

# **FISHERIES MANAGEMENT AND EVALUATION PLAN**

---

**Oregon Coastal Coho, Coastal Rivers Coho Sports Fishery**

**Prepared by  
Oregon Department of Fish and Wildlife  
3406 Cherry Ave.  
Salem, Oregon 97303**

**August 26, 2009**

**Final**

## Executive Summary

Oregon Coast coho salmon were subject to intense commercial and recreational fisheries in the ocean and freshwater prior to 1993 (commonly in the range of 60-90% harvest rate). Significant reforms to fishery harvest management of Oregon Coast coho salmon were implemented in the mid-1990s to address the decline of wild coho along the Oregon Coast. The Oregon Department of Fish and Wildlife (ODFW) developed a comprehensive harvest management plan in 1997 that permanently reduced cumulative harvest rates on coho in ocean and freshwater fisheries, adjusted the annual allowable harvest rate dependent upon parental escapement and ocean survival rate, and implemented a “weak stock” management approach to protect the weakest sub-aggregate of coho stocks in ocean mixed stock fisheries. Oregon’s coho harvest management plan was subsequently adopted by the Pacific Fisheries Management Council (as Amendment 13 to the Pacific Salmon Plan) for ocean fishery management. This harvest management plan has (and will continue to) guide harvest impacts on Oregon Coast coho salmon in ocean fisheries (Economic Exclusive Zone and stated managed waters 0-3 miles) and inland freshwater fisheries (managed by the state of Oregon).

In ocean fisheries there are limited methods for increasing harvest on strong populations while reducing impacts on weak populations. Terminal harvest fisheries, as proposed in this Fisheries Management and Evaluation Plan (FMEP), can be used to selectively target healthy wild populations while avoiding weak ones. Terminal fisheries as described here provide a strong complement to mixed stock ocean fisheries by allowing verifiable controlled harvest impacts on a specific healthy stock component

Since the 1990’s, most coho hatchery programs have been eliminated along the Oregon Coast. The abundance of wild coho salmon has increased, in general, from the worst returns ever recorded in the 1990’s. In the original harvest management plan developed by ODFW, allowing a terminal fishery on known, healthy runs of wild coho salmon was described as a means of providing harvest opportunity on healthier populations, while keeping harvest impacts low in the mixed-stock ocean fisheries so that the weakest sub-aggregates of coho could be protected. In 2003, ODFW developed an FMEP for two healthy runs of coho salmon returning to Siltcoos and Tahkenitch Lakes that put into place the terminal fishery concepts originally described in 1997. However, this FMEP only applied to these two lakes. ODFW is now specifying the criteria and guidelines that will be used for wild coho terminal fisheries in the coastal rivers of the Oregon Coast.

In this FMEP, there are four essential criteria that must be met in order for a terminal fishery in freshwater to occur in any population area:

- 1) An allowable harvest impact under the coho harvest management matrix when applied at the sub-aggregate and specific basin level, up to a maximum of 35% (if the specific criteria are met).
- 2) A positive status assessment of the population relative to the population sustainability criteria developed by NMFS’ ONCC TRT (Wainwright et al. 2008).
- 3) Two different minimum escapement thresholds must be met, *after fishery harvest*, in the population targeted for a terminal fishery in any given year. First, escapement must exceed the 100% full seeding of the best quality habitat

- escapement level, identified in Amendment 13. Secondly, escapement must exceed >75% of the full seeding level of all available habitat, based upon population-specific stock-recruit analyses.
- 4) Additional population-specific and basin-specific information, such as smolt abundance, summer parr seeding levels, adult counts in locations other than random spawner surveys, and floods and drought, will also be taken into account before a terminal fishery is proposed to ensure abundance and survival is likely to be high enough to support a fishery.

By implementing the above criteria a terminal fishery will never exceed the allowable limits specified for freshwater and ocean fisheries, weak stocks will be protected from additional harvest impacts, additional harvest of healthier populations will only occur when escapements are high and expected to adequately seed available habitat. A comprehensive monitoring and evaluation plan will assess the catch of wild fish, the abundance of the population after fisheries, and angler compliance. This information will be used annually to assess whether impacts are as expected. Review of this FMEP will occur at the specified intervals to evaluate whether the objectives of the FMEP are being accomplished.

**Title.**

**Fishery Management and Evaluation Plan** Oregon Coastal Coho, Coastal Rivers Coho Sports Fishery

**Responsible Management Agency.**

**Agency:** Oregon Department of Fish and Wildlife  
**Name of Primary Contact:** Robert C. Buckman  
**Address:** 810 SW Alder Street, Unit C  
**City, State, Zip Code:** Newport, OR 97365  
**Telephone Number:** (541) 265-8306  
**Fax Number:** (541) 265-9894  
**Email Address:** Robert.C.Buckman@state.or.us

**Date Completed.**

Public Review Draft completed on March 23, 2009. The ESA public review and comment began on June 17, 2009 and closed July 17, 2009 (74 FR 28667). Revised drafts of the FMEP were submitted to NMFS on August 6, 2009 and August 26, 2009.

**SECTION 1. FISHERIES MANAGEMENT**

**1.1) General objectives of the FMEP.**

The objective of this FMEP is:

*Objective 1:* Provide an opportunity for sport anglers to harvest naturally produced coho salmon in designated Oregon coastal river basins and provide social and economic benefits that conform to achieving the “Desired Status” for the Oregon Coastal Coho ESU as identified in the Oregon Coast Coho Conservation Plan (ODFW, 2007).

Oregon Coast coho salmon were subject to intense commercial and recreational fisheries in the ocean and freshwater prior to 1993 (commonly in the range of 60-90% harvest rate). Significant reforms to fishery harvest management of Oregon Coast coho salmon were implemented in the mid-1990s to address the decline of wild coho along the Oregon Coast. The Oregon Department of Fish and Wildlife (ODFW) developed a comprehensive harvest management plan in 1997 that permanently reduced cumulative harvest rates on coho in ocean and freshwater fisheries, adjusted the annual allowable harvest rate dependent upon parental escapement and ocean survival rate, and implemented a “weak stock” management approach to protect the weakest sub-aggregate of coho stocks in ocean mixed stock fisheries (see Appendix A). Oregon’s coho harvest management plan was subsequently adopted by the Pacific Fisheries Management Council (as Amendment 13 to the Pacific Salmon Plan) for ocean fishery management. This harvest management plan has (and will continue to) guide harvest impacts on Oregon Coast coho salmon in ocean fisheries (Economic Exclusive Zone and stated managed waters 0-3 miles) and inland freshwater fisheries (managed by the state of Oregon).

Since the 1990's, most coho hatchery programs have been eliminated along the Oregon Coast. The abundance of wild coho salmon has increased, in general, from the worst returns ever recorded in the 1990's. In the original harvest management plan developed by ODFW, allowing a terminal fishery on known, healthy runs of wild coho salmon was described as a means of providing harvest opportunity on healthier populations, while keeping harvest impacts low in the mixed-stock ocean fisheries so that the weakest sub-aggregates of coho could be protected. The Oregon Coastal Salmon Restoration Initiative, where the coho harvest management plan was originally developed, set the stage for the terminal coho fishery concept back in 1997. Here are some important quotes from the "Proposed New Spawner Escapement Rebuilding Criteria and Fishery Management Regime for Coastal Natural Coho Salmon" (OCSRI, Fish Management Chapter, Attachment B, page 5-6):

- "Each of the new four OCN stock sub-aggregates are proposed to be managed in marine fisheries as a separate stock under the "weak stock management concept" used in the PFMC forum. Because of the similarities in the ocean distribution of the four OCN components, little flexibility is apparent for differential marine fishery intensities between each group."
- "The management flexibility for increased fisheries for any strong OCN stock component will be essentially in freshwater or estuarine areas in the near future. In these areas, fishing opportunity will be based on the status of populations in individual basins within an OCN stock component. It is proposed that basin-specific spawner criteria be used to guide inside fishery allowances when the impact allowance for a particular sub-aggregate is greater than can be accommodated in marine fisheries"

In 2003, ODFW developed a Fisheries Management and Evaluation Plan (FMEP) for two healthy runs of coho salmon returning to Siltcoos and Tahkenitch Lakes that put into place the terminal fishery concepts originally described in 1997. However, the Siltcoos Tahkenitch FMEP only applied to these two lakes. ODFW is now specifying the criteria and guidelines that will be used for wild coho terminal fisheries in all of the coastal rivers of the Oregon Coast ESU.

The purpose of this FMEP is to re-instate recreational fisheries for naturally produced coho salmon in Oregon coastal river basins. The proposed fisheries will allow terminal harvest of selected coho salmon populations in a manner that is consistent with the conservation of these populations and the remainder of the Oregon Coastal Coho Evolutionary Significant Unit (ESU). Any impacts from these fisheries when combined with other fisheries that impact Oregon Coastal coho will fall within the allowable impacts of the Fishery Management Matrix in Amendment 13 of the Pacific Fisheries Management Council's Salmon Fishery Management Plan (PFMC 1999).

**1.1.1) List of the "Performance Indicators" for the management objectives.** Performance indicators as they relate to management objectives are as follows.

The performance indicators listed below are consistent with those for monitoring and evaluation as outlined in Amendment 13 (A-13) of the Pacific Fisheries Management

Council (PFMC) Salmon Fishery Management Plan (PFMC 1999), including the A-13 harvest matrix (Table A-1). . They include: surveys of summer juvenile abundance; intensive adult surveys for abundance estimates; comprehensive monitoring sites, i.e. life cycle monitoring (LCM) sites; fishery impact monitoring; and physical surveys of spawning and rearing habitat.

## **1. 1. Sport Fishery Contribution**

- Indicator 1.* Recreational fisheries which allow the harvest of non fin clipped coho salmon are re-instated in selected river basins within the Oregon Coastal Coho ESU.
- Indicator 2.* Sport fishery contribution will be determined by statistical creel data. Total harvest of naturally produced coho salmon will not exceed a quota set at or below the maximum allowable harvest determined during the annual preseason planning process and agreed to by NMFS.
- Indicator 3.* Statistical creel data indicates angler effort of about four angler days per naturally produced coho harvested (as based on past efforts).

