2019 North of Falcon

Salmon Forecasts

2019 Forecast Meeting Schedule

9:00 – 9:30	Introduction		
	• Welcome and Introduction		Ron Warren
	• North of Falcon – Setting Salmon Fisheries in 2019		Kyle Adicks
9:30 – 10:00	Southern Resident Killer Whales		Kirt Hughes
10:00 – 11:00	Salmon Forecasts 2019		
	• 2018/19 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
11:00 - Noon	Regional Discussion Sessions		
	• Puget Sound Recreational	Big Room	Mark, Aaron, Derek
	• Columbia River & Ocean	Small Room 1	Ryan, Kyle(s),Wendy
	• Coastal		Annette
	• Puget Sound Commercial	Small Room 2	Kirt, Kwasi, Marisa
Noon – 1:00 pm	Lunch Break		
1:00 – 3:00	Regional Discussion Sessions Continued		

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

2019 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. 7-12	Pacific Fishery Management Council meeting	Vancouver, WA Hilton
Mar. 18	Columbia River Fisheries Meeting	WDFW Region 5 Headquarters, Ridgefield
Mar. 19	North of Falcon 1	DSHS Office Building 2 Auditorium, Olympia
Mar. 21	Puget Sound Recreational Fisheries Discussion	Trinity Methodist Church, Sequim
Mar. 25	Ocean Management Option Public Hearing	Chateau Westport
Mar. 26	Grays Harbor Fisheries Discussion	Montesano City Hall
Mar. 26	Upper Columbia River Fisheries Discussion	Douglas County PUD, Wenatchee
Mar. 27	Puget Sound Recreational Fisheries Discussion	WDFW Mill Creek Office
Mar. 27	Willapa Bay Fisheries Discussion	Raymond Elks Club
Mar. 27	Mid-Columbia River Public Meeting	Kennewick Irrigation District Board Auditorium
Mar. 28	Snake River Fisheries Discussion	Walla Walla Comm. College, Clarkston
Apr. 2	Columbia River and Ocean Fisheries Discussion	WDFW Region 5 Headquarters, Ridgefield
Apr. 3	North of Falcon 2	Lynnwood Embassy Suites
Apr. 11-15	Pacific Fishery Management Council	Double Tree Hilton Sonoma, Rohnert Park, CA

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/)

Update on Southern Resident Orca Recovery Efforts

Dave Ellifrit, Center for Whale Research

WHAT IS WASHINGTON DOING TO HELP ORCAS?

Over the past several years, Washington state has been working to protect the ecosystem that supports orcas. Saving our southern resident killer whales requires us to tackle many challenges, both in the short-term and over the coming decades.

Governor Inslee takes action

Governor's Executive Order

March 2018

- Supplemental Funding
- Immediate actions for state agencies
- Established Task Force

Task Force and Working Groups

- Stephanie Solien & Les Purce, co-chairs
- Diverse membership
- Three Working Groups
  - ✓Vessels (Todd Hass, Puget Sound Partnership)
  - ✓Contaminants (Derek Day, Ecology)
  - ✓Prey [Penny Becker (WA Dept. Fish & Wildlife) & Steve Martin (Gov. Salmon Recovery Office)]

Reports

2018

Draft due Oct. 1, 2018 | Final due Nov. 15, 2018

Content included:

- Task Force recommendations for addressing all major threats and recovering Southern Residents (policies, programs, priority actions, legislation, budget needs)
- Summary of minority views and actions considered but not ultimately recommended

2019

Due Oct. 1, 2019

Content will include:

- Progress made
- Lessons learned
- Outstanding needs and additional recommendations

Task Force Recommendations

36 recommendations

- **Prey - 16 recommendations**
- Vessels - 10 recommendations
- Contaminants - 10 recommendations
  - 10 recommendations require or likely require legislative changes

Prey Recommendations

RESTORE & ACQUIRE HABITAT

Recommendations 1 and 2

- Significantly increase investment in restoration and acquisition of habitat for Chinook and forage fish

BETTER IMPLEMENT & ENFORCE HABITAT PROTECTION LAWS

Recommendation 3

- Increase Enforcement and Technical Assistance for Hydraulic Permitting, Shoreline, Water Quality and Water Quantity Laws

AMEND LAWS TO STRENGTHEN HABITAT PROTECTION

Recommendation 4

- Through legislation, amend existing State authorities to better align with local Shoreline Management laws
- Give state agencies the authority to deny, amend unnecessary bulkhead requests to protect habitat

INCENTIVIZE HABITAT PROTECTION & ENHANCEMENT

Recommendation 5

- Develop incentives to encourage voluntary actions to protect habitat

INCREASE HATCHERY PRODUCTION

Recommendation 6

- Increase Hatchery Production of Salmon in Concert with increased Habitat protection and restoration

INCREASE ABUNDANCE AND IMPROVE SURVIVAL OF CHINOOK AROUND HYDRO DAMS

Recommendation 7

- Prepare an implementation strategy to reestablish salmon runs above existing dams

Recommendation 8

- Modify State Water Quality Standards for Greater Spill over Columbia River and Snake River Dams

Recommendation 9

- Facilitate a Stakeholder process around potential Lower Snake River Dam Removal

INCREASE CHINOOK ABUNDANCE THROUGH REDUCED CATCH AND BYCATCH

Recommendation 10

- Support full implementation and funding of the 2019-28 Pacific Salmon Treaty – Federal Request

Recommendation 11

- Reduce Chinook bycatch in West Coast Commercial Fisheries

DECREASE THE NUMBER OF CHINOOK LOST TO PREDATION BY SPECIES OTHER THAN ORCAS

Recommendation 12

- Develop Science and Options for Pinniped Management in Puget Sound

Recommendation 13

- Increase Management of Pinnipeds on the Columbia River

Recommendation 14

- Reduce populations of nonnative predatory fish that prey upon or compete with Chinook

SUPPORT A HEALTHY MARINE FOOD WEB AND FORAGE FISH POPULATIONS

Recommendation 15

- Monitor and manage forage fish populations to support Chinook

Recommendation 16

- Support the Puget Sound zooplankton sampling program for management of Chinook and forage fish

What’s Going On Now, What’s Next

Budget	Recommendation
Operating	$66.3 M
Capital	$594.8 M
Transportation	$408.7 M
Total	**$1.07 B**

- 3 Governor request plus multiple other state legislative bills (vessels, oil traffic, habitat)
- State agencies implement recommendations as possible with funds now and when new funds hopefully become available in July 2019
- Year 2 work of the Task Force

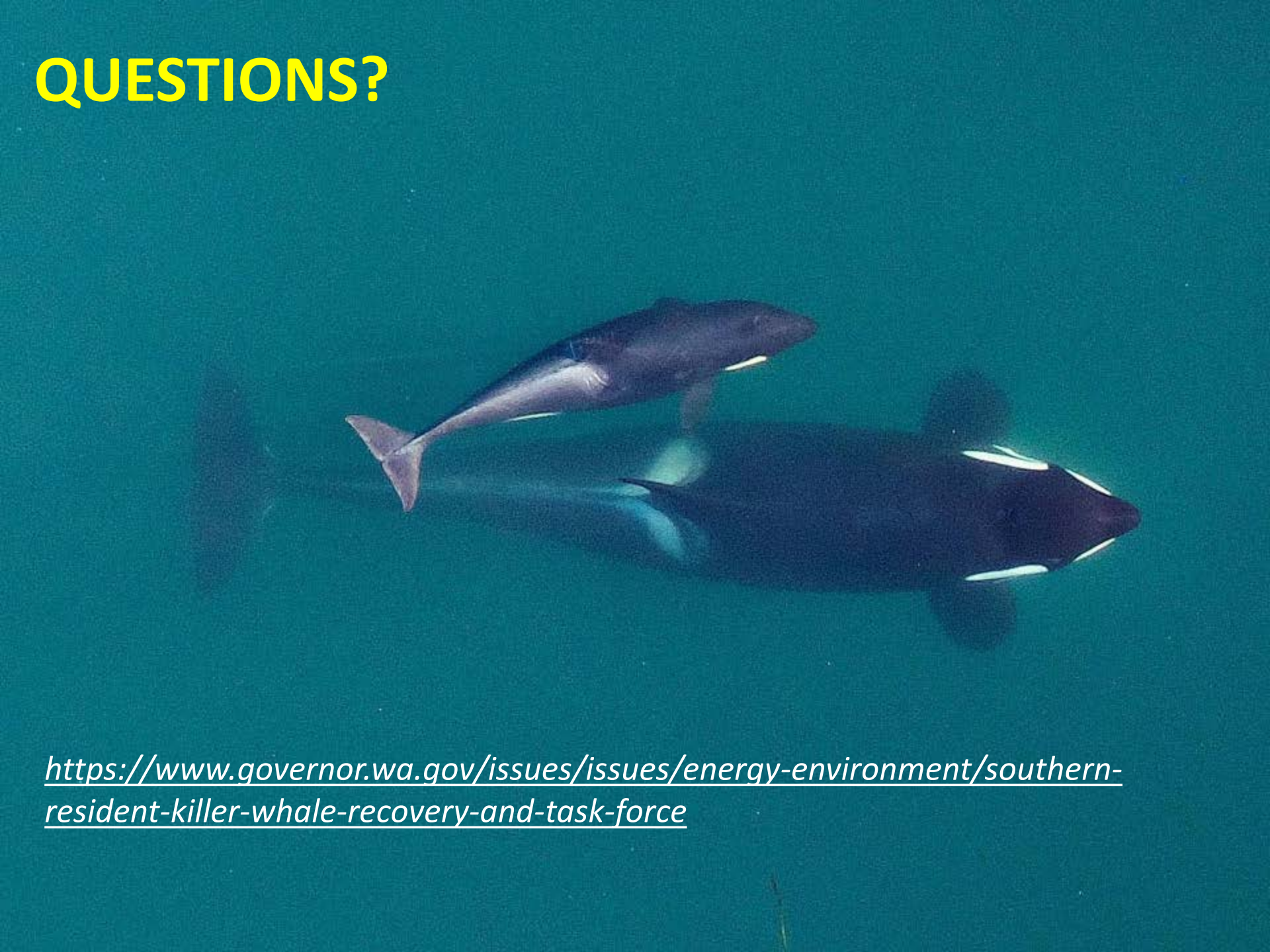
Fish & Wildlife Commission North of Falcon Policy Direction

The Department will continue to consider effects of salmon fisheries on Southern Resident Killer Whales (SRKW) when setting fishing seasons. **The Department will work with the National Marine Fisheries Service to refine tools to assess the effects of fisheries on available prey for SRKW, and will plan fisheries to ensure that they provide proper protection to SRKW from reduction to prey availability or from fishery vessel traffic**, consistent with the Endangered Species Act.

Orca Risk Assessment and Adaptive Management Framework

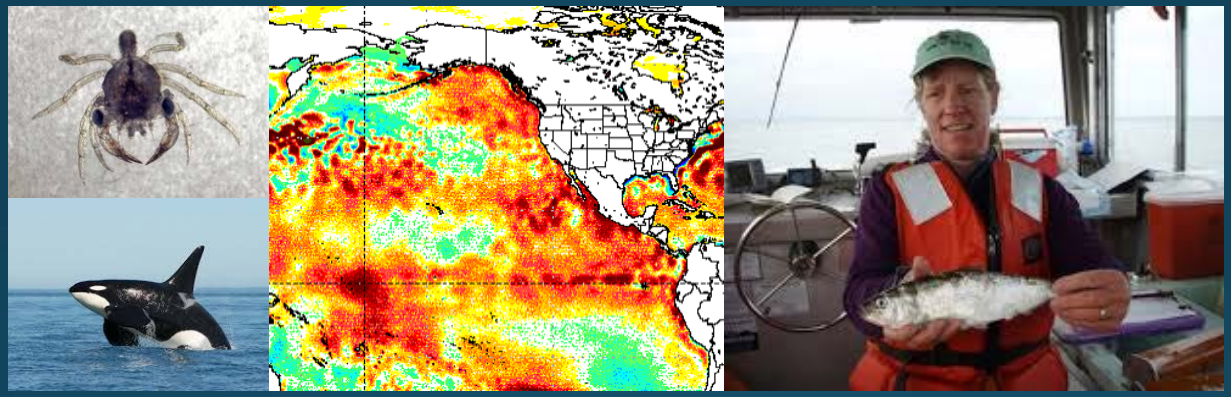
- Identifies conditions when increased prey is essential for orcas
- Categorizes orca status and expected Chinook abundance for a given year, weights fisheries based on their spatial overlap with orcas during key foraging times, and establishes threshold proportions for maximum allowable reduction of Chinook by fisheries for a given time and area
- If planned fisheries are projected to exceed the allowable prey reduction threshold, then adjustments made until the threshold is met

QUESTIONS?



https://www.governor.wa.gov/issues/issues/energy-environment/southern-resident-killer-whale-recovery-and-task-force

Update on Ocean Conditions



Marisa Litz

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Acknowledgements:
Laurie Weitkamp, NOAA Fisheries

Washington Department of FISH and WILDLIFE

Outline

- Update on the "Warm Blobs", El Niños, and La Niñas
- Physical and biological observations
- NWFSC environmental indicators (stoplight chart)

Take-Home Messages:

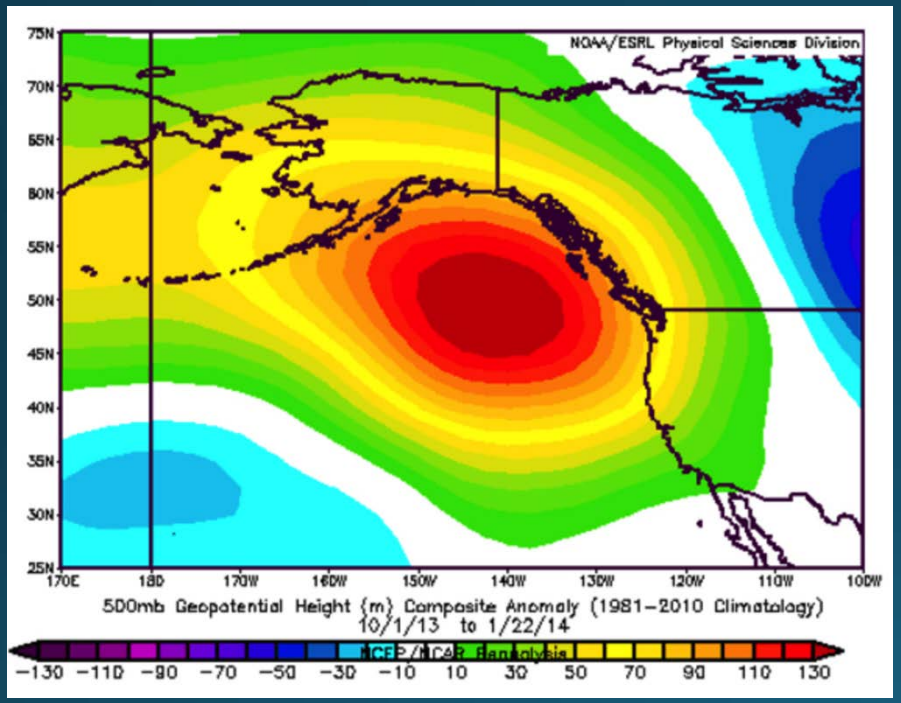
- Sea surface temperatures (SSTs) cooled following "The Blob", ushering in weak La Niñas
- Return of warm SST anomalies to the North and South in Fall 2018
- Projections are for a weak El Niño through spring 2019
- Cooling in 2018 and return to "normal"ish conditions (upwelling/copepods) may lead to better survival

The ecosystem is connected

www.ecosystems.noaa.gov

What is the "Warm Blob"?

Ridiculously Resilient Ridge

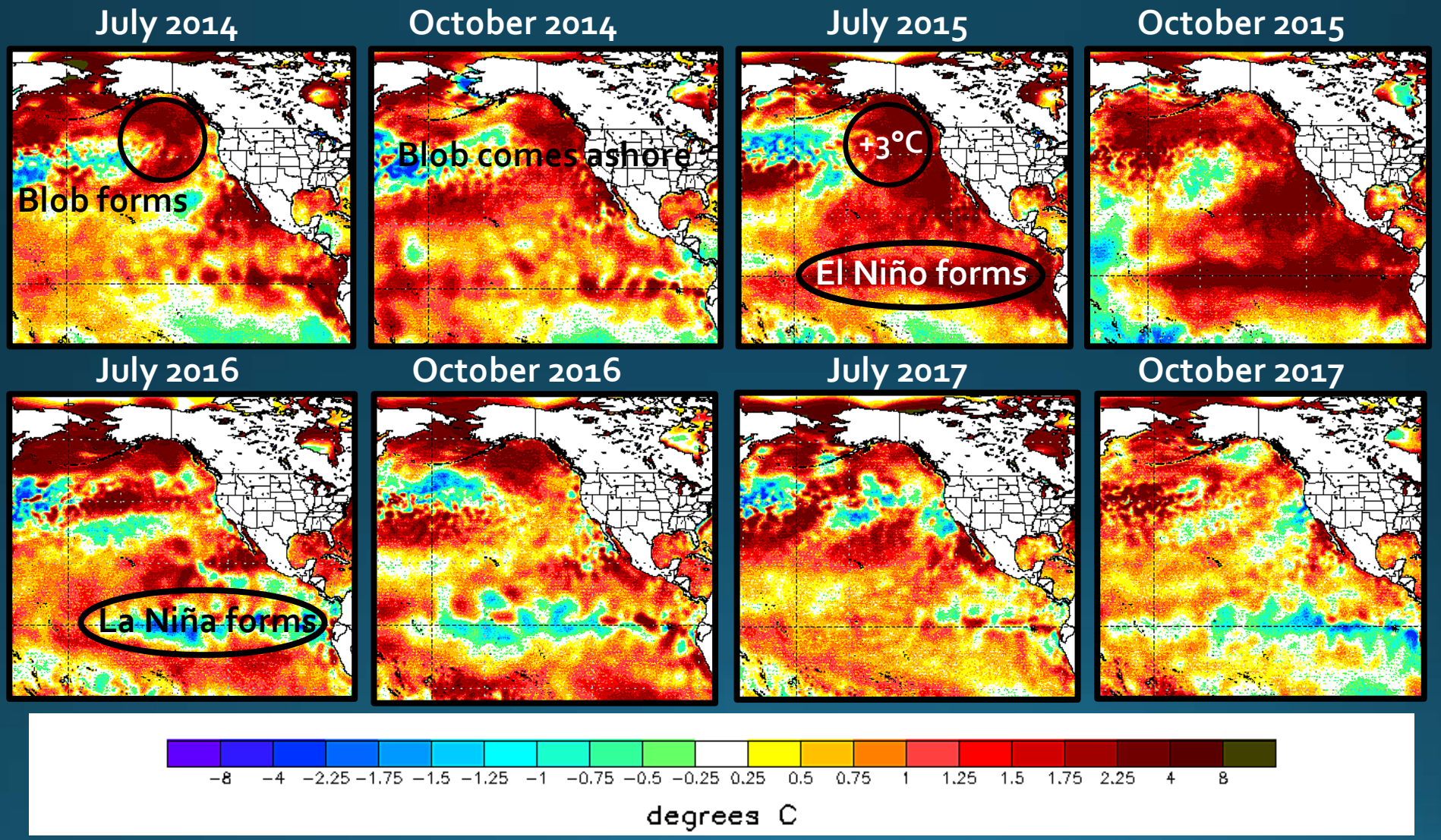


Atmospheric Pressure Anomalies

Oct 1, 2013 – Jan 22, 2014

Michael Jacox, Bond et al. 2015

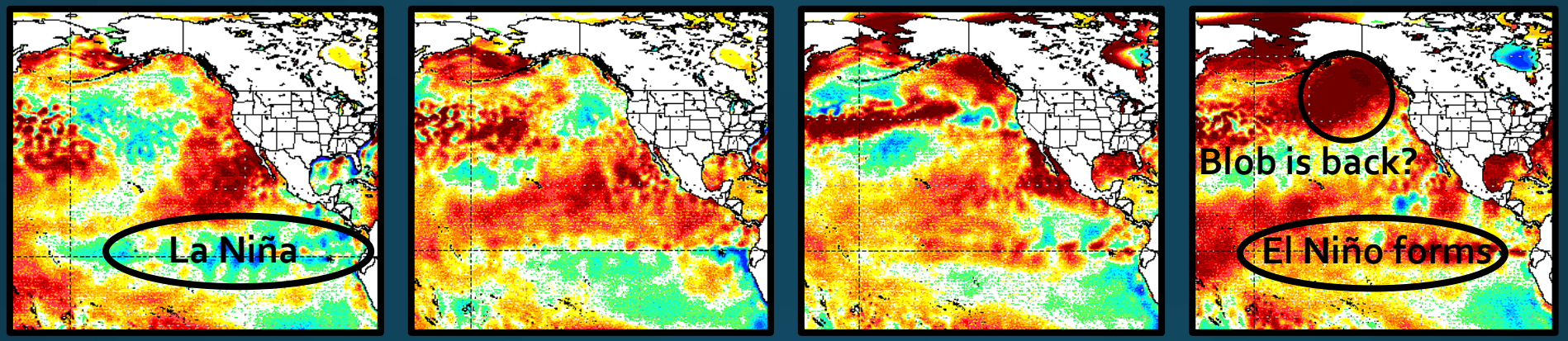
Sea Surface Temperature Anomalies



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

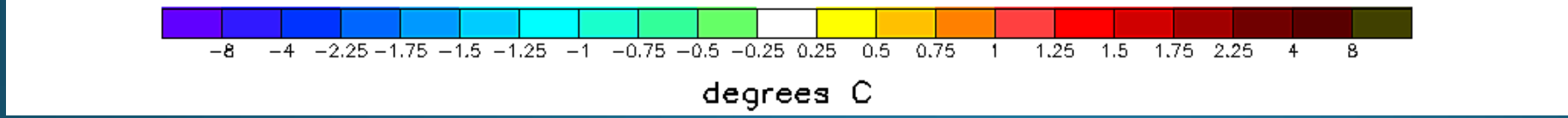
Sea Surface Temperature Anomalies

Jan 2018 | April 2018 | July 2018 | October 2018



Weak La Niña dissipated in Spring 2018 and summer/fall were ENSO neutral

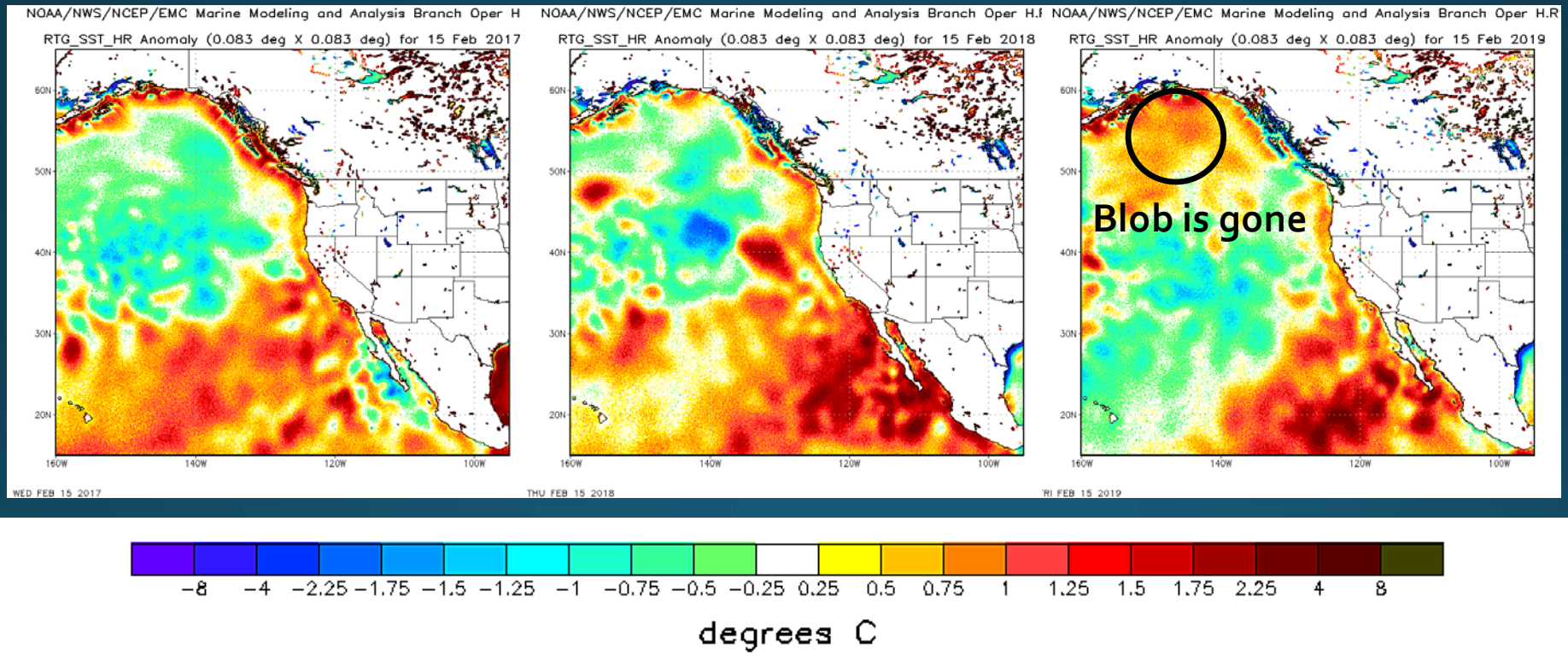
Mild September and October led to concerns of a return of "The Blob"



