# HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

| | |
|---|---|
| **Hatchery Program:** | **Cole Rivers Hatchery Summer Steelhead Program** |
| **Species or Hatchery Stock:** | **Summer Steelhead (Rogue River Stock-52)** |
| **Agency/Operator:** | **Oregon Department of Fish & Wildlife** |
| **Watershed and Region:** | **Rogue Watershed, Southwest Region** |
| **Date Submitted:**<br>**First Update Submitted:** | **January 22, 2009**<br>**August 18, 2016** |
| **Date Last Updated:** | **August 18, 2016** |

## SECTION 1. GENERAL PROGRAM DESCRIPTION

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

Cole Rivers Hatchery Summer Steelhead Program.

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

Summer Steelhead *Oncorhynchus mykiss* (Rogue River Stock-52). ESA Status: not listed

**1.3) Responsible organization and individuals.**

**Lead Contact:**
**Name (and title):** Scott Patterson, Fish Propagation Program Manager
**Agency or Tribe:** Oregon Department of Fish and Wildlife
**Address:** 4034 Fairview Industrial Drive SE, Salem, OR 97302
**Telephone:** (503) 947-6218
**Fax:** (503) 947-6202
**Email:** Scott.D.Patterson@state.or.us

**On Site Lead Contact:**
**Name (and title):** Dan VanDyke, District Fish Biologist
**Agency or Tribe:** Oregon Department of Fish & Wildlife
**Address:** 1495 East Gregory Road, Central Point, OR 97502
**Telephone:** (541) 826-8778
**Fax:** (541) 826-8776
**Email:** daniel.j.vandyke@state.or.us

**Hatchery Contact:**
**Name (and title):** David Pease, Hatchery Manager
**Agency or Tribe:** Oregon Dept. of Fish & Wildlife
**Address:** 200 Cole M. Rivers Dr., Trail, OR 97541
**Telephone:** (541) 878-2235
**Fax:** (541) 878-3959
**Email:** David.A.Pease@state.or.us

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

The United States Army Corps of Engineers (USACE) is involved by providing funding for the program.

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

The funding source is USACE, and the staffing level is 14 full time and five seasonal employees. The total USACE funded operating costs are $1,323,189 per fiscal year. This program represents ~12% of the total costs.

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

Cole Rivers Hatchery is located on the Rogue River, 30 miles northeast of Medford on Highway 62, about ½ mile downstream from the base of William Jess Dam and Lost Creek Reservoir at river kilometer 253.1. The hatchery site is at an elevation of 1,545 feet above sea level, at latitude 42$^{o}$ 39' 49.1" N and longitude 122 41' 06.7" W. The Waterbody Code for Cole Rivers Hatchery is 1500500000.

## 1.6) Type of program.

Isolated Harvest Program.

## 1.7) Purpose (Goal) of program.

The goal of this program is to mitigate for the loss of summer steelhead spawning and rearing habitat that resulted from the construction of Dams in the Rogue River Basin by the United States Army Corps of Engineers (USACE).

## 1.8) Justification for the program.

The summer steelhead program comprises part of a packaged mitigation program that is designed to compensate for the loss of anadromous salmonid spawning habitat and fish harvest loss that resulted from the construction of Dams by the USACE on the Rogue River Basin. The mitigation agreement outlines that the USACE will fund the production of 365,120 pounds of fish while providing ODFW with the flexibility to manage releases to optimize fishery benefits. Currently, ODFW is managing the mitigation program so as to annually release about 150,000 summer steelhead smolts to provide benefits to the sport fishery in the Rogue River.

An additional objective, as recommended in 1990 by the Rogue River Summer Steelhead Task Force, was to supplement hatchery smolt production with smolts reared from wild fry from the Middle Rogue and lower Applegate. This program was subsequently modified and added 70,000 hatchery smolts to the mitigation production level.

By providing fish for harvest, the program supports economic and cultural values associated with historic and renowned fisheries for adult fish and the unique half-pounder run, while reducing social pressures to allow harvest of naturally produced summer steelhead. Only hatchery produced summer steelhead may be harvested on the Rogue River. Naturally produced summer steelhead are effectively precluded from harvest through four key angling regulations:

- Protection for juveniles: virtually all tributaries of the Rogue are closed to all fishing
- Protection for juveniles: trout harvest on the mainstem is limited to adipose fin-clipped rainbow trout
- Protection for juveniles: the mainstem is closed to trout fishing between April 1 and the May

opener to protect outmigrating smolts.

- Protection for adults: harvest is limited to adipose fin-clipped hatchery adults except for a seasonal limited harvest of naturally produced steelhead as winter steelhead migrate upstream. Only wild steelhead 24" in length or larger may be harvested; virtually all Rogue summer steelhead adults are less than 24" in length.

The Rogue River summer steelhead program minimizes adverse genetic and ecological impacts on listed and other candidate species by implementing specific measures for brood collection techniques, rearing, 100% fin marking, and release strategies.

*Brood Collection:*
Adult collection occurs at the Cole Rivers Hatchery collection pond. Migrating fish enter and progress up the ladder until trapped. Both returning hatchery fish and naturally produced swim-ins are collected. Adult entry to the hatchery trap extends from mid-May of one year to late April of the next year. Peak returns occur at three times: mid to late July; November-December; and occasionally in mid-February. Brood fish are collected from throughout the run in order to maintain the genetic diversity within the hatchery produced population.

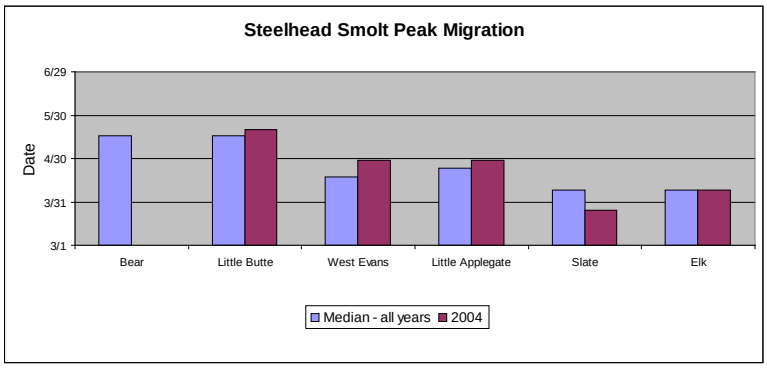
Although the period of adult collection for summer steelhead overlaps adult coho entry into Cole Rivers, the program does not necessarily increase interaction with or handling of adult Coho Salmon, as listed adult Coho Salmon entering the trap are used as brood for a Coho propagation program which has been described in a separate HGMP.

*Release Strategies:*
The hatchery program for summer steelhead is a mitigation program intended to replace lost natural production. Hatchery smolts are released in the mainstem (220,000 smolts at 4.5 f/lb in late April-early May, with a 100% adipose fin-clip), primarily on station. To start the release, screens are pulled out of the rearing ponds to allow for a volitional emigration into the river. The next day any remaining fish are crowded out of the rearing ponds.

The smolt release strategy maximizes survival rates and minimizes interaction with naturally produced fishes in the Rogue River. The timing of this upper river release matches outmigration peaks of naturally produced wild fish, as observed during smolt trapping on Bear Creek and Little Butte Creek in the upper portion of the watershed (Vogt, 2004; see below).

At this time, any fry, presmolt and adult releases are implemented at/above reservoirs and other waterbodies (fry and presmolts) outside the current range of anadromous fish species. Some fry releases occur as a result of the Classroom Incubator Program implemented through ODFW's Salmon and Trout Enhancement Program (STEP). Eyed eggs are provided to Schools to allow students to observe embryo development, and accompanying curricula are available to spur discussions on salmonids biology and watershed issues. Approximately 200 eggs are provided which are placed in aquaria for incubation in each participating classroom. Surviving fry are released into the main-

stem of the Rogue River.




## 1.9) List of program "Performance Standards" and 1.10) Performance Indicators addressing benefits and risks (1.10.1).

| BENEFITS Performance Standards | BENEFITS Performance Indicators | BENEFITS Monitoring & Evaluation |
|---|---|---|
| Provide hatchery summer steelhead for an n isolated harvest program (naturally produced summer steelhead are currently precluded from harvest). | • All smolts will be adipose fin-clipped.<br>• Returning adults contribute to the freshwater fishery | • Annual preliberation exam to confirm mark rate.<br>• Punchcard data provide an index of total harvest.<br>• Freshwater angler creel on a periodic basis. |
| Meet mitigation goals. | • Program will adequately mitigate for the habitat lost due to construction of USACE Dams. | • Punchcard data provide an index of total harvest.<br>• Freshwater angler creel on a periodic basis.<br>• Counts of returning steelhead maintained at Huntley Park, and Cole Rivers Hatchery. |
| Program fish provide societal benefits. | • Economic benefit to rural communities of Curry, Josephine and Jackson counties. | • Periodic creel survey and evaluation of the recreational/economic aspects of the fishery will reveal benefits to local communities. |
| Maintain fish health. | • Follow ODFW Fish Health Management Policy | • Conduct appropriate health checks throughout incubation, rearing, and prior to release. |
| The summer steelhead program will meet the criteria provided by the Native Fish Conservation Policy. | • A Conservation Plan will be developed by ODFW for the appropriate Species Management Unit (SMU), which shall provide guidance for this propagation program. | • The program will follow the guidance provided by the Conservation Plan for Rogue Basin steelhead populations |

| RISKS<br>Performance Standards | RISKS<br>Performance Indicators | RISKS<br>Monitoring & Evaluation |
|---|---|---|
| Life history characteristics of hatchery summer steelhead will not diverge significantly from naturally produced summer steelhead. | • Broodstock collection reflects the run timing and age classes represented in the natural population.<br>• Release of program fish mimic the emigration of naturally produced summer steelhead.<br>• Behavioral and morphological characteristics of program fish are similar to naturally produced summer steelhead. | • Data on adult return timing, brood collection and spawning protocols will be maintained by hatchery staff.<br>• Length frequency and size at release data will be maintained by hatchery staff. |
| Releases of hatchery summer steelhead have minimal impact on listed Coho Salmon that rear primarily in tributaries. | • Currently, program fish are released directly into the mainstem of the Rogue River. | • Releases made when and where scheduled. |
| Hatchery operations comply with the Fish Hatchery 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 DEQ/NPDES guidelines for water quality. | • Fish health is certified prior to release.<br>• Appropriate protocols will be followed for monitoring water quality.<br>• Screens will be checked on a regular basis. |
| Broodstock collection will have minimal impact on listed Coho Salmon. | • The program does not increase interaction with Coho Salmon. Handling of adult coho at Cole Rivers will follow the procedures outlined in the HGMP for Rogue Coho Salmon.<br>• Any brood collection that increases interaction with Coho Salmon will be reviewed with NMFS staff prior to implementation | • Maintain accurate collection data for summer steelhead and Coho Salmon at Cole Rivers. |

## 1.11) Expected size of program.

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

The maximum number of fish to be held for broodstock each year shall be 600 females

and 600 males.

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

| Life Stage | Release Location | Annual Release Level |
|---|---|---|
| **Eyed Eggs** | NA | None |
| **Unfed Fry** | Rogue R-3 and R-4 (STEP) | 6,000* |
| **Fry** | NA | None |
| **Fingerling** | Standing waterbodies or tributaries above dams | 40,000 |
| **Yearling** | Rogue R-3 and R-4 | 220,000 |

Note: additional, fry or fingerling may be released into waterbodies outside the current range of anadromous fish species.
*Classroom Incubator Program for multiple Schools/classes.

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

See notes and comments on table 1.12-1 below for fishery metrics (Tom Satterthwaite, personal communication, 2008).

- Summaries assume that all returning adults were first spawning migrants.
- Purpose of summary is to estimate the average rate over a number of years, so age-at return errors are not important for this summary.
- Estimate of river harvest for adults is the punchcard catch estimate.
- These preliminary estimates assume no straying.
- Return estimates of half-pounders are the passage estimates at Huntley Park.
- Composition of the hatchery half-pounders is estimated based on the proportions of each type of steelhead among the release groups.
- Harvest rates of half-pounders are assumed to be 50% of the freshwater return.

