengthwise into 2 raceways by blocking the openings at the head and tail ends of the pond.

The raceways have a maximum capacity of approximately 8,000-10,000pounds of fish. Cedar Creek Hatchery stock 47 summer steelhead production is reared in a raceway typically until November, when they may be transferred to the asphalt rearing lake. At the time of transfer, the fish generally weigh about 20 fish per pound. At that size, there are approximately 5,300 pounds of fish in one raceway (about 53-66% of maximum capacity).

From November until release in April, stock 47 summer steelhead juveniles may be reared in a large asphalt rearing lake. The asphalt rearing lake used for rearing summer steelhead has a capacity of approximately 89,000 cubic feet. The lake is covered with netting to prevent bird predation. The lake has a capacity of 89,000 pounds of fish. At the target size of 6 fish per pound, there are about 16,667 pounds of fish in the lake (about 19% of maximum). Alternatively, final rearing may be completed in raceways. When this is the case, the raceways contain approximately 8,333 pounds of fish at the target release size (about 80-100% of capacity).

5.6) Acclimation/release facilities.

Stock 47 summer steelhead released in the Nestucca River basin are not acclimated. All rearing takes place on-site at the hatchery. Releases into Three Rivers and the Nestucca River are direct releases via liberation truck.

A portion of the stock 47 summer steelhead smolts released into the Wilson River system may be acclimated at an above ground tank near the mouth of Hughey Creek (a tributary of the Wilson River at approximately RM 6.5). Summer steelhead smolts transported to the Hughey Creek acclimation pond are typically held up to 14 days (average 5-7 days) prior to release directly into the Wilson River. The above-ground acclimation pond at Hughey Creek is vinyl-lined and measures 83' x 8' x 4.75'. Water for the pond is

pumped from the Wilson River with three 5-horsepower (hp) pumps with a combined flow of approximately 250 – 350 gpm during the acclimation period. Working volume is approximately 17,600 gallons and is regulated by a standpipe. The remaining stock 47 summer steelhead smolts are direct released via liberation truck, typically into the South Fork Wilson River. irect releases into the lower mainstem Wilson River may occur if conditions (such as low flows) or management needs warrant.

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

There have been no operational difficulties or disasters that have led to significant fish mortality.

Potential operational difficulties that could result in significant fish mortality include high flows that deliver large amounts of debris, which may plug intake screens or deposit silt on eggs; or disease outbreaks (See Attachment A for disease history and protocols); or failure of the Three Rivers pumps which supply water to the hatchery during low flow periods (although some flow from Cedar Creek would still be available). Thus far, hatchery staff and/or fish health staff have been able minimize the effects of these events and substantial fish mortality has been avoided.

Water to the Hughey Creek Acclimation Pond (Wilson River) is supplied by electric pumps. Potential operational difficulties include loss of power and/or pump failure. The site is monitored by staff and volunteers daily when fish are on-site. A cellular alarm system is in place to warn staff and volunteers of flow problems at the site. In addition, a propane powered generator to supply backup power has been installed. In the event of loss of flow at the site, fish can be released immediately by pulling the standpipe at the downstream end of the pond.

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.

Summer steelhead propagated under this program are not listed under the Endangered Species Act. Any operational failures would be anticipated to have minimal or no effect on listed or other naturally produced species.

To minimize the risk to propagated fish, the hatchery is staffed full time, 24 hours per day. Alarm systems and communication equipment (hand held radios) are in place to warn employees of low water, plugged intakes, and other problems. Employees work schedules are adjusted as conditions warrant (i.e. during large storm events) to maintain hatchery operations. The Three Rivers pumps that supply water to the hatchery during low flow periods are electric, but a propane operated backup pump is available in the event of a power outage. The pumps receive regular maintenance to ensure they remain operational. In addition, portable aerators are available to supplement oxygen levels.

The Hughey Creek Acclimation Pond (Wilson River) has a cellular alarm system in place to warn staff and volunteers of flow problems at the site. In addition, a generator to supply backup power has been installed. The generator receives regular maintenance and is exercised periodically to ensure it functions properly.

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 broodstock for this program was from Siletz River stock summer steelhead. Eggs were supplied to Cedar Creek Hatchery from Siletz Hatchery. The Tillamook Bay and Nestucca basins do not have native populations of summer steelhead. The current broodstock utilizes adult stock 47 hatchery summer steelhead for broodstock, supplemented with Siletz stock (stock 33) eggs for genetic purposes.

6.2) Supporting information.

6.2.1) History.

The origin of stock 47 summer steelhead is from naturally produced Siletz River summer steelhead. An evaluation of operations at the Siletz River hatchery, through 1961 (Wallis 1963), shows a relatively small steelhead program, but does not indicate whether it is summer steelhead, winter steelhead or both. Broodstock for the program was composed entirely of adult returns to the Siletz River Hatchery with no transfers of eggs or fish from outside the basin (Wallis 1963). Eggs for the Cedar Creek hatchery summer steelhead program were supplied from Siletz Hatchery. The original smolt release in the Nestucca River was in 1965, but it is unknown if adults returning from this release were captured and used as broodstock in the early years of the program. Adult summer steelhead returns to Cedar Creek have been used for broodstock since at least 1987. Since 1995 broodstock for the Cedar Creek summer steelhead program has been a combination of adult returns to Cedar Creek hatchery, and eggs from adults collected for the Siletz stock 33 summer steelhead program. The program goal is for the eggs to be approximately 1/3 from Siletz River adults and 2/3 from Nestucca River adults.

6.2.2) Annual size.

The existing stock 47 summer steelhead program requires a minimum of 60 females and 60 males for broodstock needs. Additional adults may be collected as necessary to cover shortages resulting from, but not limited to, fecundity variation, early egg mortality, positive disease test, etc. If necessary additional Siletz stock eggs may also be used in event of a stock 47 shortage. Alternatively, additional stock 47 eggs may be utilized in the event of a stock 33 shortage.

