2018 North of Falcon

Salmon Forecasts

2018 Forecast Meeting Schedule

9:00 – 9:30	Introduction	
	• Welcome and Introduction	Joe Stohr
	• North of Falcon – Setting Salmon Fisheries in 2018	Kyle Adicks
9:30 – 9:45	Habitat Presentation	Jeff Davis
9:45 – 10:00	Southern Resident Killer Whales	Penny Becker, Kirt Hughes
10:00 – 11:00	Salmon Forecasts 2018	
	• 2017/18 Environmental Outlook	Marisa Litz
	• Puget Sound and Coast Chinook, Coho, Pink, Chum, Sockeye Stocks	Aaron Dufault
	• Columbia River Salmon Stocks	Ryan Lothrop, Cindy LeFleur
	• PFMC Salmon Technical Team Review	Wendy Beeghley
	• Rules Simplification	Steve Thiesfeld
11:00 - Noon	Regional Discussion Sessions	
	• Puget Sound Recreational Big Room	Mark, Aaron
	• Columbia River & Ocean Small Room 1	Kyle(s), Wendy, Annette
	• Coastal	
	• Puget Sound Commercial Small Room	Kirt, Kendall, Kwasi, Marisa
Noon – 1:00 pm	Lunch Break	
1:00 – 3:00	Regional Discussion Sessions Continued	

2018 NOF Meeting Schedule

Date	Purpose	Location
Feb. 26	Willapa Bay – Grays Harbor Forecast meeting	Montesano City Hall
Feb. 27	Statewide Forecast Meeting	Lacey Community Center
Mar. 8	Pacific Fishery Management Council 1	Rhonert Park, CA
Mar. 15	Puget Sound Rec. Fisheries Discussion	Trinity Church, Sequim (7pm)
Mar. 19	Columbia River Fisheries Discussion	WDFW Ridgefield Office
Mar. 19	Grays Harbor Advisor Meeting	WDFW Montesano Office
Mar. 20	NOF #1 State - Public	OB2 Auditorium, Capital Campus, Olympia
Mar. 22	NOF #1 State - Tribes	Lacey Community Center
Mar. 22	Willapa Bay Advisor Meeting	WDFW Montesano Office
Mar. 23	NOF# 1 State - Tribes	NWIFC (as needed)
Mar. 26	PFMC Public Hearing	Chateau Westport
Mar. 27	Mid-Columbia/Snake River Fisheries Discussion	WWCC - Clarkston
Mar. 27	Puget Sound (South S., H. Canal) Fisheries Disc.	Lacey Community Center
Mar. 27	Grays Harbor Fisheries Discussion	Montesano City Hall
Mar. 28	Mid-Columbia River Fisheries Discussion	Chelan PUD, Wenatchee
Mar. 28	Puget Sound Recreational Fisheries Discussion	WDFW Mill Creek (6-8pm)
Mar. 29	Columbia River Public Meeting	Kennewick Irrigation District Board Rm/Auditorium
April 2	Willapa Bay Fisheries Discussion	Raymond Elks Club, Raymond
April 2	NOF #2 State-Tribes	Lynnwood Embassy Suites
April 3	NOF #2 State-Public	Lynnwood Embassy Suites
April 4	NOF #2 State-Tribes	Lynnwood Embassy Suites
April 6-11	PFMC #2	Portland Sheraton Airport
April 12	Willapa Bay Fisheries Discussion	WDFW Montesano Office
April 17	Grays Harbor Advisory Meeting	WDFW Montesano Office

Available Online: http://wdfw.wa.gov/fishing/northfalcon/

Handouts

- Agenda/Schedule
- FWC Policies (NOF Policy)
- PFMC Tables
- Regional Forecast Details:
  - Puget Sound and Columbia Chinook
  - Puget Sound Coho
  - Puget Sound Chum & Sockeye
- Presentation slides (http://wdfw.wa.gov/fishing/northfalcon/)

MY TRUTH

- WE ARE ALL PART OF THE MOST COMPLEX FISHERIES IN THE WORLD
- NO ONE WANTS WILD SALMON AND STEELHEAD TO DISAPPEAR
- I BELIEVE WE HAVE 5-10 YEARS MAX. TO CHANGE THE P.S. CHINOOK TREND OR THERE WILL BE AN UP-LISTING
- WE HAVE THE BEST FISH SCIENTISTS AND MANAGERS IN THE WORLD
- HABITAT IS A MAJOR CONTRIBUTOR TO OUR SALMON CRISIS
- PLACES LIKE THE "STILLY" ARE ABSOLUTELY RECOVERABLE
- THE FISHING COMMUNITY (COMMERCIAL, RECREATIONAL AND TRIBAL) HOLD SIGNIFICANT SOCIAL AND POLITICAL LEVERAGE
- WE NEED YOUR HELP AND WE MUST DO IT TOGETHER

Southern Resident Killer Whales

Dave Ellifrit, Center for Whale Research

A Population in Trouble

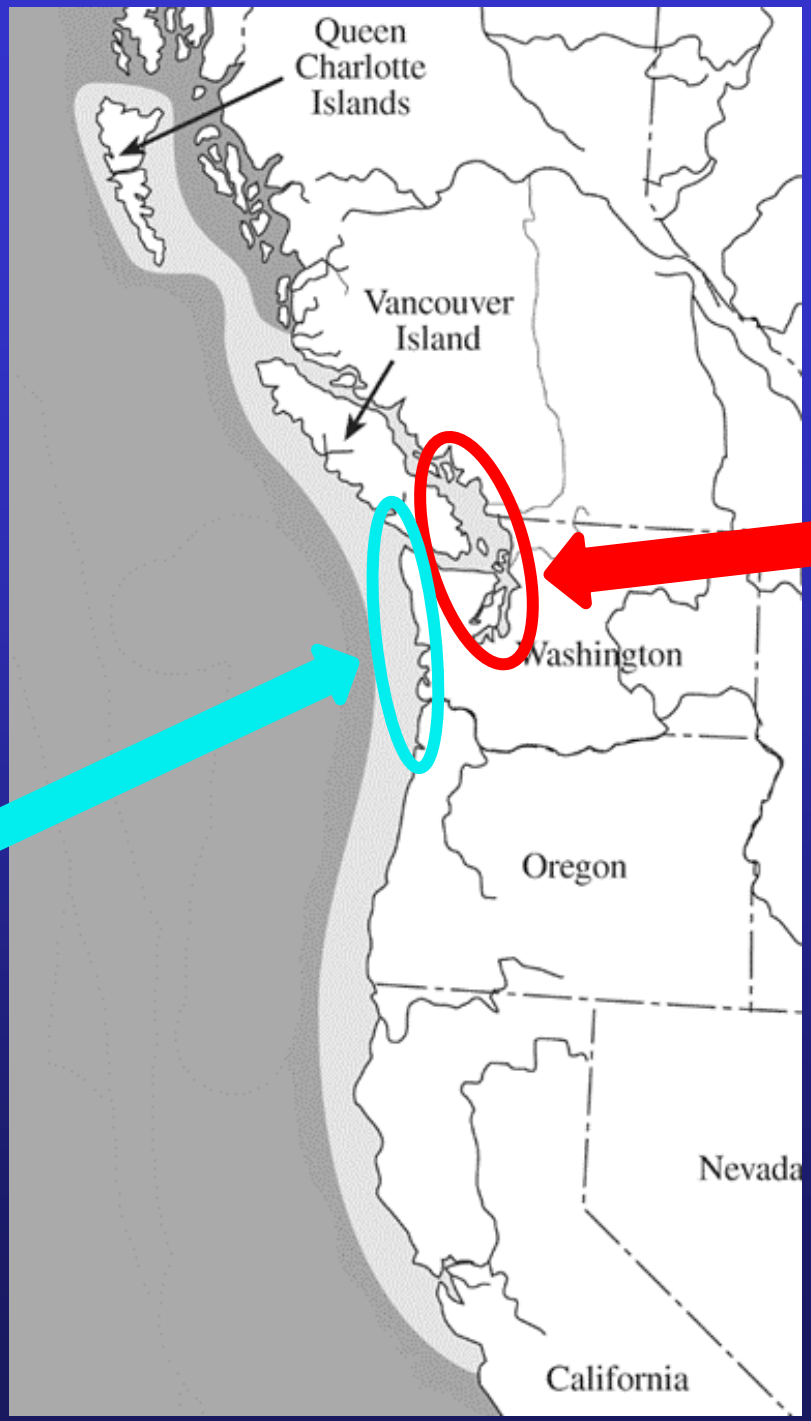
- 

Why Do We Love Them?

Top: Astrid van Ginneken, Bottom: Center for Whale Research

- Our heritage
- Economics
- We can relate
- Healthy whales, healthy waters

Southern Resident Range



Summer & J Pod Winter

K & L Pod Winter

Major Threats

- Reduced abundance of salmon
- Vessel interactions and sound- prey availability
- Chemical contaminants and potential oil spills

Associated Press photo

What Is Being Done?

What More Can Be Done?

Matt Vander Haegen, WDFW

Vessels and Noise

Boating/Whale Watching

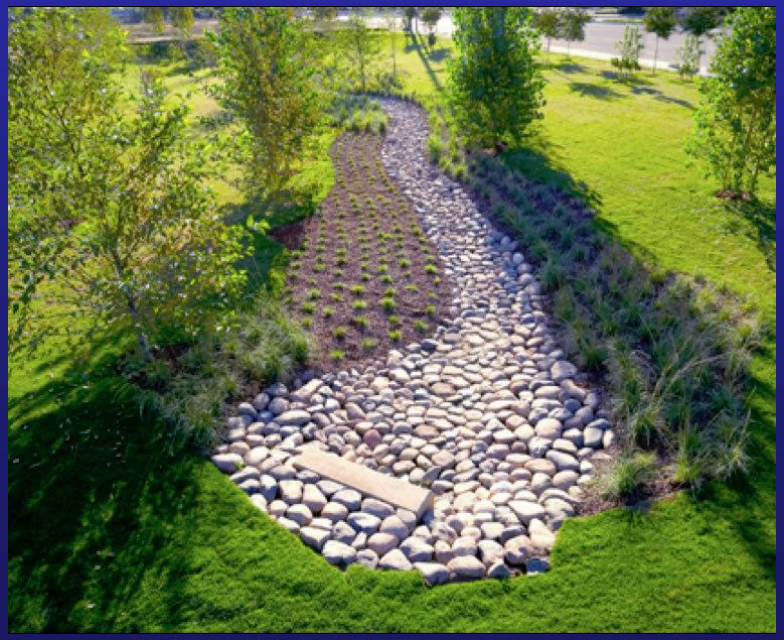
- Enforcement & outreach
- Potential additional regs, permitting, and voluntary measures

Shipping/Large Vessels

- Canada pilot go-slow times & areas
- Vessel innovations/retrofits

Contaminants & Potential Oil Spills

- Reductions in inputs of contaminants from stormwater, wastewater, other sources
- Technology and hazing preparations to keep whales away from oil spill areas



Prey Abundance

Hatchery

- Recent decreases
- Prioritizing stocks and hatcheries for increases

Habitat

- Protection
- Restoration

King5

Prey Abundance

Hydropower

- Improved infrastructure
- Increased water spill

Predation

- Lower Columbia pinniped/bird management
- Protect and restore forage fish
- Research/feasibility assessment

Prey Abundance

Harvest

- Harvest has already declined significantly
- Pacific Salmon Treaty
- Canada's proposal for area/time adjustments

We Need Your Input And Ideas During the NOF Process

Questions? Ideas?

Clint Rivers, Eagle Wing Tours

Environmental Conditions in the NE Pacific

Washington Department of FISH and WILDLIFE

Marisa Litz

Acknowledgements:
Laurie Weitkamp, NOAA Fisheries

Outline

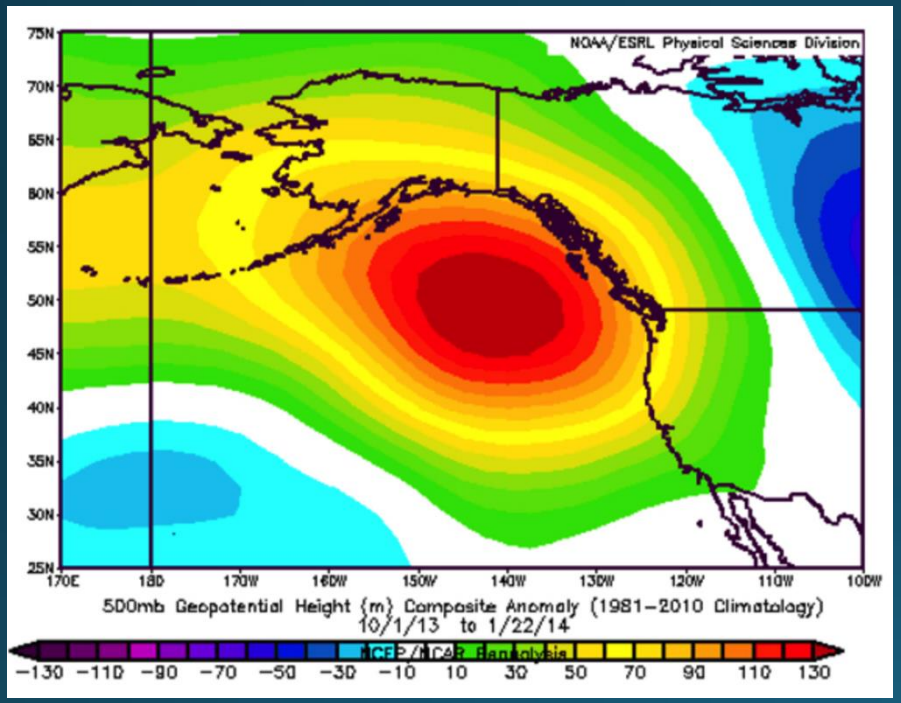
- Update on the "Warm Blob", El Niño, and La Niña
- Physical and biological observations
- NWFSC environmental indicators (stoplight chart)
- Short-term forecast

Take-Home Messages:

- In the ocean, sea surface temperatures (SSTs) have cooled following "The Blob" and El Niño
- Cold wet winters in 2017 + 2018 are good for freshwater salmon production
- Yet……impacts of poor ocean conditions will persist for another year or two

What is the "Warm Blob"?

