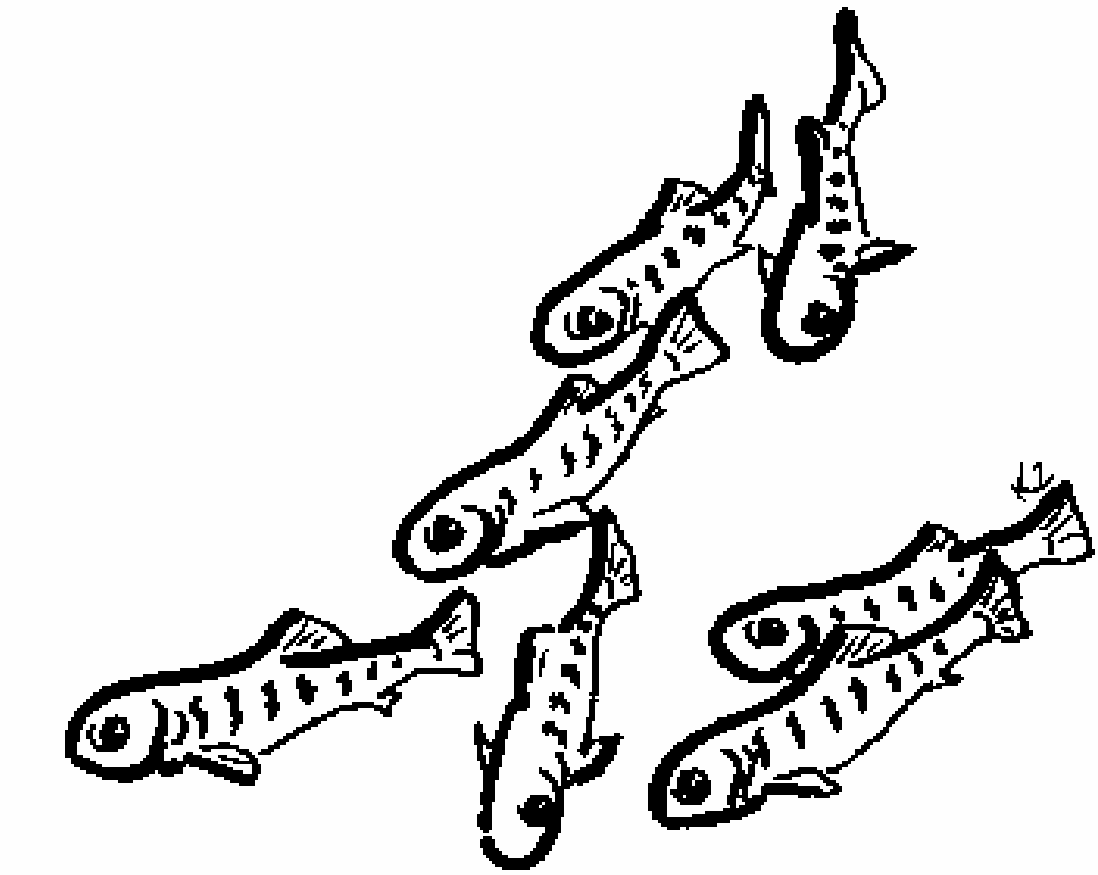
Coho



Coastal Coho

Existing Populations

The Coastal Coho SMU consists of 67 populations (Table 6). Of the 67 populations, 19 are identified as independent (ODFW 2005). The area encompassed by the independent and potentially independent populations makes up 95% of the habitat used by coho within the SMU (ODFW Coho distribution data). The remaining 48 populations are considered dependent populations. Little data is available from the dependent populations and because it is believed that these populations rely on seeding from independent populations making an assessment of their status is difficult. For the purposes of this assessment, the status of the SMU was based upon data available from the 19 independent and potentially independent populations. It is likely that the health of these populations drives the health of the SMU. None of the 19 independent or potentially independent populations are extinct.

Table 6. Population list and existence status for the Coastal Coho SMU.

Exist	Independent Population	Description (*Dependent populations*)
Yes	Necanicum	Necanicum River basin. (*Arch Cape, Asbury, Austin, Red Rock, Ecola, Canyon, Indian creeks*)
Yes	Nehalem	Nehalem River basin. (*Spring, Short Sand creeks*)
Yes	Tillamook	All tributaries to Tillamook Bay. (*Netarts Bay, Watseco creeks*)
Yes	Nestucca	Nestucca River basin. (*Neskowin, Sand, Rover creeks*)
Yes	Salmon	Salmon River basin.
Yes	Siletz	Siletz River basin. (*Rocky Creek, Depoe Bay Creek, Fogarty Creek, Schoolhouse Creek, Devils Lake*)
Yes	Yaquina	Yaquina River basin. (*Theil, Moore, Grant, Henderson, Big, Moolack, Coal, Wade, Spencer, Johnson creeks*)
Yes	Beaver	Beaver Creek basin.
Yes	Alsea	Alsea River basin. (*Yachats River, Vingie Creek, Big Creek, Little Creek*)
Yes	Siuslaw	Siuslaw River basin. (*Sutton, Berry, Cape, Blowout, China, Big, Rock, Squaw, Tenmile, Bob, Cummins, and Gwynn creeks*)
Yes	Upper Umpqua	Umpqua River basin upstream of, and including, Elk Creek.
Yes	Lower Umpqua	Umpqua River basin, including Smith River, upstream to mouth of Elk Creek. (*Threemile Creek*)
Yes	Tahkenitch	Tributaries to Tahkenitch Lake.
Yes	Siltcoos	Tributaries to Siltcoos Lake.
Yes	Tenmile	Tributaries to Tenmile and Eel Lakes.
Yes	Coos	Coos River basin.
Yes	Coquille	Coquille River basin. (*Twomile, Johnson creeks*)
Yes	Floras	Floras Lake basin.
Yes	Sixes	Sixes River basin.

Habitat Use Distribution

Coastal coho habitat use was evaluated by examining the percent occurrence of spawners in spawning survey sites. Percent occurrence of spawners was assessed using data from stratified random sample (SRS) spawner surveys. SRS Surveys are conducted at randomly selected reaches throughout the known distribution of coho spawning. Examining the percent of those reaches where spawning is observed provides an estimate of the annual distribution of spawners. A reach was considered occupied if the spawner density of naturally-produced spawners was equal to or greater than one fish per mile. The occupancy rate within a population was determined by calculating the percentage of reaches surveyed within the population that were occupied. Data were not yet available since 2004.

Though adult spawner data were used to evaluate the distribution criterion, sampling of juvenile coho throughout the SMU also indicate that naturally-produced fish consistently are distributed throughout greater than 50% of the available habitat (Jepsen and Rodgers 2004; Rodgers 2002; Rodgers 2001; Rodgers 2000).

Distribution was also assessed by examining the availability of current habitat in comparison to historic habitat. Assessments based on current vs. historic habitat provide a limited estimate of habitat losses. First, migration-only areas sometimes represent habitat that was historically suitable, particularly for rearing. However, it is unclear for what fraction of the migration-only areas this was the case. Second, analyses of distribution were based on 1:100,000 hydrography although coho distribution includes many smaller streams that show up only on a 1:24,000 scale that is not currently available. Thus, such analyses do not completely represent the potential loss of small stream habitat, for instance where a culvert may block the upper portions of headwater streams. Third, habitat that is still available may not provide for all uses it historically provided, such as over-wintering habitat. Finally, this method does not account for lost freshwater wetland and saltwater marsh habitat. Christy (2004) estimated that 74% of these types of habitat have been lost in basins within this SMU since 1850. Losses in individual basins ranged from 0% to 91%. These types of habitat may be critical to juvenile coho rearing and are not captured in our assessments based on accessible and inaccessible freshwater spawning and rearing habitat.

Table 7. Habitat accessibility data used in evaluating interim criteria for the Coastal Coho SMU.

	Accessible	Inaccessible	Percent	% of Sample Reaches Used					No. Years
Population	(mi.)	(mi.)	Accessible	1999	2000	2001	2002	2003	>50%
Necanicum	67	0	100%	73%	89%	100%	100%	89%	5
Nehalem	647	0	100%	73%	76%	82%	88%	97%	5
Tillamook	351	9	97%	63%	52%	72%	85%	91%	5
Nestucca	202	0	100%	47%	59%	86%	85%	95%	4
Salmon	54	0	100%	75%	0%	0%	100%	60%	3
Siletz	245	0	100%	91%	80%	82%	91%	100%	5
Beaver	34	0	100%	75%	100%	100%	100%	100%	5
Yaquina	231	0	100%	82%	70%	100%	100%	100%	5
Alsea	337	0	100%	79%	54%	82%	92%	100%	5
Siuslaw	684	0	100%	71%	79%	88%	86%	100%	5
Upper Umpqua	1,380	59	95%	55%	42%	73%	73%	69%	4
Lower Umpqua	521	0	100%	84%	77%	91%	98%	92%	5
Tahkenitch	36	0	100%	100%	100%	100%	100%	100%	5
Siltcoos	70	0	100%	75%	80%	67%	75%	100%	5
Tenmile	77	0	100%	67%	100%	90%	100%	100%	5
Coos	402	0	100%	89%	69%	97%	97%	94%	5
Coquille	534	2	100%	65%	78%	92%	84%	91%	5
Floras	60	0	100%	75%	100%	100%	67%	67%	5
Sixes	58	0	97%	*Assumed same as Floras*					*Pass*

Abundance

Estimates of full seeding levels are available for most of the independent and potentially independent coastal coho population based on habitat analyses (Nickelson 1998). Values used as the full seeding level were those presented as "Spawners Needed to Produce Maximum Smolts" by Nickelson (1998). Nickelson (1998) computed this metric under low (3%), moderate (5%), and high (10%) marine survival rates. We used those calculated under a marine survival of 5% (estimates provided by T. Nickelson, ODFW, pers. comm.). Full seeding estimates were not available for the Sixes, Floras, and Beaver populations. See the "Population Details" section for further discussion on the assessment of these populations. Abundance estimates for coastal coho populations were derived from SRS estimates made by ODFW (pers. comm., ODFW, Kelly Moore, 8/9/05).

Pre-marine harvest abundance was calculated based on annual coastwide Oregon Coast Natural (OCN) harvest rates to correct for the effects of highly variable fishing rates and to facilitate comparison of abundance estimates over time. Estimates of pre-harvest abundance were incorporated into the abundance graph of the SMU summary.

Table 8. Abundance estimates (adults) used in evaluating interim criteria for the Coastal Coho SMU.

	Full Seeding	25% of	Abundance by Return Year					No. Years >25%
Population	Level	Full Seeding	2000	2001	2002	2003	2004	of Full Seeding
Necanicum	1,900	475	489	4,271	2,383	3,051	2,262	5
Nehalem	31,700	7,925	14,235	22,750	17,996	31,693	20,471	5
Tillamook	5,700	1,425	1,734	1,416	13,733	14,042	4,584	4
Nestucca	6,400	1,600	1,178	4,110	16,427	10,239	6,502	4
Salmon	1,900	475	0	0	583	118	1,758	2
Siletz	7,400	1,850	3,387	1,322	1,785	8,118	5,612	3
Beaver[a]	1,224	306	614	2,945	5,237	4,355	5,647	5
Yaquina	11,800	2,950	637	3,290	23,800	16,484	5,293	4
Alsea	21,100	5,275	3,363	2,888	9,107	10,281	6,328	3
Siuslaw	39,200	9,800	6,532	10,606	55,319	28,967	9,036	3
Upper Umpqua	47,148	11,787	7,164	22,381	17,802	14,683	21,771	4
Lower Umpqua	15,052	3,763	4,760	11,987	21,136	14,656	9,777	5
Tahkenitch	2,032	508	634	3,526	3,487	3,203	3,496	5
Siltcoos	2,806	702	3,835	5,104	4,749	6,628	8,025	5
Tenmile	3,160	790	8,278	11,039	13,861	6,260	7,166	5
Coos	14,600	3,650	4,704	32,954	33,068	25,649	22,046	5
Coquille	18,900	4,725	6,253	12,933	7,626	22,445	22,407	5
Floras[b]			*Outcome based on Sixes*					*Pass*
Sixes[c]	12	3	7	13	6	8	36	5

a. No estimate of full seeding available. Used 25% of average abundance as threshold. Average abundance based on abundance estimates generated by Chilcote et al. (2005) for the period 1980-2003 and 2004 estimate provided by ODFW (pers. comm., Kelly Moore, 8/9/2005).

b. Abundance data are inconclusive in determining assessment outcome. Assessment based on outcome of Sixes assessment. See "Population Details" for a complete explanation.

c. No estimate of full seeding available. Average abundance based on 16 years of data. Abundance presented as peak counts of live and dead fish.

Productivity

For coastal coho, productivity was estimated using SRS spawner abundance estimates from 1990-2004. Because coho adults are all three years of age and the incidence of jack (2-year-old fish) is low, recruits-per-spawner could easily be estimated by comparing spawner numbers at three year intervals.

Table 9. Productivity estimates used in evaluating interim criteria for the coastal coho SMU.

Population	Recent Complete Brood Years of Below Full Seeding	Productivity (R/S) Year 1	Year 2	Year 3	Year 4	Year 5	Years > 1.2
Necanicum	1996-2000	0.8	3.4	4.5	4.6	6.2	4
Nehalem	1997-2001	6.1	10.5	4.7	2.2	0.8	4
Tillamook	1997-2001	4.1	4.9	6.4	6.2	2.5	5
Nestucca	1997-2001	4.3	17.3	7.0	8.1	1.5	5
Salmon	1997-2001	0.0	0.0	3.4	0.3	2.0	2
Siletz	1997-2001	10.1	3.7	1.3	2.4	2.3	5
Beaver[a]	1996-98, 2000-2001	4.8	1.5	2.3	7.1	1.3	5
Yaquina	1997-2001	1.2	5.1	9.3	25.9	1.5	5
Alsea	1997-2001	3.6	1.7	4.4	3.1	1.6	5
Siuslaw	1997-2001	9.8	8.0	17.3	4.4	0.9	4
Upper Umpqua	1997-2001	2.6	2.6	2.5	1.0	0.5	3
Lower Umpqua	1997-2001	4.1	2.8	7.2	3.0	0.7	4
Tahkenitch	1994-97, 2000	1.7	1.7	2.3	0.3	5.1	4
Siltcoos	1989-90, 1992, 1994, 1997	0.2	2.2	11.5	1.9	1.4	4
Tenmile	1988-92	1.2	0.6	3.3	1.1	4.0	3
Coos	1996-2000	0.4	4.2	11.0	6.9	5.4	4
Coquille	1997-2001	1.1	5.4	2.9	3.6	1.4	4
Floras[b]	*Insufficient data – Outcome based on Sixes*						*Fail*
Sixes	1995-97, 1999-2000	12.7	0.8	1.2	1.0	1.1	2

a. Productivity evaluated in most recent five brood years of below 30 year average abundance.

b. Assessment outcome based on outcome for the Sixes. See "Population Details" for a complete explanation.

Reproductive Independence

Estimates of hatchery fractions on the spawning grounds for coastal coho populations were taken directly from data provided by ODFW (pers. comm., Kelly Moore, 8/9/05). ODFW estimated hatchery fractions based upon the relative rates of observations of adipose finclipped and non-finclipped adults during random spawning surveys. Hatchery releases were obtained from ODFW and related to hatchery spawner fractions to provide a context for interpretation in the SMU summary.

Table 10. Reproductive independence estimates used in evaluating interim criteria for the Coastal Coho SMU.

	% Spawning Fish of Hatchery Origin					Years
Population	**2000**	**2001**	**2002**	**2003**	**2004**	**≤10%**
Necanicum	0%	7%	3%	0%	6%	5
Nehalem	1%	9%	17%	3%	0%	4
Tillamook	23%	22%	2%	1%	6%	3
Nestucca	7%	6%	2%	1%	2%	5
Salmon	100%	100%	47%	93%	53%	0
Siletz	0%	46%	29%	4%	0%	3
Beaver	0%	32%	4%	0%	0%	4
Yaquina	0%	8%	0%	0%	2%	5
Alsea	0%	26%	2%	0%	0%	4
Siuslaw	0%	0%	1%	0%	0%	5
Upper Umpqua	53%	45%	28%	37%	25%	0
Lower Umpqua	2%	14%	3%	0%	1%	4
Tahkenitch	0%	0%	0%	0%	0%	5
Siltcoos	0%	0%	0%	0%	0%	5
Tenmile	0%	0%	0%	0%	0%	5
Coos	0%	4%	1%	1%	1%	5
Coquille	0%	17%	3%	1%	0%	4
Floras[a]	0%	3%	0%	0%	0%	5
Sixes[a]	0%	3%	0%	0%	0%	5

a. Estimates based on standard random survey estimates for both Sixes and Floras combined..

Hybridization

Hybridization has not been identified as an issue for coastal coho.

Population Details

Beaver Creek

A full seeding estimate for Beaver Creek was not available, so the abundance criterion could not be evaluated in a manner consistent with other populations in the SMU. Instead, the 30-year average natural abundance was estimated and 25% of that was the criteria threshold used. Abundance estimates were derived from Chilcote et al. (2005). Habitat conditions within the Beaver Creek basin support the contention that the population would likely pass the abundance criterion. The lower Beaver Creek basin is a low gradient area with significant amounts of "lake-like" habitat highly suitable for juvenile coho over-winter rearing.

Coquille

Data from SRS spawning surveys in 2001 indicated that the percentage of fish on the spawning ground that were hatchery origin was 17%. District ODFW biologists believe that this number was not representative of the entire basin, and was an artifact of the point that one of the spawning surveys was on Bear Creek. Bear Creek is very near to one of the hatchery juvenile acclimation sites and is likely to have an uncharacteristically high number of strays relative to other tributaries in the basin. The coho hatchery program is small at 50,000 smolts released per year.

Floras Creek

No estimate of full seeding was available for Floras Creek, and only seven years of spawner estimates and hatchery fractions are available. Abundance estimates specific to the Floras population are not available. ODFW estimates abundance for the Floras and Sixes populations combined. In addition, the abundance estimates have a low precision. The 95% confidence interval of the estimates for these populations is approximately two times larger than the abundance estimate itself. Some coho are observed during a standard fall Chinook spawning survey on Floras Creek, but not on a consistent basis. This survey may not be located in coho habitat so these data were not used for this assessment.

Todd Confer (ODFW, Gold Beach) stated that the Floras basin has higher quality coho habitat than that of the Floras/Sixes combined abundance estimates and that 75% of the coho production is in the Floras system. He cites more suitable over-wintering habitat in Floras than in the Sixes which allows for higher over-winter survival for juvenile coho. Based on this reasoning, we decided that the Floras should pass the abundance criterion since the Sixes passed this criterion. Likewise, since the Sixes failed productivity, so did the Floras.

For reproductive independence, estimates of hatchery fractions of fish observed during SRS coho surveys were used to assess the criterion. ODFW presents these estimates for the Sixes and Floras combined, so the same data-set was used for both populations.

Sixes

Occupancy estimates were not available for the Sixes, so the outcome was based on that of the Floras population.

Abundance estimates via SRS spawning surveys are only available for the past six years in the Sixes, and are made in conjuction with the Floras population. In addition, the abundance estimates have a low level of precision. The 95% confidence interval of the estimates for these populations is approximately two times larger than the abundance estimate itself. For this assessment, abundance in the Sixes was assessed using the sum of peak counts of live and dead

coho adults observed in two standard fall Chinook surveys in the Sixes basin. Those two surveys over-lap with coho habitat, and surveyors note coho observed.

No estimate of full seeding was available for this population, so 25% of the average peak count observed in standard fall Chinook surveys was used as the abundance criterion threshold. Standard surveys in the Sixes began in 1989, so the average abundance was based on 16 years of data. Peak count estimates from those surveys were not adjusted by hatchery-to-wild ratios prior to 1998 because no hatchery fraction estimates were available prior to then.

For reproductive independence, estimates of hatchery fractions of fish observed during SRS coho surveys were used to assess the criterion. ODFW presents these estimates for the Sixes and Floras combined, so the same data set was used for both populations.

Assessment Conclusions

This SMU includes 19 populations that were assessed in ocean tributaries from the Necanicum to the Sixes River. All of the six interim criteria were met by at least 80% of the populations. Until recently, escapements have been at or near record lows. However, numbers, distributions, and productivity have rebounded for most populations in the last four years following improved ocean productivity. These improvements have eased near-term risks, but it is not clear whether all underlying factors for the recent decline have been addressed or if this is just a temporary response.

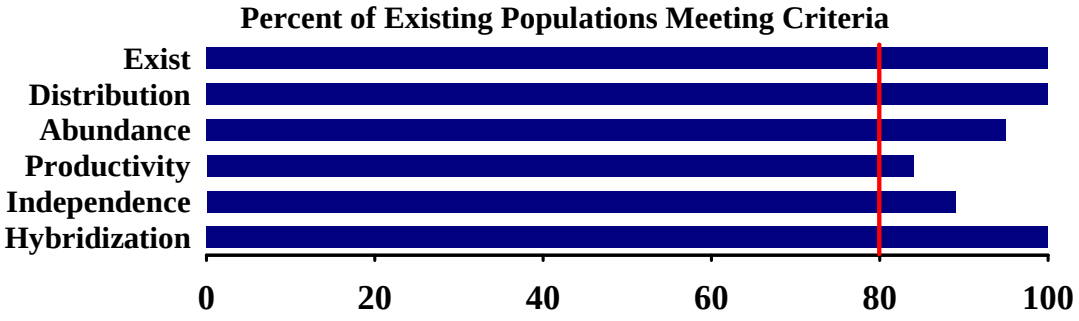
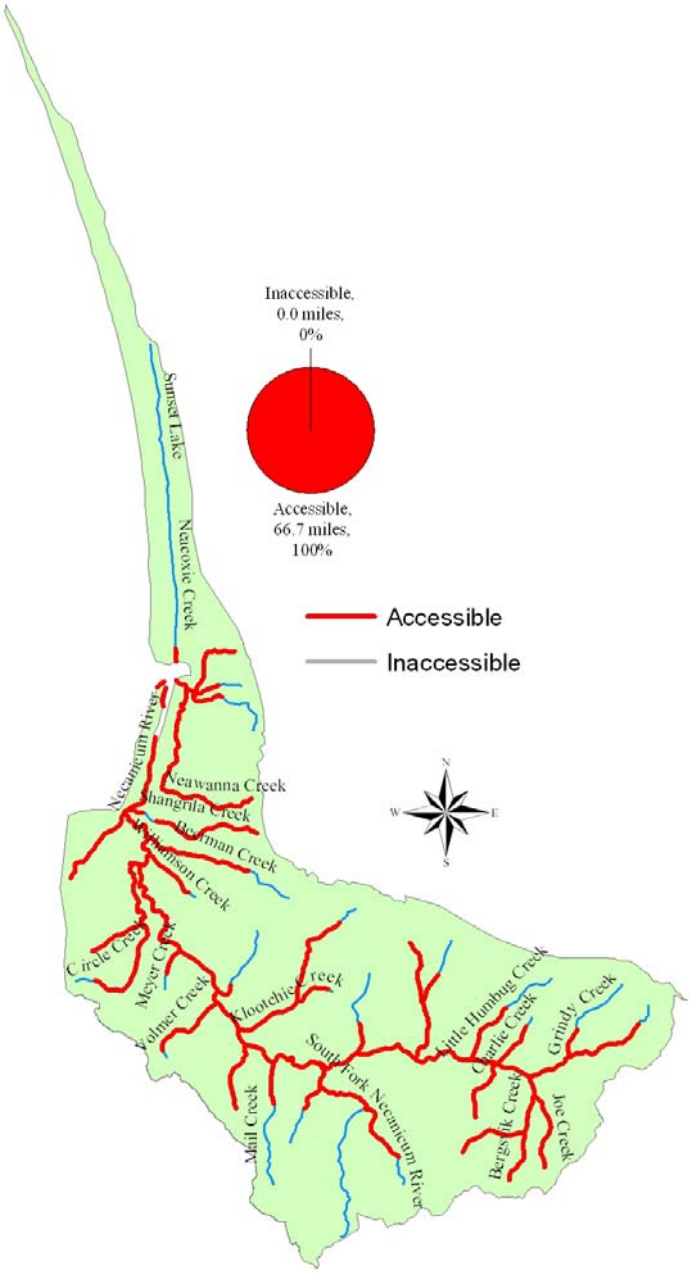
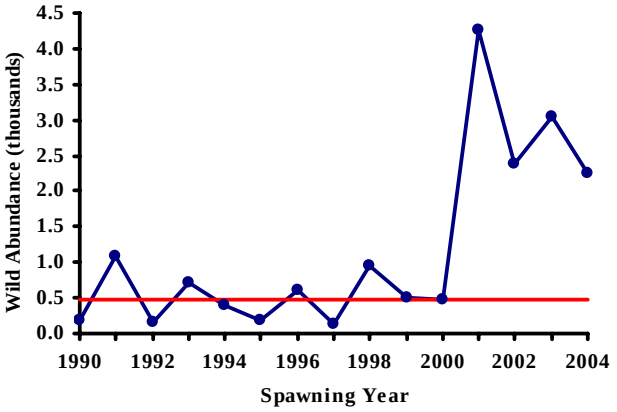
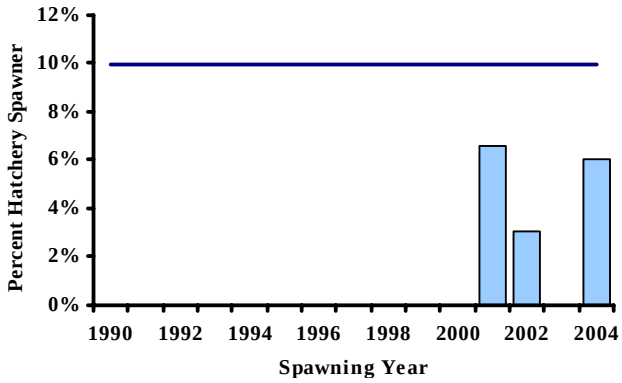


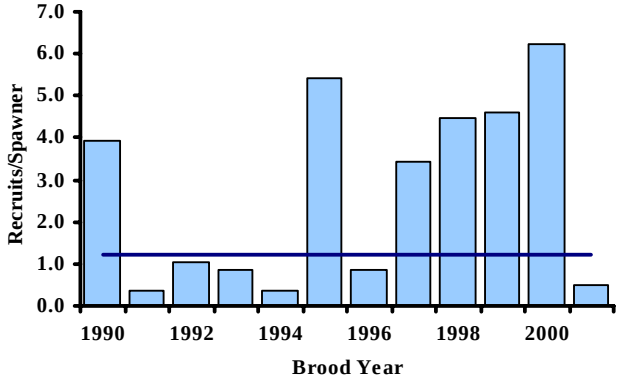
Figure 6. Assessment outcome for each of the six interim criteria with respect to the 80% threshold identified by the NFCP.