## **2. Wild Coho Management**

- Indicator 4.* Annual coho salmon spawning surveys indicate levels of parental spawners for the affected population meet or exceed critical and viability thresholds as identified under this FMEP prior to and after a terminal recreational fishery.
- Indicator 5.* Annual spawning surveys indicate wild coho spawner abundance following a fishery meets or exceeds the full seeding level identified in A-13 and the spawner abundance that equates to Maximum Sustained Production (MSP) as determined by conventional stock-recruit analysis for each population.
- Indicator 6.* Coastal life cycle monitoring (LCM) sites indicate adult spawner abundance levels comparable to or higher than necessary to maximize smolt production based on past performance before and/or after a fishery
- Indicator 7.* Coastal LCM sites indicate smolt abundance following a fishery at levels near full seeding.

*Indicator 8.* Annual randomized juvenile coho snorkel surveys indicate occupancy and densities similar to levels observed from 2002-05.

*Indicator 9.* Actual marine survival from wild smolt to adult measured at coastal LCM sites is generally equivalent to the Marine Survival Category utilized in the revised A-13 matrix for that adult class.

### 3. Fishery Impact Levels

*Indicator 10.* Statistical creel data and annual basin population estimates show exploitation rates that are consistent with the adopted harvest matrix as described in this plan for each wild coho population.

#### 1.1.2) Description of the relationship and consistency of harvest management with artificial propagation programs.

Within the Oregon Coastal Coho ESU, hatchery coho propagation programs exist in the Nehalem River (100,000 smolts released from the North Fork Nehalem Hatchery), Trask River (100,000 smolts from Trask Hatchery) and Umpqua River (60,000 smolts at Galesville Dam on Cow Creek). The current target hatchery release of 260,000 coho smolts across the entire ESU represents a sharp reduction in hatchery coho releases which totaled about 5 million smolts as recently as the early 1990's (Figures 1 and 2). These reductions are expected to decrease any negative impacts that large hatchery releases may have had on naturally produced coho.

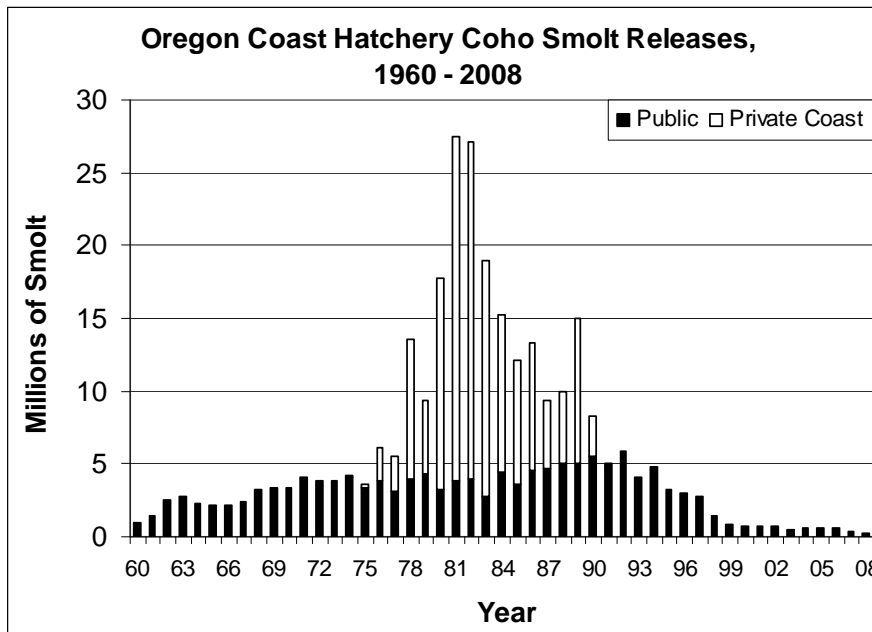


Figure 1. Oregon coast hatchery coho smolt releases.

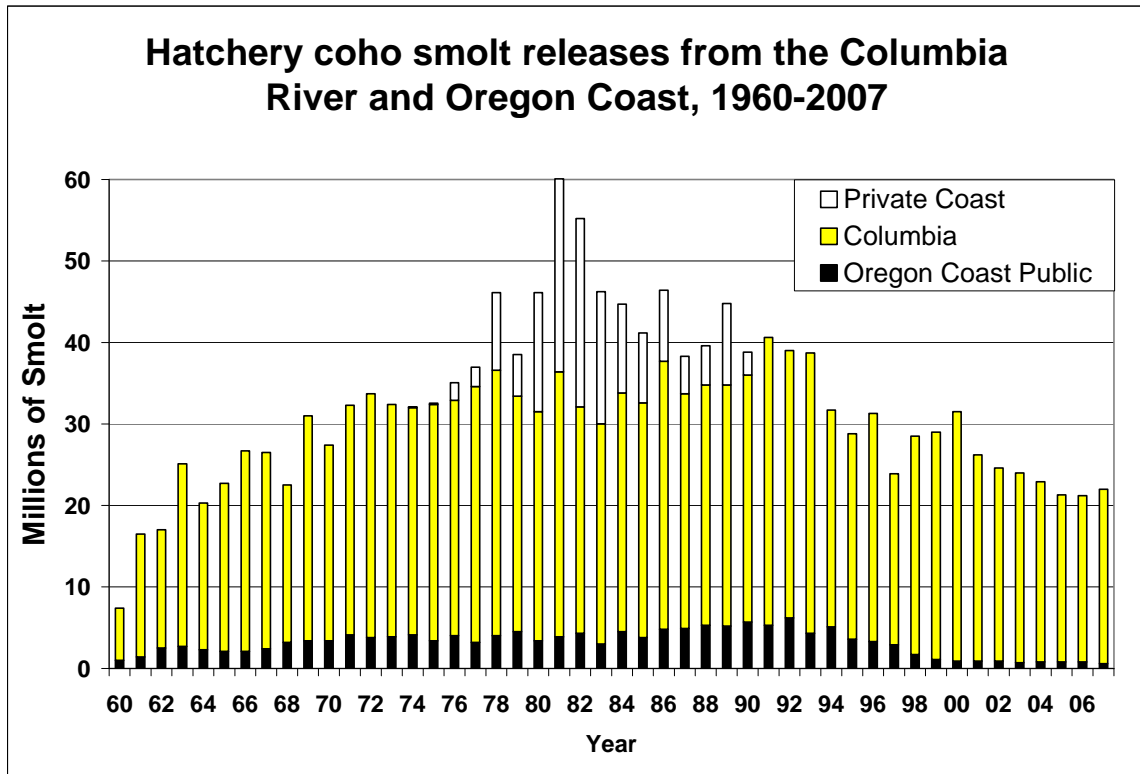


Figure 2. Hatchery coho releases from the Columbia River and Oregon Coast, 1960 – 2007.

Oregon coast non-fin-clipped coho salmon are impacted in ocean recreational fisheries targeting fin-clipped hatchery coho salmon mainly from the Columbia River. Impacts in these ocean fisheries will be considered in combination with impacts in terminal fisheries relative to overall impact criteria from the revised A-13 matrix.

**1.1.3) General description of the relationship between the FMEP objectives and Federal tribal trust obligations.**

The Confederated Tribes of the Siletz Indians have rights to harvest up to 200 coho or Chinook salmon annually from designated sites on three tributaries to the Siletz River, United States Public Law 96-340, 1980, (ODFW 1999). If a terminal fishery consistent with this FMEP is considered in the Siletz Basin, the planning of any terminal fishery in the Siletz Basin will include applicable Tribal harvest in the analysis of total harvest impacts..

**1.2) Fishery management area(s).**

**1.2.1) Description of the geographic boundaries of the management area of this FMEP.**

The management area for this FMEP will encompass coastal river basins throughout the Oregon Coastal Coho ESU (Figure 3).



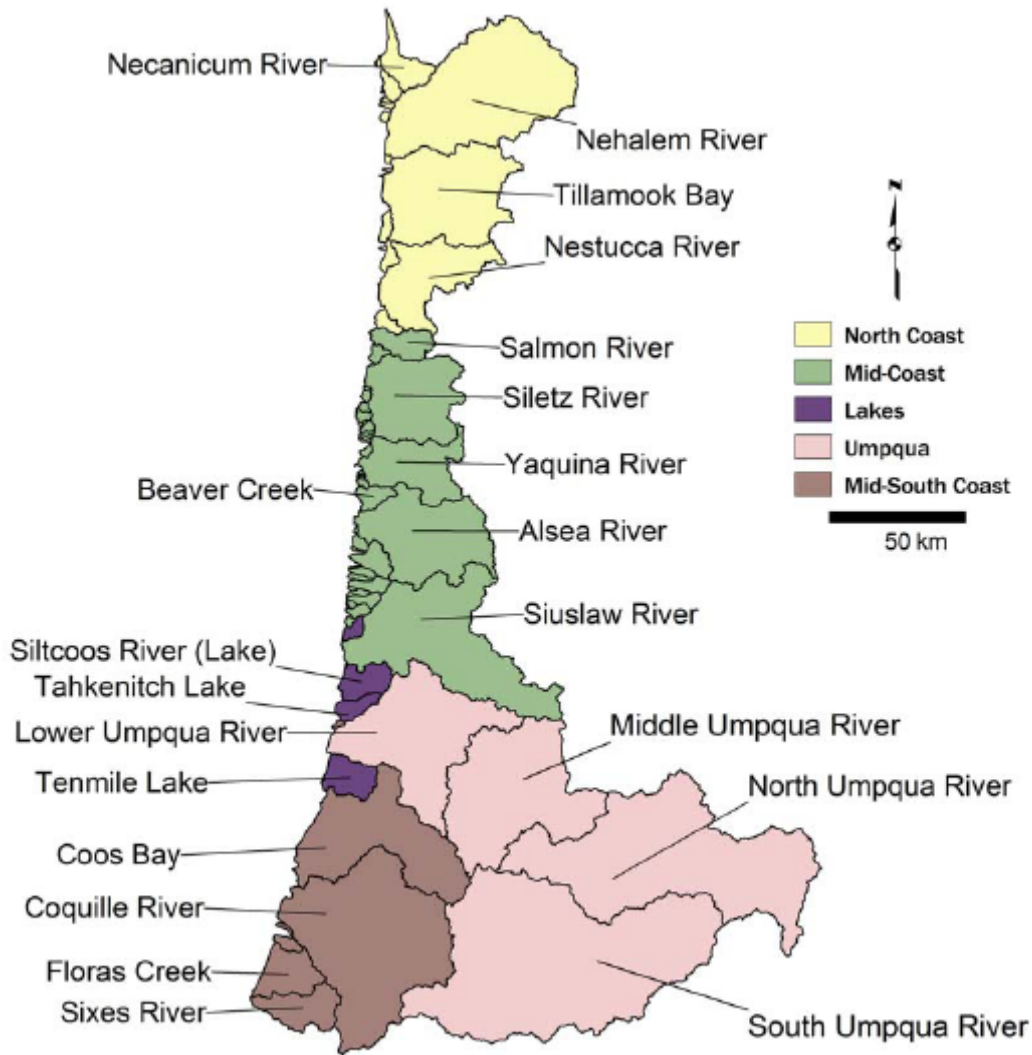


Figure 3. Oregon coastal coho ESU and fishery management area.