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

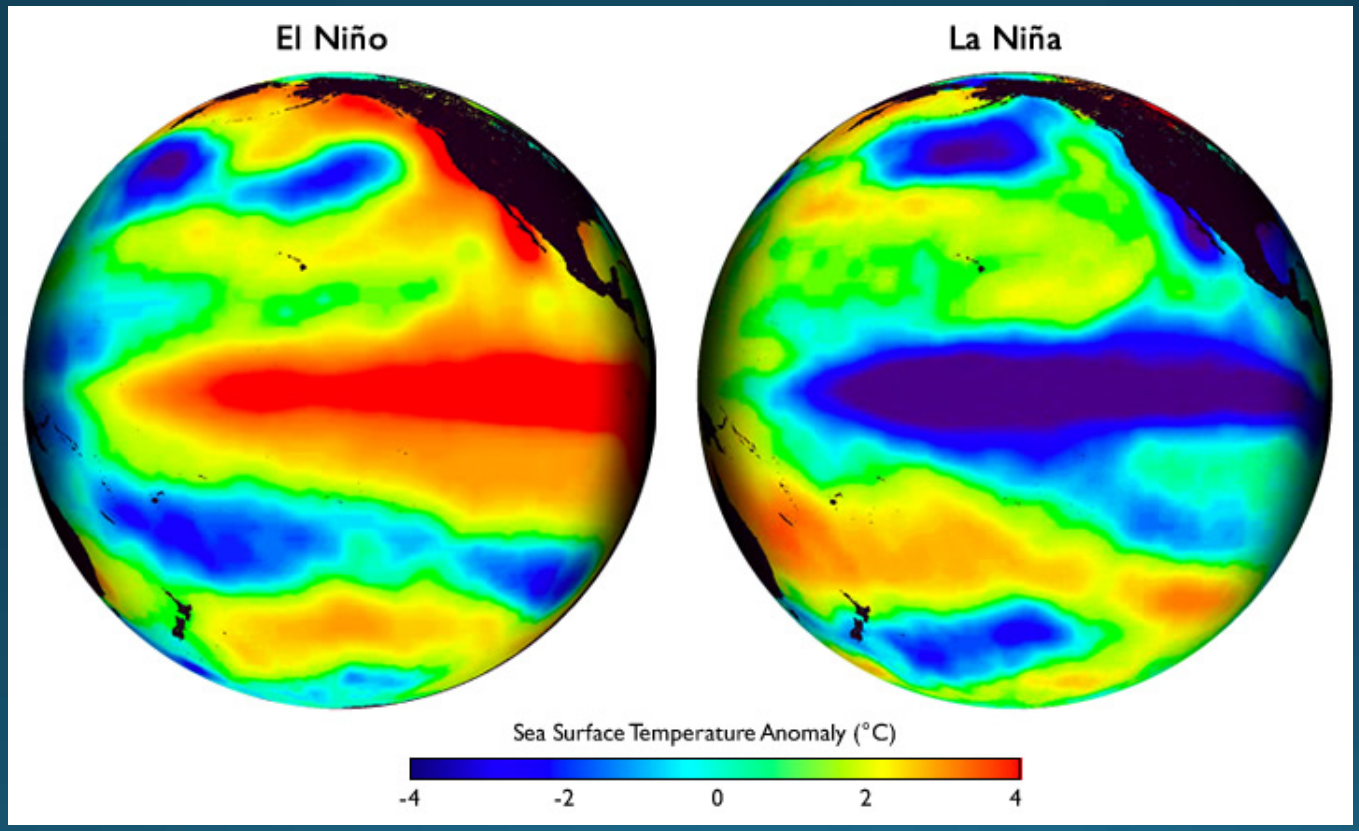
North Pacific cools through 2017-2018

Feb 15, 2017 Feb 15, 2018 Feb 15, 2019



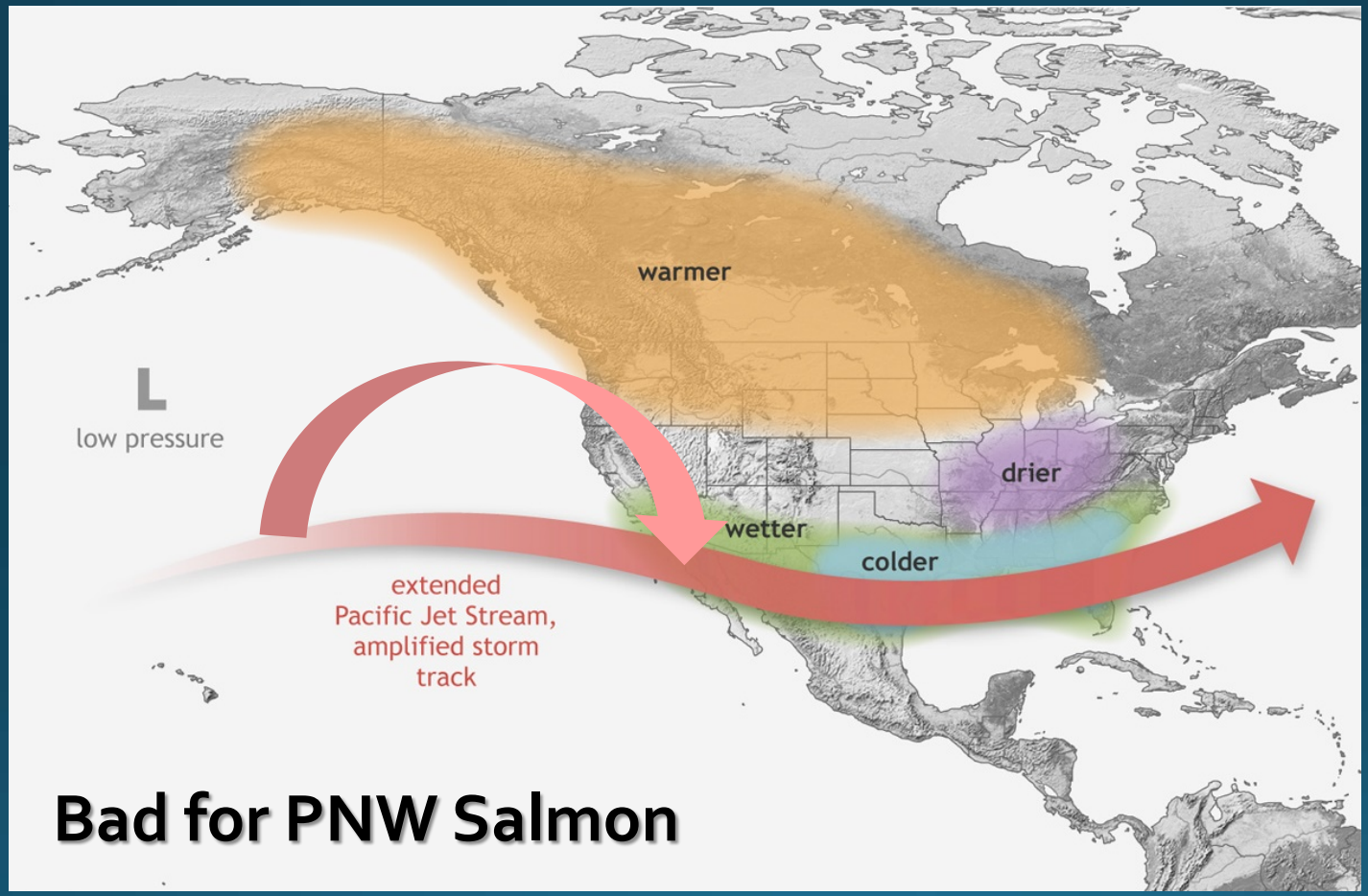
polar.ncep.noaa.gov/sst/ophi/

2014-16 **Strong** and 2019 *weak* **El Niños** and 2016 + 2017/2018 *weak* **La Niñas**

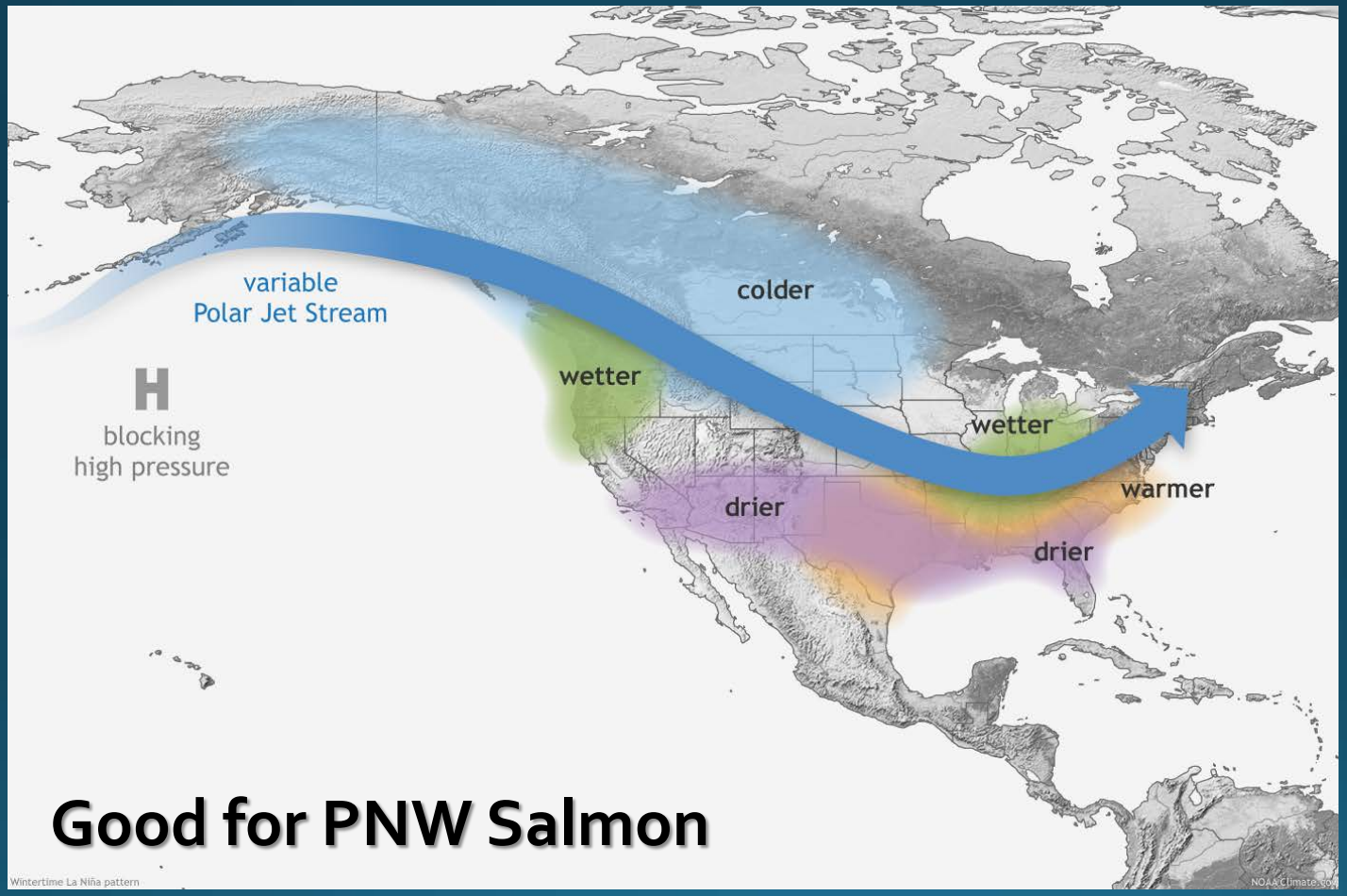


www.climate.gov/enso

Typical El Niño Pattern



Typical La Niña Pattern



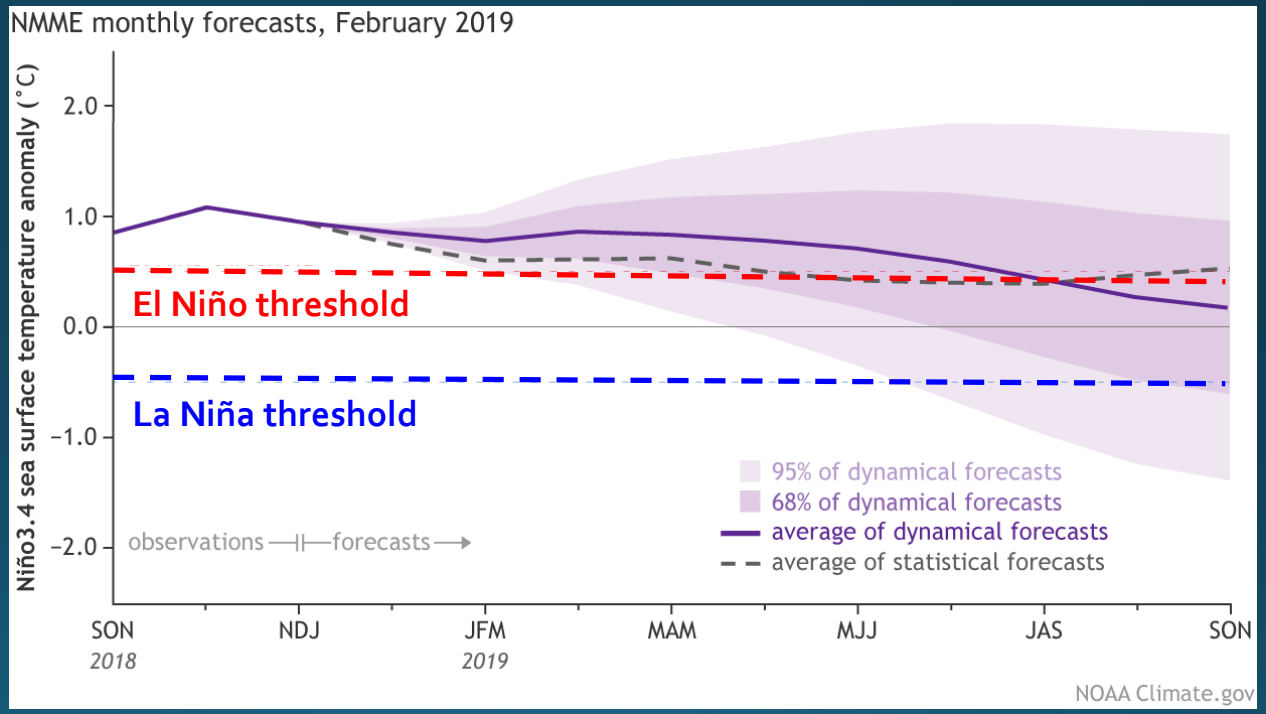
ENSO Outlook

El Niño Advisory

Equatorial sea surface temperatures (SSTs) are above average across most of the Pacific Ocean.

Weak El Niño conditions are present and are expected to continue through the Northern Hemisphere spring 2019 (~55% chance).

Widespread or significant global impacts are not anticipated.

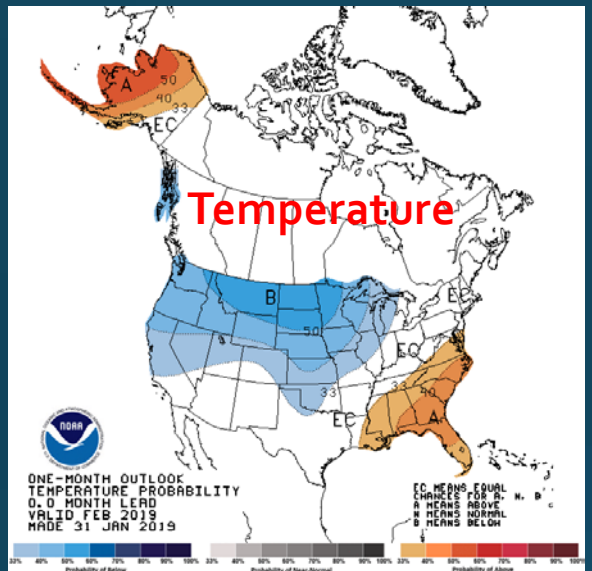


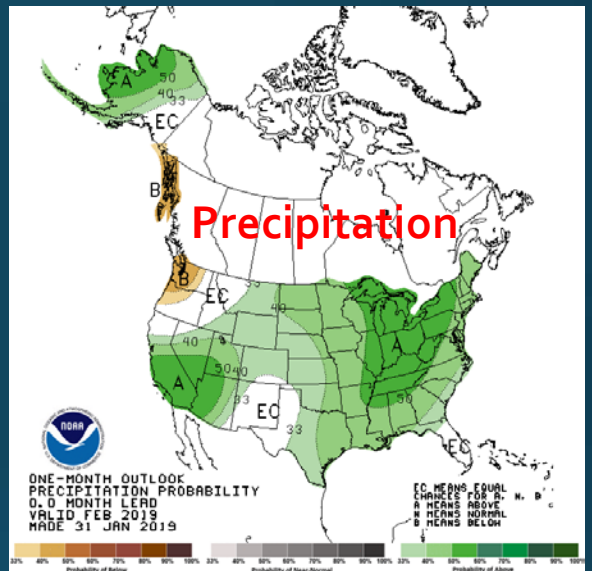
https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/ensodisc.html

Terrestrial impacts on salmon production

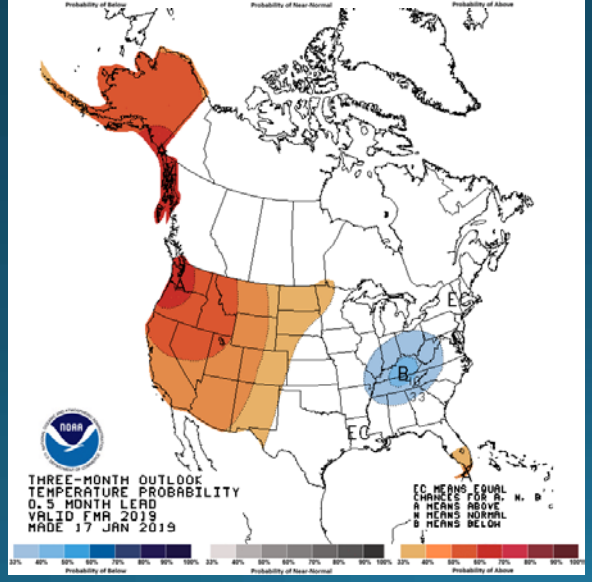
Terrestrial Climate Outlook

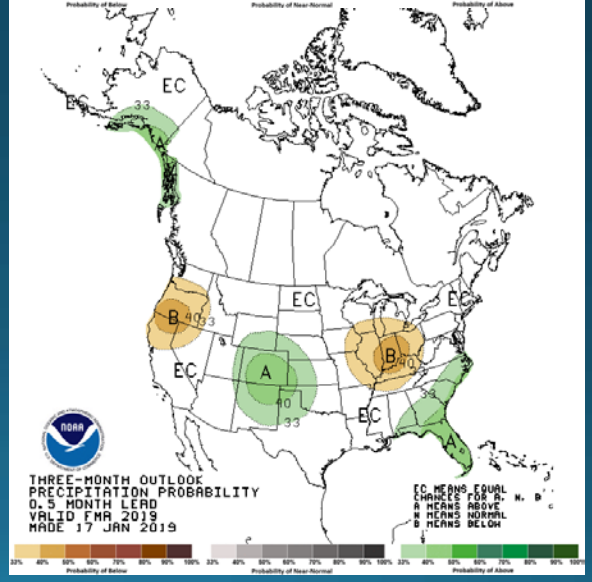
1 Month
Feb 2019





3 months:
Feb – Apr 2019

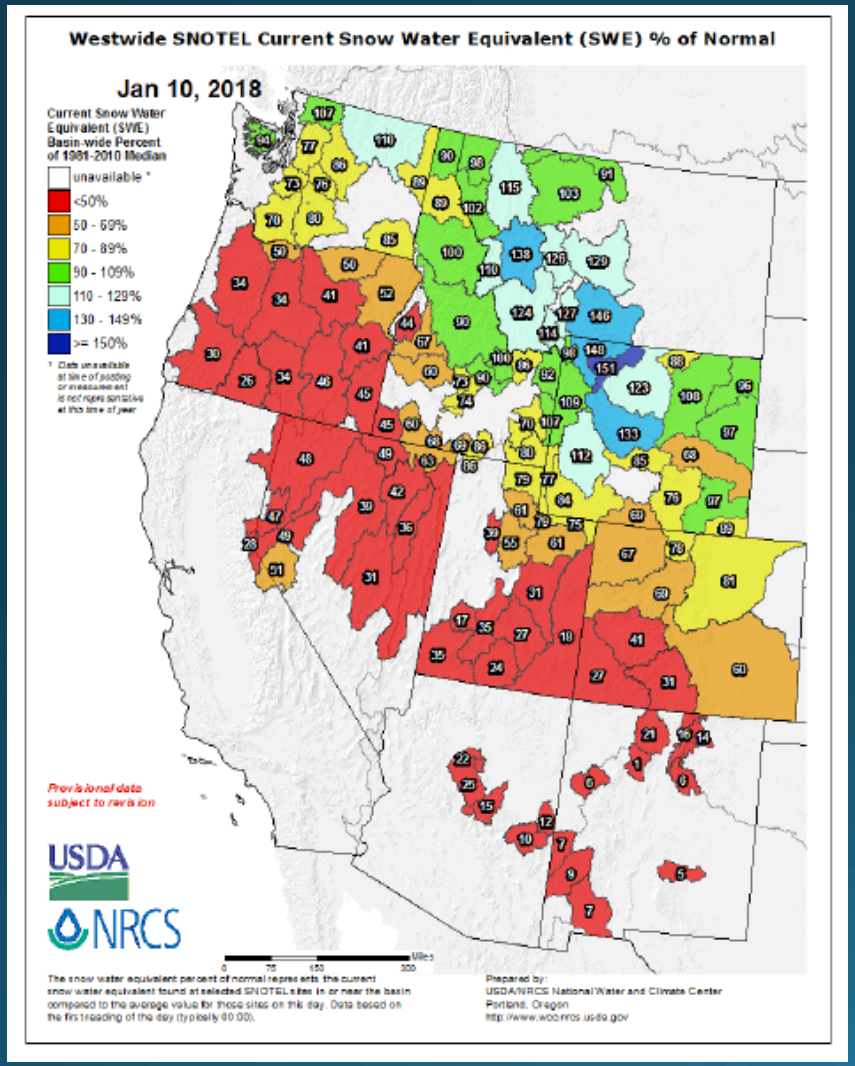




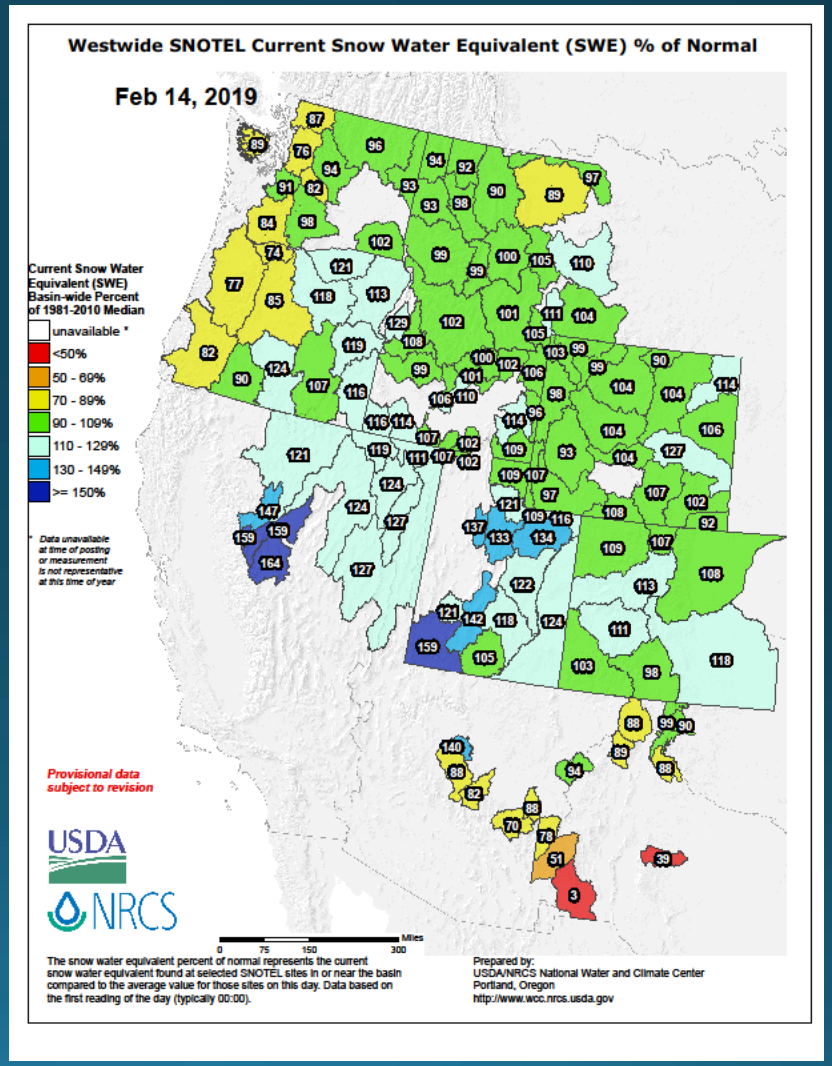
www.cpc.ncep.noaa.gov/products/forecasts

