Oregon Lower Columbia River Recovery Plan Annual Report Card for 2021 and 2022

This annual report card is an abbreviated status report that reviews the recent research, monitoring and evaluation data for Oregon's Lower Columbia River (LCR) salmon and steelhead populations. The Oregon Department of Fish and Wildlife (ODFW) uses the Lower Columbia River Conservation and Recovery Plan's (LCRCRP) analytical guidelines along with specific measurable criteria to assess progress toward recovery using viable salmonid population (VSP) metrics, relative to plan objectives. The LCRCRP has multiple population goals and uses different measurable criteria thresholds to assess population status. Abundance and productivity (A/P) statuses are reviewed at the yearly scale as well as the desired delisting and broad sense recovery scales. Status, in terms of A/P, is subject to a yearly abundance goal/benchmark which allows a timelier assessment of potential progress. The yearly A/P goals are referred to as interim goals. These yearly A/P goals are developed using a stock recruitment curve populated with abundance estimates, age at return, harvest and environmental variables. Comparisons with yearly A/P goals are meant as a real time assessment using an annual index of climate but are not necessarily a reflection of the nearness of a population to the delisting scenario goals. The desired delisting A/P goals are also developed with stock recruitment curves but do not have the same variables and are long-term average goals. The desired delisting A/P goals are used by state and federal managers during more formal assessments of fish populations.

This annual review serves as an early warning system regarding the need for potential adaptive management. The annual report card also documents formal adaptive management decisions, recommendations, and actions to assist in achieving plan goals under the delisting scenarios. The web site https://nrimp.dfw.state.or.us/RecoveryTracker contains information on VSP metrics and plan goals.

Annual report cards are typically produced one year later than the calendar year of the report to allow for data synthesis (i.e. the 2021 annual report card would be released in December 2022). However, development of annual reports for 2021 and 2022 was delayed by ongoing work on a 12-year assessment of LCRCRP. The 12-year assessment will provide an in-depth review of plan implementation and progress toward recovery.

Coho: (ESU wide)

Total abundance of adult coho natural origin spawners (NOS) across the Oregon portion of the ESU increased from 2020 to 2021 and again from 2021 to 2022 (15,749-16,298-23,373). The ESU gained a 3.4 percent increase in NOS in 2021 and a 43.4 percent increase in 2022 (Figure 1). A description of changes in NOS at the population level was hindered by 2020 spawner survey efforts due to budget reductions and safety concerns associated with COVID-19. The reduction in effort led ODFW to only achieve 51 percent of the goal for randomly selected coho salmon spawning surveys during 2020. The 2020 reduction in effort precluded reliable estimates at the population scale and thus changes between 2020 and 2021 at that level.

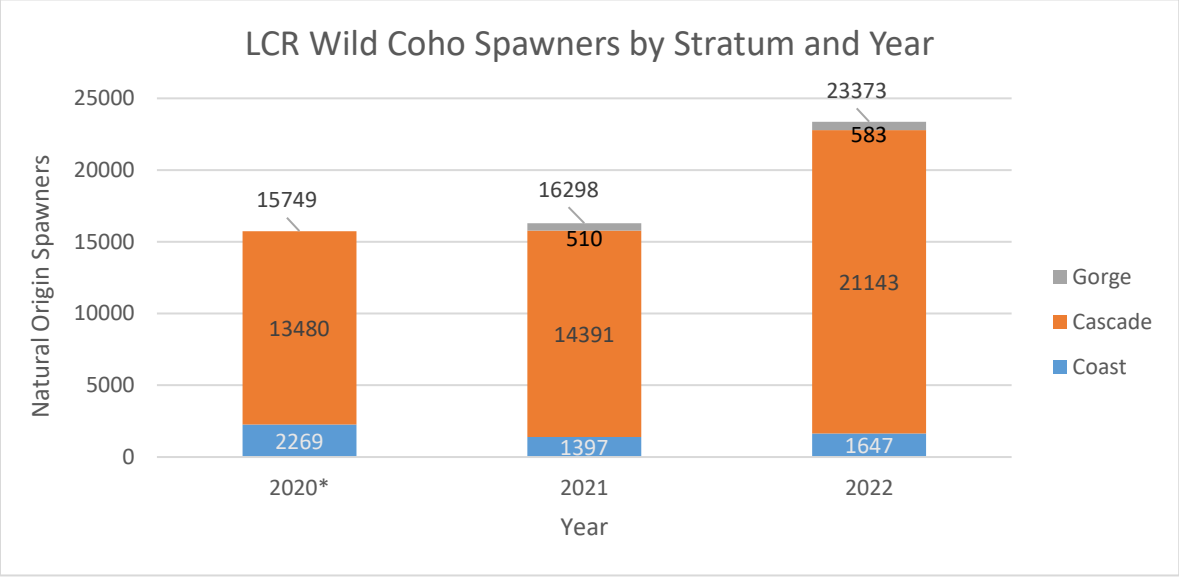

Figure 1. LCR Coho Natural Origin Spawners by Year and by Stratum
*No Gorge Stratum Abundance Estimate in 2020

NOS abundance trends at the population level between 2021 and 2022 were variable across populations (Figure 2). Not all populations followed the ESU's increasing abundance trend. Individual population increases in the Cascade stratum drove the abundance increases for the ESU. The Clackamas population (13,991) increased by 32.4 percent and the Sandy population (7,152) increased by 87.3 percent. Both populations exceeded their respective yearly A/P goals as well as their A/P goals under the desired delisting scenario. The Clatskanie population increased from a historic low in 2018 to 1,139 NOS in 2022. NOS abundance within the remaining monitored populations decreased from 46 percent (Scappoose) to 88 percent (upper gorge/Hood). VSP monitoring in the gorge stratum (Lower Gorge and Upper Gorge/Hood populations) is less reliable due to patchy distribution, low abundance and glacial till.