**1.2.2) Description of the time periods in which fisheries occur within the management area.**

Coho fisheries under this FMEP would occur within the same areas currently open to other salmon and/or steelhead fisheries and generally during the time period from September 1 through December 31 to be consistent with most salmon fisheries open in the management area. Fisheries in specific years and basins may have more restrictive open areas and time frames. They may also close prior to a scheduled closing date due to attainment of a harvest quota.

Fisheries for a variety of species other than naturally produced coho salmon will occur throughout the year in many of the coastal basins within this management area. The

annual ODFW Oregon sport fishing regulations booklet can be consulted for a detailed account of individual basin fisheries.

### **1.3) Listed salmon and steelhead affected within the Fishery Management Area specified in section 1.2.**

Only Oregon coastal coho salmon would be affected within this Fishery Management Area. No other species of salmon or steelhead are listed as threatened or endangered under the Federal Endangered Species Act (ESA) in Oregon coastal rivers. None of the stocks used for hatchery coho releases (section 1.3.2, Table 2) in the ESU have been identified as essential for the recovery of the ESU.

#### **1.3.1) Description of “critical” and “viable” thresholds for each population (or management unit) consistent with the concepts in the technical document “Viable Salmonid Populations and the Recovery of Evolutionarily Significant Units.”**

##### Viable Threshold

The viable “sustainable” threshold for wild coho salmon spawner abundance in the ESU and/or independent populations as contained in Tables 2 and 3 of the “Biological Recovery Criteria for the Oregon Coast Coho Salmon Evolutionary Significant Unit Technical Memorandum” (Wainwright et al. 2008) will be considered in determining locations to open a fishery. As outlined in the Wainwright et al. (2008) report, meeting the population sustainability criterion indicates a population can maintain its genetic legacy and long-term adaptive potential into the foreseeable future, which contributes to a negligible risk of extinction over a 100-year time frame. The Wainwright et al. (2008) report utilizes a decision support system to evaluate the application of the biological recovery criteria to the ESU. The resulting truth values were intended to be used to support a decision on status. Because of the conservative approach used to develop the truth curves used in the report, ODFW considers a positive truth value, as determined in Table 3 of the Wainwright et al. (2008) report, as indicative of a population passing the population sustainability criteria and, therefore, being a candidate population for a terminal fishery. Other escapement criteria, as defined by Amendment 13 and ODFW stock-recruit modeling, will also be used to evaluate whether current habitat is sufficiently seeded with spawners after fishery harvest.

##### Critical Threshold

The critical threshold for wild coho spawners in each independent population in the ESU was established by the OCN Workgroup (2000) and included in the revised A-13 matrix (Tables A-2 and A-3). The OCN Workgroup critical threshold is more conservative than was defined in the original A-13 and is used here as a precautionary measure. For purposes of this FMEP, the critical thresholds are not relevant because a terminal fishery will only be implemented if the viable thresholds are exceeded.

#### **1.3.2) Description of the current status of each population (or management unit) relative to its “Viable Salmonid Population thresholds”**

**described above. Include abundance and/or escapement estimates for as many years as possible.**

Populations proposed to have a fishery within the Oregon Coastal Coho ESU will only be those populations considered to be sustainable (equivalent to viable) through the application of the biological recovery criteria and use of the decision support system developed by Wainwright et al. (2008), and exceedance of specified escapement levels. Due to the conservative approach taken to develop the recovery criteria and truth curves, ODFW considers a positive truth value for population sustainability to equate to a decision that the population is sustainable. Consideration will also be made of observed improvement or deterioration to population abundance, productivity, spatial structure, diversity and/or habitat that are expected to continue into the future. The most recent application of the Wainwright et al. (2008) recovery criteria occurred in 2008. At that time, most functionally and potentially independent populations had positive truth values and are classified by ODFW as sustainable. The exceptions were the Necanicum, Tillamook, Salmon, Alsea, North Umpqua, and Sixes populations, which all had negative truth values (Table 1). The results of the 2008 application of the biological recovery criteria will be used as an indicator of the status of each population’s sustainability in this FMEP until the analyses are updated. In the event that the Wainwright et al. (2008) analyses are not updated, the existing analysis and scores will stay in effect until a new functionally equivalent analysis is completed. Any new analysis of viability other than the Wainwright et al. (2008) approach will be approved by NOAA Fisheries (NMFS) before being used for fisheries under this FMEP.

<b>Coastal Coho ESU Populations</b>	<b>Sustainability Truth Value</b>
<b>North Coast</b>	
Necanicum	(-0.19)
Nehalem	0.15
Tillamook	(-0.13)
Nestucca	0.10
<b>Mid-Coast</b>	
Salmon	(-1.00)
Siletz	0.05
Yaquina	0.54
Beaver	0.48
Alsea	(-0.40)
Siuslaw	0.44
<b>Lakes</b>	
Siltcoos	0.80
Tahkenitch	0.67
Tenmile	0.92
<b>Umpqua</b>	
Lower Umpqua	0.68
Middle Umpqua	0.36
North Umpqua	(-1.00)
South Umpqua	0.04
<b>Mid-South Coast</b>	
Coos	0.95
Coquille	0.77
Floras	0.61
Sixes	(-1.00)

The scoring of each independent population in the Oregon Coastal Coho ESU is described in the Biological Recovery Criteria for the Oregon Coast Coho Salmon Evolutionary Significant Unit Technical Memorandum, (Wainwright et al. 2008). Included is an assessment of the four VSP parameters that influence persistence as proposed in McElhany et al. (2000). Also within Appendix D of the 2008 Wainwright et al. document, abundance data (1958 -2004) for the independent populations is listed and described. In addition, annual estimates of wild coho spawner abundance in coastal river basins, 1990 – 2008 (Table A-4), were provided by Mark Lewis of the Oregon Department of Fish and Wildlife (ODFW 2008).

**Table 1.** A summary of truth values for sustainability as determined by the latest application of the biological recovery criteria in Wainwright et al. 2008. ODFW interprets positive truth values to indicate the population is sustainable/viable.

**Table 2. List of the natural fish populations, “Viable Salmonid Population” thresholds, and associated hatchery stocks included in this FMEP.**

<b>Natural Populations or Management Units</b>	<b>Critical Thresholds</b> Critical low spawner densities under revised A-13 Matrix	<b>Viable Thresholds</b> (Three indicators will be used for determining viable thresholds for each population)	<b>Associated hatchery stock(s)</b>	<b>Hatchery stock essential for recovery? (Y or N)</b>
Nehalem River	Spawner density of 4 fish per mile	1) Positive value for Population Sustainability criteria (Wainwright et al. 2008).  and  2) Population abundance exceeds Amendment 13 escapement criteria for 100% full seeding of high quality habitat following all fisheries.  and  3) Population abundance sufficiently seeds available habitat* based upon ODFW’s basin-specific stock-recruit relationship following all fisheries.	Coho salmon, stock 32 or 99, 100,000 smolt into N. Fk Nehalem	N
Tillamook Bay	Spawner density of 4 fish per mile		Coho salmon, stock 34, 100,000 smolt into Trask River	N
Nestucca River	Spawner density of 4 fish per mile		None	N
Salmon River	Spawner density of 4 fish per mile		None	N
Siletz River	Spawner density of 4 fish per mile		None	N
Yaquina River	Spawner density of 4 fish per mile		None	N
Alsea River	Spawner density of 4 fish per mile		None	N
Siuslaw River	Spawner density of 4 fish per mile		None	N
Lower Umpqua	Spawner density of 4 fish per mile		None	N
Middle Umpqua	Spawner density of 4 fish per mile		None	N
North Umpqua	Spawner density of 4 fish per mile		None	N
South Umpqua	Spawner density of 4 fish per mile		Coho salmon, stock 18, 60,000 smolt into Cow Creek	N
Coos River	Spawner density of 4 fish per mile		None	N
Coquille River	Spawner density of 4 fish per mile		None	N
Floras	Spawner density of 4 fish per mile		None	N
Sixes	Spawner density of 4 fish per mile	None	N	

\* ODFW applied the standard of >75% NEQ escapement criteria for fisheries in 2009.

## **1.4) Harvest Regime**

### **1.4.1) Provide escapement objectives and/or maximum exploitation rates for each population (or management unit) based on its status.**

ODFW will annually review several factors to determine which populations within the Oregon Coastal Coho ESU will be proposed for terminal fisheries and the allowable exploitation rates. The attached supplement “Proposed 2009 Fisheries” gives an example of how these criteria are applied.

1. A determination will be made if there is an allowable impact under the revised A-13 matrix when applied at the sub-aggregate and specific basin level. This matrix was developed by the OCN Workgroup in 2000 (OCN Workgroup 2000) and has been used by the PFMC to determine allowable harvest impacts for OCN coho since 2000. The matrix provides for more conservation of weak sub-aggregates than the original A-13 matrix through the identification of lower harvest rates when coho abundance is at “very low” or “critical” parental escapement levels, a “critical” seeding level, and use of more conservative definitions of marine survival categories (i.e. “very low” and “extremely low”). Cumulative harvest impacts at the sub-aggregate level will not be exceeded by any proposed terminal fisheries. The cumulative harvest impact (including ocean and any terminal fisheries) to any sub-aggregate or population will be capped at 35 percent – this is consistent with the original A-13 matrix. Coast-wide marine survival parameters and sub-aggregate and basin specific parental seeding levels that are the same as for ocean application of the revised A-13 matrix will be used. This will provide more protection to wild coho populations than using the original A-13 matrix. Using the revised A-13 matrix and capping cumulative impact at 35% is consistent with or more conservative than what would be allowed under the original A-13 matrix.

