# HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

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| **Hatchery Program:** | **Tenmile Basin Steelhead Program** |
| **Species or Hatchery Stock:** | **Winter Steelhead (Stock 88)** |
| **Agency/Operator:** | **Oregon Department Fish & Wildlife** |
| **Watershed and Region:** | **Tenmile Basin, West Region** |
| **Date Submitted:**<br>**First Update Submitted:**<br>**Second Update Submitted:** | **October 19, 2005**<br>**November 20, 2014**<br>**June 14, 2016** |
| **Date Last Updated:** | **June 9, 2016** |

# SECTION 1. GENERAL PROGRAM DESCRIPTION

**1.1) Name of hatchery or program**.

Tenmile Basin Winter Steelhead Program

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

Tenmile Basin winter steelhead *Oncorhynchus mykiss* (Stock 88). Tenmile Basin winter steelhead are part of the Oregon Coast Steelhead ESU, but this is not a federally ESA-listed species or population, although considered as a candidate species. This population is a sensitive species under Oregon's Sensitive Species Rule.

**1.3) Responsible organization and individuals.**


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

The Eel-Tenmile STEP Association and other volunteers assist with broodstock collection and spawning. Volunteers also assist in other aspects of the production of Tenmile winter steelhead, including feeding and care of acclimating smolts. Volunteer efforts are under the supervision of an ODFW STEP biologist or other ODFW fish district and hatchery personnel.

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

Funding source-State dollars from the sale of fishing license and 50% from state general fund (tax dollars).
*Bandon Hatchery staffing level*: One hatchery Manager-2, one hatchery Technician-2, and one hatchery Technician-1.
*Cole Rivers Hatchery Staffing level*: One hatchery Manager, nine Tech-1, one Tech-2, one Tech-3, two Trades Maintenance, and one Office Coordinator.

**1.4) Location(s) of hatchery and associated facilities.**

Bandon Hatchery is located in the Coquille watershed one mile east of the city of Bandon, location is latitude 43º 06', 58"N and longitude 124º 23' 57" W. The hatchery is located at the confluence of Ferry and Geiger Creeks, which run into the Coquille estuary at RM 1.0. Watershed code is 1700301000. The regional mark processing code for Bandon Hatchery is 5F22237 H37 21

Tenmile and Coos winter steelhead stocks were reared at Alsea Hatchery through the 1999 brood year. Due to straying concerns in the Alsea Basin, subsequent rearing has been at Cole Rivers Hatchery.

Cole M. Rivers Hatchery is located in the Rogue watershed approximately 30 miles NE of Medford at this location: Latitude 42º-41'-18" N. and Longitude 122º-37'-45" W. This hatchery is located at the base of Lost Creek Dam at river mile 157. The regional mark processing code for Cole Rivers Hatchery is 5F22208 H8 21

Also, see Appendix C for map of facility sites.

**1.6) Type of program.**

Isolated Harvest Program

**1.7) Purpose (Goal) of program.**

Smolts are raised and released into the Tenmile Basin to provide adult returns for harvest. The establishment of a localized broodstock is complete. Coos stock (37) steelhead releases in Tenmile Basin have been discontinued. In founding the localized broodstock, the program used 100% wild broodstock for one typical life cycle length (four years for steelhead). The objective of this program is to produce adults that return to acclimation sites and are isolated as much as possible from natural spawning and rearing areas. Beginning in 2003-'04 hatchery adults were used in the broodstock, with a minimum target percentage of 30% wild steelhead to be incorporated each year.

**1.8) Justification for the program.**

The program is carried out to provide adult steelhead for harvest in the Tenmile Basin.

The Saunders and Tenmile Creek acclimation sites were selected as suitable locations to attract adult steelhead back to areas where the fish are accessible to anglers. Another group of fish is acclimated at Eel Lake, to attract fish back to Eel Lake Trap, where they can be collected for broodstock. The lower Eel Creek, downstream of the trap, was opened to winter steelhead angling several years ago. Reviews of artificial production programs recommend discontinuing stock transfers associated with hatchery programs. This program discontinued using Alsea River and Coos River Stock, and converted production to native Tenmile Basin Stock.

This program will have minimal effect on ESA listed Coho Salmon. A few Coho Salmon are captured and handled at Eel Lake Trap during steelhead broodstock collection, but these Coho Salmon are released immediately to minimize stress. Incidental impacts to Coho Salmon from steelhead anglers is expected to be low since steelhead return in late winter (Jan-May) after most Coho have already returned and spawned. There is no current Coho Salmon hatchery program in the Tenmile Basin. Tenmile Creek is closed to all angling from April to the fourth Saturday in May, to protect outmigrating juvenile salmonids.

**1.9) List of program "Performance Standards" and 1.10) Performance Indicators, addressing benefits (1.10.1) and addressing risks (1.10.2)**

| **BENEFITS**<br><br>**Performance Standards** | **BENEFITS**<br><br>**Performance Indicators** | **BENEFITS**<br><br>**Monitoring & Evaluation** |
|---|---|---|
| Provide an opportunity for anglers to harvest hatchery steelhead in-basin. | • Program fish contribute to the freshwater harvest.<br>• Recycle bright hatchery winter steelhead from Eel Lake trap. The fish are taken from the trap downstream and reentered into the Spinreel/Saunders Creek area fishery.<br>• Program fish are externally marked to help evaluate survival, distribution, straying, and contribution to the fishery. | • All releases are properly documented.<br>• Analyze returned harvest tags to determine harvest level of hatchery steelhead.<br>• Periodically conduct creel or other surveys to estimate angler effort and harvest rates of program fish. |
| Program complies with the ODFW's CMP 2014. | • Increase StW release numbers to 25,000 smolts in Tenmile Lake Basin. | • Count number of smolts released each year.<br>• Monitor anglers' effort/success. |

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| Carcasses or other nutrient products will be placed in wild steelhead spawning streams for nutrient enrichment. This is identified as an Oregon Plan salmon restoration measure. | • Specified monitoring streams are designated for target nutrient loading, while other streams are not loaded and act as experimental controls. | • Distribution of carcasses and other products for nutrient enrichment is in compliance with DEQ guidelines. |
| Healthy winter steelhead are released. | • Release groups will meet ODFW fish health standards. | • Conduct appropriate health checks throughout incubation, rearing, and prior to release.<br>• Document size and age of program fish prior to release.<br>• Verify compliance with approved fish health standards and criteria. (See Appendix A.) |
| The steelhead program will meet the criteria provided by the Native Fish Conservation Policy. | • A Conservation Plan has been developed for the appropriate Species Management Unit (SMU).<br>• Based on the Conservation Plan and the Fish Hatchery Management Policy, a Hatchery Management Plan will be developed. | • Procedures for assessing stock status and risks will be developed in conjunction with the Conservation and Hatchery Management Plan.<br>• Public input will be sought during the development of the plans. |
| **RISKS**<br><br>**Performance Standards** | **RISKS**<br><br>**Performance Indicators** | **RISKS**<br><br>**Monitoring & Evaluation** |
| All hatchery steelhead smolt release lots will be 100% adipose fin-marked. This will identify hatchery-produced steelhead | • Confirm that hatchery smolts are marked with appropriate fin marks prior to release. Conduct quality control measures during and after fin marking, prior to release. | • Appropriate monitoring techniques will be used to evaluate finmark efficiency.<br>• Hatchery steelhead will be identified/quantified in angler creel and spawning |

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| in fisheries and on the spawning grounds. | | surveys. |
| Capture steelhead adults for broodstock in a manner that does not threaten the persistence/rebuilding of wild Coho Salmon and steelhead in the basin. | • Enumerate Coho Salmon passed above Eel Lake Trap for run status information, while minimizing handling and holding time of Coho Salmon in the trap to the extent possible. | • Record wild broodstock collected and incidental catch of wild Coho Salmon in the basin.<br>• Minimize the handling of wild steelhead in excess of fish collected for the hatchery program. |
| Hatchery operations comply with the Fish Hatchery Management Policy and other state and federal guidelines and permits. | • Hatchery operations conform to applicable fish health, sanitation, and operational guidelines.<br>• Hatchery operations conform to STEP poundage and/or DEQ/NPDES guidelines for water quality.<br>• Facility intakes are appropriately screened or above anadromous salmon distribution. | • Fish health is regularly monitored to avoid the introduction of new pathogens or significant levels of existing pathogens.<br>• Fish health is certified prior to release.<br>• Appropriate reports are filed to document fish mortality and growth.<br>• Sanitation and maintenance activities are conducted regularly.<br>• Appropriate protocols will be followed for monitoring water quality standards. |

## 1.11) Expected size of program.

### 1.11.1) Proposed annual broodstock collection levels.

Under the existing program a target of 20 adult fish (10 pairs) are needed to meet production goals. These were 100% wild fish during the "founding" years of this brood stock. Beginning in 2003/04, fin clipped hatchery fish are also used, with a minimum target percentage of 30% wild fish to be incorporated into the broodstock each year.

**1.11.2) Proposed annual fish release levels (maximum number) by life stage and location. See Appendix B for Hatchery Fish Production Flow Chart.**

**Table 1-1. Proposed annual release levels for Tenmile winter steelhead.**

| Life Stage | Release Location | Annual Release Level |
|---|---|---|
| **Eyed Eggs** | | |
| **Unfed Fry** | | |
| **Fry** | | |
| **Fingerling** | | |
| **Yearling** | Eel Lake<br>Saunders Creek<br>Tenmile Creek | 8,000<br>9,000<br>8,000 |

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

**Table 1-2. Estimates for smolt to adult survivals for releases in the Coos Basin.**

| Year | Survival* |
|---|---|
| 1988 | 0.92% |
| 1989 | 1.07% |
| 1990 | 1.18% |
| 1991 | 1.31% |
| 1992 | 1.49% |
| 1993 | 1.32% |
| 1994 | 1.60% |
| 1995 | 0.24% |
| 1996 | 0.39% |
| 1997 | 0.09% |
| 1998 | 1.20% |
| 1999 | 2.98% |
| 2000 | 1.10% |
| 2001 | 1.08% |
| 2002 | N/A |

* Survival data is from the Coos River winter steelhead program and is used as a surrogate to estimate the Tenmile steelhead as well.

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

The current program of localized Tenmile broodstock began in 1999-'00. Smolts released in 2001 were the first brood from 100% native parents of Tenmile Basin origin.

**1.14) Expected duration of program.**

The broodstock conversion program ran for four collection seasons. The spawning of 100% native steelhead ended within the winter of 2002-'03. After this initial conversion

to the Tenmile Lake Basin steelhead, the minimum target percentage of unmarked steelhead in the program has been reduced to 30%. The broodstock program is planned to be ongoing.

**1.15) Watersheds targeted by program.**

This program is targeted at the Tenmile Lakes watershed, near the town of Lakeside.

