2020 North of Falcon

Salmon Forecasts

2020 Forecast Meeting Agenda

9:30 – 10:30	Introduction		
	• Welcome and Introduction		Kyle Adicks
	• North of Falcon – Setting Salmon Fisheries in 2020		
	• Lifeblood Documentary		
	• SRKW Update		Julie Watson
10:30 – 11:30	Salmon Forecasts 2020		
	• 2019/20 Environmental Outlook		Marisa Litz
	• Puget Sound and Coast Chinook, Coho, Chum, Sockeye Stocks		Mickey Agha
	• Columbia River Salmon Stocks		Tim Sippel
	• PFMC Salmon Technical Team Review		Kyle Vandegraaf
11:30 – Noon	Regional Discussion Sessions		
	• Puget Sound Recreational	Big Room	Mark, Derek, Dave S
	• Columbia River & Ocean	Room 172	Ryan, Kyle(s), Tim,
	• Coastal	Room 682	Chad, Mike
	• Puget Sound Commercial	Room 175	Kwasi, Dave L, Mickey
Noon – 1:00 pm	Lunch Break		
1:00 – 3:00	Regional Discussion Sessions Continued		

Slides Available Online: http://wdfw.wa.gov/fishing/management/north-falcon/

2020 NOF Meeting Schedule

Date	Purpose	Location
Feb. 27	Willapa Bay – Grays Harbor Forecast meeting	Montesano City Hall
Feb. 28	Statewide Forecast Meeting	DSHS Office Building 2 Auditorium, Olympia
Mar. 3-9	Pacific Fishery Management Council meeting	Double Tree Hilton Sonoma, Rohnert Park, CA
Mar. 12	Willapa Bay Fisheries Discussion	Raymond Elks Lodge
Mar. 16	North of Falcon 1	Lacey Community Center
Mar. 17	Columbia River Fisheries Discussion	WDFW Region 5 Headquarters, Ridgefield
Mar. 18	Snake River Fisheries Discussion	Walla Walla Community College Clarkston
Mar. 19	Puget Sound Recreational Fisheries Discussion	Trinity United Methodist Church, Sequim
Mar. 19	Mid Columbia Fisheries Discussion	Richland Public Library
Mar. 20	Upper Columbia River Fisheries Discussion	Douglas County PUD, Wenatchee
Mar. 23	Public Hearing on Ocean Salmon Management Options	Westport, WA
Mar. 24	Grays Harbor Fisheries Discussion	Montesano City Hall, Montesano
Mar. 25	Puget Sound Recreational Fisheries Discussion	WDFW Region 4 Headquarters, Mill Creek
Mar. 31	Second North of Falcon Meeting	Lynnwood Embassy Suites
Apr. 1	Columbia River and Ocean Fisheries Discussion	Region 5 Headquarters, Ridgefield
Apr. 3-10	Final Pacific Fishery Management Council Meeting	Hilton Vancouver, Vancouver, WA

Available Online: http://wdfw.wa.gov/fishing/management/north-falcon/

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 (Available Online: http://wdfw.wa.gov/fishing/management/north-falcon/

