HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	**Coquille River Fall Chinook Program**
Species or Hatchery Stock:	**Fall Chinook Salmon (Stock 44)**
Agency/Operator:	**Oregon Department of Fish and Wildlife**
Watershed and Region:	**Coquille Watershed – ODFW West Region**
Date Submitted: **First Update Submitted:** **Second Update Submitted:** **Third Update Submitted:** **Fourth Update Submitted:**	**October 19, 2005** **December 8, 2008** **October 9, 2014** **June 21, 2016** **September 21, 2017**
Date Last Updated:	**September 20, 2017**

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Coquille River Fall Chinook Program

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

Oregon coastal fall Chinook Salmon *Oncorhynchus tshawytscha* – Coquille River Stock 44.
ESA status: not an ESA-listed stock or population (Federal Register Notice 1998).

1.3) Responsible organization and individuals

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On-site Lead Contact:
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Hatchery Contact:
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Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program.

Coquille River STEP Association and numerous unassociated students and volunteers assist with broodstock collection and spawning. Volunteers/students also assist in other aspects of the operation of the STEP and acclimation facilities. Volunteer efforts are

under the supervision of an ODFW STEP biologist or other ODFW fish district and hatchery personnel.

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

Funding source: Fifty percent state dollars from the sale of fishing licenses and fifty percent general fund from state taxes.

Bandon Hatchery staffing level: One hatchery Manager-2; one hatchery Technician-2; one hatchery Technician-1. ***Coquille River fall Chinook program operational costs*:**

Bandon Hatchery: 2006- $2,283; 2007- $2,397; 2008- $2,517
Cole Rivers Hatchery: 2007- $24,460; 2008- $25,425

In addition to these ODFW facility costs, there is a substantial value to the volunteer labor, materials, and other aspects of the production of Coquille River hatchery fall Chinook.

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

Bandon Hatchery is located in the Coquille watershed one mile east of the city of Bandon. The hatchery site is located at an elevation of approximately 98 feet above sea level, at latitude 43º 06' 54" N and longitude 124º 23' 03" W. The hatchery is situated at the confluence of Geiger and Ferry Creeks. Ferry Creek enters the Coquille estuary at river mile (RM 1.0). The watershed code is 1700301000. The regional mark processing code for Bandon Hatchery is 5F22237 H37 21.

Cole Rivers Hatchery is located in the Rogue watershed approximately 30 miles NE of Medford. The site is at an elevation of 1,545 feet above sea level, at latitude 42º 39' 49" N and longitude 122º 41' 01" W. This hatchery is located at the base of Lost Creek Dam at river mile 157. The watershed code is 1500000000. The regional mark processing code for Cole Rivers Hatchery is 5F22208 H8 21.

Associated rearing and release facilities are listed below:

Sevenmile Creek (Coquille Estuary) near Bandon	T 28 S, R 14 W, Section 3
Coquille High School on Cunningham Creek (Coquille River)	T 27 S, R 13 W, Section 36
Blue Creek (North Fork Coquille) near Fairview	T 27 S, R 11 W, Section 5
Camas Valley Elementary School on Jim Belieu Creek (Middle Fork Coquille)	T 29 S, R 8 W, Section 20
Powers Elementary School on Bingham Creek (South Fork Coquille)	T 31 S, R 12 W, Section 13
Ferry Creek Acclimation	**T 28S, R 14 W, Section 30**

Broodstock collection facilities

Broodstock are collected through swim-ins into the Bandon Hatchery and Cunningham Creek facilities, and with tangle-net collections by ODFW staff and STEP volunteers.

Common netting sites include the Coquille River near Arago, the North Fork Coquille near Laverne Park, and the South Fork Coquille near Gaylord. Netting sites and effort vary based on river flow, weather conditions, and the holding locations of adult Chinook. Captured broodstock are held at Bandon Hatchery for spawning.

Spawning and egg incubation facilities

Spawning activities and incubation of green and eyed eggs are conducted at Bandon Hatchery. Incubation of transferred eyed eggs occurs at Cole Rivers Hatchery.

Eyed egg incubation and rearing facilities

A total of 170,000 eyed eggs are transferred in January from Bandon to Cole Rivers Hatchery for incubation and rearing to smolts. An additional 22,500 eyed eggs are transferred from Bandon and reared to presmolts at Coquille High School; and approximately 116,500 eyed eggs also received from Bandon are incubated/hatched and released as unfed fry by various educational and STEP programs.

Current unfed fry programs and release numbers are:

- Camas Valley Elementary School—500 (educational—classroom incubator)
- Powers Elementary School—500 (educational—classroom incubator)
- Myrtle Crest Elementary School—500 (educational—classroom incubator)
- Additional elementary, middle school, and high school classroom incubators, depending on teacher involvement.
- Archie Flood/Blue Creek—40,000 (STEP hatchbox)
- Powers High School—60,000 (educational—hatchbox)

With implementation of the Coastal Multi-Species Conservation and Management Plan (or CMP; ODFW 2014), the hatchbox unfed fry projects are proposed to be phased-out. Classroom incubators with up to a few hundred eggs/fry are planned to continue as educational demand dictates, and the remaining numbers would be 5,000 or less.

Release sites (See map, Appendix C.)

A programmed total of 144,600 smolts are raised at Cole Rivers Hatchery, transferred back to the Coquille River, acclimated, and released at acclimation sites in the Coquille estuary. The acclimation period is two weeks. Approximately 80,000 smolts are programmed to be acclimated and released into Sevenmile Creek (RM 2.5), and 64,600 smolts acclimated and released from a holding pen in lower Ferry Creek (RM 1—Bandon Harbor).

Approximately 20,000 presmolts are programmed for release into Cunningham Creek at Coquille High School and 10,000 presmolts released into Ferry Creek from Bandon Hatchery. Also 115,000 unfed fry are programmed for release at these locations under educational (classroom incubator) or STEP hatchbox projects:

- Coquille High School—Cunningham Creek or Mainstem Coquille River
- Archie Flood—Blue Creek/North Fork Coquille
- Camas Valley Elementary School—Bear Creek/Middle Fork Coquille River

- Powers Elementary School—South Fork Coquille River
- Powers High School— South Fork Coquille River
- Myrtle Crest Elementary School— South Fork Coquille River.

While the educational classroom incubators are planned to continue, the STEP hatchbox releases are proposed to be phased-out.

1.6) Type of program.

Isolated Harvest Program (release as presmolts and smolts)
Integrated Harvest Program (release as unfed fry)

1.7) Purpose (Goal) of program.

The smolt/presmolt program is for harvest augmentation. The goal of this program is to provide hatchery fish for recreational and commercial harvest that are genetically and ecologically similar to wild populations, while minimizing any potential adverse impacts to the wild population of this species or other species. Through its educational component at Coquille High School, Powers High School, and the elementary schools, this program also serves to increase student awareness of salmonid biology, life history, and their habitat requirements.

1.8) Justification for the program.

This program provides fish for ocean commercial and recreational fisheries as well as the in-river recreational fishery on the Coquille River. These and other fisheries directed at unlisted species maintains the economic and cultural values associated with historic salmon fisheries while reducing social pressures to increase fisheries directed at listed species (i.e. Coho Salmon). The in-river fishery is primarily targeted at returning fall Chinook, with incidental catch of wild Coho Salmon. The Coquille hatchery Coho Salmon smolt program was eliminated following the 2006 release and replaced with programmed Chinook Salmon smolt production, not for conservation purposes but for the failure of the Coho hatchery program to meet harvest and smolt-to-adult survival objectives.

Smolts and presmolts are released into tidewater tributaries during the late spring and summer when Coho estuarine rearing is minimal. Unfed fry releases may be expected to have minimal adverse interactions with Coho due to competitive exclusion by Coho and due to the tendency of juvenile Chinook to migrate downstream toward the estuary. Also, hatchery fall Chinook utilize the estuary as 0-age fish, whereas wild Coho are outmigrating primarily as larger yearlings.

STEP Fish Propagation Project Review

In accordance with STEP program rules, a five-year review was conducted for all STEP-related fish propagation projects in the Coos-Coquille-Tenmile Fish District in the latter

half of 2005, culminating with conditional approval by ODFW's Fish Division Administrator in March of 2006. The overall Coquille fall Chinook hatchery program is a combination of incubation, rearing ("propagation" under the STEP rules), and acclimations conducted prior to release. These actions are carried out at multiple schools, STEP volunteer-operated facilities, and ODFW hatcheries—by volunteers, students, and ODFW staff. The Review process began with a required Oregon Fish and Wildlife Commission ("Commission") approval for individual projects to release anything greater than 100,000 fish. Those approvals were granted by the Commission in December of 2005.

Following intensive review and public comment, conditions for individual projects were established and incorporated into letters of approval that were sent to each project's sponsor. One of the six projects reviewed was the Coquille fall Chinook hatchery program, primarily rearing conducted at Coquille High School. Although only those STEP projects that rear (propagate) fish prior to release were under the five-year Review (as opposed to short-term acclimations), ODFW staff evaluated the overall Coquille fall Chinook hatchery program to provide cohesiveness and compliance with policy.

Changes that were made to this HGMP since the September 2005 version include:

- Replacement of the Coho Salmon smolt program with equivalent poundage of fall Chinook Salmon production (increase from 100,000 to 154,600 smolts).
- Discontinuation of sites or shifting of production to new sites to meet harvest augmentation objectives, increase smolt to adult survival, and reduce native fish impacts.
- Shifting the location of the former Hall Creek Acclimation, near Coquille, to the Ferry Creek Acclimation at RM 1.0 at Bandon. This action was taken as a measure of the CMP (ODFW 2014).
- Shifting a 10,000-fish smolt acclimation at Cunningham Creek/Coquille High School to a 10,000-fish presmolt release directly from Bandon Hatchery. This was to help increase swim-in broodstock for the hatchery, and also due to the fact that water condition in August/early September in Cunningham Creek was often too low to adequately acclimate smolts. Often, these smolts had to be added to lower river acclimations such as Sevenmile Creek.

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
A representative sample of the Chinook run will be collected in the Coquille Basin, in order to maintain a hatchery broodstock similar to naturally produced Chinook.	• For each effort, record the date, location, sex, and total number of Chinook captured and used for broodstock. • Chinook broodstock will not	• Tracking of broodstock collection records by District staff, in-season.

	be selected for individual fish characteristics, and multiple capture efforts across the fall Chinook run timing will be conducted.	
Marking and tagging will provide a mechanism for an estimate of the success of the artificially produced Chinook Salmon. Carcasses or other products will be placed in spawning streams for nutrient enrichment. This is identified as an Oregon Plan salmon restoration measure.	• A target of 100% of the Chinook juveniles (pre-smolts and smolts) will be fin-marked prior to release. • Distribution of carcasses and other products for nutrient enrichment is in compliance with DEQ guidelines for number, date and location of carcasses placed in streams for nutrient enrichment. • Number and location of carcass placements comply with coast-wide specified Oregon Plan monitoring designating treatment (nutrient loading) and control (no nutrient loading) streams.	• Quality control sampling post-marking, but pre-release. • Evaluation of success through hatchery returns and creel from ocean and in-basin fisheries, when feasible. • Monitor carcass placement to verify compliance with DEQ agreement. • Oregon Plan monitoring will determine effectiveness of carcass placements for nutrient enrichment.
RISKS **Performance Standards**	**RISKS** **Performance Indicators**	**RISKS** **Monitoring & Evaluation**
Adverse effects on listed Coho and wild Chinook Salmon will be minimized through numbers, timing, and location of juvenile releases.	• Releases of larger juveniles (smolts) into the upper portions of watersheds will be minimized. Releases of fall Chinook smolts and most of the presmolts will occur into tidewater tributaries. Unfed fry Chinook may be released in the main rivers. • Releases of juveniles into or just above the estuary will be timed to minimize competition with out-migrating wild Coho Salmon. These releases will primarily occur after Coho Salmon have migrated	• Releases made when and where scheduled.

	through the upper tidal areas.	
While collecting fall Chinook broodstock, avoid adverse impacts to the wild Coho Salmon run.	• Maintain numbers of wild Coho captured or otherwise handled below 5% of estimated wild Coho three-year average annual escapement, based on SRS data.	• For each effort, record the date, location, sex, total number of Coho encounters, number of Coho captured, and the number visibly harmed or otherwise impaired, if released.
ODFW Hatchery water discharges will comply with the prescribed 300J general NPDES permit as required by the Oregon Department of Environmental Quality (DEQ).	• Results within accepted criteria.	• Water samples collected and result reported.
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.
Hatchery water withdrawals will be screened to prevent entrainment of native fish.	• Screens inspected and in working order.	• Periodic inspection of screen condition.

1.11) Expected size of program.

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

At the current program size, the number of adult fall Chinook needed for broodstock for this program is 150 fish (75 pairs), of both hatchery and wild origin. Additional adults may be collected if needed for replacement of eggs due to disease culling, unanticipated excess egg loss, lower fecundity than normal, or other unforeseen circumstances. In addition, ODFW has developed protocols for minimizing wild Chinook broodstock collection in years of low forecast spawning escapement, placing heavier collection on hatchery adult fish. As the hatchbox projects are phased-out (approx. 100,000 eggs), the number of broodstock collected can be reduced accordingly.

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

Table 1-1. Proposed annual fall Chinook Salmon releases in the Coquille Basin.

Life Stage	Annual Release Level	Release Location
Eyed Eggs	0	
Unfed Fry	115,000* (total for all sites) *Proposed for 100,000 hatchbox fry to be phased-out, leaving classroom incubator projects remaining.	Blue Creek (North Fork Coquille)* Camas Valley Elementary School (Middle Fork Coquille) Powers Elementary School (South Fork Coquille) Powers High School (South Fork Coquille) Myrtle Crest Elementary (S. Fork Coquille) Additional schools as requested.
Fry	0	
Fingerling (presmolts)	20,000 10,000	Cunningham Creek (Coquille High School) Bandon Hatchery (Ferry Creek)
Smolts	80,000 64,600	Sevenmile Creek (Coquille Estuary) Ferry Creek (Coquille Estuary)

See Hatchery Production Flow Chart, Appendix B.