Ridiculously Resilient Ridge

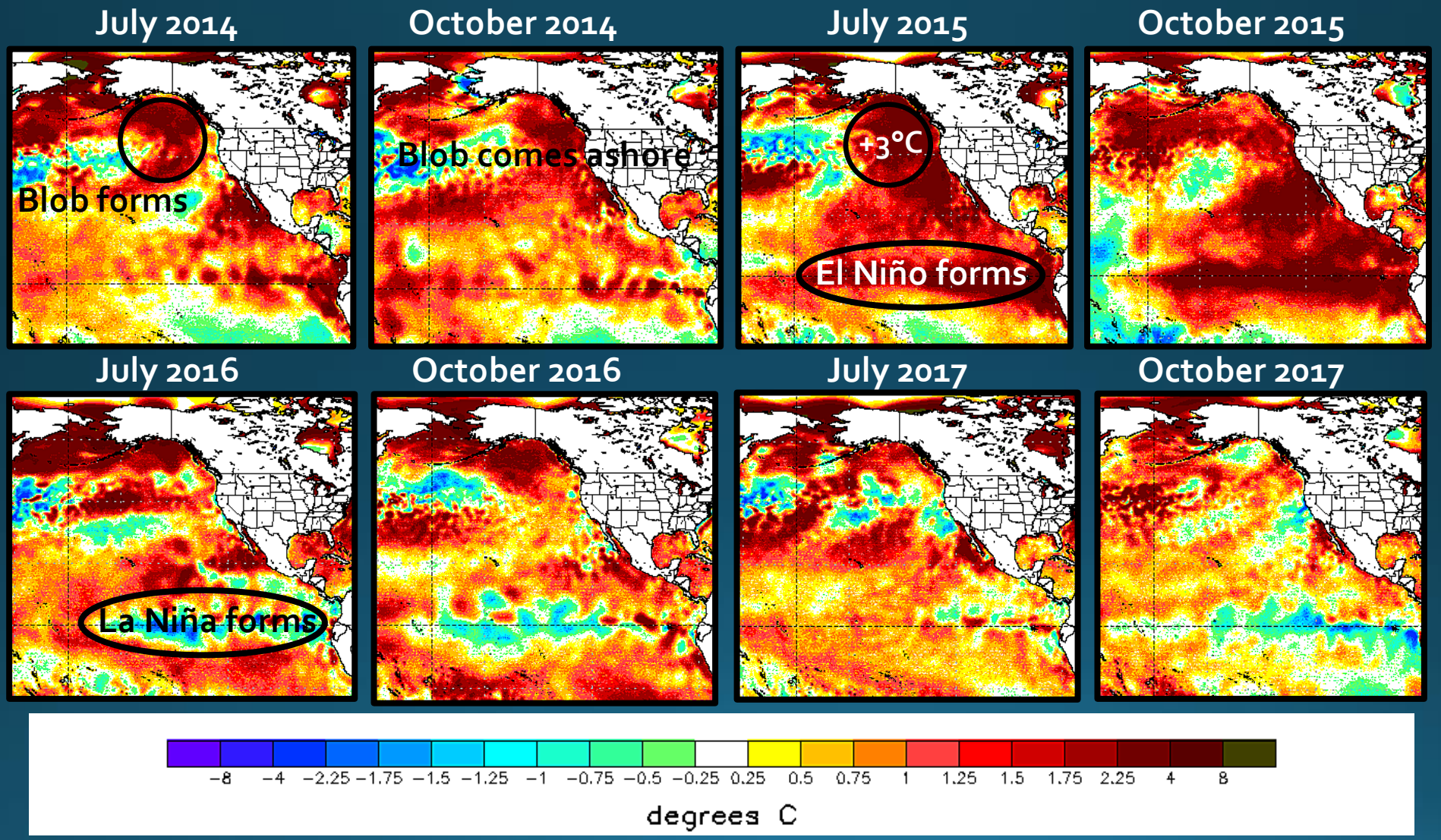


Atmospheric Pressure Anomalies

Oct 1, 2013 – Jan 22, 2014

Michael Jacox

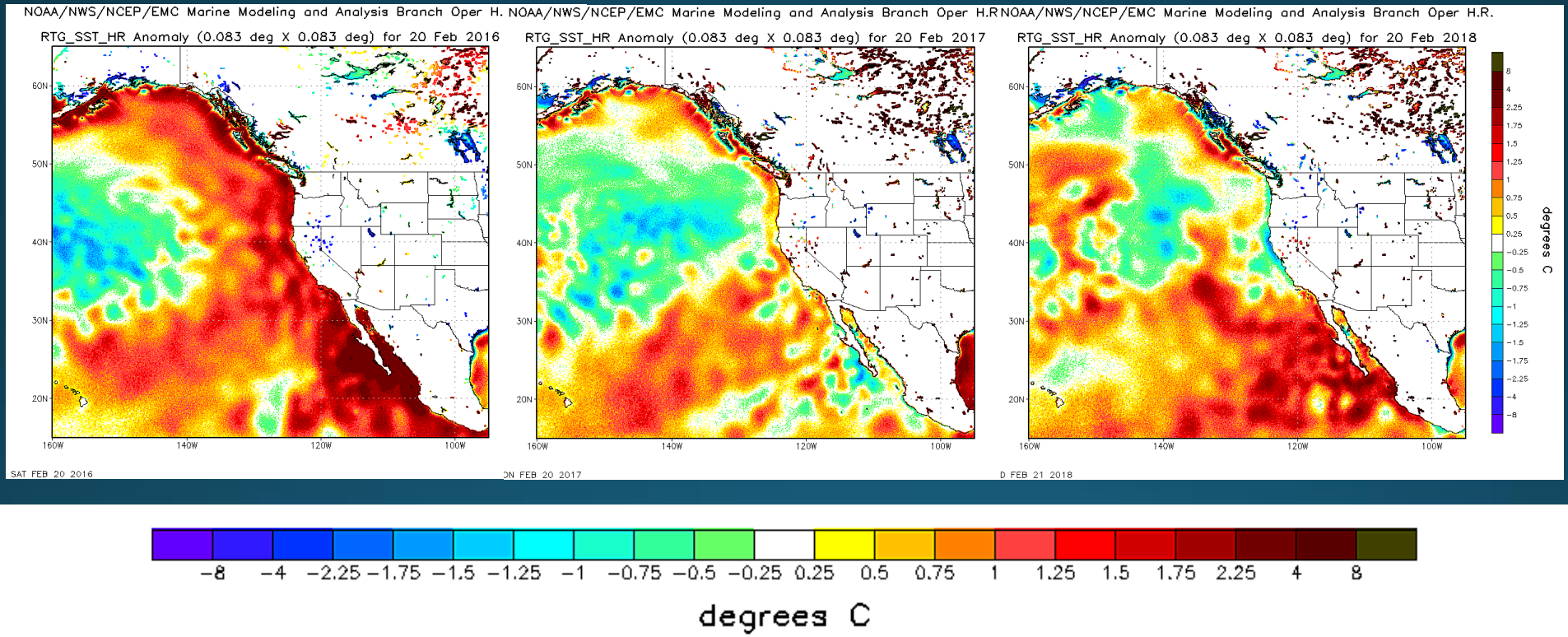
Sea Surface Temperature Anomalies



polar.ncep.noaa.gov/sst/ophi/

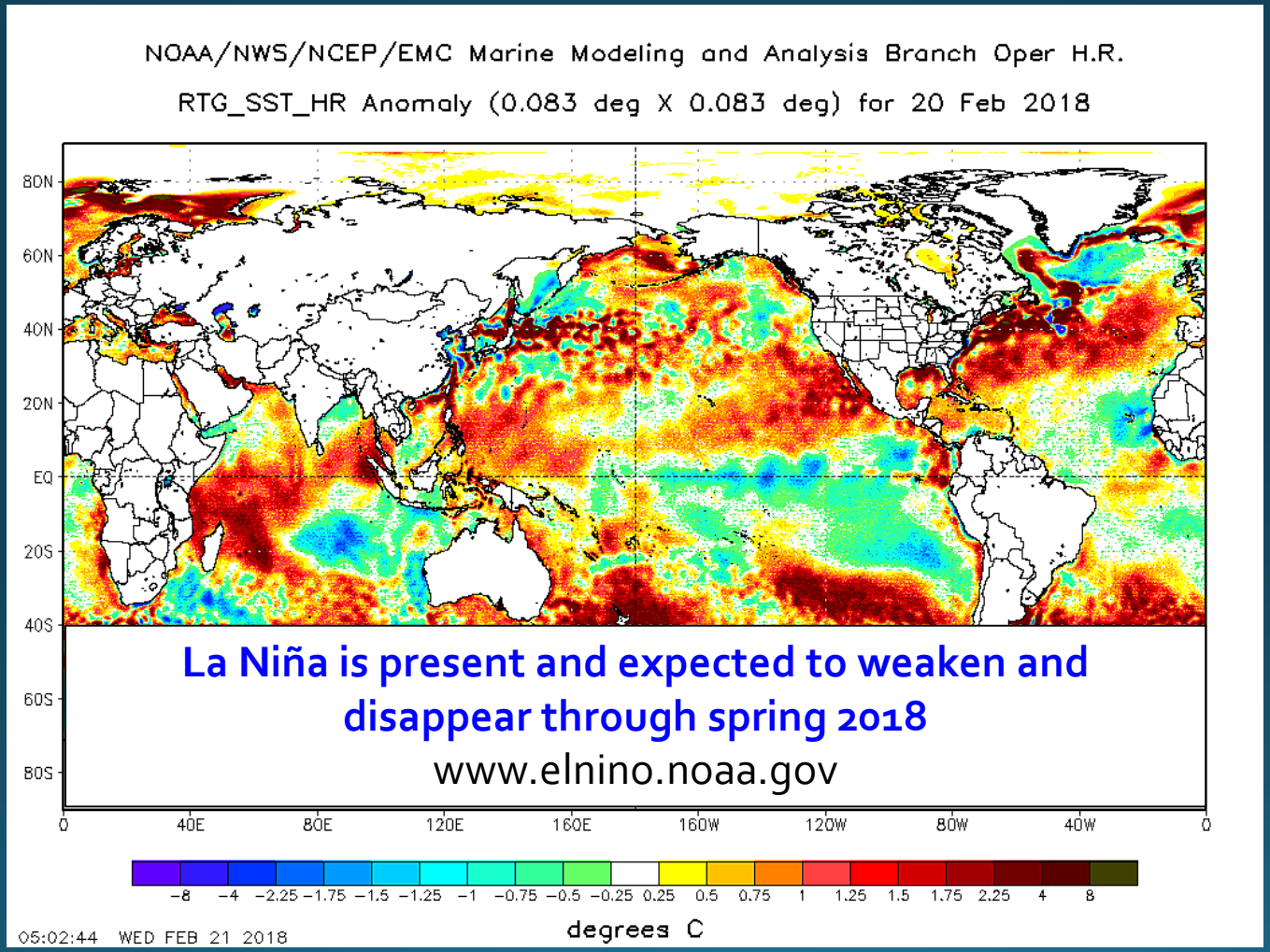
North Pacific cools through 2017

Feb 20, 2016 Feb 20, 2017 Feb 20, 2018



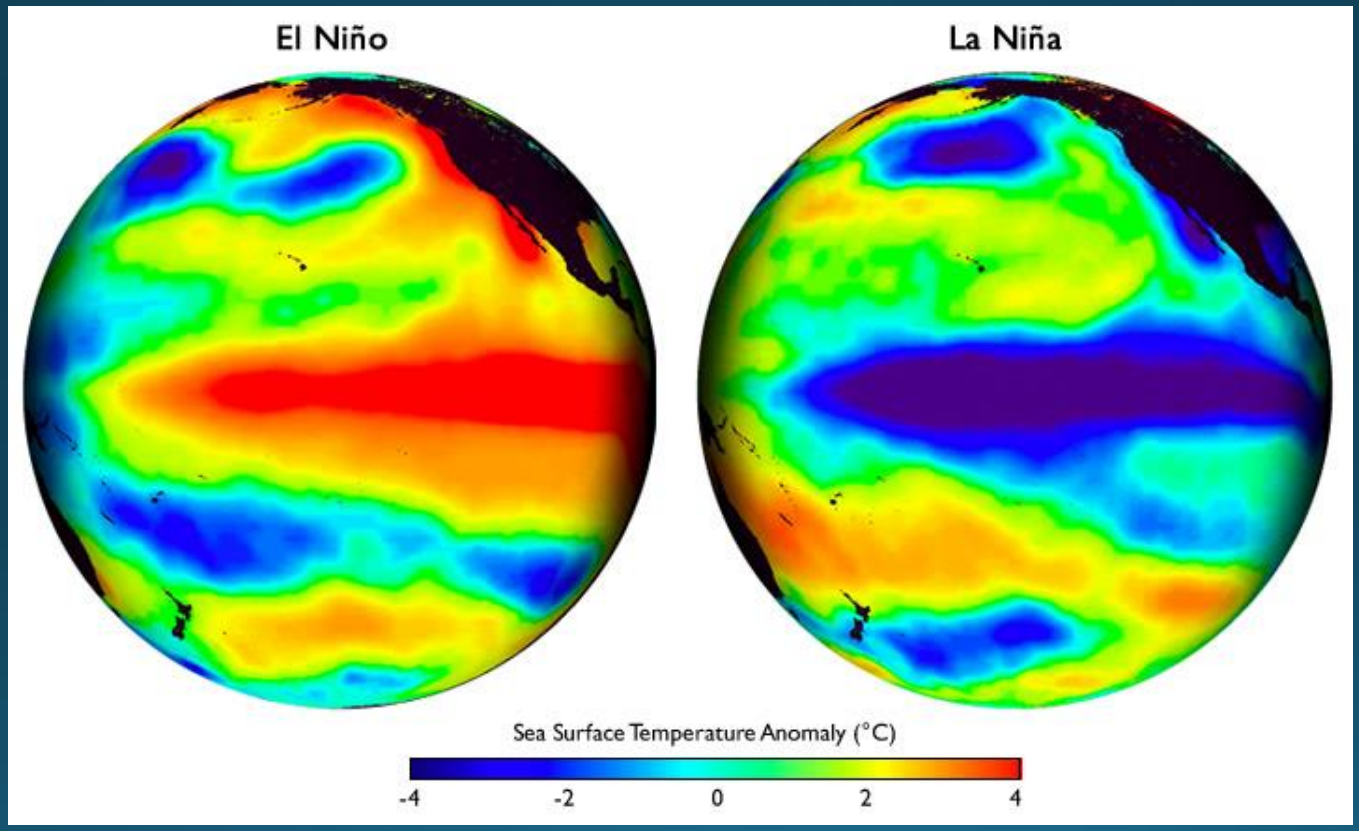
polar.ncep.noaa.gov/sst/ophi/

SST Anomaly February 20, 2018



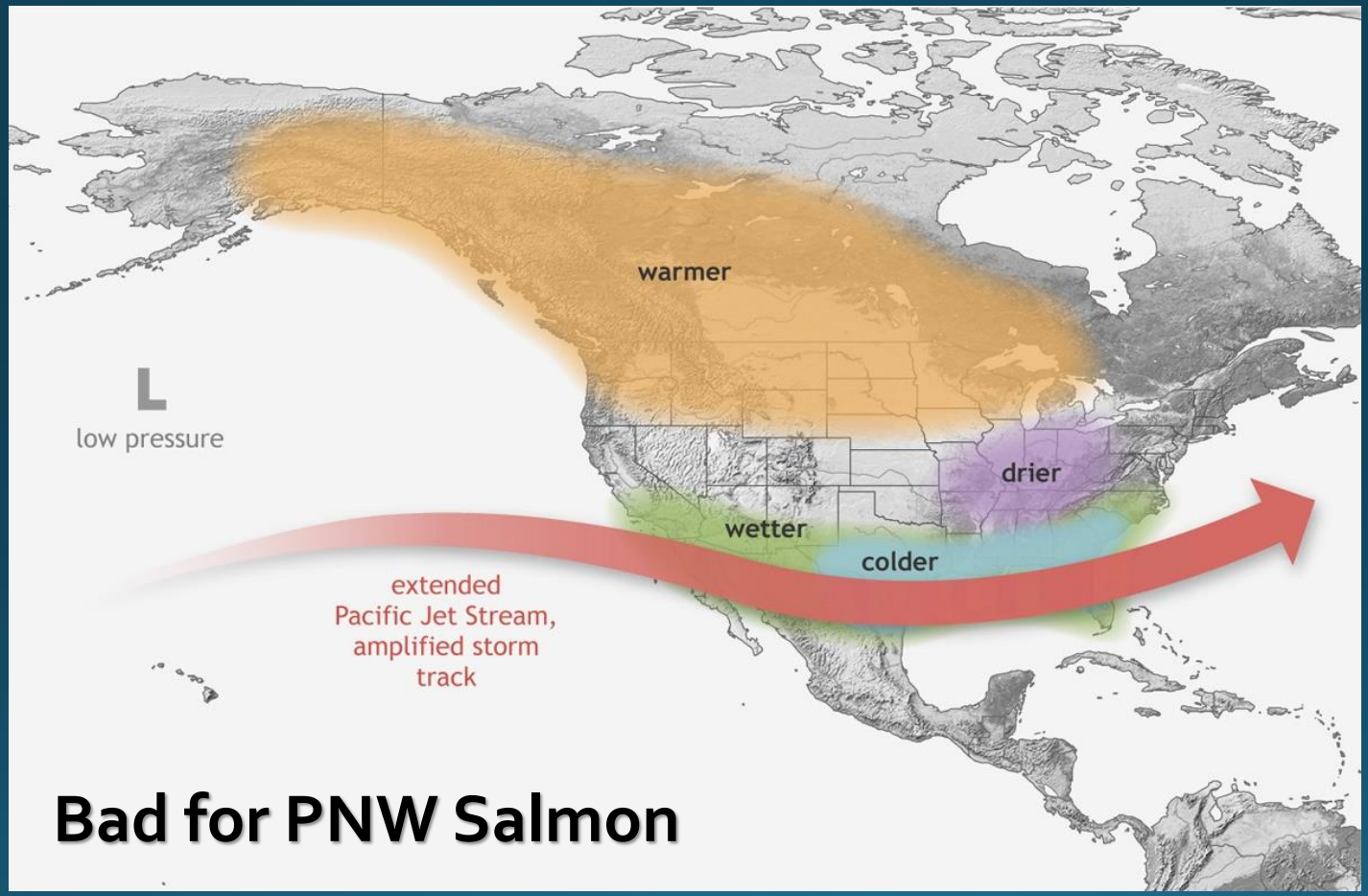
polar.ncep.noaa.gov/sst/ophi/

2015 El Niño and 2017/2018 La Niña

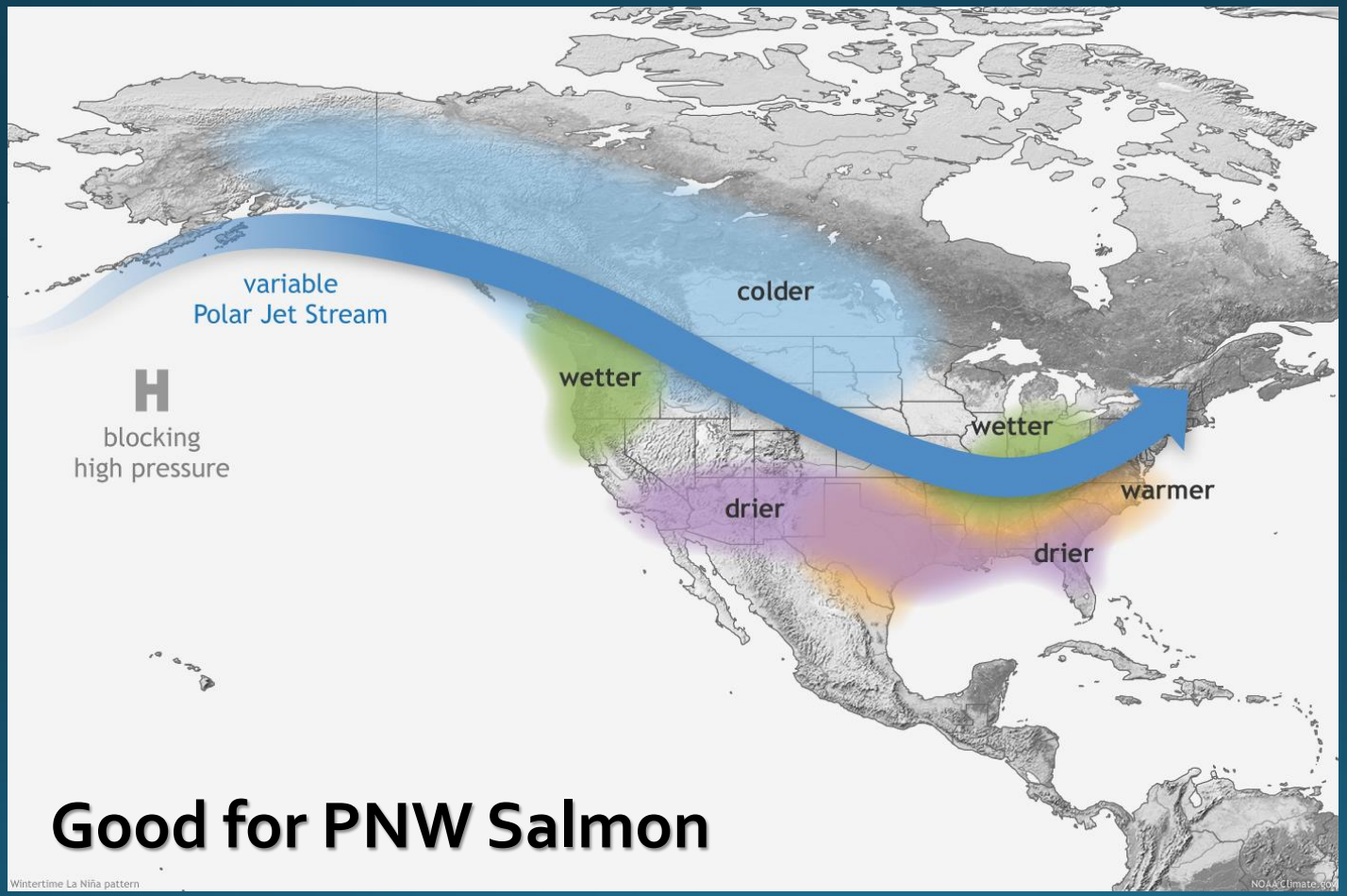


www.climate.gov/enso

Typical El Niño Pattern



Typical La Niña Pattern



The ecosystem is connected

www.ecosystems.noaa.gov

Salmon Indicators: Bad -> Fair -> Good

	Ecosystem Indicators	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
		Year																			
Basin-scale physical indices	PDO (Sum Dec-March)	17	6	3	12	7	19	11	15	13	9	5	1	14	4	2	8	10	20	18	16
	PDO (Sum May-Sept)	10	4	6	5	11	16	15	17	12	13	2	9	7	3	1	8	18	20	19	14
	ONI (Average Jan-June)	19	1	1	6	13	15	14	16	8	11	3	10	17	4	5	7	9	18	20	12
Regional physical indices	46050 SST (°C; May-Sept)	16	9	3	4	1	8	20	15	5	17	2	10	7	11	12	13	14	19	18	6
	Upper 20 m T (°C; Nov-Mar)	19	11	8	10	6	14	15	12	13	5	1	9	16	4	3	7	2	20	18	17
	Upper 20 m T (°C; May-Sept)	16	12	14	4	1	3	20	18	7	8	2	5	13	10	6	17	19	9	15	11
	Deep temperature (°C; May-Sept)	20	6	8	4	1	10	12	16	11	5	2	7	14	9	3	15	19	18	13	17
	Deep salinity (May-Sept)	19	3	9	4	5	16	17	10	7	1	2	14	18	13	12	11	20	15	8	6
Regional biological indices	Copepod richness anom. (no. species; May-Sept)	18	2	1	7	6	13	12	17	15	10	8	9	16	4	5	3	11	19	20	14
	N. copepod biomass anom. (mg C m^{-3}; May-Sept)	18	13	9	10	3	15	12	19	14	11	6	8	7	1	2	4	5	16	20	17
	S. copepod biomass anom. (mg C m^{-3}; May-Sept)	20	2	5	4	3	13	14	19	12	10	1	7	15	9	8	6	11	17	18	16
	Biological transition (day of year)	17	8	5	7	9	14	13	18	12	2	1	3	15	6	10	4	11	20	20	16
	Ichthyoplankton biomass (log (mg C 1000 m^{-3}); Jan-Mar)	20	11	3	7	9	18	17	13	16	15	2	12	4	14	10	8	19	5	6	1
	Ichthyoplankton community index (PCO axis 1 scores; Jan-Mar)											2	14						17	20	19
	Chinook salmon juvenile catches (no. km^{-1}; June)											1	6						13	17	20
	Coho salmon juvenile catches (no. km^{-1}; June)											3	9						8	13	20
	Mean of ranks	17.1	7.0	5.8	6.9	5.8	12.4	15.1	16.2	10.9	8.9	2.7	8.3	12.2	8.2	6.5	7.6	12.3	15.9	16.4	13.9
	Rank of the mean rank	20	6	2	5	2	14	16	18	11	10	1	9	12	8	4	7	13	17	19	15

