HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	**Siuslaw River Winter Steelhead Program**
Species or Hatchery Stock:	**Winter Steelhead Trout *Oncorhynchus mykiss* (Stock 38W)**
Agency/Operator:	**Oregon Department of Fish and Wildlife**
Watershed and Region:	**North Coast Watershed District**
Date Submitted: **Updated Draft Submitted:** **Second Update Submitted:**	**March 22, 2006** **August 26, 2014** **July 1, 2016**
Date Last Updated:	**July 1, 2016**

SECTION 1

GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Willamette and Roaring River hatcheries, Siuslaw River winter steelhead program.

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

Winter Steelhead *Oncorhynchus mykiss* (stock-38W). Oregon Coast Steelhead ESU is listed as a candidate species under the U.S. Endangered Species Act, but not a threatened or endangered Distinct Population Segment (DPS).

1.3) Responsible organization and individuals.

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Hatchery Contacts:

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

Members of the Emerald Empire Chapter Northwest Steelheaders and the Florence STEP Group assist with adult collection, egg incubation, and rearing of Siuslaw winter steelhead at Letz Creek and Munsel Creek STEP facilities and run up to three adult fish traps throughout the basin.

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

Funding source for the Siuslaw winter steelhead program at Willamette and Roaring River Hatcheries is 100% State of Oregon General Fund, including program staffing of one limited-duration Technician 1. Annual cost for this Siuslaw River winter steelhead program is estimated at approximately $75,000 per year plus 5% for annual inflation and includes personal services and supplies. Volunteer contributions to this program is estimated to be in excess of $95,000 each year plus 5% for inflation.

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

Munsel Creek STEP Hatchery:
Eggs from winter steelhead adults spawned in the field are transferred to the Munsel Creek STEP Hatchery for incubation. The eggs are incubated to the eyed stage and transferred to Willamette Hatchery and Letz Creek Hatchery. This facility is located on Munsel Creek, a tributary that enters the Siuslaw River at approximately river mile 5. The hatchery is located off 24th Street within the city limits of Florence, Oregon and includes incubators, rearing tanks and a raceway/trap. The facility gets its water from Munsel Creek, waterbody code 1800500040. The regional mark processing code for Munsel Creek STEP Hatchery facility is 5F22251 H51 21.

Alsea Hatchery
The hatchery is located at RM 5 on the North Fork of the Alsea River off Highway 34, near the town of Alsea, 15 miles west of Philomath (Attachment B). The hatchery site occupies about 25 acres at 380 feet above MSL (44º 25’22” N and 123º 33’ 05” W). The North Fork Alsea watershed code is 1800430000.

Letz Creek STEP Hatchery:
Green winter steelhead eggs are taken at the Letz Creek adult fish trap. Eyed winter steelhead eggs are also shipped from the Munsel Creek Hatchery to the Letz Creek Hatchery. There, they are incubated and reared to produce up to 15,000 smolts for release in Letz Creek. This hatchery is located on Letz Creek, a tributary that enters the Siuslaw River at approximately river mile 105. The facility is approximately 5 miles southwest of the town of Lorane, Oregon and includes incubators, rearing tanks and an earth pond. The hatchery gets its water from an unnamed tributary to Letz Creek, waterbody code 1800500990.

Willamette Hatchery:
Eyed Siuslaw winter steelhead eggs are shipped out of the Siuslaw Basin to Willamette Hatchery where they are incubated and early reared to a size of about 200 fish/lb. The hatchery is located on Salmon Creek, a tributary of the Middle Fork of the Willamette River, off highway 58, 2 miles East of the town of Oakridge, 45 miles southeast of Eugene. It occupies approximately 80 acres of land leased from the U.S. Forest Service, at an elevation of 1200 feet. The Salmon Creek waterbody code is 0200410000. The regional mark processing code for Willamette Hatchery is 5F33319 H19 21.

Roaring River Hatchery:
The early reared 200/lb fingerlings are transferred from Willamette Hatchery to Roaring River Hatchery near July 1st. The fingerlings are reared to produce 85,000 smolts at 6 fish/lb. The hatchery is located on Roaring River, a tributary to the South Fork of the Santiam River, 19 miles east of Albany on Fish Hatchery Drive. It occupies 15 acres owned by ODFW at an elevation of 520 feet. GPS coordinates are 10 UTM, 0522318E, 4941136N. The Roaring River waterbody code is 0201220020. The regional mark processing code for Roaring River Hatchery is 5F33322 H22 21.

1.6) Type of program.

Isolated Harvest.

1.7) Purpose (Goal) of program.

The goal of this Siuslaw winter steelhead program as outlined in the Coastal Multispecies Conservation Plan, is to release up to 100,000 hatchery winter steelhead while minimizing interactions with wild fish.

1.8) Justification for the program.

This program provides steelhead for harvest while minimizing adverse impacts to wild fish. Hatchery fish are necessary to meet public desires for consumptive harvest because regulations require the release of wild steelhead. All releases in the Siuslaw will be made into tributaries to minimize straying of returning adults and at smolt sizes that will enhance rapid outmigration and reduce interactions with naturally-produced wild juveniles. A new broodstock (38W stock) has been developed on the Siuslaw with a goal of incorporating at least 30% wild Siuslaw River winter steelhead each year.

1.9 and 1.10) List of program "Performance Standards" and applicable "Performance Indicators".

*The following are **key** performance standards and indicators identified to evaluate the success of this fish propagation program. Note, not all measurable standards are listed.* Additional within hatchery standards will be evaluated using data gathered during adult collection, mating, incubation and rearing, and release of the winter steelhead. Data will confirm fish propagation procedures identified in Sections 7-10.

Indicator 1 - Sport Fishery Contribution

Standard 1.1: Release 100,000 hatchery winter steelhead smolts at a size of 6 fish/lb annually from existing stock (38W).
Indicator: Hatchery production will be inventoried prior to release to enumerate smolt release numbers and size at release.

Indicator 2 - Life History Characteristics

Standard 2.1: Life history characteristics of the natural population do not change as a result of this fish propagation program.
Indicator: Compare annual return timing of wild fish with historical return timing.
Indicator: Adult migration timing of hatchery 038W stock tracks migration timing of natural population; compare adult return timing of wild fish and hatchery fish as seen at trapping sites.
Indicator: Smolts are released at times that track naturally produced winter steelhead emigration.
Indicator: Smolts are released at sizes and weights that promote swift emigration from freshwater and estuary habitats.

Indicator 3 - Adult Hatchery Stray Rate

Standard 3.1: Limit hatchery fish to 10% or less of the fish spawning in natural habitats, except in the immediate area around the release sites.
Indicator: Enumerate the proportion of finclipped and non-finclipped fish in adult returns to two sites within the Siuslaw Basin;
Indicator: Monitor strays at traps outside of the Siuslaw at Bohannon Falls (Alsea), Cascade Creek (Alsea), Fall Creek (Alsea), Mill Creek (Yaquina), Mill Creek (Siletz), Palmer Creek (Siletz), Schooner Creek (Siletz), and Siletz Falls (Siletz).

Indicator 4 - Stock Identification

Standard 4.1: All hatchery releases will be adipose finclipped.
Indicator: Confirm that all smolts were adipose finclipped.

Indicator 5 - Facility Operation and Maintenance

Standard 5.1: Adult broodstock collection does not significantly alter spatial and temporal distribution of the natural winter steelhead population.
Indicator: Adults are collected throughout the entire run in proportion to the natural population. Refer to Section 7 for details.

Standard 5.2: Adult selection, mating, and spawning is consistent with approved methods and procedures.
Indicator: Females and males are selected (and paired) randomly for spawning.

Indicator: Fish are spawned at a 1:1 male to female ratio and are spawned according to a 3x3 spawning matrix.
Indicator: All fish are live spawned.

Standard 5.3: Develop operational plans that maximize survival rates at varying life stages within the hatchery. (Refer to section 9.2).
Indicator: Enumerate survival rates from egg-fry, fry-fingerling, and fingerling to smolt to determine optimal rearing conditions and practices.

Standard 5.4: Follow approved fish health disease and disinfection monitoring guidelines to minimize disease impacts to natural populations.
Indicator: Verify compliance with approved fish health standards and criteria.

1.11) Expected size of program.

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

The intent of this program is to use a combination of wild and hatchery Siuslaw River winter steelhead adults for broodstock. In most years, the broodstock will be comprised of 70% hatchery fish and 30% wild. Periodically, when wild steelhead numbers are observed to be high, the broodstock will be comprised of all wild winter steelhead in an attempt to minimize potential genetic risks from using returning hatchery fish in the broodstock every year. Numbers of wild winter steelhead adults collected for broodstock in years when hatchery fish are also used will be 30 pair. Sixty pair of wild fish will be used in years when all wild fish are used.

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

Table 1-1
Proposed Annual Release Levels.

Life Stage	Release Location	Annual Release Level
Eyed Eggs	NA	NA
Unfed Fry	NA	NA
Fry	NA	NA
Fingerling	NA	NA
Yearling	Whittaker Creek (Siuslaw) Green Creek (Lake Creek) Letz Creek (Siuslaw)	70,000 15,000 15,000

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

There is little hard data to estimate the performance of this program. The release of smolts produced from 100% stock 38W began in 1997. The first three-year-old fish from this program, as outlined in this document, returned in the winter of 1998-99. The

harvest tags from that season, and since, have been summarized. This data shows an annual average catch of 1,548 hatchery winter steelhead retained by anglers for all open areas in the Siuslaw.

Creel surveys of the sport fishery suggest returns to the fishery from the Siuslaw broodstock have been as good as or better than what was observed with the most recent returns of the traditional Alsea broodstock released in the Siuslaw prior to 1997. From 1998 through 2000 there was only one hatchery stray monitoring site in the Siuslaw at West Fork Indian Creek. Beginning in 2001, there were up to three monitoring sites to better evaluate the straying rates of hatchery winter steelhead throughout the Siuslaw Basin. However, operations of trapping sites was sporadic with frequent periods of no data collection. By 2005 remote adult trap sites were closed due to reduced staffing.

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

Hatchery winter steelhead smolts have been stocked in the Siuslaw since the 1960's. The stock used through release year 1995 was primarily Alsea stock-43. Smolt releases with 100% new broodstock (stock 38W) originating from wild Siuslaw River winter steelhead adults began in 1997.

1.14) Expected duration of program.

