

SALMON TECHNICAL TEAM

*EXCERPTS FROM:*  
**PRESEASON REPORT I**  
**STOCK ABUNDANCE ANALYSIS**  
**AND**  
**ENVIRONMENTAL ASSESSMENT PART 1**  
**FOR 2016 OCEAN SALMON FISHERY**  
**REGULATIONS**

Full document available on the Council website: <http://www.pcouncil.org>

March 1, 2016

This material is excerpted from the second report in an annual series of four reports prepared by the Salmon Technical Team (STT) of the Pacific Fishery Management Council (Council) to document and help guide salmon fishery management off the coasts of Washington, Oregon, and California. The full report focuses on Chinook, coho, and pink salmon stocks that have been important in determining Council fisheries in recent years, and on stocks listed under the Endangered Species Act (ESA) with established National Marine Fisheries Service (NMFS) ESA consultation standards. The full report is available on the Council's web page and will be formally reviewed at the Council's March 2016 meeting.

## *STT Concerns*

### **Ocean Conditions and Preseason Stock Abundance Forecasts**

The abundance of most coho stocks, as well as southern fall Chinook stocks (Sacramento and Klamath), came in well below preseason forecasts in 2015. This pattern of over-predicting abundance for many stocks also occurred during the strong El Niño events of 1982-1983 and 1997-1998. We are currently experiencing another very strong El Niño that in some ways is comparable to those well-described events. Sea surface temperature anomalies indicate exceptionally warm conditions over much of the northeast Pacific over the past two years. In their State of the California Current report for 2016, the California Current Ecosystem Assessment team described several phenomena that can be viewed as unfavorable to salmon. These include low biomass of northern copepods, low biomass of forage fishes such as sardines and anchovies, and recent large-scale mortality events for common murrelets, California sea lions, and other marine mammals. While local scale ocean conditions may affect individual salmon stocks differently, these large scale indicators suggest relatively unproductive conditions in the California Current. Given the incidence of over-forecasting abundance for many stocks in 2015, and the apparent continuation of unproductive ocean conditions, the STT is concerned that abundance forecasts presented in this report may prove to be optimistic.

### **Sacramento River Winter Chinook Allowable Impact Rate**

There are several indicators suggesting that the 2014 and 2015 broods of Sacramento River winter Chinook (SRWC) have very low abundance. Largely due to drought conditions, the estimated egg-to-fry survival rates for the natural-origin component of these broods were the two lowest ever observed. A strong El Niño is currently underway, sea surface temperatures have been anomalously warm off the central California coast since the spring of 2014, and the coastal ocean has been relatively unproductive. The 2014 and 2015 broods will be contacted by 2016 ocean salmon fisheries, with the 2014 brood recruited to the fishery as age-3 fish. Fishery management for SRWC is currently guided by a control rule that specifies a maximum allowable age-3 impact rate as a function of the geometric mean of the previous three years of escapement. Because of the retrospective nature of the control rule, the STT is concerned it will not be responsive to the apparent rapid and substantial decline in SRWC abundance.