Necanicum – Coastal Coho







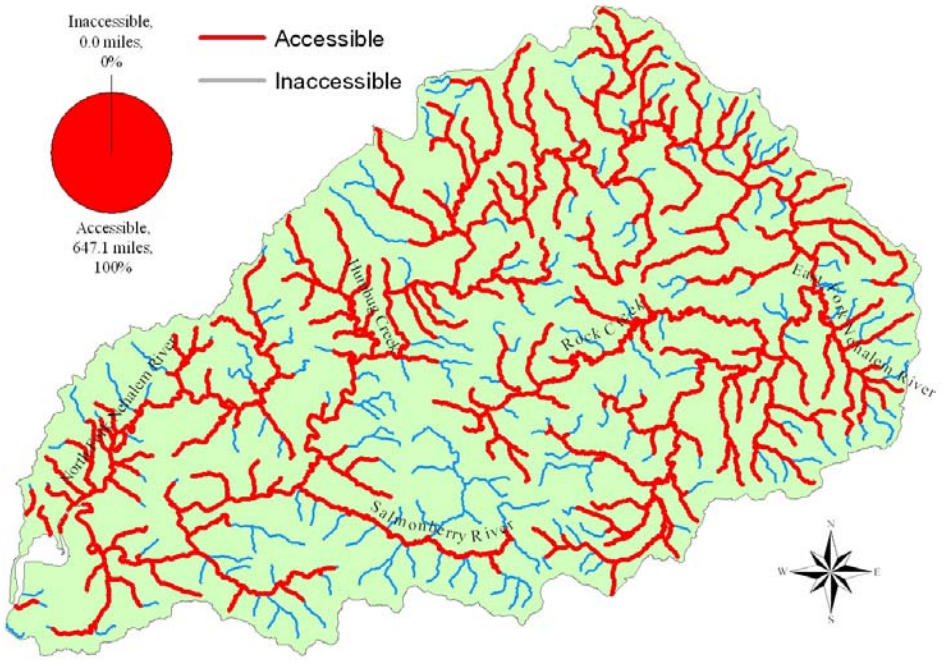


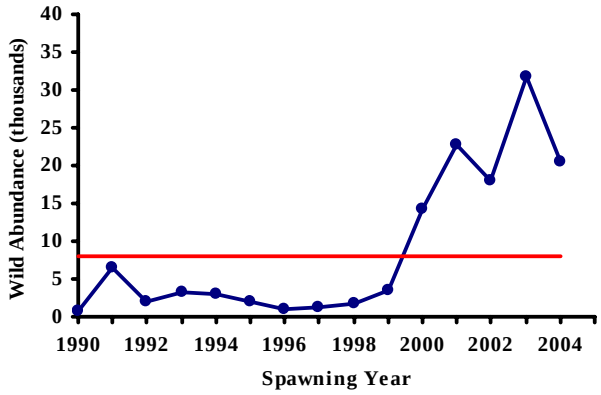
The Necanicum is the smallest coho producer in the north coast, and is among the smallest potentially independent populations in the SMU. The population passed each of the interim criteria. Landownership in the Necanicum is primarily state and private timberland. No hatchery releases have been made into the population in the last 13 years. Much of the habitat historically used by coho is still accessible today. Data from Ecola/Elk Creek were included in the assessment of the Necanicum population.

Assessment Outcome

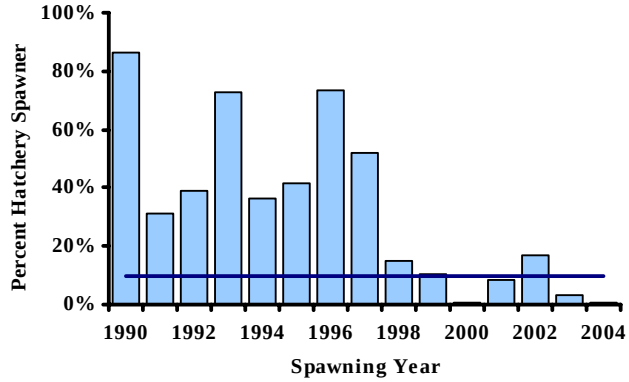
Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Pass*	*Pass*	*Pass*	*Pass*

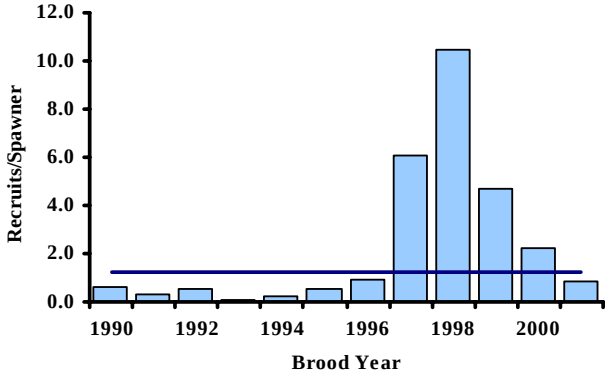
Nehalem – Coastal Coho





The Nehalem is one of the largest coho producers within the SMU. Current smolt releases of 100,000 are approximately one-sixth of releases through the 1990s. Hatchery fish contribution on the spawning ground has averaged 34% of natural spawners since 1990, but has been 10%or less in three of the last five yeaars. Much of the habitat historically used by coho is still accessible today. This population passed each of the interim criteria.

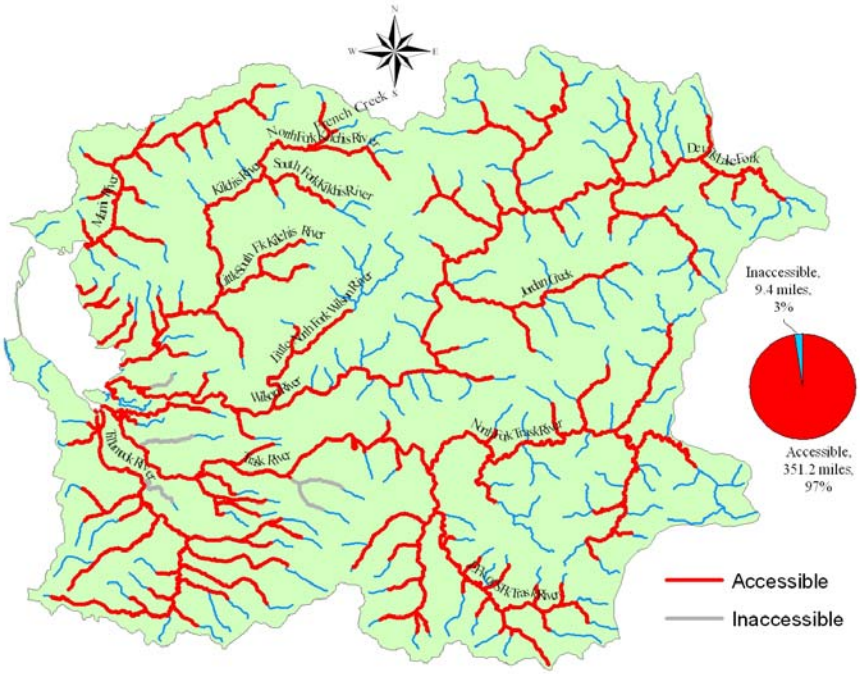


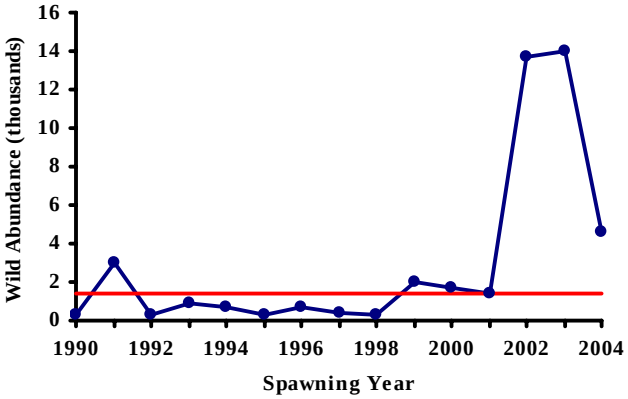


Assessment Outcome

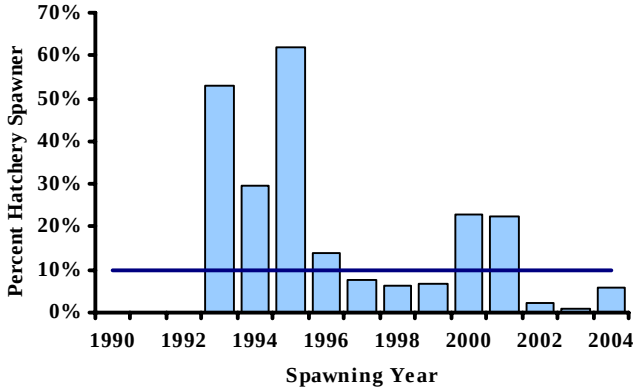
Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Pass*	*Pass*	*Pass*	*Pass*

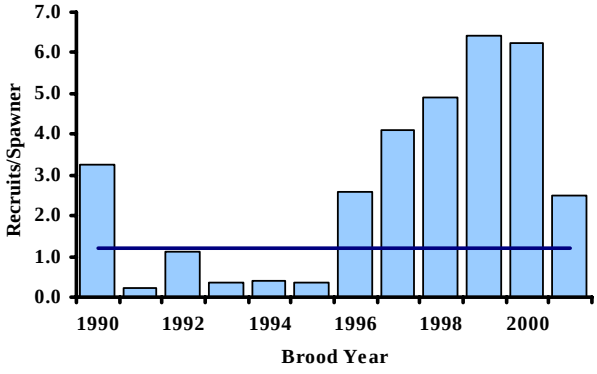
Tillamook – Coastal Coho





The Tillamook population consists of all the rivers emptying into Tillamook Bay and Netarts Bay including the Tillamook, Wilson, Trask, Kilchis and Miami rivers. While much of the upper watersheds of these rivers are held in state and industrial timberlands, the lower watersheds are marked by extensive agricultural and urban development. The Tillamook passed each of the interim criteria.

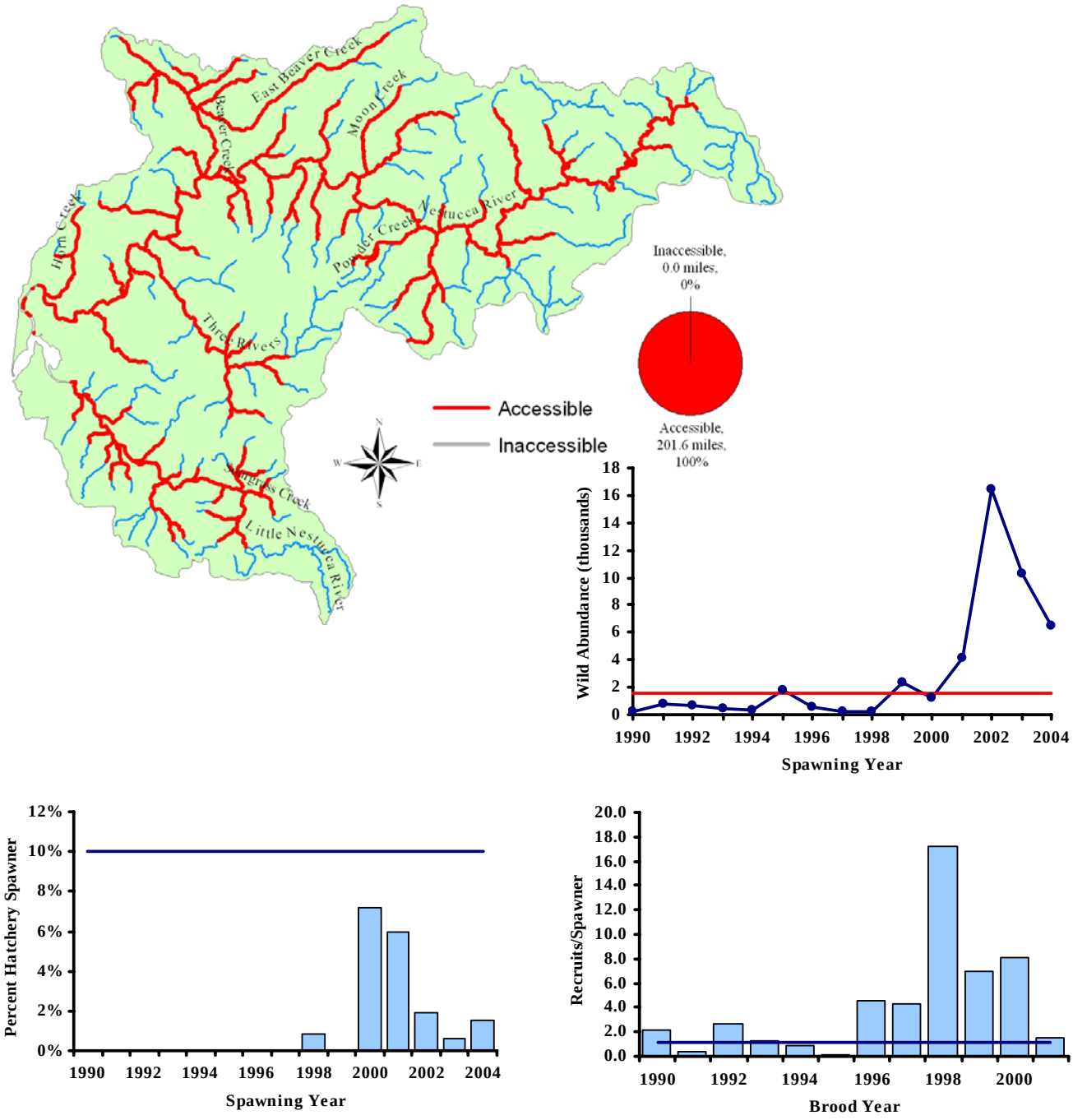




Assessment Outcome

Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Pass*	*Pass*	*Pass*	*Pass*

Nestucca – Coastal Coho

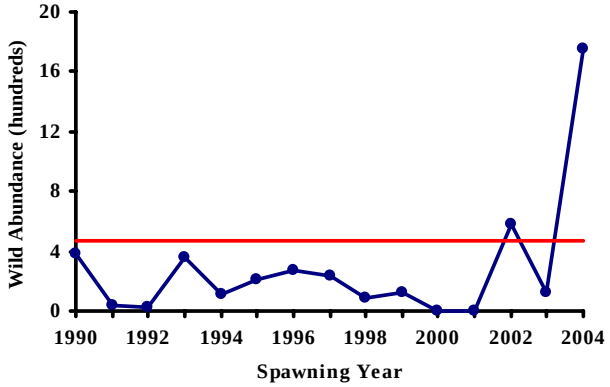


The Nestucca is the second smallest population in the north coast. Land use in the basin is primarily industrial timberlands in the upper watershed, and agriculture in the lower watershed. Much of the habitat historically used by coho is still accessible today. The Nestucca passed each of the interim criteria.

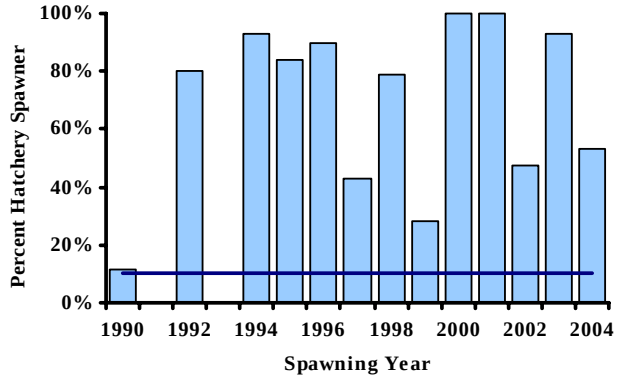
Assessment Outcome

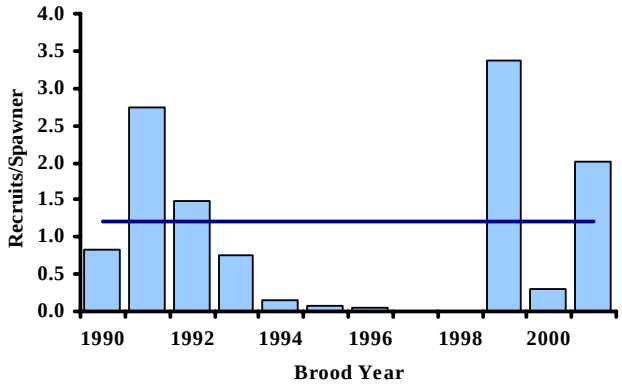
Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Pass*	*Pass*	*Pass*	*Pass*

Salmon – Coastal Coho



The Salmon is one of the smallest producers of coho in the SMU. Hatchery releases in the Salmon have consistently ranged between 200,000 and 500,000 smolts annually since 1990. In the same time period, hatchery spawners have been prevalent on the spawning grounds, and in 2000 all naturally-spawning fish in the basin were hatchery produced. Productivity in the Salmon is the lowest of populations in the SMU. The Salmon failed the abundance, productivity, and reproductive independence criteria.

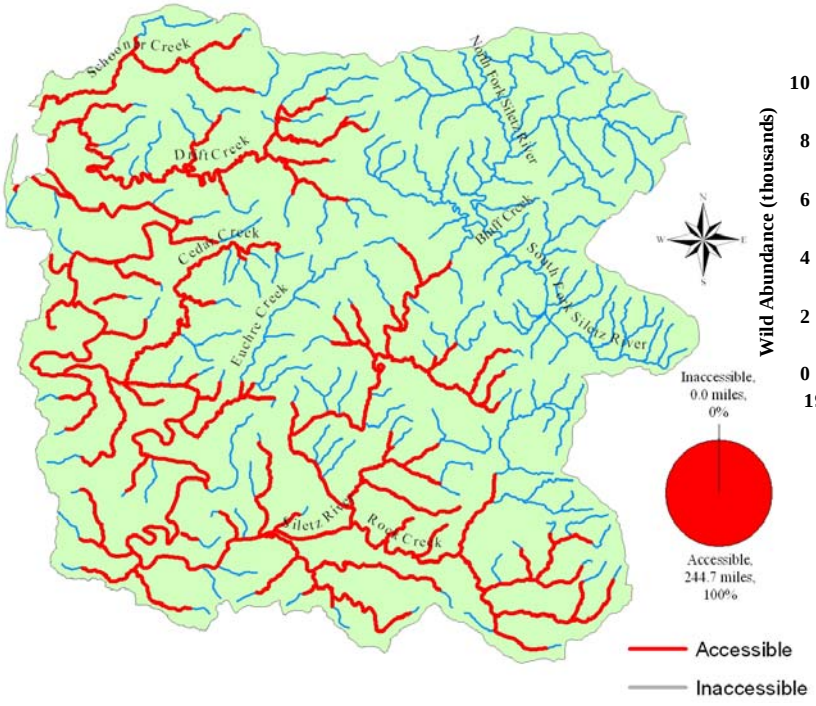


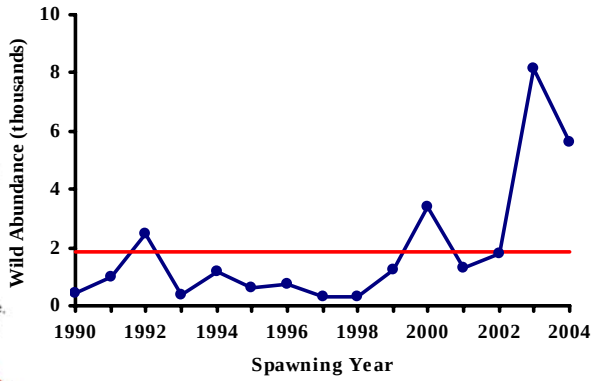


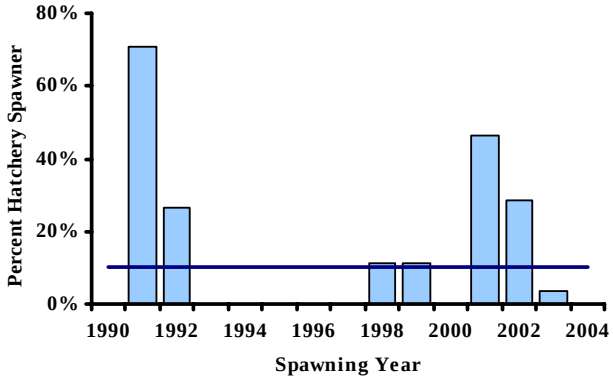
Assessment Outcome

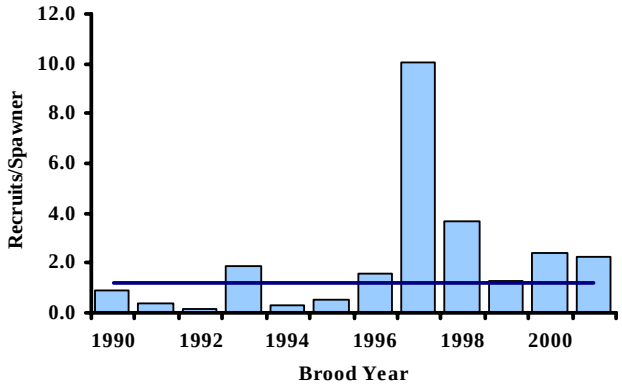
Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Fail*	*Fail*	*Fail*	*Pass*

Siletz – Coastal Coho







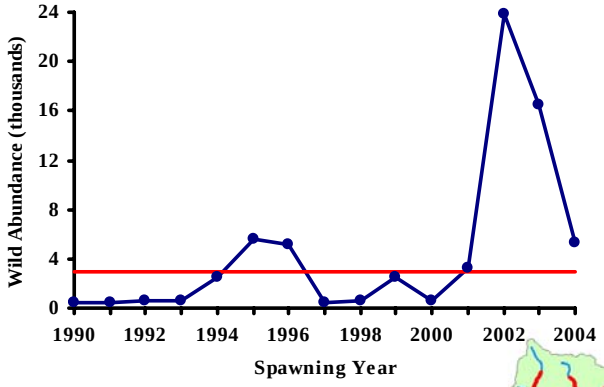


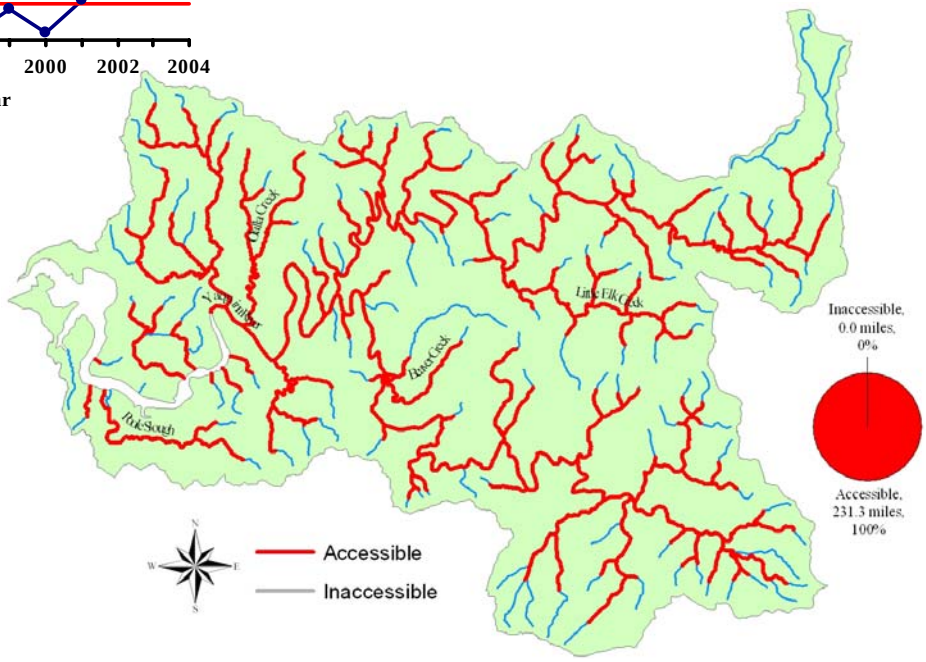
The Siletz produces numbers of coho typical of other basins in the mid-coast. While the Siletz was stocked with over one million coho smolts as recently as 1992, today no hatchery coho are planted in the basin. Much of the basin is held in managed timberland. This population passed each of the interim criteria.