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

Prior to the 1992-93 adult return, which was the first returns of mass marked adults, it is unknown at what level, if any, natural fish were included in the broodstock. Since the return of mass marked fish back to the facility no unmarked (naturally produced) adults have been used for broodstock. Limited creel survey information from marked adult returns in the mid-1990s revealed very few unmarked fish being observed; however, it was not determined if those fish were unmarked hatchery fish or naturally produced fish. Since 1992, marked adults returning to Cedar Creek Hatchery have been used for

broodstock, and based on this information it appears no wild broodstock (stock 47) have been used. Any unmarked summer steelhead trapped at Cedar Creek Hatchery or Tuffy Creek trap are currently recycled through the mainstem fishery or released in standing water bodies (except unmarked adults that are captured during times that overlap with winter steelhead may be passed above trapping facilities, due to the inability to distinguish between the two races).

Use of Siletz stock was curtailed during 1993 and 1994 until returning adult fish from that program were mass marked and it was possible to ascertain that no wild stock were used in the Siletz program. Hence, the portion of Siletz stock eggs added to the Cedar Creek program since 1995 were of hatchery origin. In recent years, with improvements in returns of wild summer steelhead, the Siletz stock 33 summer steelhead program may begin to intentionally incorporate wild fish in the broodstock. Refer to the Siletz Stock 33 Summer Steelhead HGMP for details.

6.2.4) Genetic or ecological differences.

Summer steelhead are not native to the Nestucca or Tillamook Bay basins, and there has been no establishment of a naturally reproducing run in either basin. However the current broodstock are likely to exhibit differences from the naturally produced Siletz basin summer steelhead. A significant percentage of returning hatchery adults appear to be 2-salt fish, and may represent a higher percentage than would be expected in a naturally producing population.

6.2.5) Reasons for choosing.

Siletz stock was chosen because it was the only native stock of summer steelhead on the northern Oregon coast. This stock is considered the best choice for use in this program because it is the most suited the basins of release. In addition, the use of a more locally adapted stock may reduce out of basin straying. It is unknown if the original intent was an attempt to establish a naturally reproducing stock in the basins, or to simply provide a stock suitable for increasing angling opportunity. However, the sole purpose of this program currently is to provide hatchery fish for recreational angling opportunity.

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.

Stock 47 summer steelhead hatchery broodstock selection should have minimal impact to naturally produced coho salmon. Naturally produced coho may be trapped during summer steelhead broodstock collection (typically only late in the season). Any unmarked coho trapped is passed upstream of the collection facility to spawn naturally.

Additional risk aversion measures associated with the stock 47 summer steelhead broodstock collection (and selection) are discussed in Section 7.9.

SECTION 7

BROODSTOCK COLLECTION

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

Adult stock 47 hatchery summer steelhead are collected to meet the objective of 100,000 smolts, STEP egg requests, and to meet genetic guidelines.

Siletz summer steelhead (stock 33) eggs are also used in the program. For details on the Siletz program please refer to the Siletz summer steelhed HGMP. This HGMP will only discuss Cedar Creek stock 47 summer steelhead.

7.2) Collection or sampling design.

Adult summer steelhead begin returning to the Nestucca and Wilson basins typically in April and are present in the systems until the following winter. Adult summer steelhead are collected in the hatchery trap, by seining in Three Rivers, or through trapping at other sites in the Wilson or Nestucca Basins (e.g. South Fork Wilson River). Fish are collected and held for broodstock periodically from throughout the run. Fish collected during the spring and summer are held in the adult holding pond at the hatchery. Fish collected late in the run (October-January) may be held and/or spawned in the hatchery trap building adjacent to Three Rivers if necessary. Alternative collection methods may also be employed, if necessary.

Refer to the Siletz stock 33 HGMP for a description of the collection procedures for adult summer steelhead in the Siletz River basin.

7.3) Identity.

The hatchery reared summer steelhead have a distinctive external fin clip that distinguishes them from the unmarked, naturally produced steelhead and other hatchery steelhead stocks in the Nestucca and Wilson river basins. The adipose and right maxillary clip is currently used to mark stock 47 hatchery summer steelhead, although other marks may be used if necessary.

7.4) Proposed number to be collected:

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

Existing program utilizes a minimum of 60 females and 60 males for broodstock to meet production goals and genetic guidelines. Additional adults may be collected as necessary to cover shortages resulting from, but not limited to, fecundity variation, early egg mortality, positive disease test, etc. In addition, in order to ensure sufficient broodstock is collected, additional adults may be held because of the difficulty verifying sex due to lack of distinct sex related external characteristics.

Approximately 150,000-200,000 stock 47 eggs are needed for this program (Table 7-1), to meet the production goal of 100,000 smolts and to provide eggs for STEP activities. Approximately 50,000-67,000 eggs are also collected from Siletz stock 33 summer steelhead for addition to the stock 47 program. Additional eggs from either stock may be taken if necessary. Once spawning is complete, surplus eggs may be culled and destroyed (see section 9.1.2).

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

Adult stock 47 figures presented in Table 7-1 below are Cedar Creek stock summer steelhead. Stock 33 figures in the "Total Eggs" column are eggs from Siletz stock hatchery summer steelhead which are added to the Cedar Creek production for genetic purposes. Broodstock collection and mating for this stock is addressed in the Siletz Summer Steelhead Stock 33 HGMP. Figures represent eggs retained for production program needs.

Table 7-1. **Cedar Creek Hatchery Adult Stock 47 Summer Steelhead Collection Levels, and Egg takes.** ***Adult collection and smolt production numbers shown are pre-CMP levels.***

	Adults			Total		
				*Eggs		Juveniles
Year	Females	Males	Jacks	47s	33s [1]	(Stock 47)[2]
1992	81	69	0	191,484	0	166,344
1993	370	205	34	191,295	0	169,278
1994	118	59	0	187,892	0	162,575
1995	129	145	2	168,345	10,146	154,622
1996	252	209	0	247,963	29,256	158,361
1997	171	126	1	119,016	53,760	151,294
1998	213	202	0	177,810	54,080	128,829
1999	423	461	6	174,943	54,776	205,625
2000	327	291	0	203,114	66,600	132,186
2001	597	456	2	219,080	47,657	197,281
2002	624	685	0	171,324	60,288	146,855
2003	709	843	0	135,652	57,600	146,668
2004	1244	1283	3	185,647	42,774	133,486
2005	858	874	0	169,929	54,560	193,949
2006	382	382	0	188,006	53,100	214,373

Data source: HMIS.

