HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	Oregon Hatchery Research Center (OHRC)
Species or Hatchery Stock:	Winter Steelhead/*Oncorhynchus mykiss* Fall Chinook Salmon/*Oncorhynchus tshawytscha* Coho Salmon/*Oncorhynchus kisutch* Cutthroat Trout/*Oncorhynchus clarki*
Agency/Operator:	Oregon Department of Fish and Wildlife
Watershed and Region:	North Coast Watershed District Northwest Region
Date Submitted:	1/1/2012
Date Last Updated:	1/14/2016

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

The Oregon Hatchery Research Center (OHRC)

The mission of the OHRC is to understand the mechanisms that may create differences between hatchery and wild salmon and steelhead, develop approaches to best manage any differences in order to meet fishery and conservation objectives, and help Oregonians understand the role and performance of hatcheries in supporting and protecting Oregon's native fish. The OHRC will foster and support a wide range of research and education projects and provide unique state-of-the-art facilities, including four simulated streams.

1. **Understand mechanisms that may create differences between hatchery and wild fish.**

2. **Develop approaches to manage hatchery fish that conserve and protect native fish.**

3. **Educate the public on the relationship between hatchery and wild fish, the connection between fish and watershed, estuarine and ocean systems, and the implications for fish management and stewardship.**

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

The OHRC is being operated specifically for **fisheries research** and will **NOT** be a production facility. It *will not* produce fish for harvest or large-scale supplementation of naturally spawning populations. All fish reared and released at the facility will be explicitly tied to research projects.

The OHRC *will not* be used as a large-scale production facility to supplement wild runs in the Alsea Basin. Much of the research will occur on site within the facility. Although some research activities may require limited out-planting of hatchery fish to compare with wild runs, any fish released will be part of specific research projects incorporating scientific peer review, and will be closely monitored.

The OHRC is a state-of-the-art facility embodying a wide range of design options for spawning, incubation and rearing. Incorporating maximum flexibility in facility design and operation will allow individual research projects to be accommodated based on their specific needs.

Species will include, but not be limited to:
<u>Winter Steelhead/*Oncorhynchus mykiss*</u>
The Oregon Coast steelhead Evolutionary Significant Unit (ESU) was designated as a candidate species under the Endangered Species Act (ESA) on March 19, 1998 (Federal Register Notice 1998). These fish are also a sensitive (vulnerable) species under Oregon's Sensitive Species Rule (OAR 635-100-0040).

Fall Chinook Salmon/*Oncorhynchus tshawytscha*
Fall Chinook are not listed under the ESA.

Coho Salmon/*Oncorhynchus kisutch*
Alsea Basin wild coho are part of the Oregon Coast Coho ESU, which was listed as a threatened species under the federal ESA on February 11, 2008 (Federal Register Notice 2008).

Cutthroat Trout/*Oncorhynchus clarki.*
Cutthroat Trout are not listed under the ESA.

1.3) Responsible organization and individuals

Name (and title):	Tom Stahl (Conservation& Recovery Program Manager)
Agency or Tribe:	Oregon Department of Fish and Wildlife (ODFW)
Address:	3406 Cherry Ave. NE, Salem, OR 97303
Telephone:	(503) 947-6213
Fax:	(503) 947-6219
Email:	thomas.stahl@state.or.us

Name (and title):	Ryan Couture (OHRC Facility Manager)
Agency or Tribe:	Oregon Department of Fish and Wildlife (ODFW)
Address:	2418 East Fall Creek Road, Alsea, OR 97324
Telephone:	(541) 487-5510 ex. 100
Fax:	(541) 487-5534
Email:	ryan.b.couture@state.or.us

The OHRC is a cooperative effort between ODFW, which owns the facility, and Oregon State University (OSU). ODFW and OSU have signed a Memorandum of Understanding for operation and oversight of the OHRC. The organizations share the cost of a Senior Scientist who oversees OHRC research and operations. The Senior Scientist is an OSU faculty member. Other partners include NOAA Fisheries, the U.S. Fish and Wildlife Service, and other Oregon Plan partners.

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

- The OHRC currently operates on a $1,000,000 biennial budget. Those funds are currently 100% "Other Funds" generated from ODFW license and tag sales.

- The Legislature and Governor developed $7 million in funding for the OHRC. The budget includes $4 million from Measure 66 capital funds, $1.125 million in Lottery Funds from the Restoration and Protection Research Fund, and $1.875 million in ODFW's Other Funds.

- The Governor's Office also has requested Congressional support for federal funds to support research at the OHRC. Oregon is working with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service to further explore federal funding options.

- There are 3 full time employees at the OHRC. An ODFW hatchery manager and two hatchery technicians live on site to oversee maintenance and safety, conduct education and outreach activities, and provide general fish-culture guidance to researchers

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

The OHRC is located at RM 3 of Fall Creek, approximately 30 RM from the mouth of the Alsea. The OHRC was built on the site of the former Fall Creek Hatchery. Fall Creek was most recently operated as a satellite of Alsea Hatchery and is located in the Alsea River Basin, 29 miles east of Waldport, off State Highway 34. The Hatchery is situated on 31 acres in Lincoln County. Originally constructed in 1952, a few buildings and structures were unchanged however, the majority of the facility was demolished and new buildings were built and modernized in 2003-2005.

The OHRC is strategically located in the Alsea Basin, surrounded by streams and close to coastal fisheries that offer natural laboratories to study the life cycle and interactions of wild and hatchery fish and their management on a broad “basin-to-landscape” basis. The site also is close to other scientific institutions such as the Hatfield Marine Science Center and OSU

1.6) Type of program.

The OHRC is a state-of-the-art research facility that provides a place for scientists to study native fish recovery and hatchery programs. The Center’s fish-rearing facilities enable researchers to study both natural and hatchery environments. Facilities include four artificial streams that replicate natural channels and allow scientists to alter substrate, cover, shade and water flow to mimic a variety of natural conditions; four raceways to produce fish under traditional hatchery conditions for comparison with wild fish; and a tank farm with approximately 40 tanks for rearing groups of fish. These fish-rearing facilities and the Center’s laboratory help researchers answer questions vital to the success of the Oregon Plan for Salmon and Watersheds, the state’s innovative, volunteer-based effort to conserve and revitalize Oregon’s salmon resources.

The research conducted at OHRC varies on an annual basis depending upon research priorities for the agency and university, project funding, management objectives and collaborative research efforts with various partners. It is unknown what research will occur in the future. However, all research will be related to the purpose and goals of the OHRC described in section 1.9. See section 11 below for the process for evaluating research projects for ESA authorization.

1.7) Purpose (Goal) of program.

The goal of the OHRC is to answer questions related to fish recovery and hatchery programs, including the differences that may exist between wild and hatchery fish, and how to better manage those differences. Information gained at the OHRC will help answer questions vital to the success of the Oregon Plan for Salmon and Watersheds and the Native Fish Conservation Policy.

1.8) Justification for the program.

The roles of hatcheries, expectations and measures of success have changed dramatically since the 1980s. Back then, hatcheries focused on maximizing the number of fish that survived in the hatchery and were released into streams and rivers. Today, goals for hatcheries include 1) maximizing the number of hatchery fish harvested when they return from the ocean while minimizing undesirable effects on wild fish, and 2) minimizing impacts of hatcheries on the watersheds that surround them, because hatcheries and the fish they produce are part of the ecosystem where they exist. Many questions remain about the interactions between hatchery and wild fish, and the use of hatchery fish to mitigate declining trends in natural production. Research at the OHRC will help ensure that hatchery reform is forward-thinking and scientifically based, as well as an effective and wise use of public resources.

1.9) List of program "Performance Standards".

The mission of the OHRC is to understand the mechanisms that may create differences between hatchery and wild salmon and steelhead, develop approaches to best manage any differences in order to meet fishery and conservation objectives, and help Oregonians understand the role and performance of hatcheries in supporting and protecting Oregon's native fish. The OHRC will foster and support a wide range of research and education projects and provide unique state-of-the-art facilities, including four simulated streams.

1. **Understand mechanisms that may create differences between hatchery and wild fish.**

    a. Determine the process and rate by which wild fish may change in the hatchery environment within and across generations.

    b. Determine the process, rate and pattern by which hatchery-produced fish adapt to the natural environment at each life history stage.

    c. Determine the possible genetic and ecological consequences of hatchery fish and their releases on native fish at each life history stage.

2. **Develop approaches to manage hatchery fish that conserve and protect native fish.**

    a. Determine hatchery breeding, rearing and release practices that allow hatchery-propagated fish to both contribute to fisheries and facilitate the conservation and recovery of naturally produced native fish.

        1. Identify possible effects, both locally and on a landscape scale, to natural ecosystems associated with different types and levels of hatchery production and identify approaches to manage these effects.

        2. Identify hatchery practices that may need to be altered in response to changes in the natural environment and other external factors.

b. Identify breeding, rearing and release protocols that minimize possible adverse impacts on the natural ecosystem.

c. Evaluate the effectiveness of producing hatchery fish, relative to other strategies, as a means to achieve commercial, recreational, conservation and ecological objectives.

d. Determine the effects of hatchery operations (for example: flow alteration, effluent water quality, pathogens, migration and spawning distribution, etc.) on native fish, aquatic communities and their habitats.