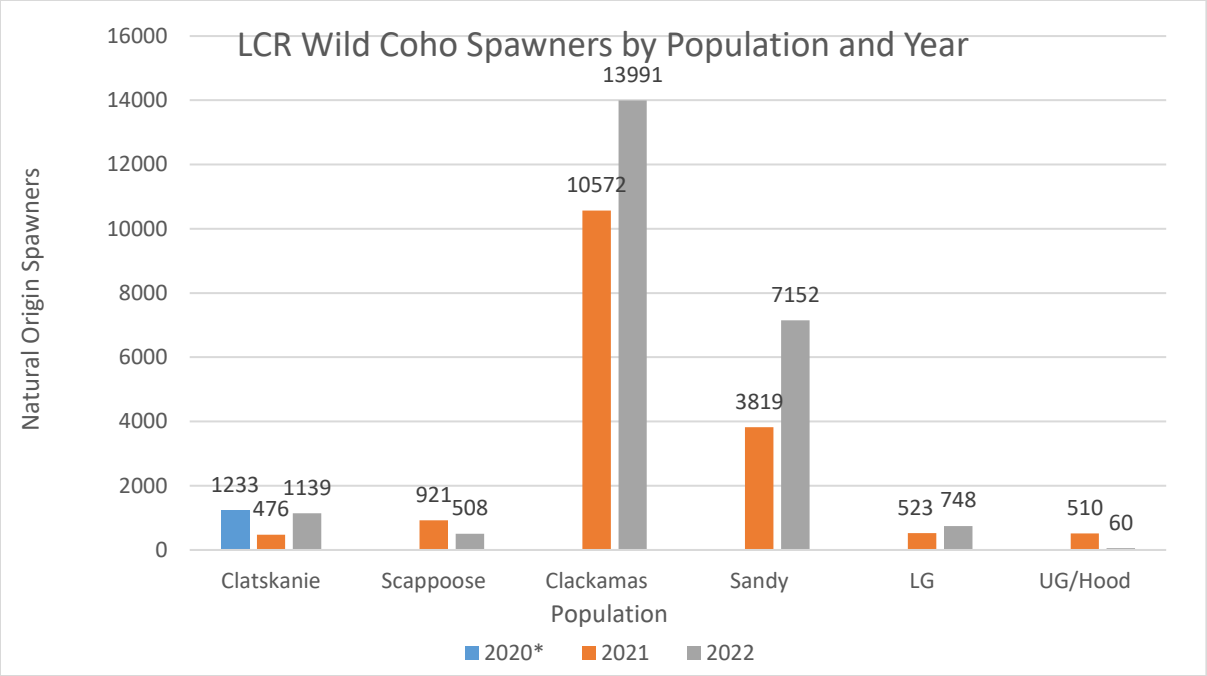

Figure 2. LCR Natural Origin Spawners by Year and by Population
*No population estimates in 2020 except Clatskanie.

The ESU's increase in NOS abundance did not follow similar paths as those for the total Columbia River returns or NOS in the Oregon Coastal Coho ESU. Both experienced a 98 and 120 percent (respectively) increase in NOS from 2020-2021 and both saw a decrease of 19 and 30 percent (respectively) from 2021-2022, whereas LCR coho saw a slight increase in 2021 and a much larger increase in in 2022. For LCR coho, marine survival was very high for the 2021 cohort and high for the 2022 cohort.

Analysis of VSP metrics to the interim measurable criteria shows all monitored populations (no estimates for Youngs Bay and Big Creek) met the A/P metric except the 2022 Hood population. Only the Lower Gorge and Hood populations were able to meet the occupancy of habitat criterion. The diversity criterion, percent hatchery fish on spawning grounds (pHOS), was met everywhere except, it was not met in 2021 for the Clatskanie or Hood populations and not met in 2022 for the Lower Gorge and Hood populations. Due to sampling difficulties, ODFW is unable to detect, with accuracy, trends in the Lower Gorge and Hood populations.

The LCR coho harvest rate (total fishery impact rate for ocean and Columbia River fisheries) in 2021 (10.6 percent) and 2022 (11.7 percent) both remained below the National Marine Fisheries Service (NMFS) harvest guidelines of 30 percent (2021) and 23 percent (2022) for all populations that are subject to harvest evaluation criteria, which is NMFS LCR Coho Harvest Rule.

