THE OREGON PLAN for Salmon and Watersheds

Western Oregon Adult Coho Salmon,
2022 Spawning Survey Data Report

Report Number: OPSW-ODFW-2023-3

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SUMMARY

This report provides a summary of results from Coho Salmon spawning ground surveys conducted in Lower Columbia (Oregon side only) and Oregon Coast basins during the 2022 spawning season. For a discussion of the history, goals and methods of this long-term monitoring effort see prior reports (e.g., Sounhein et al. 2017). Results in this report are based on data from randomly selected spawning ground surveys as well as alternative methods in areas without random sampling. Results for Coho Salmon standard spawning ground surveys and spawning surveys for other species are covered in data summaries and reports posted on an Oregon Department of Fish and Wildlife (ODFW) web page.

(see: https://odfw-oasis.forestry.oregonstate.edu/).

Long-term monitoring of Coho Salmon spawners in the Oregon portion of the Southern Oregon/Northern California Coast (SONCC) Coho Evolutionarily Significant Unit (ESU) currently relies on seining at Huntley Park in the lower Rogue River (river mile 8) and standard spawning ground surveys in other coastal basins. The ODFW monitoring in the SONCC Coho ESU is described in the Rogue–South Coast Multi-Species Conservation and Management Plan (RSP - ODFW 2021b), which was approved by the Oregon Fish and Wildlife Commission on December 17, 2021. In 2022, the 1996 to 2021 run year Rogue adult Coho Salmon estimates were recalculated to match the Coho Salmon abundance estimation methods as described in Appendix III of the RSP (ODFW 2021b). This method provides an estimate of adult Coho Salmon in the Rogue Basin at Huntley Park. In the past, the Huntley Park estimates (adjusted to account for harvest and hatchery operations above Huntley Park) were included in this report series. Beginning with the 2021 run year these Coho Salmon abundance estimates will be reported under the RSP and posted on an ODFW web page.

(see: https://www.dfw.state.or.us/fish/CRP/rogue_south_coast_multi-species_conservation%20and%20Management_plan.asp).

Wild adult Coho spawner abundance in 2022 was the highest ever recorded since monitoring began (2002) in the Lower Columbia River (LCR) ESU. In the Oregon Coast (OC) Coho ESU, wild abundance was down from the previous year, but still 132% of the 32-year average. In the Oregon portion of the LCR Coho ESU, sufficient surveys were conducted to meet the estimate precision goal at one of six populations and one of three strata. In the OC Coho ESU, sufficient surveys were conducted to meet the precision goal for the ESU, two of four strata, and zero of 13 populations where estimates were generated. No population scale estimates were produced in the North Coast stratum due to insufficient sample size issues.

INTRODUCTION AND METHODS

Monitoring of Western Oregon adult Coho Salmon occurs at three hierarchical spatial scales: Evolutionary Significant Unit; stratum; and population. There are three Coho Salmon ESUs located entirely or partially within the State of Oregon: the Lower Columbia River Coho ESU, the Oregon Coast Coho ESU, and the Southern Oregon/Northern California Coast Coho ESU. Boundaries and population structures of the Oregon Coho Salmon ESUs are presented in

Figure 1. This report summarizes results for Coho Salmon populations in the portion of each ESU within Oregon.

A brief history of sampling designs is available in prior years ODFW status reports (e.g., Sounhein et al. 2017). Field methods for establishing and conducting salmon spawning ground surveys are described in ODFW procedures manuals (ODFW 2019, ODFW 2021a). The trapezoidal Area-Under-the-Curve (AUC) technique is used to estimate the number of adult Coho Salmon spawning in each stream segment throughout the spawning season (Jacobs et al. 2002). A more detailed description of how spawner estimates are derived, the criteria used for determining if sites are included in the estimate, methods for determining the proportion of hatchery origin spawners (pHOS) in naturally spawning populations, and the analysis methods for other metrics included in this report can be found in prior years ODFW status reports.

In areas where surveys are not conducted, other sources of monitoring data are used to document the number of adult Coho Salmon spawners. These include dam counts, mark-recapture estimates, and regressions of standard survey data to abundance estimates. Historically, there have been five such locations in the LCR Coho ESU including: one dam (River Mill on the Clackamas River), three hatchery weirs (Big Creek, Klaskanine, and Sandy hatcheries), and one life-cycle monitoring site (Bonnie Falls Trap on North Scappoose Creek). In these locations, counts of adult Coho Salmon passed up-stream are added to the estimated abundance of Coho Salmon spawners below the facilities. Starting in 2020, the area above the Bonnie Falls trap location has been included in the regular spawning survey effort.

In the OC Coho ESU, random spawning ground surveys are conducted in most areas, except for the North Umpqua River above Winchester Dam and above the Alsea Hatchery weir. Winchester Dam counts and results of surveys below the dam, are used to document the number of adult Coho Salmon spawners in the North Umpqua population. The Winchester Dam count is adjusted for angler harvest of Coho Salmon in the North Umpqua River above Winchester Dam. Prior to 2020, when Rock Creek Hatchery was still in operation, the Winchester Dam count was also adjusted for Coho Salmon collected and retained at Rock Creek Hatchery. The count of Coho Salmon passed above the Alsea Hatchery weir is added to the spawning survey estimate for the Alsea population. Coho Salmon spawner abundances for the Lakes stratum are calculated using regressions of long-term standard surveys to historic mark-recapture studies and habitat measurements for those locations (Jacobs et.al. 2002).

In addition to the surveys used in the abundance estimates, “calibration” surveys are conducted in the Mill Creek-Yaquina and Mill Creek-Siletz sub-basins to test the accuracy of survey-based AUC estimates. The purpose of these surveys is to compare known passage or mark-recapture estimates with survey-based AUC estimates using a Generalized Random Tessellation Stratified (GRTS) survey site selection methodology.

RESULTS

Results include data from random spawning ground surveys and data from other sources where random surveys are not conducted. Results are presented in Bullets, Tables and Figures. Results are summarized by Coho Salmon ESU, in four categories: Survey Effort, Spawner Abundance, Distribution and Timing, and Hatchery Proportion. Spatially, results are reported by ESU, stratum, and constituent Coho Salmon populations. The individual components that comprise the results can be found in Appendices A, B, and C (by Coho Salmon ESU). Ancillary data is presented in Appendix D.

Stream flow levels in the LCR and OC Coho ESU's in the 2022 season started at below average in October, increased to near average from November through January and then dropped sharply. In all areas there was a flow peak in early November and then low flows until more consistent flows from early December to late January. Temperatures were generally above average to start the season and then dropped to below average in November, only to increase to near normal throughout December and January. Precipitation was generally below average for the season, but near normal in November and December. Overall, these weather patterns were conducive to successful surveying. In 2022, the unsuccessful survey rate was less than the previous 10-year average rate (plus one standard deviation) for most of the OC Coho ESU, and all of the LCR Coho ESU. Only in the North Coast stratum was a relaxed inclusion criteria used to determine which sites were used in abundance estimates. In some areas a high proportion of sites required application of relaxed criteria to provided adequate surveys for abundance estimates (Appendix Table D-4). In addition, issues with hiring and retention of surveyors in the North Coast Stratum forced reductions in the number of surveys to meet available staffing levels. Generally good adult coho carcass recoveries in 2022 resulted in adequate samples sizes for determining pHOS. Thus, standard criteria were used in 18 of 28 spatial scales (populations) at which surveys were selected (Appendix Table D-3).

Survey Effort

Lower Columbia River Coho ESU

- Survey effort was similar to recent years (Table 1).
- The percentage of sites successfully surveyed was similar to the prior 8-year average (Table D-1).
- No surveys have been conducted in the Youngs Bay and Big Creek population's since 2013.
- Survey conditions were amenable to project protocols, and relatively few surveys had to be excluded from the abundance estimates (see No AUC rate in Table D-5).

Oregon Coast Coho ESU

- Survey effort was reduced in the North Coast stratum, (Table 4) due to staffing shortages.
- The percentage of sites successfully surveyed was lower than the 8-year average (Table D-2).
- Survey conditions were amenable to project protocols, and relatively few surveys had to be excluded from the abundance estimates (see No AUC rate in Table D-5).

Southern Oregon/Northern California Coast Coho ESU

- Randomly selected spawning surveys targeting Coho Salmon were conducted across the ESU from the 1996 through 2008 spawning seasons. No random (GRTS) coho spawning ground surveys have been conducted since the 2008 season.

Spawner Abundance

Lower Columbia River Coho ESU

- Total wild adult coho spawner abundance in 2022 (23,373) was the highest ever recorded since monitoring began in 2002 (Table 3, and Figure 2).
- Wild adult coho spawner abundance in 2022 was above average in 4 of 6 populations.
- Approximately 60% of the wild abundance in the Lower Columbia River Coho ESU was driven by the Clackamas population estimate (Table 3), and approximately 94% of the Clackamas population abundance was determined by counts of wild coho passed above River Mill Dam (Table A-2).

Oregon Coast Coho ESU

- Total wild adult coho spawner abundance in 2022 (170,002) was 133% of the previous 32-year average (127,421 wild adults, Table 6, and Figure 5).
- Abundance in 2022 was above average in the North and Mid Coast strata, near average in the Mid-South Coast stratum and down in the Lakes and Umpqua strata. (Table 6).
- No population scale estimates were generated in the North Coast stratum due to insufficient numbers of sample sites (Table 4 and Table 6).
- Wild adult coho spawner abundance in 2022 was above average in seven of the nineteen populations where population scale estimates were produced (Table 6).
- One notable anomaly was the absence of coho in the South Umpqua population. On average, approximately 8,400 coho are estimated annually (Table 6); however, no adult coho were observed in the sixteen sites successfully surveyed in 2022.

Calibration Sites

- In 2022, the AUC estimates averaged 88% of the dam count or mark recapture abundance at the two calibration sites (Table 7), slightly above the 8-year (2014-2021) average of 86%.

Distribution and Timing

Lower Columbia River Coho ESU

- Spawn timing in 2022 peaked later than normal and was protracted with strong numbers of fish observed into late December (Figure 4).
- The proportion of sites occupied by coho in 2022 was at or above the prior 8-year average in all populations (Table 2).

- The proportion of sites occupied by wild coho in 2022 was also at or above the prior 8-year average in all populations (Table 2). Wild occupancy for the ESU in 2022 was 147% of the prior 8-year average (Table 2).

Oregon Coast Coho ESU

- Spawn timing in 2022 mirrored the long term average, peaking in mid-December. Very little spawning was observed into late January (Figure 8).
- Total coho and wild coho site occupancy results were very similar (Table 5). Wild coho site occupancy in 2022 was about average for the ESU, and above average in two of the four strata. Occupancy was down in the Umpqua and Mid-South Coast strata (Table 5).

Hatchery Proportion

Lower Columbia River Coho ESU

- Sample sizes for pHOS estimation at the population scale were sufficient in most areas.
- The 2022 proportion of hatchery coho on spawning grounds in the ESU was 11%, well below the 20-year average of 22.1% (Table 3). However, the 2022 results do not include two populations, Youngs Bay and Big Creek, which typically contribute a sizable portion of hatchery spawners to the ESU total.
- The Scappoose, Clackamas and Sandy populations had the lowest pHOS in 2022 (4.3 – 4.9%), while the highest occurred in the Hood River (96.6%) (Table 3).
- In the LCR ESU, pHOS has been decreasing over time, and has consistently been below 12% since 2014 (Figure 2).

Oregon Coast Coho ESU

- Sample sizes for pHOS estimation at the population scale were sufficient in most areas.
- The 2022 proportion of hatchery coho on spawning grounds in the ESU was 0.4%, well below the 32-year average of 9% (Table 6).
- At the population and strata scale, pHOS was near or below the 32-year average in all cases. No populations had a pHOS higher than 4% in 2022 (Table 6).
- In the OC ESU, pHOS has been decreasing over time, and has consistently been below 5% since 2008 (Figure 5).