The program will continue in the Siuslaw River for the foreseeable future. Some modifications to the program may be necessary if stray levels or other negative impacts to wild fish are found to be too high, or adjustments are deemed necessary to improve fishery benefits. Smolt numbers or release sites may be changed.

1.15) Watersheds targeted by program.

The Siuslaw watershed is the target of this program.

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.

Issues related to the Siuslaw hatchery winter steelhead program primarily revolve around protecting the native winter steelhead population in the Siuslaw and achieving the desired levels of angler harvest.

Most of the possible alternatives recognize that the smolt release and hatchery adults spawning in natural areas pose a risk to the wild population. Measures that could be taken include discontinuing the hatchery program, reducing the number of hatchery smolts released, confining releases to tributaries entering the mainstem Siuslaw River and away from better steelhead habitat in Lake Creek tributaries, or raising the smolts to mimic most of the life-history characteristics of the wild winter juveniles.

Another issue raised about this hatchery program is increasing harvest. The fishery for hatchery winter steelhead is popular, and anglers would like to have more fish to harvest. An alternative to address this issue is to increase hatchery smolt stocking in Lake Creek and Siuslaw tributaries, and also open some limited areas to wild steelhead harvest where populations are robust.

1.16.2) Potential Alternatives to the Current Program.

Alternative 1 - *Discontinue current hatchery winter steelhead program.*

This would pose the least amount of risk to wild Siuslaw winter steelhead of any of the alternatives. There would be no hatchery smolt or adult interactions. Eliminating the program would eliminate the consumptive fishery for winter steelhead in the Siuslaw, and the objective of this program to provide harvest of hatchery steelhead. Discontinuing the smolt releases would also mean that the hatchery broodstock would not be maintained, which would eliminate a source of genetic material to be used if the wild population becomes extremely depressed in the future. In the absence of a hatchery program, wild steelhead may recover to sufficient numbers to provide for a much reduced consumptive fishery.

Alternative 2 - *Reduce the number of hatchery smolts released.*
This would reduce the impact of smolts released on the native winter steelhead smolts and would likely produce fewer hatchery adults that might spawn in natural areas. A reduction in returning adults would probably also reduce the number of hatchery winter steelhead harvested in the Siuslaw.

Alternative 3 - *Rear the hatchery winter steelhead smolts in a way that mimics the life-history of wild steelhead smolts.*

Rearing the hatchery smolts to produce mostly two-year old smolts and to migrate to the ocean in a similar manner as wild smolts could help produce hatchery adults that impact the native winter steelhead population less than the current hatchery adults do. This would likely require additional rearing space at Roaring River Hatchery and result in a higher cost to produce the smolts. There is little information on how to implement such an approach and no data available to show that this approach produces the desired results.

Alternative 4 - *Release more hatchery winter steelhead smolts.*

Releasing more smolts could increase the harvest of winter steelhead in the Siuslaw; however experiments in the past decade showed that increasing Alsea stock smolts into the Siuslaw resulted in a strong negative relationship in adult returns. Any increase in smolts, would probably result in a greater negative interaction with wild steelhead smolts, resulting in an increased risk to all juvenile wild fish in the Siuslaw. This could lead to a violation of the objectives in the Coastal Multispecies Conservation and Management Plan, Siuslaw River Basin Fish Management Plan and the Native Fish Conservation Policy concerning the level of hatchery fish on the spawning grounds.

Alternative 5 - *Confine releases to tributaries entering the mainstem Siuslaw River and away from better steelhead habitat in Lake Creek tributaries.*

This could provide more adult fish to harvest in a heavily fished section of the Siuslaw River. This alternative may also reduce wild/hatchery interactions and allow naturally produced steelhead the benefit of utilizing the better habitat in Lake Creek basin tributaries. Discontinuing releases of hatchery steelhead in the Lake Creek basin would reduce angler opportunity and harvest on Lake Creek.

1.16.3) Potential Reforms and Investments.

Reform/Investment 1 - *Upgrade facilities at Roaring River Hatchery to allow raising two-year-old smolts.*

Upgrading the facilities at Roaring River Hatchery may require building new ponds or modifying existing ponds. The estimated cost would be less than $1,000,000.

SECTION 2

PROGRAM EFFECTS ON ESA - LISTED SALMONID POPULATIONS

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

The HGMP for this program was submitted to NMFS 6/27/2008 for approval and ESA coverage. This is an updated version of the previously submitted HGMP and is consistent with ODFW's Coastal Multi-Species Conservation and Management Plan.

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.

The only salmonid species in the Siuslaw that has been listed under the Endangered Species Act (ESA) is Oregon Coast Coho Salmon. These Coho were listed as threatened under the ESA in 1998. It was subsequently de-listed in 2005 and was relisted again effective May 12, 2008 under the federal ESA.

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

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

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

The NMFS ESA-listed Oregon Coast Coho Salmon may be indirectly affected through competitive interactions with hatchery fish for food and space, as well as during wild winter steelhead brood collection. This program could indirectly affect the wild Coho Salmon population in the Siuslaw River Basin. Coho populations that could be incidentally affected by this program are in the Yachats Basin and the Siltcoos Basin, which are located to the north and south of the Siuslaw River.

Siuslaw Complex

The Siuslaw Complex consists of Coho Salmon inhabiting the Siuslaw Basin and small ocean tributaries north to Heceta Head (Nickelson 2000). There is an estimated 580 miles of spawning habitat available to the Coho Salmon of this complex.

Siuslaw Coho Population

Coho Salmon that return to the Siuslaw River and its tributaries have been identified as an Independent Population by the Oregon Coast Technical Recovery Team Workgroup (Lawson et al. 2005) and by the Oregon Coastal Coho Assessment (Chilcote et al. 2005). As one of twenty-one independent populations that comprise the Oregon Coast Coho ESU, the abundance, distribution, and productivity of the Siuslaw Coho are monitored to

assess population viability and to guide recovery planning. Coho returning to each of the direct ocean tributaries included in the Siuslaw Complex are now classified as Dependent Populations.

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% 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 two or three weeks until the yolk is absorbed and emerge as fry to actively feed in the spring. Most juvenile Coho Salmon spend one summer and one winter in fresh water. The following spring, approximately one year after emergence, they undergo physiological changes that allow them to survive in seawater. They then migrate to the ocean as silvery smolts, about 10 to 12 centimeters (cm) in length.

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

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

of the males attain sexual maturity and return to spawn as jacks. Migration patterns during the fall and winter are unknown. Those fish remaining at sea grow little during winter, but feed voraciously during the next spring and summer, growing to about 60 to 80 cm in length. During this second summer in the ocean, a substantial percentage of these maturing adults are caught in ocean troll and sport fisheries, usually to the south of their natal stream (Lewis 2000). The survivors return to their home streams or neighboring streams where they spawn and die to complete the life cycle.

Habitat Use and Freshwater Distribution

Spawning and rearing of juvenile Coho Salmon generally take place in small, low-gradient (generally less than 3%) tributary streams, although rearing may also take place in lakes where available. Coho Salmon require clean gravel for spawning and cool water temperatures (53°F to 58°F preferred, 68°F maximum) for rearing (Reiser and Bjornn 1979). Fry emerge from February to early June (Moring and Lantz 1975). They 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. During winter, they prefer off-channel alcoves, beaver ponds, and dam pools with complex cover (Nickelson et al. 1992a, 1992b). 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 with 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 high quality habitats comprise about 22% of the total 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.

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

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

The Siuslaw Complex consists of Coho Salmon inhabiting the Siuslaw Basin and small ocean tributaries north to Heceta Head. There is an estimated 580 miles of spawning habitat available to the Coho Salmon of this complex. The critical population level for the Siuslaw Complex is 2,300 adult spawners. The habitat of this complex has the potential to support a viable population because high quality habitat is estimated to be present in 158 miles of stream, well above the 15-mile threshold (Nickelson 2000). It should be noted however, that the estimate of habitat quality is based on a sample size of only 15 percent of the available stream miles, much less than any other complex.

The abundance of Coho Salmon spawners of the Siuslaw Complex has ranged from less than 700 to more than 55,000 and has averaged about 13,500 since 1990 (Figure 2-1 and Table 2-2).

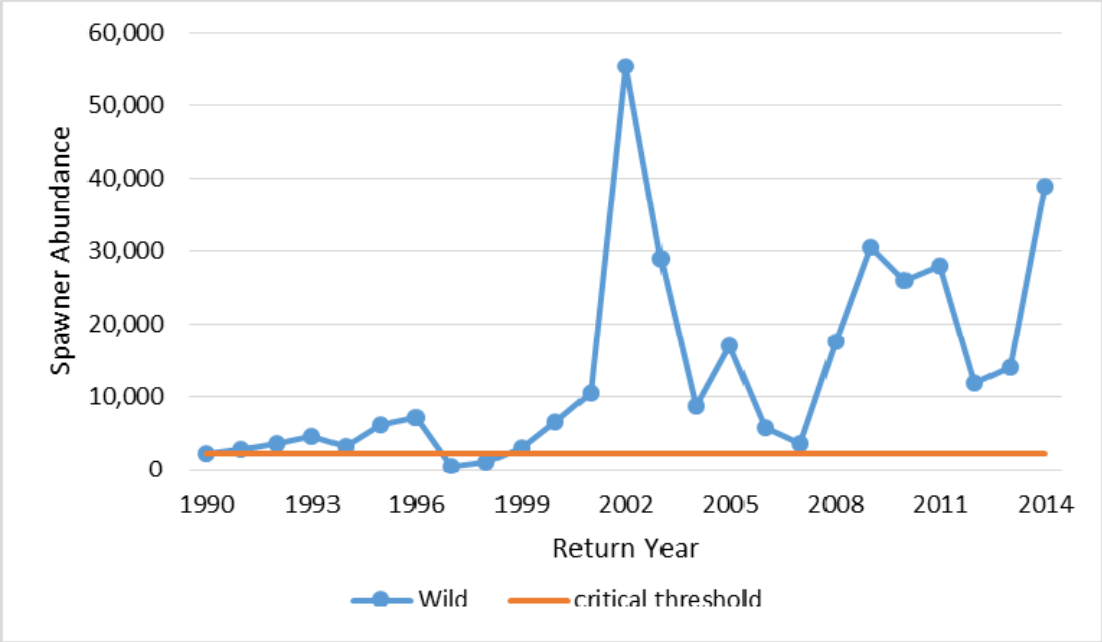

Figure 2-1. **Trend in adult Coho Salmon abundance relative to the critical population level for the Siuslaw Complex. Error bars are 95 percent confidence limits.**

Table 2-2. Population parameters for the Siuslaw Complex Coho Salmon.

