HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	**Coquille River Steelhead Program**
Species or Hatchery Stock:	**Winter Steelhead– Stocks 44 and 144**
Agency/Operator:	**Oregon Department of Fish & Wildlife**
Watershed and Region:	**Coquille Watershed –West Region**
Date Submitted: **First Update Submitted:** **Second Update Submitted:**	**October 19, 2005** **October 16, 2014** **June 10, 2016**
Date Last Updated:	**June 9, 2016**

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Coquille River Steelhead Program.

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

Coquille Winter Steelhead *Oncorhynchus mykiss* (North Fork/East Fork - stock 44 and South Fork - stock 144).

1.3) Responsible organization and individuals.

Lead Contact: Scott Patterson, Fish Propagation Program Manager
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Hatchery Contact: David Welch, Bandon Hatchery Manager
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Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program.

ODFW Salmon and Trout Enhancement Program (STEP) volunteers assist with broodstock collection, acclimation, and releases.

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

Funding source: 50% state dollars from the sale of fishing licenses and 50% general fund from state taxes.
Bandon Hatchery staffing level: One hatchery manager-1 (vacant), one senior hatchery

technician, and one hatchery technician 1.

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

Hatchery Facility
Bandon Hatchery is located in the Coquille watershed one mile east of the city of Bandon, located at latitude 43º 06' 58"N and longitude 124º 23' 57" W. The hatchery is situated at the confluence of Geiger and Ferry Creeks, which run into the Coquille estuary at RM 1.5. Watershed code is 1700301000. The regional mark processing code for Bandon Hatchery is 5F22237 H37 21.

Spawning, egg incubation and rearing facilities
Bandon Hatchery is responsible for all spawning of adults and the incubation of all green and most eyed eggs, except small numbers to classroom incubators. All fish rearing takes place at Bandon Hatchery.

Acclimation and release sites

Stock 44
A total of 45,000 smolts are reared at Bandon Hatchery, then transferred to the North Fork Coquille River after acclimation at Laverne Park Acclimation site. Laverne Park Acclimation site is located at river mile 31.5 on the North Fork Coquille River. With the approval of Fish Division, effective from 2017 the Laverne Park release has been reduced from 45,000 to 42,000 smolts, and the 3,000 smolts release is being shifted to Bandon Hatchery for direct release into Ferry Creek. The release of 3,000 smolts from Bandon Hatchery is for broodstock maintenance only. The release from Bandon Hatchery would facilitate swim-in adult steelhead for broodstock collection. It was done in the past, and adult fish successfully returned to hatchery and met broodstock needs. Approximately 3,000 eyed eggs of this stock are incubated to hatching at Coquille Basin schools, and button-up fry are released into Coquille River streams.

Stock 144
A total of 70,000 smolts are reared at Bandon Hatchery, then transferred to two acclimation sites, Beaver Creek (40,000) and Woodward Creek (30,000). Beaver Creek Acclimation site is located at river mile 21 and Woodward Creek Acclimation Site is located at river mile 27.5 on the South Fork Coquille River. Approximately 2,000 eyed eggs of this stock are incubated to hatching at Coquille Basin schools, and button-up fry are released into Coquille River streams.

1.6) Type of program.

Isolated Harvest Program (Smolts)

1.7) Purpose (Goal) of program.

The smolt program is being used for harvest augmentation. The goal of this program is to provide fish primarily for harvest that are genetically and ecologically similar to wild

populations to minimize potential impacts to wild populations. Adult hatchery fish are also produced to provide broodstock for the hatchery program. The unfed fry program (classroom incubators) is strictly an educational program, allowing K-12 students an opportunity to observe incubating steelhead eggs as they develop.

1.8) Justification for the program.

This program provides fin marked fish for an in-river marked steelhead fishery in the Coquille River Basin. Hatchery fish are acclimated to reduce straying and to concentrate fish for the fishery. The fishery is currently limited by regulations that require the release of any unmarked steelhead. As an action of the Coastal Multi-Species Conservation Plan (CMP)(ODFW 2014), the fin marked hatchery steelhead acclimation and release into the East Fork Coquille River (formerly 20,000-25,000 smolts) was discontinued, and shifted to the North Fork at Laverne Park. A concomitant action will allow for wild (unmarked) steelhead harvest in the East Fork.

The release of unfed fry (hatched in classroom incubators) is mainly to educate students to increase their awareness of salmonid biology, life history, and habitat requirements.

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

BENEFITS **Performance Standards**	**BENEFITS** **Performance Indicators**	**BENEFITS** **Monitoring & Evaluation**
Provide an opportunity for anglers to harvest hatchery steelhead in-basin.	• Program fish contribute to the ocean and freshwater harvest. • Anglers pursue program fish. • Program fish are externally marked to help evaluate survival, distribution, straying, and contribution to the fishery.	• All releases are properly documented. • Analyze returned harvest tags to determine harvest level of hatchery steelhead. • Periodically conduct creel or other surveys to estimate angler effort and harvest rates of program fish.
Carcasses or other nutrient products will be placed in wild steelhead spawning streams for nutrient enrichment. This is identified as an Oregon Plan salmon restoration measure.	• Specified monitoring streams are designated for target nutrient loading, while other streams are not loaded and act as experimental controls.	• Distribution of carcasses and other products for nutrient enrichment is in compliance with DEQ guidelines.

Healthy winter steelhead are released.	• Release groups will meet ODFW fish health standards.	• Conduct appropriate health checks throughout incubation, rearing, and prior to release. • Document size and age of program fish prior to release. • Verify compliance with approved fish health standards and criteria. (See Appendix A.)
The steelhead program will meet the criteria provided by the Native Fish Conservation Policy.	• A multi-species Conservation Plan was developed for the appropriate Species Management Unit (SMU). • Based on the Conservation Plan and the Fish Hatchery Management Policy, a revised HGMP has been developed.	• Procedures for assessing stock status and risks will be developed in conjunction with the Conservation and Hatchery Management Plan. • Revised HGMP submitted to NMFS. Public input will be sought by NMFS during the approval of the plan.
RISKS **Performance Standards**	**RISKS** **Performance Indicators**	**RISKS** **Monitoring & Evaluation**
All hatchery steelhead smolt release lots will be 100% adipose fin-marked. This will identify hatchery-produced steelhead in fisheries and on the spawning grounds.	• Confirm that hatchery smolts are marked with appropriate fin marks prior to release. Conduct quality control measures during and after fin marking, prior to release.	• Appropriate monitoring techniques will be used to evaluate finmark efficiency. • Hatchery steelhead will be identified/quantified in angler creel and spawning surveys.
Capture steelhead adults for broodstock in a manner that does not threaten the persistence/rebuilding of wild Coho Salmon and steelhead in the basin.	• Steelhead broodstock collection activities will avoid the unnecessary take of wild Coho Salmon to the extent possible. • Steelhead broodstock collection activities that become susceptible to excessive take of wild	• Record wild broodstock collected and incidental catch of wild Coho Salmon in the basin. • Avoid the take of listed Coho and wild steelhead in excess of fish collected for the hatchery programs under HGMP.

	Coho will be modified to reduce take.	
Hatchery operations comply with the Fish Hatchery Management Policy and other state and federal guidelines and permits.	• Hatchery operations conform to applicable fish health, sanitation, and operational guidelines. • Hatchery operations conform to STEP poundage and/or DEQ/NPDES guidelines for water quality. • Facility intakes are appropriately screened or above anadromous salmon distribution.	• Fish health is regularly monitored to avoid the introduction of new pathogens or significant levels of existing pathogens. • Fish health is certified prior to release. • Appropriate reports are filed to document fish mortality and growth. • Sanitation and maintenance activities are conducted regularly. • Appropriate protocols will be followed for monitoring water quality standards.

1.11) Expected size of program.

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

The maximum number of adult fish needed for broodstock for this program is 48 fish (24 pairs) for stock 44, and 64 fish (32 pairs) for stock 144.

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

Stock 44 winter steelhead release levels.

Life Stage	Annual Release Level	Release Location
Eyed Eggs		
Unfed Fry*	3,000 (STEP)	Coquille River tributaries
Fry		
Fingerling		
Yearling	42,000	Laverne Park (N. Fork Coquille River)
	3,000	Ferry Creek (release from Bandon Hatchery for broodstock maintenance)

*Unfed fry releases are from educational/classroom-incubated eggs.

With the approval of Fish Division, effective from 2017 the Laverne Park release has been reduced from 45,000 to 42,000 smolts, and the 3,000 smolts release is being shifted to Bandon Hatchery for direct release into Ferry Creek. The release of 3,000 smolts from Bandon Hatchery is for broodstock maintenance only. The release from Bandon Hatchery would facilitate swim-in adult steelhead for broodstock collection.

Stock 144 winter steelhead release levels.

Life Stage	Annual Release Level	Release Location
Eyed Eggs	0	
Unfed Fry*	2,000 (STEP)	Coquille River tributaries
Fry	0	
Fingerling	0	
Yearling	70,000	Beaver Creek (40,000) Woodward Creek (30,000)

*Unfed fry releases are from educational/classroom-incubated eggs.

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

Estimates of adult winter steelhead production from the Coquille Basin hatchery steelhead programs from brood years 1986-2003 are presented in Table # 1.12. Estimates for hatchery winter steelhead harvested, based on punch card data, cannot be separated into stock 44 and

stock 144 catch, thus catch estimates are a combination of the two stocks. The estimated number of adult hatchery winter steelhead produced was derived from a variety of data sources.

The "Freshwater Sport" column is based on punch card estimates of catch in the Coquille Basin. For the 1988-89 through 1990-91 run years total estimated catch was adjusted for hatchery/wild and age composition based on scale samples from the fishery. For the 1991-92 and 1992-93 run years the South Fork Coquille was managed as a hatchery fish only fishery. Age composition for the South Fork punch card data, and age composition and hatchery or wild origin for the rest of the basin was based on averages from the 1983-84 through 1990-91 scale data. Beginning with the 1993-94 run year the entire Coquille Basin has been managed as a hatchery fish only fishery, with age composition based on an average of the 1983-84 to 1990-91 fishery scale data. The "Hatchery Return" column depicts the actual count of adult winter steelhead returns at Bandon Hatchery, with the adult age composition based on an average of the 1983-84 to 1991-92 fishery scale data. This is a minimum estimate of the number of hatchery winter steelhead that were not harvested, for two reasons. First, smolts of stock 44 and stock 144 are released off-station in areas upstream of Bandon Hatchery. Since there are no adult fish collection facilities in these areas that operate throughout the winter steelhead run timing, only a small portion of the returning hatchery fish are collected. Second, estimates are not available for the number of hatchery winter steelhead that strayed to natural spawning areas in the Coquille Basin. A minimum smolt to adult survival is calculated as the sum of the prior three columns divided by the "Smolt Release" columns.