**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.**

**Issue #1: Program Efficiency**
Survival of hatchery fish and adult returns may generate questions with regard to program's efficiency. However, steelhead smolts that are acclimated at Tenmile Basin sites survive well and also contribute well to fisheries as adults. The hatchery steelhead smolt program provides a very popular fishery that accommodates a substantial number of angler days.

**Issue #2: Straying**
Straying of hatchery-produced fish is always a concern, but it has been observed that hatchery steelhead have strayed at a minimal level to locations in which wild Coho Salmon populations spawn. This is based on trap data and spawning ground surveys. Based on observations from the fishery for winter steelhead in the basin, the returning adults have strong homing tendency to acclimation sites. Observations of steelhead in acclimation streams and angler success near release sites indicate a high degree of homing. With hatchery steelhead straying estimated to be minimal and differences in run timing that only minimally overlap, the potential impacts to listed Coho Salmon are minimal as well.

**Issue #3: Broodstock Collection**
Capture of wild Coho Salmon during steelhead broodstock collections may occur incidentally but is not considered as a serious issue, since Coho Salmon and steelhead usually move at different times up the stream and lake system of the Tenmile Basin; thus steelhead broodstock collection only mildly overlaps Coho Salmon migration.

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

These alternatives are "draft" only and not necessarily endorsed by the mgmt. entity.

The Oregon Fish and Wildlife Commission adopted the ODFW's Coastal Multi-Species Conservation and Management Plan (CMP) in 2014. The CMP included an increase of the winter steelhead smolts released in the Tenmile Lakes Basin to 25,000. ODFW implemented this alternative beginning with release year 2015, to comply with the CMP and increase the winter steelhead fishing opportunity for anglers within the basin.

## DRAFT ALTERNATIVE 1—Current program size, with improvements.

**DESCRIPTION AND IMPLICATIONS:**
The current hatchery winter steelhead program in the basin could be kept in alignment with the CMP 2014. Additional changes could be made to the current program operated in the basin to improve survival of releases and contribution to fisheries. The Tenmile Basin hatchery winter steelhead program is conducted to geographically separate them from the core spawning areas for listed Coho Salmon and wild winter steelhead.

**PROS AND CONS:**
**Pros—** This would continue the economic and recreational benefits that are currently being realized as an outcome of the program. This program currently produces a successful targeted fishery on hatchery winter steelhead.
**Cons—** There are no major negative impacts of the current program, therefore, the program will continue as status quo in release numbers, combined with minor program changes in release strategies which are not anticipated to increase the level of potential impacts on Coho Salmon.

## DRAFT ALTERNATIVE 2—Program reduction.

**DESCRIPTION AND IMPLICATIONS:**
Reduce the number of winter steelhead juveniles that are produced in the hatchery program to some unidentified lower level.

**PROS AND CONS:**
**Pros—** Costs to produce steelhead smolts would be reduced in proportion to the level of reduction implemented. Fewer broodstock would need to be collected and reduced impacts on Coho Salmon, if any.
**Cons—** This would result in reduced angler-success and reduced economic benefits.

## DRAFT ALTERNATIVE 3—Eliminate hatchery winter steelhead program.

**DESCRIPTION AND IMPLICATIONS:**
Eliminate the hatchery program for winter steelhead in the basin.

**PROS AND CONS:**
**Pros—** This alternative would eliminate any conceivable potential impacts on Coho Salmon or wild steelhead. Costs associated with the hatchery program would be eliminated.
**Cons—** This alternative would completely eliminate the recreational fishery and economic benefits of the program. Under current steelhead regulations, no harvest would prevail if hatchery program is eliminated.

### 1.16.3) POTENTIAL REFORMS AND INVESTMENTS

**These are drafts only, for further discussion, not final decisions.**

**Reform / Investment 1:** Construct additional winter steelhead acclimation ponds to diversify and expand the fishery. These facilities could be constructed at other locations where the land is publicly owned or where long term agreements for the use of the facilities exist. This action would spread the distribution of steelhead and expand the fishery for hatchery winter steelhead throughout more of the basin. A rough cost estimate of such expanded acclimation sites would be approximately $15,000 each, based on previously built projects.

**Reform / Investment 2:** Construct additional traps or adult holding ponds to diversify the collection of winter steelhead in the basin. This would add to the number of broodstock that could be collected and utilized in the program. The advantage of additional steelhead broodstock from other Tenmile Basin winter steelhead streams is to increase the genetic variability of the hatchery program. The rough cost estimate of constructing additional trapping and adult holding facilities is $12,000 each, based on previously built projects.

## 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 winter steelhead program was submitted to NMFS on 10/19/2005 for approval and ESA coverage. This is an updated version of the previously submitted HGMP and consistent with the ODFW's Coastal Multi-Species Conservation and Management Plan 2014.

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

*The following descriptive and status information for the Lakes Complex Coho Salmon was prepared in 2000 and 2001 for the direct-take Coho HGMPs submitted at that time. As this HGMP was being finalized, the Oregon Plan for Salmon and Watersheds Coastal Coho Assessment was finalized and presented to NOAA Fisheries. Also, ODFW has completed Oregon Native Fish Stock Status Report under the Native Fish Conservation Policy. Oregon Fish and Wildlife Commission has adopted the ODFW's Coastal Multi-Species Conservation and Management Plan 2014. This winter steelhead program is consistent with the above plans. These plans/documents include updated Coho Salmon status information for the Lakes Complex, and are available through links on the ODFW website (www.dfw.state.or.us). This winter steelhead program has no intent to directly take any ESA-listed Coho Salmon although incidental and/or indirect take may occur due to this program.*

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

**Lakes Complex**

The Tenmile Lakes Complex consists of Coho Salmon inhabiting the three major coastal lake basins: Siltcoos, Tahkenitch, and Tenmile (Nickelson 2001). There is an estimated 100 miles of spawning habitat available to the Coho Salmon of this complex.

**Coho Salmon Life History**

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

The eggs hatch in about 35 to 50 days, depending upon water temperature (warm temperature speeds hatching). The alevins remain in the gravel 2 or 3 weeks until the yolk is absorbed and emerge as fry to actively feed in the spring. Most juvenile Coho Salmon spend 1 summer and 1 winter in fresh water. The following spring, approximately 1 year after emergence, they undergo physiological changes that allow them to survive in seawater. They then migrate to the ocean as silvery smolts about 10 to 12 centimeters (cm) in length.

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

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

The smolts undergo rapid growth in the ocean, reaching about 40 to 50 cm by fall. Little is known of the ocean migrations of Coho Salmon from Oregon coastal streams; however, based on what is known, it appears migrations are mostly limited to coastal waters. Initial ocean migration appears to be to the north of their natal stream (Fisher and Pearcy 1985; Hartt and Dell 1986). After the first summer in the ocean, a small proportion of the males attain sexual maturity and return to spawn as jacks. Migration patterns during the fall and winter are unknown. Those fish remaining at sea grow little during winter but feed voraciously during the next spring and summer, growing to about 60 to 80 cm in length. During this second summer in the ocean, a substantial percentage of these maturing adults are caught in ocean troll and sport fisheries, usually to the south of their natal stream (Lewis 2000). The survivors return to their home streams or neighboring streams where they spawn and die to complete the life cycle.

**Habitat Use and Freshwater Distribution**

Spawning and rearing of juvenile Coho Salmon generally take place in small, low-gradient (generally less than 3 percent) tributary streams, although rearing may also take place in lakes where available. Coho Salmon require clean gravel for spawning and cool water temperatures (53º to 58°F preferred, 68°F maximum) for rearing (Reiser and Bjornn 1979). Fry emerge from February to early June (Moring and Lantz 1975) and occupy backwater pools and the stream margins (Mundie 1969; Lister and Genoe 1970; Nickelson et al. 1992a). During the summer, Coho prefer pools in small streams, whereas during winter, they prefer off-channel alcoves, beaver ponds, and dam pools with complex cover (Nickelson et al. 1992a, 1992b). Complexity, primarily in the form of large and small wood is an important element of productive Coho Salmon streams (Nickelson et al. 1992b; Rodgers et al. 1993). Little is known about residence time or

habitat use of estuaries during seaward migration. It is usually assumed that Coho Salmon spend only a short time in the estuary before entering the ocean. However, recent research is finding that rearing in the upper ends of tidal reaches can be extensive. The distribution of Coho Salmon within a basin is primarily determined by two factors: marine survival and the distribution of freshwater habitat of different levels of quality. When marine survival has been very poor as in recent years, Coho will be found in only the highest quality habitats. Coast-wide, these habitats comprise about 22 percent of the 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.

- **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.**

Incidental take of ESA-listed Oregon Coast ESU Coho Salmon may occur during steelhead brood collection. A lso, this program may indirectly affect the listed Coho Salmon through competitive interactions for food and space between hatchery steelhead and listed Coho within the basin.

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

**Lakes Complex**

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

The Lakes Complex consists of Coho Salmon inhabiting the three major coastal lake basins: Siltcoos, Tahkenitch, and Tenmile. There are an estimated 100 miles of spawning habitat available to the Coho Salmon of this complex (Nickelson 2001). The critical population level for the Lakes Complex is 400 adult spawners. The habitat of this complex has the potential to support a viable population. The lakes provide excellent winter rearing habitat, which has the effect that all 100 miles of stream function as high quality habitat. As a result, this is one of the most productive complexes on the coast and trends in abundance reflect just that.

The abundance of Coho Salmon spawners of the lakes complex has ranged from about 2,000 to about 13,500 and has averaged about 9,000 over the past 10 years (Figure 2-1 and Table 2-2). Abundance during the past decade has never fallen below the critical threshold of 400 fish.