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 fall Chinook production from the Coquille hatchery fall Chinook

program for brood years 1989-1999 are presented in Table 1-2. The estimated number of total adult hatchery fall Chinook produced was derived from a variety of data sources. The "Ocean Commercial" and "Ocean Sport" columns were estimated by expansion of coded-wire tag (CWT) recoveries to reflect total production as follows: {(Estimated CWT recoveries / number of CWT smolts released) * total fish released}. This calculation was made for each group of CWT smolts released, and then summed across all CWT groups released for each brood year. This estimate represents landed catch only. Estimated "Freshwater Sport" catch is not available, as punch card estimates of catch in the Coquille Basin cannot be separated into hatchery and wild fish. The "Hatchery Return" column depicts the actual count of adult fall Chinook returns at Bandon Hatchery. The adult fall Chinook returns for each run year were allocated to a brood year based on the average age composition of Bandon Hatchery recoveries of CWT fall Chinook. We do not have an estimate of the number of hatchery fall Chinook that strayed to natural spawning areas. Therefore, the "Spawning Areas" column is not available. Smolt to adult survival is calculated as the sum of the prior five columns divided by the "Smolt Release" column. This is a minimum survival estimate, as we do not have estimates of the number of hatchery fall Chinook caught in freshwater fisheries (by brood year) or straying to spawning areas.

Table 1-2. Estimated total adult hatchery Coquille fall Chinook produced per brood year. (Derived from CWT expansions, N/A = not available)

		Estimated Total Adult Hatchery Fall Chinook Produced					
Brood Year	Smolt Release	Ocean Comm.	Ocean Sport	Freshwater Sport	Hatchery Return	Spawning Areas	Smolt to Adult
1989	0			N/A		N/A	
1990	54,613	75	0	N/A	32	N/A	0.20%
1991	92,145	35	0	N/A	3	N/A	0.04%
1992	101,986	234	0	N/A	4	N/A	0.23%
1993	99,664	387	21	N/A	9	N/A	0.42%
1994	58,235	305	0	N/A	3	N/A	0.53%
1995	100,394	80	0	N/A	42	N/A	0.12%
1996	105,207	107	0	N/A	0	N/A	0.10%
1997	116,593	376	87	N/A	4	N/A	0.40%
1998	64,801	250	57	N/A	5	N/A	0.48%
1999	107,364	966	80	N/A	8	N/A	0.98%

Freshwater sport data are not available by brood year contribution (i.e. derived from 3-year olds, 4-year olds, etc. contributing to harvest in a given run year). However, overall punchcard harvest estimates are available for total basin catch and divided amongst subbasin fishery areas. Figure 1-1 shows total basin harvest for Coquille fall Chinook Salmon for the run years 1978 through 2003. The ten-year average harvest estimate (1994-2003) was 2,754 adult fish, with a range from 1,595 to 4,052. Hatchery fish to wild fish ratios are not available from this data.

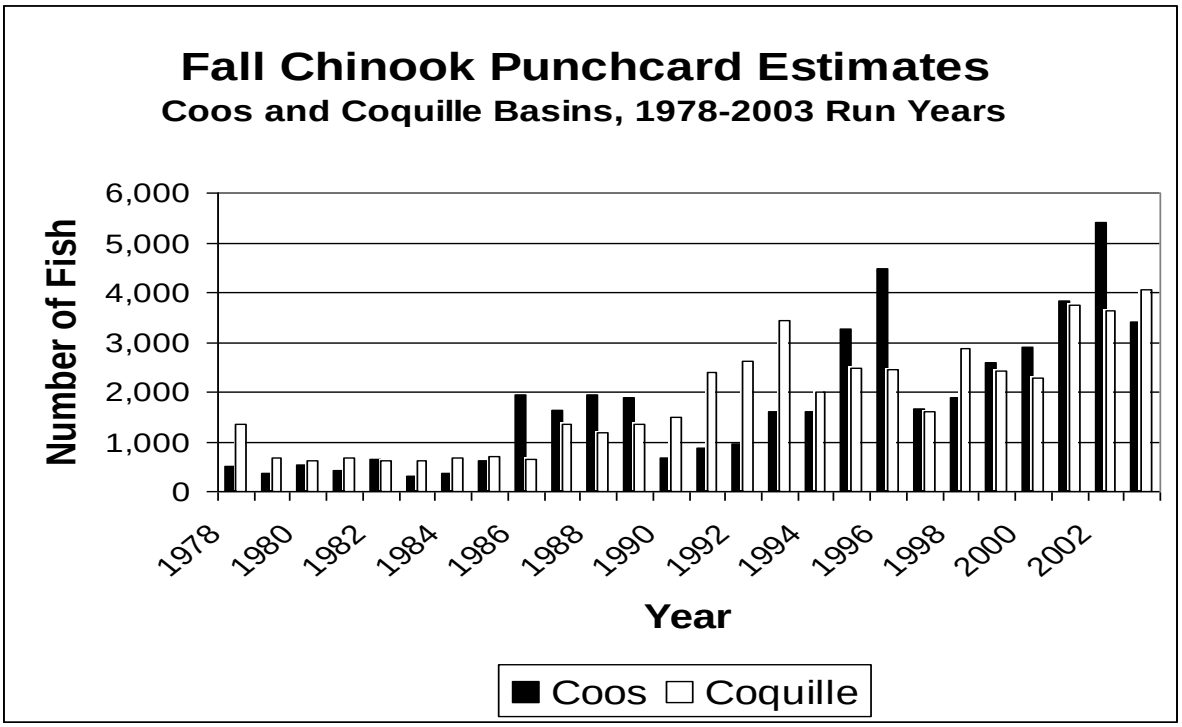


Figure 1-1. Total harvest of Coos and Coquille rivers fall Chinook Salmon for the run years 1978 through 2003.

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

The current program began in 1983. The Chinook Salmon smolt program was expanded in 2006-'07, with the discontinuation of hatchery Coho Salmon production and a replacement with additional Chinook Salmon smolts.

1.14) Expected duration of program.

Ongoing, with no planned termination.

1.15) Watersheds targeted by program.

Coquille River watershed.

1.16) Indicate alternative actions considered for attaining goals.

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.)

The Coquille River estuary is relatively small in comparison to other Oregon coastal basins. The Coquille estuary is primarily riverine with no broad expanse of tidal flats, especially compared to the nearby Coos River estuary. Therefore, the Coquille estuary does not support a large fall Chinook hatchery program since carrying capacity for estuary-rearing salmonids can be met with relatively low numbers. The hatchery Chinook program in the Coquille remains much smaller than in the Coos.

This program augments a highly popular and successful in-river fishery in the Coquille Basin, as well as contributing to ocean commercial and recreational fisheries. Formerly, nearly all smolts were acclimated and released at tributary sites in the lower estuary to target returning adults to the fishery area, and thus the number of swim-in broodstock to Bandon Hatchery was negligible. This necessitated netting operations to collect sufficient adult broodstock. Netting operations are labor-intensive and subject to the unpredictability of river flow, weather, and fish behavior. Subsequently, smolt and presmolt release from lower Ferry Creek has resulted in swim-in broodstock that allows for less reliance on upriver netting.

Bandon Hatchery's rearing capacity is limited by the summer/fall water supply. Low flows allow for only minimal rearing through the summer months. Thus, most hatchery production occurs at Cole Rivers Hatchery.

The hatchery project at Cunningham Creek (Coquille High School) is primarily intended as an educational program. Program size, facility capabilities, and adult returns are not a major component of the basin's fall Chinook production. Water supply and water quality at Cunningham Creek in late spring/summer limit the production capability of this facility. Improvements in the water supply and filtration system at Cunningham Creek would greatly improve the survival of eggs/fish produced here.

ODFW and Coquille River STEP volunteers have initiated an acclimation operation near the mouth of Ferry Creek in Bandon harbor to create a tourist attraction, interpretive opportunity for Coquille River salmon production, and to bolster a terminal fishery in the Bandon marina area. Salmon fisheries once occurred at the mouth of Ferry Creek when higher numbers of smolts were released on-station at Bandon Hatchery. When the Coho Salmon hatchery program was eliminated from the Coquille Basin, they were replaced with similar poundage of Chinook Salmon smolts. Initially, this production from Cole Rivers Hatchery was acclimated and released from Hall Creek, a mid-basin tributary near Coquille. Problems with water quality in the late summer were experienced at Hall Creek. With the development of the CMP (ODFW 2014), this Chinook Salmon smolt

production was moved downriver and added to the lower Ferry Creek acclimation/release to increase the lower river sport fishery and bolster swim-in broodstock collection at Bandon Hatchery.

1.16.2) POTENTIAL ALTERNATIVES TO THE CURRENT PROGRAM

The alternatives are "draft" only and not necessarily endorsed by the management entity.

DRAFT ALTERNATIVE 1—Program expansion.

DESCRIPTION AND IMPLICATIONS:

Expand the Coquille fall Chinook hatchery program to approach the estuarine carrying capacity for juvenile fall Chinook Salmon rearing. As previously stated, however, the Coquille estuary is greatly limited in size and quality of early rearing compared to that of the Coos estuary. This alternative assumes that the Coquille estuary has additional potential to rear fall Chinook juveniles. Studies would be needed to determine the remaining available capacity. As previously described, an expansion in programmed Chinook Salmon smolt releases occurred with the elimination of the hatchery Coho Salmon program (2006). Any further expansion of the Chinook program will require improvements in the ability to collect hatchery broodstock. The difficulties with netting, described in 1.16.1, could be resolved by the construction/operation of traps to collect adult Chinook. Two possible sites that are being proposed are Sevenmile Creek (where the bulk of hatchery smolts are released), and Laverne Park (on the North Fork Coquille, where much of the netting takes place currently).

PROS AND CONS:

Pros—Seeding the Coquille Estuary to its full capacity may create an expansion in angling opportunities. Expanded angling opportunities provide economic benefits for the local community and the state of Oregon.

Cons—Expansion of the hatchery fall Chinook program in the Coquille Basin could have unanticipated impacts on Coho Salmon or other aspects of the ecosystem. An expanded program would require additional broodstock collection that could cause additional handling of listed Coho, although the small numbers of Coho typically captured each year are used as broodstock under the Coquille Coho propagation program and described is a separate HGMP. This potential impact could be a result of delays at traps or handling during netting operations.

DRAFT ALTERNATIVE 2—a) Current program size, with improvements.

DESCRIPTION AND IMPLICATIONS:

The current hatchery fall Chinook program in the basin could be kept at status quo with regard to size. This would continue the economic benefits that are currently being realized as an outcome of the program. Experimental changes could be made to the current hatchery fall Chinook program to improve survival of releases and contribution to

fisheries. Investigations need to continue as to the best time and location to release Chinook juveniles to maximize their production and subsequent benefits to the community.

PROS AND CONS:

Pros—Successful changes to release strategy or other improvements to the hatchery fall Chinook program at the current release levels would improve survival and return to creel in the fishery. This would have economic and recreational benefits to in-river anglers, as well as potentially higher contributions to ocean commercial and recreational fishers.

Cons—Status quo in release numbers combined with minor program changes in release strategies is anticipated to have very little, if any, impact to Coho Salmon. However these changes will require additional funding and/or staff time. There may be underutilized carrying capacity in the Coquille estuary that would accept additional fall Chinook rearing, but this has not been fully evaluated. Due to limited estuary size and quality, the hatchery fall Chinook release program in the Coquille Basin has remained conservative, and this alternative could cause a higher risk to local wild Chinook stocks. The hatchery smolt release program should remain in the tidewater section of the Coquille River.

DRAFT ALTERNATIVE 3—Program reduction.

DESCRIPTION AND IMPLICATIONS:

Reduce the number of fall Chinook juveniles that are produced in the hatchery program to some unidentified lower level.

PROS AND CONS:

Pros—Reductions in impacts to listed Coho Salmon would be expected from reduced Chinook broodstock collection. However some level of Chinook broodstock collection would still occur, and Coho would still be handled during this capture.

Cons—This program reduction may result in reduced benefits to commercial and recreational fisheries, and have a negative effect on the local and State economies. Reduced community support for conservation programs might also result (see Alternative 4, below).

DRAFT ALTERNATIVE 4—Eliminate hatchery fall Chinook program.

DESCRIPTION AND IMPLICATIONS:

Eliminate the hatchery program for fall Chinook Salmon in the Coquille Basin.

PROS AND CONS:

Pros— Elimination of the program would eliminate annual costs to ODFW. Some reduction in impacts to Coho Salmon might be expected, by eliminating handling of Coho during Chinook Salmon broodstock collection, however these impacts are currently minor.

Cons—This action would reduce the contribution of Coquille fall Chinook Salmon to

commercial and recreational fisheries and have an unknown benefit on the production of Coho Salmon. Fisheries would be dependent strictly on fall Chinook from natural production, and estuarine rearing capacity might be underutilized. Overall harvest of Coquille fall Chinook would likely decrease. The local and State economy could be negatively impacted by this decrease in Chinook production. ODFW could experience a loss of volunteer effort, a loss of support for conservation efforts, and a loss of community "ownership" in the salmon resources of the basin if the hatchery program for fall Chinook Salmon were eliminated.

1.16.3) POTENTIAL REFORMS AND INVESTMENTS

These are draft, for further discussion, not final decisions. Discuss operating changes or facility modifications that require additional funds, if implemented. Include rough cost estimates, if available. Modifications could include: facility rehabilitation, additional acclimation capacity or sites, alternative rearing practices, changed or new holding and segregation facilities, additional transportation equipment, etc. Include the importance of the reform. Section could be one to five pages in length.