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

Production Source and Stock or Stock Group	2008	2009	2010	2011	2012	2013	2014	2015	2016	Methodology for 2016 Prediction and Source
<b>Sacramento Index</b>										
Fall	54.6 <sup>a/</sup>	122.2	245.5	729.9	819.4	834.2	634.7	652.0	299.6	Log-log regression of the Sacramento Index on jack escapement from the previous year, accounting for lag-1 autocorrelated errors. STT.
<b>Klamath River (Ocean Abundance)</b>										
Fall	190.7	505.7	331.5	371.1	1,651.8	727.7	299.3	423.8	142.2	Linear regression analysis of age-specific ocean abundance estimates on river runs of same cohort. STT.
<b>Oregon Coast</b>										
North and South/Local Migrating										None.
<b>Columbia River (Ocean Escapement)</b>										
Upriver Spring <sup>b/</sup>	269.3	298.9	470.0	198.4	314.2	141.4	227.0	232.5	188.8	Log-normal sibling regressions of cohort returns in previous run years. WDFW staff.
Willamette Spring	34.0	37.6	62.7	104.1	83.4	59.8	58.7	55.4	70.1	Age-specific linear regressions of cohort returns in previous run years. ODFW staff.
Sandy Spring	6.8	5.2	3.7	5.5	4.8	6.1	5.5	5.5	NA	
Cowlitz Spring	5.2	4.1	12.5	6.6	8.7	5.5	7.8	11.2	25.1	Age-specific linear regressions of cohort returns in previous run years. WDFW.
Kalama Spring	3.7	0.9	0.9	0.6	0.7	0.7	0.5	1.9	4.9	Age-specific linear regressions of cohort returns in previous run years. WDFW.
Lewis Spring	3.5	2.2	6.0	3.4	2.7	1.6	1.1	1.1	1.0	Age-specific linear regressions of cohort returns in previous run years. WDFW.
Upriver Summer	52.0	70.7	88.8	91.9	91.2	73.5	67.5	73.0	93.3	Log-linear brood year sibling regressions or average return (4-ocean fish). Columbia River TAC subgroup and WDFW.
URB Fall	162.5	259.9	310.8	398.2	353.5	432.5	973.3	500.3	589.0	Age-specific average cohort ratios or brood year sibling regressions. Columbia River TAC subgroup and WDFW.
SCH Fall	87.2	59.3	169.0	116.4	63.8	38.0	115.1	160.5	89.6	Age-specific average cohort ratios or brood year sibling regressions. Columbia River TAC subgroup and WDFW.
LRW Fall	3.8	8.5	9.7	12.5	16.2	14.2	34.2	18.9	22.2	Age-specific average cohort ratios or brood year sibling regressions. Columbia River TAC subgroup and WDFW.
LRH Fall	59.0	88.8	90.6	133.5	127.0	88.0	110.0	94.9	133.7	Age-specific average cohort ratios or brood year sibling regressions. Columbia River TAC subgroup and WDFW.
MCB Fall	54.0	94.5	72.6	100.0	90.8	105.2	360.1	113.3	101.0	Age-specific average cohort ratios or brood year sibling regressions. Columbia River TAC subgroup and WDFW.

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

Production Source and Stock or Stock Group		2008	2009	2010	2011	2012	2013	2014	2015	2016	Methodology for 2016 Prediction and Source
Willapa Bay Fall	Natural	2.5	2.0	2.0	2.0	5.2	4.9	2.9	3.8	3.3	Return per spawners applied to 3-6 year olds (brood years 2010-13) adjusted by brood year performance.
	Hatchery	27.0	34.8	31.1	31.1	40.5	22.2	29.5	31.0	36.2	
Quinalt Fall	Natural	3.7	6.9	7.6	5.9	7.7	4.0	6.0	NA	NA	
	Hatchery	1.3	7.8	5.5	4.7	3.8	3.1	10.3	NA	NA	
Queets Spring/Sum	Natural	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	NA	
	Queets Fall	Natural	3.5	4.5	4.1	2.7	5.8	3.8	3.6	4.3	
	Hatchery	7.0	1.2	9.8	1.9	1.8	0.9	0.9	1.5	NA	
Hoh Spring/Summer	Natural	0.9	1.1	0.8	1.0	1.0	0.9	0.9	0.8	0.9	Spawner/Recruit all years geometric mean for each age class
Hoh Fall	Natural	2.9	2.6	3.3	2.9	2.7	3.1	2.5	2.6	1.8	Spawner/Recruit of recent 3 years adjusted by previous brood performance for all ages
Quillayute Spring	Hatchery	1.7	2.0	1.5	1.4	1.5	2.1	2.0	1.7	1.8	Recent 2 year mean adjusted by previous performance.
Quillayute Sum/Fall	Natural	6.0	6.8	7.5	8.8	7.4	6.6	7.6	8.5	7.5	Summer: Recent 5 year mean for all ages except age-3. Used the regression of age-3 to escapement. Fall: Recent 5 year means; adjusted for previous 5 year forecast performance
Hoko <sup>e/</sup>	Natural	1.1	1.0	1.8	0.6	1.9	1.2	2.7	3.3	2.9	2016 Recruits for age-3's 5 year average return, age 3-6 sibling regression
<i>North Coast Totals</i>											
Spring/Summer	Natural	1.3	1.5	1.2	1.4	1.4	1.3	1.4	1.2	NA	
Fall	Natural	16.1	20.8	22.5	20.3	23.6	17.5	19.7	15.4	9.3	
Spring/Summer	Hatchery	1.7	2.0	1.5	1.4	1.5	2.1	2.0	1.7	1.8	
Fall	Hatchery	8.3	9.0	15.3	6.6	5.6	4.0	11.2	1.5	0.0	
<b>Puget Sound summer/fall<sup>c/</sup></b>											
Nooksack/Samish	Hatchery	35.3	23.0	30.3	37.5	44.0	46.3	43.9	38.6	27.9	Average of previous two years
East Sound Bay	Hatchery	0.8	0.1	2.3	0.4	0.4	1.9	1.2	1.2	0.7	Average of previous two years
Skagit <sup>d/</sup>	Natural	23.8	23.4	13.0	14.3	8.3	12.9	18.0	11.8	15.1	Hierarchical Bayesian model to estimate the spawner-recruit dynamics.
	Hatchery	0.7	0.6	0.9	1.5	1.3	0.3	0.3	0.6	0.4	Recent 4 year average terminal smolt to adult return rate to estimate age classes 3 – 5

