2024-25 Lower Columbia Fall Chinook Survey Summary

This report provides a brief summary of results from Fall Chinook spawning ground surveys conducted in the Lower Columbia River Evolutionarily Significant Unit (ESU) during the 2024-25 spawning season. Site selection, as well as survey and analysis methods, mirrored those used for coho spawning ground surveys in the same area. This report covers results from spawning surveys selected using a Generalized Random Tessellation Stratified (GRTS) sampling design (Stevens 2002). Additional long-term index sites were also surveyed during the 2024-25 season; those results are not reported here. Plympton Creek, and the lower portion of Big Creek below the hatchery, are monitored and reported separately from their respective populations. This is due to the high density of hatchery fish present at these sites, which are uncharacteristic of their population areas.

Survey Effort

- 67 (74%) of the attempted 91 sites were successfully surveyed (Table 1).
- Dropped and inaccessible sites were not included in the count of attempted sites. These sites are initially selected but not attempted due to dangerous conditions or inaccessibility.
- Sites with either an insufficient number of survey visits (< 4), or gaps between survey visits of more than thirteen days are considered non-response. Poor survey conditions such as elevated turbidity and/or high flows are the most common reasons for site loss. Some non-response sites (4) were inaccessible due to landowner denials.

Table 1. Lower Columbia Fall Chinook ESU, site goals and results for the number of valid target responses, 2024 run year. Target Response sites are within spawning habitat and were successfully surveyed. Successful sites were defined as having no gaps of 13 or more days between valid survey dates and no more than one gap of 9 to 12 days, during the period when 75% of the live Chinook were observed for the population.

Stratum	Population	Goal	Target Response 2024	Survey Points Attempted 2024
Coast	Youngs Bay	6	8	10
	Big Creek	4	2	2
	Below Hatchery	-	2	2
	Clatskanie	5	2	4
	Plympton Creek	-	1	1
	Scappoose	4	3	8
	Total	**19**	**18**	**27**
Cascade	Clackamas	11	12	17
	Sandy[1]	25	35	42
	Total	**36**	**47**	**59**
Gorge	Lower Gorge	2	2	5
	Hood	2	0	0
	Total	**4**	**2**	**5**
	ESU Total	**59**	**67**	**91**

1 - peak counts were used for Sandy estimates in place of area under the curve (AUC) methods due to gaps in survey schedules over 13 days during the critical period. These gaps were due to poor weather/survey conditions.

Distribution and Timing

- Live adult Chinook were observed in 49% of the selected sites that were successfully surveyed in 2024.
- In the Big Creek population, two of the four successfully surveyed sites were located directly downstream of the Big Creek hatchery. No Fall Chinook activity was observed in the remining two sites.
- The number of live adult observations in each population varied considerably, ranging between 0 in the Scappoose population to 4,409 in Big Creek (Below Hatchery) surveys. Of the 4,409 fish in Big Creek, some likely migrated to the hatchery and were not active spawners.
- 85% (40 out of 47) of the sites surveyed in the two Cascade Strata populations were located on main stem rivers (i.e., Sandy R., Clackamas R., Bull Run R., Salmon R., or Zig Zag R.). The number of live adults observed in the Clackamas and Sandy populations is likely underestimated due to the difficulties of surveying large rivers (i.e. covering the entire width of river and lack of visibility in deep holes).
- Median peak count date ranged from 9/5/23 to 10/28/24 among Lower Columbia populations (Table 2). A spatial pattern is apparent in these peak dates, with relatively early peak dates in the Coastal stratum, and later peak count dates in the Cascade strata.
- The Sandy population surveys failed date gap checks due to a large gap during the critical period. As a result, estimates were derived from survey peak counts as opposed to AUC's. The prolonged gap in valid surveys and the use of peak counts means the estimate represents a minimum Fall Chinook escapement estimate, and the median Adult peak date may not be accurate.

Table 2. Total number of Chinook observed and peak count information by Lower Columbia population, 2024. Peak dates are from all sites attempted. All other data are from target response sites.