Table 1.12-1. Summary of fishery metrics related to the production and harvest of Rogue summer steelhead at Cole Rivers Hatchery.

| Release Year | Number STS smolts | Pounds of smolts | Hatchery return | River harvest | Harvest/1000 lbs of smolts | River return | Return Rate to Freshwater (%) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | half-pounders | adults |
| **1990** | 97,511 | 22,868 | 1,204 | 4,215 | 43.2 | 6,777 | 6.9 | 4.2 |
| **1991** | 162,316 | 36,070 | 1,025 | 5,975 | 36.8 | 10,945 | 6.7 | 1.9 |
| **1992** | 257,211 | 55,915 | 4,490 | 13,037 | 50.7 | 26,334 | 10.2 | 3.4 |
| **1993** | 292,842 | 65,076 | 4,807 | 15,182 | 51.8 | 29,936 | 10.2 | 3.4 |
| **1994** | 214,441 | 50,518 | 6,026 | 15,447 | 72.0 | 32,811 | 15.3 | 4.7 |
| **1995** | 281,617 | 62,826 | 6,394 | 56,127 | 199.3 | 113,134 | 40.2 | 4.2 |
| **1996** | 268,520 | 62,646 | 5,292 | 19,030 | 70.9 | 38,541 | 14.4 | 3.8 |
| **1997** | 226,076 | 52,113 | 2,392 | 21,297 | 94.2 | 42,144 | 18.6 | 2.3 |
| **1998** | 222,122 | 48,199 | 3,381 | 12,795 | 57.6 | 27,086 | 12.2 | 2.4 |
| **1999** | 219,837 | 42,239 | 3,869 | 16,543 | 75.3 | 34,159 | 15.5 | 3.0 |
| **2000** | 235,661 | 51,979 | 9,500 | 33,744 | 143.2 | 73,152 | 31.0 | 5.7 |
| **2001** | 229,134 | 52,997 | 12,742 | 22,446 | 98.0 | 52,454 | 22.9 | 7.8 |
| **2002** | 216,905 | 53,357 | 6,899 | 19,686 | 90.8 | 42,176 | 19.4 | 5.1 |
| **2003** | 219,623 | 51,190 | 4,627 | 11,511 | 52.4 | 24,785 | 11.3 | 3.4 |
| **2004** | 227,539 | 49,039 | 3,355 | 8,113 | 35.7 | 17,499 | 7.7 | 2.4 |
| **2005** | 216,937 | 43,118 | 3,426 | 10,046 | 46.3 | 21,323 | 9.8 | 2.6 |
| **2006** | 147,638 | 25,282 | | | | | | |
| **Mean 1990-06** | 236,250 | 52,715 | 5,593 | 20,151 | 84 | 42,246 | 17.6 | 3.9 |

The stray rates for Rogue hatchery steelhead programs are low. In the 2005 Oregon Native Fish Status Report, the Rogue summer steelhead SMU passed review criteria for reproductive independence (ODFW 2005). Data on hatchery steelhead collected at the Elk Creek Trap are shown below (Table 1.12-2). Elk Creek trap data are considered a surrogate for stray rates to the spawning grounds. Elk Creek is located only five miles below the hatchery facility, and would be expected to have higher stray rates than other areas in the watershed.

Table 1.12-2. Proportion of hatchery-origin steelhead observed at fish collection trap operated at Elk Creek, 1995-2008.

| Brood Year | Hatchery Steelhead (all adults) | % Hatchery |
|---|---|---|
| **1995** | 7 | 3 |
| **1996** | 18 | 6 |
| **1997** | 22 | 4 |
| **1998** | 7 | 3 |
| **1999** | 10 | 3 |
| **2000** | 4 | 1 |

| | | |
|---|---|---|
| **2001** | 10 | 2 |
| **2002** | 17 | 2 |
| **2003** | 19 | 1 |
| **2004** | 19 | 1 |
| **2005** | 16 | 2 |
| **2006** | 19 | 2 |
| **2007** | 12 | 1 |
| **2008** | 14 | 2 |
| **Average** | **14** | **2%** |

Source: Mike Evenson (2008, personal communication).

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

The program started in 1972.

**1.14) Expected duration of program.**

The program is ongoing with no planned termination date.

**1.15) Watersheds targeted by program.**

Rogue River Section 1: Waterbody code 1500200000.
Rogue River Section 2: Waterbody code 1500300000
Rogue River Section 3: Waterbody code 1500400000
Rogue River Section 4: Waterbody code 1500500000

**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: Release Strategies*
Release of program fish into the mainstem, concurrent with peak outmigration of naturally produced smolts, is a key issue. This practice in fact is part of efforts to ensure that this mitigation program does not diverge from the life history characteristics of the naturally produced population. It's known that released juvenile steelhead prey on newly emergent fry of spring Chinook Salmon (Evenson et al. 1981).

It's also a concern that competitive interaction with coho smolts and predation on newly emergent coho fry may occur. However, most natural Coho Salmon fry are produced in tributary streams of the Rogue River and are thus not susceptible to predation by summer

steelhead smolts of hatchery origin, as hatchery smolts are released into the mainstem of the Rogue River.

*Issue 2: Straying*
Summer steelhead primarily spawn in small and often intermittent streams in the Rogue watershed. For many of these streams, use by other salmonids is minimal, although spawn timing overlaps the spawning of Coho Salmon. Despite the low stray rates in the Rogue watershed, it is possible that spawning activity of hatchery fish in the wild may impact the spawning activity of individual coho or coho redds, which is a concern.

*Issue 3: Broodstock collection*
Collection of summer steelhead at Cole Rivers Hatchery overlaps the collection of Coho Salmon at the facility, although the trapped Coho Salmon are being used as brood for the coho propagation program.

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

The alternatives are drafts only and not necessarily endorsed by the implementing agency.

**Alternative 1**: Terminate Rogue summer steelhead hatchery program.

Pros: The termination of the program will eliminate any possible risk to listed Coho Salmon due to interaction with hatchery summer steelhead. This alternative would ensure no interaction with listed wild and hatchery coho smolts and no risk of predation on newly emergent Coho Salmon fry. This alternative would ensure no interaction between hatchery adults and wild coho adults on the spawning grounds, although there would be no change in Coho Salmon broodstock collection, because Coho Salmon would continue to be collected at the same rate due to the coho propagation program.

Cons: Eliminates the culturally and economically important harvest of hatchery summer steelhead in the recreational fishery. The discontinuation of the program would violate the mitigation agreement that was a key part of final public approval of Dams in the Rogue River Basin, which may cause significant public concern.

**Alternative 2**: Reduce the number of hatchery summer steelhead smolts released into the Rogue River.

Pros: It would reduce the potential risk to listed natural Coho Salmon due to interaction with hatchery summer steelhead. This alternative would minimize potential interaction with listed wild and hatchery coho smolts and decrease the risk of predation on newly emergent coho fry. Also, this alternative would reduce potential interaction between hatchery adults and wild coho adults on the spawning grounds, although there would be no change during broodstock collection, because coho would continue to be collected at the same rate due to the hatchery coho program.

Cons: This alternative would reduce the culturally and economically important harvest of hatchery summer steelhead in the recreational fishery. The reduction could violate the mitigation agreement and may cause significant public concern, as the agreement was a key part of final public approval of dams in the Rogue watershed.

**Alternative 3:** Increase the number of hatchery summer steelhead smolts released into the Rogue River.

Pros: This will provide additional hatchery summer steelhead for the recreational fishery.

Cons: This alternative may increase risk to listed Coho Salmon due to interaction with hatchery summer steelhead. The competitive interaction with coho smolts during outmigration could be for food or rearing habitat, as well as predation on smaller coho fry. Also, it may increase the potential for interaction between hatchery summer steelhead adults and coho adults on the spawning grounds. There would be no change during broodstock collection, because coho would continue to be collected at the same rate due to the hatchery coho program.

### 1.16.3) Potential Reforms and Investments.

Reform/Investment 1: Investigate and implement off-site releases and/or acclimation sites to improve contribution to the fishery, minimize impacts to other species, and continue to minimize the number of hatchery adults that stray and spawn in the wild.

Reform/Investment 2: Survey to find the level of smoltification among various size groups at release, and determine whether facility or procedural improvements are possible to minimize adverse impacts on naturally produced fish and maximize survival to adult.

Reform/Investment 3: Implement additional changes to increase program performance consistent with ODFW's Native Fish Conservation Policy. This may include additional broodstock collection techniques and the use of salvaged, naturally produced fry.

## SECTION 2. PROGRAM EFFECTS ON NMFS ESA-LISTED SALMONID POPULATIONS.

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

The HGMP for this program was submitted to NMFS on 1/22/2009 for ESA permit or take authorization. This is an updated version of the HGMP submitted in 2009.

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

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

The NMFS-listed Southern Oregon Northern California Coast (SONCC) Coho Salmon population may be affected by this propagation program.

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

No direct take of ESA-listed SONCC Coho Salmon is expected due to this summer steelhead program.

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

The ESA-listed populations of SONCC Coho Salmon may be incidentally affected by the

program during program operation. Three populations of SONCC Coho Salmon have been identified in the Rogue River Basin, including populations present in the Illinois River, Middle Rogue River (including Applegate River), and Upper Rogue River (ODFW, 2005).

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

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

The Final Recovery Plan for the Southern Oregon/Northern California Coast Evolutionarily Significant Unit of Coho Salmon (NOAA Fisheries, 2014) lists recovery goals by population. ODFW has expressed concerned about the analysis behind the recovery goals, and has recommended the use of alternate criteria for effective population size.

The Recovery Plan identifies the upper Rogue River Coho Salmon population is identified as a Core, Functionally Independent Population with a Moderate Extinction Risk and an ESU viability recovery goal of 13,800. Key limiting stresses are identified as 'Altered Hydrologic Function' and 'Impaired Water Quality'.

The Middle Rogue/Applegate River Coho Salmon population is identified as a Non-Core, Functionally Independent Population with a High Extinction Risk and an ESU viability recovery goal of 2,400. Key limiting stresses are identified as 'Lack of Floodplain and Channel Structure' and 'Altered Hydrologic Function'.

The Illinois River Coho Salmon population is identified as a Core, Functionally Independent Population with a High Extinction Risk and an ESU viability recovery goal of 11,800. Key limiting stresses are identified as 'Altered Hydrologic Function' and 'Degraded Riparian Forest Conditions'.

ODFW does not routinely monitor Coho Salmon escapement to individual population areas but total escapement of the aggregate populations is estimated at Huntley Park (RM 8). Estimates of run size of Coho Salmon to the Rogue River Basin for 2000-2014 are presented in Table 2.2.2-1 (Sounhein et al. 2015). Estimates of wild fish are based on the observation of fin-marks at the Huntley Park seining site (Jacobs et al. 2002). The estimated escapement of wild Coho Salmon to the Rogue River has ranged from 394 to 24,231 and has averaged 7,369 since 2000.

Table 2.2.2-1. Estimated escapement of naturally produced wild Coho Salmon in the Rogue River, 2000 - 2014. Mark-recapture estimate derived through capture at the Huntley Park seine site (~ River Mile 8).

| Return Year | Adult Wild Coho |
|---|---|
| 2000 | 10,895 |

| | |
|---|---|
| 2001 | 11,654 |
| 2002 | 8,385 |
| 2003 | 6,534 |
| 2004 | 24,231 |
| 2005 | 9,715 |
| 2006 | 3,750 |
| 2007 | 5,103 |
| 2008 | 394 |
| 2009 | 2,566 |
| 2010 | 3,671 |
| 2011 | 4,545 |
| 2012 | 5,474 |
| 2013 | 11,210 |
| 2014 | 2,409 |

Upper Rogue River Population Data--The counting station at Gold Ray Dam was operated between 1942 and 2010. Located at rivermile 126, the station provided a count of most (but not all) Coho Salmon in the upper Rogue population as identified by the National Marine Fisheries Service. Below is a graph of the Coho Salmon count at Gold Ray over time.