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

Production Source and Stock or Stock Group		2008	2009	2010	2011	2012	2013	2014	2015	2016	Methodology for 2016 Prediction and Source
Stillaguamish <sup>a/</sup>	Natural	1.1	1.7	1.4	1.8	0.9	1.3	1.6	0.5	0.5	Natural plus Hatchery. Multiple regression environmental model (EMPAR).
Snohomish <sup>e/</sup>	Natural	6.5	8.4	9.9	7.4	2.8	3.6	5.3	4.2	3.3	Multiple regression environmental model (EMPAR).
	Hatchery	8.8	4.9	5.6	5.2	3.9	6.9	5.4	3.3	5.0	Average terminal run.
Tulalip <sup>e/</sup>	Hatchery	4.1	4.0	3.4	3.5	5.9	10.9	4.7	1.3	1.4	Multiple regression environmental model (EMPAR).
South Puget Sound	Natural	21.1	17.2	12.7	8.9	8.9	5.0	4.8	3.8	4.5	Puyallup R. average return per spawner applied to brood years contributing ages 3-5. For Nisqually, 3 year average SAR age specific survival. For Green, 3-year average return/out-migrant rate for each age.
	Hatchery	101.3	93.0	97.4	118.6	95.8	102.0	96.7	62.4	43.1	Average return at age multiplied by smolt release for Green, Nisqually, Puyallup, Carr Inlet, and Area 10E.
Hood Canal <sup>d/</sup>	Natural	2.6	2.5	2.4	2.2	2.9	3.4	3.5	3.1	2.3	Natural fish based on the Hood Canal terminal run reconstruction-based relative contribution of the individual Hood Canal management units in the 2013-2015 return years
	Hatchery	34.2	40.1	42.6	38.4	43.9	65.7	80.6	59	42.7	Brood 2012 fingerling lbs released from WDFW facilities in 2013, multiplied by the average of post-season estimated terminal area return rates for the last 3 years (2013-2015).
Strait of Juan de Fuca Including Dungeness spring run <sup>d/</sup>	Natural	3.2	2.4	1.9	2.5	2.9	3.1	3.8	4.9	3.7	Natural and hatchery. Dungeness and Elwha hatchery estimated by recent return rates time average releases. Dungeness wild estimated by smolts times average hatchery return rate. Elwha wild estimated using recent 3 year returns from otolith and CWT.

a/ Does not include the river harvest component. SI forecasts after 2008 include river harvest.

b/ Beginning in 2005, the upriver spring/summer designation was changed, with stream type Snake Basin summer fish being combined with the spring stock.

c/ Unless otherwise noted, forecasts are for Puget Sound run size (4B) available to U.S. net fisheries. Does not include fish caught in troll and recreational fisheries.

d/ Terminal run forecast.

e/ Expected spawning escapement without fishing.