Population	No. of Random Survey Points	No. Random Survey Points w/ Live Adults	Total Live Adults Observed	Median Adult Peak Date	Avg. Peak/mile
Youngs Bay	8	4	45	10/28/2024	4
Big Creek[1]	2	0	0	-	0
Big Creek Hatchery	2	2	4409	9/5/2024	996
Clatskanie[1]	2	0	0	-	0
Plympton Cr	1	1	2439	9/18/2024	1248
Scappoose	3	0	0	-	0
Clackamas	12	7	21	10/7/2024	1
Sandy	35	17	1662	10/24/2024	12
Lower Gorge	2	0	0	-	0
Hood	-	-	-	-	-

1 = Plympton Creek and Big Creek are within the Clatskanie and Big Creek Populations respectively, but the very high hatchery influence at these sites is not found in any other streams in their area. As a result, estimates and other reported statistics are shown separately.

Hatchery & Wild Information

- The percentage of marked carcasses recovered on the spawning grounds in each population varied from 0% to 100%.
- Three of the seven populations (Clackamas, Sandy, and Lower Gorge) had less than 10% hatchery origin adults. Some of these results may be influenced by small sample sizes. (Figure 1).
- The Clackamas population recoveries had a sample size of only 3 fish (all unmarked), and due to this small sample size the 100% wild outcome is probably not precise. Samples have been in the single digits since 2020, so this has been an ongoing issue. The sample size in 2019 was 60 fish, and 95% of Chinook carcasses observed were wild fish. The 2009 – 2020 average is 64% wild, and while the ratio of wild fish has increased since 2018 only 2018 and 2019 had significant sample sizes.
- All Chinook carcasses recovered throughout the ESU, are checked electronically for the presence of a coded wire tag (CWT). In Plympton Creek, for 2024, CWT tags were detected in 0% of unmarked and 6% of marked fish. (Table 3).
- Based on coded wire tag recoveries, 1 Spring Chinook was recovered during the 2024 season. The Spring Chinook carcass was recovered on Big Cr just below the hatchery on September 10th and represents 5.5% of 2024 total CWT recoveries on Big Cr.