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Table 1. Lower Columbia River Coho ESU, GRTS spawning survey goals and results for number of surveys and 95% C.I., 2022 run year. Target response sites are reaches within Coho Salmon spawning habitat which were successfully surveyed.

Stratum	Population	Goal	Target response				95% CI as percent of point estimate (goal is +/- 30%)			
			2022	2014 to 2021			2022	2014 to 2021		
				Avg.	Min.	Max.		Avg.	Min.	Max.
Coast	Youngs Bay	0	0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	Big Creek	0	0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	Clatskanie	18	26	21	12	26	23%	40%	21%	74%
	Scappoose	20	14	14	8	18	91%	67%	46%	103%
	Total	**38**	**40**	**35**	**27**	**40**	**30%**	**40%**	**24%**	**72%**
Cascade	Clackamas	30	21	24	15	30	47%	70%	33%	110%
	Sandy	30	23	27	8	35	48%	49%	37%	66%
	Total	**60**	**44**	**51**	**24**	**61**	**40%**	**39%**	**31%**	**44%**
Gorge	Lower Gorge	2	2	2	0	6	184%	81%	9%	119%
	Hood	2	5	2	0	5	95%	76%	0%	191%
	Total	**4**	**7**	**4**	**0**	**8**	**84%**	**68%**	**1%**	**108%**
ESU Total		**102**	**91**	**90**	**52**	**101**	**31%**	**29%**	**23%**	**36%**

n.a. = Not available (no surveys were selected in the population, less than 2 surveys stayed in rotation, or the abundance estimate was 0).

Table 2. Lower Columbia River Coho ESU adult Coho Salmon occupancy (total & wild) by population, stratum, and ESU for the 2022 run year and previous 8-year average (2014–21). Occupancy = a peak of 4 or more adult Coho Salmon per mile. Wild Occupied = occupied sites with at least one wild Coho Salmon. n.a = Not available, population was not monitored.

ESU, Stratum, and TRT Population	2022 No. sites surveyed	8 yr. avg. No. sites surveyed	Total Coho Salmon		Wild Coho Salmon	
			2022 % Occupied	8 yr. avg. % Occupied	2022 % Occupied	8 yr. avg. % Occupied
Lower Columbia R. ESU	**91**	**92**	**64%**	**44%**	**64%**	**44%**
Coast Stratum	**40**	**35**	**63%**	**50%**	**63%**	**49%**
Youngs Bay	0	0	n.a	n.a	n.a	n.a
Big Creek	0	0	n.a	n.a	n.a	n.a
Clatskanie River	26	21	73%	55%	73%	53%
Scappoose Creek	14	14	43%	43%	43%	43%
Cascade Stratum	**44**	**53**	**61%**	**37%**	**61%**	**38%**
Clackamas River	21	26	48%	28%	48%	31%
Sandy River	23	27	74%	45%	74%	43%
Gorge Stratum	**7**	**4**	**86%**	**77%**	**86%**	**72%**
Lower Gorge tribs.	2	3	100%	83%	100%	70%
Hood River	5	3	80%	79%	80%	79%

Table 3. Lower Columbia River Coho ESU estimated abundance of adult Coho Salmon spawning naturally by ESU, stratum, and population in the 2022 run year compared to the previous 20 years.

Geographic scale ESU/Stratum/Population		Spawning year			
			2002 to 2021		
		2022	Avg.	Min.	Max.
Lower Columbia River ESU (Oregon Only)	**Wild**	**23,373***	**7,970**	**2,988**	**21,849**
	Hatchery	**2,896***	**2,468**	**285**	**12,230**
	% Hat.	**11.0%***	**22.1%**	**2.4%**	**65.6%**
Coast Stratum *	**Wild**	**n.a.**	**1,836**	**1,140**	**3,993**
	Hatchery	**n.a.**	**838**	**89**	**3,420**
	% Hat.	**n.a.**	**27.8%**	**4.9%**	**74.4%**
Youngs Bay *	Wild	n.a.	119	21	411
	Hatchery	n.a.	510	14	2,506
	% Hat.	n.a.	67.7%	21.9%	92.1%
Big Creek *	Wild	n.a.	300	98	792
	Hatchery	n.a.	317	66	936
	% Hat.	n.a.	46.0%	15.5%	89.8%
Clatskanie	Wild	1,139	801	25	3,246
	Hatchery	189	69	0	413
	% Hat.	14.2%	13.0%	0.0%	67.9%
Scappoose	Wild	508	687	178	1,960
	Hatchery	26	10	0	67
	% Hat.	4.9%	1.4%	0.0%	9.9%
Cascade Stratum	**Wild**	21,143	5,833	2,157	16,612
	Hatchery	959	1,419	139	10,871
	% Hat.	4.3%	17.9%	1.2%	71.2%
Clackamas	Wild	13,997	4,213	1,301	10,670
	Hatchery	636	1,333	50	10,871
	% Hat.	4.3%	20.8%	1.5%	75.8%
Sandy	Wild	7,152	1,620	382	5,942
	Hatchery	323	90	0	515
	% Hat.	4.3%	7.4%	0.0%	57.4%
Gorge Stratum	**Wild**	583	465	34	1,525
	Hatchery	1,722	665	25	2,555
	% Hat.	74.7%	48.3%	11.9%	73.8%
Lower Gorge Tribs.	Wild	523	268	16	920
	Hatchery	5	244	8	1,512
	% Hat.	0.9%	38.3%	4.2%	85.2%
Hood River	Wild	60	242	4	1,262
	Hatchery	1,717	436	0	1,434
	% Hat.	96.6%	53.0%	0.0%	85.3%

** = Does not include data for the Youngs Bay and Big Creek Populations. These populations were not sampled, 2013 through present run years. Also, the Lower Gorge and Hood populations were not sampled in 2017 and 2020.*

Table 4. Oregon Coast Coho ESU, GRTS spawning survey goals, responses, and estimate precision by population, 2022 run year. Target response sites are reaches within Coho Salmon spawning habitat which were successfully surveyed.

Stratum	Population	Goal	Target response				95% CI as percent of point estimate (goal is +/- 30%)			
				2014 to 2021				2014 to 2021		
			2022	Avg.	Min.	Max.	2022	Avg.	Min.	Max.
North Coast	Necanicum	13	8	14	6	18	*No Est*	35%	22%	50%
	Nehalem	20	7	17	5	24	*No Est*	43%	37%	49%
	Tillamook	20	9	18	8	25	*No Est*	51%	36%	56%
	Nestucca	20	12	14	7	23	*No Est*	51%	42%	73%
	NC Depend.	7	6	7	4	9	*No Est*	92%	79%	104%
	Total	**80**	**42**	**69**	**30**	**92**	**46%**	**27%**	**22%**	**32%**
Mid-Coast	Salmon	9	7	10	5	17	117%	72%	23%	126%
	Siletz	20	16	19	12	26	56%	41%	33%	48%
	Yaquina	20	18	17	10	22	33%	43%	33%	55%
	Beaver	3	3	4	3	5	74%	67%	24%	130%
	Alsea	20	18	18	11	24	30%	35%	26%	55%
	Siuslaw	20	15	17	12	23	32%	41%	28%	59%
	MC Depend.	8	7	8	5	11	60%	83%	43%	132%
	Total	**100**	**84**	**93**	**65**	**114**	**19%**	**20%**	**16%**	**27%**
Lakes	Siltcoos	0	0	0	0	0	n.a.	n.a.	n.a.	n.a.
	Tahkenitch	0	0	0	0	0	n.a.	n.a.	n.a.	n.a.
	Tenmile	0	0	0	0	0	n.a.	n.a.	n.a.	n.a.
	Total	**0**	0	0	0	0	**n.a.**	**n.a.**	**n.a.**	**n.a.**
Umpqua	L. Umpqua	20	15	17	11	20	37%	49%	24%	78%
	M. Umpqua	20	17	12	6	15	60%	68%	50%	85%
	N. Umpqua	3	1	1	0	3	n.a.	n.a.	n.a.	n.a.
	S. Umpqua	20	16	15	9	20	n.a.	72%	37%	107%
	Total	**63**	**49**	**45**	**30**	**55**	**32%**	**38%**	**22%**	**62%**
Mid-South Coast	Coos	20	16	18	11	22	40%	51%	29%	69%
	Coquille	20	14	18	11	24	37%	44%	33%	57%
	Floras	17	14	10	1	22	55%	47%	17%	72%
	Sixes	8	16	8	3	15	87%	73%	40%	115%
	MS Depend	3	1	2	0	6	n.a.	179%	163%	195%
	Total	**68**	**61**	**55**	**34**	**79**	**28%**	**32%**	**26%**	**37%**
ESU Total		**311**	**236**	**262**	**191**	**322**	**18%**	**15%**	**13%**	**18%**

n.a. = Not available (no surveys were selected in the population, less than 2 surveys stayed in rotation, or the abundance estimate was 0).

Table 5. Oregon Coast Coho ESU adult Coho Salmon occupancy (total & wild) by population, stratum, and ESU for the 2022 run year and previous 8-year average (2014–21). Occupancy = a peak of 4 or more adult Coho Salmon per mile. Wild Occupied = occupied sites with at least one wild Coho Salmon. n.a = not available.

ESU, Stratum, and Population	2022 No. sites surveyed	8 yr. avg. No. sites surveyed	Total Coho Salmon		Wild Coho Salmon	
			2022 % Occupied	8 yr. avg. % Occupied	2022 % Occupied	8 yr. avg. % Occupied
Oregon Coast ESU	**236**	**262**	**67.8%**	**67.3%**	**66.9%**	**65.6%**
North Coast Stratum	**42**	**69**	**92.9%**	**69.7%**	**90.5%**	**67.9%**
Necanicum River	8	14	n.a.	76.4%	n.a.	73.5%
Nehalem River	7	17	n.a.	72.5%	n.a.	72.5%
Tillamook Bay	9	18	n.a.	66.9%	n.a.	64.9%
Nestucca River	12	14	n.a.	71.8%	n.a.	69.1%
NC Dependents	6	7	n.a.	55.7%	n.a.	53.6%
Mid-Coast Stratum	**84**	**93**	**88.1%**	**74.9%**	**86.9%**	**73.6%**
Salmon River	7	10	71.4%	48.2%	57.1%	45.3%
Siletz River	16	19	81.3%	87.3%	81.3%	87.3%
Yaquina River	18	17	100.0%	83.1%	100.0%	82.4%
Beaver Creek	3	4	100.0%	95.8%	100.0%	91.7%
Alsea River	18	18	94.4%	83.8%	94.4%	83.8%
Siuslaw River	15	17	93.3%	71.5%	93.3%	70.0%
MC Dependents	7	8	57.1%	32.5%	57.1%	25.1%
Lakes Stratum	**0**	**0**	**n.a.**	**n.a.**	**n.a.**	**n.a.**
Siltcoos Lake	0	0	n.a.	n.a.	n.a.	n.a.
Tahkenitch Lake	0	0	n.a.	n.a.	n.a.	n.a.
Tenmile Lake	0	0	n.a.	n.a.	n.a.	n.a.
Umpqua Stratum	**49**	**45**	**32.7%**	**53.8%**	**32.7%**	**51.7%**
Lower Umpqua River	15	17	73.3%	75.9%	73.3%	72.8%
Mid. Umpqua River	17	12	29.4%	47.2%	29.4%	46.1%
North Umpqua River	1	1	n.a.	n.a.	n.a.	n.a.
South Umpqua River	16	15	0.0%	37.0%	0.0%	35.0%
Mid-South Stratum	**61**	**55**	**50.8%**	**62.5%**	**50.8%**	**60.6%**
Coos River	16	18	68.8%	75.6%	68.8%	74.3%
Coquille River	14	18	78.6%	70.1%	78.6%	68.3%
Floras Creek	14	10	57.1%	73.1%	57.1%	69.9%
Sixes River	16	8	6.3%	30.7%	6.3%	24.5%
MSC Dependents	1	2	0.0%	6.7%	0.0%	6.7%

Table 6. Oregon Coast Coho ESU estimated abundance of adult Coho Salmon spawning naturally by ESU, stratum, and population for the 2022 run year compared to the previous 32 years.