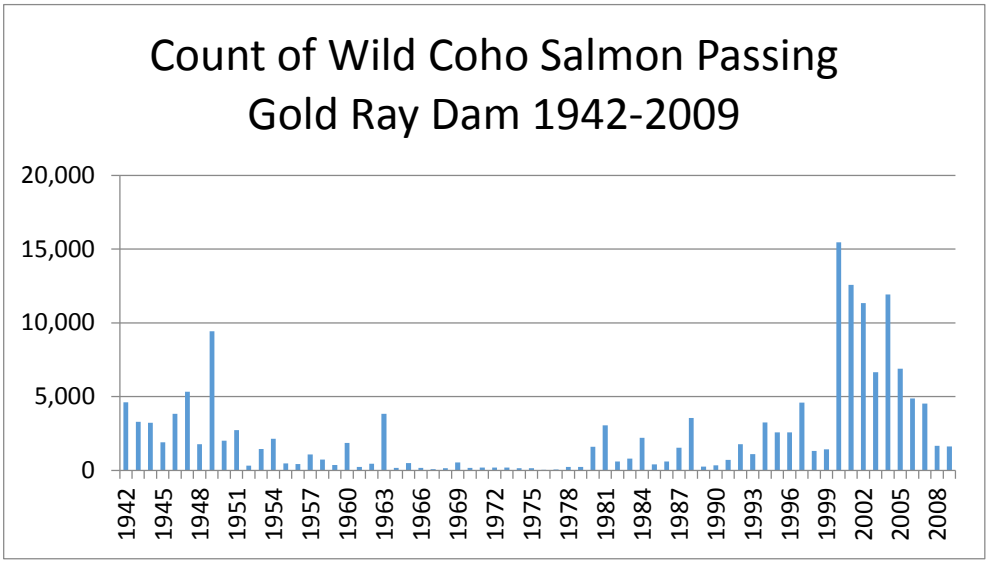



Figure 2.2.2-1—Count of wild Coho Salmon passing Gold Ray Dam over time.

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

Parent-progeny ratios for naturally produced Coho Salmon in the Rogue River Basin can be evaluated based on freshwater returns for the 1993 and later brood years. Earlier years can also be evaluated, but any evaluation would need to account for the marked changes

in the ocean fishery impacts. Mortality impacts in the ocean fisheries were estimated to range between 0.07 and 0.15 during the 1994-2005 fishery years (PFMC 2006), and in earlier years the impacts ranged between 0.27 and 0.87 (PFMC 2006).

The following figure (2.2.2-2) shows recruits per returning adult of Rogue River coho for the brood years 1993-2004. This figure of recruits per spawner has shown no discernable pattern over the 12 year period. Survival has shown dramatic inter-annual variation, ranging from less than one to greater than six recruits per brood year. Spawners failed to replace themselves five times during this period. Productivity rates were highest for the 1998 and 1999 brood years when brood productivity rates averaged about six recruits per returning adult. These estimates were derived from data presented in the previous table.

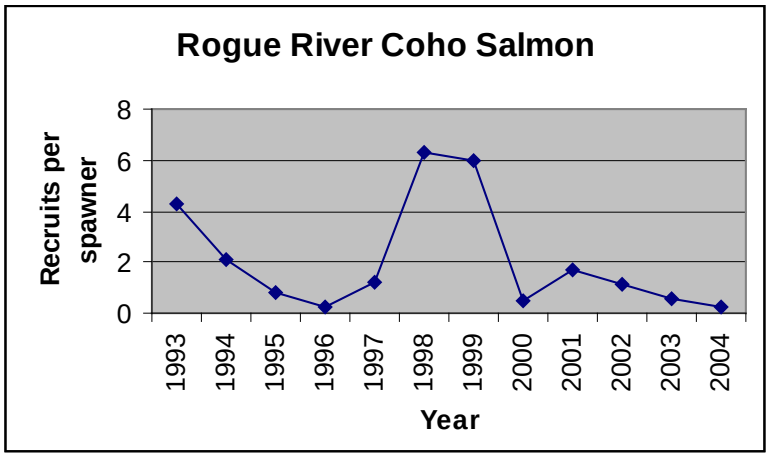



Figure 2.2.2-2. Recruits per spawner of Rogue River Coho Salmon (1993-2004)

Hatchery Coho Salmon produced at Cole Rivers Hatchery have included coded wire tag groups throughout the history of the program. Below is a graph of smolt to adult recruitment over time for Cole Rivers' hatchery-origin Coho Salmon. These data include only ocean harvest and hatchery returns. Poor returns in recent years hint at poor ocean conditions for Coho Salmon.

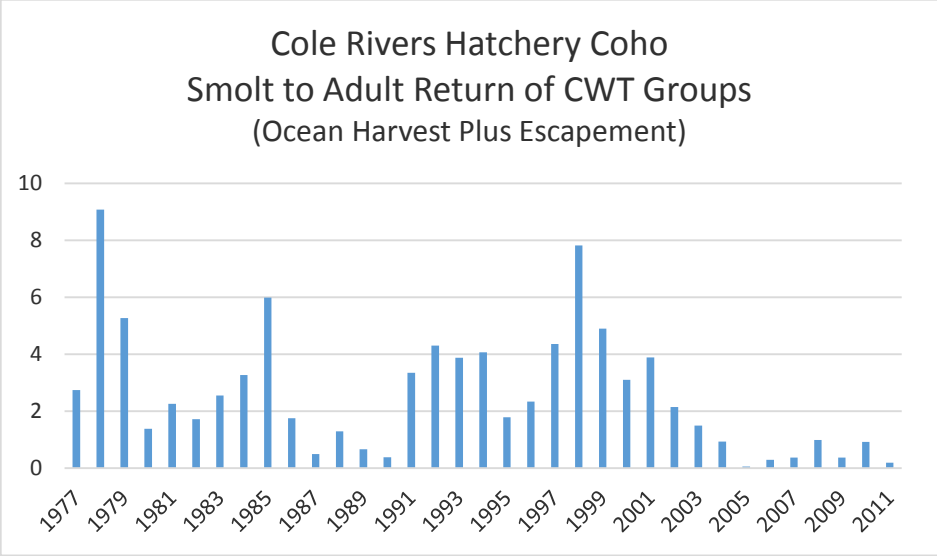



Figure 2.2.2-3. Smolt to adult return for Cole Rivers Coho Salmon over time.

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

A. Estimates of freshwater returns of naturally produced Coho Salmon to the Rogue watershed were presented above (Table 2.2.2-1). The figure below shows the number of adult returns of Rogue River Coho for the years 1980-2015.

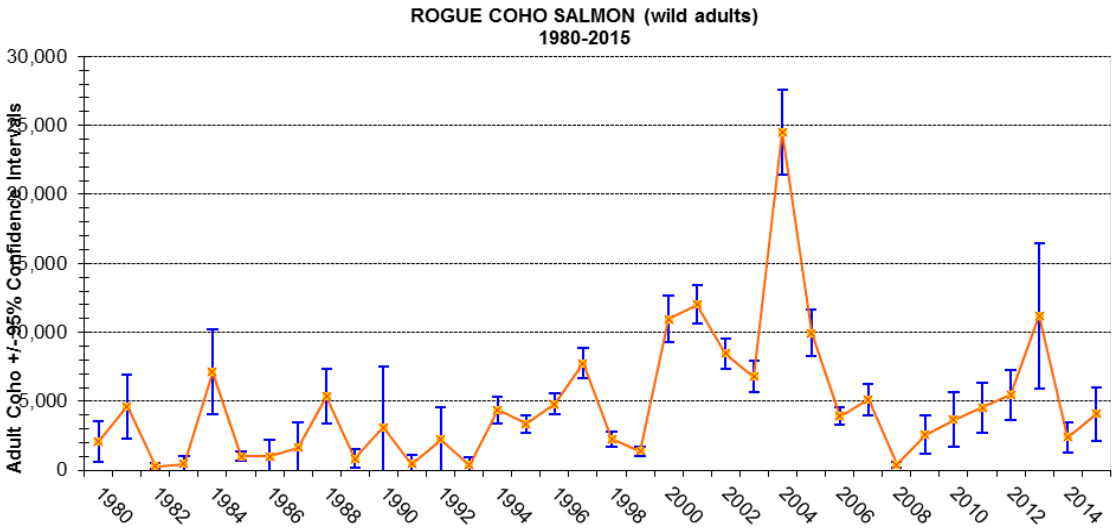



Figure 2.2.2-4. Number of wild adult Coho Salmon returns for the years 1980-2015.

The distribution of adult Coho Salmon spawners among annual random sites in the Rogue River Basin is shown in Figure 2.2.2-4. Spawner densities are adjusted to compensate for differences in spawner abundance among the four return years. What this

figure illustrates is the inter-annual consistency (or variability) of spawner distribution among these sites (Jacobs et al. 2002).

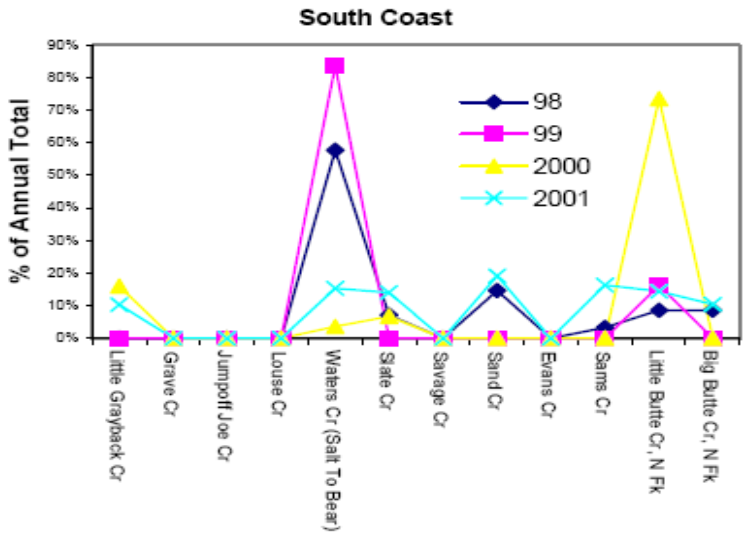



Figure 2.2.2-5 Distribution of adult Coho Salmon spawners among annual random sites in the Rogue River Basin, 1998-2001. Data are plotted as the proportion of annual total abundance among all sites that each individual site comprises. Only sites having valid Area Under the Curve (AUC) estimates in each of the four years are used.

**Juvenile Abundance:**

In the summer of 1998 the Western Oregon Rearing Project began a program to monitor juvenile Coho Salmon in Oregon coastal streams. The project was designed to monitor trends in abundance of juvenile salmonids rearing in five coastal monitoring areas, including the South Coast Monitoring Area (Jepsen and Rodgers, 2004).

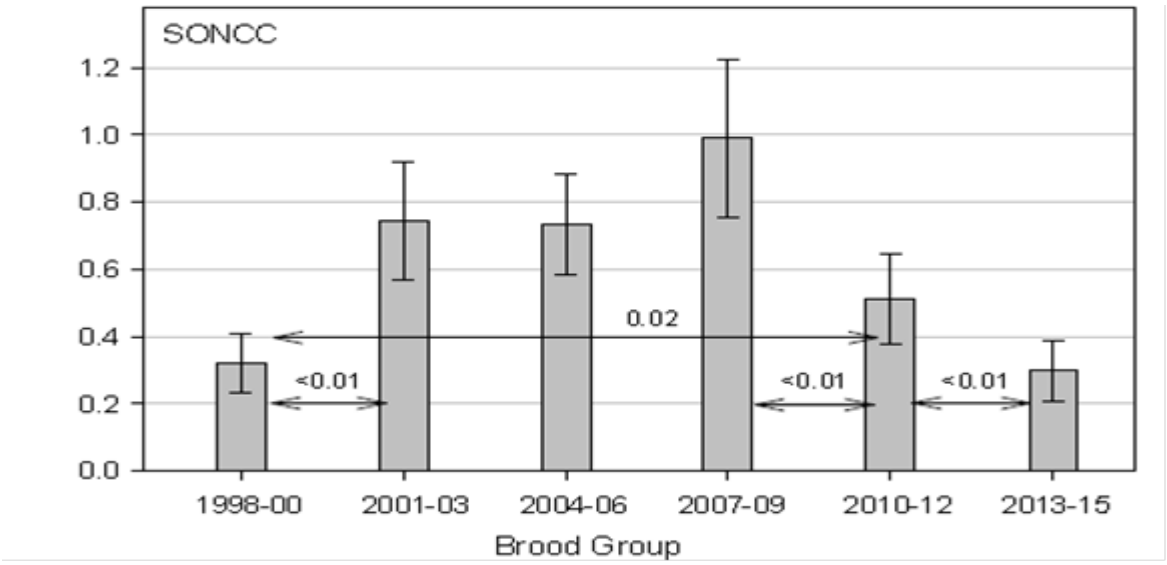


Figure 2.2.2-6. Trends in average pool population estimates of Coho Salmon by brood group in the Rogue portion of the SONCC Coho Salmon ESU. Gray bars show the population estimate (with 95%CI) for the brood group, *p* values for comparisons among brood groups are given above each vertical arrow where differences are significant.