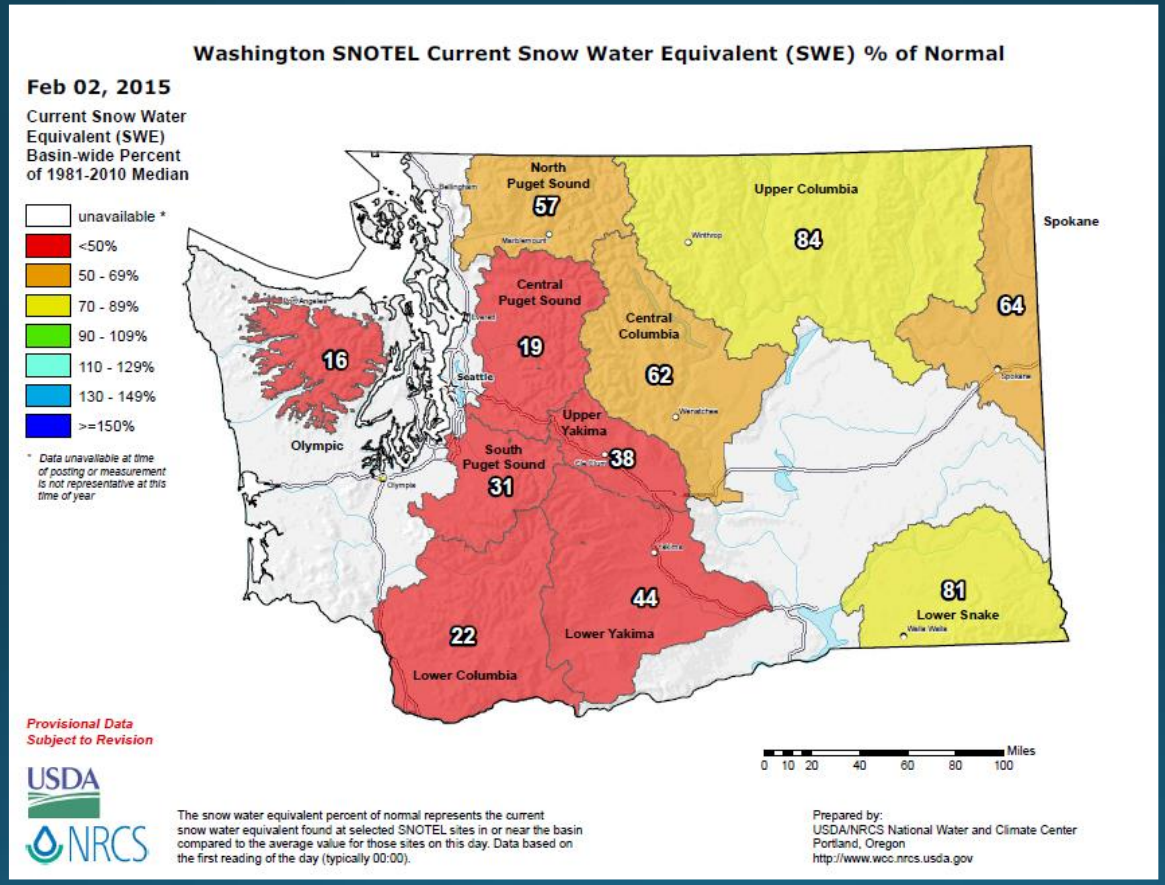
1998 = Worst Score

2005 = 3rd Worst Score

2016 = 2nd Worst Score

Terrestrial impacts on salmon production

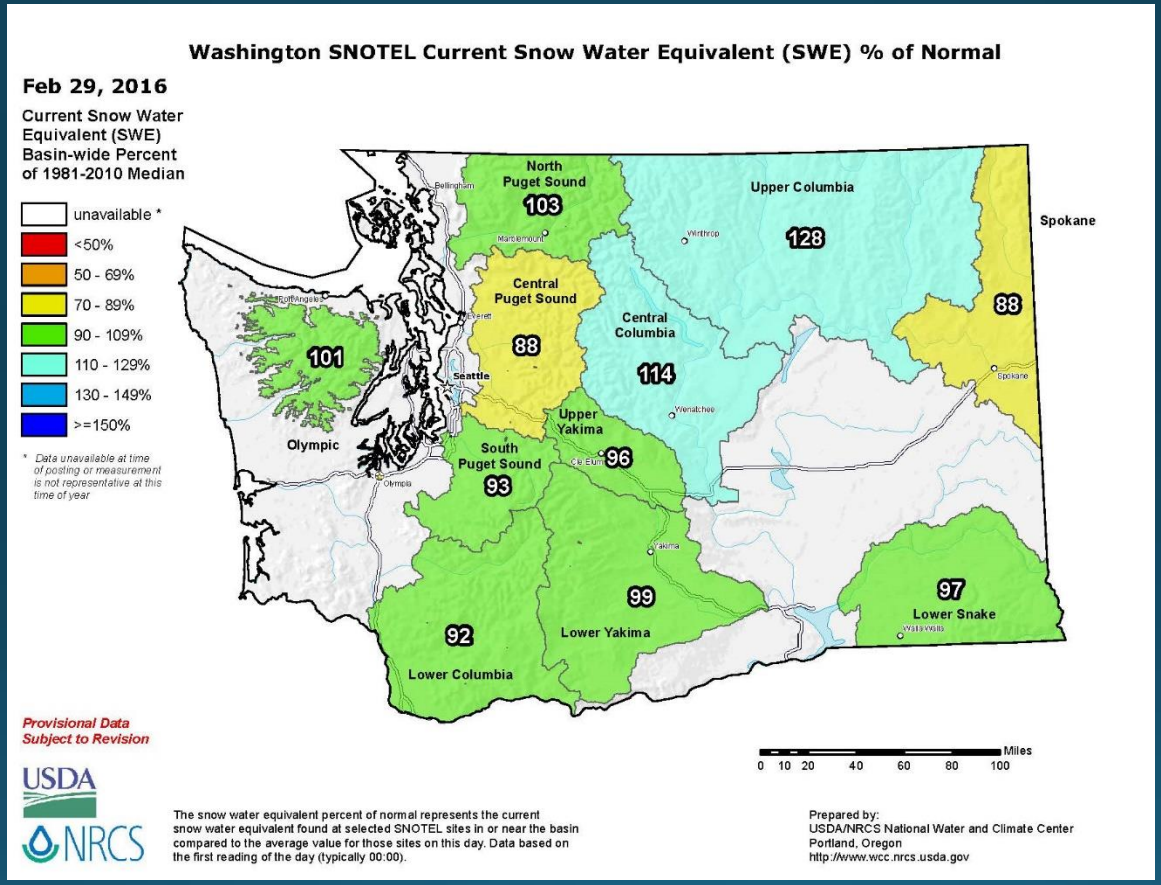
Snowpack – Feb 2015



Record low snowpack in the PNW

www.wcc.nrcs.usda.gov/gis/snow.html

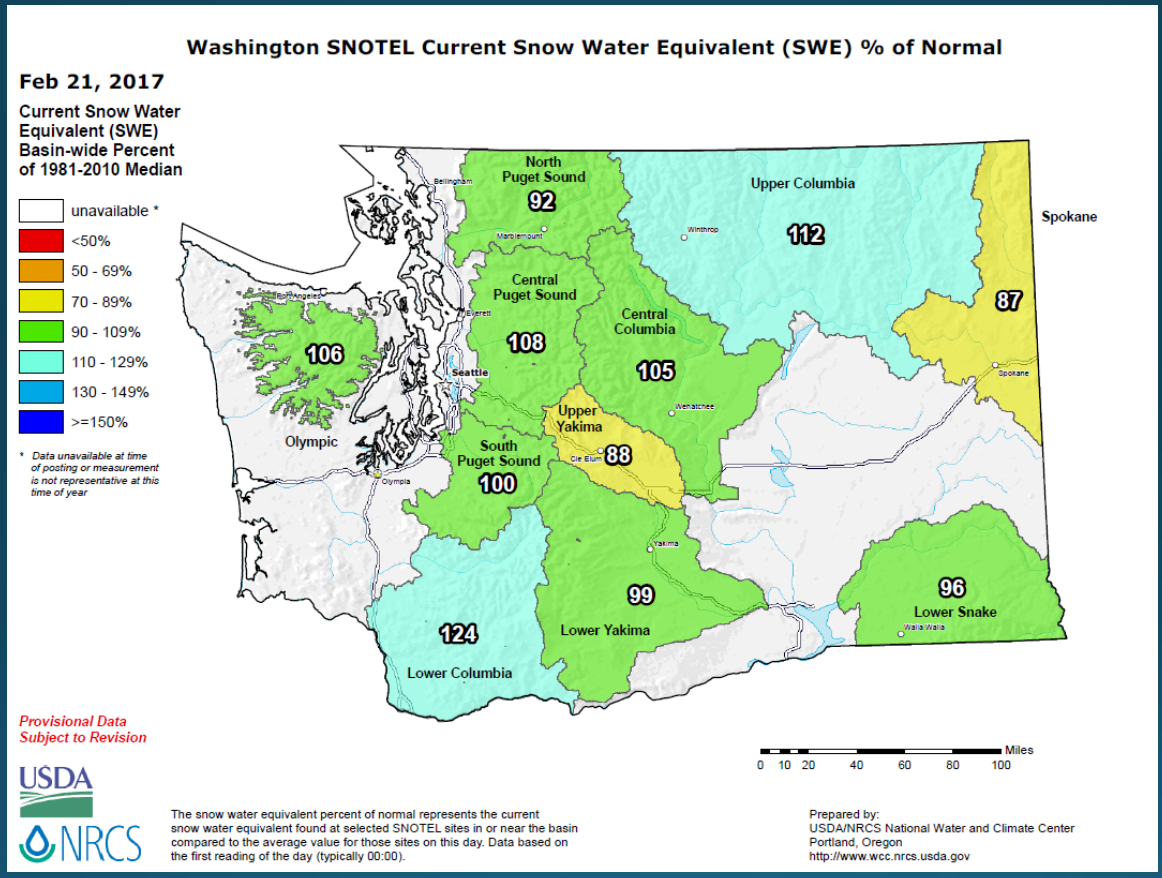
Snowpack – Feb 2016



Average snowpack + warm spring = low snowpack

www.wcc.nrcs.usda.gov/gis/snow.html

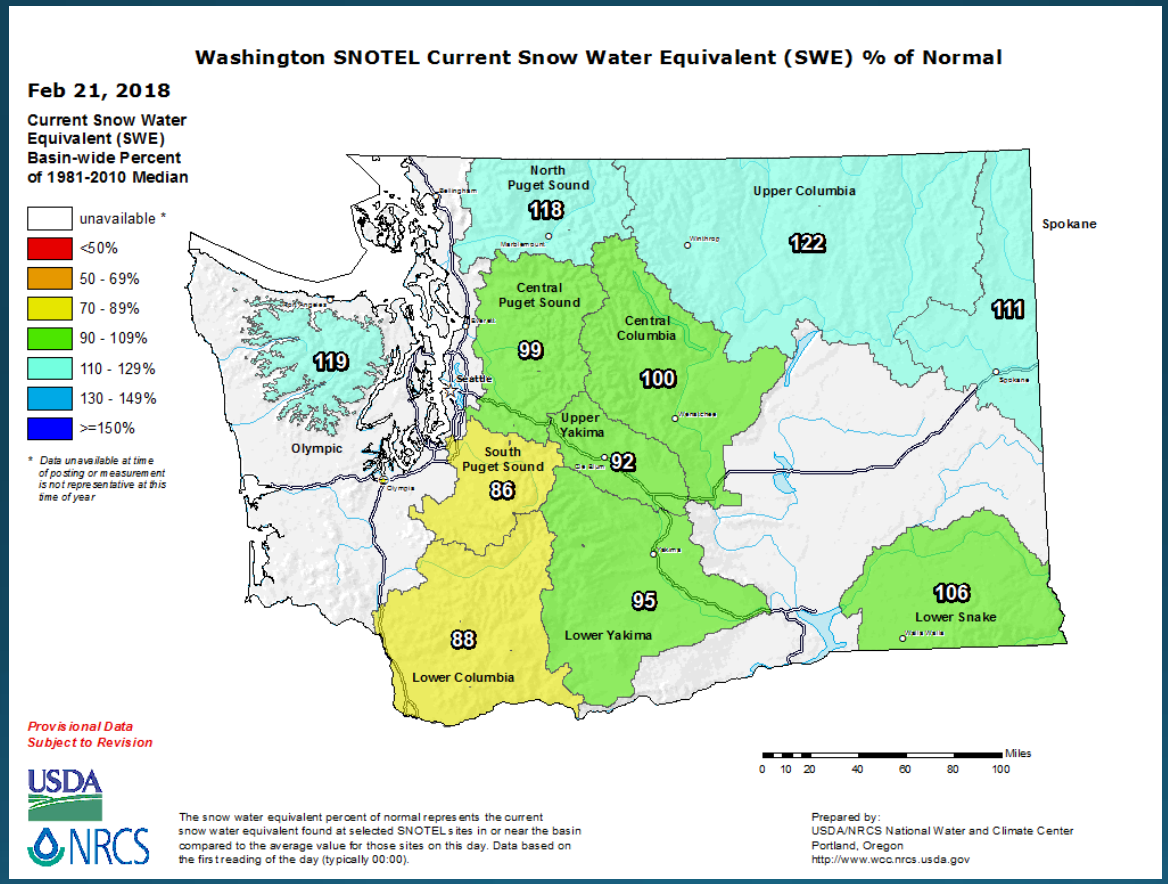
Snowpack – Feb 2017



Average snowpack

www.wcc.nrcs.usda.gov/gis/snow.html

Snowpack – Feb 2018



Average conditions at current time

www.wcc.nrcs.usda.gov/gis/snow.html

Biological Responses to the Warm Ocean

2015

Harmful algal blooms shut down crab and clam fisheries CA – AK

Reductions in zooplankton and changes to jellyfish community

Tropical fish caught in the PNW

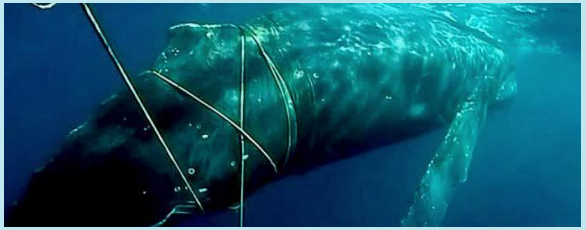
Whales feeding in estuaries

2016

Pelagic red crabs wash ashore

Food web changes continue

Anchovy increase in Salish Sea



Whales nearshore; entangled in fishing lines

2017

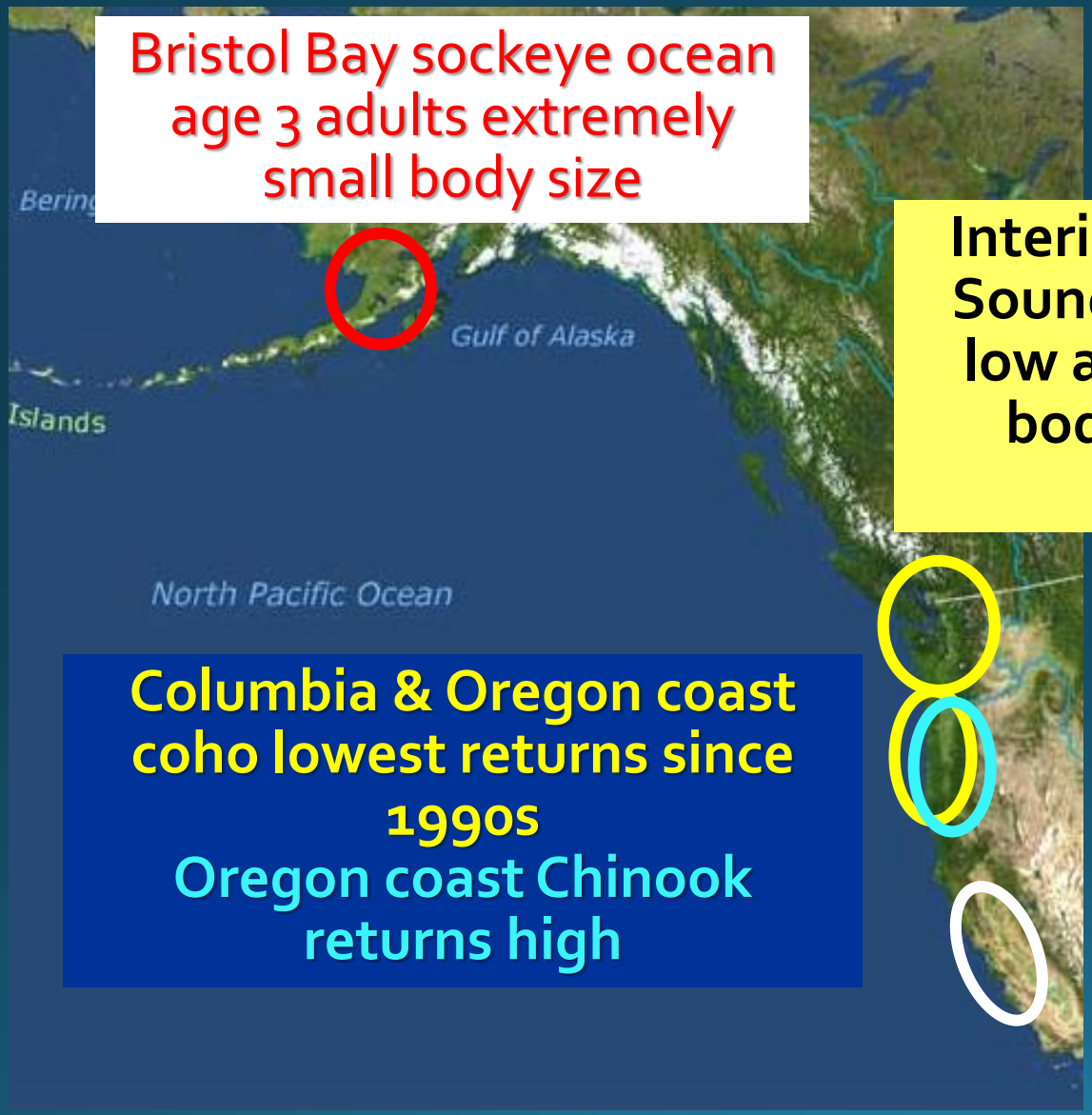
Pyrosomes explode in N Pacific

Sea bird die offs in Bering Sea

Pacific cod collapse in Gulf of AK

Sea lion abundance increasing in PNW

Unusual salmon observations in **2015**

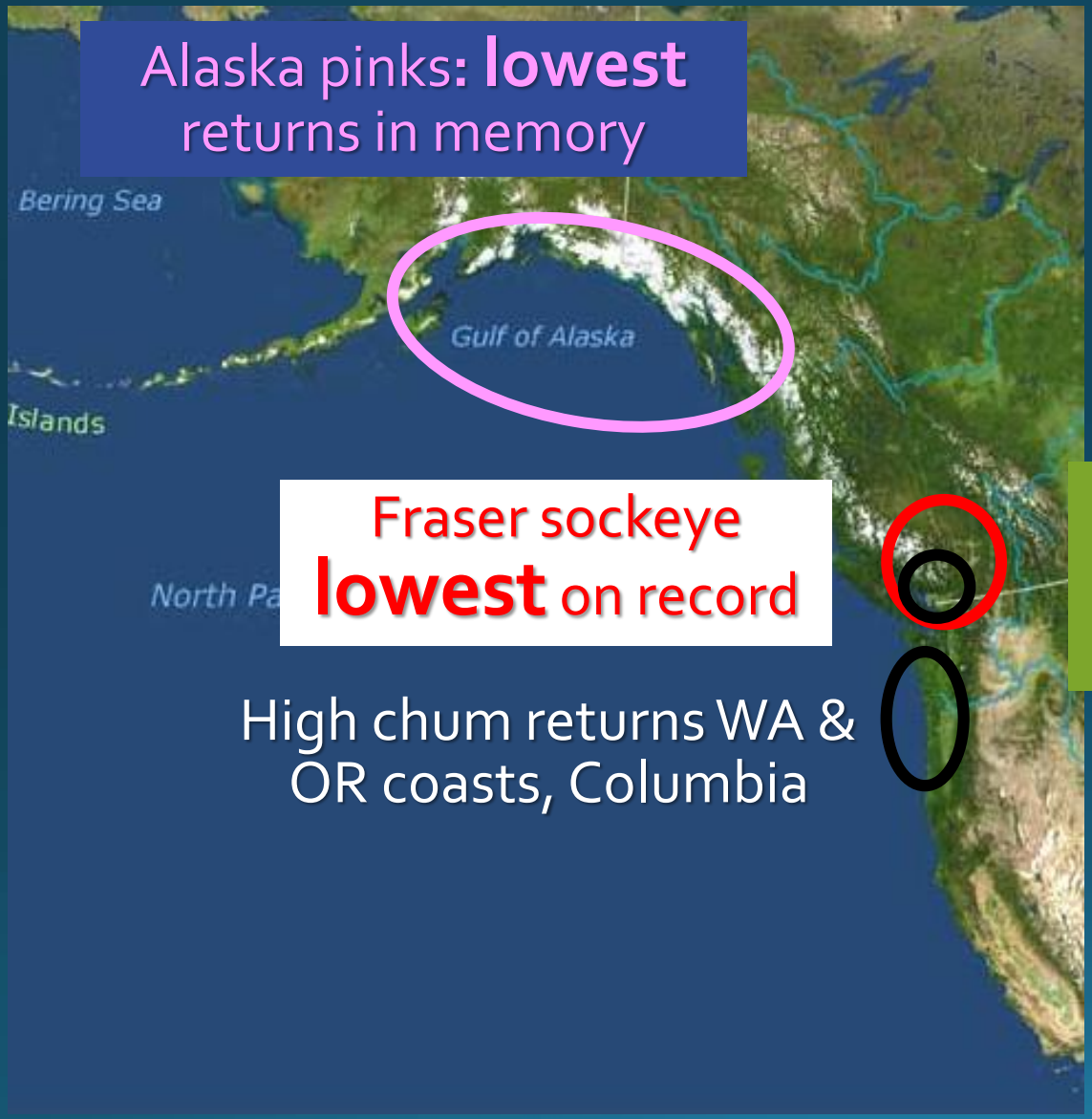


Interior Fraser & Puget Sound coho extremely low abundance, small body size, and low fecundity

Extremely low downstream survival Central Valley Chinook & steelhead (drought)

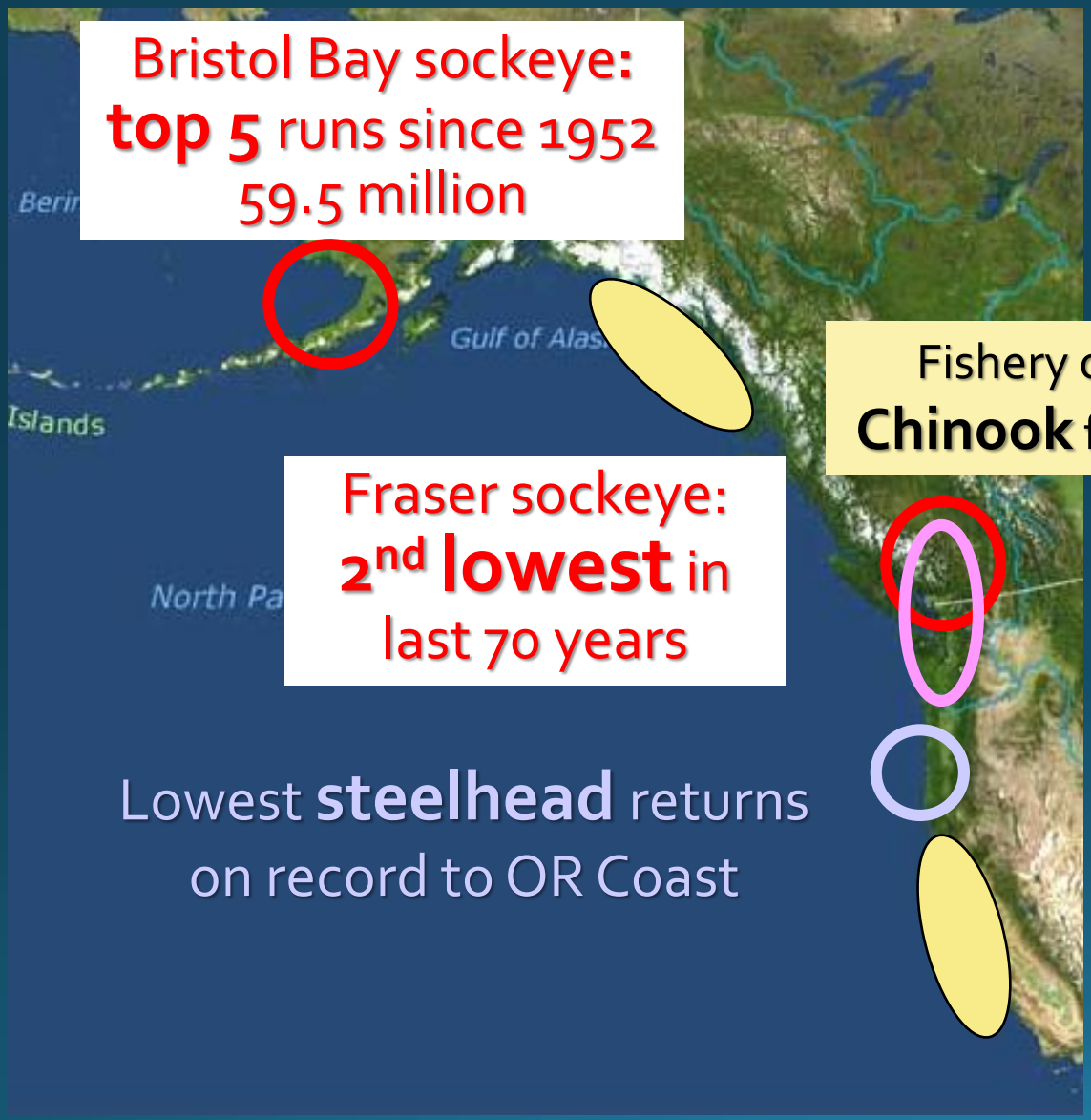
Modified from L. Weitkamp

Unusual salmon observations in **2016**



Modified from L. Weitkamp

Unusual salmon observations in **2017**



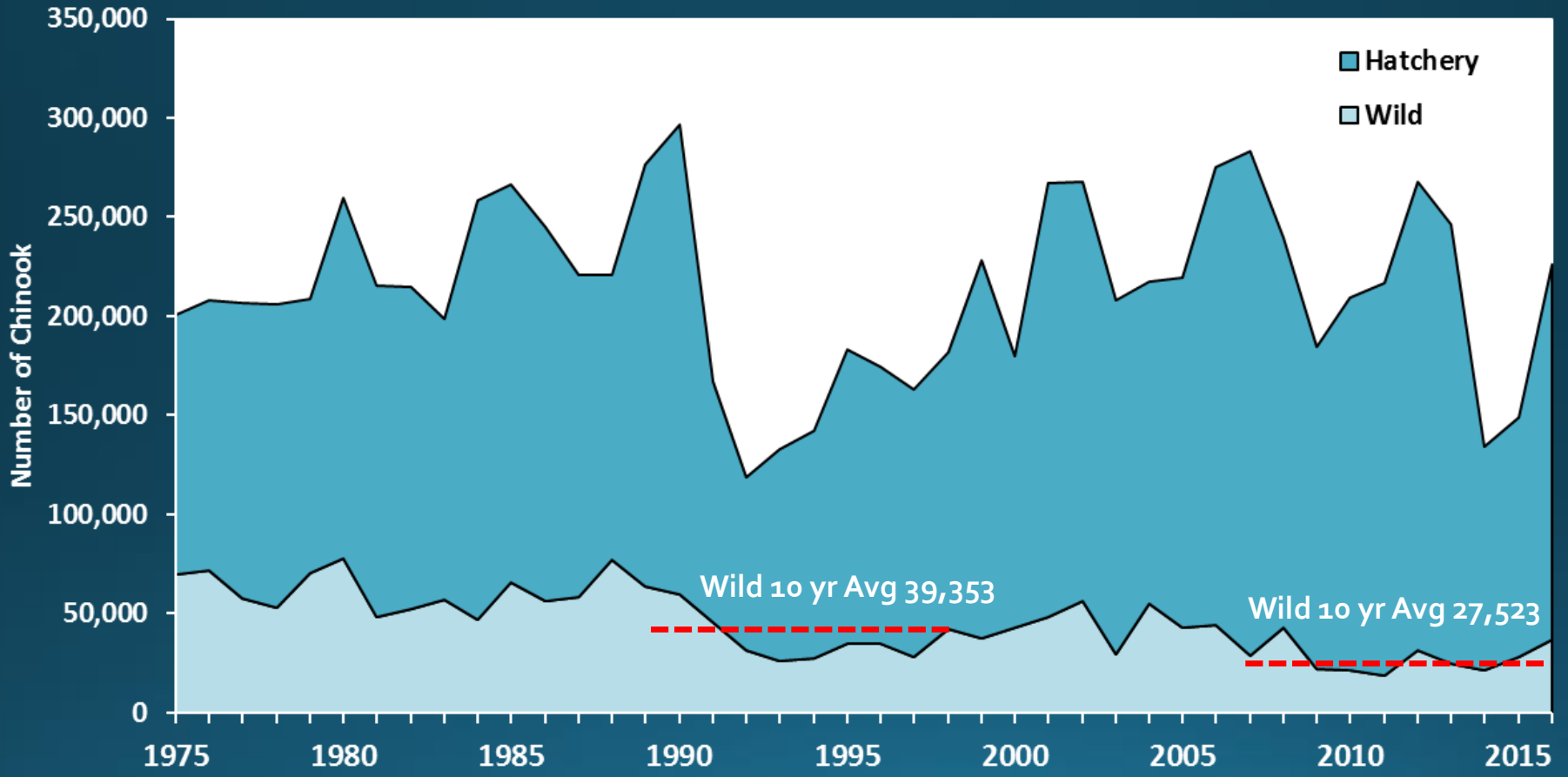
Modified from L. Weitkamp

Questions?

WA Coast and Puget Sound 2017 Returns and 2018 Forecasts

Chinook Salmon

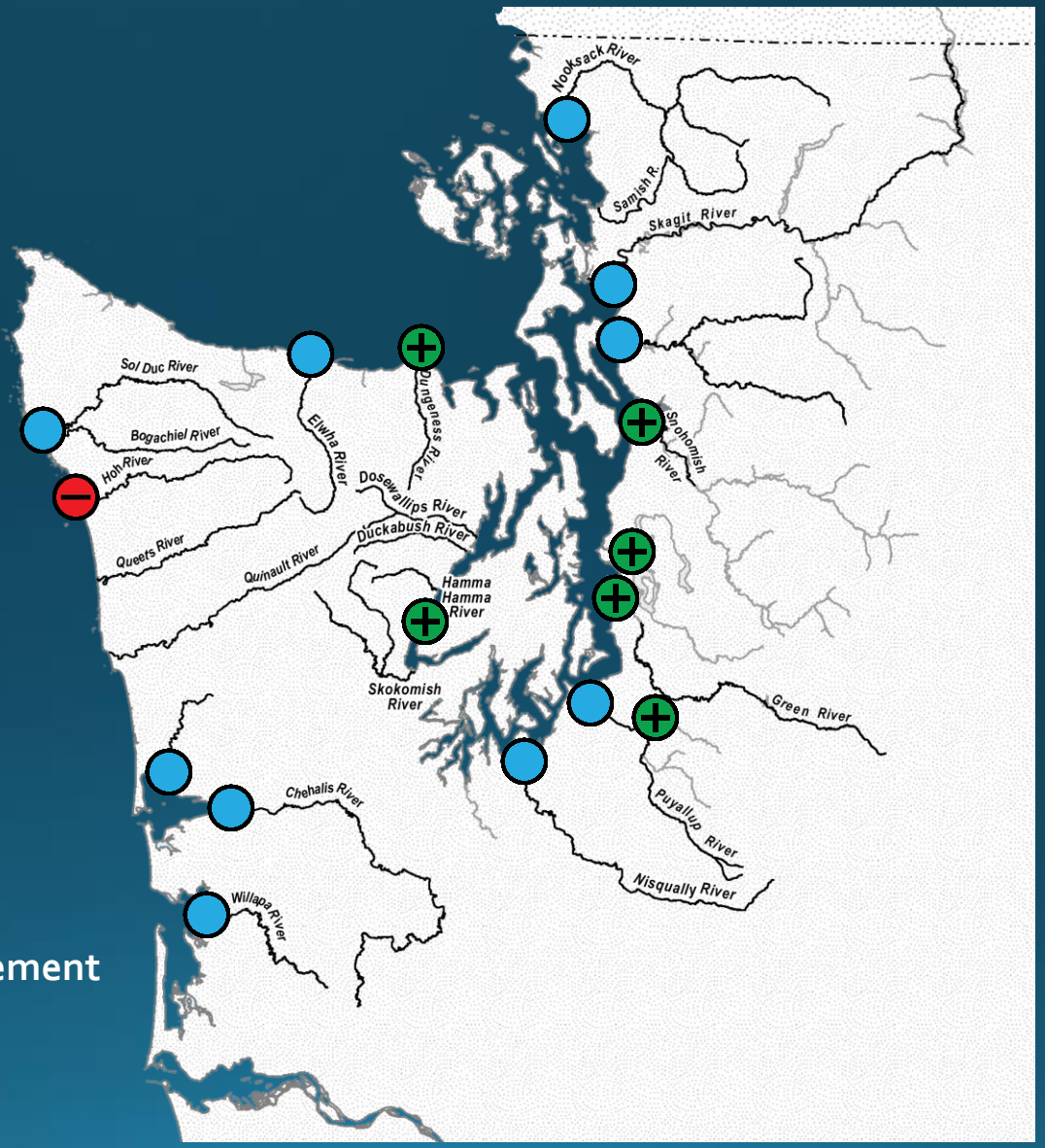
Chinook Historical Runsize – Puget Sound



Wild Chinook ⬇~30% since 10yr avg. prior to listing under ESA in 1999

2017 Wild Fall Chinook Returns

- All returns are preliminary
- Returns range from Neutral to Good in Puget Sound
- Poor to Neutral on Coast