2. A second factor in identifying coho populations that are suitable for terminal fisheries considers the status of the population(s) relative to the population sustainability criteria developed by NMFS’s ONCC TRT (Wainwright et al. 2008). Only populations that are considered sustainable based on the most recent application of these criteria will be proposed for terminal fisheries. The population sustainability criteria will be considered passed by ODFW if there is a positive truth value for an independent population. These sustainability criteria will be used for at least the first two years of this FMEP as a requirement for a proposed fishery. However, in time the status assessment conducted in the Wainwright et al. (2008) document will become outdated and, therefore, an updated status assessment will be necessary in order to determine the current status of coho populations to guide development of allowable terminal fisheries that could occur under the criteria described here in section 1.4.1. Other assessments of viability (besides the formal Decision Support System specifically used in Wainwright et al. 2008) may be used in the future and will be more protective of population conservation. The updated status assessment will be described in ODFW’s annual report on this FMEP, along with the agency’s

proposal for fisheries in the following year, if any (also see section 1.3.2). Any new viability assessment methods proposed by ODFW will not increase the allowable take of Oregon coast coho beyond what is allowed under A-13 or the revised A-13 matrix. The sustainability criteria described in the current FMEP will continue to be used until assessment methods are updated and approved by NMFS.

3. A third factor that will be considered in identifying populations for terminal fisheries is that spawner escapement after all harvest will seed the high quality habitat as described in A-13. The PFMC FMP requires that ODFW consider terminal fisheries on wild populations only when spawners following the fishery are expected to be at or above levels necessary for full seeding of high quality habitat. Since PFMC does not make basin specific forecasts, approximations of basin-specific run sizes will be based on the overall PFMC forecast for OCN, subdivided to the basin level based on the last three years average proportions. This forecast for specific basins will then be adjusted for expected harvest impacts and compared to A-13 full seeding levels of high quality habitat in each specific basin. ODFW will work through the PFMC process to develop a mutually agreed upon method to forecast OCN run sizes at the population level. If a different method for forecasting population abundance is developed with the approval of the PFMC, this FMEP will be modified to describe the approved method.

During development of the Oregon Coast Coho Conservation Plan, ODFW identified that the seeding levels used in A-13 needed to be re-assessed. This re-assessment is just beginning and any changes to population seeding levels will need to be adopted through the PFMC process (see Section 3.5.2). To ensure that adequate seeding will occur in populations proposed for terminal wild coho fisheries, ODFW will conduct a second exercise to look at basin specific seeding levels through a stock recruit analysis. This analysis will include a forecast of basin specific abundance and an estimation of spawners needed to provide full seeding of juvenile rearing habitat. The forecast abundance will be adjusted for expected harvest and then compared to the population-specific seeding level criteria. If the forecasted seeding level meets or exceeds the full-seeding target ( $\geq 75\%$  of full seeding), then this criterion will be satisfied. A population can be considered for a fishery if it meets both of the post-harvest seeding goals described above. Additional information such as coho performance at life cycle monitoring sites will be considered as a method to assess seeding and forecasts if available.

4. A final factor ODFW may consider will be population-specific and basin-specific information such as smolt abundance, summer parr seeding levels, adult counts in locations other than random spawner surveys, and floods and drought. This will provide additional insight into population(s) status and how it would respond to an inland fishery. If the majority of the population- and basin- specific information supports the determination that a population is healthy and will adequately seed the habitat, ODFW will consider implementing a conservative

terminal fishery on that population. These considerations will be described in each annual fishery proposal.

As an example, the Nehalem River (part of the Northern Sub-aggregate in A-13) can be used to demonstrate how a fishery could be proposed for 2009.

Step 1. A-13 allowable impact (as guided by the revised A-13 harvest matrix and capped at 35%)

- a) Sub-aggregate allowable impact
  - 2006 Parental Spawners = High
  - 2008 Marine Survival Index = Medium
  - Sub-aggregate total impact = 30%
  
- b) Basin specific allowable impact
  - 2006 Parental Spawners = Medium
  - 2008 Marine Survival = Medium
  - Total impact = 20%
  
- c) Ocean impacts as determined in PFMC Preseason Report III, April, 2009 = 10 %
  
- d) Terminal fishery allowance
  - Basin impact rate (20%) – Ocean impact rate (10%)
  - = 2009 Terminal Impact Rate = 10%

Step 2. Population sustainability status

- a) Positive truth value from 2008 application of criteria indicates a viable population
  - Pass (Table 1)

Step 3. Part 1 - Full seeding of high quality habitat

- a) OCN forecast is 211,600 pre harvest recruits which equates to 189,805 return to rivers after 10.3 % ocean impact.
  - full seeding for the entire ESU in A-13 is 132,100
  - full seeding coastwide is likely since  $189,805 > 132,100$ .
- b) Nehalem specific forecast is not made by PFMC, but based on PFMC overall OCN forecast subdivided based on the average proportion of the ESU the Nehalem made up the last three years, the Nehalem can expect a return of 25,126 coho ( $189,805 \times 13.2\%$ ).
  - full seeding level from revised A-13 habitat model = 17,500 which will likely be achieved.
  - maximum terminal harvest impact is  $25,126 \times 10\% = 2,513$ .
  - actual harvest proposed by ODFW staff is 1,000 well below the maximum

Part 2 – Basin-specific stock recruit-based forecast and seeding levels

- a) 2009 Nehalem forecast is 22,239 from ODFW stock-recruit analysis after ocean impact (10.3%)
  - full seeding level from the same analysis is ~11,763 which is easily exceeded
  - maximum terminal harvest impact is  $22,239 \times 10\% = 2,224$
  - actual harvest proposed by ODFW staff is 1,000 well below maximum

Step 4. Basin and population specific data

- a) Managers will review basin / population specific data as well as consider other pertinent information, such as ocean productivity during the summer prior to the fishery, before implementing a fishery. A specific example of this is provided in the proposal for 2009 fisheries which is a supplement to this FMEP.

For the Nehalem River for 2009, ODFW staff chose to be conservative in the amount of harvest that would be allowed and proposed only a 1,000 fish quota rather than allowing 2,224 fish to be harvested.

An annual quota or harvest ceiling will be used initially to manage the individual fisheries. This will be based on the allowable exploitation rate (from the harvest matrix and considering ocean fisheries) and a predicted population size. Catch estimates from the statistical creel surveys<sup>1</sup> will be monitored in-season. As estimated harvest nears the quota, the fishery will be closed to avoid exceeding the quota. As more experience is gained on how these fisheries perform, it may become apparent that the fisheries have inherently low harvest rates, thereby alleviating the need for quotas. If this becomes the case, a harvest ceiling or quota would not be necessary and the fishery would be allowed to continue without quotas provided the population continues to meet conservation management objectives. This will be monitored through the review of annual harvest tags and spawning survey data.

**1.4.2) Description of how the fisheries will be managed to conserve the weakest population or management unit.**

The weaker populations within the Oregon Coastal Coho ESU will not have a targeted terminal fishery. Only specific stocks that have allowable harvest under the A-13 matrix and meet other biological criteria in this FMEP will have terminal fisheries. Since these fisheries are included under the overall impacts allowed within the A-13 matrix, ESA listed stocks in-ocean fisheries managed under the matrix are also relevant. Allowing terminal fisheries on specific healthy stocks will give managers options to provide

---

<sup>1</sup> Information on statistical creels can be found in Bernard et al. (1998). The methods ODFW will use are described and vary depending on the location, logistics of the fishery and information sought.



harvest benefits from these known healthy stocks as an alternative to ocean fisheries which potentially impact a multitude of ESA listed stocks.

**1.4.3) Demonstrate that the harvest regime is consistent with the conservation and recovery of commingled natural-origin populations in areas where artificially propagated fish predominate.**

Hatchery coho predominate in the mixed stock ocean coho fisheries off Oregon. Hatchery (ad-clipped) and wild (unmarked) fish have different exploitation rates in mark selective fisheries. Wild populations as a group generally experience the same exploitation rate in ocean fisheries. The mortality rate of unmarked fish released in mark-selective fisheries is estimated to be 14% for the recreational sector and 26.5% for the commercial troll sector. There are limited methods for increasing harvest on strong populations and reduce impacts on weak populations. Terminal harvest fisheries, as proposed, can be used to selectively target healthy wild populations while avoiding weak ones. Terminal fisheries as described here provide a strong complement to mixed stock ocean fisheries by allowing verifiable controlled harvest impacts on a specific healthy stock component.

Artificially propagated coho salmon are released into three basins in the Oregon Coastal Coho ESU, as described in section 1.1.2 above. All three hatchery coho releases are relatively small with localized impacts that do not dominate any specific wild population.

**Annual Implementation of the Fisheries**

The process to annually consider regulations for a proposed fishery would be coordinated with ocean fisheries during the annual January through April regulation setting process. ODFW will provide a presumptive proposal to PFMC during this process. This will ensure the annual PFMC proposal includes an allowance for these fisheries under A-13.

Spawner abundance estimates, creel survey, and other performance indicators for a given year's fishery will be considered in developing subsequent years fishing proposal. Harvest ceiling and any season adjustments will be developed utilizing the criteria in Section 1.4.1. The information used to apply the revised A-13 Harvest Management Matrix will be thoroughly described in the proposal submitted to NMFS for annual fisheries. Any additional harvest impacts proposed when added to all other impacts will not exceed 35% as outlined in the original A-13 matrix. A rationale will be provided for the data sources and methodology used to develop harvest proposals.

For state approval, the proposed regulations for the forthcoming year would be reviewed and/or approved at the June meeting of the OFW Commission. Proposed regulations could also be finalized at the August Commission meeting.