Reform/Investment #1—Netpens/acclimation pond at Bandon Harbor.
See description above (Section 1.16.2). Initial (startup) costs estimated at approximately $30,000, including first year feed and operation. Coquille STEP estimated the approximate annual costs of operation at $5,000. Similar projects are operational at the ODFW/STEP netpen at Winchester Bay, and ODFW/CEDC netpens at Youngs Bay.

For the past three years, ODFW and Coquille STEP have implemented an acclimation pen placed in lower Ferry Creek to accomplish similar objectives. Startup and operational costs were much less with this proposal. Adult/jack returns from this project should appear in 2008 and after. This two-week acclimation is accomplished with a set of in-stream screens, placed in a concrete channel built by ODOT.

Reform/Investment #2—Improvement of Water Supply and Facility at Cunningham Creek (Coquille High School Project)
The water filtration and supply system at Cunningham Creek facility has experienced recent problems, especially in the winter period during freshet/flood events. A settling tank and sand filter system currently in place need to be re-configured and perhaps modified or replaced. Plumbing improvements are also needed. Cost estimate is not developed at this time.

Reform/Investment #3—Improvement of acclimation/incubation facilities.
On January 27, 2004 we conducted a tour of the acclimation sites in the Coquille Basin to identify issues and concerns with their operation. Items related to Chinook production included:

- new roof and paint for building (Cunningham Creek— Coquille High School);
- repair undermining/erosion of spawning building (Cunningham Creek);
- install walkway on top of culvert, access dock alongside culvert for safety of

employees and volunteers (Sevenmile acclimation);
- widen a road pull-out or alternate gravel access road for the liberation truck (Sevenmile acclimation);

Cost estimates for investment #3 have not been developed at this time.
Note: Per recommendation of ODFW's Coastal Multi-Species Conservation and Management Plan 2014, release of smolts from Hall Creek Acclimation has been discontinued and shifted to Ferry Creek Acclimation.

Reform/Investment #4—Improvement of trapping facilities.
As described above in 1.16, the ability to collect broodstock has been one of the factors limiting attainment of the hatchery production goal in recent years. In the late 1990's, releases from Bandon Hatchery were eliminated in favor of acclimation/release at Sevenmile Creek. This was done to focus the recreational fishery in the lower Coquille tidewater. As a result, swim-in Chinook returns to Bandon Hatchery were nearly eliminated. Since that time, the majority of adult Chinook broodstock have been collected through entanglement netting efforts. These efforts are often affected by river conditions and fish behavior. A more effective way of gathering broodstock could be accomplished with the installation of traps at a few key locations in the Coquille Basin. The investment to accomplish this would likely be in the range of $5,000 to $10,000 per site, plus annual operational costs and maintenance. Volunteer assistance would offset some of the costs of operation and maintenance. Many hatchery-origin adult Chinook return to the culvert at the mouth of Sevenmile Creek, where the smolt acclimation and release occur. A temporary trap installation was used for three seasons, to collect some of these fish for broodstock. Netting efforts in the acclimation pool at this site have been ineffective, but a trap installed there was moderately effective at capturing broodstock, although labor intensive and with annual variation in effectiveness. Update: (2016)—the Ferry Creek acclimation/release has increased swim-in broodstock collection at Bandon Hatchery, allowing a reduction in the number of broodstock needed by netting.

Reform / Investment #5. Obtain the permission and equipment necessary to use adipose-only mass-marking of juvenile fall Chinook. Replace ventral fin marking with adipose marking. Maintain ad-CWT marking of small groups, in order to provide a unique identifier for project evaluation, while using the mass-mark to make the simpler evaluation of hatchery/non-hatchery fish. Update (2014)—ventral fin marking has been replaced with adipose-only marking, and 100% marking was accomplished in 2014.

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 the Coquille River fall Chinook Salmon propagation 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 2014.

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

The following descriptive and status information for Coquille Complex Coho Salmon was prepared in 2000 and 2001 for the direct-take Coho HGMPs submitted at that time. Since that time, the Oregon Plan for Salmon and Watersheds Coastal Coho Assessment was finalized. Also, ODFW completed an Oregon Native Fish Status Report (ODFW 2005), under the Native Fish Conservation Policy. These documents include updated Coho Salmon status information for the Coquille population, and are available through links on the ODFW website (www.dfw.state.or.us).

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

Coquille River Coho Population

When this HGMP was originally produced (submitted 2005), a "Coquille Complex" was described. This Complex included the Coho Salmon inhabiting the Coquille River Basin, as well as New River and the Sixes River. Some information provided here refers to the Coquille Complex, while more updated information refers to the Coquille population as described in the 2005 Oregon Native Fish Status Report (ODFW 2005), which does not include the Sixes and New River systems.

The Coquille population consists of Coho Salmon inhabiting streams from the Coquille Basin, also influencing small, direct ocean tributaries nearby (Oregon Native Fish Status Report, 2005). Fish in the Coquille River Basin are considered to be part of an Independent population, while fish found in nearby direct ocean tributaries are considered to be Dependent populations that depend upon adjacent Independent populations for persistence.

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

Table 2-1. Sex ratio in Coho Salmon observed in 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)
Alsea	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. Ocean migration patterns during the fall and winter are unknown. Those fish remaining at sea grow little during winter but feed voraciously during the next spring and summer, growing to about 60 to 80 cm in length. During this second summer in the ocean, a substantial percentage of these maturing adults are caught in ocean troll and sport fisheries, usually to the south of their natal stream (Lewis 2000). The survivors return to their home streams or neighboring streams where they spawn and die to complete the life

cycle.

Habitat Use and Freshwater Distribution

Spawning and rearing of juvenile Coho Salmon generally take place in small, low-gradient (generally less than 3 percent) tributary streams, although rearing may also take place in lakes where available. Coho Salmon require clean gravel for spawning and cool water temperatures (53º to 58°F preferred, 68°F maximum) for rearing (Reiser and Bjornn 1979). Fry emerge from February to early June (Moring and Lantz 1975) and occupy backwater pools and the stream margins (Mundie 1969; Lister and Genoe 1970; Nickelson et al. 1992a). During the summer, Coho 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). Habitat complexity, primarily in the form of large and small wood is an important element of productive Coho Salmon streams (Nickelson et al. 1992b; Rodgers et al. 1993). Little is known about residence time or habitat use of estuaries during seaward migration. It is usually assumed that Coho Salmon spend only a short time in the estuary before entering the ocean. However, recent research is finding that rearing in the upper ends of tidal reaches can be extensive.

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

- Identify the ESA-listed population(s) that will be <u>directly</u> affected by the program.

The Coquille River fall Chinook Salmon hatchery program has no intent to directly take any ESA-listed Coho Salmon. Wild Coho may be incidentally caught during fall Chinook brood collection, but these Coho are released immediately.

- Identify the ESA-listed population(s) that may be <u>incidentally</u> affected by the program.

ESA-listed Oregon coast Coho Salmon may be incidentally or indirectly affected by this fall Chinook program through handling during broodstock collection, or competitive interactions for food and space.

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

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

The Coquille River Coho Salmon population consists of Coho Salmon inhabiting streams of the Coquille Basin (ODFW 2005). The habitat of this complex has the potential to support a viable population. The Coquille River is one of the two main Coho-producing rivers in the mid-south coast. Approximately 530 miles of stream are accessible to Coho Salmon in the Coquille Basin, with no major impediments identified over historic distribution.

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, a research study (Miller 1998) has documented the life history pattern of Coho Salmon in Coquille River whereby large numbers of juveniles actively migrate to lowland reaches during spring and fall, presumably to take advantage of the over-wintering habitat.

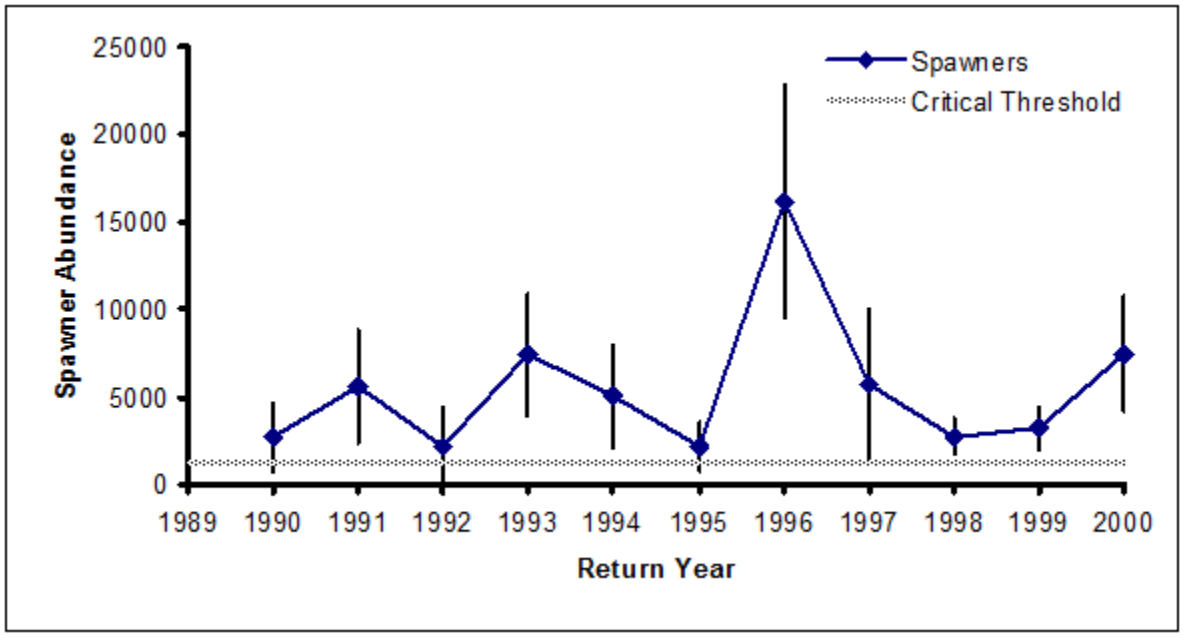


Figure 2-1. Trend in adult Coho Salmon abundance relative to the critical population level for the Coquille Complex. Error bars are at 95% confidence limits.

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

See Figure 2.2 and Table 2.3 below.

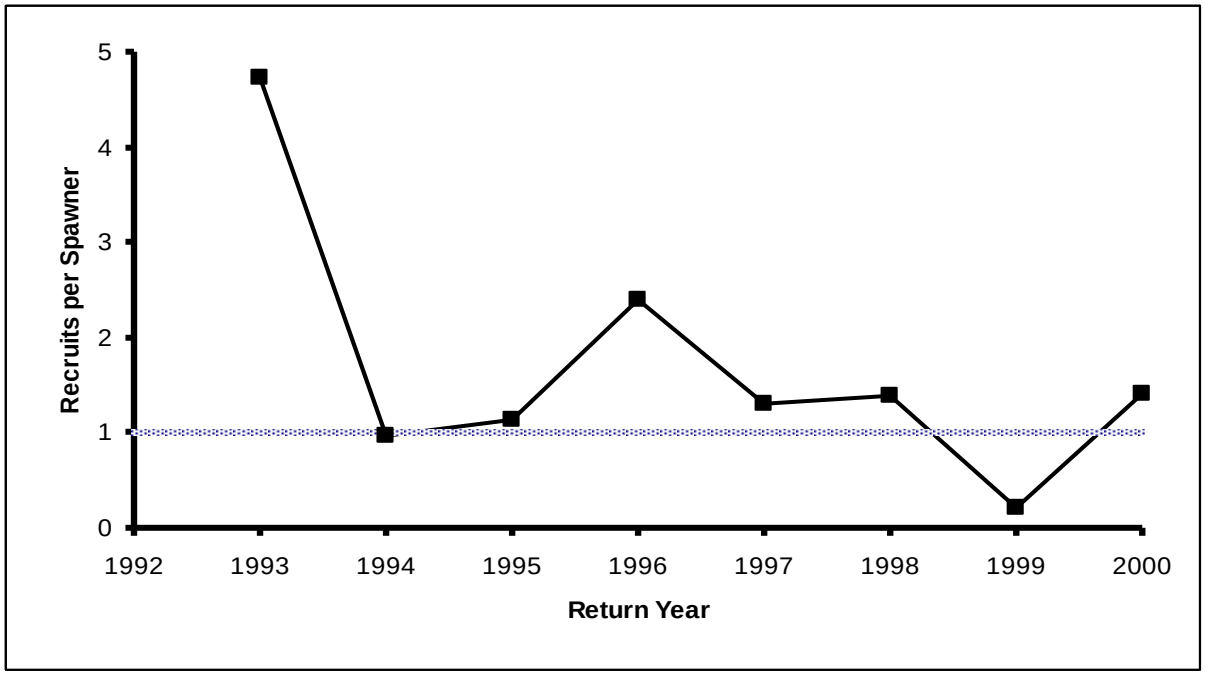


Figure 2-2. Trend in recruits per spawner for Coquille Complex wild Coho Salmon.

Table 2-2. Population parameters for the Coquille Complex listed Coho Salmon showing spanner abundance and recruit per spawner.

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
Annual mean	5,480	7,514	1.7

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

From 1990 through 2000, the abundance of Coho Salmon spawners of the Coquille Complex ranged from about 2,100 to about 16,200 and averaged about 5,500 (Figure 2-1 and Table 2-2). During that period, abundance never fell below the critical threshold of 1,300 fish and in only three years did the lower 95% confidence limit fall below the critical threshold. Recruits per wild spawner exhibited a general downward trend, 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.

Spawner abundance during the period from 2001 through 2006 was much higher, with an average of 18,000 spawners estimated for those years. The estimates for those years ranged from 8,610 to 28,577 spawners in the Coquille Basin. Since 2007, several higher escapements have been recorded, with 55,667 and 41,660 in 2011 and 2014, respectively. This past fall (2015) saw the fifth lowest escapement estimate since 1990, at 3,357 fish. This low escapement was seen coastwide in the fall of 2015.