Table 1.12. Estimated total adult hatchery winter steelhead produced per brood year (and related adult return year). Data were derived from hatchery returns and punch card data. Italicized data represents incomplete returns for the brood year (i.e. missing 3 salt return data). NA=data not available.

Brood Year	Coquille Basin Smolts		2-Salt Return Year	Estimated Adult Hatchery STW (2-salt + 3-salt)			
	Stock 44	Stock 144		Freshwater Sport *	Hatchery Return **	Spawning grounds	Smolt to Adult Survival***
1986	139,297	N/A	1988-89	2,748	143	N/A	2.08%
1987	195,767	N/A	1989-90	4,653	286	N/A	2.52%
1988	140,244	N/A	1990-91	3,651	131	N/A	2.70%
1989	140,722	N/A	1991-92	3,884	152	N/A	2.87%
1990	187,488	N/A	1992-93	2,986	22	N/A	1.53%
1991	176,262	N/A	1993-94	2,585	81	N/A	1.90%
1992	67,253	75,907	1994-95	3,222	208	N/A	2.40%
1993	76,290	52,613	1995-96	2,523	269	N/A	1.49%
1994	51,084	38,637	1996-97	2,162	355	N/A	1.42%
1995	60,314	69,715	1997-98	2,338	196	N/A	1.74%
1996	28,476	59,658	1998-99	3,082	154	N/A	2.51%
1997	52,305	64,614	1999-00	1,540	121	N/A	1.85%
1998	41,763	74,665	2000-01	1,851	248	N/A	1.61%
1999	47,046	88,416	2001-02	1,681	197	N/A	2.13%
2000	60,534	48,699	2002-03	1,439	160	N/A	1.36%
2001	61,864	69,337	2003-04	1,789	107	N/A	1.62%
2002	95,724	85,944	2004-05	N/A	123	N/A	N/A
2003	106,087	124,686	2006-07	N/A	148	N/A	N/A

* = Coquille Basin catch, based on punch card returns. The 1988-89 through 1992-93 run years hatchery/wild and age comp based on scale samples. The 1993-94 to 1999-00 run years are hatchery fish only fisheries with age comp based on an average of the 1983-84 to 1991-92 scale data.
** = Only represents stock 44 returns to Bandon Hatchery, most smolts were released off-station. Used average age composition from fishery scales to assign age to Bandon Hatchery returns.
***= Survival based on punch card data and hatchery return, which is the only way survival can be estimated in this basin.

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

Utilization of native broodstock began in 1981. Prior to that, Alsea stock were used in the Coquille Basin.

1.14) Expected duration of program.

The Coquille River Steelhead smolt program is an ongoing program for harvest augmentation, has been redesigned per ODFW's CMP (2014), and is intended to continue indefinitely. The unfed fry component of the program is intended as an educational opportunity and is intended to continue as long as adequate resources and interest from schools persist.

1.15) Watersheds targeted by program.

Coquille River watershed (Mainstem, North Fork, and South Fork)

1.16) Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed.

1.16.1) Brief Overview of key Issues.

Issues, problems, controversies in connection with the program. (size of facilities, program efficiency, straying, broodstock problems, etc.) A sentence or two for each issue, in simple paragraph form.

Issue #1: Program Efficiency
Survival of hatchery fish, adult returns, and cost involvement may generate questions with regard to program's efficiency. The program has proven to be cost effective due to the fact that steelhead smolts acclimated at Coquille Basin sites survive well and contribute well to fisheries. The hatchery steelhead smolt program generates a very popular fishery that supports a substantial number of angler days.

Issue # 2: Straying
Straying of hatchery-produced fish is always a concern. ODFW evaluates hatchery steelhead numbers observed on spawning grounds. Based on observation and creel sampling from the fishery for winter steelhead in the basin, and a radio telemetry study in the early 2000's, returning adult fish showed strong homing tendency to acclimation sites. Observations of hatchery steelhead in acclimation streams also indicate a high degree of

homing.

Issue #3: Broodstock Collection
Capture of wild Coho Salmon during steelhead broodstock collections may occur, but is not a serious issue. Incidentally caught Coho Salmon are released alive, and usually most Coho have migrated upriver to spawning grounds prior to steelhead broodstock collection. However, trapping of steelhead broodstock can be suspended if late-returning Coho Salmon move upriver through the trapping locations.

Issue #4: Unfeasible water conditions at acclimation time
In the event of extreme drought conditions or other water supply related conditions, full three-week acclimations may not be feasible with some of the existing acclimation facilities. Such examples include low stream flows and/or low dissolved oxygen necessitating a direct-stream release, or high water flooding the containment ponds and causing early release.

1.16.2) Potential Alternatives to the Current Program

DRAFT ALTERNATIVE 1—Program expansion.

DESCRIPTION AND IMPLICATIONS:
Expand the current winter steelhead hatchery program by increasing smolt releases and the number of unfed fry released. Expansion of the hatchery winter steelhead program in the Coquille Basin could have unanticipated impacts on Coho Salmon. An expanded program would require additional broodstock collection that could potentially have impacts to Coho Salmon during capture. Expanded unfed fry releases could increase competition with Coho juveniles in rearing areas.

PROS AND CONS:
Pros— Expanded hatchery releases that increase angling opportunities are good for anglers and good for the economic benefits to the local community and Oregon.
Cons— Because Coho Salmon spawn earlier, hatchery winter steelhead spawning in natural spawning areas could have an impact on Coho redds, if superimposition of redds occurred and if hatchery steelhead straying increased.

DRAFT ALTERNATIVE 2—Current program size, with improvements.

DESCRIPTION AND IMPLICATIONS:
The current hatchery winter steelhead program in the basin could be kept at status quo. Changes could be made to the current hatchery winter steelhead program to improve survival of releases and contribution to fisheries. Such improvements could include additional acclimation sites, changes in size at release, or changes in release strategy.

PROS AND CONS:
Pros— This could improve the economic and recreational benefits that are currently being realized as a product of the program.
Cons— Status quo in release numbers--combined with minor program changes in release strategies may require additional funding to implement the improvements.

DRAFT ALTERNATIVE 3—Program reduction.

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

PROS AND CONS:
Pros— This would reduce the potential impacts on Coho Salmon, from reduced broodstock collection efforts and reduced juvenile competition in rearing habitat.
Cons— This would result in reduced benefits and volunteer/angler support for salmon and steelhead conservation efforts.

DRAFT ALTERNATIVE 4—Eliminate hatchery winter steelhead program.

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

PROS AND CONS:
Pros— This would eliminate any potential impacts on Coho Salmon.
Cons— This would completely eliminate the benefits of the program and could significantly erode angler/volunteer support for salmon and steelhead conservation projects. Under current angling regulations, no harvest of steelhead would be available to anglers under this scenario.

1.16.3) Potential Reforms and Investment

Reform / Investment 1: Construct additional winter steelhead acclimation ponds to diversify and expand the fishery. These facilities could be constructed at other locations where the land is publicly owned or where long term agreements for the use of the facilities were developed. This action could increase the distribution of steelhead and expand the fishery for hatchery winter steelhead throughout more of the basin. Based on previous experience with other projects, a rough cost estimate of such expanded acclimation sites is approximately $18,000 each. Also, investments could be made to improve the water supply to existing facilities to improve contingencies for extreme water conditions (costs unknown).

Reform / Investment 2: Construct additional traps or adult holding ponds to diversify the collection of winter steelhead in the basin. This would add to the number of broodstock that could be collected and utilized in the program. The advantage of additional steelhead broodstock sites is to add to the genetic variability of the hatchery program.

A rough cost estimate of constructing additional trapping and holding facilities is $15,000 each.

Reform / Investment 3: Combine the Coquille hatchery program back into a single broodstock (i.e. eliminate the separation between Stock 44 and Stock 144, toward a single Coquille winter steelhead broodstock). Logistically, this would simplify broodstock collection, spawning procedures, rearing procedures, and acclimation/release procedures. The two broodstocks were initially established due to perceived differences between adult

steelhead from the South Fork Coquille subbasin vs. the North/East Fork subbasins. There is some speculation that the different geologies found between those two areas creates genotypic/phenotypic differences that justify two separate broodstocks. This is unsubstantiated with discriminating genetic or phenotypic analysis. No barriers exist that separate the two sets of returning adults. Radio telemetry studies indicate movement of individual fish (particularly males) between river forks during the spawning season. A parallel program in the Coos Basin has a single steelhead broodstock.

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

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

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

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

The following descriptive and status information for Coquille Complex Coho Salmon was prepared in 2000 and 2001 for the direct-take Coho HGMP submitted at that time.

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

Coquille Complex
The Coquille Complex consists of Coho Salmon inhabiting streams from the Coquille Basin south to Sixes River (Nickelson 2001). Populations are found in the Coquille River, New River, and Sixes River. There are an estimated 320 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 one summer and one winter in fresh water. The following spring, approximately one year after emergence, they undergo physiological changes that allow them to survive in seawater. They then migrate to the ocean as silvery smolts about 10 to 12 centimeters (cm) in length.

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

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

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

Habitat Use and Freshwater Distribution

Spawning and rearing of juvenile Coho Salmon generally take place in small, low-gradient (generally less than 3 percent) tributary streams, although rearing may also take place in lakes where available. Coho Salmon require clean gravel for spawning and cool water temperatures (53º to 58°F preferred, 68°F maximum) for rearing (Reiser and Bjornn 1979). Fry emerge from February to early June (Moring and Lantz 1975) and occupy backwater

pools and the stream margins (Mundie 1969; Lister and Genoe 1970; Nickelson et al. 1992a). During the summer, Coho Salmon prefer pools in small streams, whereas during winter, they prefer off-channel alcoves, beaver ponds, and dam pools with complex cover (Nickelson et al. 1992a, 1992b). Complexity, primarily in the form of large and small wood is an important element of productive Coho Salmon streams (Nickelson et al. 1992b; Rodgers et al. 1993). Little is known about residence time or habitat use of estuaries during seaward migration. It is usually assumed that Coho Salmon spend only a short time in the estuary before entering the ocean. However, recent research is finding that rearing in the upper ends of tidal reaches can be extensive.

The distribution of Coho Salmon within a basin is primarily determined by two factors: marine survival and the distribution of freshwater habitat of different levels of quality. When marine survival has been very poor as in recent years, Coho Salmon will be found in only the highest quality habitats. Coast-wide, these habitats comprise about 22 percent of the total habitat (Nickelson 1998). When marine survival increases, as could occur with a changing climate regime, Coho Salmon will redistribute into freshwater habitats of lower quality. Thus, Coho Salmon population dynamics function with a classic "source-sink" relationship among stream reaches.

