

SALMON TECHNICAL TEAM REPORT 1

*Excerpts from Review of 2019 Ocean Salmon Fisheries and
2020 Preseason Report I*

March 5, 2020

TABLE II-6. Chinook stock status relative to overfished and overfishing criteria. A stock is overfished if the 3-year geometric mean spawning escapement is less than the minimum stock size threshold (MSST); a stock experiences overfishing if the total annual exploitation rate exceeds the maximum fishing mortality threshold (MFMT)

Chinook Stock	Spawning Escapement									Exploitation Rate						
	2014	2015	2016	2017	2018	2019	3-yr Geo Mean	MSST	S _{MSY}	2014	2015	2016	2017	2018	2019	MFMT
Sacramento Fall	212,476	113,468	89,699	43,466	105,531	162,532	90,675	91,500	122,000	0.61	0.55	0.56	0.68	0.53	NA	0.78
Klamath River Fall	95,104	28,112	13,937	19,904	52,352	20,245	27,631	30,525	40,700	0.36	0.59	0.37	0.10	0.28	NA	0.71
Southern Oregon	53,546	30,462	27,278	91,977	39,497	19,426	41,325	20,500	34,992	NA	NA	NA	NA	NA	NA	0.78
Central and Northern OR ^{a/}	157	247	118	114	92	64	88	30 fish/mile	150k-200k	0.44	0.43	0.48	0.46	NA	NA	0.78
Upper River Bright - Fall ^{a/}	233,934	323,276	151,373	96,096	58,540	86,239	78,576	19,182	39,625	0.53	0.40	0.51	0.48	NA	NA	0.86
Upper River - Summer ^{a/}	77,982	88,691	79,253	56,265	38,816	41,090	44,771	6,072	12,143	0.67	0.65	0.63	0.52	NA	NA	0.75
Willapa Bay - Fall ^{b/}	2,075	2,824	1,887	3,078	2,853	NA	2,549	1,696	3,393	0.58	0.48	0.61	0.55	NA	NA	0.78
Grays Harbor Fall ^{b/}	11,893	17,305	11,248	17,145	20,741	NA	15,874	5,694	13,326	0.58	0.48	0.61	0.55	NA	NA	0.78
Grays Harbor Spring	1,583	1,841	926	1,384	493	1,185	932	546	1,400	NA	NA	NA	NA	NA	NA	0.78
Queets - Fall ^{b/}	3,820	5,313	2,915	2,702	2,095	NA	2,546	1,250	2,500	0.58	0.48	0.61	0.55	NA	NA	0.87
Queets - Sp/Su	377	532	704	825	484	NA	655	350	700	NA	NA	NA	NA	NA	NA	0.78
Hoh - Fall ^{b/}	1,933	1,795	2,831	1,808	2,478	NA	2,332	600	1,200	0.58	0.48	0.61	0.55	NA	NA	0.90
Hoh Sp/Su	744	1,070	1,144	1,364	793	NA	1,074	450	900	NA	NA	NA	NA	NA	NA	0.78
Quillayute - Fall ^{b/}	2,782	3,440	3,654	3,604	3,937	7,256	4,687	1,500	3,000	0.58	0.48	0.61	0.55	NA	NA	0.87
Quillayute - Sp/Su	625	783	871	1,097	990	1,015	1,033	600	1,200	NA	NA	NA	NA	NA	NA	0.78
Hoko -Su/Fa ^{a/}	1,760	2,877	1,324	1,188	2,062	1,815	1,644	425	850	0.42	0.30	0.28	0.27	NA	NA	0.78

a/ CWT based exploitation rates from PSC-CTC 2019 Exploitation Rate Analysis and Model Calibration.

b/ Queets River fall Chinook coded-wire-tag (CWT) exploitation rates used as a proxy. Exploitation rates in the terminal fisheries will differ from those calculated for Queets fall CWTs.

TABLE III-7. Coho stock status relative to overfished and overfishing criteria. A stock is overfished if the 3-year geometric mean spawning escapement is less than the minimum stock size threshold (MSST); a stock experiences overfishing if the total annual exploitation rate exceeds the maximum fishing mortality threshold (MFMT).