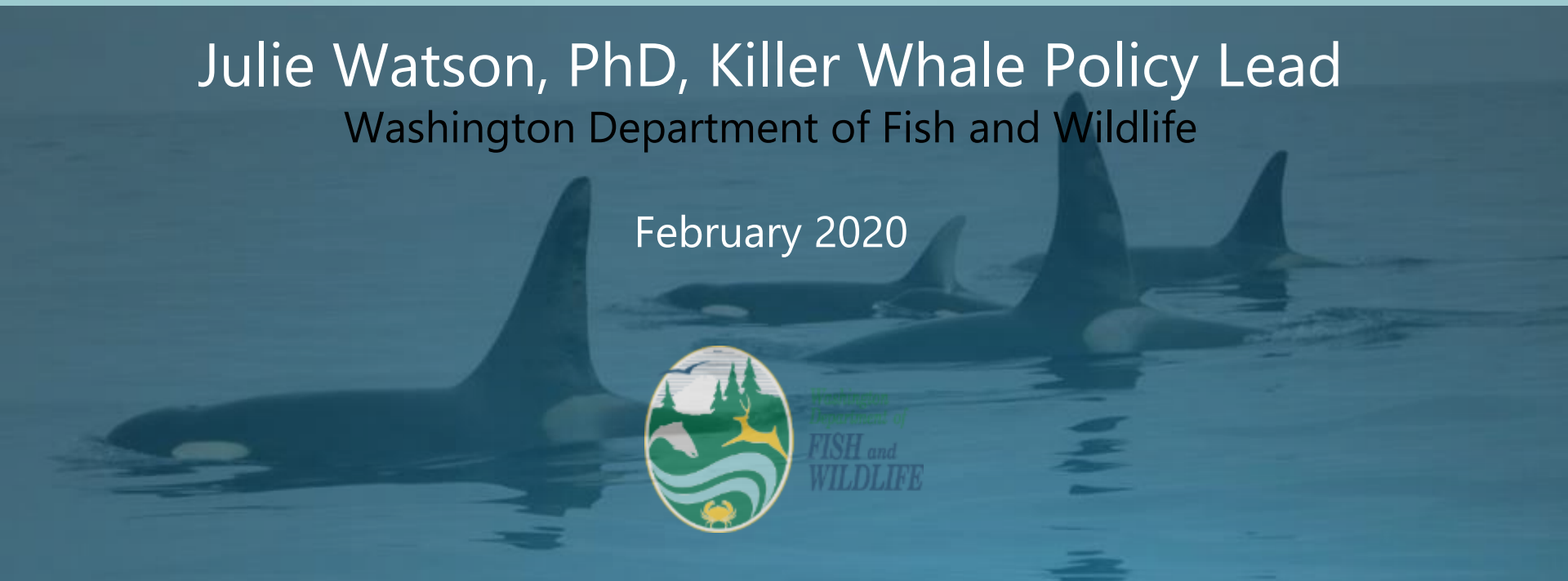
Lifeblood

https://www.youtube.com/watch?v=AWjkgVJ2s0s

Washington Southern Resident Killer Whale Recovery Update

Julie Watson, PhD, Killer Whale Policy Lead
Washington Department of Fish and Wildlife

February 2020



Intervention for the Southern Residents: SRKW Task Force

Governor Inslee takes action

Task Force Charge:

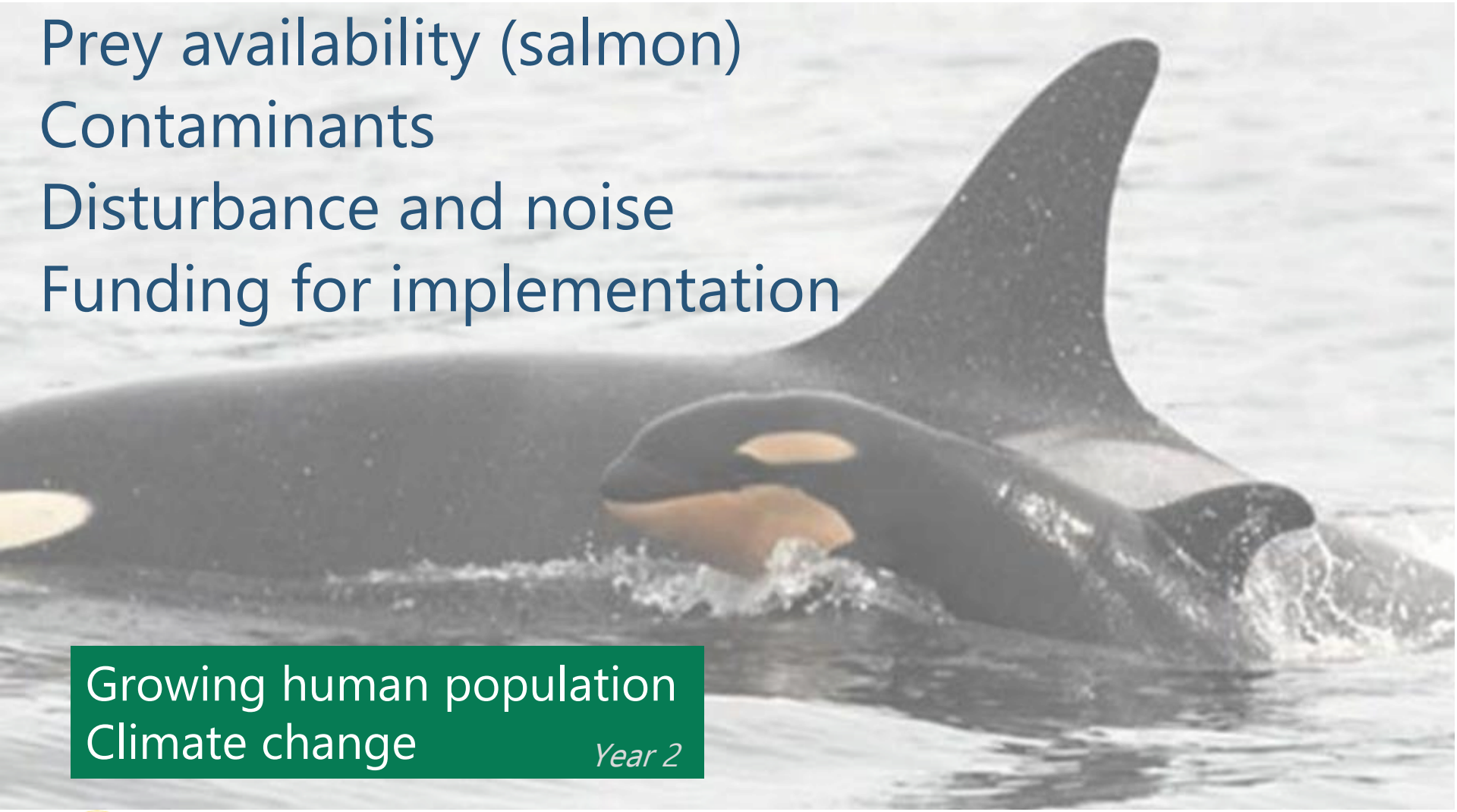
Provide recommendations for addressing all major threats to Southern Resident orcas

Task Force Priorities

Prey availability (salmon)
Contaminants
Disturbance and noise
Funding for implementation

Growing human population
Climate change

Year 2



Matt Vander Haegen, WDFW

2018 Recommendations

36 recommendations

- ✓ Prey - 16 recommendations
- ✓ Vessels - 10 recommendations
- ✓ Contaminants - 10 recommendations