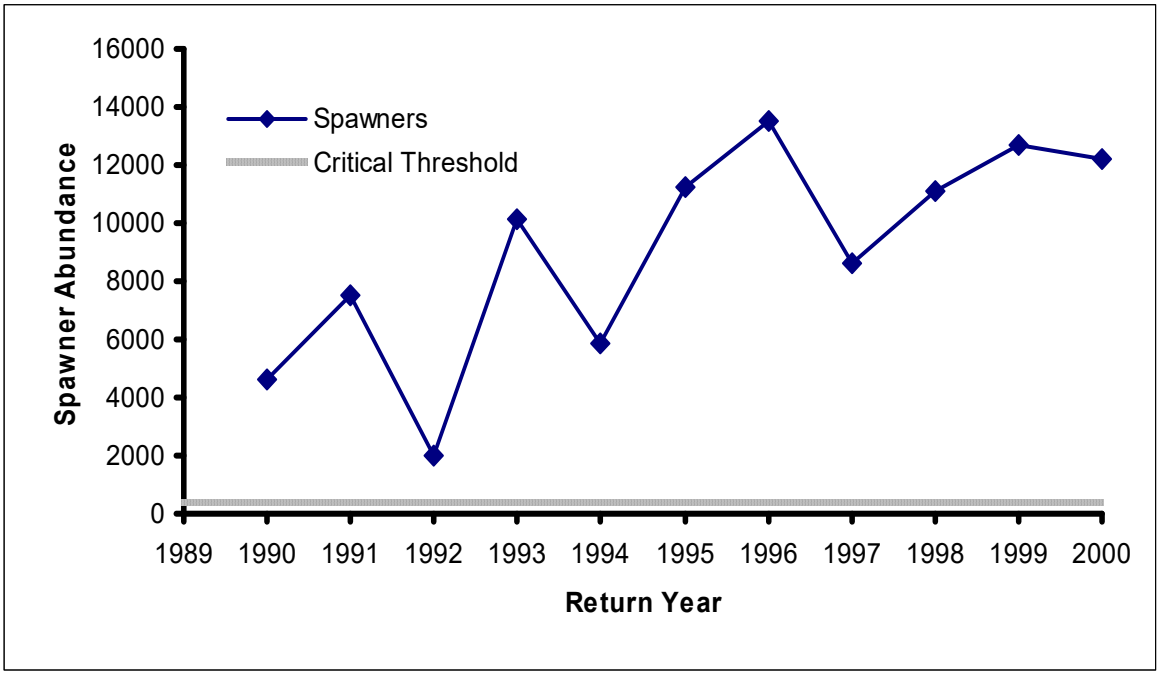



**Figure 2-1. Trend in adult Coho Salmon abundance relative to the critical population level for the Lakes Complex. Population estimation methods do not allow calculation of confidence intervals.**

- **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 spawner have been variable over the last 8 years, with the only one year falling to below one (Table 2-2 and Figure 2-2). Hatchery fish have been rare in the spawning population with only 22 of 2,540 (0.9%) of scales sampled during 1990-99 having hatchery scale patterns.

Smolt production was estimated for the 1997 through 1999 broods. Estimated smolt abundance ranged from 274,000 to 311,000 for the Lakes Complex (Table 2-3).

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

For annual spawning abundance and recruits/spawner see Figures 2-1 & 2-2 respectively; and Tables 2-2 & 2-3.

**Table 2-2. Population parameters for the Lakes Complex Coho Salmon.**

| Return Year | Wild spawners | Pre-harvest wild population | Recruits per spawner |
|---|---|---|---|
| 1990 | 4,629 | 14,884 | |
| 1991 | 7,495 | 13,727 | |
| 1992 | 1,986 | 4,061 | |
| 1993 | 10,145 | 17,582 | 3.8 |
| 1994 | 5,841 | 6,267 | 0.8 |
| 1995 | 11,216 | 12,804 | 6.5 |
| 1996 | 13,493 | 14,714 | 1.5 |
| 1997 | 8,603 | 9,821 | 1.7 |
| 1998 | 11,108 | 12,048 | 1.1 |
| 1999 | 12,710 | 13,755 | 1.0 |
| 2000 | 12,178 | 13,180 | 1.5 |
| Annual mean | 9,037 | 12,077 | 2.2 |

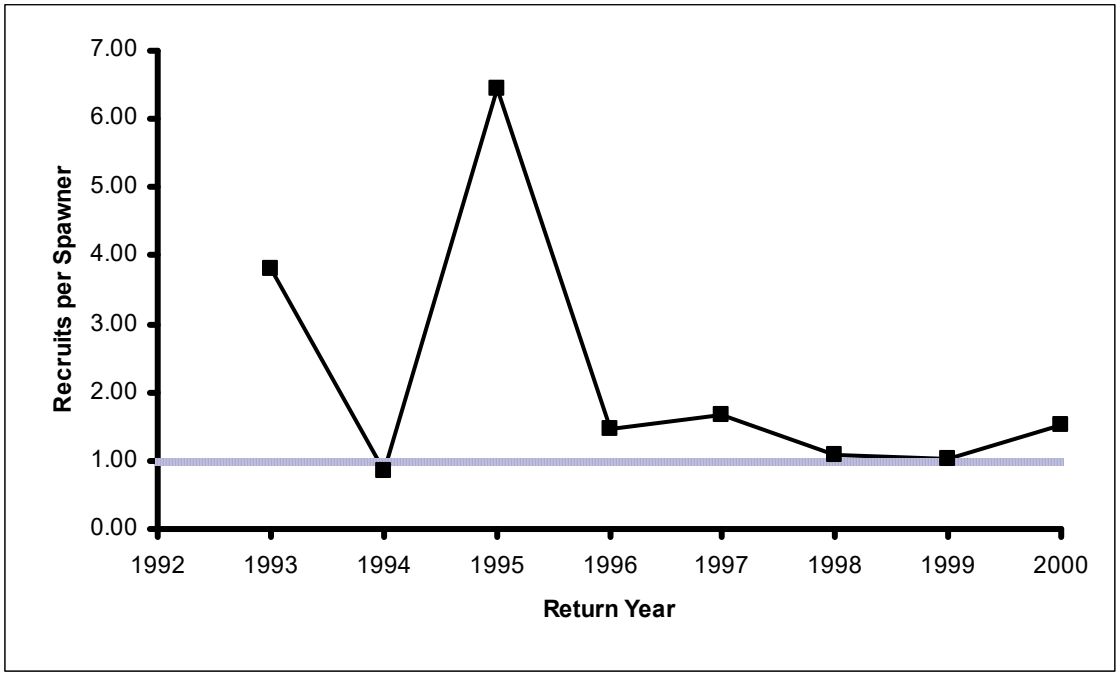



**Figure 2-2. Trend in recruits per spawner for Lakes Complex wild Coho Salmon.**

The updated Coho Salmon escapement estimates for the Lakes Complex and Tenmile Basin are as follows:

| | Complex | Tenmile |
|---|---|---|
| 2001 | 19,669 | 11,039 |
| 2002 | 22,162 | 13,861 |
| 2003 | 16,668 | 6,620 |
| 2004 | 18,687 | 7,166 |
| 2005 | 14,724 | 8,464 |
| 2006 | 24,378 | 15,187 |
| 2007 | 8,885 | 3,957 |
| 2008 | 23,608 | 17,131 |
| 2009 | 17,349 | 9,175 |
| 2010 | 38,744 | 20,385 |
| 2011 | 20,282 | 7,284 |
| 2012 | 18,922 | 9,302 |
| 2013 | 13,659 | 6,449 |
| 2014 | 22,010 | 11,141 |
| 2015 | 4,729 | 2,086 |

The ODFW—OASIS website (ODFW 2016) provides the estimated abundance of wild and hatchery Coho Salmon for the Oregon Coast ESU from 1990 through 2015.

**Table 2-3. Estimates of abundance of juvenile life stages based on spawner abundance.**

| Populn. | 1997 Brood (millions) | | | | 1998 Brood (millions) | | | | 1999 Brood (millions) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Coho** | Eggs | Fry | Parr | Smolts | Eggs | Fry | Parr | Smolts | Eggs | Fry | Parr | Smolts |
| Lakes | 10.753 | 6.990 | 0.809 | 0.274 | 13.885 | 9.025 | 0.881 | 0.298 | 15.888 | 10.327 | 0.921 | 0.311 |

- **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**.

The proportion of hatchery-origin steelhead spawners (pHOS) in the Oregon Coast DPS was 10% in 2015 (ODFW 2015). This was lower than the 2003-2014 average of 14%, and nearly the lowest observed in thirteen years of monitoring the Oregon Coast ESU. The pHOS for steelhead is evaluated at the Monitoring Area scale, and not at the basin or population scale. For the Mid-Coast Monitoring Area, the pHOS in 2015 was 12%, where the 2003-14 average is 17%. ODFW has recognized "hotspots" of hatchery-origin spawners observed in streams near acclimation/release sites. The new Coastal Multi-Species Conservation and Management Plan considers these hotspots and allows for higher pHOS adjacent to release sites. ODFW is developing new criteria for evaluating pHOS that might stratify areas based on adjacency to release sites.

Intraspecific pHOS has potential genetic and environmental impacts to naturally-produced fish. Interspecific pHOS, in this case hatchery steelhead found on natural Coho Salmon spawning grounds have only environmental impacts. For streams with high steelhead pHOS, hatchery steelhead adults may superimpose their redds on existing Coho redds, displacing those eggs from the gravel. Progeny of hatchery steelhead may compete with Coho juveniles for rearing space and food. Finally, hatchery-progeny steelhead parr may be predators on Coho Salmon fry.

The environmental impacts, from redd superimposition to competition, is not monitored or evaluated. These impacts are likely greater near hatchery steelhead acclimation/release sites where pHOS may be higher, depending on dispersal of juvenile steelhead post-emergence and homing fidelity of hatchery steelhead adults.

**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.**

Steelhead broodstock collection occurs from late November through March and occasionally into April, to collect fish from throughout the run period. Adult Coho Salmon captured/enumerated at Eel Lake trap are released into the lake. There is overlap in the run timing of both species, and some winter netting efforts have the potential to capture both species. Anglers attempting to capture unclipped winter steelhead for the steelhead hatchery program have the potential to hook wild Coho Salmon; however these anglers are operating under ODFW permit or authorization letter, and are seasoned anglers with good fish identification skills. They are also trained by ODFW staff in safe fish handling techniques, enabling them to keep steelhead broodstock alive for donation, and to release wild Coho Salmon.

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

Coho Salmon captured in the process of collecting steelhead for broodstock are released. Few, if any, Coho Salmon mortalities would be associated with steelhead broodstock collection activities.

**- 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).**

Take of wild Coho Salmon associated with the Tenmile winter steelhead broodstock collection is anticipated to be minimal as shown in Figure 2-3. Coho and steelhead

exhibited a bimodal distribution of migration times in the 2003-04 run. Note that this trapping ended in the second week of March, prior to the peak of native steelhead return. Wild Coho are captured, handled, and released unharmed.

Due to acclimation of steelhead to migration-ready smolts and release into mainstem areas away from juvenile Coho and steelhead rearing areas, the impact to rearing wild Coho Salmon juveniles is anticipated to be minimal. Residualization or delayed migration have not been observed in Tenmile Creek or Tenmile Lakes, as would be evident if finmarked "rainbow" appeared in angler creel or sampling efforts conducted by ODFW staff (e.g. gillnets set for warmwater population sampling).