Fall Chinook: (ESU wide)

Oregon's LCR fall Chinook return as two life history types. Fall Chinook spawners that return in September and early October are referred to as tule Chinook and those returning in late October and November are referred to as bright or late fall Chinook. The Oregon portion of the LCR ESU has one bright Chinook population which is in the Sandy. The Sandy basin has both tule and bright fall Chinook runs. Currently, Sandy River fall Chinook A/P estimates are problematic because the two populations overlap spatially and temporally and A/P for the two populations is reported as one fall Chinook A/P estimate. Current methodologies and investigations to distinguish the two populations have not been successful. The combined Sandy basin fall Chinook estimate is near an order of magnitude higher than the combined natural origin return (NOR) fall Chinook for the remaining eight populations.

Abundance based generalized random tessellation stratified surveys (GRTS) began across the ESU in 2012 and occurs in all populations except the gorge stratum populations. The average abundance of NOS over a two-year period to the Oregon portion of the ESU is 4,656 NOS which includes the Sandy late fall Chinook population (Figure 3). NOS abundance increased by 70.4 percent from 2020-2021 (5,202) and decreased by 21 percent from 2021-2022 (4,109). The combined Sandy River fall and late fall Chinook populations account for 80 percent of these estimates (Figure 4).

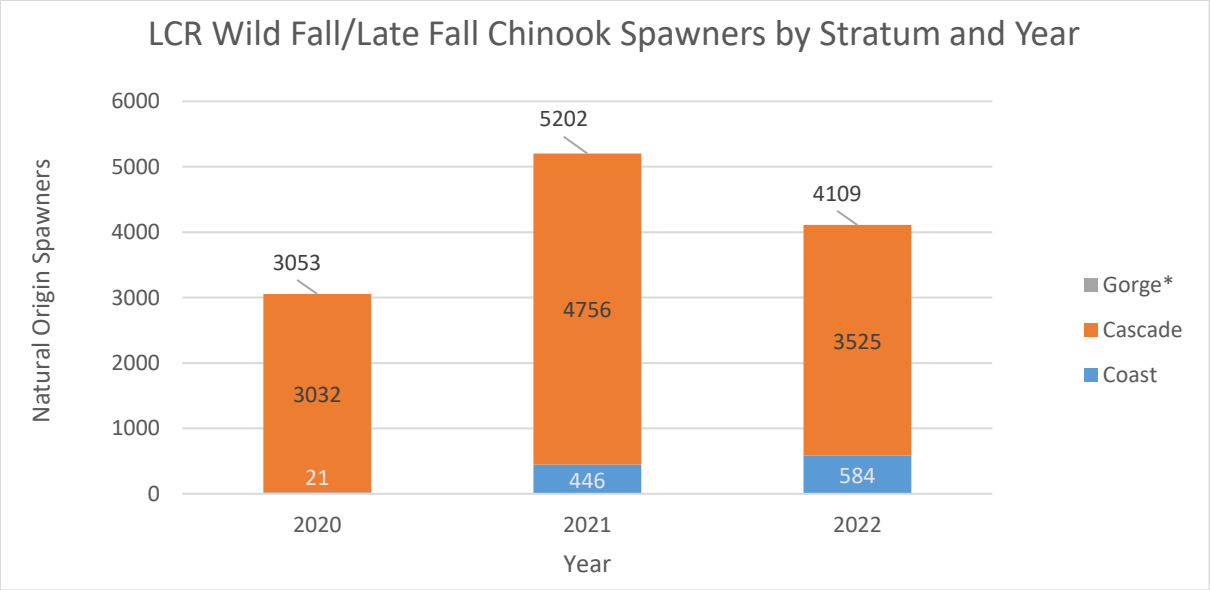

Figure 3. LCR Fall/Late Fall Chinook Natural Origin Spawners by Stratum and Year.
*There are no Gorge Stratum Abundance Estimates.

Analysis of interim measurable criteria shows the Young's Bay, Big Creek, and Sandy populations met the yearly A/P goals for 2021 and 2022. The Clackamas, Clatskanie, and Scappoose populations were below the yearly A/P goal for both years. The combined fall

Chinook and late fall Chinook abundance estimate in the Sandy increased by 62 percent to 4,720 NOS in 2021 and decreased by 26 percent to 3,482 NOS in 2022. The Big Creek population increased from 21 to 522 NOS in 2022. All other populations ranged from a maximum of 142 NOS in Youngs Bay to a low of 0 spawners in the Scappoose (Figure 4). ODFW is not producing VSP estimates for gorge stratum populations.