Federal approval of the fishery would occur concurrently with the state process. A letter and report summarizing the previous year's fishery, as well as fishery proposals for the

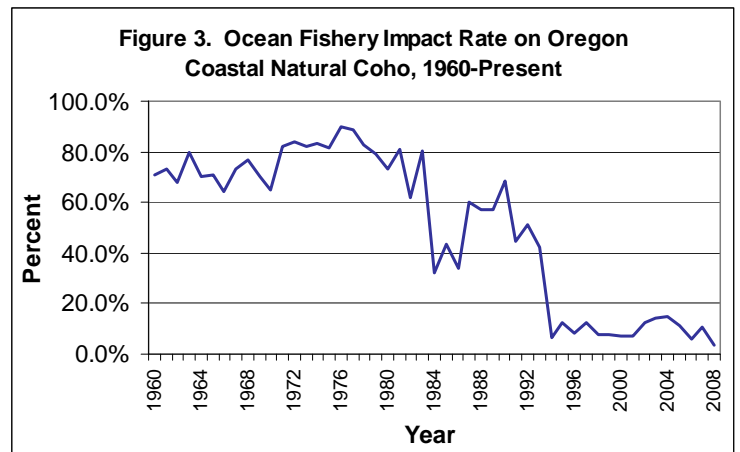
forthcoming year, would be provided to NMFS by July 1. NMFS would then provide a response to ODFW outlining their position on the proposed fishery.

## SECTION 2. EFFECTS ON ESA-LISTED SALMONIDS

### 2.1) Description of the biologically-based rationale demonstrating that the fisheries management strategies will not appreciably reduce the likelihood of survival and recovery of the affected ESU(s) in the wild.

The fisheries will target only wild coho in sustainable populations and will be structured in a way that minimizes risk to those populations. The fishery will be managed at or below maximum impact levels to the Oregon Coast Coho ESU as outlined in the PFMC's Amendment 13 to the Salmon Fishery Management Plan. The revised A-13 fishery

management strategy was approved by the OFW Commission and endorsed by the Oregon Coast Coho Conservation Plan (ODFW, 2007) for application to terminal fisheries. These impact levels, capped at 35%, and the harvest matrix are intended to accommodate the rebuilding of the Oregon coast wild coho populations. Harvest impacts under the A-13 matrix were approved by NMFS in 1999 (NMFS 1999) through the section 7 consultation process under the Federal ESA. Impacts under the revised A-13 matrix have consistently been



found to be compatible with recovery (NMFS 1999, OCN Workgroup 2000, ODFW 2007). Spawning abundance data, harvest data, and other performance indicators (section 1.1.1) will be reviewed annually for consistency with management objectives and to ensure impacts are within allowed limits. If the fishery is within allowable limits and spawner abundance is adequate, there will be no changes necessary. If the fishery exceeds impact rate limits, spawning abundance is below expectations, or other indicators suggest biological problems, the fishery will be modified or closed.

Historical exploitation rates on coastal coho have been much higher than anything that would be considered in the future under this FMEP (Figures 2 and 3 and Tables 3 and 4). As demonstrated by their performance under high exploitation rates, Oregon coast coho salmon are productive and have the ability to recover quickly. It is not expected that future fisheries proposed under this FMEP will impede ESU recovery because these fisheries will have much lower harvest impacts, impacts that only occur in a subset of years with reasonable ocean conditions, and avoidance of any impacts on weaker populations.

An advantage of wild coho harvest in a terminal fishery is that impacts can be directly measured using a statistical creel survey. This contrasts with ocean fisheries, where wild coho mortality is estimated based on assumed encounters in fisheries targeting Chinook

or fin clipped hatchery coho and assumptions on hook and release mortality in each of these encounters. These indirect estimates of harvest impacts on wild coho create the potential for error and are difficult to verify. Biological risk is reduced by the more direct impact assessment allowed by direct estimation of known stock harvest in a terminal fishery.

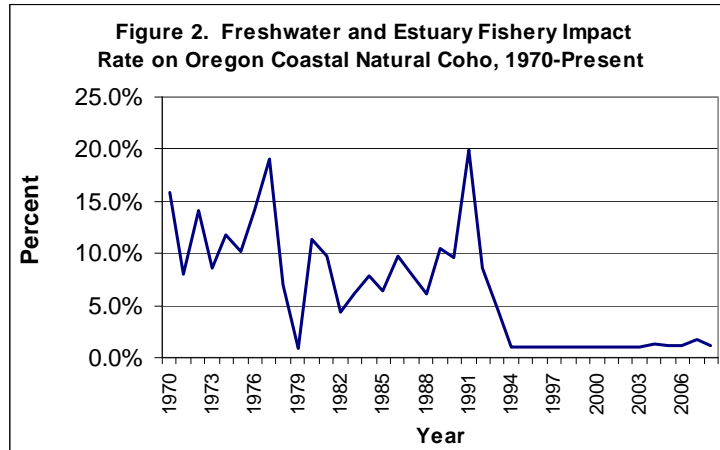


Table 3. Estimated historic fishery impact rate by time period on Oregon coastal natural coho, 1890-1959.<sup>a/</sup>

Years	Estimated Fishery Impact Rate
1890-1929	40%
1930-1939	55%
1940-1949	55%
1950-1959	70%

<sup>a/</sup> From evaluation of ODFW documents and data sets as reported in the Final Amendment 13 to the Pacific Coast Salmon Plan.

Table 4. Estimates of OPI and OCN coho harvest rate in ocean and freshwater salmon fisheries, 1970-2008. Data provided by Craig Foster with the ODFW.

Fishery Year	OPI Ocean Harvest Rate	FRAM OCN Ocean Harvest Rate	OCN Ocean Harvest Rate	OCN Freshwater Impact Harvest Rate	Freshwater Hatchery & OCN Exploitation Rate
1970	65.0%		65.2%	15.8%	35.46%
1971	82.3%		82.5%	8.0%	19.36%
1972	84.2%		84.3%	14.1%	35.03%
1973	81.9%		81.9%	8.6%	18.73%
1974	83.5%		83.5%	11.8%	19.15%
1975	81.3%		81.4%	10.2%	29.28%
1976	89.8%		89.9%	14.1%	23.43%
1977	88.7%		88.8%	19.1%	42.76%
1978	82.5%		82.5%	7.0%	11.18%
1979	79.4%		79.4%	0.9%	1.25%
1980	73.0%		73.1%	11.4%	6.65%
1981	81.0%		81.1%	9.7%	5.67%
1982	62.0%		61.6%	4.4%	5.19%
1983	80.4%		78.7%	6.2%	4.05%
1984	32.3%		31.9%	7.8%	7.78%
1985	43.6%		43.2%	6.3%	3.60%
1986	34.0%		33.5%	9.7%	5.27%
1987	60.1%		59.5%	8.0%	4.12%
1988	57.4%		56.4%	6.1%	5.99%
1989	56.9%		55.3%	10.4%	10.75%
1990	68.7%		68.9%	9.7%	11.78%
1991	44.7%		44.4%	19.9%	60.35%
1992	51.0%		50.9%	8.6%	24.97%
1993	42.3%		42.3%	4.6%	16.03%
1994	2.2%	6.8%	6.8%	1.0%	3.24%
1995	22.3%	12.4%	12.4%	1.0%	4.00%
1996	14.0%	8.3%	8.3%	1.0%	3.37%
1997	11.9%	12.4%	12.4%	1.0%	8.11%
1998	6.5%	7.8%	7.8%	1.0%	8.97%
1999	10.4%	7.6%	7.6%	1.0%	3.98%
2000	13.1%	7.3%	7.3%	1.0%	3.68%
2001	15.7%	7.4%	7.4%	1.0%	3.66%
2002	13.9%	12.3%	12.3%	1.0%	2.47%
2003	22.6%	14.4%	14.4%	1.0%	2.39%
2004	21.5%	14.7%	14.7%	1.3%	2.72%
2005	12.1%	11.1%	11.1%	1.1%	2.96%
2006	8.6%	5.9%	5.9%	1.2%	2.89%
2007	27.8%	10.6%	10.6%	1.7%	3.06%
2008	4.0%	3.3%	3.3%	1.2%	1.86%

**2.1.1) Description of which fisheries affect each population (or management unit).**

Mixed-stock ocean fisheries (not proposed or covered in this FMEP) will have an affect on all coho populations within the Oregon Coastal Coho ESU, as well as the Lower Columbia and Southern Oregon / Northern California Coho ESUs. A specific terminal fishery will also have an affect on that specific independent population in the Oregon Coastal Coho ESU.

All coho populations will also be impacted by estuary and freshwater fisheries for Chinook salmon, steelhead and/or cutthroat trout. All these fisheries have been approved by NMFS with total impact levels to wild coho guided by Amendment 13.

**2.1.2) Assessment of how the harvest regime will not likely result in changes to the biological characteristics of the affected ESUs.**

The proposed harvest regime will not result in appreciable changes to the biological characteristics of the Oregon Coastal Coho ESU. Harvest within these fisheries added together with all other fisheries impacting these stocks will continue a regime of low harvest impacts beginning around 1993 (Table 4). These harvest levels are the lowest on Oregon Coastal wild coho since the late 1800's (Table 3). Fisheries will be opened when marine survival and overall production of coho is expected to be strong. High stock productivity will still allow populations to expand even with a small directed increment of harvest.

The fisheries would be structured to be "non-selective" toward any particular component of a wild population. Seasons would be open over the entire course of the run timing or until a quota is reached. If quota attainment causes fisheries to target the early portion of the run, the fishery will be adjusted to spread the harvest over the entire run. Size limits would be set to allow retention of jacks and adults and open fishing areas would be situated low in basins where almost all coho are "bright" thus avoiding selective retention of green fish and release of dark fish. Given that a fishery would only be open on a population where it is forecasted to have an abundant adult return or impacts to the wild population are not anticipated to effect productivity or viability, it is unlikely that changes would occur to the biological characteristics of the Oregon Coastal Coho ESU.