3. **Educate the public on the relationship between hatchery and wild fish, the connection between fish and watershed, estuarine and ocean systems, and the implications for fish management and stewardship.**

    a. Provide educational facilities and programs for K-12 students.

    b. Design and manage the facility to provide an environment of passive and active learning for visitors.

    c. Conduct undergraduate and graduate programs and classes at the facility.

    d. Provide opportunities for educators and others to use the OHRC for meetings, workshops and programs that further public understanding of the relationship between fish and watershed health.

1.10) List of program "Performance Indicators."

The research conducted at OHRC varies on an annual basis depending upon research priorities for the agency and university, project funding, management objectives and collaborative research efforts with various partners. It is unknown what research will occur in the future. However, all research will be related to the purpose and goals of the OHRC described in section 1.9. See section 11 below for the process for evaluating research projects for ESA authorization. The research conducted at the OHRC will always be aligned with performance standards for each management and research objective. Beneficial performance standards will drive future research projects and goals.

1.11) Expected size of program.

The OHRC will not be used as a large-scale production facility to supplement wild runs in the Alsea Basin. Much of the research will occur on-site at the facility. Although some research activities may require limited out-planting of hatchery fish to compare with wild runs, any fish released will be part of specific research projects incorporating scientific peer review, and will be closely monitored.

Research projects at OHRC varies from year to year. Therefore, the number of fish used for research at OHRC cannot be specified in this HGMP at this point. For each research project proposed at OHRC in the future, staff with work with NMFS to review and authorize future research projects consistent with the framework specified in this HGMP.

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

The OHRC was created specifically for fisheries research and will **NOT** be a production facility. It will not produce fish for harvest or large-scale supplementation of naturally spawning populations. All fish reared and released at the facility will be explicitly tied to research projects.

Broodstock will be collected to meet the needs of OHRC research project. Broodstock collection will not exceed 25% of the returning fish to OHRC for a given species and brood year. These criteria have been established through communications with ODFW Mid-Coast District Fish Biologist and staff and are in part based on low production and recruitment of Coho in Fall Creek.

Proposed annual broodstock collection (for research needs)

Species	***Total Adult Collection****
Fall Chinook	16
Coho	46
Winter Steelhead	26

*based on 6 year average of returning adults to OHRC trap.

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

None

Life Stage	**Release Location**	**Annual Release Level**
Eyed Eggs	TBD for research needs only	TBD for research needs only
Unfed Fry	“	“
Fry	“	“
Fingerling	“	“
Yearling	“	“

1.12) Current program performance, including estimated smolt-to-adult survival rates,

adult production levels, and escapement levels. Indicate the source of these data.
None

1.13) Date program started (years in operation), or is expected to start.
The OHRC opened on October 14, 2005.

1.14) Expected duration of program.
Indefinite
OHRC research will also be expanded outside of the Alsea Basin.

1.15) Watersheds targeted by program.
Most of the OHRC research will take place in the Alsea basin. Some research will be carried out in other basins and/or other production hatchery facilities.

1.16) Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed.
No other alternative actions are available to meet the mission and goals of the OHRC.

<u>SECTION 2. PROGRAM EFFECTS ON NMFS ESA-LISTED SALMONID POPULATIONS</u>. (USFWS ESA-Listed Salmonid Species and Non-Salmonid

Species are addressed in Addendum A)

2.1) **List all ESA permits or authorizations in hand for the hatchery program.**
No current/active permits.

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

2.2.1) <u>Description of NMFS ESA-listed salmonid population(s) affected by the program.</u>

Alsea Complex Coho

The Alsea Complex coho consists of coho salmon inhabiting mid-coast streams located from Beaver Creek south to China Creek, just north of Heceta Head (Nickelson 2001). Populations include Beaver Creek, Drift Creek, Alsea River and Yachats River. There is an estimated 360 miles of spawning habitat available to the coho salmon of this complex.

Coho Salmon Life History

Adult coho salmon migrate into fresh water in the fall to spawn. Spawning of wild coho salmon usually occurs from mid-November through February. Adult spawning coho salmon are typically 3 years old and are often accompanied by 2 year old jacks (precocious males) from the next brood. Spawning occurs primarily in small tributaries located throughout coastal basins. The parents normally exhibit strong homing to their natal stream. The female digs a nest (redd) in the gravel and lays her eggs, which are immediately fertilized by accompanying adult males or jacks. The eggs are covered by digging and displacing gravel from the upstream edge of the nest. Each female lays about 2,500 eggs. The adults die soon after spawning. Sex ratios of spawning adults tend to average around 50:50 at most locations (Table 2-1). However, Moring and Lantz (1975) observed 77 percent males in three small Alsea River tributaries over a period of 14 years. They concluded that males tend to move around a lot and visit multiple streams. The eggs hatch in about 35 to 50 days, depending upon water temperature (warm temperature speeds hatching). The alevins remain in the gravel 2 or 3 weeks until the yolk is absorbed and emerge as fry to actively feed in the spring. Most juvenile coho salmon spend 1 summer and 1 winter in fresh water. The following spring, approximately 1 year after emergence, they undergo physiological changes that allow them to survive in seawater. They then migrate to the ocean as silvery smolts about 10 to 12 centimeters (cm) in length.

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

Population Complex	Percent Males	Percent Females	Location	Run Years	Data Source

Nehalem	52%	48%	North Fork trap	1998-1999	Life Cycle Monitoring
Siletz	50%	50%	Mill Creek trap	1997-1999	Life Cycle Monitoring
Yaquina	51%	49%	Mill Creek trap	1997-1999	Life Cycle Monitoring
Alsea	77%	23%	Drift Creek tributaries	1959-1972	Moring & Lantz (1975)
	50%	50%	Cascade Creek trap	1997-1999	Life Cycle Monitoring
Umpqua	55%	45%	Smith River trap	1999	Life Cycle Monitoring
Coos	63%	37%	S. Coos River, Winchester Creek, and Fall Creek	1999	Life Cycle Monitoring

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

Habitat Use and Freshwater Distribution

Spawning and rearing of juvenile coho salmon generally take place in small, low-gradient (generally less than 3 percent) tributary streams, although rearing may also take place in lakes where available. Coho salmon require clean gravel for spawning and cool water temperatures (53º to 58°F preferred, 68°F maximum) for rearing (Reiser and Bjornn 1979). Fry emerge from February to early June (Moring and Lantz 1975) and occupy backwater pools and the stream margins (Mundie 1969; Lister and Genoe 1970; Nickelson et al. 1992a). During the summer, coho prefer pools in small streams, whereas during winter, they prefer off-channel alcoves, beaver ponds, and dam pools with complex cover (Nickelson et al. 1992a, 1992b). Habitat complexity, primarily in the form of large and small wood is an important element of productive coho salmon streams (Nickelson et al. 1992b; Rodgers et al. 1993). Little is known about residence time or habitat use of estuaries during seaward migration. It is usually assumed that coho salmon spend only a short time in the estuary before entering the ocean. Recent research is finding that rearing of wild coho juveniles in the upper ends of tidal reaches can be extensive (Solazzi et al. 2001). However, coho salmon released from the Salmon River hatchery remained in the estuary for only a short time and only rarely entered the marsh channels (Cornwell et al. 2001). The distribution of coho salmon within a basin is primarily determined by two factors: marine survival and the distribution of freshwater habitat of different levels of quality. When marine survival has been very poor, as in recent years, coho will be found in only the highest quality habitats. Coast-wide, these habitats comprise about 22 percent of the habitat (Nickelson 1998). When marine survival increases, as could occur with a changing climate regime, coho will redistribute into freshwater habitats of lower quality. Thus, coho salmon population dynamics function with a classic "source-sink" relationship among stream reaches.

2.2.2) <u>Status of NMFS ESA-listed salmonid population(s) affected by the program.</u>

The Alsea Complex consists of coho salmon inhabiting mid-coast streams located from Beaver Creek south to China Creek, just north of Heceta Head. Populations include Beaver Creek, Drift Creek, Alsea River and Yachats River. There is an estimated 360 miles of spawning habitat available to the coho salmon of this complex. The critical population level for the Alsea Complex is 1,400 adult spawners (Nickelson 2001). The habitat of this complex has the potential to support a viable population because high quality habitat is estimated to be present in 97 miles of stream, well above the 15-mile threshold (Nickelson 2001). The abundance of coho salmon spawners of the Alsea Complex has ranged from about 1,000 to over 8,600 and has averaged about 3,000 since 1990 (Figure 2-1 and Table 2-2). Twice in the past decade, spawner abundance fell below the critical threshold of 1,400 fish. However, every year except 1999 the lower 95% confidence limit extended below the critical threshold (Figure 2-1) and the Alsea River population, the largest in the complex fell to about 200 fish in 1998. Recruits per wild spawner have been highly variable over the last eight years (Table 2-2 and Figure 2-2), but have been below one only twice. Hatchery fish have been common in the spawning population in some years of the last decade, particularly in Beaver Creek and the Alsea River. Of 424 scale samples collected during 1990-99, 84 (19.8%) had hatchery scale patterns. However, the hatchery programs that contributed to the strays have now been eliminated.