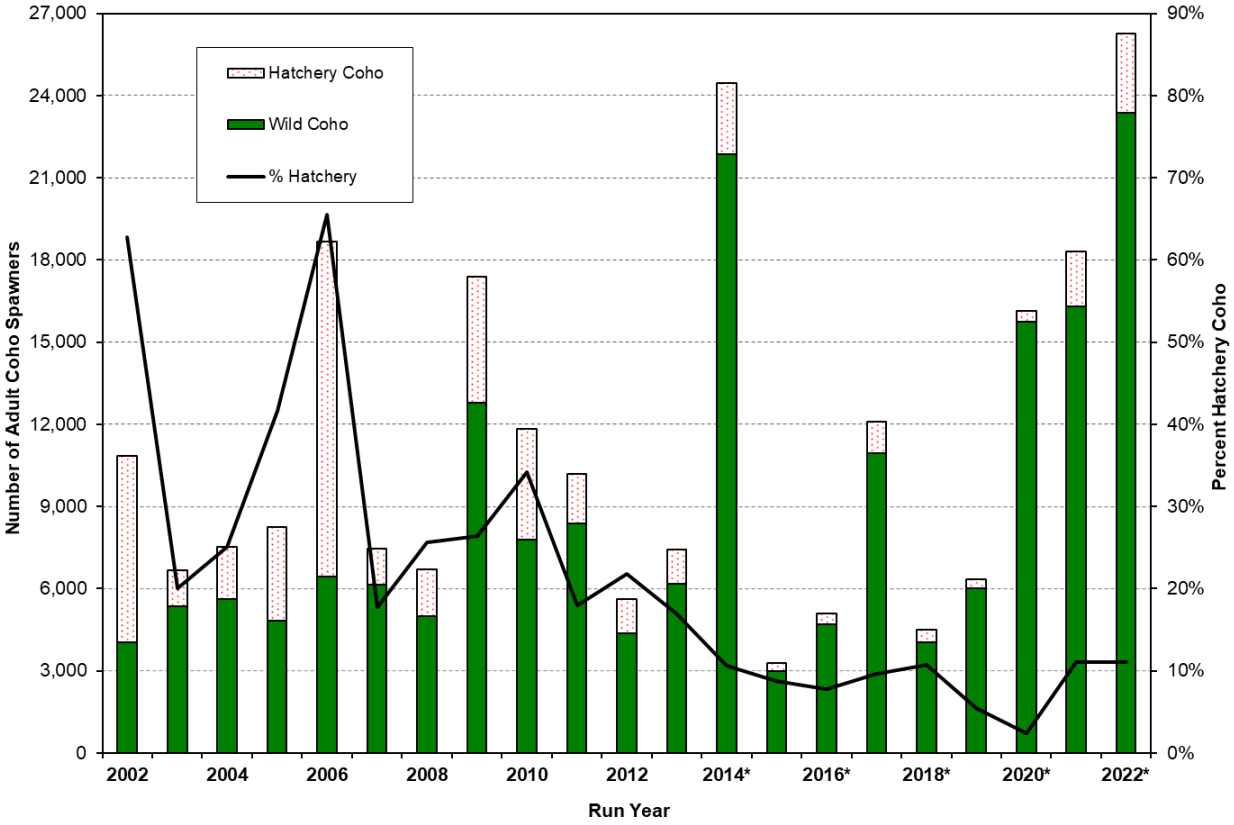
Geographic scale ESU/Stratum/Population	Coho salmon origin	Spawning year			
			1990 to 2021		
		2022	Avg.	Min.	Max.
Oregon Coast Coho ESU	**Wild**	**170,002**	**127,836**	**21,139**	**359,692**
	Hatchery	**715**	**7,818**	**386**	**26,128**
	% Hat.	**0.4%**	**9.0%**	**0.5%**	**31.4%**
North Coast Stratum	**Wild**	**52,956**	**21,293**	**1,524**	**67,370**
	Hatchery	**225**	**1,749**	**0**	**15,563**
	% Hat.	**0.4%**	**15.8%**	**0.0%**	**79.0%**
Necanicum River	Wild	No Est.	1,307	97	5,727
	Hatchery	No Est.	102	0	501
	% Hat.	No Est.	13.6%	0.0%	40.1%
Nehalem River	Wild	No Est.	11,290	527	32,517
	Hatchery	No Est.	1,324	0	14,014
	% Hat.	No Est.	17.4%	0.0%	87.7%
Tillamook Bay	Wild	No Est.	5,014	80	20,090
	Hatchery	No Est.	263	0	1,498
	% Hat.	No Est.	14.2%	0.0%	68.9%
Nestucca River	Wild	No Est.	3,035	160	16,698
	Hatchery	No Est.	52	0	274
	% Hat.	No Est.	5.0%	0.0%	15.3%
North Coast Dependents	Wild	No Est.	646	0	4,607
	Hatchery	No Est.	14	0	111
	% Hat.	No Est.	0.9%	0.0%	6.3%
Mid-Coast Stratum	**Wild**	**71,933**	**36,749**	**2,444**	**121,963**
	Hatchery	**406**	**1,734**	**0**	**9,633**
	% Hat.	**0.6%**	**11.3%**	**0.0%**	**50.1%**
Salmon River	Wild	1,324	580	5	3,680
	Hatchery	0	522	0	2,621
	% Hat.	0.0%	49.7%	0.0%	97.6%
Siletz River	Wild	16,466	6,485	207	33,094
	Hatchery	222	221	0	962
	% Hat.	1.3%	13.6%	0.0%	58.4%
Yaquina River	Wild	6,484	6,294	317	25,582
	Hatchery	98	149	0	1,526
	% Hat.	1.5%	6.0%	0.0%	25.0%
Beaver Creek	Wild	2,058	1,728	90	6,564
	Hatchery	86	41	0	405
	% Hat.	4.0%	3.1%	0.0%	23.8%
Alsea River	Wild	19,141	6,855	108	28,337
	Hatchery	0	275	0	2,214
	% Hat.	0.0%	13.3%	0.0%	93.8%
Siuslaw River	Wild	24,892	13,348	501	55,445
	Hatchery	0	510	0	4,136
	% Hat.	0.0%	8.8%	0.0%	37.6%
Mid Coast Dependents	Wild	1,568	1,459	51	8,179
	Hatchery	0	29	0	118
	% Hat.	0.0%	1.7%	0.0%	5.9%

Table 6. Continued

Geographic scale ESU/Stratum/Population	Coho salmon origin	Spawning year			
			1990 to 2021		
		2022	Avg.	Min.	Max.
Lakes Stratum	**Wild**	**8,049**	**13,593**	**1,302**	**38,744**
	Hatchery	**43**	**46**	**0**	**251**
	% Hat.	**0.5%**	**0.4%**	**0.0%**	**2.2%**
Siltcoos Lake	Wild	3,056	3,737	385	7,998
	Hatchery	34	22	0	124
	% Hat.	1.1%	0.9%	0.0%	8.7%
Tahkenitch Lake	Wild	1,586	2,651	269	10,681
	Hatchery	9	11	0	107
	% Hat.	0.6%	0.4%	0.0%	3.1%
Tenmile Lake	Wild	3,407	7,206	318	20,385
	Hatchery	0	13	0	123
	% Hat.	0.0%	0.2%	0.0%	3.4%
Umpqua Stratum	**Wild**	**9,632**	**27,510**	**3,334**	**94,655**
	Hatchery	**41**	**3,896**	**257**	**17,758**
	% Hat.	**0.4%**	**15.6%**	**0.7%**	**36.0%**
Lower Umpqua River	Wild	6,448	10,258	1,257	36,942
	Hatchery	0	229	0	1,484
	% Hat.	0.0%	2.8%	0.0%	15.7%
Middle Umpqua River	Wild	1,665	6,175	563	19,962
	Hatchery	0	191	0	1,259
	% Hat.	0.0%	3.8%	0.0%	20.6%
North Umpqua River	Wild	1,519	2,700	355	9,397
	Hatchery	41	2,732	50	14,094
	% Hat.	2.6%	42.8%	1.2%	84.3%
South Umpqua River	Wild	0	8,378	435	49,958
	Hatchery	0	745	0	7,040
	% Hat.	-	12.3%	0.0%	57.2%
Mid-South Coast Stratum	**Wild**	**27,432**	**28,691**	**4,890**	**82,077**
	Hatchery	**0**	**392**	**0**	**2,766**
	% Hat.	**0.0%**	**1.9%**	**0.0%**	**23.8%**
Coos River	Wild	7,370	13,556	1,112	38,880
	Hatchery	0	179	0	1,387
	% Hat.	0.0%	2.0%	0.0%	36.4%
Coquille River	Wild	19,078	12,819	2,033	55,667
	Hatchery	0	151	0	1,832
	% Hat.	0.0%	1.6%	0.0%	15.4%
Floras Creek	Wild	871	2,410	340	11,329
	Hatchery	0	55	0	400
	% Hat.	0.0%	3.3%	0.0%	22.8%
Sixes River	Wild	113	175	34	567
	Hatchery	0	15	0	182
	% Hat.	0.0%	7.3%	0.0%	65.7%
Mid-South Coast Dependents	Wild	0	83	0	484
	Hatchery	0	1	0	9
	% Hat.	-	0.9%	0.0%	4.6%

Table 7. Comparison of two independent coho abundance estimates at each of two life-cycle monitoring sites in the Oregon Coast Coho ESU. An estimate based on AUC protocol compared to a Mark–Recapture estimate (Mill Cr., Siletz R.) or a Dam Count (Mill Cr., Yaquina R.).

Spawning Year	Mill Creek (Siletz R.)			Mill Creek (Yaquina R.)		
	M-R Est.	AUC Est.	AUC/M-R	Dam Count	AUC Est.	AUC/Dam
2014	1,844	1,642	89%	1,471	1,677	114%
2015	316	196	62%	275	142	52%
2016	451	440	98%	760	607	80%
2017	518	471	91%	405	211	52%
2018	363	276	76%	382	298	78%
2019	674	611	91%	473	291	62%
2020	656	834	127%	*No comparison in 2020 (budget cuts)*		
2021	2,321	2,102	91%	1,223	993	81%
2022	1,175	1,038	88%	590	521	88%
Mean	**924**	**846**	**90%**	**663**	**593**	**76%**



** Estimates for 2013 to present do not include Big Creek and Youngs Bay populations and are therefore incomplete. These populations combined account for an average of 12% of the total estimate for the ESU (about 7% of the wild, and 27% of the hatchery components). Note: The Hood River and Lower Gorge populations were not sampled in 2017 (wildfires) and 2020 (budgets).*

Figure 2. Lower Columbia River Coho ESU estimated abundance of adult Coho Salmon spawning naturally by rearing origin for the 2002 through 2022 run years.

