THE NATIONAL MARINE FISHERIES SERVICE REPORT 1
REGULATORY ACTIVITIES

The National Marine Fisheries Service (NMFS) provides this report on issues relevant to ocean salmon harvest management in 2023.

Status of ESA listing petitions and determinations

Washington Coast Chinook: NMFS received a petition in July 2023 to list either an Evolutionary Significant Unit (ESU) of spring-run Chinook salmon on the Washington coast; or, to list the Washington Coast Chinook ESU (which includes both spring- and fall-run Chinook salmon), based primarily on the decline in the status of the spring-run component of the ESU. NMFS is currently drafting its 90-day finding as to whether the petition meets the standard for further review to determine if these ESUs warrant listing.

Upper Klamath/Trinity River Chinook ESU: NMFS received the petition in 2017 and announced a 90-day finding in 2018. NMFS continues to evaluate this petition and to incorporate traditional ecological knowledge in the evaluation of the petition.

Petition to list and designate critical habitat for OC/SONCC Chinook ESUs: In 2021, NMFS found that a previous petition to list new spring-run ESUs was not warranted. That petition had requested we identify and list new spring-run ESUs. In August 2022, NMFS received a petition to list the Oregon Coast and the Southern Oregon/Northern California Chinook ESUs. The 90-day finding issued in January 2023 for the most recent petition concluded that the petitioners met the standard for further review to determine if these ESUs warrant listing given new information. The Biological Review Team is currently conducting the status review which will provide key information that NMFS will consider in determining whether listing is warranted.

Petition to list Olympic Peninsula steelhead Distinct Population Segment (DPS): In August 2022, NMFS received a petition to list the DPS. The 90-day finding issued in February 2023 concluded that the petitioners met the standard for further review to determine if the DPS warrants listing given new information. The Biological Review Team is currently conducting the status review which will provide key information that NMFS will consider in determining whether listing is warranted.

Performance Report for the Sacramento Winter-run Chinook Control Rule

DRAFT
Review of the Sacramento River Winter Chinook Control Rule
September 9, 2023

At its November 2017 meeting, the Pacific Fishery Management Council (Council) proposed to update the harvest control rule (HCR) for Sacramento River Winter Chinook (SRWC) salmon for salmon fisheries in 2018 and beyond (Tracy 2017). The control rule provides a *de minimis* option at projected escapements of age-3 spawners below 500, ramps down allowable impacts as the forecast of escapement falls below 3,000, and provides a conservative policy approach that balances an acceptably low extinction risk with fishing opportunity on target stocks of Chinook salmon with the goal of eliminating fishery impacts as a significant impediment to species recovery for SRWC.

The harvest control rule uses a forecast of SRWC age-3 escapement in the absence of salmon fisheries (E_3^0) to determine the allowable age-3 impact rate.[1] If E_3^0 is above 3,000, a maximum impact rate of 20 percent is allowed. If E_3^0 is between 3,000 and 500, then the impact rate ranges from 20 percent to 10 percent. If E_3^0 is below 500, then the impact rate has a steeper decline from 10 percent until it reaches zero at an E_3^0 of zero (Figure 1).