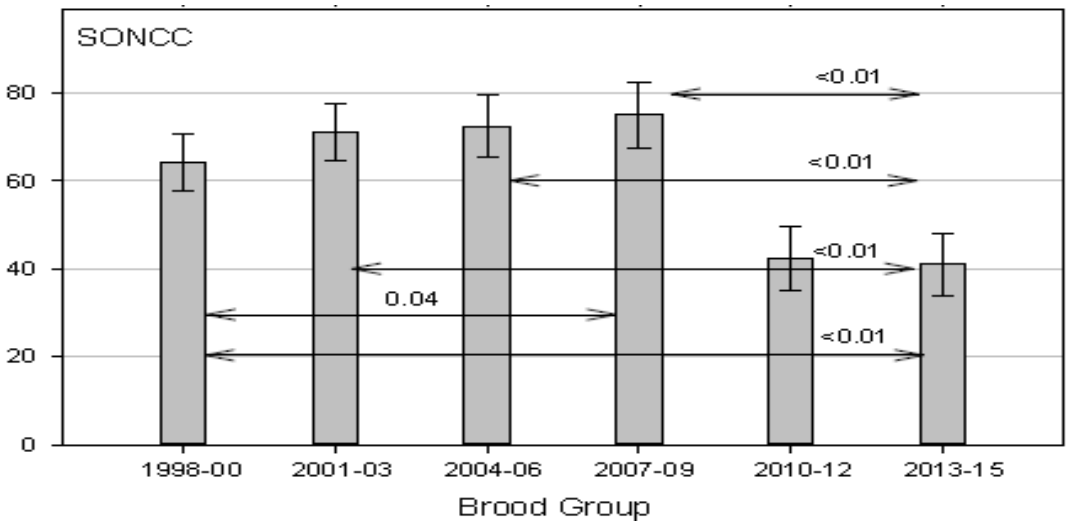



Figure 2.2.2-7. Trends in site occupancy of Coho Salmon by brood group in the Rogue portion of the SONCC Coho Salmon ESU. Gray bars show the percent occupied (with 95%CI) for the brood group, *p* values for comparisons among brood groups are given above each vertical arrow where there is a significant difference.

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

The stray rates for Rogue River hatchery-origin steelhead are low. In the 2005 Oregon Native Fish Status Report, the Rogue winter steelhead SMU passed review criteria for reproductive independence (ODFW 2005). Data on hatchery steelhead (1995-2008) collected at the Elk Creek Trap are presented in Section 1.12 (See page 13, Table 1.12-2). The average percentage of hatchery origin steelhead captured in the Elk Creek Trap was only 2%. Elk Creek Trap data are considered a surrogate for stray rates to the natural spawning grounds. Elk Creek is located only five miles below the hatchery facility, and would be expected to have higher stray rates than other areas of the watershed.

**2.2.3) Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of NMFS 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 take may occur, the risk potential for their occurrence, and the likely effects of the take.**

**Broodstock Collection**

Summer steelhead brood collection occurs at the Cole Rivers Hatchery collection pond. Migrating fish enter and progress up the ladder until trapped. Both returning hatchery fish and naturally produced swim-ins are collected. Adult entry to the hatchery trap extends from mid-May of one year to late April of the next year. Peak returns occur at three times: mid to late July; November-December; and occasionally in mid-February. Brood fish are collected from throughout the run of Rogue River summer steelhead in order to maintain the genetic diversity of the population.

Although the period of adult collection for summer steelhead overlaps adult Coho Salmon entry into Cole Rivers, the program does not necessarily increase interaction with or handling of adult Coho Salmon, because coho adult which enter the hatchery are used as brood for the coho propagation program, which has been described in a separate HGMP.

Changes in summer steelhead broodstock collection may mean additional handling of Coho Salmon adults above the handling that occurs as part of the Rogue coho hatchery program. No changes in brood collection are planned at this time, but may be considered a program improvement in the future.

**Smolt Release**

The hatchery program for summer steelhead is a mitigation program intended to replace lost production. Hatchery smolts are released in the mainstem (220,000 smolts at 4.5 f/lb in late April-early May, with a 100% adipose finclip), primarily on station. Screens are pulled out of the rearing ponds to allow for a volitional emigration into the river. The next day, any remaining fish are crowded out of the rearing ponds.

The released hatchery-produced summer steelhead may have competitive interactions with listed Coho Salmon fry for food and space. But the smolt size at release and release strategy minimizes the interactions with naturally produced fishes including listed Coho Salmon in the Rogue River, as they outmigrate towards the sea soon after their release. The timing of this upper river release matches outmigration peaks of naturally produced wild fish, as observed during smolt trapping on Bear Creek and Little Butte Creek in the upper portion of the watershed.

Coho Salmon spawning occurs almost exclusively in tributary streams, with fry emergence occurring in early April. The mainstem release will have minimal impact because it matches the outmigration of naturally produced summer steelhead smolts, and coho fry are found primarily in tributary streams at this time.

**Presmolt Releases**

At this time, any fry, presmolt and adult releases are implemented at/above reservoirs and other waterbodies (fry and presmolt) outside the current range of anadromous fish species.

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

The summer steelhead program does not necessarily increase handling of Coho Salmon at Cole Rivers Hatchery, because coho trapped at the hatchery are used as brood for the coho propagation program. The adult Coho Salmon handling and collection at Cole Rivers Hatchery follows the procedure described in a separate HGMP for coho propagation. Recent collections are shown below.

Table 2.2.3-1. Past take levels of Coho Salmon adults during brood collection, which overlapped the summer steelhead brood and Coho Salmon brood collection*.

| YEAR | WILD COLLECTED | WILD SPAWNED | WILD MORTALITY | WILD RELEASED |
|---|---|---|---|---|
| **1998** | 61 | 54 | 2 | 3 |
| **1999** | 67 | 38 | 2 | 8 |
| **2000** | 436 | 224 | 5 | 367 |
| **2001** | 903 | 283 | 20 | 488 |
| **2002** | 1006 | 299 | 27 | 767 |
| **2003** | 824 | 306 | 31 | 535 |
| **2004** | 975 | 300 | 2 | 671 |
| **2005** | 391 | 237 | 18 | 121 |
| **2006** | 273 | 199 | 14 | 115 |
| **2007** | 113 | 89 | 8 | 74 |

*Note: All adult Coho Salmon were handled as brood for the Coho Salmon propagation program.

**- 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).**

No adult Coho Salmon will be handled or taken, particularly due to summer steelhead hatchery program. The above Table 2.2.3-1 demonstrates the adult Coho Salmon capture, handling, release and mortalities due to Rogue River Coho Salmon hatchery program.

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

No adult Coho Salmon are expected to be taken as part of the summer steelhead program.

Take of Coho Salmon associated with the coho propagation program at Cole Rivers Hatchery will follow the guidelines described in the HGMP for the Coho Salmon program.

## SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

**3.1) Describe the alignment of the hatchery program with any ESU-wide hatchery plan or other regionally accepted policies. Explain any proposed deviations from the plan or policies.**

**Oregon Plan for Salmon and Watersheds** is a prescriptive set of measures for recovering salmon and steelhead populations and habitats, 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 in Rogue River Basin including nutrient enrichment and monitoring hatchery and wild runs. While many of the particular measures in the OPSW make reference to a particular species, the measures are broadly applicable to all salmonids.

**ODFW Native Fish Conservation Policy:** The Oregon Fish and Wildlife Commission adopted the policy in 2003 to ensure the conservation and recovery of native fish in Oregon, and manage hatchery based fisheries consistent with conservation of naturally produced native species. Conservation plans will provide guidance for hatchery programs for species within the associated Species Management Units.

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

**ODFW Rogue Spring Chinook Salmon Conservation Plan:** The Oregon Fish and

Wildlife Commission adopted the Rogue Spring Chinook Salmon Conservation Plan in July 2007, and the current hatchery program on Rogue River spring Chinook Salmon is consistent with the plan.

**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) USACE/ODFW Cooperative Agreement
(2) ODFW Fish Health Management Policy
(3) ODFW/DEQ MOA: fish carcass distribution in Oregon streams
(4) NPDES permit for Cole Rivers Hatchery operation, to maintain the environmental standards of hatchery effluents.

**3.3) Relationship to harvest objectives.**

Summer steelhead smolts are released primarily into the Rogue River at Cole Rivers Hatchery (river kilometer 253). Some fish are trucked and released downstream. The smolt release maximizes survival rates and minimizes the potential for competition between hatchery and wild juveniles. Adult hatchery-origin summer steelhead returning to the Rogue River are intended to be caught in the recreational fishery, as the program was designed to provide a fishery to mitigate for lost habitat and fish production.

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

The fishery for Rogue summer steelhead is a selective fishery for hatchery fish. Hatchery steelhead on the Rogue River contribute to the sport fishery both as half-pounders and as returning adults, increasing contribution rates for these programs (see Table 1.12-1).

In 1994, the direct economic value of the Rogue River summer steelhead fishery was approximately $5 million. Economic impacts measured as personal income or salaries and wages totaled approximately $5.2 million. These totals resulted from an estimate of 60,092 local resident and 8,446 non-resident summer steelhead trips tallied in an economic study that was conducted from 1992 to 1994 by the Rogue Valley Council of Governments (Olson et al, 1994). The study included interviews of 1,200 anglers who participated in Rogue River fisheries.

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

The climate of the Rogue watershed is more extreme than most of western Oregon, with much hotter and drier summers. Rogue summer steelhead are able to utilize naturally intermittent streams as habitat, and the highest densities of spawners are found in the small tributaries of the mainstem between Grants Pass and Gold Ray Dam (Everest, 1973). These tributaries are located in Western Interior Valley habitat, where human population growth and development is concentrated.

Major factors affecting natural production include impacts to spawning habitat, rearing habitat, access to habitat, ocean conditions, predation, water flows, water quality, and climatic conditions. The Oregon Plan for Salmon and Watersheds lays out measures to be followed by all state agencies including: habitat protection, restoration, harvest, and hatchery refinement measures by Oregon Department of Fish and Wildlife; forest practices revisions by Oregon Department of Forestry; water quality protection by Department of Environment Quality; irrigation diversion monitoring by Water Resources Division; and Senate Bill 1010 implementation by Department of Agriculture, all of which are designed to protect and improve salmonid habitat. Protection of riparian habitat is the responsibility of city and county governments through Oregon's land use system.

The Rogue summer steelhead program is consistent with these habitat protection and recovery strategies, and provides hatchery fish for harvest while naturally produced wild fish must be released unharmed in the fishery.

## 3.5) Ecological interactions.

***(1) Species that could negatively impact program.***
Mammalian predators including otters, harbor seals, sea lions and raccoons may adversely affect the program. Avian predators including the great blue heron, green herons, kingfishers, mergansers, cormorants, osprey, and gulls may negatively impact the program.

***(2) Species that could be negatively impacted by program.***
The listed natural Coho Salmon within the basin could be negatively impacted by the program, but the impact is expected to be minimal due to the life history compatibility of the two populations, and their spatial and temporal differences in habitat utilization. Surveys have found that wild spring Chinook Salmon fry are preyed upon by smolts after release from the hatchery (Evenson et al 1981).

***(3) Species that could positively impact program.***
Any fish (Coho and Chinook Salmon as well as steelhead) that dies (or is recycled for nutrient enrichment) in the basin may positively impact the program.

***(4) Species that could be positively impacted by the program.***
Aquatic species (salmonids, other fish, mammals, birds, etc.) that depend directly or indirectly on salmonids for food and nutrient supply could be positively impacted by the program. Hatchery production has potential for significant influence on predator-prey relationships and community ecology during periods of low natural productivity**.**

## 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.**

The Rogue River is the main source water for Cole Rivers Hatchery. Ambient water is gravity fed to the hatchery from an impoundment formed by a diversion dam. The intake structure is screened with a #4 mesh having 0.178 inch square holes. The supply system will provide up to 300 cfs. Ambient temperatures range from 41.2 $^{o}$F to 56.7 $^{o}$F.