[1] Figures are those eggs retained for the Cedar Creek program only

[2] At the time of ponding, juveniles are mixed. They are considered stock 47 from that point forward.

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

Surplus adults not needed for the hatchery program are recycled back into the Nestucca or Wilson Rivers to provide additional angling opportunity during the summer and early fall. Fish trapped later in the season (excess to broodstock needs) may be stocked into local lakes, again providing additional fishing opportunity for the public. No marked summer steelhead are intentionally passed above any trap site.

Stock 47 hatchery summer steelhead adults may also be donated to food bank programs or utilized in the stream enrichment program.

7.6) Fish transportation and holding methods.

Adult hatchery summer steelhead collected for brood are held in a holding pond at the hatchery until ready to spawn. Occasionally, fish collected from late in the run may be held in the hatchery trap facility adjacent to Three Rivers if necessary. Spawning activities usually take place at the Cedar Creek Hatchery adult holding pond, but may on occasion occur at the hatchery trap facility.

See Sections 5.2, 8.3, and 10.5 for description of transportation equipment and procedures.

7.7) Describe fish health maintenance and sanitation procedures applied.

Developing eggs receive regular treatments with formalin to prevent/control fungus (*Saprolegnia parasitica*) outbreaks. Green eggs are water-hardened in an iodine solution to prevent disease or viral contamination. Juveniles are typically treated with medicated feed, hydrogen peroxide, or possibly formalin (as per label directions) as directed by ODFW fish health staff if necessary. Adult summer steelhead broodstock held at the hatchery may receive injections of antibiotics to control furunculosis. Adult summer steelhead broodstock are treated regularly (with hydrogen peroxide, formalin, or other approved chemical) in the holding pond. Additional sanitation procedures are described in section 9.2.7. See also Attachment A.

7.8) Disposition of carcasses.

Hatchery summer steelhead carcasses may be used for stream enrichment activities in the Nestucca River and Tillamook Bay basins. Specific criteria for operation of the stream enrichment program are identified in ODFW approved guidelines (or as permitted by DEQ). Carcasses suitable for human consumption may be used for food programs, or carcasses may be sold for processing into fish food or other products. Carcasses not used for stream enrichment, food programs, or sold, are buried or disposed of in a landfill.

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 broodstock collection program.

It is unlikely that summer steelhead broodstock collection will have any genetic effects on naturally-produced salmonids. To minimize genetic and ecological effects between hatchery produced summer steelhead and naturally produced coho (and other salmonids), the following measures will be taken:

- Naturally produced coho that enter hatchery or remote trap facilities will be released alive upstream of the trapping facility. The hatchery trap(s) will be visually checked at least daily, and fish sorted at least weekly (or as needed) to minimize delay and potential harm to naturally produced coho. The Cedar Creek Hatchery weir and trap facility is further being operated as indicated in the attached letter from Tom Stahl to Lance Kruzic (Attachment B).
- Stock 47 summer steelhead will be managed as a hatchery broodstock isolated to the extent possible from naturally produced fish populations in the Nestucca and Wilson river basins. Only returning hatchery stock 47 (with the addition of Siletz stock 33) summer steelhead are currently used in the broodstock. See Section 1.16.2 for possible alternatives to the program.
- No transfers (except for the use of Siletz stock 33 eggs) from other hatchery summer steelhead broodstocks for breeding purposes into stock 47 are permitted.
- Only stock 47 (with the addition of Siletz stock 33) hatchery summer steelhead will be released in the Nestucca and Wilson river basins.
- A disease monitoring plan will be implemented (Attachment A).
- To safeguard against catastrophic loss of broodstock, excess adults may be retained.

SECTION 8
MATING

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

Siletz stock 33 summer steelhead eggs are used in the Cedar Creek Hatchery summer steelhead program when available. For details on the Siletz program please refer to the Siletz summer steelhead HGMP. This section will only discuss stock 47 summer steelhead collected at Cedar Creek Hatchery.

8.1) Selection method.

Collection of summer steelhead for use as broodstock occurs throughout the run. Spawning usually occurs in late January or early February. Spawning is done randomly based on availability of ripe fish at the time of spawning. It is assumed that the spawning population is representative of the entire run of hatchery summer steelhead, since adults are collected randomly from the returning population. Excess eggs may be collected to assure meeting the production goal. Excess eggs may be culled after spawning is completed if necessary (see section 9.1.2).

8.2) Males.

Males are typically only used once during spawning. If necessary, in the case of a shortage of males, individual fish may be spawned more than once. Jacks will be included in the broodstock when available.

8.3) Fertilization.

Summer steelhead are spawned with the goal of a 1:1 male-to-female ratio. Each fish is typically only used once in spawning, however if necessary, in the case of a shortage of males, individual fish may be spawned more than once.

Spawning is conducted using a modified matrix. Eggs from multiple females are spawned into a single plastic bucket and mixed. The eggs are then divided into separate buckets. An equal number of males are spawned, one into each of the buckets of eggs. These groups are held separate and transferred to the incubation facility in the plastic buckets. Once in the incubation facility, the fertilized eggs are water hardened in a solution of iodophore and placed in the incubation baskets. Each family group is incubated in separate baskets. This matrix-spawning regime provides for the possibility of multiple family groups per each female spawned.

Ovarian samples are taken from all spawned females and visceral (kidney, spleen) samples are collected from the first 60 fish spawned for viral analysis. Eggs that test positive for disease may be kept or destroyed, at the direction of ODFW fish health staff.

8.4) Cryopreserved gametes.

Cryopreservation of summer steelhead gametes is not used in the Nestucca stock 47 hatchery summer steelhead program.

8.6) 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.

No genetic or ecological effects to naturally produced fish species is expected from the mating scheme of the stock 47 hatchery summer steelhead 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.

See Table 9-1.