Coho Stock	Escapement									Exploitation Rate						
	2014	2015	2016	2017	2018	2019	3-yr Geo		S _{MSY}	2014	2015	2016	2017	2018	2019	MFMT
							Mean	MSST								
Willapa Bay	59,569	17,086	30,667	10,878	14,920	NA	17,074	8,600	17,200	0.51	0.44	0.38	0.33	NA	NA	0.74
Grays Harbor	105,039	21,278	38,595	26,907	49,622	NA	37,213	18,320	24,426	0.45	0.49	0.11	0.32	NA	NA	0.65
Queets	7,558	2,028	5,156	5,232	2,631	NA	4,140	4,350	5,800	0.41	0.26	0.15	0.23	NA	NA	0.65
Hoh	4,565	1,794	5,009	4,478	2,463	NA	3,809	1,890	2,520	0.52	0.39	0.07	0.43	NA	NA	0.65
Quillayute Fall	7,425	2,571	9,630	7,474	6,091	6,506	6,666	4,725	6,300	0.58	0.48	0.18	0.42	NA	NA	0.59
Juan de Fuca	11,488	3,859	8,435	5,530	5,470	NA	6,343	7,000	11,000	0.17	0.18	0.03	0.05	NA	NA	0.60
Hood Canal	26,787	26,926	24,313	23,283	NA	NA	24,794	10,750	14,350	0.68	0.59	0.40	0.35	NA	NA	0.65
Skagit	24,820	5,794	35,822	20,184	19,047	NA	23,970	14,875	25,000	0.52	0.63	0.20	0.09	NA	NA	0.60
Stillaguamish	35,829	2,914	13,048	6,099	23,937	NA	12,396	6,100	10,000	0.27	0.48	0.16	0.12	NA	NA	0.50
Snohomish	46,244	12,804	44,141	18,195	58,135	NA	36,009	31,000	50,000	0.31	0.55	0.18	0.21	NA	NA	0.60

TABLE I-1. Preseason adult Chinook salmon stock forecasts in thousands of fish. (Page 1 of 3)

Production Source and Stock or Stock Group	Preseason Abundance Forecasts						Methodology for 2020 Prediction and Source
	2015	2016	2017	2018	2019	2020	
Sacramento River							
Fall (Sacramento Index)	652.0	299.6	230.7	229.4	379.6	473.2	Log-log regression of the Sacramento Index on jack escapement from the previous year, accounting for lag-1 autocorrelated errors. STT.
Winter (age-3 absent fishing)	--	--	--	1.6	1.9	3.1	Stochastic life cycle model applied to natural- and hatchery-origin production. STT.
Klamath River (Ocean Abundance)							
Fall	423.8	142.2	54.2	359.2	274.2	186.6	Linear regression analysis of age-specific ocean abundance estimates on river runs of same cohort. STT.
Oregon Coast							
North and South/Local Migrating	--	--	--	--	--	--	None.
Columbia River (Ocean Escapement)							
Cowlitz Spring	11.2	25.1	17.1	5.2	1.3	1.4	Age-specific linear regressions of cohort returns in previous run years. WDFW.
Kalama Spring	1.9	4.9	3.1	1.5	1.4	1.0	Age-specific linear regressions of cohort returns in previous run years. WDFW.
Lewis Spring	1.1	1.0	0.7	3.7	1.5	1.4	Age-specific linear regressions of cohort returns in previous run years. WDFW.
Willamette Spring	55.4	68.7	38.1	53.8	40.2	40.8	Age-specific linear regressions of cohort returns in previous run years. ODFW. Forecast includes adult fish only.
Sandy Spring	5.5	NA	3.6	5.3	5.5	5.2	Recent 3-year average. ODFW.
Upriver Spring ^{a/}	232.5	188.8	160.4	166.7	99.3	81.7	Log-linear sibling regressions of cohort returns in previous run years.
Upriver Summer ^{b/}	73.0	93.3	63.1	67.3	35.9	38.3	Log-linear sibling regressions or average return (4-ocean fish). Columbia River TAC subgroup.
LRW Fall	18.9	22.2	12.5	7.6	13.7	19.7	Columbia River Fall Chinook: Age-specific average cohort ratios or sibling regressions. Columbia River TAC subgroup and WDFW.
LRH Fall	94.9	133.7	92.4	62.4	54.5	51.0	
SCH Fall	160.5	89.6	158.4	50.1	46.0	46.2	
MCB Fall	113.3	101.0	45.6	36.4	56.7	71.8	
URB Fall	500.3	589.0	260.0	200.1	158.4	233.4	