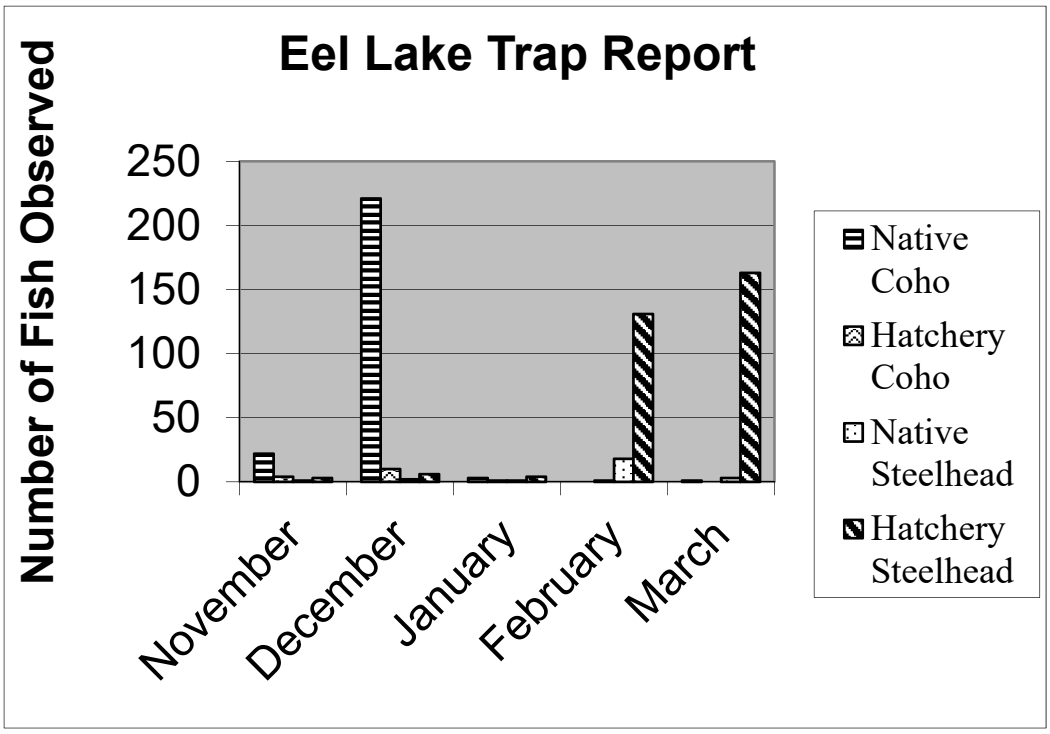



**Figure 2-3. Fish captured at Eel Lake Trap during the 2003-'04 run year. Note that trapping was discontinued on or about March 9, 2004.**

**- 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.**

Options include:

(1) Discontinue trapping/netting of winter steelhead as take limits (of Coho Salmon) are reached.

(2) Open trap facilities to allow pass-through of additional 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. Explain any proposed deviations from the plan or policies.**

**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 Coho Salmon and steelhead in the Coos 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. Also included in the Oregon Plan is a measure to establish and monitor Steelhead Population Health Goals. ODFW is currently in the process of developing these goals for coastal steelhead populations.

The Coos River hatchery steelhead program will operate consistently with **Pacific Fishery Management Council (PFMC) Harvest Program Section 7 consultation** and with Regional harvest management programs. Specifically, the steelhead hatchery smolts will be mass marked with an adipose fin clip prior to release to allow for selective harvest as adults. Allowable harvest impacts to wild Coho Salmon will be determined based on the harvest matrix in Amendment 13 to the Pacific Coast Salmon Plan (PFMC 1997), updates to that plan, and Fishery Management Evaluation Plans (FMEPs) as developed.

**ODFW Native Fish Conservation Policy** is the guiding policy for state management of wild and hatchery fish for protection of genetic resources. Through various avenues including the development of localized broodstocks, acclimation and release strategies for smolts, and other management activities, the Tenmile steelhead program had improved compliance with the former Wild Fish Management Policy. The subsequent Native Fish Conservation Policy will continue to direct protection of native steelhead and Coho Salmon. The new policy is a directive of the Oregon Legislature and the Governor. ODFW fish managers continue to refine the hatchery programs for all species in order to minimize impacts of hatchery fish releases on wild fish production and watershed ecology. In 2014, the Coastal Multi-Species Conservation and Management Plan was adopted by the Oregon Fish and Wildlife Commission, and included coastal steelhead strategies and actions (ODFW 2014).

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

1. Oregon Plan for Salmon and Watersheds
2. ODFW Native Fish Conservation Policy
3. PSFMC Harvest Program Section 7 consultation
4. Coastal Multi-Species Conservation and Management Plan (ODFW 2014)
5. Hatchery Fish Management Review

6. Integrated Hatchery Operations Team (IHOT) guidelines
7. NPDES permit for hatchery effluents and DEQ Memorandum of Agreement regarding fish carcass distribution in Oregon streams
8. US Army Corps of Engineers general authorization for fish habitat improvement in Western Oregon.
9. ESA Section 7 consultation, biological opinion with Roseburg and Coos BLM districts, Interagency population and monitoring program approved NMFS April 10, 1997

**3.3) Relationship to harvest objectives.**

The artificial production component of this program is designed to minimize the biological impacts to listed species. Fish culture practices are designed and carried out to rear smolts to a size and condition that limit impacts to naturally rearing Coho Salmon.

The Tenmile Basin is closed to CohoSalmon angling, except under fisheries allowed by NOAA and the Oregon F&W Commission. Angling for fin-marked steelhead in Tenmile Creek is allowed from late May to April 30. Angling for fin-marked steelhead in Eel Creek is allowed from late Jan. 1 to April 30. Angling for fin-marked steelhead in the Tenmile Lakes is open year-round. As of the winter of 2015-‘16, hatchery steelhead are not passed above the Eel Lake Trap, so there are no hatchery steelhead available there for harvest. Incidental take of wild Coho Salmon during steelhead angling in the creeks occurs at a very low level, and fish caught must be released immediately. Impacts to wild Coho Salmon populations are addressed under the Pacific Coast Salmon Plan by PFMC (Amendment 13). Under this plan, take is limited to less than an established percentage of the total preharvest Oregon Coast ESU wild Coho abundance, in a matrix that considers parental spawner numbers and ocean survival data.

**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 winter steelhead fishery will benefit from this program. Beginning in 1992, steelhead retention has been restricted to finclipped fish only. The sport fishery targeted at returning winter steelhead is expected to have minimal impact to Coho Salmon in the Tenmile Basin. Minimal overlap in run timing between Coho and steelhead reduces such impacts.

For the period from the 1985-86 run year through the 1996-97 run year, the winter steelhead harvest from punchcard estimates ranged from 19 fish to 844, with an average annual harvest of 266. The harvest dropped to below 100 fish annually, once wild steelhead harvest was eliminated. Increases in hatchery steelhead harvest have occurred since “re-founding” the hatchery broodstock.

**3.4) Relationship to habitat protection and recovery strategies.**

Major factors affecting natural production include habitat, ocean conditions, predation,

water flows, water quality, climatic conditions, and rearing habitat. The Oregon Plan for Salmon and Watersheds lays out habitat protection measures to be followed by all state agencies including Forest Practices revisions by Oregon Dept. of Forestry, water quality protection by Dept. of Environment Quality, diversion monitoring by Water Resources Division, and Senate Bill 10-10 implementation by Dept. of Agriculture. These are all designed to protect and improve salmonid habitat, both short and long term, and will ultimately improve natural production of Coho Salmon. The Tenmile Lakes Basin Partnership implements habitat improvement projects throughout the Tenmile Basin that include riparian fencing and planting, culvert replacement to improve or restore fish passage, and road improvements to reduce sedimentation.

**3.5) Ecological interactions.**

*a) Species that could negatively impact program.*

Predacious fish that could impact outmigrating steelhead smolts include one native fish (coastal Cutthroat Trout) and three introduced, non-native fishes (Largemouth Bass, Smallmouth Bass, and Striped Bass). Predation by aquatic mammals like otters, seals, sea lions etc. may negatively impact the program. Also, birds like blue herons, Caspian terns, cormorants, and gulls may impact the program fish.

*b) Species that could be negatively impacted by program.*

The outmigrating steelhead smolts may compete for space and food with listed Coho Salmon smolts for a short duration as they will migrate to the sea after release. The potential for short duration competition with Coho Salmon exists, but is anticipated to be minimal due to rapid outmigration of hatchery steelhead smolts.

*c) Species that could positively impact program.*

Any hatchery or wild fish that dies or is recycled for nutrient enrichment of the basin may positively impact the outmigrating smolts of this program.

*d) Species that could be positively impacted by the program.*

The freshwater and marine species that depend directly or indirectly on salmonids for their food and nutrient supply could be positively impacted by the program. These include larger salmonids, other fish species, aquatic mammals, birds, etc. Thus the hatchery production has the potential for playing a significant role in the predator-prey relationships and community ecology during periods of low natural productivity. Wildlife projects may receive surplus eggs/fry from this 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.**

Bandon Hatchery:
The water source for incubating eggs at Bandon Hatchery is surface water from Ferry Creek and its tributary, Geiger Creek. Ferry Creek feeds into the Coquille River estuary at river mile 1.0, near the Port of Bandon. Average summer flows are approximately 1.25 cfs each. Winter flows vary greatly with storm activity, but average about 5 cfs each.

Bandon Hatchery has water rights for a total of 3.0 cfs. These water rights are senior to all other active water rights in the Ferry Creek system. Intakes are fully screened with perforated aluminum plates with 1/8" x 3/4" slots. The hatchery is operated under the National Pollutant Discharge Elimination System (NPDES) General Permit #300J.

Annual water temperatures range from about 38ºF in the winter to a maximum of 61ºF in the summer. The 14-year average is 51ºF. The water quality at Bandon hatchery meets or exceeds the recommended IHOT standards for temperature, ammonia, carbon dioxide, chlorine, pH, copper, dissolved oxygen, hydrogen sulfide, dissolved nitrogen, iron, and zinc. Fish production at Bandon Hatchery is limited by available water in the summer.

Cole Rivers Hatchery:
Eyed eggs from Bandon are shipped to Cole Rivers Hatchery where they are hatched and reared to full term smolts. Cole Rivers Hatchery's main water supply is the Rogue River. Ambient water is gravity fed to the hatchery from an impoundment formed by a diversion dam. The intake structure is screened with #4 mesh having 0.178 inch square holes. This supply system will provide up to 300 cubic feet of water per second. Annual ambient water temperatures range from 41.2ºF to 56.7ºF. The hatchery's warm water supply is piped from the surface of Lost Creek Reservoir. Warmer water is gravity fed to the hatchery from a floating intake on the Powerhouse Intake Tower. The supply system will provide up to 60 cubic feet of water per second. Annual warm water temperatures range from 42.8ºF to 72.8ºF. When the warm water temperature rises above 55º F it is mixed with ambient water to achieve an upper limit goal of 55ºF. At Cole Rivers hatchery, the water quality parameters meet or exceed the recommended IHOT standards for temperature, ammonia, carbon dioxide, chlorine, pH, copper, dissolved oxygen, hydrogen sulfide, dissolved nitrogen, iron, and zinc.

Incubation water is pumped from the ambient water supply line and sterilized with ultra violet. Incubation water is all single pass and can be filtered with pressure sand filters. The Tenmile Steelhead are generally incubated on sand filtered, UV sterilized ambient water with the ability to heat or chill water to speed up and slow down egg or fry development. This strategy is used to "catch up" development of all egg takes to achieve a common ponding date. The overall quality of the water is very good. Fish production at Cole M. Rivers has not been limited by available water or water temperature. The

hatchery is operated under the National Pollutant Discharge Elimination System (NPDES) General Permit #300J. The water right is for 224 cfs and the permit number is (S 44910).