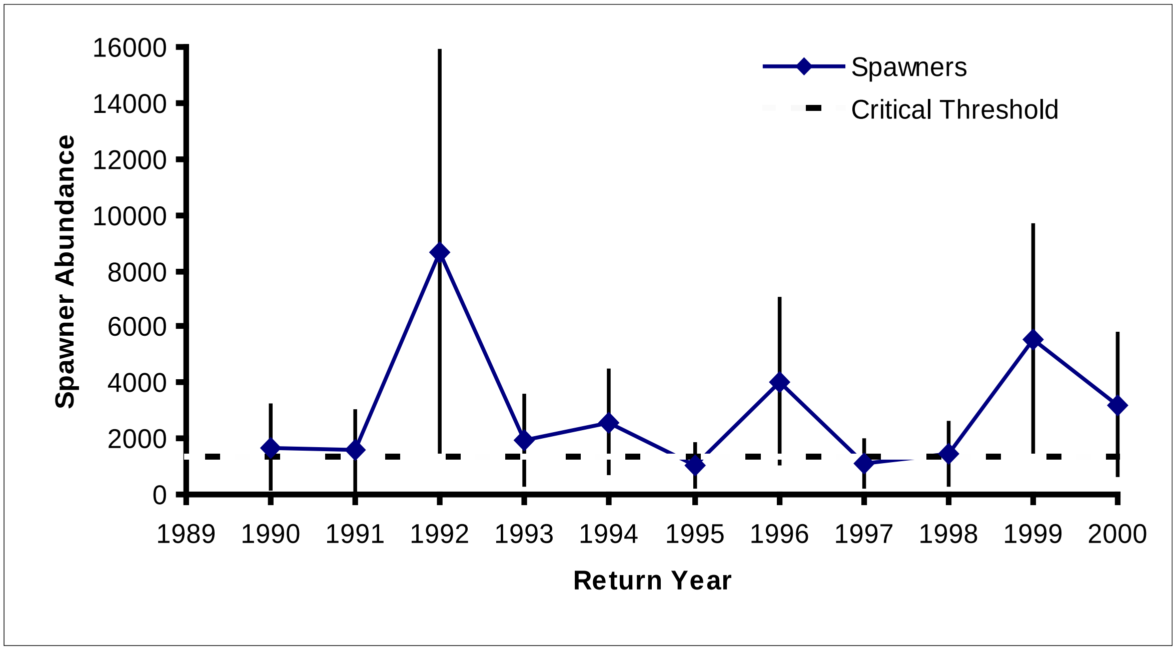

Figure 2-1
Trend in adult coho salmon abundance relative to the critical population level for the Alsea Complex. Error bars are 95 percent confidence limits.

Table 2-2
Population Parameters for the Alsea Complex Coho Salmon

Return Year	Wild Spawners	Pre-harvest Wild Population	Recruits per Spawner
1990	1,694	5,447	
1991	1,589	2,910	
1992	8,656	17,701	
1993	1,928	3,341	2.0
1994	2,578	2,766	1.7
1995	1,029	1,175	0.1
1996	4,046	4,412	2.3
1997	1,123	1,282	0.5
1998	1,423	1,543	1.5
1999	5,563	6,021	1.5
2000	3,219	3,484	3.1
Annual mean	2,986	4,553	1.6

Table 2-2
Population Parameters for the Alsea Complex Coho Salmon

2.2.3) <u>Describe hatchery activities, including associated monitoring and evaluation</u>

and research programs, that may lead to the take of NMFS listed fish in the target area, and provide estimated annual levels of take *(see "Attachment 1" for definition of "take")***.**

These activities are described in Section 12 "Research."

- Describe hatchery activities that may lead to the take of listed salmonid populations in the target area, including how, where, and when the takes may occur, the risk potential for their occurrence, and the likely effects of the take.
(*e.g. "Broodstock collection directed at sockeye salmon has a "high" potential to take listed spring chinook salmon, through migrational delay, capture, handling, and upstream release, during trap operation at Tumwater Falls Dam between July 1 and October 15. Trapping and handling devices and methods may lead to injury to listed fish through descaling, delayed migration and spawning, or delayed mortality as a result of injury or increased susceptibility to predation*").

Broodstock will be collected primarily in the adult fish trap located on Fall Creek at the OHRC. Other means of collection are described in Section 12 "Research."

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

Production releases ended in 1996. Although this took place at the same site, Fall Creek Hatchery no longer exists and has been replaced by the OHRC.

- **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).**

General guidelines from ODFW Mid-Coast Fish District Biologist is to take no more than 25% of the adult fish returning to the OHRC trap located on Fall Creek (all species) for research. For juvenile fish, 10% limit has been set (i.e. collect 10% of all fish collection during research or monitoring activities).

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

We will work closely with ODFW Mid-Coast District Fish Biologists to monitor take in the basin. We will keep daily record of take so we know when we are nearing the limit and we will contact NMFS immediately if excess take occurs or for notification of project modification.

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

3.1) Describe alignment of the hatchery program with any ESU-wide hatchery plan

• Alsea Basin Management Plan (approved by the Oregon Fish and Wildlife Commission—November 14, 1997).

• Oregon Steelhead Management Plan. This program attempts to manage hatchery program so it is compatible with wild populations and provides recreational opportunities.

• Oregon Wild Fish Management Policy is the guiding policy for state management of wild and hatchery fish for protection of genetic resources. Through various avenues including the development of a localized broodstock, acclimation and release strategies for smolts, and other management activities, ODFW has sought to bring the Alsea River winter steelhead program into compliance with the Wild Fish Management Policy. Under directive of the Oregon Legislature and the Governor, ODFW is currently developing alternative guidance called the Native Fish Conservation Policy.

• The Oregon Plan for Salmon and Watersheds is a prescriptive set of measures for recovering threatened and endangered salmon and steelhead, and meeting federal water quality standards, established by Executive Order of the Governor. The Oregon Plan includes measures linked to the hatchery production of salmon and steelhead, including; nutrient enrichment, exploration the use of hatchery technology in the recovery of wild populations, acclimation and other separations of hatchery and wild production, terminal fisheries that reduce harvest impacts on wild fish, and monitoring of hatchery and wild runs.

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

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

• Pacific Fisheries Management Council (Section 7, Consultation).

• Interagency Agreement between Oregon State University and the Oregon Department of Fish and Wildlife.

3.3) Relationship to harvest objectives.

The OHRC was created specifically for fisheries research and is **NOT** a production facility. It will not produce fish for harvest or large-scale supplementation of naturally spawning populations. All fish reared and released at the facility will be explicitly tied to research projects.

The OHRC will not be used as a large-scale production facility and will not be used to supplement wild runs in the Alsea Basin. Much of the research will occur on-site at the facility. Although some research activities may require limited out-planting of hatchery fish to compare with wild runs, any fish released will be part of specific research projects incorporating scientific peer review, and will be closely monitored.

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

Hatchery roles, expectations and measures of success have changed dramatically since the 1980s. Back then, hatcheries focused on maximizing the number of fish that survived in the hatchery and were released into streams and rivers. Today, goals for hatcheries include 1) maximizing the number of hatchery fish harvested when they return from the ocean while minimizing undesirable effects on wild fish, and 2) minimizing impacts of hatcheries on the watersheds that surround them, because hatcheries and the fish they produce are part of the ecosystem where they exist. Many questions remain about the interactions between hatchery and wild fish, and the use of hatchery fish to mitigate declining trends in natural production. Research at the OHRC will help ensure that hatchery reform is forward-thinking and scientifically based, as well as an effective and wise use of public resources.

3.4) Relationship to habitat protection and recovery strategies.

Generally, habitat protection and recovery strategies are prioritized in areas with (potential) good-/high quality habitat for coho. Habitat protection and recovery strategies for coho in the Alsea focus on riparian areas and winter and summer rearing habitat. Progress has been made to improve fish passage at road crossings. Most fish passage barriers blocking significant habitat reaches have been remediated. ODFW personnel work with both private and public landowners in the Alsea basin to protect and restore riparian areas along coho streams. Numerous projects using large wood have been implemented to enhance natural processes in streams and create coho summer and winter rearing habitat.

3.5) Ecological interactions.

We anticipate VERY little ecological interactions associated with the OHRC research in the Alsea Basin.

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.

- OHRC utilizes Fall Creek for it's primary water source.
- The intake source is screened with 3/32 inch screen and conforms to current screening criteria and National Marine Fisheries Service (NMFS) screening guidelines.
- OHRC maintains a water diversion permit for 20 cubic feet per second (cfs) from Fall Creek.
- OHRC is exempt from NPDES 300-J permitting and monitoring due to low poundage (<25,000lbs) of production.
- OHRC utilizes Carnes Creek as a secondary water source for incubation and indoor rearing.
- The intake screen at Carnes Creek is 1/8 inch screen and conforms to past screening criteria. The intake is above the range of anadramous fish habitat.
- OHRC maintains a water diversion permit for 2 cubic feet per second (cfs) from Carnes Creek.

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.

None

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods).