TABLE I-1. Preseason adult Chinook salmon stock forecasts in thousands of fish. (Page 2 of 3)

Production Source and Stock or Stock Group		Preseason Abundance Forecasts						Methodology for 2020 Prediction and Source
		2015	2016	2017	2018	2019	2020	
Washington Coast								
Willapa Bay Fall	Natural	3.8	3.3	4.2	3.8	4.3	2.9	Return per spawners applied to 3-6 year olds (brood years 2014-17) adjusted by brood year performance.
	Hatchery	31.0	36.2	34.3	40.3	23.6	28.3	
Grays Harbor Fall	Natural	--	--	--	16.4	18.0	NA	Past year based on a 4-year average recruits for age-3, and recruits per spawner adjusted by brood performance for age-4, 5, 6.
	Hatchery	--	--	--	4.8	7.7	NA	Past year based on a 10-year average recruits per spawn for age 3 and log linear regressions for age-4 on Age-2 and 3; age-5 on age-2, 3, and 4 for all stocks; and age- 6 on age-5.
Quinault Spring/Summer	Natural	NA	NA	NA	NA	NA	NA	
	Hatchery	--	--	--	4.8	NA	NA	
Quinault Fall	Natural	8.1	5.5	5.9	5.2	5.3	NA	
	Hatchery	4.0	5.3	4.4	3.1	2.7	NA	
Queets Spring/Sum Queets Fall	Natural	0.4	0.5	0.5	0.5	0.6	NA	
	Natural	4.3	4.9	3.7	3.3	3.4	NA	
	Hatchery	1.5	1.7	0.9	0.6	0.8	NA	
Hoh Spring/Summer Hoh Fall	Natural	0.8	0.9	1.0	1.1	1.0	0.8	Recent 3 year mean adjusted by previous performance.
	Natural	2.6	1.8	2.7	2.6	2.5	2.6	Recent 3 year mean adjusted by previous performance, age 4 & 5 adjusted by regressions.
Quillayute Spring	Hatchery	1.7	1.8	2.2	2.1	2.1	2.4	Spring: Recent 5 year mean adjusted by previous performance.
Quillayute Sum/Fall	Natural	8.5	7.5	7.6	8.0	7.9	9.8	Summer: Recent 5 year mean for all ages. Fall: Recent 3 year means; adjusted for previous 5 year forecast performance.
Hoko ^d	Natural	3.3	2.9	1.5	1.5	2.8	2.6	Escapement without fishing, includes supplemental. 2019 recruits for age-3 is recent 5-year average return, age 4-6 is sibling regression.
North Coast Totals								
Spring/Summer	Natural	1.2	1.4	1.5	1.6	1.7	NA	
Fall	Natural	23.5	19.7	19.9	19.1	19.2	NA	
Spring/Summer	Hatchery	1.7	1.8	2.2	2.1	2.1	2.4	
Fall	Hatchery	5.5	7.0	5.3	3.7	3.5	NA	

TABLE I-1. Preseason adult Chinook salmon stock forecasts in thousands of fish. (Page 3 of 3)