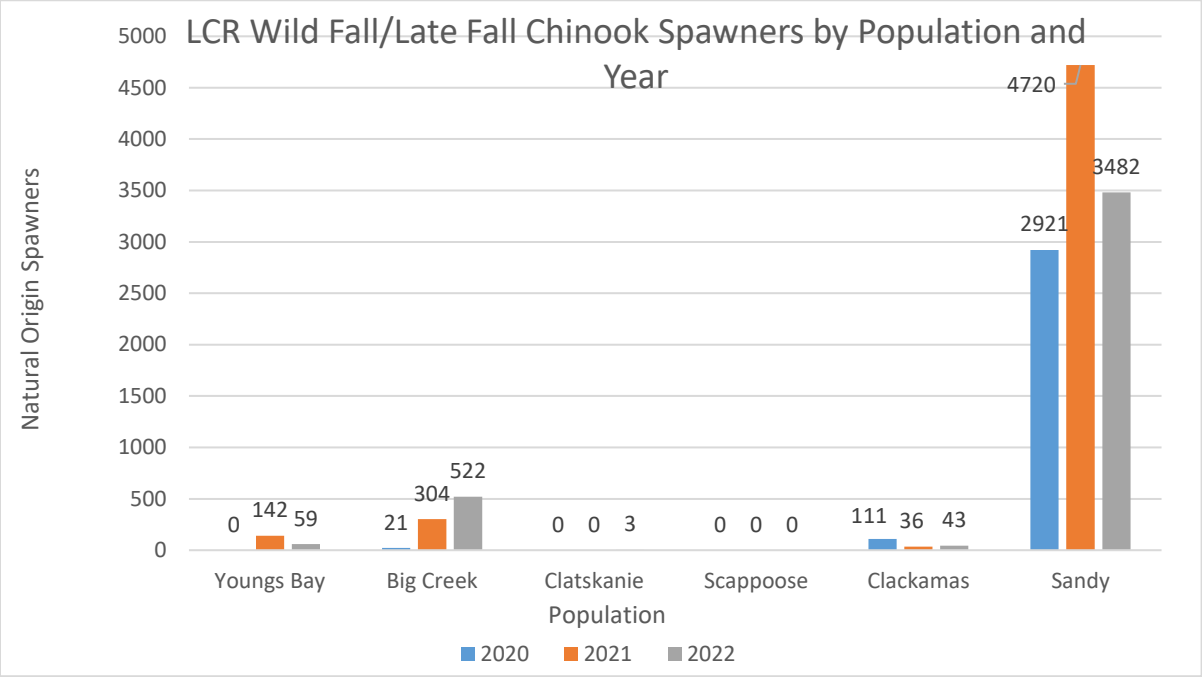

Figure 4. LCR Fall/Late Fall Chinook Natural Origin Spawners by Population and Year.

For occupancy of habitat, only the Youngs Bay population in 2021 met the goals. The Sandy, Scappoose and Youngs Bay populations met the diversity goals (pHOS) for both years. The Big Creek population in 2022 and the Clackamas population in 2021 met the diversity goals. Zero fall Chinook have been observed in the Scappoose since sampling began in 2012 and zero NOS fall Chinook have been observed in the Clatskanie population, outside of Plympton Creek, since 2016. The Clatskanie and Scappoose populations are likely functionally extirpated.

Estimates of harvest data for LCR fall Chinook are made yearly at the ESU level for ocean and mainstem Columbia River fisheries (below Bonneville Dam). The ESU is subject to a yearly harvest rate under an abundance-based management harvest matrix. The 2021 and 2022 harvest rates, for ocean and Columbia River fisheries (37.7 percent and 30.6 percent respectively) are below the allowable harvest rate of 38 percent, except possibly for the Hood River population. Columbia River harvest upstream of Bonneville Dam is not calculated and the total harvest rate is unknown for the Hood River population.

Late-Fall Chinook: (Sandy)

VSP information is not available until ODFW ascertains a methodology to proportion spawner estimates among fall and late fall Chinook. Sandy late fall chinook VSP information is included within the Sandy fall Chinook VSP estimates.

Spring Chinook: (Sandy and Hood)

There are two populations within Oregon's portion of the ESU, the Sandy and Hood. Native Hood spring Chinook went extinct in the early 1970's. A joint reintroduction and integrated harvest hatchery program was cooperatively started in 1991 between ODFW and the Confederated Tribes of the Warm Springs (CTWS) with Deschutes stock spring Chinook as the donor. This out-of-ESU stock is not part of the federally-listed LCR ESU.

A/P estimates for Hood spring Chinook were previously generated from monitoring of the Hood River Production Program (HRPP). Funding for the program was severely reduced in 2020 and there are no Hood River VSP metric estimates since 2020. The last A/P estimate of Hood River NOS (30) accounted for 0.7 percent of the ESU's total, leaving the Sandy as the majority contributor to the ESU in Oregon. Thirty plus years of hatchery supplementation has provided a good integrated harvest opportunity but has not yet produced a self-sustaining population of NOR spring Chinook. Sandy spring Chinook A/P decreased by 19 percent from 2020-2021 (3,660) and increased by 64 percent from 2021-2022 (6,000), continuing an increasing trend since LCRCRP approval in 2010 (Figure 5).