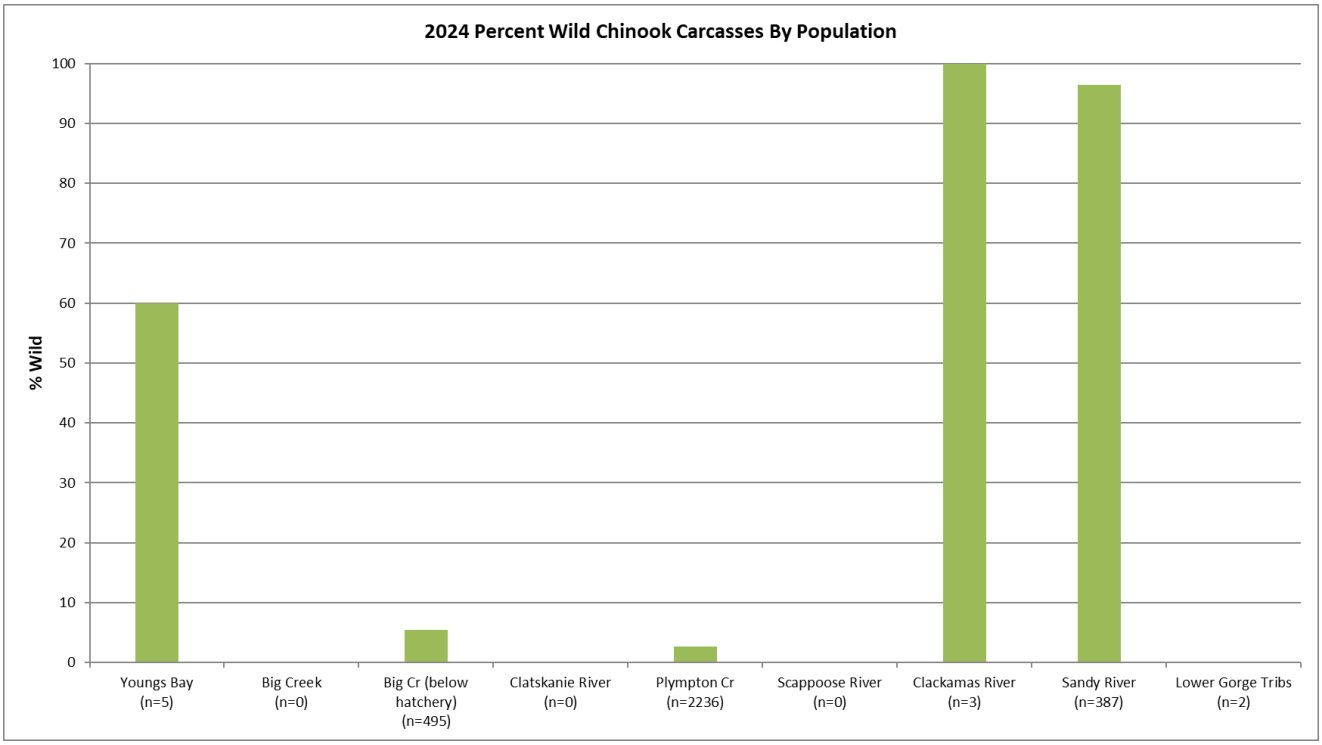

Figure 1. The percentage of Chinook carcasses observed on GRTS spawning ground surveys in 2024 that were not fin-clipped, by Lower Columbia population. n = number of carcasses recovered.

Table 3. The percentage of marked and unmarked carcasses with CWT from each population in the Lower Columbia, 2024. Electronic detection was used on all carcasses to identify the presence of a CWT.

Population Name	% Unmarked fish with CWT tags	% Marked fish with CWT
Youngs Bay	0	0
Big Creek		
Big Creek (Below Hatchery)	4%	4%
Clatskanie River		
Plympton Creek	0%	6%
Scappoose		
Clackamas		
Sandy	0	0
Lower Gorge Tribs	0	0
Hood River	-	-

Null cells = zero carcasses collected in these areas.

"-"in cell=area not surveyed in 2024.

Abundance Estimates

- The Clackamas estimate of 66 wild fish continues a trend of low abundance. Difficult survey conditions and delayed survey schedules may be contributing to the trend of low estimates and may be resulting in a negative bias for this population.
- Estimates at the stratum scale may be negatively biased due to difficult survey conditions in the Clatskanie and Clackamas populations.

Table 4. Final results of randomly selected spawning ground surveys for Chinook salmon in the Oregon portion of the Lower Columbia River ESU, run year 2024. Final estimates are based on sites that passed inclusion criteria. Qualifying sites were defined as having no gaps between valid survey dates of 13 or more days, and no more than one gap of 9 to 12 days during the period when 75% of the live Chinook were observed. Estimates of wild spawners were derived through application of fin-mark observations. Missing values indicate inadequate samples for determining total and/or wild abundance.

		Survey Effort		Adult Chinook Spawner Abundance			
				Total		Wild	
Monitoring Area	Population	Number of Surveys	Miles	2024	5-Yr Avg	2024	5-Yr Avg
Coast Strata	Youngs Bay	8	8.5	149	599	47	93
	Big Cr	2	1.6	0	240	0	5
	Below Big Creek Hatchery	2	1.9	9,057	2,104	455	189
	Clatskanie	2	2.0	0	19	0	-
	Plympton Creek	1	1.0	2,776	2,195	72	69
	Scappoose	3	2.7	0	0	0	0
	Coastal Stratum Total	**18**	**17.7**	**11,983**	**4,922**	**575**	**333**
Cascade Strata	Clackamas	12	19.3	61	232	61	221
	Sandy [1]	35	52.6	1,384	3,269	1,273	3,210
	Cascade Stratum Total	**47**	**71.9**	**1,445**	**3,503**	**1,333**	**3,431**
Gorge Strata	Lower Columbia Gorge	2	0.9	0	51	**0**	**31**
	Hood River	-	-	-	-	-	-
	Columbia Gorge Stratum Total	**2**	**1**	**0**	**51**	**0**	**31**
ESU	**Lower Columbia ESU Total**	**67**	**89**	**13,427**	**8,453**	**1,908**	**3,783**