Production Source and Stock or Stock Group		Preseason Abundance Forecasts						Methodology for 2020 Prediction and Source
		2015	2016	2017	2018	2019	2020	
Puget Sound summer/fall^{d/}								
Nooksack/Samish	Hatchery	38.6	27.9	21.2	24.6	21.3	18.2	Three year average return rate.
East Sound Bay	Hatchery	1.2	0.7	0.8	0.7	0.3	0.3	Three year average return rate.
Skagit	Natural	11.8	15.1	15.8	13.3	13.6	12.9	<u>Natural</u> : Hierarchical Bayesian model to estimate the spawner-recruit dynamics. <u>Hatchery</u> : Recent 4-year average terminal smolt to adult return rate to estimate ages 2 -5.
	Hatchery	0.6	0.4	0.4	0.3	0.3	0.5	
Stillaquamish ^{e/}	Natural	0.5	0.5	1.5	1.6	0.9	0.9	Natural plus hatchery terminal run. Multiple regression environmental model (EMPAR).
Snohomish ^{e/}	Natural	4.2	3.3	3.4	3.5	3.2	3.0	<u>Natural</u> : Multiple regression environmental model (EMPAR). <u>Hatchery</u> : Extreme Terminal Run (to mouth of Snohomish River), with ocean fishing, recent 3-year geomean of total return broken out into returns from fingerling and yearling releases and age at return.
	Hatchery	3.3	5.0	4.8	6.5	7.0	6.8	
Tulalip ^{e/}	Hatchery	1.3	1.4	5.3	7.5	12.5	6.0	Three year geomean.
South Puget Sound	Natural	3.8	4.5	4.7	4.8	8.4	5.8	<u>Natural</u> : Puyallup, climate relationship for age 3, and 5 year average return per spawner applied to brood years contributing to ages 4-5. Nisqually, 5 year average age specific return/spawner for ages 3 and 5, sibling relationship for age 4. Green, 3-year geometric return rates. <u>Hatchery</u> : Variety of recent year average return rates and sibling relationships.
	Hatchery	62.4	43.1	80.4	123.6	99.9	100.7	
Hood Canal	Natural	3.1	2.3	2.5	3.9	1.2	4.6	<u>Natural</u> : proportioned using the Hood Canal terminal run reconstruction-based relative contribution of the individual Hood Canal management units in the 2015-2019 return years. Area 12B returns derived from applying an average proportion of natural origin recruits returning to area 12B during 2016-2019.
	Hatchery	59	42.7	48.3	57.6	66.0	67.6	
Strait of Juan de Fuca Including Dungeness spring run	Natural	4.9	3.7	3.1	6.0	8.3	5.0	Natural and hatchery. Dungeness and Elwha hatchery estimated by recent return rates times average releases. Dungeness wild estimated by smolts times average hatchery return rate. Elwha wild estimated using 9 year hatchery/wild breakouts from otolith and CWT.

a/ Since 2005, the upriver spring Chinook run includes Snake River summer Chinook.

b/ Since 2005, the upriver summer Chinook run includes only upper Columbia summer Chinook, and not Snake River summer Chinook.

c/ Expected spawning escapement without fishing.

d/ Unless otherwise noted, Puget Sounds forecasts are in units of terminal run size.

e/ Includes a mixture of runsize types including escapement without fishing and terminal run. 2020 values are terminal runsize.

TABLE I-2. Preseason adult coho salmon stock forecasts in thousands of fish. (Page 1 of 2)

Production Source and Stock or Stock Group		Preseason Ocean Abundance Forecasts						Methodology for 2020 Prediction and Source
		2015	2016	2017	2018	2019	2020	
OPI Area Total Abundance (California, Oregon Coasts, and Columbia River)		1,015.0	549.2	496.2	349.0	1,009.6	268.7	Abundance of all OPI components based on cohort reconstruction including all fishery impacts using Mixed Stock Model (MSM); prior to 2008 only fishery impacts south of Leadbetter Point were used (traditional OPI accounting). OPITT, see Chapter III for details.
OPI Public	Hatchery	808.4	396.5	394.3	294.1	933.5	185.7	OPIH: Columbia River jacks adjusted for delayed smolt releases and total OPI jacks regressed on 1970-2019 adults. Columbia/Coastal proportions based on jacks; Columbia early/late proportions based on jacks; Coastal N/S proportions based on smolts.
Columbia River Early		515.2	153.7	231.7	164.7	545.0	130.7	
Columbia River Late		261.8	226.9	154.6	121.5	360.6	50.3	
Coastal N. of Cape Blanco		6.9	5.5	3.5	3.3	12.0	2.4	
Coastal S. of Cape Blanco		24.4	10.4	4.5	4.6	15.9	2.3	
Lower Columbia River	Natural	35.9	40.0	30.1	21.9	36.9	24.6	Oregon: recent two year average return; Washington: natural smolt production multiplied by 2017 brood marine survival rate. Abundance is subset of early/late hatchery abundance above.
Oregon Coast (OCN)	Natural	206.6	152.7	101.9	54.9	76.1	83.0	Rivers: Generalized additive model (GAM) relating ocean recruits to parental spawners and marine environmental variables. See text in Chapter III for details. Lakes: recent three year average abundance.
Washington Coast								
Willapa	Natural	42.9	39.5	36.7	20.6	63.4	17.9	Washington Coast stocks: A variety of methods were used for 2020, primarily based on smolt production and survival. See text in Chapter III for details.
	Hatchery	57.7	28.1	55.0	44.5	94.0	51.8	
Grays Harbor	Natural	142.6	35.7	50.0	42.4	71.5	50.0	
	Hatchery	46.6	22.9	36.4	51.4	64.3	42.3	
Quinault	Natural	44.2	17.1	26.3	25.4	13.9	17.5	
	Hatchery	24.9	19.8	29.4	29.6	26.9	27.0	
Queets	Natural	7.5	3.5	6.5	7.0	11.1	7.8	
	Hatchery	11.3	4.5	13.7	10.8	13.2	10.9	
Hoh	Natural	5.1	2.1	6.2	5.8	7.0	4.2	