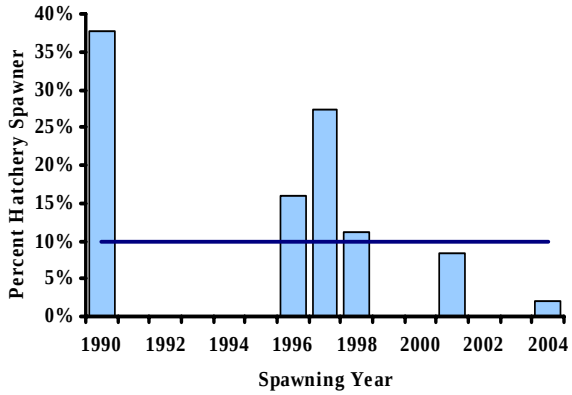
Assessment Outcome

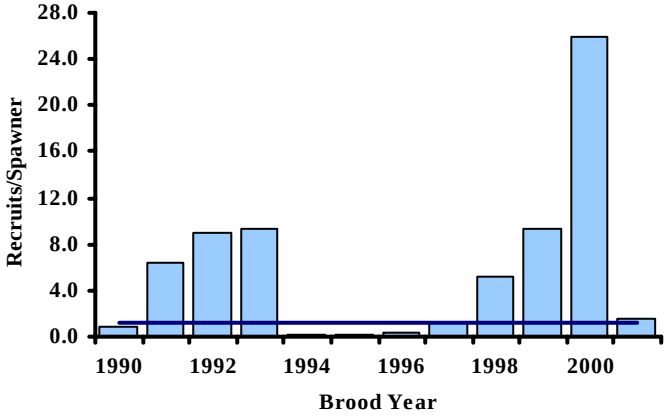
Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Pass*	*Pass*	*Pass*	*Pass*

Yaquina – Coastal Coho







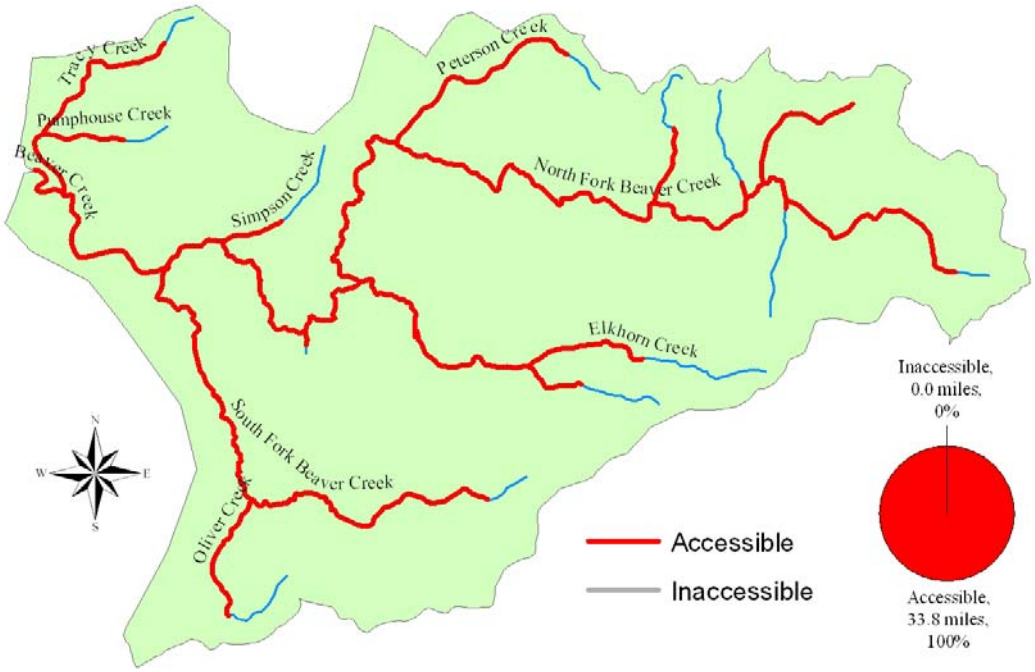


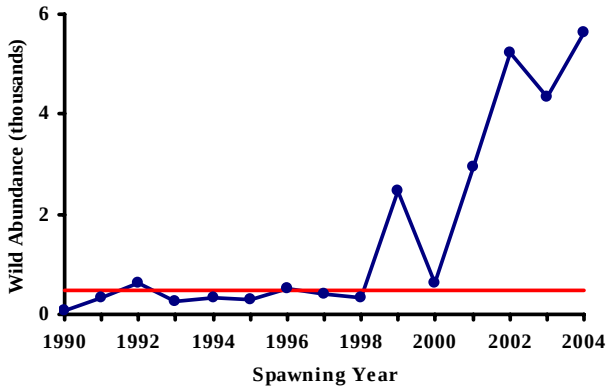
The Yaquina produces numbers of coho typical of other basins in the mid-coast. While the Yaquina was stocked with nearly three million coho smolts in 1990, today there are no coho planted in the Yaquina Basin. Much of the habitat historically used by coho is still accessible today. The Yaquina passed each of the interim criteria.

Assessment Outcome

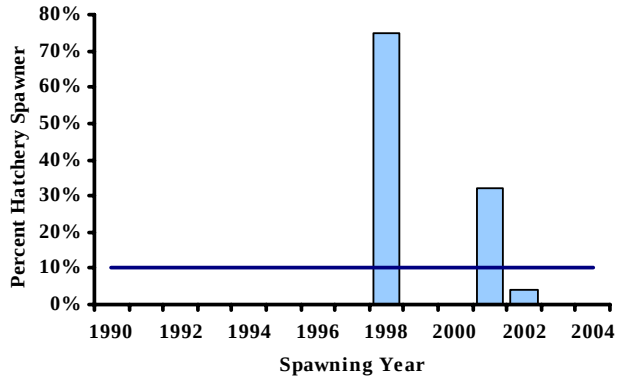
Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Pass*	*Pass*	*Pass*	*Pass*

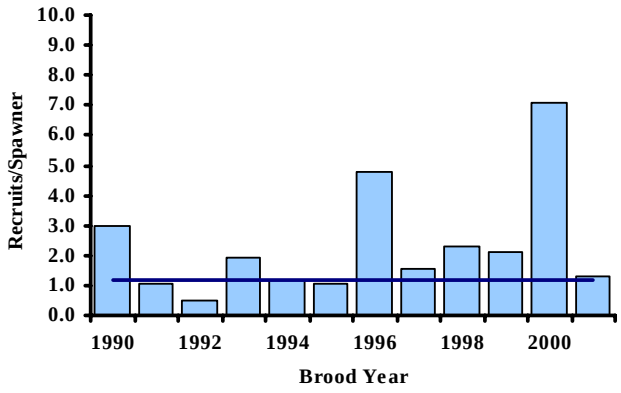
Beaver – Coastal Coho





The Beaver Creek population is one of the smallest coho producers in the SMU. Beaver Creek has the least amount of habitat currently used of any population on the Oregon coast. Habitat within the Beaver Creek Basin is favorable to coho production because there is a large amount of lower basin slow-water, pond-like habitat. This type of habitat provides optimal over-wintering refuge for juvenile coho. The Beaver population passed each of the interim criteria.

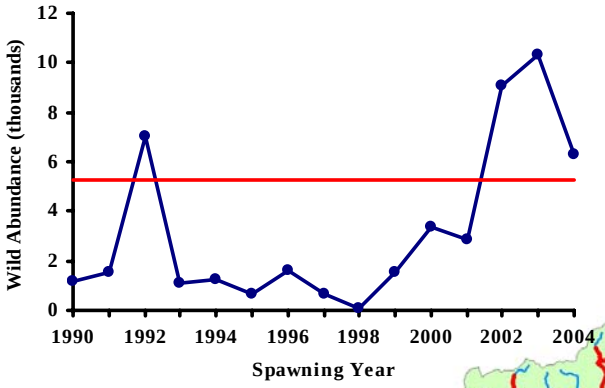


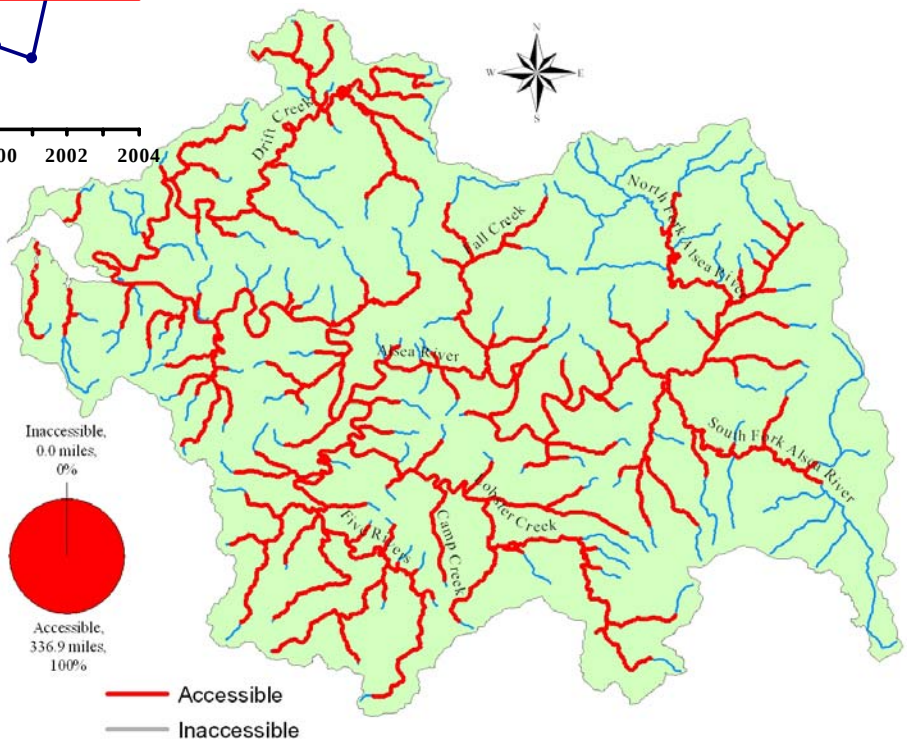


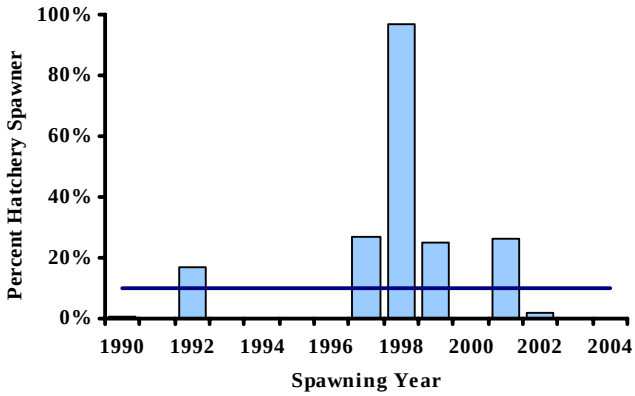
Assessment Outcome

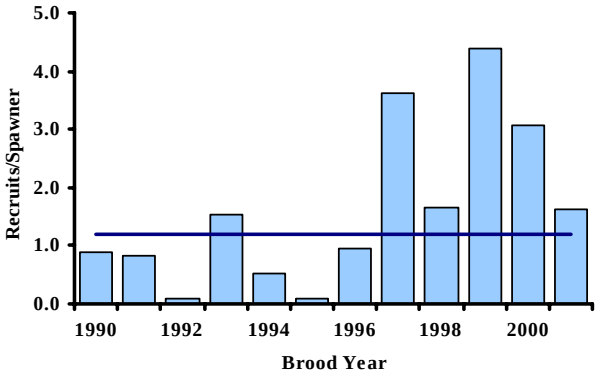
Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Pass*	*Pass*	*Pass*	*Pass*

Alsea – Coastal Coho







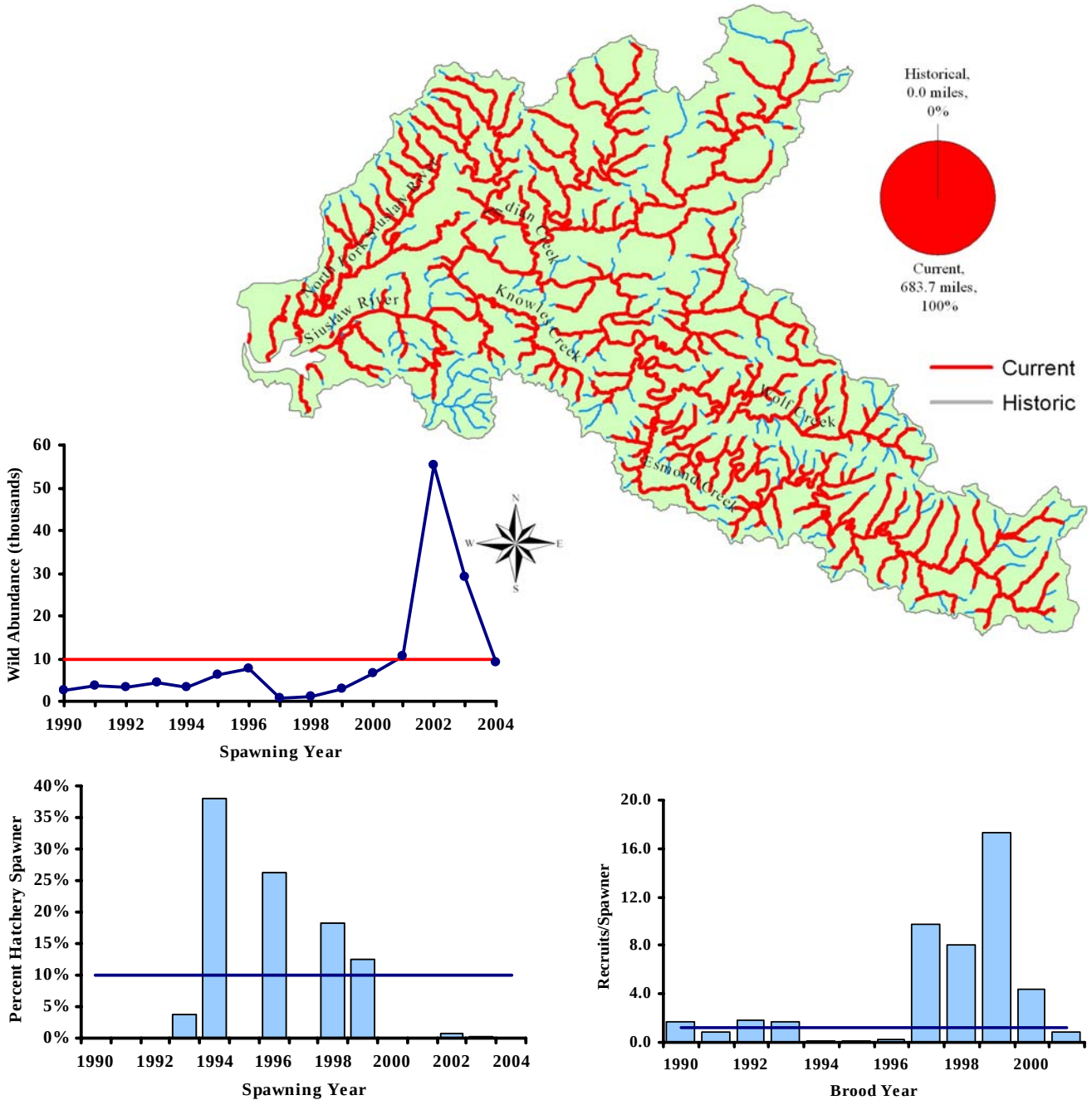


The Alsea produces numbers of coho typical of other basins in the mid-coast. While the Alsea was stocked with over one million coho smolts as recently as 1997, today there are no coho planted in the Alsea Basin. Much of the habitat historically used by coho is still accessible today. The Alsea passed all six criteria.

Assessment Outcome

Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Pass*	*Pass*	*Pass*	*Pass*

Siuslaw – Coastal Coho

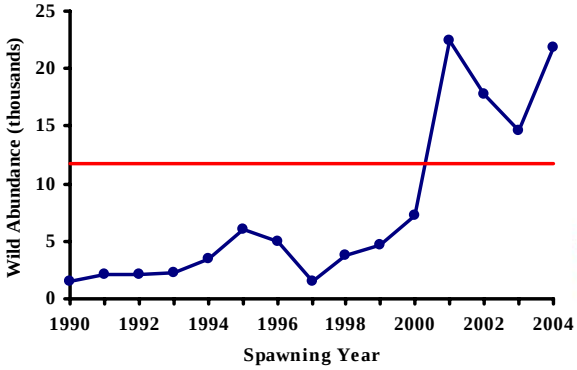


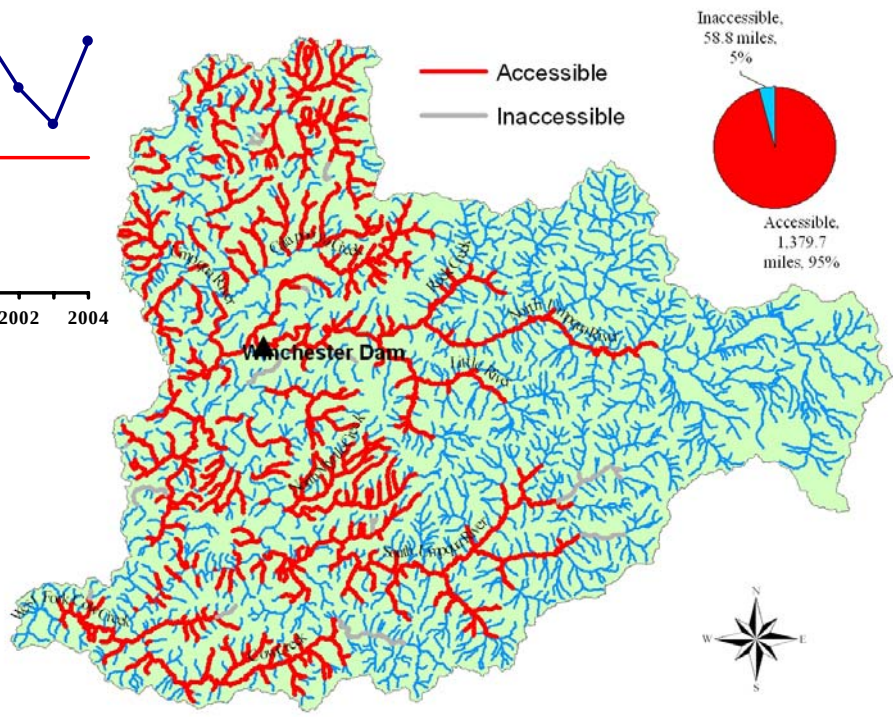
The Siuslaw is the largest coho producing basin in the mid coast. In 2002, the Siuslaw had a larger spawning escapement than any population within the Coastal SMU. A large portion of the Siuslaw is held in industrial and federal timberlands. Much of the habitat historically used by coho is still accessible today. The Siuslaw passed each of the interim criteria.

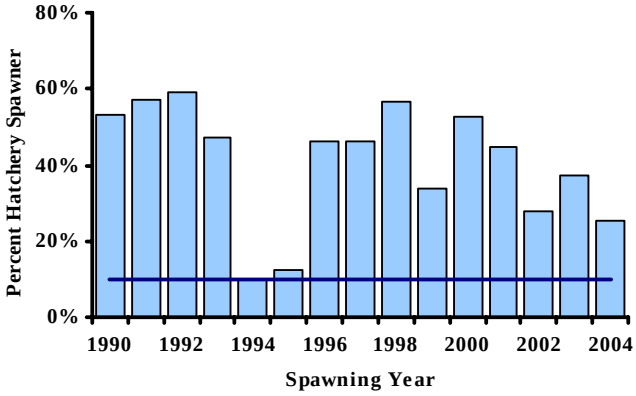
Assessment Outcome

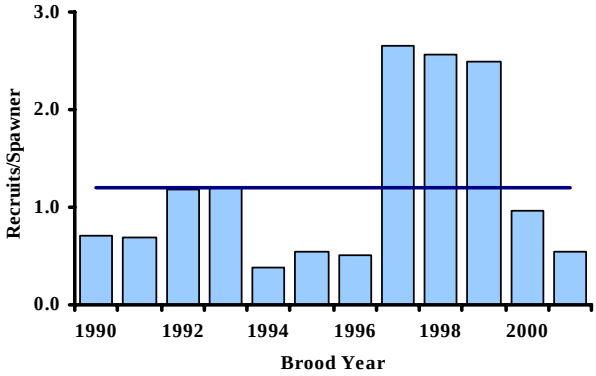
Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Pass*	*Pass*	*Pass*	*Pass*

Upper Umpqua – Coastal Coho







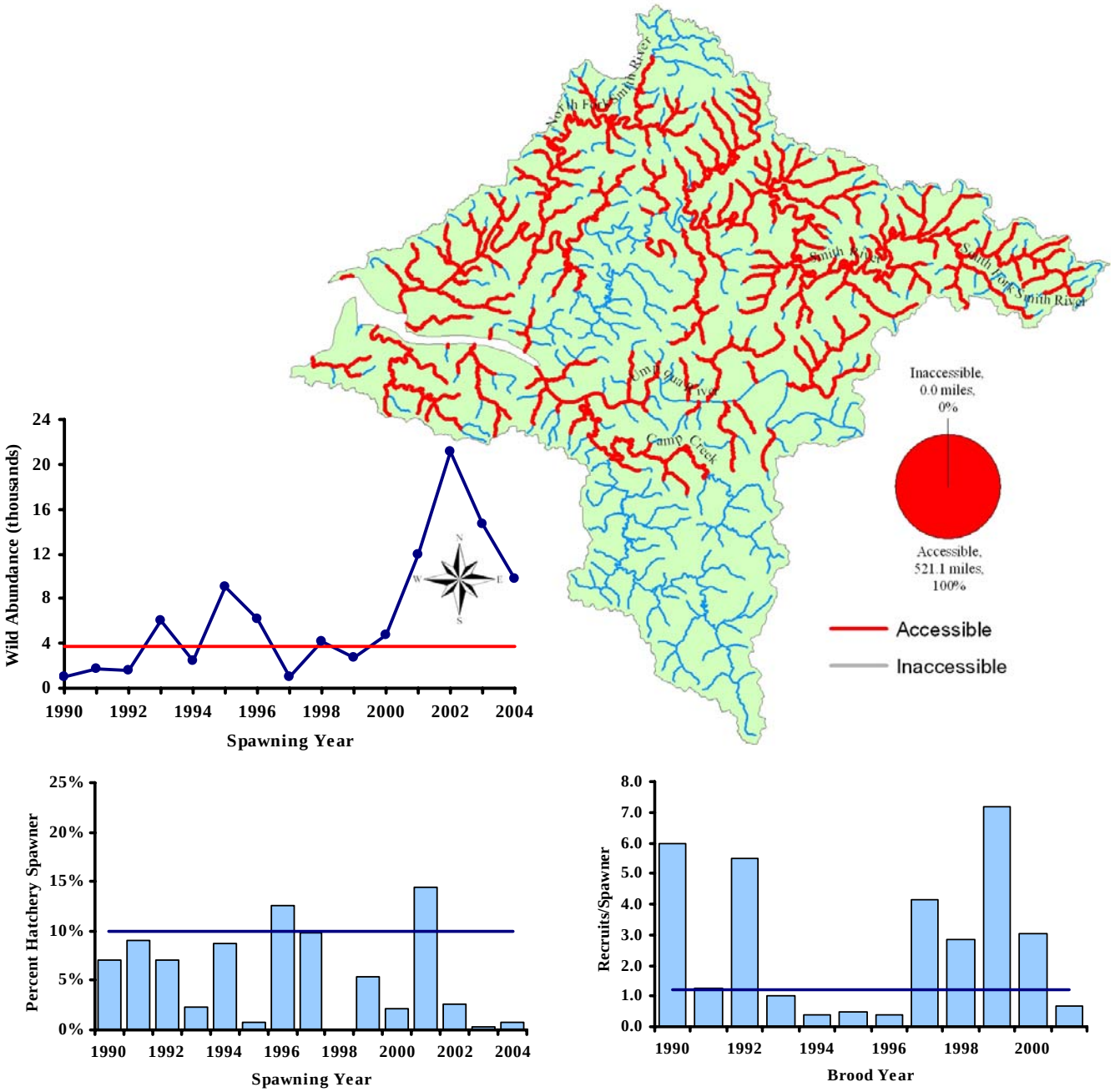


The Upper Umpqua is defined as the Umpqua basin above the mouth of the North Umpqua. The basin is primarily divided into two subbasins, the North Umpqua and the South Umpqua. The North Umpqua coho population has been monitored historically by counts at Winchester Dam since 1946. The South Umpqua is characterized by warm summer temperatures and a substantial smallmouth bass population. Both subbasins originate mainly in the Cascade Range. This population passed each of the interim criteria with the exception of reproductive independence.