1 – Due to difficult survey conditions estimates were based off peak counts in the Sandy population instead of AUC due to most sites failing criteria tests.

Future Monitoring Concerns

- **Fall vs Spring Chinook:** Genetic samples collected from both Spring and Fall run Chinook carcasses during the 2015 through 2018 spawning years were analyzed. Results of this analysis indicated that there were spatial-temporal patterns in the distribution of these runs within the Sandy Basin. The spatial-temporal pattern is as follows: Almost all Spring Chinook in the lower Sandy (mouth up to the Revenue Bridge) through October 15th and in the Upper Sandy through October 31st. Chinook recovered in the lower river after October 15th and in the upper river after October 31st were almost all Fall Chinook. Based on these results, our analysis of Fall Chinook in the Sandy excluded all data collected before the dates identified within this spatial-temporal pattern. In the Clackamas population evidence of spatial-temporal patterns are less clear, and so a monitoring approach similar to that used in the Sandy population is not possible.

- **Survey effort:** Hatchery influenced sites such as Plympton Creek and Big Creek require nearly full-time attention by multiple crews to maintain sampling schedules, due to the high volume of carcass recoveries. These surveys draw crews away from other sites and dilute the ability to detect spawning activity in other surveys around the area. Additional effort is typically provided by crews not funded under this project to assist in conducting these high fish-density sites during the peak of their run.
- **Main stem float surveys:** Since the introduction of this Lower Columbia chinook monitoring in 2009, mainstem sites in the Sandy Population have been notoriously difficult to keep in a consistent survey rotation. This difficulty in attaining consistent rotations has led to a low level of confidence in Chinook estimates given that chronically turbid surveys on the Lower Sandy are often excluded from the final estimates. To give broader consideration to sites that have Chinook data but are not normally used in estimates under the original screening process, sites within the Sandy Population have been included if they have more than 4 valid survey dates. In 2018, this relaxed criterion resulted in a 52% increase in the number of sites utilized in the estimate. Furthermore, 1,140 out of the total 1,193 chinook observed in the Sandy Population came from surveys now included in the estimation process under these relaxed criteria. In 2024, 12 out of 32 sites surveyed met base level survey gap criteria for the Sandy Population thus requiring relaxed criteria to be implemented resulting in an additional 18 sites being included.
- **Spawning residence time:** A brief review of the Fall Chinook/Tule literature suggests that spawning residence time ranges from 5 to 8 days (Rawding et al. 2006 and Parken et al. 2003). Our crews surveyed under the Coho Salmon criteria of conducting a survey at least once every 10 days. Anecdotal evidence of spawn timing on Plympton Creek suggests that residence times are likely higher than those specified by Rawding, but these patterns remain untested.

Literature Cited

Parken, C.K., R.E. Bailey, and J.R. Irvine. 2003. Incorporating uncertainty into area under the curve and peak count salmon escapement estimation. North American Journal of Fisheries Management 23: 78–90.

Rawding**,** D., T. Hillson, B. Glaser, K. Jenkins, and S. VanderPloeg. 2006. Abundance and spawning distribution of Chinook salmon in Mill, Abernathy, and Germany Creeks during 2005. Washington Department of Fish and Wildlife. Vancouver, WA.

Stevens, D.L. 2002. Sampling design and statistical analysis methods for integrated biological and physical monitoring of Oregon streams. OPSW-ODFW-2002-07, Oregon Department of Fish and Wildlife, Salem, Oregon.