Both Bandon and Cole Rivers hatcheries are in compliance with the water rights, water withdrawal, and water uses reporting to Oregon Department of Water Resource.

**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.**

Bandon Hatchery water intake is screened to minimize the risk of entrapment of juvenile listed fish or any other native fish species, but the intake structures are not accessible to anadromous salmonids. The intakes are in two reservoirs above dams without fish passage. Water diversion for fish culture purposes is non-consumptive, and is returned to Ferry Creek at the fish weir. The water flow, settleable solids, suspended solids, temperature, pH, ammonia, phosphorus etc. are monitored and reported to DEQ as per the NPDES permit to insure compliance with pollution abatement.

There are no listed natural fish above Cole Rivers Hatchery. However, there are intake structures and barriers which will prevent anadromous fish from reaching intake structures. The water diverted for fish culture purposes is non-consumptive and is returned to the Rogue River below the hatchery.

All wastewater is pumped to a 150' x 100' x 6' asphalt lined pollution abatement settling basin. Hatchery effluents are monitored and reported quarterly to DEQ as per NPDES permit.

## SECTION 5. FACILITIES

**5.1) Broodstock collection facilities (or methods)**.

Broodstock for this steelhead program are now primarily captured at Eel Lake trap. While founding the new broodstock, wild steelhead were captured with the use of entanglement nets at selected sites in the Tenmile Basin. This method was extremely labor intensive, but at the time was the only reliable method of wild broodstock collection.

Angler donations (hook and line) have also been used to collect broodstock but this method has not been as consistent as netting or trapping broodstock in the Tenmile Basin**.**

**5.2) Fish Transportation Equipment**

Fish are transported in plastic water storage tanks that have been modified to fit in the back of trucks. These tanks are four feet in diameter and about four feet tall, holding about 250 gallons of water. A 12-volt aerator circulates the water to keep the fish alive.

**5.3) Broodstock holding and spawning facilities.**

Adults captured for broodstock at the Eel Lake trap are held until ripe and spawned on site. Gametes are then transferred to Bandon Hatchery where they are fertilized, and incubated to the eyed egg stage.

The holding pond at Eel Lake is a concrete raceway located at the outlet of Eel Lake. A sheet piling dam forces water through the raceway. The raceway is 30'X20'X6' with a water level that averages three feet deep. Dam boards at the lower end of the raceway control the flow of water into the pond and the water depth.

**5.4) Incubation facilities**.

Bandon Hatchery's incubation building has a total of 27 vertical double stack incubators. These are supplied by two aluminum headboxes. Five gallons of water per minute are normally run through each stack.

Eggs are incubated at Bandon Hatchery from fertilization to eyed eggs that are transferred to the Cole Rivers Hatchery. Cole Rivers Hatchery hatches the eggs, then places the resulting fry into rearing troughs and rears them to full term smolts. The goal of the program is to produce enough smolts for an eventual release of 25,000 smolts annually.

At Cole Rivers, incubation takes place in 66 stacks of vertical incubators. Each stack has 15 usable trays for a total of 990. Five trays are used for Tenmile steelhead production. The water is generally ambient, sand filtered and UV sterilized.

**5.5) Rearing facilities.**

Winter steelhead are not reared in the Tenmile Lakes Basin. Cole Rivers is equipped with 87 concrete ponds, each 100 feet long, 20 feet wide and 5.5 feet deep. All ponds are supplied with ambient water and 21 ponds have warm water supply. The Tenmile steelhead require the use of ambient and warm water in one raceway pond during rearing. Flows are adjustable in all containers and all containers are single pass.

**5.6) Acclimation/release facilities.**

The acclimation sites in the Tenmile basin are: Eel Lake, Saunders Creek, and Tenmile Creek. The acclimation site at Eel Lake is the same facility that is used for holding adult broodstock. The acclimation pond is a concrete raceway 30 feet long, 20 feet wide and 6 feet deep. Dam boards in the lower end of the raceway control the flow of water into the pond. A sheet piling dam forces water through the raceway. Water depth in the acclimation pond averages approximately three feet deep and screens on the lower dam boards prevent steelhead smolts from leaving the pond prior to completion of the three week acclimation period.

The Saunders Creek acclimation site is a flash board dam attached to an eight foot culvert

that creates a large pond upstream of the culvert. The structure is located in the US Forest Service's Spinreel Park, near the confluence of Saunders Creek and Tenmile Creek. Water depth is controlled by the dam-boards on the outlet of the pond. The acclimation pond that forms in the natural stream channel is approximately 200feet long, 20 feet wide and 6 feet deep. A screen attached to the dam boards prevents the steelhead from leaving the acclimation site prior to the end of the three week acclimation period.

The primary Tenmile Creek acclimation site is a floating net pen located at the mouth of a small tributary of Tenmile Creek (unofficially nicknamed Marsh Creek). In order to spread out the fishery on returning adult steelhead, multiple acclimation pens have been used along Tenmile Creek, splitting this acclimation number into smaller groups.

The steelhead smolts are acclimated for three weeks in the pens. In the event of extreme drought conditions or other water supply related conditions, full three-week acclimations may not be feasible. Such examples include low water flows and low dissolved oxygen necessitating a direct-stream release, or high water flooding the containment ponds, causing early release. Because smolts are typically showing characteristics of migration-readiness as they begin the acclimation period, residualization or poor homing is not expected even if the full acclimation period is not accomplished. Extreme water conditions are rarely a problem in the Tenmile Basin because the lakes act as a "buffering" factor in providing a relatively consistent water supply to down-basin acclimation sites.

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

No significant fish mortality events observed.

**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.**

Tenmile steelhead are not an ESA-listed species. Risk aversion measures are taken to prevent any loss of steelhead under this propagation program.

The Eel Lake adult holding pond is supplied by water out of Eel Creek by way of a diversion dam. The water is only diverted into the facility and is not pumped, which eliminates the risk of fish loss due to a pump or power failure. This is a very secure adult holding facility where no adults have been lost due to water failure in 18 years of operation.

All equipment that is used in the course of collection, adult holding, spawning, and acclimation is disinfected with an iodine solution to prevent the transmission of pathogens.

At Bandon Hatchery, the incubator headbox system is also very reliable. Water-level monitor alarms are located at each headbox to insure uninterrupted flows. Green eggs are kept at low density, to avoid suffocation. Historically, there haven't been any significant

problems associated with diseases that would affect the eggs.

Cole Rivers Hatchery is equipped with a 210kw generator connected to an automatic transfer switch that starts and transfers critical power needs within 10 seconds of a power interruption. This provides for uninterrupted operation of all pumps necessary to run the incubation facilities. All circular and raceway rearing containers are gravity fed. The incubation facility and all rearing containers are secured with low water level alarms connected to a central alarm system. When this alarm system is tripped it activates a facility grounds audio siren, audio alarms to all hatchery residences and pager systems. The facility is staffed 24 hours a day, 365 days a year. All eggs are disinfected with PVP iodine upon arrival to the station. All rearing containers necessary for the Tenmile steelhead are double screened at the outflow to prevent any escape due to screen failure. All stocks are examined by ODFW Pathologists on a monthly basis and immediately prior to transfer to acclimation.

# 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 of broodstock for current stock of steelhead.

| Year | Location | Hatchery/wild | Operation |
|---|---|---|---|
| 1999-2000 | Tenmile Lakes | Wild | Netting/trapping |
| 2000-2001 | Tenmile Lakes | Wild | Netting/trapping |
| 2001-2002 | Tenmile Lakes | Wild | Netting/trapping |
| 2002-2003 | Tenmile Lakes | Wild | Netting/trapping |
| 2003-2004 | Tenmile Lakes | Hatchery/wild | Netting/trapping |

## 6.2) Supporting information.

### 6.2.1) History.

This program first started with Alsea River broodstock in 1968. The program then switched to using broodstock from the Coos River Basin in 1990 and continued using Coos River stock until 1999. Upon several reviews and because of concerns over using out-of-basin stock, district personnel again began switching over to using Tenmile Basin stock in 2000. Currently, only Tenmile Basin winter steelhead are being used as broodstock for this program.

### 6.2.2) Annual size.

A maximum of 20 steelhead (10 males and 10 females) are needed for this program. Occasionally, if fecundity is low in female spawners, additional adults may be taken to achieve production numbers.

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

The broodstock for Tenmile hatchery winter steelhead was switched several years ago from out-of-basin stocks to a native stock. During the "re-founding" period for Tenmile broodstock, all of the steelhead used for broodstock were naturally produced. Once the switch was completed, a minimum target of 30% naturally produced steelhead are used each year. That translates to a minimum of three pairs of naturally produced fish that would be utilized annually.

### 6.2.4) Genetic or ecological differences.

Even with the extensive use of out-of-basin stock over the years, the Department has not observed any genetic or ecological differences between program fish and wild fish. There has been no intentional selection of any particular traits or characteristics for fish collected for broodstock. Since this program now uses in-basin stock, the Department expects minimal differences between program fish and wild fish in the basin.

### 6.2.5) Reasons for choosing.

Broodstock has never been selected for any special trait or characteristic since the program began. Converting the program over to an in-basin stock allows the Department to produce fish with characteristics similar to those of wild steelhead from the Tenmile Basin.

## 6.3) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish that may occur as a result of broodstock selection practices.

The Tenmile winter steelhead is not an ESA-listed population. It is unlikely that brood stock selection practices for this species will have adverse genetic effects on listed Coho population within the basin. However, to minimize genetic differences between hatchery and wild steelhead populations, as well as to maintain genetic diversity within the population, broodstock will be collected from throughout the run and wild fish will continue to be incorporated into the program while avoiding selection of any specific characteristics.

Coho Salmon are temporarily delayed at Eel Lake Trap in the course of trapping adult winter steelhead. Most Coho will pass through the lake by the time steelhead trapping begins, however. Prior to beginning the steelhead trapping season for the year, the boards in the facility are configured as a fish ladder over the dam, allowing Coho to pass into the lake to spawning streams above the lake. Once steelhead broodstock trapping begins, the trap is sorted as many as three times a week during peak steelhead migration, in order to minimize the number of days a fish may be delayed, to spawn fish as they become ripe, and to maintain a safe density of adult fish in the trap. Coho may be caught incidentally during winter steelhead broodstock collections, due to minor overlap in run timing. All Coho Salmon will be released unharmed as soon as possible. The delay to the wild Coho Salmon population is minor.

# SECTION 7. BROODSTOCK COLLECTION.

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

Adult hatchery and wild winter steelhead will be collected for broodstock.

## 7.2) Collection or sampling design.

The majority of fish collected for broodstock are now taken at the Eel Lake fish trap. Hatchery fish returning to the Eel Lake fish trap will be used in the broodstock program. Previously, when founding this new broodstock, fish were collected with entanglement nets at various sites in the basin. This labor intensive process was the most consistent means to collect wild fish. Attempts have been made to take angler donations as another means to collect wild broodstock but this process has not produced broodstock consistently. In the Tenmile Lakes Basin, the Department may continue to use and improve this method through education, and as run sizes increase angler donation may contribute more broodstock to the program.