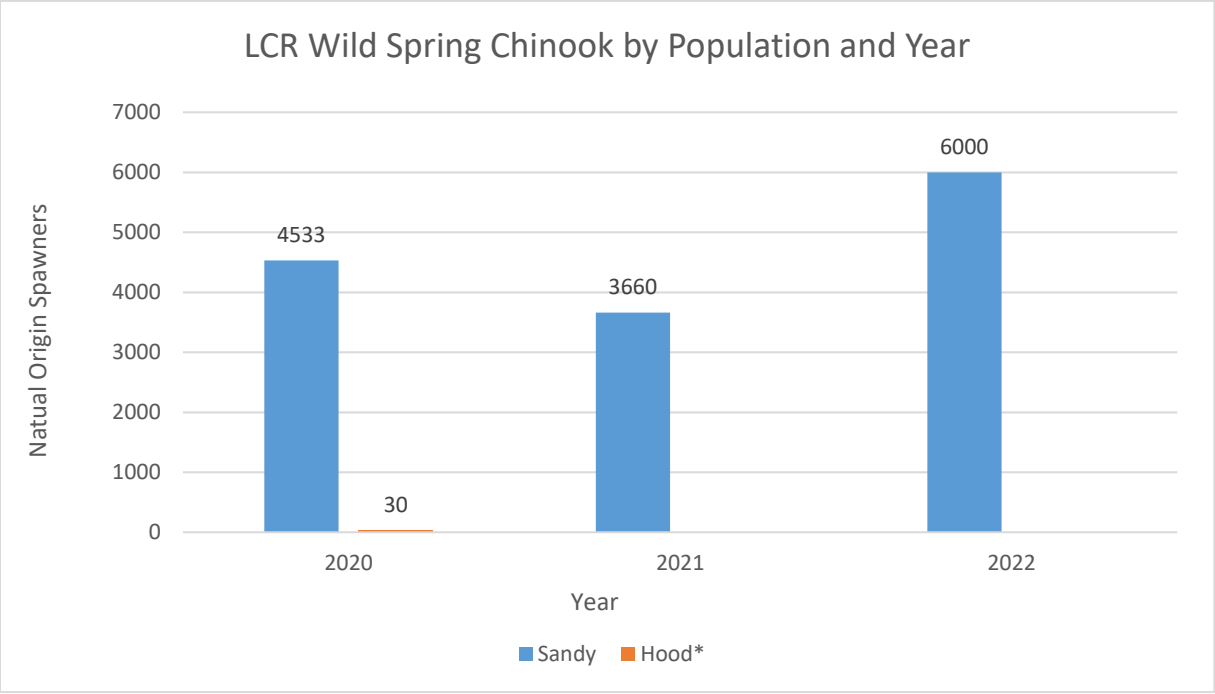

Figure 5. LCR Spring Chinook Natural Origin Spawners by Year and Population
*Hood River Spring Chinook only monitored in 2020

Analysis of VSP metrics to interim measurable criteria shows that the Sandy's A/P and diversity (pHOS) goals were met for both years as well as meeting the delisting goals every year since plan adoption. Monitoring methodology does not allow for evaluation of the occupancy metric.

ODFW calculates harvest for LCR spring Chinook at the ESU level for ocean, mainstem Columbia River and tributary fisheries. Ocean harvest is obtained from the yearly Pacific Salmon Commission Joint Chinook Technical Committee Report which lags approximately 2 years behind the calendar date to allow for coded wire tag synthesis. Upper Willamette River hatchery fish are used as a surrogate for ocean impact rates on LCR spring Chinook. There are no estimates of harvest for the 2021 or 2022 years currently. The LCR spring Chinook populations are allowed a yearly combined ocean and freshwater harvest rate of 25 percent. Sandy spring Chinook passed this metric for 10 of 11 years from 2010-2020. The total harvest rate on Hood River spring Chinook is not currently available as no methodology has been developed to estimate the harvest rate occurring on the CR upstream of Bonneville Dam (the average impact rate to Bonneville Dam is 15.0 percent).

Winter Steelhead: (Clatskanie, Scappoose, Clackamas, Sandy, Hood)

The LCRCRP covers steelhead populations in two distinct population segments (DPS). Oregon's LCR DPS winter steelhead return to the Clackamas, Sandy, lower and upper gorge and Hood populations. Oregon's winter steelhead in the Southwest Washington (SWW) DPS return to the Youngs Bay, Big Creek, Clatskanie, and Scappoose populations. Both DPSs also include populations in Washington. Winter steelhead A/P in the Oregon's cascade stratum of the LCR DPS followed a similar trend as the Oregon Coast DPS. Within the gorge stratum only the Hood was monitoring in 2020. Estimated spawner abundance increased by five percent from 2020 4639) to 2021 (4858) and increased by 23 percent increase between 2021 and 2022 (5944) (Figure 6). SWW winter steelhead surveys are only conducted in the Clatskanie and Scappoose populations, so an A/P analysis of SW winter steelhead is not available at the DPS scale. SWW winter steelhead are not a listed DPS.