Table 9-1. **Eggs Taken and Survival Rates. Values shown are pre-CMP levels.**

Brood Year	Egg Take[1]	Eyed Eggs	Percent Survival to Eye-up
1992	191,484	179,412	93.7
1993	191,295	182,560	95.4
1994	187,892	174,064	92.6
1995	342,687	293,340	85.6
1996	366,185	299,843	81.9
1997	334,603	299,408	89.5
1998	492,262	432,138	87.8
1999	284,895	265,616	93.2
2000	272,082	250,904	92.2
2001	320,833	291,694	90.9
2002	274,944	245,094	89.1
2003	287,332	268,336	93.4
2004	345,403	285,957	82.7
2005	378,329	339,288	89.7
2006	396,507	314,075	79.2
2007	444,843	323,167	72.6

Data source: HMIS, Cedar Creek Hatchery files.

[1] includes stock 33 eggs

9.1.2) Cause for and disposition of surplus egg takes.

Additional summer steelhead eggs may be collected in order to compensate for egg to smolt mortality and genetic considerations, such as increased family size to promote genetic diversity, etc. Surplus eggs are later culled, usually at the eyed stage. Eggs are culled randomly across the egg take groups to retain diversity among those adults

spawned. Eggs that are used for production are randomly taken from the family groups based on a percentage to ensure equal representation throughout the population. For example, if one egg-take date consists of 4 family groups and will make up 25% of the total population of the brood, then an equal number of eyed eggs will be retained from each of the 4 family groups to achieve the 25% of the total population goal.

Mortality and culled eggs are disposed of by freezing and then burial. Culled eggs (which are rendered non-viable by freezing) may also be used in the stream enrichment program if permitted.

9.1.3) Loading densities applied during incubation.

Summer steelhead egg average size at spawning is approximately 158 eggs per ounce. Eggs are incubated in vertical stack incubation trays, baskets, or both. The baskets used to incubate summer steelhead eggs are suspended in troughs. Water flow is supplied at a rate of 12 gpm. The standard loading density per basket from green to eyed stage is approximately 18,000 eggs per unit (10,000 in vertical stack incubation trays). When eggs eye-up they are shocked, picked, inventoried, and densities are reduced to approximately 8,000-10,000 eggs per basket (5,000-6,000 in vertical stack incubation trays). Typically, about 11 baskets and 8 incubator trays are utilized from the green to eyed stage. After eye-up, the eggs retained for stock 47 summer steelhead production are split into several baskets, and at this time eggs may be supplied to STEP participants.

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 re-circulating type pump supplies flow. No flow rates have been calculated but the 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 supplied by Cedar Creek, and may be supplemented by water pumped from Three Rivers if necessary. The water is monitored for flow and temperature daily. The incubating eggs are held in water that is generally 40º to 47ºF. Dissolved oxygen (DO) levels are typically not monitored during incubation, but natural DO levels of the in-flow are in the range of 10-11 ppm. Water temperature may be manipulated if necessary to bring egg groups together for common ponding dates. The incubation facility is equipped to chill water, but on a limited basis and only during incubation. Water can be chilled and delivered to no more than two incubation stacks or one shallow trough. Temperature manipulation for heated water is achieved by using up to three, in-line, single-pass, spa heaters. The incubation facility is subject to silting problems, as the incoming water will carry fine materials during heavy rain events. Incubating eggs are treated as necessary with formalin (or other approved chemical) to control fungus.

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, but have ice added daily to keep temperatures in the optimum range of 50 to 60º F., but below the prolonged exposure lethal level of 63º F or higher. A standard aquarium re-circulating pump supplies flow.

9.1.5) **Ponding.**

Fry are physically relocated from the incubator baskets (or trays) to starter troughs in the hatch house when the majority of the fry are visually estimated to be fully buttoned up. This occurs with approximately 1,100 temperature units. Summer steelhead fry average approximately 2,000 fish per pound at the time of ponding.

Note: At the time of ponding, stock 47 juveniles are mixed with juveniles from the stock 33 eggs taken for this program. From that point forward, the fish are all considered stock 47.

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.**

Incubation of stock 47 hatchery summer steelhead eggs should have no genetic effect on naturally produced fish species. To minimize ecological effects to the receiving stream and the inhabiting natural fish populations, hatchery personnel check incubating eggs regularly to remove dead eggs, treat eggs for disease/fungus, and keep the incubation facility clean to prevent transmission of diseases.

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.**

Survival data for stock 47 summer steelhead at Cedar Creek Hatchery from fry to the time of marking and release is presented Table 9-2. Survival rates to release have ranged from approximately 56-93%. The lower survival rates are likely a result of heavy bird predation on fish reared in the rearing lake (which had protective netting installed in 2003).

Actual survival rates are difficult to calculate, as inventory methods vary by life stage. Fish are hand counted at marking, whereas other numbers are estimated by using average weight samples. Differences in the accuracy of each counting method (and the equipment used) sometimes leads to more fish at marking and/or release than were estimated at the time of ponding.

Table 9-2. **Stock 47 Summer Steelhead Survival Rates. Values shown are pre-CMP levels.**

Brood Year	Fry Ponded	Juveniles at Marking	Fish Released[1]	Percent Survival to Marking[2]	Percent Survival to Release[2]
1992	171,486	165,952	148,170	96.8	86.4
1993	169,916	123,237	144,880	72.5	85.3
1994	165,550	164,101	142,648	99.1	86.2
1995	167,042	139,040	116,691	83.2	69.9
1996	159,407	126,637	141,807	79.4	89.0
1997	152,247	127,873	119,263	84.0	93.3
1998	178,590	148,196	139,586	83.0	78.1
1999	213,599	130,609	120,245	61.1	56.3
2000	163,777	140,943	112,543	86.1	68.7
2001	203,818	181,222	159,246	88.9	78.1
2002[3]	165,927	130,133	137,228	78.4	82.7
2003[3]	148,067	135,089	126,700	91.2	85.6
2004[3]	133,486	131,388	116,935	98.4	87.6
2005	193,949	192,445	172,626	99.2	89.0
2006	214,373	209,614	187,626	97.7	87.3

Data Source: HMIS; Cedar Creek Hatchery files

[1] Includes fry and/or fingerling releases to standing water bodies

[2] Juveniles are hand counted at marking. All other counts are estimated by weight sampling, and are approximate counts. Differences in the accuracy of the counting methods likely accounts for more fish at marking and/or release than were ponded.