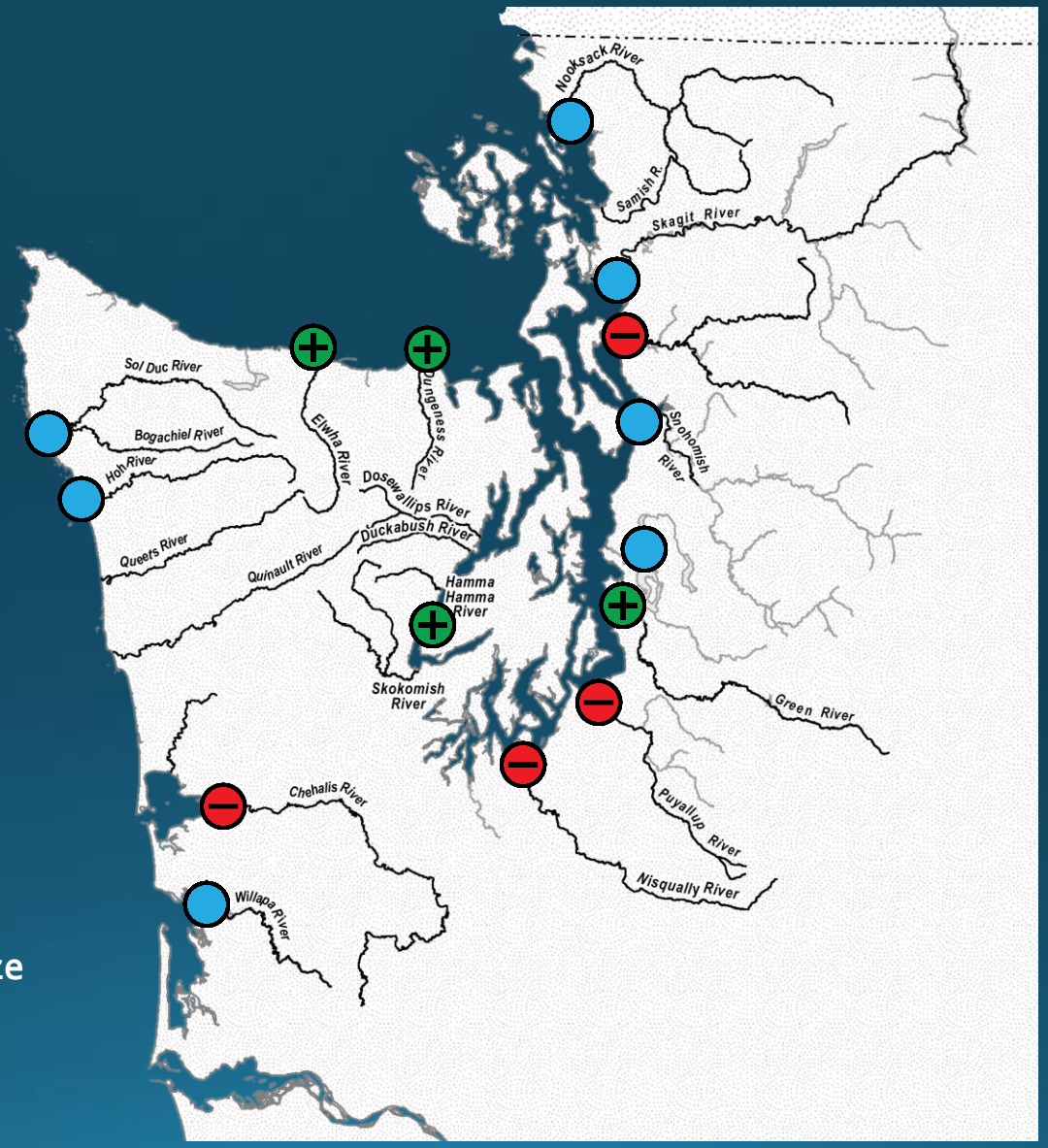


Relative to Recent 10yr Avg. Escapement

- Good > 125%
- Neutral 75-125%
- Poor < 75%

2018 Wild Fall Chinook Forecasts

- Forecasts in Puget Sound and Coast range from Poor to Good
- Poor to Neutral on Coast
  - Queets and Quinault forecasts not available

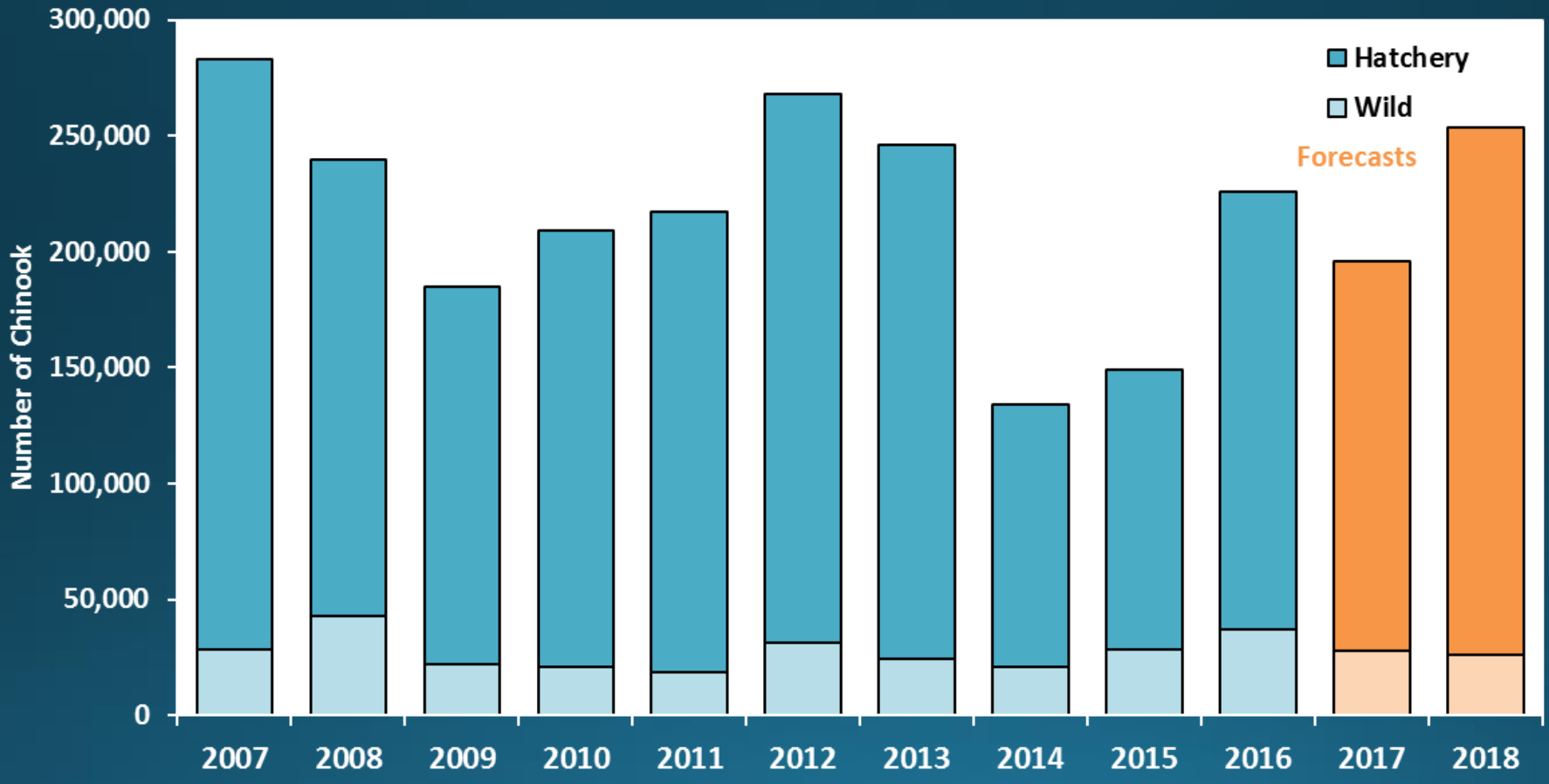


Relative to Recent 10yr Avg. Runsize

- Good > 125%
- Neutral 75-125%
- Poor < 75%

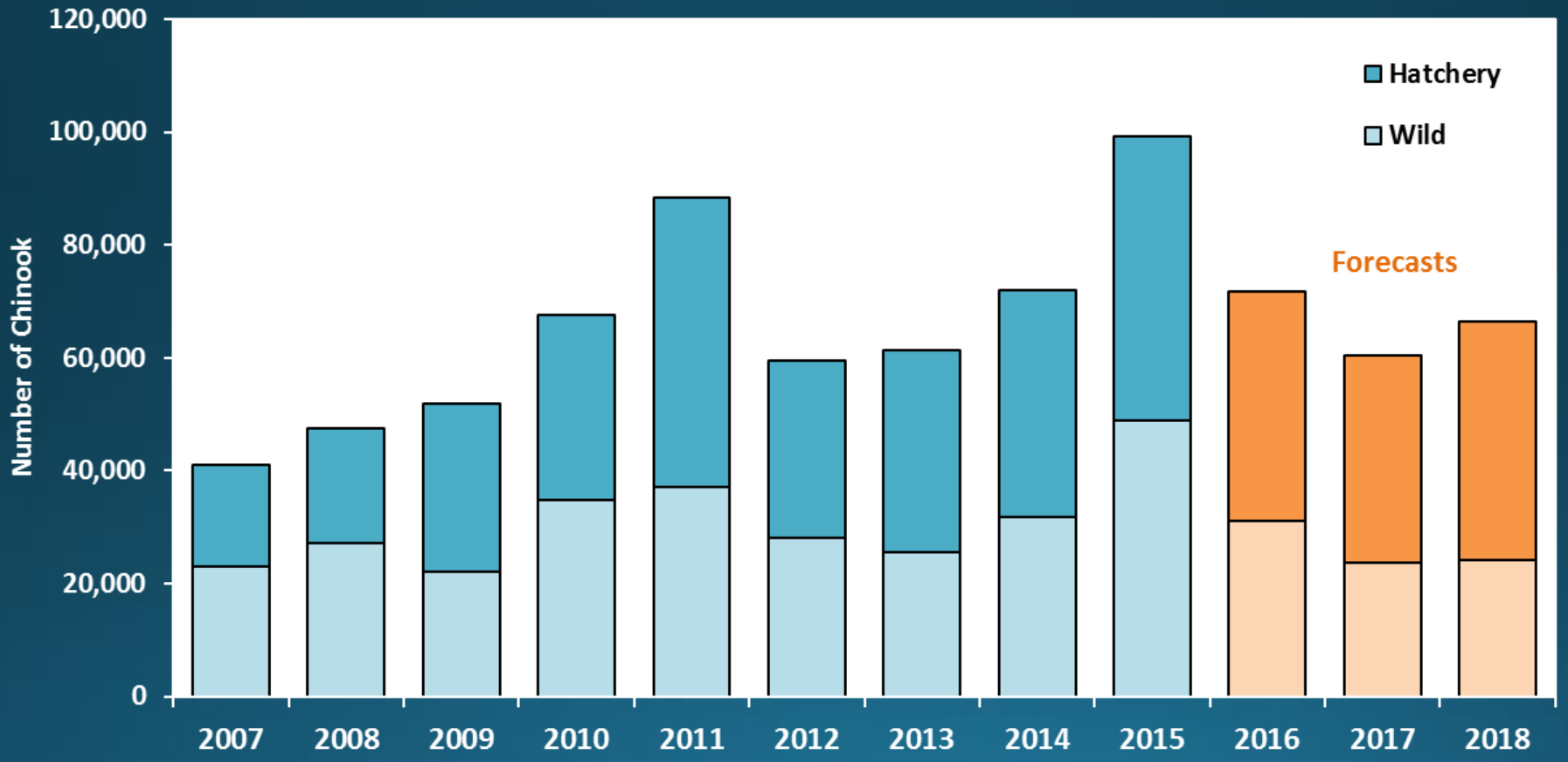
P. Sound Hatchery Chinook Forecasts

Puget Sound hatchery Chinook forecast ⬆21% from recent 10 year avg
(⬆35% from 2017 forecast)



Coastal Chinook Forecasts

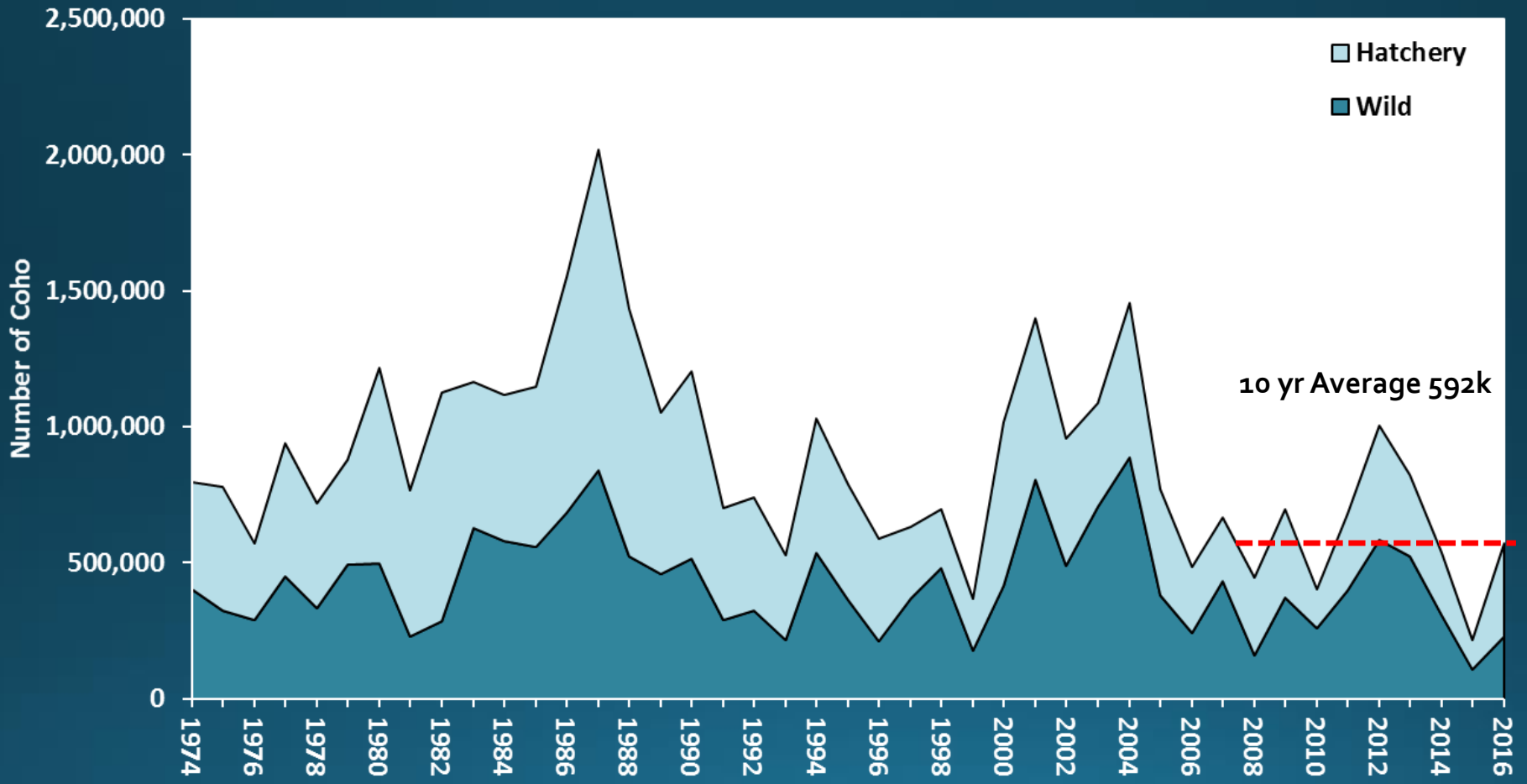
Coastal Wild Chinook forecast ⬇23% and hatchery Chinook forecast ⬆21% from recent 10 yr avg.



*Excludes Queets and Quinault

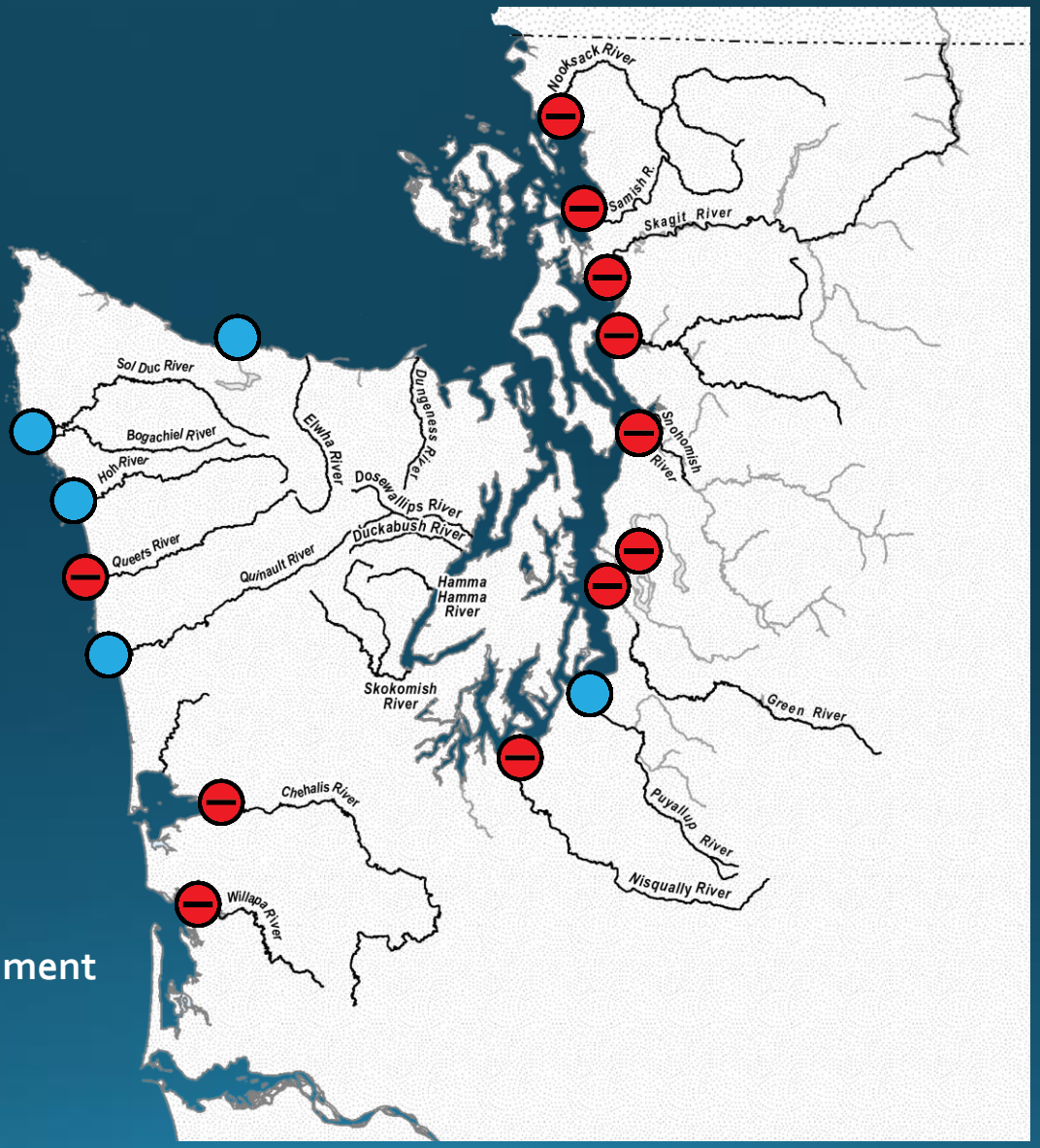
Coho

Coho Historical Runsize – Puget Sound



2017 Wild Coho Returns

- All returns are preliminary
- Returns ranged from Poor to Neutral for Puget Sound and Coast
- No data available for several stocks

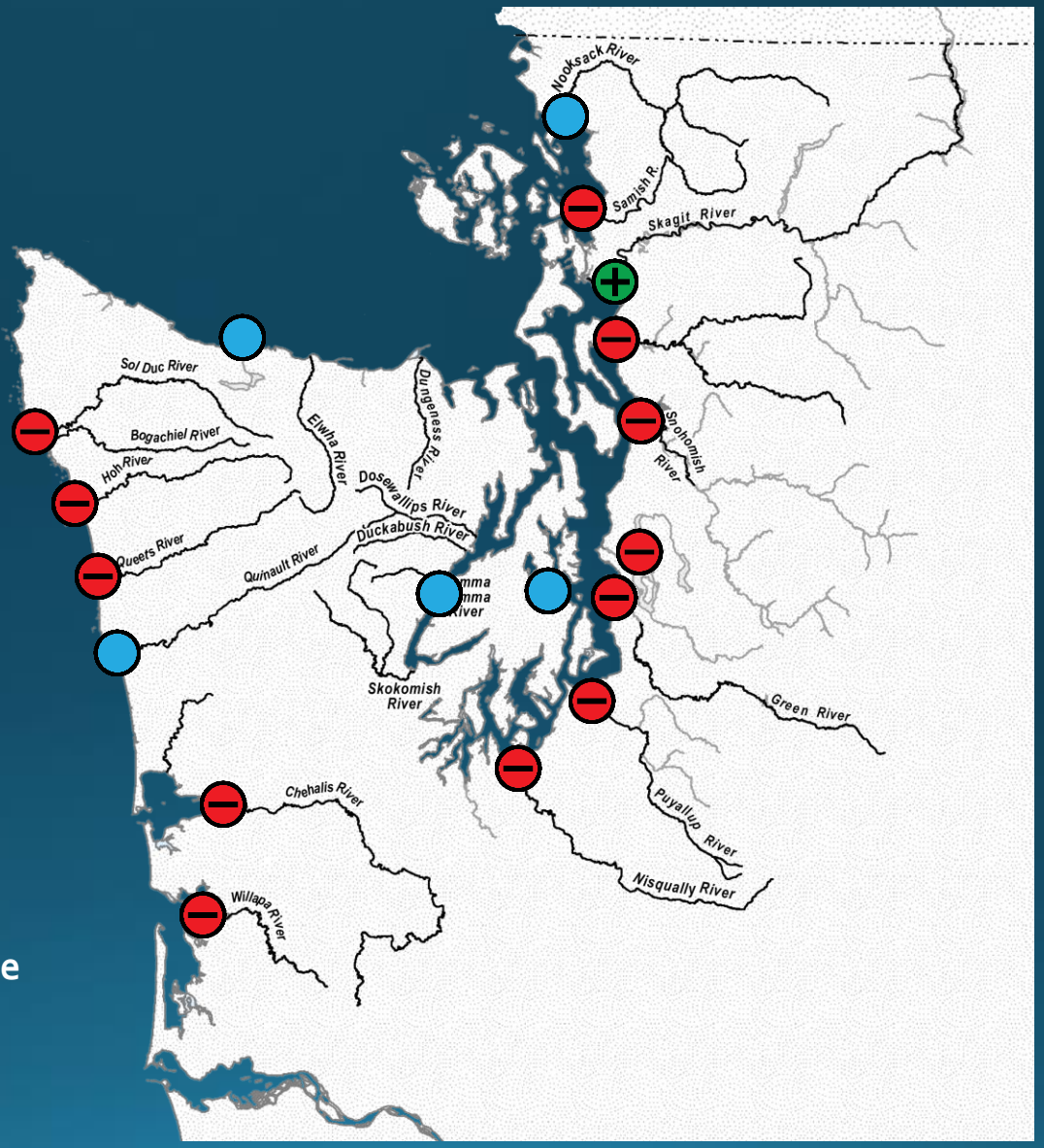


Relative to Recent 10yr Avg. Escapement

- Good > 125%
- Neutral 75-125%
- Poor < 75%

2018 Wild Coho Forecasts

- Forecasts range from Poor to Neutral across Puget Sound and coast
  - Exception Skagit – poor recent returns contribute to "Good" categorization

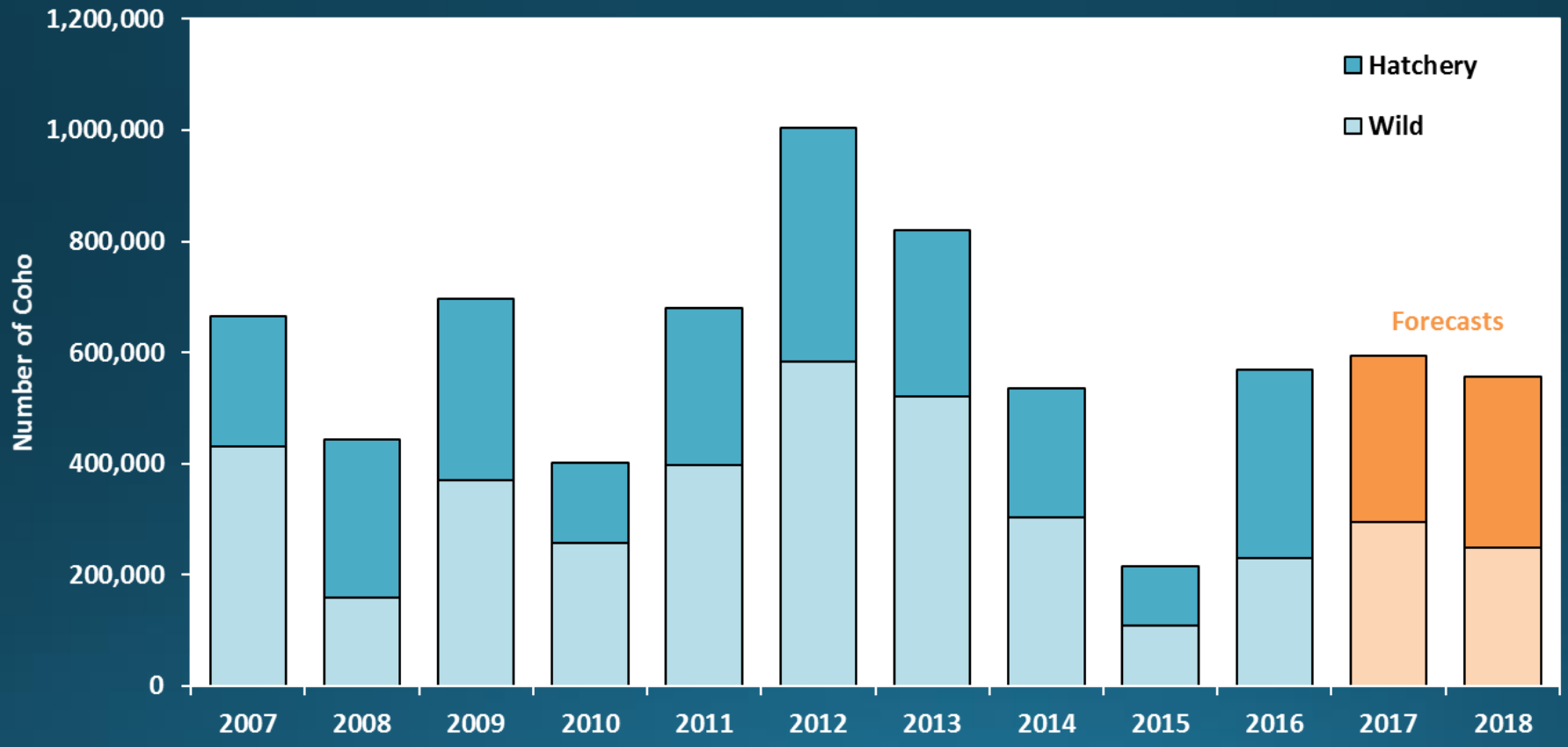


Relative to Recent 10yr Avg. Runsize

- Good > 125%
- Neutral 75-125%
- Poor < 75%

P. Sound Coho Forecasts

Aggregate Puget Sound Coho forecast ⬇ 6% from recent 10 year avg.
(⬇ 6% from 2017 forecast)