Return Year	Wild spawners	Pre-harvest wild population	Recruits per spawner
1990	2,268	8400	
1991	2,808	7800	
1992	3,554	9605	
1993	4,600	7667	3.38
1994	3,159	3361	1.20
1995	6,161	6922	1.95
1996	7,234	7696	1.67
1997	501	551	0.17
1998	1,020	1109	0.18
1999	2,980	3204	0.44
2000	6,532	6804	13.58
2001	10,606	11048	10.83
2002	55,445	58363	19.58
2003	29,003	32525	4.83
2004	8,729	9488	0.89

2005	16,907	17611	0.32
2006	5,869	6379	0.22
2007	3,552	4036	0.46
2008	17,491	17848	10.6
2009	30,607	32911	5.61
2010	25,983	27351	7.70
2011	28,082	29874	1.71
2012	11,946	14568	0.48
2013	14,118	16416	0.63
2014	38,896	39289	1.40
Annual mean	13522	15193	3.56

- **Provide the most recent 12 year (e.g. 1990-present) progeny-to-parent ratios, survival data by life-stage, or other measures of productivity for the listed population. Indicate the source of these data.**

Recruits per wild spawner exhibited a downward trend from 1993 to 1999, which was dramatically reversed in 2000, when the 1997 brood produced about 7,100 adults and 6,500 spawners from about 700 parent spawners (Table 2-2 above and Figure 2-2 below).

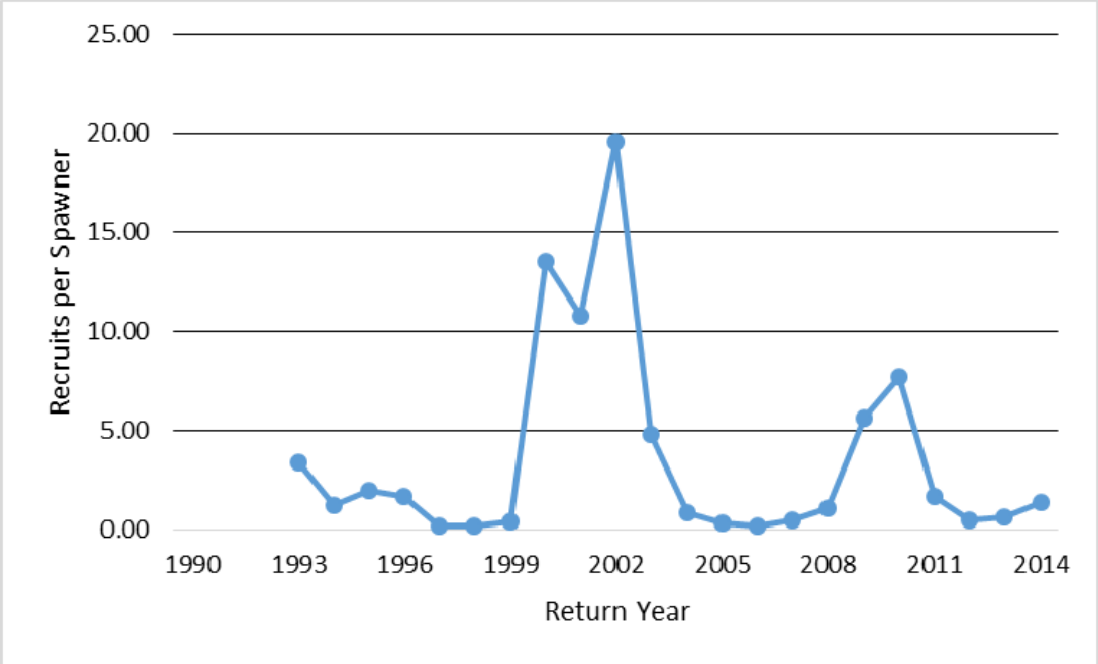

Figure 2-2. **Trend in recruits per spawner for Siuslaw Complex wild Coho Salmon.**

- **Provide the most recent 12 year (e.g. 1990-2002) annual spawning abundance estimates, or any other abundance information. Indicate source of these data.**

In an Oregon Coast Coho Stock Status Assessment using information (2001-2003 return years) in conjunction with earlier data (1990-2001), the Siuslaw population passed all biological criteria used to assess conservation status: Abundance, Productivity, Persistence, Distribution, and Diversity (Chilcote et al. 2005).

The spawner abundance in the Siuslaw Complex for 2001-2015 has ranged from 8,000 to 55,000 adult Coho reflecting a tremendous increase in run size compared to the early 1990s. Only three times since 1990 the spawner abundance fell below the critical threshold of 2,300 fish, and in 5 other years the lower 95% confidence limit extended below the critical threshold.

The juvenile Coho Salmon abundance in the Siuslaw complex from 1990 – 2014 brood years is shown below (Table 2-3). Estimated smolt abundance ranged from just under 100,000 to over nine million for the Siuslaw Complex.

Table 2-3. **Estimates of abundance of juvenile Coho Salmon based on spawner abundance, Siuslaw Complex. Estimates are in millions.**

Brood Year	Eggs	Fry	Parr	Smolts
1990	2.835	1.843	1.143	0.388
1991	3.510	2.282	1.415	0.481
1992	4.443	2.888	1.790	0.609
1993	5.750	3.738	2.317	0.788
1994	3.949	2.567	1.591	0.541
1995	7.701	5.006	3.104	1.055
1996	9.043	5.878	3.644	1.239
1997	0.626	0.407	0.252	0.086
1998	1.275	0.829	0.514	0.175
1999	3.725	2.421	1.501	0.510
2000	8.165	5.307	3.290	1.119
2001	13.258	8.617	5.343	1.817
2002	69.306	45.049	27.930	9.496
2003	36.254	23.565	14.610	4.967
2004	10.911	7.092	4.397	1.495
2005	21.134	13.737	8.517	2.896
2006	7.336	4.769	2.957	1.005
2007	4.440	2.886	1.789	0.608
2008	21.864	14.211	8.811	2.996
2009	38.259	24.868	15.418	5.242
2010	32.479	21.111	13.089	4.450
2011	35.103	22.817	14.146	4.810
2012	14.933	9.706	6.018	2.046
2013	17.648	11.471	7.112	2.418
2014	48.620	31.603	19.594	6.662

- **Provide the most recent 12 year (e.g. 1990-2002) estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.**

See Table below 2-4 for running 5-year average and yearly average pHOS data of steelhead. It's not identified the proportions of pHOS between winter steelhead and summer steelhead.

Table 2-4. Yearly average and 5-year running average data of spawning ground survey showing pHOS levels of steelhead, 2003-2015, without differentiating the proportion of pHOS between summer steelhead and winter steelhead.

Spawning Year	5-year avg pHOS	5-year observations (n)	Yearly pHOS	Yearly observations (n)
2003	NA	NA	8.5%	47
2004	NA	NA	4.3%	46
2005	NA	NA	9.1%	11
2006	NA	NA	15.0%	20
2007	11.8%	148	45.8%	24
2008	17.2%	110	33.3%	9
2009	26.1%	64	NA	0
2010	21.2%	57	0.0%	4
2011	22.7%	47	20.0%	10
2012	12.8%	44	9.5%	21
2013	12.2%	43	37.5%	8
2014	11.0%	54	0.0%	11
2015	13.1%	62	8.3%	12

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

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

Broodstock Collection, Monitoring and Evaluation – Wild Coho Salmon have been incidentally captured in the past at Whittaker Creek, Green Creek, and Letz Creek traps while attempting to collect wild and hatchery winter steelhead for broodstock. The live wild Coho are released upstream above the trap.

Wild Coho Salmon have also been incidentally captured in the West Fork Indian Creek and Turner Creek monitoring sites (intended to track winter steelhead stray rates). Adult trapping is likely to incidentally take wild Coho by delaying upstream migrations, and invoking stress as a result of capture, handling, and upstream release. These impacts will likely occur in December and January. All winter steelhead trapping begins the last week in December, after most Coho salmon spawning has taken place. Whenever small groups of Coho are captured at the monitoring traps, the trapping procedure is modified and traps are left open, so they do not impede wild fish movement upstream. The trap types used at all sites incorporate the use of a horizontal weir to allow adults to move downstream unimpeded at most flows. When a few (1-4) adult Coho are found in the trap they are

netted and released unharmed above the trap. *Note: All incidental impacts from steelhead trapping have been identified under ODFWs 4(d) Research and Monitoring application.*

Smolt Releases - Hatchery winter steelhead smolts may interact with wild salmon smolts after their release. This impact should be minimal, but is not well understood. Estuary seining data from nearby estuaries indicate that salmon and steelhead in coastal systems are temporally separated with steelhead smolts migrating to the ocean in April and early May and Coho smolt migration peaking in mid June. It is thought that most hatchery steelhead smolts may be out of the system before the majority of wild Coho smolts emigrate to the ocean because they are temporally separated and show signs of active smolting when released. Emerging Coho, and other salmon fry, may be directly affected by superimposing much larger than natural concentrations of smolts at the hatchery smolt release sites in Whittaker and Green Creeks.

Adult Spawners - Hatchery steelhead may spawn in natural habitats where listed Coho Salmon have spawned. This could disrupt Coho Salmon redds and incubating eggs, or result in juvenile steelhead directly competing with juvenile Coho Salmon for limited stream resources.

– **Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken, and observed injury or mortality level for listed fish:**

Wild Coho Salmon were captured in adult traps in the Siuslaw Basin from 1997-2005, and averaged 46 Coho per year. These fish were passed above the traps to spawn naturally, or were found dead on the weirs and placed upstream for nutrient recycling. Most dead Coho were found on the weirs, and all of them had spawned. The overall mortality of Coho Salmon averaged 50% when we included the dead fish removed from the weirs.

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

Projected annual take levels of wild Coho Salmon from this program are identified below in Table 2-5. Some of this take was also described in ODFW's 4(d) Research and Monitoring application.

Table 2-5. Estimated Listed Salmonid Take Levels by Hatchery Activity. NOTE: This take was previously identified in ODFW's 4(d) Research and Monitoring Application.