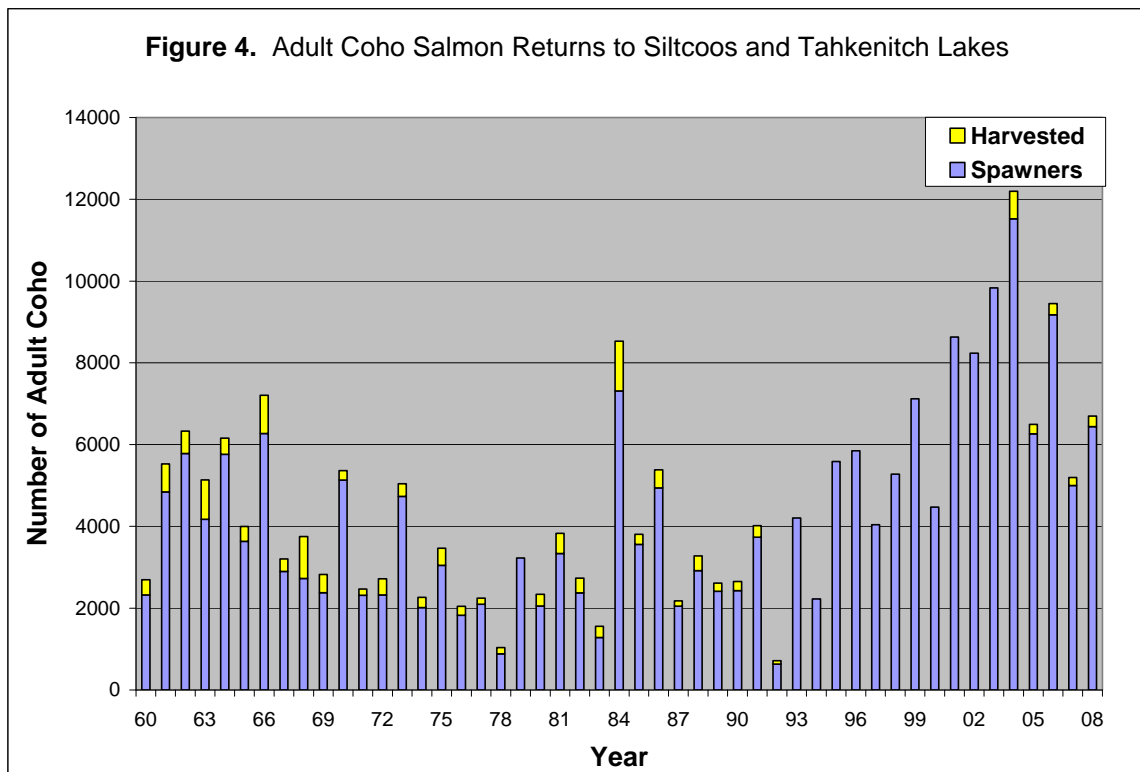
**2.1.3) Comparison of harvest impacts in previous years and the harvest impacts anticipated to occur under the harvest regime in this FMEP.**

These proposed estuary and river coho fisheries are likely to have lower harvest rates than historic fisheries. Prior to the development of A-13, salmon fisheries were managed for an aggregate natural spawning escapement goal of 200,000 coho salmon. Preseason abundance estimates were used to establish catch quotas by simply subtracting the 200,000 spawning escapement goal from estimated annual ocean abundance to determine the number of OCN coho available for fisheries (Melcher 2005). With the inception of A-13 and subsequent 2000 revision, harvest impacts on natural coho populations in the

ESU have been managed based on parent spawners and an index of marine survival. As a result, ocean harvest rates on OCN coho from 1994 -2008 have been as low as 3% and averaged about 9% with freshwater impact rates at approximately 1% annually (Table 4). Mixed-stock ocean fisheries may also be constrained by weak stocks including Sacramento Chinook, Klamath Chinook, Tule Chinook and Lower Columbia River coho, thus leaving additional impact allowance for terminal areas.

Compared to previous years when terminal areas were open to coho harvest, impacts anticipated to occur under this proposed FMEP will be more constrained. Some potential management restrictions to a terminal fishery may include; restricting the bag limit to 1 wild adult coho per day, seasonal limit of 5 per year, limited to tidewater and/or lower river only fishing, and quotas in place at least during initial years. This will reduce harvest compared to previous fisheries that had much more liberal harvest (2 per day and 40 per year), and much larger open areas encompassing the majority of coho migration habitat.

The management strategies proposed for re-instating in river coho fisheries as mentioned above have already been demonstrated to work in two Mid Coast fisheries at Siltcoos and Tahkenitch lakes. These two lake fisheries were re-instated in December 2003 following completion and NMFS approval of an FMEP (ODFW 2003). These two lake populations have the highest spawner abundance on record during the time period fisheries have been allowed under their FMEP (Figure 4). These lake fisheries have demonstrated that terminal harvest rate on wild coho will be low (4% average) and that terminal harvest of strong populations can provide substantial angling opportunity consistent with conservation.



**2.1.4) Description of additional fishery impacts not addressed within this FMEP for the listed ESUs specified in section 1.3. Account for harvest impacts in previous year and the impacts expected in the future.**

Fisheries under this FMEP are guided by the revised A-13 matrix, though capped at 35%. A-13 considers impacts from all fisheries on OCN adult coho salmon, which includes the ocean fisheries and freshwater fisheries on other adult salmonids not addressed in this FMEP.

Additional fishery impacts on these coho salmon would include mortality on juvenile coho during trout fisheries. These impacts are minor because juvenile coho salmon are typically small (less than 90 mm in size) during open trout seasons and thereby only caught on occasion.

For coho salmon in these fisheries, harvest impacts will mainly be on a single age class of fish. It is anticipated that the likely small harvest of jacks in these fisheries will not substantially impact future year returns.

## **SECTION 3. MONITORING AND EVALUATION**

**3.1) Description of the specific monitoring of the “Performance Indicators” listed in section 1.1.3.**

Performance indicators 1, 2, 3 and 10 will be monitored and evaluated using a statistical creel survey during initial years of the coho fishery. The statistical creel surveys will be continued for an estimated three years or a time period determined to be sufficient to characterize the fisheries. If as expected, overall harvest rates are low, creel surveys (and quotas) will not be continued indefinitely. If fisheries are implemented without quotas, impact rates will be monitored based on annual catch estimates made from harvest tags and annual spawner estimates.

Spatially balanced random spawning surveys and standard spawning surveys will be conducted annually within a basin opened for wild coho harvest and throughout the entire ESU. These will be used to estimate spawner abundance, distribution, and population trends. The surveys would monitor performance indicators 4, 5, 6, 9 and 10.

Life cycle monitoring (LCM) sites will continue to operate annually to monitor adult salmon returns and salmon smolt out migrants. These sites provide sound assessments of smolt productivity from parent spawners as well as marine survival estimates from subsequent adult returns. Although these sites are not located in every basin with an independent population in the ESU, they do provide managers with applicable data

indicating status and/or trends for independent populations or sub-aggregates in the ESU. Indicators 6, 7 and 9 will be monitored from these sites.

Randomized snorkel surveys are conducted annually to assess juvenile coho occupancy throughout suitable available habitat. These surveys provide juvenile density data that can be compared to previously known high spawner abundance years, as in 2001- 2005. Performance indicator 8 would be monitored by these surveys.

**3.2) Description of other monitoring and evaluation not included in the Performance Indicators (section 3.1) which provides additional information useful for fisheries management.**

Hatchery releases and returns will be monitored to determine jack return rates and used as a basis to categorize marine survival. Similarly, jack coho salmon spawners observed in coastal random and standard surveys, and at LCM sites will potentially be used to categorize marine survival.

Additional information that can be used for fisheries management include; Rapid Biological Assessment (RBA) data, which is an indicator of juvenile salmonid rearing density and distribution; stream habitat surveys conducted by the ODFW Aquatic Inventory Project intended to characterize stream habitat conditions and production capacity; other agency data such as the Knowles Creek smolt trap operated by the U.S. Forest Service; and finally, pertinent information from field biologists, anglers and the public on the condition of the fishery may also be used to supplement other information.

**3.3) Public Outreach**

Initially, public meetings will be held in cities close to basins being proposed for a fishery to describe the fishery and take comments. Public outreach would also be accomplished through ODFW news releases, articles in local and regional newspapers, announcements through the ODFW web site, local and regional radio stations, local fishing groups and watershed councils, the Oregon Fish and Wildlife Commission meetings, and internet discussion boards. The announcements would indicate areas open and closed to coho salmon fishing, seasons, bag limits, quota, and fishing gear allowed. If immediate changes to the fishery are needed, announcements would be made at the above mentioned outreach opportunities and signs would be posted at all pertinent boat ramps and access sites.

**3.4) Enforcement**

Enforcement would be by the Oregon State Police (OSP) and local county Sheriff department through routine checks of anglers. Prior to any rule and regulation setting for a wild coho fishery, the OSP would be consulted to assess rule and regulation language and enforcement capabilities. In addition, any such fishery will be made a priority and discussed in full during the annual Cooperative Enforcement Program (CEP) meeting conducted between local and/or regional OSP officers and ODFW fisheries management



biologists. Volunteers may also be used to observe angling violations and report to local authorities.

### **3.5) Schedule and process for reviewing and modifying fisheries management.**

#### **3.5.1) Description of the process and schedule that will be used on a regular basis to evaluate the fisheries, and revise management assumptions and targets if necessary.**

The management of these terminal fisheries will be reviewed annually in association with the PFMC ocean fishery planning process. During each review, modifications to the fishery (which basins will be opened or closed, season length, quotas, etc.) will be considered to ensure impacts do not reduce spawner abundance below desired levels and are within allowed limits as identified by the revised A-13 matrix (capped at 35%) and this FMEP. Since there are uncertainties in forecasting the abundance of coho salmon, ODFW will strive to improve coho predictive capabilities.

Annual reviews of the fishery will include angler harvest, angler effort, and spawner abundance data, and other performance indicators previously outlined in this FMEP, such as data from LCM sites. Additional information collected from field biologists, anglers and the public will also be considered.

ODFW will annually submit a summary report to NMFS (c/o Branch Chief, Salmon Recovery Branch, Salmon Recovery Division, 1201 N.E. Lloyd Blvd Suite 1100, Portland, OR 97232) describing the previous years coho harvest, angler effort, and spawner abundance and other biological attributes used as performance indicators (section 1.1.1). The report will also include forecasts of coho abundance for the following year and the plans for a fishery in the upcoming season (if any), including the dates of the fishery and fish quota (if any). The report will be provided to NMFS no later than July 1. NMFS will review the annual report and provide written approval or disapproval of ODFW's proposal for the upcoming fishery.