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

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

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

Oregon Coast ESU Coho Salmon may be indirectly affected through competitive interactions with hatchery fish for food and space, as well as during brood collection.

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

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

The Coquille Complex consists of Coho Salmon inhabiting streams from the Coquille Basin south to Sixes River. Populations are found in the Coquille River, New River, and Sixes River. There are an estimated 320 miles of spawning habitat available to the Coho Salmon of this complex. The critical population level for the Coquille Complex is 1,300 adult spawners. The habitat of this complex has the potential to support a viable population. Although high quality habitat is estimated to be present in only 21 miles of stream, only slightly greater than the 15-mile threshold (Nickelson 2001), the lowland area of the Coquille Basin, much of which becomes a lake during winter, provides winter rearing habitat. In fact, recent research (Miller 1998) has documented a life history pattern in Coquille River Coho Salmon whereby large numbers of juveniles actively migrate to lowland reaches during spring and fall, presumably to take advantage of the over-wintering habitat.

The abundance of Coho Salmon spawners of the Coquille Complex has ranged from about 2,100 to about 16,200 and has averaged about 5,500 since 1990 (Figure 2-1 and Table 2-2). Since 1990, abundance has never fallen below the critical threshold of 1,300 fish and in only three years has the lower 95% confidence limit fallen below the critical threshold. Recruits per wild spawner have exhibited a general downward trend over the last eight years, but with only the 1996 brood falling below one (Table 2-2 and Figure 2-2). Hatchery fish have been uncommon on the spawning grounds with only 42 (5.3%) of 800 scales sampled from 1990-99 having hatchery patterns.

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

Smolt production was estimated for the 1997 through 1999 broods. Estimated smolt abundance ranged from 119,000 to 296,000 thousand for the Coquille Complex (Table 2-3).

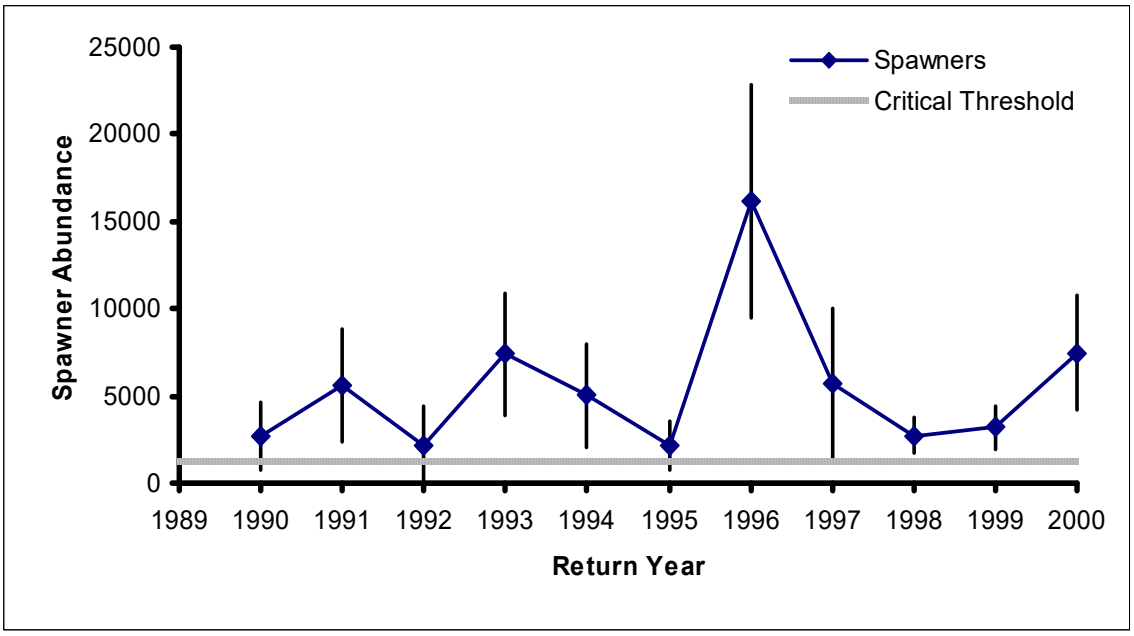

Figure 2-1. Trend in adult Coho Salmon abundance relative to the critical population level for the Coquille Complex. Error bars are 95% confidence limits.

The updated abundance estimates for the Coquille Coho Salmon population are:
2001—13,833
2002—7,676
2003—22,403
2004—22,138
2005—11,806
2006—28,577
2007—13,968
2008—8,791
2009—22,286

2010—23,564
2011—55,667 (highest return since 1990)
2012—5,911
2013—23,637
2014—41,660 (second highest return from 1990-2015)
2015—3,357 (sixth lowest since 1990) (ODFW 2016)

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

Return Year	Wild spawners	Pre-harvest wild population	Recruits per spawner
1990	2,712	8,720	
1991	5,651	10,350	
1992	2,115	4,325	
1993	7,384	12,797	4.7
1994	5,035	5,402	1.0
1995	2,116	2,416	1.1
1996	16,169	17,632	2.4
1997	5,720	6,530	1.3
1998	2,718	2,948	1.4
1999	3,183	3,445	0.2
2000	7,478	8,093	1.4
Average	**5,480**	**7,514**	**1.7**

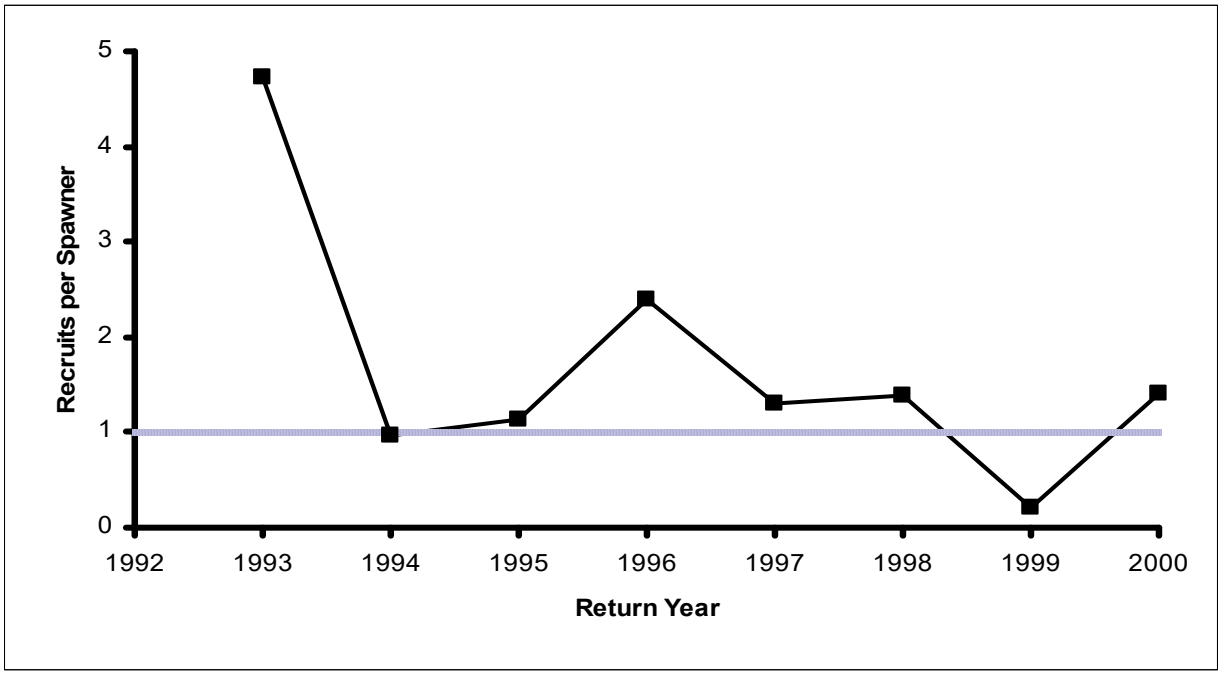

Figure 2-2. Trend in recruits per spawner for Coquille Complex wild Coho Salmon.

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

Population	1997 Brood (millions)				1998 Brood (millions)				1999 Brood (millions)			
Complex	Eggs	Fry	Parr	Smolts	Eggs	Fry	Parr	Smolts	Eggs	Fry	Parr	Smolts
Coquille	7.150	4.648	1.188	0.296	3.398	2.208	0.353	0.119	3.979	2.586	0.372	0.126

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

For annual spawning abundance and recruits/spawner see Figures 1and 2; and Table 2.2.

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

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

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

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

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

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

Adult winter steelhead are collected by three methods in the Coquille River Basin.

Wild adult steelhead are netted at several sites within the river system. Netting operations occur from December through March (see section 7.2). Wild adult steelhead can be trapped at Steelhead Falls on the North Fork Coquille (see section 7.2). Adult steelhead are also donated alive by specified anglers who receive a letter authorizing them to hold live steelhead for transfer to ODFW staff. Usually adult Coho Salmon exist in the river during the adult winter steelhead broodstock collection period from December through March. The released steelhead smolts may have competitive interaction effects with naturally produced Coho Salmon fry, and the extent of such interaction effect is unknown.

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

Coho Salmon captured in the process of collecting steelhead for broodstock are released with as little handling as possible. Few, if any, Coho mortalities are associated with the steelhead broodstock collection activities.

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

Take of wild Coho Salmon associated with the Coquille winter steelhead broodstock collection is expected to be minimal. Wild Coho encountered will be captured, handled, and released immediately. The projected annual take levels is being shown in the attached "take table".

Due to acclimation of steelhead to migration-ready smolts and release into mainstream areas away from juvenile Coho and steelhead rearing areas, the impact to rearing Coho juveniles is anticipated to be minimal.

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

Options include:
1. Discontinue trapping/netting as take limits are reached.
2. Close trap facilities to prevent capture of additional wild Coho Salmon.

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

3.1) Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted policies (e.g. the NPPC *Annual Production Review* Report and Recommendations - NPPC document 99-15). Explain any proposed deviations from the plan or policies.

1) Oregon Plan for Salmon and Watersheds
2) Native Fish Conservation Policy
3) ODFW Coastal Multi-Species Conservation Plan (2014)
4) Pacific Fishery Management Council (PFMC) Harvest Program Section 7 consultation
5) Hatchery Management Review
6) Integrated Hatchery Operations Team guidelines (IHOT)
7) DEQ Memorandum of Agreement regarding fish carcass distribution in Oregon Streams.
8) US Army Corps of Engineers general authorization for fish habitat improvement in Western Oregon.
9) ESA Section 7 consultation, biological opinion with the Roseburg and Coos BLM Districts, Interagency population and monitoring program approved NMFS April 10, 1997.