Listed Species Affected: Coho Salmon **ESU/Population:** Oregon Coast/Siuslaw River **Activity:** Winter Steelhead Trapping				
Location of Hatchery Activity: Trapping at Whittaker & Letz Creek	**Dates of Activity:** December - May		**Hatchery Program Operator:** ODFW	
	Annual Take of Listed Fish By Life Stage *(Number of Fish)*			
Type of Take	**Egg/Fry**	**Juvenile/Smolt**	**Adult**	**Carcass**
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)			0 - 100	
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)				
Other Take (specify) h)				

a. Contact with listed fish through stream surveys, carcass and mark recovery projects, or migrational delay at weirs.
b. Take associated with weir or trapping operations where listed fish are captured and transported for release.
c. Take associated with weir or trapping operations where listed fish are captured, handled and released upstream or downstream.
d. Take occurring due to tagging and/or bio-sampling of fish collected through trapping operations prior to upstream or downstream release, or through carcass recovery programs.
e. Listed fish removed from the wild and collected for use as broodstock.
f. Intentional mortality of listed fish, usually as a result of spawning as broodstock.
g. Unintentional mortality of listed fish, including loss of fish during transport or holding prior to spawning or prior to release into the wild, or, for integrated programs, mortalities during incubation and rearing.
h. Other takes not identified above as a category.

Instructions:

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

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

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

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

Trapping can be modified for short periods at the broodstock collection sites if the number of Coho Salmon captured is higher, or expected to be higher, than what has been projected. Trapping must continue to collect broodstock for this program, and to remove hatchery fish to address stray rates. At the monitoring sites for stray hatchery fish, we can open the traps to allow unimpeded passage for a longer time for groups of Coho Salmon, without compromising our stray assessment for these systems.

Methods of handling will be reviewed and modified if there appears to be increases in injuries or mortality to wild Coho Salmon.

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.

Siuslaw River Basin Fish Management Plan (approved by the Oregon Fish and Wildlife Commission - 11/14/97). The basin management plan identifies the existing winter steelhead broodstock program. The projected smolt release is within the target level identified in the plan.

Native Fish Conservation Policy - The Oregon Fish and Wildlife Commission has approved the Native Fish Conservation Policy (NFCP). This policy relies on conservation plans being developed for each species management unit. Until a conservation plan for coastal winter steelhead is developed, management of winter steelhead in the Siuslaw Basin will be directed by the Siuslaw River Basin Fish Management Plan or the criteria outlined in the NFCP, whichever is more protective of native fish.

Oregon Coast Multi-Species Conservation and Management Plan – This program is consistent with ODFW's Coastal Multi-Species Conservation and Management Plan with regard to smolts release numbers and locations.

Fish Hatchery Management Policy – This policy provides guidance for the responsible use of hatchery fish. The Policy outlines the best management practices for hatchery programs. This Hatchery and Genetic Management Plan will serve as the guiding document for the Siuslaw winter steelhead program until a Hatchery Program Management Plan, as called for in the Fish Hatchery Management Policy, can be written.

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

Oregon Plan for Salmon and Watersheds (Executive Order 99-01). The Oregon Plan for Salmon and Watersheds is a prescriptive set of measures for recovering threatened and endangered salmon and steelhead, and meeting federal water quality standards established by Executive Order of the Governor. The Oregon Plan includes measures linked to the hatchery production of winter steelhead in the Siuslaw River Basin; including nutrient enrichment, acclimation, and other separations of hatchery and wild production, terminal fisheries that reduce harvest impacts on wild Coho, and monitoring of hatchery and wild runs.
Pacific Fisheries Management Council (Section 7 Consultation).

3.3) Relationship to harvest objectives.

The sole intent of this program is to provide sport fish harvest opportunities in the Siuslaw Basin consistent with the Siuslaw Basin Fish Management Plan.

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.

The Siuslaw winter steelhead sport fishery benefits from this program. Since 1992, this program has been designed and managed as a hatchery winter steelhead targeted fishery; thus, all non-finclipped steelhead are released.

Estimated (not actual) harvest of winter steelhead from 1988 to 1996 (run year) are presented in Table 3-1. And estimated harvests during 1997-2014 are presented in Table 3-2. Estimates are based upon returned harvest tags (from anglers); estimates have been adjusted to account for bias in returned tags.

Table 3-1. **Estimated Harvest rates in the Siuslaw River from 1988 to 1996 run years of Alsea Hatchery broodstock winter steelhead. Note: pre-1992 data includes hatchery and wild fish harvest. (Kevin Goodson)**

1988-1989	1989-1990	1990-1991	1991-1992	1992-1993	1993-1994	1994-1995	1995-1996	1996 1997
1647	1996	1939	1725	1438	918	2192	975	1975

Table 3-2. **Harvest rates in the Siuslaw River from 1997 to 2014 run years of Siuslaw River (offspring of integrated winter steelhead broodstock).**

Run Year	Harvest
1997	465
1998	585
1999	1203
2000	1795
2001	1291
2002	808
2003	1175
2004	688
2005	1759
2006	1313
2007	1618
2008	2461
2009	2808
2010	1707
2011	1375
2012	2511
2013	2674
2014	1462

The harvest levels depicted in Table 3-1 equate to 0.44% to 1.83% adults harvested from the Alsea Hatchery smolt releases plus an unknown number of wild stock smolts. And the harvest levels for Siuslaw winter steelhead broodstock to date, ranges from 1.4% to 4.6% for return years 1999-2014 (Table 3-2).

Impacts to listed natural Coho Salmon in the Siuslaw Basin, from this fishery, will likely involve incidental catch-and-release of adults. Information from past creel surveys indicate that some Coho Salmon are caught in December and January. Impacts resulting from this fishery are included in the PFMC Section 7 consultation for ocean fisheries.

3.4) Relationship to habitat protection and recovery strategies.

Refer to Appendix 1 for ODFW habitat protection and enhancement policies identified in the Siuslaw River Basin Fish Management Plan (adopted 11/14/97). Generally, habitat protection and recovery strategies are prioritized in areas with (potential) good/high quality habitat. Hatchery releases from this program are localized, to minimize potential adverse impacts to wild fish populations.

Habitat protection and recovery strategies for Coho Salmon in the Siuslaw Basin focus on riparian areas and instream structure, enhancing winter and summer rearing habitat. Progress has been made to improve fish passage at road crossings. Most adult fish passage barriers, blocking significant habitat reaches, have been remedied. ODFW personnel work with both private and public landowners in the Siuslaw Basin, to protect and restore riparian areas and fish habitats inhabiting Coho, Chinook and steelhead. More than 150 projects using large wood and boulders have been implemented to enhance natural processes in over 25% of Siuslaw basin streams. These projects improve Coho summer and winter rearing habitats, and adult spawning and holding habitats.

3.5) Ecological interactions.

(1) Species that could negatively impact program:
Predation by coastal Cutthroat Trout, mink, otters, harbor seals, raccoons, blue herons, mergansers, cormorants, and gulls cold negatively impact out migrating steelhead smolts. Returning adult steelhead could be negatively impacted from predation by harbor seals and otters.

(2) Species that could be negatively impacted by program:
Competition and/or predation by hatchery steelhead smolts on most native fish species present in the areas where the hatchery smolts migrate is a potential negative impact. These interactions are expected to be minimal due to competitive exclusion, spatial and temporal differences in habitat utilization, and relative size of hatchery steelhead smolts compared to other juvenile salmonids.

(3) Species that could positively impact program:
Any fish that dies (or is recycled for nutrient enrichment) in the basin may positively impact the program. Nutrient enrichment in the basin could improve the quantity of aquatic life that hatchery steelhead smolts could feed on during the transition process.

(4) Species that could be positively impacted by program:
Aquatic species (salmonids, other fish, mammals, birds, etc.) that depend directly or indirectly on salmonids for food and nutrient supply could be positively impacted by the program.

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.

This program utilizes four facilities to produce up to 100,000 hatchery winter steelhead smolts. Winter steelhead eggs are incubated at the Alsea Hatchery and Letz Creek STEP Hatcheries, (Siuslaw basin). Eggs are hatched and reared at the Letz Creek STEP facility and at Willamette Hatchery. Fingerlings are raised to smolt size at Letz Creek and Roaring River Hatchery.

Letz Creek STEP Hatchery:
The water source for incubation and early rearing is an unnamed tributary to Letz Creek. This tributary appears to be supplied by both surface run-off and springs. Water is gravity fed and has water temperatures and other quality similar to Letz Creek. A second unnamed tributary to Letz Creek provides water for a half-acre pond used to rear winter steelhead to smolt. This pond is located in the stream channel and has quality and temperatures similar to Letz Creek. Because this is a STEP facility, water right requirements are waived for the water withdrawn from the streams used at the facility.

Alsea Hatchery
Alsea Hatchery utilizes the North Fork Alsea River as its sole surface water source. The average water temperatures range from 37º to 68º F. Alsea maintains a water diversion permit for 21,103 gallons per minutes (gpm). Alsea Hatchery operates under a NPDES 0300-J discharge permit. Low stream flows during the late summer and fall can limit total hatchery production.

Willamette Hatchery:
The hatchery utilizes Salmon Creek as its sole surface source. The intake screening meets NOAA screen guidelines. The hatchery maintains a water diversion permit for 82.5 cubic feet per second (cfs). The hatchery operates under a NPDES 0300-J discharge permit that is monitored regularly by ODFW personnel. The hatchery has a well that produces 300 gpm that we are able to use for all Siuslaw steelhead egg incubation and fry rearing.

Roaring River Hatchery:
The hatchery utilizes Roaring River as its sole surface source. The intake screening meets NOAA guidelines. The hatchery maintains a water diversion permit for 25 cfs. The hatchery operates under a NPDES 0300-J discharge permit that is regularly monitored by ODFW personnel.

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

Letz Creek STEP Hatchery:
The intake structure supplying water for incubation and early rearing is not screened. The stream does not support any fish populations above the intake as determined by ODFW Midcoast District personnel.
The water supply for the half-acre pond is not screened. No wild coho are able to access the stream above the pond. Wild Coho fry do access this stream below the pond, and use it for summer and winter rearing. No spawning areas are present in this section of unnamed tributary.