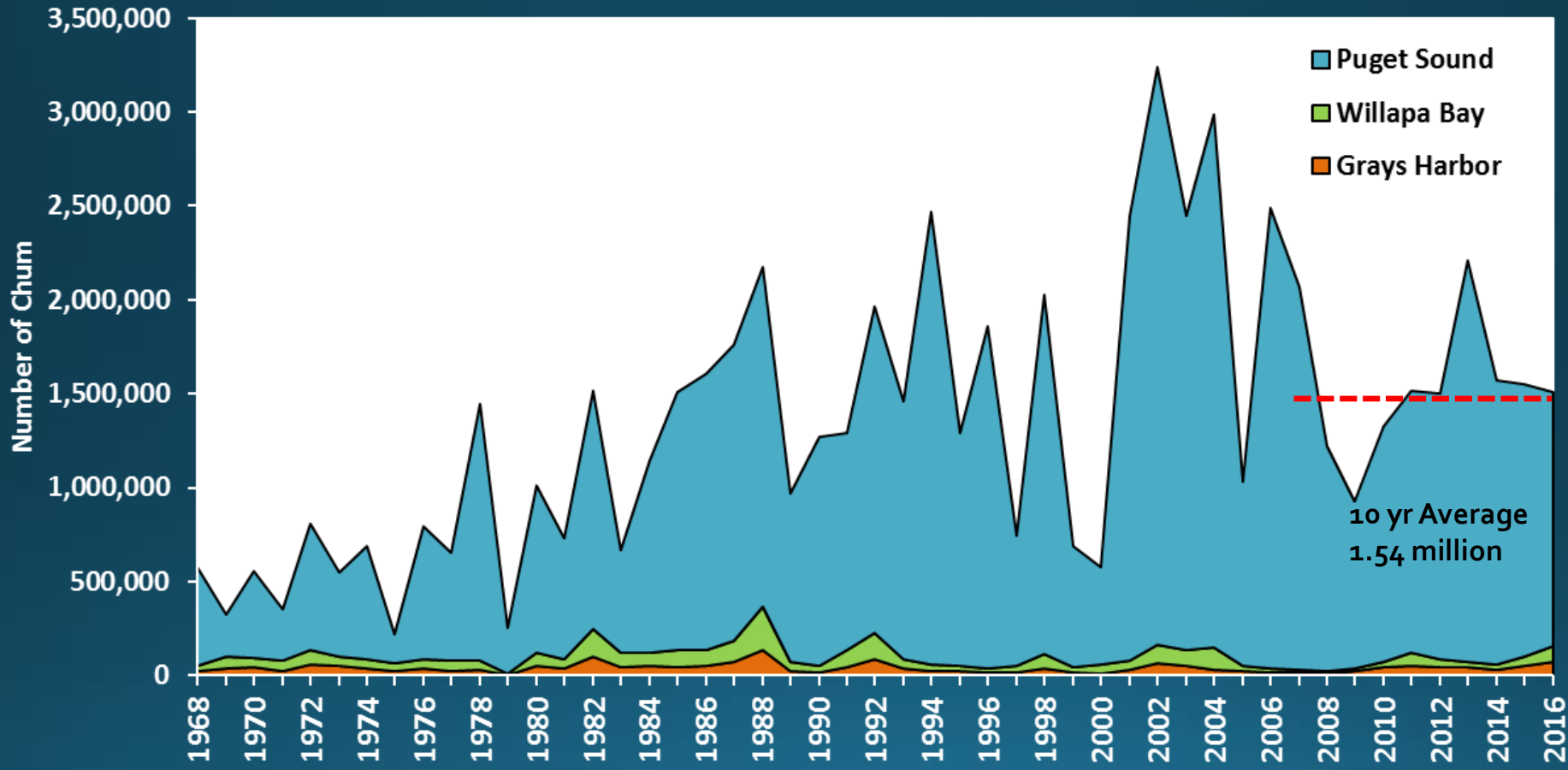


Pink

No preliminary return information available – indication 2017 return likely below forecast in most watersheds

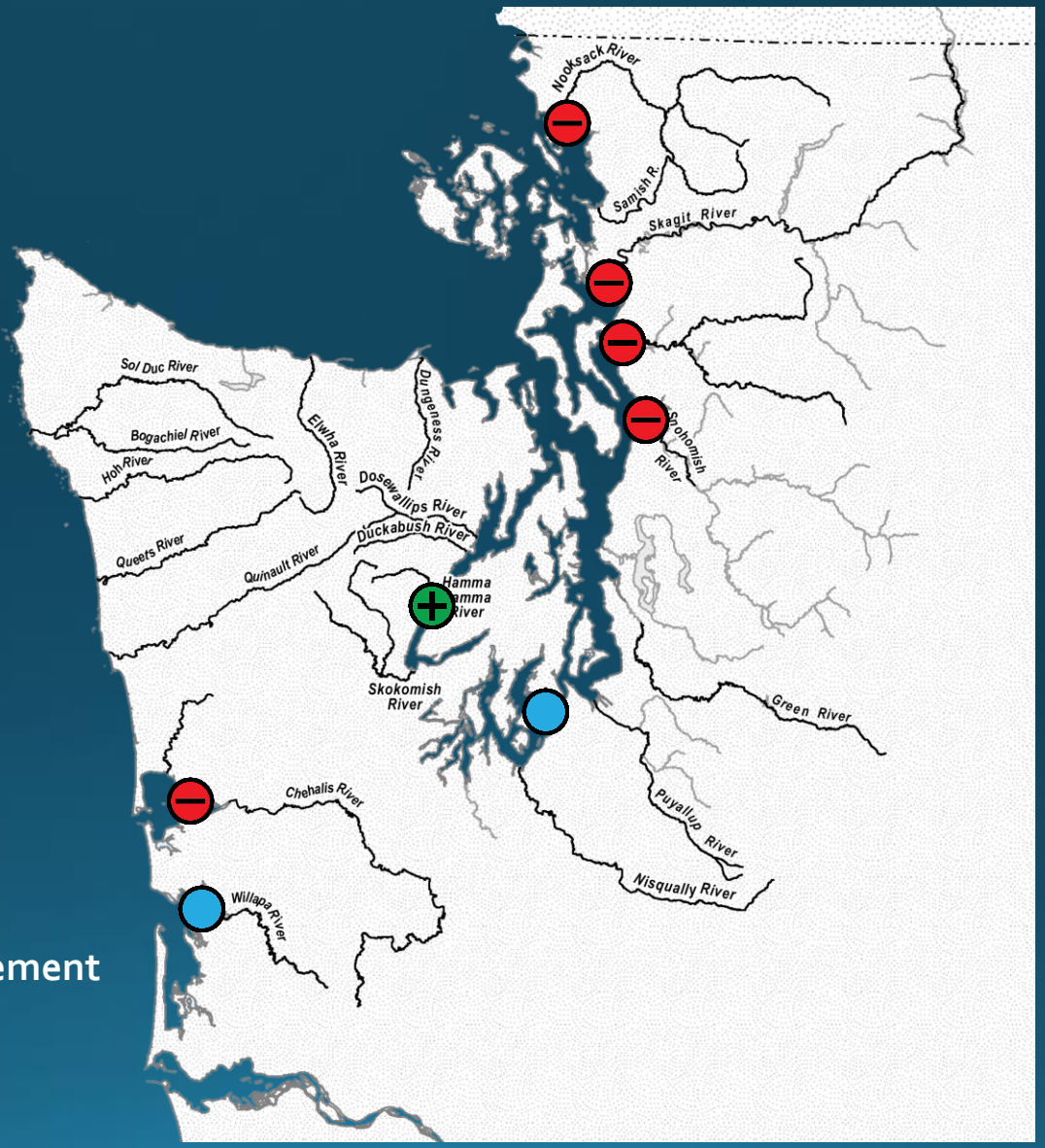
Chum

Chum Historical Runsize



2017 Fall Chum HOR/NOR Returns

- Returns were Poor for N. Sound Rivers
- Neutral to Good in SS and HC
- HC and SS are relative to in-season updated runsizes, not escapement

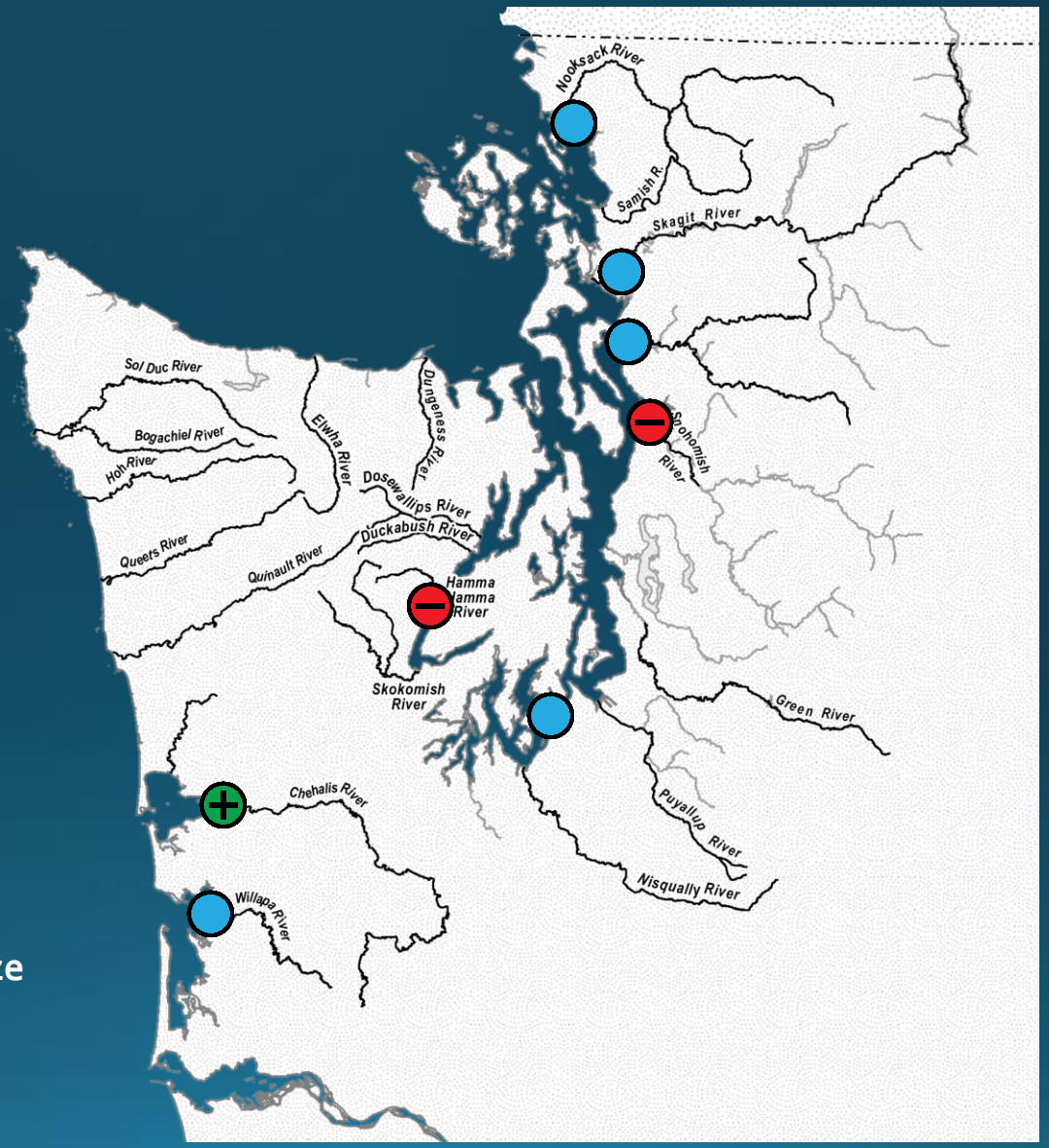


Relative to Recent 10yr Avg. Escapement

- Good > 125%
- Neutral 75-125%
- Poor < 75%

2018 Fall Chum HOR/NOR Forecast

- Forecasts range from Good to Poor
- Hood Canal - 497k
- Central/S. Sound – 543k
- Coast – Willapa – 40k
  Grays H – 61k

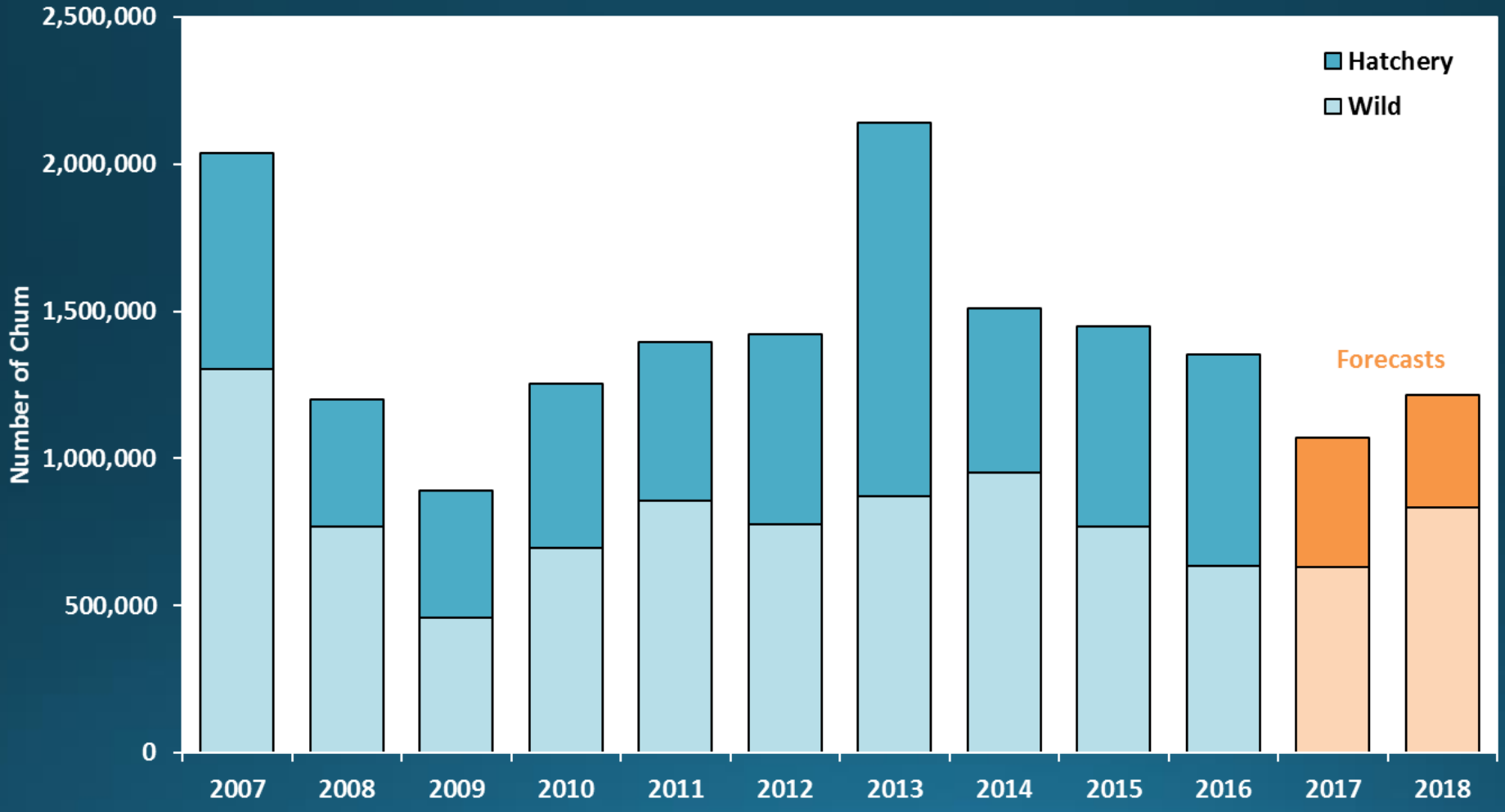


Relative to Recent 10yr Avg. Runsize

- Good > 125%
- Neutral 75-125%
- Poor < 75%

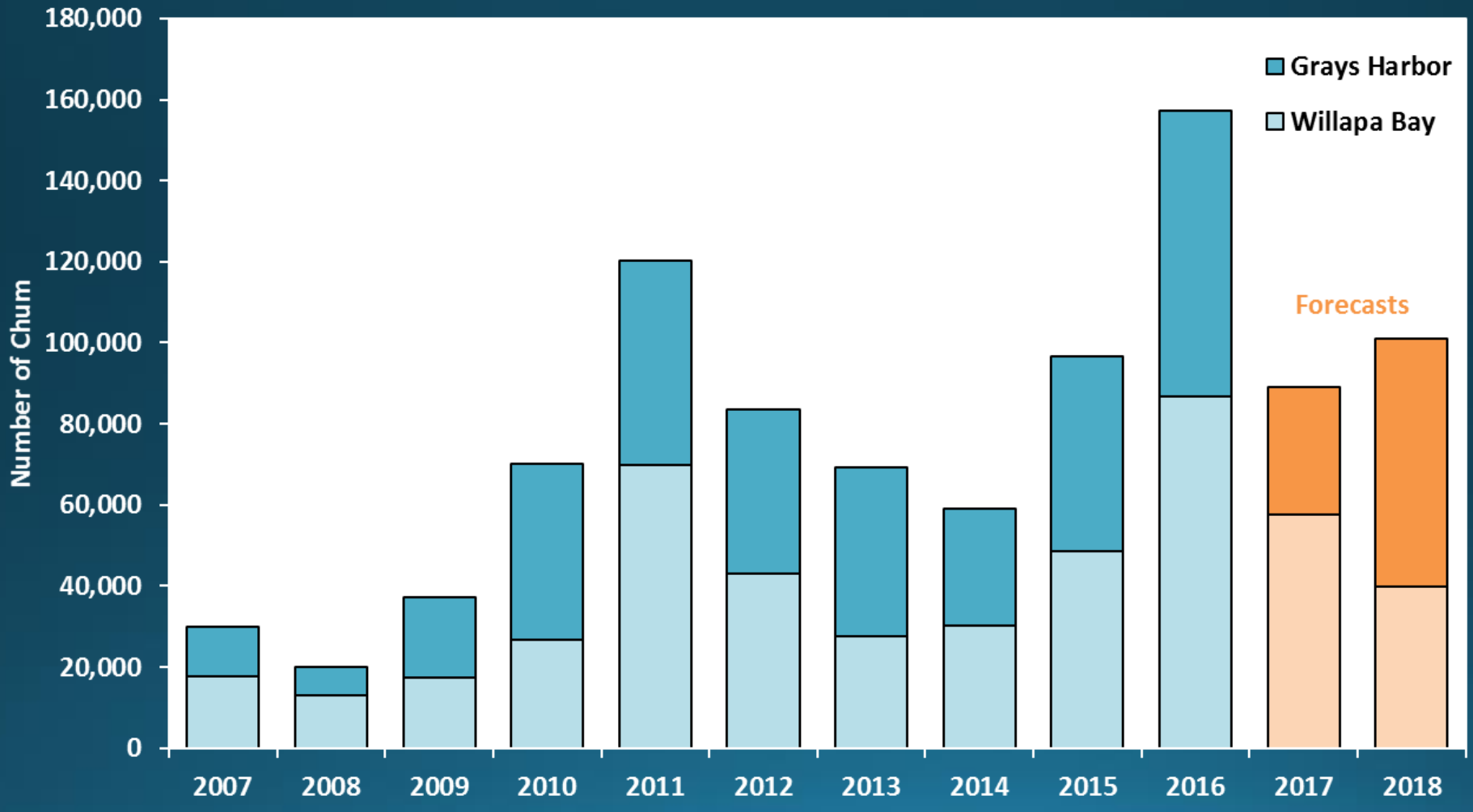
Puget Sound Chum Forecasts

Hatchery ⬇ 42% and Wild ⬆ 3% over recent 10 year avg.



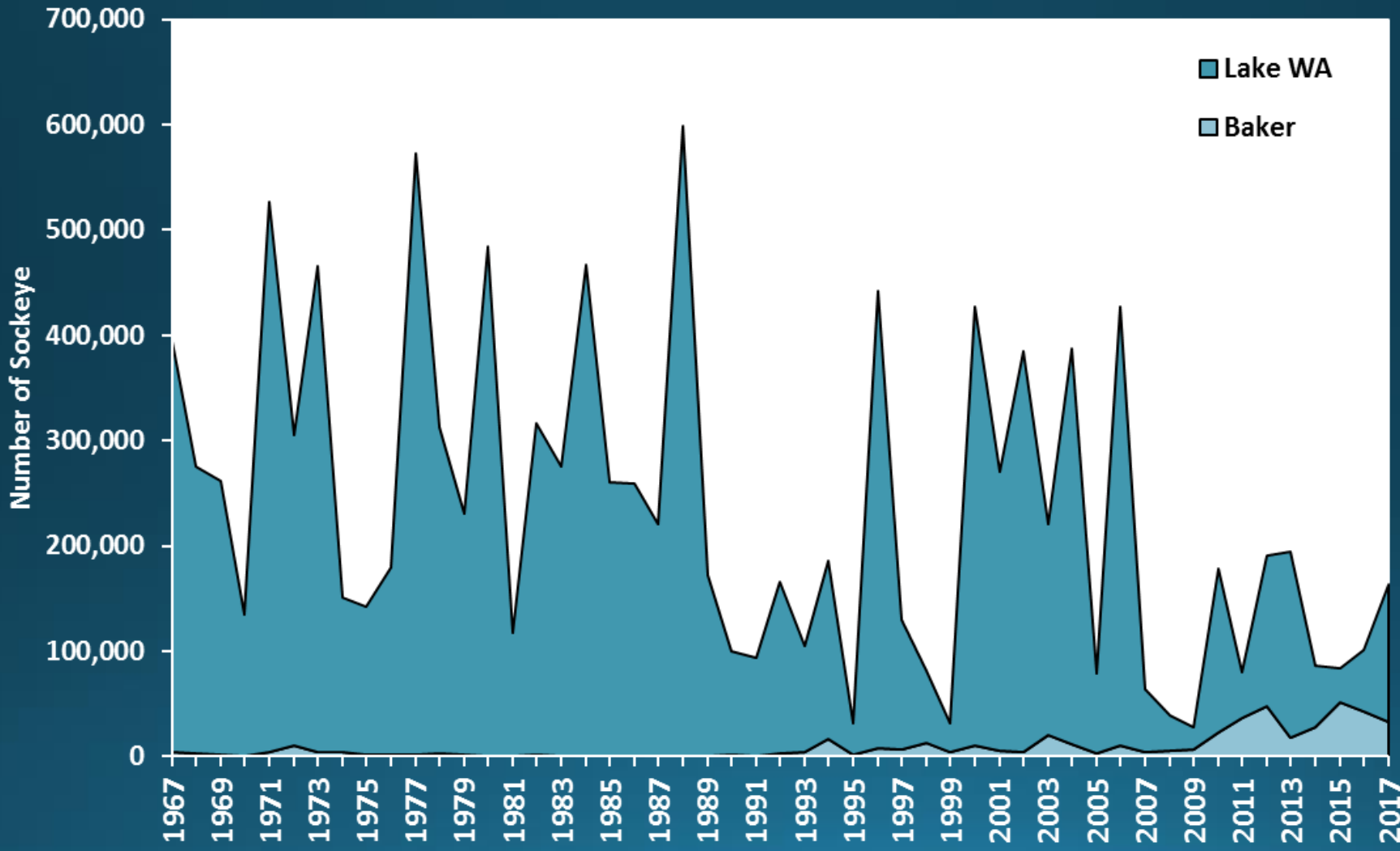
Coastal Chum Forecasts

Willapa Bay ⬆ 5% and Grays Harbor ⬆ 69% over recent 10 year avg.