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 steelhead in the Coquille River Basin including nutrient enrichment, acclimation and other separations of hatchery and wild production, terminal fisheries that reduce harvest impacts on wild salmonids, and monitoring of hatchery and wild runs.

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

Native Fish Conservation Policy is the guiding policy for state management of wild and hatchery fish for protection of genetic resources. The Coastal Multi-Species Conservation Plan (ODFW 2014) developed guidance, strategies, and actions for management of winter steelhead and other species/runs in coastal Oregon.
No deviations from the above plans and policies are proposed.

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

1) Oregon Plan for Salmon and Watersheds
2) PFMC Harvest Management Agreement
3) NPDES permit for hatchery effluents and DEQ Memorandum of Agreement regarding fish carcass distribution in Oregon streams
4) ESA Section 7 consultation, biological opinion with Roseburg and Coos BLM districts, interagency fish population and monitoring program – approved NMFS April 10, 1997
5) US Army Corps of Engineers General Authorization Permit for improving fish habitat in western Oregon
6) Integrated Hatchery Operations Team
7) ODFW Hatchery Management Review

3.3) Relationship to harvest objectives.

Acclimation sites are used to maximize homing of returning marked adults for the fishery. The acclimation sites are intended to provide a spatial separation between hatchery and wild steelhead spawners.

The data on harvest rates for the program exists only in the form of punch card estimates in most years. In 1993, a creel survey conducted on the South Fork of the Coquille demonstrated a bank angler catch rate of 12.6 hours per fish. Boat anglers were more efficient, averaging 10.1 hours per fish. We would assume a similar harvest rate on the North and East Fork of the Coquille. Catch rate is variable, however, from year to year depending on weather, river conditions, and run size. Catch rates for wild fish are difficult to ascertain, since regulations have required the release of wild (unmarked) steelhead for many years.

3.4) Relationship to habitat protection and recovery strategies.

Major factors affecting natural production include habitat, ocean conditions, predation, water flows, water quality, climatic conditions, and rearing habitat conditions. The Oregon Plan for Salmon and Watersheds lays out habitat protection measures to be followed by all the state agencies including Forest Practices revisions by Oregon Dept. of Forestry, water quality protection by Dept. of Environment Quality, diversion monitoring by Water Resources Department, and Senate Bill 10-10 implementation by Dept. of Agriculture. These are all designed to protect and improve salmonid habitat to ultimately improve natural production of salmonids. The Coquille Watershed Association is also developing habitat improvement projects throughout the Coquille Basin. Their projects include fencing and planting riparian vegetation, placement of large woody debris, and culvert replacement to improve or restore fish passage.

3.5) Ecological interactions.

a) *Species that could negatively impact program.*
Predacious fish that could impact outmigrating steelhead smolts include one native fish (coastal Cutthroat Trout) and three introduced, non-native fishes (Largemouth Bass, Smallmouth Bass, and Striped Bass). Effects of predation by Cutthroat Trout on steelhead fry and smolts are unknown. Largemouth Bass exist in small numbers within the lower Coquille River probably as a result of escaping from neighboring ponds during high water events. Smallmouth Bass were illegally introduced to the Coquille Basin sometime around 2009-10. Predation effects on salmonid populations are unknown, and Smallmouth Bass are now widespread and abundant in the basin, with multiple age/size classes.

Studies conducted on Striped Bass predation of Coho Salmon smolts in the Coos and Umpqua rivers showed little impact to wild Coho populations. Studies conducted in the San Francisco Bay also document little salmonid predation by Striped Bass due to migration patterns and timing that coincides with Striped Bass spawning when they tend to cease or reduce feeding. There is anecdotal evidence that Striped Bass can and do concentrate on hatchery smolt releases and may have an impact on survival of hatchery smolts. The subject of Striped Bass predation on salmonid smolts is a controversial subject with limited information available from which to draw any scientific conclusions. The impacts of Smallmouth Bass on native fishes of the Coquille Basin have not yet been evaluated.

b) *Species that could be negatively impacted by program.*
Our understanding of the consequences of interactions between hatchery steelhead and wild Coho Salmon is incomplete. The Coquille hatchery program for winter steelhead is designed to mimic wild populations in spawning, run timing, and genetic considerations to minimize any potential negative effects with wild steelhead. Hatchery smolt releases are located at specific sites within Coquille Basin to concentrate returns in high-success fishery areas and minimize straying into upriver spawning areas. Wild juvenile Coho and steelhead have been observed to partition available rearing habitat, but some overlap exists in their distributions in the Coquille Basin. The ongoing smolt production programs for salmon and steelhead do not release fish into major wild salmon and steelhead production areas.

Hatchery steelhead smolts are acclimated for a period of three weeks and released volitionally over 2-3 days' time. Release is predicated upon a high degree of the acclimating fish displaying characteristics of a migration-ready smolt, including silvery appearance, loss of visible parr marks, slender body shape, and changes in behavior. This migration-readiness is intended to reduce the in-basin residency of released fish, and thus reduce competition with riverine and estuarine resident wild juveniles. Fish are typically displaying these characteristics as they begin the acclimation process. As a standard practice, pre-release pathology tests are conducted to detect the presence of disease (see Fish Health Monitoring, Appendix A).

c) *Species that could positively impact program.*
Any hatchery or wild fish that dies or is recycled for nutrient enrichment of the basin may positively impact the program.

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

SECTION 4. WATER SOURCE

4.1) Provide a quantitative and narrative description of the water source (spring, well, surface), water quality profile, and natural limitations to production attributable to the water source.

The water sources at Bandon Hatchery for holding adults, incubating eggs and rearing fish are Ferry Creek and Geiger Creek. These small, surface water tributaries feed into the Coquille River estuary at river mile 1.5, near the Port of Bandon. Average summer flows are approximately 1.25 cfs each. Winter flows vary greatly with storm activity, but average about 5 cfs each.

Bandon Hatchery has water rights for a total of 3.0 cfs (1.5 cfs from each stream). These water rights are senior to all other active water rights. Intakes are screened with perforated aluminum plates with 1/8" x 3/4" slots.

The hatchery is operated under NPDES General Permit 300J to maintain environmental standards of effluents.

Annual water temperatures range from about 38ºF in the winter to a maximum of 61ºF in the summer. The 14-year average is 51ºF. The water quality at Bandon hatchery meets or exceeds the recommended IHOT standards for temperature, ammonia, carbon dioxide, chlorine, pH, copper, dissolved oxygen, hydrogen sulfide, dissolved nitrogen, iron, and zinc. For adult holding, egg incubating and rearing purposes, the overall quality of water is good; but fish production at Bandon Hatchery is limited in summer by water quantity.

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.

Anadromous salmonids do not have access to intake screens at Bandon Hatchery, because intakes are located in reservoirs above two dams without fish passage. Water diversion for fish culture purposes is non-consumptive, and is returned to Ferry Creek at the fish weir. The water flow, settleable solids, total suspended solids, temperature, pH, ammonia and phosphorus levels of effluents are monitored and reported to DEQ as per NPDES permit to insure compliance with pollution abatement.

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods).

A fish weir at the lower end of the hatchery grounds diverts returning adult salmon and steelhead into the ladder, finger weir trap and collection pond where fish are sorted by species and sex prior to spawning. Most of the steelhead broodstock for this program are collected by netting, and/or angling effort at various locations in the North Fork, East Fork, and South Fork Coquille River. Details of brood collection locations and methods are described in Section 7.2.

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

Steelhead broodstock collected off site are transported in "home-made" polyethylene transportation tanks, secured in the back of pickup trucks. These tanks vary in size, but most have a capacity of approximately 250 gallons. A freshflow aerator provides oxygen. Up to 12 adult fish can be safely held and transported for up to about 3 hours.

5.3) Broodstock holding and spawning facilities.

Bandon Hatchery's adult holding area is a converted 20' x 100' rearing pond. There are seven pens with metal dividers for holding various groups or species.

The spawning building is a simple wood structure built over the top of the upper end of the holding pond. It contains 2 racks for killed females, 2 spawning chutes, a cabinet for various spawning and virus sampling equipment and a home-made snout cutter for coded wire tagged (CWT) fish.

There is no power equipment to conduct the spawning procedure such as crowders or hoists. All functions are done by hand. Broodstock are checked for ripeness in the holding pen. Ripe females are killed in the pen and handed up to the deck for placing in the rack.

5.4) Incubation facilities.

The hatchery building has a total of 27 vertical, double stack incubators. These are supplied by two aluminum headboxes. Five gallons of water per minute is normally run through each stack.

5.5) Rearing facilities.

Buttoned up fry are ponded in Canadian style troughs measuring 16' x 2' x 1.5', then transferred to rearing ponds measuring 20'x 80'x 3'.

5.6) Acclimation/release facilities.

Stock 44
Laverne Park Acclimation Site is at river mile 31 of the North Fork Coquille River.

Stock 144
Beaver Creek Acclimation Site is located at river mile 21 on the South Fork Coquille River. Woodward Creek Acclimation Site is at river mile 27.5 South Fork Coquille River.

In the event of extreme drought conditions or other water supply related conditions, full three-week acclimations may not be feasible. Such examples include low water flows and low dissolved oxygen necessitating a direct-stream release, or high water flooding the containment ponds, causing early release. As previously stated in section 3.5, smolts are typically showing characteristics of migration-readiness as they begin the acclimation period, so residualization or poor homing is not expected, even if the full acclimation period is not accomplished.

In some instances where acclimation conditions (primarily low water quality/quantity) have jeopardized the health of smolts, releases have been made directly into streams near the acclimation site.

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

Bandon Hatchery has no history of significant steelhead broodstock or egg mortality, or existing problems that would likely cause a disaster, other than the possibility of flooding that could result in adults escaping from holding pens.

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 Coquille River winter steelhead is not an ESA-listed population. However, risk aversion measures are applied for all species at the hatchery facility. At Bandon Hatchery, the fresh flow aerators on fish transportation tanks have a backup power supply in the event of battery failure. Hauling densities are deliberately kept low to minimize risk of loss during transportation. The holding pen pond has two water supplies. One is fresh water from the Ferry Creek supply line, while the other is discharged water from rearing ponds. Normally, both sources are operational. Bandon Hatchery's water supply system is quite reliable, even during periods of high water. Holding pen densities are kept low to reduce stress and oxygen demand.