Alsea Hatchery
Hatchery intake is screened with 1/8-inch-square screening to avoid entrapment of juveniles. Downstream migration of fish over intake screens is accomplished through a bypass channel, which collects fish moving over the intake screen, and allows diversion back into the stream below the intake. The recent construction of a new trap and fish ladder facility at the water intake dam will allow for both downstream and upstream migration for fish.

Hatchery effluent is sampled and tested according to NPDES discharge permit requirements. Facility effluent compliance falls well within permit allowances. The date for inspection of the intake screens, to check compliance with NMFS standards, is to be determined in cooperation with the ODFW Engineering Division.

Willamette Hatchery:
Hatchery intake screens conform to NOAA screening guidelines to minimize the risk of entrapment of juvenile listed fish. The hatchery effluent is sampled and tested according to NPDES discharge permit requirements.

Roaring River Hatchery:
Hatchery intake screens conform to NOAA screening guidelines to minimize the risk of entrapment of juvenile listed fish. The hatchery effluent is sampled and tested according to NPDES discharge permit requirements.

SECTION 5
FACILITIES

5.1) Broodstock collection facilities (or methods).

Winter steelhead broodstock for this program are collected at traps on Whittaker and Letz Creeks. Traps are a "gorilla cage" design. The adult trap built at Letz Creek in the summer of 2003 is authorized to collect broodstock for the 15,000 smolts produced at the Letz Creek STEP Hatchery.

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

Egg or fry are transported using ice chests, and maximum transport time can reach up to four hours. Transportation of smolts is accomplished with the use of various sized liberation truck units. Units range in size from 1,000 to 2,500 gallon tankers. Some units utilize re-circulatory refrigeration systems, which are used to maintain temperature of water taken at the hatchery site. Oxygen is added at a rate of 0.4 lpm. Some units utilize insulated tanks equipped with aerators. Oxygen is added at a rate of 0.4 lpm. All units haul fish at an average density of 0.75 lb/gallon. Total length of time in transit averages two to three hours for this haul.

5.3) Broodstock holding and spawning facilities.

Whittaker Creek Trap:
Fish entering the Whittaker Creek trap are checked for ripeness. If the fish is ready to spawn it is incorporated into the broodstock. Fish not ready to spawn are released downstream to reenter the fishery. All steelhead are live spawned in the traps, and their eggs and milt are held in separate plastic bags in an ice chest until they are combined at Alsea Hatchery.

Letz Creek STEP Hatchery:
Winter steelhead adults may be held in PVC tubes kept in circular tanks or in frames suspended in a half-acre pond. An adult trap was built on-site in 2003, and could also be used to hold the adults in PVC tubes. A total of 200 adult steelhead could be held at Letz Creek Hatchery, but on average only five steelhead are held each week. Steelhead are live spawned at a spawning shed.

5.4) Incubation facilities.

Alsea Hatchery:
Alsea hatchery receives eyed-eggs from Roaring River Hatchery. Incubation facilities at Alsea consist of 24 stacks of 8-tray vertical incubators. North Fork Alsea River water, diverted at the intake, is delivered to the hatchery by a 42-inch mainline. An 18-inch line delivers water from the mainline to the hatchery building. Two 4-inch lines feed water,

in tandem, to a screened headbox that is supported over the incubators to create a supply and flow reservoir.

In addition, there are four 15-foot, shallow trough incubators. Equipment includes a Jensorter egg picker, mechanical counter, egg picking trough, and other necessary equipment. The total egg hatching capacity is 1.7 million. The incubation system is equipped with a low-water alarm system. The incubation facilities are housed in a 100-foot by 40-foot wood constructed building.

Letz Creek STEP Facility:
This facility has a fully enclosed hatch house with four double stacks (15 trays each) of Heath incubators. Each stack is supplied with up to 10 gallons per minute, with water temperatures of 42°F to 52°F each spring.

Willamette Hatchery:
Incubation facilities consist of 134 stacks of eight tray vertical incubators. Salmon Creek feeds the hatchery incubation system. The hatchery has the ability to utilize well water, which runs a consistent 54°F, the river runs between 32°F and 58°F. Siuslaw steelhead eggs use only well water for all incubation.

5.5) Rearing facilities.

Letz Creek STEP Hatchery:
The facility has six 300-gallon and two 500-gallon circular tanks for use as early rearing facilities. Each tank is equipped with an electric feeder. Once juvenile steelhead size range from 100 to 250 fish per pound, they are finclipped and placed in a half-acre earthen pond where they are reared to smolt.

Willamette Hatchery:
These rearing facilities consist of ten 20'x100'x 4' depth, 8,000-gallon concrete ponds; Forty 20'x80'x2 ½' depth, 4,000-gallon concrete ponds; and two concrete raceway show ponds. Siuslaw steelhead are initially reared inside the hatch house in 1,000-gallon-capacity "Canadian" fiberglass raceways up to the size of 250 fish per pound, and then transferred to the 4,000-gallon concrete ponds outside.

Roaring River Hatchery:
These rearing facilities consist of fourteen 10'x100'x3' depth concrete ponds; six 19.5'x89.5'x4' depth concrete ponds; one 19'x103'x4' depth concrete ponds; two 20.5'x100'x3' depth concrete ponds; one 19'x87'x3' depth concrete pond; three 11'x86'x2.5' depth concrete ponds; and three 12'diameter x 3'depth concrete ponds.

5.6) Acclimation/release facilities.

Siuslaw River winter steelhead smolts reared at Letz Creek are volitionally released into Letz Creek over a one to two month period beginning in March. This pond is slowly drained to encourage smolt out-migration by May 1 each year. Smolts reared at Roaring

River Hatchery are transported by an ODFW liberation truck to Whittaker and Green Creeks, where the smolts are released into artificial pools created in the creeks by placing a temporary board and tarp dam. No formal acclimation facilities are used at either site. Hatchery smolts generally stay from one to five days before out-migrating to the mainstem Siuslaw or Lake Creek. During this time, smolts are allowed to leave volitionally from both sites. Smolts are fed the same feed as at the hatchery for up to five days and then the temporary dam is removed.

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

Alsea Hatchery:
The hatcheries experience seasonal environmental difficulties that could lead to fish mortality. These include high muddy water, extreme low-flow situations, seasonal parasite infestation, and disease problems. Although there has not been significant fish mortality due to these conditions in recent history, these conditions do exist and must be dealt with.

Letz Creek STEP Hatchery:
In the past, there was a significant loss of fish that occurred in the incubation and early rearing facility, due to a landslide that plugged the water intake. The intake structure on the unnamed tributary to Letz Creek has been modified to provide water when the normal intake has been plugged. Predation by birds and otters can lead to significant numbers of fish loss in the rearing pond. An electric fence has been installed and maintained to deter predators. Also, perch and resting sites for most wading or diving birds have been reduced.

Willamette and Roaring River Hatcheries:
These programs operate under normal ODFW hatchery operation guidelines. Hatchery operations are faced with seasonal environmental difficulties that could lead to fish mortality. This includes high muddy water, extreme low flow situations, seasonal parasite infestation, and disease problems. Although there has not been any significant fish mortality due to these conditions in recent history, these conditions do exist and must be dealt with. Siuslaw steelhead eggs and fry have contracted coagulated yolk disease and cold water disease while at Willamette Hatchery in the past. Mortality of eggs and fry has reached 50% of total eggs received in one year.

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

No listed fish are likely to be taken during period of water loss, flooding, disease transmission or other event. If the pump screens at Munsel Creek Hatchery failed, it would be possible but not likely, that coho fry could be pumped into the hatchery water incubation and distribution system, then back into the stream. The following systems

describe the backup plans for making sure the steelhead eggs and fry are not lost at these facilities.

Alsea Hatchery:
The hatchery is staffed full time, 24 hours per day, and is equipped with a low-water alarm system to alert the hatchery personnel for immediate action on any emergency situations to help prevent stress, injury or mortality to rearing fish. Disinfecting procedures between stocks of fish are followed to prevent disease transmission. Regular exams are conducted by an ODFW fish pathologist to assess status of fish health. All equipment utilized to handle and move fish is regularly inspected and repaired or replaced, if necessary, to prevent damage to fish from handling. There is no backup water source available should primary water source be reduced due to some catastrophe.

Letz Creek STEP Hatchery:
This facility is not staffed 24-hours a day and is in a remote location. For these reasons, low flow alarms would not provide a benefit. The water supply system is gravity fed and has redundancies in it to compensate for a water line blockage. Both an electric and gas powered pump along with hose, are on site to provide water in the event of a complete blockage of the water supply. Water lines are equipped with the necessary fittings to pump water to the entire incubation and early rearing facility. The facility also has a generator in case of a power outage. Effluent is piped into a circular pond and screened, to prevent steelhead fry from escaping into the wild to interact with wild Coho. Steelhead smolts are tested by ODFW pathologist to insure diseased fish are not released into Letz Creek where wild Coho salmon live.

Willamette and Roaring River Hatcheries:
The hatcheries are staffed full time, 24 hours a day. They are equipped with low water alarm systems to help prevent loss. Disinfecting procedures between stocks of fish are followed to prevent disease transmission. Regular exams are conducted by a fish pathologist to stay current on status of fish health. All equipment utilized to handle and move fish is regularly inspected to prevent damage to fish from handling. There are no back-up water sources available, should primary water sources be reduced due to some catastrophe.

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 38W (wild) Siuslaw stock winter steelhead originated from wild winter steelhead captured in the Siuslaw. Since 1995, the broodstock has been comprised of approximately 70% returning hatchery adults, and 30% wild winter steelhead.

6.2) Supporting information.

6.2.1) History.

Hatchery winter steelhead smolts have been released in the Siuslaw since the early 1960s. Until 1991, all of the hatchery smolts released were an Alsea stock (43). Beginning in 1991, some of the smolts released originated from wild Siuslaw winter steelhead, 038W. The majority of the smolts released in the Siuslaw in 1996, and all of the smolts since then, have been from the 038W stock. This stock includes the annual incorporation of approximately 30% wild winter steelhead and 70% returning hatchery adults.

6.2.2) Annual size.

The intent of this program is to use a combination of wild and hatchery Siuslaw winter steelhead adults for broodstock. In most years, the broodstock will be comprised of 70% hatchery fish and 30% wild fish. Periodically, when wild steelhead numbers are observed to be high, the broodstock will be comprised of 100% wild winter steelhead. This is an attempt to minimize potential genetic risks from using returning hatchery fish in the broodstock every year. In years when 70% of hatchery fish are used, we will incorporate at least 30% wild fish into the broodstock. Sixty plus pair of wild fish will be used in those periodic years when only wild fish are used.