The more recent abundance estimates for wild Coho Salmon spawners in the Coquille Basin are:

2001—13,310
2002—8,610
2003—23,909
2004—22,276
2005—11,806
2006—28,577
2007—13,968
2008—8,791
2009—22,286
2010—23,564
2011—55,667 (highest since 1990)
2012—5,911
2013—23,637
2014—41,660
2015—3,357 (fifth lowest since 1990).
(Source: ODFW 2016.)

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

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

Population Complex	1997 Brood (millions)				1998 Brood (millions)				1999 Brood (millions)			
	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 estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.

Hatchery Coho have been uncommon on the spawning grounds with only 42 (5.3%) of 800 scales sampled from 1990-99 having hatchery patterns. For the period from 2000 through 2004, the estimated fractions of hatchery Coho on spawning grounds in the Coquille were:

2000—0%
2001—17%
2002—3%
2003—1%
2004—0%
(Source: ODFW 2005)

It should be noted that in 2001, a random spawning survey was conducted in Bear Creek, a lower Coquille estuary tributary near Sevenmile Creek, where hatchery smolts were released for many years. This high hatchery fraction in 2001 is believed to be an artifact of the selection of Bear Creek as one of the random surveys in the basin. Otherwise, hatchery fraction estimates have been below 5% in recent years.

The proportion of hatchery-origin Chinook spawners (pHOS) in the Oregon Coast Coho ESU is not available (personal communication, Ben Clemens and Shannon Richardson, ODFW, June 2016). The sampling protocol for Chinook spawning surveys does not provide the data necessary to estimate Chinook pHOS with any precision. ODFW has recognized "hotspots" of hatchery-origin spawners observed in streams near acclimation/release sites. The new Coastal Multi-Species Conservation and Management Plan considers these hotspots and allows for higher pHOS adjacent to release sites. ODFW is developing new criteria for evaluating pHOS that might stratify areas based on adjacency to release sites.

In the Coquille hatchery Chinook Salmon program, releases of hatchery smolts and presmolts have historically been low in the system, well downriver of the major spawning areas for naturally-produced Chinook Salmon. Tidewater occurs up to river mile 40, above Myrtle Point. Hatchery smolt/presmolt releases have primarily been near Coquille (river mile 25) and lower. Broodstock netting near the head of tidewater only rarely encounters a fin-marked Chinook Salmon.

Intraspecific pHOS has potential genetic and environmental impacts to naturally-produced fish. Interspecific pHOS, in this case hatchery Chinook found on natural Coho spawning grounds, have only environmental impacts. Because they spawn earlier in the fall prior to Coho spawning, hatchery Chinook adults don't superimpose redds on existing Coho redds. Chinook also tend to spawn in larger, main rivers whereas Coho tend to spawn in smaller order tributaries. Progeny of hatchery Chinook may compete with Coho juveniles for rearing space and food, however fall Chinook produce 0-age smolts that move from spawning grounds to tidewater and the ocean within a few months of hatching. This minimizes overlap of Chinook presmolts/smolts with rearing juvenile Coho Salmon. Coho Salmon produce yearling smolts that are much larger than 0-age Chinook outmigrants. Due to spatial, temporal, and life cycle differences between these species, the pHOS of hatchery Chinook should have minimal impact on wild Coho Salmon.

2.2.3) Describe hatchery activities, incl. associated monitoring, 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 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. b) Provide information regarding past takes associated with the hatchery program, including numbers taken, and observed injury or mortality levels for listed fish.

Following the 2006 release of smolts, the Coquille hatchery Coho Salmon smolt program was discontinued. As the former Coho hatchery program was described in the 2001 Coquille Coho HGMP, adult Coho swim volitionally into Bandon Hatchery from October through January. These fish are almost all of hatchery origin from smolt releases at the hatchery facility, and they were incorporated into the Coho hatchery program. Also as described in the Coquille Coho HGMP, wild Coho were collected for broodstock by netting efforts upriver and incorporated into the Coho hatchery program. The total number of wild Coho formerly incorporated into the Coquille Coho program is presented in Table 2-4; this total included individuals that were collected while also targeting Chinook and individuals that were collected independent of Chinook collection. No juveniles are taken in the process of broodstock collection or other activities associated with this hatchery program.

Table 2-4. Number of wild Coho Salmon taken and used as brood for Coho propagation.

Return Year	Males	Females	Jacks	Percent of Broodstock
1988	5	26	0	5.2
1989	No Data	No Data	No Data	--
1990	No Data	No Data	No Data	--
1991	3	2	0	1.3
1992	35	45	31	61.0
1993	6	9	1	2.9
1994	5	4	0	12.5
1995	9	5	8	81.5
1996	23	33	0	10.2
1997	8	11	0	13.6
1998	4	2	0	7.1
1999	14	3	0	10.2

Chinook Salmon are actively collected for broodstock using seines and entanglement nets. Netting for Chinook Salmon usually begins around October 15th and continues through December 15th. Due to the overlap of run timing, broodstock collection targeting Chinook Salmon may encounter early returning Coho. Broodstock collection for fall Chinook Salmon program occurs at or near the following locations:

- Letz Bar - River mile 33.0 of the mainstem of Coquille River
- Mouth of North Fork - River mile 36.0 of the mainstem of Coquille River
- Laverne Park - River mile 31.5 of the North Fork Coquille River
- Shell Hole - River mile 1.0 of the South Fork Coquille River
- South Fork at Gaylord - River mile 20 of the South Fork Coquille River

Broodstock collection directed at Chinook Salmon has a high potential to non-lethally take (capture, handle, and release) a small number of Coho Salmon (typically 12 or fewer) and a low potential to unintentionally lethally take an even smaller number of Coho (typically 4 or fewer). Any listed Coho that are captured during fall Chinook brood collection are released immediately with minimal handling stress.

The release of artificially propagated juveniles of Chinook may harass or harm juvenile Coho through competition for space and food resources. Such interactions are most likely to occur at Chinook release sites (see Item 1.11.2). Due to competitive exclusion by Coho on Chinook, and due to temporal differences between the species in freshwater and estuarine habitat utilization, Chinook releases may have very minimal adverse effects on Coho. Coho fry are not typically found in the mainstem estuary areas where Chinook presmolt and smolt releases occur. Coho smolts are emigrating through the estuary in the springtime, but are larger and at a competitive advantage over 0-age Chinook smolts.

- 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).

Broodstock collection for Chinook Salmon has a potential to non-lethally take (capture, handle, and release) a small number of Coho (12 or fewer) and a low potential for unintentional, lethal take of an even smaller number of Coho (4 or fewer).

- 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 for broodstock collection include:

1. Immediately release all unmarked Coho collected from netting or trapping.
2. Open trap facilities (hatchery) to prevent capture of additional wild Coho, allowing for free passage.
3. Discontinue Chinook netting operations if larger numbers of wild Coho are encountered.

Options for juvenile releases include:

1. Adjust time of release.
2. Adjust location of release.
3. Adjust size at release for hatchery Chinook juveniles.

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

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

Pacific Fishery Management Council (PFMC) Harvest Program Section 7 consultation: The Coquille River hatchery Chinook program will operate consistently with **PFMC Harvest Program Section 7 consultation** and with State and Regional harvest management programs. Specifically, the Chinook hatchery smolts and presmolts will be marked with an adipose fin clip prior to release to allow for the monitoring of harvest rates and escapement as adults.

The Oregon Plan for Salmon and Watersheds (OPSW): This is a prescriptive set of measures for recovering salmon and steelhead populations and habitats, and meeting federal water quality standards, established by Executive Order of the Governor. The Oregon Plan includes measures linked to the hatchery production of Coho Salmon in the Coquille River Basin. Such measures include nutrient enrichment, acclimation and other separations of hatchery and wild production, terminal fisheries that reduce harvest impacts on wild Coho, and monitoring of hatchery and wild runs. While many of the particular measures in the OPSW make reference to a particular species, the measures are broadly applicable to all salmonids.

Native Fish Conservation Policy (NFCP): The Oregon Fish and Wildlife Commission has approved the Native Fish Conservation Policy (NFCP). The NFCP requires the development of a conservation plan for each species management unit (SMU). The ODFW has completed an Oregon Native Fish Stock Status Report 2005. Information in the document will be used for the development of conservation plan as part of the NFCP.

Coastal Multi-Species Conservation and Management Plan (CMP): In 2014, the Coastal Multi-Species Conservation and Management Plan (ODFW 2014) was adopted by the Oregon Fish and Wildlife Commission. This plan addresses conservation and management of anadromous salmonids on the Oregon coast from Cape Blanco to Seaside. The CMP is unique from other conservation plans in that it addresses both conservation and utilization of six distinct groups of fish species, none of which are listed under the ESA. In addition to meeting requirements of the Native Fish Conservation Policy, the CMP provides long-term management direction for species which are relatively healthy, with the intent to help ensure the continued existence of wild fish and the fisheries which wild and hatchery fish support.

Fish Hatchery Management Policy (FHMP): This policy provides guidance for the responsible use of hatchery-produced fish. It outlines the best management practices for hatchery programs to ensure conservation and management of both naturally produced native fish and hatchery produced fish in Oregon. The FHMP calls for the development of Hatchery Program Management Plans (HPMPs) to outline the hatchery practices that

will be followed for each hatchery program. A HPMP may be a Hatchery and Genetic Management Plan (HGMP) or an aspect of conservation plan developed under the Native NFCP.

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) DEQ National Pollutant Discharge Elimination System (NPDES) permit for hatchery effluents; and Memorandum of Agreement for fish carcass distribution in Oregon streams
4) Integrated Hatchery Operations Team guidelines (IHOT)
5) Hatchery Management Review
6) ESA Section 7 consultation, biological opinion with Roseburg and Coos BLM districts, interagency fish population and monitoring program – approved NMFS April 10, 1997
7) U S Army Corps of Engineers Regional General Permit for Stream Restoration in Oregon, or other General Permits
8) US-Canada Salmon Treaty (Pacific Salmon Treaty)
9) Coastal Multi-species Conservation Plan (ODFW 2014).

3.3) Relationship to harvest objectives.

The two primary smolt acclimation sites on the Coquille River are located low in the estuary at Sevenmile Creek at RM 2.5 and Ferry Creek at RM 1. The Ferry Creek acclimation site is in Bandon Harbor, within sight of the confluence of the Coquille River and the Pacific Ocean. These tidewater acclimation sites are used to maximize homing of returning hatchery adults to the lower river fishery, well separated from natural Chinook spawning areas. Tidal influence extends beyond Myrtle Point, to a point 41 miles upriver of the mouth.

Data has been collected for contribution of program fish to the ocean and estuary fishery. For the years 1983 through 1994, on average 720 fish (range of 3,813 to 35) were caught in the ocean commercial fishery, and 32 fish (range 0-188) were caught in the ocean recreational fishery. In the 1999 in-river recreational fishery, 2.6% of the Chinook caught were adipose fin clipped (95 out of a total of 3,620). In-river creel was only conducted in 1999 for the Coquille River. At that time, the ad-CWT mark rate for smolt releases was ~ 25%.

3.4) Relationship to habitat protection and recovery strategies.

Major factors affecting natural production include spawning habitat, rearing habitat, ocean conditions, predation, water quality/quantity, and climatic conditions. The Oregon Plan for Salmon and Watersheds lays out measures to be implemented by all state

agencies including habitat protection and restoration, and harvest and hatchery refinement measures by ODFW. Other measures include forest practices revisions by Oregon Department of Forestry; water quality protection by Department of Environment Quality; diversion monitoring by Water Resources Division; and Senate Bill 1010 implementation by Department of Agriculture; all of which are designed to protect and improve salmonid habitat. The Coquille Watershed Association has also developed a watershed assessment and action plan and has implemented habitat improvement projects throughout the Coquille Basin. ODFW fish habitat biologists are represented on the Coquille Watershed Association projects committee.

The hatchery Chinook program in the Coquille River is intended to augment recreational and commercial fisheries, while minimizing impacts to naturally produced Chinook and other native fish. The intention of this program, operated under the former WFMP and current NFCP, is to minimize the straying of hatchery Chinook to natural spawning areas. Another objective is to keep juvenile hatchery release numbers below the level that would exceed the estuary carrying capacity, considering the numbers of naturally-produced Chinook and other species also using the estuary.

3.5) Ecological interactions.

a) *Species that could negatively impact program.*
Predatory fish that could negatively impact outmigrating Chinook smolts in freshwater include one native fish (coastal cutthroat trout) and three introduced non-native fishes (Largemouth Bass, Smallmouth Bass, and Striped Bass). The level of impact on Chinook fry and smolts by predators is 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. Striped Bass are known to prey on juvenile salmonids, however, information is limited on levels of predation on specific species. Chinook may be relatively more susceptible to Striped Bass predation than other juvenile salmonids due to their smaller size and lesser experience in predator avoidance. Smallmouth Bass were illegally introduced into the Coquille Basin within the past five years or so. The impacts of Smallmouth Bass on native fish species in the Coquille Basin is currently unknown.

Predation by marine fishes such as rockfish or Lingcod may be occurring in the lower estuary and nearshore ocean environment; however this level of impact on Chinook smolts is unknown. Predation by aquatic mammals like otters, seals, sea lions, etc. could negatively impact the program. Also, birds like blue herons, Caspian terns, cormorants, and gulls may impact the program.

b) *Species that could be negatively impacted by program*
Competition and/or predation by hatchery Chinook Salmon on listed salmonids (Coho) and candidate salmonids (steelhead, cutthroat) are expected to be minimal due to competitive exclusion by juvenile Coho on juvenile Chinook, and due to spatial and temporal differences in habitat utilization and relative size at the time of habitat utilization between Chinook and Coho. The size of the hatchery Chinook program in the

Coquille Basin is relatively small, as compared to the Coos Basin nearby. The Coquille has a much smaller estuary than the Coos, and fall Chinook with their short freshwater life history are highly dependent on the estuary for early rearing. Due to the limited estuary size, the hatchery program is maintained at a few hundred thousand juveniles released, in order to avoid intra- and inter-species competition. Release timing, release procedure (volitional), size at release, and locations are selected to minimize competition and predation on wild juvenile fish. While predation may be concentrated to some degree at release locations, this effect would increase the risk to hatchery juveniles, but not necessarily to naturally-produced Coho juveniles coming from elsewhere in the basin.