Current Snow Pack

Jan 2018



Feb 2019



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

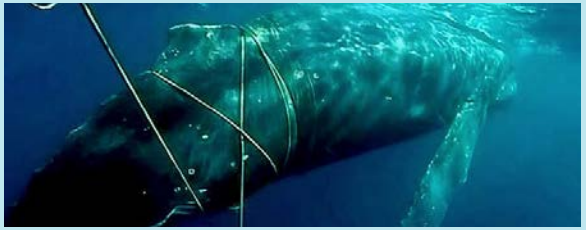
Whales feeding in estuaries

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

Huge Responses at all Trophic Levels

2018

More whale entanglements in estuaries and near shore

Hypoxic conditions on shelf and estuary from Jun-Sep

Better than expected Chinook returns to South Puget Sound

Northern, lipid-rich copepods and high abundances of crab megalopae in coastal waters

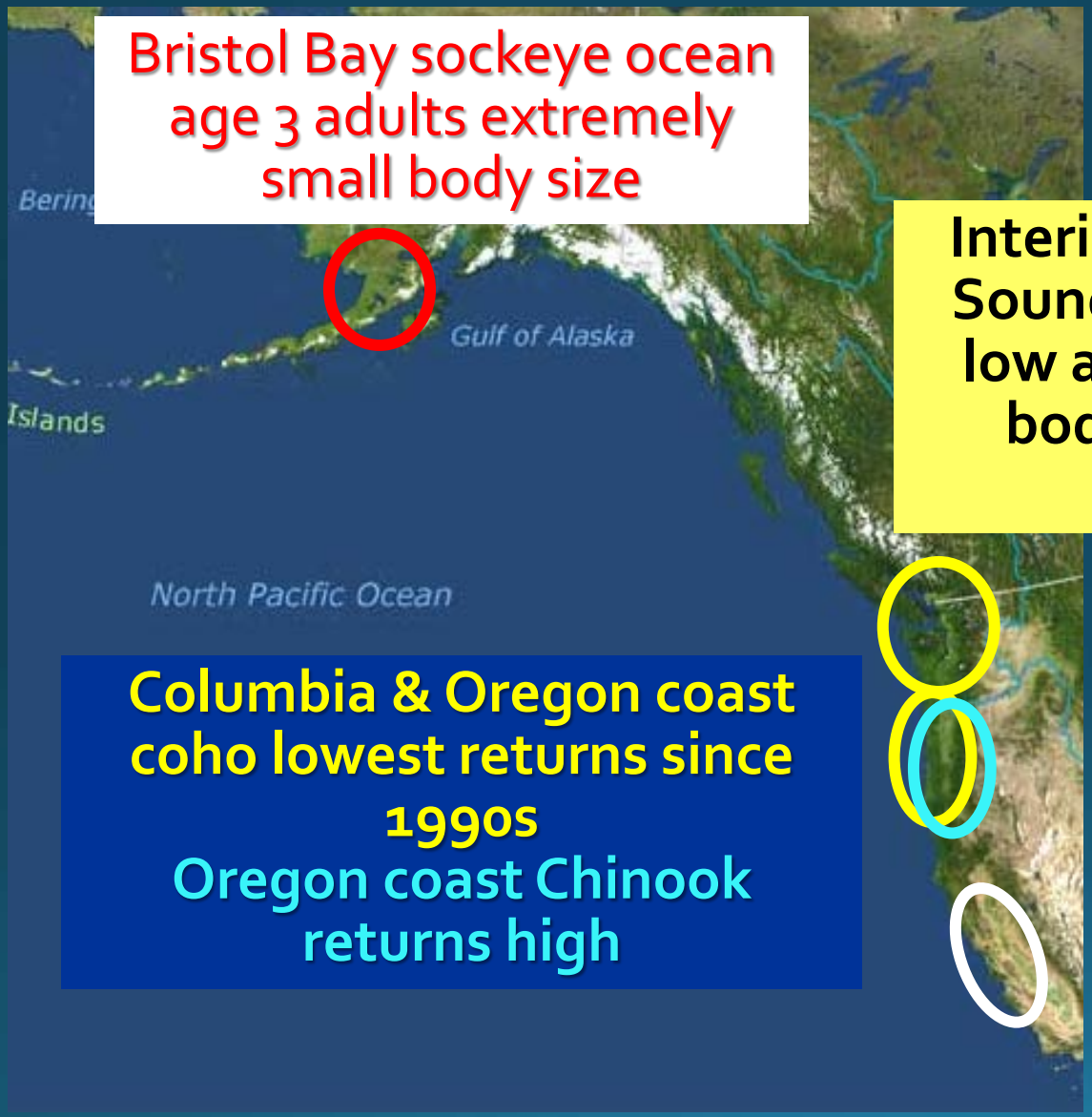
Pyrosomes dissipated off OR/WA for first time since 2017

Record breaking opah caught off WA

Culling of up to 93 sea lions approved by federal government below Willamette Falls to protect winter run of steelhead

Mourning Orca mother carries dead calf for a record 17 days

Unusual salmon observations in **2015**

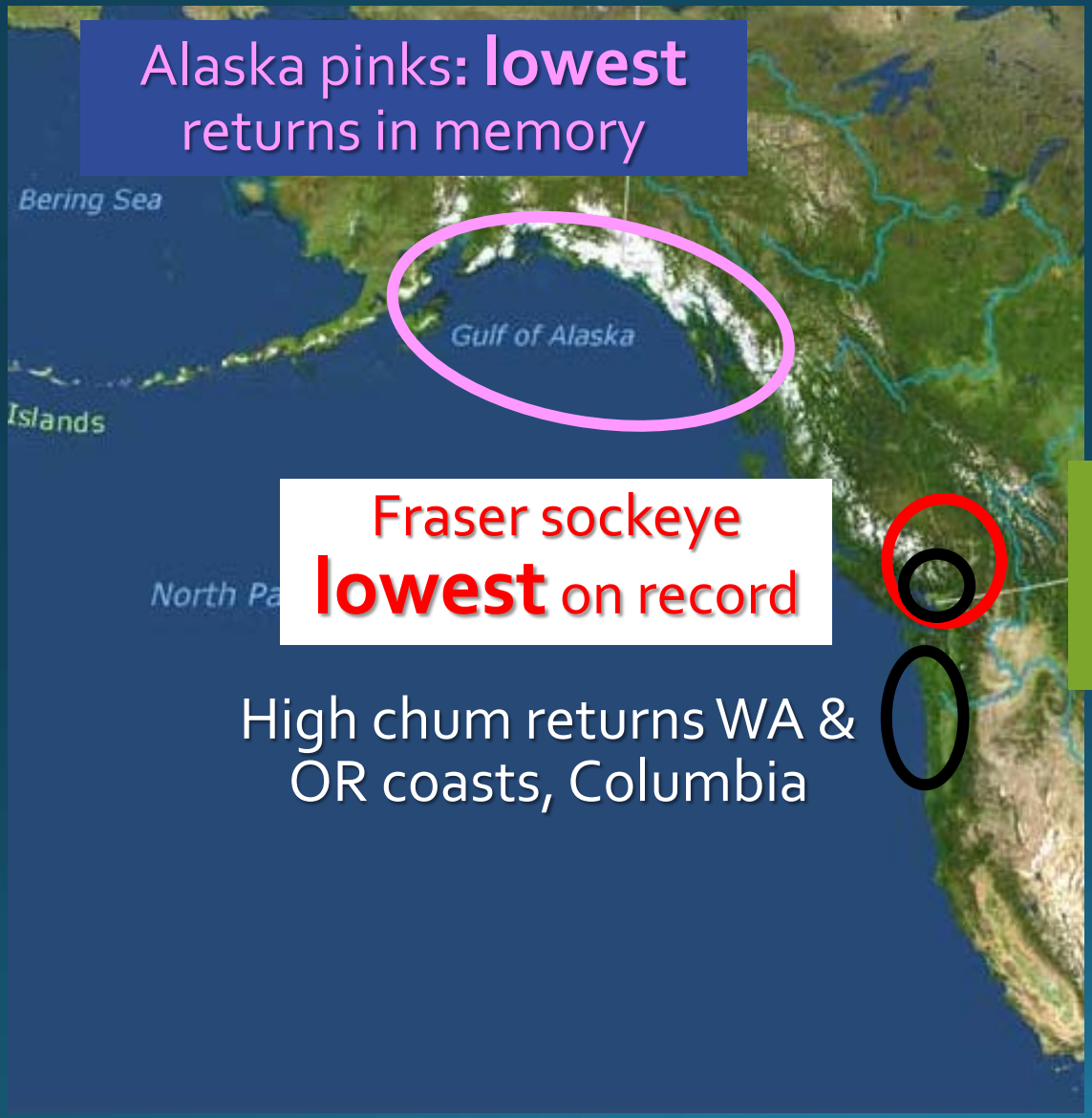


Interior Fraser & Puget Sound coho extremely low abundance, small body size, and low fecundity

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

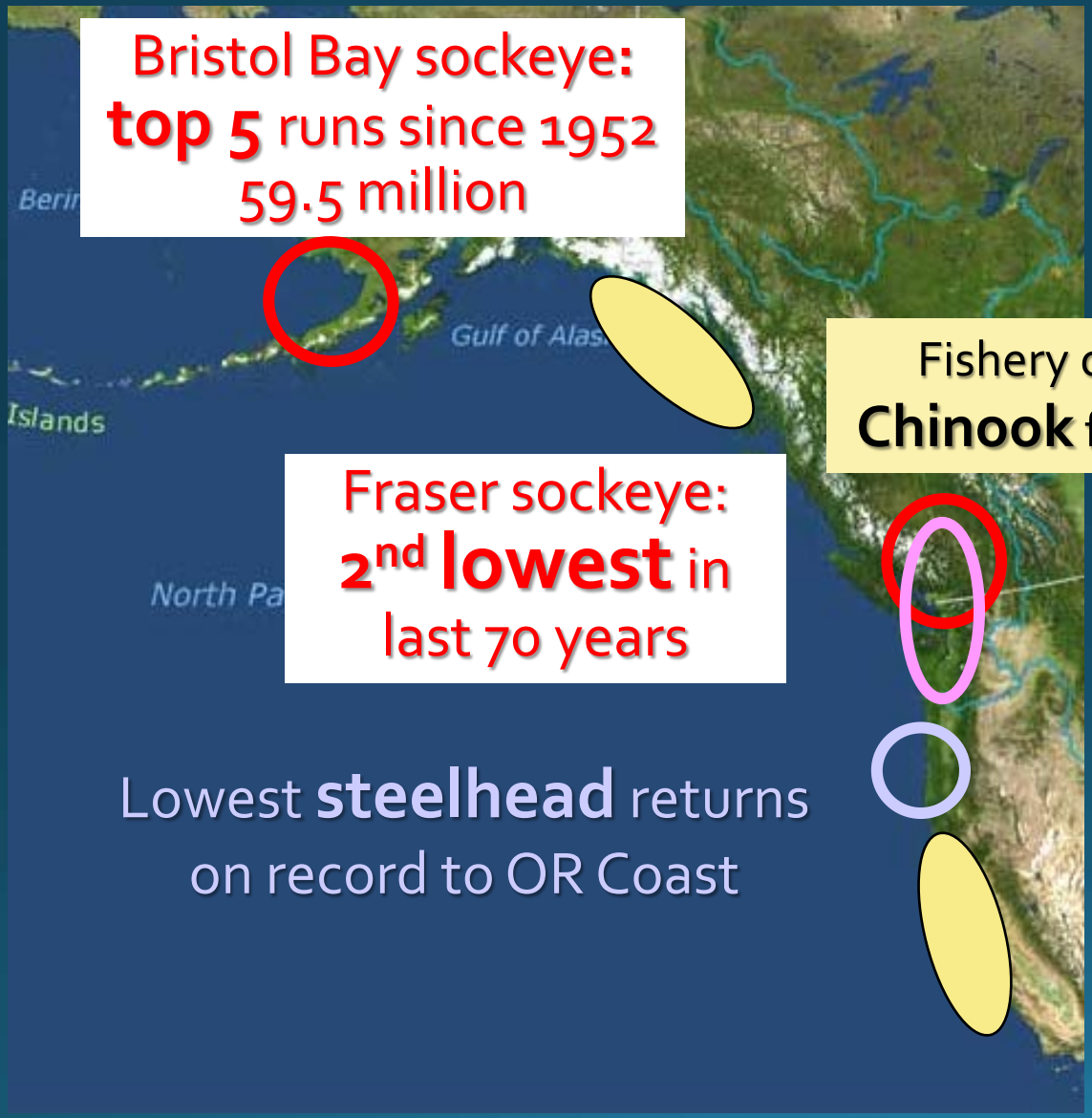
Modified from L. Weitkamp

Unusual salmon observations in **2016**



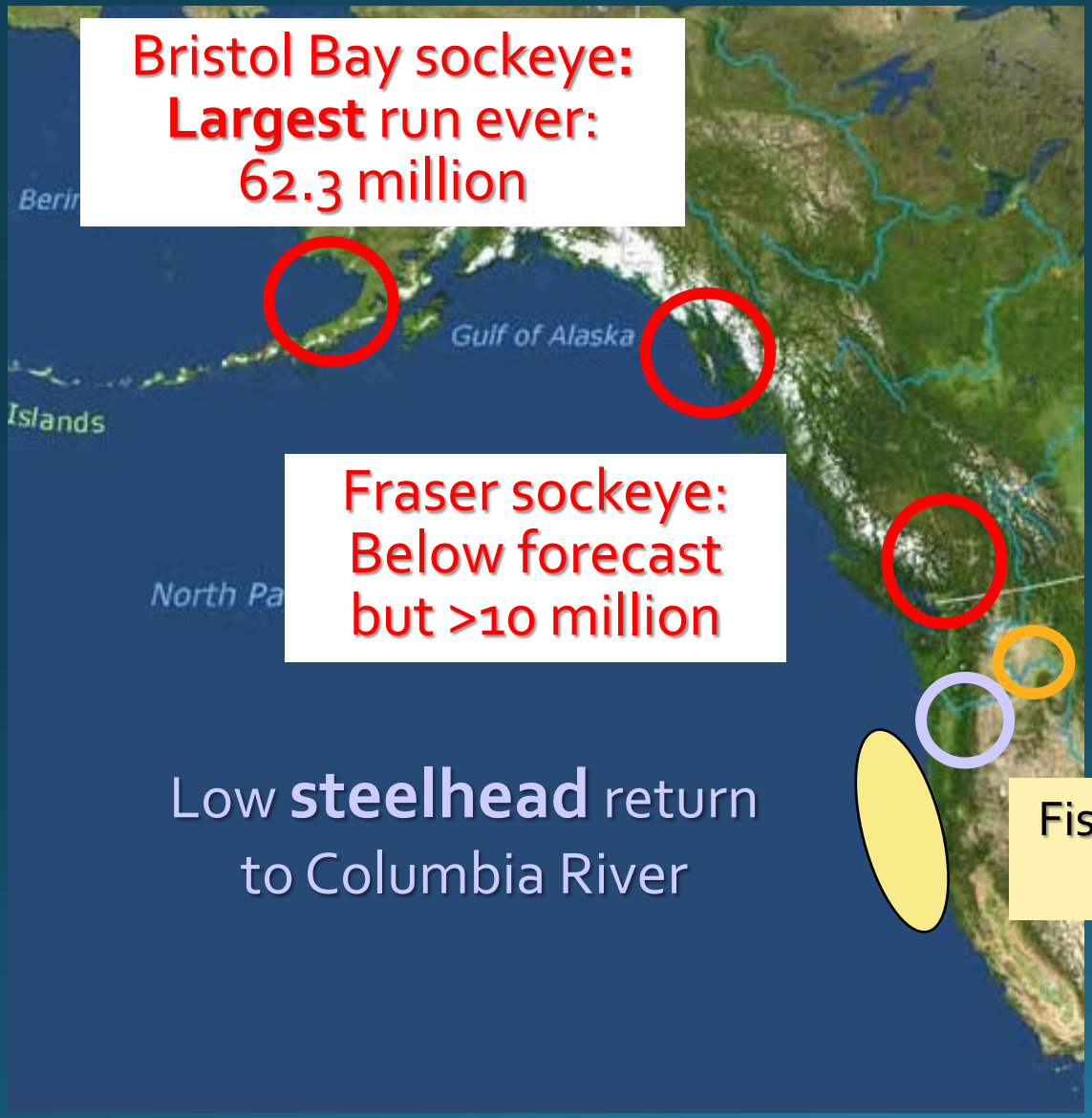
Modified from L. Weitkamp

Unusual salmon observations in **2017**



Modified from L. Weitkamp

Unusual salmon observations in **2018**



Bristol Bay sockeye:
Largest run ever:
62.3 million

Poor sockeye, pink, and Coho run in SE Alaska

Fraser sockeye:
Below forecast
but >10 million

High **shad** returns on Columbia River

Low **steelhead** return to Columbia River

Fishery closures for **Coho** in OR and CA

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	2018
		Year																				
Basin-scale physical indices	PDO (Sum Dec-March)	18	6	3	13	7	20	12	16	14	9	5	1	15	4	2	8	10	21	19	17	11
	PDO (Sum May-Sept)	10	4	6	5	11	17	16	18	12	14	2	9	7	3	1	8	19	21	20	15	13
	ONI (Average Jan-June)	20	1	1	7	14	16	15	17	9	12	3	11	18	4	6	8	10	19	21	13	5
Regional physical indices	46050 SST (°C; May-Sept)	16	9	3	4	1	8	21	15	5	17	2	10	7	11	12	13	14	20	18	6	19
	Upper 20 m T (°C; Nov-Mar)	20	11	8	10	6	15	16	12	13	5	1	9	17	4	3	7	2	21	19	18	14
	Upper 20 m T (°C; May-Sept)	17	12	14	4	1	3	21	19	7	8	2	5	13	10	6	18	20	9	15	11	16
	Deep temperature (°C; May-Sept)	21	6	8	4	1	10	12	16	11	5	2	7	14	9	3	15	20	18	13	17	19
	Deep salinity (May-Sept)	19	3	9	4	5	16	17	10	7	1	2	14	18	13	12	11	20	15	8	6	6
Regional biological indices	Copepod richness anom. (no. species; May-Sept)	19	2	1	7	6	14	13	18	15	10	8	9	17	4	5	3	11	20	21	16	12
	N. copepod biomass anom. (mg C m^{-3}; May-Sept)	19	14	10	11	3	16	13	20	15	12	6	9	8	1	2	4	5	17	21	18	7
	S. copepod biomass anom. (mg C m^{-3}; May-Sept)	21	2	5	4	3	14	15	20	13	10	1	7	16	9	8	6	11	18	19	17	12
	Biological transition (day of year)	18	8	5	7	9	14	13	19	12	2	1	3	16	6	10	4	11	21	21	17	15
	Ichthyoplankton biomass (mg C 1,000 m^{-3}; Jan-Mar)	21	12	3	8	10	19	18	15	17	16	2	13	5	14	11	9	20	6	7	1	4
	chthyoplankton community index (PCO axis 1 scores; Jan-Mar)	10	13	2	7	5	11	20	18	3	12	1	14	15	8	4	6	9	19	21	17	16
	Chinook salmon juvenile catches (no. km^{-1}; June)	19	4	5	16	8	12	17	20	11	9	1	6	7	15	3	2	10	13	18	21	14
	Coho salmon juvenile catches (no. km^{-1}; June)	19	8	13	6	7	3	16	20	17	5	4	10	11	15	18	1	12	9	14	21	2
	Mean of ranks	17.9	7.2	6.0	7.3	6.1	13.0	15.9	17.1	11.3	9.2	2.7	8.6	12.8	8.1	6.6	7.7	12.8	16.7	17.2	14.4	11.6
	Rank of the mean rank	21	5	2	6	3	15	17	19	11	10	1	9	13	8	4	7	13	18	20	16	12

2018 = Ranked 12th

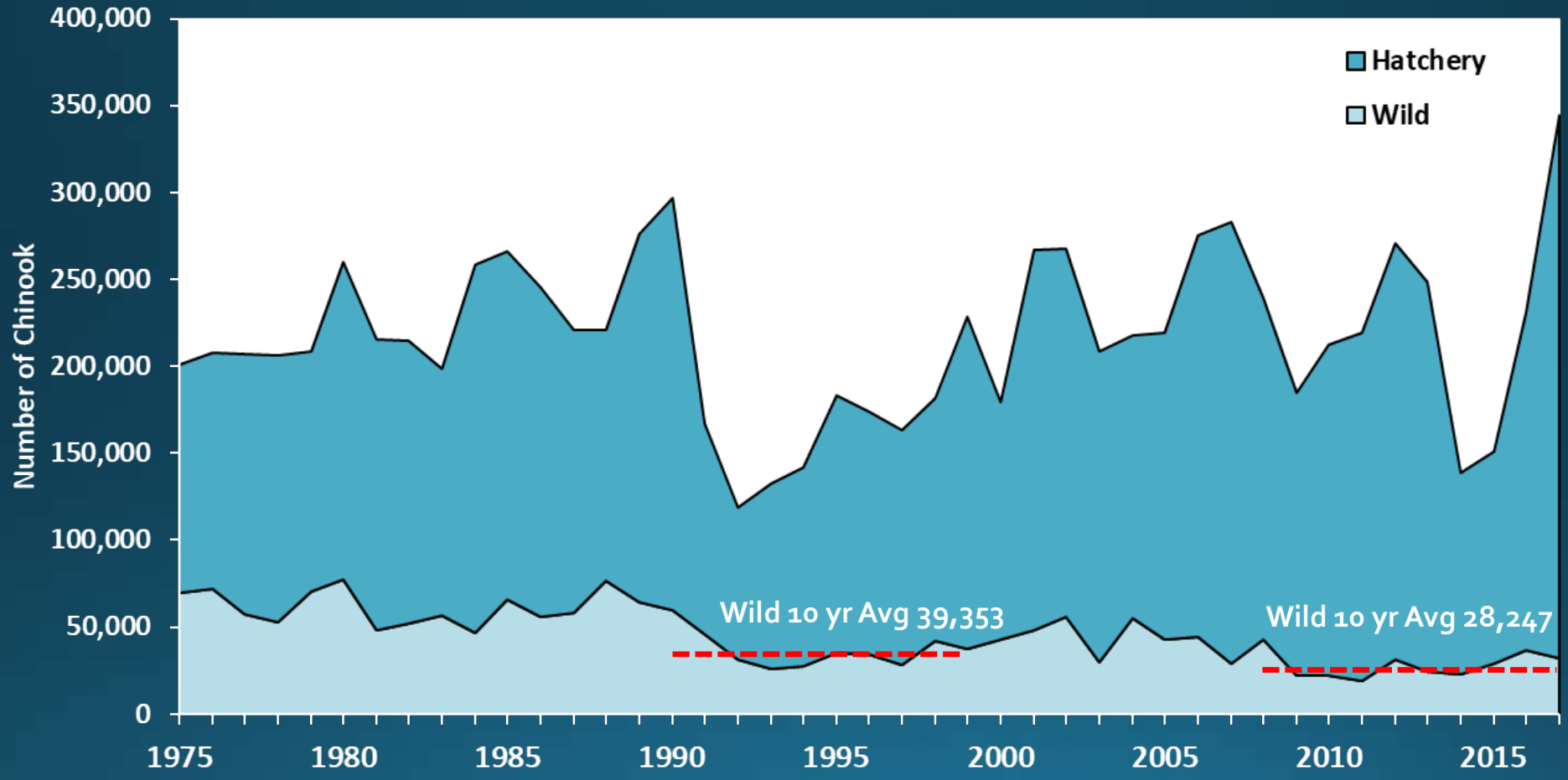
www.nwfsc.noaa.gov

Questions?