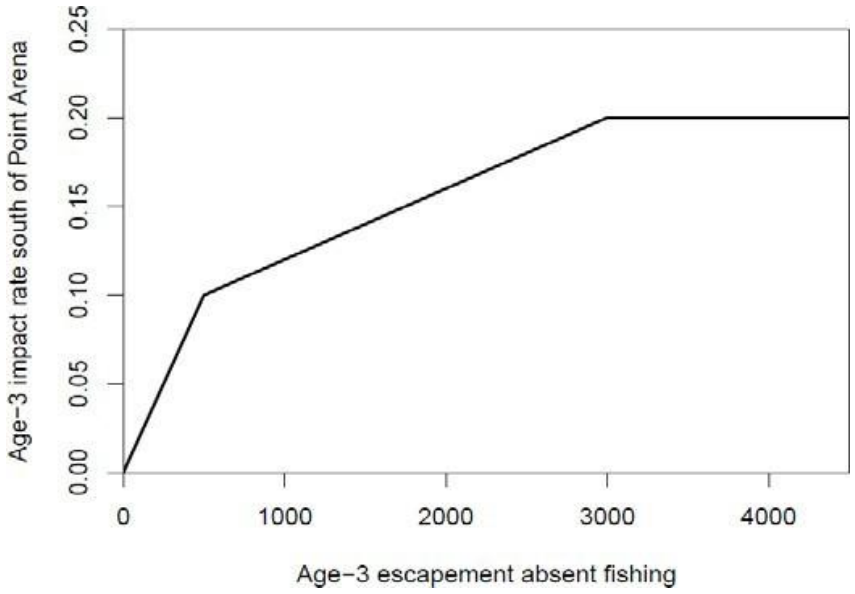

Figure 1. The adopted Sacramento River winter-run Chinook salmon harvest control rule for management of ocean fisheries south of Point Arena, California.

Subsequently, the HCR also incorporates and maintains the fishing season and size restrictions listed in Table 1.

[1] O'Farrell, M., N. Hendrix, and M. Mohr. 2016. An evaluation of preseason abundance forecasts for Sacramento River winter Chinook salmon. Pacific Fishery Management Council Briefing Book for November 2016, 35 pages. Available: https://www.pcouncil.org/documents/2016/11/agenda-item-d-2-attachment-1-an-evaluation-of-preseason-abundance-forecasts.pdf/ (website accessed August 8, 2023).

Table 1. Fishing Season and Size Restrictions for Ocean Chinook Salmon Fisheries, South of Point Arena, California.

Fishery	Location	Shall open no earlier than	Shall close no later than	Minimum size limit (total length[1]) shall be
Recreational	Between Point Arena and Pigeon Point	1st Saturday in April	2nd Sunday in November	20 inches
	Between Pigeon Point and the U.S./Mexico border	1st Saturday in April	1st Sunday in October	
Commercial	Between Point Arena and the U.S./Mexico border†	May 1	September 30†	26 inches
	†Exception: Between Point Reyes and Point San Pedro, there may be an October commercial fishery conducted Monday through Friday, but shall end no later than October 15.			

[1]Total length of salmon means the shortest distance between the tip of the snout or jaw (whichever extends furthest while the mouth is closed) and the tip of the longest lobe of the tail, without resort to any force or mutilation of the salmon other than fanning or swinging the tail (50 CFR 660.402).

In 2018 NOAA's National Marine Fishery Service (NMFS) issued a biological opinion under the authority of Section 7 of the Endangered Species Act (ESA), evaluating the proposed harvest impacts of implementing the new HCR on the ESA-listed SRWC Salmon Evolutionarily Significant Unit (ESU). NMFS concluded in the biological opinion that the proposed update to the control rule was not likely to jeopardize the continued existence of the SRWC ESU (NMFS 2018). The opinion concurred with the recommendation from the Council to assess the performance of the harvest framework every five years as a check on projected results and any changes in key presumptions and adopted it as a term and condition in its opinion.

NMFS is now conducting the review consistent with the terms and conditions of the biological opinion. This report comprises our draft review and recommendations. We invite comments and expect to report on comments received on the draft report at the Council's November 2023 meeting prior to finalizing this review between the November 2023 Council meeting and the March 2024 Council meeting. Written comments should be submitted to Susan Bishop by February 1, 2024 at either Susan.Bishop@noaa.gov or 7600 Sand Point Way NE, Building 1, Seattle WA 98115.

This HCR depends on escapement and abundance forecasts of the SRWC salmon stock. The effectiveness of the HCR depends, in large part, on whether SRWC abundance can be predicted with reasonable accuracy and precision. Table 2 lists the annual preseason forecast of SRWC salmon since implementing the control rule along with the resulting exploitation rate that fisheries were managed to during each corresponding year, and compares that information with the exploitation rate achieved each year.

Table 1. Annual SRWC salmon forecasts used to determine harvest control rule (HCR)level and pre- and post-season resulting exploitation rates (from PFMC 2023).

Year	SRWC preseason abundance forecast of age-3 escapement in the absence of fisheries	Allowed Exploitation Rate based on HCR	Exploitation Rate achieved
2018	1,594	14.4%	8.5%
2019	1,924	15.7%	14.8%
2020	3,077	≤ 20%	16.2%
2021	9,063	≤ 20%	14.7%
2022	5,971	≤ 20%	15.2%
2023	4,540	≤ 20%	n/a

Table 2 indicates that since implementation of the current HCR the preseason abundance of SRWC salmon have allowed fisheries to operate at the highest tier available in the majority of years. Table 3 lists the annual postseason return of SRWC salmon for the same time period. For comparative context, the recent 10-year average (2013-2022) for ocean escapement of SRWC Chinook salmon was 4,510 (PFMC 2023, Table B-3).