The hatchery's warm water supply is piped from the surface of Lost Creek Reservoir. This warmer water is gravity fed from a floating intake on the powerhouse intake tower, and energy is dissipated in a pool to lower the pressure before it enters the hatchery. The warm water supply system can provide up to 60 cfs, and annual temperatures range from 42.8 $^{o}$F to 72.8 $^{o}$F. When the warm water temperatures rise above 57 $^{o}$F, ambient water is blended to acquire a maximum of 57 $^{o}$F.

Incubation water is pumped from the ambient supply line and is ultraviolet sterilized. Incubation water is all single pass. The facility has the ability to filter all of the water through sand and drum filters. Also, it has boilers and chillers to manipulate growth rates of the developing embryos. The water quality is generally very good, and production at Cole Rivers has not been hampered by available water or its temperatures. The NPDES permit number for effluent discharge is #300J, and is under a general permit issued to ODF&W. The water right for Cole Rivers is for 224 cfs, and the permit number is (S 44910). The facility complies with the water rights, water withdrawals, and annual 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.**

There are no listed fish above the water intake structures, and therefore they are exempt from NOAA Fisheries screening criteria, and downstream barriers prevent anadromous fish from reaching the water intake structures. The water diversion for fish culture is

non-consumptive and is returned to the Rogue River below the hatchery. All wastewater effluent is pumped to a 150' X 100' X 6' asphalt lined pollution abatement settling basin. The water quality of hatchery effluent is monitored and reported quarterly to DEQ as per requirements of the NPDES 300-J permit.

## SECTION 5. FACILITIES

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

Broodstock collection facilities consist of 1-20' X 60' X 6' concrete pond with a finger weir trapping device, and a mechanical crowding device.

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

Cole Rivers has three liberation units assigned to it. One of the units is an insulated 250 gallon pickup driven slip tank with aeration, and oxygen supplementation. The other is a flatbed truck mounted, insulated 1,000 gallon tank, with aeration, oxygen supplementation, and cab mounted dissolved oxygen monitors. The third is an insulated, chassis mounted, 1,600 gallon tank, with aeration, oxygen supplementation, recirculation, and cab mounted dissolved oxygen sensors.

### 5.3) Broodstock holding and spawning facilities.

There are six 20' X 100' X 5' broodstock holding ponds, of which the Rogue summer steelhead occupy only two ponds. Spawning facilities consist of an indoor room with mechanical lifts, sorting tables, spawning tables, and fresh water supplied horse troughs for fish recovery. Fish are anesthetized using electroshock and are mechanically lifted using a self draining brail to lift the fish up to table height.

### 5.4) Incubation facilities.

At Cole Rivers the total incubation capacity consists of 66 stacks of Marisource incubators. Each stack consists of 15 usable trays totaling 990 trays. Only 98 trays are used for the Rogue River summer steelhead egg incubation.

### 5.5) Rearing facilities.

Cole Rivers has 16-14'x3'x3' "Canadian" style fiberglass troughs; 26- 25' X 4' concrete circular ponds; and 87 – 100' X 20' X 5.5' concrete raceways. The Rogue River summer steelhead require the use of up to six Canadian troughs and seven raceways.

### 5.6) Acclimation/release facilities.

Fish are primarily released volitionally on site through both the upstream and downstream release channels located at the tailrace end of the raceways. Some smolts are trucked and released downstream. No acclimation facilities are used for this program at this time, but will be implemented if needed to improve contribution to the fishery. Grade-outs and pre-smolts are stocked using one of the trucks described in Section 5.2, and are stocked directly into the waterbody.

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

A water supply disruption resulted in a loss of 1999 brood spring Chinook Salmon fry. An estimated 1.4 million fry were lost.

**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.**

Even though no listed fish are at issue with this section, Cole Rivers employs many risk aversion measures to protect its program fish and the habitat. These include but not limited to full time staffing with trained personnel assigned to be on-call; back up generator systems that power essential equipment; alarm systems for water levels and intruders; daily alarm system checks; monthly fish health check-ups and pre-release fish health certification by Fish Health Services staff; and disinfection protocols to prevent the spread of disease.

## SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

**Describe the origin and identity of broodstock used in the program, its ESA-listing status, annual collection goals, and relationship to wild fish of the same species/population.**

### 6.1) Source.

The broodstock originated from wild fish entering the collection pond at Cole Rivers Hatchery.

### 6.2) Supporting information.

#### 6.2.1) History.

Production began in 1972, and no selection procedures have been undertaken that would have adversely affected the basic characteristics of the founding broodstock.

#### 6.2.2) Annual size.

The goal is to use as many wild steelhead as possible from naturally produced adults returning to the trap. In years when low numbers of naturally produced fish are collected, marked hatchery produced adults are held for broodstock. Currently, up to 200 pair are kept from the beginning of the run until October 15, up to 200 pair are kept from October 15 – December 31, and up to 200 pair are retained from fish arriving from January 1 – April.

During spawning, the desire is to have eggs from 25 pairs arriving before October 15, and spawning before February 15; 25 pairs arriving before October 15, and spawning after February 15; 50 pairs arriving after October 15, and spawning before February 15; and 50 pairs arriving after October 15, and spawning after February 15. The overriding and prevailing influences on the annual egg take are arrival and spawn timing, and wild fish are used as the primary source as long as the timing fits the four spawning schemes described above. The smolt release goal is to have 1/3 of the smolts from early arriving adults, and 2/3 from late arriving adults; as well as 50% from adults that spawn before February 15, and 50% from adults that spawn after February 15, to inherit the genetic quality of the entire population.

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

Table 6.2.3-1. Percentage of naturally produced fish used in egg takes (1999-2007).*

| Brood Year | Males | Females |
|---|---|---|
| **1999** | No Data | 11.4% |
| **2000** | 7.7% | 2.7% |
| **2001** | 20.8% | 20.0% |
| **2002** | 81.8% | 74.2% |
| **2003** | 72.8% | 63.0% |
| **2004** | 100.0% | 100.0% |
| **2005** | 63.9% | 63.9% |
| **2006** | 24.6% | 25.1% |
| **2007** | 29.9% | 28.4% |

*The proposed level is 100% naturally produced fish as broodstock, whenever possible.

### 6.2.4) Genetic or ecological differences.

ODF&W staff has detected no genetic, phenotypic, or ecological differences between hatchery and naturally produced Rogue summer steelhead.

### 6.2.5) Reasons for choosing.

Summer steelhead stock-52 is native to the Rogue River Basin, remains well-adapted to the basin, and will have minimal adverse impacts on naturally produced summer steelhead in the basin if they interbreed.

## 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.

Even though no listed fish (Coho Salmon) are expected to be impacted by the selection of summer steelhead broodstock, our risk aversion measures to minimize its impacts on naturally produced steelhead include utilizing a majority of wild fish in the broodstock selection and corresponding egg takes, and implementing elements of run timing and spawning timing into the spawn, which shall minimize the genetic impacts if they interbreed in the wild.

# SECTION 7. BROODSTOCK COLLECTION

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

All fish retained for broodstock will be from maturing adults.

## 7.2) Collection or sampling design.

The adult fish are collected at the Cole Rivers Hatchery trap which is a finger weir design, and the collection pond is open year round. Adult entry to the hatchery trap extends from mid-May of one year to late April of the next year. Upstream migration of summer steelhead ends at the barrier weir at the hatchery collection pond.

## 7.3) Identity.

Wild fish are identified by the presence of all fins and are generally described as "unmarked". Adults returning from hatchery origins are identified by scanning the fish for specific missing, or clipped fins. Virtually 100% of the hatchery released smolts are adipose fin-clipped.

## 7.4) Proposed number to be collected:

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

Currently, the program goal is to collect a maximum of 600 pairs of adults to use for broodstock. Male to female spawning ratio used in this program is 1:1.

### 7.4.2) Broodstock collection levels for the last twelve years, or for most recent years available:

| Year | Adults | | | Eggs | Juveniles |
|---|---|---|---|---|---|
| | Females | Males | Jacks | | |
| **1993** | 480 | 556 | 0 | 0 | 0 |
| **1994** | 1531 | 1537 | 0 | 0 | 0 |
| **1995** | 627 | 607 | 0 | 0 | 0 |
| **1996** | 352 | 365 | 0 | 0 | 0 |
| **1997** | 485 | 424 | 0 | 0 | 0 |
| **1998** | 658 | 640 | 0 | 0 | 0 |
| **1999** | 487 | 466 | 0 | 0 | 0 |

| Year | Adults | | | Eggs | Juveniles |
|---|---|---|---|---|---|
| | Females | Males | Jacks | | |
| **2000** | 689 | 821 | 0 | 0 | 0 |
| **2001** | 646 | 661 | 0 | 0 | 0 |
| **2002** | 875 | 845 | 0 | 0 | 0 |
| **2003** | 545 | 531 | 0 | 0 | 0 |
| **2004** | 546 | 550 | 0 | 0 | 0 |
| **2005** | 488 | 511 | 0 | 0 | 0 |
| **2006** | 395 | 431 | 0 | 0 | 0 |
| **2007** | | | 0 | 0 | 0 |

Source: ODFW Hatchery Management System (HMS)

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

Surplus hatchery origin fish are opercle-punched and recycled back downstream into the fishery until January 1 each year, to provide further fishing opportunities. Daily pre-spawning mortality is frozen in totes and later disposed of in a sanitary landfill or processed for rendering. These fish are not used for nutrient enrichment, nor given to any food banks.

All wild fish that are spawned are spawned alive and returned to the river after spawning. Unspawned wild fish are also returned to the river alive with minimal handling stress. Hatchery females are spawned alive and returned to the river after spawning. Hatchery females that are surplus to brood needs may be stripped of eggs and released to the Rogue. Males may be held for release in the future if acceptable techniques can be developed.

Currently, any surplus adults available after January 1 are killed to minimize the risk of disease transmission (IHN). These fish are available for donation to foodbanks, for classroom dissection, and similar uses. Currently most carcasses are being used for nutrient enrichment as part of a Salmon Trout Enhancement Program project. Other uses include use as fertilizer by a local company. Surplus adults were formerly released into local reservoirs for the trout fishery. This practice will be resumed as allowed under ODFW Fish Health Management Policy.

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

Fish are usually transported on the truck less than one hour, and are loaded onto a liberation unit using a powered brail and chute. Fish held for broodstock are usually not treated. Mortality is picked daily, and any unusual losses would be promptly reported to

ODF&W Fish Health Services for treatment recommendations.

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

Footbaths containing 100 ppm iodophor are utilized at the door of the adult area and at the door into the incubation area to prevent the spread of disease. Latex surgical gloves when used are disposed of before leaving the adult area, and all rubberized outerwear is disinfected with 100 ppm iodophor before leaving. Routine samplings from at least 60 adult fish, taken for the detection of any viral infections, are preformed each year. All equipment used during spawning is disinfected with either iodophor or chlorine on a routine basis.

**7.8) Disposition of carcasses.**

Daily pre-spawning mortality is frozen in totes and later disposed of in a sanitary landfill or processed for rendering. These fish are not used for nutrient enrichment, nor given to any food banks.

All wild fish that are spawned are spawned alive and returned to the river after spawning. Unspawned wild fish are returned to the river alive. Hatchery females are spawned alive and returned to the river after spawning. Hatchery males are killed during spawning (males may be held for release in the future if acceptable techniques can be developed). Currently most carcasses are being used for nutrient enrichment as part of a Salmon and Trout Enhancement Program project. Other uses include use as fertilizer by a local company.

**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.**

No adverse genetic or ecological effects are expected, anticipated, or have been observed as a result of this summer steelhead broodstock collection program, because listed Coho Salmon that are trapped during steelhead brood collection are being used for the Coho Salmon propagation program, which has been described in the coho HGMP.

## SECTION 8. MATING

**Describe fish mating procedures that will be used, including those applied to meet**

**performance indicators identified previously**.

**8.1) Selection method.**

Brood are retained throughout the run on a 1:1 male to female ratio, keeping a specified number of fish per week to achieve the goal for that particular period. For example if we need 200 pairs for a nine week period, then we will keep 23 pairs per week. Wild fish are given preference for broodstock, and hatchery fish are used to backfill up to the 23 pairs as needed. All egg groups are labeled and transferred to the incubator trays which are also labeled appropriately.

**8.2) Males.**

Males are used one time only.