WA Coast and Puget Sound 2018 Returns and 2019 Forecasts

Chinook Salmon

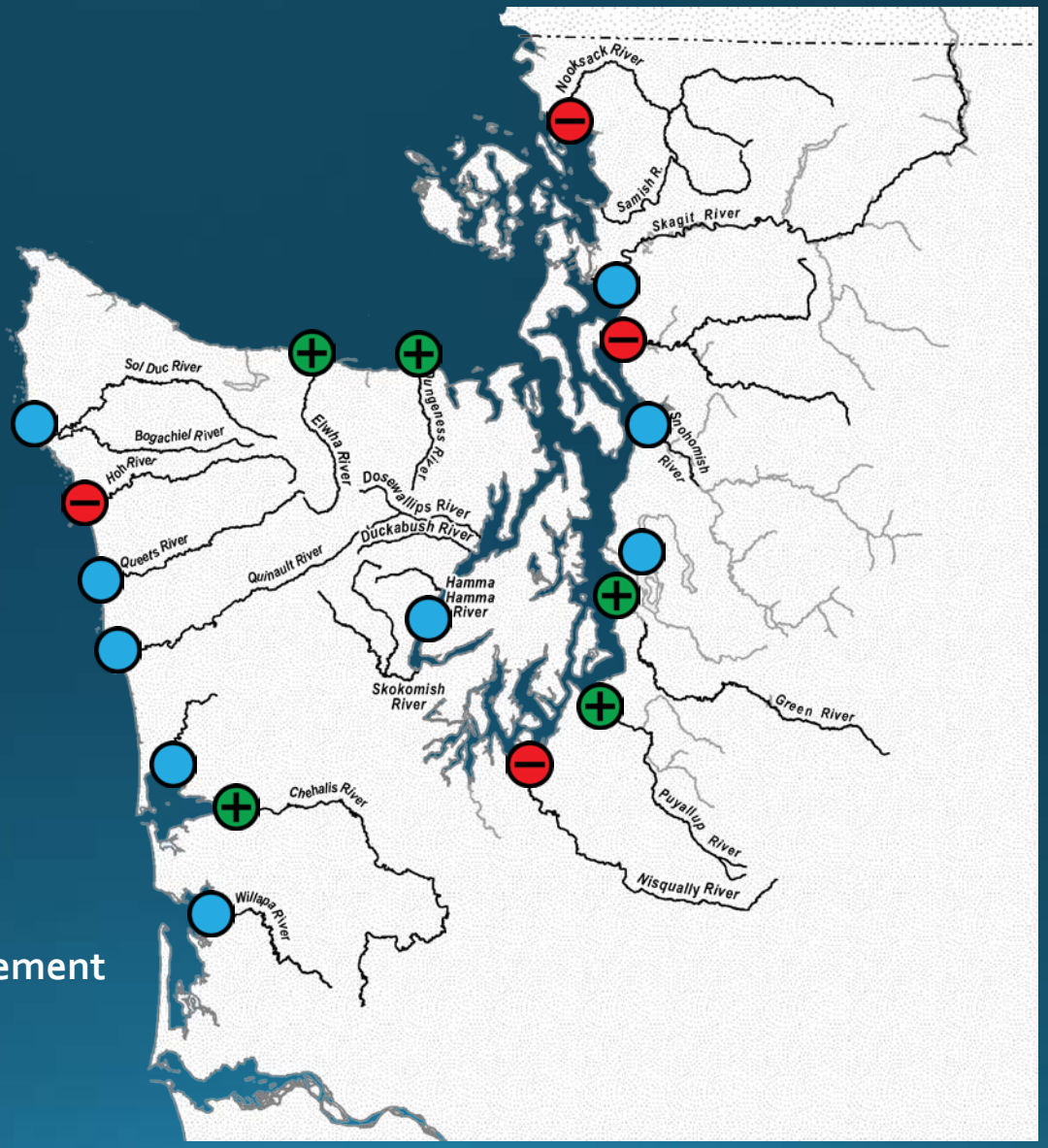
Chinook Historical Runsize – Puget Sound



Wild Chinook ⬇~28% since 10yr avg. prior to listing under ESA in 1999

2018 Wild Fall Chinook Returns

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

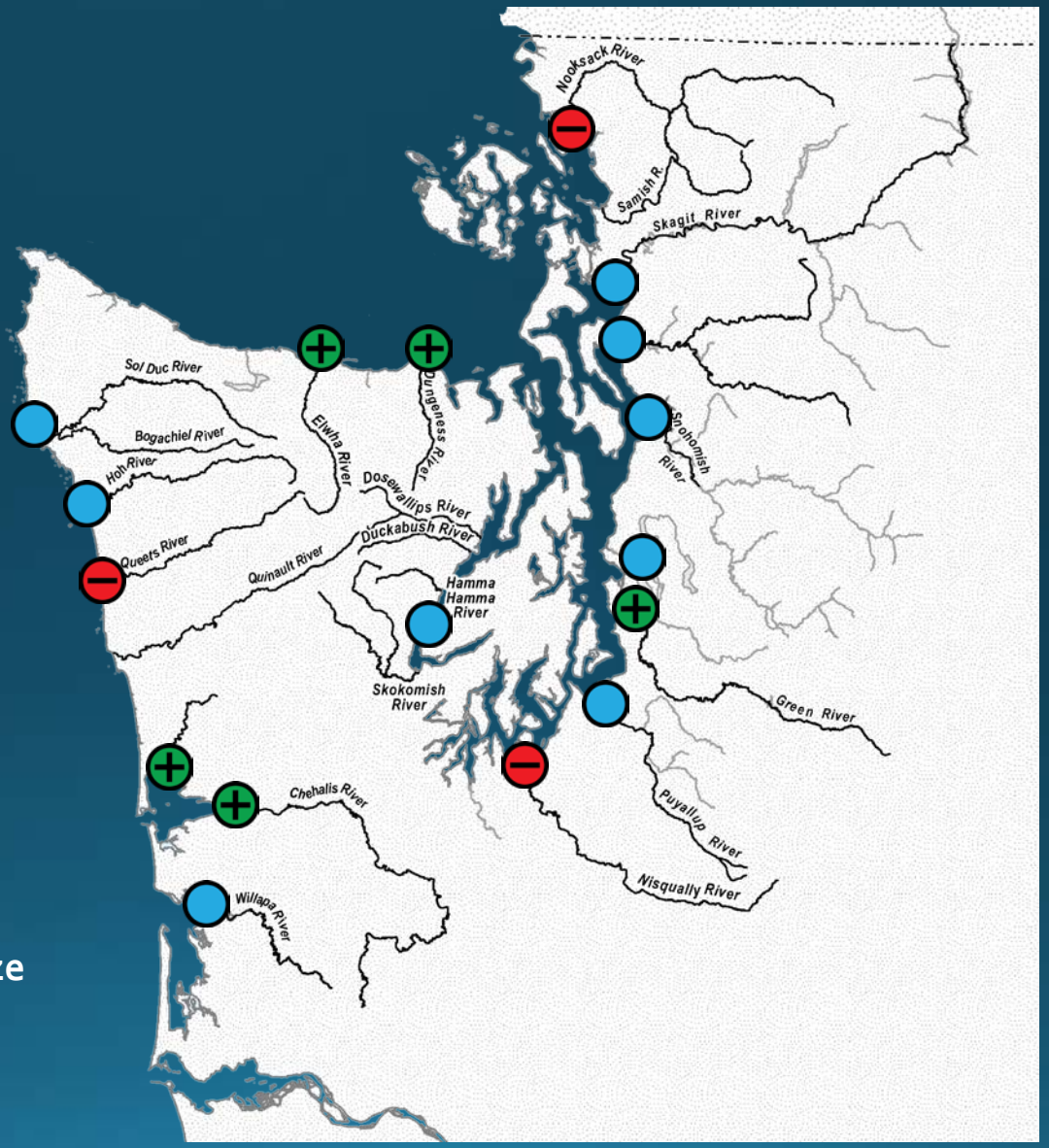


Relative to Recent 10yr Avg. Escapement

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

2019 Wild Fall Chinook Forecasts

- Forecasts range from Poor to Good for both Puget Sound and Coast
- Both Puget Sound and Coast wild forecasts ⬆ 6%

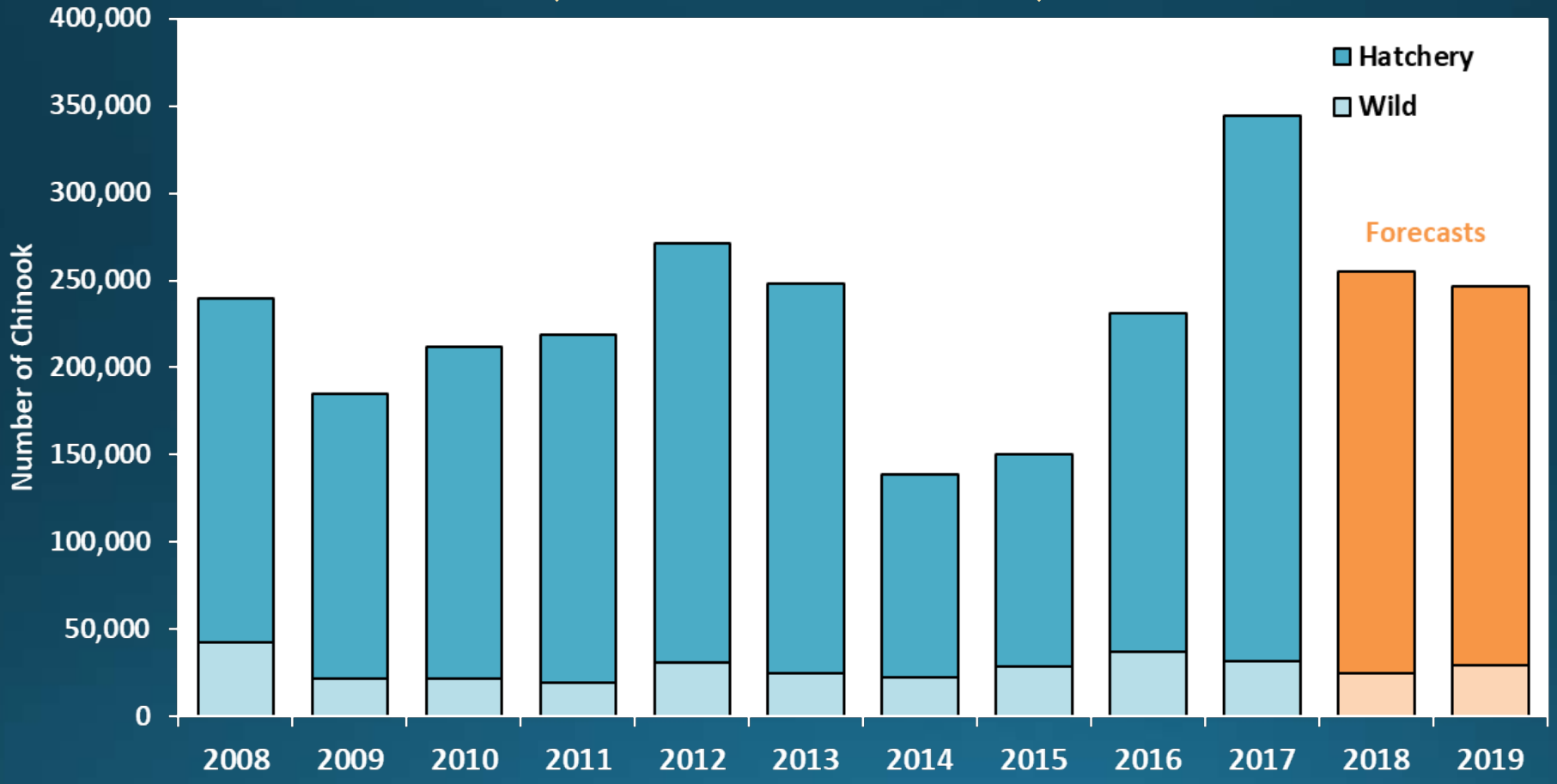


Relative to Recent 10yr Avg. Runsize

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

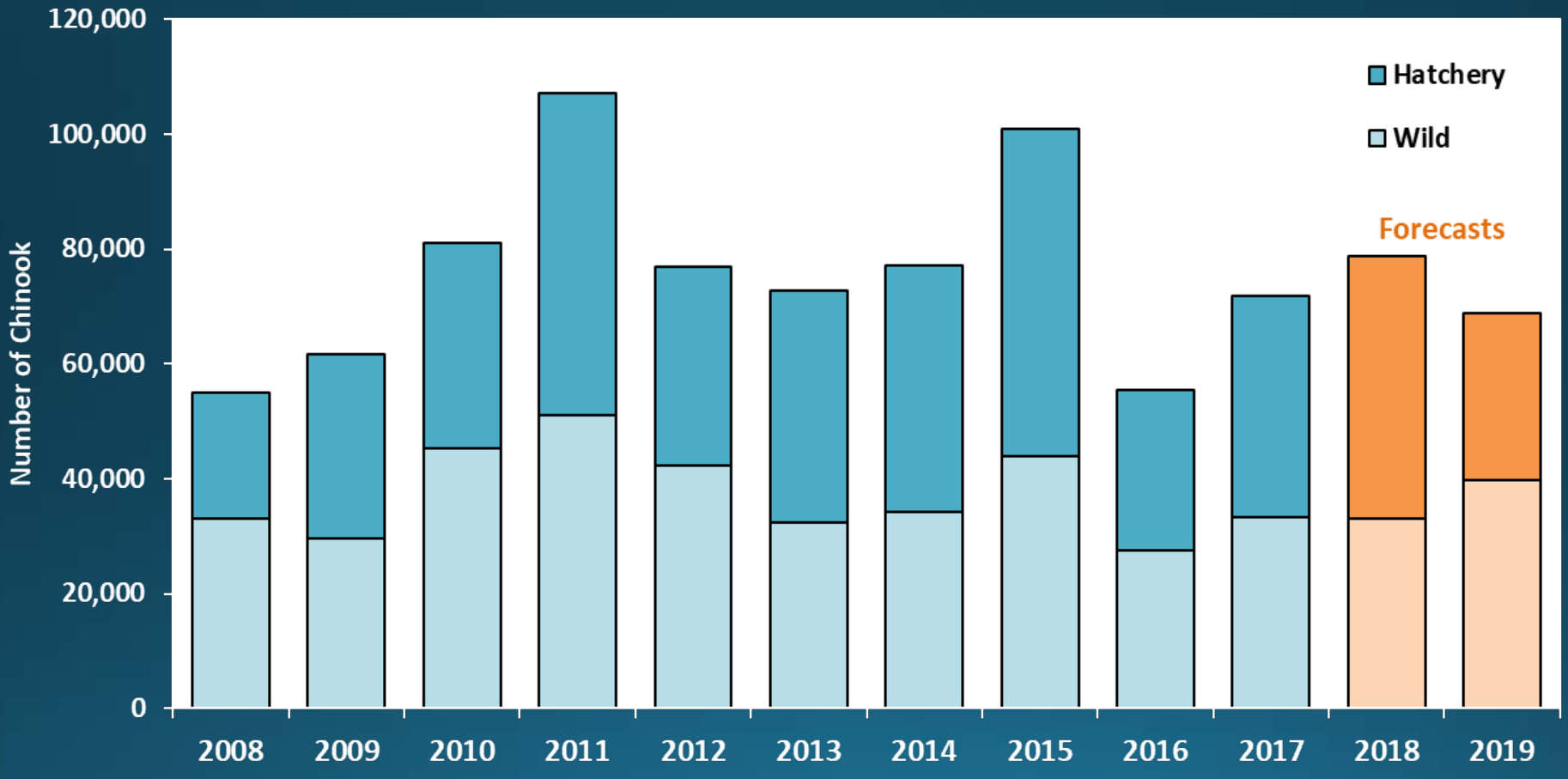
P. Sound Hatchery Chinook Forecasts

Puget Sound hatchery Chinook forecast ⬆ 11% from recent 10 year avg
(⬇ 6% from 2018 forecast)



Coastal Hatchery Chinook Forecasts

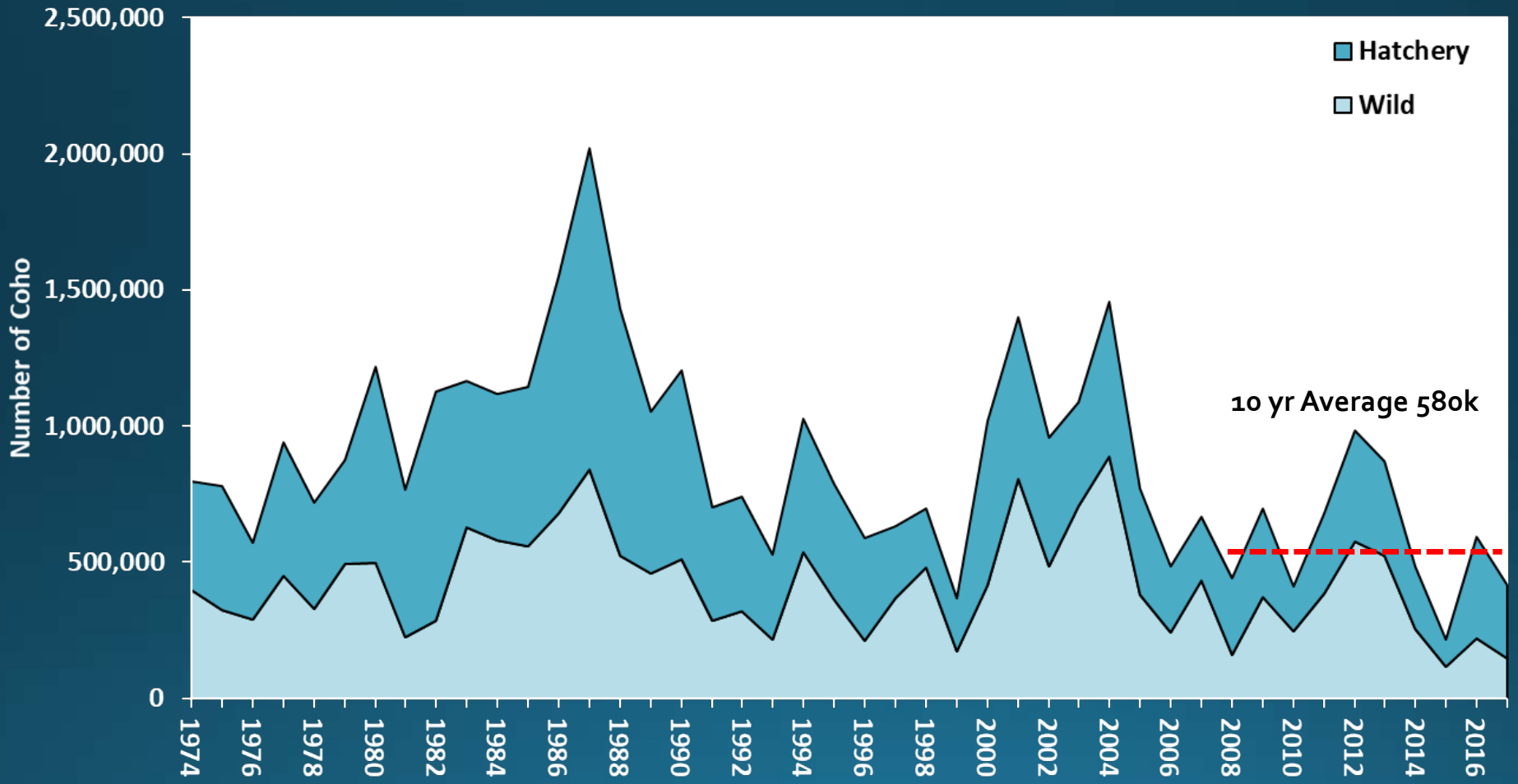
Coastal Hatchery Chinook forecast ⬇25% from recent 10 yr avg.
(⬇36% from 2018 Forecast)



*Excludes Quinault R.
Several Coastal forecasts are preliminary and subject to change

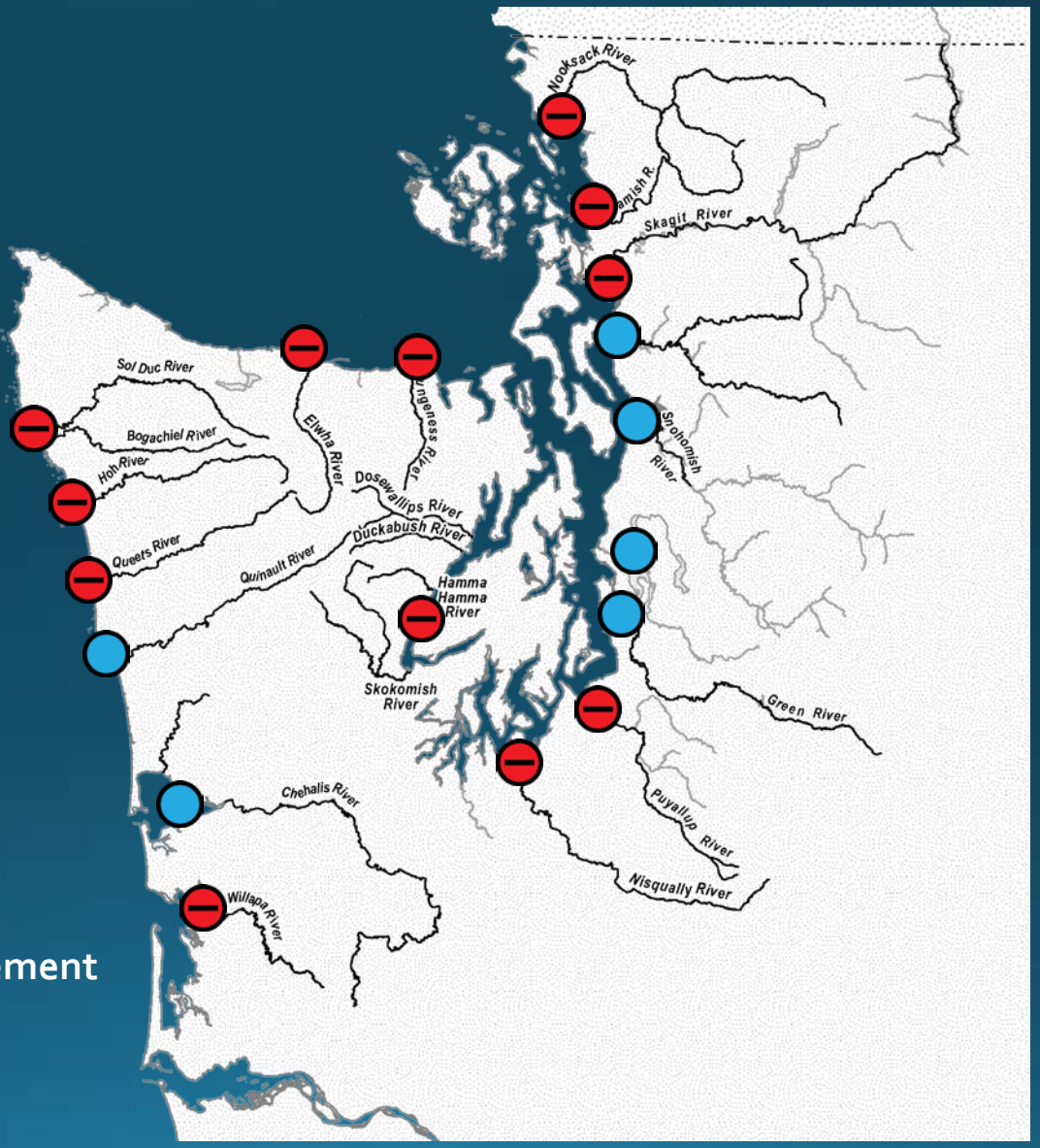
Coho

Coho Historical Runsize – Puget Sound



2018 Wild Coho Returns

- All returns are preliminary
- Returns ranged from Poor to Neutral for Puget Sound and Coast

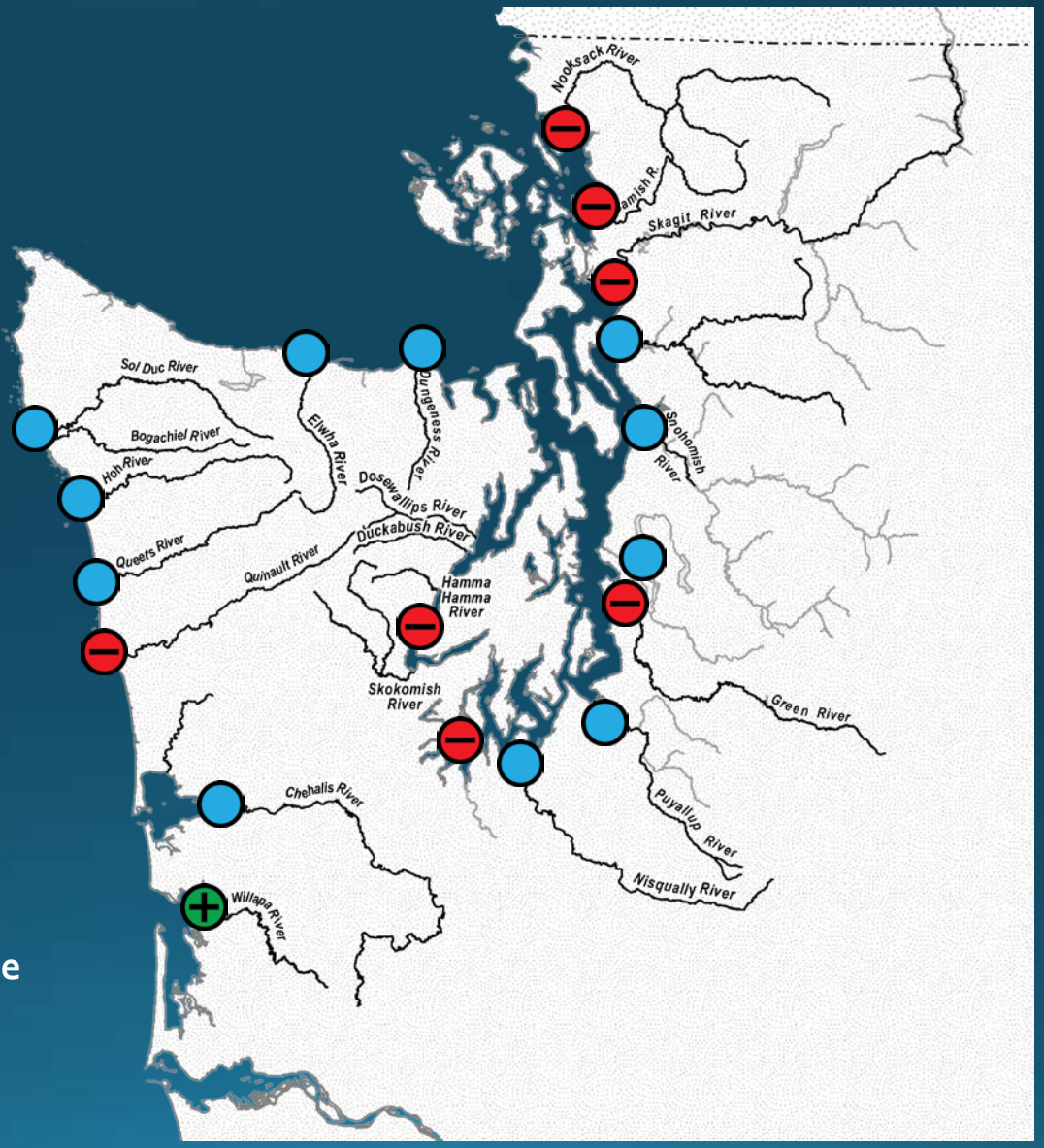


Relative to Recent 10yr Avg. Escapement

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

2019 Wild Coho Forecasts

- Forecasts range from Poor to Neutral across Puget Sound; ⬇ 15%
- Poor to Good on coast; ⬇ 11%