The incubator headbox system is also very reliable. Water-level monitor alarms are located at each headbox to insure uninterrupted flows. Green eggs are kept at low density, to avoid suffocation. Presently the ponds do not have functional water level monitors.

Historically, there haven't been significant problems associated with diseases that would affect broodstock, eggs or acclimation, especially transmission from steelhead to Coho or vice versa. Virus samples are obtained from adults each season.

SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

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

6.1) Source.

The original brood stock for this program was obtained from a fish trap at Steelhead Falls located at RM 49 on the North Fork Coquille River. Starting in 1984, additional wild fish were netted in the mainstem Coquille River. Currently wild fish from these two sources (trapping and netting) are combined with hatchery and wild fish that swim naturally into Bandon Hatchery to meet broodstock objectives. Some steelhead broodstock are also collected by volunteer angler donations, from the mainstem and major forks of the Coquille River. Broodstock source of the past is shown below.

Year	Location	Hatchery/wild	Operation
1981	North Fork Coquille.	Wild	Trap
1984	Coquille	Wild	Netting
1986	Bandon /Ferry Cr.	Hatchery	Trap
1987	China Creek	Wild	Trap

6.2) Supporting information.

6.2.1) History.

For over 20 years, wild broodstock came from several sources. Traps combined with netting efforts have continued to provide wild stock to maintain genetic similarities between the wild and hatchery steelhead populations in the basin. The minimum annual hatchery broodstock target is 30% wild steelhead, although higher percentages are desirable. The remaining broodstock are composed of returning hatchery adults.

In 1981, ODFW began trapping steelhead in the North Fork fishway. This was the beginning of the broodstock development. The resulting juveniles from this first year were reared at Bandon. The first returning adults from this program were spawned in 1984. In 1984 as well, collections of adults from the North Fork fishway were supplemented with collections of fish that were netted in the basin.

In 1987, the China Creek trap was constructed on the East Fork Coquille River. This additional broodstock source added to the collection and subsequent incorporation of East Fork wild broodstock into the hatchery population. The China Creek Trap was removed by the BLM in 2013.

The South Fork stock 144 was originated in 1992. The hypothesis was that the South Fork Coquille steelhead was a different stock than the rest of the basin. Subsequently, broodstock development began to convert the South Fork steelhead program to the 144 stock. Extensive genetic sampling was conducted to ascertain if these fish are genetically separate stocks, but

results of the genetic analyses were not forthcoming. In the absence of evidence that the stocks are genetically separate, there is interest within ODFW to re-combine the stocks into a single Coquille Basin stock.

Protocols for staff and volunteer broodstock collection attempt to avoid biased selection. Broodstock collection is conducted in as wide a range as possible across the run timing in order to maintain genetic similarity between hatchery-produced fish and wild populations in the basin. Staff and volunteers are instructed to avoid selecting brood fish for any physical traits. Pairings are done without regard to observed physical traits.

6.2.2) Annual size.

Stock 44
A minimum of 24 pairs (at least 30% wild) will be needed to fulfill the green egg goal of 70,000 eggs. These eggs are used to produce 45,000 smolts and up to 3,000 eyed eggs/unfed fry for the classroom incubator program.

Stock 144
For the South Fork, a minimum of 32 pairs (at least 30% wild) will be collected to take 92,000 green eggs. These eggs are used to produce 70,000 smolts, and up to 2,000 eyed eggs/unfed fry for the classroom incubator program.

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

Since the program began, 30% has been the minimum annual goal of wild broodstock, but collections have been highly variable. In recent years, wild fish incorporation rates have been as high as 60%, and as low as 15%. River conditions and fish migration behavior can limit the ability to collect wild broodstock.

6.2.4) Genetic or ecological differences.

There are no known genotypic differences between hatchery stocks and wild stocks. To determine whether there are any genetic differences between the two stocks (44 & 144), genetic sampling has been conducted, but results of the analyses are not yet available. Due to the objectives of the program, certain behavioral/physical differences may exist between hatchery and wild smolts. Fish size and timing at migration for hatchery smolts is more uniform than that observed for wild smolts. Other behaviors, such as surface feeding and aggression may be different between hatchery and wild smolts. Their interactions are believed to be minimal because of differences in feeding behavior, and also because of the short time of residence of hatchery steelhead smolts in the river and the estuary.

Since the inception of the broodstock development program for steelhead in the basin, every effort possible has been made to mimic the naturally produced steelhead in the basin, at least genetically. This has been accomplished through aggressive incorporation of wild steelhead each generation. Every effort has been made to make the collections and the matings as random as possible. Personnel are instructed that broodstock should not be selected for a given trait. Wild and hatchery steelhead are spawned throughout the entire run to maintain

genetic variability of the population. Hatchery steelhead are released at the time when peak outmigration is occurring in the natural population. No known differences have been observed between wild and hatchery populations in the basin.

6.2.5) Reasons for choosing.

There were no special traits or characteristics for which the broodstock was selected. It was mainly to represent the local wild population.

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 Coquille River winter steelhead is not an ESA-listed population. It is, therefore, unlikely that broodstock selection practices for winter steelhead will have adverse genetic effects on listed Coho Salmon populations. However, to minimize effects on wild steelhead population, several measures have been put in place. Broodstock is collected from throughout the spawning run, 30% wild fish are incorporated into the broodstock annually to infuse wild genes into the hatchery stock, spawning at the hatchery is one to one (male to female) and one salt adults are included to mimic the natural occurrence. In addition, broodstock collection numbers are kept well below the critical level of 25% of the wild escapement, and overall population numbers have been well above the critical threshold population number (see section 2.2.2). Measures to maintain the migratory and other behavior of hatchery steelhead as similar as possible to wild steelhead should minimize ecological effects on Coho Salmon.

SECTION 7. BROODSTOCK COLLECTION

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

Coquille steelhead are collected only as returning adults.

7.2) Collection or sampling design.

Collection of wild- and hatchery-origin steelhead broodstock occurs or may occur at the following locations:

Stock 44
Laverne Park - River mile 31.5 of the North Fork Coquille River
Steelhead falls - River mile 49.0
North & East Fork - Angling effort (Various locations)
Bandon Hatchery – Swim-in volitional return to hatchery

Steelhead Falls has a removable “V” style trap that is operated for steelhead collection. Anglers donate wild steelhead from the system. Netting also may occur at Laverne Park.

Stock 144

Beaver Creek	- River mile 21 of the South Fork Coquille River
Woodward Creek	- River mile 27.5 of the South Fork Coquille River
South Fork	- Angling effort –throughout the river

Collection usually begins around December 15th. Late January is when the greatest effort is made, in order to coincide with the peak of the run. Broodstock collection by net, trap, hatchery weir, or angling effort continues through March. Collections are conducted as randomly as possible to represent the entire run. Individuals involved in the collections are trained to make collections of broodstock randomly. Collections are not made based on size, condition factor, maturity, sex, age or other characteristic. Steelhead with marks that identify them as being foreign stock are not used in the hatchery program.

Traps are operated on a rotation basis. The collections are stratified over the entire migration of a population. Protocol calls for the operation of traps for a set number of days on and a set number of days off. All steelhead caught during the operational period are taken for broodstock – thus any biased selection is avoided. All wild steelhead that are collected during a collection operation are utilized in a broodstock program. This is an attempt to maximize genetic variability.

Care is exercised in netting operations to conduct these throughout the entire run. Early migrating/immature steelhead caught in netting operations may be released due to the high risk of holding them until they are mature enough to spawn. Netting is rarely conducted more than twice a week and only in a few locations. Compared to trapping, netting operations are very inefficient.

7.3) Identity.

All hatchery steelhead smolts are finclipped for identity purposes. Thus, the F1 generation with hatchery broodstock parentage are fin marked when encountered as adult fish.

7.4) Proposed number to be collected:

The proposed number to be collected for stock 44 is 24 pairs (48 fish), and 32 pairs (64 fish) for stock 144. These adults may be hatchery or wild fish. The proposed broodstock collection number is based on an assumed fecundity of 3,000 eggs per female.

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

The current program goal for adult steelhead to be collected annually is 112 fish total from both stocks (44 and 144). The minimum goal is 30% wild fish.

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

Stock 44 winter steelhead broodstock collection levels, 1988-2004.

Year	Females	Males	Jacks
1988	203	116	N/A
1989	197	110	N/A
1990	229	196	N/A
1991	172	122	N/A
1992	220	135	N/A
1993	33	32	N/A
1994	28	25	N/A
1995	134	125	N/A
1996	99	125	N/A
1997	33	27	N/A
1998	233	203	N/A
1999	87	83	N/A
2000	113	73	N/A
2001	39	32	N/A
2002	41	32	N/A
2003	40	32	N/A
2004	81	68	N/A

Stock 144 winter steelhead broodstock collection levels, 1993-2004.

Year	Females	Males	Jacks
1993	51	40	N/A
1994	19	18	N/A
1995	26	24	N/A
1996	23	24	N/A
1997	33	27	N/A
1998	36	22	N/A
1999	36	26	N/A
2000	30	28	N/A
2001	42	42	N/A
2002	39	25	N/A
2003	50	39	N/A
2004	50	55	N/A

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

Surplus returning hatchery fish go to stream enrichment as per District plan. Achieving the minimum goal of 30% wild broodstock is not always reached. Wild broodstock may be collected up to 100% of the broodstock; however, this has not typically been accomplished.

7.6) Fish transportation and holding methods.

Wild adult fish are transported in portable tanks (see section 5.2) from the upper watershed of the Coquille River to Bandon Hatchery. Usually the fish are held in these tanks 3 hours or

less. Fresh flow aerators provide for adequate oxygen levels. No chemical treatments of any kind are administered during any phases of capture, transfer or holding. At Bandon Hatchery they are then transferred to divided holding pens (see section 5.3).

7.7) Describe fish health maintenance and sanitation procedures applied.

Bandon Hatchery has a history of low adult steelhead mortality, and it hasn't been necessary to treat fish prior to spawning. This may be due to the high tannic acid level naturally occurring in Ferry Creek. On spawning days, fish are sorted by hand without the use of anesthetic. Buckets, spawning chutes, knives and other equipment are disinfected with an iodine solution between fish. Fertilized eggs are disinfected for 15 minutes at 1:500 with a buffered iodine solution.

7.8) Disposition of carcasses.

All carcasses, spawned or unspawned, are used for stream enrichment. However, on occasion some fish have been live spawned and released into Ferry Creek below the Bandon Hatchery.

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 Coquille River winter steelhead is not an ESA-listed population. Therefore, the brood collection for steelhead program should have no genetic effects on listed Coho in the basin. To avoid any adverse ecological effects, any adult Coho that are captured during steelhead brood collection are carefully handled and released.