**8.3) Fertilization.**

Females are live spawned individually in a bucket, and males are spawned individually in a "dixie" cup. Eggs from each female are fertilized using the milt from one male only. The fertilized eggs are left to stand for 2-3 minutes and are then pooled into one bucket in three mated pair family groups in preparation for incubation.

**8.4) Cryopreserved gametes.**

No cyropreserved gametes are used 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.**

The mating scheme described should pose no risk to listed Coho Salmon. The use of naturally produced wild fish in the mating pool reduces the risk of genetic drift, and the 300 fish spawning pool with 1:1 spawning reduces the threat of gene resource bottlenecking.

## 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 9.1.1-1. Table of egg take and survival rates (1993-2007).

| Brood Year | Eggs Spawned | % Survival To Eyed | # Eggs Shipped | # Excess Culled | % Survival To Swim Up | # Fry Ponded |
|---|---|---|---|---|---|---|
| **1993** | 637,306 | 92.6% | 218,695 | 0 | 86.8% | 394,461 |
| **1994** | 413,385 | 94.2% | 41,891 | 0 | 89.3% | 331,767 |
| **1995** | 639,132 | 92.7% | 81,750 | 209,255 | 82.9% | 288,477 |
| **1996** | 1,073,250 | 93.6% | 64,750 | 625,342 | 77.3% | 296,061 |
| **1997** | 872,613 | 94.6% | 64,000 | 438,460 | 83.0% | 307,288 |
| **1998** | 863,372 | 93.4% | 43,750 | 414,405 | 79.1% | 320,253 |
| **1999** | 664,180 | 92.6% | 0 | 269,161 | 74.0% | 291,161 |
| **2000** | 669,147 | 93.6% | 0 | 344,814 | 83.9% | 272,231 |
| **2001** | 630,484 | 91.8% | 0 | 263,939 | 81.2% | 297,794 |
| **2002** | 456,906 | 93.0% | 250 | 142,853 | 85.6% | 268,478 |
| **2003** | 482,744 | 89.8% | 0 | 111,625 | 82.7% | 306,797 |
| **2004** | 606,301 | 88.8% | 0 | 213,374 | 78.4% | 308,063 |
| **2005** | 474,662 | 90.2% | 0 | 0 | 85.0% | 403,510 |
| **2006** | 624,991 | 89.1% | 0 | 215,122 | 78.4% | 321,458 |
| **2007** | 820,042 | 85.5% | 0 | 336,764 | 63.2% | 305,623 |

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

Surplus eggs and/or fry may be destroyed when these are in excess of program needs. Enough green eggs are taken to fulfill the requirements of the four groups described in Section 6.2.2. Often fecundity rates and survival exceed estimates and surplus alevins are randomly culled from the population with preference to wild progeny, parental run timing, and spawning timing. Eggs and/or fry are disposed of by freezing in totes and disposed of in a sanitary landfill or processed for rendering.

### 9.1.3) Loading densities applied during incubation.

Average fecundity is 2,400 eggs per female and eggs are trayed down at the rate of three females per tray, for an average rate of 7,200 total eggs per tray. Flow rates are set at 5 GPM, checked daily and maintained throughout the incubation period. When eye up occurs at about 400 temperature units the eggs are shocked, picked, enumerated and re-incubated at the rate of 6,000 per tray. Hatching occurs between 500 – 600 temperature units, and button up occurs between 1,100-1,150 temperature units.

### 9.1.4) Incubation conditions.

Flows are set at five GPM and monitored daily. Temperatures can be manipulated, and usually are, using boilers and chillers, to achieve temperatures from 40-54$^{o}$F. Temperatures are manipulated to achieve the same size for all groups of fry for a

common ponding date. Temperatures are monitored daily. Dissolved oxygen levels are not routinely monitored, and are only taken if deemed necessary. Incubation water is generally UV sterilized, filtered, and aerated prior to exposure to the eggs.

### 9.1.5) Ponding.

Ponding occurs at an estimated 99% button up usually between 1,100-1,150 temperature units. Fry are ponded in "Canadian" troughs between 2,500 and 3,000 fish per pound, and the ponding process is forced. Ponding occurs in late April- Early May.

### 9.1.6) Fish health maintenance and monitoring.

All eggs are water hardened in a bath solution of 100 ppm PPV buffered iodophor for 15 minutes when first trayed down. Fish Health Services staff examine the visceral tissues and ovarian fluids to detect the presence of any pathogens. Fertilized, healthy eggs are treated on weekdays with a formalin solution to control fungal infections. Dead or diseased eggs are removed during the shocking process using a mechanical picker or salt bath, and hand tools. Dead and diseased fry are removed one day after ponding using hand tools, and the dead material is frozen in totes and disposed of in a local landfill or processed for rendering. All equipment and tools used during incubation are cleaned and sterilized between uses using either iodophor or bleach solutions.

### 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 summer steelhead population in the Rouge Basin is not an ESA-listed population. However, to minimize the genetic and ecological effects on the wild population, eggs are incubated in four subgroups for each egg take based on arrival time, spawn time, and wild or hatchery parentage. At the eyed stage, all eggs within each subgroup are mixed to help randomize any later reductions that could create bias. Catastrophic losses are minimized due to alarm systems and 24 hour surveillance.

## 9.2) <u>Rearing</u>:

### 9.2.1) Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling to smolt) for the most recent 12 years or for years dependable data are available.

Table 9.2.1-1. Survival rates of fry to fingerling, and fingerling to smolt stages of

summer steelhead at Cole Rivers Hatchery.

| Brood Year | # Ponded | % Survival to Fingerling | % Survival to Smolt | # Smolt Released |
|---|---|---|---|---|
| **1992** | 479,816 | 84.8% | 84.6% | 293,139 |
| **1993** | 394,461 | 93.0% | 91.8% | 214,441 |
| **1994** | 331,767 | 96.4% | 96.1% | 281,617 |
| **1995** | 288,477 | 96.4% | 96.2% | 234,502 |
| **1996** | 296,061 | 93.6% | 92.9% | 226,076 |
| **1997** | 307,288 | 81.2% | 80.1% | 228,622 |
| **1998** | 320,253 | 83.8% | 83.2% | 219,837 |
| **1999** | 292,161 | 93.4% | 92.7% | 235,661 |
| **2000** | 272,231 | 90.9% | 90.6% | 229,134 |
| **2001** | 297,794 | 91.0% | 90.4% | 216,905 |
| **2002** | 268,478 | 78.4% | 77.9% | 219,623 |
| **2003** | 306,797 | 88.2% | 88.0% | 227,539 |
| **2004** | 308,063 | 86.7% | 83.2% | 216,937 |
| **2005** | 403,510 | 49.5% | 40.5% | 147,638 |
| **2006** | 321,457 | 86.8% | 72.0% | 225,397 |

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

Fry are ponded into six "Canadian" troughs at the rate of 18 pounds of fry per trough. This is equivalent to 0.034 pounds per cubic foot of space and 1.8 pounds per GPM flow. Flows are increased as fish grow and when the size of fish approaches 100 pounds per trough they are transferred to outside raceways, usually in early – mid June at a size of 400 – 600 fish per pound. The maximum densities when transferred are 0.21 pounds per cubic foot of space, and 5.4 pounds per GPM flow. The final density goal is not expected to exceed 1.0 pounds per cubic foot of space, and 8.0 pounds per GPM of flow. For the 2003 brood released in 2004, the highest density of all of the raceways at release was 0.95 pounds per cubic foot of space, and 5.7 pounds per GPM.

### 9.2.3) Fish rearing conditions.

Various water sources and fish facilities are described in sections 4.1, 5.3, and 5.5. Water temperatures are recorded daily from the various sources. Dissolved oxygen levels are taken at times of crisis or as needed as densities approach limits. Ponds are screened to prevent the escape of fish. Avian predator mesh covers the raceways. Any debris and wastes are broomed from the raceway bottom weekly.

### 9.2.4) Indicate biweekly or monthly fish growth information, including length, weight, and condition factor data collected during rearing, if available

Table 9.2.4-1. Fish growth expressed in number of fish per pound (BY 1999-2003)

| MONTH | BY 99 | BY 00 | BY 01 | BY 02 | BY 03 | AVG (99-03) |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| **APR** | 2750 | 2750 | 2750 | 2750 | 2529 | 2706 |
| **MAY** | 936 | 517 | 581 | 1363 | 312 | 742 |
| **JUN** | 132 | 183 | 167 | 379 | 189 | 210 |
| **JUL** | 75 | 94 | 99 | 177 | 110 | 111 |
| **AUG** | 34 | 33 | 38 | 91 | 91 | 57 |
| **SEPT** | 20 | 21 | 29 | 46 | 33 | 30 |
| **OCT** | 12 | 12 | 19 | 27 | 19 | 18 |
| **NOV** | 9.1 | 9.3 | 15 | 16 | 14 | 13 |
| **DEC** | 8.4 | 8.4 | 213 | 15 | 10 | 11 |
| **JAN** | 7.0 | 7.4 | 9.5 | 12 | 8.9 | 9.0 |
| **FEB** | 6.0 | 5.7 | 7.8 | 7.0 | 7.3 | 6.8 |
| **MAR** | 4.9 | 5.3 | 6.3 | 6.0 | 5.2 | 5.5 |
| **APR** | | 4.3 | 4.5 | 4.3 | | 4.4 |
| **FINAL** | 4.5 | 4.3 | 4.1 | 4.3 | 4.6 | 4.4 |

Table 9.2.4-2. Fish growth expressed in number of fish per pound (BY 2004-2006)

| **MONTH** | **BY 04** | **BY 05** | **BY 06** | **AVG (03-05)** |
|---|---|---|---|---|
| **APR** | 2547 | N/A | 2200 | 2374 |
| **MAY** | 674 | 1349 | 805 | 943 |
| **JUNE** | 186 | 655 | 257 | 366 |
| **JUL** | 85 | 241 | 106 | 144 |
| **AUG** | 47 | 99 | 54 | 67 |
| **SEPT** | 32 | 52 | 41 | 42 |
| **OCT** | 30 | 25 | 21 | 25 |
| **NOV** | 19 | 17 | 16 | 17 |
| **DEC** | 15 | 14 | 13 | 14 |
| **JAN** | 12 | 11 | 12 | 11.7 |
| **FEB** | 9.2 | 8.3 | 11 | 9.5 |
| **MAR** | 6.6 | 6.5 | 8.2 | 7.1 |
| **APR** | 5.0 | 5.8 | 5.6 | 5.5 |
| **FINAL** | 5.0 | 5.8 | 5.6 | 5.5 |

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

Table below shows the food conversion rates at different sizes (length) of fish from fry to smolt stage (a predicted schedule for a 220,000 smolt production from ponding to smolt release).

| **DATE** | **TEMP F** | **LENGTH** | **#/LB** | **% BOD WT** | **LB FED/D** | **FOOD CONV** |
|---|---|---|---|---|---|---|
| **04/30** | 55.5 | 1.11 | 1995 | 7.513 | 8.28 | 1.2 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **05/31** | 58.5 | 1.87 | 417 | 5.037 | 26.6 | 1.2 |
| **06/30** | 58.6 | 2.65 | 146 | 3.559 | 53.75 | 1.2 |
| **07/31** | 59.0 | 3.46 | 65 | 2.758 | 93.38 | 1.2 |
| **08/31** | 58.6 | 4.28 | 34 | 2.199 | 141 | 1.2 |
| **09/30** | 58.0 | 5.06 | 21 | 1.820 | 192 | 1.2 |
| **10/31** | 55.9 | 5.82 | 14 | 1.455 | 234 | 1.2 |
| **11/30** | 49.4 | 6.44 | 10.1 | 0.955 | 208 | 1.2 |
| **12/31** | 44.8 | 6.90 | 8.2 | 0.658 | 176 | 1.2 |
| **01/31** | 40.8 | 7.24 | 7.2 | 0.432 | 134 | 1.2 |
| **02/28** | 44.2 | 7.53 | 6.3 | 0.573 | 199 | 1.2 |
| **03/31** | 49.2 | 7.97 | 5.3 | 0.762 | 314 | 1.2 |
| **FINAL** | 53.3 | 8.35 | 4.65 | 0.902 | 427 | 1.2 |

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

See table above under sections 9.2.4 and 9.2.5 for further information. The starting diet is Bio BVS mash, followed by BVS size #0. The fish are then switched to BCS #1 and #2, before being fed BCF through to releases. Feed is fed to the fish using automatic timed feeders, and supplemented by hand to observe feeding habits.