#### **3.5.2) Description of the process and schedule that will occur every three to six years to evaluate whether the FMEP is accomplishing the stated objectives. The conditions under which revisions to the FMEP will be made and how the revisions will likely be accomplished should be included.**

Evaluation of whether this FMEP is accomplishing its objectives will be conducted on a three to six year basis by ODFW and NMFS. The difference of reporting either on a three or six year time frame will depend on the number of years fisheries are open given unforeseen variables, i.e. poor ocean conditions and no fishery. It is anticipated a review of the FMEP will occur after three years with several basins open.

If objectives and/or expectations are found not to have been met by ODFW and NMFS, then ODFW will revise the original FMEP and resubmit it to NMFS.

ODFW has initiated internal discussion of the revised A-13 harvest matrix. Since the last review of this matrix in year 2000, monitoring information has increased and modeling procedures have been improved. Ocean conditions have gotten better which necessitates consideration of coho performance and habitat use when smolt survival is higher. ODFW will collaborate with the PFMC and others on any changes to the A-13 harvest matrix. If these changes are made, they will be incorporated into harvest criteria in this FMEP when completed and subject to NMFS approval.

#### **SECTION 4. CONSISTENCY OF FMEP WITH PLANS AND CONDITIONS SET WITHIN ANY FEDERAL COURT PROCEEDINGS**

The only relevant Federal Court Proceeding is with the Siletz Tribe. The Confederated Tribes of the Siletz Indians have rights to harvest up to 200 coho or Chinook salmon annually from designated sites on three tributaries to the Siletz River, United States Public Law 96-340, 1980 (ODFW 1999). If a terminal fishery is considered in the Siletz Basin, Tribal Harvest that is likely to occur will be included in determining total harvest impacts during planning.

## References

- Bernard, D.R., A.E. Bingham, and M. Alexandersdottir. 1998. The mechanics of onsite creel surveys in Alaska. Alaska Department of Fish and Game, Special Publication No. 98-1, Anchorage, Alaska.
- McElhany, P., M. Ruckelshaus, M. J. Ford, T.C. Wainwright, and E.P. Bjorkstedt. 2000. Viable salmonid populations and the recovery of evolutionary significant units. U.S. Dept. of Commer., NOAA Tech Memo. NMFS-NWFSC-42.
- Melcher, C. 2005. Oregon Coastal Natural Coho Harvest Management in Ocean and In-River Salmon Fisheries. Part 4 (C) ODFW (2) Harvest Final Report. Oregon Department of Fish and Wildlife, Clackamas Oregon.
- OCN Work Group. 2000. 2000 review of Amendment 13 to the Pacific Coast Salmon Plan. Exhibit B.3.b, Work Group Report, November 2000. Portland, Oregon.
- OCSRI (Oregon Coastal Salmon Restoration Initiative). 1997. OCSRI Conservation Plan for Oregon Coast Coho Salmon. Section 4: Fish Management. March 10, 1997. State of Oregon. Salem.
- NMFS (National Marine Fisheries Service). 1999. ESA Section 7 Consultation. Supplemental Biological Opinion and Incidental Take Statement. The Pacific Coast Salmon Plan and Amendment 13 to the Plan. Northwest and Southwest Regional Sustainable Fisheries Divisions.
- ODFW. 2008. Annual estimates of wild coho spawner abundance in coast river basins within the OPITT OCN, 1990-2008. Unpublished data. Corvallis, Oregon.
- ODFW. 2007. Oregon Coast Coho Conservation Plan for the State of Oregon. Oregon Department of Fish and Wildlife. Salem, OR.
- ODFW 2003. Oregon Coastal Coho, Siltcoos and Tahkenitch Lakes Coho Fishery, FMEP. Oregon Department of Fish and Wildlife, Portland OR.
- ODFW, 1999. Siletz River Basin Fish Management Plan. Oregon Department of Fish and Wildlife. Newport, OR.
- PFMC, 1999. Final Amendment 13 to the Pacific Coast Salmon Plan. PFMC, Portland, Oregon.
- Wainwright, T.C., M.W. Chilcote, P.W. Lawson, T.E. Nickelson, C.W. Huntington, J.S. Mills, K.M.S. Moore, G.H. Reeves, H.A. Stout, and L.A. Weitkamp. 2008. Biological recovery criteria for the Oregon Coast coho salmon evolutionary significant unit. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-91, 199 p.



## Appendix A

Table A-1. Original harvest management matrix in the PFMC Salmon Fishery Management Plan Amendment 13.

PARENT SPAWNER STATUS <sup>b/</sup>	SMOLT TO ADULT MARINE SURVIVAL <sup>a/</sup>		
	Low	Medium	High
ALLOWABLE TOTAL FISHERY IMPACT			
<b>High</b> Parent Spawners achieved Level #2 rebuilding criteria <i>and</i> grandparent spawners achieved Level #1 rebuilding criteria	≤15%	≤30%	≤35%
<b>Medium</b> Parent spawners achieved Level #1 or greater rebuilding criteria	≤15%	≤20%	≤25%
<b>Low</b> Parent spawners less than Level #1 rebuilding criteria	≤15% ----- ≤10-13% <sup>c/</sup>	≤15%	≤15%
Stock Component Rebuilding Criteria:	<b>Level #1</b> (50%)	<b>Level #2</b> (75%)	
Northern	10,900	16,400	
North - Central	27,500	41,300	
South - Central	25,000	37,500	
Southern	2,700	4,100	
Total	66,100	99,300	

a/ Smolt to adult marine survival is projected from smolt to jack marine survival for representative OPI hatchery stocks from the appropriate brood year. Low medium and high marine survival categories are defined as less than 0.09%, from 0.09% to 0.34% and greater than = 0.34% respectively.

b/ In the event that a spawner criteria is achieved, but a *major* basin within the stock component is *less than ten percent of the full seeding level*, the next tier of additional harvest would not be allowed in mixed stock fisheries for that component, nor additional impacts within that particular basin. (see Table A-3 in Appendix A of Amendment 13 to the FMP for a listing of major basins within stock components and Table A-2 in Appendix A of Amendment 13 for spawners needed for full seeding at 3% marine survival.

c/ This exploitation rate criteria applies when parent spawners are less than 38% of the Level #1 rebuilding criteria, or *when marine survival conditions are extremely low as in 1994-98 (i.e. < 0.06% hatchery smolt to jack survival)*

Table A-2. The harvest management matrix in the PFMC Plan Amendment 13, including OCN work group revisions, showing allowable fishery impacts and ranges of resulting recruitment for each combination of parental spawner abundance and marine survival.

Parent Spawner Status <sup>a/</sup>	Marine Survival Index (based on return of jacks per hatchery smolt)						
	Extremely Low (<0.0008)	Low (0.0008 to 0.0014)	Medium (>0.0014 to 0.0040)	High (>0.0040)			
<b>High</b> Parent Spawners > 75% of full seeding	<b>E</b> ≤ 8%	<b>J</b> ≤ 15%	<b>O</b> ≤ 30%	<b>T</b> ≤ 45%			
<b>Medium</b> Parent Spawners > 50% & ≤ 75% of full seeding	<b>D</b> ≤ 8%	<b>I</b> ≤ 15%	<b>N</b> ≤ 20%	<b>S</b> ≤ 38%			
<b>Low</b> Parent Spawners > 19% & ≤ 50% of full seeding	<b>C</b> ≤ 8%	<b>H</b> ≤ 15%	<b>M</b> ≤ 15%	<b>R</b> ≤ 25%			
<b>Very Low</b> Parent Spawners > 4 fish per mile & ≤ 19% of full seeding	<b>B</b> ≤ 8%	<b>G</b> ≤ 11%	<b>L</b> ≤ 11%	<b>Q</b> ≤ 11%			
<b>Critical<sup>b/</sup></b> Parental Spawners ≤ 4 fish per mile	<b>A</b> 0 - 8%	<b>F</b> 0 - 8%	<b>K</b> 0 - 8%	<b>P</b> 0 - 8%			
Sub-aggregate and Basin Specific Spawner Criteria Data							
Sub-aggregate	Miles of Available Spawning Habitat	100% of Full Seeding	"Critical"		Very Low, Low, Medium & High		
			4 Fish per Mile	12% of Full Seeding	19% of Full Seeding	50% of Full Seeding	75% of full Seeding
Northern	899	21,700	3,596	NA	4,123	10,850	16,275
North - Central	1,163	55,000	4,652	NA	10,450	27,500	41,250
South - Central	1,685	50,000	6,740	NA	9,500	25,000	37,500
Southern	450	5,400	NA	648	1,026	2,700	4,050
Coastwide Total	4,197	132,100	15,636		25,099	66,050	99,075

a/ Parental spawner abundance status for the OCN aggregate assumes the status of the weakest sub-aggregate.

b/ "Critical" parental spawner status is defined as 4 fish per mile for the Northern, North-Central, and South-Central sub-aggregates. Because the ration of high quality spawning habitat to total spawning habitat in the Rogue River Basin differs significantly from the rest of the basins on the coast, the spawner density of 4 fish per mile does not represent "Critical" status for that basin. Instead, "Critical" status for the Rogue Basin (Southern Sub-aggregate) is estimated as 12% of full seeding of high quality habitat.

Table A-3. Basin specific spawner criteria to the harvest matrix in the PFMC Plan Amendment 13.