3 Includes fish transferred to Trask Hatchery for rearing while alternative rearing methods were developed at Cedar Creek Hatchery when use of the rearing lakes was discontinued. 2004 brood juveniles were returned to Cedar Creek for final rearing.

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

The criteria for Cedar Creek Hatchery fish density and loading varies considerably through the various life stages and by rearing container. Rearing densities are below goals set by Piper (1982).

Fry are typically ponded into starter troughs at about 2,000 fish/lb after they button up. Juveniles are transferred outside to a concrete raceway after about one month, at approximately 1,000 fish/lb. Juveniles are further split into two raceways at the time of fin-marking (usually in July or early August). Density targets from fry to smolt are not to exceed 1.0 pound of fish per cubic foot of water. Density in the raceway is less than 0.5

lbs/ft^3 at the time of marking, and up to 0.7 lbs/ft^3 at the time of transfer to the rearing lake (if final rearing is to occur in the lake). Flow through the raceway is typically around 400 gpm when fish are first transferred, and increases to 800-1,200 gpm by the time of marking.

The rearing lake that has been used to rear summer steelhead at Cedar Creek Hatchery is capable of rearing a maximum of approximately 89,000 pounds of fish (about 1.0 lb/ft^3). Flow through the lake varies depending on inflow from Cedar Creek. Typically, flow will average approximately 1,800 gpm. Maximum density occurs at release when the fish are at their largest size (target size is 6 fish/lb). The density is approximately 0.22 lbs/ft^3. Stock 47 summer steelhead may also be reared to smolt size in raceways. Maximum density in the raceways would be approximately 0.8 to 1.0 fish/lb at the time of release.

The maximum loading level criteria for rearing in the raceway is 10 lbs of fish per gpm. Actual pond loading level in the racways is approximately 5-6 lbs of fish per gpm at time of transfer to the rearing lake (if used). Maximum loading level criteria for rearing in the lake is 20 lbs of fish per gpm. Actual pond loading level in the lake is approximately 11.0 lbs of fish per gpm at time of release (at maximum size). If final rearing is done in raceways, density reaches approximately 8 lbs./gpm. During storm events water flow to the rearing lake may be turned off and aerators are used to recirculate the water. Feeding is greatly reduced or eliminated at this point and dissolved oxygen levels tested frequently.

9.2.3) **Fish rearing conditions.**

Summer steelhead reared at Cedar Creek Hatchery grow on incoming river water (from Cedar Creek, supplemented by pumping from Three Rivers during low flow periods); hence, rearing water temperatures vary with seasons and with natural fluctuations. Water temperatures range approximately from 45º to 65ºF during spring and summer and from 36º to 45º F during the fall and winter. Dissolved oxygen (DO) levels coming into the facility are typically between 10.0 ppm and 11.0 ppm in the fall and winter. However, in the summer, DO levels can be as low as 7.0 ppm. Re-circulation of effluent water through the ponds is possible in extreme drought conditions.

Monitoring of the pond conditions is done daily at feeding time. While feeding fish, personnel are observing for signs of stress, disease, water clarity, and general fish behavior. Pond mortality is picked and recorded daily. During late summer and early fall, the fish are closely monitored by ODFW Fish Health staff for external parasites. Water quality is monitored under the prescribed 300-J general NPDES permit as required by the DEQ (see Section 4).

Summer steelhead may be reared in a rearing lake at Cedar Creek Hatchery (Pond 14) (if not reared in a raceway). The hatchery has the ability to turn off incoming water to the lake during storm events and use aerating pumps to maintain acceptable DO levels. This is done to limit the amount of sediment placed into the lake (which must be vacuumed out of the lake).

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 monthly and reported on ponded fish reports in the ODFW Hatchery Management System (HMS) database. Length frequency measurements are made at the time of liberation (see section 9.2.8); mark quality observations are also made at this time. At liberation, condition factors may also be calculated. Table 9-3 shows typical monthly average weights of program fish from ponding to release.

Table 9-3. Average Monthly Fish Size for Cedar Creek Stock 47 Summer Steelhead.

Month	Number of fish/pound*
February	--
March	--
April	1310
May	430
June	150
July	66
August	38
September	22
October	18
November	13
December	9.0
January	8.0
February	6.3
March	6.0
April	--

Data Source: HMIS; Cedar Creek Hatchery files

* Numbers represent end-of-month averages

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 increases substantially (approximately doubles) each month (see Table 9-3) until the time of marking. After marking, feeding is programmed to ensure that the fish do not exceed pond density limitations and are on target to meet production size goals. Growth rates slow as fish reach the pre-smolt and smolt stages.

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).**

Cedar Creek stock 47 summer steelhead juveniles are fed a fish food diet at a rate and frequency that varies with fish size. Feeding rates may vary due to water temperature, water clarity, or other factors influencing food consumption. 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. During the final stages of rearing, either in the rearing lake or in raceways, the fish are fed a programmed amount at a rate that will control their growth in order to meet the desired size and condition factor at release.

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

Fish health of rearing juvenile summer steelhead is monitored regularly by Cedar Creek Hatchery staff and ODFW fish health staff. ODFW fish health staff diagnoses disease problems and prescribes the appropriate treatments to eliminate or control disease. See Attachment A for description of treatments.

Tools and equipment used for summer steelhead spawning are disinfected between family groups using an iodine antiseptic. Nets and sampling equipment used for summer steelhead are also disinfected in this manner. Some tools and equipment used during rearing are not routinely disinfected (other than allowing to air dry) because they are kept separate from other fish at the hatchery. For further description, see Attachment A.

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

Weight samples of the fish are taken monthly to ensure proper growth rate (Table 9-3). Prior to release, length frequencies are taken (Table 9-4). At this time, condition factors may also be calculated. A visual mark quality check is conducted on a representative sample of the fish targeted for release to determine fin-clip retention rates.