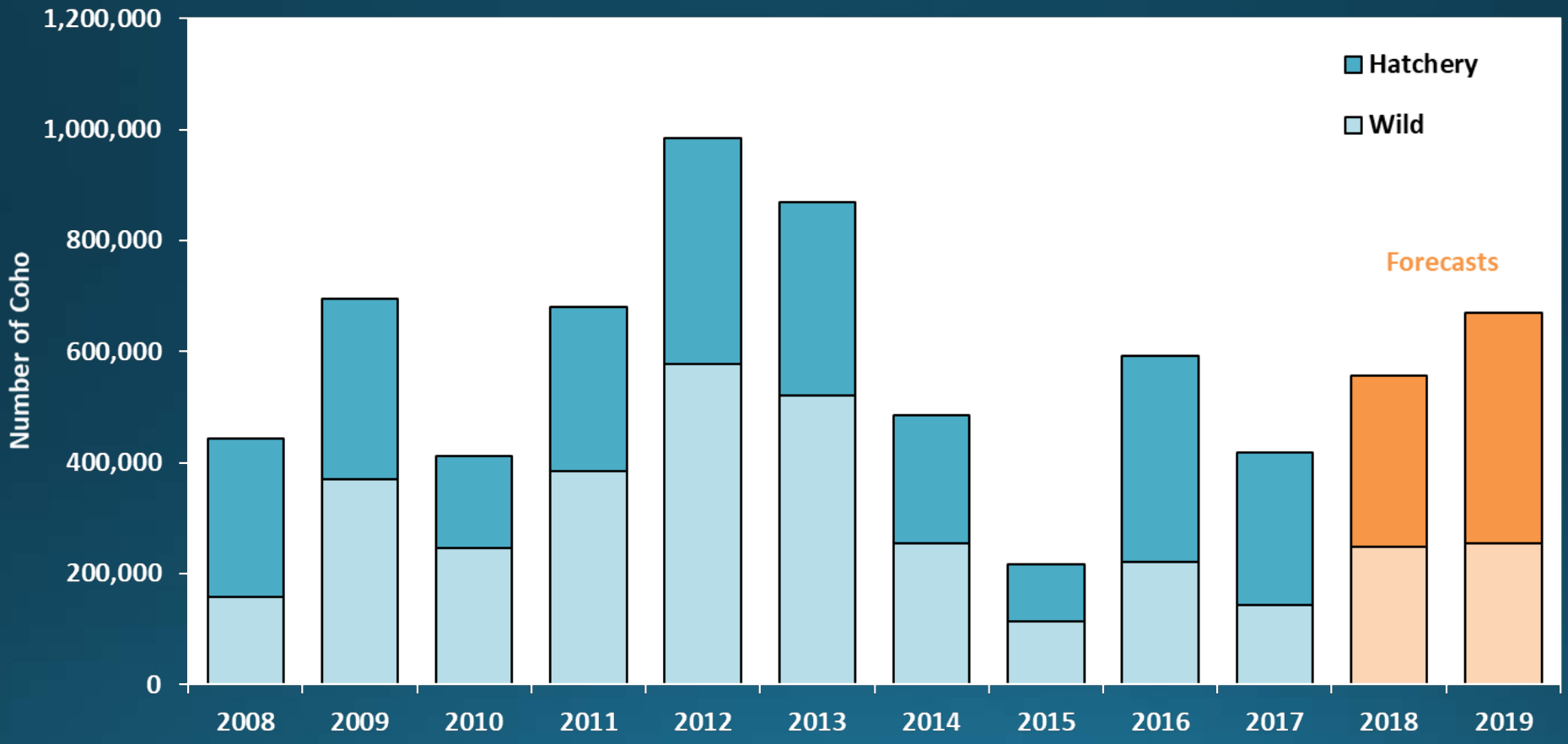


Relative to Recent 10yr Avg. Runsize

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

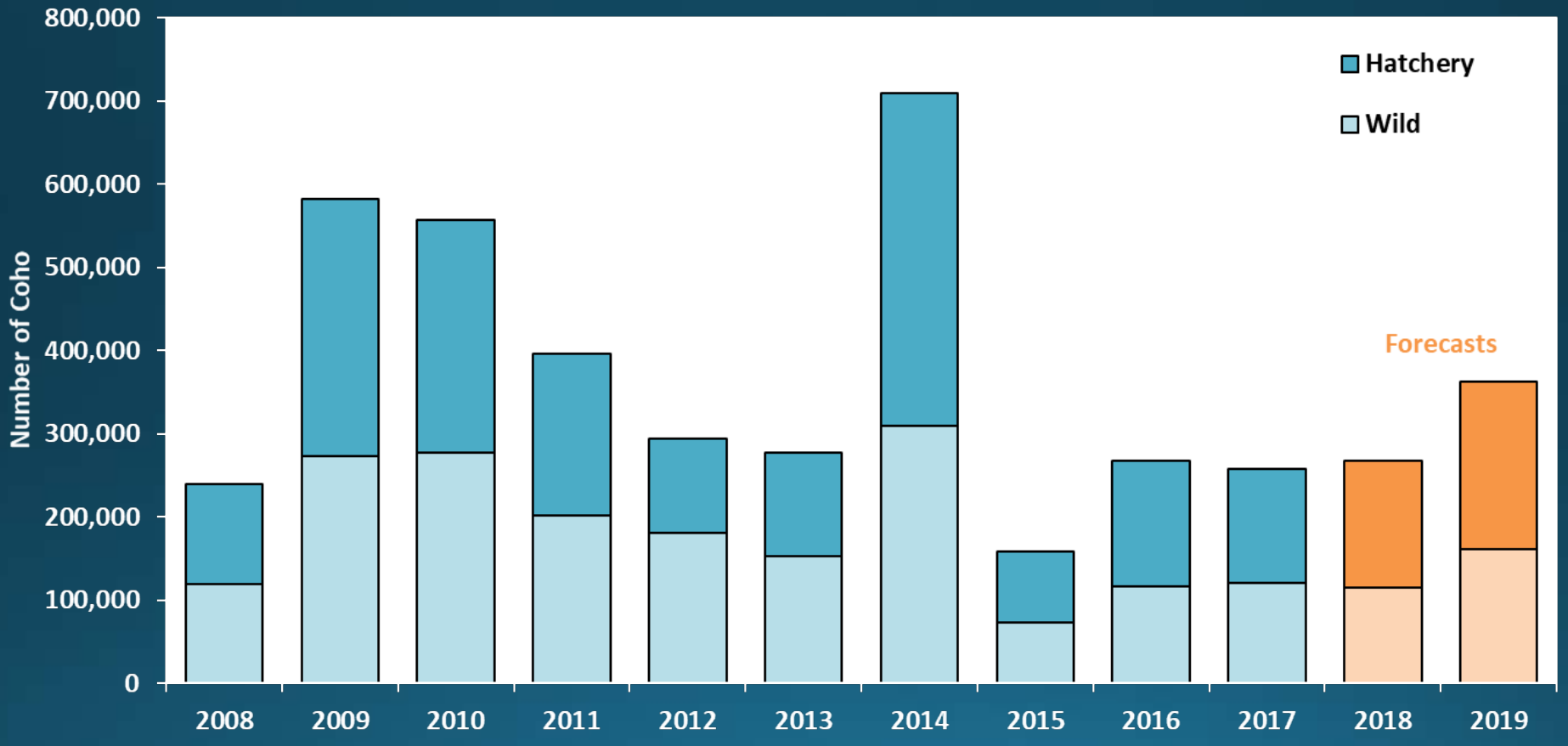
P. Sound Hatchery Coho Forecasts

Puget Sound Hatchery Coho forecast ⬆ 49% from recent 10 year avg.
(⬆ 35% from 2018 forecast)



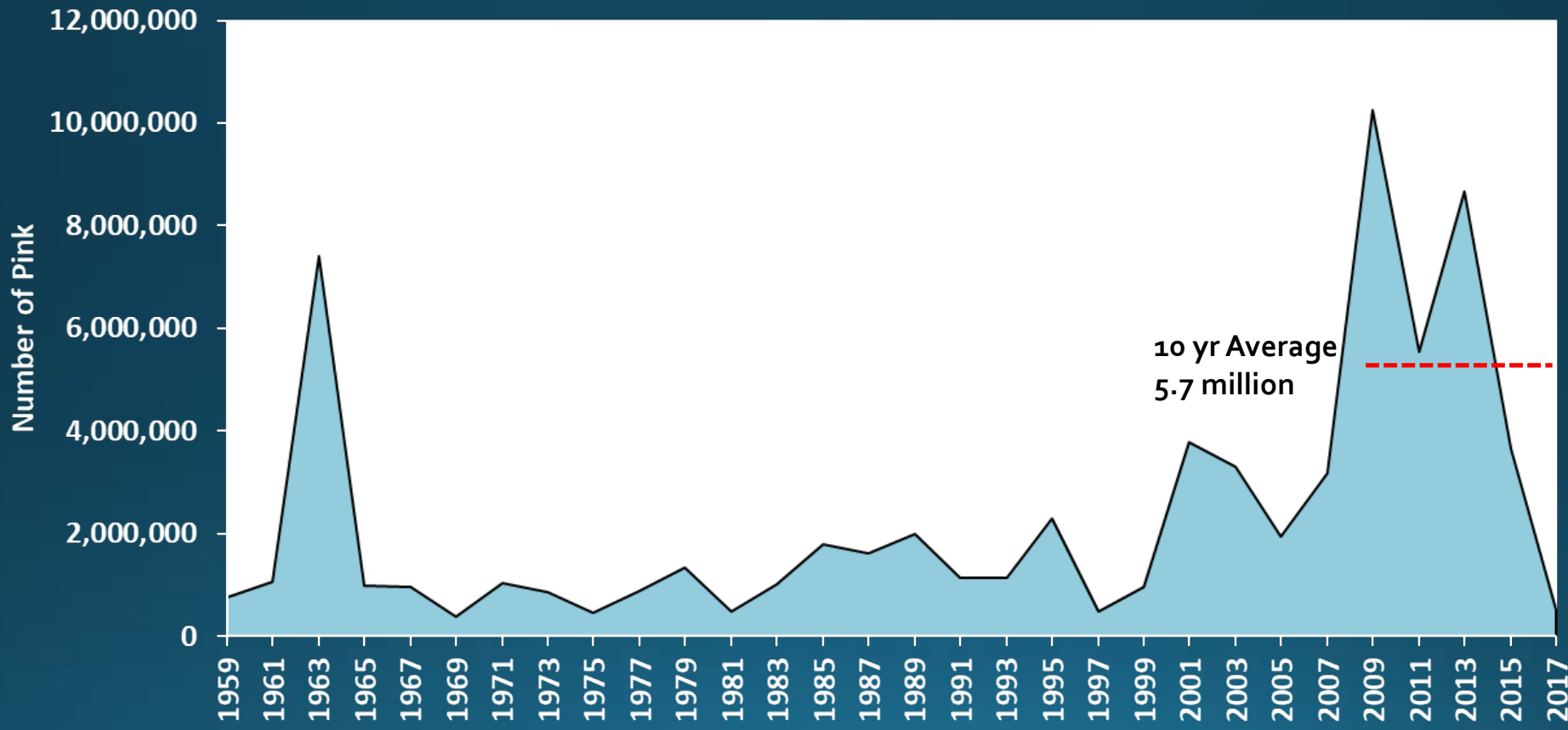
Coastal Hatchery Coho Forecasts

Coastal Hatchery Coho forecast ⬆ 5% from recent 10 year avg.
(⬆ 20% from 2018 forecast)



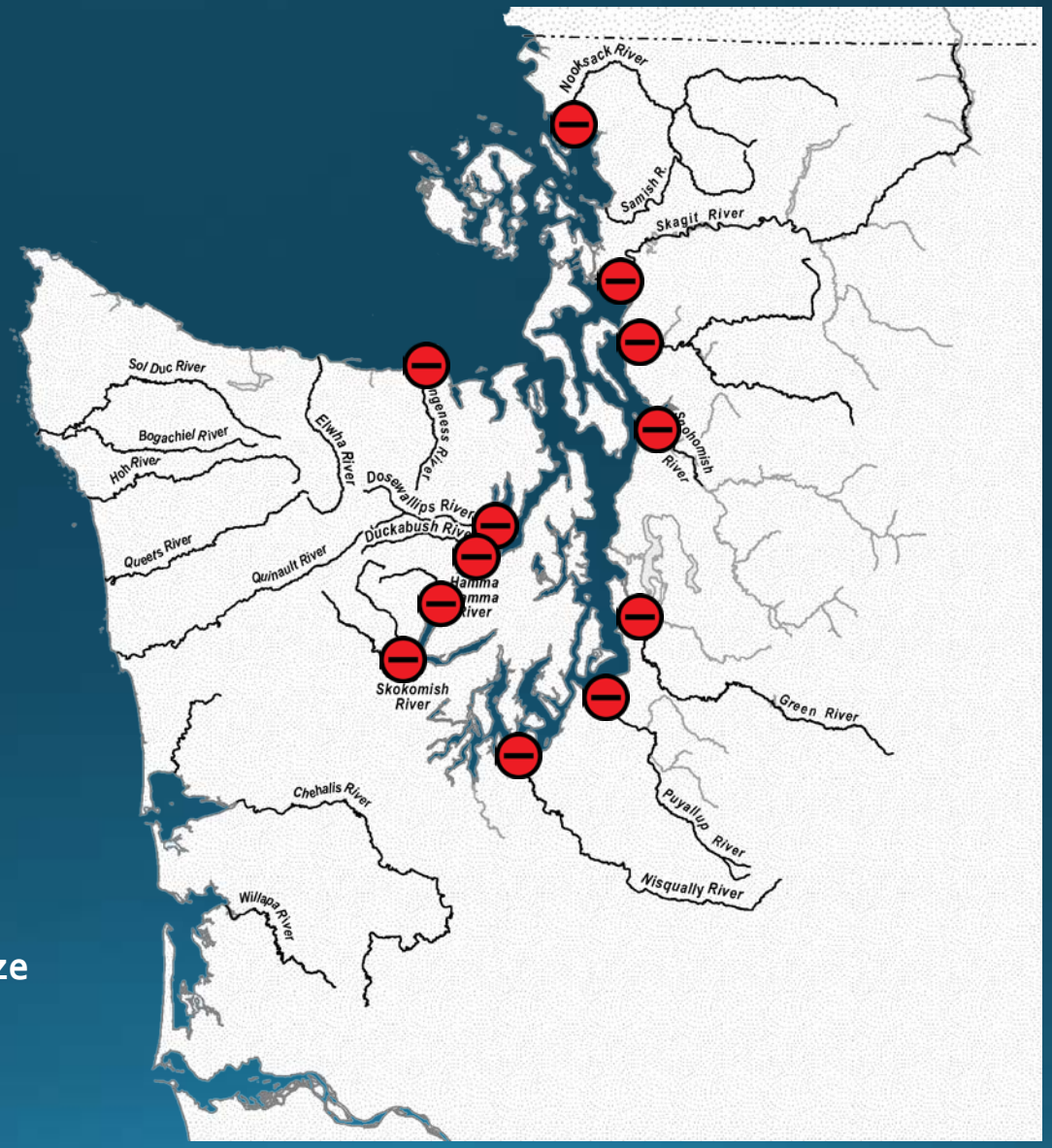
Pink

Pink Historical Runsize



2017 Pink Returns

- Returns were poor everywhere
- Large body size common
- Poor freshwater production as fry

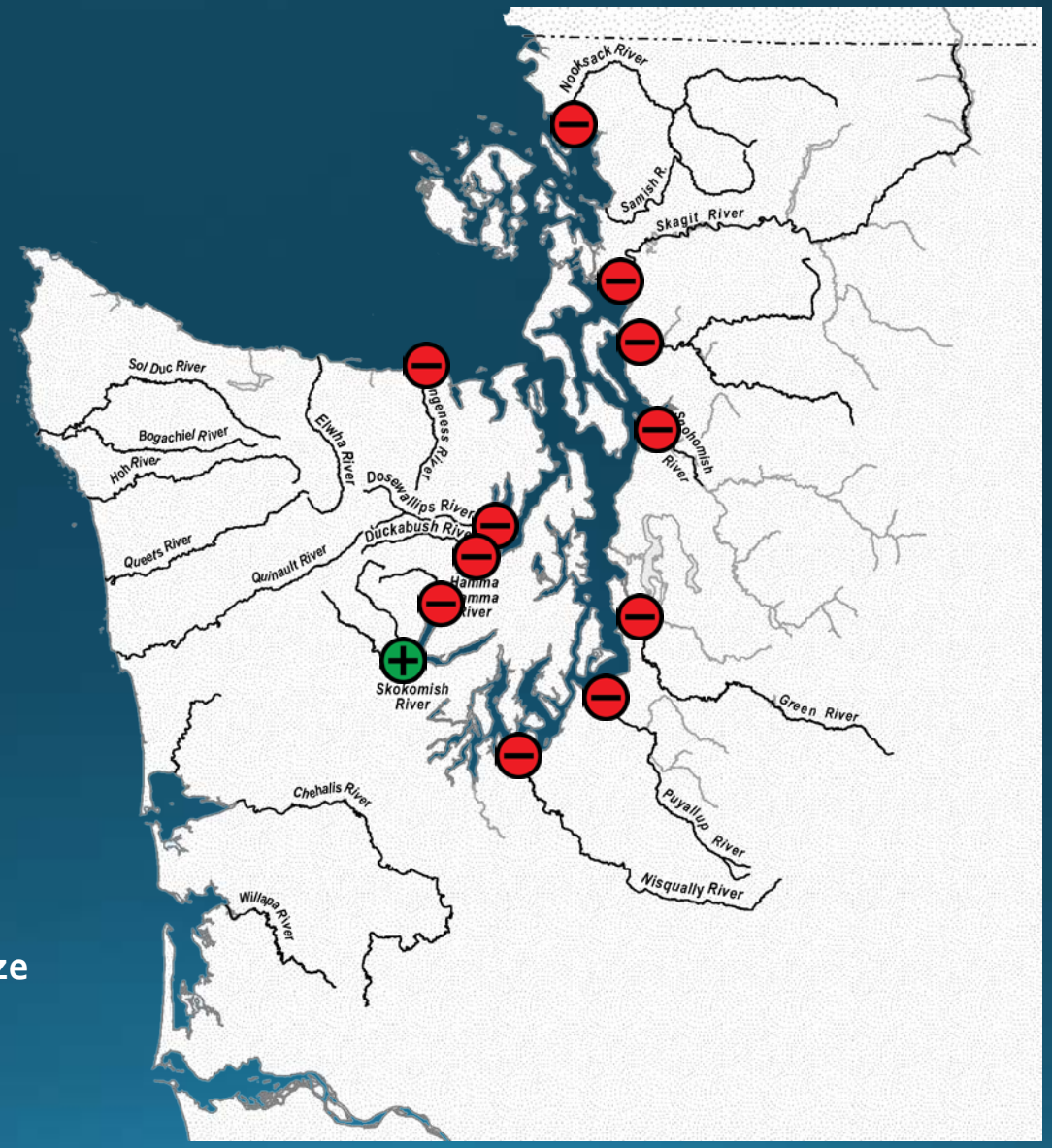


Relative to Recent 10yr Avg. Runsize

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

2019 Pink Forecasts

- Forecasts are mostly poor
- Very poor outmigrating fry numbers from most systems

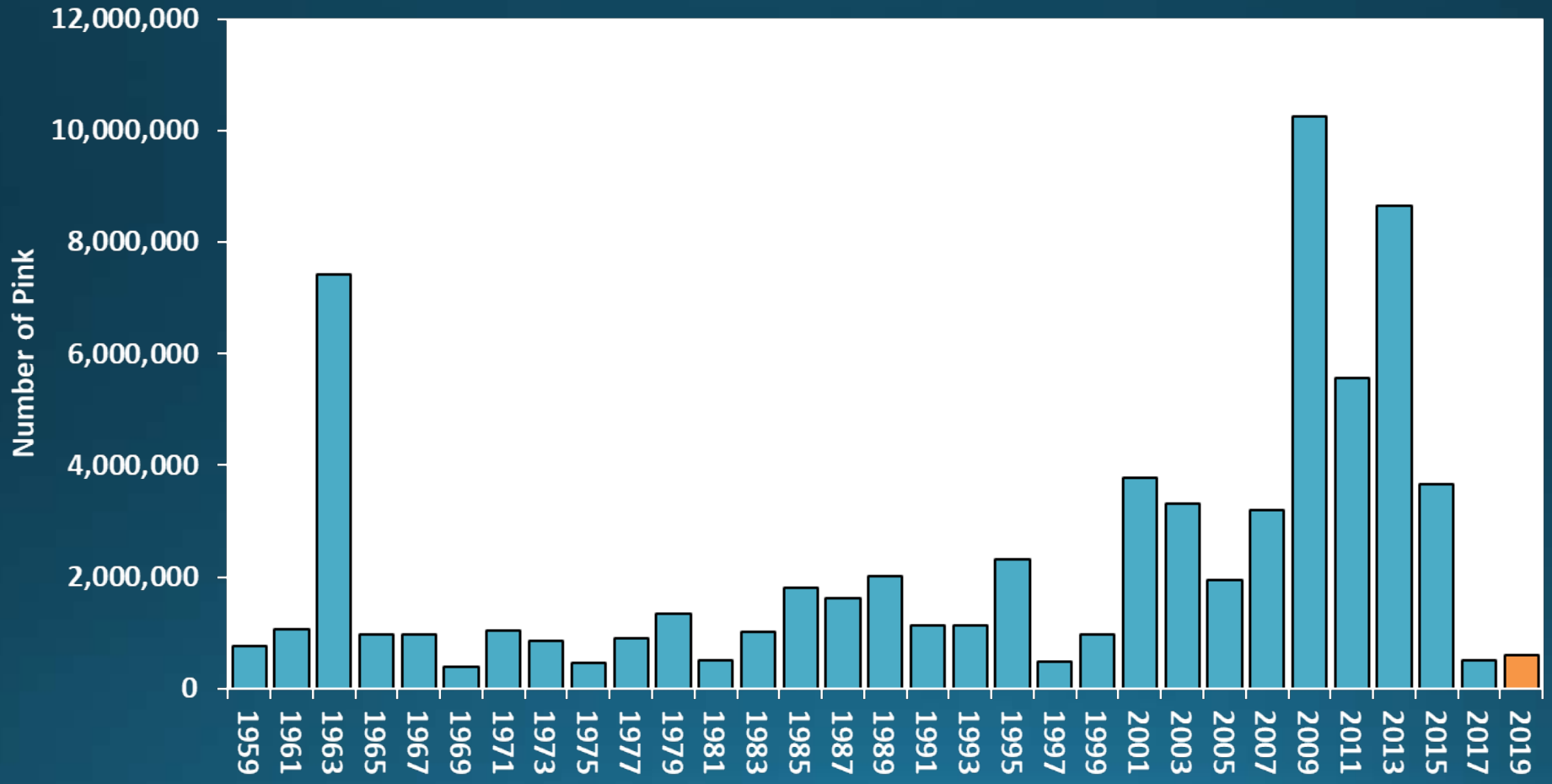


Relative to Recent 10yr Avg. Runsize

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

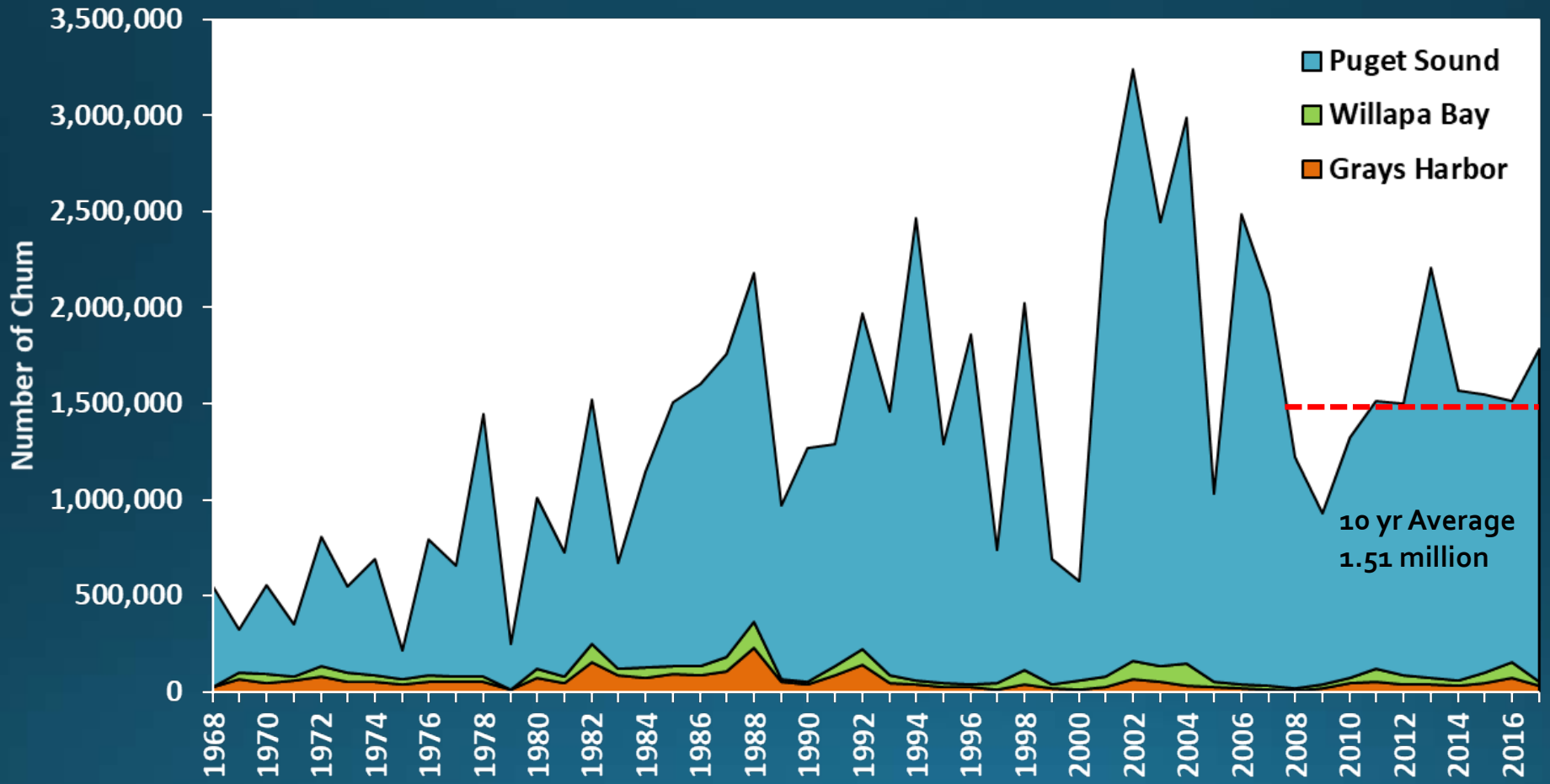
2017 Pink Forecasts

Puget Sound Pink forecast ⬇ 89% from recent 10 year avg.