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

Fish health and behavior are monitored daily. Any mortality is picked, discarded and recorded. Any unusually high losses are reported to ODFW Fish Health Services for investigation. Fish Health Services performs monthly site visits for routine sampling and pre-liberation checkups. Infections/diseases of either parasitic or bacterial origin are treated as prescribed by Fish Health Services. Empty raceways are pressure washed and sun dried in preparation for incoming groups of fish. All equipment used in the raceways is disinfected with iodophor or bleach solutions prior to their use.

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

No gill ATPase enzyme activity or other quantitative analysis is performed. Degree of smoltification is determined by fish behavior, age of fish, fish size, time of year, scale loss, coloration, and body elongation characteristics.

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

No natural rearing strategy is applied except that the natural water of Rogue River is used for fish rearing.

**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 summer steelhead population which is under propagation is not a listed population. However, all raceways are securely screened to prevent the escape of propagated fish prematurely. Fish rearing practices are programmed in a way that all fish will achieve full smolt stage at the desired time of year to optimize outmigration. Size at release and time of release are planned to mimic the characteristics of the natural population.

## 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 (fpp) | Release Date | Location |
|---|---|---|---|---|
| **Eggs** | 0 | NA | NA | NA |
| **Unfed Fry** | 6,000* | NA | NA | Rogue R 3-4 |

| Age Class | Maximum Number | Size (fpp) | Release Date | Location |
|---|---|---|---|---|
| **Fry** | 0 | NA | NA | NA |
| **Fingerling** | 40,000 | 60 | 8/31-10/31 | Standing waterbodies |
| **Smolt** | 220,000 | 4.5 | Late April | Rogue R. R-3, R-4 |

Note: Aditional, fry or fingerling may be released into waterbodies outside the current range of anadromous fish species.
*Classroom Incubators Program.

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

**Stream, river, or watercourse:** Rogue River 1500500000,
**Release point:** Rogue River 42 39’ 39.4” N, 122 41’ 02.6” W
**Major watershed:** Rogue River
**Basin or Region:** Rogue River Basin

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

Table 10.3-1. Cole Rivers Hatchery summer steelhead past releases by age class (1993-2015).

| Release year | Eggs/ Unfed Fry | Avg size | Fry* | Avg size | Fingerling* | Avg size | Smolt | Avg size |
|---|---|---|---|---|---|---|---|---|
| **1993** | 212,234 | 2750 | 0 | NA | 123,497 | 38.8 | 293,139 | 4.51 |
| **1994** | 40,489 | 2750 | 0 | NA | 117,794 | 62.0 | 214,441 | 4.24 |
| **1995** | 70,397 | 2750 | 0 | NA | 33,203 | 39.9 | 281,617 | 4.48 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **1996** | 60,263 | 2750 | 0 | NA | 102,805 | 38.1 | 234,502 | 4.25 |
| **1997** | 59,458 | 2750 | 0 | NA | 24,344 | 22.9 | 226,076 | 4.34 |
| **1998** | 42,336 | 2750 | 0 | NA | 19,195 | 30.0 | 222,122 | 4.61 |
| **1999** | 0 | NA | 45,211 | 345 | 0 | NA | 219,837 | 5.20 |
| **2000** | 0 | NA | 0 | NA | 17,201 | 33.6 | 235,661 | 4.53 |
| **2001** | 0 | NA | 0 | NA | 0 | NA | 229,134 | 4.32 |
| **2002** | 125 | 2750 | 0 | NA | 85,464 | 26.2 | 216,905 | 4.07 |
| **2003** | 0 | NA | 0 | NA | 0 | NA | 219,623 | 4.29 |
| **2004** | 0 | NA | 0 | NA | 69,354 | 17.5 | 227,539 | 4.64 |
| **2005** | 0 | NA | 0 | NA | 0 | NA | 216,937 | 5.03 |
| **2006** | 0 | NA | 0 | NA | 0 | NA | 147,638 | 5.84 |
| **2007** | 0 | NA | 0 | NA | 0 | NA | 225,359 | 6.53 |
| **2008** | 0 | NA | 0 | NA | 0 | NA | 229,025 | 4.26 |
| **2009** | 235,442* | 2750 | 0 | NA | 0 | NA | 240,393 | 4.67 |
| **2010** | 0 | NA | 0 | NA | 0 | NA | 220,673 | 4.81 |
| **2011** | 0 | NA | 0 | NA | 0 | NA | 169,924 | 6.11 |
| **2012** | 0 | NA | 0 | NA | 0 | NA | 228,357 | 6.60 |
| **2013** | 0 | NA | 0 | NA | 0 | NA | 211,610 | 7.30 |
| **2014** | 0 | NA | 0 | NA | 90,450 | 45.0 | 192,450 | 5.10 |
| **2015** | 0 | NA | 0 | NA | 0 | NA | 230,000 | 4.50 |
| **Average** | **22,059** | **2750** | **45,211** | **345** | **64,891** | **28.7** | **223,172** | **4.89** |

*Surplus fish released into reservoirs.
Source: ODFW HMS database.

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

Table 10.4-1. Actual dates of fish release, life stage and method of release (1999 - 2015).

| BROOD YEAR | RELEASE DATE(S) | LIFE STAGE* | RELEASE TYPE |
|---|---|---|---|
| **1999** | 9/2/1999 | Fingerling | Forced |
| **1999** | 4/24 -27/2000 | Smolt | Volitional/Forced |
| **2000** | 5/1-3/2001 | Smolt | Volitional/Forced |
| **2001** | 9/25/2001 | Fingerling | Forced |
| **2001** | 5/7/2002 | Smolt | Volitional/Forced |

| | | | |
|---|---|---|---|
| **2002** | 4/16/2002 | Fry | Forced |
| **2002** | 5/5-6/2003 | Smolt | Volitional/Forced |
| **2003** | 12/12/2003 | Fingerling | Forced |
| **2003** | 4/28/2004 | Smolt | Volitional/Forced |
| **2004** | 4/25-28/2005 | Smolt | Volitional/Forced |
| **2005** | 4/25-27/2006 | Smolt | Volitional/Forced |
| **2006** | 4/6/2007, 5/1-2/2007 | Smolt | Volitional/Forced |
| **2007** | 4/28-30/2008 | Smolt | Vilitional/Forced |
| **2008** | 4/27-29/2009 | Smolt | Volitional/Forced |
| **2009** | 5/7/2009 | Fry | Forced |
| **2009** | 5/3-5/2010 | Smolt | Volitional/Forced |
| **2010** | 4/26-28/2011 | Smolt | Volitional/Forced |
| **2011** | 4/23-25/2012 | Smolt | Volitional/Forced |
| **2012** | 4/24/2013 | Smolt | Volitional/Forced |
| **2013** | 4/28-29/2016 | Smolt | Volitional/Forced |
| **2014** | 10/14-11/13/2014 | Fingerling | Forced |
| **2014** | 4/23-29/2015 | Smolt | Volitional/Forced |
| **2015** | 4/25-26/2016 | Smolt | Volitional/Forced |

*Fry and fingerling releases were surplus fish and released to reservoirs.
Source: ODFW HMS database.

In standing waterbodies, fingerlings are released forcibly from a tank truck. The dates usually coincide with the outcome of final grading and splitting for final rearing purposes. These fingerlings are surplus to the program's production goals.

The timing of smolt releases has been chosen to be late April – early May to best coincide with the outmigration of natural smolts in the Rogue River.

The smolt releases are primarily considered "volitionally then forced", by lowering the water in the raceway(s) down to a level that matches the level in the release channel at the outfall of the raceways, pulling one screen up, and leaving up overnight. Any fish remaining in the raceway(s) the next morning are forced out into the release channel, and any fish remaining in the release channel are forced out into the river.

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

Fingerlings stocked by truck are loaded using a fish pump, and hand loaded as necessary using crowders and dipnets. There is no temperature control devices on any of the trucks used in this program. Oxygen supplementation is provided by a bottled source, and dispersed through ceramic diffusers at a rate of 2-4 liters per minute. Levels are

monitored with a meter inside the cab. Additional oxygen supplementation is provided by powered aerators and water pump recirculation. Oxygen levels are maintained using these three methods to be above at least 10 ppm throughout loading and transport. Fish are generally in the truck tank less than one hour, and densities do not exceed 1.0 lb fish/gallon of total tank volume.

**10.6) Acclimation procedures.**

There are no acclimation devices or procedures utilized in the program at this time. This has been described in Section 1.16 as a potential alternative/investment for the program.

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

Fingerling releases into standing water bodies or tributaries above Dams may be released unmarked. Smolt releases into the Rogue River are 100% marked with an adipose clip.

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

Surplus fish that are in excess of program needs/goals are released into standing waterbodies to generate additional fishing opportunities.

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

Fish Pathologists of ODFW Fish Health Service perform a pre-release examination within 30 days of the scheduled release of all fish of this stock. Any infected or diseased raceways are treated as necessary and prescribed, allowed to withdraw from the therapy as recommended, re-checked, and released if cleared to do so. Any raceways deemed unfit for release shall be destroyed, or stocked in water bodies where the infection may not cause any significant impacts. The decision to not stock smolt fish as scheduled would be a joint decision between the hatchery manager, ODFW Fish Health Service, ODFW Fish Division, ODFW SW Region and Rogue Watershed staff, and consultation with appropriate NOAA Fisheries staff as needed.

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

Emergency releases of fingerling fish in standing water bodies can occur at the discretion of the hatchery manager anytime prior to their scheduled release time as long as they are certified disease free, are within 20% of scheduled release numbers, and are stocked only in scheduled water bodies. Emergency smolt releases can occur, at the discretion of the hatchery manager, within 60 days of their scheduled release, as long as the fish have been properly marked, are within 20% of scheduled release numbers, are stocked in scheduled water bodies, and are certified disease free. Emergency release of smolts earlier than 60 days prior to their scheduled release would be a joint management decision between the ODFW Rogue Watershed staff, ODFW Southwest Region staff, ODFW Fish Division

staff, the Cole Rivers Hatchery manager and consultation with appropriate NOAA Fisheries staff as needed.

**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.**

Smolt releases of Cole Rivers Hatchery summer steelhead are programmed to be at full smolt stage during the peak outmigration period in the spring of the year. Release of fish at full smolt stage will enhance the speed of outmigration, and the likelihood of residualization shall be low, and thus will reduce the competitive interactions with listed natural Coho Salmon in the watershed.

# 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.**

Indicator--All smolts will be adipose fin-clipped.

- Preliberation mark retention examination will be conducted to confirm mark rate.

Indicator--Returning adults contribute to the freshwater fishery.

- Punchcard data will provide indexes of total harvest.
- Freshwater angler creel will be conducted on a periodic basis.

Indicator--Program will adequately mitigate for the habitat lost due to USACE built

Dams.

- Punchcard data will provide indexes of total harvest.
- Freshwater angler creel will be conducted on a periodic basis.
- Counts of returning steelhead will be maintained at Huntley Park and Cole Rivers Hatchery.

Indicator--Economic benefit to rural communities of Curry, Josephine and Jackson counties.

- Periodic creel and evaluation of the economic benefits provided by the hatchery program and associated sport fishery.

Indicator--Release groups will meet ODFW fish health standards.

- Conduct appropriate health checks throughout incubation, rearing, and prior to release.

Indicator--A Conservation Plan will be developed for the appropriate Species Management Unit (SMU).

- Procedures for assessing stock status and risks will be developed in conjunction with the Conservation Plan.

Indicator--Broodstock collection reflects the run timing and age classes represented in the natural population.

- Data on adult return timing and spawning maintained by hatchery staff.

Indicator--Release of program fish mimic the emigration of naturally produced summer steelhead.
Indicator--Behavioral and morphological characteristics of program fish are similar to naturally produced summer steelhead

- Length frequency and size at release data will be maintained by hatchery staff.

Indicator--Program fish are released within the period of peak outmigration for naturally produced smolts.

- Releases shall be made as per scheduled time and locations.

Indicator--Hatchery operations conform to applicable fish health, sanitation, and operational guidelines.

- Fish health is certified prior to release.

Indicator--Hatchery operations conform to DEQ/NPDES guidelines for water quality.
Indicator--Facility intakes are screened appropriately.

- Appropriate protocols will be followed for monitoring water quality as per NPDES permit requirements and data will be reported to DEQ for compliance.
- Screens will be checked on a regular basis.