The Fall Creek trap at the OHRC facility consists of a pool and weir ladder with a small holding area and trap located at the upstream end of the ladder. Fish entering the trap area will be sorted by species, sex and fin-clip (or lack of) and either placed upstream or removed for research needs.

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

Broodstock caught by anglers will be placed in 36- by 5-inch PVC holding tubes or aerated, large, chest coolers. Broodstock that have been angler caught will be transported either by angler utilizing aerated cooler or by volunteer or ODFW staff using a portable tank supplied by ODFW. A 300-gallon portable tank will be utilized for transporting fish onsite or within the basin.

5.3) Broodstock holding and spawning facilities.

Broodstock (for research needs) will be held in large outdoor tanks in the OHRC Tank Farm. Either six foot or twelve foot diameter tanks will be utilized depending on the number of species of fish. Fish will be spawned in the Tank Farm where a 70-gallon anesthetic tub will be utilized.

5.4) Incubation facilities.

The research building wet lab is supplied with water from both the Fall Creek and Carnes Creek intakes. Untreated water is supplied by gravity flow in pipes routed through the floor trenches. A 150 gpm side stream is pumped through a self cleaning micro strainer, and UV disinfection to provide pathogen free water. Smaller side streams of 25 gpm are routed through heat exchangers to provide tempered water, heated or chilled by up to 3.5 degrees C from ambient.

All of the treated water is then degassed at a packed column head box, and is then distributed in the wet lab area through an overhead piping system with frequent supply drops. Provisions have been made for re-use of tempered water to reduce the power costs of operating the chiller system.

Effluent from the quarantine lab is UV disinfected prior to discharge.

5.5) Rearing facilities.

Four of the ten existing production raceways from the old hatchery were retained and re-furbished with new floors, walls, walkways, and railings. Using the existing raceways minimized earthwork and concrete formwork saving construction costs. Screen slots were added at 9 feet on center to allow segregation of fish within the raceways.

The tank farm consists of fiberglass round tanks varying in size from 3 foot to 12 foot diameter, with underground piping for supply, drain and cleaning waste conveyance. Gravel pad area and underground piping is in place to allow more tanks to be added in the future depending on what research needs dictate. Screened standpipes in the center of the tanks retain fish. Water levels are controlled by and adjustable pipe loop outside each tank.

The simulated streams will be used by researchers to observe fish behavior in a replicated natural environment. Four concrete channels, 25 feet wide by 200 feet long, were constructed to contain the simulated stream improvements. A mixture of river gravels were custom blended and placed to create a series of pools and riffles. Woody debris, salvaged from site clearing activities, was placed to provide improved habitat. Shade cloth is suspended above the streams, supported on tensioned cables, to simulate tree cover.

Water flow at the stream inlets is controlled by a replaceable glu-lam beam weir. Design flows of 1 to 3 CFS per stream will vary seasonally, as does the natural stream flow in Fall Creek. An innovative air lift pumping system will recirculate up to 1 CFS from the tail end to the head end of the streams during low flow periods. At the downstream end of the stream channels, a concrete chamber allows crowding and trapping of juvenile fish. Alternatively, outlet screens can be removed to allow volitional release of out migrants to Fall Creek. Valves control whether the flow is routed to cleaning waste, the central site tank farm via re-use pipes, or allowed to overflow to Fall Creek.

5.6) Acclimation/release facilities.

None

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

The OHRC operates under normal hatchery operations. Hatchery operations are faced with seasonal environmental difficulties that could lead to fish mortality. These include high water, muddy water, extreme low-flow situations, seasonal parasite infestation, and disease problems. Although there has not been any significant fish mortality due to these conditions in recent history, these conditions do exist and must be dealt with.

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.

The OHRC is staffed full time, 24 hours per day, and is equipped with a low-water alarm system to help prevent fish loss. Disinfecting procedures between stocks of fish are followed to prevent disease transmission. Regular exams are conducted by an ODFW fish pathologist to assess status of fish health. All equipment utilized to handle and move fish is regularly inspected and repaired or replaced, if necessary, to prevent damage to fish from handling. There is backup water source available for the tanks and raceways should primary water source be reduced due to some catastrophe. For early rearing, Carnes Creek can be utilized in the event that Fall Creek water is unusable.

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.

Although no broodstock will be used for production, the following species will be used to meet research needs at the OHRC.

- Winter Steelhead/*Oncorhynchus mykiss*
- Fall Chinook Salmon/*Oncorhynchus tshawytscha*
- Coho Salmon/*Oncorhynchus kisutch*
- Cutthroat Trout/*Oncorhynchus clarki*.

6.2) Supporting information.

6.2.1) History.

- Winter Steelhead/*Oncorhynchus mykiss*
  - 043 and 043W winter steelhead are produced at the North Fork Alsea Fish Hatchery. Naturally produced steelhead from Fall Creek will be collected as well.
- Fall Chinook Salmon/*Oncorhynchus tshawytscha*
  - Historic hatchery production at Fall Creek (pre-1996). No current hatchery production in the basin.
- Coho Salmon/*Oncorhynchus kisutch*
  - Historic hatchery production at Fall Creek (pre-1996). No current hatchery production in the basin.
- Cutthroat Trout/*Oncorhynchus clarki*.
  - Historic hatchery production at Fall Creek (pre-1996). No current hatchery production in the basin.

6.2.2) Annual size.

No more than 25% of the respective run will be utilized for broodstock for research needs. Estimated numbers listed in section 1.11.1.

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

No info?

6.2.4) Genetic or ecological differences.

Adult return timing

The 043 stock hatchery adults exhibit an earlier return timing than native Alsea Basin winter steelhead. Returns of hatchery adults peak in January and February. Based on historical data at ODFW’s North Coast Watershed District Field Office in Newport, returns of wild steelhead to the North Fork fish ladder from 1954 through 1961 peaked in March and April. Consequences of this difference are not completely understood.

Age at smolt emigration

Hatchery smolts are one-year-old at the time of out-migration. Wild smolts emigrate when they are from one to three years old. The majority emigrate at age two (Wagner, et al. 1963). Consequences of this difference are not completely understood.

6.2.5) Reasons for choosing.

All four stocks are present in Fall Creek and endemic to the Alsea Basin.

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

The only broodstock selection practice that may have an affect on wild coho is the actual collection of broodstock. This practice and measures to minimize impacts to wild coho are described in Section 7.

SECTION 7. BROODSTOCK COLLECTION

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

For Broodstock, only adult fish will be collected.

7.2) Collection or sampling design.

Include information on the location, time, and method of capture (e.g. weir trap, beach seine, etc.) Describe capture efficiency and measures to reduce sources of bias that could lead to a non-representative sample of the desired broodstock source.

OHRC is not a production facility. Broodstock collection will be utilized for OHRC associated research projects. The annual numbers and species will vary depending on the specific research needs.

7.3) Identity.

Describe method for identifying (a) target population if more than one population may be present; and (b) hatchery origin fish from naturally spawned fish.

N/A

7.4) Proposed number to be collected:

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

Program goal will be set by annual and long term needs of specific research projects at the OHRC. There are no annual production needs and/or goals. Goals and needs will vary by brood year.

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

Tables' show data in number collected (number used for research). (e.g for 2005, 53 adult female Coho were collected and (0) used for research.

Year	Coho Adults Females	Males	Jacks	Eggs	Juveniles
2005	53 (0)	60 (0)	14 (0)	0 (0)	0 (0)
2006	40 (0)	43 (0)	3 (0)	0 (0)	0 (0)
2007	56 (0)	57 (0)	1 (0)	0 (0)	0 (0)
2008	58 (4)	54 (4)	3 (0)	12,000 (12,000)	10,000 (10,000)
2009	171 (0)	236 (0)	7 (0)	0 (0)	0 (0)
2010	120 (0)	118 (0)	4 (0)	0 (0)	0 (0)
2011	75 (0)	102 (0)	4 (0)	0 (0)	0 (0)
2012	68 (0)	72 (0)	4 (0)	0 (0)	0 (0)
Year	**Chinook Adults Females**	**Males**	**Jacks**	**Eggs**	**Juveniles**
2005	6 (0)	34 (0)	0 (0)	0 (0)	0 (0)
2006	27 (0)	67 (0)	0 (0)	0 (0)	0 (0)
2007	23 (0)	53 (0)	4 (0)	0 (0)	0 (0)
2008	9 (0)	26 (0)	5 (0)	0 (0)	0 (0)
2009	10 (0)	45 (0)	0 (0)	0 (0)	0 (0)
2010	11 (0)	40 (0)	3 (0)	0 (0)	0 (0)
2011	29 (0)	99 (0)	3 (0)	0 (0)	0 (0)
2012	16 (0)	45 (0)	2 (0)	0 (0)	0 (0)

Year	Winter Steelhead Adults Females	Males	Jacks	Eggs	Juveniles
2005	25 (7)	25 (7)	0 (0)	0 (0)	0 (0)
2006	41 (10)	47 (10)	2 (0)	0 (0)	0 (0)
2007	56 (14)	57 (14)	1 (0)	12,000 (12,000)	10,000 (10,000)
2008	94 (15)	72 (15)	0 (0)	0 (0)	0 (0)
2009	57 (6)	40 (6)	0 (0)	0 (0)	0 (0)
2010	45 (5)	38 (5)	0 (0)	0 (0)	0 (0)
2011	58 (6)	47 (6)	2 (0)	0 (0)	0 (0)
2012	47 (5)	40 (5)	2 (0)	0 (0)	0 (0)

Data source: OHRC Adult Trap Data Files.
Steelhead adults used for Alsea Wild Broodstock program

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

Describe procedures for remaining within programmed broodstock collection or allowable upstream hatchery fish escapement levels, including culling.