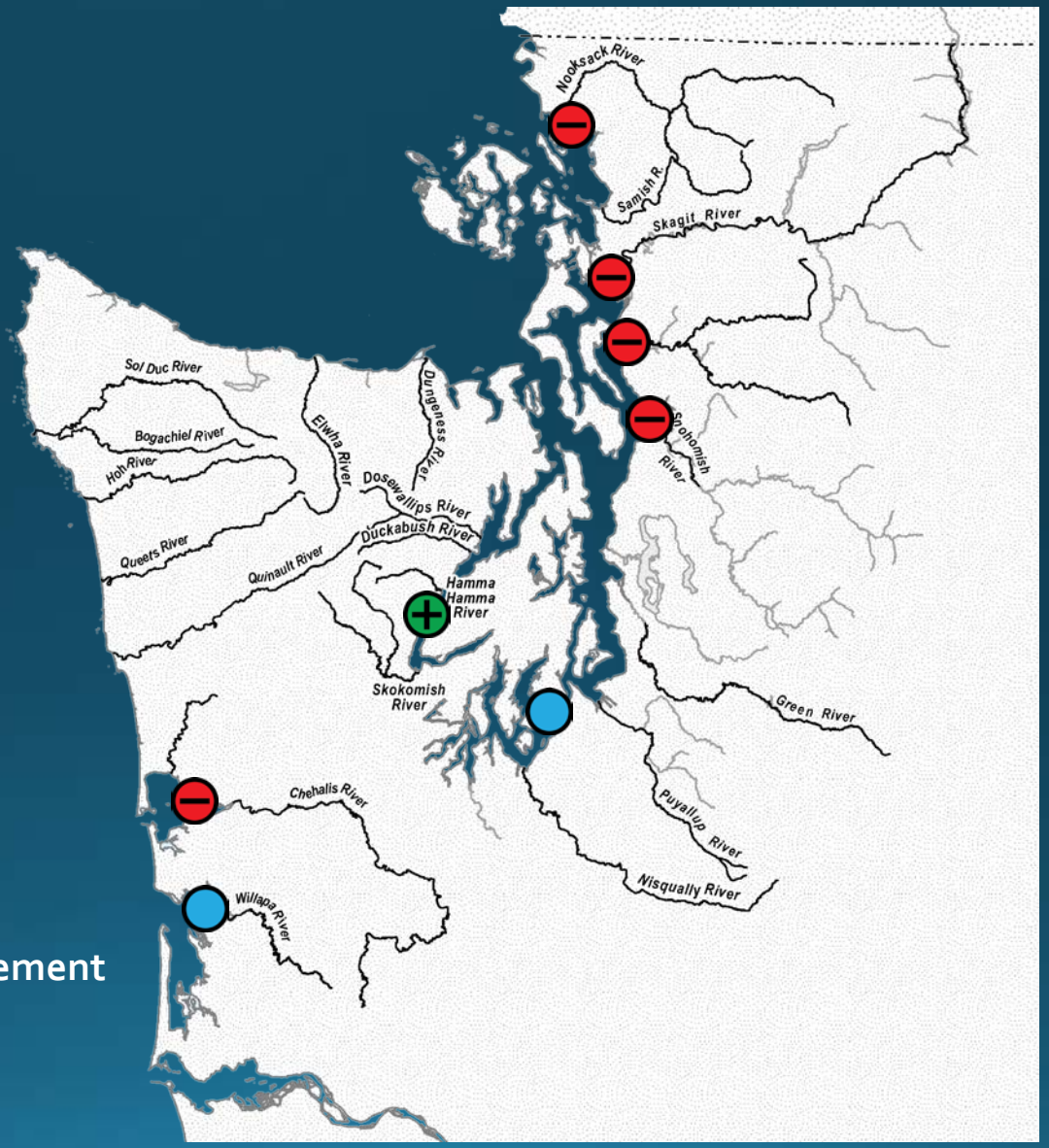
Chum

Chum Historical Runsize



2018 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

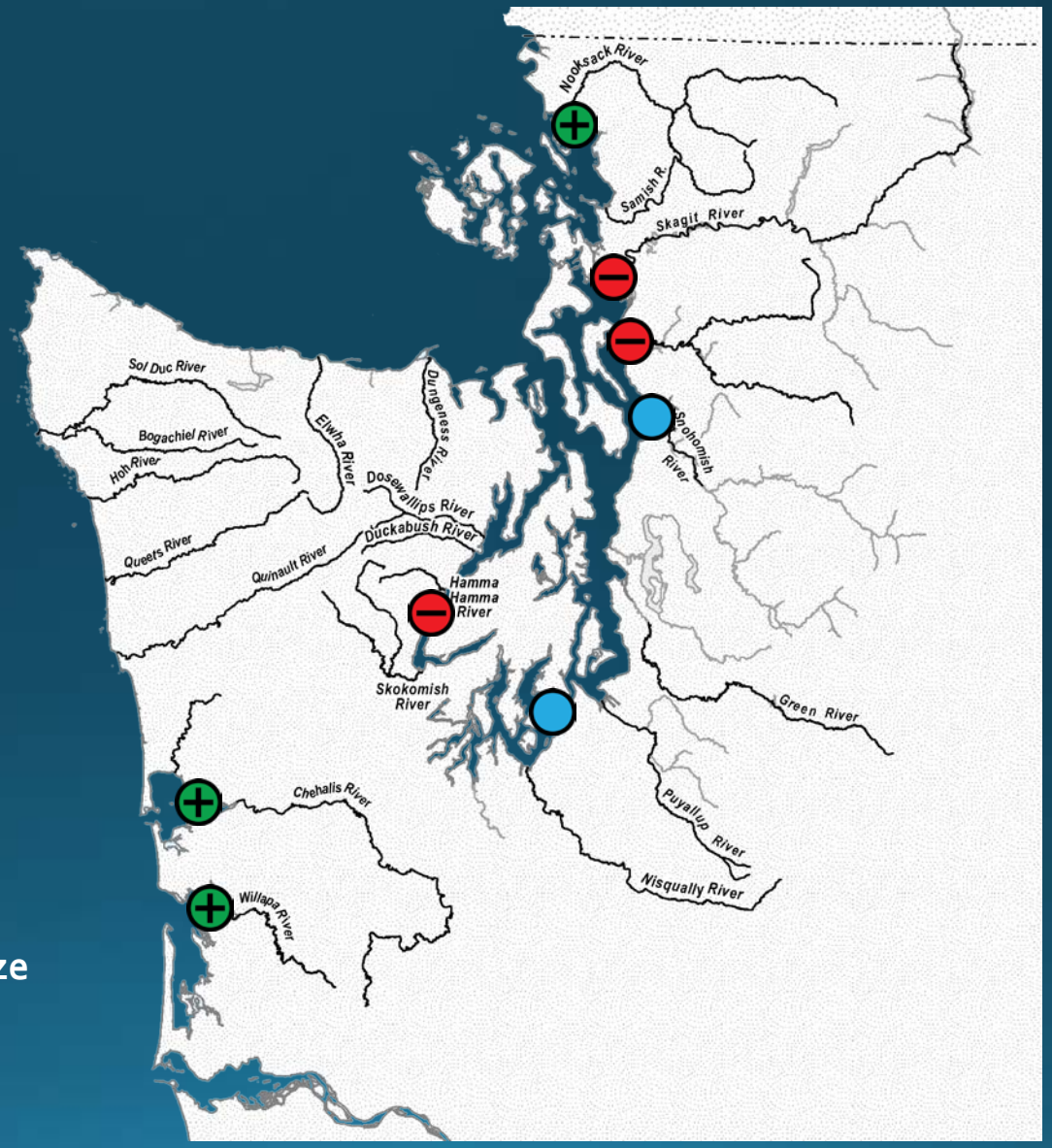


Relative to Recent 10yr Avg. Escapement

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

2019 Fall Chum HOR/NOR Forecast

- Forecasts range from Good to Poor
- Hood Canal - 519k*
- Central/S. Sound – 391k*
- Coast – Willapa – 52k
  Grays H – 72k



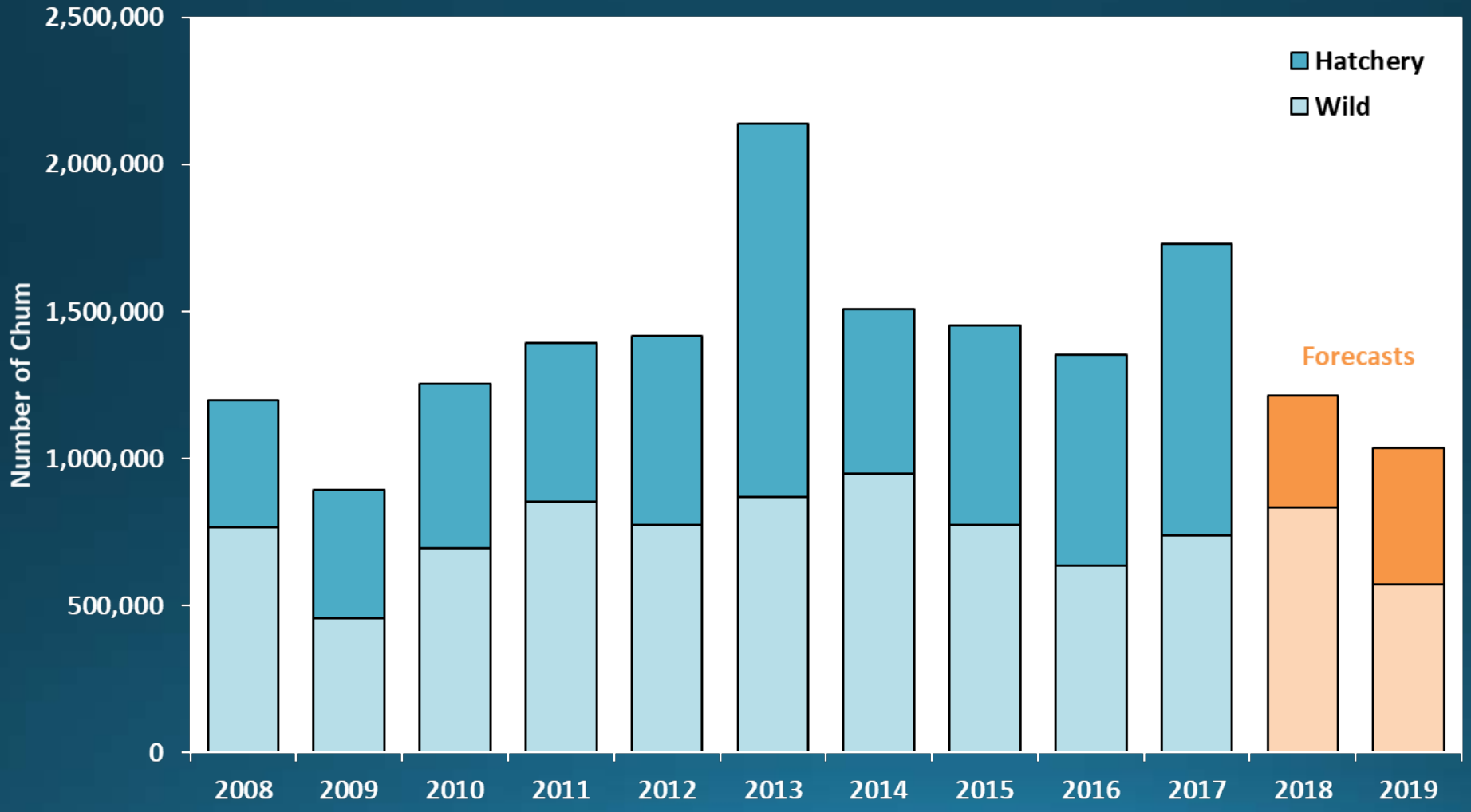
Relative to Recent 10yr Avg. Runsize

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

* Forecasts not "agreed-to" with comanagers

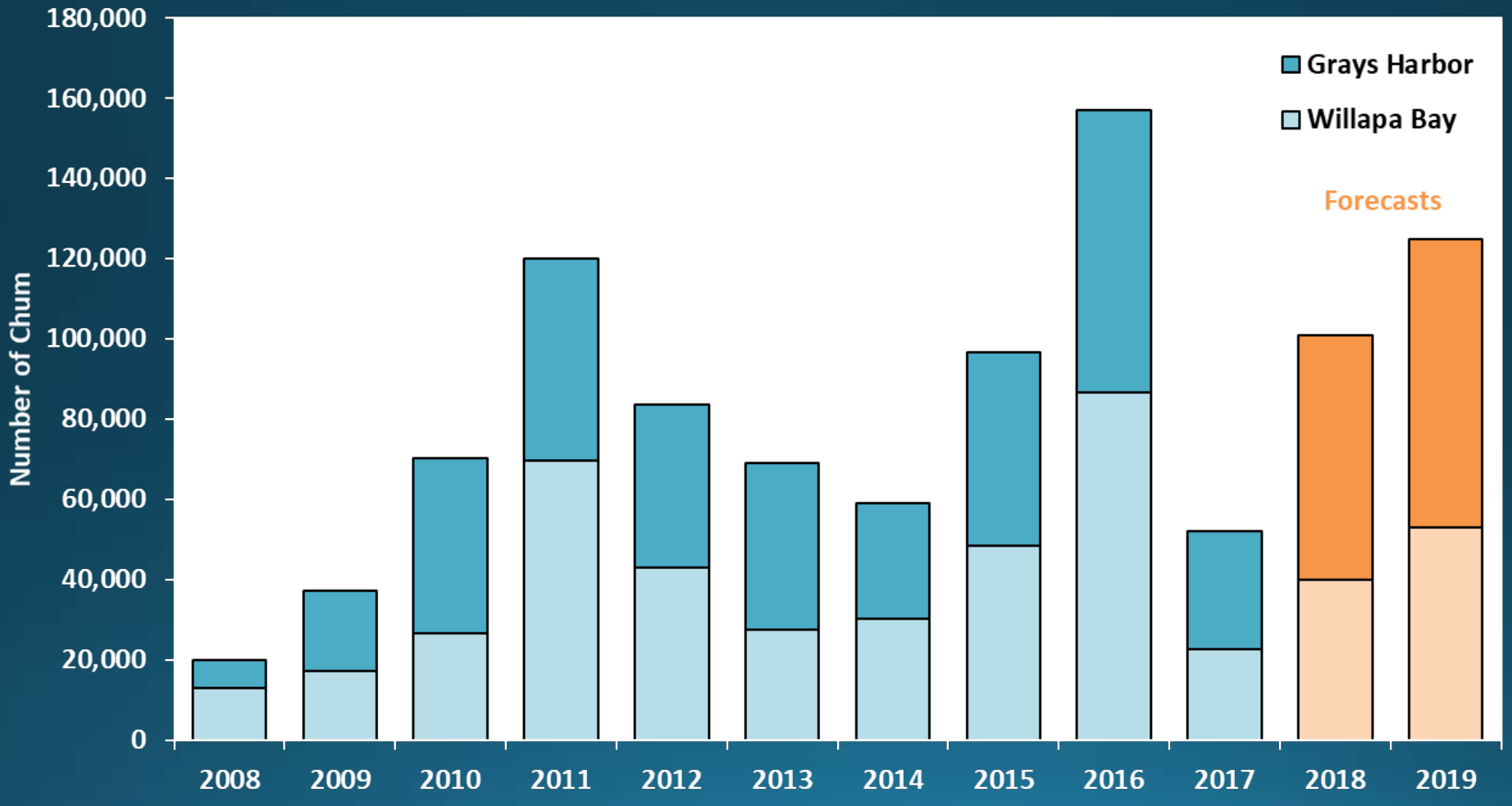
Puget Sound Chum Forecasts

Hatchery ⬇ 32% and Wild ⬇ 23% over recent 10 year avg.



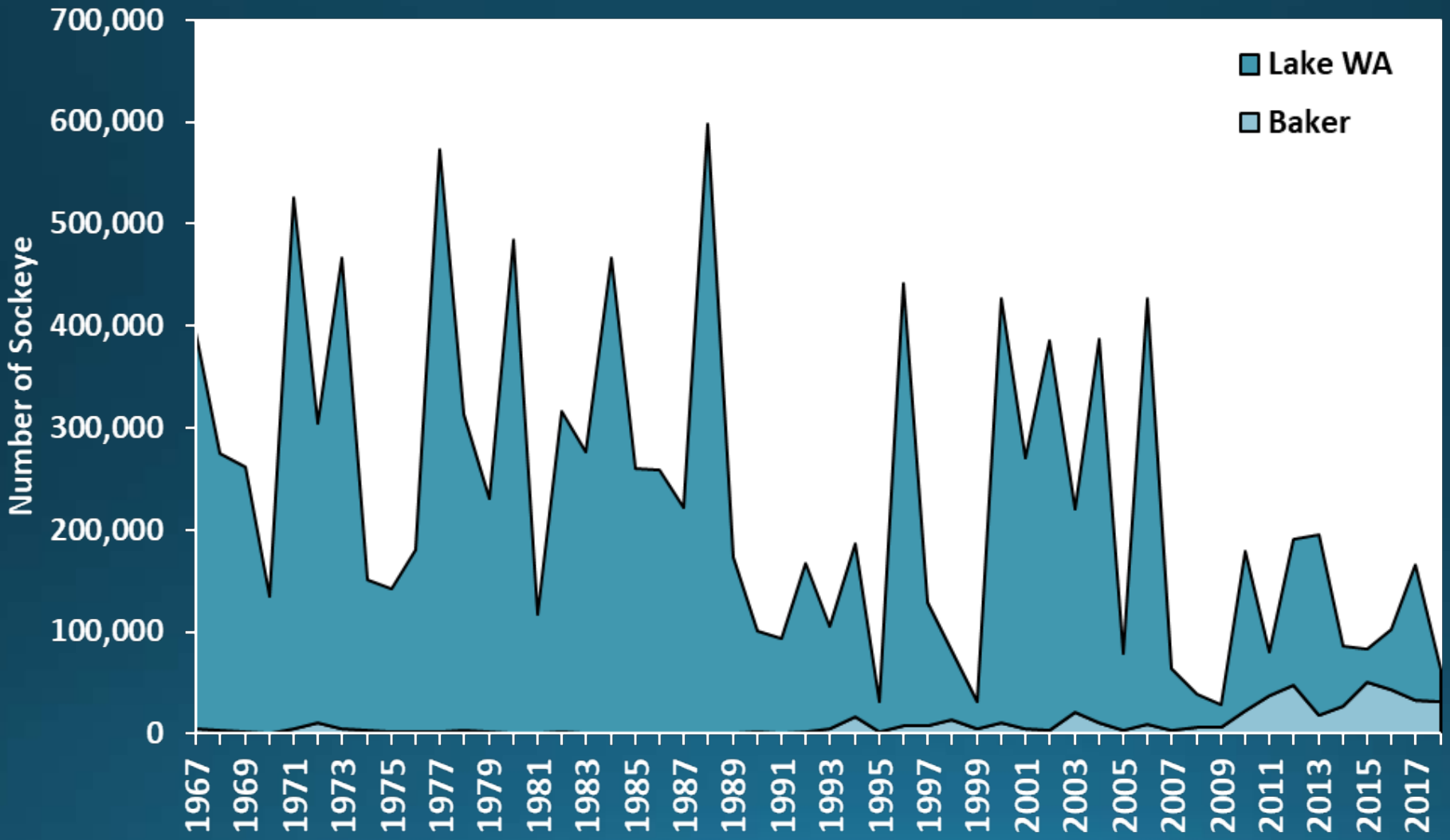
Coastal Chum Forecasts

Willapa Bay ⬆ 37% and Grays Harbor ⬆ 89% over recent 10 year avg.