Table 3. Annual SRWC salmon escapements with the corresponding year of ocean fisheries (from PFMC 2023).

Year	Parental Escapement	Jack Escapement
2018	7,570	559
2019	6,743	686
2020	10,239	277
2021	5,561	477
2022	n/a	n/a

The exploitation rates calculated in Table 3 use harvest impacts from all fisheries in marine waters. During this time preseason abundance forecasts for SRWC salmon have fluctuated, with a high in 2021 (Table 2). Because abundance has been on the higher end of the framework, fisheries have been managed subject to ensuring they do not exceed an exploitation rate limit of 20 percent in the majority of years (Table 2) since the HCR was implemented. Preliminary post season estimates based on harvest model analysis indicate that exploitation rates have not exceeded the preseason limit in any year and that the ER achieved has been well below the limit in all but one year and stable since the HCR was implemented. Escapements have been above the 10-year average in every year since the HCR was implemented. Based on this information, NMFS concludes that (1) fisheries over the past five years have been managed consistent with the control rule; (2) escapements have consistently exceeded the spawner abundance criterion of 2,500 associated with low risk evaluated in the biological opinion, and; (3) fisheries managed under the SWRC harvest control rule have continued to be consistent with the outcomes and expectations of NMFS' 2018 biological opinion evaluating effects of the HCR on this ESU (NMFS 2018).

Ongoing monitoring efforts continue to be directed at gathering consistent natural population status and trends (e.g., abundance numbers, age composition, hatchery fractions, and productivity). NMFS and the Council will continue to report on the performance of the harvest control rule and the status and trends of the SWRC ESU at 5-year intervals consistent with the provisions of the biological opinion.

References

Tracy, C. 2017. Letter transmitting the Pacific Fishery Management Council's recommendation for a new Endangered Species Act harvest control rule for Sacramento River Winter Chinook. Letter to B. Thom, National Marine Fisheries Service, from C. Tracy, Executive Director, Pacific Fisheries Marine Council, Portland, OR. December 6, 2017.

National Marine Fisheries Service (NMFS). 2018. Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat (EFH) Consultation. Effects of the Pacific Coast Salmon Plan Fisheries on the Sacramento River Winter-run Chinook salmon Evolutionarily Significant Unit. NMFS, WCR, Sustainable Fisheries Division. WCR-2017-8012. March 30, 2018.

Pacific Fishery Management Council (PFMC). 2023. *Review of 2022 Ocean Salmon Fisheries: Stock Assessment and Fishery Evaluation Document for the Pacific Coast Salmon Fishery Management Plan*. (Document prepared for the Council and its advisory entities.) Pacific Fishery Management Council, 7700 NE Ambassador Place, Suite 101, Portland, Oregon 97220-1384.

Performance Report for Lower Columbia Coho Harvest Control Rule

DRAFT
Three Year Review of the Lower Columbia River Natural Coho
Abundance-based Harvest Matrix
September 9, 2023

In November 2014, the Pacific Fishery Management Council (Council) proposed to update the harvest control rule (HCR) for lower Columbia River (LCR) natural coho salmon for salmon fisheries in 2015 and beyond (McIsaac 2015). The control rule identifies exploitation rate (ER) limits based on two levels of parental escapement and five levels of marine survival (a 2 x 5 harvest matrix), see Table 1.

Table 2. Harvest management matrix for Lower Columbia River natural coho showing allowable fishery exploitation rates based on parental escapement and marine survival index.