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. Also, it has been observed that American Shad and Striped Bass eggs and larvae, present in the estuary in the springtime, provide forage for rearing fall Chinook juveniles as they move to the ocean.

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 ids, other fish species, aquatic mammals, and birds. 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 and incubating eggs are Ferry Creek and Geiger Creek. This small tributary system drains into the Coquille River estuary at river mile 1, in the Port of Bandon. This supply is surface water. Average summer flows are approximately 1.25 cfs in each stream. Winter flows vary greatly with storm activity, but average about 5 cfs each. Bandon Hatchery has water rights for a total of 3.0 cfs. These water rights are senior to all other active water rights in the Ferry Creek system. The hatchery is operated under the NPDES General Permit 300J to maintain environmental standards of hatchery effluents. Annual water temperatures range from about 38º F in the winter to a maximum of 64º F in the summer. The 14-year average is 51º F. The water quality at Bandon hatchery meets or exceeds the recommended IHOT standards for temperature, ammonia, carbon dioxide, chlorine, pH, copper, dissolved oxygen, hydrogen sulfide, dissolved nitrogen, iron, and zinc. Fish production at Bandon Hatchery is limited in the summer by available water quantity.

Eyed eggs are shipped from Bandon to Cole Rivers Hatchery, where they may be raised to smolt or presmolt stage.

Cole Rivers Hatchery

Eyed eggs from Bandon hatchery are shipped to Cole Rivers Hatchery where they are hatched and reared to smolts. Cole Rivers Hatchery's main water supply is the Rogue River. Ambient water is gravity fed to the hatchery from an impoundment formed by a diversion dam. The intake structure is screened with #4 mesh having 0.178 inch square holes. This supply system will provide up to 300 cubic feet of water per second. Annual ambient water temperatures range from 41.2ºF to 56.7ºF. The hatchery's warm water supply is piped from the surface of Lost Creek Reservoir. Warmer water is gravity fed to the hatchery from a floating intake on the Powerhouse Intake Tower. The supply system will provide up to 60 cubic feet of water per second. Annual warm water temperatures range from 42.8ºF to 72.8ºF. When the warm water temperature rises above 55ºF it is mixed with ambient water to achieve an upper limit goal of 55ºF. At Cole Rivers hatchery, the water quality parameters meets or exceeds the recommended IHOT standards for temperature, ammonia, carbon dioxide, chlorine, pH, copper, dissolved oxygen, hydrogen sulfide, dissolved nitrogen, iron, and zinc.
Incubation water is pumped from the ambient water supply line and ultra violet light sterilized. Incubation water is all single pass. Cole Rivers Hatchery has the ability to filter some incubation water with pressure sand filters. The fall Chinook are generally incubated on sand filtered, UV sterilized ambient water. The hatchery is equipped with facilities to heat or chill water to speed up and slow down egg or fry development; and the temperature regime is regulated to "catch up" development of all egg takes to achieve a common ponding date. The overall quality of the water is good. Fish production at

Cole M. Rivers has not been limited by available water or water temperature. The hatchery is operated under the NPDES general permit 300J to maintain the environmental standards of the discharges. The water right is for 224 cfs and the permit number is (S 44910).

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

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

Bandon Hatchery intakes are screened to minimize the risk of entrapment of juvenile native fish species, but the intakes are not accessible to anadromous fish. Intakes are screened with perforated aluminum plates with 1/8" x 3/4" slots. Due to the large dimensions of the plates, approach velocity is minimal. The intakes are located in reservoirs immediately upstream of the hatchery. Due to the height of the dams, and no fish passage, anadromous fish are currently unable to reach the area above the hatchery where the intakes are located, however resident cutthroat are present. 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 are monitored and reported to DEQ as per NPDES permit requirements to comply with the federal Clean Water Act and Oregon Water Quality Standards.

There are no listed natural fish above Cole Rivers Hatchery intake structures, and barriers prevent anadromous fish from reaching intake structures. The water diversion for fish culture purposes is non-consumptive and is returned to the Rogue River below the hatchery. All wastewater is pumped to a 150' x 100' x 6' asphalt lined pollution abatement settling basin. Like Bandon, the effluents of Cole Rivers Hatchery are monitored and reported quarterly to DEQ as per NPDES 300J permit requirements.

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods).

Coquille River fall Chinook broodstock are collected by netting at various locations in the Coquille River drainage. Detailed information of capture methods are described below in section 7.2. Major releases of Coquille stock fall Chinook smolts into Ferry Creek ceased after the 1997 brood year, thus returning "swim-in" adults to Bandon Hatchery have been reduced since 2002. For those few Chinook that do return to the hatchery, a fish weir at the lower end of the hatchery grounds diverts fish into the ladder, finger weir trap, and collection pond where fish are sorted by species and sex prior to spawning. The acclimation program in the concrete channel of lower Ferry Creek re-started in about 2005, acclimating the former Hall Creek production, will bolster swim-in numbers once again at Bandon Hatchery.

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

All Chinook Salmon broodstock collected off site are transported in polyethylene or aluminum transportation tanks, secured in the back of pickup trucks or on trailers. These tanks vary in size, but most have a capacity of approximately 250 gallons, and are equipped with aerators to provide oxygen while transporting fish. Fifteen to twenty adult Chinook Salmon can be safely held and transported for up to three hours, depending on which tank is used.

5.3) Broodstock holding and spawning facilities.

Bandon Hatchery's adult holding area is a converted 20' x 100' rearing pond. A long, central collection area is flanked by separation pens. There are seven separation pens having dividers constructed of metal, for holding various groups or species. Each pen is equipped with a Dutch door to allow fish to be sorted into the pen from the collection area. Wild adults collected off station are usually held separately from hatchery swim-in fish.

The spawning building is a simple wood structure built over the top of the upper end of the holding pond. It contains two racks for killed females, two spawning chutes, a cabinet for various spawning and virus sampling equipment, and a mechanical snout cutter for CWT fish.

There is no power equipment, such as crowders or hoists, used in the spawning process. All functions are done by human labor. 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 Bandon hatchery building has a total of 28 vertical double stack incubators. These are supplied by two aluminum headboxes. Five gallons of water per minute is normally run through each stack. Eggs are incubated at Bandon Hatchery from fertilization to eye-up. Water supply headboxes and incubator stacks are equipped with alarms that sound when water depth drops below critical level. Bandon Hatchery transfers some eyed eggs to Cole Rivers Hatchery for further incubation and smolt or presmolt production.

At Cole Rivers, incubation takes place in 66 stacks of vertical incubators. Each stack has 15 usable trays for a total of 990 trays. The water is generally ambient, sand filtered and UV sterilized. The water supply is the ambient water line. Eggs are trayed at approximately 5,000 per tray upon receipt from Bandon Hatchery. Water supply lines, pumps, and the aeration tower (used as a reservoir for gravity feed) are equipped with pressure and temperature alarms. The wet well used to feed the aeration tower is also equipped with an alarm.

5.5) Rearing facilities.

Cole Rivers Hatchery

At Cole Rivers Hatchery there are 26 circular ponds in two groups of 13 each. Each circular is 25 feet in diameter and 4 feet deep. Each group of circulars is supplied with ambient or warm water from separate valves connected to each group. Cole Rivers is equipped with 87 concrete ponds 100 feet long, 20 feet wide and 5.5 feet deep. All ponds are supplied with ambient water and 21 ponds have warm water facility. Flows are adjustable in all containers and all containers are single pass.

5.6) Acclimation/release facilities.

There are multiple fall Chinook Salmon acclimation ponds in the Coquille River Basin. The Sevenmile Creek pond is created via screening or netting, contained within the natural channel of the stream. The Cunningham Creek acclimation pond is a concrete flashboard dam that also utilizes the natural stream channel to create the pond in which the Chinook are contained. The concrete dam is 20 feet wide by 3 feet deep and 200 feet long. Few of the Chinook presmolts are actually on the concrete portion of the impoundment. Most of the Chinook hold up in the natural stream channel for the acclimation period. Temperature and DO levels in September have previously prevented us from using that acclimation for smolts. The acclimation at lower Ferry Creek is accomplished by installing screens within a concrete channel constructed by ODOT for passing Ferry Creek under Highway 101.

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

Bandon Hatchery has no history of significant Chinook Salmon broodstock or egg mortality, or existing problems that would likely to cause a disaster, other than the

possibility of flooding that could result in adults escaping from holding pens.

The occurrence of IHN virus at Cole Rivers Hatchery in 2006 did not impact the entire water system, and Cole Rivers Hatchery was only temporarily quarantined from raising fish for the Coquille Basin.

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 fresh flow aerators on fish transportation tanks normally have a backup power supply in the event of battery failure. Hauling densities are deliberately kept low to minimize risk of loss during transportation. At Bandon Hatchery, 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, though Bandon Hatchery's water supply system is extremely 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 as well as each incubator stack to warn of flow interruptions. Green eggs are kept at low density, to avoid suffocation. New water level monitor alarms were installed at Bandon Hatchery since 2003.

Samples to check viral infections are obtained from adult fish each season, and the results will indicate whether egg culling is necessary prior to transport of eyed eggs, to avoid IHN infections.

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 the following locations:

- Letz Bar - River mile 33.0 of the mainstem of Coquille River
- Mouth of North Fork - River mile 36.0 of the mainstem of Coquille River
- Laverne Park - River mile 31.5 of the North Fork Coquille River
- Shell Hole - River mile 1.0 of the South Fork Coquille River
- South Fork at Gaylord - River mile 20 of the South Fork Coquille River

Currently fish netted from these sites and trapped at Sevenmile Creek are combined with fish that swim into Bandon Hatchery and Coquille High School/Cunningham Creek to meet broodstock requirements. The annual collection goal is 150 (75 pairs) adult fish. Ninety-five percent of broodstock are unmarked, however in years of low forecast wild spawning escapement, it would be preferable to use higher numbers of hatchery-origin fish in the broodstock. The development of trap sites would facilitate the capture of more hatchery fish for broodstock use, as will increasing swim-ins from re-established lower Ferry Creek releases.

6.2) Supporting information.

6.2.1) History.

The fall Chinook Salmon hatchery smolt program using Coquille Basin broodstock began in brood year 1983. Presmolt releases began in 1982, and unfed fry releases began in 1981. Releases of out-of-basin stocks occurred earlier. Approximately 100,000 smolts were released each year since 1983, with the exception of 1991 and 1994, when 54,000 and 61,000 fall Chinook were released, respectively. Prior to 1991, smolts were released at various locations, including sites much higher in the basin. Typically, smolts have been released in the lower portion of the estuary in order to improve survival rates, decrease encounters between outmigrating smolts and anglers, increase residence time of returning adults in areas with an intensive Chinook fishery, and minimize straying of artificially propagated fish into wild fish spawning areas. Around 2006, when the Coho Salmon hatchery program was eliminated for the Coquille Basin, the equivalent poundage of production was shifted to a 54,600 Chinook Salmon smolt acclimation/release for Hall Creek, near Coquille. In 2014, that acclimation/release was moved downriver and combined with the lower Ferry Creek release, as a measure of the CMP (ODFW 2014).

6.2.2) Annual size.

Until recently, the accuracy of extant survey methodology to estimate natural fall Chinook escapement was questioned. Therefore, a precise estimate of the proportion of the natural population collected for broodstock was unavailable. The Coquille River Escapement Indicator Stock Feasibility Study (under Pacific Salmon Treaty) was conducted in 2001 to examine the feasibility of estimating escapement levels for the basin. The sampling proved feasible and the study continued through 2004. Estimates derived from mark and recapture methods are calibrated to estimates derived from Standard, Random, and Supplemental spawning surveys that have been conducted for many years. The mark-recapture estimates for this study were:

2001—12,512
2002—13,675
2003—18,876
2004—11,514
(Source: ODFW)

A broad range of estimated escapements may be calculated using available data. Using twelve years' average peak count per mile from the eight standard annual surveys (115 fish per mile) and expanding this to the estimated 179 miles of Chinook spawning habitat, a maximum 1989 – 2000 average escapement is estimated at 20,652 Chinook. This figure is certainly high, as the eight standard surveys represent what is considered to be the best spawning habitat in the basin, and the 179 miles is considered to be the maximum available Chinook spawning habitat. The proposed broodstock collection level of 150 fish would represent less than one percent of the 1989-2000 average estimate. In summary, the proportion of the natural population that has been collected for broodstock has been estimated to be in the range of 0.05 to 9.7 percent of the escapement to spawning grounds. After reviewing the status of Oregon coast Chinook, NMFS concluded that a listing was not warranted.

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

The target minimum proportion of wild fish collected for broodstock is 30%, but historically the proportion of unmarked fish has been at least 80%, and this historic proportion refers to a time when swim-in adults returned to Bandon Hatchery. While historically only 25% of the released smolts were marked, it is assumed that the majority of unmarked Chinook actively collected are wild because few marked and/or coded-wire tagged adults were observed or collected in the upper tidewater area where broodstock netting occurs. Fin-marked adults, if captured during broodstock collection efforts, will be used for broodstock.

ODFW has developed protocols for minimizing wild Chinook broodstock collection in years of low forecast spawning escapement, placing heavier collection on hatchery adult fish.

6.2.4) Genetic or ecological differences.

There are no known genotypic differences between hatchery stocks and wild stocks. 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 are more uniform than that observed for wild smolts. Other behaviors, such as surface feeding and aggression may be different between hatchery and wild smolts.