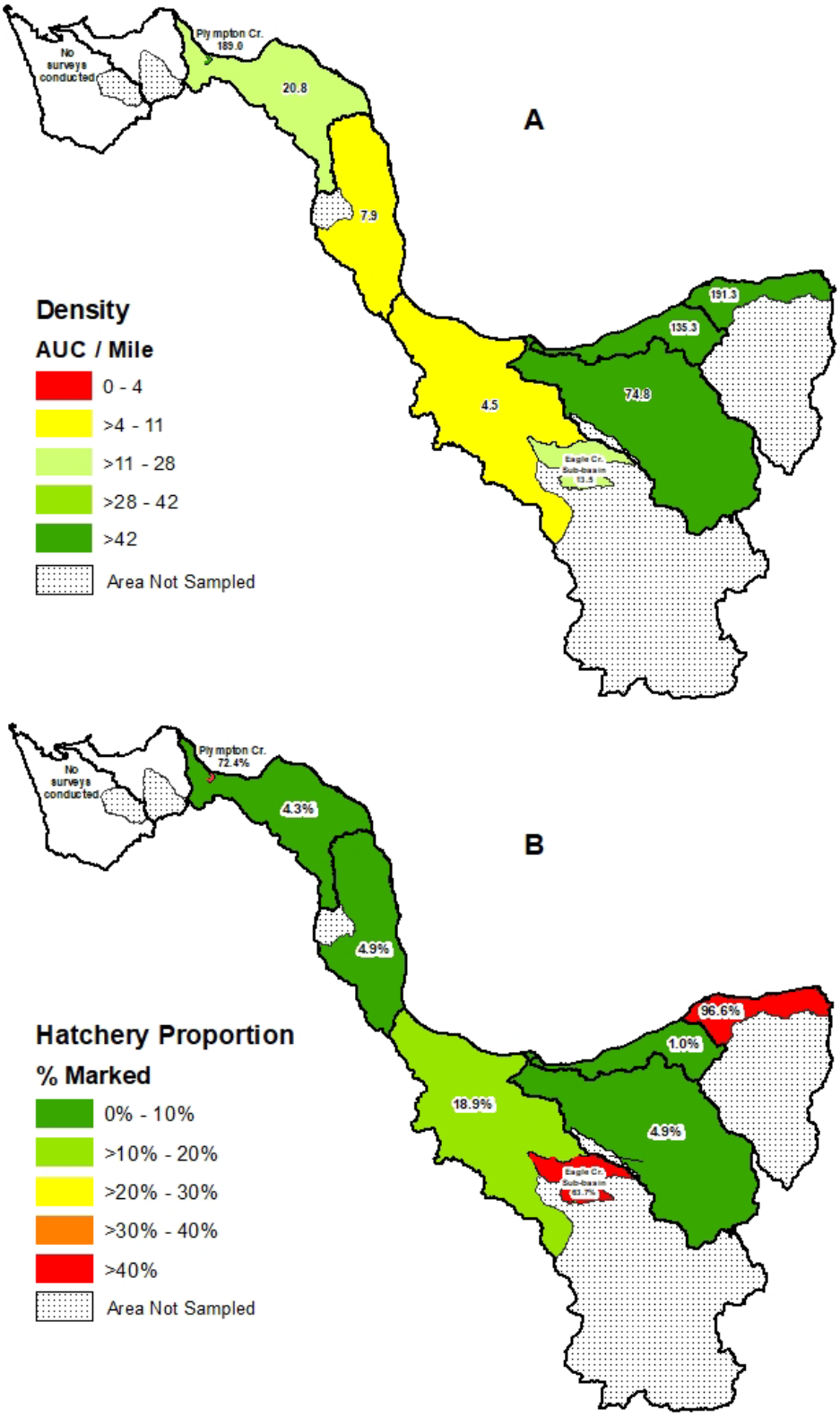


Figure 3. A) Coho salmon density (AUC/mile) in GRTS surveys by lower Columbia River TRT population, 2022. B) Percentage of marked adult coho salmon in GRTS surveys by lower Columbia River TRT population, 2022.

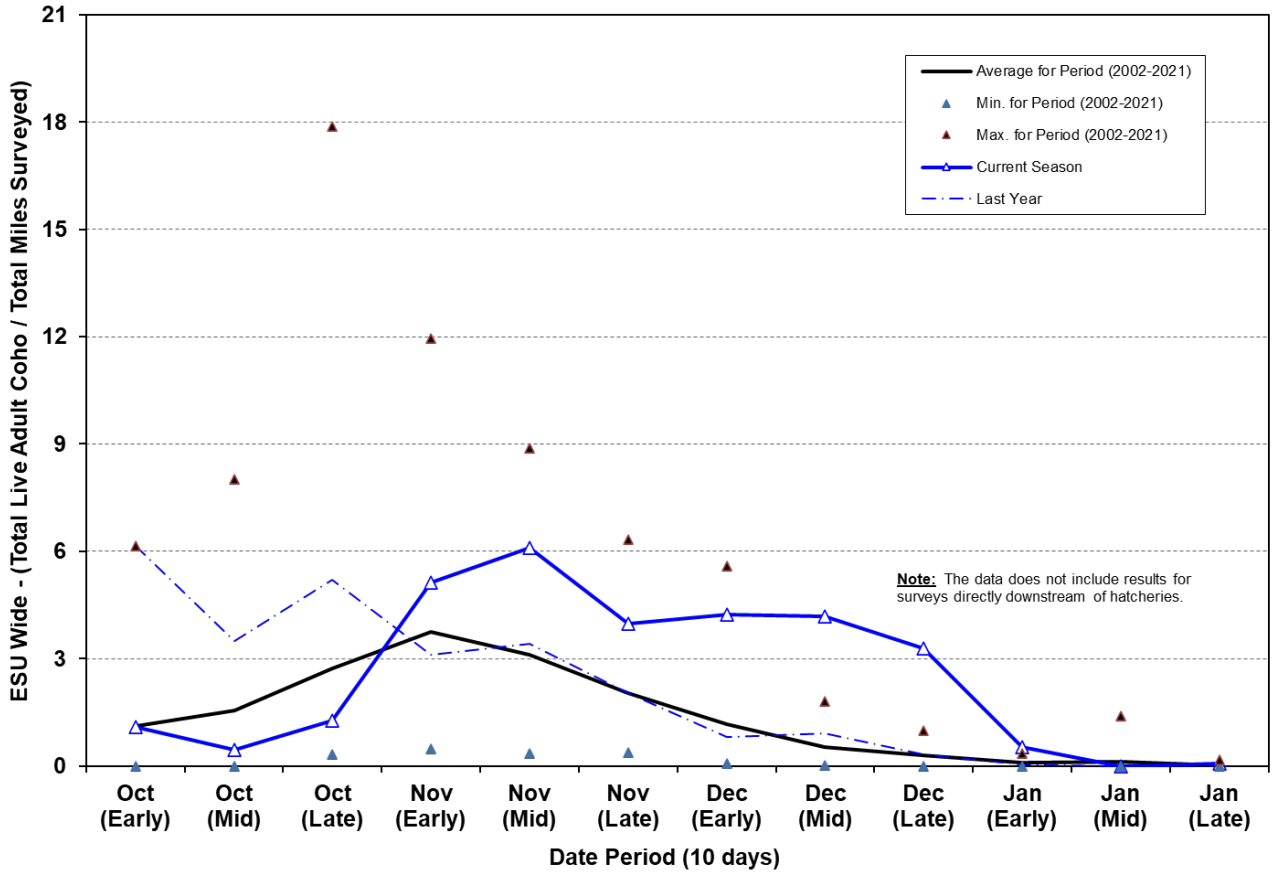


Figure 4. Spawn timing of live adult Coho Salmon in 2022 on GRTS spawning ground surveys in the Lower Columbia River Coho ESU.

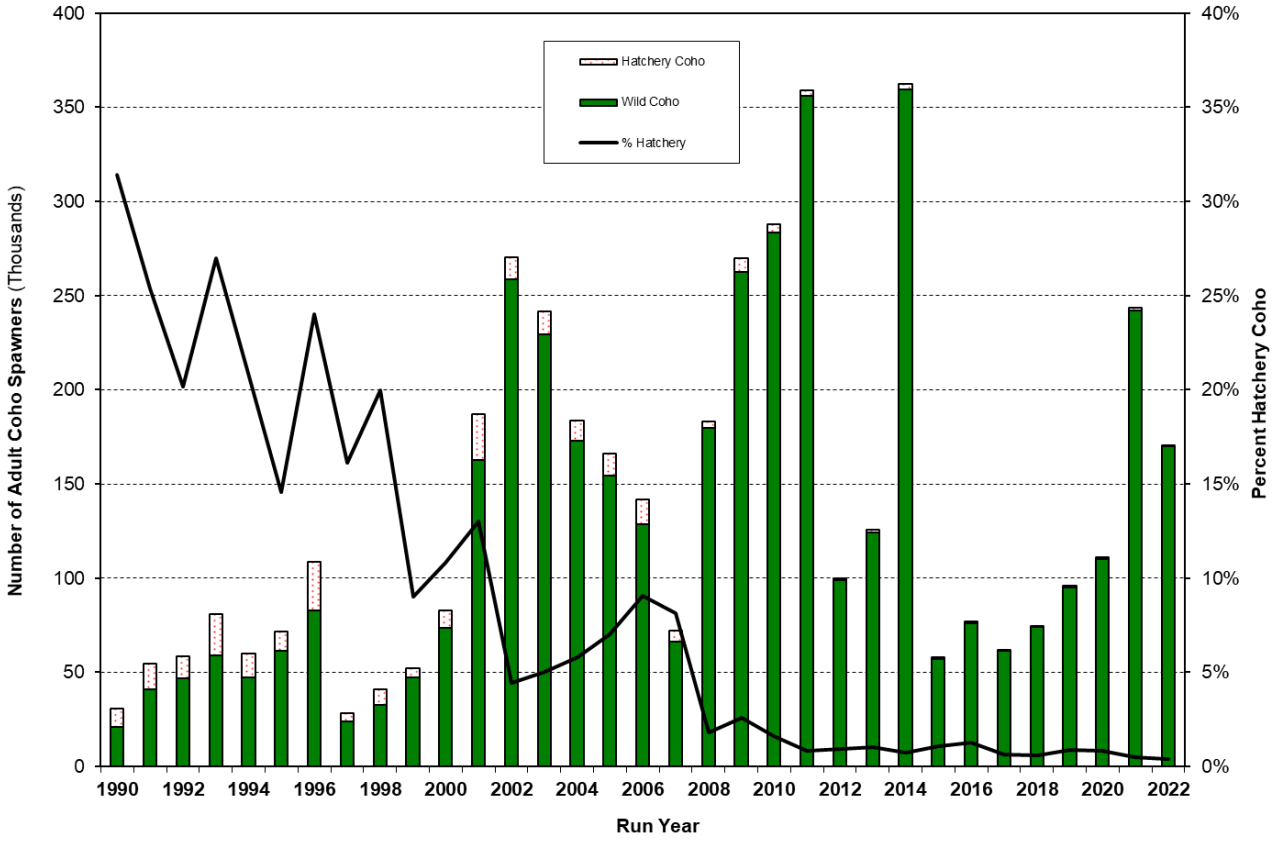


Figure 5. Oregon Coast Coho ESU estimated abundance of adult Coho Salmon spawning naturally by rearing origin for the 1990 through 2022 run years.