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

Table 6-1 shows the numbers of wild and hatchery winter steelhead that have actually been used as broodstock in the Siuslaw winter steelhead program since 1996. The goal for future years is described in 6.2.2.

Table 6-1. **Numbers of wild and hatchery winter steelhead collected for the Siuslaw winter steelhead program for 1996-2005.**

Brood Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Wild	24	64	55	17	60	47	61	70	87	70
Hatchery	93	157	155	55	111	197	232	216	138	179

6.2.4) Genetic or ecological differences.

It is unknown whether there are genotypic differences between the wild Siuslaw winter steelhead and the winter steelhead reared in a hatchery, when all segments of the wild population are incorporated each year into the hatchery gene pool. However, there are likely to be behavioral differences due to the vastly different environments these fish are raised in. The hatchery smolts are one year old as compared to the wild smolts, which are usually two years old or older. Wild fish select spawning locations that are closely tied to smolt imprinting and previous years' survival of juveniles and smolts in natural and familiar habitats. Hatchery fish are generally distributed based only on imprinting on a smolt release location. As a result, the normal distribution of adult wild fish spawning in natural habitats will be quite different compared to hatchery fish returning to the broodstock collection and smolt release sites. However, large groups of spawning fish are known to attract other adult fish. Wild fish that may have imprinted in an area other than the hatchery release sites could be inadvertently drawn to trap sites by large numbers of spawning or holding hatchery fish. Delaying the wild fish from an opportunity to spawn in their natal streams when optimum water flow conditions are present for short periods of time, could reduce wild fish distribution throughout much of the watershed. Also, ODFW hatchery records repeatedly show that peak egg fertility is achieved in steelhead during a very narrow window of time. Delays in the timing of wild fish returning to their spawning areas may quickly reduce wild juvenile fish populations in both number and distribution.

6.2.5) Reasons for choosing.

Wild Siuslaw winter steelhead are being used in this isolated harvest program on the Siuslaw River, as they are thought to be better adapted for survival in this watershed. More importantly, decades of releases of Alsea River stock winter steelhead produced an excessive stray rate to other coastal streams in the region. By using Siuslaw stock steelhead, we hope to better control straying of adults to other basins, reduce inbreeding and genetic drift of the hatchery stock, concentrate fish for an improved fishery, and reduce overall costs associated with this program by enlisting help from volunteers.

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.

The only broodstock selection practice that may have an effect on wild Coho, is the actual collection of winter steelhead broodstock. The practices and measures to minimize impacts to wild Coho are described in Section 7.
All broodstock selection practices followed for the Siuslaw hatchery winter steelhead program were chosen to minimize the likelihood for adverse genetic and ecological effects to wild steelhead, while maintaining a healthy hatchery stock. The number and timing of broodstock collected and spawned is intended to maximize the genetic diversity of the hatchery stock. Efforts will be made to ensure the broodstock maintains as many

of the characteristics of the wild population as possible. Efforts will also be made to limit the number of hatchery fish spawning in the wild, to minimize potential adverse genetic and ecological interactions with wild fish populations. The primary way we will accomplish this is expressing milt and eggs from hatchery steelhead not used in the broodstock.

SECTION 7

BROODSTOCK COLLECTION

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

Wild and hatchery adult winter steelhead will be collected for this program.

7.2) Collection or sampling design.

Collections will continue at Whittaker, Green, and Letz Creek traps. Broodstock collections will occur from January through March. Fish will be selected at weekly intervals based on proportion of historic wild fish return. An effort to incorporate a minimum of 30% of the broodstock from wild adult winter steelhead will be made.

7.3) Identity.

Wild winter steelhead will be identified by the presence of their adipose fin. Returning Siuslaw hatchery adults will be identified by the absence of their adipose fin, and condition of other fins.

7.4) Proposed number to be collected:

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

In most years, the goal for broodstock collection will be 140 hatchery winter steelhead adults and 60 wild winter steelhead. In those periodic years when only wild winter steelhead will be collected for broodstock, the goal will be 120 wild adults.

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

Broodstock collection for the current program, releasing all Siuslaw stock 038W smolts, began in 1996. Table 7-1 below shows the numbers of males and females spawned since 1996, the number of eggs taken from those spawnings, and the numbers of smolts released.

***Table 7-1.*Siuslaw winter steelhead hatchery broodstock collection levels, smolt releases and egg takes since 1996 from all sites.**

Year	Adults		Smolts Released	Eggs Collected	Eyed Eggs
	Females	Males			
1996	60	40	69,600	218,950	150,750
1997	117	81	82,300	355,902	231,810
1998	98	105	89,200	254,000	172,530
1999	44	28	89,000	147,615	134,880
2000	111	82	36,000	340,000	236,230
2001	147	121	70,000	310,000	210,000
2002	52	84	86,800	139,050	117,700
2003	101	97	98,000	132,360	116,860
2004	114	132	78,000	177,050	164,760
2005	123	121	76,000	231,060	133,380

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

Returning hatchery winter steelhead not needed for broodstock are stripped of their eggs or milt if close to spawning, and released downstream of the trap where they were collected. Hatchery fish that are not close to spawning are released below the traps to enhance the fishery.

7.6) Fish transportation and holding methods.

Fish collected for broodstock are held in the traps and are not transported. After eggs are live spawned at the traps, the eggs are transported in an ice chest to the Alsea Hatchery or Letz Creek Hatcheries.

7.7) Describe fish health maintenance and sanitation procedures applied.

Equipment used for handling and spawning the winter steelhead are disinfected between uses, with a five percent argentine solution. No chemicals or drugs are used on the adults.

7.8) Disposition of carcasses.

All winter steelhead spawned for this program are live spawned and released. Carcasses of trap mortalities are placed in headwater sections of the streams where they were trapped for stream nutrient enhancement.

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

All adult Coho Salmon of natural origin that are found in traps at the time of sorting will be immediately removed from the holding area, and released upstream of the trap. Most of the Coho Salmon run moves past the traps, unimpeded, before January of each year.

SECTION 8

MATING

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

8.1) Selection method.

Collection of winter steelhead is random throughout the whole run. Individual fish are collected at a 1:1 male to female ratio throughout the run. Fish are spawned randomly as they ripen.

8.2) Males.

There will be no backup broodstock. Jacks will be included in the broodstock, and will be used as any adult male in the production egg takes.

8.3) Fertilization.

Adults are live-spawned in this program. Winter steelhead are spawned using a 1:1 male to female ratio in a 3x3 matrix. The individual family groups are kept separate. Ovarian fluid samples are taken from all parents to facilitate culling, if either or both parents have a high titer for virus.

8.4) Cryopreserved gametes.

Cryopreservation of winter steelhead gametes is not used in the 038W stock Siuslaw program.

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

This program does not utilize listed stocks. Broodstock are selected at random from throughout the winter steelhead run. Spawning is done randomly based on availability of ripe fish. Matings are done on a 1:1 sex ratio (i.e. one male and one female). Each fish is only used once in spawning and is used in a 3x3 spawning matrix to maintain genetic diversity within hatchery population.

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.

Alsea Hatchery:
Siuslaw steelhead eggs have been incubated to the eyed stage at this facility since 2014. Prior to moving the program to Alsea Hatchery the eggs were incubated at the Munsel Cr. STEP Facility. Numbers of eggs taken since 1996 are shown in Section 7.4.2. The average survival from the green egg take to the eyed stage has been 50% at the Munsel STEP Facility and 90% at Alsea Hatchery. Green egg takes have ranged from 355,900 to 132,360. Hatcheries run by volunteer groups have a 50% target for green egg survival to the eyed stage.

Letz Creek STEP Hatchery:
Green eggs from Siuslaw stock have been incubated from 1997 to 2015, at Letz Creek. In some years, eyed eggs or unfed fry have been transferred to Letz Creek from the Munsel Creek Hatchery. In several years, the Letz Creek volunteers have additionally taken their own green eggs and raised them to smolts. There are only estimates on survival rates of eggs incubated at Letz Creek. Eggs are inventoried after they are received, and fry are inventoried at time of ponding. However, accurate records are not available. Smolt release numbers are also estimated by volunteers. The survival of fry to smolt is estimated at 50% for the years 1997 to 2015. This estimate is above the expected survival rate from a volunteer run hatchery.

Willamette Hatchery:
This stock is received as eyed eggs, only from Munsel Cr. and since 2014 from Alsea Hatchery. From eyed eggs to ponding survival rate at Willamette Hatchery has averaged 75%.

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

Surplus eggs will be taken during years when 70% of the broodstock is returning hatchery fish, to minimize over-representation of any particular individual family groups in the smolts produced. Surplus eggs will be disposed.

9.1.3) Loading densities applied during incubation.

Alsea Hatchery:
1. Expected egg size = 130 eggs per ounce (on average)
2. Standard Incubator Flow = 5 gpm / vertical incubator stack.

3. Density per tray = maximum of 8,000 eggs/tray from green to eyed stage.

Letz Creek STEP Hatchery:
Incubator loading densities are kept as low as possible, ranging from 2,000 to 5,000 eggs per tray. Flow rates vary according to egg densities in trays, ranging from 3.5 to 5 gallons per minute.

Willamette Hatchery:
Based on hatchery historical data for this stock only, the program follows parameters for incubation as follows: a standard flow of 4 to 5 gallons per minute would be utilized for each vertical incubator stack; a maximum of 4,000 eggs per tray from eggs received to ponding.

9.1.4) Incubation conditions.

Alsea Hatchery:
- Incubators are visually inspected twice daily for proper flow. Water supply to the incubator head box is monitored continuously by a low-water alarm.
- Silt loads in incubator trays are monitored. Roding techniques are used to remove silt loads when necessary.
- Water temperature is tracked continuously. Temperature units are reported and projected on a weekly basis. This information, along with visual inspections, is used to track egg development and to determine proper timing of eggshell removal during hatching, egg shocking, and fry ponding.
- Eggs are incubated on ambient river water; the hatchery does not thermally control incubator water supply.
- Dissolved oxygen (DO) is not monitored unless conditions indicate a need to do so. For example, influent water supplies are less than saturation, high-density loading, and/or warm temperatures.

Letz Creek STEP Hatchery:
Temperatures are monitored daily and range from 40°F to 54° F, and silt is removed as necessary.