Surplus hatchery fish that return to Fall Creek (OHRC Trap) are deemed as "strays" as no release occurs. These fish are removed from the trap (i.e. not passed upstream) and utilized for research needs. If there is no need, they are euthanized and used for stream enrichment.

7.6) Fish transportation and holding methods.

Describe procedures for the transportation (if necessary) and holding of fish, especially if captured unripe or as juveniles. Include length of time in transit and care before and during transit and holding, including application of anesthetics, salves, and antibiotics.

Transport and holding is described in Section 11 "Research." Fish will be transported in live well, or transport tanks. Aeration and supplemental oxygen will be provided. Fish health and behavior will be monitored. Fish will be held onsite at the OHRC is above ground fiberglass tanks. Each tank is supplied with single pass water from Fall Creek. Loading density guidelines will be followed.

7.7) Describe fish health maintenance and sanitation procedures applied.

Normal fish health inspections will occur by the ODFW Fish Health Specialists assigned to the facility. OHRC staff also report any fish health issues or concerns to the Oregon State University (OSU) Attending Veterinarian, as OHRC and OSU are partners on this project. Tanks are cleaned and disinfected before each use and fish handling gear (i.e. nets) are disinfected between each use.

The facility regularly uses non ph-buffered iodine for surface disinfection. The chemical trade name is DRAW 476. This product or another acceptable product can be used at 50ppm or the following the guidelines on the product label for surface and equipment disinfection.

a. Disinfection footbaths or other means of disinfection must be provided at the incubation facility's entrance and exit areas for sanitizing footwear, raingear, and equipment while embryos are incubating or fry are being reared in the facility. Non-buffered iodophor will be used at 50ppm for surface disinfection, which is replaced on a weekly basis.
b. Equipment and rain gear used in broodstock handling or spawning must be sanitized after leaving the adult area and before being used in other rearing units or the hatch-house building as described above.
c. Equipment used to collect dead fish must be sanitized before being used in another pond or equipment must be designated for each specific pond.
    a. Dead fish must be disposed of promptly and in a manner that will prevent the introduction of diseases.
    b. Whole fish and/or parts are placed in Formalin and the containers are properly labeled with sample and chemical information.
d. Rearing units must be cleaned on a regular basis (weekly) by vacuuming, brushing, or flushing. All equipment used for this purpose must be disinfected before being moved to a different pond or stock of fish.
e. Equipment used to transfer eggs or fish among facilities, including fish liberation tankers, must be sanitized before being used with any other fish lot or at any other location. Disinfecting and disinfected water must be disposed of in an approved manner.
f. Rearing units must be sanitized after removing fish and before introducing a new fish stock either by thoroughly cleaning the unit and using a disinfectant (iodine and/or bleach) or by cleaning it and leaving it to dry for a minimum of three days.
g. Use of pathogen-free water is preferable, especially for egg incubation and early fish rearing.

7.8) Disposition of carcasses.

Include information for spawned and unspawned carcasses, sale or other disposal methods, and use for stream reseeding.

Carcasses of fish handled or used for research at OHRC will be disposed under the proper protocol as per ODFW's Fish Health Management Policy. Carcasses from adult fish will either be used as ODFW's nutrient enrichment program or frozen and placed into the facilities waste disposal system and hauled to a local landfill. Carcasses from juvenile fish, as well as surplus fish eggs, will be frozen and placed into the facilities waste disposal system and hauled to a local landfill.

Carcasses for Stream Enrichment

a. Before approving the use of fish carcasses or fish components for stream enrichment programs, the Fish Division must determine that the use is consistent with the Department of Environmental Quality's requirements.
b. The Department must review the disease history of the hatchery and particular fish stock, current fish health testing results, geographic location and history of fish disease, and presence of disease agents in the receiving stream and watershed as a whole in order to minimize the risk of introducing or disseminating disease agents into the receiving waters.
c. Carcasses must be placed in the originating river basin or where identified in hatchery program management plans or other operational or conservation plans.

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

The risk of fish disease amplification will be minimized by following Fish Health Management sanitation and fish health maintenance and monitoring guidelines

SECTION 8. MATING

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

8.1) Selection method.

Specify how spawners are chosen (e.g. randomly over whole run, randomly from ripe fish on a certain day, selectively chosen, or prioritized based on hatchery or natural origin).

Spawners are selected based on goals of specific research projects. Adult fish will be chosen randomly over the whole run. Fish species and origin (hatchery or natural) will be determined by specific research needs and goals.

8.2) Males.

Specify expected use of backup males, precocious males (jacks), and repeat spawners.

Males will be chosen based on level of maturity at the date of spawning. Precocious males will be used (assuming the research project permits) at the proportion of the entire run that they consit (i.e. if jacks represent 10% of the run, we will utilize 10% jacks in normal spawning). For many research projects we will select for same age males and exclude jacks.

8.3) Fertilization.

Describe spawning protocols applied, including the fertilization scheme used (such as equal sex ratios and 1:1 individual matings; equal sex ratios and pooled gametes; or factorial matings). Explain any fish health and sanitation procedures used for disease prevention.

Fertilization protocol will be determined by specific research needs. A typical mating will consist of a 1:1 individual mating. Often, researchers will ask for specific 2x2 or greater matrices.

8.4) Cryopreserved gametes.

If used, describe number of donors, year of collection, number of times donors were used in the past, and expected and observed viability.

N/A

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.
(*e.g. "A factorial mating scheme will be applied to reduce the risk of loss of within population genetic diversity for the small chum salmon population that is the subject of this supplementation program".*).

No more than 25% of the wild coho adults will be spawned in any one year. The randomness of the collection and spawning practices should minimize any adverse effects.

SECTION 9. INCUBATION AND REARING -

Specify any management *goals* (e.g. "egg to smolt survival") that the hatchery is currently operating under for the hatchery stock in the appropriate sections below. Provide data on the success of meeting the desired hatchery goals.

9.1) Incubation:

9.1.1) Number of eggs taken and survival rates to eye-up and/or ponding.
Provide data for the most recent twelve years (1988-99), or for years dependable data are available.

This will range from 30,000 to 200,000 per year based on species and research program goals.

9.1.2) Cause for, and disposition of surplus egg takes.
Describe circumstances where extra eggs may be taken (e.g. as a safeguard against potential incubation losses), and the disposition of surplus fish safely carried through to the eyed eggs or fry stage to prevent exceeding of programmed levels.

Circumstances where extra eggs may be taken are as follows:

1. More eggs than are needed for research goals may be taken to fully utilize genetic input from all females collected for brood stock. In this situation, a percentage of the eggs spawned from each female is used, while remaining eggs from each female are destroyed during egg-take or at time of ponding.
2. When surplus eggs and fry exist as a result of high survival rates in the hatchery, then surpluses are removed and buried. Surpluses are reduced in a manner that maintains equal representation of all family groups.

9.1.3) Loading densities applied during incubation.
Provide egg size data, standard incubator flows, standard loading per Heath tray (or other incubation density parameters).

Based on historical hatchery data, the program follows parameters for incubation as follows:

1. Expected egg size = 130 eggs per ounce (on average)
2. Standard Incubator Flow = 5 gpm / vertical incubator stack.
3. Density per tray = maximum of 8,000 eggs/tray from green to eyed stage
   = maximum of 6,000 eggs/tray from eyed-egg to ponding

9.1.4) Incubation conditions.

Describe monitoring methods, temperature regimes, minimum dissolved oxygen criteria (influent/effluent), and silt management procedures (if applicable), and any other parameters monitored.

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

9.1.5) Ponding.

Describe degree of button up, cumulative temperature units, and mean length and weight (and distribution around the mean) at ponding. State dates of ponding, and whether swim up and ponding are volitional or forced.

Fry are ponded when 95 percent of those fish sampled are at complete button-up. This generally occurs from March to late April, when fry are at 2,050 fish per pound (2,175 to 1,850 fish per pound) and are at 1,050 to 1,200 cumulative temperature units (TU). Average fry length at time of ponding should be 2.8 cm. Fry are physically carried in baskets from incubator trays to ponding tanks.

9.1.6) Fish health maintenance and monitoring.

Describe fungus control methods, disease monitoring and treatment procedures, incidence of yolk-sac malformation, and egg mortality removal methods.

- A qualified ODFW fish health specialist will conduct all fish health monitoring. Appropriate actions including drug or chemical treatments will be recommended as necessary. If bacterial pathogens require treatment with antibiotics, a drug sensitivity profile will be generated (if feasible).