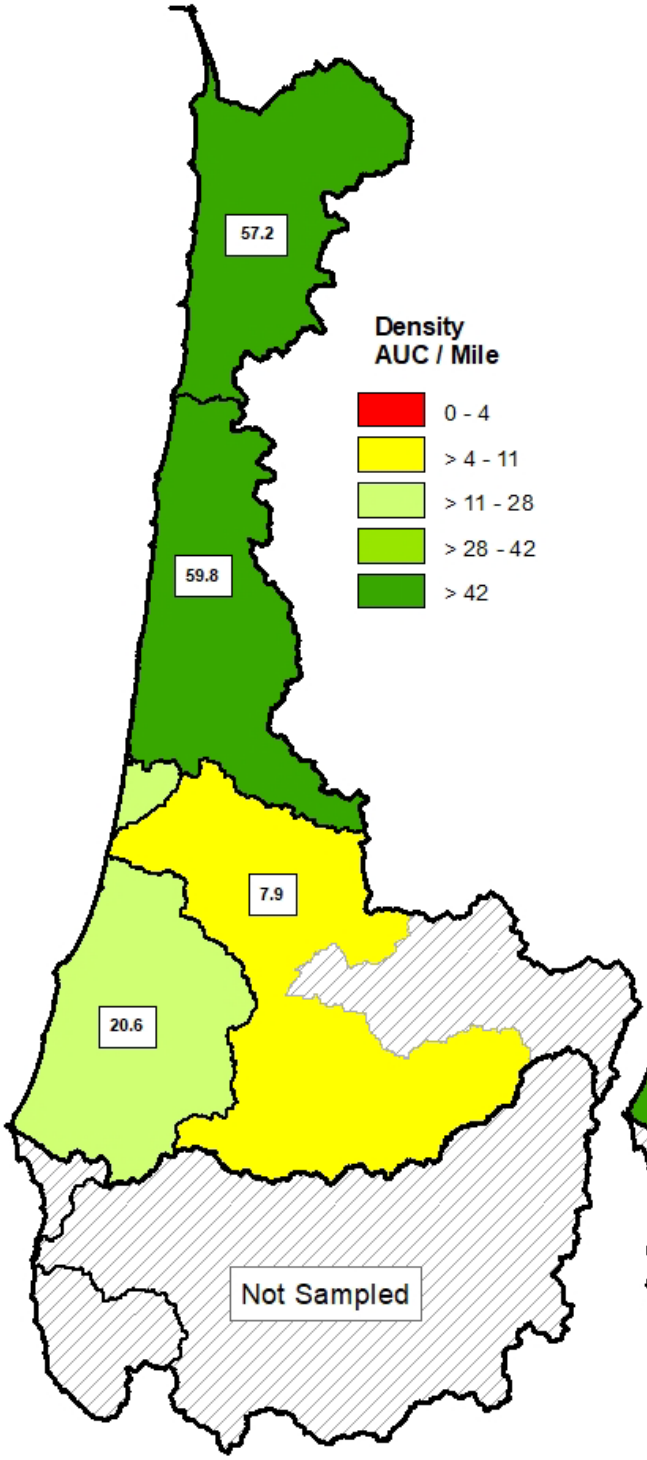


Figure 6. Coho salmon density (AUC/mile) in GRTS surveys by strata in the Oregon Coast Coho ESU, 2022.

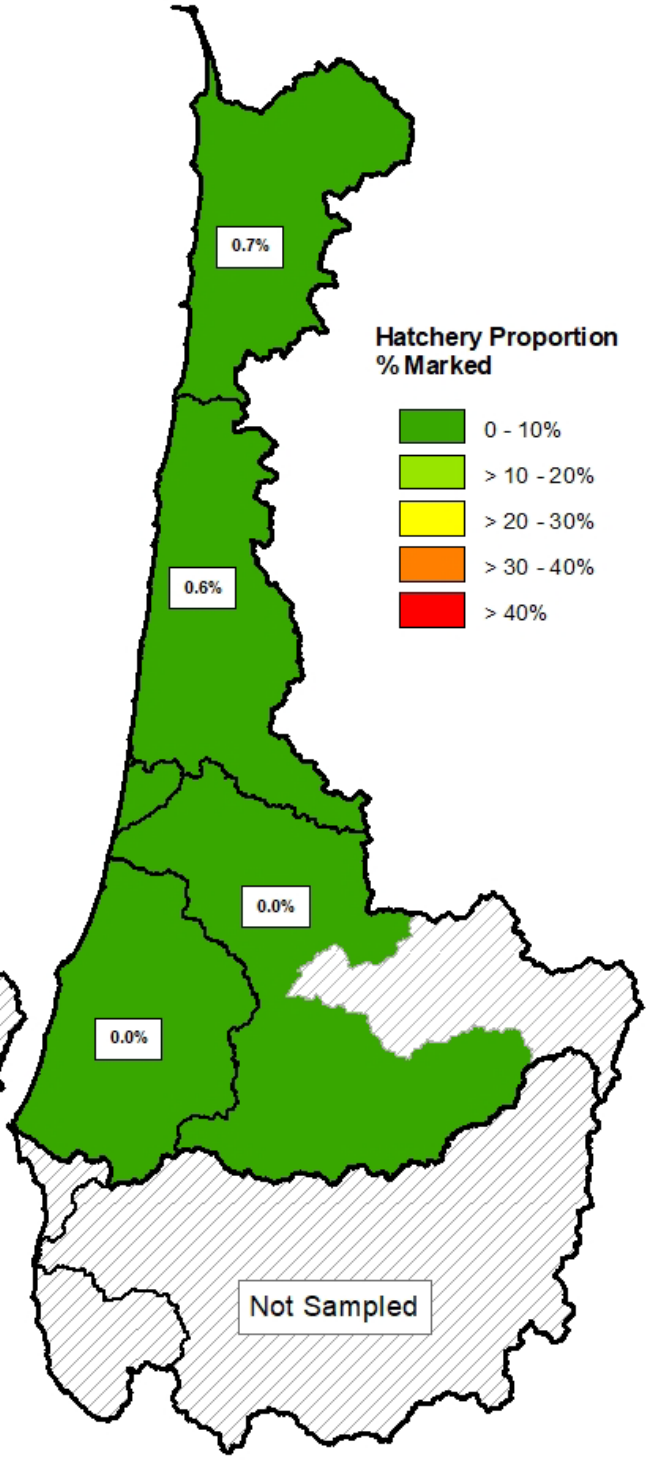


Figure 7. Percentage of marked adult coho salmon in GRTS surveys by strata in the Oregon Coast Coho ESU, 2022.

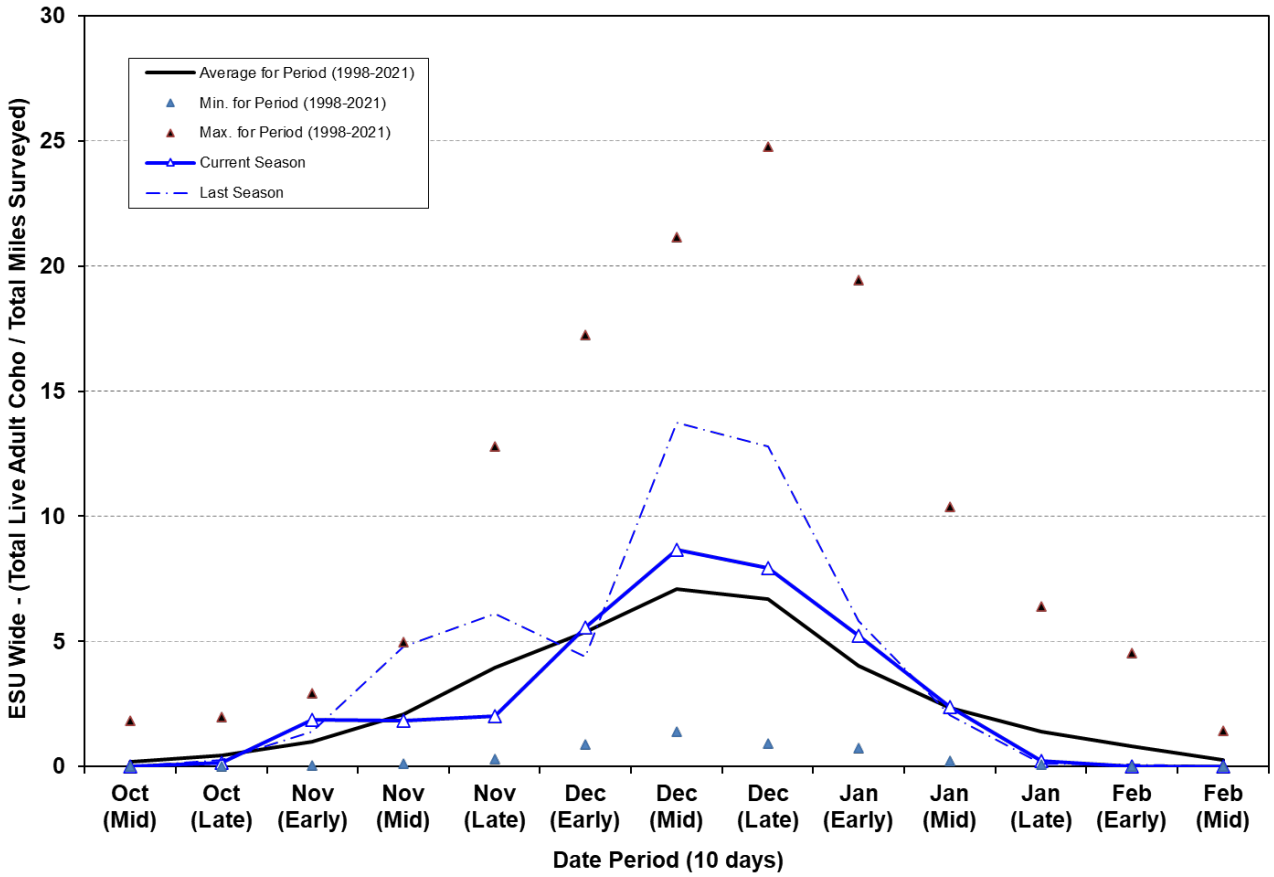


Figure 8. Spawn timing of live adult Coho Salmon in 2022 on GRTS spawning ground surveys in the Oregon Coast Coho ESU.

APPENDIX A (LCR COHO ESU)

Table A-1. Results of randomly selected spawning ground surveys for Coho Salmon in the Oregon portion of the LCR Coho ESU, run year 2022. Estimates derived using GRTS protocol. Estimates of wild spawners derived through application of fin-mark observations. Missing values for populations indicate inadequate samples for determining total and/or wild abundance.

ESU, Stratum, and TRT Population	Survey effort number of		Adult Coho Salmon spawner abundance			
			Total		Wild	
	Surveys	Miles	Estimate	*95% CI*	Estimate	*95% CI*
Lower Columbia River ESU	**91**	**83.8**	**12,301**	**3,791**	**9,405**	**3,224**
Coast Stratum	**40**	**36.1**	**1,863**	**552**	**1,647**	**526**
Youngs Bay	0					
Big Creek	0					
Clatskanie River (ex. Plympton)	25	23.4	1,135	264	1,086	252
Plympton Cr. (Clatskanie R.)	1	1.0	193	0	53	0
Scappoose River	14	11.6	534	485	508	461
Cascade Stratum	**44**	**43.1**	**8,133**	**3,210**	**7,175**	**3,030**
Clackamas River (ex. Eagle Cr.)	15	16.0	701	308	568	250
Eagle Creek (Clackamas R.)	6	6.7	790	389	287	141
Sandy River	23	20.4	6,643	3,171	6,320	3,017
Gorge Stratum	**7**	**4.6**	**2,305**	**1,941**	**583**	**966**
Lower Gorge	2	0.9	528	973	523	964
Hood River	5	3.7	1,777	1,679	60	57

Table A-2. The number of unmarked adult Coho Salmon passed upstream of counting stations into areas without GRTS spawning surveys. Oregon portion of the LCR Coho ESU, run year 2022.

ESU, Stratum, and TRT Population	Counting station	Spawning year			
			2002 to 2021		
		2022	Avg.	Min.	Max.
Lower Columbia River ESU					
Coast Stratum					
Youngs Bay	Klaskanine Hatchery	25	22	2	68
Big Creek	Big Creek Hatchery	509	258	46	606
Scappoose River	Bonnie Falls Trap	n.a. [a]	47	4	136
Cascade Stratum					
Clackamas River	River Mill Dam	13,136	3,440	835	10,201
Sandy River	Sandy Hatchery [b]	832	242	36	601
	Marmot Dam	n.a.	809	310	1,173
Gorge Stratum					
Hood River	Powerdale Dam	n.a.	52	27	126

a = Not Applicable. Trap count discontinued after 2018 season, and area above trap included in GRTS sampling starting in 2020.
b = Sandy Hatchery count through 2009 is number released above Marmot Dam, which was removed in 2006. Beginning in 2010, Sandy Hatchery switched the release site for these fish to above the hatchery weir on Cedar Creek.
n.a. = Not Applicable. Marmot dam was removed in 2006 and Powerdale Dam was removed in 2010, so there are no longer any dam counts.