Willamette Hatchery:
Incubators are visually inspected twice daily for proper flow. Overall water supply to incubator head box is continuously monitored by a low water alarm. Silt loads are monitored and removed by a rodding technique, on an as needed basis. Temperature is tracked continuously. Temperature units are updated and projected on a weekly basis. Temp units are utilized to determine approximate development stage, with the final determination being visual. Development is monitored to allow for proper timing of eggshell removal during hatching and ponding. Dissolved oxygen levels are not monitored unless conditions would indicate a need.

9.1.5) Ponding.

Letz Creek STEP Hatchery:
Fry will be forced ponded at 100% button-up stage, as determined by visual inspection. Developing a method to allow volitional ponding will be explored and implemented if feasible.

Willamette Hatchery:
Ponding will occur, regardless of accumulated temperature units, when several fry samples indicate that 95% of fry show complete button-up.
Average weight sample at ponding ranges from 1,850 to 2,175 fish per pound (f/lb), with an average of 2,050 f/lb. Average length at time of ponding should be 2.8 cm. Approximate ponding dates will depend on collection and spawning strategies actually used in the program. Most years, fry ponding occurs from April to June. Fry are physically carried from tray to tank by baskets, at time of ponding.

9.1.6) Fish health maintenance and monitoring.

Alsea Hatchery:
- A qualified ODFW fish health specialist will conduct all fish health monitoring. Appropriate actions including drug or chemical treatments will be recommended as necessary. If bacterial pathogens require treatment with antibiotics, a drug sensitivity profile will be generated (if feasible).
- Fish health maintenance and monitoring for the Siuslaw winter steelhead program are carried-out according to existing standardized procedures. These protocols include:

  (1) Eggs are disinfected during water hardening phase; iodophore treatment at 1:150 ppm for 15 to 30 minutes.
  (2) To control fungus, eggs are treated with a flow-through formalin treatment (at 1:600 ppm) every other day until eye-up and shocking.
  (3) Incubators are monitored daily for environmental conditions (water temperature, water flow, and silting).
  (4) Egg mortality is removed at eye-up (during shocking) and ponding, unless significant losses dictate otherwise. Folded Vexar is used (in each incubator tray) to isolate mortalities to particular locations on the tray. This method also allows mortalities to be easily removed during ponding.
- Mortalities are removed 24 hours after shocking, initially via an automated egg picker, followed by thorough handpicking. Mortalities are also removed (by hand) at the time of ponding.

Incubators are continuously monitored by a float alarm system and by a visual inspection, which occurs twice daily and again during evening check rounds.Eggs are treated with iodophor up to three times a week to control fungus. The water for the incubators are exposed to ultraviolet light to reduce fungus and bacteria loads on green eggs. All egg mortalities are removed after eggs have eyed up. All effluent from egg treatments will be diluted to meet NPDES discharge standards.

Letz Creek STEP Hatchery:
There are no fungus control methods beyond cleanliness and picking mortality on a regular basis. Vexar matting is added to each tray when eggs are eyed and during hatching, to help isolate dead fish and make picking eggs easier.

Willamette Hatchery:
All fish health monitoring will be conducted by a qualified fish health specialist. 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.
Fish health maintenance and monitoring will be carried out under standard procedures. These will include: eggs disinfected upon receiving with iodophor solution; incubators monitored daily for environmental conditions; mortality removed at eye-up (shocking) to ponding stage, unless significant loss would dictate otherwise. Folded vexar is utilized in each incubator tray. With this method, mortality is isolated in small locations of the tray and is easily removed at time of ponding. Incubators are continually monitored by a float alarm system, and visually checked twice daily and again during evening check rounds.

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.

All Facilities:
The program does not include listed stock. A risk aversion measure applied to the program will follow established operation procedures utilized during this rearing phase. The incubation system will be continuously alarmed to indicate low flows (except at Letz Creek). Daily inspection of incubator environmental conditions such as flow, mortality, silting, temperature, and also egg development will be monitored. The eggs will be incubated in substrate (vexar) and darkness at low densities. The incubator screening will be checked regularly to ensure that screens are in good order to prevent escapement.

9.2) Rearing:

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

Letz Creek STEP Hatchery:
No survival data is available at Letz Creek. Fry from multiple sources are inventoried at ponding. Fingerlings are counted at the time of marking. Efforts will be made to estimate smolts as they volitionally leave the rearing pond. Recent improvements in discouraging predators should increase survival of smolt significantly. We estimate average survival to exceed 50% from fry to smolt.

Willamette Hatchery & Roaring River Hatchery:
The estimated survival rates for the rearing stages are as follows:
Average survival from eggs received to fry: 75% (WI)

Average survival from fry to fingerling:	80%	(WI)
Average survival from fingerling to smolt:	95%	(RR)
Overall survival from egg take to release:	65%	

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

Letz Creek STEP Hatchery:
There are no set loading goals for fry in the circular tanks. The different sizes of fish and the number of circulars available, will dictate the loading densities. Efforts are made within these constraints to keep densities low. Flows are kept as high as the fish can take, or as much as the tributary can provide.
The density of fish in the rearing pond is low, due to the size of the pond relative to the number of fish reared. All of the tributary flow goes through the pond. A commercial aerator is available for use when dissolved oxygen drops to low levels.

Willamette Hatchery:
The Siuslaw Winter Steelhead program will operate under current on-site guidelines for managing density levels at Willamette Hatchery. These guidelines were developed following hatchery guidelines recommended by IHOT, and are stated in the Artificial Production Review. Fry starter tank-rearing densities are not to exceed 25,000 at ponding or a flow index factor of 1.5 at any phase of tank rearing. The goal for raceway pond densities of winter steelhead stocks is to maintain a flow index factor of less than 1.5.

Roaring River Hatchery:
The Siuslaw Winter Steelhead program will operate under current on-site guidelines for managing density levels at Roaring River Hatchery. These guidelines were developed following hatchery guidelines recommended by IHOT, and are stated in the Artificial Production Review. The goal for raceway pond densities of winter steelhead stocks is to maintain a flow index factor of less than 1.5.

9.2.3) Fish rearing conditions

Letz Creek STEP Hatchery:
Circular tanks are monitored and cleaned daily. Fish are observed for signs of disease and feeding activity.

Willamette Hatchery:
The following parameters and procedures have been established to maintain the pond environment at Willamette Hatchery. Hatchery effluent is monitored quarterly for total suspended solids and settable solids. All reporting is completed under 300-J NPEDS permit. Ponds are cleaned weekly. Willamette Hatchery has no temperature control on Salmon Creek. Winter temperatures range from 32°F to 49°F. Summer temperatures range from 50°F to 68°F. There is no monitoring program for carbon dioxide, nitrogen saturation, etc. There has been no history of fish loss at Willamette Hatchery in the past, attributed to these factors.

Roaring River Hatchery:
Hatchery effluent is monitored quarterly for total suspended solids and settable solids. Reporting is completed under 300-J NPEDS permit.
Ponds are cleaned weekly. Roaring River Hatchery has no temperature control on Roaring River. Temperatures during the year range from 38°F to 55°F.

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.

Letz Creek STEP Hatchery:
No data is available. A few fish are collected by hook and line periodically, to determine length and weight of the larger fish. The STEP group has sought to minimize the handling of the fish as much as possible.

Willamette Hatchery & Roaring River Hatchery:
The following is an average of expected growth of monthly sizes for the Siuslaw Winter Steelhead program from ponding to release. These average growth rates were met from the 1999 to 2005 smolt release years. In 1997 and 1998 cold water temperatures at both hatcheries, and experiments in rearing wild Siuslaw stock steelhead, resulted in smolts released well below target level.

Ponding	2050/lb	1.16” avg.
Month 1	637/lb	1.62” avg.
Month 2	185/lb	2.44” avg.
Month 3	78/lb	3.26” avg.
Month 4	38/lb	4.15” avg.
Month 5	20/lb	5.16” avg.
Month 6	14/lb	5.80” avg.
Month 7	12/lb	6.06” avg.
Month 8	11/lb	6.28” avg.
Month 9	9/lb	6.63” avg.
Month 10	8/lb	6.98” avg.
Month 11	7/lb	7.35” avg.
Month 12	6/lb	7.71” avg.

Cumulative Conversion 1.3 % of Pond Population Length: <18cm = 8.9%; 18-22cm = 86%; and >22cm = 5.1%.

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

Letz Creek STEP Hatchery:
No data is available.

Willamette Hatchery and Roaring River Hatchery:
Energy reserve data is not available. Growth rates for the Siuslaw winter steelhead program are shown in section 9.2.4.

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*).

Letz Creek STEP Hatchery:
Fish food from BioOregon is used of the following sizes:
starter #1(for fish 2000-3000 per pound)
starter #2 (for fish 850-1999 per pound)
starter #3 (for fish 501-849 per pound)
1.0 mm (400-500 per pound)
1.3 mm (for fish 250-399 per pound)
1.5 mm (for fish 100-249 per pound)
2.0 mm, 2.5 mm (for fish 50-99 per pound)
3.0 mm (for fish 15-49 per pound)
4.0 mm (for fish 10-14 per pound).

This food is not required to be frozen, but is kept frozen when the fish are in the rearing pond. The food comes with a recommendation of which food to feed fish of a given size. This is used as a rough guide, however, because there is often a range of fish sizes in a circular. Usually, at least two different sizes of feed are used at the same time to accommodate different sized fish.

The commercial fish food is augmented with natural food (bugs, grubs, worms, maggots, etc.) brought out to the fish by volunteers. It is hoped that exposure to "natural" food throughout their time in the hatchery, will help the steelhead transition to natural food after their release as smolts. Because weight samples are not taken of all feeds, feed conversions cannot be determined.

Willamette Hatchery & Roaring River Hatchery:
Fry begin on dry diet fed at varying rates, depending on need for controlling or increasing growth rates. The minimum rate of feeding for fish in the size range of 2,000 fish/lb to 300 fish/lb is 75% agr (average daily growth rate). At this stage, expected conversions average </= 1.0. Auto feeding at a rate of 8 to 12 times per day is used. Because of the short period of time that we have to feed the fish, we demand feed them from a 0.5-3.0% of their body weight, depending on the life stage of fish and the season. A feed scheduling computer program is available which calculates the factors affecting growth development such as water temperature, fish length/weight relationship, food conversion, and expected average growth rate. We have found that this chart is ineffective for Siuslaw steelhead to achieve the desired weight at time of release. We augment the feeding schedule with several additional feedings each day. The food conversion average for the Siuslaw winter steelhead program is 1.3.