Sockeye

Puget Sound Sockeye Runsize



2018 Sockeye HOR/NOR Returns

- Returns ranged from Poor 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%

2019 Sockeye HOR/NOR Forecast

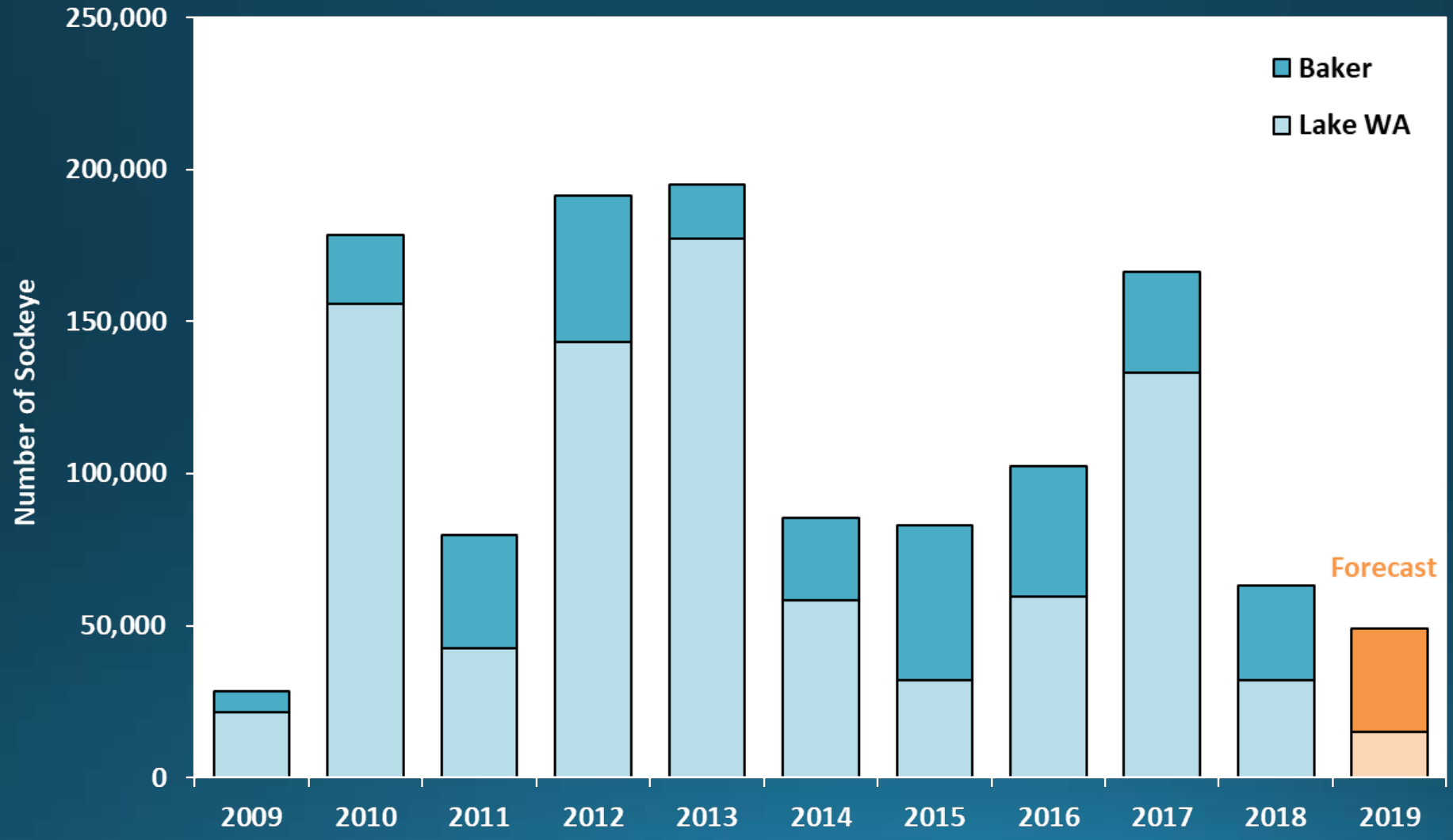
- Baker Lake – 34k
- Lake WA – 15k
- Columbia river - 93k

Relative to Recent 10yr Avg. Runsize

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

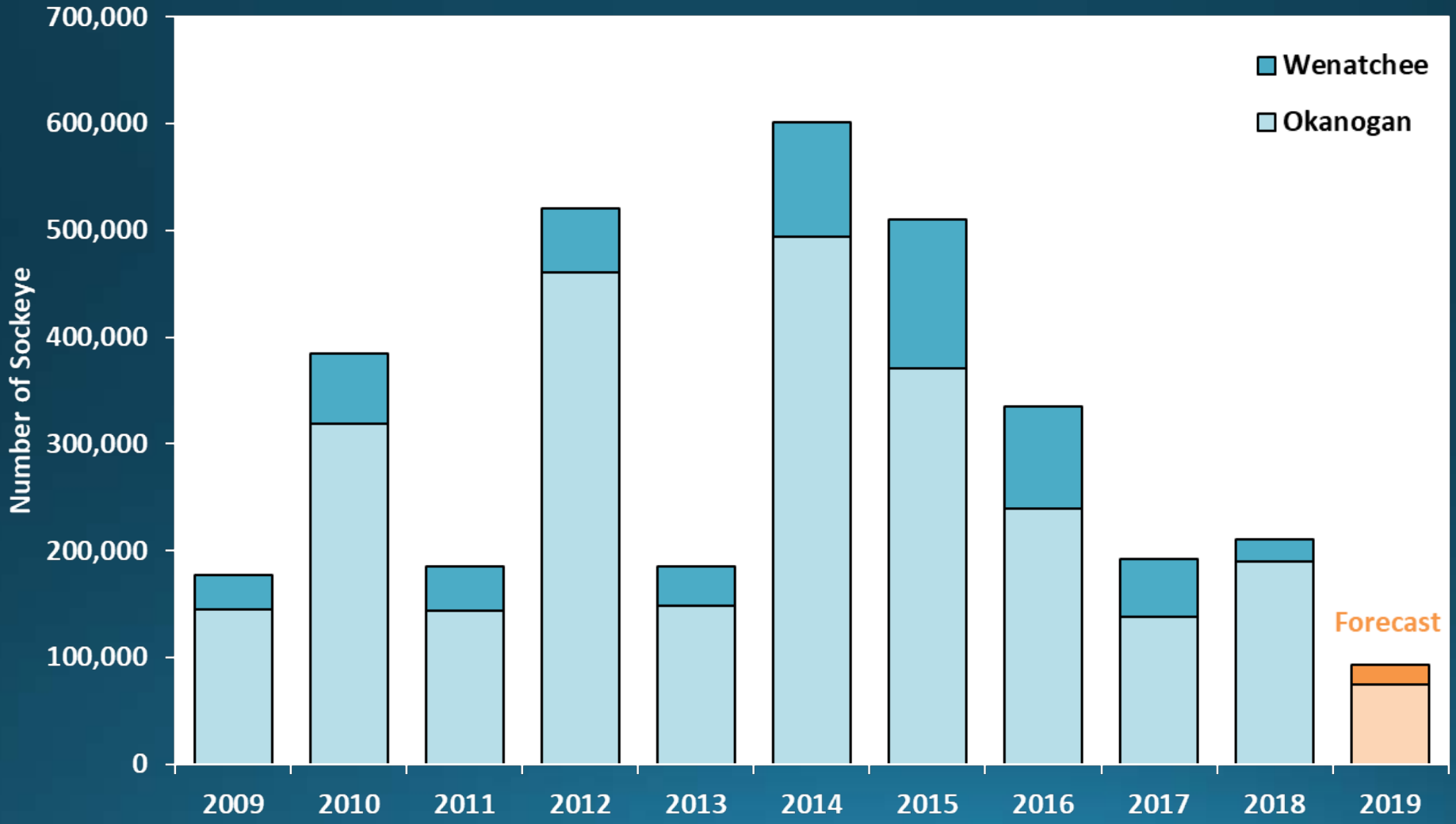
Puget Sound Sockeye Forecasts

Lake WA ⬇ 82% and Baker ⬆ 6% over recent 10 year avg.



Columbia Sockeye Forecasts

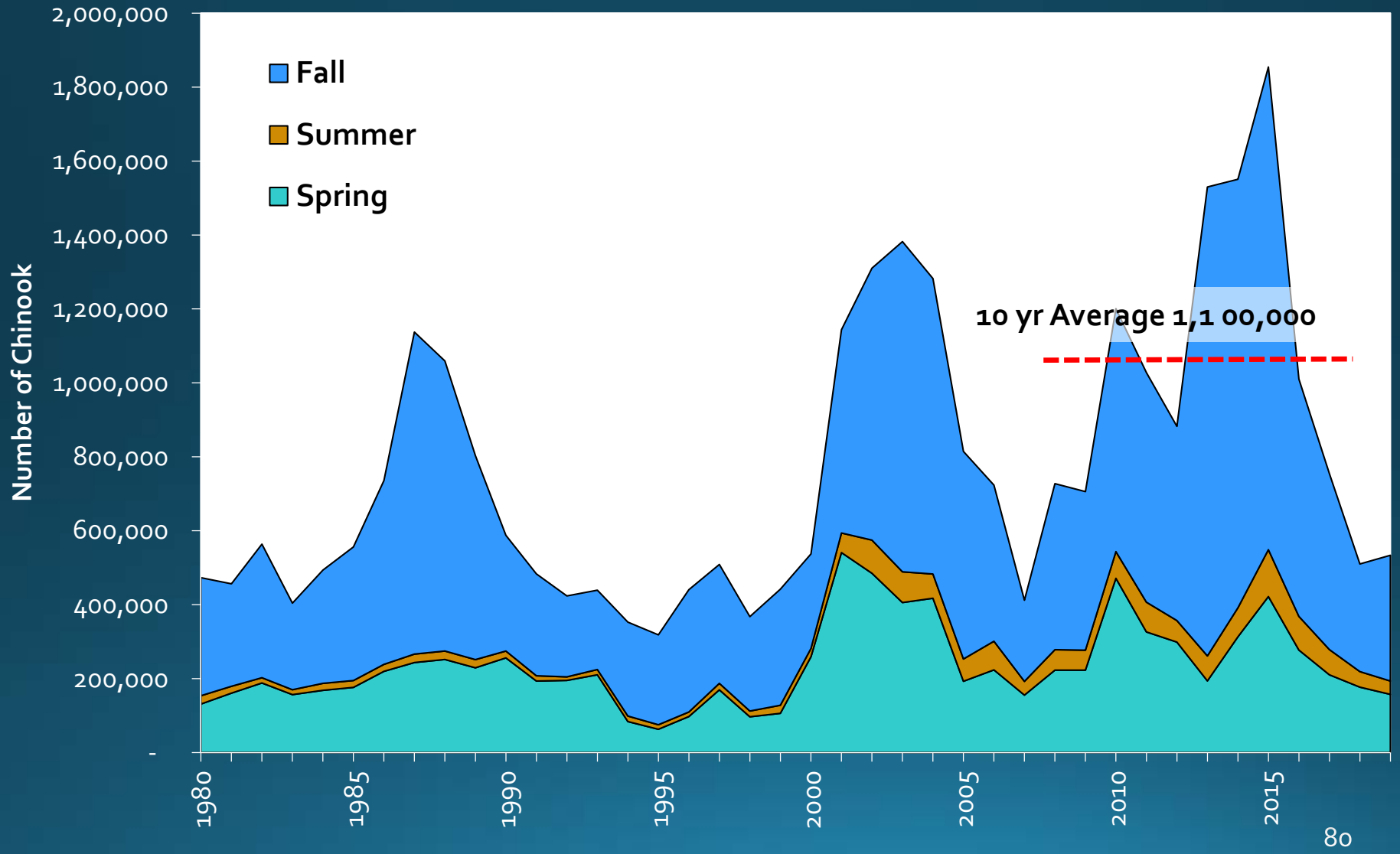
Lake Wenatchee ⬇ 72% and Okanogan ⬇ 72% over recent 10 year avg.



WA Columbia River Chinook and Coho 2018 Returns and 2019 Forecasts

Chinook Salmon

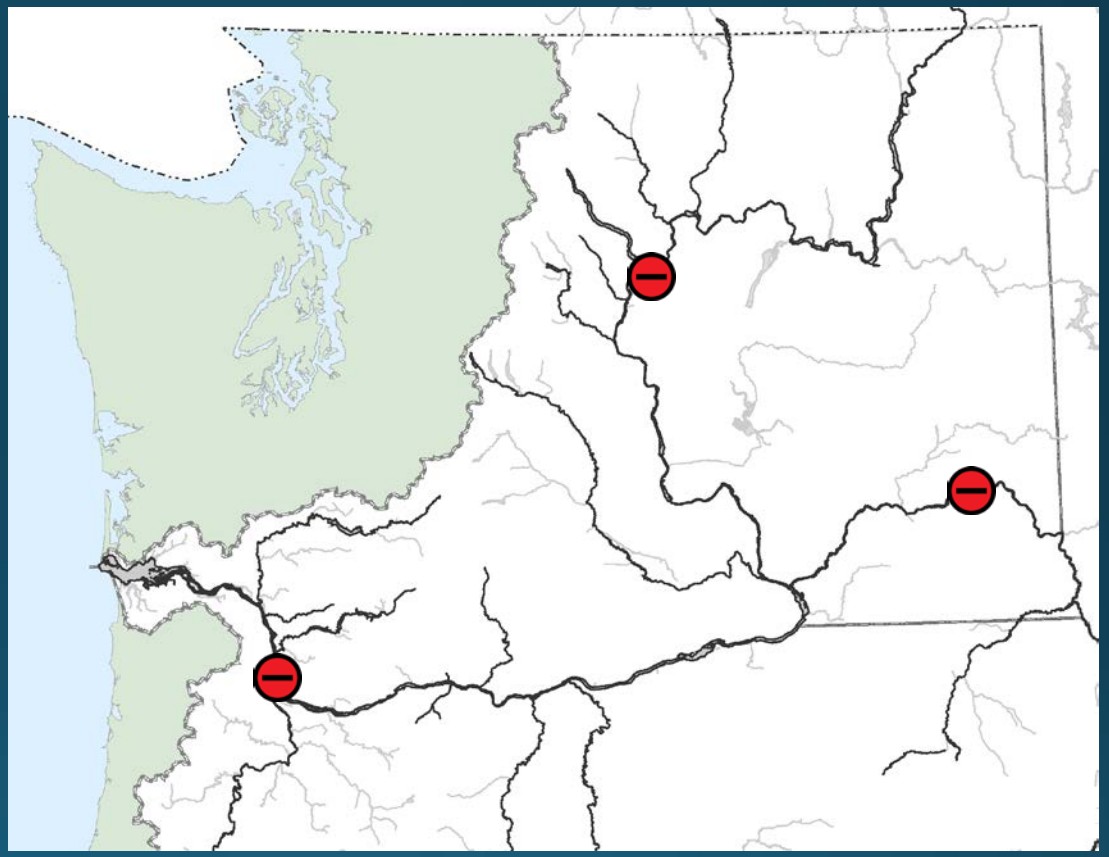
Chinook Historical Runsize – Columbia River



2018 Spring/Summer Chinook Returns

All returns are preliminary and returns range from

- Lower Spring – 62k (71%)
- Upriver Spring – 115k (56%)
- Summer – 42k (56%)



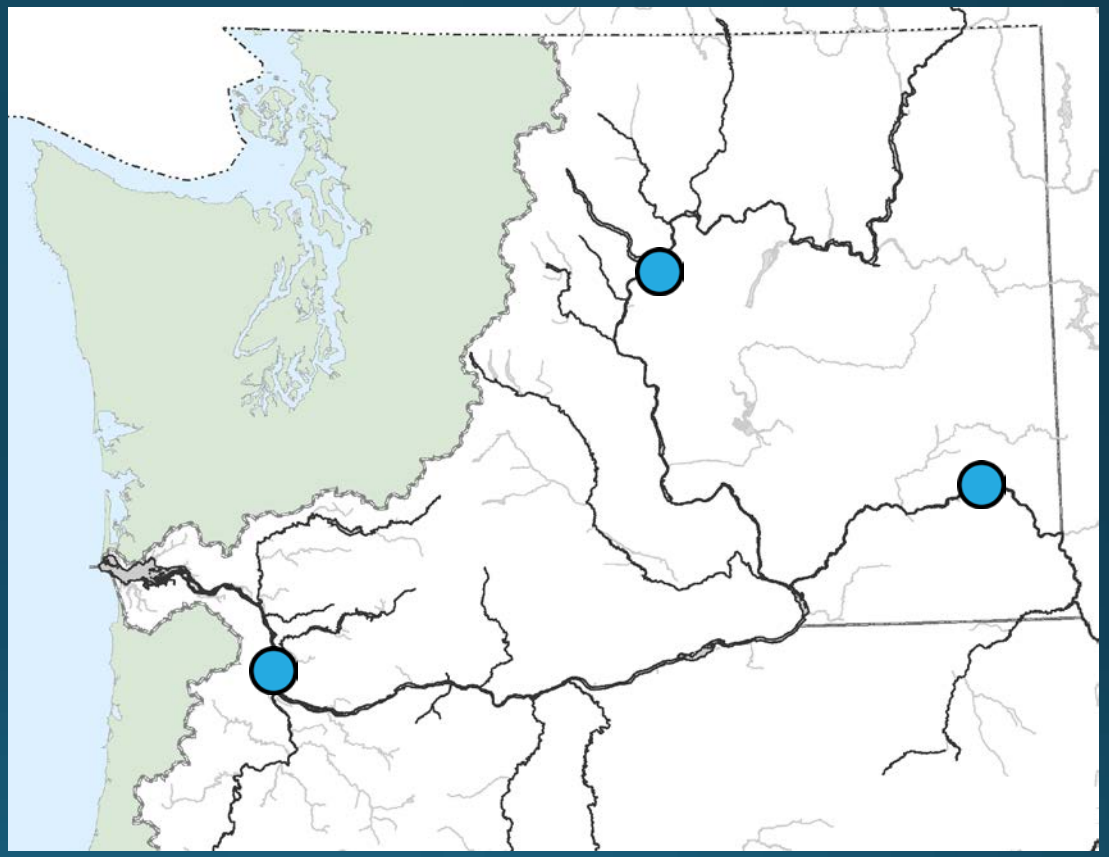
Relative to Recent 10yr Avg. Escapement

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

2019 Spring/Summer Chinook Forecasts

Forecasts in Columbia River range from

- Lower Spring – 58k (94%)
- Upriver Spring – 99k (86%)
- Summer – 36k (85%)



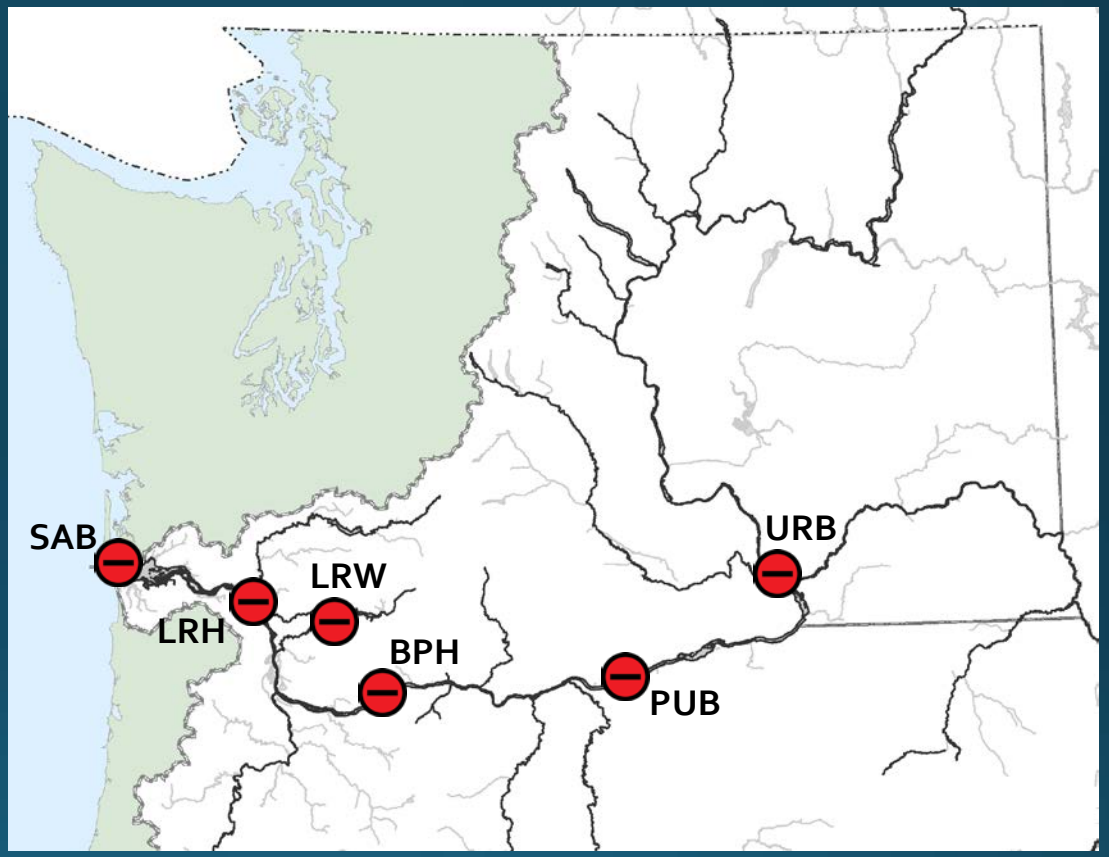
Relative to 2018 Runsize

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

2018 Fall Chinook Returns

All returns are preliminary and range from

- SAB (Select Area Bright) – 4.1k (33%)
- LRH (Lower River Hatchery) – 50k (55%)
- LRW (Lower River Wild) – 8.3k (53%)
- BPH (Bonneville Pool Hatchery) – 29k (33%)
- PUB (Pool Upriver Bright) – 36k (42%)
- URB (Upriver Bright) – 149k (34%)



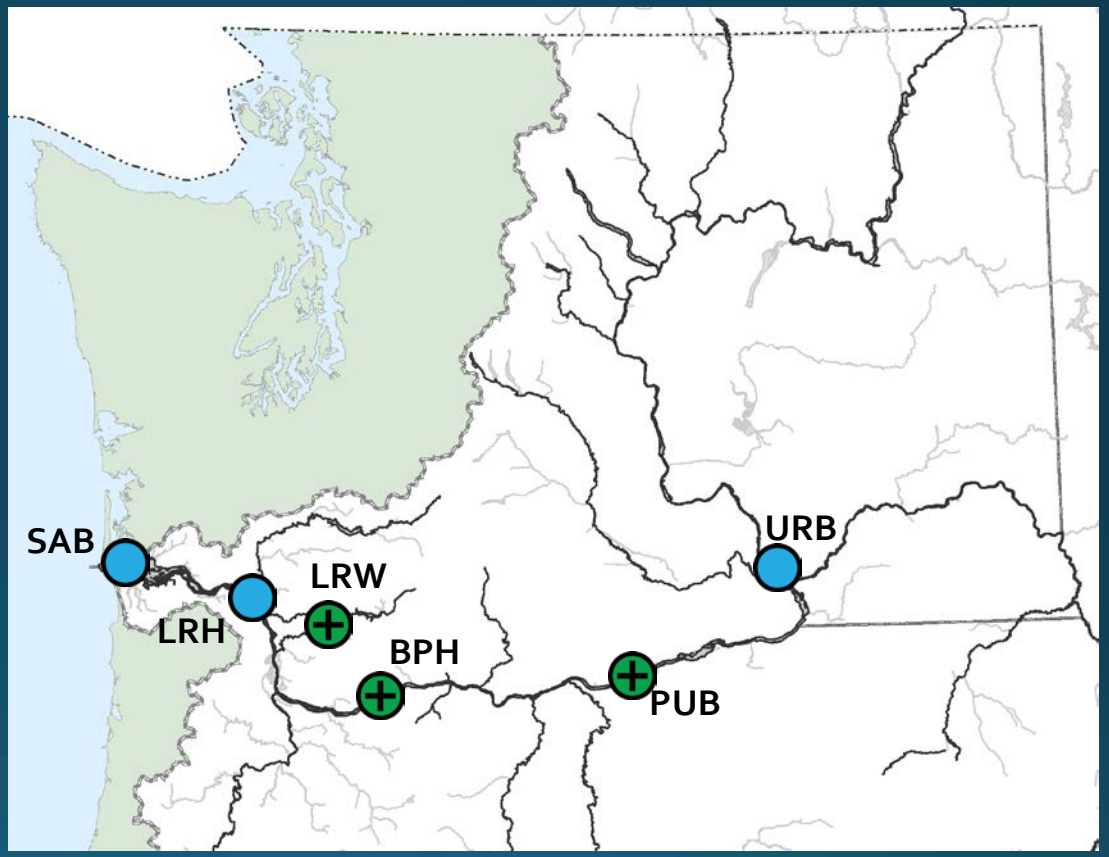
Relative to Recent 10yr Avg. Escapement

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

2019 Fall Chinook Forecasts

Forecasts in Columbia River range from

- SAB (Select Area Bright) – 3.1k (76%)
- LRH (Lower River Hatchery) – 54.5k (108%)
- LRW (Lower River Wild) – 13.7k (165%)
- BPH (Bonneville Pool Hatchery) – 46k (159%)
- PUB (Pool Upriver Bright) – 57k (158%)
- URB (Upriver Bright) – 158k (106%)

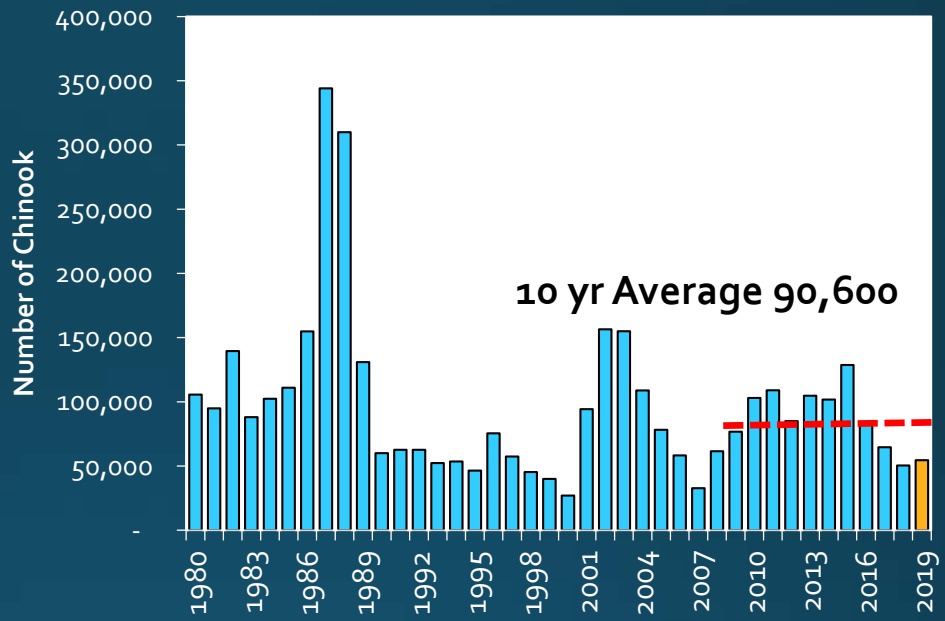


Relative to 2018 Runsize

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

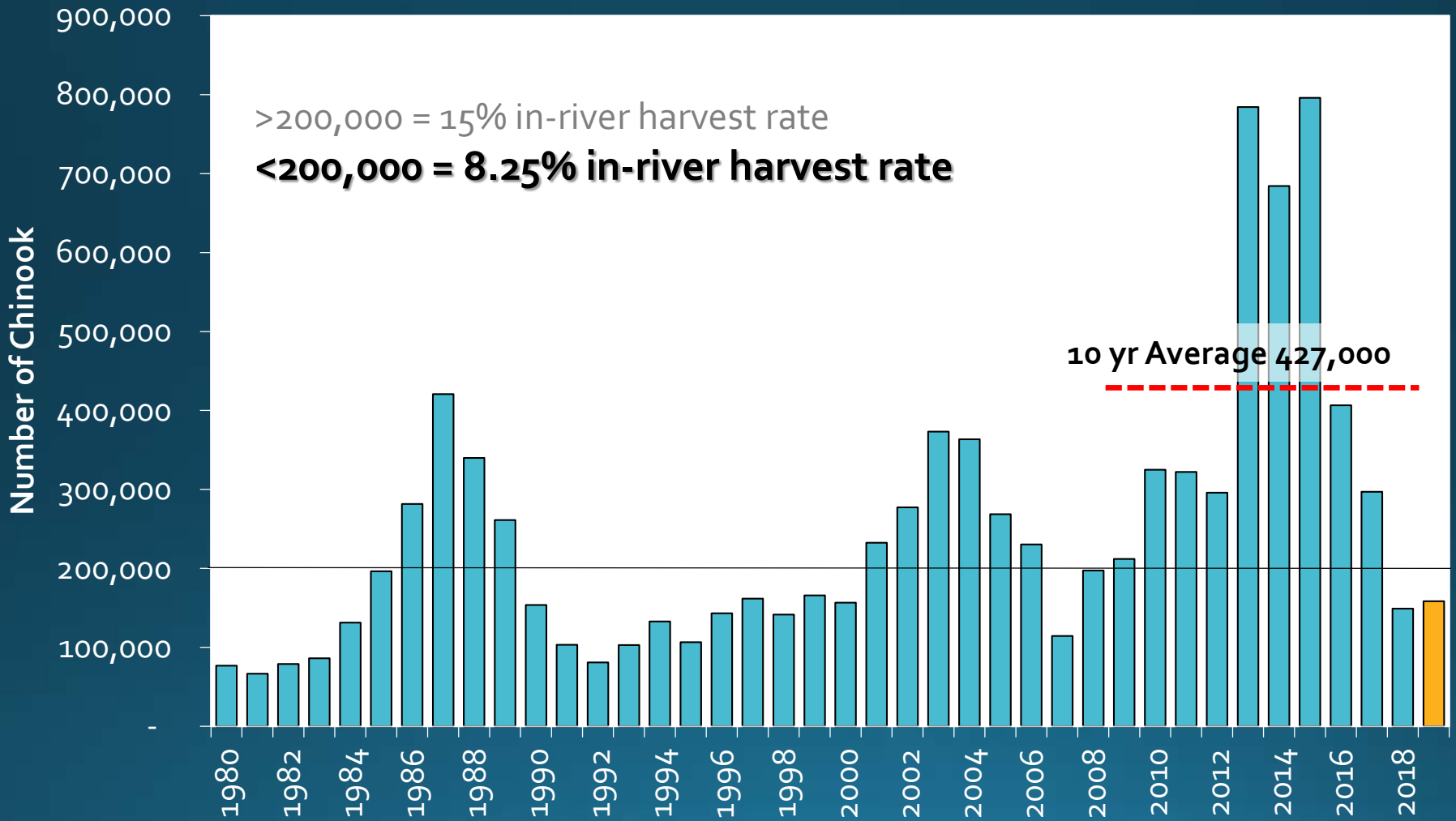
Lower Columbia River Tule Exploitation Rate (ER) Matrix