## 7.3) Identity.

Wild Tenmile Basin stock are differentiated from hatchery stock by the lack of fin-marks, with 100% of hatchery smolts are being adipose fin-marked.

## 7.4) Proposed number to be collected:

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

The number of adults to be collected is 20 (l0 males and 10 females) to fulfill the program goal of 25,000 smolts released. Adults are spawned 1:1 ratio, male to female. Fish collected for the broodstock program are held at Eel Lake Trap until ripe, and then spawned. Fish are collected throughout the run, to the extent possible.

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

**Tenmile Basin Broodstock Collection**

| Return Year | Males | Females | Jacks |
|---|---|---|---|
| 2000 | 143 | 114 | 1 |
| 2001 | 52 | 77 | - |
| 2002 | 173 | 128 | 2 |
| 2003 | 100 | 55 | 1 |
| 2004 | 177 | 162 | 3 |

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

To implement the Multi-Species Conservation Plan (ODFW 2014), excess hatchery swim-ins at the Eel Lake trap will not be passed over the facility into Eel Lake. Hatchery

adult fish may be re-cycled to Spinreel Park on lower Tenmile Creek or into Saunders Lake to re-enter the sport fishery, in numbers similar to re-cycling in recent years. Surplus hatchery fish may also be stocked into standing water bodies in the District, or killed to provide nutrient enrichment for basin streams.

**7.6) Fish transportation and holding methods.**

See section 5.2 for the description of the transport tanks that are used in the district. See section 5.3 for the description of the holding containers.

**7.7) Describe fish health maintenance and sanitation procedures applied**.

All ponds and equipment are cleaned and allowed to air dry prior to each use for any season. Equipment are specifically assigned to any given station to prevent the spread of disease from one site to another should a pathogen be present. Broodstock collection equipment is sterilized using an iodophore that has demonstrated good success at eliminating potential disease-causing organisms. Pathologists routinely examine samples from most of the females used for broodstock to detect the presence of any viral pathogens. Eggs taken from any infected females are buried to prevent transmission of diseases. The pathologists also conduct a pre-liberation disease certification check-up prior to reared steelhead being released into the Tenmile Lakes Basin.

**7.8) Disposition of carcasses.**

Carcasses of spawned males and females may be placed into streams for nutrient enrichment. Pond mortalities are buried away from the water body, to prevent any spread of diseases. Carcass placement is conducted under a Memorandum of Agreement with Oregon DEQ.

**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.**

The trap at Eel Lake will be installed as late as possible to minimize capture of Coho Salmon. Coho Salmon returns to the trap are tapering off by the time steelhead trapping begins. Coho captured at Eel Lake trap are strictly enumerated and released with as little handling as possible. The trap is emptied up to three times per week to minimize retention time. To maintain genetic diversity within the hatchery-produced steelhead population, adults will be collected randomly from throughout the run without bias to certain characteristics such as weight or length; and at least 30% wild fish will continue to be incorporated into the broodstock. The primary means to minimize adverse genetic effects on Coho Salmon from the steelhead broodstock collection is to minimize mortality of Coho, thus minimizing a reduction of genetic diversity.

## SECTION 8. MATING

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

### 8.1) Selection method.

Adults (males and females) are chosen randomly based on their maturity and ripeness. All fish are sorted one or two days each week throughout the holding period, beginning when the first fish becomes ripe. Matings may be W x W, W x H, or H x H to produce the smolts for this program.

### 8.2) Males.

One male is used to spawn with one female. On rare occasions when more than one female are ripe and only one male is available, then the eggs of multiple females may be fertilized by a single male.

### 8.3) Fertilization.

The spawning protocol is that one female is mated with one male (1:1). This mating strategy is an attempt to maximize genetic variability within the hatchery population. Gametes from an individual fish are taken into baggies and are kept completely separate from those of other fish. Actual matings occur in a plastic bag to ensure that fertilization of multiple females does not occur from a single male. Differential sperm motility is not a concern when using these fertilization techniques. Gametes are never pooled.

The plastic bags that are used to hold gametes and to effect fertilization are used only once and then discarded. This technique provides a good aseptic environment so that gametes can be handled and subsequently fertilized without any risks of horizontal transmission of pathogen. When the eggs are placed into a common incubator, the water is treated with an iodophore that further reduces the potential for horizontal pathogen transmission. During the egg taking operation the equipment used is also treated with an iodophore to prevent the spread of diseases.

### 8.4) Cryopreserved gametes.

Cryropreserved gametes are not utilized in this 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.

We anticipate no adverse genetic or ecological risks to listed wild Coho Salmon from the mating techniques used in this steelhead program.

# SECTION 9. INCUBATION AND REARING

## 9.1) Incubation:

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

**Table 9-1. Egg take and survival information for stock 88 StW at Bandon Hatchery.**

| Brood Year | Eggs Taken | Eyed % Survival | Eyed Eggs Received | Fry % Loss | Juvenile % Loss | Shipped to Acclimation | Fingerling Liberated to Impoundments | Smolt Release Goal |
|---|---|---|---|---|---|---|---|---|
| 2000 | 26,858 | 85.8 | 19,684 | 0.35 | 15.68 | 12,361 | 0 | 16,000 |
| 2001 | 43,234 | 96.2 | 41,598 | 1.6 | 14.95 | 29,928 | 0 | 16,000 |
| 2002 | 34,906 | 80.5 | 21,251 | 1.8 | 30.45 | 13,607 | 0 | 16,000 |
| 2003 | 43,471 | 88 | 34,480 | 2 | 29.68 | 23,796 | 0 | 19,000 |
| 2004 | 36,759 | 93 | NA | NA | NA | NA | 0 | 25,000 |

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

No gametes from wild parents are ever considered to be surplus of the hatchery spawning program. Wild gametes always have priority over those of returning hatchery fish and all fertilized eggs from wild parents are used in rearing programs. Now that hatchery fish are being utilized in the program along with a percentage of wild fish, any surplus eggs will be culled from H x H family groups.

### 9.1.3) Loading densities applied during incubation.

At Bandon Hatchery, eggs are loaded into vertical incubators at a density of approximately 10,000 eggs per tray, or what will usually amount to the gametes of four females. The standard water flow rate is 5 gpm/tray. The 12 year average for egg size is 73.6 eggs per ounce, with a range of 64 to 85.

Upon arrival at Cole Rivers Hatchery, eyed eggs are loaded into vertical incubators at a density of approximately 5000 eggs/tray. The standard flow rate is 5 gpm/tray for egg and fry incubation. The 12 year average for egg size is 73.6 eggs per ounce.

### 9.1.4) Incubation conditions.

At Bandon Hatchery water temperatures are checked twice daily and recorded, then averaged. Temperature units are tracked daily to monitor egg development. Dissolved oxygen levels are not monitored, as suffocation has not been a problem in flow-through systems with steelhead eggs. Tray screens are brushed and bottoms are “rodded out” as needed to clear silt and debris, usually after storms.

Eyed eggs destined for smolt production are transferred to Cole Rivers Hatchery in

Styrofoam containers. Ice in the top tray insures a cool, moist shipping environment. At Cole Rivers Hatchery, incubation temperatures are monitored and recorded at 1:00 pm daily. Temperature units are tracked daily to monitor egg development. Oxygen is randomly monitored, minimum dissolved oxygen level is 7 ppm, and suffocation has not been a problem with steelhead eggs. Tray screens are brushed daily during hatching. All incubation water is UV sterilized and may be sand filtered. Heated or chilled water is used to "catch up" or "slow down" egg takes to achieve desired ponding dates.

**9.1.5) Ponding**.

At Cole Rivers Hatchery, the fry are force ponded at 99% button up, normally between 1,350 and 1,450 temperature units. The size at ponding is 1,300 fish per pound, with an average length of 3.301 cm. Ponding dates range from March 16$^{th}$ to May 12$^{th}$.

**9.1.6) Fish health maintenance and monitoring.**

At Bandon Hatchery eggs are treated with formalin every other day at 1:600 for 15 minutes to prevent fungal growth. During the eyeing stage, eggs are not handled. Eyed eggs are addled at 475 or more temperature units, then run through a Van Gaalen brand egg-picking machine to separate the dead (white) eggs. Additional hand picking may be necessary for blank and/or weak eyed eggs.

At Cole Rivers Hatchery, eggs are received eyed, disinfected with PVP iodine at 1:100 dilution for 15 minutes and hand-picked for mortality and fungal infection. Eyed eggs are treated three times a week with formalin at 1:600 for 15 minutes to prevent fungal growth. Hatch house water is disinfected with UV sterilizer units and much of the water is sand filtered.

**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.**

The Tenmile steelhead is not an ESA-listed population. It is unlikely that the incubation of steelhead will have any adverse genetic effects of listed Coho Salmon in the basin, as Tenmile Basin Coho Salmon are not present at Cole Rivers Hatchery and steelhead to be transported and liberated in the Tenmile Basin receive pre-liberation health examinations. However, risk aversion measures are always taken to minimize adverse effects of all incubating fish in these facilities. At Bandon Hatchery, eggs are incubated at low-density levels that have proven to be safe. Headboxes are equipped with level monitor alarms to reduce risk of interrupted flows. Bandon Hatchery's water supply has a history of being an extremely reliable gravity feed system. All supply lines and valves including main pipeline from intake, hatchery building supply line, headbox feed and valve were replaced in 1998/99. The Ferry Creek Reservoir was dredged in 1998, significantly reducing silt levels in incubators, thus increasing safety factors for all eggs.

At Cole Rivers eggs and fry are incubated in UV sterilized water to minimize losses due to disease. Eggs and fry are incubated at low densities that have proven to be safe.

Siltation has not been a problem. Cole Rivers Hatchery did experience higher than desired mortality in Tenmile winter steelhead juveniles, until problems associated with an older filter and piping were discovered. New infrastructure has reduced this mortality to reasonable levels.

Adverse genetic and ecological effects to listed Coho Salmon are not anticipated from the incubation of Tenmile winter steelhead eggs.

## 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.

See Table in Section 9.1.1.

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

Cole Rivers Hatchery densities are stated for temperatures below 58º F. Flow and fish density = 5.77 to 8 lbs. fish/gal/min. Rearing space density is less than 1 pound/cubic foot.

### 9.2.3) Fish rearing conditions

Incubation water temperature at Cole Rivers Hatchery is monitored daily. Dissolved oxygen is monitored during times of concern. Rearing containers are cleaned weekly or as needed. Mortality is collected daily. Densities are monitored monthly.