Since the inception of the broodstock development program for Chinook in the basin, every effort possible has been made to mimic the naturally produced Chinook in the basin, at least genetically. This has been accomplished through aggressive incorporation of wild fish each generation. Every effort has been made to make the collections and the mating as random as possible. Individual fish to be mated are not selected for a given trait(s). Chinook are collected and spawned throughout the entire run to maintain genetic variability or diversity within the population. Hatchery Chinook 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. The broodstock was chosen to represent the local wild population, for easy adaptation to the basin and exert the least possible impacts to the wild stock. Development of the broodstock (founding the broodstock with naturally-produced Coquille River fall Chinook) over 20 years ago was designed to improve compliance with ODFW's former Wild Fish Management Policy and current Native Fish Conservation Policy, and reduce the potential for genetic impacts to wild fish.

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 Oregon coastal fall Chinook is not an ESA-listed population. It is unlikely that brood stock selection practices for fall Chinook will have adverse genetic effects on listed Coho Salmon populations. However, any listed Coho Salmon captured during fall Chinook Salmon brood collection process will be released immediately.

SECTION 7. BROODSTOCK COLLECTION

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

Adults.

7.2) Collection or sampling design.

Chinook are actively collected for broodstock using seines and entanglement nets at or near the following locations:

- Letz Bar - River mile 33.0 of the mainstem of Coquille River
- Mouth of North Fork - River mile 36.0 of the mainstem of Coquille River
- Laverne Park - River mile 31.5 of the North Fork Coquille River
- Shell Hole - River mile 1.0 of the South Fork Coquille River
- South Fork at Gaylord - River mile 20 of the South Fork Coquille River

Netting of Chinook usually begins around October 15 and continues through December 15. Major releases of Coquille stock Chinook smolts into Ferry Creek ceased after the 1997 brood year, thus returning adults to Bandon Hatchery were minimal since about 2002. Swim-ins have increased as adults return from lower Ferry Creek acclimations begun in 2005. For those Chinook Salmon that return to the hatchery, 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.

Presmolt and smolt releases into Cunningham Creek at Coquille High School have resulted in a few adult fish returning to the facility, which have been used for broodstock. Broodstock (primarily hatchery fish) have also been trapped at a removable trap in Sevenmile Creek.

The intent of the broodstock collection program is to collect fish which represent the run as a whole with respect to run timing and age class distribution. Collections are conducted as randomly as possible employing trained personnel. Collections are not made based on size, color, condition factor, maturity, sex, age, or other characteristic.

7.3) Identity.

A single population of wild Chinook Salmon is present in the Coquille River Basin. The WFMP status review (Kostow, 1995) places Coquille Chinook into the Mid-South Coast Gene Conservation Group. Coquille Chinook are further divided into the South Fork Coquille and Coquille (remainder of the Coquille forks), and spring and fall runs (the former primarily in the South Fork). Some natural gene flow is expected to occur between these sub-populations, although to a lesser degree between the spring and fall Chinook. The Coquille spring Chinook population is considered to be depressed due to

marginal habitat and historic poaching. The broodstock program targets fall Chinook, and as a result of the migration of spring Chinook to upper river holding pools well prior to broodstock collection, few if any spring Chinook are collected as part of the broodstock program. For the purposes of hatchery program operation, it is appropriate to maintain an operational awareness of these subdivisions in broodstock collection, rearing, and juvenile release.

7.4) Proposed number to be collected:

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

The proposed number of fish to be collected is 150 fish (75 pairs). The planned minimum proportion for wild fish is 30%. This number may be reduced as the hatchbox unfed fry projects are phased-out.

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

The broodstock numbers collected for this program are presented below in Table 7-1, for the years 1988-2003.

Table 7-1. Coquille River fall Chinook Salmon broodstock collection levels, egg takes and number of juvenile productions, 1988-2003.

Year	Females	Males	Jacks	Eggs	Juveniles
1988	124	67	6	694,371	73,312
1989	117	75	48	477,671	75,035
1990	64	90	10	331,165	53,664
1991	111	118	4	408,782	55,787
1992	49	40	12	216,899	55,819
1993	36	29	0	169,916	90,878
1994	19	26	19	71,498	99,664
1995	37	31	23	167,869	61,235
1996	37	53	7	158,837	100,394
1997	35	40	12	136,812	105,207
1998	43	51	7	177,593	100,221
1999	50	38	11	201,005	96,200
2000	53	48	8	233,340	95,256
2001	54	52	2	263,207	95,466
2002	53	46	4	260,701	91,351
2003	63	58	5	254,543	N/A

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

Any hatchery-origin Chinook Salmon collected, whether spawned or un-spawned, will be used for stream nutrient enrichment.

7.6) Fish transportation and holding methods.

Fish are transported in portable tanks (see section 5.2). Usually the fish are held in these tanks for three 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 mortality; therefore it has not been necessary to treat fish prior to spawning. This may be due to the high tannic acid level naturally occurring in Ferry Creek in the fall. On spawning days, fish are sorted by hand without the use of anesthetics. Buckets, spawning chutes, knives, and other equipment are disinfected with an iodine solution between handling of individual fish. Fertilized eggs are disinfected for 15 minutes in a 1:500 buffered iodine solution.

7.8) Disposition of carcasses.

Most carcasses, spawned or unspawned, are used for stream enrichment, in compliance with the conditions of the MOU signed with the Oregon Department of Environmental Quality. Pond mortalities (typically uncommon) are buried or otherwise disposed of, away from any stream.

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 fall Chinook Salmon in the Coquille River Basin is not an ESA-listed population; and brood collection for fall Chinook should have no genetic effects on listed Coho Salmon in the basin. To avoid any adverse ecological impacts, listed adult Coho that will be captured during fall Chinook brood collection will be carefully handled and released.

SECTION 8. MATING

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

8.1) Selection method.

Fish are selected randomly from throughout the whole run time. Mating to produce Chinook Salmon smolts are accomplished utilizing gametes from wild males and wild females. Mating to produce unfed fry and presmolts may be from crosses that are WxW, HxH, or WxH. Assuming there are excess gametes, the wild gametes will be fully utilized. The importance of utilizing all segments of the run is recognized, and hatchery x hatchery gametes may be destroyed accordingly, if surplus to production needs. Destroying of excess eggs does not occur until the eyed stage and is done equally or randomly across all family groups in order to provide all family groups an equal opportunity to contribute to the next generation.

8.2) Males.

Adult males, including jacks, are not selected for size, color, age class, or any other characteristic. They are randomly selected that are ready to spawn on the scheduled spawning date. The target spawning percentage for the utilization of jacks is 5 percent. This percentage may vary depending on brood year survivals in both the hatchery and wild populations.

8.3) Fertilization.

The spawning protocol is that one female is mated with one male (1:1). This mating strategy is an attempt to maximize genetic diversity within the hatchery population. Gametes are collected into plastic bags. Fertilization is carried out into these same plastic bags to ensure that fertilization of multiple females does not occur from a single male. Differential sperm motility is not a consideration by the use of this fertilization technique. Gametes are never pooled.

The plastic bags that are used to hold gametes and to carry out fertilization are used only once and then discarded. This technique provides an aseptic environment to handle and fertilize gametes without the threat of horizontal pathogen transmission. When the eggs are placed into a common incubator, the water is treated with iodophore to further reduce the potential for horizontal pathogen transmission. During the egg taking operation, the equipment used is also treated with an iodophore solution 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.

The Oregon coastal fall Chinook Salmon is not an ESA-listed population. It is, therefore, unlikely that the mating scheme for fall Chinook Salmon will have adverse genetic effects on listed Coho Salmon populations. The intent of fall Chinook mating scheme is to mate fish that represent the natural run as a whole and maximize genetic diversity, thereby reducing ecological effects on wild Chinook. Although the intent of the hatchery Chinook program is to augment fisheries in the ocean and lower estuary, thus targeting adult Chinook returns to areas segregated from natural spawning areas higher in the basin, the mating scheme is intended to maintain the hatchery fish as close as possible to wild Chinook Salmon genetics.

SECTION 9. INCUBATION AND REARING

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

9.1) Incubation:

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

The egg take goal is associated with juvenile (smolt, presmolt, unfed fry) release numbers, adjusted for anticipated/experienced mortality levels from gamete collection to release. The data of eggs taken and survival rates to eye-up stage (1992-2007) are presented in Table 9-1.

Table 9-1. Coquille fall Chinook annual egg take and survival rates to eyed stage.

Year	Eggs Taken	Survival Rate (%) to Eyed Stage
1992	216,899	90.7
1993	169,916	94.0
1994	71,498	93.6
1995	167,869	88.5
1996	158,837	91.7
1997	136,812	90.0
1998	177,593	93.6
1999	201,005	90.7
2000	233,340	95.9
2001	263,207	88.2
2002	260,702	92.7
2003	254,543	94.4
2004	265,862	61.0
2005	193,384	93.1
2006	83,193	94.1
2007	216,257	93.1

Source: HMS database, ODFW

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

Usually, lower than expected levels of egg mortality may result in surpluses in eyed eggs. These surpluses, however, have been very limited and typically gone to STEP hatchboxes.

9.1.3) Loading densities applied during incubation.

Bandon Hatchery

Eggs are loaded into vertical incubators at a density of approximately 10,000 eggs per tray, usually equivalent to the eggs of two females. The standard flow rate is 5 gpm/tray.

The 12-year average for eyed egg size (by wt.) is 59 eggs per ounce, with an annual range of 54 to 62 eggs.
At Cole Rivers Hatchery, eyed eggs are loaded into shallow trough basket at 90 ounces of eggs per basket. The standard flow rate is 10 gpm. The average eyed egg size is 59 eggs/oz.

9.1.4) Incubation conditions.

At Bandon Hatchery, water temperatures are checked twice daily and recorded, then averaged. Temperature units (T.U.) are tracked daily to monitor egg development. Dissolved oxygen levels are not routinely monitored, as suffocation has not been a problem with eggs in flow-through system. Tray screens are brushed and bottoms are "rodded out" as needed depending on the number and severity of rainstorms. Eyed eggs destined for smolt production are transferred to Cole Rivers Hatchery in styrofoam containers. Ice in the top tray insures a cool, moist shipping environment.

At Cole Rivers Hatchery, water temperatures are checked twice daily and averaged. Temperature units are tracked and recorded daily. Dissolved oxygen levels are not monitored as inflowing waters always carry sufficient dissolved oxygen content. Heated water is used to "catch up" the later groups of egg take, to achieve a common ponding date.

9.1.5) Ponding.

At Cole Rivers Hatchery the fry are forced ponded when they are 99% buttoned up, normally around 1,650 temperature units. Fry size at ponding is between 850 and 1,100 fish/lb. Ponding dates range from March 20th to April 10th.

9.1.6) Fish health maintenance and monitoring.

A summary of fish health monitoring and fish disease history is presented in Appendix A.

Bandon Hatchery
Eggs are treated with formalin every other day at 1:600 for 15 minutes to prevent fungal growth. During the eyeing stage, eggs are not handled. Virus samples are taken at the time of spawning, including ovarian fluid, gill, kidney, and spleen tissues. Eyed eggs are addled at 575 or more T.U., 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. Formalin treatments are suspended once eyed eggs have been shocked and picked.

Cole Rivers Hatchery
Eyed eggs are received from Bandon, disinfected with an iodophore, and hand-picked for mortality and fungus. Hatch house water comes from the main supply.

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.

Incubation of hatchery fall Chinook Salmon eggs may not have adverse genetic or ecological impact on listed wild Coho Salmon. However during incubation period, eggs are inspected regularly and all dead and infected eggs are picked up and disposed of in a manner that prevents transmission of diseases to the receiving stream.

At Bandon Hatchery, eggs are incubated at low density to prevent any catastrophic loss of incubating Chinook eggs. Headboxes are equipped with low water level monitoring 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, and headbox feed valves were replaced in 1998-99. The Ferry Creek Reservoir was dredged in 1998, which significantly reduced silt levels in incubators, thus increasing safety for all eggs. These risk aversion measures apply to all species/stocks of eggs incubated, including listed Coho Salmon while under propagation.

At Cole Rivers Hatchery, eggs are incubated at density levels that have proven to be optimum, safe, and productive. All troughs are equipped with low-level water alarms. Due to the water supply being gravity fed, it has been quite reliable with minor siltation.

9.2) Rearing:

9.2.1) Survival rate data.

Table 9-2. Eyed egg to presmolt survival rates of Coquille fall Chinook, 1990 – 2007.

Brood Year	Eyed Egg to Presmolt Survival Rate (%)
1993	95.1*
1994	97.6
1995	97.7
1996	96.9
1997	97.7
1998	97.9
1999	97.9
2000	96.1
2001	97.4
2002	96.7
2003	97.7
2004	98.0
2005	NA (destroyed due to IHN)*
2006	94.9
2007	97.5

*No fry loss available for these years.

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

The goal for rearing density as it pertains to flow rate is a range of 4 to 7.5 pounds of fish/gal/min. The goal for rearing space density is less than 1 pound of fish/cubic foot. These goals are met or exceeded.

9.2.3) Fish rearing conditions.

Temperature is monitored and recorded daily. Dissolved oxygen is monitored on an "as needed" basis. Mortality numbers are collected daily. Ponds are flushed or swept weekly and effluents are monitored. Fish densities are monitored monthly.

Cole Rivers Hatchery receives stock 44 ChF Salmon eggs in December and January. Eggs are incubated at 41-54^{o}F. Fish are ponded into circular ponds in March and reared on "warm" water at 41-56^{o} F. Then they are moved to raceways, and reared from April thru mid-September at similar temperatures.

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

Table 9-2. Type of feed, feeding rate, monthly growth of fish (weight gain) and food conversion rate at Butte Falls Hatchery.

	APR	MAY	JUN	JUL	AUG	SEP	OCT to MAR		AVG
F/LB	363.5	111.4	51.4	32.6	17	15			98.5
FEED	STARTER-MOIST > BMG BMF				BMG BMF				
% BW/DAY	4.9	5.1	4.9	5.2	4.5	3.9			4.75
CONV.	0.86	0.98	1.18	1.37	1.02	1.47			1.15
LBS/GPM	4.7	3.2	4.6	4.7	6.1	7.9			5.2

The natural acclimation ponds are not suitable for sampling of Chinook during the acclimation period. It would be very difficult to obtain an accurate sampling of the acclimating fish to determine growth and conversion rates. During the acclimation period, the Chinook are fed only 1% of their body weight, strictly to maintain size. No significant change in size should occur at this rate of feeding.