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

Letz Creek STEP Hatchery:
Fish are observed for signs of disease while feeding. Any accessible mortalities are removed. ODFW fish pathologists are consulted if high mortality or unusual fish behavior is observed. If an outbreak is detected, fish could be treated as recommended and prescribed by a fish pathologist.

Willamette Hatchery & Roaring River Hatchery:
Sanitation consists of incubation, tank, and pond disinfecting prior to, and after rearing. Disinfecting of all equipment utilized to carry out daily rearing operations will be conducted between each use and pond. Disinfecting procedures for on-site operations were developed from the IHOT recommendation for hatchery disinfecting.
Fish Health monitoring is accomplished by daily observation of fish behavior, pond environment monitoring, and daily recording of fish mortality. In addition to daily on-site monitoring, the following steps are carried out routinely by a qualified ODFW fish pathologist:

- Hatchery personnel will 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.
- Investigation of abnormal levels of fish loss will be noted and reported as 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 one month prior to 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.

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

Letz Creek STEP Hatchery:
Fish are observed for signs of smolting prior to release.

Roaring River Hatchery:
The only information recorded at the scheduled date of release for the 038W stock Siuslaw winter steelhead program are condition factors and length frequencies. These are collected within seven days prior to release. No ATPase studies are conducted at any facility to determine smoltification.

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

Letz Creek STEP Hatchery:
Fish are reared in a dirt pond with natural food present.

Willamette Hatchery:
There are no directed natural rearing methods utilized. There is significant insect hatching that occurs during summer evenings on raceway ponds. During these periods there is a great amount of feeding activity observed.

Roaring River Hatchery:
There are no direct natural rearing methods utilized.

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.

The 38W stock Siuslaw winter steelhead is not a listed species being utilized in the program.

Letz Creek STEP Hatchery:
Steelhead released at Letz Creek are volitionally released as the rearing pond is drained.

Willamette Hatchery & Roaring River Hatchery:
An effort is made to have fish ready for migration at release, by setting the size range of 18 to 22 cm and condition factor of less than 1.0.

SECTION 10

RELEASE

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

10.1) Proposed fish release levels.

Table 10-1. **Proposed fish release levels.**

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Eggs	n/a			
Unfed Fry				
Fry				
Fingerling				
Yearling	15,000 70,000 15,000	6.0/lb 6.0/lb 6.0/lb	April 15th April 15th April 15th	Green Cr. Whittaker Cr. Letz Cr.

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

Stream, river, or watercourse: Green Creek
Release point: 1800520020 water body code
Major watershed: Lake Creek
Basin or Region: Siuslaw

Stream, river, or watercourse: Whittaker Creek
Release point: 1800500680 Water body code
Major watershed: Siuslaw River
Basin or Region: Siuslaw

Stream, river, or watercourse: Letz Creek
Release point: 1800500990 Water body code
Major watershed: Siuslaw River
Basin or Region: Siuslaw

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

Releases of 100% Siuslaw stock 38W did not begin until 1997. Releases since 1997 are shown in Table 10-2.

Table 10-2. **Siuslaw River Stock 38W Winter Steelhead Releases (1997-2015 release years). These data do not include the Letz Creek release.**

Release Year	Eggs/ Unfed Fry	Avg size	Fry	Avg size	Fingerling	Avg size	Yearling	Avg size	Release Date
1997					4050	27	82,277	7.4	
1998							89,225	6.8	
1999							89,106	6.1	
2000							36,000	6.1	
2001							70,000	6.0	
2002							86,800	6.1	
2003							98,000	6.0	
2004							78,000	5.9	
2005							80,000	5.9	
2006							105,188	8.06	4/18 - 4/19
2007							145,127	9.82	4/18 - 4/19
2008							87,053	6.06	4/16 - 4/17
2009							66,118	5.20	4/13 - 4/14
2010							56,859	6.15	4/26
2011							87,047	6.10	4/18 - 4/19
2012							74,262	7.21	4/27 - 4/30
2013							93,412	5.58	4/13 - 4/29
2014							69,624	6.29	4/28 - 4/29
2015							72,278	6.54	5/4
Average							**82,441**	**6.49**	

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

Letz Creek STEP Hatchery:

Smolts will be released volitionally from the half-acre pond over several weeks beginning in early March. The pond will be gradually pulled down to encourage emigration. Any fish that remain in the pond during the first weeks in May will be forced out. Smolt numbers will be estimated as they emigrate into Letz Creek.

Roaring River Hatchery:

Dates for the direct release from liberation trucks, for both Whittaker Creek and Green Creek generally occur in april. See Table 10-2 above for actual release dates from 2006-2015. Smolts are released into artificial pools created in the creeks to allow the fish to recover from hauling stress.

10.5) Fish transportation procedures, if applicable.

Transportation is accomplished with the use of various size liberation truck units. Units range in size form 1,000 gallon to 2,500 gallon tankers. Some units utilize re-circulatory refrigeration systems, which are used to maintain the temperature of water taken at the hatchery site. Oxygen is added at a rate of 0.4 gpm. Some units utilize insulated tanks equipped with agitators and oxygen is added at a rate of 0.4 gpm. All units haul fish at an average density of 0.75 lb fish per gallon. Total length of time in transit averages two hours for this haul.

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

No formal acclimation occurs with this program. Tributary releases allow smolts to recover from hauling stress for an unspecified time. In some years, high flows in the streams push smolts out immediately.

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

Program calls for marking 100% of hatchery-produced smolts. From 1996 to 2000, Siuslaw 38W stock smolt releases from Willamette Hatchery received a double mark (adipose, right ventral finclip). From 1996 to 1999, Letz Creek STEP facility releases received a double mark (adipose, left ventral finclip). Since 2001, an adipose only mark has been used for all winter steelhead smolts to be released in the Siuslaw Basin at all sites.

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

Letz Creek STEP Hatchery:
Eggs taken will be hatched. Fry and smolt surplus to program needs will be released to a closed water body. Number of smolt releases will be within approved program levels.

Roaring River Hatchery:
Number at release should be within the accepted level of +/- 5% of programmed release number. Should that number be exceeded, the release would still be made provided all fish were at smolt stage. An effort is made to maintain the program within acceptable levels by reducing surplus at the egg/fry and fingerling stages.

10.9) Fish health certification procedures applied pre-release.

Letz Creek STEP Hatchery:
There are a very select set of procedures in place at this facility. Standard fish culture practices to keep fish healthy when trapping, incubating, rearing, and releasing will be utilized. Many years of experience have been passed down from fellow hatchery managers, biologists, and hatchery operators in the successful operation of the Letz Creek Hatchery. All fish health monitoring is conducted as suggested by ODFW qualified fish pathologist. A 60-fish sample, within one month prior to release of smolts, is sent to the ODFW fish pathologist in Corvallis. All fish are treated humanely at all times and only certified fish are released.

Roaring River Hatchery:
All fish health monitoring will be conducted by a qualified fish health specialist. A fish health specialist will 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 one month prior to release). Again, only certified fish are released.

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

Letz Creek STEP Hatchery:
Any winter steelhead being reared at Letz Creek will be released on-site if there is a system failure that threatens the fish. Backup systems for water flow and oxygen are in place and will be used prior to the early release of these fish.

Roaring River Hatchery:
In the event of flooding or water system failure, attempts will be made to transport fish to the Siuslaw. This will depend on how close to release time it is, and if trucks are available. The Siuslaw winter steelhead will never be directly released from Roaring River Hatchery.

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.

The program will target release of fish at an appropriate size, to assist migration and lessen contact time with natural populations in the watershed. The smolts are released in early April to avoid interaction with most of the wild coho smolts that out-migrate in May.

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.

Sections 1.9 and 1.10 define the plans for monitoring the performance of this program. The indicators listed, identify methods that will be used to monitor the program.

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

All of the measures identified in sections 1.9 and 1.10 are being performed with existing staff and facilities.

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.

The only monitoring activity that could impact wild Siuslaw Coho is the operation of the adult traps. Measures to minimize the effects of operating the traps are identified in Section 2.2.3.

SECTION 12

RESEARCH

No true research is being conducted on the Siuslaw River. Monitoring activities are occurring with the hatchery winter steelhead program. These activities are described in section 1.9 and 1.10.

SECTION 13

ATTACHMENTS AND CITATIONS

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Rodgers, J. D., S. L. Johnson, T. E. Nickelson, and M. F. Solazzi. 1993. The seasonal use of natural and constructed habitat by juvenile coho salmon (*Oncorhynchus kisutch*) and preliminary results from two habitat improvement projects on smolt production in Oregon coastal streams. *In* Proceedings of the coho workshop, May 26-28, 1992 at Nanaimo, B.C.

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

Siuslaw River Basin Fish Management Operating Policies and Objectives

635-500-6130

Habitat Management - Policies and objectives for habitat management in the Siuslaw River Basin.

1. Policies:
   a. The Department shall actively pursue and promote habitat protection and improvement necessary to achieve the objectives for management of the basin's aquatic resources;
   b. The Department shall coordinate with and advise landowners and management agencies of the Siuslaw River Basin;
   c. Habitat protection shall be emphasized over habitat restoration and enhancement;
   d. Potential losses of fish production from habitat alteration shall be prevented or reduced to the extent possible.
2. Objectives:
   a. Maintain or increase in-stream flows during summer low flow periods in the Siuslaw River Basin;
   b. Reduce summer water temperatures where artificial warming occurs that is detrimental to fish;
   c. Increase in-stream channel complexity in the Siuslaw River Basin;
   d. Reduce artificially accelerated erosion rates and inputs of sediments into waterways in the Siuslaw River Basin;
   e. Prevent chemical contaminants from degrading fish habitat in the Siuslaw River Basin;
   f. Restore natural fish passage conditions in the Siuslaw River Basin;
   g. Increase habitat area available to fish in the Siuslaw River Basin;
   h. Coordinate with other agencies and landowners to implement habitat protection and restoration activities.

Stat. Auth.: ORS 496.138, ORS 496.146 & ORS 506.119

Stats. Implemented: ORS 506.109 & ORS 506.129

Hist.: DFW 5-1998, f. & cert. ef. 1-12-98