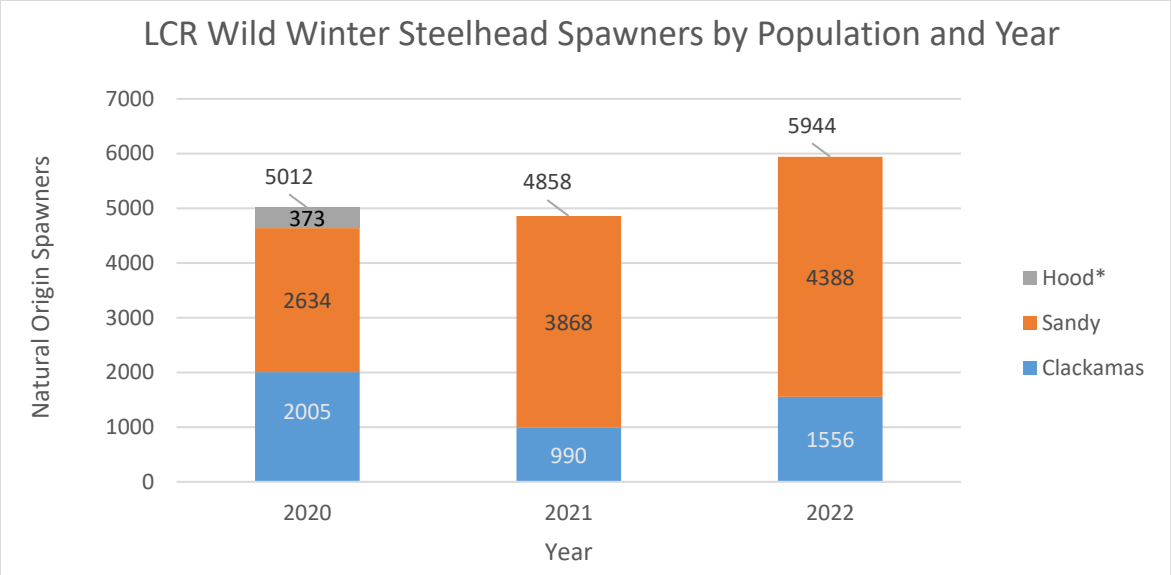

Figure 6. LCR Winter Steelhead by Population and Year
*Hood River Winter Steelhead Monitored only in 2020. No Upper or Lower Gorge Estimates.

Analysis of VSP metrics to the interim measurable criteria shows A/P in the Clackamas and Sandy populations followed different pathways. The Clackamas followed the Oregon Coast DPS pathway with a decrease from 2020-2021 of 51 percent (2006-990) and then an increase of 58 percent from 2021-2022 to 1,566 NOS. The Sandy pathway is one of a continued A/P increase from 2,634 NOS in 2020 to 3,868 NOS in 2021 and 4,388 NOS in 2022, a 66 percent increase over two years (Figure 7). The Sandy population exceeded the A/P goal in 2021 and 2022, while the Clackamas population was below the A/P goal in both years. Monitoring of the HRPP ended in 2020 and gorge populations are not monitored due to budget constraints, therefore there are no estimates of A/P for the gorge stratum populations.

Spatial structure goals for the Clackamas and Hood populations are not available. There are no surveys conducted on the Clackamas upstream of North Fork Dam and a reliable occupancy estimate is not possible based solely on surveys below the dam. For the Hood, prior to the cessation of the HRPP monitoring program, the mark/recapture methodology for estimating A/P did not allow for an estimate of occupancy. Within the Sandy, the occupancy continues to increase from 2020-2022 and is now above the desired delisting goal (75 percent) at 87 percent. The Hood River population has not met the diversity goal (pHOS) since plan adoption. The Hood River winter steelhead hatchery program was adaptively managed and has ended. The Sandy and Clackamas populations met the diversity goal of less than 10 percent pHOS for both years.

Analysis of VSP metrics to the interim measurable criteria for SWW DPS winter steelhead shows A/P in the Clatskanie and Scappoose took different A/P pathways. The Clatskanie decreased by 78 percent (328) and the Scappoose decreased by 59 percent (48) from 2020-2021 but the Clatskanie rebounded and increased by 148 percent (815) while the Scappoose decreased

by another 29 percent (34) from 2021-2022 (Figure 7). Scappoose NOS were in the low double digits (Figure 7). For the occupancy of habitat metric, the Clatskanie followed the A/P track and changed from 71 to 47 to 70 percent occupancy of habitat from 2020-2022. The Scappoose went from 31 to 16 percent in 2022, with no estimate in 2021. Both populations met the diversity goals and range from zero to five percent pHOS over all years since plan adoption, well below the plan goals. These populations do not have delisting goals since this DPS is not listed, but each population has broad sense recovery goals.