Assessment Outcome

Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Pass*	*Pass*	*Fail*	*Pass*

Lower Umpqua – Coastal Coho

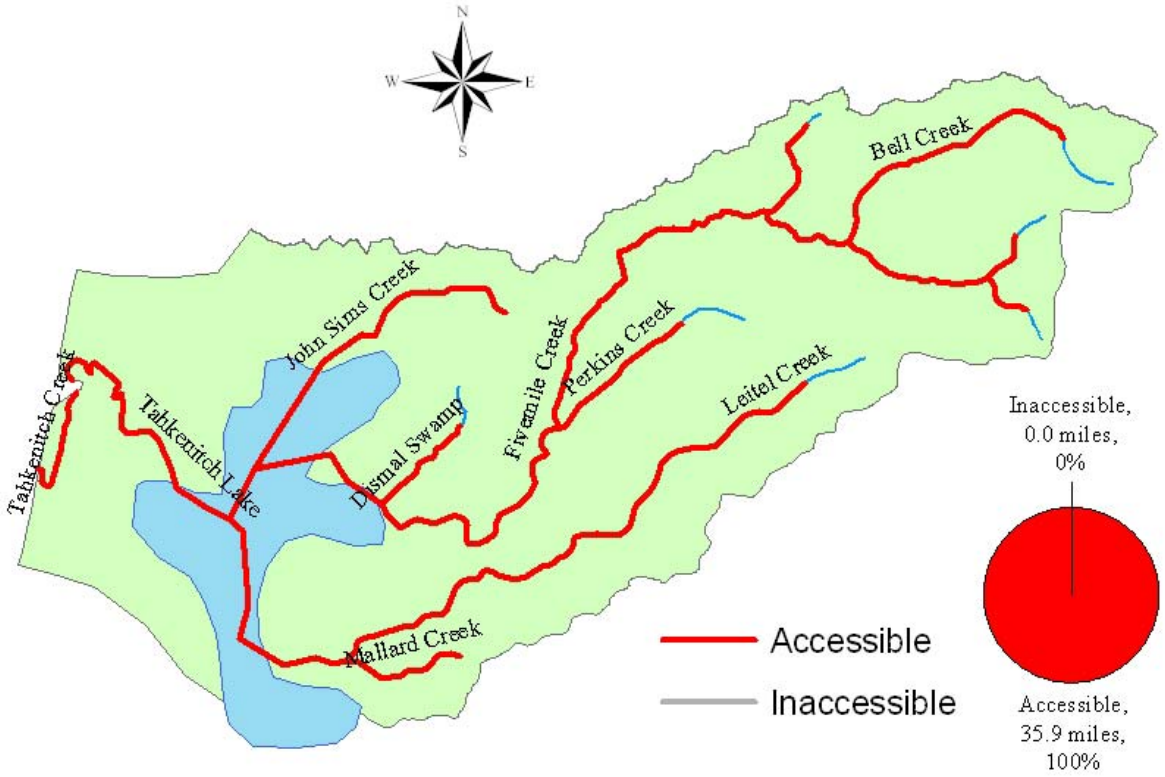


The Lower Umpqua includes the portion of the Umpqua basin below the mouth of the North Umpqua. In contrast to the Upper Umpqua which drains the Cascades, much of the lower Umpqua originates in the Coastal Range. The mainstem lower Umpqua supports a substantial smallmouth bass population and is characterized by warm summer temperatures. The lower Umpqua passed each of the interim criteria.

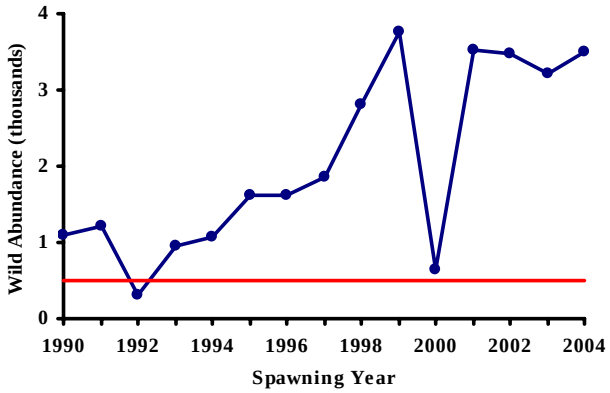
Assessment Outcome

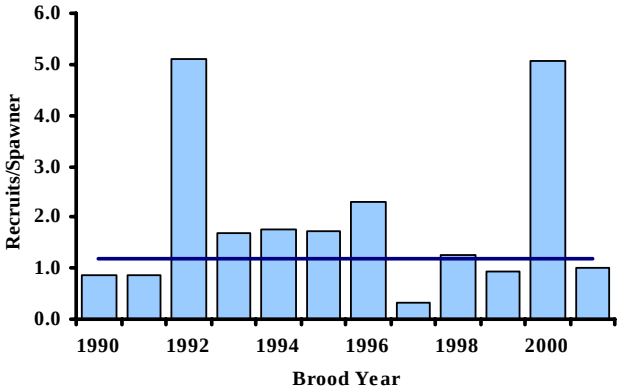
Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Pass*	*Pass*	*Pass*	*Pass*

Tahkenitch – Coastal Coho



Tahkenitch Lake is the smallest of three major coho producing lakes in the mid-south coast. The stable physical and biological environments provided by these lakes are highly suitable for over-winter rearing of juvenile coho salmon. Through the latter half of the twentieth century, as coho abundance declined in Oregon coastal rivers, abundance in Tahkenitch Lake remained relatively steady. This population passed each of the interim criteria.

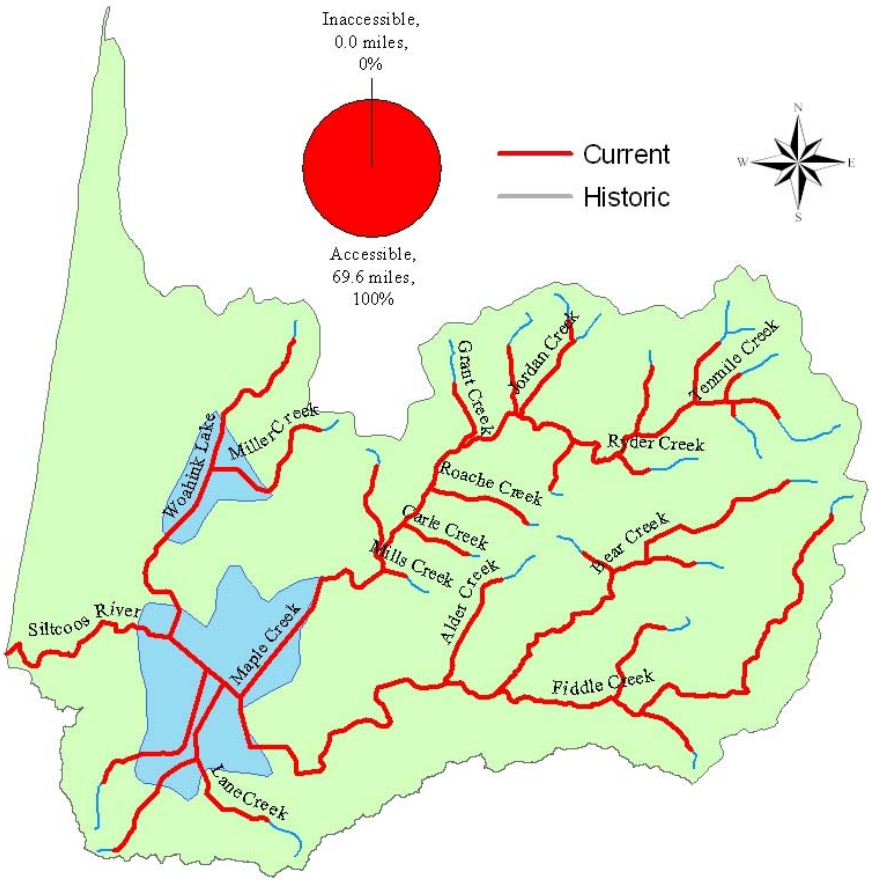


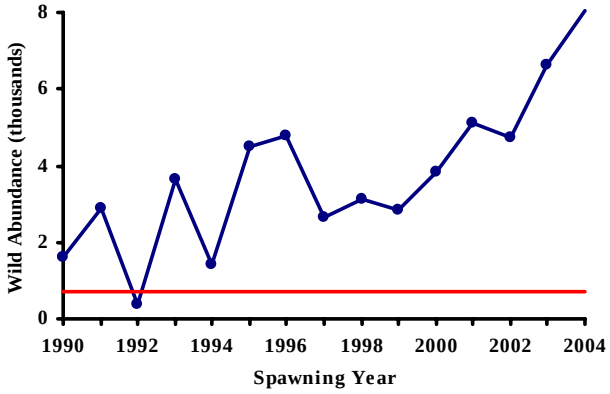


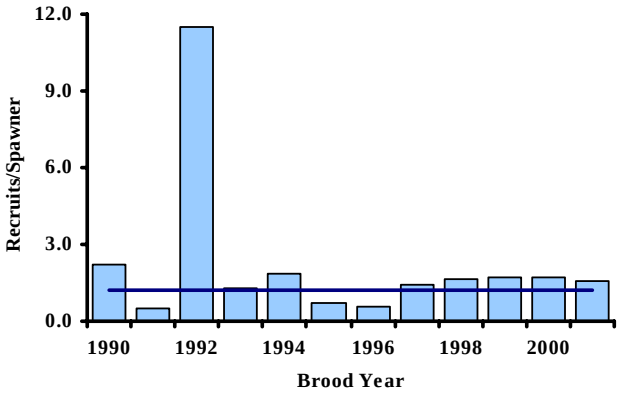
Assessment Outcome

Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Pass*	*Pass*	*Pass*	*Pass*

Siltcoos – Coastal Coho





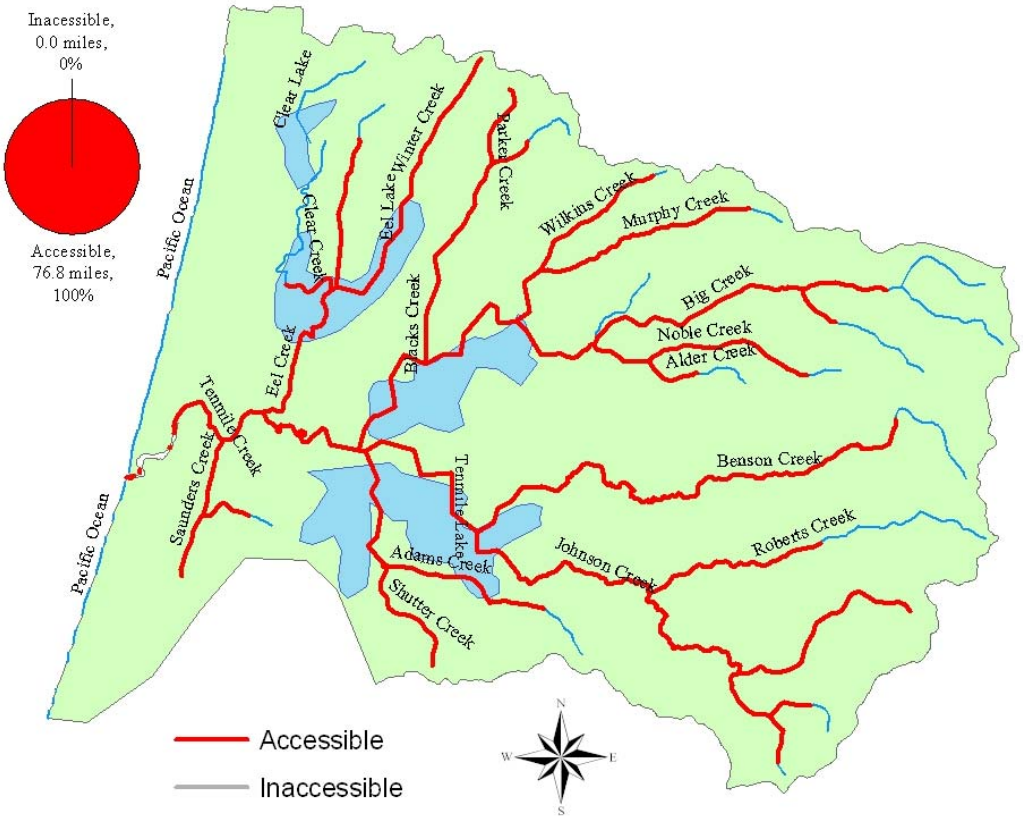


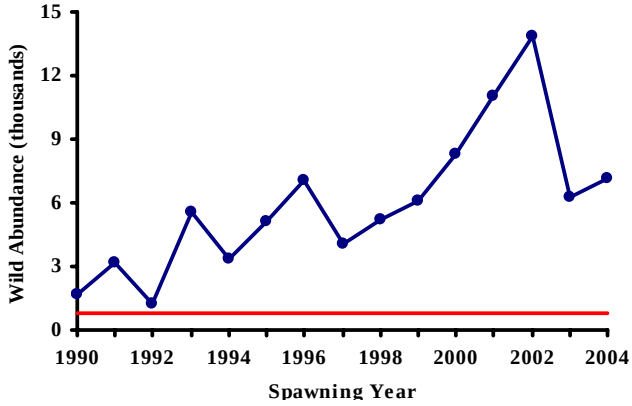
Siltcoos Lake is one of three major coho producing lakes in the mid-south coast. The stable physical and biological environments provided by these lakes are highly suitable for juvenile coho salmon. However, environmental alterations such as sedimentation, shallowing of lake arms, accelerated eutrophication, excess nitrification, and the introduction of non-native warmwater species have resulted in an environment less hospitable to coho rearing than historically existed. This population passed each of the interim criteria.

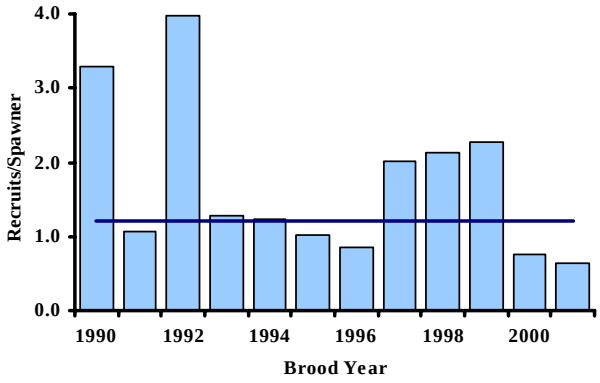
Assessment Outcome

Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Pass*	*Pass*	*Pass*	*Pass*

Tenmile – Coastal Coho





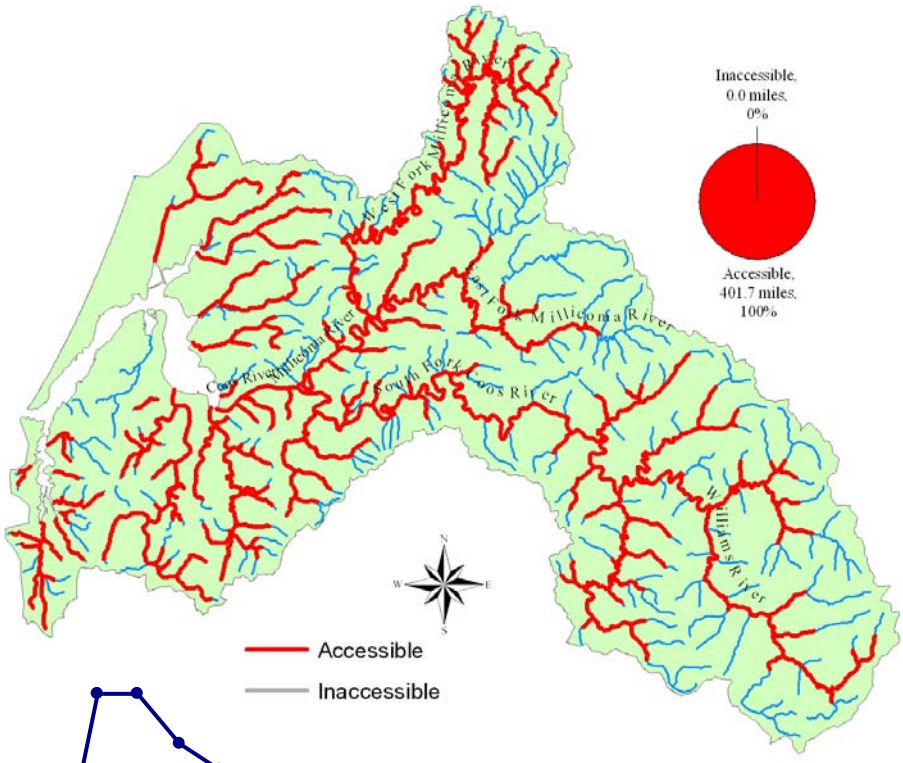


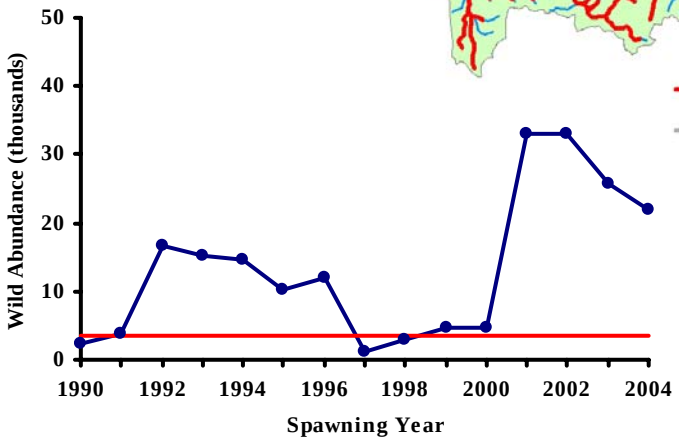
Tenmile Lake is one of three major coho producing lakes in the mid-south coast, and is the largest producer of those lakes. The stable physical and biological environments provided by these lakes are highly suitable for juvenile coho salmon. However, environmental alterations such as sedimentation, shallowing of lake arms, accelerated eutrophication, excess nitrification, and the introduction of non-native warmwater species have resulted in an environment less hospitable to coho rearing than historically existed. This population passed each of the interim criteria.

Assessment Outcome

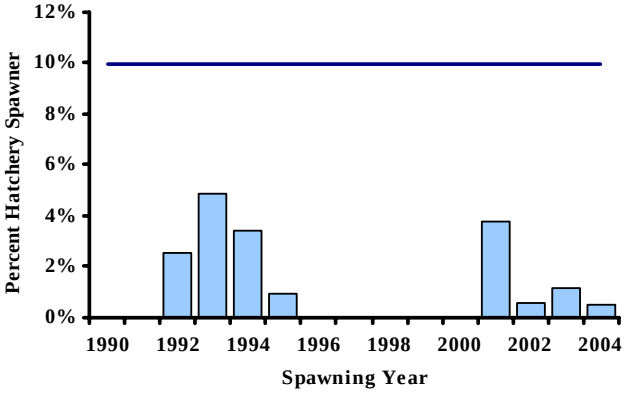
Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Pass*	*Pass*	*Pass*	*Pass*

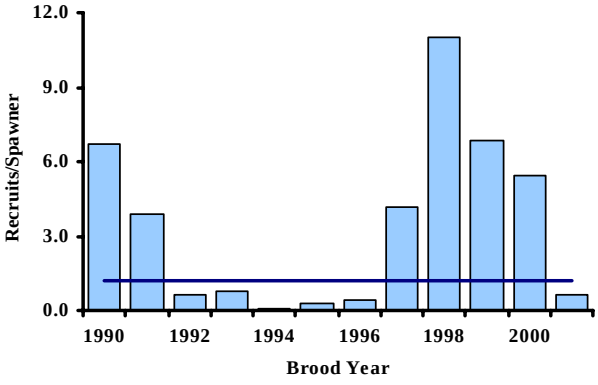
Coos – Coastal Coho





The Coos is the largest coho producing population in the mid-south coast. The Coos was historically stocked with millions of juveniles annually through private hatcheries releases as late as 1989. Today, releases range between 50,000 and 150,000 smolts and originate at state-operated hatcheries. The Coos passed each of the interim criteria.

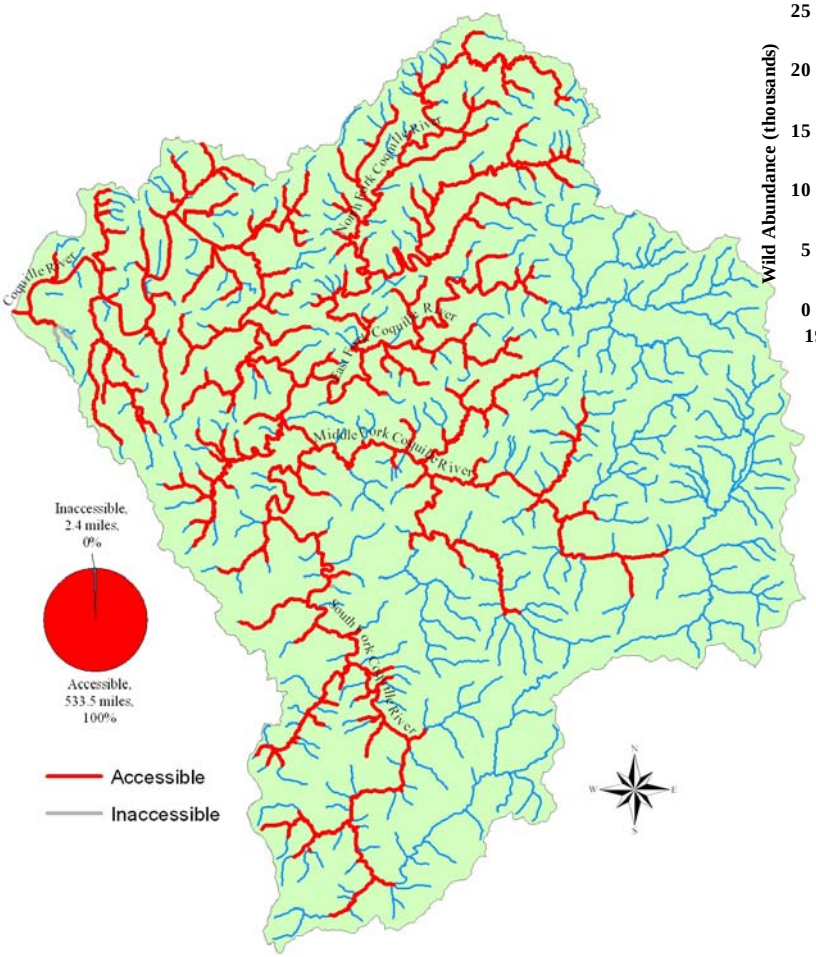


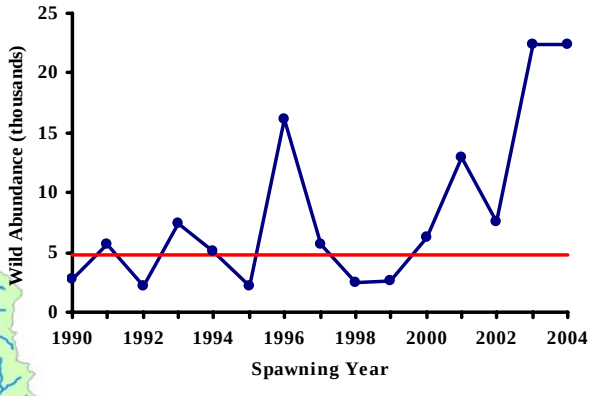


Assessment Outcome

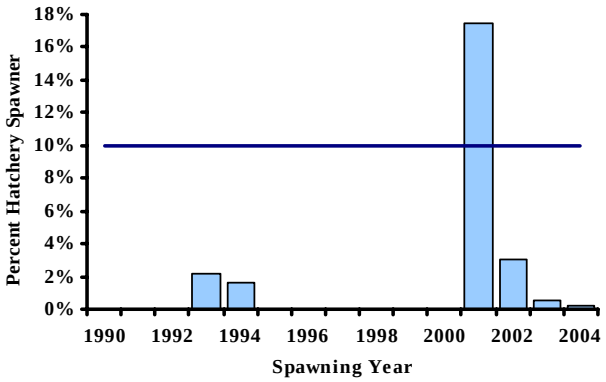
Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Pass*	*Pass*	*Pass*	*Pass*

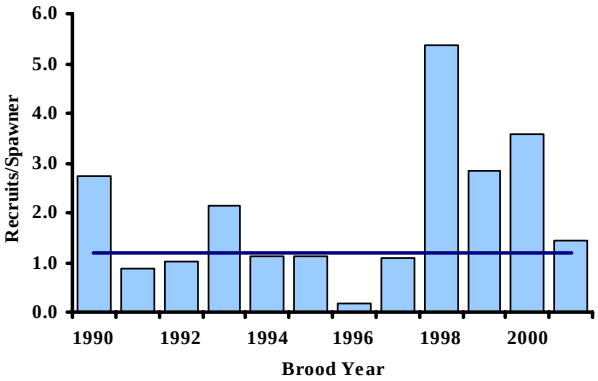
Coquille – Coastal Coho





The Coquille is one of the two main coho producing rivers in the mid-south coast. Coho distribution throughout the basin is similar to historic distribution. This population passed each of the interim criteria.