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

Production Source and Stock or Stock Group		2008	2009	2010	2011	2012	2013	2014	2015	2016	Methodology for 2016 Prediction and Source
<b>OPI Area (Total Abundance) (California and Oregon Coasts and Columbia River)</b>		276.1	1,284.7	556.0	624.5	632.7	716.4	1,213.7	1,015.0	549.2	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	216.1	1,073.1	408.0	375.1	341.7	525.4	983.1	808.4	396.5	OPIH: 1969-2014 Columbia River jacks adjusted for delayed smolt releases and total OPI jacks regressed on 1970-2015 adults. Columbia/Coastal proportions based on jacks; Coastal N/S proportions based on smolts.
Columbia River Early		110.3	672.7	245.3	216.0	229.8	331.6	526.6	515.2	153.7	
Columbia River Late		86.4	369.7	144.2	146.5	87.4	169.5	437.5	261.8	226.9	
Coastal N. of Cape Blanco		1.7	7.3	4.4	3.6	6.4	5.6	4.8	6.9	5.5	
Coastal S. of Cape Blanco		17.7	23.4	14.1	9.0	18.1	18.7	14.2	24.4	10.4	
Lower Columbia River	Natural	13.4	32.7	15.1	22.7	30.1	46.5	33.4	35.9	40.0	Oregon: recent three year cohort average; Washington: natural smolt production multiplied by 2013 brood marine survival rate. Abundance is subset of early/late hatchery abundance above.
Oregon Coast (OCN)	Natural	60.0	211.6	148.0	249.4	291.0	191.0	230.6	206.6	152.7	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 return.
<b>Washington Coast</b>											
Willapa	Natural	35.1	33.5	20.4	47.8	81.3	58.6	58.9	42.9	39.5	A variety of methods were used for 2016, primarily based on smolt production and survival. See text in Chapter III for details.
	Hatchery	25.5	59.4	78.7	64.7	88.8	37.1	41.0	57.7	28.1	
Grays Harbor	Natural	42.7	59.2	67.9	89.1	150.2	196.8	108.8	142.6	NA	
	Hatchery	53.1	63.5	33.3	44.0	47.8	85.2	65.4	46.6	22.9	
Quinault	Natural	17.4	16.3	16.7	22.9	27.3	32.1	25.0	44.2	17.1	
	Hatchery	24.5	26.2	26.6	35.5	35.4	42.0	24.7	24.9	19.8	
Queets	Natural	10.2	31.4	21.8	13.3	37.2	24.5	10.3	7.5	3.5	
	Hatchery	10.3	13.5	11.9	16.3	25.3	19.8	15.7	11.3	4.5	
Hoh	Natural	4.3	9.5	7.6	11.6	14.3	8.6	8.9	5.1	2.1	

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

Production Source and Stock or Stock Group		2008	2009	2010	2011	2012	2013	2014	2015	2016	Methodology for 2016 Prediction and Source	
Quillayute Fall	Natural	10.5	19.3	22.0	28.2	33.5	17.2	18.4	10.5	4.5		A variety of methods were used for 2016, 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	13.0	39.5	17.7	31.0	16.9	12.4	12.6	8.0	6.4		
Quillayute Summer	Natural	1.1	2.2	2.8	2.8	5.7	0.5	2.0	1.2	0.3		
	Hatchery	4.2	12.9	3.2	5.4	4.3	3.3	3.2	2.2	1.4		
North Coast Independent Tributaries	Natural	3.2	11.1	4.2	21.6	15.7	17.8	15.2	11.7	1.9		
	Hatchery	5.0	14.1	5.7	11.8	11.4	6.3	11.6	11.9	2.5		
WA Coast Total	Natural	132.7	177.3	165.3	233.3	362.5	361.8	247.5	265.6	68.9		
	Hatchery	135.7	229.1	177.1	208.7	229.9	206.1	174.2	162.6	85.6		
<b>Puget Sound</b>												
Strait of Juan de Fuca	Natural	24.1	20.5	8.5	12.3	12.6	12.6	12.5	11.1	4.4		
	Hatchery	9.5	7.0	7.8	15.2	18.6	17.6	17.3	11.1	3.9		
Nooksack-Samish	Natural	14.8	7.0	9.6	29.5	25.2	45.4	20.8	28.1	9.0		
	Hatchery	47.1	25.5	36.0	45.7	62.8	49.2	61.7	50.8	28.8		
Skagit	Natural	61.4	33.4	95.9	138.1	48.3	137.2	112.4	121.4	8.9		
	Hatchery	18.3	11.7	9.5	16.7	14.9	16.3	15.8	19.5	4.9		
Stillaguamish	Natural	31.0	13.4	25.9	66.6	47.5	33.1	32.5	31.3	2.8		
	Hatchery	0.1	0.0	5.4	0.6	4.1	3.1	6.0	0.0	0.0		
Snohomish	Natural	92.0	67.0	99.4	180.0	109.0	163.8	150.0	151.5	20.6		
	Hatchery	53.5	53.6	24.5	55.0	45.7	111.5	78.2	53.9	16.7		
South Sound	Natural	27.3	53.6	25.3	98.9	43.1	36.0	62.8	63.0	9.9		
	Hatchery	170.0	188.8	186.4	173.3	162.9	151.0	150.7	180.2	27.1		
Hood Canal	Natural	30.4	48.6	33.2	74.7	73.4	36.8	82.8	61.5	35.3		
	Hatchery	35.0	52.0	51.2	74.9	62.6	68.6	47.6	108.4	83.5		
Puget Sound Total	Natural	281.0	243.5	297.8	600.1	359.1	464.9	473.8	467.9	91.0		
	Hatchery	333.5	338.6	320.8	381.4	371.6	417.3	377.3	423.9	165.0		



TABLE III-5. Status categories and constraints for Puget Sound and Washington Coast coho under the FMP and PST Southern Coho Management Plan.