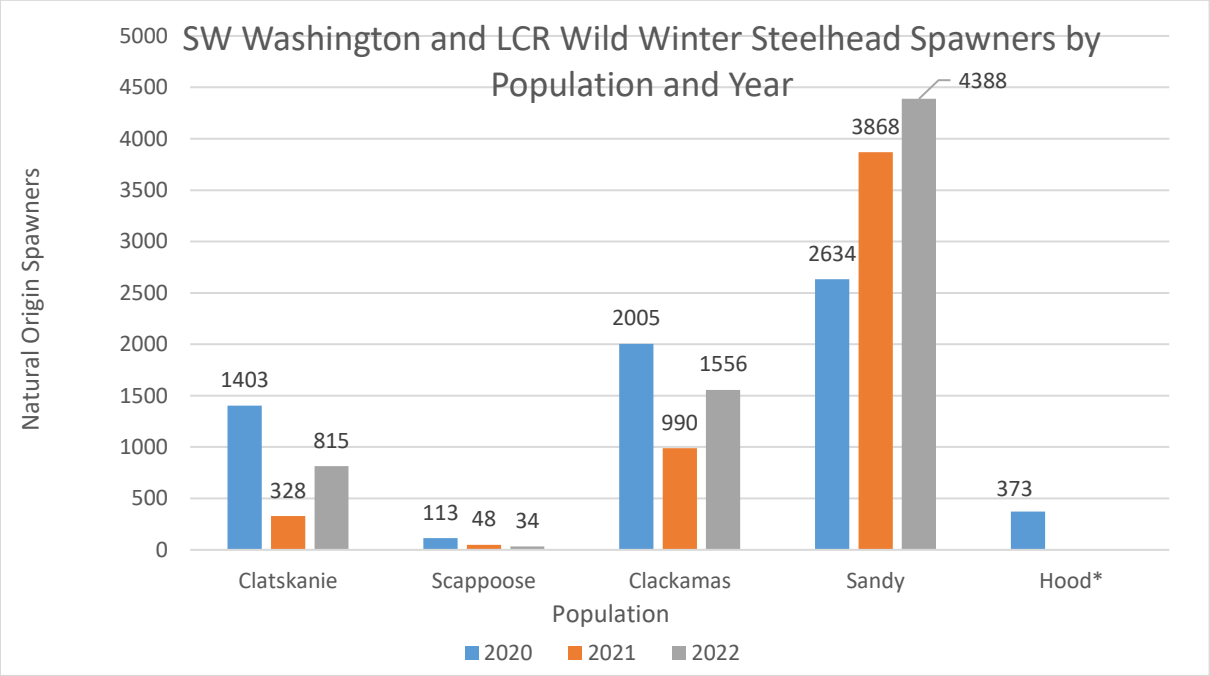

Figure 7. Combined SW Washington and LCR Wild Winter Steelhead Spawners by Population and Year. *Hood River Winter Steelhead Monitored only in 2020. No Upper or Lower Gorge Estimates.

Summer Steelhead: (Hood)

VSP metrics for Hood summer steelhead are not available. Funding for monitoring the Hood River Production Program ended in 2020.

Chum Salmon: ESU

Oregon's populations of Columbia River (CR) chum salmon do not currently have a delisting scenario and did not have evaluation criteria within the LCRCRP as there was little information on Oregon CR chum salmon at plan development. A specific reintroduction strategy was developed and included as an appendix to the LCRCRP. The Oregon populations were thought to be functionally extirpated and the first step was to attempt to re-introduce chum salmon back to Oregon's coastal stratum of the LCR.

For several years (2016–2019), the Program to Restore Oregon's Chum Salmon (PROCS) struggled to maintain a conservation broodstock at Big Creek Hatchery (BCH), due to low adult returns to BCH. Then, starting in 2020, returns to BCH significantly increased and PROCS released excess adults into the Bear Creek watershed situated within the Big Creek recovery population. This large return was likely due, at least in part, to adaptive management of release strategies to improve hatchery fry survival. Even larger adult returns to BCH occurred in 2021 (2,368) and 2022 (1,599), representing the two biggest returns in program history (Figure 8). Returns to the hatchery include hatchery origin adults and naturally produced chum.

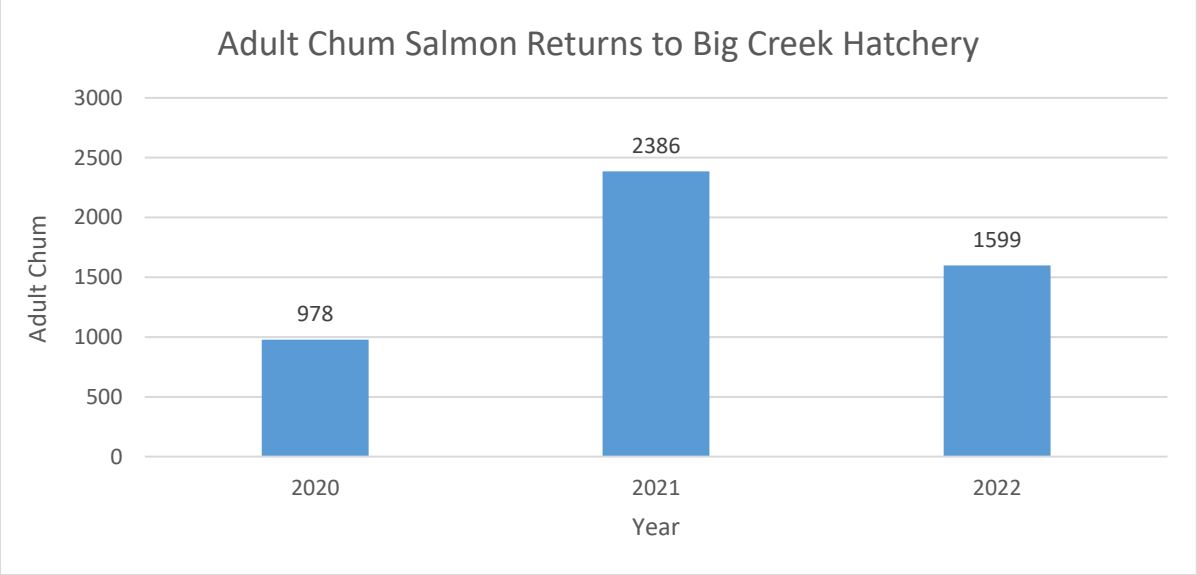

Figure 8. Adult Chum Salmon Returns to Big Creek Hatchery.