Health risks will be minimized by professional monitoring and ODFW Fish Health Policy guidelines. The populations of Coho and steelhead in the Coquille River Basin are healthy, based on population sizes. A small percentage of the wild steelhead populations of the Coquille are used for broodstock. Impacts to spawner abundance and subsequent juvenile production as a result of the hatchery programs are minimal at current population sizes. Smolts are transferred from Bandon Hatchery to acclimation sites as full-term ocean migrants, which have a minimal length of residence in the basin after release. The use of full-term smolts and location of acclimation sites separated from natural spawning areas reduces potential competition or other types of density dependent effects on wild juveniles.

Hatchery steelhead are routinely checked by pathologists and are treated when virulent pathogens are present. Standard testing and procedures are conducted to reduce or avoid the horizontal and the vertical transmission of pathogens. The fact that hatchery reared steelhead are geographically separated from the bulk of their wild counterparts may be the most significant treatment at reducing risk of disease amplification through a hatchery program. Disease transmission between Coho and steelhead is not considered a high risk.

SECTION 8. MATING

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

8.1) Selection method.

Regarding spawning, fish are chosen throughout the entire run. Adult fish used for broodstock are selected randomly not for physical traits, including size. Matings to produce unfed fry are from WxW crosses; while matings to produce smolts are WxW, HxH, or WxH. Assuming there are excess gametes, the wild gametes will be fully utilized. Destroying surplus eggs does not occur until the eyed egg stage and is conducted randomly across all family groups, to provide all family groups an equal opportunity to contribute to the next generation.

8.2) Males.

Surplus males of hatchery origin are killed and are placed into streams as nutrients or are donated to charities. The target spawning percentage for the utilization of one salt fish is 5 percent. Actual use of one-salt fish may vary depending on the brood year survivals in both hatchery and wild populations.

8.3) Fertilization.

The spawning protocol is one female mated with one male (1:1). This mating strategy is an attempt to maximize genetic variability within the hatchery population. Gametes from an individual female are kept completely separate from those of another female. Actual matings occur in a plastic bucket to ensure that fertilization of multiple females does not occur from a single male. Differential sperm motility is not a consideration in the use of this fertilization technique. Gametes are never pooled.

The plastic buckets are cleaned and disinfected between fish. This technique provides a good aseptic environment so that gametes can be handled and subsequently fertilized without the threat of horizontal pathogen transmission. When the eggs are placed into a common incubator the water is treated with an iodophor that further reduces the potential for the horizontal pathogen transmission. During the egg taking operation, the equipment used is also treated with an iodophor to prevent the spread of diseases.

8.4) Cryopreserved gametes.

Cryopreserved gametes are not utilized in this program.

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

N/A. The Coquille River winter steelhead is not a listed fish.

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.

Stock 44 winter steelhead egg take and survival to eyed stage at Bandon Hatchery.

Year	Eggs Taken	Eyed % Survival
1988	620,076	95.2%
1989	540,592	94.3%
1990	790,039	94.0%
1991	595,989	81.5%
1992	488,928	90.7%
1993	104,232	92.9%
1994	88,153	94.8%
1995	410,163	91.4%
1996	363,289	94.7%
1997	472,600	89.1%
1998	216,211	91.0%
1999	260,174	93.1%
2000	172,549	93.9%
2001	149,980	95.7%
2002	122,475	80.0%
2003	173,836	81.0%
2004	181,268	89.0%

Stock 144 winter steelhead egg take and survival to eyed stage at Bandon Hatchery.

Year	Eggs Taken	Eyed % Survival
1993	151,271	84.6%
1994	49,537	97.2%
1995	91,772	95.1%
1996	78,955	91.8%
1997	104,229	93.8%
1998	94,445	95.0%
1999	86,087	75.3%
2000	100,961	94.8%
2001	145,030	94.6%
2002	132,105	73.0%
2003	96,016	94.5%
2004	144,034	94.5%

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

It should be noted that no eggs from wild Coquille stock steelhead are ever surplus, and will always be incorporated into the smolt or unfed fry program. In past years, more eggs from hatchery fish are taken than are needed for production. Eggs from any given egg take are kept separate during the incubation period. When the eyed stage is reached, all viable eggs from the wild fish are saved, while only a portion of the eggs originating from hatchery fish may be incorporated into the program, depending on the progress toward production goals. However, all females spawned will be represented by that egg take, to maximize the number of family groups in the brood.

9.1.3) Loading densities applied during incubation.

Eggs are loaded into vertical incubators at a density of approximately 10,000 eggs per tray, or what will usually amount to the eggs of 3 females. The standard flow rate is 5 gpm/tray. The 12 year average for egg size is 142.2 eggs per ounce, with a range of 128 to 168.

9.1.4) Incubation conditions.

At Bandon hatchery, water temperatures are checked twice daily and recorded, then averaged. Temperature units are tracked daily to monitor egg development. Dissolved oxygen levels are not monitored, as suffocation has not been a problem with steelhead eggs in flow-through system. Tray screens are brushed and bottoms are "rodded out" as needed depending on the number and severity of storms.

9.1.5) Ponding.

Ponding of fry occurs at or near 1100 temperature units, and/or when the fry are buttoned up. The average size of ponded fish is 2,000 fish per pound.

9.1.6) Fish health maintenance and monitoring.

Bandon Hatchery
Eggs are treated with formalin every other day at 1:600 for 15 minutes to prevent fungus growth. During the eyed development stage, eggs are not handled. The only disease monitoring that is done is virus samples taken at the time of spawning. These samples include ovarian fluid, gill, kidney and spleen tissues. Eyed eggs are addled at 475 or more temperature units, then run through a Van Gaalen brand egg picking machine to separate the dead (white) eggs. Additional hand picking may be necessary for blank and/or weak eyed eggs.

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.

It is unlikely that incubation of steelhead eggs will have any adverse genetic effects on listed Coho Salmon. However, incubating eggs are disinfected regularly to prevent transmission of pathogens to the receiving stream. To improve survival, steelhead eggs are incubated at

low density levels that have proven to be safe. Headboxes are equipped with water level monitor alarms to reduce risk of interrupted flows. Bandon Hatchery's water supply has a history of being an extremely reliable gravity feed system. All supply lines and valves including main pipeline from intake, hatchery building supply line, headbox feed and valve were replaced in 1998/99. The Ferry Creek Reservoir was dredged in 1998 significantly reducing silt levels in incubators, thus increasing safety factors for all eggs.

9.2) Rearing:

9.2.1) Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling smolt) for the most recent twelve years (1990-2002), or, for years dependable data are available.

Survival to eye-up provided in section 9.1.1.
Egg-to-yearling numbers provided in section 10.3.

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

Maximum rearing density is 0.93 pounds/cubic foot. Density goal is less than 1.0 pounds/cubic foot.

9.2.3) Fish rearing conditions

After initial ponding in troughs, fish are moved twice during their rearing period. In October, they are marked and moved to the final pond in which they will reach full-term. Other than feeding, cleaning once a week, monthly or bi-monthly counts, they are not stressed or handled during the winter or spring months. Winter temperatures are mild, and allow for excellent growth.

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.

Data of length and condition factors are not available. See Table 9-2 below for fish growth (fish/lb) during rearing cycle.

Table 9-2

Monthly Fish Growth Data on STW for One Calendar Year at Bandon Hatchery.

Month	Size (fish per pound)	Stage
April	1200	Fry
May	600	Fry
June	200	Fry
July	85	Fry
August	40	Fingerling
September	25	Fingerling
October	15	Fingerling
November	12	Fingerling
December	9	Fingerling
January	8	Fingerling
February	6	Fingerling
March	5.6	Smolt
April 7th	5.5	Smolt
Note: Numbers represent end-of-month averages.		

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

See growth Table 9-2 (Section 9.2.4)

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

Fish are generally started with BioMoist Starter #2 and #3, then switched to a dry diet (usually BioDry 1000) for their remaining growth period. Feed rates vary. Average cumulative conversion since switching to dry feed is 1.05:1.

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

At Bandon Hatchery, fish health and behavior monitoring are ongoing daily. Mortalities are collected and analyzed daily and continuously. Scheduled pathology examinations are conducted at random as needed and as prophylactic. Parasitic and bacterial infections are treated as needed under prescription of the Department pathologist. Viral samples are monitored by Fish Health Services. Disinfection is the primary prevention of lateral transfer of viral infection.

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

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

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

Natural rearing methods are not practiced, except that smolts are acclimated in release sites for a period of three weeks. Feeding rates are reduced during acclimation to force them to search for natural food.

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

The fish under propagation is not an ESA listed population. Propagated steelhead are reared to full term smolts, and released after acclimation. This strategy insures prompt migration from the river, thus minimizing adverse effects to listed Coho Salmon. Genetic similarities are maintained with wild steelhead, which also minimizes ecological effects on Coho Salmon.

SECTION 10. RELEASE

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

10.1) Proposed fish release levels.

Stock 44 winter steelhead proposed release levels.

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Eggs				
Unfed Fry	2,000 (STEP)	2,000	March	Classroom incubators
Fry				
Fingerling				
Yearling (smolts)	42,000	5.5	April	North Fork Coquille River/Laverne Park
	3,000	5.5	April	Bandon Hatchery (release into Ferry Creek, for swim-in broodstock maintenance)

With the approval of Fish Division, effective from 2017 the Laverne Park release of stock-44 has been reduced from 45,000 to 42,000 smolts, and the 3,000 smolts release is being shifted to Bandon Hatchery for direct release into Ferry Creek. The release of 3,000 smolts from Bandon Hatchery is for broodstock maintenance only. The release from Bandon Hatchery would facilitate swim-in adult steelhead for broodstock collection. It was done in the past, and adult fish successfully returned to hatchery and met broodstock needs.

Stock 144 winter steelhead proposed release levels.

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Eggs				
Unfed Fry	1,000 (STEP)	2,000	March	Classroom incubators
Fry				
Fingerling				
Yearling	70,000	5.5	April	Beaver Creek, Woodward Creek

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

Stock 44: North Fork Coquille – Laverne Park – RM 31.5.
Stock 144: Beaver Creek Acclimation Site – River mile 21
Woodward Creek Acclimation Site – River Mile 27.5

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

Stock 44 Coquille River winter steelhead actual release number, age class, and size at release, 2006-2015.