Sockeye

Puget Sound Sockeye Runsize



2017 Sockeye HOR/NOR Returns

- Returns ranged from Neutral to Good in Puget Sound
- Columbia Return was Poor
- Baker and Lake Wa relative to total runsize

Relative to Recent 10yr Avg. Escapement

- Good > 125%
- Neutral 75-125%
- Poor < 75%

2018 Sockeye HOR/NOR Forecast

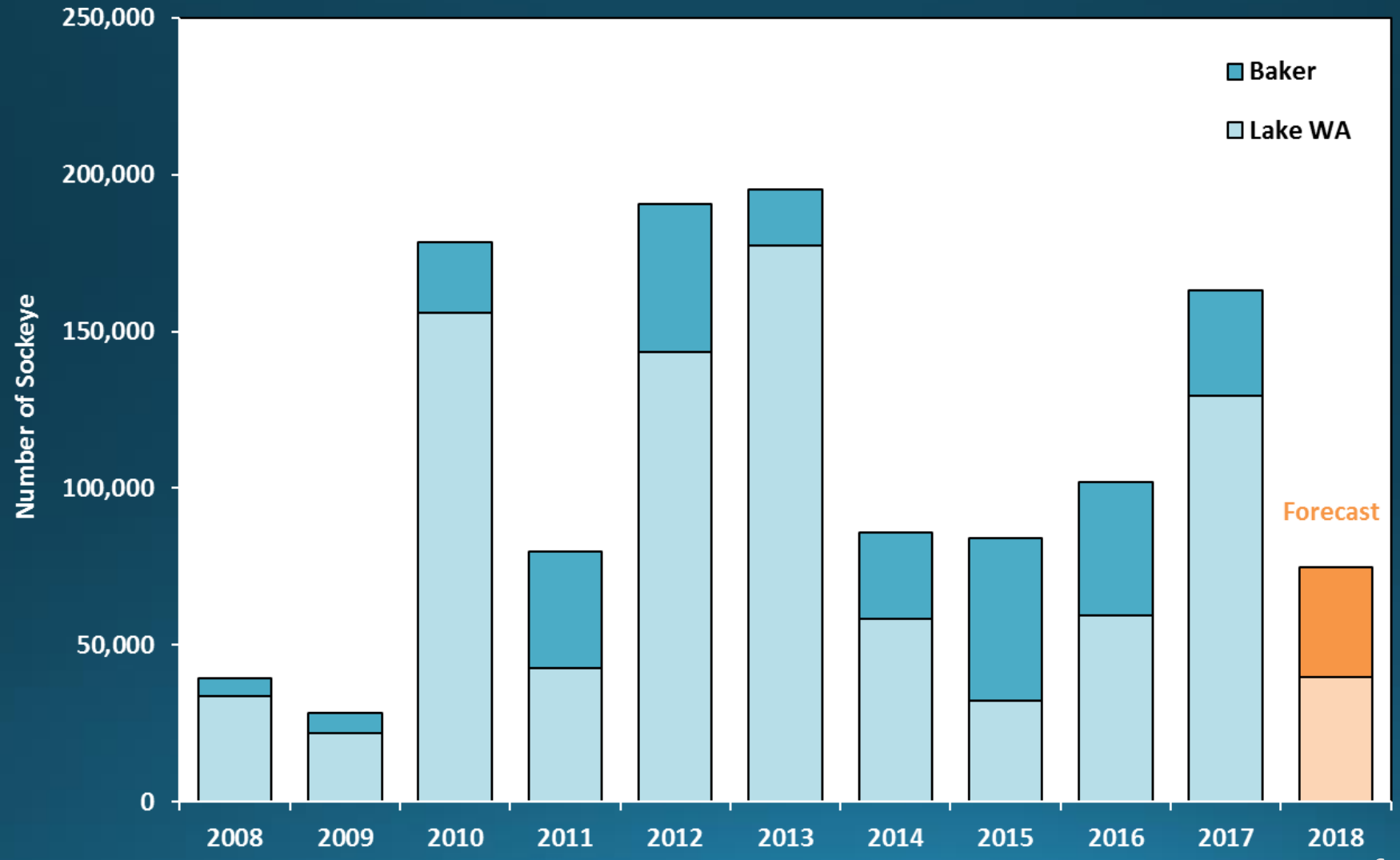
- Baker Lake – 35k
- Lake WA – 40k
- Columbia river - 98k

Relative to Recent 10yr Avg. Runsize

- Good > 125%
- Neutral 75-125%
- Poor < 75%

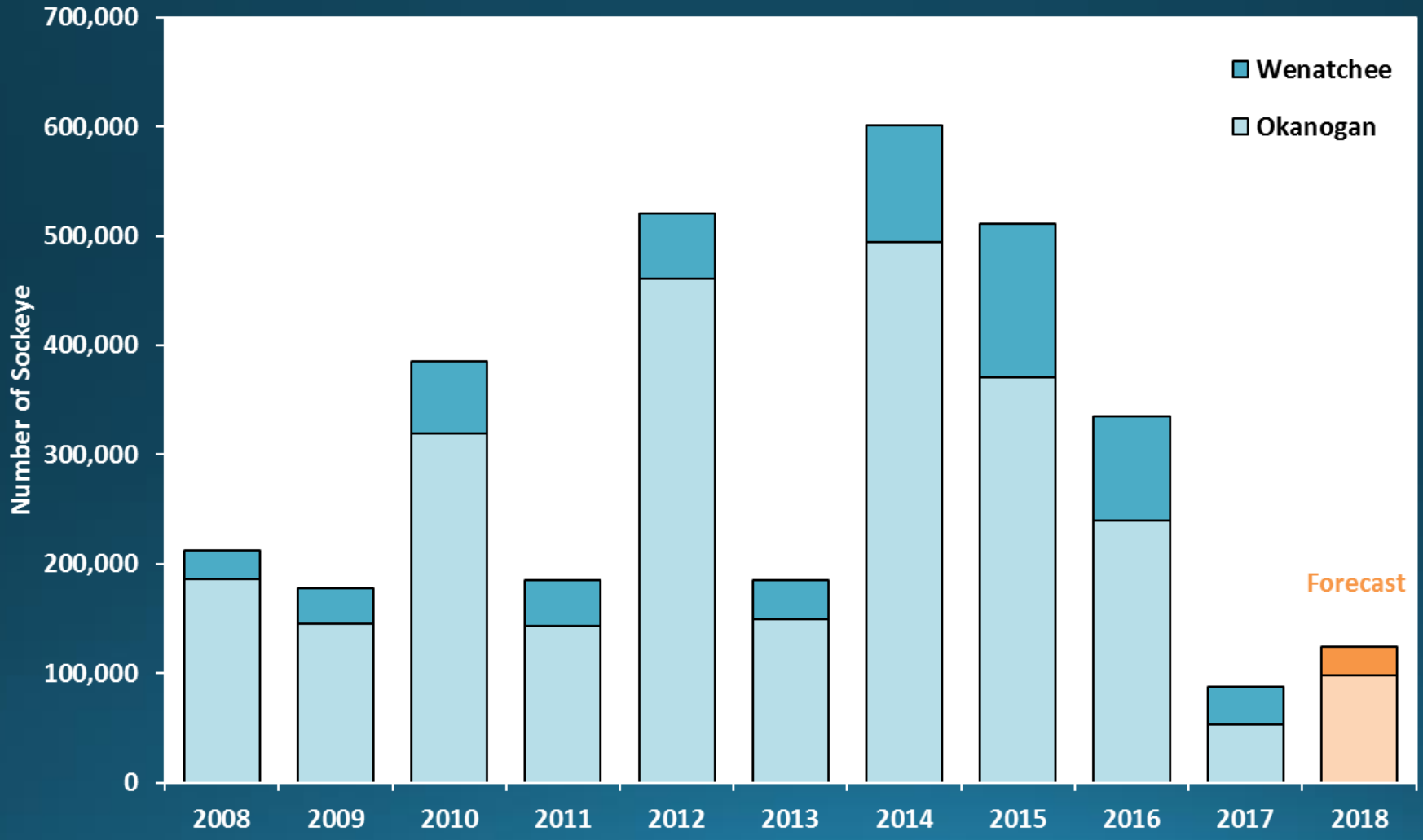
Puget Sound Sockeye Forecasts

Lake WA ⬇ 53% and Baker ⬆ 20% over recent 10 year avg.



Columbia Sockeye Forecasts

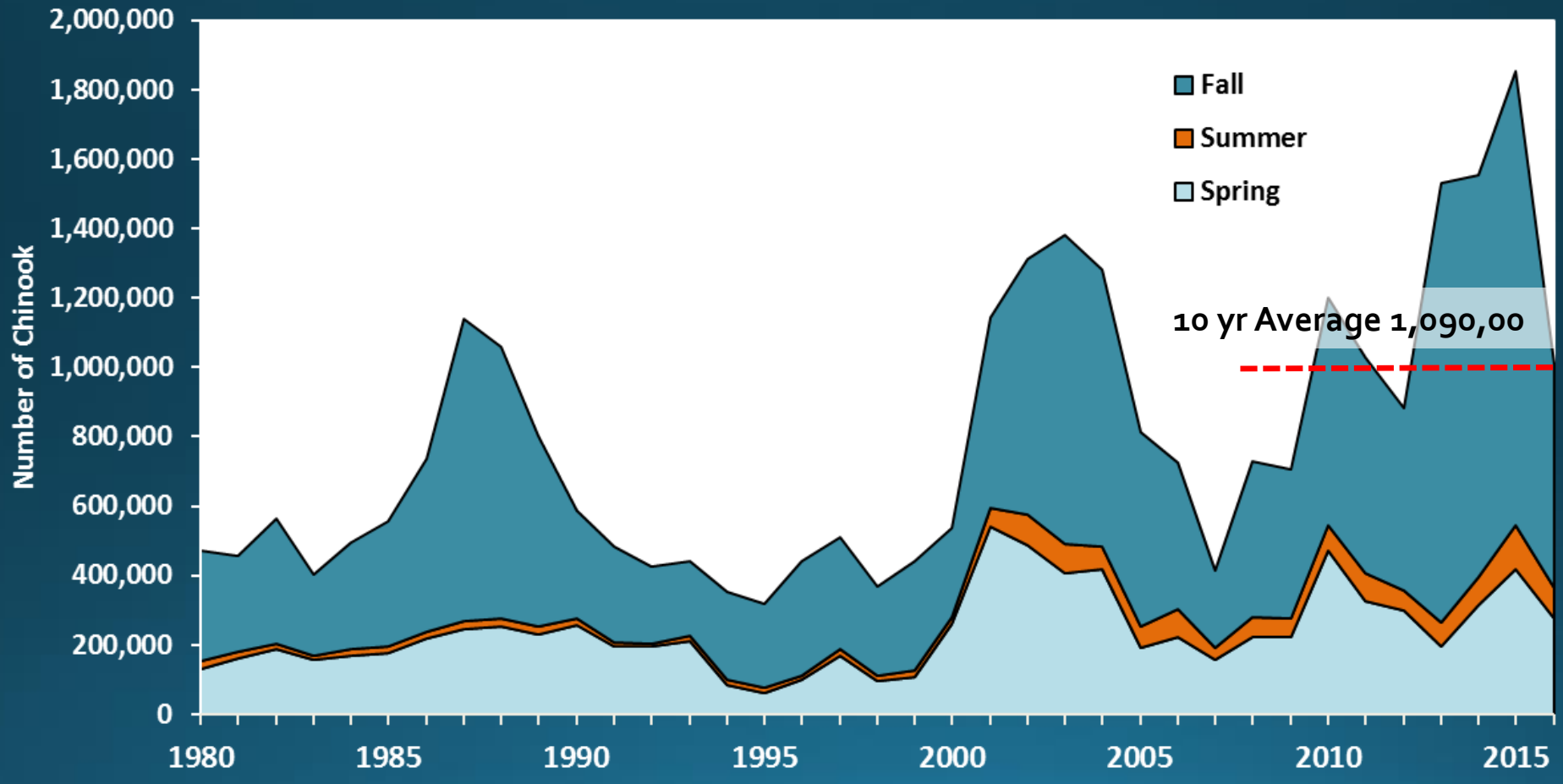
Lake Wenatchee ⬇ 60% and Okanogan ⬇ 62% over recent 10 year avg.



WA Columbia River Chinook and Coho 2017 Returns and 2018 Forecasts

Chinook Salmon

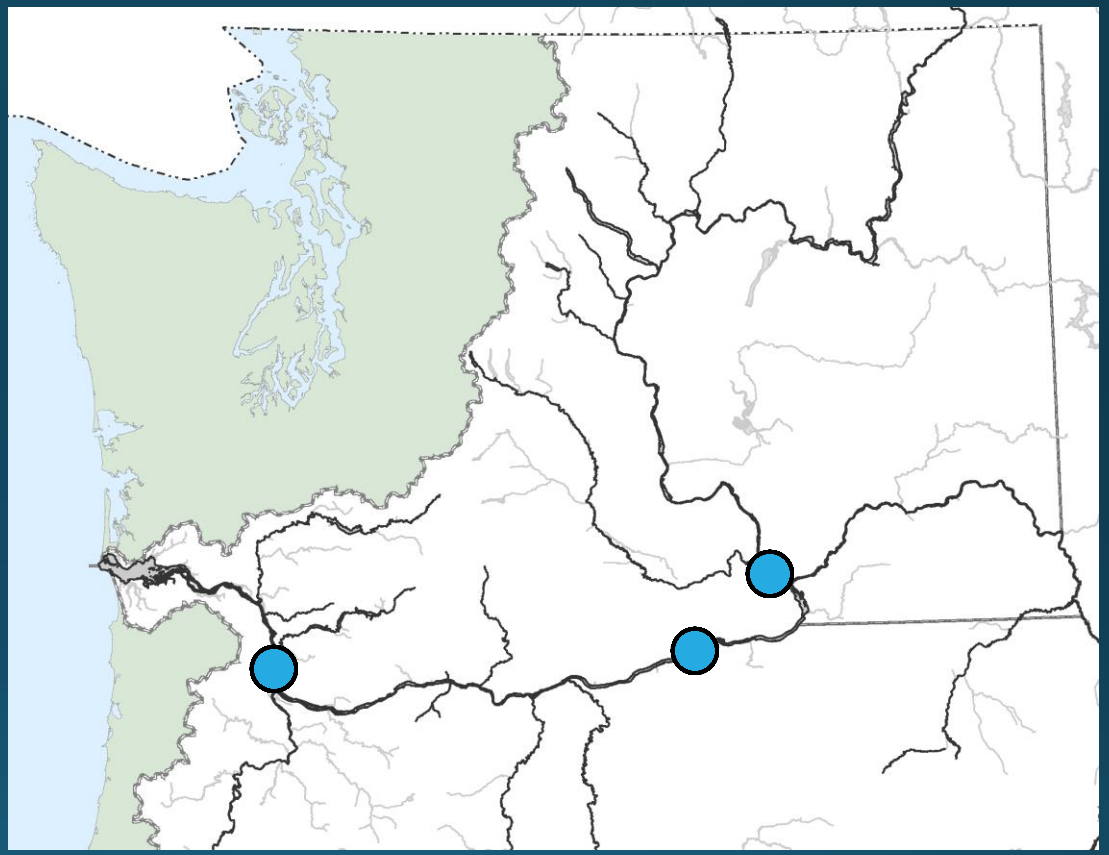
Chinook Historical Runsize – Columbia River



2017 Spring/Summer Chinook Returns

All returns are preliminary and returns range from

- Lower Spring – 93k (90%)
- Upriver Spring – 160k (81%)
- Summer – 68k (95%)



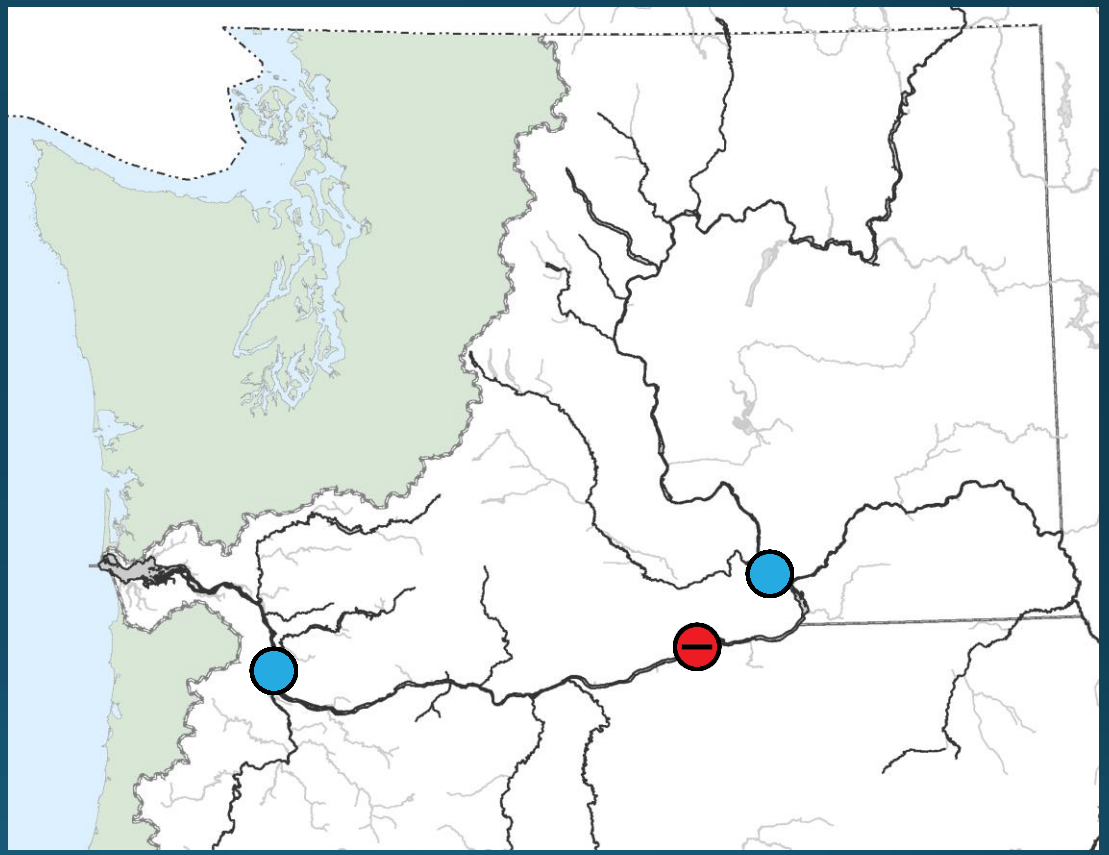
Relative to Recent 10yr Avg. Escapement

- Good > 125%
- Neutral 75-125%
- Poor < 75%

2018 Spring/Summer Chinook Forecasts

Forecasts in Columbia River range from

- Lower Spring – 82k (90%)
- Upriver Spring – 167k (58%)
- Summer - 67k (93%)



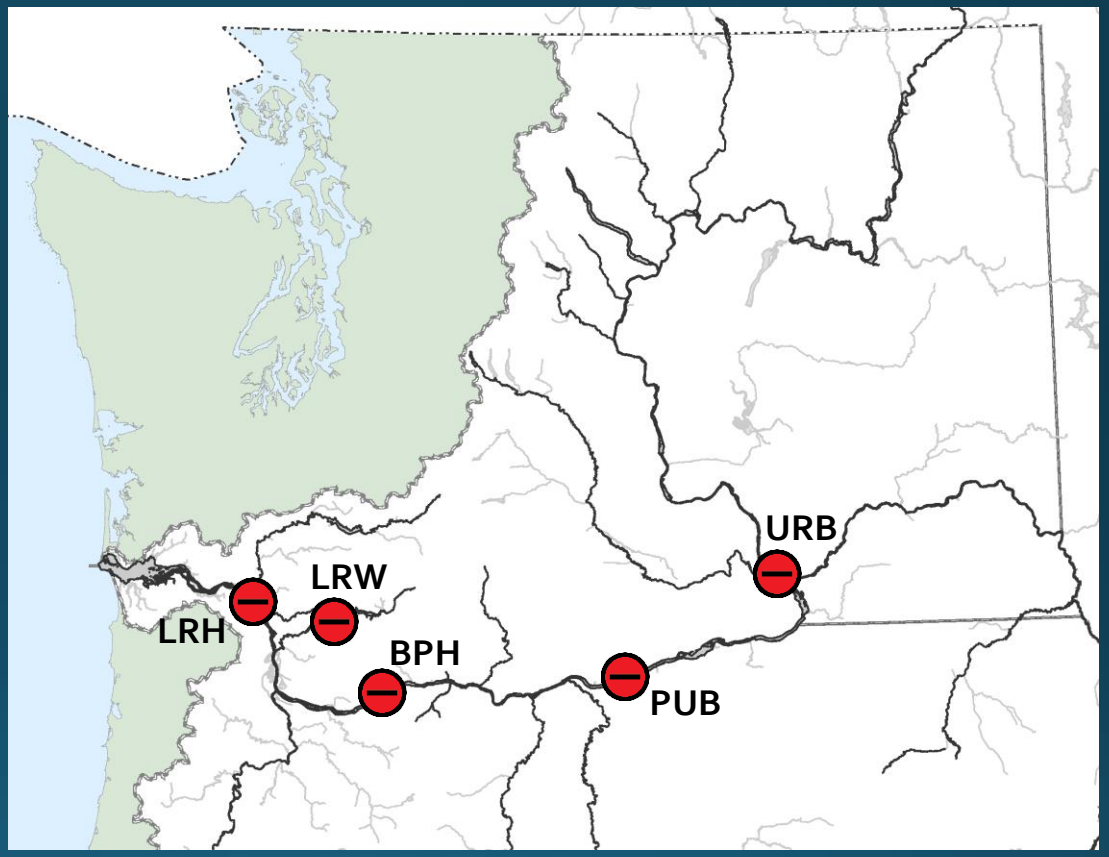
Relative to Recent 10yr Avg. Runsize

- Good > 125%
- Neutral 75-125%
- Poor < 75%

2017 Fall Chinook Returns

All returns are preliminary and range from

- LRH (Lower River Hatchery) – 64k (73%)
- LRW (Lower River Wild) – 7.8k (50%)
- BPH (Bonneville Pool Hatchery) – 48k (58%)
- URB (Upriver Bright) – 297k (72%)
- PUB (Pool Upriver Bright) – 46k (55%)



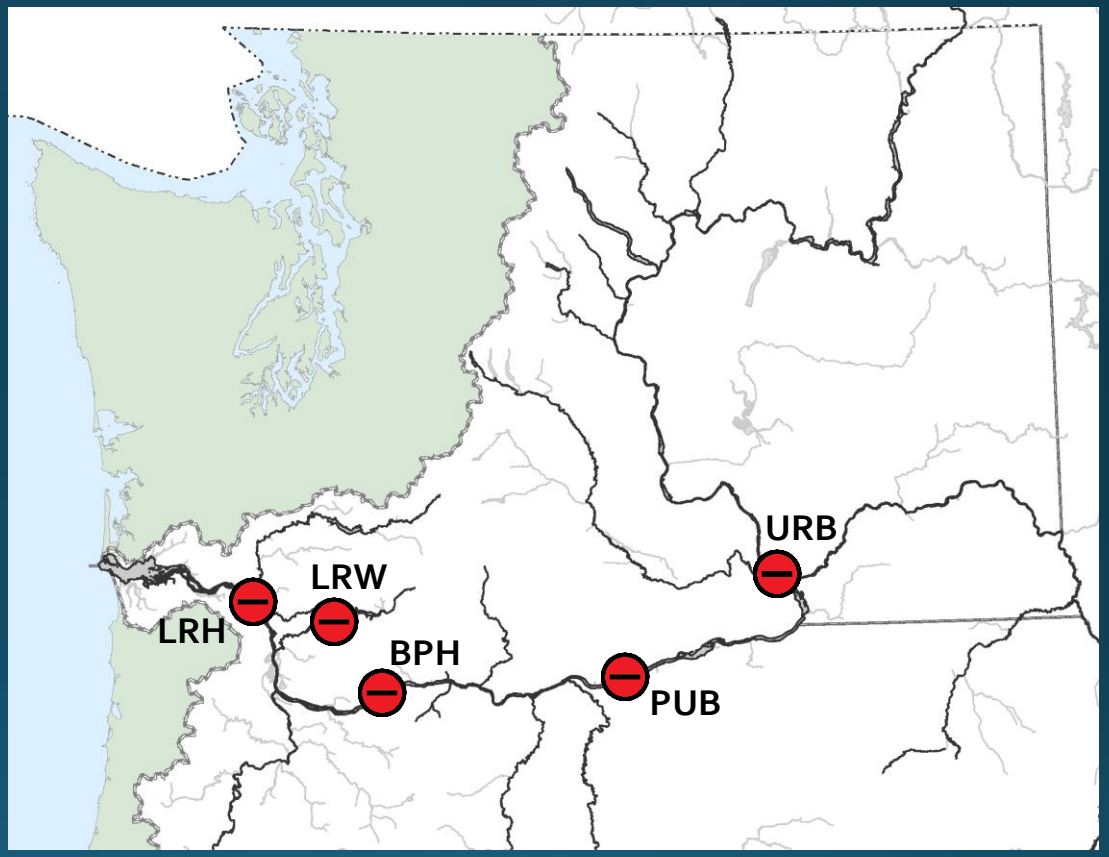
Relative to Recent 10yr Avg. Escapement

- Good > 125%
- Neutral 75-125%
- Poor < 75%

2018 Fall Chinook Forecasts

Forecasts in Columbia River range from

- LRH (Lower River Hatchery) – 62k (71%)
- LRW (Lower River Wild) – 7.6k (49%)
- BPH (Bonneville Pool Hatchery) – 50k (60%)
- URB (Upriver Bright) – 200k (48%)
- PUB (Pool Upriver Bright)– 36k (44%)