Parental Escapement (rate of full seeding)		**Marine Survival Index (based on return of jacks per hatchery smolt)**					
		Very Low (≤ 0.06%)	**Low (≤ 0.08%)**	**Medium (≤ 0.17%)**	**High (≤ 0.40%)**	**Very High (> 0.40%)**	
Normal	≥ 0.30	10%	15%	18%	23%	30%	Allowable exploitation rate
Very Low	< 0.30	≤ 10%	≤ 15%	≤ 18%	≤ 23%	≤ 30%	

In 2015, NOAA's National Marine Fishery Service (NMFS) issued a biological opinion under the authority of Section 7 of the Endangered Species Act (ESA), evaluating the proposed harvest impacts of implementing the new harvest control rule on the ESA-listed LCR Coho Salmon Evolutionarily Significant Unit (ESU). NMFS concluded in the biological opinion that the proposed update to the HCR was not likely to jeopardize the continued existence of the LCR Coho Salmon ESU (NMFS 2015). The opinion concurred with the recommendation from the Council to assess the performance of the HCR every three years as a check on projected results and any changes in key presumptions.

NMFS is now conducting the review, and this report comprises our draft review and recommendations. We invite comments and expect to report on comments received on the draft report at the Council's November 2023 meeting prior to finalizing this review between the November 2023 Council meeting and the March 2024 Council meeting. Written comments should be submitted to Susan Bishop by February 1, 2024 at either Susan.Bishop@noaa.gov or 7600 Sand Point Way NE, Building 1, Seattle WA 98115.

The LCR coho ESU is synonymous with the Lower Columbia River natural coho stock (LCN coho) in the Fishery Management Plan. The harvest management matrix depends on parental escapement and marine survival of the LCN coho stock, which includes only natural-origin

coho salmon. In Table 1 the average seeding level of parental escapement is expressed as a percentage of the full seeding level. If a particular parental escapement was greater than 100 percent of full seeding, parental escapement is set at 100 percent (NMFS 2015). For example, in 2014 the parental escapement of the Clatskanie population was 3,246 (Table 2) which is 270 percent of the full seeding level, but the parental escapement is set at 100 percent. The parental seeding level used to establish the tiers in the matrix is the average seeding levels of ten LCN coho populations (McIsaac 2015). The ten primary populations are: Clatskanie, Scappoose, Elochoman/Skamokawa, Grays/Chinook, Clackamas, Sandy, Lower Cowlitz, Toutle, Coweeman, and East Fork Lewis. Full seeding levels for Oregon populations were defined based on a combination of stock-recruitment and habitat analyses (Kern and Zimmerman 2013). Full seeding levels for Washington populations were defined as equilibrium abundance in stock-recruitment parameters inferred with the Ecosystem Diagnosis and Treatment Model from assessments of the available habitat quantity and quality (Beamesderfer et al. 2014). In the event that LCN coho average spawning escapements (calculated as an average of the ten reference populations) fall below 30 percent of full seeding, the Council would then work to the extent possible to minimize LCN coho ERs on adult returns from the corresponding brood year, and in no case exceed the ER limit for the given marine survival index category.

Table 2 shows the LCN coho salmon parental escapements for the 10 populations used to determine harvest matrix seeding level. These data indicate that average parental brood year escapement levels have been in the normal category and actually well above the 30 percent criterion since implementation of the new control rule in 2015.

Table 3 lists the annual pre- and post-season returns of LCN coho salmon since 2015 along with the associated marine survival index, preseason ER limit, and postseason ER estimate. Returns of Lower Columbia River hatchery adult coho are highly correlated with the marine survival index based on jack returns per smolts – indicating that this marine survival index predicts marine conditions which likely affect both hatchery and wild coho.

Table 3. Annual LCN coho salmon parental escapements in 10 populations used to determine harvest matrix seeding level (N.O. esc = natural origin escapement), (full seeding determinations are described in Kern and Zimmerman 2013).