- Fish health maintenance and monitoring for the Alsea winter steelhead program are carried-out according to existing standardized procedures. These protocols include:
    1. Eggs are disinfected during water hardening phase; iodophore treatment at 1:150 ppm for 15 to 30 minutes.
    2. To control fungus, eggs are treated with a flow-through formalin treatment (at 1:600 ppm) every other day until eye-up and shocking.
    3. Incubators are monitored daily for environmental conditions (water temperature, water flow, and silting).
    4. Egg mortality is removed at eye-up (during shocking) and ponding, unless significant losses dictate otherwise. Folded Vexar is used (in each incubator tray) to isolate mortalities to particular locations on the tray. This method also allows mortalities to be easily removed during ponding.
- Mortalities are removed 24 hours after shocking, initially via an automated egg picker, followed by thorough handpicking. Mortalities are also removed (by hand) at the time of ponding.
- Incubators are continuously monitored by a float alarm system and by a visual inspection, which occurs twice daily and again during evening check rounds.

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. (*e.g. "Eggs will be incubated using well water only to minimize the risk of catastrophic loss due to siltation.")*

Risk aversion measures applied during incubation follow established hatchery operation procedures.

- Incubation system is hooked up to an alarm, such that hatchery staff is notified if low flows occur.
- Hatchery staff is available 24 hours per day.
- Daily inspection of incubator environmental conditions such as flow, mortality, silting, and temperature.
- Egg, fry, and smolt development is monitored regularly.
- Eggs are incubated in substrate (Vexar) and in the dark.
- Eggs are incubated at low densities.
- Incubator screening is in good condition and prevents escapement.

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 twelve years (1988-99), or for years dependable data are available..

There is currently no production goals at the OHRC. Survival data is maintained and monitored for specific research project and program needs.

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

Rearing density equivalency of (spatial and volume) guidelines recommended by IHOT protocols (IHOT 1995), and by protocols stated in the Northwest Power Planning Council's 1999 Artificial Production Review (NPPC 1999) will be utilized and followed.

- Starter-tank rearing density (goal): Not to exceed 25,000 fish at ponding and a flow index factor of 1.5 at any time during rearing (Piper et al. 1982).
- Raceway pond density (goal): Maintain a flow index factor of less than 1.5. This is sometimes exceeded during late summer low flows or if fall rains have been delayed.
- Fish densities are monitored weekly by updating flow and growth data. Weekly reports are reviewed for compliance with on site operating guidelines with adjustments being made as needed.

9.2.3) Fish rearing conditions

(Describe monitoring methods, temperature regimes, minimum dissolved oxygen, carbon dioxide, total gas pressure criteria (influent/effluent if available), and standard pond management procedures applied to rear fish).

The following parameters and procedures have been established to maintain optimal pond rearing environments.

1. Pond density levels are monitored weekly (flow index and fish growth). This data is used to calculate individual pond density levels based upon pounds per gallons per minute, pounds per cubic feet, and flow index.
2. Dissolved oxygen is monitored weekly during summer flows and throughout the year when environmental factors indicate a need.
3. Ponds are cleaned weekly.
4. During summer rearing, ponds are lowered to an average depth of 8 inches for 4 hours each day; usually from 7:30 a.m. to 11:30 a.m. This has greatly reduced the need to treat fish for external parasites.
5. OHRC has no water temperature control system for outdoor rearing. Winter temperatures range from 36º to 49ºF. Summer temperatures range from 50º to 72ºF.
6. There is no monitoring program for carbon dioxide, nitrogen saturation, etc. There is no history of fish loss at OHRC in recent years attributed to these factors.

9.2.4) Indicate biweekly or monthly fish growth information (*average program performance*), including length, weight, and condition factor data collected during rearing, if available.

N/A

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

Contrast fall and spring growth rates for yearling smolt programs. If available, indicate hepatosomatic index (liver weight/body weight) and body moisture content as an estimate of body fat concentration data collected during rearing.

N/A

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*).

- Fry (from 2,000 fish per pound to 300 fish per pound) are fed by hand 6-8 times per day. Fry are started on a dry diet and are fed at varying rates depending on the need to control or increase growth rates. The minimum fry feeding rate is 75 percent of the average daily growth rate (AGR). Expected conversion rates average less than or equal to 1.0.
- From 300 per pound to release, fish are fed a dry diet, and are hand fed 3-6 times per day. Feed schedules are developed to reach research project needs/goals
- A fish feed scheduling computer program is used to calculate growth factor parameters such as temperature, length/weight ratios, conversion rates, and expected average growth rates.
- Overall average conversions for the OHRC holding/stock fish is 1.2.

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

Incubation trays, rearing tanks, and rearing ponds are disinfected prior to and after rearing. In addition, all equipment used during daily rearing activities is disinfected between uses. Disinfection procedures for onsite operations were developed from IHOT recommendations for hatchery disinfection (IHOT 1995). Fish health monitoring is accomplished from daily observation of fish behavior, pond environment monitoring, and daily recording of fish mortality. In addition to daily onsite monitoring, the following steps are carried out routinely by qualified ODFW fish pathologist.

- A qualified fish health specialist will conduct all fish health monitoring.
- Conduct examinations of juvenile fish at least monthly and more often as necessary. A representative sample of healthy and moribund fish from each lot of fish will be examined. The number of fish examined will be at the discretion of the fish health specialist.
- Investigate abnormal levels of fish loss when they occur.

- Determine fish health status prior to release or transfer to another facility. The exam may occur during the regular monthly monitoring visit (i.e., within 1 month of release).
- Appropriate actions including drug or chemical treatments will be recommended as necessary. If a bacterial pathogen requires treatment with antibiotics, a drug sensitivity profile will be generated when possible.
- Findings and results of fish health monitoring will be recorded on a standard fish health reporting form and maintained in a fish health database.

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

Body length, weight and condition factor will be determined. Other parameters will be dependent on specific research needs and questions.

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

This is dependent on the needs and goals of specific research projects. Methods such as reduced density, alternative feed souces and reduced rearing temperature may be applied methods.

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. (*e.g. "Fish will be reared to sub-yearling smolt size to mimic the natural fish emigration strategy and to minimize the risk of domestication effects that may be imparted through rearing to yearling size.")*

N/A

SECTION 10. RELEASE

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

No production fish releases are planned from the OHRC.
Specific studies may require release of hatchery reared fish for scientific study. These areas are yet to be determined but will occur in the Alsea Basin. NMFS staff will be consulted prior to any releases.

10.1) Proposed fish release levels. *(Use standardized life stage definitions by species presented in* ***Attachment 2****. "Location" is watershed planted (e.g. "Elwha River").*

TBD

Age Class	Maximum Number	Size (fpp)	Release Date	Location

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Eggs				
Unfed Fry				
Fry				
Fingerling				
Yearling				

10.2) Specific location(s) of proposed release(s).
Stream, river, or watercourse:
Release point:
Major watershed:
Basin or Region:

TBD based on specific research project goals.

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

For existing programs, provide fish release number and size data for the past three fish generations, or approximately the past 12 years, if available. Use standardized life stage definitions by species presented in ***Attachment 2****. Cite the data source for this information.*

N/A

Release year	Eggs/ Unfed Fry	Avg size	Fry	Avg size	Fingerling	Avg size	Yearling	Avg size
1988								
1989								
1990								
1991								
1992								
1993								
1994								
1995								
1996								
1997								
1998								
1999								

Release year	Eggs/ Unfed Fry	Avg size	Fry	Avg size	Fingerling	Avg size	Yearling	Avg size
Average								

Data source: (Link to appended Excel spreadsheet using this structure. Include hyperlink to main database)

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

Provide the recent five year release date ranges by life stage produced (mo/day/yr). Also indicate the rationale for choosing release dates, how fish are released (volitionally, forced, volitionally then forced) and any culling procedures applied for non-migrants.

TBD

10.5) Fish transportation procedures, if applicable.

Describe fish transportation procedures for off-station release. Include length of time in transit, fish loading densities, and temperature control and oxygenation methods.

Transportation of fish is accomplished with the use of various size liberation truck units. Units range in size from 1,000- to 2,500-gallon tankers. Some units utilize recirculatory refrigeration systems which are used to maintain the temperature of water taken at the hatchery site. Oxygen is added at a rate of 1.5 Lpm. Some units utilize insulated tanks equipped with agitators.. All units haul fish at an average density of 0.75 pounds per gallon.

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

TBD, based on specific research project needs and goals.

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

TBD, based on specific research project needs and goals. Marking is discussed in Section 12 “Research.”

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

Numbers at release should be within the accepted level of plus or minus 2 percent of programmed release. Should that number be exceeded the release would still be made provided all fish were at smolt stage. Efforts are made to maintain program within acceptable release levels by reducing surplus at the egg/fry and/or fingerling stage.

10.9) Fish health certification procedures applied pre-release.

- All fish health monitoring will be conducted by a qualified fish health specialist.

- An ODFW fish health specialist will determine fish health status prior to release or transfer to another facility. The exam may occur during the regular monthly monitoring visit (i.e., within 1 month of release).

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

An emergency release due to water system failure may occur depending on stage of rearing. Due to seasonal conditions, a water system failure is most likely to occur in the later months of rearing when there exists a greater chance of successful migration. Under these conditions, the Alsea stock winter steelhead program would be released.