<b>FMP</b>		
FMP Stock	Total Exploitation Rate Constraint <sup>a/</sup>	Categorical Status <sup>a/</sup>
Skagit	20%	Critical
Stillaguamish	20%	Critical
Snohomish	20%	Critical
Hood Canal	45%	Low
Strait of Juan de Fuca	20%	Critical
Quillayute Fall	59%	
Hoh	65%	
Queets	65%	
Grays Harbor	65%	

**PST Southern Coho Management Plan**

U.S. Management Unit	Total Exploitation Rate Constraint <sup>b/</sup>	Categorical Status <sup>c/</sup>
Skagit	20%	Low
Stillaguamish	20%	Low
Snohomish	20%	Low
Hood Canal	45%	Moderate
Strait of Juan de Fuca	20%	Low
Quillayute Fall <sup>c/</sup>		Low
Hoh <sup>c/</sup>		Low
Queets <sup>c/</sup>		Low
Grays Harbor		NA

a/ Preliminary. For Puget Sound stocks, the exploitation rate constraints and categorical status (Normal, Low, Critical) reflect application of Comprehensive Coho Agreement rules, as adopted in the FMP. For Washington Coast stocks, exploitation rate constraints represent MFMT. Note that under *U.S. v. Washington* and *Hoh v. Baldrige* case law, the management objectives can differ from FMP objectives provided there is an annual agreement among the state and tribal comanagers; therefore, the exploitation rates used to report categorical status do not necessarily represent maximum allowable rates for these stocks.

b/ Preliminary. For Puget Sound and Washington Coast management units, the exploitation rate constraints reflect application of the 2002 PST Southern Coho Management Plan.

c/ Categories (Abundant, Moderate, Low) correspond to the general exploitation rate ranges depicted in paragraph 3(a) of the 2002 PST Southern Coho Management Plan. For Washington Coast stocks, categorical status is determined by taking the midpoint of the range of exploitation rates associated with achieving the escapement goal ranges. The exploitation rate ranges are based on preseason abundance forecasts and the upper and lower ends of the escapement goal ranges. Maximum exploitation rates are computed using the lower end of the escapement range; minimum exploitation rates are computed using the upper end of the escapement range.

TABLE III-6. Projected coho mark rates for 2016 fisheries under base period fishing patterns (percent marked).

Area	Fishery	June	July	August	Sept
Canada					
Johnstone Strait	Recreational	-	32%	31%	-
West Coast Vancouver Island	Recreational	48%	33%	34%	31%
North Georgia Strait	Recreational	47%	47%	46%	40%
South Georgia Strait	Recreational	36%	53%	42%	46%
Juan de Fuca Strait	Recreational	50%	51%	50%	47%
Johnstone Strait	Troll	57%	45%	32%	43%
NW Vancouver Island	Troll	41%	35%	35%	27%
SW Vancouver Island	Troll	52%	47%	48%	50%
Georgia Strait	Troll	57%	55%	55%	48%
Puget Sound					
Strait of Juan de Fuca (Area 5)	Recreational	64%	56%	55%	55%
Strait of Juan de Fuca (Area 6)	Recreational	60%	56%	58%	53%
San Juan Island (Area 7)	Recreational	69%	62%	52%	36%
North Puget Sound (Areas 6 & 7A)	Net	-	54%	55%	38%
Council Area					
Neah Bay (Area 4/4B)	Recreational	57%	60%	55%	63%
LaPush (Area 3)	Recreational	67%	62%	70%	50%
Westport (Area 2)	Recreational	72%	70%	65%	61%
Columbia River (Area 1)	Recreational	77%	76%	69%	72%
Tillamook	Recreational	65%	58%	50%	41%
Newport	Recreational	59%	50%	47%	32%
Coos Bay	Recreational	45%	39%	29%	19%
Brookings	Recreational	38%	24%	21%	13%
Neah Bay (Area 4/4B)	Troll	55%	57%	56%	58%
LaPush (Area 3)	Troll	51%	57%	55%	58%
Westport (Area 2)	Troll	58%	64%	65%	59%
Columbia River (Area 1)	Troll	73%	72%	67%	59%
Tillamook	Troll	59%	56%	56%	51%
Newport	Troll	55%	51%	47%	44%
Coos Bay	Troll	44%	39%	34%	20%
Brookings	Troll	27%	30%	34%	47%
Columbia River					
Buoy 10	Recreational	-	-	-	65%

## Summary

The effects of projected impacts (where available) under 2015 fishery regulations and 2016 abundance forecasts are as follows:

- With the exception of KRFC and California Coastal Chinook, Chinook stocks with available information would achieve management objectives.
- For SRFC, the predicted exploitation rate is below the maximum allowable rate specified by the control rule and thus hatchery and natural area adult escapement is greater than the 2016 objective.
- For KRFC, the predicted exploitation rate exceeds the maximum allowable rate specified by the control rule and thus natural area adult escapement is lower than the 2016 objective.
- The KRFC age-4 ocean harvest rate would exceed the California Coastal Chinook ESA consultation standard.
- Of the coho stocks with available information, Willapa and Hood Canal coho would achieve  $S_{MSY}$  spawning escapement objectives; Queets, Hoh, Quillayute, Strait of Juan de Fuca, Skagit, Stillaguamish, and Snohomish coho would not.
- Willapa Bay, Hood Canal, Skagit, Stillaguamish, and Snohomish coho would have exploitation rates that exceed the MFMT.
- OCN coho and LCN coho stocks would have projected exploitation rates that exceed ESA consultation standards.
- All Puget Sound coho stocks would have exploitation rates that exceed the annual rates allowed under the FMP harvest rate matrix and the PST 2002 Southern Coho Management Plan.
- All projected escapement of Washington coastal natural coho would be below FMP conservation objectives.

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). 2016 spawning escapement and exploitation rate estimates are based on preliminary 2016 preseason abundance forecasts and 2015 Council regulations. Corrections were made to this table on March 1, 2016, after the original posting of Preseason Report I.

	Spawning Escapement								Total Exploitation Rate					
	2012	2013	2014	2015 <sup>a/</sup>	Forecast 2016 <sup>b/</sup>	3-yr Geo Mean	MSST	S <sub>MSY</sub>	2012	2013	2014	2015 <sup>a/</sup>	2016 <sup>b/</sup>	MFMT
<b>Chinook</b>														
Sacramento Fall	285,429	406,200	212,468	112,434	153,346	154,154	91,500	122,000	0.54	0.53	0.62	0.56	0.49	0.78
Klamath River Fall	121,543	59,156	95,104	28,120	14,540	33,879	30,525	40,700	0.45	0.64	0.36	0.59	0.65	0.71
Southern Oregon <sup>c/</sup>	69,060	81,855	53,518	31,286	NA	51,558	20,500	34,992	NA	NA	NA	NA	NA	0.54
Central and Northern OR	146	189	157	247	NA	194	30 fish/mi	60 fish/mi	0.65	NA	NA	NA	NA	0.78
Upper River Bright - Fall <sup>d/</sup>	94,925	305,445	233,934	295,000	239,234	254,632	19,182	39,625	0.55	0.53	NA	NA	NA	0.86
Upper River - Summer <sup>d/</sup>	52,184	68,380	77,982	88,691	65,217	76,691	6,072	12,143	<b>0.78</b>	0.57	NA	NA	NA	0.75
Willapa Bay - Fall <sup>e/</sup>	2,687	1,916	2,136	NA	NA	2,224	1,696	3,393	<b>0.83</b>	0.74	NA	NA	NA	0.78
Grays Harbor Fall <sup>e/</sup>	14,032	12,582	NA	NA	NA	13,287	5,694	11,388	<b>0.83</b>	0.74	NA	NA	NA	0.78
Grays Harbor Spring	878	2,459	1,583	NA	NA	1,506	546	1,092	NA	NA	NA	NA	NA	0.78
Queets - Fall <sup>d/</sup>	3,707	2,582	3,820	NA	NA	3,319	1,250	2,500	0.83	0.74	NA	NA	NA	0.87
Queets - Sp/Su	760	520	377	NA	NA	530	350	700	NA	NA	NA	NA	NA	0.78
Hoh - Fall <sup>e/</sup>	1,937	1,269	1,933	1,592	NA	1,575	600	1,200	0.83	0.74	NA	NA	NA	0.90
Hoh Sp/Su	915	750	744	1,070	NA	842	450	900	NA	NA	NA	NA	NA	0.78
Quillayute - Fall <sup>e/</sup>	3,518	4,017	2,782	3,098	NA	3,259	1,500	3,000	0.83	0.74	NA	NA	NA	0.87
Quillayute - Sp/Su	729	957	608	824	NA	783	600	1,200	NA	NA	NA	NA	NA	0.78
Hoko -Su/Fa <sup>d/</sup>	663	1,406	1,760	2,998	NA	1,950	425	850	0.34	0.67	NA	NA	NA	0.78
<b>Coho</b>														
Willapa Bay	18,880	22,638	41,969	NA	4,013	15,622	8,600	17,200	0.50	NA	NA	NA	<b>0.90</b>	0.74
Grays Harbor	66,836	56,785	104,836	NA	NA	73,550	18,320	24,426	0.44	0.44	0.46	NA	NA	0.65
Queets	4,285	5,684	7,174	NA	2,022	4,352	4,350	5,800	0.30	0.39	0.44	NA	0.43	0.65
Hoh	4,072	2,899	4,565	2,083	734	1,911	1,890	2,520	0.46	<b>0.70</b>	0.43	NA	0.65	0.65
Quillayute Fall	5,846	7,063	7,410	3,079	2,446	3,821	4,725	6,300	0.53	0.55	0.50	NA	0.46	0.59
Juan de Fuca	13,096	9,564	13,651	NA	3,350	7,591	7,000	11,000	0.12	0.43	0.17	NA	0.22	0.60
Hood Canal	46,802	16,786	27,365	NA	9,277	16,213	10,750	14,350	<b>0.70</b>	0.55	<b>0.66</b>	NA	<b>0.74</b>	0.65
Skagit	109,763	88,246	27,059	NA	2,731	18,683	14,875	25,000	0.31	0.44	0.50	NA	<b>0.70</b>	0.60
Stillaguamish	45,156	60,387	35,763	NA	0	NA	6,100	10,000	0.29	0.33	0.40	NA	<b>1.00</b>	0.50
Snohomish	130,637	125,870	46,244	NA	1,922	22,365	31,000	50,000	0.31	0.39	0.43	NA	<b>0.89</b>	0.60