Table A-3. Annual abundance estimates of naturally spawning wild adult Coho Salmon in the Oregon portion of the LCR Coho ESU, run years 2002 through 2022. n.a. = not available.

Return Year	Youngs Bay	Big Creek	Clatskanie*	Scappoose	Clackamas*	Sandy	Lower Gorge	Hood River
2002	411	98	167	500	1,985	382	338	147
2003	113	435	563	336	2,495	1,348	n.a.	41
2004	149	111	398	755	2,733	1,213	n.a.	126
2005	79	219	494	348	1,301	856	263	1,262
2006	74	225	421	719	3,464	923	226	373
2007	25	212	927	375	3,438	687	126	170
2008	82	360	995	294	1,800	1,277	223	69
2009	28	792	1,195	778	8,642	1,493	468	65
2010	68	279	1,686	1,960	4,009	901	920	223
2011	161	160	1,546	297	2,253	3,494	216	232
2012	129	409	619	210	1,663	1,165	96	169
2013	n.a.	n.a.	611	979	4,012	667	151	561
2014	n.a.	n.a.	3,246	1,587	10,672	5,942	362	42
2015	n.a.	n.a.	240	487	1,784	443	30	4
2016	n.a.	n.a.	464	1,200	1,628	939	395	57
2017	n.a.	n.a.	566	387	7,598	2,384	n.a.	n.a.
2018	n.a.	n.a.	25	178	3,159	537	16	107
2019	n.a.	n.a.	146	384	4,044	1,052	184	193
2020	n.a.	n.a.	1,233	n.a.	n.a.	n.a.	n.a.	n.a.
2021	n.a.	n.a.	476	921	10,572	3,819	n.a.	510
2022	n.a.	n.a.	1,139	508	13,991	7,152	523	60

* = *Stratified abundance estimation. Plympton Creek is estimated separately from the rest of the Clatskanie population and Eagle Creek is estimated separately from the rest of the Clackamas population.*

APPENDIX B (OC COHO ESU)

Table B-1. Results of randomly selected spawning ground surveys for Coho Salmon in the OC Coho ESU, run year 2022. Estimates derived using GRTS protocol. Estimates of wild spawners derived through application of fin-mark observations. Missing values for populations indicate inadequate samples for determining total and/or wild abundance.

ESU, Stratum, and TRT Population	Survey effort number of		Adult Coho Salmon spawner abundance			
			Total		Wild	
	Surveys	Miles	Estimate	*95% CI*	Estimate	*95% CI*
Oregon Coast ESU	**236**	**179.2**	**160,840**	**29,285**	**160,133**	**29,234**
North Coast Stratum	**42**	**31.3**	**53,181**	**24,412**	**52,956**	**24,406**
Necanicum River	8	4.8	*No Est.*		*No Est.*	
Nehalem River	7	5.4	*No Est.*		*No Est.*	
Tillamook Bay	9	7.3	*No Est.*		*No Est.*	
Nestucca River	12	10.1	*No Est.*		*No Est.*	
NC Dependents	6	3.8	*No Est.*		*No Est.*	
Mid-Coast Stratum	**84**	**61.2**	**72,039**	**14,007**	**71,632**	**13,911**
Salmon River	7	4.9	1,324	1,554	1,324	1,554
Siletz River	16	13.1	16,688	9,417	16,466	9,292
Yaquina River	18	10.8	6,582	2,173	6,484	2,141
Beaver Creek	3	1.7	2,144	1,591	2,058	1,527
Alsea River	18	13.1	18,840	5,696	18,840	5,696
Siuslaw River	15	9.9	24,892	8,032	24,892	8,032
MC Dependents	7	7.5	1,568	948	1,568	948
Umpqua Stratum	**49**	**36.4**	**8,187**	**2,602**	**8,113**	**2,602**
Lower Umpqua River	15	11.6	6,448	2,404	6,448	2,404
Middle Umpqua River	17	13.6	1,665	996	1,665	996
North Umpqua River	1	0.7	75	0		
South Umpqua River	16	10.5	0	0		
Mid-South Coast Stratum	**61**	**50.4**	**27,433**	**7,661**	**27,433**	**7,661**
Coos River	16	13.9	7,370	2,975	7,370	2,975
Coquille River	14	9.5	19,078	7,043	19,078	7,043
Floras Creek	14	10.8	871	477	871	477
Sixes River	16	16.0	113	97	113	97
MSC Dependents	1	0.2	0			

Table B-2. Coho Salmon spawners in the Oregon Coastal Lakes populations based on calibrated standard surveys, 2022.

ESU, Stratum, & TRT Population	Survey goal	Survey effort number of		Adult Coho Salmon spawner abundance			
				Total		Wild	
		Surveys	Miles	Estimate	*95% CI*	Estimate	*95% CI*
Standard Surveys							
Lakes Strata	**14**	**9**	**8.7**	**8,092**	**--**	**8,049**	
Siltcoos	5	2	2.5	3,090	--	3,056	
Tahkenitch	2	2	1.6	1,595	--	1,586	
Tenmile	7	5	4.6	3,407	-	3,407	

Table B-3. Coho passage above the Alsea Hatchery into an area without GRTS surveys (Alsea Population) and estimates of adult Coho Salmon run size in the North Umpqua Population derived through adjustment of Winchester Dam count. Dam count adjusted for adult Coho Salmon retained by hatchery operations and harvest above Winchester Dam, 2022 compared to the previous 8 years.

Data component	Coho salmon origin	Spawning year			
			2014 to 2021		
		2022	Avg.	Min.	Max.
Alsea Population Passed above Alsea Hatchery	**Wild**	301	112	9	475
North Umpqua Population	**Wild**	**1,519**	**2,994**	**1,148**	**4,795**
	Hatchery	**41**	**193**	**50**	**404**
	% Hat.	**2.6%**	**6.3%**	**1.2%**	**10.9%**
GRTS Estimate below Winchester Dam [1]	Total	75	37	0	298
	Wild	75	37	0	298
	Hatchery	0	0	0	0
Winchester Dam [2]	Total	1,496	3,173	1,252	5,149
	Wild	1,449	2,957	1,148	4,798
	Hatchery	47	216	104	407
Freshwater Catch [3] Above Winchester Dam	Total	11	22	3	60
	Wild	5	1	0	3
	Hatchery	6	20	3	60
Rock Creek Hatchery [4]	Total	0	1	0	10
	Wild	0	0	0	0
	Hatchery	0	1	0	10

1 = Estimate of adult Coho Salmon observed in GRTS surveys below Winchester Dam (i.e., Sutherlin Creek and tributaries).

2 = Counts of adult Coho Salmon by mark type (marked =hatchery, unmarked = wild) at Winchester Dam on the North Umpqua River.

3 = Estimated freshwater harvest of Coho Salmon in the North Umpqua basin above Winchester Dam based on Angler Harvest Cards (see: http://www.dfw.state.or.us/resources/fishing/sportcatch.asp). Selective harvest of mark Coho Salmon began in 2004.

4 = Number of adult Coho Salmon collected from the North Umpqua population (at Rock Creek and at Winchester Dam) and retained at Rock Creek Hatchery. These numbers do not include Coho Salmon collected and released alive back into the wild.

Table B-4. Annual abundance estimates of naturally spawning wild adult Coho Salmon in the Oregon Coast Coho ESU, run years 1990 through 2022 n.a. = not available. *Numbers in italics are partial estimates of spawners in dependent populations*.

Stratum and Population	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
North Coast											
Necanicum River	126	752	133	512	269	181	416	97	575	351	359
Nehalem River	1,158	6,837	1,392	3,049	2,844	1,700	527	1,187	1,206	3,555	14,462
Tillamook Bay	80	1,577	176	571	1,105	341	733	437	358	1,831	2,178
Nestucca River	160	618	604	340	266	1,537	440	230	202	2,357	1,219
NC Dependents	*0*	*444*	*24*	*41*	*77*	*108*	*275*	*61*	*0*	*47*	*0*
Mid-Coast											
Salmon River	19	5	11	13	91	105	82	16	86	14	179
Siletz River	228	410	2,386	207	621	314	395	298	316	1,209	3,387
Yaquina River	318	317	528	458	2,040	4,723	4,578	419	510	2,563	637
Beaver Creek	90	484	618	275	675	308	1,296	497	401	1,511	1,464
Alsea River	775	1,011	6,273	694	828	441	1,060	601	108	1,341	3,363
Siuslaw River	2,269	2,808	3,554	4,600	3,159	6,161	7,234	501	1,020	2,980	6,532
MC Dependents	*487*	*51*	*1,037*	*467*	*317*	*348*	*1,364*	*112*	*173*	*150*	*91*
Umpqua											
Lower Umpqua River	1,678	3,123	1,797	7,877	2,762	10,854	7,985	1,257	4,552	2,623	5,781
Middle Umpqua River	1,222	4,546	5,275	2,947	2,162	3,250	5,086	563	1,257	1,748	4,555
North Umpqua River	355	1,301	1,579	906	899	1,293	1,069	577	765	1,194	1,677
South Umpqua River	2,934	2,233	435	3,723	1,081	4,715	7,040	937	3,177	3,011	2,581
Lakes											
Siltcoos	1,578	2,868	385	3,569	1,302	4,415	4,707	2,653	3,122	2,756	3,835
Tahkenitch	1,085	1,215	317	954	1,056	1,577	1,627	1,842	2,817	3,664	634
Tenmile	1,687	3,033	1,271	5,544	3,354	5,092	7,092	4,092	5,169	6,123	8,278
Mid-South Coast											
Coos River	2,243	2,426	16,722	14,932	14,500	10,302	12,128	1,112	2,985	4,818	4,704
Coquille River	2,589	4,782	2,033	7,291	5,119	2,034	15,814	5,720	2,412	2,667	6,253
Floras Creek	n.a	n.a	n.a.	n.a.	2,653	1,351	1,519	482	879	670	1,477
Sixes River	58	35	92	253	238	77	194	143	558	56	136
MSC Dependents	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Table B-4. Continued.