If a water system failure occurred during early rearing there would be no release of fish due to the length of time hatchery stock would rear within the Alsea system, and the associated risk of this rearing to natural production. Historical information from this site shows overall survival rate to adult of such an early release would be extremely low.

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.
(*e.g. "All yearling coho salmon will be released in early June in the lower mainstem of the Green River to minimize the likelihood for interaction, and adverse ecological effects, to listed natural chinook salmon juveniles, which rear in up-river areas and migrate seaward as sub-yearling smolts predominately in May").*

- Program will target release of fish at an appropriate size to assist migration and lessen contact time with natural population in upper watershed.
- Program fish will be released at their own volition, and directly from rearing site. Fish moving out should be in smolt phase to assist in migration. Onsite release should reduce straying potential of returning adults within the Alsea Basin.

SECTION 11. RESEARCH

The research conducted at OHRC varies on an annual basis depending upon research priorities for the agency and university, project funding, management objectives and collaborative research efforts with various partners. It is unknown what research will occur in the future. However, all research will be related to the purpose and goals of the OHRC described in section 1.9. See below for the process that will be used for evaluating research projects for ESA authorization.

The proposed process for ESA authorization of any research activities conducted at OHRC will be the following:

1) OHRC, in collaboration with ODFW, will submit the proposed research and identify take limits for listed coho salmon via the online 4(d) Research application process.
2) Once the application is completed, NMFS Sustainable Fisheries Division will evaluate the proposed research at OHRC to ensure activities are consistent with the purpose and objectives set forth in this HGMP.
3) If the research complies with the HGMP and take limits are appropriate, NMFS Sustainable Fisheries Division will issue written concurrence for upcoming research project(s) to OHRC and ODFW. Annual research authorization by NMFS will provide ESA coverage under limit 5 of the 4(d) Rule for Oregon Coast hatchery programs.
4) NMFS' annual concurrence will specify the terms and conditions of the research approval.
5) The annual process specified here for OHRC research activities is intended to be similar to the annual process used by NMFS for the review and approval of ODFW's Fisheries Management and Evaluation Plan for wild coho fisheries along the Oregon Coast under limit 4 of the 4(d) Rule.

1. The general scope of research activities are listed below:

Use of Backpack Electroshocker for Presence or Absence Surveys.

Purpose: The purpose is to determine presence or absence of fish and fish species present in Fall Creek and Carnes Creek.

Description: Single-pass backpack electroshocking will be used to further the knowledge of fish distributions and to determine species presence or absence seasonally in the two streams. Single-pass electroshocking is only conducted by experienced ODFW staff or other trained participants in direct supervision by ODFW staff at the OHRC. The NMFS Backpack Electrofishing Guidelines are strictly adhered to. Throughout the survey fish are observed for signs of stress and electroshocker settings are adjusted as necessary to ensure fish survival.

Use of Backpack Electroshocker for Fish Collection

Purpose: The purpose is to collect fish species from Fall Creek and Carnes Creek for OHRC research projects.

Description: Single-pass backpack electroshocking will be used collect fish species from either of the two streams. Single-pass electroshocking is only conducted by experienced ODFW staff or other trained participants in direct supervision of ODFW staff at the OHRC. The NMFS Backpack Electrofishing Guidelines are followed. Throughout the survey fish are observed for signs of stress and electroshocker settings are adjusted as necessary toe ensure fish survival. Fish that will be retained will be immediately transferred to a holding tank with adequate water flow. Fish not intended for collection will be allowed to recovered and released at the collection site.

Smolt Trap Operation-

<u>Purpose:</u> The OHRC smolt trap is a 5 foot rotary screw trap that is used to monitor the production of salmonids from Fall Creek on the Alsea River. By developing a long term record of fry and smolt collections we will have more information on fish survival and outmigration patterns.

<u>Description:</u> A rotary screw trap will be used to capture downstream migrating fish near the OHRC from February 01 until low water in June. Protocols developed by the ODFW Salmonid Life-Cycle Monitoring program will be followed. The trap will be operated 24 hours per day, 7 days per week and will be checked every 24 hours, generally in the morning when all captured fish will be processed. Length and species of each captured fish will be recorded. A portion of captured fish will be marked and released upstream of the trap to measure trap efficiency. The remaining fish will be released downstream of the trap. Fish handled for measuring or marking will be anesthetized using MS222. Fish will be marked by clipping a portion of the anal fin. Genetic samples may be collected. The information collected is used to monitor trends of salmonid production in the Alsea Basin, specifically Fall Creek. The data will provide long term trends in outmigration timing. Fish may be collected for specific research project needs at the OHRC. Fish will be recovered in a five gallon bucket, then transported to the OHRC tank farm and held until the onset of the research project. Tagging may take place following collection. Tagging will follow approved animal care protocol and be conducted by trained personnel. Tagged fish will be allowed to recover in a recovery tank located in Fall Creek for 12 hours prior to a night release to reduce predation.

Netting/Seining

<u>Purpose:</u> The OHRC use netting and seining techniques to collect juvenile salmonids for OHRC related research.

Description: Beach and pole seining is an efficient method to capture salmonids and some non-salmonid fishes in a wide variety of habitats including rivers, estuarine and nearshore lake, reservoir, and marine habitats. It is most effective when used in relatively shallow water with few obstructions, where fish are in high concentrations, and for species that are less likely to out swim the net; however, in some circumstances seining can capture highly mobile species such as adult salmon. Seining permits the sampling of relatively large areas in short periods of time as well as the capture and release of fish without significant stress or harm, as long as the bunt of the seine is kept in water and the fish are not too crowded (or fish are quickly moved to a holding container). Seining is a useful technique for objectives such as collecting fish for biological samples, sampling fish diversity within a given habitat (low-precision requirements), and estimating relative abundance (with modest precision) or population abundance with high accuracy and precision (via mark–recapture). Beach seines allow the selective capture and subsequent release of a wide range of salmonid fish sizes. This characteristic makes beach seining a useful capture method for many mark–recapture based salmonid assessments, in which marking more fish allows for greater precision of the population estimate.

We categorized objectives for seining into six types or purposes: (1) relative abundance estimation, (2) absolute abundance estimation via indirect measures, (3) relative survival estimation, (4) biological sampling, (5) estimating species diversity or presence, and (6) absolute abundance estimation via direct measures. There may be some studies in which two or more of these are applicable, but the most important objective should determine the capture method(s) of choice, which may include methods other than seining/

Tagging Adults

Purpose: The OHRC various tagging methods to identify and track adult salmonids for OHRC related research.

Description:

- Coded Wire Tags (CWT). Though not commonly used for adults, CWT's may be used to track or identify adult salmon or stocks of salmon. CWT's are typically inserted into salmonids at the juvenile stage. A small piece of wire injected into a fish using small applicators or by hand. These tags can be placed in the snout, necks, caudal fins, and any other muscular area. The tags can be detected with a sensitive metal detector or an x-ray, which can show color-coded wires or notches that are used to identify specific groups of fish. The equipment used to tag and detect the wires are very expensive, however using this technique allow fish to be tagged quickly, easily, and without altering behaviors.
- Acoustic Tags. Acoustic tags can be attached to fish using multiple methods including external placement, esophageal/gastric insertion, and surgical implantation. Esophageal insertion is typically used for adult salmonids because surgery in not required and behavior is not altered. Acoustic tagging allows researchers to monitor and track fish behavior, habitat uses, migration routes and timing as well as survival. Tag data is recorded on hydrophones positioned throughout the creek, river or watershed.
- Radio Tags. Fish radio telemetry involves tracking the movement, survival or behavior of fish using surgically or gastric inserted radio transmitters. Tagged fish are then tracked using fixed station receivers as well as mobile tracking units. Capture methods will be selected that minimize stress and researchers will ensure that study animals are affected as little as possible by the transmitter (accounting for the size of the tag in relation to the size of the fish). Proper handling techniques should be follow and use of anesthetics when needed.
- Passive Integrated Transponder (PIT). PIT tags have been used as a research and management tool for over two decades. Generally fish anesthesia is used prior to handling. Many researchers use PIT tags and readers to study migration habits and movement to and from specified areas. A PIT tag is a radio frequency device that transmits a unique individual code to a reader where it is displayed in a numeric or alphanumeric form. The tag has no internal battery, hence the term "passive". The reader powers or excites the tag circuitry by radio frequency induction and receives the code back from the tag. Radio frequency identification does not require line of sight, tags can be read as long as they are within the range of a reader. PIT tags were designed for positive identification; because they are passive they are not capable of long-distance tracking. The implant site is dependent upon the species, size of the animal and the size of the tag.
- Anchor (Floy) Tags. Floy tags are applicable for long-term studies on migration on adult migratory species. This tag is a modified dart tag in which a nylon T-bar replaces the harpoon like head of the dart tag. These tags are exactly like tags used to attach prices to clothing. The tags are inserted with a gun which can be loaded with one or a clip of anchor tags, marking the tagging of individuals or hundreds of organisms quick and

easy. Like dart tags it is important that anchor tags penetrate deep enough into the fish that the T-bar interlocks with the skeleton.

Tagging Juveniles

<u>Purpose:</u> The OHRC various tagging methods to identify and track juvenile salmonids for OHRC related research.