Table A-2. Sub-aggregate and basin specific spawner criteria for the A-13 harvest matrix.				
Sub- Aggregate / Basin	Critically Low Spawner Densities	Rebuliding Levels (Number of Spawners)		
		50% of Full Seeding	75% of Full Seeding	Full Seeding
<b>Northern</b>	3,596			
Nehalem	4 fish per mile	8,750	13,125	17,500
Tillamook	4 fish per mile	1,000	1,500	2,000
Nestucca	4 fish per mile	900	1,350	1,800
Ocean Tributaries	4 fish per mile	200	300	400
Total	3,596	10,850	16,275	21,700
<b>North Central</b>	4,652			
Siletz	4 fish per mile	2,150	3,225	4,300
Yaquina	4 fish per mile	3,550	5,325	7,100
Alsea	4 fish per mile	7,550	11,325	15,100
Siuslaw	4 fish per mile	11,400	17,100	22,800
Ocean Tributaries	4 fish per mile	2,850	4,275	5,700
Total	4,652	27,500	41,250	55,000
<b>South Central</b>	6,740			
Umpqua	4 fish per mile	14,700	22,050	29,400
Coos	4 fish per mile	3,600	5,400	7,200
Coquille	4 fish per mile	2,700	4,050	5,400
Coastal Lakes	4 fish per mile	4,000	6,000	8,000
Total	6,740	25,000	37,500	50,000
<b>South</b>	648			
Rogue	648	2,700	4,050	5,400
Total	648	2,700	4,050	5,400
<b>Coastwide Total</b>	15,636	66,050	99,075	132,100

Table A-4. Annual estimates of wild coho spawner abundance in Oregon coastal river basins within the OPITT OCN, 1990-2008

Monitoring Area, Basin/Group	Population	Spawner Abundance by Return Year															Population Based Est.			
		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008 *
<b>Oregon Coast ESU</b>																				
<b>North Coast:</b>																				
Necanicum R. & Elk Cr.	Necanicum R.	191	1,135	185	941	408	211	768	253	946	728	474	5,247	2,896	3,068	3,142	1,218	750	431	1,105
Nehalem R.	Nehalem R.	1,552	3,975	1,268	2,265	2,007	1,463	1,057	1,173	1,190	3,713	14,285	22,310	20,903	33,059	21,479	10,451	11,614	14,033	15,690
Tillamook Bay	Tillamook Bay	265	3,000	261	860	652	289	661	388	271	2,175	1,983	1,883	15,715	14,584	2,290	1,995	8,774	2,280	4,897
Nestucca R.	Nestucca R.	189	728	684	401	313	1,811	519	271	169	2,201	1,171	3,940	13,003	8,929	6,152	686	1,876	394	5,444
Sand Lake & Neskowin Cr.	--		240	24	41	77	108	275	61	0	47	0	71	16	0	0	--	--	--	--
Miscellaneous	N Coast Dependents	-	204	-	-	-	-	-	-	-	-	-	-	-	-	-	2,116	1,121	376	540
<b>Total</b>		<b>2,197</b>	<b>9,282</b>	<b>2,422</b>	<b>4,508</b>	<b>3,457</b>	<b>3,882</b>	<b>3,280</b>	<b>2,146</b>	<b>2,576</b>	<b>8,864</b>	<b>17,913</b>	<b>33,451</b>	<b>52,533</b>	<b>59,640</b>	<b>33,063</b>	<b>16,466</b>	<b>24,135</b>	<b>17,514</b>	<b>27,676</b>
<b>Mid Coast:</b>																				
Salmon R.	Salmon R.	385	39	28	364	107	212	271	237	8	175	0	310	372	0	2,374	79	513	59	784
Siletz R.	Siletz R.	441	984	2,447	400	1,200	607	763	336	394	706	3,553	1,437	2,252	9,736	6,399	14,567	5,205	2,197	14,519
Yaquina R.	Yaquina R.	381	380	633	549	2,448	5,668	5,127	384	365	2,588	647	3,039	23,981	13,254	4,989	3,441	4,247	3,158	8,710
Devil's Lk. & Beaver Cr.	Beaver Cr.	23	-	756	500	1,259	-	1,340	425	1,041	3,366	738	5,274	8,754	5,812	7,179	2,264	1,950	611	1,182
Alsea R.	Alsea R.	1,189	1,561	7,029	1,071	1,279	681	1,637	680	213	2,050	2,465	3,339	6,170	8,957	6,005	13,907	1,972	2,146	11,431
Yachats R.	--	280	28	337	287	67	117	176	99	102	150	79	52	1,245	1,635	641	--	--	--	--
Siuslaw R.	Siuslaw R.	2,685	3,740	3,440	4,428	3,205	6,089	7,625	668	1,089	2,724	6,767	11,024	57,129	29,257	8,443	16,907	5,869	3,552	17,042
Miscellaneous	Mid-Coast Dependents	207	-	700	180	250	231	1,188	13	71	0	12	764	4,063	217	4,364	246	1,468	557	4,204
<b>Total</b>		<b>5,591</b>	<b>6,732</b>	<b>15,370</b>	<b>7,779</b>	<b>9,815</b>	<b>13,605</b>	<b>18,127</b>	<b>2,842</b>	<b>3,283</b>	<b>11,759</b>	<b>14,261</b>	<b>25,239</b>	<b>103,966</b>	<b>68,868</b>	<b>40,394</b>	<b>51,411</b>	<b>21,224</b>	<b>12,280</b>	<b>57,872</b>
<b>Umpqua:</b>																				
Lower Umpqua & Smith R.	Lower Umpqua R.	589	1,316	1,759	4,804	1,689	6,803	4,904	935	5,118	2,323	3,696	8,850	14,492	12,760	8,046	18,591	7,994	4,237	12,267
Mainstem Umpqua	Middle Umpqua R.	455	-	192	1,431	1,240	352	339	397	444	1,289	2,774	8,177	9,349	5,770	5,309	7,608	4,852	1,587	4,594
Elk & Calapooya Cr.	--	185	-	-	-	708	2,315	1,709	196	379	434	1,864	2,581	1,555	4,450	2,602	--	--	--	--
South Umpqua R.	South Umpqua R.	2,508	2,284	201	2,415	579	755	1,685	512	678	1,219	479	6,482	1,670	2,345	9,333	14,364	2,246	4,549	12,007
Cow Cr.	--	-	-	-	661	269	1,124	1,112	193	1,807	1,234	1,582	6,661	6,745	1,277	2,351	--	--	--	--
Winchester Dam (Wild Adult Coho)	North Umpqua R.	376	1,273	1,607	933	851	1,460	1,075	727	727	1,186	1,838	2,951	3,780	3,005	3,705	2,113	3,062	1,410	3,438
<b>Total</b>		<b>4,113</b>	<b>4,873</b>	<b>3,759</b>	<b>10,244</b>	<b>5,336</b>	<b>12,809</b>	<b>10,824</b>	<b>2,960</b>	<b>9,153</b>	<b>7,685</b>	<b>12,233</b>	<b>35,702</b>	<b>37,591</b>	<b>29,607</b>	<b>31,346</b>	<b>42,676</b>	<b>18,154</b>	<b>11,783</b>	<b>32,306</b>
North Umpqua (Survey Est.)	North Umpqua R.																3,692	2,154	1,081	1,027
<b>Lakes:</b>																				
Siltcoos Lake	Siltcoos Lake	1,622	2,895	391	3,622	1,426	4,497	4,775	2,653	3,122	2,819	3,835	5,104	4,812	7,225	8,025	4,364	5,473	1,447	3,835
Tahkenitch Lake	Tahkenitch Lake	1,085	1,215	318	954	1,062	1,627	1,627	1,858	2,817	3,769	634	3,526	3,489	3,203	3,496	1,897	3,718	3,551	2,604
Tenmile Lake	Tenmile Lake	1,687	3,141	1,277	5,569	3,354	5,092	7,092	4,092	5,169	6,123	8,278	11,039	13,861	6,260	7,166	8,464	15,187	3,957	17,131
<b>Total</b>		<b>4,393</b>	<b>7,251</b>	<b>1,986</b>	<b>10,145</b>	<b>5,841</b>	<b>11,216</b>	<b>13,493</b>	<b>8,603</b>	<b>11,107</b>	<b>12,710</b>	<b>12,747</b>	<b>19,669</b>	<b>22,162</b>	<b>16,688</b>	<b>18,687</b>	<b>14,724</b>	<b>24,378</b>	<b>8,955</b>	<b>23,570</b>
<b>Mid-South Coast:</b>																				
Coos Bay & Big Cr.	Coos Bay	2,273	3,813	16,545	15,284	14,685	10,351	12,128	1,127	3,167	4,945	5,386	43,301	35,688	29,559	24,116	17,048	11,266	1,329	13,312
Coquille	Coquille R.	2,712	5,651	2,115	7,384	5,035	2,116	16,169	5,720	2,466	3,001	6,130	13,310	8,610	23,909	22,276	11,806	28,577	13,968	9,874
Floras & Sixes R.	Floras Creek	-	-	-	-	-	-	-	-	252	164	1,440	1,945	20	310	5,498	n.a.s.	1,104	340	637
	Sixes R.																n.a.s.	n.a.s.	n.a.s.	77
<b>Total</b>		<b>4,985</b>	<b>9,464</b>	<b>18,660</b>	<b>22,668</b>	<b>19,720</b>	<b>12,467</b>	<b>28,297</b>	<b>6,847</b>	<b>5,885</b>	<b>8,110</b>	<b>12,956</b>	<b>58,556</b>	<b>44,318</b>	<b>53,778</b>	<b>51,890</b>	<b>28,854</b>	<b>40,947</b>	<b>15,637</b>	<b>23,900</b>
<b>Oregon Coastal ESU</b>		<b>21,279</b>	<b>37,602</b>	<b>42,197</b>	<b>55,344</b>	<b>44,169</b>	<b>53,979</b>	<b>74,021</b>	<b>23,398</b>	<b>32,004</b>	<b>49,128</b>	<b>70,110</b>	<b>172,617</b>	<b>260,570</b>	<b>228,581</b>	<b>175,380</b>	<b>154,131</b>	<b>128,838</b>	<b>66,169</b>	<b>165,324</b>
<b>Spawner/Spawner Ratio</b>					2.60	1.17	1.28	1.34	0.53	0.59	0.66	3.00	5.39	5.30	3.26	1.02	0.59	0.56	0.38	1.07
<b>Southern Oregon Northern California Coast ESU</b>																				
Rogue (Huntley Seining)	Rogue (Huntley Seining)	3,051	1,027	2,208	361	5,439	3,761	4,622	8,282	2,316	1,438	10,966	12,213	7,800	6,754	24,481	9,953	3,937	5,179	414
<b>Spawner/Spawner Ratio</b>					0.12	5.30	1.70	12.80	1.52	0.62	0.31	1.32	5.27	5.42	0.62	2.00	1.28	0.58	0.21	0.04

a = Preliminary Data.

n.a.s. = Not adequate surveys for estimate.

Red Italics = Inadequate observations to calculate H/W ratio, reported numbers are Total Coho.

Yellow Highlighted cells need to determine H:W Ratio. Reported numbers are based on prior years average % wild fish in each area.