TABLE I-2. Preseason adult coho salmon stock forecasts in thousands of fish. (Page 2 of 2)

Production Source and Stock or Stock Group		Preseason Ocean Abundance Forecasts						Methodology for 2020 Prediction and Source	
		2015	2016	2017	2018	2019	2020		
Quillayute Fall	Natural	10.5	4.5	15.8	10.6	14.7	9.2	For all Washington Coast stocks: A variety of methods were used for 2020, primarily based on smolt production and survival. See text in Chapter III for details.	
	Hatchery	8.0	6.4	17.6	16.5	17.0	13.0		
Quillayute Summer	Natural	1.2	0.3	1.5	2.7	1.2	0.8		
	Hatchery	2.2	1.4	3.4	3.3	3.4	3.4		
North Coast Independent Tributaries	Natural	11.7	1.9	6.5	4.1	8.1	5.1		
	Hatchery	11.9	2.5	0.2	7.9	12.5	1.3		
<i>WA Coast Total</i>	<i>Natural</i>	<i>265.6</i>	<i>104.6</i>	<i>149.5</i>	<i>118.7</i>	<i>191.0</i>	<i>112.4</i>		
	<i>Hatchery</i>	<i>162.6</i>	<i>85.6</i>	<i>155.6</i>	<i>164.1</i>	<i>231.3</i>	<i>149.6</i>		
Puget Sound									
Strait of Juan de Fuca	Natural	11.1	4.4	13.1	7.2	8.8	7.5		For all Puget Sound stocks: A variety of methods were used for 2020, primarily based on smolt production and survival. See text in Chapter III and Joint WDFW and tribal annual reports on Puget Sound Coho Salmon Forecast Methodology for details.
	Hatchery	11.1	3.9	15.4	10.6	16.8	20.6		
Nooksack-Samish	Natural	28.1	9.0	13.2	20.6	25.1	15.4		
	Hatchery	50.8	28.8	45.6	61.3	59.8	42.5		
Skagit	Natural	121.4	8.9	11.2	59.2	57.9	31.0		
	Hatchery	19.5	4.9	7.6	13.1	9.9	18.2		
Stillaguamish	Natural	31.3	2.8	7.6	19.0	23.8	19.5		
	Hatchery	0.0	0.0	1.5	0.0	2.2	2.3		
Snohomish	Natural	151.5	20.6	107.3	65.9	62.6	39.0		
	Hatchery	53.9	16.7	62.0	38.3	43.7	26.6		
South Sound	Natural	63.0	9.9	20.2	15.0	30.4	7.3		
	Hatchery	180.2	27.1	102.4	103.0	180.4	164.0		
Hood Canal	Natural	61.5	35.3	115.6	59.5	40.1	35.0		
	Hatchery	108.4	83.5	74.9	84.5	87.9	72.2		
<i>Puget Sound Total</i>	<i>Natural</i>	<i>467.9</i>	<i>91.0</i>	<i>288.3</i>	<i>246.4</i>	<i>248.8</i>	<i>154.6</i>		
	<i>Hatchery</i>	<i>423.9</i>	<i>165.0</i>	<i>309.3</i>	<i>310.8</i>	<i>400.7</i>	<i>346.3</i>		