Release year	*Eggs/unfed fry	Ave size (fpp)	No. of smolts released	Avg. size (fpp)
2006	See Table 10.1	See Table 10.1	52,240	5.60
2007			41,500	5.00
2008			46,190	5.50
2009			52,780	5.60
2010			53,530	5.30
2011			49,870	5.45
2012			42,390	5.40
2013			45,432	5.20
2014			46,154	5.40
2015			54,230	5.37
Average			48,432	5.38

Source: ODFW HMS database
*About 2,000 unfed fry are released each year from classroom incubators to neighboring tributary.

Stock 144 Coquille River winter steelhead actual release number, age class, and size at release, 2006-2015.

Release year	*Eggs/unfed fry	Ave size (fpp)	No. of smolts released	Avg. size (fpp)
2006	See Table 10.1	See Table 10.1	76,574	5.60
2007			78,362	5.30
2008			72,049	5.70
2009			77,797	5.60
2010			78,540	5.10
2011			66,150	5.40
2012			72,981	5.40
2013			68,900	5.20
2014			38,610	5.40
2015			63,252	4.90
Average			69,322	5.36

Source: ODFW HMS database
*About 1,000 unfed fry are released each year from classroom incubators to neighboring tributary.

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

Fish are acclimated for three weeks. After the acclimation period, screens and some boards are pulled to encourage the smolts to leave the acclimation area volitionally, and begin their migration to the ocean. After a few days, all remaining boards are pulled.

Stock 44 winter steelhead release dates and release protocol.

RELEASE YEAR	RELEASE DATE(S)	LIFE STAGE	RELEASE TYPE
2006	4/3 - 4/24	Smolt	Acclimated/Volitional
2007	4/2 - 4/16	Smolt	Acclimated/Volitional
2008	4/1 - 4/24	Smolt	Acclimated/Volitional
2009	4/8	Smolt	Acclimated/Volitional
2010	4/7	Smolt	Acclimated/Volitional
2011	4/6	Smolt	Acclimated/Volitional
2012	4/11	Smolt	Acclimated/Volitional
2013	4/3 - 4/9	Smolt	Acclimated/Volitional
2014	4/9 - 4/14	Smolt	Acclimated/Volitional
2015	3/24 - 3/25	Smolt	Acclimated/Volitional

Source: ODFW HMS database

Stock 144 winter steelhead release dates and release protocol.

RELEASE YEAR	RELEASE DATE(S)	LIFE STAGE	RELEASE TYPE
2006	4/17 - 4/25	Smolt	Acclimated/Volitional
2007	4/17	Smolt	Acclimated/Volitional
2008	4/14	Smolt	Acclimated/Volitional
2009	4/22 - 4/30	Smolt	Acclimated/Volitional
2010	4/27	Smolt	Acclimated/Volitional
2011	4/20	Smolt	Acclimated/Volitional
2012	4/24	Smolt	Acclimated/Volitional
2013	4/2 - 4/22	Smolt	Acclimated/Volitional
2014	4/23	Smolt	Acclimated/Volitional
2015	4/7	Smolt	Acclimated/Volitional

Source: ODFW HMS database

10.5) Fish transportation procedures, if applicable.

Fish are transported from Bandon Hatchery in fish trucks ranging in size from 1,000 to 2,500 gallon capacity. Loading density parameters are normally 1 pound per cubic foot. Trucks have bottled oxygen systems, fresh flow aerators and backup recirculation systems. Fish are on board for a period of up to 2 hours. Some trucks have refrigeration capabilities, but it is normally not necessary, as temperature differences between shipping and receiving water (release location) are usually minimal. Tempering is not required.

10.6) Acclimation procedures.

Fish are acclimated for a period of three weeks. During this time they are fed a diet of dry pellets (usually BioDry 1000) at a rate of 1% body weight per day.

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

All (100%) of the Coquille steelhead yearlings are adipose clipped each year. All unfed fry are released unmarked.

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

Every effort to avoid producing surplus smolts is made prior to transportation and liberation. Eyed eggs are carefully inventoried to insure adequate, but not excessive number of fish will be reared. If the projected overage is minimal (10% or less) the excess fish have been included in the releases. Options for future excesses include: release excess steelhead smolts into standing water bodies for trout fisheries, humanely kill and bury, or kill and use for wildlife projects.

10.9) Fish health certification procedures applied pre-release.

Fish are examined and certified by an ODFW fish health pathologist prior to transportation and liberation.

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

Since Ferry Creek is part of the Coquille system, an emergency onsite release would be the most preferred emergency response, especially if fish have not smolted yet. Such a release would not meet objectives for targeting adult steelhead back to fishery areas, but adults would be prone to homing back to Ferry Creek in the lower Coquille estuary, far from natural spawning areas upriver.

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.

Steelhead smolts are released after a three-week acclimation period, at which time they have been well smolted for at least 4 weeks. The release strategy for steelhead has been shown to provide for high survival and return, yet cause minimal impact on existing wild juveniles. This is primarily because the smolts migrate to the ocean directly after release from the acclimation site.

SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

11.1) Monitoring and evaluation of "Performance Indicators" presented in Section 1.10.

11.1.1) Describe plans and methods proposed to collect data necessary to respond to each "Performance Indicator" identified for the program.

Steelhead spawning ground counts will monitor steelhead spawning escapement. Methodologies for conducting steelhead spawner counts are under development by ODFW.

Habitat surveys and/or juvenile counts will also be used to determine steelhead population health. Fish Districts will document number and location of carcasses placed for nutrient enhancement and an annual statewide report will document compliance with DEQ permit requirements. ODFW Fish Propagation Section, and hatchery staff, will determine program costs.

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

As with all state programs, budgets are approved by the Legislature for a two-year period. No commitment of funds can be made past the approved budget period. Funds for various projects associated with this HGMP come from a variety of sources including license dollars, state general funds, and the Federal Sport Fish Restoration Program. Funds are committed for portions of the HGMP monitoring but, can change with relatively short notice. For example, some ODFW hatcheries have been periodically designated for closure under the Governor's proposed budgets due to general fund shortfalls. If this occurs, it may result in elimination or reduction in hatchery programs depending on reprioritization by ODFW. Positions at the Charleston Fish District have also been periodically targeted for termination. As a result, the performance standards may be affected with declining staffing and funding levels.

11.2) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from monitoring and evaluation activities.

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

SECTION 12. RESEARCH

Provide the following information for any research programs conducted in ***direct association with the hatchery program described in this HGMP. Provide sufficient detail to allow for the independent assessment of the effects of the research program on listed fish****. If applicable, correlate with research indicated as needed in any ESU hatchery plan approved by the co-managers and NMFS. Attach a copy of any formal research proposal addressing activities covered in this section. Include estimated take levels for the research program with take levels provided for the associated hatchery program in* ***Table 1****.*

12.1) Objective or purpose. None identified at this time.
12.2) Cooperating and funding agencies. N/A
12.3) Principal investigator or project supervisor and staff. N/A
12.4) Status of stock, particularly the group affected by project, if different than the stock(s) described in Section 2. N/A
12.5) Techniques: include capture methods, drugs, samples collected, tags applied. N/A
12.6) Dates or time period in which research activity occurs. N/A
12.7) Care and maintenance of live fish or eggs, holding duration, transport methods. N/A
12.8) Expected type and effects of take and potential for injury or mortality. N/A
12.9) Level of take of listed fish: number or range of fish handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached "take table" (Table 1). N/A
12.10) Alternative methods to achieve project objectives. N/A
12.11) List species similar or related to the threatened species; provide number and causes of mortality related to this research project. N/A
12.12) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury, or mortality to listed fish as a result of the proposed research activities. N/A

SECTION 13. ATTACHMENTS AND CITATIONS

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SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

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

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

Signature: _____Date_____

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

Signature: _____ Date: _____

Appendix A. Fish Health Monitoring

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

Stocks/Species _

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

Disease Treatment

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

Fish Health Monitoring Plan

Monitoring will be conducted by a qualified fish health specialist.

The monitoring plan is similar to that developed by the Integrated Hatchery Operations Team for the Columbia Basin anadromous salmonid hatcheries. (see Policies and Procedures for the Columbia Basin Anadromous Salmonid Hatcheries, Annual Report 1994. Bonneville Power Administration).

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

A representative sample of healthy and moribund fish (if available) from each lot of fish will be examined. The number of fish examined will be at the discretion of the fish health specialist. Appropriate actions including drug or chemical treatments will be recommended as necessary. If a bacterial pathogen requires treatment with antibiotics a drug sensitivity profile will be generated when possible.

Fish culture practices will be reviewed as necessary with facility personnel. Where and when pertinent, nutrition, water flow and chemistry, loading and density indices, handling, disinfection procedures, and treatments will be discussed.

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

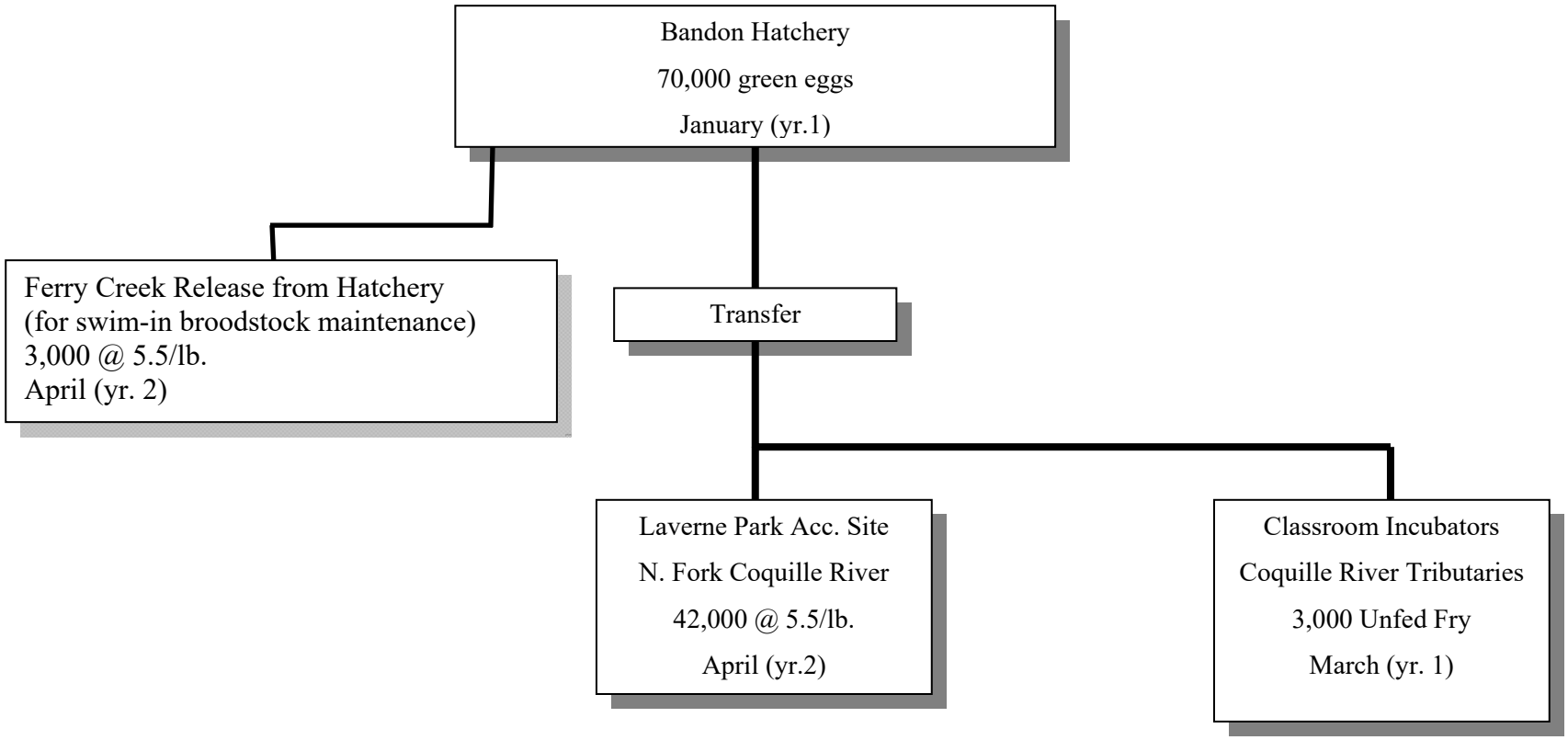
Fish health status prior to release or transfer to another facility will be determined and reported on the standard reporting form. The exam may occur during the regular monthly monitoring visit, i.e. within 1 month of release.