Stratum and Population	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
North Coast											
Necanicum River	4,832	2,047	2,377	2,198	1,218	750	431	1,055	3,827	4,445	2,120
Nehalem River	21,928	17,164	32,517	18,736	10,451	11,614	14,033	17,205	21,753	32,215	15,322
Tillamook Bay	1,944	13,334	13,008	2,532	1,995	8,774	2,295	4,828	16,251	14,890	19,250
Nestucca River	4,164	16,698	10,194	4,695	686	1,876	394	1,844	4,252	1,947	7,857
NC Dependents	*71*	*16*	*0*	661	2,116	1,121	376	639	2,052	1,473	1,341
Mid-Coast											
Salmon River	225	543	42	1,642	79	513	59	652	753	1,382	3,636
Siletz River	1,595	2,129	8,038	8,179	14,567	5,205	2,197	20,634	24,070	6,283	33,094
Yaquina River	3,589	23,800	16,484	5,539	3,441	4,247	3,158	10,913	11,182	8,589	19,074
Beaver Creek	1,832	3,217	5,552	4,569	2,264	1,950	611	1,218	3,575	2,072	2,389
Alsea River	3,228	9,073	10,281	5,233	13,907	1,972	2,146	13,320	14,638	9,688	28,337
Siuslaw River	10,606	55,445	29,003	8,729	16,907	5,869	3,552	17,491	30,607	25,983	28,082
MC Dependents	*816*	*5,308*	*1,852*	8,179	246	1,468	546	3,910	1,610	2,548	4,487
Umpqua											
Lower Umpqua River	11,639	18,881	16,494	8,989	18,591	7,994	4,237	9,023	19,245	17,516	18,715
Middle Umpqua River	8,940	10,738	11,090	6,375	7,608	4,852	1,587	4,472	15,075	18,123	19,962
North Umpqua River	2,634	3,368	2,862	3,559	1,969	3,000	1,410	3,438	7,720	9,397	6,020
South Umpqua River	11,871	10,517	4,337	10,997	14,364	2,246	4,549	20,935	15,944	24,983	49,958
Lakes											
Siltcoos	5,104	4,636	6,628	7,998	4,364	5,452	1,447	3,873	5,197	7,678	6,354
Tahkenitch	3,510	3,480	3,188	3,496	1,897	3,611	3,551	2,604	2,977	10,681	6,644
Tenmile	10,990	13,861	6,260	7,148	8,464	15,064	3,957	17,131	9,175	20,385	7,284
Mid-South Coast											
Coos River	33,595	33,120	25,761	23,337	17,048	11,266	1,329	14,881	26,979	27,658	10,999
Coquille River	13,833	7,676	22,403	22,138	11,806	28,577	13,968	8,791	22,286	23,564	55,667
Floras Creek	5,664	3,272	952	7,446	506	1,104	340	786	3,203	11,329	9,217
Sixes River	95	95	86	403	105	294	97	43	176	92	334
MSC Dependents	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0	188	484	100

Table B-4. Concluded.

Stratum and Population	2012	2013	2014	2015	2016	2017	2018	2019	2020 [a]	2021	2022
North Coast											
Necanicum River	902	798	5,727	847	936	529	393	698	n.a.	n.a.	n.a.
Nehalem River	2,963	4,539	30,577	3,079	7,549	5,486	4,190	12,383	n.a.	n.a.	n.a.
Tillamook Bay	1,686	4,402	20,090	1,345	7,102	2,927	2,035	3,961	n.a.	n.a.	n.a.
Nestucca River	1,751	946	6,369	1,029	2,412	4,495	1,072	4,602	n.a.	n.a.	n.a.
NC Dependents	218	271	4,607	440	699	206	262	616	n.a.	n.a.	n.a.
Mid-Coast											
Salmon River	297	1,165	3,680	332	1,054	450	103	215	n.a.	571	1,324
Siletz River	4,495	7,660	19,496	2,216	3,015	5,202	4,064	4,509	n.a.	15,428	16,466
Yaquina River	6,268	3,553	25,582	2,400	3,730	2,491	4,672	3,452	n.a.	16,721	6,484
Beaver Creek	1,878	2,015	6,564	332	1,709	1,553	494	814	n.a.	2,483	2,058
Alsea River	8,470	9,283	25,855	6,185	7,375	4,377	5,112	4,915	n.a.	13,633	19,141
Siuslaw River	11,946	14,118	38,896	10,352	9,141	7,129	6,635	5,881	n.a.	38,031	24,892
MC Dependents	492	1,929	1,890	856	464	1,646	958	289	n.a.	1,747	1,568
Umpqua											
Lower Umpqua River	3,731	7,792	36,942	3,725	4,422	10,848	14,080	9,152	n.a.	23,714	6,448
Middle Umpqua River	2,447	4,272	13,939	2,245	1,159	1,788	3,888	3,104	n.a.	6,354	1,665
North Umpqua River	3,134	2,774	3,979	3,012	1,148	1,772	2,481	3,302	3,003	4,795	1,519
South Umpqua River	11,636	12,178	11,412	5,878	765	1,084	3,125	3,600	n.a.	14,403	0
Lakes											
Siltcoos	3,945	3,797	7,178	1,558	2,421	715	2,256	1,065	2,832	3,885	3,056
Tahkenitch	5,675	3,413	3,691	1,085	1,249	269	1,678	1,405	1,526	2,398	1,586
Tenmile	9,302	6,449	11,141	2,086	4,374	318	2,770	4,963	5,364	13,381	3,407
Mid-South Coast											
Coos River	9,414	6,884	38,880	3,030	4,624	2,689	7,292	13,289	n.a.	n.a.	7,370
Coquille River	5,911	23,637	41,660	3,357	9,494	4,641	5,688	11,841	n.a.	n.a.	19,078
Floras Creek	2,502	1,936	1,022	1,585	942	693	628	904	n.a.	n.a.	871
Sixes River	34	567	410	168	120	69	174	155	n.a.	n.a.	113
MSC Dependents	48	32	105	0	0	0	10	23	n.a.	n.a.	0

n.a. = Survey effort was reduced (COVID19 budget cuts) to a point so far below goal that no estimate was produced.

APPENDIX D

Table D-1. Site status of 2022 GRTS samples in the Lower Columbia River Coho ESU by TRT population. Target sites fell within Coho Salmon spawning habitat; response sites were successfully surveyed, and non-response sites were not surveyed because of issues such as lack of landowner permission, site inaccessibility, or gaps in survey effort usually from stream turbidity. Non-target sites are outside of Coho Salmon spawning habitat. The average is for 2014 to 2021.

		Target response				Target non-response				Non-target			
Stratum	Population	**2022**	Avg.	Min	Max	**2022**	Avg.	Min	Max	**2022**	Avg.	Min	Max
Coast	Youngs Bay	0	0	0	0	0	0	0	0	0	0	0	0
	Big Creek	0	0	0	0	0	0	0	0	0	0	0	0
	Clatskanie	25	20	11	24	4	6	0	16	0	1	0	3
	Plympton	1	2	1	2	0	0	0	0	0	0	0	0
	Scappoose	14	14	8	18	20	20	10	28	0	1	0	2
	Total	**40**	**35**	**27**	**40**	**24**	**26**	**15**	**39**	**0**	**2**	**0**	**3**
Cascade	Clackamas	15	19	12	30	25	20	11	29	1	0	0	1
	Eagle Cr	6	7	3	9	8	4	0	12	0	0	0	0
	Sandy	23	27	8	35	22	20	14	46	0	1	0	2
	Total	**44**	**53**	**24**	**64**	**55**	**44**	**27**	**83**	**1**	**1**	**0**	**3**
Gorge	Lower Gorge	2	2	0	6	2	4	2	6	1	0	0	1
	Hood	5	2	0	5	1	3	0	6	0	1	0	2
	Total	7	4	0	8	3	7	2	12	1	1	0	2
ESU Total		**91**	**92**	**52**	**105**	**82**	**76**	**46**	**129**	**2**	**4**	**1**	**8**

Table D-2. Site status of 2022 GRTS samples in the Oregon Coast Coho ESU by TRT population. Target sites fell within Coho Salmon spawning habitat; response sites were successfully surveyed, and non-response sites were not surveyed because of issues such as lack of landowner permission, site inaccessibility, or gaps in survey effort usually from stream turbidity. Non-target sites are outside of Coho Salmon spawning habitat. The average is for 2014 to 2021.

		Target response				Target non-response				Non-target			
Stratum	Population	**2022**	Avg.	Min	Max	**2022**	Avg.	Min	Max	**2022**	Avg.	Min	Max
North Coast	Necanicum	8	14	6	18	16	6	1	14	1	1	0	2
	Nehalem	7	17	5	24	23	9	1	24	3	4	2	8
	Tillamook	9	18	8	25	18	7	3	16	0	2	0	5
	Nestucca	12	14	7	23	16	11	4	19	6	5	3	9
	NC Depend.	6	7	4	9	3	2	1	4	2	3	3	4
	Total	**42**	**69**	**30**	**92**	**76**	**34**	**20**	**77**	**12**	**15**	**11**	**24**
Mid-Coast	Salmon	7	10	5	17	16	12	8	17	1	0	0	1
	Siletz	16	19	12	26	14	5	1	12	4	6	3	9
	Yaquina	18	17	10	22	8	6	3	9	1	3	1	6
	Beaver	3	4	3	5	1	1	0	3	0	1	0	1
	Alsea	18	18	11	24	16	7	3	10	1	1	1	2
	Siuslaw	15	17	12	23	13	8	3	14	3	2	1	4
	MC Depend.	7	8	5	11	2	3	2	6	1	0	0	1
	Total	**84**	**93**	**65**	**114**	**70**	**41**	**26**	**56**	**11**	**13**	**7**	**20**
Lakes	Siltcoos	0	--	--	--	0	--	--	--	0	--	--	--
	Tahkenitch	0	--	--	--	0	--	--	--	0	--	--	--
	Tenmile	0	--	--	--	0	--	--	--	0	--	--	--
	Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Umpqua	L. Umpqua	15	17	11	20	21	9	7	12	1	1	0	3
	M. Umpqua	17	12	6	15	19	16	11	22	2	2	1	4
	N. Umpqua	1	1	0	3	4	6	4	9	0	1	0	1
	S. Umpqua	16	15	9	20	15	13	8	17	3	2	0	5
	Total	**49**	**45**	**30**	**55**	**59**	**44**	**33**	**54**	**6**	**6**	**3**	**12**
Mid-South Coast	Coos	16	18	11	22	13	6	2	13	0	2	1	4
	Coquille	14	18	11	24	21	15	9	21	3	2	0	4
	Floras	14	10	1	22	13	19	8	27	3	3	1	6
	Sixes	16	8	3	15	5	9	2	16	1	0	0	1
	MS Depend.	1	2	0	6	4	11	4	18	1	4	2	7
	Total	**61**	**55**	**34**	**79**	**56**	**60**	**44**	**87**	**8**	**12**	**5**	**18**
ESU Total		**236**	**262**	**191**	**322**	**261**	**179**	**132**	**269**	**37**	**46**	**32**	**63**

Table D-3. Adult Coho Salmon counts, density (AUC/mile), and marked proportion information for valid GRTS surveys by population in the Lower Columbia River and Oregon Coast Coho ESUs during the 2022 spawning year. Averages in *italics* do not include data for all years.