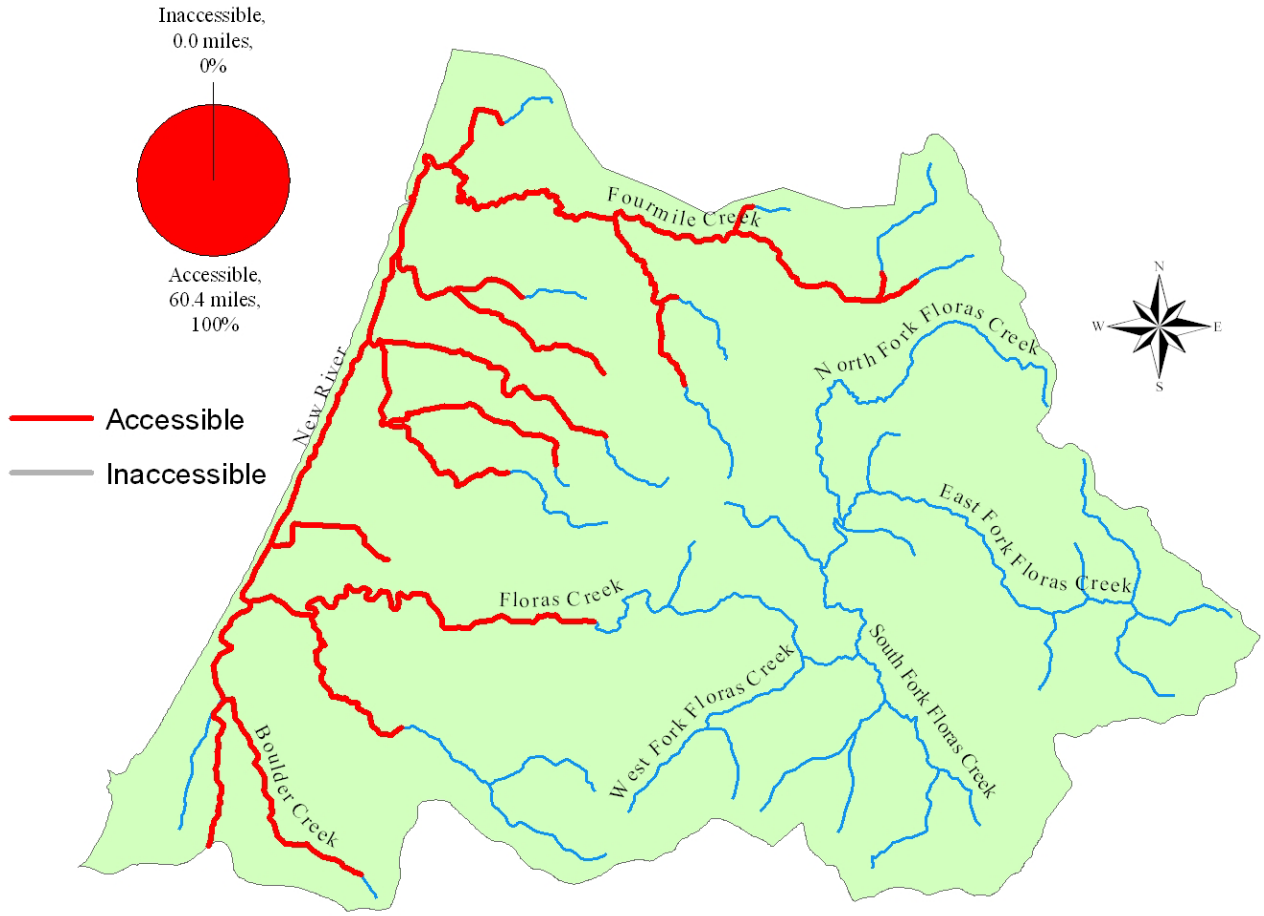


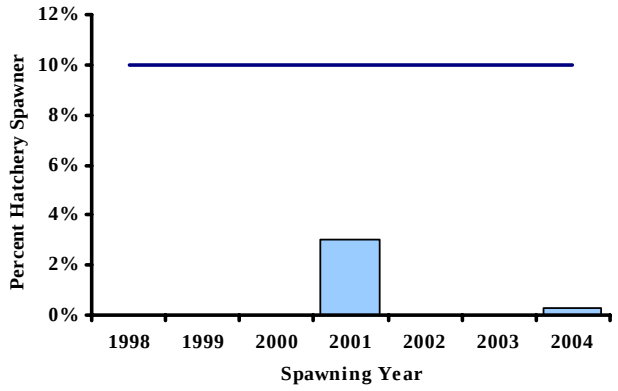


Assessment Outcome

Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Pass*	*Pass*	*Pass*	*Pass*

Floras – Coastal Coho



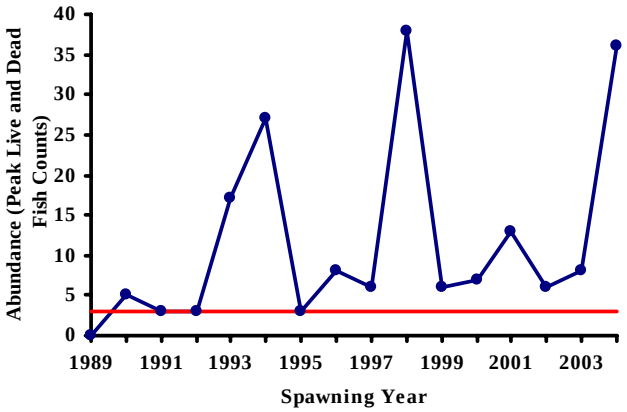


Floras is the fourth smallest population in the SMU. The population passed each of the criteria except productivity. The abundance estimates from SRS surveys, and observations of coho during standard fall Chinook surveys both proved inadequate for evaluating abundance and productivity. The assessments for abundance and productivity were based on outcomes for the Sixes population. ODFW biologists believe that the Floras basin is better suited to coho than the Sixes because there is greater availability of over-wintering habitat. Reproductive independence was evaluated with the last five years of data from the SRS surveys.

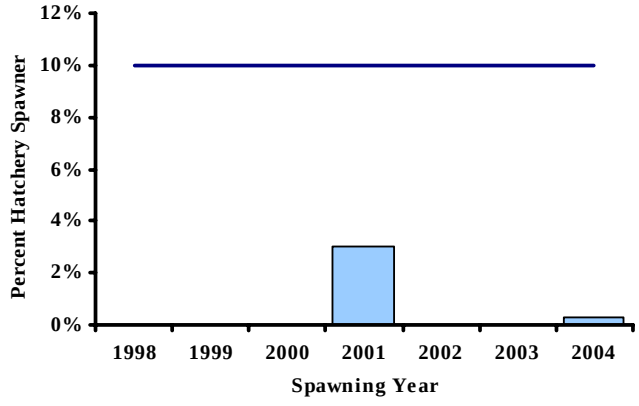
Assessment Outcome

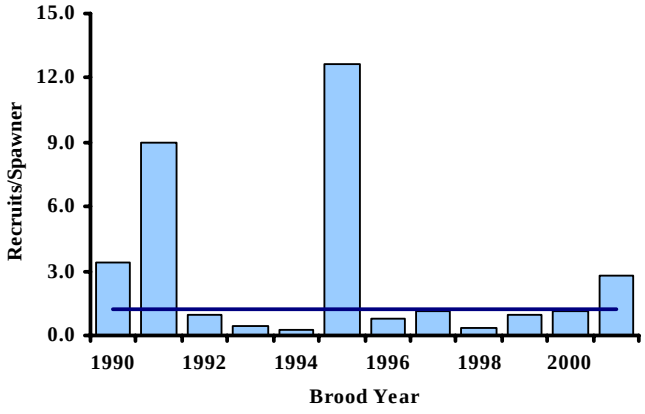
Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Pass*	*Fail*	*Pass*	*Pass*

Sixes – Coastal Coho



The Sixes is the third smallest population in the SMU. The Sixes passed each of the criteria except productivity. Standard random survey population estimates used for most other coastal coho populations were only available for the past six years for the Sixes. Further, those estimates for the Sixes have a low level of precision. Abundance and productivity were indexed with peak counts of coho observed during standard fall Chinook surveys which have been conducted since 1989. Reproductive independence was evaluated with the last five years of data from the SRS surveys.





Assessment Outcome

Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Pass*	*Fail*	*Pass*	*Pass*

Rogue Coho

Existing Populations

The Rogue Coho SMU consists of three populations within the Rogue basin. This SMU met all six of the interim criteria, meaning the near-term sustainability is not at risk. Data from annual seining surveys near Huntley Park were used to assess the abundance and productivity criterion in aggregate for the SMU. Spawning ground observations were used to assess the reproductive independence criterion.

Table 11. Population list and existence status for populations assessed in the Rogue Coho SMU.

Exist	Population	Description
Yes	Illinois	Illinois River basin.
Yes	Middle Rogue	Rogue River basin from mouth of Illinois River to mouth of Applegate River (including the Applegate).
Yes	Upper Rogue	Rogue River basin upstream of Applegate River mouth.

Habitat Use Distribution

The habitat use distribution criterion was evaluated based on accessibility of historic habitat. Several populations show "0 miles inaccessible" (Table 12). It must be recognized that these estimates are derived at the 1:100,000 scale and thus ***will not*** capture habitat lost in many smaller (1:24,000) streams resulting from barriers such as culverts. Habitat lost in smaller streams will vary by population, but is not likely to account for 50% of any population, and thus does not alter assessment outcomes derived using data at the 1:100,000 scale. Data presented in this report on accessibility of habitat should be viewed as general approximations and not as a definitive analysis on habitat availability/accessibility. These issues will be more thoroughly addressed through the conservation planning process.

These data also do not reflect changes in habitat usage due to changes in habitat quality, or changes in availability of estuary habitat. Christy (2004) estimated that 74% of freshwater wetland and saltwater marsh habitat has been lost or converted to other habitat types in the basins within the coastal coho SMU since 1850. Though the proportion of habitat lost in theis SMU may be different, this estmate gives a sense of the potential loss of estary habitat.

Construction of Lost Creek Dam in the upper Rogue Basin eliminated access to 12 miles of coho habitat within the Rogue (USFWS 1954). Applegate Dam has blocked access to 19 miles of coho habitat in the Middle Rogue.

Table 12. Habitat accessibility data used in evaluating interim criteria for the Rogue Coho SMU.

Population	Accessible (mi.)	Inaccessible (mi.)	Percent Accessible
Illinois	283	0	100%
Middle Rogue	366	19	95%
Upper Rogue	310	12	96%

Abundance

For two of the interim criteria, abundance and productivity, each of the populations were assessed as one. A longer time series of abundance estimates was available for the entire Rogue than for the individual populations. Huntley Park seine mark-recapture estimates of Rogue River naturally and hatchery-produced coho abundance are available beginning in 1980. Those

estimates represent the most robust and precise estimates of abundance in the Rogue. Further, they provide the ability to index abundance in all three populations over the past 24 years.

SRS estimates of abundance at the population level did not begin until 1998. Those estimates are not adequate to use as a long-term average abundance. Abundance in the Upper Rogue could be indexed via counts at Gold Ray Dam, but using Huntley Park estimates allowed for consistent use of data between populations.

Huntley Park seine estimates were provided by Jacobs et al. (2002) and ODFW (pers. comm., Briana Sounhein, 6/17/2004). The abundance estimates were adjusted to account for harvest of hatchery and naturally-produced fish above Huntley Park. Harvest estimates were provided by ODFW (pers. comm., Tom Satterthwaite, 6/29/04, and John Leppink, 7/8/04). Since 1994, harvest of non-finclipped fish has been prohibited. Prior to that, harvest rates of naturally and hatchery produced fish were assumed to be equal. Harvest rates prior to 1995 were assumed to be equal to average harvest rates of hatchery fish from 1995-2003. This appeared to be a safe assumption because harvest rates between 1995 and 2003 were consistently low (3-11%). Coho freshwater fishery harvest rates in the Rogue have generally been low over the past 25 years (pers. comm., Tom Satterthwaite, 7/20/04).

Table 13. Abundance estimates (adults) used in evaluating interim criteria for the Rogue Coho SMU.

Population	24-Year Average	25% of Average	Abundance by Return Year 1999	2000	2001	2002	2003	No. Years >25% of Average
Illinois/Mid/Uppr. Rogue	3,853	963	1,438	10,966	12,213	7,800	6,754	5

Productivity

Productivity was assessed for the Illinois, Middle, and Upper Rogue populations as an aggregate. Naturally-produced abundance was estimated as the Huntley Park seine mark-recapture estimate less harvest of naturally-produced fish above Huntley Park. Harvest of naturally-produced fish in the Rogue was terminated beginning in 1994. Hatchery abundance, used to estimate parents, was calculated in the same manner, except that Cole Rivers Hatchery returns were also subtracted from the Huntley Park estimate. In several years, the combination of number of fish harvested and returns to Cole Rivers hatchery slightly exceeded the population estimate at Huntley Park. In those years, we assumed that there were no naturally spawning hatchery fish.

Table 14. Productivity estimates used in evaluating interim criteria for the Rogue Coho SMU.

Population	Recent Complete Brood Years of Below Average Abundance	Productivity (R/S) Year 1	Year 2	Year 3	Year 4	Year 5	Years ≥ 1.2
Illinois/Mid/Uppr. Rogue	1991-93, 1998-99	5.6	1.8	13.7	5.3	5.4	5

Reproductive Independence

Reproductive independence was evaluated using hatchery-to-naturally produced ratios of spawners estimated during SRS surveys. Surveys are conducted throughout the Rogue basin and provided hatchery-to-naturally produced ratios for each of the respective populations. The assessment using SRS estimates resulted in all populations passing the criterion. Independent estimates based on population estimates and run reconstructions confirm that hatchery fractions throughout the Rogue have been below 10% over the past five years, and no greater than 12% since 1995.

Table 15. Reproductive independence estimates used in evaluating interim criteria for the Rogue Coho SMU.

	Percent of Spawning Fish of Hatchery Origin						Years
Population	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**≤10%**
Illinois	--	0%	0%	0%	0%	0%	5
Middle Rogue	--	28%	0%	8%	2%	0%	4
Upper Rogue	--	0%	0%	3%	0%	1%	5

Hybridization

Hybridization has not been identified as an issue for Rogue coho.

Assessment Conclusions

The Rogue Coho SMU consists of three populations within the Rogue basin, none of which have been classified as extinct. This SMU met all six of the interim criteria, and was classified as "Not at Risk". Data from annual seining surveys near Huntley Park were used to assess the abundance and productivity criteria in aggregate for the SMU. Stratified random spawning surveys provided base data to evaluate the reproductive independence criterion for the populations on an individual basis in the last five years.

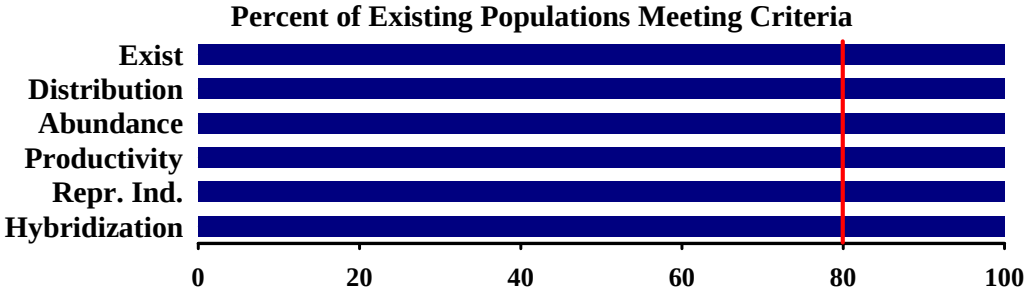
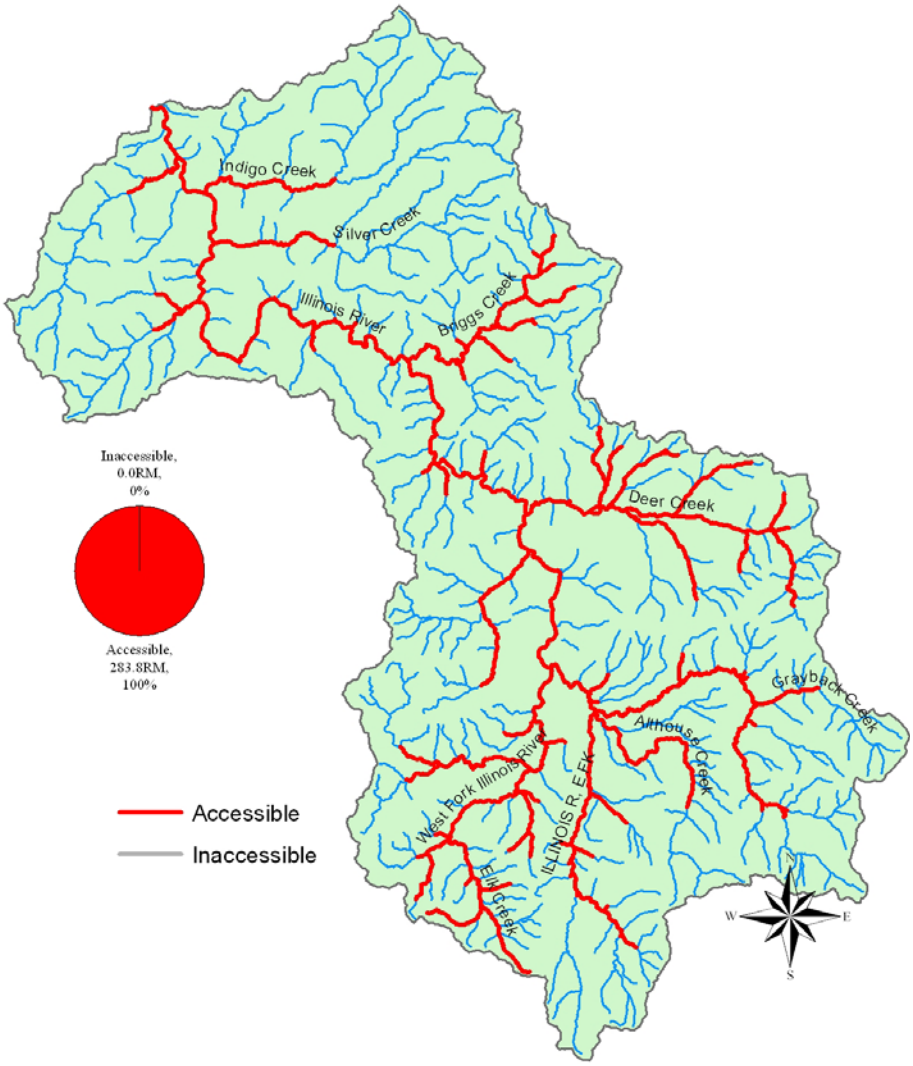
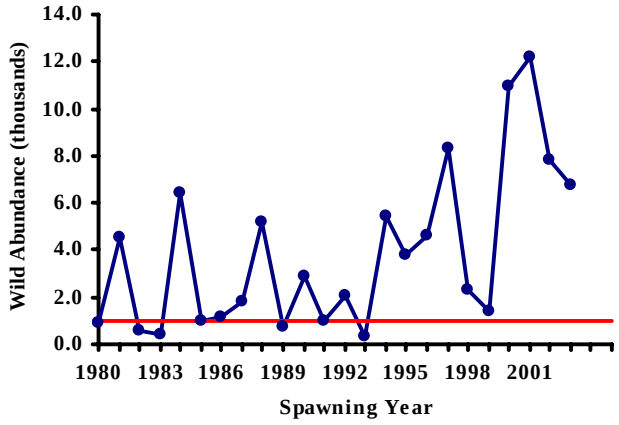


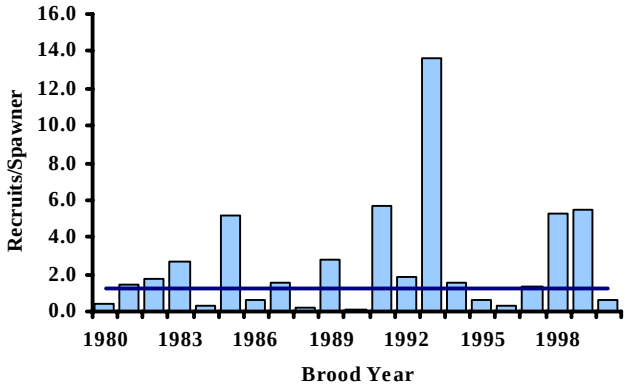
Figure 7. Assessment outcome for each of the six interim criteria with respect to the 80% threshold as identified by the NFCP.

Illinois – Rogue Coho



Abundance and productivity in the Illinois were assessed in aggregate with the other populations in the SMU. Huntley Park seine mark-recapture estimates of Rogue River naturally and hatchery-produced coho abundance are available beginning in 1980. Those estimates represent the most robust and precise estimates of abundance in the Rogue. Further, they provide the ability to index abundance in all three populations over the past 24 years. Reproductive independence was evaluated using stratified random spawner survey observations from within the Illinois. This population passed each of the criteria.

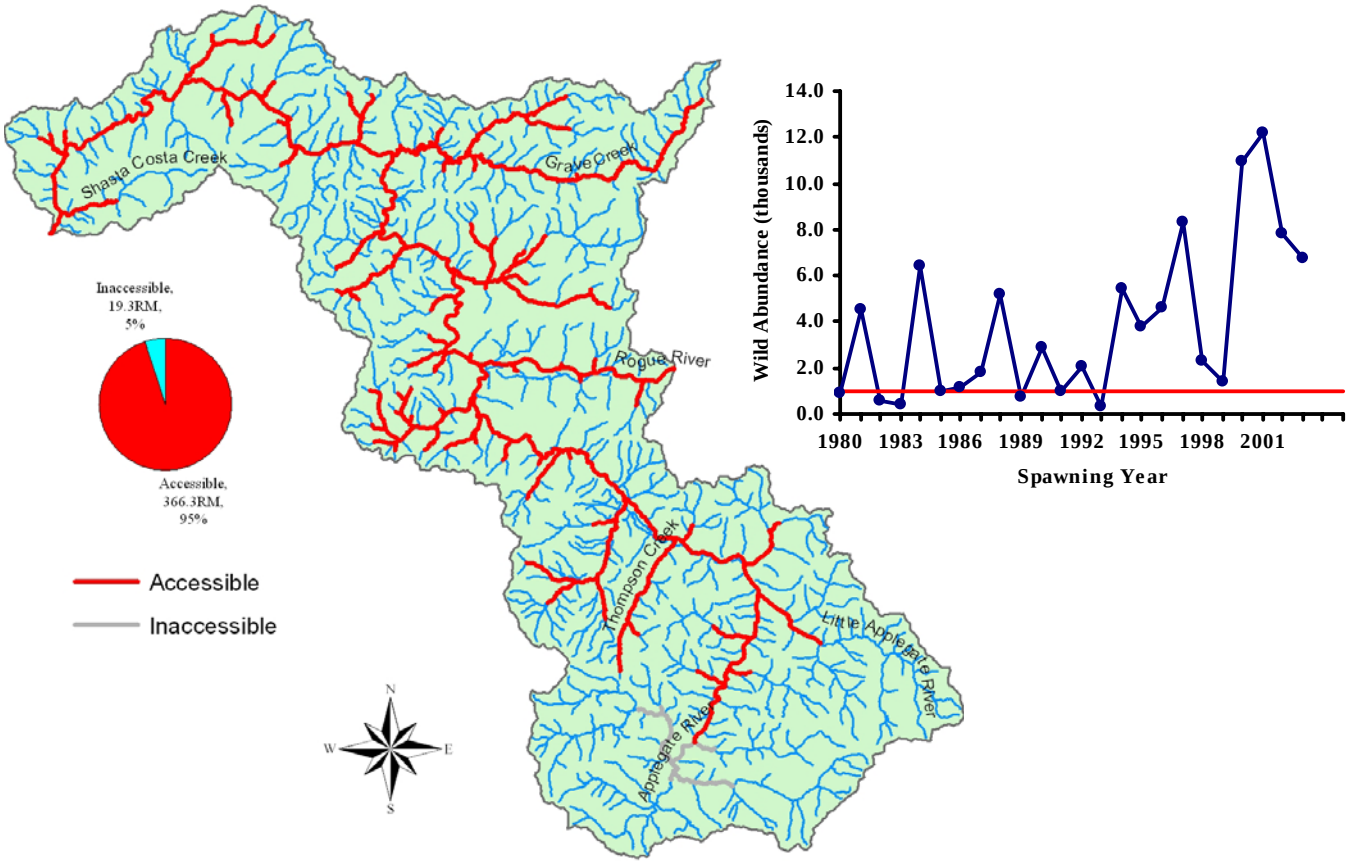




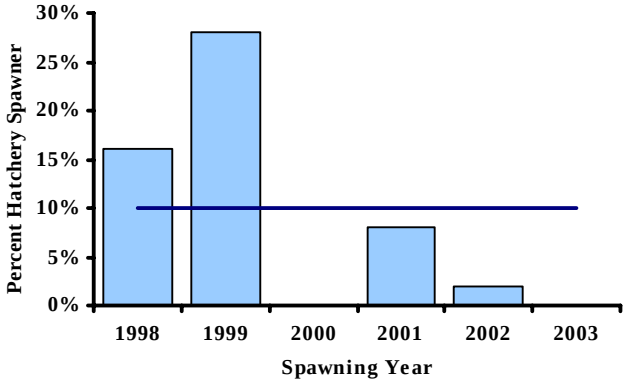
Assessment Outcome

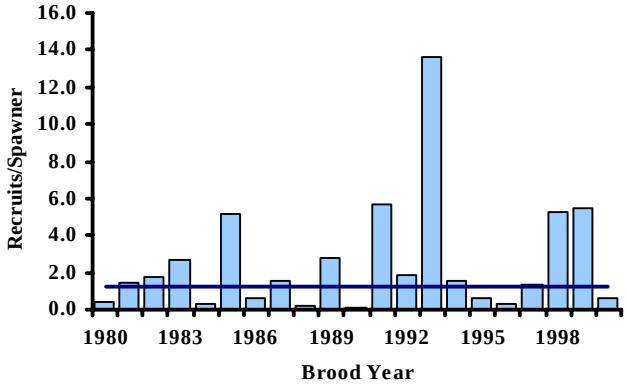
Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Pass*	*Pass*	*Pass*	*Pass*

Middle Rogue – Rogue Coho



Abundance and productivity in the Middle Rogue population were assessed in aggregate with the other populations in the SMU. Huntley Park seine mark-recapture estimates of Rogue River naturally and hatchery produced coho abundance are available beginning in 1980. Those estimates represent the most robust and precise estimates of abundance in the Rogue. Further, they provide the ability to index abundance in all three populations over the past 24 years. Reproductive independence was evaluated using stratified random spawner survey observations from within the Middle Rogue. This population passed each of the criteria. Applegate Dam blocks access to 19 miles of historical coho habitat.