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

See Table 9-2 for fish growth. Energy reserve data are not available.

9.2.6) Indicate food type used, daily application schedule, feeding rate range, and estimates of total food conversion efficiency during rearing (*average program performance*).

See Table 9-2.

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

At Cole Rivers Hatchery, fish health and behavior are monitored daily. Dead fish are collected immediately and data on mortality are recorded and analyzed daily. Pathology examinations are scheduled at random, as needed, and as prophylactic. Parasitic and bacterial infections are treated as needed under prescription of a department pathologist. Viral samples are monitored by fish health section staff. Disinfection is the primary prevention of lateral transfer of viral infection. For further information, see Appendix A.

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. Upon completion of a two-week acclimation period, smolts are allowed to leave the pond volitionally. Screens and upper flashboards are removed and most smolts leave the facility. Eventually all flashboards are removed, and "hesitant" fish are flushed from the facilities by natural flow.

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

Natural rearing methods are not practiced, except that some acclimating smolts are held in ponds formed in natural stream channels, and are subject to predation. In these ponds, they have the capability to spread upstream and utilize aquatic vegetation and natural wood for cover.

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.

During rearing, no adverse genetic or ecological effects are exerted on listed Coho. Also, no adverse genetic effects from fall Chinook Salmon smolts are exerted on listed Coho during acclimation. Naturally produced Coho juveniles in the vicinity of the acclimation ponds (in-stream) may be subject to short-term competition or displacement by hatchery Chinook Salmon. Daily feeding of acclimating Chinook smolts minimizes competition for natural food supplies used by wild Coho juveniles. Also, juvenile Coho are not prevented from moving upstream to avoid contact with acclimating Chinook. The acclimation pond at Sevenmile Cr. is tidally influenced, and salinity reduces the number of natural Coho Salmon rearing in this pond.

SECTION 10. RELEASE

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

10.1) Proposed fish release levels

Table 10-1. Proposed release levels of Coquille River fall Chinook.

Age Class	Maximum Number	Size (fpp)	Release Date	Location (See also Sec. 1.1)
Eggs	0			
Unfed Fry	100k to 115k total for all sites* *Proposed to phase-out unfed fry hatchbox projects.	~800	February - March	Cunningham Creek (Coquille estuary) Blue Creek (North Fork Coquille)* Camas Valley Elementary School (Middle Fork Coquille) Powers Elementary School, Powers H.S.*, Myrtle Crest Elementary (South Fork Coquille) and additional schools as requested.
Fry	0			
Fingerling (presmolts)	30,000	100	Late May – Early June	Cunningham Creek (20,000) Ferry Creek (10,000)
Smolts	144,600	13	August-September	Sevenmile Creek (80,000) Ferry Creek Acclimation (64,600)

* As part of the CMP, it is proposed to phase-out the larger unfed fry hatchbox projects, excluding the educational classroom incubator projects.

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

Table 10-2. Locations of Coquille River fall Chinook releases.

Release Location	Legal Description	Waterbody Code	Release Point
Sevenmile Creek (Coquille Estuary) near Bandon	T 28 S, R 14 W, Section 3	1700302000	River Mile 1.9
Cunningham Creek (Coquille Estuary) at Coquille High School	T 27 S, R 13 W, Section 36	1700305000	River Mile 0.5
Blue Creek(North Fork Coquille) near Fairview*	T 27 S, R 11 W, Section 5	N.A.	River Mile 0.1
Middle Fork Coquille-- Camas Valley Elementary School	T 29 S, R 8 W, Section 20	1700330120	River Mile 0.1
South Fork Coquille at Powers Elementary School	T 31 S, R 12 W, Section 13	N.A.	River Mile 0.4
Ferry Creek Acclimation	T 28S, R 14 W, Section 30	1700301000	River Mile 0.1

* Proposed for phase-out of hatchbox unfed fry project.

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

Release Year	Eggs/Unfed Fry	Size	Fed Fry	Size	Fingerling (pre-smolt)	Size	Yearling (smolt)	Size
1988	491,169	950	308	220	0	N/A	100,252	10.5
1989	434,682	950	44,215	185	0	N/A	99,387	11.2
1990	377,025	950	24,840	108	6,952	79.0	0	N/A
1991	179,763	950	36,738	117	0	N/A	54,613	12.2
1992	149,754	950	0	N/A	14,308	98.0	92,145	15.3
1993	61,031	950	6,450	125	0	N/A	101,986	13.5
1994	35,336	950	8,382	127	0	N/A	99,664	13.6
1995	0	N/A	0	N/A	0	N/A	61,235	12.5
1996	24,677	950	0	N/A	7,200	90.0	100,394	14.5
1997	11,461	950	7,420	212	0	N/A	105,207	13.6
1998	1,951	950	0	N/A	6,327	90.0	116,542	12.5
1999	34,119	950	0	N/A	7,125	95.0	111,010	16.1
2000	70,936	950	0	N/A	7,898	88.0	107,364	11.6
2001	93,051	950	0	N/A	8,280	92.0	101,287	13.5
2002	79,099	950	0	N/A	8,133	79.5	107,529	12.3
2003	114,705	950	0	N/A	9,875	79.0	96,256	12.4
2004	93,288	950	0	N/A	25,614	83.0	101,230	16.7
2005	48,682	950	0	N/A	8,469	79.9	86,018	14.0
2006	9,550	950	0	N/A	0	N/A	15,336	10.8
2007	0	N/A	0	N/A	3,003	78.0	69,947	12.2
2008	37,782	950	0	N/A	54,316	65.1	96,617	12.8
2009	137,373	950	0	N/A	0	N/A	151,595	11.6
2010	0	N/A	0	N/A	18,722	77.1	78,047	14.8
2011	118,745	950	0	N/A	24,041	69.4	136,541	13.8
2012	130,566	950	0	N/A	18,385	60.6	126,225	14.3
2013	35,607	950	0	N/A	10,809	58.0	135,235	13.0
2014	48,198	950	0	N/A	24,681	70.9	134,688	12.3
2015	0	N/A	0	N/A	24,357	45.1	184,714	13.0
Average	**100,663**	**950**	**18,336**	**137**	**10,303**	**70.0**	**98,967**	**13.1**

Source: ODFW HMS database

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

Release times are intended to coincide with the peak presence of naturally produced fish of the given life stage in the location of release in order to mimic the natural population's migration timing. This timing is based on past estuary seining data looking at catch per

unit effort for juvenile Chinook use of the estuary. Unfed fry and fingerlings (presmolts) are reared on station and released volitionally; smolts are acclimated for two weeks and released volitionally. Release dates are presented in Table 10-4. In general, unfed fry are released in early spring, presmolts in late spring, and smolts in late summer.

Acclimation conditions (i.e. DO, temperature, flow) in some tributaries can be marginal in late August and September, depending on the weather conditions and water levels.

Table 10-4. Life stages and release dates of Coquille River fall Chinook, 1988-2008.

Release Year	Release Date(s)			
	Unfed Fry	Fed Fry	Fingerling (Presmolt)	Smolt
1988	1/15 - 3/15	5/28	N/A	9/12 - 9/14
1989	3/10-3/30, 5/10	5/29	N/A	9/5 - 9/22
1990	2/25 - 3/30	N/A	5/23 - 5/29	N/A
1991	2/27 - 3/30	N/A	5/31	10/7
1992	2/29 - 3/11	N/A	5/31	9/6 - 9/30
1993	3/2 - 4/3	N/A	5/27	9/24 - 9/28
1994	3/1	6/2	N/A	9/8 - 9/26
1995	N/A	N/A	N/A	9/12 - 9/27
1996	2/5 - 2/24	N/A	6/5	9/5 - 9/26
1997	1/14	4/23	N/A	9/10 - 9/18
1998	2/15 - 3/1	N/A	5/20	9/9 - 9/28
1999	1/27 - 2/16	N/A	5/27	9/8 - 9/29
2000	2/4 - 3/13	N/A	6/1	9/18 - 10/3
2001	2/21 - 3/18	N/A	5/10	9/18 - 10/8
2002	3/4 - 4/25	N/A	5/30	9/23 - 9/30
2003	2/28 - 3/17	N/A	5/30	9/5 - 10/30
2004	1/16 - 2/5	N/A	6/1	9/23 - 9/25
2005	1/27	N/A	5/30	9/2 - 9/19
2006	2/27	N/A	N/A	8/28 - 9/11
2007	N/A	N/A	6/3	9/18 - 10/4
2008	3/4 - 3/8	N/A	6/6 - 6/11	9/10 - 10/1
2009	1/6 - 3/15	N/A	N/A	9/1 - 10/1
2010	N/A	N/A	5/25 - 6/5	9/21 - 10/6
2011	2/20 - 2/28	N/A	5/27 - 6/5	9/14 - 10/6
2012	12/28 - 3/9	N/A	5/24 - 5/30	9/18 - 10/21
2013	1/4	N/A	5/16	9/18 - 10/3
2014	4/2 - 6/14	N/A	6/6 - 6/8	9/2 - 10/15
2015	N/A	N/A	5/11	9/4 - 10/16

Source: ODFW HMS database

10.5) Fish transportation procedures, if applicable.

Fish are transported from Cole Rivers Hatchery in fish trucks ranging in size from 1,000 to 2,500 gallons capacity. Loading density approximates one pound of fish per cubic foot. Trucks have bottled oxygen systems, fresh flow aerators, and backup recirculation systems. Fish are on board for a period of four hours. Some trucks have refrigeration capabilities, but refrigeration is normally not necessary, as variation in water temperature between tank and release location is minimal. Tempering is typically not required, unless transporting and receiving water differ in temperature by several degrees.

10.6) Acclimation procedures.

The fall Chinook Salmon smolts are transferred to the acclimation sites from late August to early October. The fish are contained with screens for a target period of about two weeks. During the acclimation period, the smolts are fed a minimum of 1% of their body weight one time per day. At the end of the acclimation period, the screens are removed and the fish are allowed to leave the ponds on their own volition.

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

Unfed fry are released unmarked. Presmolts (fingerlings) and smolts are 100% adipose fin-marked.

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 ensure adequate but not excessive numbers of fish will be reared. If rearing mortalities are less than expected, overages can occur. If the projected overage is minimal (10% or less), the excess fish will be included in releases. Other options for excess juvenile production include releasing excess Chinook into standing water bodies for "trout" fisheries, humanely killing and burying, or killing and using for wildlife projects. The Oregon Coast Aquarium at Newport has utilized excess hatchery fish as food for aquarium fish, birds, and mammals. Excess juveniles could also be used as test animals for laboratory studies or tagging experiments.

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. Only certified fish are released into state's waters. For further information of fish health monitoring, see Appendix A.

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

During rearing, emergency release procedures at Cole Rivers Hatchery would start with contact of the Watershed District Managers and District Fish Biologists for the Upper Rogue and Coquille Basins. Options for water system failure include: (1) truck and release in the Coquille Basin, (2) truck and release in an approved standing water body, or (3) truck to another hatchery facility. Coquille River Chinook would not be released into the Rogue River Basin.

Flooding of the Coquille Basin acclimation facilities could cause the early release of part, if not all, of the smolts or presmolts. This occurrence would not be anticipated to cause a significant ecological problem, as smolts would still be flushed into the lower estuary of the Coquille Basin, and would imprint on the estuary during outmigration.

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.

Due to temporal differences between Coho and fall Chinook for the freshwater and estuarine habitat utilization, Coquille River hatchery fall Chinook releases may not have significant adverse impacts to listed Coho population. Unfed fry released at upper basin sites may be expected to have minimal adverse interactions with Coho due to competitive exclusion by Coho and due to the tendency of juvenile Chinook to migrate downstream toward the estuary. All fingerling and yearling (presmolt and smolt) Chinook will be released from tributaries to the estuary in the late spring through early fall when Coho rearing in the estuary is minimal. This strategy will minimize the likelihood for interaction and adverse ecological effects to Coho juveniles, which rear in upriver freshwater areas and migrate to the sea as smolts with a peak in May.

SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

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

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

Staff will record the date, location, total number of Coho Salmon encounters, and the number of Coho visibly harmed or otherwise impaired upon release. As significant numbers are encountered (in-season), the encounter rate will be compared to a three-year average of spawning escapement estimates, and broodstock collections will be altered if necessary to remain under the target percentage. (See Section 1.10.)

ODFW Fish Health Services will sample the hatchery Cohorts prior to releases. See Appendix A for Fish Health procedures.

Staff will conduct quality control monitoring of fin-clipping and coded-wire tagging at the hatchery. The quality control goal for coded-wire tags will be < 1% tag loss prior to transport to acclimation.

District staff will coordinate with research staff in order to stay abreast of current research documenting patterns of Coho and Chinook Salmon rearing in estuaries. Management of hatchery practices and release strategies will reflect the best available science with regard to hatchery/wild fish interactions.

District staff will document number and location of carcasses placed for nutrient enhancement and an annual statewide report will document compliance with DEQ permit requirements. ODFW Research will report any project effectiveness results. Priority for carcass placement will be to meet target carcass loads on treatment streams for Oregon Plan nutrient enrichment monitoring.

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 fall Chinook program come from a variety of sources including license dollars, State general funds, federal Sport Fish Restoration funds, and volunteer efforts. Funds are committed for portions of the HGMP monitoring but can change with relatively short notice. For example, Butte Falls Hatchery was closed for a period of time several years ago due to general fund shortfalls, and was eventually closed permanently. Also funding for ODFW's Fish Division has seen several rounds of cuts during the recent past biennia. As a result, some performance indicators may be difficult

to measure as staffing and funding levels fluctuate.