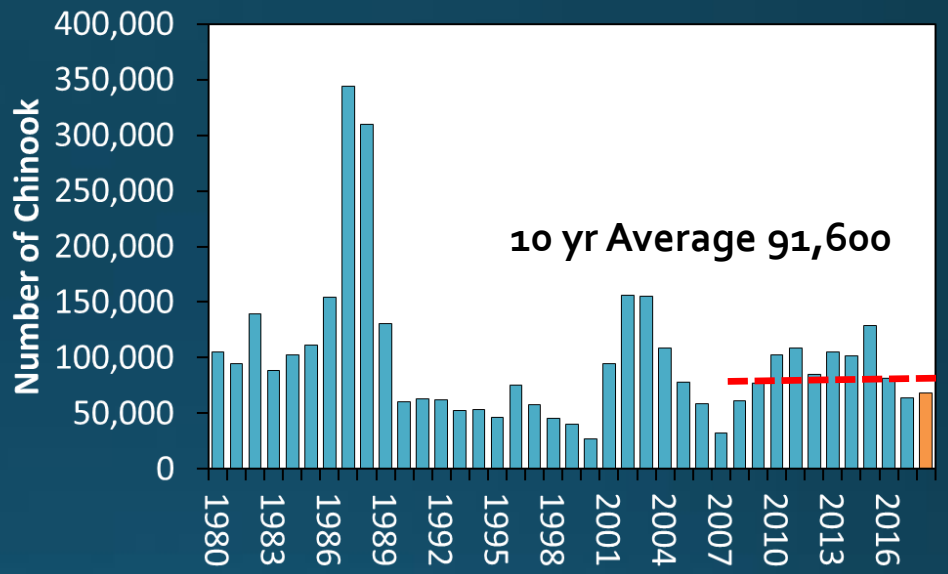


Relative to Recent 10yr Avg. Runsize

- Good > 125%
- Neutral 75-125%
- Poor < 75%

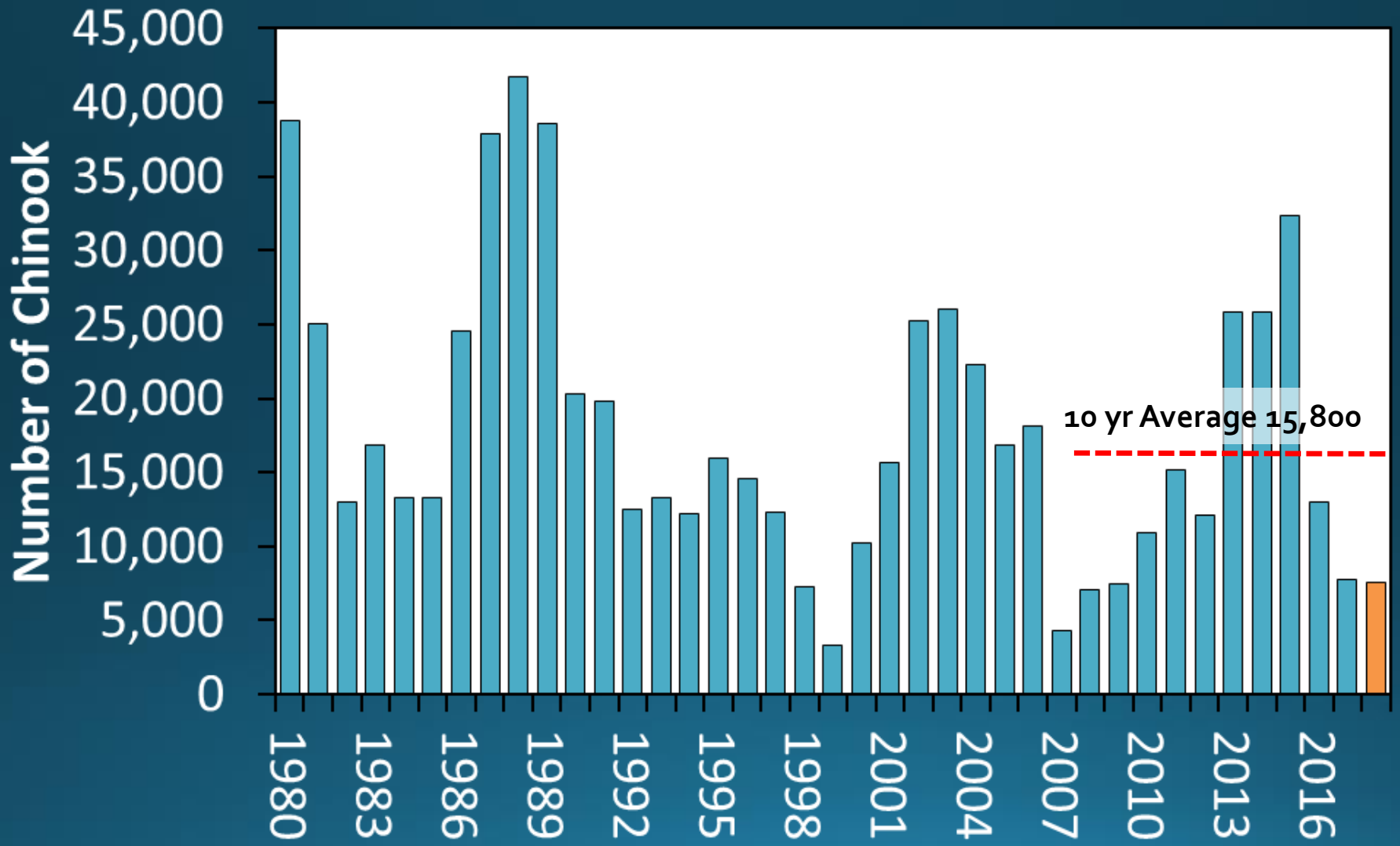
Lower Columbia River Tule Exploitation Rate (ER) Matrix

LRH Run Size	LCR Tule ER
<30,000	30%
30,000 – 40,000	35%
40,000 – 85,000	**38%**
>85,000	41%

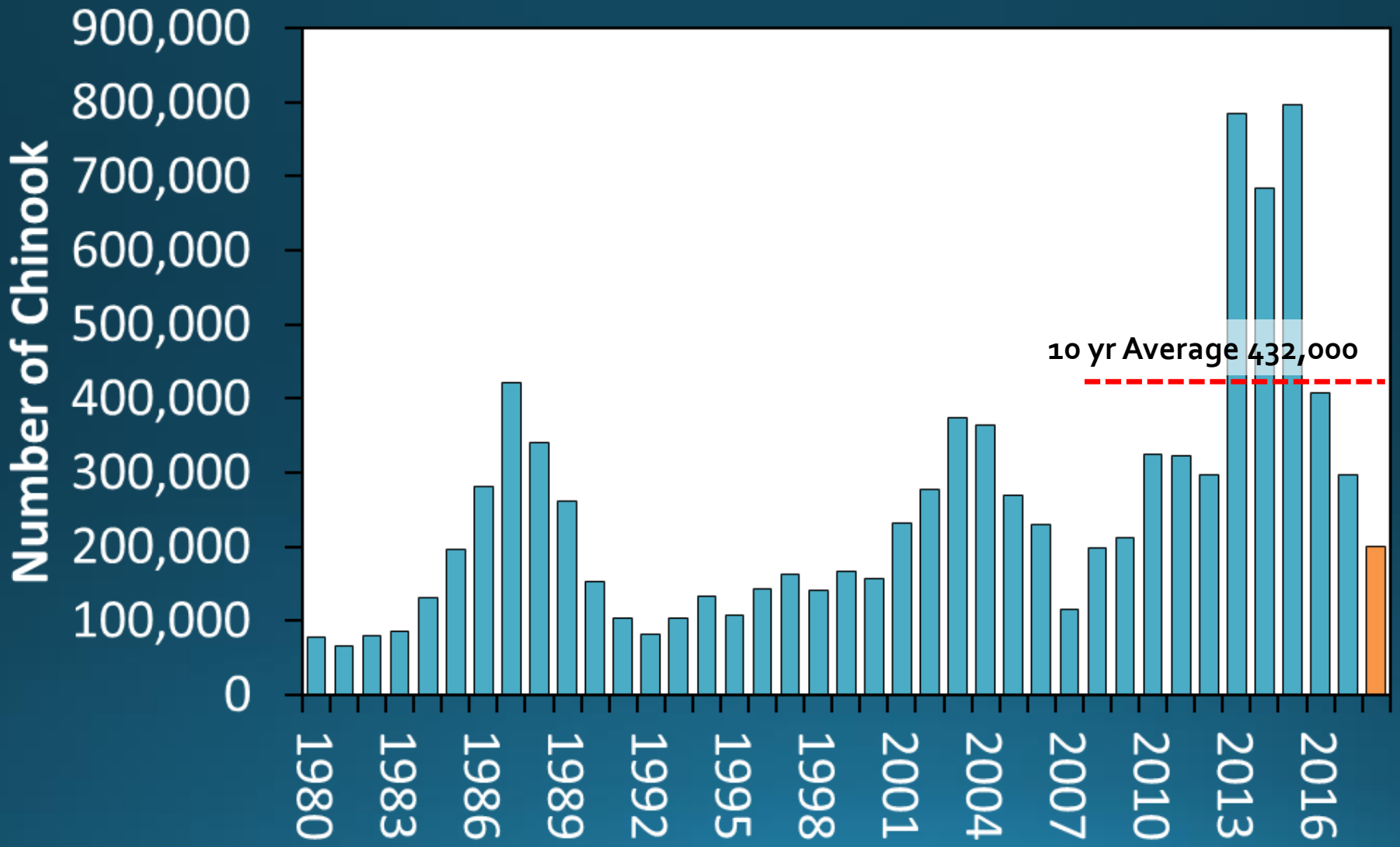


- LRH is down 28% compared to the previous 10 year return.
- 2018 LRH forecast of 62,400 will manage in ocean and in-river fisheries to not to exceed a 38% ER.

Chinook Historical Runsize – LRW

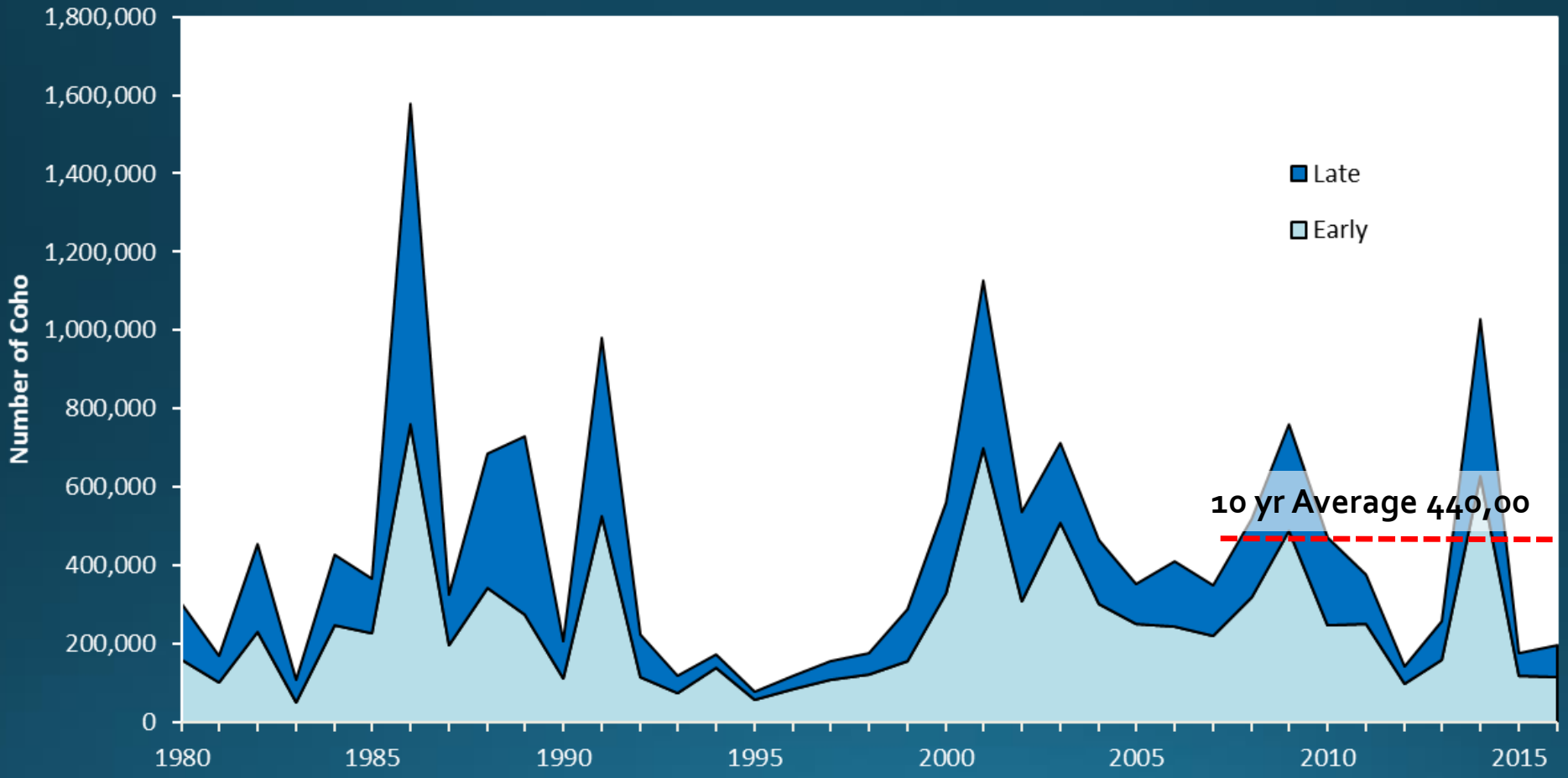


Chinook Historical Runsize – URB



Coho

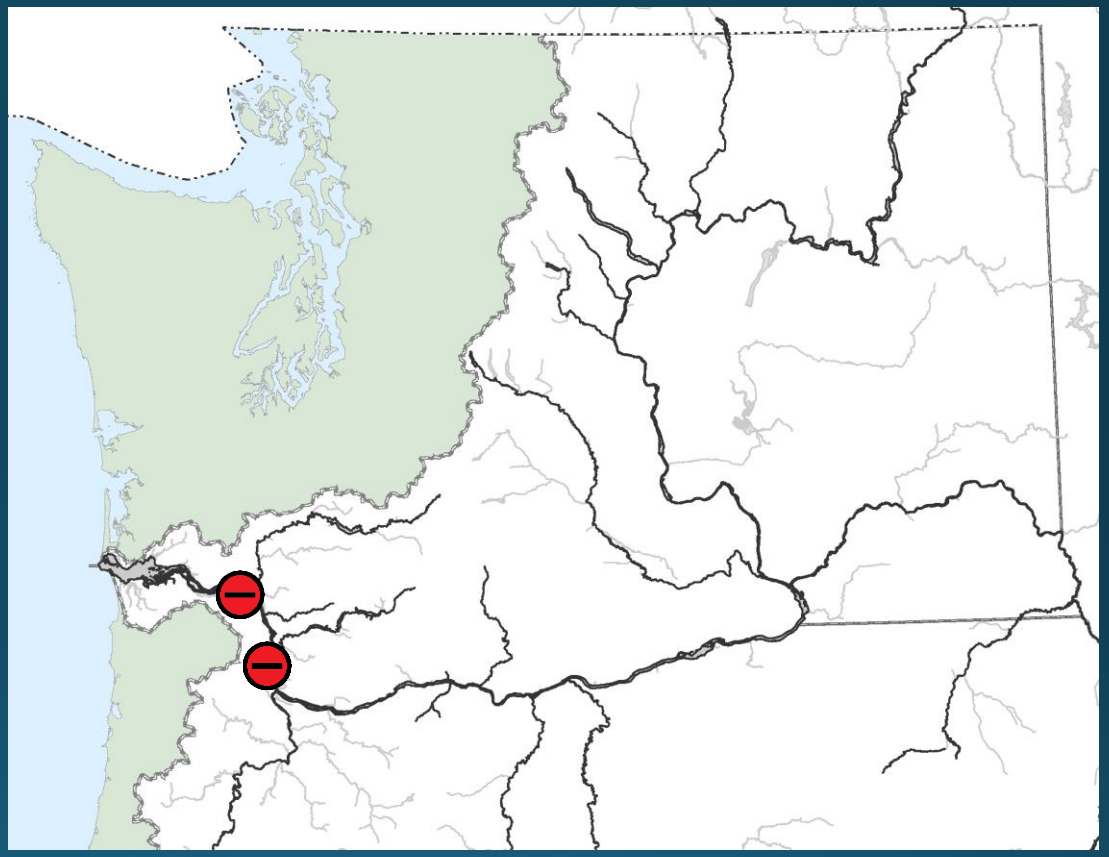
Coho Ocean Abundance – Columbia River



2017 Coho Returns

All returns are preliminary and returns range from

- Early – 171k (52%)
- Late –108k (51%)



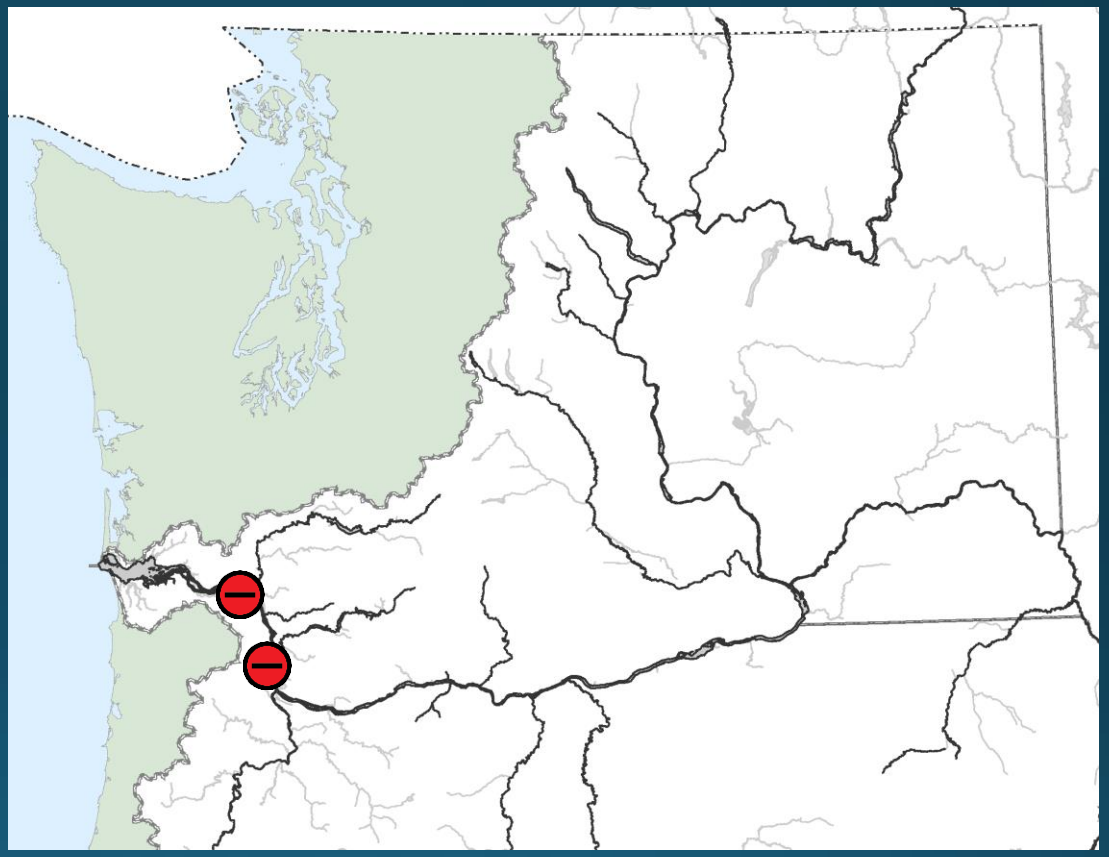
Relative to Recent 10yr Avg. Escapement

- Good > 125%
- Neutral 75-125%
- Poor < 75%

2018 Coho Forecasts

Forecasts in Columbia River range from

- Early – 165k (53%)
- Late – 122k (60%)



Relative to Recent 10yr Avg. Runsize

- Good > 125%
- Neutral 75-125%
- Poor < 75%

Lower Columbia Coho Exploitation Rate (ER) Matrix

Marine Survival Index		ER
Very Low	≤ 0.06%	10%
Low	≤ 0.08%	15%
Medium	**≤ 0.17%**	**18%**
High	≤ 0.40%	23%
Very High	> 0.40%	30%

- Marine survival index is 0.11% (medium).
- 39% seeding on index sites is above threshold (30%).
- Exploitation rate for 2018 is 18%; same as 2017.

Questions?

PFMC Pre-I Table I-1

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

Production Source and Stock or Stock Group	2013	2014	2015	2016	2017	2018	Methodology for 2018 Prediction and Source
Sacramento Index							
Fall	834.2	634.7	652.0	299.6	230.7	229.4	Log-log regression of the Sacramento Index on jack escapement from the previous year, accounting for lag-1 autocorrelated errors. STT.
Sacramento River							
Winter (age-3 absent fishing)	--	--	--	--	--	1.6	Stochastic life cycle model applied to natural- and hatchery-origin production. STT.
Klamath River (Ocean Abundance)							
Fall	727.7	299.3	423.8	142.2	54.2	359.2	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)							
Upriver Spring [a/]	141.4	227.0	232.5	188.8	160.4	166.7	Log-normal sibling regressions of cohort returns in previous run years. Columbia River TAC.
Willamette Spring	59.8	58.7	55.4	68.7	38.1	53.8	Age-specific linear regressions of cohort returns in previous run years. ODFW.
Sandy Spring	6.1	5.5	5.5	NA	3.6	5.3	Recent 3-year average. ODFW.
Cowlitz Spring	5.5	7.8	11.2	25.1	17.1	5.2	Age-specific linear regressions of cohort returns in previous run years. WDFW.
Kalama Spring	0.7	0.5	1.9	4.9	3.1	1.5	Age-specific linear regressions of cohort returns in previous run years. WDFW.
Lewis Spring	1.6	1.1	1.1	1.0	0.7	3.7	Age-specific linear regressions of cohort returns in previous run years. WDFW.
Upriver Summer [b/]	73.5	67.5	73.0	93.3	63.1	67.3	Log-linear brood year sibling regressions or average return (4-ocean fish). Columbia River TAC subgroup.
URB Fall	432.5	973.3	500.3	589.0	260.0	200.1	Columbia River Fall Chinook: Age-specific average cohort ratios or brood year sibling regressions. Columbia River TAC subgroup and WDFW.
SCH Fall	38.0	115.1	160.5	89.6	158.4	50.1	
LRW Fall	14.2	34.2	18.9	22.2	12.5	7.6	
LRH Fall	88.0	110.0	94.9	133.7	92.4	62.4	
MCB Fall	105.2	360.1	113.3	101.0	45.6	36.4	

PFMC Pre-I Table I-1 Cont.

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

Production Source and Stock or Stock Group		2013	2014	2015	2016	2017	2018	Methodology for 2018 Prediction and Source
Willapa Bay Fall	Natural	4.9	2.9	3.8	3.3	4.2	3.8	Return per spawners applied to 3-6 year olds (brood years 2012-15) adjusted by brood year performance.
	Hatchery	22.2	29.5	31.0	36.2	34.3	40.3	
Grays Harbor Fall	Natural	--	--	--	--	--	16.4	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	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: Based on ten-year average recruits per spawner for age-3; log linear regressions for age-4 on age-2 and 3; age-5 on age-2, 3, 4 for all stocks; and age-6 on age-5.
	Hatchery	--	--	--	--	--	4.8	
Quinault Fall	Natural	4.0	6.0	8.1	5.5	NA	NA	
	Hatchery	3.1	10.3	4.0	5.3	NA	NA	
Queets Spring/Sum	Natural	0.4	0.5	0.4	0.5	NA	NA	
Queets Fall	Natural	3.8	3.6	4.3	4.9	NA	NA	
	Hatchery	0.9	0.9	1.5	1.7	NA	NA	
Hoh Spring/Summer	Natural	0.9	0.9	0.8	0.9	1.0	1.1	Spawner/Recruit all years geometric mean for each age class.
Hoh Fall	Natural	3.1	2.5	2.6	1.8	2.7	2.6	Spawner/Recruit of recent 3 years adjusted by previous brood performance for all ages.
Quillayute Spring	Hatchery	2.1	2.0	1.7	1.8	2.2	2.1	Recent 2 year mean adjusted by previous performance.
Quillayute Sum/Fall	Natural	6.6	7.6	8.5	7.5	7.6	8.0	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[c/]	Natural	1.2	2.7	3.3	2.9	1.5	1.5	Includes supplemental. 2017 recruits for age-3 is recent 5-year average return, age 4-6 is sibling regression.
North Coast Totals								
Spring/Summer	Natural	1.3	1.4	1.2	1.4	NA	NA	
Fall	Natural	17.5	19.7	23.5	19.7	NA	NA	
Spring/Summer	Hatchery	2.1	2.0	1.7	1.8	NA	NA	
Fall	Hatchery	4.0	11.2	5.5	7.0	NA	NA	
Puget Sound summer/fall[d/]								
Nooksack/Samish	Hatchery	46.3	43.9	38.6	27.9	21.2	24.6	Three year average return rate.
East Sound Bay	Hatchery	1.9	1.2	1.2	0.7	0.8	0.7	Three year average return rate.