4 Governor Bills; Budget Requests

2019 legislative session

Year 2: Task Force Conclusion

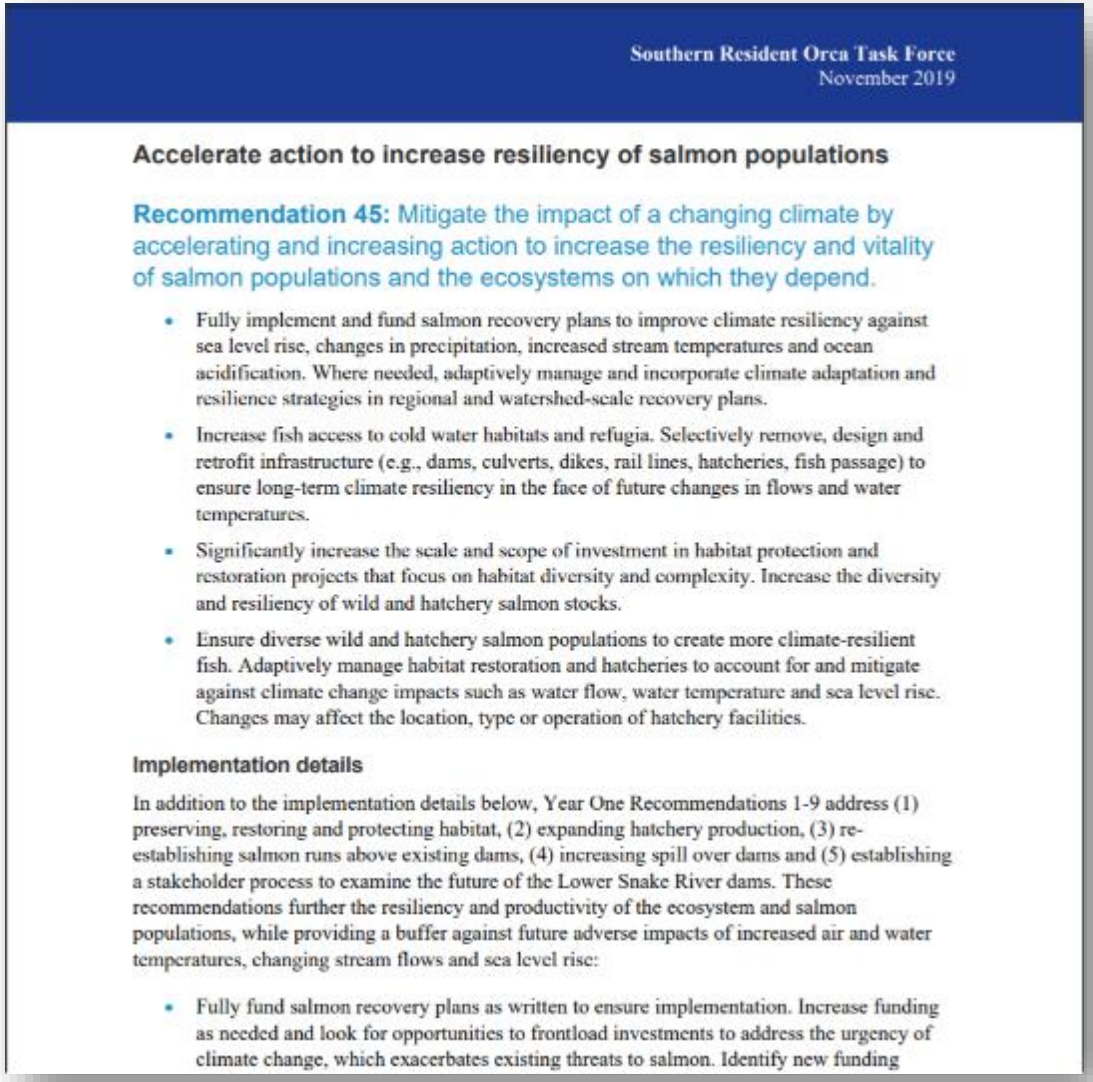
- Final Task Force Meeting- Oct. 7, 2019
- Final Task Force Report- Nov. 8, 2019

Dave Ellifrit, Center for Whale Research

Two New Goals

Goal 5: Reduce the **threat from climate change, including ocean acidification**, to Southern Residents, the region's biodiversity and, ultimately, the wellbeing of Washington's people and economy.

Prey Availability (Climate)



Southern Resident Orca Task Force
November 2019

Accelerate action to increase resiliency of salmon populations

Recommendation 45: Mitigate the impact of a changing climate by accelerating and increasing action to increase the resiliency and vitality of salmon populations and the ecosystems on which they depend.

- Fully implement and fund salmon recovery plans to improve climate resiliency against sea level rise, changes in precipitation, increased stream temperatures and ocean acidification. Where needed, adaptively manage and incorporate climate adaptation and resilience strategies in regional and watershed-scale recovery plans.
- Increase fish access to cold water habitats and refugia. Selectively remove, design and retrofit infrastructure (e.g., dams, culverts, dikes, rail lines, hatcheries, fish passage) to ensure long-term climate resiliency in the face of future changes in flows and water temperatures.
- Significantly increase the scale and scope of investment in habitat protection and restoration projects that focus on habitat diversity and complexity. Increase the diversity and resiliency of wild and hatchery salmon stocks.
- Ensure diverse wild and hatchery salmon populations to create more climate-resilient fish. Adaptively manage habitat restoration and hatcheries to account for and mitigate against climate change impacts such as water flow, water temperature and sea level rise. Changes may affect the location, type or operation of hatchery facilities.