Table 9-4. Average Fork Length Frequency Percentages At Release.

Fork Length Size Range	Average Percentages at Release
< 18 cm.	14.0%
18-22 cm.	75.0%
> 22 cm.	11.0%
Data Source: HMS database; Cedar Creek Hatchery files	

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

No "natural" rearing methods are applied in this program

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

Stock 47 summer steelhead reared in this program are not listed under either the Federal or State ESA. However, hatchery fish will be reared to full-term smolt size and released directly to the selected release sites.

Summer steelhead smolts released in the Nestucca River are hauled and direct released in the mainstem Nestucca River or Three Rivers. Summer steelhead smolts released in the Wilson River basin are either hauled and directly released in the S.F. Wilson River or the lower mainstem Wilson River, or are acclimated and released from an acclimation pond on the lower river. The majority of smolts should quickly migrate downstream, minimizing the amount of time spent in the freshwater portions of these basins.

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	Target Size (fish/lb)	Release Date	Location
Eggs				
Unfed Fry (STEP)	2,000	1,000-2,000	March	Nestucca River, Wilson River, or tributaries, or standing water bodies[1]
Fry[2]	Surplus	1,000-2,000	March-April	Standing Water
Fingerling[2]	Surplus	15-30	Sept.-Oct.	Standing Water
Yearling	50,000	6.0	April	Nestucca River basin
Yearling	50,000	6.0	April	Wilson River basin

Data Source: ODFW hatchery production schedules; District files; Cedar Creek Hatchery files

[1] Releases of unfed fry from classroom incubators varies depending on the annual egg survival. The specified release level is a maximum number, based on the number of eggs provided to the program

[2] This program does not produce fry and/or fingerlings for release as a program goal for stock 47 summer steelhead. In any given year there may be surplus fingerlings (typically from above average fry and fingerling survival). These will be released to standing water bodies, or destroyed.

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

Smolt releases:

Stream, river, or watercourse: Nestucca River, including Three Rivers (tributary to the Nestucca at RM 9.75)

Release point: Three Rivers (at hatchery),

Nestucca River (various sites up to RM 22)

Bays Creek. (RM 22) or another suitable tributary may be utilized as a release site in the future.

Major watershed: Nestucca River

Basin or region: Nestucca Bay Basin

Stream, river, or watercourse: Wilson River

Release point: Hughey Cr acclimation pond (RM 6.5)

S.F. Wilson River (tributary of Wilson River at RM 33) at Tuffy Creek RM 1.5

	Wilson River- various access sites RM 2-33 (alternative release locations)
Major watershed:	Wilson River
Basin or region:	Tillamook Bay Basin

STEP Fry releases:

Typically summer steelhead are only occasionally used in classroom incubators. Release sites are typically close to participating schools, and generally low the given river system or may be in standing water bodies. Data on prior releases are provided in Section 10.3.

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

Table 10-2. **Nestucca River Basin Stock 47 Summer Steelhead Releases (1992-2014 brood years). Values shown are pre-CMP levels.**

Brood Year	Eggs/ Unfed Fry[1]	Avg size (fish/lb)	Fry	Avg size (fish/lb)	Fingerling[2]	Avg size (fish/lb)	Yearling	Avg size (fish/lb)
1992					17,674	7.6	70,326	5.0
1993					35,524	34.8	66,251	4.7
1994	1,922	~1,000			41,691	19.5	77,518	5.6
1995					12,102	115.3	73,827	6.1
1996					15,170	74.0	67,997	5.5
1997					20,323	64.9	49,426	5.2
1998	180	~1,000			24,420	111.0	69,467	6.0
1999					44,480	64.0	60,750	5.7
2000	529	~1,000			8,757	139.0	62,719	5.2
2001					49,216	107.0	65,035	6.2
2002	600	~1,000			42,780	115.0	44,241	6.4
2003	316	~1,000			45,920	31.8	70,126	5.4
2004							69,837	5.4
2005					62,100	60.0	70,841	5.2
2006					70,188	74.9	76,074	5.9
2007					26,296	72.0	73,899	6.0
2008							69,093	6.5
2009							71,940	5.9
2010							71,383	6.0
2011					24,254	74.4	74,151	5.7
2012					5,079	104.0	75,745	6.2
2013							71,645	5.5
2014					27,550	58.0	53,911	5.3
2015					31,862		61,080	5.9
Average	709	~1,000			**31,862**	**45.7**	**67,424**	**5.7**

Data source: HMS; Cedar Creek Hatchery files; District files

[1] STEP releases

[2] Fingerling releases were to various standing water bodies

[3] Average is calculated based on years when releases occurred

Table 10-3. **Wilson River Basin Stock 47 Summer Steelhead Releases (1992-2014 brood years). Values shown are pre-CMP levels.**

Brood year	Eggs/ Unfed Fry[1]	Avg size (fish/lb)	Fry	Avg size (fish/lb)	Fingerling[2]	Avg size (fish/lb)	Yearling	Avg size (fish/lb)
1992							50,102	5.1
1993							43,063	4.7
1994							55,648	5.7
1995							50,811	6.1
1996							50,201	5.1
1997							29,785	5.3
1998							24,019	6.0
1999							34,873	5.6
2000	600	~1,000					41,067	5.2
2001							46,066	6.5
20024							36,253	6.3
20034							36,494	6.1
20044							47,091	5.4
2005							49,466	5.4
2006							50,857	5.9
2007							29,251	6.0
2008							30,401	6.6
2009							30,366	5.9
2010							25,990	5.9
2011							30,250	5.8
2012							29,786	6.2
2013							31,843	5.6
2014							50,954	5.6
2015							50,377	5.8
Average	600	~1,000					**39,792**	**5.7**

Data source: HMS; Cedar Creek Hatchery files; District files

[1] STEP releases

[2] Fingerling releases were to various standing water bodies

[3] Average is calculated based on years when releases occurred

[4] Includes fish transferred to Trask Hatchery for rearing while alternative rearing methods were developed at Cedar Creek Hatchery when use of the rearing lakes was discontinued. 2004 brood juveniles were returned to Cedar Creek for final rearing.