Location **ESU** / ***Stratum*** / Population	Total Surveys	Survey Miles	Sample of marks * dead (live)	2022 Density	2014-21 Avg. Density	2022 % Marked	2014-21 Avg. % Marked
Lower Columbia River ESU							
Coastal Stratum							
Youngs Bay	0	--	--	--	--	--	--
Big Creek	0	--	--	--	--	--	--
Clatskanie River [a]	25	23.4	23	20.8	14.0	4.4%	17.2%
Plympton Creek	1	1.0	29	189.0	74.8	72.4%	77.4%
Scappoose Creek	14	11.7	8 (73)	7.9	9.0	4.9%	0.7%
Cascade Stratum							
Clackamas River [a]	15	16.0	17	4.5	4.7	18.9%	13.7%
Eagle Creek	6	6.7	37	13.5	14.1	63.8%	65.1%
Sandy River	23	20.4	144	74.8	19.3	4.9%	2.7%
Gorge Stratum							
Lower Gorge	2	0.9	5 (146)	135.4	*61.5*	1.0%	*18.7%*
Hood River	5	3.7	119	191.3	*65.1*	96.6%	*54.5%*
Oregon Coast ESU							
North Coast Stratum							
Necanicum River	8	4.8	21	*No Est.*	24.3	*No Est.*	1.1%
Nehalem River	7	5.4	58	*No Est.*	27.0	*No Est.*	0.7%
Tillamook Bay	9	7.3	23	*No Est.*	27.0	*No Est.*	0.4%
Nestucca River	12	10.1	192	*No Est.*	30.7	*No Est.*	0.4%
NC Dependents	6	3.8	6 (132)	*No Est.*	28.0	*No Est.*	0.6%
Mid-Coast Stratum							
Salmon River	7	5.0	40	31.8	18.8	0.0%	2.1%
Siletz River	16	13.2	75	119.9	49.7	1.3%	0.0%
Yaquina River	18	10.8	67	29.7	55.5	1.5%	0.4%
Beaver Creek	3	1.7	25	160.3	148.2	4.0%	0.0%
Alsea River	18	13.1	221	68.5	35.4	0.0%	0.1%
Siuslaw River	15	9.9	68	35.7	23.8	0.0%	0.1%
MC Dependents	7	7.5	5 (43)	9.6	6.5	0.0%	1.8%
Lakes Stratum							
Siltcoos Lake	0	--	--	--	--	--	--
Tahkenitch Lake	0	--	--	--	--	--	--
Tenmile Lake	0	--	--	--	--	--	--
Mid-South Coast Str.							
Coos Bay	16	13.9	18	27.3	55.1	0.0%	0.2%
Coquille River	14	9.5	7 (424)	48.3	39.5	0.0%	0.0%
Floras Creek	14	10.8	10	15.1	17.0	0.0%	0.0%
Sixes River	16	16.0	5 (22)	2.2	5.0	0.0%	0.0%
MS Dependents	1	0.2	0 (0)	0.0	0.7	--	*0.6%*
Umpqua Stratum							
Lower Umpqua	15	11.6	5 (185)	18.9	40.1	0.0%	0.4%
Middle Umpqua	17	13.6	7 (47)	5.0	14.7	0.0%	0.2%
North Umpqua	1	0.7	0 (2)	3.8	2.0	0.0%	*4.5%*
South Umpqua	16	10.5	0 (0)	0.0	9.6	--	10.0%

a = Stratified sampling. Results for population excluding the sub-area listed below.
* = Used carcass (i.e., dead) sample only if greater than 10, otherwise use both live and dead sample.

Table D-4. The percentage of selected GRTS sites classified "Target Response" that were included in abundance estimates based on non-standard criteria (i.e., some level of relaxed criteria). Average, Minimum and Maximum are for 2014 to 2021. n.a. = not available.

Stratum	Population	Percent by Relaxed Criteria			
		2022	Avg.	Min	Max
Coast	Youngs Bay	n.a.	n.a.	n.a.	n.a.
	Big Creek	n.a.	n.a.	n.a.	n.a.
	Clatskanie	0.0%	0.0%	0.0%	0.0%
	Scappoose	0.0%	3.8%	0.0%	30.0%
	Total	**0.0%**	**1.0%**	**0.0%**	**8.3%**
Cascade	Clackamas	14.3%	0.5%	0.0%	4.3%
	Sandy	0.0%	9.1%	0.0%	47.6%
	Total	**6.8%**	**4.2%**	**0.0%**	**17.2%**
Gorge	Lower Gorge	0.0%	0.0%	0.0%	0.0%
	Hood	20.0%	0.0%	0.0%	0.0%
	Total	**14.3%**	**0.0%**	**0.0%**	**0.0%**
ESU Total		**4.4%**	**2.8%**	**0.0%**	**12.5%**
North Coast	Necanicum	50.0%	9.7%	0.0%	66.7%
	Nehalem	71.4%	15.0%	0.0%	80.0%
	Tillamook	33.3%	12.6%	0.0%	63.6%
	Nestucca	50.0%	12.4%	0.0%	57.1%
	NC Depend.	33.3%	0.0%	0.0%	0.0%
	Total	**47.6%**	**10.9%**	**0.0%**	**50.0%**
Mid-Coast	Salmon	100.0%	26.6%	0.0%	100.0%
	Siletz	6.3%	12.2%	0.0%	50.0%
	Yaquina	0.0%	5.3%	0.0%	31.6%
	Beaver	0.0%	13.3%	0.0%	40.0%
	Alsea	5.6%	4.9%	0.0%	27.8%
	Siuslaw	13.3%	6.3%	0.0%	27.3%
	MC Depend.	0.0%	8.5%	0.0%	42.9%
	Total	**13.1%**	**9.8%**	**0.0%**	**20.2%**
Lakes	Siltcoos	n.a.	n.a.	n.a.	n.a.
	Tahkenitch	n.a.	n.a.	n.a.	n.a.
	Tenmile	n.a.	n.a.	n.a.	n.a.
	Total	**n.a.**	**n.a.**	**n.a.**	**n.a.**
Umpqua	L. Umpqua	20.0%	11.3%	0.0%	33.3%
	M. Umpqua	35.3%	32.1%	0.0%	75.0%
	N. Umpqua	100.0%	42.9%	0.0%	100.0%
	S. Umpqua	6.3%	14.3%	0.0%	68.4%
	Total	**22.4%**	**18.9%**	**0.0%**	**58.2%**
Mid-South Coast	Coos	0.0%	10.6%	0.0%	66.7%
	Coquille	21.4%	26.2%	0.0%	100.0%
	Floras	14.3%	13.9%	0.0%	86.4%
	Sixes	31.3%	23.4%	0.0%	100.0%
	MS Depend.	0.0%	30.0%	0.0%	100.0%
	Total	**16.4%**	**21.1%**	**0.0%**	**77.8%**
ESU Total		**22.0%**	14.0%	0.0%	45.5%

Table D-5. The percentage of selected GRTS sites classified as "Target Non-Response" in three main categories. No AUC - Site surveyed but didn't meet inclusion criteria for estimates. Denied - Sites not surveyed; lacked access permission. Inaccessible - Sites not surveyed, safety concerns or time required (greater than 3 hours). Average, minimum and maximum are for the period 2008 through 2021.

			No AUC				Denied				Inaccessible			
ESU	Strata	Population	**2022**	Avg.	Min.	Max.	**2022**	Avg.	Min.	Max.	**2022**	Avg.	Min.	Max.
LCR	Coastal	Youngs Bay	n.a.	8.2%	0.0%	24.1%	n.a.	3.2%	0.0%	8.7%	n.a.	1.7%	0.0%	8.7%
LCR	Coastal	Big Creek	n.a.	22.0%	0.0%	37.5%	n.a.	3.3%	0.0%	8.3%	n.a.	0.0%	0.0%	0.0%
LCR	Coastal	Clatskanie River	0.0%	13.2%	0.0%	42.3%	13.3%	7.6%	0.0%	23.1%	0.0%	1.1%	0.0%	4.5%
LCR	Coastal	Scappoose Creek	0.0%	7.6%	0.0%	13.8%	44.1%	26.0%	10.3%	52.8%	0.0%	1.4%	0.0%	5.7%
LCR	Cascade	Clackamas River	7.3%	18.8%	4.5%	37.8%	32.7%	11.7%	2.9%	25.6%	5.5%	1.2%	0.0%	7.5%
LCR	Cascade	Sandy River	17.8%	7.5%	0.0%	28.2%	4.4%	3.7%	0.0%	11.5%	24.4%	11.3%	4.8%	21.4%
LCR	Gorge	Lower Gorge	0.0%	2.6%	0.0%	33.3%	0.0%	0.0%	0.0%	0.0%	0.0%	9.7%	0.0%	100.0%
LCR	Gorge	Hood River	0.0%	0.0%	0.0%	0.0%	0.0%	3.5%	0.0%	16.7%	0.0%	12.3%	0.0%	100.0%
OC	N Coast	Necanicum River	4.0%	5.5%	0.0%	25.8%	12.0%	4.2%	0.0%	12.0%	12.0%	7.4%	0.0%	19.2%
OC	N Coast	Nehalem River	0.0%	17.8%	0.0%	66.7%	6.1%	2.3%	0.0%	9.5%	9.1%	4.1%	0.0%	9.5%
OC	N Coast	Tillamook Bay	7.4%	11.0%	0.0%	47.7%	3.7%	6.4%	2.0%	13.3%	3.7%	5.4%	0.0%	15.6%
OC	N Coast	Nestucca River	0.0%	17.1%	2.9%	41.9%	2.9%	7.5%	2.1%	16.7%	5.9%	6.5%	0.0%	17.1%
OC	N Coast	NC Dependents	18.2%	2.9%	0.0%	15.4%	9.1%	7.4%	2.6%	13.3%	0.0%	0.6%	0.0%	3.2%
OC	Mid-Coast	Salmon River	16.7%	21.2%	0.0%	47.6%	8.3%	6.5%	0.0%	11.5%	37.5%	17.8%	0.0%	31.0%
OC	Mid-Coast	Siletz River	17.6%	10.8%	0.0%	36.6%	5.9%	0.8%	0.0%	4.9%	8.8%	4.5%	0.0%	9.1%
OC	Mid-Coast	Yaquina River	7.4%	10.1%	0.0%	26.8%	14.8%	10.4%	6.3%	18.0%	0.0%	3.4%	0.0%	13.3%
OC	Mid-Coast	Beaver Creek	25.0%	10.8%	0.0%	35.7%	0.0%	3.9%	0.0%	16.7%	0.0%	0.0%	0.0%	0.0%
OC	Mid-Coast	Alsea River	2.9%	6.0%	0.0%	15.0%	20.0%	15.0%	8.5%	25.0%	2.9%	1.7%	0.0%	6.9%
OC	Mid-Coast	Siuslaw River	19.4%	13.2%	0.0%	51.3%	6.5%	6.5%	2.4%	13.3%	6.5%	6.5%	3.2%	16.7%
OC	Mid-Coast	MC Dependents	0.0%	10.7%	0.0%	21.8%	20.0%	14.2%	3.6%	22.2%	0.0%	1.7%	0.0%	6.1%
OC	Lakes	Siltcoos Lake	n.a.	3.8%	0.0%	20.0%	n.a.	19.2%	11.1%	36.4%	n.a.	6.5%	3.0%	11.1%
OC	Lakes	Tahkenitch Lake	n.a.	6.3%	0.0%	30.8%	n.a.	5.5%	0.0%	15.4%	n.a.	0.0%	0.0%	0.0%
OC	Lakes	Tenmile Lake	n.a.	3.3%	0.0%	13.3%	n.a.	28.9%	18.2%	43.3%	n.a.	7.7%	2.6%	15.2%
OC	Mid-S Coast	Coos Bay	17.2%	12.4%	0.0%	62.2%	13.8%	9.7%	4.7%	16.1%	0.0%	1.8%	0.0%	6.7%
OC	Mid-S Coast	Coquille River	13.2%	8.7%	0.0%	36.7%	31.6%	21.4%	14.8%	28.3%	5.3%	8.3%	1.9%	15.0%
OC	Mid-S Coast	Floras Creek	0.0%	22.2%	0.0%	51.9%	30.0%	24.1%	9.7%	31.3%	6.7%	5.9%	2.9%	11.8%
OC	Mid-S Coast	Sixes River	0.0%	23.2%	0.0%	63.2%	18.2%	16.6%	5.0%	28.6%	4.5%	7.0%	0.0%	11.8%
OC	Mid-S Coast	MS Dependents	0.0%	3.5%	0.0%	13.0%	66.7%	55.6%	35.0%	78.3%	0.0%	0.6%	0.0%	4.5%
OC	Umpqua	Lower Umpqua	5.4%	12.7%	3.2%	40.5%	5.4%	8.8%	2.4%	19.4%	21.6%	10.8%	7.1%	14.8%
OC	Umpqua	Middle Umpqua	7.9%	22.0%	7.7%	41.4%	21.1%	18.8%	7.7%	26.5%	10.5%	3.2%	0.0%	11.8%
OC	Umpqua	North Umpqua	40.0%	29.7%	0.0%	80.0%	0.0%	17.6%	0.0%	40.0%	0.0%	2.2%	0.0%	12.2%
OC	Umpqua	South Umpqua	5.9%	12.7%	0.0%	39.3%	23.5%	17.2%	8.5%	25.8%	0.0%	5.2%	0.0%	9.1%