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

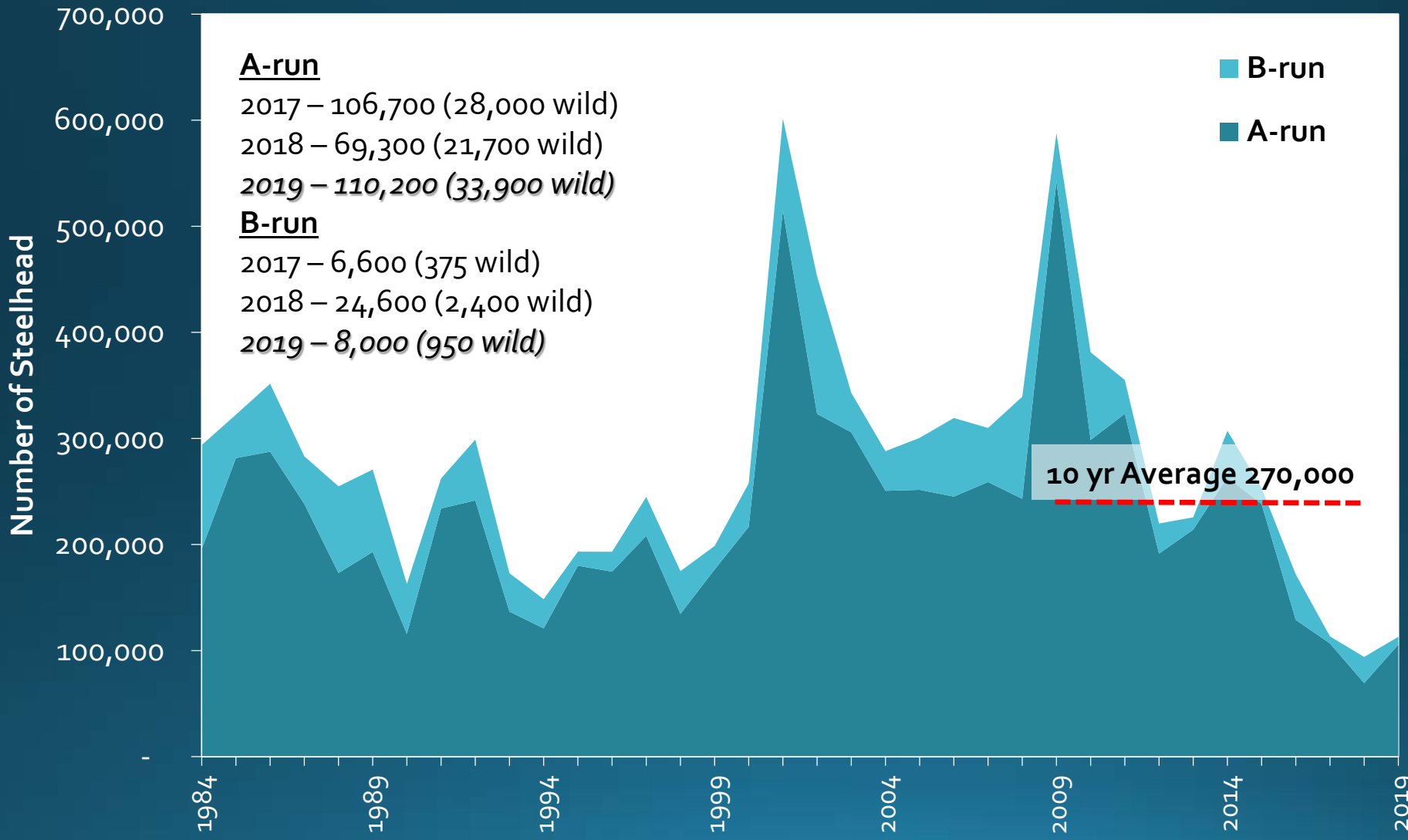


- LRH is down 40% compared to the previous 10 year return.
- 2018 LRH forecast of 54,500 will manage in ocean and in-river fisheries to not to exceed a 38% ER.

Chinook Historical Runsize – URB

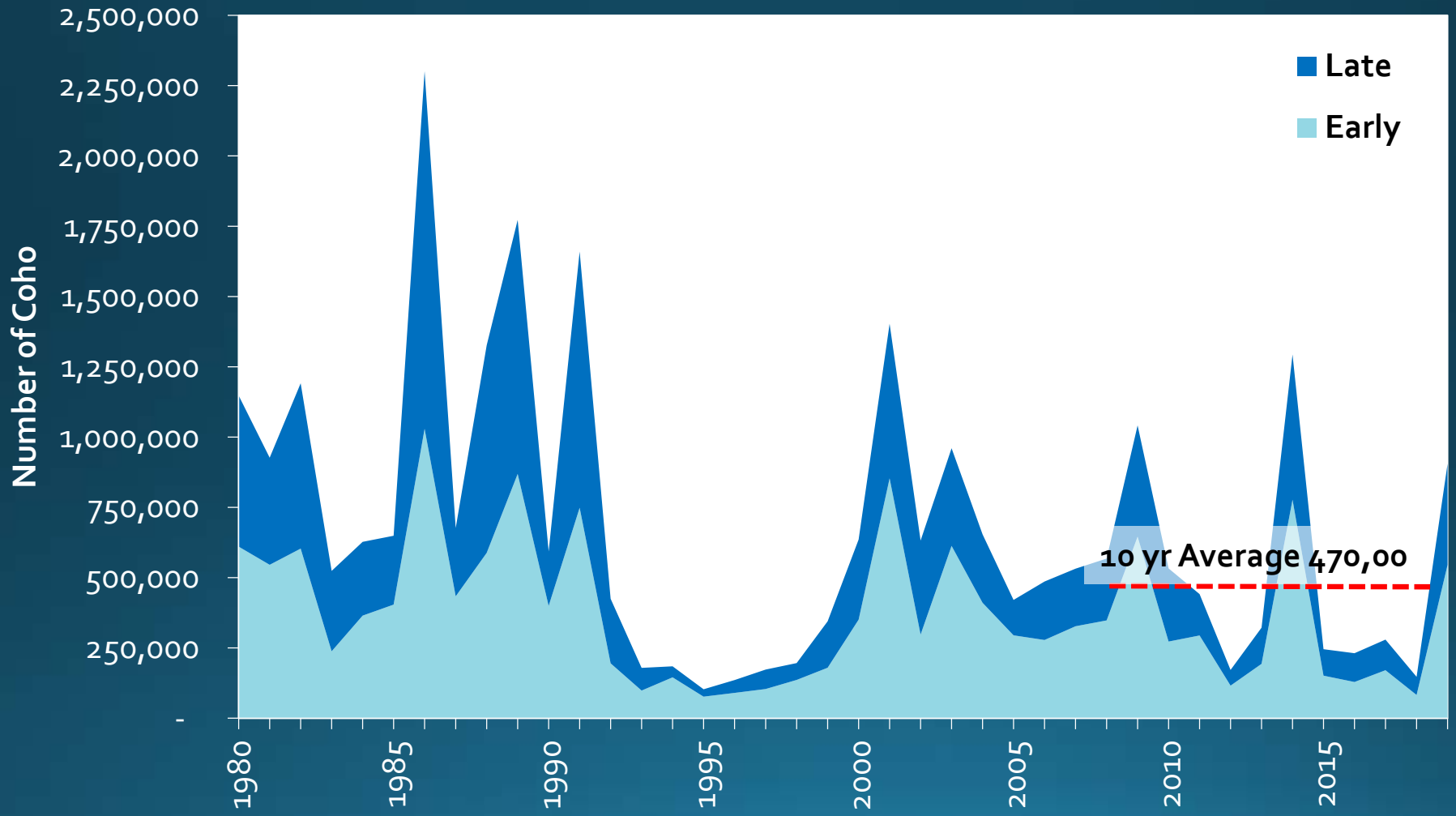


Upper Summer Steelhead



Coho

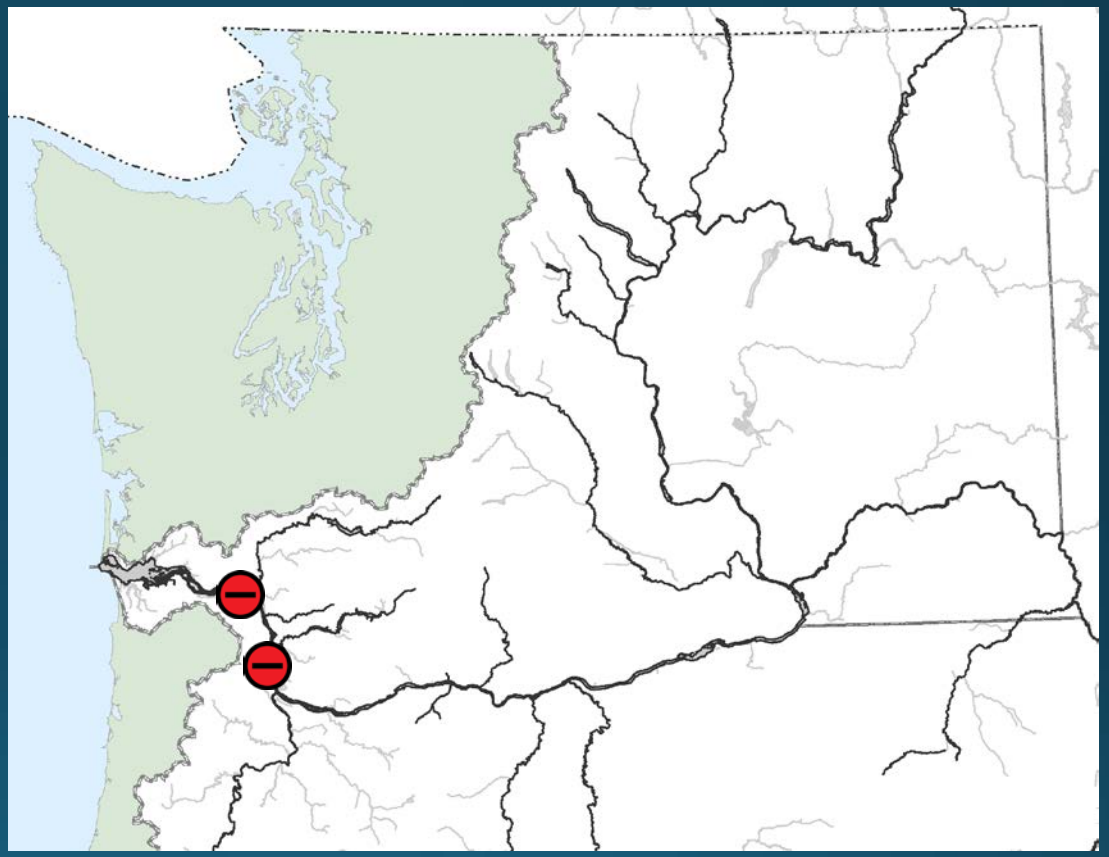
Coho Ocean Abundance – Columbia River



2018 Coho Returns

All returns are preliminary and returns range from

- Early – 83k (27%)
- Late –165k (32%)



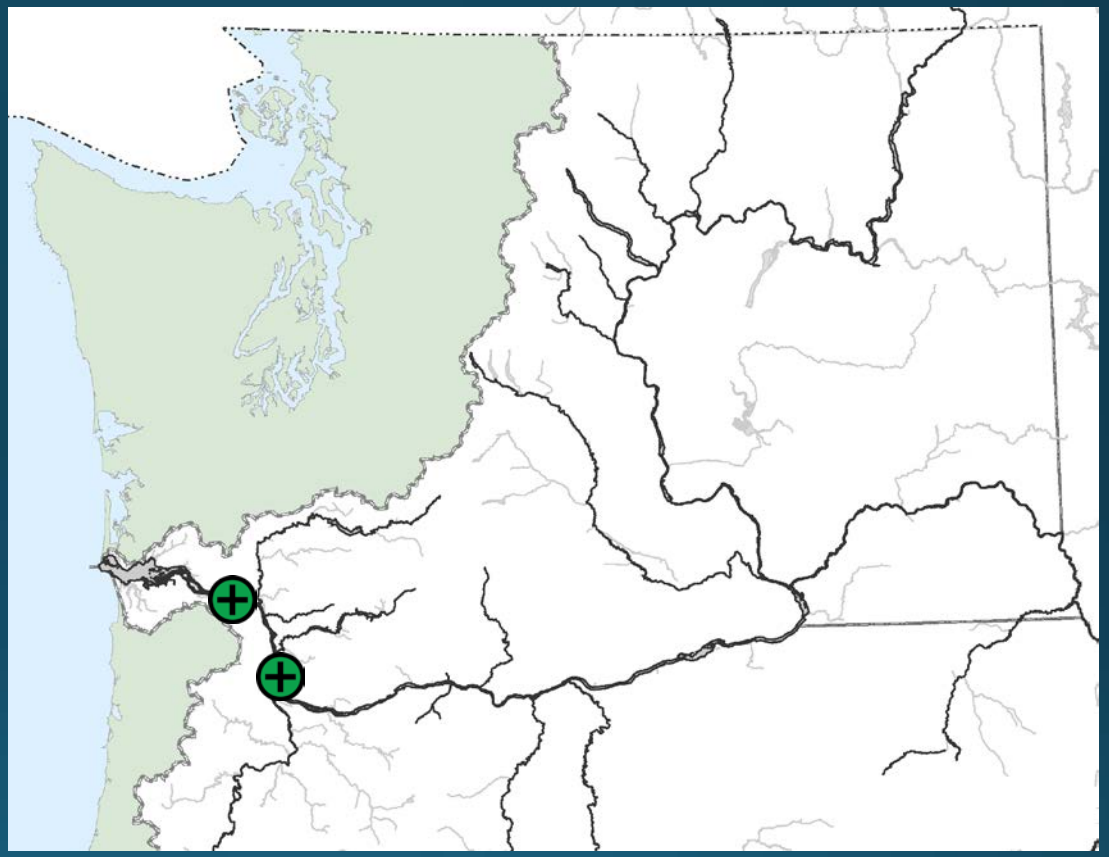
Relative to Recent 10yr Avg. Escapement

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

2019 Coho Forecasts

Forecasts in Columbia River range from

- Early – 545k (660%)
- Late – 360k (560%)



Relative to Recent 2018 Runsize

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

Lower Columbia Natural 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 0.27% (high).
- Normal seeding, exceeds 30% on index sites.
- Exploitation rate for 2019 is 23%.

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	Preseason Abundance Forecasts					
	2014	2015	2016	2017	2018	2019
Sacramento River						
Fall (Sacramento Index)	634.7	652.0	299.6	230.7	229.4	379.6
Winter (age-3 absent fishing)	--	--	--	--	1.6	1.9
Klamath River (Ocean Abundance)						
Fall	299.3	423.8	142.2	54.2	359.2	274.2
Oregon Coast						
North and South/Local Migrating	--	--	--	--	--	--
Columbia River (Ocean Escapement)						
Upriver Spring [a/]	227.0	232.5	188.8	160.4	166.7	99.3
Willamette Spring	58.7	55.4	68.7	38.1	53.8	40.2
Sandy Spring	5.5	5.5	NA	3.6	5.3	5.5
Cowlitz Spring	7.8	11.2	25.1	17.1	5.2	1.3
Kalama Spring	0.5	1.9	4.9	3.1	1.5	1.4
Lewis Spring	1.1	1.1	1.0	0.7	3.7	1.5
Upriver Summer [b/]	67.5	73.0	93.3	63.1	67.3	35.9
URB Fall	973.3	500.3	589.0	260.0	200.1	158.4
SCH Fall	115.1	160.5	89.6	158.4	50.1	46.0
LRW Fall	34.2	18.9	22.2	12.5	7.6	13.7
LRH Fall	110.0	94.9	133.7	92.4	62.4	54.5
MCB Fall	360.1	113.3	101.0	45.6	36.4	56.7

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		Preseason Abundance Forecasts					
		2014	2015	2016	2017	2018	2019
Washington Coast							
Willapa Bay Fall	Natural	2.9	3.8	3.3	4.2	3.8	4.3
	Hatchery	29.5	31.0	36.2	34.3	40.3	23.8
Quinault Spring/Summer	Natural	NA					
Grays Harbor Fall	Natural	--	--	--	--	16.4	NA
	Hatchery	--	--	--	--	4.8	NA
Quinault Spring/Summer	Natural	NA	NA	NA	NA	NA	NA
	Hatchery	--	--	--	--	4.8	NA
Quinault Fall	Natural	6.0	8.1	5.5	5.9	5.2	3.7
	Hatchery	10.3	4.0	5.3	4.4	3.1	2.7
Queets Spring/Sum	Natural	0.5	0.4	0.5	0.5	0.5	NA
Queets Fall	Natural	3.6	4.3	4.9	3.7	3.3	NA
	Hatchery	0.9	1.5	1.7	0.9	0.6	0.5
Hoh Spring/Summer	Natural	0.9	0.8	0.9	1.0	1.1	1.0
Hoh Fall	Natural	2.5	2.6	1.8	2.7	2.6	2.5
Quillayute Spring	Hatchery	2.0	1.7	1.8	2.2	2.1	2.1
Quillayute Sum/Fall	Natural	7.6	8.5	7.5	7.6	8.0	7.9
Hoko[c/]	Natural	2.7	3.3	2.9	1.5	1.5	2.8
North Coast Totals							
Spring/Summer	*Natural*	*1.4*	*1.2*	*1.4*	*1.5*	*1.6*	*1.7*
Fall	*Natural*	*19.7*	*23.5*	*19.7*	*19.9*	*19.1*	*16.5*
Spring/Summer	*Hatchery*	*2.0*	*1.7*	*1.8*	*2.2*	*2.1*	*2.1*
Fall	*Hatchery*	*11.2*	*5.5*	*7.0*	*5.3*	*3.7*	*3.2*

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		Preseason Abundance Forecasts					
		2014	2015	2016	2017	2018	2019
Puget Sound summer/fall[d/]							
Nooksack/Samish	Hatchery	43.9	38.6	27.9	21.2	24.6	21.3
East Sound Bay	Hatchery	1.2	1.2	0.7	0.8	0.7	0.3
Skagit[e/]	Natural	18.0	11.8	15.1	15.8	13.3	13.6
	Hatchery	0.3	0.6	0.4	0.4	0.3	0.3
Stillaguamish[f/]	Natural	1.6	0.5	0.5	1.5	1.6	0.9
Snohomish[f/]	Natural	5.3	4.2	3.3	3.4	3.5	3.7
	Hatchery	5.4	3.3	5.0	4.8	6.5	7.2
Tulalip[f/]	Hatchery	4.7	1.3	1.4	5.3	7.5	12.7
South Puget Sound	Natural	4.8	3.8	4.5	4.7	4.8	8.4
	Hatchery	96.7	62.4	43.1	80.4	123.6	99.9
Hood Canal[e/]	Natural	3.5	3.1	2.3	2.5	3.9	1.2
	Hatchery	80.6	59	42.7	48.3	57.6	66.0
Strait of Juan de Fuca Including Dungeness spring run[e/]	Natural	3.8	4.9	3.7	3.1	6.0	8.3

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

e/ Terminal run forecast.

f/ Includes a mixture of runsize types including escapement without fishing and terminal run. 2019 values are escapement w/out fishing for Tulalip and Snohomish natural, and terminal runsize for Stillaguamish and Snohomish hatchery.

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		Preseason Ocean Abundance Forecasts 2014	2015	2016	2017	2018	2019
OPI Area Total Abundance (California, Oregon Coasts, and Columbia River)		1,213.7	1,015.0	549.2	496.2	349.0	1,009.6
OPI Public	Hatchery	983.1	808.4	396.5	394.3	294.1	933.5
Columbia River Early		526.6	515.2	153.7	231.7	164.7	545.0
Columbia River Late		437.5	261.8	226.9	154.6	121.5	360.6
Coastal N. of Cape Blanco		4.8	6.9	5.5	3.5	3.3	12.0
Coastal S. of Cape Blanco		14.2	24.4	10.4	4.5	4.6	15.9
Lower Columbia River	Natural	33.4	35.9	40.0	30.1	21.9	36.9
Oregon Coast (OCN)	Natural	230.6	206.6	152.7	101.9	54.9	76.1
Washington Coast							
Willapa	Natural	58.9	42.9	39.5	36.7	20.6	63.4
	Hatchery	41.0	57.7	28.1	55.0	44.5	94.0
Grays Harbor	Natural	108.8	142.6	35.7	50.0	42.4	71.5
	Hatchery	65.4	46.6	22.9	36.4	51.4	64.3
Quinault	Natural	25.0	44.2	17.1	26.3	25.4	13.9
	Hatchery	24.7	24.9	19.8	29.4	29.6	26.9
Queets	Natural	10.3	7.5	3.5	6.5	7.0	11.1
	Hatchery	15.7	11.3	4.5	13.7	10.8	13.2
Hoh	Natural	8.9	5.1	2.1	6.2	5.8	7.0

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		Preseason Ocean Abundance Forecasts 2014	2015	2016	2017	2018	2019
Quillayute Fall	Natural	18.4	10.5	4.5	15.8	10.6	14.7
	Hatchery	12.6	8.0	6.4	17.6	16.5	17.0
Quillayute Summer	Natural	2.0	1.2	0.3	1.5	2.7	1.2
	Hatchery	3.2	2.2	1.4	3.4	3.3	3.4
North Coast Independent Tributaries	Natural	15.2	11.7	1.9	6.5	4.1	8.1
	Hatchery	11.6	11.9	2.5	0.2	7.9	12.5
WA Coast Total	*Natural*	*247.5*	*265.6*	*104.6*	*149.5*	*118.7*	*191.0*
	Hatchery	*174.2*	*162.6*	*85.6*	*155.6*	*164.1*	*231.3*
Puget Sound							
Strait of Juan de Fuca	Natural	12.5	11.1	4.4	13.1	7.2	8.8
	Hatchery	17.3	11.1	3.9	15.4	10.6	16.8
Nooksack-Samish	Natural	20.8	28.1	9.0	13.2	20.6	25.1
	Hatchery	61.7	50.8	28.8	45.6	61.3	59.8
Skagit	Natural	112.4	121.4	8.9	11.2	59.2	57.9
	Hatchery	15.8	19.5	4.9	7.6	13.1	9.9
Stillaguamish	Natural	32.5	31.3	2.8	7.6	19.0	23.8
	Hatchery	6.0	0.0	0.0	1.5	0.0	2.2
Snohomish	Natural	150.0	151.5	20.6	107.3	65.9	62.6
	Hatchery	78.2	53.9	16.7	62.0	38.3	43.7
South Sound	Natural	62.8	63.0	9.9	20.2	15.0	30.4
	Hatchery	150.7	180.2	27.1	102.4	103.0	180.4
Hood Canal	Natural	82.8	61.5	35.3	115.6	59.5	40.1
	Hatchery	47.6	108.4	83.5	74.9	84.5	87.9
Puget Sound Total	*Natural*	*473.8*	*467.9*	*91.0*	*288.3*	*246.4*	*248.8*
	Hatchery	*377.3*	*423.9*	*165.0*	*309.3*	*310.8*	*400.7*