### 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.

**Table 9-2. Data of feed type, feeding rate, fish growth (weight gain), and feed conversion for stock 88 winter steelhead at Cole Rivers Hatchery.**

| | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | AVG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F/LB | 1750 | 400 | 120 | 70 | 32 | 15 | 10 | 9 | 8.5 | 7.5 | 6.4 | 5.9 | 436.31 |
| FEED | Skretting fed through #3 dry | | | | | | Growout feed is BioMoist Grower | | | | | | NA |
| %BW/DAY | 2.6 | 2.7 | 2.6 | 2.8 | 2.7 | 3.1 | 2.5 | 2.7 | 2.3 | 1.6 | 1.9 | 2.2 | 2.48 |
| FOOD CONV. | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.40 |
| LBS/GPM | 1.03 | 1.3 | 1.57 | 1.97 | 2.38 | 2.86 | 3.6 | 4.32 | 5.15 | 5.98 | 6.71 | 7.67 | 3.71 |

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

See Table above in Section 9.2.4. Energy reserve data are not available.

**9.2.6) Indicate food type used, daily application schedule, feeding rate range (e.g. % body weight/day and lbs/gpm inflow), and estimates of total food conversion efficiency during rearing (*average program performance*).**

Food type used is:
Skretting Nutra Mash Plus Starter between 2,500 and 2,000 f/lb.
#0 Nutra Starter between 2,000 f/lb and 570 f/lb.
#1 Nutra Starter between 570 f/lb and 300 f/lb.
#2 Nutra Starter between 300 f/lb and 150 f/lb.
#3 Nutra Starter between 150 f/lb and 45 f/lb
#2.5 BioMoist Grower between 45 f/lb and 38 f/lb
#3.0 BioMoist Grower between 38 f/lb and 17 f/lb
#4.0 BioMoist Grower between 17 f/lb and 6 f/lb

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

Fish health and behavior monitored daily. Mortality collected and analyzed daily and continuously. Scheduled pathology examinations conducted at random as needed and as prophylactic. Parasitic and bacterial infections treated as needed under prescription of department pathologist. Viral samples are monitored by fish health section. Disinfection is primarily to prevent lateral transfer of viral infection. Prophylactic Aquamycin treatment administered through feed for Bacterial Kidney Disease prevention.

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

Smolt development indices used are age, size, external appearance and behavior of juvenile fish. No ATPase studies are conducted.

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

Shade cloth netting will be used to cover portions of the raceways.

**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 Tenmile winter steelhead is not an ESA-listed population, although a candidate. However, appropriate risk aversion measures are taken to minimize adverse genetic and ecological effects, which were described in Sections 7.9 and 9.1.7.

## SECTION 10. RELEASE

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

### 10.1) Proposed fish release levels.

| Age Class | Maximum Number | Size(f/lb) | Release Date | Location |
|---|---|---|---|---|
| Smolts | 9,000 | 6.7 | 4/22 | Saunders Creek |
| Smolts | 8,000 | 6.7 | 4/21 | Eel Lake |
| Smolts | 8,000 | 6.7 | 4/21 | Tenmile Creek |

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

1) Saunders Creek Acclimation Site: Confluence of Saunders Creek and Tenmile Creek at T23S; R13W; Sec 14. Located within Spinreel Park, US Forest Service.

2) Eel Lake Acclimation Site: Outlet of Eel Lake into Eel Creek; T23S; R12W; Sec. 6. Located within Tugman State Park.

3) The primary Tenmile Creek acclimation site is a net pen in Tenmile Creek, located at the mouth of a small tributary to Tenmile Creek (sometimes known as "Marsh Creek"). The location is in T23S, R13W, Sec. 13.

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

| Release Year | Number Released | Size (fish/lb) | Date Released | Release Protocol |
|---|---|---|---|---|
| 2006 | 14,068 | 6.30 | 4/17 | Acclimated |
| 2007 | 0 | N/A | N/A | N/A |
| 2008 | 32,309 | 7.20 | 4/10 - 11/13 | Acclimated |
| 2009 | 20,258 | 5.21 | 4/21 - 4/22 | Acclimated |
| 2010 | 24,859 | 5.65 | 3/29 - 4/25 | Acclimated |
| 2011 | 23,132 | 5.96 | 4/21 - 4/22 | Acclimated |
| 2012 | 10,800 | 6.00 | 4/18 | Acclimated |
| 2013 | 19,518 | 6.07 | 4/15 | Acclimated |
| 2014 | 21,684 | 6.73 | 4/15 | Acclimated |
| 2015 | 26,003 | 5.72 | 4/15-4-21 | Acclimated |
| **Average** | **19,263** | | | Acclimated |

Source: ODFW HMS database.

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

Smolts will be transported from Cole Rivers Hatchery to the acclimation sites in early April. As described earlier, the smolts will be acclimated for three weeks prior to release into the streams. Once acclimation is complete, the boards and screens are removed,

which allows fish to enter the main tributaries for migration out of the basin. See Section 10.3 above for actual release dates.

**10.5) Fish transportation procedures, if applicable.**

Steelhead smolts from Cole Rivers Hatchery are transported in ODFW liberation trucks to acclimation sites. Acclimated smolts are then released directly into the tributaries from the acclimation sites. See Section 10.2 for acclimation sites.

**10.6) Acclimation procedures.**

Once the steelhead are transported to the three acclimation ponds in the Tenmile Basin, the fish are contained in the holding ponds with the use of screens, or a net pen in the case of Tenmile Acclimations. Shortly after the fish are placed into the acclimation ponds they are fed one percent of their body weight per day for a period of three weeks. They are fed BioDry 1000 for that time period. The steelhead are allowed to get over the stresses of handling and hauling during the three-week acclimation period, which improves survival as demonstrated by research. The acclimation period also allows the smolts ample time to imprint on the stream and the facility to increase the rate of homing back to the station. High homing rate is desired to alleviate the risk of impacts that hatchery steelhead may have on wild populations, and to contribute to the freshwater fishery.

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

The smolts are mass marked (100%) with an adipose fin clip and no CWT is used to these program fish.

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

Every effort is made to avoid producing surplus smolts prior to transportation and liberation. Eyed eggs are carefully inventoried to insure that adequate, but not excessive, numbers of fish will be reared. If the projected overage is minimal (on the order of 10% or less), the excess fish have been included into releases. Other options for future excesses include releasing into standing water bodies for trout fisheries, marking/tagging and release for research or monitoring purposes, humanely killing and burying, or killing and using for wildlife projects.

**10.9) Fish health certification procedures applied pre-release.**

Fish health is examined by ODFW's fish pathologist prior to any transfer or at pre-release, and only certified fish are released per ODFW's Fish Health Management Policy. See Appendix A in attachments.

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

Cole Rivers Hatchery has never had a flooding problem, being at the base of a large Federal dam. Water problems have been a rare occurrence. During rearing at Cole Rivers Hatchery, if there is an emergency, out-of-basin stocks are never released from the station.During the time of acclimation, screens can be pulled and the fish allowed to leave. At the time of acclimation the steelhead are full term smolts and early release would not be a major problem; although minor reductions in survival and/or homing fidelity might occur.

**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.**

Full-term steelhead smolts are released after three week acclimation based on behavioral and physical characteristics that signal their readiness to make the migration to saltwater. This readiness minimizes their freshwater residence time upon release, and minimizes ecological impacts to wild Coho Salmon and steelhead. No genetic impacts to listed Coho Salmon are anticipated from releases of hatchery steelhead.

## 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.**

Staff will record the date, location, total number of Coho Salmon encounters, and the number of Coho Salmon visibly harmed or otherwise impaired upon release.

ODFW Fish Health Services will sample the hatchery cohorts prior to releases.

Staff will conduct quality control monitoring during fin clipping.

District staff will coordinate with research staff in order to stay abreast of current research documenting patterns of Coho and Chinook Salmon rearing in estuaries.

District staff will document number and location of carcasses placed for nutrient enhancement and an annual statewide report will document compliance with DEQ permit requirements. ODFW Research will report any project effectiveness results.

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

As with all state programs, budgets are approved by the Legislature for a two-year period.

No commitment of funds can be made past the approved budget period. Funds for various projects associated with this HGMP come from a variety of sources including license dollars, state general funds, and Federal Sport Fish Restoration. Funds are committed for portions of the HGMP monitoring but can change with relatively short notice. Also funding for ODFW's Fish Division has seen several rounds of cuts during recent biennia. As a result, the performance standards may be difficult to meet given staffing and funding levels.

**Other "ideal" performance standards:**
Conduct in-basin creel surveys and record location of hatchery catch, to assist in evaluating extent of hatchery occurrence near natural spawning areas.

Refine methodologies for adult steelhead spawning escapement estimates, and conduct measurements toward Steelhead Population Health Goals, a measure of the Oregon Plan for Salmon and Watersheds and compliance with the NFCP.

**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.**

ODFW staff has not identified any potential genetic or ecological risks from our current and proposed monitoring program**.**

## SECTION 12. RESEARCH

No formal research program is proposed in direct association with this winter steelhead hatchery program.

**12.1) Objective or purpose. N/A**

**12.2) Cooperating and funding agencies**. N/A

**12.3) Principal investigator or project supervisor and staff. N/A**

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

**12.5) Techniques: include capture methods, drugs, samples collected, and tags applied**. N/A

**12.6) Dates or time period in which research activity occurs. N/A**

**12.7) Care and maintenance of live fish or eggs, holding duration, transport methods. N/A**

**12.8) Expected type and effects of take and potential for injury or mortality. N/A**

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

**12.10) Alternative methods to achieve project objectives. N/A**

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

**12.12) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury, or mortality to listed fish as a result of the proposed research activities. N/A**

# SECTION 13. ATTACHMENTS AND CITATIONS

## Appendix A.—Fish Health Monitoring

**Table A-1. Five Year Disease History by Fish Stock at Bandon Hatchery 1996-2000.**

| | Stock/Species | | | | | | |
|---|---|---|---|---|---|---|---|
| **Disease/Organism** | **72 Rb** | **44 Co** | **44 Chf** | **44 StW** | **144 StW** | **37 ChF** | **88 StW** |
| IHNV | no | No | no | no | no | no | no |
| CAD | no | No | no | no | no | no | no |
| *Fl. psychrophilum* | no | No | no | yes | yes | yes | yes |
| *Fl. columnare* | no | No | no | no | no | no | no |
| *Aeromonas salmonicida* | no | No | no | no | no | no | no |
| *Aeromonas/Pseudomonas* | yes | Yes | yes | yes | yes | yes | yes |
| *Yersinia ruckeri* | no | No | no | no | no | yes | no |
| *R. salmoninarum* | no | Yes | yes | yes | yes | yes | no |
| Internal mycosis | no | No | no | no | no | yes | no |
| External mycosis | yes | Yes | yes | yes | yes | yes | yes |
| *Ichthyobodo* | no | No | no | yes | yes | yes | yes |
| *Gyrodactylus* | yes | No | no | yes | yes | no | yes |
| *Ichthyophthirius* | no | No | no | yes | yes | no | no |
| Gill Amoeba | no | No | no | no | no | no | no |
| Trichodinids | yes | No | no | yes | yes | no | no |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

**Disease Treatment**

Treatments for disease at Bandon Hatchery include: treating juvenile fish for external parasites using either hydrogen peroxide (75-100 ppm for 1 hour exposure) or formalin 1:6000 to 1:40000 depending on species treated and water temperature. *Ichthyophthirius* may be treated with a prolonged formalin drip, 1:25,000 for 8 hours). On rare occasions it is necessary to treat a group of fish for bacterial pathogens with medicated food containing oxytetracycline.