<u>Description:</u>

- <u>Coded Wire Tags (CWT).</u> Tagging fish with CWT's is the most common marking method used for studies of Pacific Salmon released from hatcheries. CWT's can also be used in studies of wild stocks to estimate harvest, total adult production, exploitation rates, smolt production, marine survival or return rates and spawner recruitment. Anesthetics are necessary to minimize stress to fish and reduce injury during the CWT process. Tricaine methanesulfonate (MS222) is the only drug registered with the U.S. Food and Drug Administration for use on food fish. The Mark IV tag injector manufactured by Northwest Marine Technology, Inc. (NMT), is the standard tag injector used on CWT projects throughout the U.S. and Canada. Handheld injectors are also available when tagging smaller numbers of fish. A small piece of wire injected into a fish using small applicators or by hand. These tags can be placed in the snout, necks, caudal fins, and any other muscular area. The tags can be detected with a sensitive metal detector or an x-ray, which can show color-coded wires or notches that are used to identify specific groups of fish. The equipment used to tag and detect the wires are very expensive, however using this technique allow fish to be tagged quickly, easily, and without altering behaviors.
- <u>Acoustic Tags.</u> Acoustic tags can be attached to fish using multiple methods including external placement, esophageal/gastric insertion, and surgical implantation. Surgical implantation is typically used for juvenile salmonids because it does not alter their feeding habits. Acoustic tagging allows researchers to monitor and track fish behavior, habitat uses, migration routes and timing as well as survival. Tag data is recorded on hydrophones positioned throughout the creek, river or watershed.
- <u>Radio Tags.</u> Fish radio telemetry involves tracking the movement, survival or behavior of fish using surgically or gastric inserted radio transmitters. Tagged fish are then tracked using fixed station receivers as well as mobile tracking units. Capture methods will be selected that minimize stress and researchers will ensure that study animals are affected as little as possible by the transmitter (accounting for the size of the tag in relation to the size of the fish). Proper handling techniques should be follow and use of anesthetics when needed.
- <u>Passive Integrated Transponder (PIT).</u> PIT tags have been used as a research and management tool for over two decades. Generally fish anesthesia is used prior to handling. Many researchers use PIT tags and readers to study migration habits and movement to and from specified areas. A PIT tag is a radio frequency device that transmits a unique individual code to a reader where it is displayed in a numeric or alphanumeric form. The tag has no internal battery, hence the term “passive". The reader powers or excites the tag circuitry by radio frequency induction and receives the code back from the tag. Radio frequency identification does not require line of sight, tags can be read as long as they are within the range of a reader. PIT tags were designed for positive identification; because they are passive they are not capable of long-distance

tracking. The implant site is dependent upon the species, size of the animal and the size of the tag.

- Visible Implant Elastomer (VIE). VIE tagging is typically done on smaller juvenile fish where tags (colored elastomer material) are injected as a liquid under the skin of the fish. VIE's can either be numbered or colored tagging regimes.

Thermal Marking
Purpose: Thermal marking will be used to identify fish from specific research projects.
Description: Thermal marking is an efficient means of marking 100% of the fish at the hatchery. Therefore, we can take fish that have been thermal marked, remove its otoliths or ear bones and tell whether or not it is a hatchery fish. The hatchery fish are marked prior to hatch or soon thereafter in incubators. By manipulating the water temperature in the incubators, hatchery technicians can place a series of rings on the otoliths that will identify them by hatchery and brood year. This process forms a type of "bar code" on the otolith that remains with the fish for its lifetime. These patterns of bands can be customized for each hatchery and brood year by varying the number of bands and the width and spatial placement of these bands.

Fin Marking
Purpose: Fin marking allows identification of individual or groups of fish for OHRC related research projects.
Description: Researchers often remove parts or whole fins to identify individual fish or fish from various groups or families. The adipose fin is the common fin removed for identificiation of hatchery vs. wild salmonid. Other fins including upper or lower caudal or pelvic or pectoral fins are often partly or entirely removed.

Adult Fish Trap
Purpose: Adult salmonids will be trapped and collected in the fish trap at the OHRC for use in OHRC related research.
Description: OHRC staff monitors fish migrations into the fish trap on a daily basis. Fish are handled, biological samples taken and typically native coho, steelhead and Chinook are released upstream in Fall Creek, above OHRC. As needed and discussed with ODFW's Mid Coast Watershed District Staff, adult salmonids will be removed from the OHRC fish trap for OHRC related research projects. From the fish trap, they will be transported to either holding tanks in the OHRC tank farm, or directly into the simulated streams. Fish will also be collected as needed from the adult fish trap at the Alsea Fish Hatchery located on the North Fork of the Alsea River.

Hook and Line Collection of Adults
Purpose: Hook and line sampling of adult salmonids will be used for collection and monitoring of specific OHRC related research projects.
Description: Hook and line sampling is a somewhat dignified phrase for conventional sport fishing. However, good hook and line samples involve more procedures, more measurements, and more records than normal fishing trips. Hook and line fish sample data can provide even more information related to absence or presence of fish. Hook and line also allows collection of fish caught by this manner for research. This may be critical for certain research pertaining to behavior of returning fish or contribution to fisheries. Often it is desirable to sample or collect fish low in the river system where most other sampling and collection methods would be

ineffective.

Hook and Line Collection of Juveniles
Purpose: Hook and line sampling of juvenile salmonids will be used for collection and monitoring of specific OHRC related research projects.
Description: Hook and line sampling is a somewhat dignified phrase for conventional sport fishing. However, good hook and line samples involve more procedures, more measurements, and more records than normal fishing trips. Hook and line fish sample data can provide even more information related to absence or presence of fish. Hook and line also allows collection of fish caught by this manner for research. This may be critical for certain research pertaining to behavior of returning fish or contribution to fisheries. Often it is desirable to sample or collect fish low in the river system where most other sampling and collection methods would be ineffective.

Tangle Net Collection
Purpose: Tangle nets will be used for collection and sampling of adult samlonids related to OHRC research.
Description: Selective capture and subsequent release of nontarget bycatch is possible because the tangle net can efficiently capture salmonids in large rivers and estuaries in short time periods with low immediate mortality rates and relatively low post-release mortality. Tangle nets are visually comparable to gill nets and fished similarly, however the mesh of the tangle net is smaller than that of a conventional gill net, which results in the fish being caught by the snout or teeth. Tangle nets allow researchers to capture a representative sample of fish to assess survival, to tag, or to collect fish or biological samples. The use of tangle nets also gives researchers a sampling of the percentage of hatchery vs. wild origin fish as they enter the sampling area, typically low in the river or upper estuary.

Snorkeling
Purpose: Snorkeling will be used to identify and monitor salmonids related to OHRC research.
Description: Snorkeling in the underwater observation and study of fish in flowing waters. Snorkeling gear is worn by biologists or researchers who survey for fish abundance, distribution, size and habitat use while slowly working in (generally) an upstream direction. This technique is most commonly used to survey juvenile salmonid populations, but can be used for other species as well.

SECTION 13. ATTACHMENTS AND CITATIONS

Include all references cited in the HGMP. In particular, indicate hatchery databases used to provide data for each section. Include electronic links to the hatchery databases used (if feasible), or to the staff person responsible for maintaining the hatchery database referenced (indicate email address). Attach or cite (where commonly available) relevant reports that describe the hatchery operation and impacts on the listed species or its critical habitat. Include any EISs, EAs, Biological Assessments, benefit/risk assessments, or other analysis or plans that provide pertinent background information to facilitate evaluation of the HGMP.

SECTION 14. CERTIFICATION LANGUAGE AND 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, Title, and Signature of Applicant:

Certified by_____________________________ Date:_____________

Table 1. Estimated listed salmonid take levels of by hatchery activity. The amount of take depends upon the specific research project being proposed. NMFS will review and authorize proposed research projects prior to implementation.

Listed species affected: Coho________________________ ESU/Population:____Mid-Coast_____________________ Activity:____Research_______

Location of hatchery activity:_____OHRC___ Dates of activity:___Annual_______ Hatchery program operator:____ODFW/Ryan Couture_______

Type of Take	**Annual Take of Listed Fish By Life Stage *(<u>Number of Fish</u>)***			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)	TBD by project	TBD by project	< 46	TBD by project
Collect for transport b)	TBD by project	TBD by project	< 46	TBD by project
Capture, handle, and release c)	TBD by project	TBD by project	< 46	TBD by project
Capture, handle, tag/mark/tissue sample, and release d)	TBD by project	TBD by project	< 46	TBD by project
Removal (e.g. broodstock) e)	TBD by project	TBD by project	TBD by project	TBD by project
Intentional lethal take f)	TBD by project	TBD by project	TBD by project	TBD by project
Unintentional lethal take g)	TBD by project	TBD by project	TBD by project	TBD by project
Other Take (specify) h)	TBD by project	TBD by project	TBD by project	TBD by project

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.

<u>Instructions</u>:

1. *An entry for a fish to be taken should be in the take category that describes the greatest impact.*
2. *Each take to be entered in the table should be in one take category only (there should not be more than one entry for the same sampling event).*
3. *If an individual fish is to be taken more than once on separate occasions, each take must be entered in the take table.*

Attachment 1. 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 B