TABLE V-4. Stock status relative to overfished and overfishing criteria. A stock is approaching an overfished condition if the 3-year geometric mean of the most recent two years and the forecast spawning escapement is less than the minimum stock size threshold (MSST); a stock would experience overfishing if the total annual exploitation rate exceeds the maximum fishing mortality threshold (MFMT). Occurrences of stocks *at risk of* approaching an overfished condition or experiencing overfishing are indicated in **bold**. 2020 spawning escapement and exploitation rate estimates are based on preliminary 2020 preseason abundance forecasts and 2019 Council regulations.

	Estimated Adult Spawning Escapement									Total Exploitation Rate						
	2015	2016	2017	2018	2019 ^{a/}	Forecast 2020 ^{b/}	3-yr Geo Mean	MSST	S _{MEY}	2015	2016	2017	2018	2019 ^{a/}	2020 ^{b/}	MFMT
	Chinook															
Sacramento Fall	113,468	89,699	43,466	105,531	162,532	199,616	150,720	91,500	122,000	0.55	0.56	0.68	0.53	0.68	0.58	0.78
Klamath River Fall	28,112	13,937	19,904	52,352	20,245	24,178	29,482	30,525	40,700	0.59	0.37	0.10	0.28	0.42	0.50	0.71
Southern Oregon ^{c/}	30,462	27,278	91,977	39,497	19,426	NA	41,325	20,500	34,992	NA	NA	NA	NA	NA	NA	0.54
Central and Northern OR	247	118	114	92	64	NA	88	30 fish/mi	60 fish/mi	0.43	0.48	0.46	NA	NA	NA	0.78
Upper River Bright - Fall ^{d/}	323,276	151,373	96,096	58,540	77,880	96,000	75,925	19,182	39,625	0.40	0.51	0.48	NA	NA	NA	0.86
Upper River - Summer ^{d/}	88,691	79,253	56,265	38,816	41,090	35,800	38,507	6,072	12,143	0.65	0.63	0.52	NA	NA	NA	0.75
Willapa Bay - Fall ^{e/}	2,824	1,887	3,078	2,853	NA	NA	2,549	1,696	3,393	0.48	0.61	0.55	NA	NA	NA	0.78
Grays Harbor Fall ^{e/}	17,305	11,248	17,145	20,741	NA	NA	15,874	5,694	13,326	0.48	0.61	0.55	NA	NA	NA	0.78
Grays Harbor Spring	1,841	926	1,384	493	1,185	NA	932	700	1,400	NA	NA	NA	NA	NA	NA	0.78
Queets - Fall ^{d/}	5,313	2,915	2,702	2,095	NA	NA	2,546	1,250	2,500	0.48	0.61	0.55	NA	NA	NA	0.87
Queets - Sp/Su	532	704	825	484	NA	NA	655	350	700	NA	NA	NA	NA	NA	NA	0.78
Hoh - Fall ^{e/}	1,795	2,831	1,808	2,478	NA	NA	2,332	600	1,200	0.48	0.61	0.55	NA	NA	NA	0.90
Hoh Sp/Su	1,070	1,144	1,364	793	NA	NA	1,074	450	900	NA	NA	NA	NA	NA	NA	0.78
Quillayute - Fall ^{e/}	3,440	3,654	3,604	3,937	7,256	NA	4,687	1,500	3,000	0.48	0.61	0.55	NA	NA	NA	0.87
Quillayute - Sp/Su	783	871	1,097	990	1,015	NA	1,033	600	1,200	NA	NA	NA	NA	NA	NA	0.78
Hoko -Su/Fa ^{d/}	2,877	1,324	1,188	2,062	1,815	NA	1,644	425	850	0.30	0.28	0.27	NA	NA	NA	0.78
Coho																
Willapa Bay	17,086	30,667	10,878	14,920	NA	NA	17,074	8,600	17,200	0.44	0.38	0.33	0.31	NA	NA	0.74
Grays Harbor	21,278	38,595	26,907	49,622	NA	NA	37,213	18,320	24,426	0.49	0.12	0.32	0.22	NA	NA	0.65
Queets	2,028	5,156	5,232	2,631	NA	NA	4,140	4,350	5,800	0.26	0.15	0.23	0.24	NA	NA	0.65
Hoh	1,794	5,009	4,478	2,463	NA	NA	3,809	1,890	2,520	0.39	0.08	0.43	0.34	NA	NA	0.65
Quillayute Fall	2,571	9,630	7,474	6,091	6,506	NA	6,666	4,725	6,300	0.47	0.18	0.42	0.30	NA	NA	0.59
Juan de Fuca	3,859	8,435	5,530	5,470	NA	NA	6,343	7,000	11,000	0.18	0.03	0.06	0.08	NA	NA	0.60
Hood Canal	26,926	24,313	23,283	NA	NA	NA	24,794	10,750	14,350	0.59	0.40	0.35	0.57	NA	NA	0.65
Skagit	5,794	35,822	20,184	19,047	NA	NA	23,970	14,875	25,000	0.63	0.20	0.09	0.49	NA	NA	0.60
Stillaguamish	2,914	13,048	6,099	23,937	NA	NA	12,396	6,100	10,000	0.48	0.16	0.12	0.22	NA	NA	0.50
Snohomish	12,804	44,141	18,195	58,135	NA	NA	36,009	31,000	50,000	0.55	0.18	0.21	0.25	NA	NA	0.60