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

Table 10-4. **Annual Summer Steelhead Smolt Release Dates.**

Release Year	Nestucca River/Three Rivers	Wilson River
1999	13-Apr	4/13- 4/26
2000	11-Apr	4/11- 4/21
2001	4/9-4/10	9-Apr
2002	8-Apr	4/8- 4/18
2003	9-Apr	4/2- 4/9
2004	13-Apr	3/31-4/13
2005	11-Apr	4/11-4/18
2006	11-Apr	4/11-4/18
2007	10-Apr	4/10-4/17
2008	7-Apr	4/7-4/14
2009	6/3-6/4	4/6-4/14
2010	12-Apr	4/12-4/15
2011	4-Apr	4/4-4/7
2012	9-Apr	4/9-4/14
2013	10-Apr	4/10-4/15
2014	9-Apr	4/9-4/14
2015	4/8-4/9	4/8-4/10
2016	5-Apr	4/5-4/11

Data Source: HMS; Cedar Creek Hatchery filesNote: Unless directed otherwise by fish health or Department staff, date(s) of release is determined annually based on the ODFW production schedule and the size and condition of the fish.

STEP fry are usually released in mid-April, dependent on incubation water temperatures in individual classrooms or ambient temperatures for hatchboxes. Depending on the situation temperature may be "controlled" (to the extent feasible) by teachers to allow fry release timing to avoid spring break periods when students are unavailable for release activities. Transportation is typically done in a garbage can (some with aeration) or a set of buckets to the site, followed by a direct release into the stream by students using a small aquarium dipnet. Transportation time is typically 10 to 15 minutes, but may be as high as 30 minutes in some instances.

10.5) Fish transportation procedures, if applicable.

Stock 47 summer steelhead smolts released in the Nestucca and Wilson basins are hauled in liberation trucks to the selected release (or acclimation) sites. Portable liberation tanks may also be used if necessary. Refer to section 5.2 for further description of transportation equipment. Hauling time varies depending on the release site, with a maximum of approximately one and a half hours.

Summer steelhead smolts released from the Hughey Creek acclimation pond on the Wilson River are released directly from the pond into the river. A standpipe at the downstream end of the pond is removed, and fish exit the pond through an outflow pipe. Smolts are crowded from the upstream end of the pond towards the exit pipe. Generally, once the pond has mostly drained, the last few remaining smolts must be hand netted and placed into the outflow at the pipe.

Juvenile summer steelhead in excess of production needs are released to standing water bodies at or prior to the time of marking. Juveniles are hauled in liberation trucks or in portable liberation tanks (as above) to the selected release location.

See section 10.4 for a description of STEP fry release procedures.

10.6) Acclimation procedures.

Hughey Creek acclimation site is located on the Wilson River (RM 6.5). The facility is an above ground raceway with a vinyl liner supported by a galvanized steel frame. The dimensions are 83' x 8' x 4'9". The approximate working volume is 2,324 cubic feet or 17,600 gallons. Water is supplied from the Wilson River by three 5-hp pumps. Flow rates vary depending on river level, but the typical flow rate is approximately 250-300 gpm. Pump intakes are screened to meet ODFW/NOAA screening requirements. When utilized, smolts are transferred in and held for up to 14 days (average 5-7 days). Release is by draining the pond directly to the river. Fish may leave volitionally via an unscreened standpipe; however, it is doubtful many do. Fish are fed a maintenance ration during the acclimation period.

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

Stock 47 summer steelhead smolts are mass marked with an adipose and right maxillary clip (although alternate clips may be used if necessary). Fry released from STEP programs are unmarked.

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

Any juvenile fish surplus to production are released into standing water as fry or fingerlings, prior to or at the time of marking, not at the time of smolt release. Smolt releases have generally been within 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.

In the event a flood or water system failure causes an emergency release of summer steelhead juveniles, the release will only occur after:

- The hatchery crew has exhausted all possibilities for retaining the fish.
- The hatchery crew has consulted with the ODFW District Fish Biologist.
- The release will be into the Nestucca River or Three Rivers, the Wilson River, or into a closed water body, as directed by the District Fish Biologist.

Emergency releases at Hughey Creek acclimation pond would be accomplished by removing the standpipe and directly releasing the smolts into the Wilson River. This facility is equipped with an alarm system to alert staff and volunteers in the event of a loss of water flow. A propane generator (set to start automatically) provides a backup power supply at the site.

Cedar Creek Hatchery is equipped with a backup propane operated pump utilized in the event of a power outage or electric pump failure. Operating procedures include running the propane pump periodically and topping the 500-gallon fuel tank as necessary. The hatchery also has portable aerators that can be used to maintain dissolved oxygen levels in the rearing lake. These tools should reduce the possibility of an emergency release due to a water system failure.

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.

Stock 47 summer steelhead are reared to full-term, yearling smolts and released shortly before the majority of naturally produced coho and steelhead smolts typically emigrate. The peak outmigration of naturally produced coho and steelhead smolts typically occurs during mid-late April or early May (Solazzi et al, 2003). The hatchery summer steelhead smolts are expected to migrate upon or shortly after release, which should keep freshwater residence time to a minimum.

This release strategy should minimize potential interactions and adverse ecological effects that may occur between hatchery summer steelhead and juvenile salmonids rearing or migrating through these systems.

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.

Existing staff, funds and resources are available to conduct the following monitoring and evaluation activities. These activities will directly measure performance standards and indicators previously described in Sections 1.9 and 1.10. Information on the catch of summer steelhead is compiled from returned salmon/steelhead tags and is available from Fish Division in the Salem office of ODFW. 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. Steelhead population health goals are currently being addressed through *Oregon Plan for Salmon and Watersheds* (ODSW) activities and through the Coastal Multi-Species Conservation and Management Plan. New performance standards (and subsequent monitoring and evaluation) may be prescribed in the future as these population health goals are established. Monitoring of naturally spawning salmon and steelhead has increased coast-wide in recent years. Additional information regarding the number of naturally spawning summer steelhead of hatchery origin may become available in the future.