Indicator--The program does not increase interaction with Coho Salmon. Handling of adult Coho Salmon at Cole Rivers will follow the procedures outlined in the HGMP for

the Rogue River Coho Salmon propagation program.
Indicator--Any brood collection that increases projected take levels of Coho Salmon will be reviewed with NMFS staff prior to implementation.

- Maintain accurate collection data for summer steelhead and Coho Salmon at Cole Rivers for further evaluation.

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

Most actions are conducted as part of existing district, hatchery, and fish health program workload. Additional funding and assistance will be needed for future creel surveys, economic evaluation.

**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.**

No adverse effects on listed natural fish are expected from monitoring and evaluation activities planned for the Rogue River summer steelhead program. The following monitoring activities for this program shall be conducted:

- Annual preliberation exam to confirm retention of mark rate.
- Punchcard data will provide index of total harvest.
- Freshwater angler creel will be conducted on a periodic basis.
- Periodic evaluation of the economic benefits.
- Conduct appropriate health checks throughout incubation, rearing, and prior to release
- Procedures for assessing stock status and risks will be developed by ODFW for the SMU
- Data on adult return timing and spawning maintained by hatchery staff.
- Length frequency and size of smolts at release data will be maintained by hatchery staff.
- Releases shall be made as per scheduled time and locations.
- Fish health is certified prior to release.
- Appropriate protocols will be followed for monitoring water quality.
- Screens will be checked on a regular basis.
- Maintain accurate collection data for summer steelhead and Coho Salmon at Cole Rivers for further evaluations.

## SECTION 12. RESEARCH

**12.1) Objective or purpose.**

No research program is planned under the Rogue River summer steelhead program. Projects to improve performance of the program may be implemented in the future by ODFW and/or volunteers in the Salmon and Trout Enhancement Program (STEP).

**12.2-12.12)** Not applicable to the Rogue River summer steelhead program

## SECTION 13. ATTACHMENTS AND CITATIONS

**Citations:**

Evenson, M.D., R.D. Ewing, E.K. Birks, A.R. Hemmingsen, and J. Dentler. 1981. Cole Rivers Hatchery evaluation. Oregon Department of Fish and Wildlife, Fish Research Project AFS-71-4, Annual Progress Report, Portland.

Everest, F.H. 1973. Ecology and Management of Summer Steelhead in the Rogue River. Fishery Research Report Number 7, Oregon State Game Commision Final Report.

Jacobs S., J. Firman, G. Susac, D. Stewart and J. Weybright 2002. Status of Oregon coastal stock of anadromous salmonids, 2000-2001 and 2001-2002; Monitoring Program Report Number OPSW-ODFW-2002-3, Oregon Department of Fish and Wildlife, Salem, Oregon.

Jepsen, D.B. and Rodgers, J.D. 2004. Abundance Monitoring of Juvenile Salmonids in Oregon Coastal Streams, 2002-2003. Monitoring Program Report Number OPSW-ODFW-2003-1, Oregon Department of Fish and Wildlife, Salem, Oregon.

ODFW. 2005. Oregon Native Fish Status Report 2005 Public Draft. Oregon Department of Fish and Wildlife, Salem, Oregon.

Olsen, D., J.Richards, C. Carter, R. Jones, and R. Baxter, 1994. Rogue River Sport Fisheries Economic Valuation Study, Rogue Valley Council of Governments.

PFMC 2006. 2006 Preseason Report I. Pacific Fishery Management Council, Portland, Oregon.

Vogt, J. 2004. Upper Rogue Smolt Trapping project, 2004. Oregon Department of Fish and Wildlife, Central Point, Oregon.

Personal Communications

John Leppink. Email message with ODFW punchcard harvest estimates, February 28, 2008. Oregon Department of Fish and Wildlife, Salem Oregon.

Mark Lewis. Email message with Rogue coho summary table, January 29, 2007. Oregon Department of Fish and Wildlife, Corvallis Oregon.

Mike Evenson. Email message on corrected table of Elk Creek Trap data, March 26, 2008. Biologist, Rogue FishBio Services, Inc.

Rene Pellisier. Email message on Gold Ray coho data, August 11, 2008. Gold Ray fish counter, Oregon Department of Fish and Wildlife, Central Point Oregon.

Tom Satterthwaite. Email message on basic fishery metrics associated with steelhead production at Cole Rivers Hatchery, March 31, 2008. Fishery Biologist, Oregon Department of Fish and Wildlife, Grants Pass Oregon.

Tom Satterthwaite. Email message on estimated freshwater returns of coho salmon to the Rogue River, Sept.1, 2008. Fishery Biologist, Oregon Department of Fish and Wildlife, Grants Pass.

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

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

Name and Title of Applicant: Russell Stauff, Rogue Watershed District Manager, West Region, ODFW

Signature of Applicant: _____ Date: _____

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

Signature: _____ Date: _____

## Attachment 1. ESA take table.

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

| | | | | |
|---|---|---|---|---|
| **Listed species affected: Coho Salmon ESU/Population: Southern Oregon Northern California Coast (SONCC) Coho Salmon ESU**<br>**Activity: Broodstock collection for summer steelhead and Coho Salmon (captured adult Coho Salmon are used as broodstock for Coho Salmon hatchery program).** | | | | |
| **Location of hatchery activity: Rogue River (RM 157) Dates of activity: April - August**<br>**Hatchery program operator: Oregon Department of Fish and Wildlife (ODFW)** | | | | |
| | **Annual Take of Listed Fish By Life Stage *(Number of Fish)*** | | | |
| **Type of Take** | Egg/Fry | Juvenile/Smolt | Adult | Carcass |
| **Observe or harass a)** | | | | |
| **Collect for transport b)** | | | | |
| **Capture, handle, and release c)** | Collection of | Coho adults | at Cole Rivers | is concurrent |
| **Capture, handle, tag/mark/tissue sample, and release d)** | with a portion | of the brood | collection | period for |
| **Removal (e.g. broodstock) e)** | this StS | Program. See | note below* | |
| **Intentional lethal take f)** | Also see table | 2.2.3-1 for Coho | handling/take levels. | |
| **Unintentional lethal take g)** | | | | |
| **Other Take (specify) h)** | | | | |

*Note: All adult Coho Salmon that are trapped and handled during steelhead brood collection are used for the Coho Salmon propagation program, which has been described in the Rogue River Coho Salmon HGMP.

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

# Attachment 2. Definition of terms referenced in the HGMP template.

Augmentation - The use of artificial production to increase harvestable numbers of fish in areas where the natural freshwater production capacity is limited, but the capacity of other salmonid habitat areas will support increased production. Also referred to as "fishery enhancement".

Critical population threshold - An abundance level for an independent Pacific salmonid population below which: depensatory processes are likely to reduce it below replacement; short-term effects of inbreeding depression or loss of rare alleles cannot be avoided; and productivity variation due to demographic stochasticity becomes a substantial source of risk.

Direct take - The intentional take of a listed species. Direct takes may be authorized under the ESA for the purpose of propagation to enhance the species or research.

Evolutionarily Significant Unit (ESU) - NMFS definition of a distinct population segment (the smallest biological unit that will be considered to be a species under the Endangered Species Act). A population will be/is considered to be an ESU if 1) it is substantially reproductively isolated from other conspecific population units, and 2) it represents an important component in the evolutionary legacy of the species.

Harvest project - Projects designed for the production of fish that are primarily intended to be caught in fisheries.

Hatchery fish - A fish that has spent some part of its life-cycle in an artificial environment and whose parents were spawned in an artificial environment.

Hatchery population - A population that depends on spawning, incubation, hatching or rearing in a hatchery or other artificial propagation facility.

Hazard - Hazards are undesirable events that a hatchery program is attempting to avoid.

Incidental take - The unintentional take of a listed species as a result of the conduct of an otherwise lawful activity.

Integrated harvest program - Project in which artificially propagated fish produced primarily for harvest are intended to spawn in the wild and are fully reproductively integrated with a particular natural population.

Integrated recovery program - An artificial propagation project primarily designed to aid in the recovery, conservation or reintroduction of particular natural population(s), and fish produced are intended to spawn in the wild or be genetically integrated with the targeted natural population(s). Sometimes referred to as "supplementation".

Isolated harvest program - Project in which artificially propagated fish produced primarily for harvest are not intended to spawn in the wild or be genetically integrated with any specific natural population.

Isolated recovery program - An artificial propagation project primarily designed to aid in the recovery, conservation or reintroduction of particular natural population(s), but the fish produced are not intended to spawn in the wild or be genetically integrated with any specific natural population.

Mitigation - The use of artificial propagation to produce fish to replace or compensate for loss of fish or fish production capacity resulting from the permanent blockage or alteration of habitat by human activities.

Natural fish - A fish that has spent essentially all of its life-cycle in the wild and whose parents spawned in the wild. Synonymous with *natural origin recruit (NOR).*

Natural origin recruit (NOR) - See *natural fish* .

Natural population - A population that is sustained by natural spawning and rearing in the natural habitat.

Population - A group of historically interbreeding salmonids of the same species of hatchery, natural, or unknown parentage that have developed a unique gene pool, that breed in approximately the same place and time, and whose progeny tend to return and breed in approximately the same place and time. They often, but not always, can be separated from another population by genotypic or demographic characteristics. This term is synonymous with stock.

Preservation (Conservation) - The use of artificial propagation to conserve genetic resources of a fish population at extremely low population abundance, and potential for extinction, using methods such as captive propagation and cryopreservation.

Research - The study of critical uncertainties regarding the application and effectiveness of artificial propagation for augmentation, mitigation, conservation, and restoration purposes, and identification of how to effectively use artificial propagation to address those purposes.

Restoration - The use of artificial propagation to hasten rebuilding or reintroduction of a fish population to harvestable levels in areas where there is low, or no natural production, but potential for increase or reintroduction exists because sufficient habitat for sustainable natural production exists or is being restored.

Stock - (see "Population").

Take - To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.

Viable population threshold - An abundance level above which an independent Pacific salmonid population has a negligible risk of extinction due to threats from demographic variation (random or directional), local environmental variation, and genetic diversity changes (random or directional) over a 100-year time frame.

## Attachment 3. Age class designations by fish size and species for salmonids released from hatchery facilities.

**(generally from Washington Department of Fish and Wildlife, November, 1999).**

| | SPECIES/AGE CLASS | SIZE CRITERIA Number of fish/pound | SIZE CRITERIA Grams/fish |
|---|---|---|---|
| X | Chinook Yearling | <=20 | >=23 |
| X | Chinook (Zero) Fingerling | >20 to 150 | 3 to <23 |
| X | Chinook Fry | >150 to 900 | 0.5 to <3 |
| X | Chinook Unfed Fry | >900 | <0.5 |
| X | Coho Yearling 1/ | <20 | >=23 |
| X | Coho Fingerling | >20 to 200 | 2.3 to <23 |
| X | Coho Fry | >200 to 900 | 0.5 to <2.3 |
| X | Coho Unfed Fry | >900 | <0.5 |
| X | Chum Fed Fry | <=1000 | >=0.45 |
| X | Chum Unfed Fry | >1000 | <0.45 |
| X | Sockeye Yearling 2/ | <=20 | >=23 |
| X | Sockeye Fingerling | >20 to 800 | 0.6 to <23 |
| X | Sockeye Fall Releases | <150 | >2.9 |
| X | Sockeye Fry | > 800 to 1500 | 0.3 to <0.6 |
| X | Sockeye Unfed Fry | >1500 | <0.3 |
| X | Pink Fed Fry | <=1000 | >=0.45 |
| X | Pink Unfed Fry | >1000 | <0.45 |
| X | Steelhead Smolt | <=10 | >=45 |
| X | Steelhead Yearling | <=20 | >=23 |
| X | Steelhead Fingerling | >20 to 150 | 3 to <23 |
| X | Steelhead Fry | >150 | <3 |
| X | Cutthroat Trout Yearling | <=20 | >=23 |
| X | Cutthroat Trout Fingerling | >20 to 150 | 3 to <23 |
| X | Cutthroat Trout Fry | >150 | <3 |
| X | Trout Legals | <=10 | >=45 |
| X | Trout Fry | >10 | <45 |

**1/ Coho yearlings defined as meeting size criteria and 1 year old at release, and released prior to June 1st.**
**2/ Sockeye yearlings defined as meeting size criteria and 1 year old.**