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

No research programs are conducted in direct association with this hatchery program. ODFW conducted the Coquille River Fall Chinook Spawning Indicator Stock Study, with regard to Pacific Salmon Treaty monitoring obligations. This study was conducted from 2001 through 2004, with a mark and recapture escapement estimate indexed to standard spawning survey estimates to calibrate the two methodologies.

Information from this study is being used to develop an Indicator Stock spawning escapement goal, to be used in management and negotiations through the Pacific Salmon Treaty with Canada.

12.1) Objective or purpose.

See section 12 above.

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

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

SECTION 13. ATTACHMENTS AND CITATIONS

APPENDIX A.—F ISH HEALTH MONITORING

The fish health monitoring plan is identical 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).

- All fish health monitoring will be conducted by a ODFW's qualified fish health specialists.
- Annually examine brood stock for the presence of viral reportable pathogens. Number of individuals examined, usually 60 fish, will be great enough to assure a 95% chance of detection of a pathogen present in the population at the 5% level. American Fisheries Society "Fish Health Blue Book" procedures will be followed. With wild adult steelhead stocks, generally all fish are sampled for viruses at spawning.
- Annually screen each salmon brood stock for the presence of *R. salmoninarum* (R.s.), agent of bacterial kidney disease. Beginning in 2001, 100% of the Coos and Coquille Coho female adults will be sampled for Rs antigen and culling or segregation of the progeny will be implemented. Methodology and effort will be at the discretion of the fish health specialist.
- Conduct examinations of juvenile fish at least monthly and more often as necessary. A representative sample of healthy and moribund fish from each lot of fish will be examined. The number of fish examined will be at the discretion of the fish health specialist.
- Investigate abnormal levels of fish loss when they occur.
- Determine fish health status prior to release or transfer to another facility. The exam may occur during the regular monthly monitoring visit, i.e. within 1 month of release.
- Appropriate actions including drug or chemical treatments will be recommended as necessary. If a bacterial pathogen requires treatment with antibiotics, a drug sensitivity profile will be generated when possible.
- Findings and results of fish health monitoring will be recorded on a standard fish health reporting form and maintained in a fish health database.
- 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, disinfecting procedures, and treatments will be discussed.

Disease History and Treatment

Treatments for disease at Bandon Hatchery include treatment of juvenile fish for external parasites using either hydrogen peroxide (75-100 ppm for 1 hour exposure) or formalin 1:6,000 to 1:40,000 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, in which case medicated food containing oxytetracycline is used. A five-year disease history of Bandon Hatchery is summarized in Table 13-1.

Table 13-1. Five-year disease history by fish stock at Bandon Hatchery, 1996-2000.

Disease/Organism	**Stock/Species**						
	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

A five-year disease history of Cole Rivers Hatchery is summarized in Table 13-2. In May of 2006, the rearing presmolts (’05 brood year) were destroyed at Cole Rivers Hatchery due to exposure to IHN virus. This incident did not affect the entire water supply and was isolated to certain ponds/raceways on the hatchery facility. No further incidence of IHN in stock there has been observed.

Table 13-2. Five-year disease history by fish stock at Cole Rivers Hatchery, 1996-2000.

Disease/Organism	**Stock/Species**					
	53 Rb	**37 ChF**	**18 Co**	**72 Rb**	**44 Co**	**55 Co**
IHNV	No	No *	no	no	no	no
EIBS	No	no	no	no	no	no
CAD	No	no	yes	no	yes	yes
Fl. psychrophilum	Yes	no	yes	yes	yes	yes
Fl. columnare	No	no	no	no	no	no
Aeromonas salmonicida	No	no	no	no	no	no
Aeromonas/Pseudomonas	Yes	yes	yes	yes	yes	yes
Yersinia ruckeri	No	no	no	no	no	no
R. salmoninarum	No	no	yes	no	yes	no
Internal mycosis	No	no	no	no	no	no
External mycosis	No	no	no	no	no	no
Ichthyobodo	No	yes	yes	yes	yes	yes
Gyrodactylus	Yes	no	no	yes	no	no
Ichthyophthirius	No	yes	no	no	no	no
Gill Amoeba	No	no	no	no	no	no
Trichodinids	No	yes	yes	yes	yes	no

* As noted, IHN Virus did occur at Cole Rivers Hatchery in 2006.

A five-year disease history (1996-2000) of Butte Falls Hatchery is summarized in Table 13-3. In May of 2006, the rearing Coquille smolts (’05 brood year) were destroyed at Butte Falls Hatchery due to exposure to IHN virus. This incident affected the entire water supply and led to quarantine of the Butte Falls Hatchery to fish reared for release into “IHN-negative” waterbodies. Butte Falls Hatchery is no longer in existence, and thus does not raise Chinook for the hatchery program described in this HGMP.

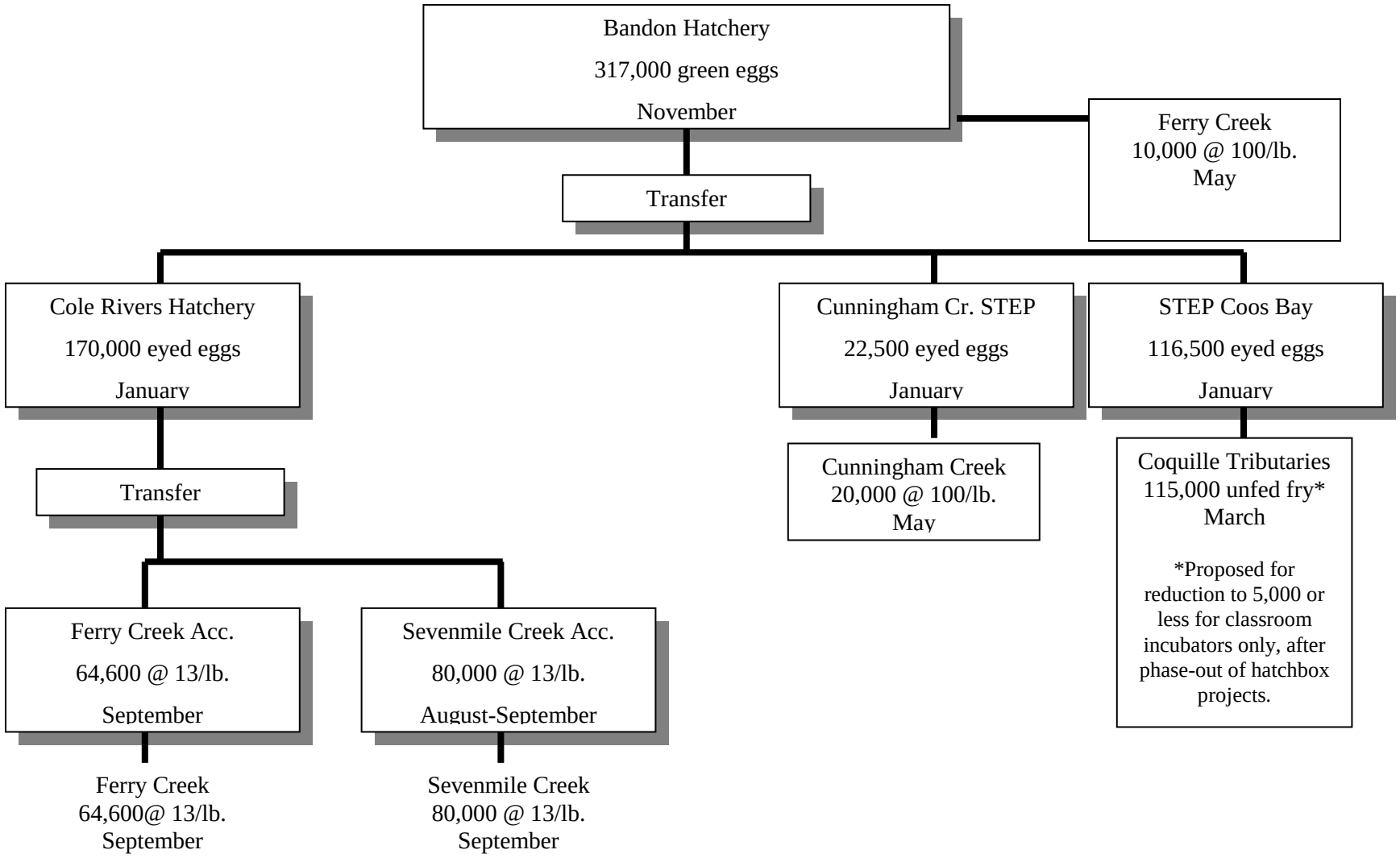
Table 13-3. Five year disease history by fish stock at Butte Falls Hatchery, 1996-2000.

Disease/Organism	**Stock/Species**					
	53 Rb	**44 ChF**	**18 Co**	**72 Rb**	**44 Co**	**55 Co**
IHNV	no	No *	no	no	no	no
EIBS	no	no	no	no	no	no
CAD	no	no	yes	no	yes	yes
Fl. psychrophilum	yes	no	yes	yes	yes	yes
Fl. columnare	no	no	no	no	no	no
Aeromonas salmonicida	no	no	no	no	no	no
Aeromonas/Pseudomonas	yes	yes	yes	yes	yes	yes
Yersinia ruckeri	no	no	no	no	no	no
R. salmonsalmoninarum	no	no	yes	no	yes	no
Internal mycosis	no	no	no	no	no	no
External mycosis	no	no	no	no	no	no
Ichthyobodo	no	yes	yes	yes	yes	yes
Gyrodactylus	yes	no	no	yes	no	no
Ichthyophthirius	no	yes	no	no	no	no
Gill Amoeba	no	no	no	no	no	no
Trichodinids	no	yes	yes	yes	yes	no

* As noted, IHN Virus did occur at Butte Falls Hatchery in 2006.

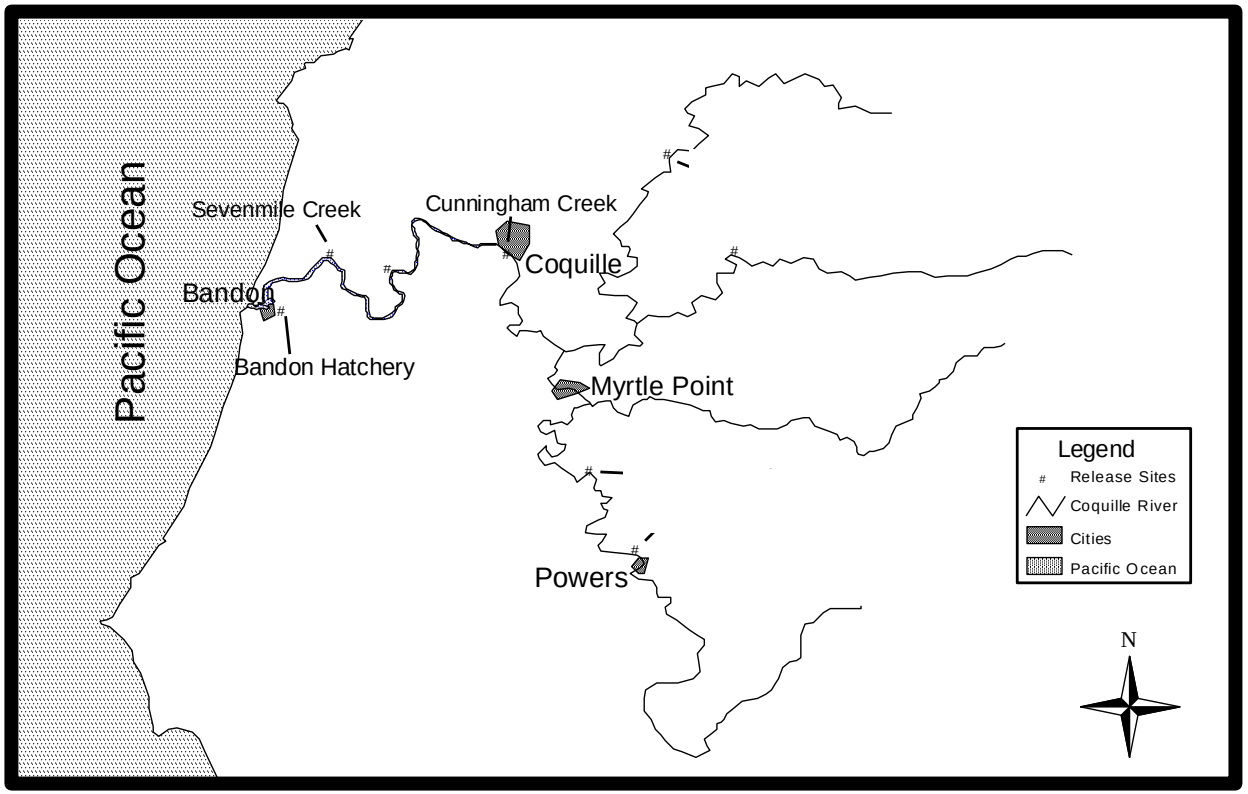
APPENDIX B.—HATCHERY PRODUCTION FLOW CHART

Fall Chinook Salmon- Stock 44 (Coquille River)



APPENDIX C.—Smolt/presmolt release sites for Chinook Salmon in the Coquille Basin: Bandon Hatchery, Sevenmile Creek, Ferry Creek (in Bandon), and Cunningham Creek. Unfed fry sites are primarily at schools in the towns shown, plus Blue Creek on the North Fork Coquille system.

Coquille Basin Release Sites



APPENDIX D.—REFERENCES

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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: Tim Walters, Umpqua Watershed District Manager, West Region, ODFW

Signature: _____ Date_____

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

Signature: _____ Date: _____

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

Listed species affected: Coho Salmon ESU/Population: Oregon Coast Coho Salmon ESU Activity: Coquille River fall Chinook Salmon hatchery program/broodstock collection				
Location of hatchery activity: Coquille River Basin Dates of activity: Ongoing Hatchery program operator: Michael Gray				
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)			12	
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)			4	
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.