Populations	Year →	2013		2014		2015		2016		2017		2018		2019		2020	
	Full seeding level	N.O. esc.	% of full	N.O. esc.	% of full	N.O. esc.	% of full	N.O. esc.	% of full	N.O. esc.	% of full	N.O. esc.	% of full	N.O. esc.	% of full	N.O. esc.	% of full
Clatskanie	1,200	611	51%	3,246	100%	240	20%	464	39%	566	47%	25	2%	146	12%	1,233	100%
Scappoose	1,200	979	82%	1,587	100%	487	41%	1,200	100%	387	32%	178	15%	384	32%	1,036	86%
Elochoman/ Skamokawa	2,429	768	32%	3,079	100%	328	14%	754	31%	896	37%	1,076	44%	1,664	69%	1,725	71%
Grays/Chinook	1,113	862	77%	2,689	100%	312	28%	627	56%	400	36%	406	36%	746	67%	962	86%
Clackamas	3,800	4,012	100%	10,672	100%	1,784	47%	1,628	43%	7,598	100%	3,159	83%	4,044	100%	9,012	100%
Sandy	1,200	667	56%	5,942	100%	443	37%	939	78%	2,384	100%	537	45%	1,052	88%	601	50%
Lower Cowlitz[1]	3,890	6,802	100%	24,544	100%	2,474	64%	4,365	100%	2,674	69%	2,762	71%	3,191	82%	4,740	100%
Toutle[2]	3,164	4,697	100%	12,730	100%	2,186	69%	3,639	100%	2,004	63%	2,012	64%	3,838	100%	4,318	100%
Coweeman	931	3,693	100%	6,876	100%	1,238	100%	2,988	100%	2,349	100%	2,518	100%	3,501	100%	4,362	100%
East Fork Lewis	568	2,408	100%	3,940	100%	544	96%	1,143	100%	1,463	100%	1,610	100%	2,497	100%	2,653	100%
Average			**80%**		**100%**		**51%**		**75%**		**68%**		**56%**		**75%**		**89%**

1. Lower Cowlitz full-seeding and spawner estimates are for tributary habitat only and do not include the main stem river.
2. Toutle coho population includes both the North Fork/Green population and South Fork Toutle population.

Table 4. Annual LCN coho salmon stock pre- and post-season returns and resulting exploitation rates (from PFMC 2023a and JCRMS 2023).

Year	Average Parental Escapement (rate of full seeding)	Marine Survival Index	Preseason LCN coho forecast	Postseason LCN coho run	Exploitation Rate limit preseason	Exploitation Rate achieved[1]
2015	Normal	High	35,900	**20,900**	23.0%	**24.3%**
2016	Normal	Medium	40,000	**25,100**	18.0%	9.0%
2017	Normal	Medium	30,100	31,200	18.0%	11.0%
2018	Normal	Medium	21,900	29,700	18.0%	11.1%
2019	Normal	High	36,900	**34,100**	23.0%	19.5%
2020	Normal	Medium	24,800	55,400	18.0%	7.0%
2021	Normal	Very High	39,200	70,500	30.0%	10.6%
2022	Normal	High	65,700	73,100	23.0%	11.7%
2023	Normal	High	45,500	n/a	23.0%	n/a

[1] *Calculated total exploitation on LCN coho salmon in all fisheries in the ocean and in the Columbia River below Bonneville Dam. These are estimated using the Fisheries Regulation Assessment Model (FRAM) which is currently used by the Council to annually estimate impacts of proposed ocean and terminal fisheries on Chinook and coho salmon stocks.*

The ERs presented in Table 3 use harvest from all fisheries in marine waters and the Columbia River, below Bonneville Dam. Ongoing monitoring efforts continue to be directed at gathering consistent information on natural population status and trends (e.g., abundance, age composition, hatchery fractions, and productivity). New escapement information that has been gathered over the last four or five year shows no substantive changes in abundance or hatchery fractions that are inconsistent with previous trends (Table 4, Table 5) used in NMFS' assessment of the HCR. As evidenced by blank columns prior to 2010, escapement data for 14 populations in Table 5 were not previously monitored, but instead are now tracked including six populations which are included in the annual assessment of parental escapement that is used to define each year's ER limit. Tracking escapement of these populations is expected to continue since they are now part of the tier selection calculations. Updated spawning abundances come from either the Washington Department of Fish and Wildlife's Salmon Conservation and Reporting Engine or Oregon Department of Fish and Wildlife's Salmon and Steelhead Recovery Tracker online databases.

Since implementing the new harvest control rule, parental escapement has consistently been in the normal category and the marine survival index has ranged from medium to very high, resulting in four years with an ER limit if 18%, four years with an ER limit of 23%, and one year with an ER limit of 30% (Table 3); the higher end of the framework tiers. Post-season estimates of abundance indicate that the abundance was over-forecast in three of the eight years with estimates of post-season returns since the new HCR was implemented in 2015. Preliminary post-season estimates based on FRAM model analysis indicate that exploitation rates exceeded the preseason limit in 2015 but have been well below the limit since 2016, indicating the approach is risk averse to forecast error. When more data points allow for a more comprehensive review, the review should include comparisons of the estimates of exploitation rates from FRAM to independent exploitation rate estimates derived from coded-wire tag groups that are now being used to track the new status information on the additional populations being monitored. Trends in pHOS should also be evaluated once more data points

associated with the new control rule are available given Council fisheries harvesting LCN coho are broadly mark selective and the long-term expectation is that levels of pHOS will decline from historically high averages.