Due to the large run size at BCH in 2021, which exceeded broodstock needs, PROCS transferred excess adult spawners into multiple reintroduction locations in the Clatskanie River (>1,000) and Big Creek (>700) recovery populations to spawn volitionally. Due to the large, unexpected adult return in 2021, PROCS identified reintroduction strategies that would better facilitate recovery in anticipation of another large return. These reintroduction strategies included adult releases, direct unfed fry releases, and the use of a remote site incubator at reintroduction sites that chum salmon historically occupied. During the 2022 return year, adult returns again exceeded conservation broodstock needs and PROCS was able to experiment with all three reintroduction strategies: 1) excess adults were outplanted in both the Big Creek and Clatskanie River recovery populations; 2) excess adults were spawned and eggs were reared at BCH until the unfed fry stage and released at sites in the Big Creek and Clatskanie River recovery populations; and 3) excess adults were spawned and the eggs were transferred to a remote site incubator constructed on Page Creek (Clatskanie River recovery population).

Reintroduction and evaluation of these three reintroduction strategies are now a top priority of PROCS. Monitoring occurs via spawning ground surveys, juvenile smolt trapping, and through eDNA sampling. Spawning ground surveys are showing some chum salmon spawning in the

Youngs Bay recovery population where natural colonization is the planned trajectory for recovery. Smolt trapping is showing that natural reproduction is occurring from adult outplanting and unfed fry releases in the Big Creek and Clatskanie River recovery populations. eDNA sampling is being conducted in the Scappoose Creek, Clackamas River, and Sandy River recovery populations by volunteers to determine potential volitional expansion to upstream populations and as a method of outreach for future reintroduction efforts. So far, no chum salmon DNA has been detected in these recovery populations to indicate recolonization, but efforts are planned to last through 2024.

The PROCS program hosts the web site (https://odfwchum.forestry.oregonstate.edu/) to inform the public of recent projects, ongoing research, and updates about reintroduction efforts of chum salmon in the LCR.

Habitat Restoration and Effectiveness Monitoring-

ODFW created a modification of LCRCRPESU-wide restoration goals in 2014 as a more reasonable target for restoration practioners. The revised goal setting occurred based on best available science and modeled in threat reduction scenarios to reduce tributary habitat mortality to a level that is consistent with plan mortality rates for each population, under the delisting scenario. The habitat restoration targets are useful as a starting point to visualize the relative amount and types of restoration work needed in tributaries. When practioners meet these goals, all implementers are encouraged to continue to implement additional projects until biological viability occurs, as well as achievement of habitat restoration goals under the broad sense recovery scenario. Table 1 lists habitat restoration accomplishments by population area for 2021 and 2022.

Table 1. Habitat Restoration Projects Completed within the ESU during 2021 and 2022*

Population	Fish Passage corrections	Water Conserved(cfs)	LWD placed (mile)	Irrigation Improvement Projects (#)	Side Channel Creation (mile)	Alcove Creation (m2)	Riparian Planting (mile)
Young's Bay	1						.22/1
Big Creek	2		1.09				1.37
Clatskanie	1		.15				.27/.11
Scappoose	3/2		2.11/.08		.11		2.21/.59
Clackamas	2/2		.32/6.1		.32/.45		.7/5.81
Sandy	1		3.45/1		1.23/.8		1.53/.59
Lower Gorge							
Upper Gorge							
Hood		.5	.73/.6	3/8	.21/.35	149/836	
Total	**14**	**0.5**	**15.63**	**11**	**3.47**	**985**	**14.4**

*Information from OWEB and BPA databases as well as annual and restoration practioners reports

The recovery plan gives a schedule for completing habitat restoration goals as within 15 years. Thirteen in-water work periods have passed since plan adoption. If practitioners were on track to meet restoration goals, under the delisting scenario and over this 15-year period, then 87 percent of the goals would need to be completed in each population. The Young's Bay and Sandy populations are on track to meet all the restoration goals under the delisting scenario. The Clackamas and Scappoose populations achieved restoration goals for riparian and off-channel habitat. The remaining populations vary from 0-49 percent of the goals.

Key accomplishments from local restoration practitioners:

- The Hood River Watershed Group, Greater Oregon City and North Clackamas Watershed Councils updated their strategic action plans.
- The Oregon Zoo, City of Portland, Bureau of Land Management and the US Fish and Wildlife Service implemented a five-year pilot Beaver Translocation Program and holding facility.
- Restoration practioners operating in the Sandy population are the first to achieve the interim habitat restoration goals for creating access to side channels at 18.09 miles from 2010-2022.
- The Clackamas Basin Watershed Council begins a three-year water temperature monitoring study basin-wide at 80 selected sampling locations utilizing data loggers/sensors between June and October. Data culmination will result in a predictive tool of future water temperature under a changing climate.

Adaptive management:

Hood River winter steelhead hatchery stray rates have exceeded goals every year since plan adoption. The hatchery program for winter steelhead was discontinued.

Research Monitoring and Evaluations Addendums:

While not adaptive management per se, monitoring of fish populations is critical to a yearly assessment of the effectiveness of plan actions and prioritization of limited monitoring funds.

Staff recommend the following actions for implementation:

- Develop a monitoring program to capture VSP metrics for Hood River fish populations.
- Finalize the 12-year assessment of the LCR Conservation and Recovery Plan.
- Resume annual implementation team meetings.
- Re-examine Hood River spring Chinook VSP goals in relation to their listing status.

The web site http://www.dfw.state.or.us/fish/CRP/lower_columbia_plan.asp contains past reports as well as presentations and a host of LCR Recovery Plan information.

Recovery Plan Adopted: August 2010
Date Reviewed: November 7, 2024