**Fish Health Monitoring Plan**

Monitoring will be conducted by ODFW's qualified Fish Health specialists.

The monitoring plan is similar to that developed by the Integrated Hatchery Operations Team for the Columbia Basin anadromous salmonid hatcheries. (see Policies and Procedures for the

Columbia Basin Anadromous Salmonid Hatcheries, Annual Report 1994. Bonneville Power Administration).

Conduct examinations of fish at least monthly and more often as necessary. Investigate fish losses when they occur.

A representative sample of healthy and moribund fish (if available) from each lot of fish will be examined. The number of fish examined will be at the discretion of the 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 culture practices will be reviewed as necessary with facility personnel. Where and when pertinent, nutrition, water flow and chemistry, loading and density indices, handling, disinfection procedures, and treatments will be discussed.

Findings and results of fish health monitoring will be recorded on a standard fish health reporting form and maintained in a fish health data base.

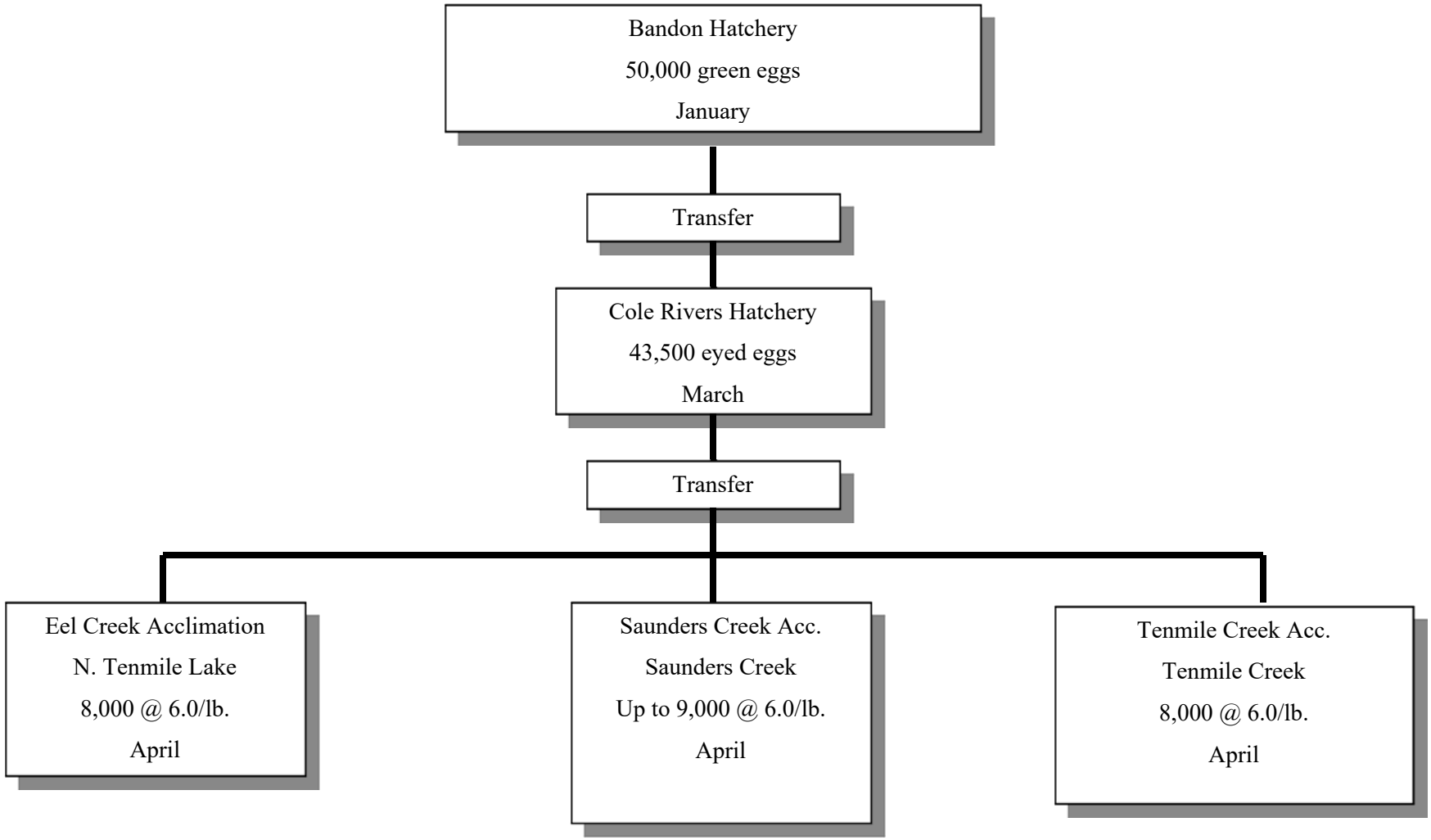
Fish health status prior to release or transfer to another facility will be determined and reported on the standard reporting form. The exam may occur during the regular monthly monitoring visit, i.e. within 1 month of release.

**Fish Health Inspection for Broodstock**

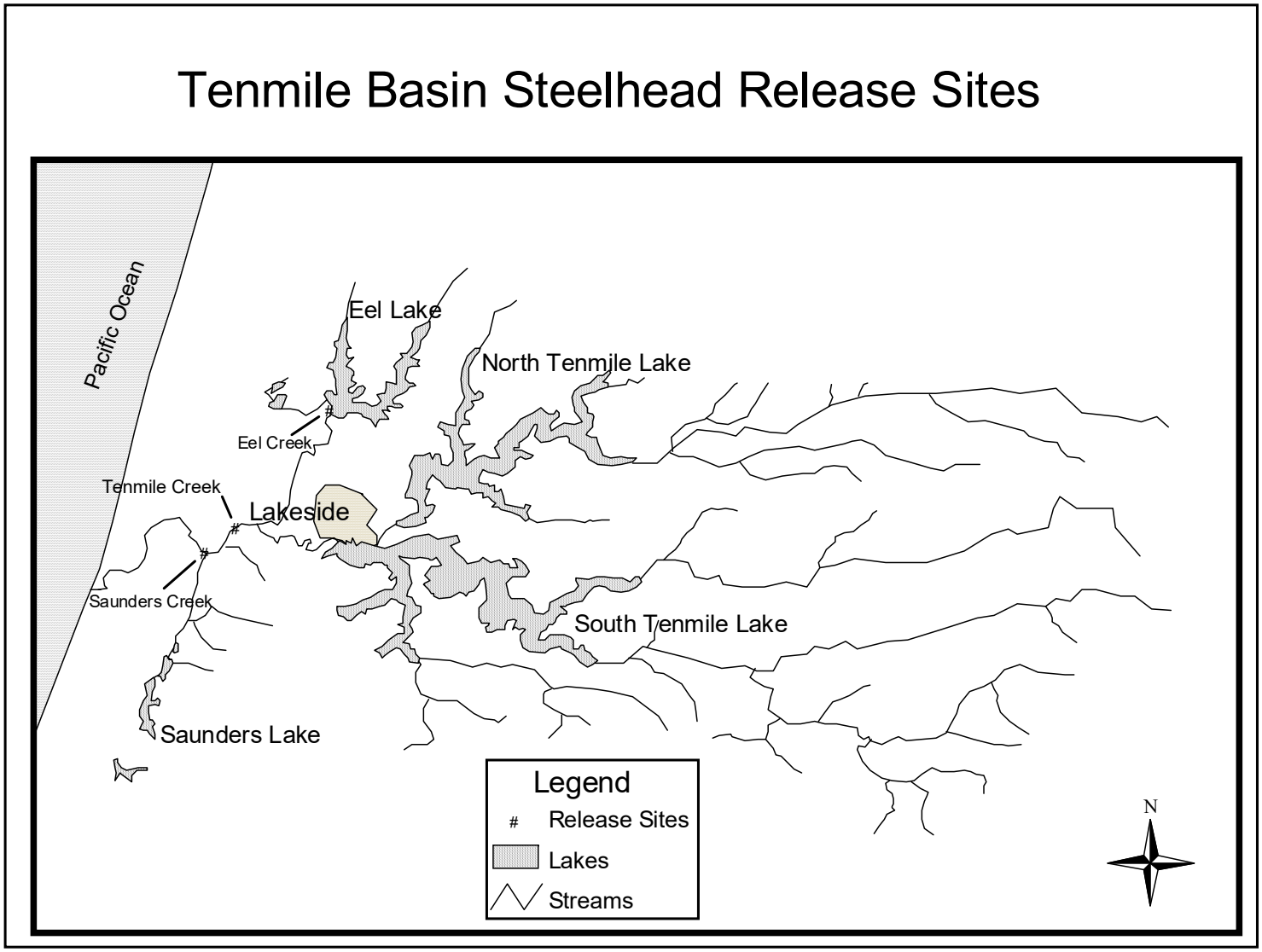
Fall Chinook Salmon, Coho Salmon and two lots of winter steelhead are examined for the presence of viruses and the Chinook and Coho are also sampled for bacterial kidney disease.

**APPENDIX B.—Hatchery Fish Production Flow Chart**

# Winter Steelhead - Stock 88 (Tenmile Lakes)



**APPENDIX C.—Steelhead Release Sites in Tenmile Basin. Acclimations/releases are at Saunders Creek mouth, Eel Lake outlet, and on Tenmile Creek.**



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## SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

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

Name and Title of Applicant: Timothy Walters, Umpqua Watershed District Manager, West Region, ODFW

Signature: _____Date_____

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

Signature: _____ Date: _____

## Appendix Table 1. Estimated listed salmonid take levels of by hatchery activity.

**Listed species affected:** *Coho Salmon* **ESU/Population:** *Oregon Coastal ESU* **Activity:** *Tenmile Basin Winter Steelhead Program*

**Location of hatchery activity:** *Tenmile Lks Basin* **Dates of activity:** *Ongoing* **Hatchery program operator:** *Mike Gray (District Biologist)*

| **Type of Take** | **Annual Take of Listed Fish By Life Stage (*Number of Fish*)** | | | |
|---|---|---|---|---|
| | Egg/Fry | Juvenile/Smolt | Adult | Carcass |
| **Observe or harass a)** | | | | |
| **Collect for transport b)** | | | | |
| **Capture, handle, and release c) Eel Lake trap** | | | 500 | |
| **Capture, handle, tag/mark/tissue sample, and release d)** | | | | |
| **Removal (e.g. broodstock) e)** | | | | |
| **Intentional lethal take f) broodstock** | | | | |
| **Unintentional lethal take g)** | | | 5 | |
| **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.*