a/ Preliminary.

b/ Preliminary approximations based on preseason abundance projections and 2015 regulations. For an indication of stock status for stocks without a 2016 forecast of escapement, see *Review of 2015 Ocean Salmon Fisheries (PFMC 2016)*, Table II-6 and Table III-7.

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

d/ CWT based exploitation rates from annual catch and escapement distribution from PSC-CTC 2013 Exploitation Rate Analysis.

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) and Klamath River fall Chinook (KRFC). For the current year,  $S_{ACL}$ ,  $S_{OFL}$ , and spawner escapements are preseason values based on current abundance forecasts and the previous year fishing regulations.

Year	SRFC			KRFC		
	$S_{ACL}^{a/}$	$S_{OFL}$	Escapement <sup>b/</sup>	$S_{ACL}^{a/}$	$S_{OFL}$	Escapement <sup>c/</sup>
2012	187,595	137,570	285,429	70,936	64,286	121,543
2013	260,456	191,001	406,200	52,065	47,184	59,156
2014	165,978	121,717	212,468	47,539	43,083	95,104
2015	76,586	56,163	112,434	21,929	19,873	28,120
2016	89,883	65,914	153,346	13,188	11,951	14,540

a/  $S_{ACL} = S_{ABC}$ .

b/ Hatchery and natural area adult spawners.

c/ Natural area adult spawners.

TABLE V-6. Estimated ocean escapements and exploitation rates for critical natural and Columbia River hatchery coho stocks (thousands of fish) based on preliminary 2016 preseason abundance forecasts and 2015 Council management measures. <sup>a/</sup> Corrections were made to this table on March 1, 2016, after the original posting of Preseason Report I.

Stock	Ocean Escapement and ER Estimates Under 2015 Regulations <sup>b/</sup>				2016 FMP Conservation Objective <sup>c/</sup>
	2016 Preseason		2015 Preseason		
	Abundance	Exploitation Rate	Abundance	Exploitation Rate	
<b>Natural Coho Stocks</b>					
Skagit	7.8	69.6%	113.1	39.1%	Exploitation Rate $\leq 20.0\%$ <sup>d/</sup>
Stillaguamish	2.6	100.0%	30.0	34.4%	Exploitation Rate $\leq 20.0\%$ <sup>d/</sup>
Snohomish	15.6	88.6%	145.5	32.7%	Exploitation Rate $\leq 20.0\%$ <sup>d/</sup>
Hood Canal	31.1	74.0%	56.9	53.8%	Exploitation Rate $\leq 45.0\%$ <sup>d/</sup>
Strait of Juan de Fuca	4.0	24.7%	10.5	12.6%	Exploitation Rate $\leq 20.0\%$ <sup>d/</sup>
Quillayute Fall	3.8	45.6%	9.8	40.3%	6.3 - 15.8 Spawners
Hoh	1.4	64.9%	4.3	56.1%	2.0 - 5.0 Spawners
Queets	2.4	43.3%	6.2	30.7%	5.8 - 14.5 Spawners
Grays Harbor <sup>e/</sup>	NA	NA	127.6	47.2%	35.4 Spawners
LCN	29.9	42.0%	41.9	23.0%	Exploitation Rate $\leq 18.0\%$ <sup>f/</sup>
OCN	112.5	27.0%	176.7	14.9%	Exploitation Rate $\leq 20.0\%$ <sup>f/</sup>
R/K	6.0	11.9%	NA	6.8%	Exploitation Rate $\leq 13.0\%$ <sup>f/</sup>
<b>Hatchery Coho Stocks</b>					
Columbia Early	42.3	49.9%	331.5	28.0%	6.2 Hatchery Escapement
Columbia Late	59.2	67.8%	155.5	38.9%	14.2 Hatchery Escapement