Monitoring of in-hatchery performance and adult returns at Cedar Creek Hatchery and at the Tuffy Creek (S.F. Wilson River) facility will be conducted by the hatchery personnel. This information is stored on the ODFW mainframe computer in the HMIS database. This will include at least the following information:

Adults

The number of females, males, and jacks (one-salt adults) collected at Cedar Creek Hatchery andTuffy Creek, (Standard 2.1; 3.3).

- Number of unmarked winter steelhead, unmarked coho, fall chinook, chum, and cutthroat handled and released from Cedar Creek Hatchery and Tuffy Creek, (Standard 4.5).
- Any observed mortalities of unmarked winter steelhead, unmarked coho, fall chinook, chum, and cutthroat handled at Cedar Creek Hatchery and Tuffy Creek (Standard 4.5).
- Date of entry into the Cedar Creek Hatchery (or collected by seining), or Tuffy Creek trap, specified by hatchery and naturally produced fish, (Standard 2.1).
- Date of entry into the Cedar Creek Hatchery trap (or collected by seining), or Tuffy Creek, for fish retained for broodstock, (Standard 2.1).
- Dates of spawning at Cedar Creek Hatchery, (Standard 2.1).
- The number of males, jacks and females spawned, (Standard 3.3).
- Fecundity of females spawned, (Standard 2.1).

- Disposition (spawned, sold, stream enrichment, etc.) of all summer steelhead collected, (Standard 4.4).

Juvenile Rearing

- Monthly number of 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 fish released, by mark type, (Standard 1.2, 2.2).
- Fish age and size at release; average weight, and length frequency distribution, (Standard 2.3).
- Location of releases, (Standard 2.2; 2.3).
- Date releases started and ended, (Standard 2.2).

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 also currently being pursued for Coastal Multi-Species Conservation and Managemnt Plan monitoring.

However, as with all state and federal programs, budgets are approved by the Legislature, and no commitment of funds can be made past the approved budget period. Funds for various projects associated with this HGMP come from (or could come from) a variety of sources, possibly including license dollars, state general funds, and federal funding sources. Funds are committed for certain activities; but can change with relatively short notice. This could result in elimination or reduction in the hatchery program and associated monitoring and evaluation activities.

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.

Neither the in-hatchery monitoring program nor other monitoring activities (i.e. life cycle monitoring, coastal salmonid inventories) is expected to increase risks to naturally produced fish 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

No research activities are currently associated with this program. ODFW conducts annual resting hole surveys in the Nestucca River and Wilson River to monitor trends in abundance of summer steelhead (and spring chinook and sea-run cutthroat trout). Winter steelhead spawning ground surveys were initiated in 2002 to monitor hatchery/wild ratios and measure trends in abundance of natural spawners in the basin; summer steelhead may be observed in these surveys. Summer steelhead were also encountered during Nestucca hatchery winter steelhead evaluation activities. Data from these surveys is available from the ODFW Tillamook District office.

SECTION 13

ATTACHMENTS AND CITATIONS

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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, North Coast Watershed District Manager, ODFW

Signature: _____Date:_____

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

Signature: _____ Date:_____

Attachment A

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 broodstock 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 broodstock for the presence of *R. salmoninarum* (R.s). 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 is used at 1:15,000 to 1:6,000 for one hour static bath for three to five consecutive days. Treatments of winter or summer steelhead juveniles in the large rearing lakes require hydrogen peroxide flush treatments introduced into the water supply for 4 to 6 hours. Juvenile fish are treated for bacterial infections with florfenecol, oxytetracycline or Romet medicated feed according to label or under an Investigational New Animal Drug Permit (INAD). During the summer, on rare occasions the winter and summer steelhead juveniles may require an oxytetracycline, florfenecol or Romet medicated food treatment for furunculosis as directed by fish health professionals. The steelhead broodstocks are given hydrogen peroxide flush treatments at 1:3500 for one hour plus turnover three to five times per week. The spring chinook 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 are also treated with hydrogen peroxide flush treatments at 1:3500 to1:5,000 for one hour three to five times per week as needed for external fungi infections. One hour Formalin bath treatments at a concentration of 1:12,000 – 1:6000 for adult brood fish may be an option if planned modifications allow proper chemical dilution.

Table A-1

Five-Year Disease History[a] (1996 to present) 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 47 stock 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

STS = Summer Steelhead

Rb = Rainbow Trout

Stock 047 = Nestucca River

Stock 033 = Siletz River

Stock 072 = Roaring River

Oregon
Theodore R. Kulongoski
Governor

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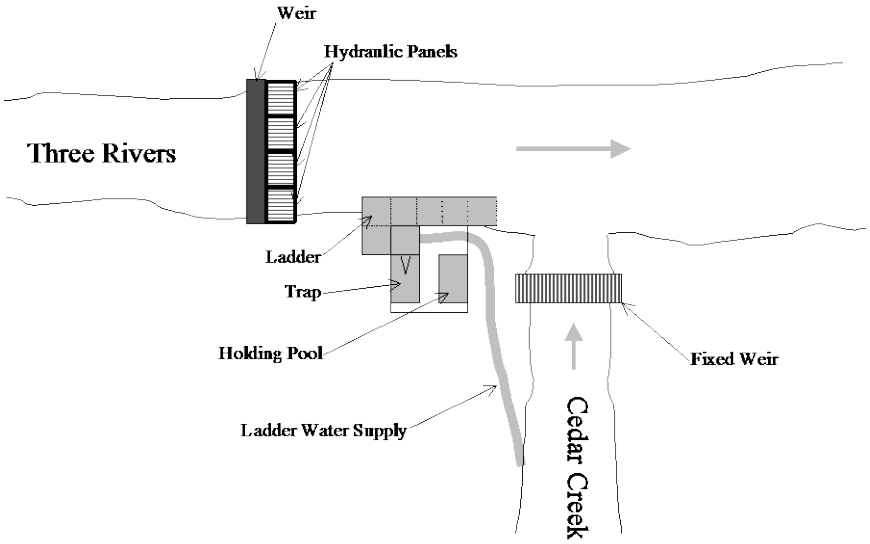
May 27, 2003

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