Based on this information, NMFS concludes that (1) fisheries over the past review period have been managed consistent with the control rule; (2) escapements have consistently exceeded the parental escapements in 10 populations used to determine harvest matrix seeding level associated with low risk evaluated in the biological opinion, with the post-season LCN abundance continuing to build over time (Table 3) and; (3) fisheries managed under the harvest management matrix for LCN coho salmon have continued to be consistent with the outcomes and expectations of NMFS' 2015 biological opinion evaluating effects of the HCR on this ESU (NMFS 2015).

Table 5. Natural-origin spawning escapement numbers and the proportion of natural spawners composed of hatchery-origin fish (pHOS[1]) on the spawning grounds for LCN coho salmon populations in Oregon from 2008 through 2021. (http://www.odfwrecoverytracker.org/)*.

Major Population Group	Oregon Population	Origin	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total Average	Pre-HCR update (2010-14) Average	Post-HCR update (2015+) Average
Coast	Youngs Bay	Natural	68	161	129	-	-	-	-	-	-	-	-	-	-	119	119	n/a
		pHOS	61%	66%	46%	-	-	-	-	-	-	-	-	-	-	58%	58%	n/a
	Big Creek	Natural	279	160	409	-	-	-	-	-	-	-	-	-	-	283	283	n/a
		pHOS	52%	21%	18%	-	-	-	-	-	-	-	-	-	-	30%	30%	n/a
	Clatskanie	Natural	1,686	1,546	619	611	3,246	240	464	566	25	146	1,233	476	1,139	923	1,542	536
		pHOS	3%	1%	11%	11%	4%	4%	6%	19%	68%	40%	10%	46%	-	19%	6%	28%
	Scappoose	Natural	1,960	298	210	979	1,587	487	1,200	387	178	384	-	921	508	758	1,007	581
		pHOS	0%	0%	0%	0%	0%	0%	0%	3%	2%	0%	-	0%	-	0%	0%	1%
Cascade	Clackamas	Natural	4,009	2,253	1,663	4,012	10,672	1,784	1,628	7,598	3,159	4,044	-	10,572	13,991	5,449	4,522	6,111
		pHOS	26%	10%	8%	3%	14%	11%	9%	12%	10%	5%	-	2%	-	10%	12%	8%
	Sandy	Natural	901	3,494	1,165	667	5,942	443	393	2,384	537	1,052	-	3,819	7,152	2,329	2,434	2,254
		pHOS	12%	8%	3%	12%	3%	4%	3%	0%	8%	0%	-	0%	-	5%	8%	3%
Gorge	Lower Gorge	Natural	920	216	96	151	362	30	395	-	16	184	-	-	523	289	349	230
		pHOS	7%	54%	56%	6%	51%	38%	7%	-	36%	4%	-	-	-	29%	35%	21%
	Upper Gorge/ Hood	Natural	223	232	169	561	42	4	57	-	107	193	-	510	60	196	245	155
		pHOS	85%	69%	78%	65%	76%	64%	65%	-	28%	18%	-	74%	-	62%	75%	50%

[1] For example, Clatskanie in 2010 had 1,686 natural-origin spawners and 3% hatchery spawners. To calculate hatchery-origin numbers multiply (1,686/(1-.03))-1,686 = 52 hatchery-origin spawners.

*http://www.odfwrecoverytracker.org/summary/#/species=1&run=2&esu=159/esu=159&metric=1&level=3/filter=160&start_year=1992&end_year=2017 Date accessed: August 7, 2023.

Table 6. Natural-origin spawning escapement numbers and the proportion of all natural spawners composed of hatchery-origin fish (pHOS[1]) on the spawning grounds for LCN coho salmon populations in Washington from 2008 through 2022. (https://fortress.wa.gov/dfw/score/score/species/coho.jsp?species=Coho)*.