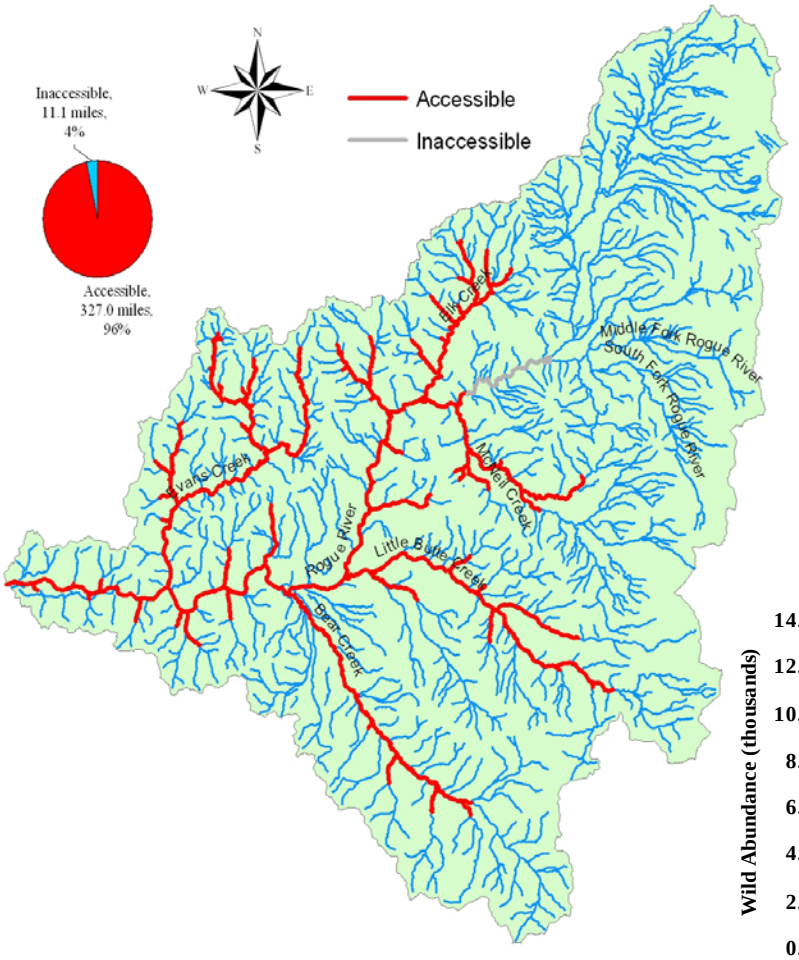




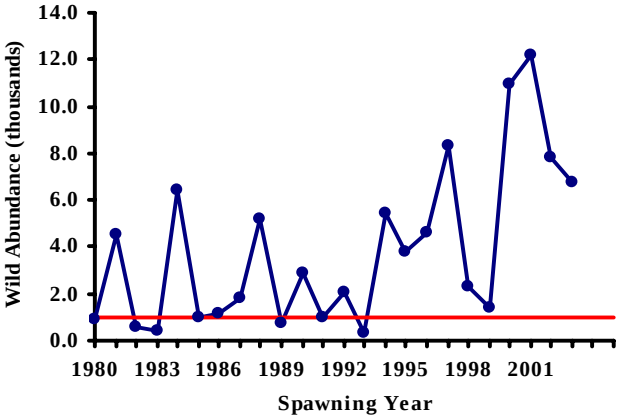
Assessment Outcome

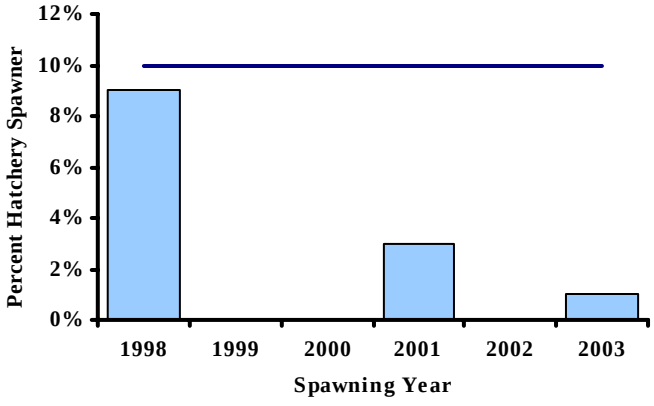
Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Pass*	*Pass*	*Pass*	*Pass*

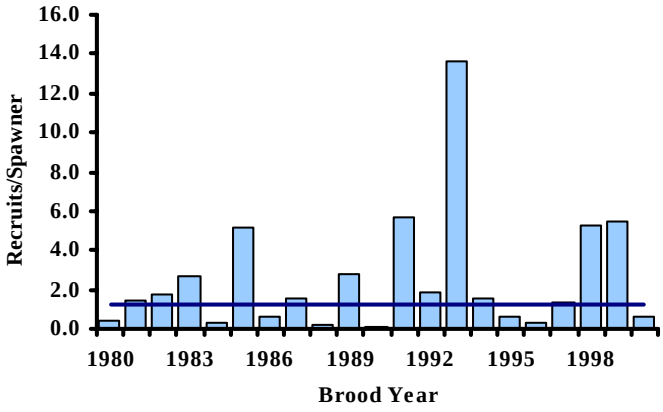
Upper Rogue – Rogue Coho



Abundance and productivity in the Upper Rogue population were assessed in aggregate with the other populations in the SMU. Huntley Park seine mark-recapture estimates of Rogue River naturally and hatchery produced coho abundance are available beginning in 1980. Those estimates represent the most robust and precise estimates of abundance in the Rogue. Further, they provide the ability to index abundance in all three populations over the past 24 years. Reproductive independence was evaluated using stratified random spawner survey observations from within the Upper Rogue. This population passed each of the criteria. Construction of Lost Creek Dam eliminated 11 miles of coho habitat in the Upper Rogue.







Assessment Outcome

Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Pass*	*Pass*	*Pass*	*Pass*

Lower Columbia Coho

Existing Populations

This SMU includes eight populations in tributaries from the Columbia River mouth to Fifteenmile Creek upstream of Hood River. A population upstream from Willamette Falls was not included because it is a naturalized population that was established by introduced fish. Both early and late-run Clackamas coho are also included in this SMU. None of the populations are officially designated as extinct, though several populations are severely depressed and current returns may primarily be offspring of naturally-spawning hatchery fish. The SMU failed four of the six criteria so its near-term sustainability is at risk.

Table 16. Population list and existence status for the Lower Columbia Coho SMU.

Exist	Population	Description
Unknown	Youngs	Youngs Bay tributaries.
Yes	Big	Big Creek basin plus other Columbia River tributaries from MillCreek to (and including) Hunt Creek.
Yes	Clatskanie	Clatskanie River basin plus Columbia River tributaries downstream to include Plympton Creek and upstream to include Beaver Creek.
Yes	Scappoose	Scappoose Creek basin plus Columbia River tributaries downstream to Goble Creek and upstream to mouth of Willamette River.
Yes	Early Clackamas	Clackamas River basin - early run timing, primarily spawning upstream from mouth of Fish Creek.
Yes	Late Clackamas	Clackamas River basin – late run timing, primarily spawning downstream from Fish Creek.
Yes	Sandy	Sandy River basin.
Unknown	Bonneville	Hood River basin plus small Columbia River tributaries from Bridal Veil Creek upstream to Fifteenmile Creek.

Habitat Use Distribution

The habitat use distribution criterion was evaluated based on accessibility of historic habitat with the exception of three populations with such low abundance levels that it is unlikely they met the criterion (Table 17). Several populations show "0 miles inaccessible". It must be recognized that these estimates are derived at the 1:100,000 scale and thus ***will not*** capture habitat lost in many smaller (1:24,000) streams resulting from barriers such as culverts. Habitat lost in smaller streams will vary by population, but is not likely to account for 50% of any population, and thus does not alter assessment outcomes derived using data at the 1:100,000 scale. Data presented in this report on accessibility of habitat should be viewed as general approximations and not as a definitive analysis on habitat availability/accessibility. These issues will be more thoroughly addressed through the conservation planning process.

For this assessment, early Clackamas coho were considered to be primarily distributed above Fish Creek (tributary to the Clackamas above North Fork Dam), and late coho were considered to be distributed primarily below Fish Creek. In actuality, there is overlap in the distribution of the two populations. Some early run coho spawn in tributaries below North Fork Dam (Clear Creek, Deep Creek, and Eagle Creek), and some late run fish may pass above Fish Creek. Annecdotal observations indicate that distribution varies annually and is dependent on flow. In a low flow season, some early fish may be more apt to spawn in streams downstream of Fish Creek, and in high flow years, late run coho may be more apt to move further upstream.

Returns to the Big, Clatskanie, and Bonneville populations have been so small in recent years that it is unlikely that naturally-produced fish distributed themselves over 50% of the coho habitat. Accordingly, these populations failed the distribution criterion.

Table 17. Habitat accessibility data used in evaluating interim criteria for the Lower Columbia Coho SMU.

Population	Accessible (miles)	Inaccessible (miles)	Percent Accessible
Youngs	128	0	100%
Big[a]	109	4	*Fail*
Clatskanie[a]	78	7	*Fail*
Scappoose	93	8	92%
Early Clackamas	93	0	100%
Late Clackamas	139	8	95%
Sandy	133	31	81%
Bonneville[a]	77	4	*Fail*

a. Data reflect habitat availability. Recent returns have been so small that it is unlikely that the naturally-produced population has occupied 50% of the habitat in 3 of the past 5 years. Population failed the distribution interim criterion.

Abundance

Estimates of abundance were derived from a variety of sources. Spawner surveys have been conducted annually since the 1949 and 1950 return years in index reaches in basins downstream of the Willamette River. The Clackamas, Sandy, and Hood (Bonneville population) each have dams with counting stations that provide consistent annual abundance estimates. Both early and late Clackamas coho were indexed via counts at North Fork Dam, though some spawning of late Clackamas coho takes place in mainstem tributaries below the dam. See "Population Details" for more information on sources of abundance data for each population.

Table 18. Abundance estimates (adult indices) used in evaluating interim criteria for the Lower Columbia Coho SMU.

	30-Year	25% of	Abundance by Return Year						No. Years >25%
Population	Average	Average	1999	2000	2001	2002	2003	2004	of Average
Youngs[a]	*Insufficient data*		0	140	17	231	89	--	*Fail*
Big[a]	*Insufficient data*		0	0	0	17	10	--	*Fail*
Clatskanie[a]	*Insufficient data*		0	3	3	2	23	--	*Fail*
Scappoose[a]	*Insufficient data*		0	16	1	50	27	--	*Fail*
Early Clackamas[b]	1,088	272	--	1,973	2,761	695	1,734	1,211	5
Late Clackamas[b]	1,154	289	--	461	1,425	185	372	164	3
Sandy[c]	805	201	--	679	1,146	289	1,173	1,032	5
Bonneville[d]	22	6	--	8	20	27	31	125	*Fail*

a. Peak count of live and dead fish per mile in index reaches. See "Population Details" for explanation of failure designation.
b. Counts at North Fork Dam.
c. Counts at Marmot Dam.
d. Counts at Powerdale Dam on the Hood River. See "Population Details" for explanation of failure designation.

Productivity

Productivity estimates could not be made for populations in tributaries downstream of the Willamette River because abundance estimates include a substantial but unknown proportion of hatchery spawners. Productivity estimates with available data would not accurately reflect the productivity of the naturally-produced population. Each of the populations failed the productivity criterion. See "Population Details" for explanations of this assessment.

Table 19. Productivity estimates used in evaluating interim criteria for the Lower Columbia Coho SMU.

Population	Recent Complete Brood Years of Below Average Abundance	Productivity (R/S) Year 1	Year 2	Year 3	Year 4	Year 5	Years ≥ 1.2
Youngs	*Insufficient data – High hatchery fraction*						*Fail*
Big	*Insufficient data – High hatchery fraction*						*Fail*
Clatskanie	*Insufficient data – High hatchery fraction*						*Fail*
Scappoose	*Insufficient data*						*Fail*
Early Clackamas	1989-90, 1996, 1998-99	3.2	4.6	2.2	10.3	3.7	5
Late Clackamas[a]	1995, 1997-2000	0.3	2.7	14.3	3.6	0.4	3
Sandy	1996-2000	0.9	5.9	4.4	1.8	1.7	4
Bonneville[b]	1993, 1996-97, 1999-2000	0.4	0.6	0.3	0.9	1.1	0

a. No estimate of productivity for the 1996 brood.
b. Used 5 years of lowest parent abundance.

Reproductive Independence

Estimates of hatchery fractions on the spawning grounds were based on data from multiple sources. See the "Population Details" section for specifics for each population.

Table 20. Reproductive independence estimates used in evaluating interim criteria for the Lower Columbia Coho SMU.

Population	% Spawning Fish of Hatchery Origin 1999	2000	2001	2002	2003	2004	Years ≤10%
Youngs	--	49%	99%	93%	68%	--	≤1
Big	--	49%	92%	93%	68%	--	≤1
Clatskanie[a]	--	--	17%	69%	0%	--	*Fail*
Scappoose	7%	9%	20%	0%	6%	--	4
Early Clackamas	--	0%	8%	13%	0%	0%	4
Late Clackamas	--	46%	39%	7%	0%	0%	3
Sandy	--	0%	0%	0%	0%	0%	5
Bonneville	--	71%	98%	68%	82%	79%	0

a. See "Population Details" for explanation of failure designation.

Hybridization

Hybridization has not been identified as an issue for lower Columbia coho.

Population Details

Youngs/Big/Clatskanie

Abundance estimates for these populations are based on peak counts of live and dead spawners following November 30. Index surveys have been conducted on each of these populations since 1949 and 1950. The November 30 date is relevant because managers have assumed that naturally-produced fish spawned primarily following November 30 and that hatchery fish spawning was nearly complete by this date. Peak count data were obtained from Ollerenshaw (2002), StreamNet Online data (2004), and ODFW online data (2004e). The 30-year average, naturally-produced abundance could not be estimated because the hatchery-to-naturally produced ratio of these populations was unknown until the last few years. It is likely that a large portion of returns over the past 30 years have been hatchery origin. The 30-year average may be driven more by hatchery production than returns of the natural population. The Youngs and Big failed the abundance criterion because hatchery fish consistently make up greater than 50% of the spawning population. This assessment is consistent with Rule No. 1 of the Full Seeding Estimation Rules. Hatchery-to-naturally produced ratios based on observations of fin-clip ratios during spawner surveys were available for recent years from ODFW (2001b), Brown et al. (2003), and ODFW (pers. comm., Eric Suring, 1/19/05 and Eric Ollerenshaw, 4/14/04). Hatchery fractions since 1999 have ranged from 49% to 99%. Hatchery-to-naturally produced ratio data are also available for lower Columbia River tributaries from surveys in 1990-1992. Hatchery fractions during this period varied from 87% to 100% based on scale analysis from carcasses sampled on the spawning grounds. Those samples were all taken from Columbia River tributaries downstream of the Willamette river.

The Clatskanie population failed the abundance criterion because index counts have been very low in the last five years (Table 18). Low abundance coupled with moderate to high hatchery fractions is a cause of concern for this population.

Only three years of hatchery fraction data were available in the Clatskanie. Since the population exceeded 10% hatchery fish in two years, it was determined that the population failed the criterion.

Productivity for each of these populations was failed citing the same reasons for failure of the abundance criterion.

Previously, it has been thought that spawn timing of hatchery and naturally-produced fish in lower Columbia River tributaries was temporally segregated with hatchery fish spawning primarily before December 1, and naturally-produced fish primarily afterwards. While this may be the case, data examined from 1991-1993 and 2001, show that hatchery fish dominate both spawning periods (Table 21).

Table 21. Observations of marked and unmarked carcasses in both index and non-index surveys of tributaries to the Columbia River downstream of Willamette Falls.

Year	Prior to December 1		On or After December 1	
	Marked	Unmarked	Marked	Unmarked
1990	132	4	7	6
1991	61	9	25	4
1992	23	0	32	0
2001	185	6	37	3

Scappoose

Abundance was indexed using peak counts of live and dead fish following Novermber 30 in index reaches surveyed since 1949. Until 1999, the hatchery-to-naturally produced fraction among natural spawners was unknown, so a 30-year average natural abundance could not be estimated. Since 1999, hatchery-to-naturally produced ratios were estimated using data from the adult trap at Bonnie Falls on the North Fork Scappoose and hatchery-to-naturally produced fractions based on observations of finclips during spawning surveys (ODFW 2001a; Brown et al. 2003; pers. comm., Eric Suring, 1/19/05; pers. comm., Eric Ollerenshaw, 4/14/04; and pers. comm., Todd Alsbury, 2/7/05).

The Scappoose failed both the abundance and productivity criteria citing inconclusive evidence. Precautionary application of the interim criteria treats inconclusive data as failure in assessment of risks to the SMU.

Early and Late Clackamas

Clackamas abundance and hatchery-to-naturally produced ratio data from 1992-2003 were provided by PGE (pers. comm., Jim Bartlett, 1/10/05). North Fork Dam counts were provided for both early and late run coho, and for hatchery and naturally-produced coho. Early run coho return to North Fork Dam between August and November, while late run fish pass between October and March of the following year. Early and late-run coho counts from 1957-1991 were derived from Cramer and Cramer (1995).

In several years, late run coho recruits were produced from broods that had no late run parents pass North Fork Dam. This could have been from from late run parents spawning below North Fork Dam and their progeny returning above the dam three years later.

This assessment did not include accounting for abundance, productivity, or hatchery-to-naturally produced ratios of fish spawning below North Fork Dam. Spawner surveys occasionally document spawning in both Deep Creek and Tickle Creek below North Fork Dam (Ollerenshaw 2002).

Sandy

Abundance of naturally-produced coho in the Sandy was indexed using counts at Marmot Dam provided by PGE (pers. comm., Jim Bartlett, 1/10/05) and Chilcote (1999). Beginning in 1998, coho passing Marmot Dam could be identified as being of hatchery or naturally-produced origin based on the presence or absence of an adipose finclip, and clipped fish were prevented from passing upstream. Prior to 1998, naturally and hatchery-produced fish could not be distinguished and all fish were passed upstream. It is assumed that prior to 1998 that essentially all fish passed above the dam were naturally produced. Returns since 1998 confirm this assumption. Between 1999 and 2003, only 0.2% of fish arriving at Marmot Dam have been identified as hatchery fish (unpublished PGE data, pers. comm., Jim Bartlett, PGE, 1/10/05).

This assessment did not include accounting for abundance, productivity, or hatchery-to-naturally produced ratios of fish spawning below Marmot Dam.

Bonneville

The Bonneville population is believed to have been dominated by coho produced in the Hood River and was indexed by natural returns to Powerdale Dam (Olsen 2004). Returns of naturally-produced fish to the Hood have been so low in recent years that we determined that the Bonneville population failed the abundance criterion regardless of the average abundance. The average return of naturally-produced fish to the Hood over the last 11 years has been low, and

would not provide a good indicator of a healthy population level. In addition, 78% of natural spawners have been of hatchery origin since 1992 indicating that abundance trends are being driven more by natural spawning of hatchery fish rather than the naturally-produced population. Productivity was assessed using the five years of lowest parent abundance. Hatchery-to-naturally produced ratios were based on the number of natural and hatchery fish arriving at Powerdale Dam (Olsen 2004).

Assessment Conclusions

The Lower Columbia Coho SMU includes eight populations in Columbia River tributaries from the Columbia River mouth to Fifteenmile Creek upstream of Hood River. Both early and late-run Clackamas coho are also included in this SMU. None of the populations are officially designated as extinct, though several populations are severly depressed and current returns may simply be offspring of naturally-spawning hatchery fish. The SMU failed four of the six criteria and is classified as "At Risk".