a/ Preliminary.

b/ Preliminary approximations based on preseason forecasts and the previous year fishing regulations.

c/ MSST 18,440 (20,500 as measured at Huntley Park).

d/ CWT based exploitation rates from PSC-CTC 2019 Exploitation Rate Analysis and Model Calibration.

e/ Queets River fall Chinook CWT exploitation rates used as a proxy. Exploitation rates in the terminal fisheries will differ from those calculated for Queets fall CWTs.

TABLE V-5. Postseason S_{ACL} , S_{OFL} , and spawner escapement estimates for Sacramento River fall Chinook (SRFC), Klamath River fall Chinook (KRFC) and Willapa Bay coho. For the current year, S_{ACL} and S_{OFL} are preseason values. Current year spawner escapements are preseason values based on current abundance forecasts and the previous year fishing regulations.

Year	SRFC			KRFC			Willapa Bay Coho		
	$S_{ACL}^{a/}$	S_{OFL}	Escapement ^{b/}	$S_{ACL}^{a/}$	S_{OFL}	Escapement ^{c/}	$S_{ACL}^{a/}$	S_{OFL}	Escapement ^{c/}
2012	188,378	138,144	285,429	70,922	64,273	121,543	--	--	--
2013	260,798	191,251	406,846	52,032	47,154	59,156	--	--	--
2014	165,355	121,260	212,476	47,674	43,205	95,104	--	--	--
2015	76,485	56,089	113,468	22,202	20,120	28,112	9,183	7,958	17,086
2016	61,595	45,170	89,699	7,056	6,394	13,937	14,780	12,810	30,667
2017	40,860	29,964	43,466	7,114	6,447	19,904	6,189	5,364	10,878
2018	66,115	48,484	105,531	24,470	22,176	52,352	7,888	6,836	14,920
2019	151,661	111,218	162,532	11,079	10,041	20,245	NA	NA	NA
2020	141,955	104,100	199,616	15,448	13,999	24,178	9,860	8,546	NA

a/ $S_{ACI} = S_{AFC}$

b/ Hatchery and natural area adult spawners.

c/ Natural area adult spawners.

TABLE V-6. Comparison of projected ocean escapements and exploitation rates for critical natural and Columbia River hatchery coho stocks (thousands of fish) resulting from application of 2019 Council-adopted regulations to 2019 and 2020 ocean abundance forecasts.^{a/}