Major Population Group	Washington Population	Origin	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total Average	Pre-HCR update (2010-14) Average	Post-HCR update (2015+) Average
Coast	Grays/Chinook	Natural	479	301	461	862	2,689	312	627	400	406	746	962	1,114	814	783	958	673
		pHOS	79%	93%	42%	65%	40%	48%	58%	67%	69%	58%	42%	57%	44%	59%	64%	55%
	Elochoman / Skamokawa	Natural	858	605	477	768	3,079	328	754	896	1,076	1,664	1,725	1,450	756	1,110	1,157	1,081
		pHOS	72%	59%	27%	39%	36%	36%	34%	25%	41%	36%	21%	46%	n/a	39%	46%	34%
	Mill Creek	Natural	207	128	130	146	988	220	356	303	245	378	475	421	482	345	320	360
		pHOS	12%	19%	2%	6%	12%	7%	13%	8%	15%	27%	12%	14%	24%	13%	10%	15%
	Abernathy	Natural	471	254	277	387	959	248	501	314	344	757	686	742	819	520	470	551
		pHOS	12%	18%	2%	7%	12%	7%	13%	8%	15%	28%	9%	14%	24%	13%	10%	15%
	Germany	Natural	164	115	128	164	529	159	228	202	326	301	309	222	392	249	220	267
		pHOS	12%	18%	2%	7%	12%	7%	13%	8%	16%	27%	11%	14%	25%	13%	10%	15%
Cascade	Lower Cowlitz	Natural	5,482	4,316	5,135	6,802	24,544	2,474	4,365	2,674	2,762	3,191	4,740	5,906	4,293	5,899	9,256	3,801
		pHOS	15%	11%	14%	19%	5%	8%	9%	22%	8%	6%	7%	15%	19%	12%	13%	n/a
	Upper Cowlitz/Cispus	Natural	2,774	7,615	1,601	12	6,850	374	911	5,200	172	3,562	8,915	9,666	11,532	4,553	3,770	5,042
		pHOS	94%	77%	74%	100%	87%	84%	96%	73%	99%	79%	74%	81%	52%	82%	86%	80%
	Tilton	Natural	899	1,963	1,270	2,653	8,920	1,362	2,629	5,195	1,321	1,559	2,401	6,399	7,275	3,373	3,141	3,518
		pHOS	85%	84%	87%	78%	55%	72%	80%	69%	84%	89%	91%	76%	56%	77%	78%	77%
	SF Toutle	Natural	1,653	1,180	1,876	2,825	8,364	1,453	2,372	1,165	1,117	2,243	2,418	2,581	2,036	2,406	3,180	1,923
		pHOS	20%	12%	11%	14%	19%	50%	22%	8%	8%	10%	6%	11%	11%	16%	15%	16%
	NF Toutle[2]	Natural	1,408	877	1,203	1,872	4,366	733	1,267	839	895	1,595	1,900	2,188	2,015	1,628	1,945	1,429
		pHOS	53%	52%	53%	54%	51%	53%	59%	51%	50%	56%	51%	51%	56%	53%	53%	53%

Major Population Group	Washington Population	Origin	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total Average	Pre-HCR update (2010-14) Average	Post-HCR update (2015+) Average
	Coweeman	Natural	3,799	3,311	3,200	3,693	6,876	1,238	2,988	2,349	2,518	3,501	4,362	4,541	4,311	3,591	4,176	3,226
		pHOS	9%	5%	4%	13%	16%	18%	15%	11%	26%	25%	15%	20%	9%	14%	9%	18%
	Kalama	Natural	75	46	47	59	150	31	74	64	79	143	245	253	268	118	75	145
		pHOS	96%	90%	85%	85%	90%	88%	64%	58%	63%	51%	74%	76%	61%	75%	89%	67%
	NF Lewis[3]	Natural	2,141	4,327	1,897	1,372	4,780	990	3,303	4,241	2,951	4,392	7,677	4,698	1,461	3,402	2,903	3,714
		pHOS	26%	25%	15%	85%	66%	79%	65%	55%	71%	52%	44%	62%	62%	54%	43%	61%
	EF Lewis	Natural	1,640	1,502	2,617	2,408	3,940	544	1,143	1,463	1,610	2,497	2,653	4,561	4,070	2,358	2,421	2,318
		pHOS	23%	6%	7%	9%	13%	17%	34%	38%	13%	8%	9%	7%	8%	15%	12%	17%
	Salmon Creek	Natural	1,952	1,320	1,421	1,749	4,627	953	2,017	1,660	1,733	2,612	2,808	2,915	2,938	2,208	2,214	2,205
		pHOS	8%	6%	5%	2%	2%	2%	4%	10%	11%	9%	9%	3%	2%	6%	5%	6%
	Washougal	Natural	597	399	386	423	834	151	322	272	302	584	858	860	1,026	540	528	547
		pHOS	40%	11%	12%	33%	68%	61%	72%	75%	70%	55%	61%	17%	39%	47%	33%	n/a
Gorge	Lower Gorge	Natural	555	446	498	631	1,537	340	706	509	555	1,075	1,113	1,344	1,363	821	733	876
		pHOS	24%	12%	15%	23%	27%	13%	7%	15%	20%	26%	9%	6%	20%	17%	20%	15%
	Upper Gorge/ Hood	Natural	40	122	104	112	50	156	88	78	83	128	21	46	n/a	86	86	86
		pHOS	15%	14%	15%	16%	14%	14%	15%	14%	19%	20%	19%	0%	n/a	15%	15%	14%