PFMC Pre-I Table I-1 Cont.

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

Production Source and Stock or Stock Group		2013	2014	2015	2016	2017	2018	Methodology for 2018 Prediction and Source
Skagit[e/]	Natural	12.9	18.0	11.8	15.1	15.8	13.3	Natural: Hierarchical Bayesian model to estimate the spawner-recruit dynamics. Hatchery: Recent 4-year average terminal smolt to adult return rate to estimate ages 3 -5.
	Hatchery	0.3	0.3	0.6	0.4	0.4	0.3	
Stillaguamish[c/]	Natural	1.3	1.6	0.5	0.5	1.5	1.6	Natural plus Hatchery. Multiple regression environmental model (EMPAR).
Snohomish[c/]	Natural	3.6	5.3	4.2	3.3	3.4	3.5	Multiple regression environmental model (EMPAR).
	Hatchery	6.9	5.4	3.3	5.0	4.8	6.5	Terminal Run (to 8-2), with ocean fishing, Wallace Model Data.
Tulalip[c/]	Hatchery	10.9	4.7	1.3	1.4	5.3	7.5	Three year geomean terminal return.
South Puget Sound	Natural	5.0	4.8	3.8	4.5	4.7	4.8	Natural: Puyallup R. average return per spawner applied to brood years contributing ages 3-5. For Nisqually, 4-year average SAR age specific survival. For Green, 3-year average return/out-migrant rate for each age. Hatchery: Average return at age multiplied by smolt release for Green, Nisqually, Puyallup, Carr Inlet, and Area 10E.
	Hatchery	102.0	96.7	62.4	43.1	80.4	123.6	
Hood Canal[e/]	Natural	3.4	3.5	3.1	2.3	2.5	3.9	Natural fish based on the Hood Canal terminal run reconstruction-based relative contribution of the individual Hood Canal management units in the 2014-2016 return years.
	Hatchery	65.7	80.6	59	42.7	48.3	57.6	Brood 2014 fingerling lbs released from WDFW facilities in 2014, multiplied by the average of post-season estimated terminal area return rates for the last 3 years (2013-2017).
Strait of Juan de Fuca Including Dungeness spring run [e/]	Natural	3.1	3.8	4.9	3.7	3.1	6.0	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/ 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, forecasts are for Puget Sound run size (4B) available to U.S. net fisheries. Does not include fish caught in troll and recreational fisheries.
e/ Terminal run forecast.

Final Preseason I report available by March 2 at:
https://www.pcouncil.org/salmon/stock-assessment-and-fishery-evaluation-safe-documents/preseason-reports/

PFMC Pre-I Table I-2

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

Production Source and Stock or Stock Group		2013	2014	2015	2016	2017	2018	Methodology for 2018 Prediction and Source
OPI AreaTotal Abundance (California, Oregon Coasts, and Columbia River)		716.4	1,213.7	1,015.0	549.2	496.2	349.0	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	525.4	983.1	808.4	396.5	394.3	294.1	OPIH: Columbia River jacks adjusted for delayed smolt releases and total OPI jacks regressed on 1970-2017 adults. Columbia/Coastal proportions based on jacks; Columbia early/late proportions based on jacks; Coastal N/S proportions based on smolts.
Columbia River Early		331.6	526.6	515.2	153.7	231.7	164.7	
Columbia River Late		169.5	437.5	261.8	226.9	154.6	121.5	
Coastal N. of Cape Blanco		5.6	4.8	6.9	5.5	3.5	3.3	
Coastal S. of Cape Blanco		18.7	14.2	24.4	10.4	4.5	4.6	
Lower Columbia River	Natural	46.5	33.4	35.9	40.0	30.1	21.9	Oregon: recent two year average return; Washingtion: natural smolt production multiplied by 2015 brood marine survival rate. Abundance is subset of early/late hatchery abundance above.
Oregon Coast (OCN)	Natural	191.0	230.6	206.6	152.7	101.9	54.9	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.
Washington Coast								
Willapa	Natural	58.6	58.9	42.9	39.5	36.7	20.6	Washington Coast stocks: A variety of methods were used for 2018, primarily based on smolt production and survival. See text in Chapter III for details.
	Hatchery	37.1	41.0	57.7	28.1	55.0	44.5	
Grays Harbor	Natural	196.8	108.8	142.6	35.7	50.0	42.4	
	Hatchery	85.2	65.4	46.6	22.9	36.4	49.5	
Quinault	Natural	32.1	25.0	44.2	17.1	26.3	25.4	
	Hatchery	42.0	24.7	24.9	19.8	29.4	29.6	
Queets	Natural	24.5	10.3	7.5	3.5	6.5	7.0	
	Hatchery	19.8	15.7	11.3	4.5	13.7	10.8	
Hoh	Natural	8.6	8.9	5.1	2.1	6.2	5.8	

PFMC Pre-I Table I-2 Cont.

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

Production Source and Stock or Stock Group		2013	2014	2015	2016	2017	2018	Methodology for 2018 Prediction and Source
Quillayute Fall	Natural	17.2	18.4	10.5	4.5	15.8	10.6	
	Hatchery	12.4	12.6	8.0	6.4	17.6	16.5	
Quillayute Summer	Natural	0.5	2.0	1.2	0.3	1.5	2.7	
	Hatchery	3.3	3.2	2.2	1.4	3.4	3.3	
North Coast Independent Tributaries	Natural	17.8	15.2	11.7	1.9	6.5	4.1	
	Hatchery	6.3	11.6	11.9	2.5	0.2	NA	
WA Coast Total	Natural	356.1	247.5	265.6	104.6	149.5	118.7	
	Hatchery	206.1	174.2	162.6	85.6	155.6	NA	
Puget Sound								
Strait of Juan de Fuca	Natural	12.6	12.5	11.1	4.4	13.1	7.2	Puget Sound stocks: A variety of methods were used for 2018, 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	17.6	17.3	11.1	3.9	15.4	10.6	
Nooksack-Samish	Natural	45.4	20.8	28.1	9.0	13.2	20.6	
	Hatchery	49.2	61.7	50.8	28.8	45.6	61.3	
Skagit	Natural	137.2	112.4	121.4	8.9	11.2	59.2	
	Hatchery	16.3	15.8	19.5	4.9	7.6	13.1	
Stillaguamish	Natural	33.1	32.5	31.3	2.8	7.6	19.0	
	Hatchery	3.1	6.0	0.0	0.0	1.5	0.0	
Snohomish	Natural	163.8	150.0	151.5	20.6	107.3	65.9	
	Hatchery	111.5	78.2	53.9	16.7	62.0	38.3	
South Sound	Natural	36.0	62.8	63.0	9.9	20.2	11.7	
	Hatchery	151.0	150.7	180.2	27.1	102.4	79.0	
Hood Canal	Natural	36.8	82.8	61.5	35.3	115.6	59.5	
	Hatchery	68.6	47.6	108.4	83.5	74.9	84.5	
Puget Sound Total	Natural	464.9	473.8	467.9	91.0	288.3	243.1	
	Hatchery	417.3	377.3	423.9	165.0	309.3	286.8	

Final Preseason I report available by March 2 at:
https://www.pcouncil.org/salmon/stock-assessment-and-fishery-evaluation-safe-documents/preseason-reports/

Recreational Rule Simplification

- Part of a 3-Year Project to simplify regulations
  - ✓2017 Gamefish
  - 2018 Salmon
  - 2019 Marine Fish and Shellfish
- Introduction at NOF Forecast meetings
  - Basic Tenets
  - Broad Proposals
  - Brainstorming with Public
- Based on brainstorming, refine broad proposals and develop waterbody specific proposals

Recreational Rule Simplification

- Share specific proposals at future meetings.
- Likely:
  - March 15 Puget Sound
  - March 19 Columbia River
  - March 20 NOF #1
  - March 27 Columbia/Snake
- Concepts are unrefined at this time
- Will develop quickly as NOF progresses
- Public will need to continue to track

Recreational Rule Simplification

- Constraints
  - Tribal co-manager agreement
  - Columbia River requires discussion with Oregon and needs to accommodate their process
    - They are targeting January 1, 2019

Recreational Rule Simplification

- Basic Tenets
  - Consider implications at a population level versus individual fish level
  - Stop adding complexity
  - Reduce the number of stream reaches
  - Standardize opening and closing dates
  - Standardize the daily limit (recognizing conservation needs)
  - Decouple salmon and steelhead limits
  - Eliminate layered gear restrictions

Recreational Rule Simplification

- Broad Proposals
  - Daily limit
    - 6 fish, no more than 2 adults
    - 6 fish, no more than 2 adults. Bonus fish where needed.
    - Combine jacks and adults with a limit of 2, 3, or 4 per day
    - 2 adults, no limit on jacks
  - Gear Restrictions
    - One gear restriction for all salmon fisheries?
  - Boat Limit/Party Fishing
    - Allow everywhere?
  - 2-Pole
    - Allow everywhere except quota fisheries and most marine areas?
  - Fish Handling Rules
    - Eliminate?

2018 Puget Sound Summer/Fall Chinook Preseason Forecasts

Region	Watershed	Notes	Forecast Type	Hatchery	Supplmt	Wild	Total	Comp Chinook Management Criteria RER[1]	Comp Chinook Management Criteria Low Abundance Thresholds[2 3]
Strait	Hoko		Escape w/o fishing	398		1,071	1,469		
	Dungeness		Terminal	707		89	796		
	Elwha		Terminal	4,931		238	5,169		
	Morse Creek		Terminal	77			77		
	Region total			***6,113***		***1,398***	**7,511**		
North Sound	Glenwood Springs		Terminal	673			673		
	Nooksack/Samish		Terminal	24,558			24,558		
	Skagit		Terminal	303		13,340	13,643		
	Stillaguamish		Terminal run w/ fishing	1063		487	1,550		
	Snohomish		Extreme Terminal w/ harvest	6,508		3,460	9,968		
	Tulalip		Terminal Run w Harvest	7,450			7,450		
	Region total			***40,555***	***0***	***17,287***	***57,842***		
Upper South Sound	Lake Washington								
	Issaquah		Terminal	4,761			4,761		
	Cedar		Terminal			1,350	1,350		
	Sammamish		Terminal			111	111		
	Subregion total			***4,761***		***1,461***	***6,222***		
	Green River								
	Soos Creek Hatchery		Terminal	20,766			20,766		
	Icy Creek		Terminal	555			555		
	Mainstem/Newaukum		Terminal			2,110	2,110		
	Subregion total			***21,321***		***2,110***	***23,431***		
	Grovers		Terminal	3,211			3,211		
	East Kitsap (Gorst, Dogfish)		Terminal	8,977			8,977		
	Subregion total			***12,188***			***12,188***		
	Puyallup River		Terminal	11,778		672	12,450		
	Upper South Sound Total			***50,048***		***4,243***	***54,291***		

2018 Puget Sound Summer/Fall Chinook Preseason Forecasts (continued)

Region	Watershed	Notes	Hatchery	Supplmt	Wild	Total	Comp Chinook Management Criteria RER[1]	Comp Chinook Management Criteria Low Abundance Thresholds[3]
Lower South Sound	Carr Inlet	Terminal	22,302			22,302		
	Deschutes	Terminal	21,529			21,529		
	Nisqually	Terminal	28,514		586	29,100		
	Chambers	Terminal	1,196			1,196		
	Lower South Sound Total		***73,541***		***586***	***74,127***		
	South Sound Total		**123,589**	**0**	**4,829**	**128,418**		
Hood Canal	Skokomish w/George Adams	Terminal	31,250		3,338	34,588		
	12B Naturals	Terminal			358	358		
	12C/12H/12D	Terminal	26,308		194	26,502		
	Hood Canal Total		**57,558**	**0**	**3,890**	**61,448**		
	Puget Sound Total		**227,815**	**0**	**27,404**	**255,219**		

Footnotes

1. RER = Recovery Exploitation Rate (interim management ceiling during recovery phase).
2. Level of spawning abundance that triggers additional management action.
3. Threshhold expressed as natural origin spawners
4. Aggregate for combined hatchery and wild spawners

Puget Sound Spring Chinook 2018 Preseason Forecasts

Notes	Forecast Type	Hatchery	Supplmt	Wild	Total	RER	Low Abundance Thresholds
Nooksack River							
North Fork	Terminal	2,984	1,187	179	**4,350**		
South Fork	Terminal	1,798		23	**1,821**		
Skagit River	Terminal	3,439		2,317	**5,756**		
White River							
Minter Creek	Terminal	755			**755**		
White River Hatchery	Terminal	2,546			**2,546**		
Buckley Trap	Terminal		1,706	528	**2,234**		
Total White River Springs					**5,535**		
Total		**11,522**	**2,893**	**3,047**	**17,462**		

1. Supplementation number is hatchery-origin acclimated fish expected to spawn in the wild.
2. Forecast of SF Nooksack stock origin chinook.
3. Forecast of returns to the hatchery rack only.
4. Includes naturally produced spring and fall chinook returns and acclimation pond production.

Washington Coast 2018 Chinook Preseason Forecasts

		Hatchery	Wild	Totals	Natural Escapement Goal
North Coast					
Quillayute River					
Spring	Terminal	2,143		***2,143***	200
Summer	Terminal		1,132	***1,132***	1,200
Fall	Terminal		6,837	***6,837***	> of 3,000 or 60% of run
Hoh					
Spring/Summer	Terminal		1,092	***1,092***	>of 900 or 69% of RS
Fall	Terminal		2,583	***2,583***	>of 1,200 or 60% of RS
Queets					
Spring/Summer	Terminal		-	**-**	>of 700 or 70% of RS
Fall	Terminal	0	0	**0**	>of 2,500 or 60% of RS
Quinault					
Fall	Terminal	0	0	***0***	
North Coast totals Summer/Falls:		***0***	***10,552***	***10,552***	
Spring/Summers:		***2,143***	***1,092***	***3,235***	13,787
Grays Harbor					
Chehalis springs	Terminal		1,748	*1,748*	1,400
Chehalis falls	Terminal	2,103	10,807	*12,910*	9,753
Humptulips falls	Terminal	2,715	5,592	*8,307*	3,573
Subregion Falls Total		***4,818***	***16,399***	***21,217***	
Willapa Bay - Fall Chinook	**Terminal**	***40,258***	***3,838***	***44,096***	
Coast total		**47,219**	**33,629**	**80,848**	

COLUMBIA RIVER FALL CHINOOK

2017 Forecast/Actual Returns and 2018 Preseason Forecasts

The forecasts shown here are estimates made in February in preparation for the North of Falcon season-setting process. Once the North of Falcon process is complete, these February forecasts will change slightly. Final forecasts will be available in mid-April.

	2017		2018
Stock Group	**February Forecasts**	**Actual Returns**	**February Forecasts**
Lower River Hatchery - LRH	92,400	64,600	62,400
Lower River Wild - LRW	12,500	7,800	7,600
Lower River Bright - LRB	NA	4,200	3,700[3]
Bonneville Pool Hatchery - BPH	158,400	48,200	50,100
Upriver Bright – URB	260,000	297,100	200,100
Snake River Wild (SRW)[1]	*12,400*	*7,000*	NA
Bonneville Upriver Bright - BUB	3,500[2]	1,400	---
Pool Upriver Bright - PUB	42,100	46,000	36,400
Select Area Bright - SAB	13,700	6,600	5,300
Columbia River Total	582,600	475,900	**365,600**

[1]Subset of URB

[2]Age 5s only. Production moved to PUB stock.

[3]First year for predicting LRB which was formerly a component of BUB stock.

2018 Forecasts

- **LRH** – Same as last year's actual return. 70% of the 10-year average.
- **LRW** – About half of the 10-year average.
- **LRB** – First year for predicting LRB stock.
- **BPH** – Same as last year's actual return. Slightly more than half of the 10-year average.
- **URB** – Slightly less than half of the 10-year average.
- **PUB** – Slightly less than half of the 10-year average.
- **SAB** – Slightly less than half of the 10-year average.
- **Total Return** – Prediction is about half of the 10-year average return. Several years of poor ocean conditions are likely contributing to the decreased returns.

February 15, 2018
Washington Department of Fish and Wildlife
U.S. v Oregon Technical Advisory Committee Sub-group

CHUM AND SOCKEYE SALMON
CO-MANAGER RUNSIZE FORECASTS FOR THE 2018 RETURN YEAR

CHUM - SUMMER

	HATCHERY	WILD	TOTAL	FORECAST METHOD
Puget Sound				
Central Sound		1,403	1,403	R/S, 10 yr avg
South Sound		23,775	23,775	R/S, 10 yr avg
Hood Canal*		17,034	17,034	PDO regression
Strait of Juan de Fuca*		2,309	2,309	PDO regression
Puget Sound Total		**44,521**	**44,521**	

* Wild forecast includes supplementation returns.

CHUM - FALL

	HATCHERY	WILD	TOTAL	FORECAST METHOD
Puget Sound				
Nooksack/Samish	9,501	67,651	77,152	R/S
Skagit	710	48,271	48,981	Fry based
Stillaguamish	1,468	20,172	21,640	Fry based
Snohomish	12,134	13,957	26,091	Fry based
Central Sound	31,329	116,949	148,278	R/S
South Sound	22,127	373,232	395,359	R/S
Hood Canal	304,455	192,945	497,400	R/S
Strait of Juan de Fuca	389	741	1,130	R/S and PDO + Esc. regression
Puget Sound Total	**382,113**	**833,918**	**1,216,031**	

CHUM - FALL

	HATCHERY	WILD	TOTAL	FORECAST METHOD
Coastal				
Grays Harbor	3,259	57,885	61,144	R/S, 5 yr avg, perform adj.
Willapa	796	39,136	39,932	R/S, perform adj.
Coastal Total	**4,055**	**97,021**	**101,076**	

CHUM - WINTER

	HATCHERY	WILD	TOTAL	FORECAST METHOD
Puget Sound				
South Sound	13,852	40,295	54,147	R/S regression, perform adj.
Puget Sound Total	**13,852**	**40,295**	**54,147**	

SOCKEYE

	HATCHERY	WILD	TOTAL	FORECAST METHOD
Puget Sound				
Baker River*		35,002	35,002	NPGO and sibling relationship
Lake Washington	13,653	26,222	39,875	R/S and sibling relationship
Puget Sound Total	**13,653**	**61,224**	**74,877**	

* Forecast contains hatchery and wild production

SOCKEYE

	HATCHERY	WILD	TOTAL	FORECAST METHOD
Columbia River				
Wenatchee River		25,700	25,700	Adult-cohort relationship
Okanogan River		72,600	72,600	Adult-cohort relationship
Columbia River Total		**98,300**	**98,300**	

Fraser River Forecasts (from Fisheries and Oceans Canada)

Sockeye Salmon	13,981,000	p50 forecast

2017 and 2018 Washington Coho Forecast Summary[1]

Last updated: 02/23/18

Production unit	2017 Hatchery	2018 Hatchery	2017 Wild	2018 Wild	2017 Total	2018 Total
Dungeness R	10,203	9,087	918	505	11,121	9,592
Elwha R	1,307	242	513	718	1,820	960
Eastern Strait (excl. Dung, Elwha)	-	-	2,762	800	2,762	800
Western Strait	-	-	10,296	6,368	10,296	6,368
West/East sub-total excl. Dung, Elwha	-	-	**13,058**	**7,168**	13,058	7,168
West/East Strait sub-total	**11,510**	**9,329**	**14,489**	**8,391**	**25,999**	**17,720**
Nooksack R	39,041	50,797	6,291	18,629	45,332	69,426
Lummi Ponds	6,568	10,459	-	-	6,568	10,459
7B net pens	0	0	-	-	0	0
Indian Slough Hatchery	0	0	-	-	0	0
Samish R	-	-	6,209	1,162	6,209	1,162
Misc 7&7A (incl. San Juans CoOps)	0	0	735	783	735	783
Nook/Samish R sub-total	**45,609**	**61,256**	**13,235**	**20,574**	**58,845**	**81,830**
Skagit R sub-total	**7,551**	**13,101**	**11,160**	**59,196**	**18,711**	**72,297**
Stillaguamish R sub-total	**1,520**	**0**	**7,622**	**18,950**	**9,142**	**18,950**
Snohomish R	9,452	7,092	107,325	65,925	116,777	73,017
Tulalip Bay	51,626	31,211	-	-	51,626	31,211
Area 8A Misc. Hatchery	880		-	-	880	
Snohomish R sub-total	**61,958**	**38,303**	**107,325**	**65,925**	**169,283**	**104,228**
Lake Washington	18,218	12,984	2,160	2,018	20,378	15,002
Green River	39,924	48,032	3,852	3,320	43,776	51,352
Elliot Bay Net Pens	0	0	-	-	0	0
Misc. Area 10,11,10E	6,831	0	1,728	1,429	8,559	1,429
Puyallup R	19,951	17,985	7,560	4,964	27,511	22,949
Mid-Sound sub-total	**84,924**	**79,001**	**15,300**	**11,731**	**100,224**	**90,732**
Area 13A-K wild, exc. Deschutes	-	-	1,575	1,976	1,575	1,976
Area 13A Hatchery (Minter CR)	6,547	7,340	-	-	6,547	7,340
Nisqually R	871	952	3,290	1,268	4,161	2,220
Deschutes R	-	-	67	59	67	59
Area 13D net pens (Squaxin Island)	10,018	15,718	-	-	10,018	15,718
Deep South Sound sub-total	**17,436**	**24,010**	**4,932**	**3,303**	**22,368**	**27,313**
Mid+Deep South Sound sub-total	**102,360**	**103,011**	**20,232**	**15,034**	**122,592**	**118,045**
Area 9A (Port Gamble)	12,070	12,680	1,337	579	13,407	13,259
Area 12A - Quilcene R	33,376	49,605	3,354	995	36,730	50,600
Area 12A - Quilcene Net Pens	2,893	0	-	-	2,893	0
Area 12/12B	-	-	43,460	27,693	43,460	27,693
Area 12C/12D (exc. Skokomish R)	-	-	47,869	30,503	47,869	30,503
Skokomish R	21,867	20,690	24,277	1,334	46,144	22,024
Area 12/12B-12D/Skok. R sub-total	21,867	20,690	115,606	59,530	137,473	80,220
Hood Canal sub-total	**70,206**	**82,975**	**120,297**	**61,104**	**190,503**	**144,079**
Puget Sound Total	**300,713**	**307,975**	**294,360**	**249,174**	**595,074**	**557,149**
Willapa Bay	54,998	44,542	36,720	20,645	91,718	65,187
Grays Harbor	36,355	51,414	50,043	42,379	86,398	93,793
Quinault R	29,435	29,622	26,300	25,442	55,735	55,064
Queets R	13,651	10,814	6,548	6,964	20,199	17,778
North Coast Indept. Tribs	132				132	0
Hoh R			6,198	5,816	6,198	5,816
Quillayute R summer	3,376	3,313	1,468	2,743	4,844	6,056
Quillayute R fall	17,619	16,505	15,808	10,557	33,427	27,062
Coast total	**155,566**	**156,210**	**143,085**	**114,546**	**298,651**	**270,756**
Columbia Hatch/WA Wild Early [2]	222,854	152,523	5,101	4,519	148,100	157,042
Columbia Hatch/WA Wild Late [2]	133,533	111,774	20,605	8,393	226,000	120,167
Columbia Oregon Wild [3]	-	-	4,401	8,990	6,500	8,990
Columbia total	**356,387**	**264,297**	**30,107**	**21,902**	**380,600**	**286,199**
Grand Total	**812,667**	**728,482**	**467,552**	**385,622**	**1,274,325**	**1,114,104**

Notes:

1) Ocean Age 3 (OA3) abundance

2) Columbia Early and Late Production Unit hatchery forecast categories include hatchery production from all states, Columbia Early and Late Wild Production Unit forecasts contain Washington-origin stocks only.

3) Oregon Wild Production Unit category is summarized separately from Columbia Early and Late categories because it is considered by ODFW to account for entire fall coho return on Oregon side of river.