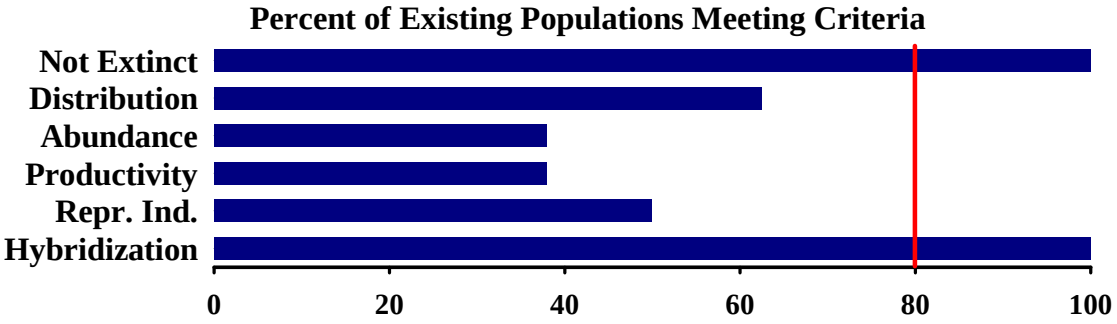
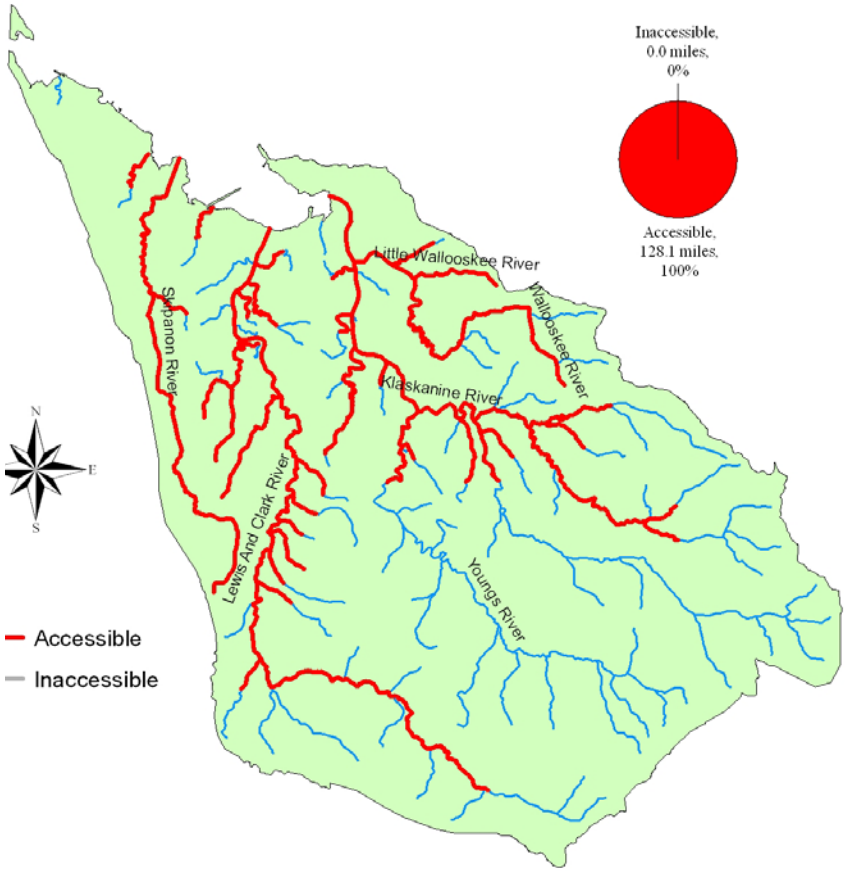
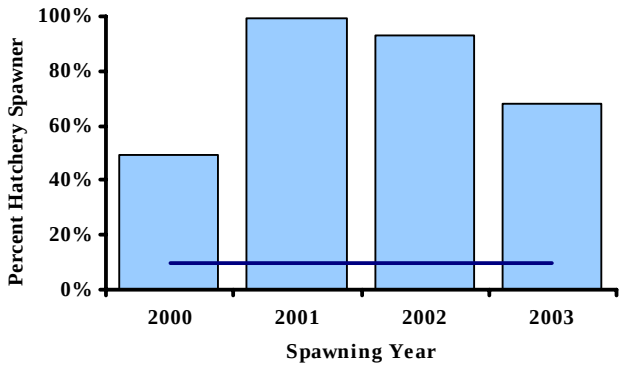
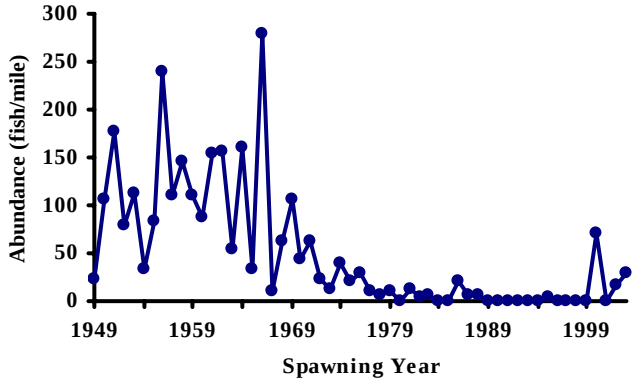


Figure 8. Assessment outcome for each of the six interim criteria with respect to the 80% threshold identified by the NFCP.

Youngs – Lower Columbia Coho





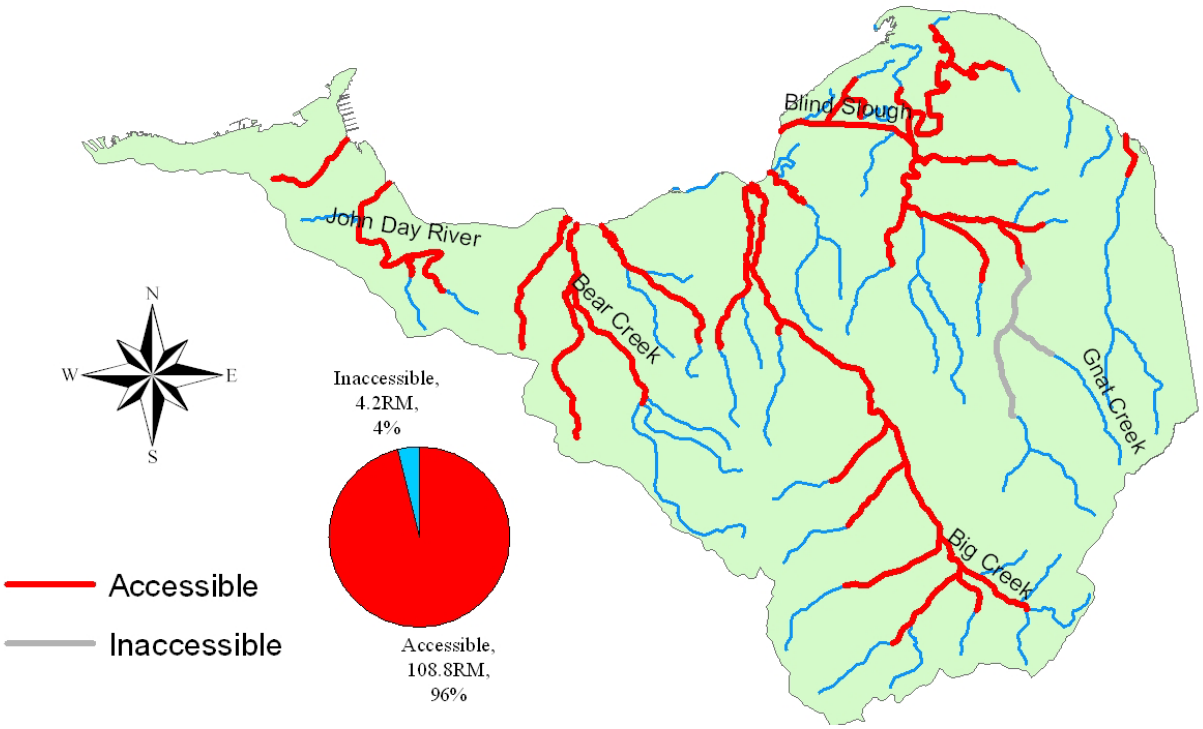


The Youngs population passed the distribution and hybridization criteria, but failed the remaining criteria. The abundance graph reflects peak counts of live and dead fish observed in an index reach. The abundance and productivity criteria were failed because hatchery fish consistently make up greater than 50% of natural spawners. Hatchery-to-naturally produced ratios could only be estimated in the last four years, though estimates from 1990-1992 confirm that hatchery fractions have been high for at least the last 14 years.

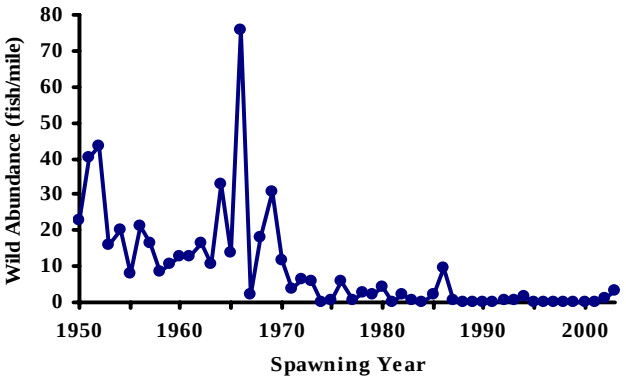
Assessment Outcome

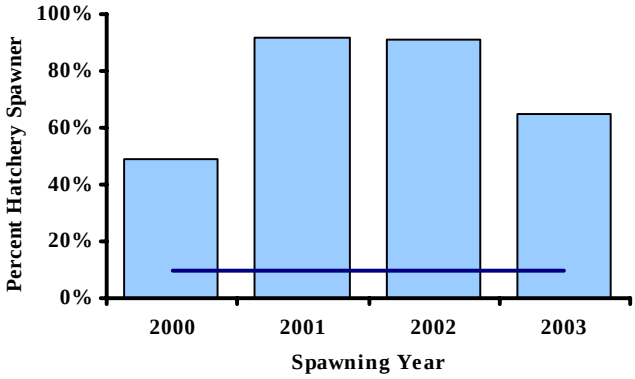
Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Fail*	*Fail*	*Fail*	*Pass*

Big – Lower Columbia Coho



The Big population failed all the criteria except for existence and hybridization. Low returns indicate habitat usage is under 50%. The abundance graph reflects peak counts of live and dead fish observed in an index reach. The abundance and productivity criteria were failed because hatchery fish consistently make up greater than 50% of natural spawners. Hatchery-to-naturally produced ratios could only be estimated in the last four years, though estimates from 1990-1992 confirm that hatchery fractions have been high for at least the last 14 years.

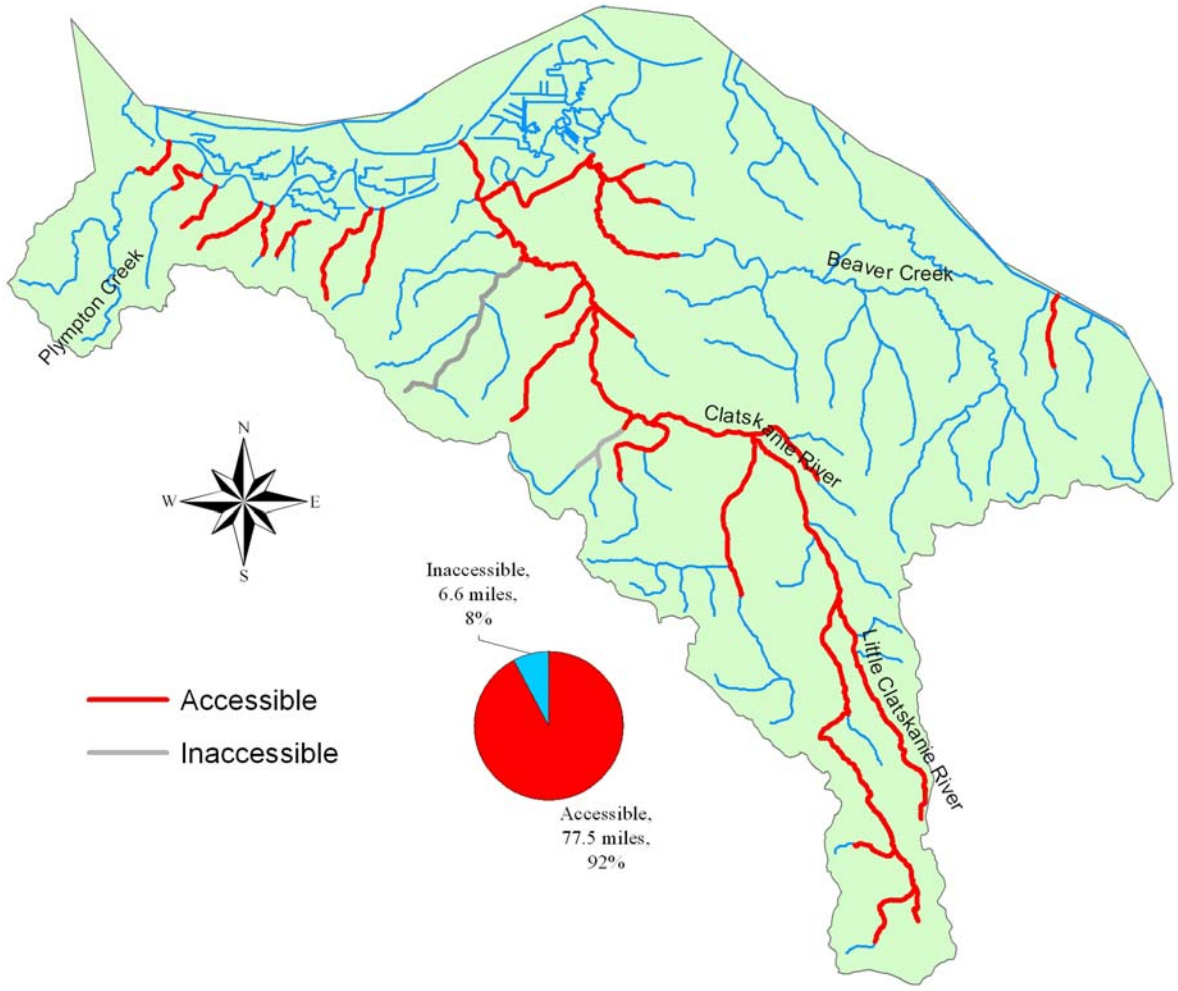




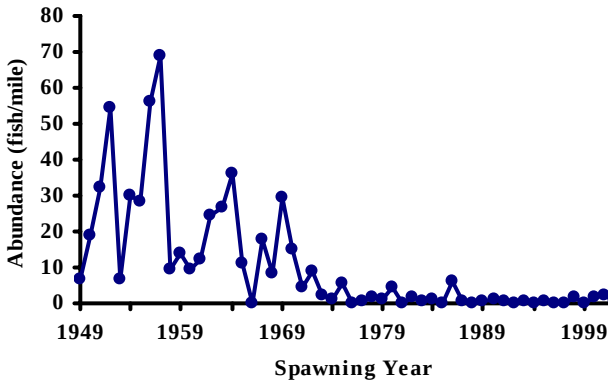
Assessment Outcome

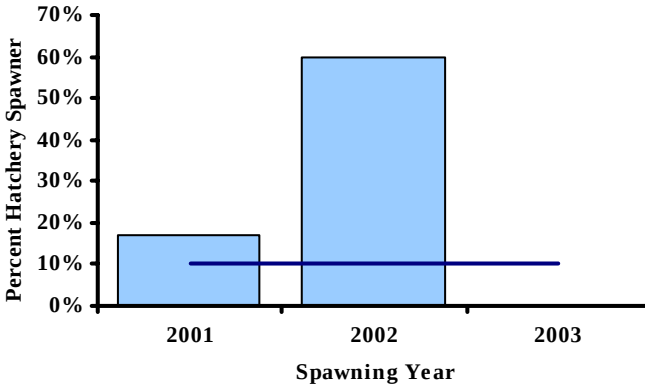
Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Fail*	*Fail*	*Fail*	*Fail*	*Pass*

Clatskanie – Lower Columbia Coho



The Clatskanie population failed the distribution, abundance criteria, productivity, and independence criteria. Low returns indicate habitat usage is under 50%. The abundance graph reflects peak counts of live and dead fish observed in an index reach. The abundance and productivity criteria were failed because hatchery fish consistently make up greater than 50% of natural spawners. Hatchery-to-naturally produced ratios could only be estimated in the last three years, though estimates from 1990-1992 confirm that hatchery fractions have been high for at least the last 14 years.

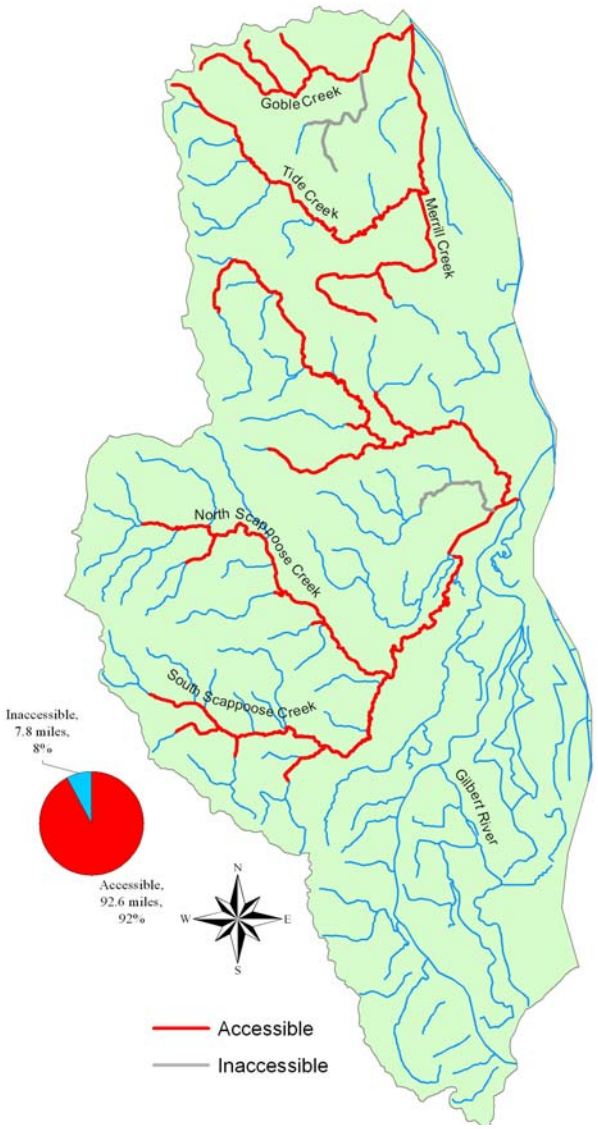


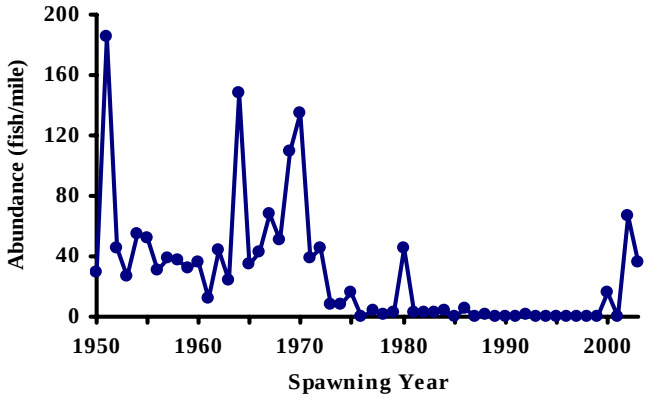


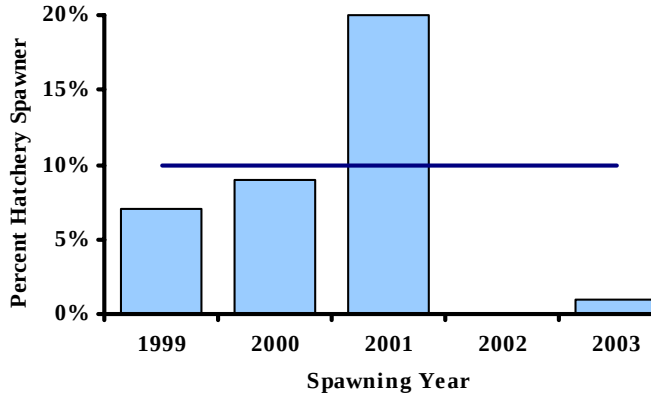
Assessment Outcome

Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Fail*	*Fail*	*Fail*	*Fail*	*Pass*

Scappoose – Lower Columbia Coho





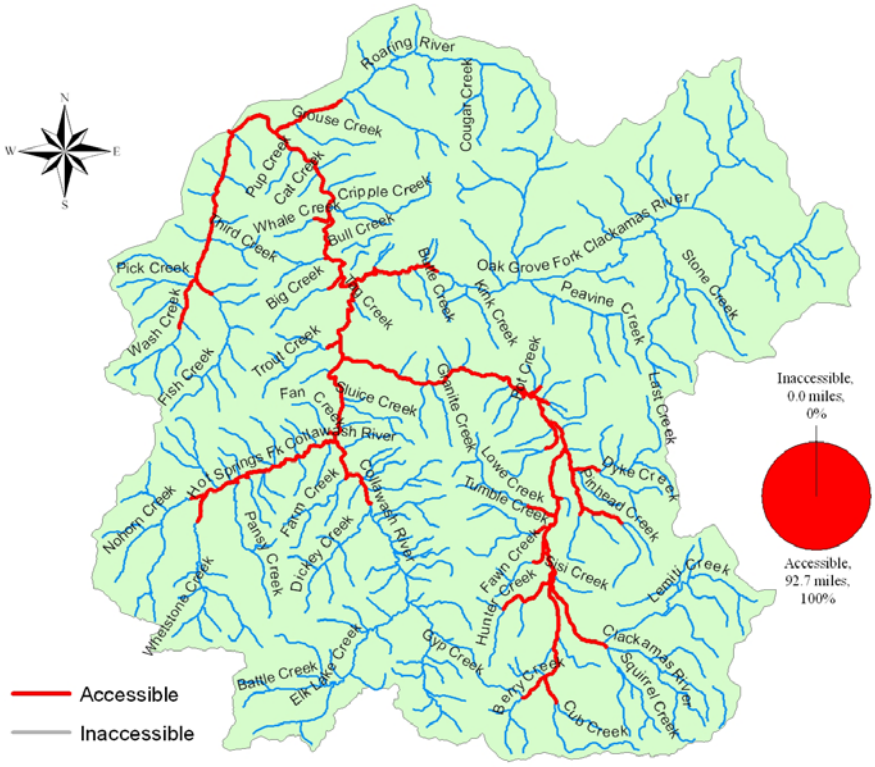


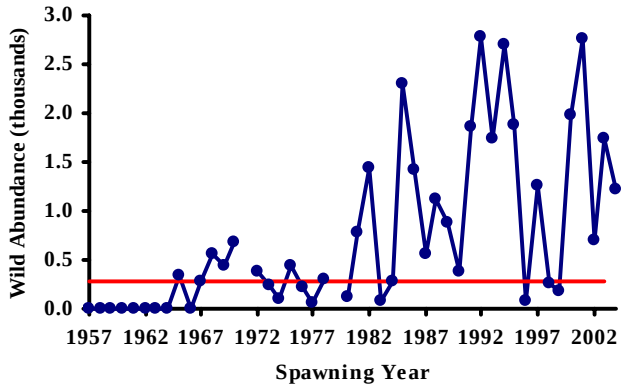
The Scappoose population passed the distribution, independence, and hybridization criteria, and failed abundance and productivity. The abundance graph reflects peak counts of live and dead fish observed in an index reach. Both abundance and productivity were failed due to inconclusive data. Precautionary application of the interim criteria treats inconclusive data as failure in assessment of risk to the SMU. Observations of ratios of finclipped to non-finclipped adults captured at the Bonnie Falls trap on North Fork Scappoose Creek were coupled with spawner survey results to estimate hatchery-to-naturally produced ratios from 1999-2003.

Assessment Outcome

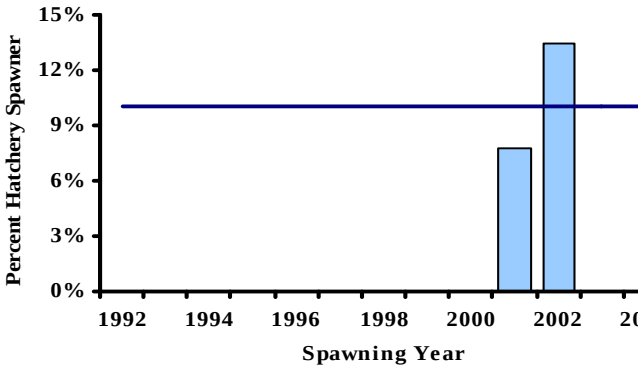
Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Fail*	*Fail*	*Pass*	*Pass*

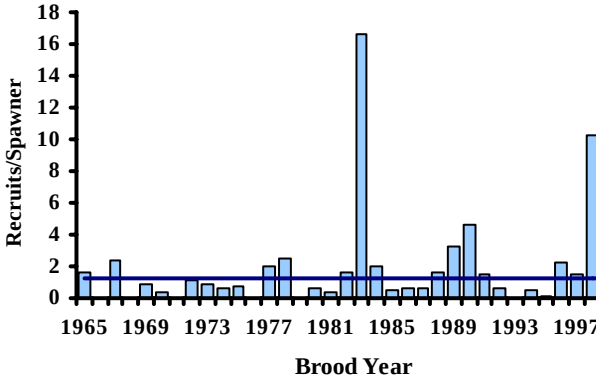
Early Clackamas – Lower Columbia Coho





The Early Clackamas population passed each of the six interim criteria. North Fork Dam counts were used to index abundance of early run coho which pass the dam between August and November. Few hatchery fish arrive at the dam, and marked fish are not passed upstream. Early run coho primarily spawn above Fish Creek, and late run fish spawn below Fish Creek though there is some spatial overlap in the two populations. Distribution patterns vary annually and are likely influenced by seasonal flow conditions.