[1] For example, Mill Creek in 2010 had 207 natural-origin spawners and 12 % hatchery spawners. To calculate hatchery-origin numbers multiply (207/(1-.12))-207) = 28 hatchery-origin spawners.

[2] Natural-origin escapement numbers and proportion of hatchery-origin fish combines the Green River (NF Toutle) coho salmon, the North Fork Toutle River coho salmon, and trap count data.

[3] Natural-origin escapement numbers and proportion of hatchery-origin fish combines the Cedar Creek (NF Lewis) coho salmon and the North Fork Lewis River Mainstem coho salmon.

* Date accessed: August 7, 2023

References

Beamesderfer, R., S. Ellis, J. Jording, C. Kern, C. LeFleur, D. Milward, E. Patiño, A. Rankis, J. Whisler. 2014. Allowable Fishery Impacts to Lower Columbia River Natural Coho. A Review of the 2006 Harvest Control Rule for Possible Policy Reconsideration. Pacific Fishery Management Council Ad Hoc Lower Columbia River Natural Coho Work Group. October 2014.

Kern, J. C., and M. Zimmerman. 2013. Harvest strategy risk assessment for lower Columbia River coho. ODFW and WDFW report to the Pacific Fishery Management Council. Agenda Item C.2.a. Attachment 2. November 2013.

Joint Columbia River Management Staff (JCRMS). 2023. Joint staff report: stock status and fisheries for fall Chinook salmon, Coho salmon, Chum salmon, summer steelhead and White sturgeon. Oregon Department of Fish and Wildlife, Washington Department of Fish and Wildlife. Joint Columbia River Management Staff. July 10, 2023.

McIsaac, D. O. 2015. Letter transmitting the Pacific Fishery Management Council's recommendation for a new Endangered Species Act consultation standard for Lower Columbia River Coho. Letter to W. Stelle, National Marine Fisheries Service, from D.O. McIssac, Executive Director, Pacific Fisheries Marine Council, Portland, OR. January 21, 2015.

National Marine Fisheries Service (NMFS). 2015. Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat (EFH) Consultation. Effects of the Pacific Coast Salmon Plan Fisheries on the Lower Columbia River Coho Evolutionarily Significant Unit Listed Under the Endangered Species Act. Dept. of Comm. NMFS, WCR, Sustainable Fisheries Division. WCR-2015-2026. April 9, 2015.

Pacific Fishery Management Council (PFMC). 2023a. Review of 2022 Ocean Salmon Fisheries: Stock Assessment and Fishery Evaluation Document for the Pacific Coast Salmon Fishery Management Plan. (Document prepared for the Council and its advisory entities.) Pacific Fishery Management Council, 7700 NE Ambassador Place, Suite 101, Portland, Oregon 97220-1384.

PFMC. 2023b. Preseason Report I: Stock Abundance Analysis and Environmental Assessment Part 1 for 2023 Ocean Salmon Fishery Regulations. (Document prepared for the Council and its advisory entities.) Pacific Fishery Management Council, 7700 NE Ambassador Place, Suite 101, Portland, Oregon 97220-1384.