a/ Quota levels include harvest and hooking mortality estimates used in planning the Council's 2015 ocean fisheries and a coho catch for the Canadian troll fishery off the West Coast of Vancouver Island (WCVI).

b/ 2015 preseason regulations with the following coho quotas: U.S. Canada Border to Cape Falcon: Treaty Indian troll-42,500 non-selective; non-Indian troll-19,200 selective; recreational-150,800 selective; Cape Falcon to OR/CA border: recreational-55,000 selective and 12,500 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 estimated number of coho entering Puget Sound (Area 4B) which are available for U.S. net fisheries in Puget Sound and spawning escapement after Canadian and Puget Sound troll and recreational fisheries impacts have been deducted. 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. The Council fisheries exploitation rates are forecast at 27.1% using 2016 abundances with 2015 fishery regulations and 13.6% in 2015 with the 2015 ESA limit of 23.0% including mainstem Columbia R. fisheries.

c/ 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.

d/ Assumed exploitation rate based on preliminary abundance forecasts.

e/ The Grays Harbor natural coho forecast was not agreed to by comanagers at the time of print. Using the Quinault Indian Nation forecast resulted in an ocean escapement of 29,953 Grays Harbor natural coho; using the WDFW forecast resulted in an ocean escapement of 36,809 Grays Harbor natural coho. The difference in forecasts did not significantly affect escapement or ER values for any other stock shown.

f/ Pending confirmation of 2015 ESA consultation standard.

TABLE V-7. Comparison of Lower Columbia natural (LCN), Oregon coastal natural (OCN), and Rogue/Klamath (RK) coho projected harvest mortality and exploitation rates by fishery under Council-adopted 2015 management measures and preliminary 2016 preseason abundance estimates.

Fishery	Projected Harvest Mortality and Exploitation Rate					
	LCN		OCN		RK <sup>a/</sup>	
	Number	Percent	Number	Percent	Number	Percent
<b>SOUTHEAST ALASKA</b>	0	0.0%	0	0.0%	0	0.0%
<b>BRITISH COLUMBIA</b>	89	0.2%	508	0.3%	12	0.2%
<b>PUGET SOUND/STRAITS</b>	227	0.5%	154	0.1%	0	0.0%
<b>NORTH OF CAPE FALCON</b>						
Recreational	5,249	11.6%	3,218	2.1%	5	0.1%
Treaty Indian Troll	1,924	4.3%	1,521	1.0%	0	0.0%
Non-Indian Troll	1,488	3.3%	1,085	0.7%	1	0.0%
<b>SOUTH OF CAPE FALCON</b>						
Recreational:						
Cape Falcon to Humbug Mt.	2,489	5.4%	19,094	11.9%	122	0.8%
Humbug Mt. to Horse Mt. (KMZ)	38	0.2%	1,009	1.1%	214	4.2%
Fort Bragg	23	0.1%	817	0.5%	114	1.7%
South of Pt. Arena	19	0.0%	689	0.4%	75	1.1%
Troll:						
Cape Falcon to Humbug Mt.	626	1.4%	2,852	1.8%	24	0.3%
Humbug Mt. to Horse Mt. (KMZ)	0	0.0%	48	0.1%	12	0.2%
Fort Bragg	39	0.1%	1,896	1.2%	196	2.9%
South of Pt. Arena	20	0.0%	673	0.4%	22	0.3%
<b>BUOY 10</b>	2,998	6.6%	815	0.5%	0	0.0%
<b>ESTUARY/FRESHWATER</b>	3,320	8.3%	7,280	4.7%	16	0.2%
<b>TOTAL</b>	18,549	42.0%	41,659	27.0%	813	11.9%

a/ Unmarked hatchery production used as a surrogate for Rogue/Klamath natural stock coho.

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