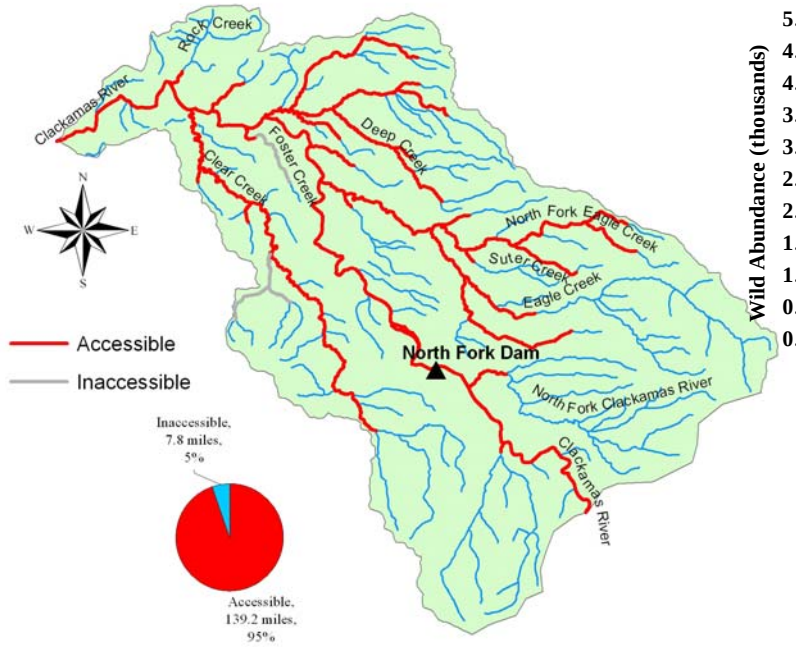


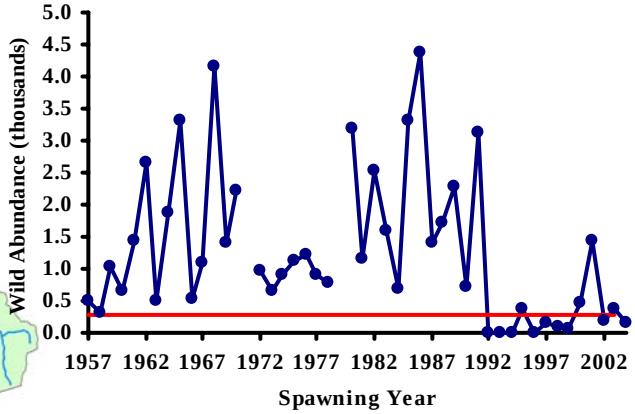


Assessment Outcome

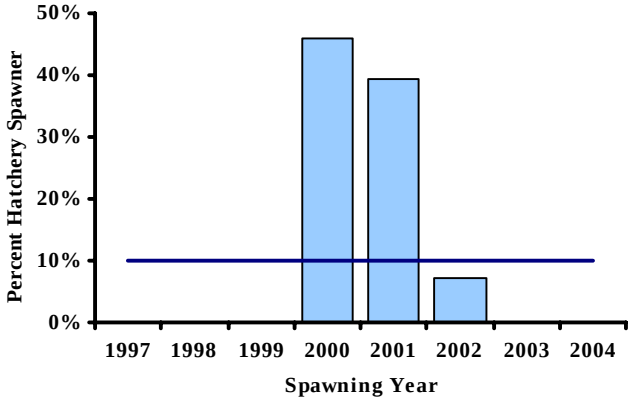
Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Pass*	*Pass*	*Pass*	*Pass*

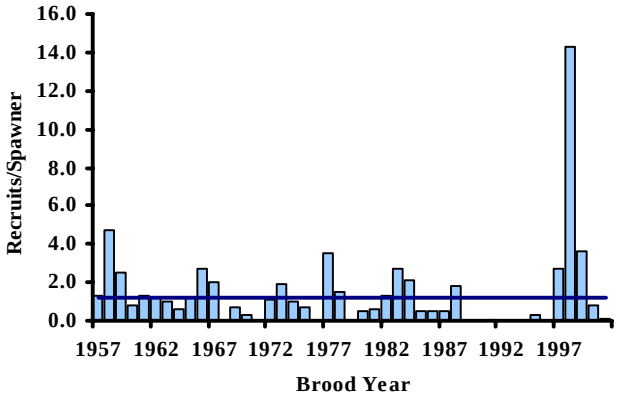
Late Clackamas – Lower Columbia Coho





The Late Clackamas population passed each of the interim criteria with the exception of abundance. North Fork Dam counts were used to index abundance of late run coho which pass the dam between October and March. Few hatchery fish arrive at the dam, and marked fish are not passed upstream. Hatchery fish passed upstream in 2000, 2001, and 2002 were part of an experimental program designed to supplement natural spawning using returns from naturally-produced broodstock. That program has been terminated. Early run coho primarily spawn above Fish Creek, and late run fish spawn below Fish Creek though there is some spatial overlap in the two populations. Distribution patterns vary annually and are likely influenced by seasonal flow conditions.

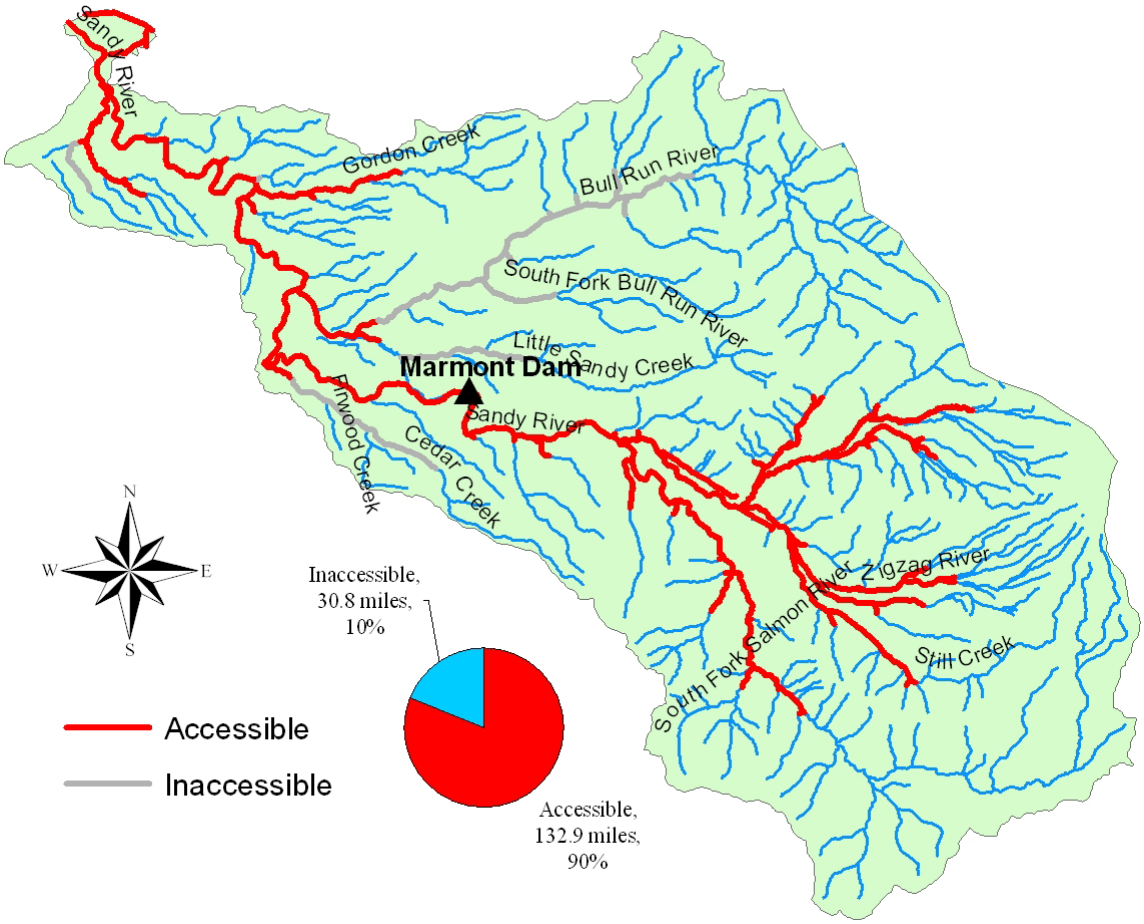




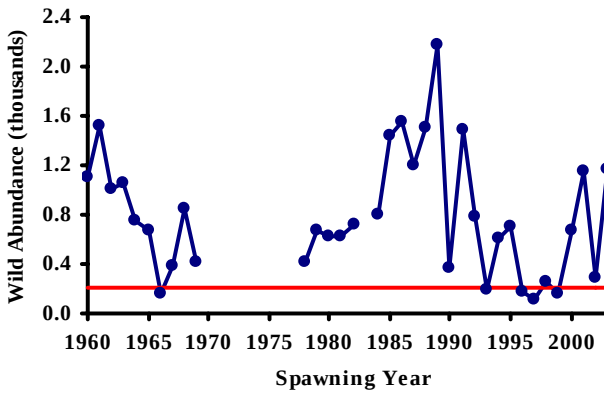
Assessment Outcome

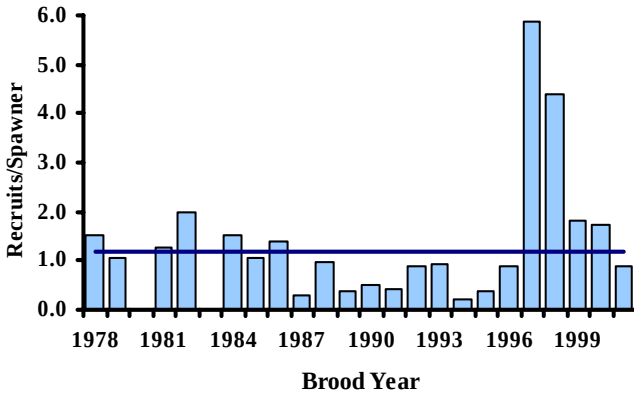
Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Pass*	*Pass*	*Pass*	*Pass*

Sandy – Lower Columbia Coho



The Sandy population passed each of the six interim criteria. Abundance was indexed by returns to Marmot Dam. Returns of finclipped fish to Marmot Dam since 1998 indicate that few, and in some years no hatchery fish, have arrived at Marmot Dam. Prior to 1998, hatchery and naturally-produced fish could not be distinguished, but it is likely that most of these fish were naturally produced. Between 1999 and 2004, only 0.7% of coho arriving at Marmot Dam were adipose finclipped.

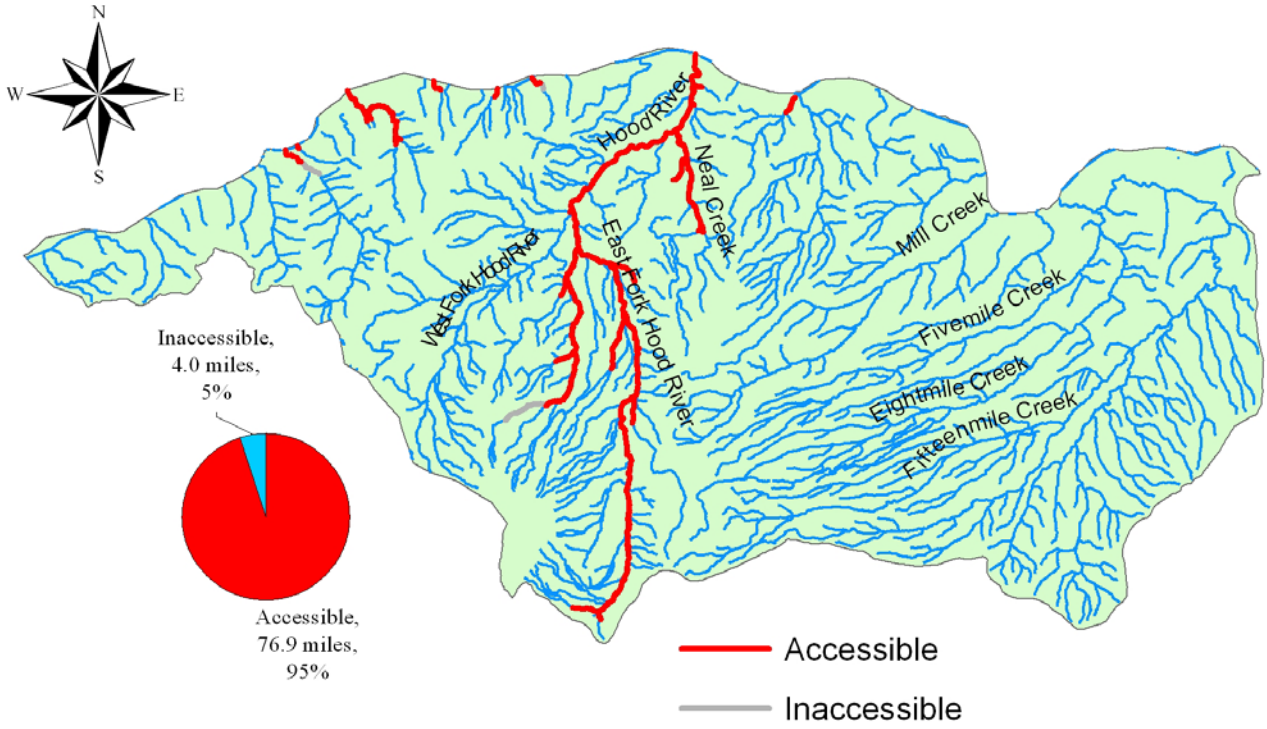


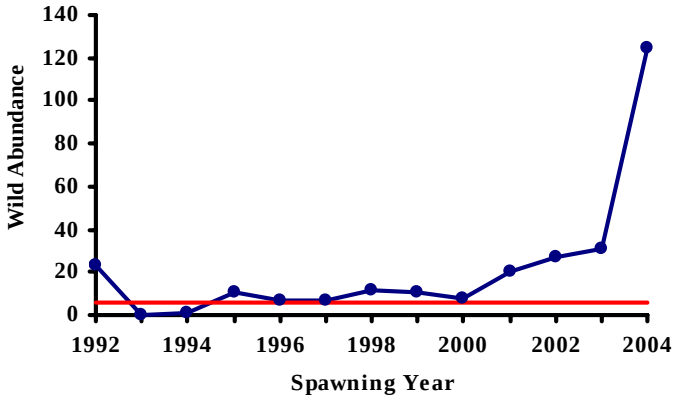


Assessment Outcome

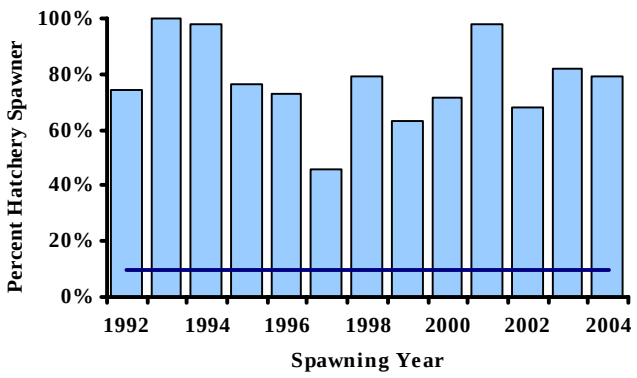
Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Pass*	*Pass*	*Pass*	*Pass*	*Pass*

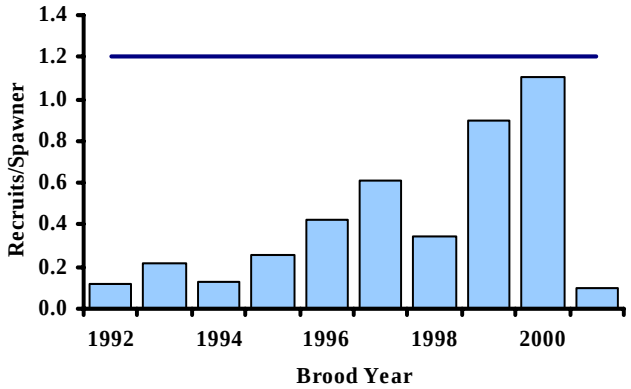
Bonneville – Lower Columbia Coho





The Bonneville population failed four of the five interim criteria for existing populations. Abundance in the Hood was indexed by returns to Powerdale Dam. Although abundance was greater than the interim criteria threshold in three of the last five years, the consistent high proportions of hatchery fish in the spawning population caused the population to fail the abundance criterion. In addition, the small naturally-produced returns indicate that spawners have not distributed themselves over 50% of the available habitat.





Assessment Outcome

Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Pass	*Fail*	*Fail*	*Fail*	*Fail*	*Pass*

Interior Columbia Coho

Existing Populations

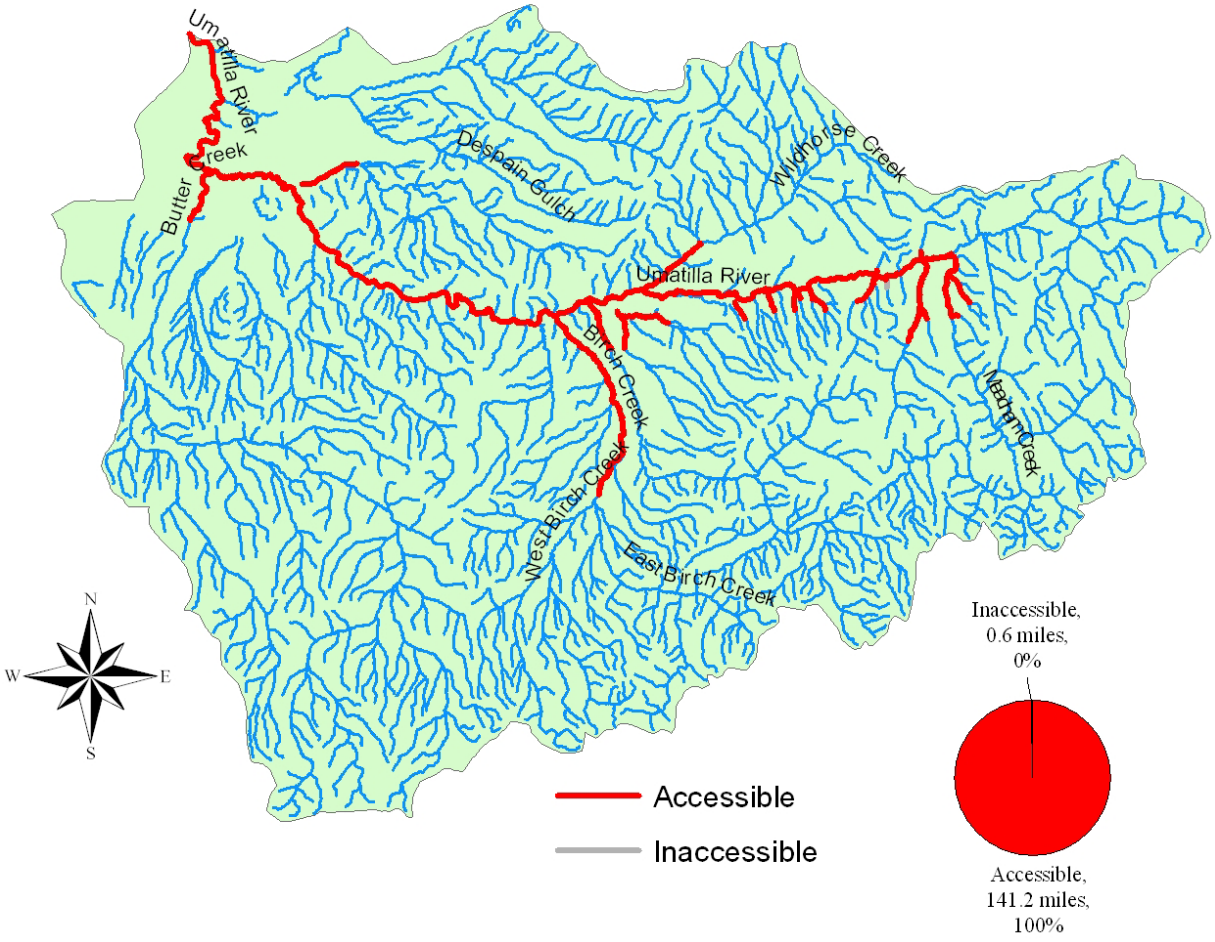
The Interior Columbia Coho SMU consists of two extinct populations including the Umatilla and the Wallowa (Table 22). Information within the SMU layout regarding the Umatilla population was extracted from Boyce (1986). Wallowa information was provided by Cramer and Witty (1998).

Table 22. Population list and existence status for the Interior Columbia Coho SMU.

Exist	Population	Description
No	Umatilla	Umatilla River basin.
No	Wallowa	Wallowa River basin (Grande Ronde River tributary).

Umatilla – Interior Columbia Coho

The Umatilla coho population is extinct. Overfishing, extensive water use, habitat degradation, and the Columbia hydropower system contributed to the elimination of this population. It is believed that coho were eliminated from the Umatilla shortly after the construction of Three Mile Dam in 1914. A coho hatchery program currently exists in the Umatilla basin. Some of those returns spawn naturally and have shown a small level of natural production.

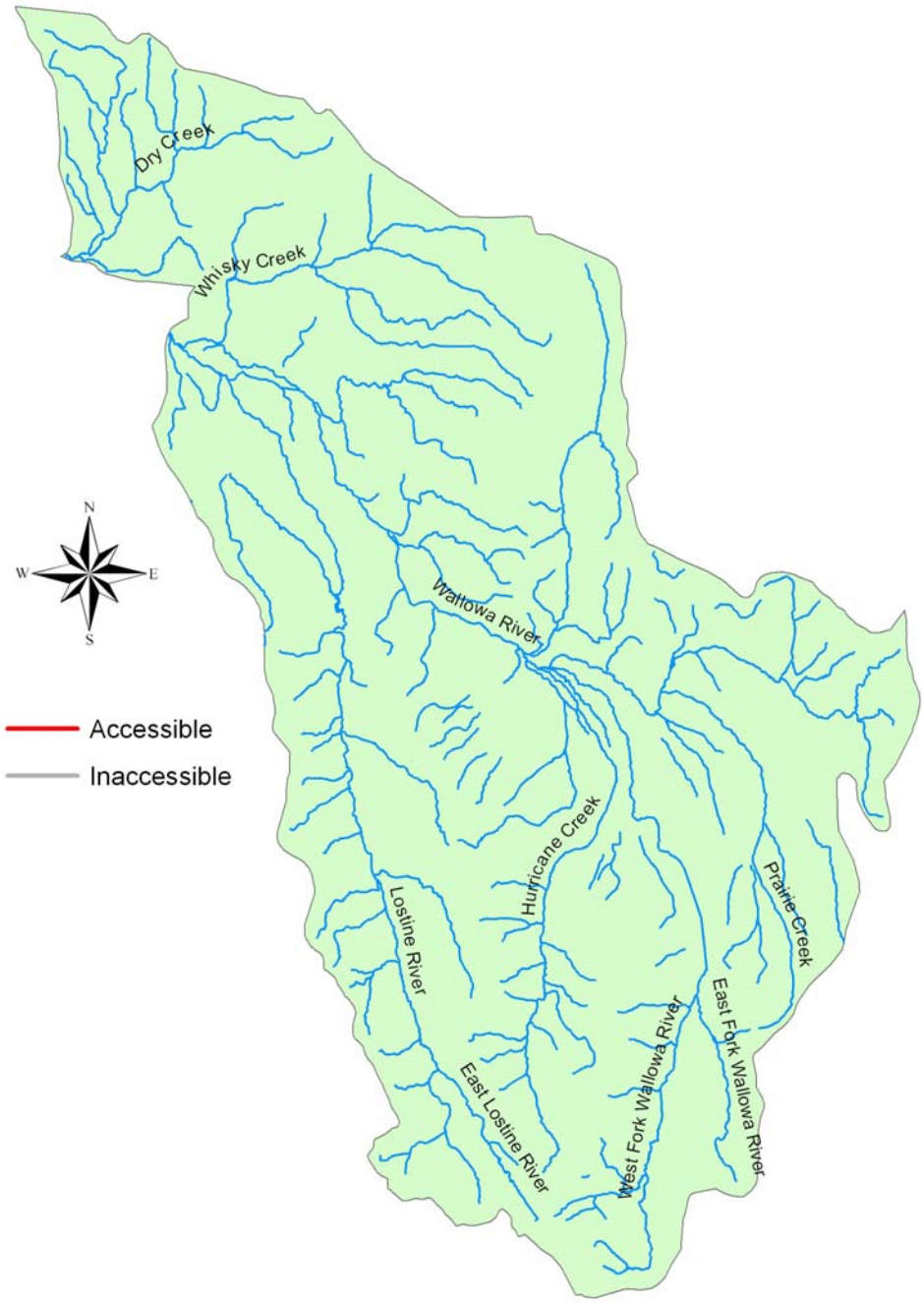


Assessment Outcome

Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Fail	--	--	--	--	--

Wallowa – Interior Columbia Coho

The Wallowa coho population is extinct. Overfishing, extensive water use, habitat degradation, and the Columbia hydropower system contributed to the elimination of runs of this population. Coho were virtually eliminated from the Wallowa by a 14-foot dam at river mile 3.0 in place in the Wallowa Riverbetween 1907 and 1924. Spawners were occasionally observed in the basin as late as the 1970s, but none have been seen since then.



Assessment Outcome

Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Fail	--	--	--	--	--

Klamath Coho

Existing Populations

The Klamath Coho SMU consists of a single extinct population within the Klamath basin upstream of the Oregon/California border, and thus the SMU is classified as extinct (Table 23).

Table 23. Population list and existence status for the Klamath Coho SMU.

Exist	Population	Description
No	Upper Klamath	Historical population of unknown distribution within the Klamath River upstream of the Oregon/California border.

Upper Klamath – Klamath Coho

The Upper Klamath coho population is an extinct population in the Klamath basin upstream of the Oregon/California border. Access to the upper Klamath was originally blocked in 1918 with the installation of Copco 1 Dam. In 1925, Copco 2 Dam was built just a quarter-mile downstream of the original dam. Iron Gate Dam, built in 1962, eliminated another seven miles of habitat downstream of the previous two dams. This series of dams has effectively extirpated coho and other anadromous salmonids upstream of Iron Gate Dam, 20 miles upstream of Yreka California. Historical distribution of coho in the Klamath is not well understood.

Assessment Outcome

Existence	Distribution	Abundance	Productivity	Independence	Hybridization
Fail	--	--	--	--	--