Fish Health Inspection for Broodstock

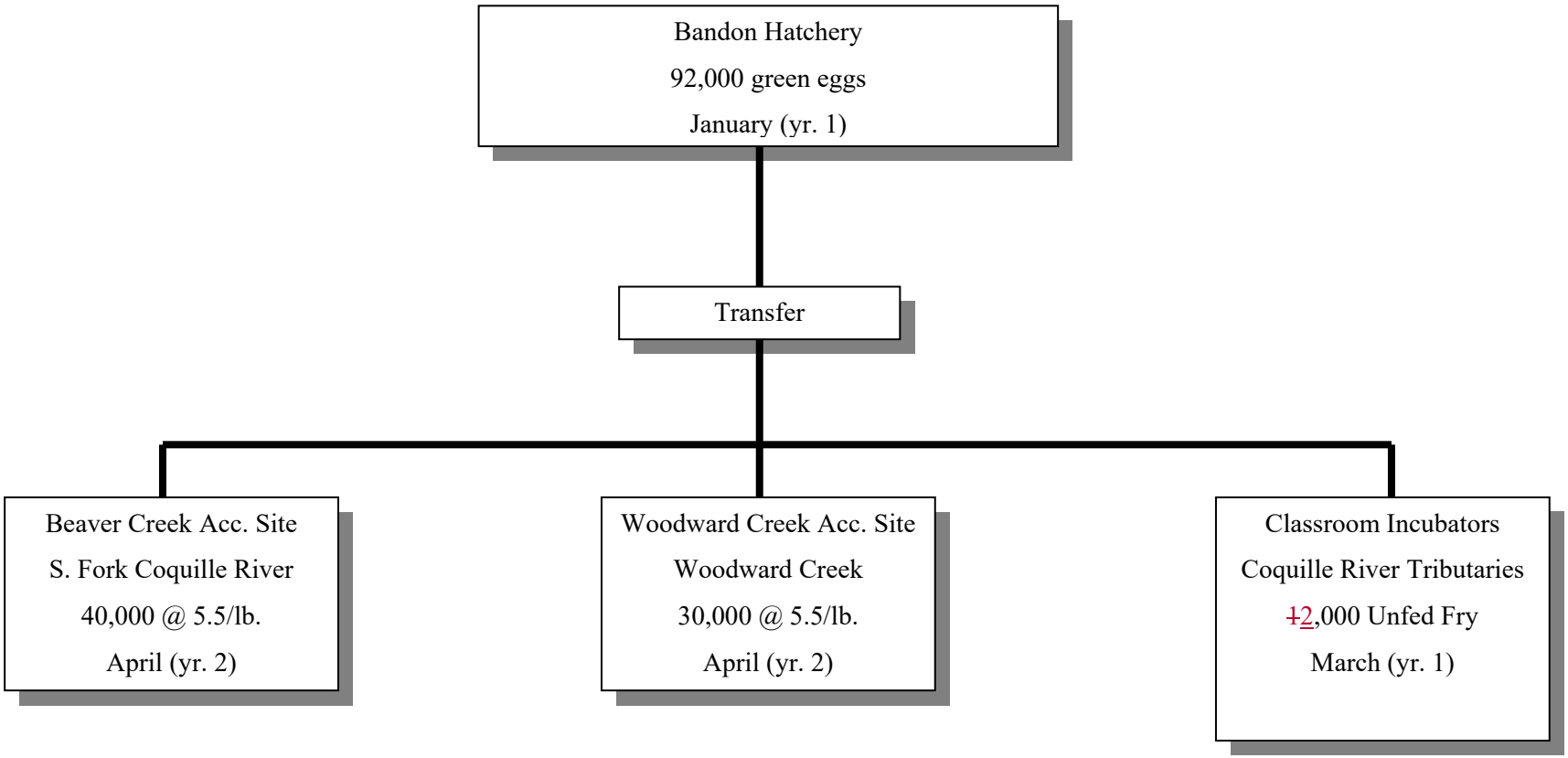
Fall Chinook, Coho and two lots of winter steelhead are examined for the presence of viruses. Chinook and Coho are also sampled for bacterial kidney disease.

APPENDIX B—Fish Production Flow Charts

Winter Steelhead - Stock 44 (Coquille River)



Winter Steelhead - Stock 144 (S. Fork Coquille River)



APPENDIX C.—Map of Coquille Basin Acclimation/Release Sites. Beaver Cr., Woodward Cr., and Laverne Park are the winter steelhead acclimation sites.

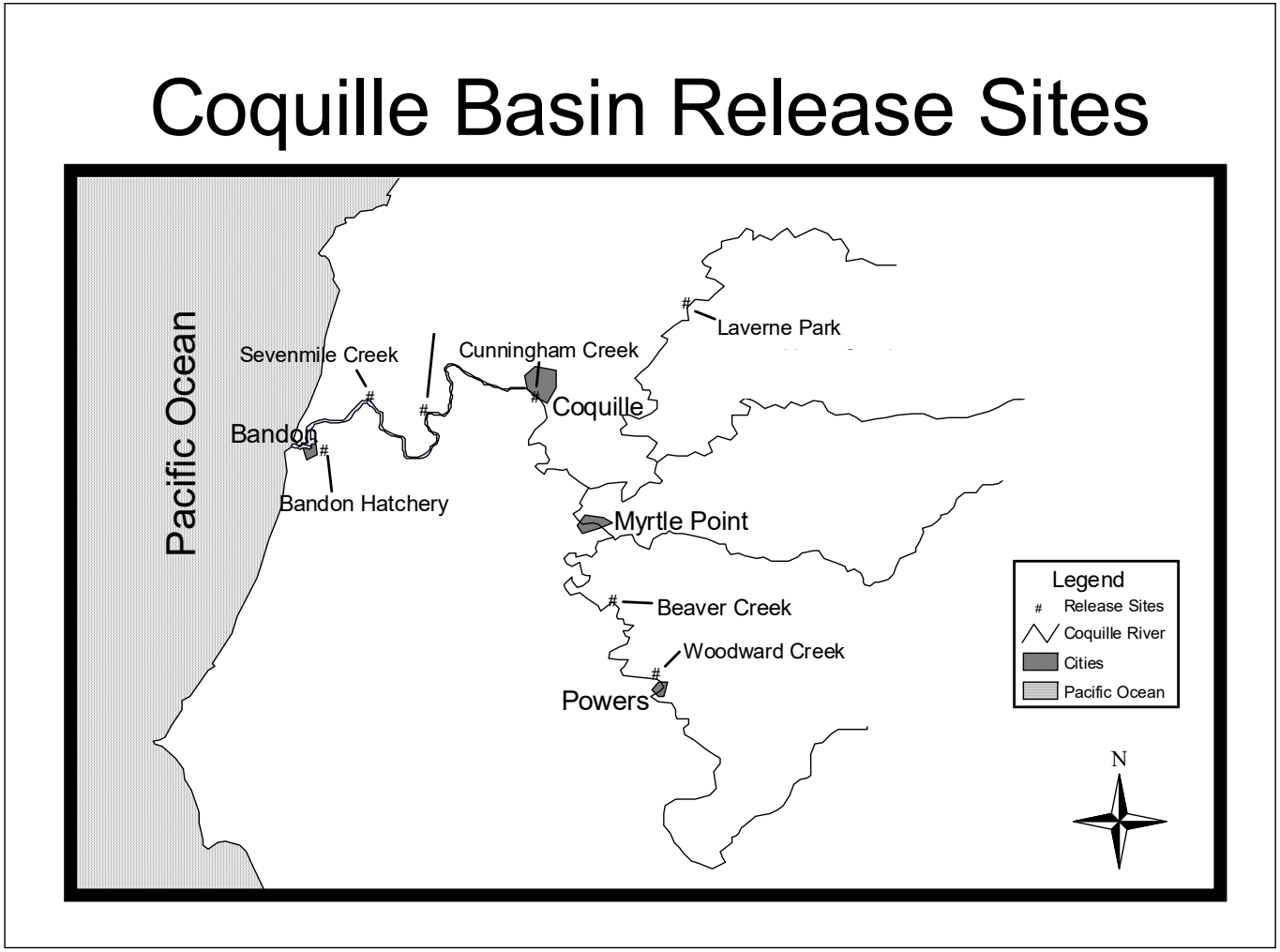


Table 1. Estimated listed salmonid take levels by hatchery activity.

Listed species affected: Coho Salmon ESU/Population: Oregon Coast ESU Activity: Coquille winter steelhead (stocks 44 and 144)				
Location of hatchery activity: *Coquille River Basin* Dates of activity: *Ongoing* Hatchery program operator: *Michael Gray* (*District Biologist)*				
Type of Take	**Annual Take of Listed Fish By Life Stage (*Number of Fish*)**			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)			25	
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)			2	
Other Take (specify) h)				

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

Instructions:

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