Stock	Ocean Escapement and ER Estimates Under 2019 Regulations ^{b/}					2020 FMP Conservation Objective ^{d/}
	2019 Abundance Forecasts		2020 Abundance Forecasts ^{c/}			
	Ocean Escapement	Exploitation Rate	Ocean Escapement	Exploitation Rate		
Natural Coho Stocks						
Skagit	54.2	32.5%	NA	NA		Exploitation Rate $\leq 35.0\%$ ^{e/}
Stillaguamish	22.8	22.5%	NA	NA		Exploitation Rate $\leq 35.0\%$ ^{e/}
Snohomish	59.8	19.4%	NA	NA		Exploitation Rate $\leq 20.0\%$ ^{e/}
Hood Canal	37.2	44.3%	NA	NA		Exploitation Rate $\leq 45.0\%$ ^{e/}
Strait of Juan de Fuca	8.3	8.9%	NA	NA		Exploitation Rate $\leq 20.0\%$ ^{e/}
Quillayute Fall	13.7	50.8%	NA	NA		6.3 - 15.8 Spawners
Hoh	5.8	54.6%	NA	NA		2.0 - 5.0 Spawners
Queets	9.1	39.9%	NA	NA		5.8 - 14.5 Spawners
Grays Harbor	65.9	42.1%	NA	NA		35.4 Spawners
LCN	31.4	18.0%	NA	NA		Exploitation Rate $\leq 18.0\%$ ^{f/}
OCN	66.0	13.7%	NA	NA		Exploitation Rate $\leq 15.0\%$ ^{f/}
R/K	12.5	5.8%	NA	NA		Exploitation Rate $\leq 13.0\%$ ^{f/}
Hatchery Coho Stocks						
Columbia Early	340.5	58.8%	NA	NA		6.2 Hatchery Escapement
Columbia Late	213.3	52.2%	NA	NA		14.2 Hatchery Escapement

a/ Quota levels include harvest and hooking mortality estimates used in planning the Council's 2019 ocean fisheries and a coho catch for the Canadian troll fishery off the West Coast of Vancouver Island (WCVI).

b/ 2019 preseason regulations with the following coho quotas: U.S. Canada Border to Cape Falcon: Treaty Indian troll-55,000; non-Indian troll-30,400 selective; recreational-159,600 selective; Cape Falcon to OR/CA border: recreational-90,000 selective and 9,000 non-selective; troll-none. Ocean escapement is generally the estimated number of coho escaping ocean fisheries and entering freshwater. For Puget Sound stocks, ocean escapement is the total abundance minus ocean fisheries (ie outside Puget Sound). For the OCN coho stock, this value represents the estimated spawner escapement in SRS accounting. For Columbia R. hatchery and LCN stocks, ocean escapement represents the number of coho after the Buoy 10 fishery; the LCN exploitation rates shown are total marine and mainstem Columbia R. fishery ERs.

c/ Analysis of 2019 preseason regulations combined with the much lower abundance forecasts for 2020 was beyond the capability of the FRAM model. For all stocks, substantially lower ocean escapement estimates and higher exploitation rates compared with 2019 abundances would be expected with 2020 forecast abundance.

d/ Goals represent FMP conservation objectives, ESA consultation standards, or hatchery escapement needs. Spawning escapement goals are not directly comparable to ocean escapement because the latter occur before inside fisheries.

e/ Assumed exploitation rate based on preliminary abundance forecasts.

f/ Pending confirmation of 2020 ESA consultation standard.

1.1 STT Concerns

At the September 2019 Council meeting, the Council approved three topics for methodology review, one of which was to “examine the data and models used to forecast impacts on Upper Columbia River summer Chinook to determine whether a change in methodology is warranted.” After a thorough investigation, the Model Evaluation Workgroup (MEW) presented its findings to the STT and Scientific and Statistical Committee (SSC) Salmon Subcommittee during an October 22, 2019 webinar. The MEW recommended that no formal methodology review was required, but identified three data input corrections that would help to improve the model representation of the Upper Columbia River summer Chinook stock.

At the November 2019 Council meeting, the Council agreed with the MEW’s findings and directed that “any needed data input changes would be made in time for the 2020 preseason process.” At that time it was understood that these data input changes would come in the form of a new Chinook FRAM base period calibration that was scheduled for completion and implementation prior to the 2020 preseason process.

Due to other developments, however, this updated base period calibration will not be available for the 2020 preseason. The STT is concerned that, in the absence of this updated base period, use of the existing model base period for the 2020 preseason will continue to result in over-representation of the Upper Columbia River summer Chinook stock in both Council area fisheries and other fisheries along the coast. Consequently, this would also result in the underestimation of impacts to other stocks that are encountered in these fisheries, some of which are ESA listed.