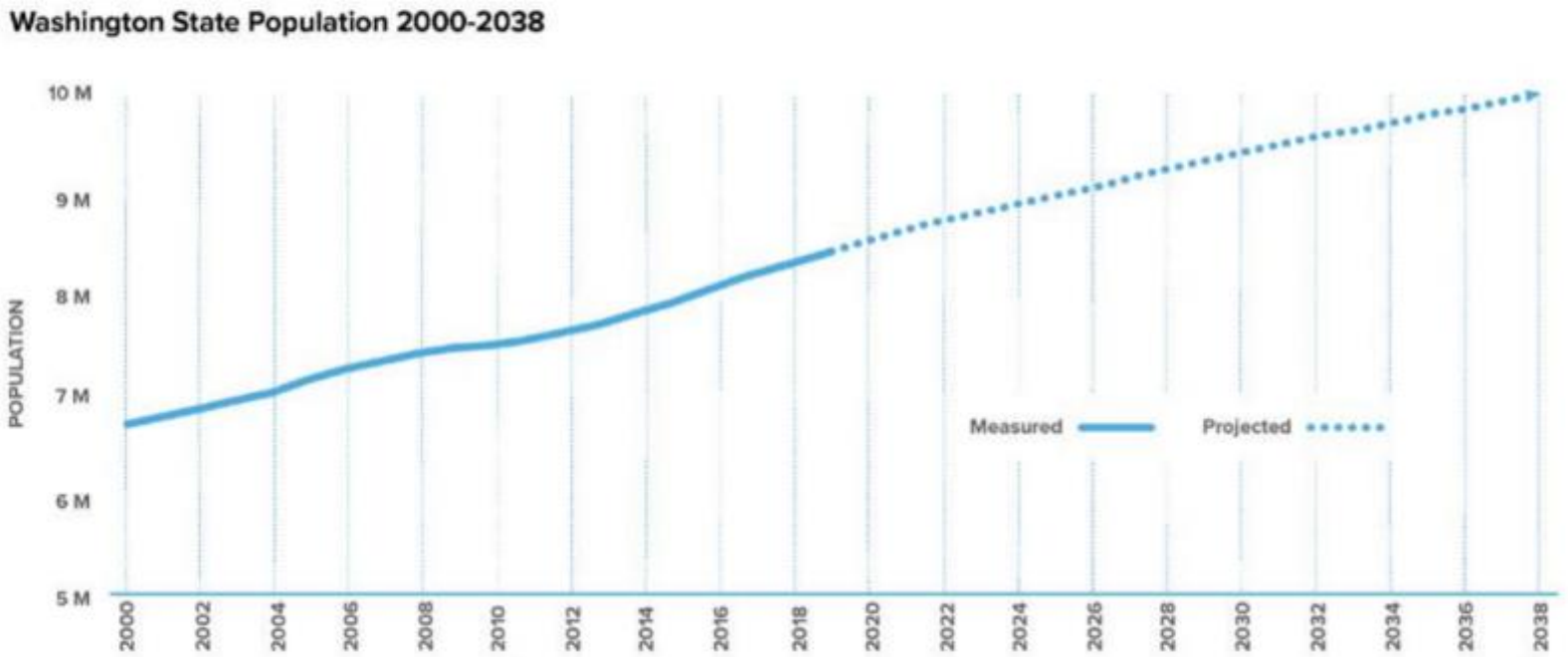
Implementation details

In addition to the implementation details below, Year One Recommendations 1-9 address (1) preserving, restoring and protecting habitat, (2) expanding hatchery production, (3) re-establishing salmon runs above existing dams, (4) increasing spill over dams and (5) establishing a stakeholder process to examine the future of the Lower Snake River dams. These recommendations further the resiliency and productivity of the ecosystem and salmon populations, while providing a buffer against future adverse impacts of increased air and water temperatures, changing stream flows and sea level rise:

- Fully fund salmon recovery plans as written to ensure implementation. Increase funding as needed and look for opportunities to frontload investments to address the urgency of climate change, which exacerbates existing threats to salmon. Identify new funding

Department of Fish and Wildlife

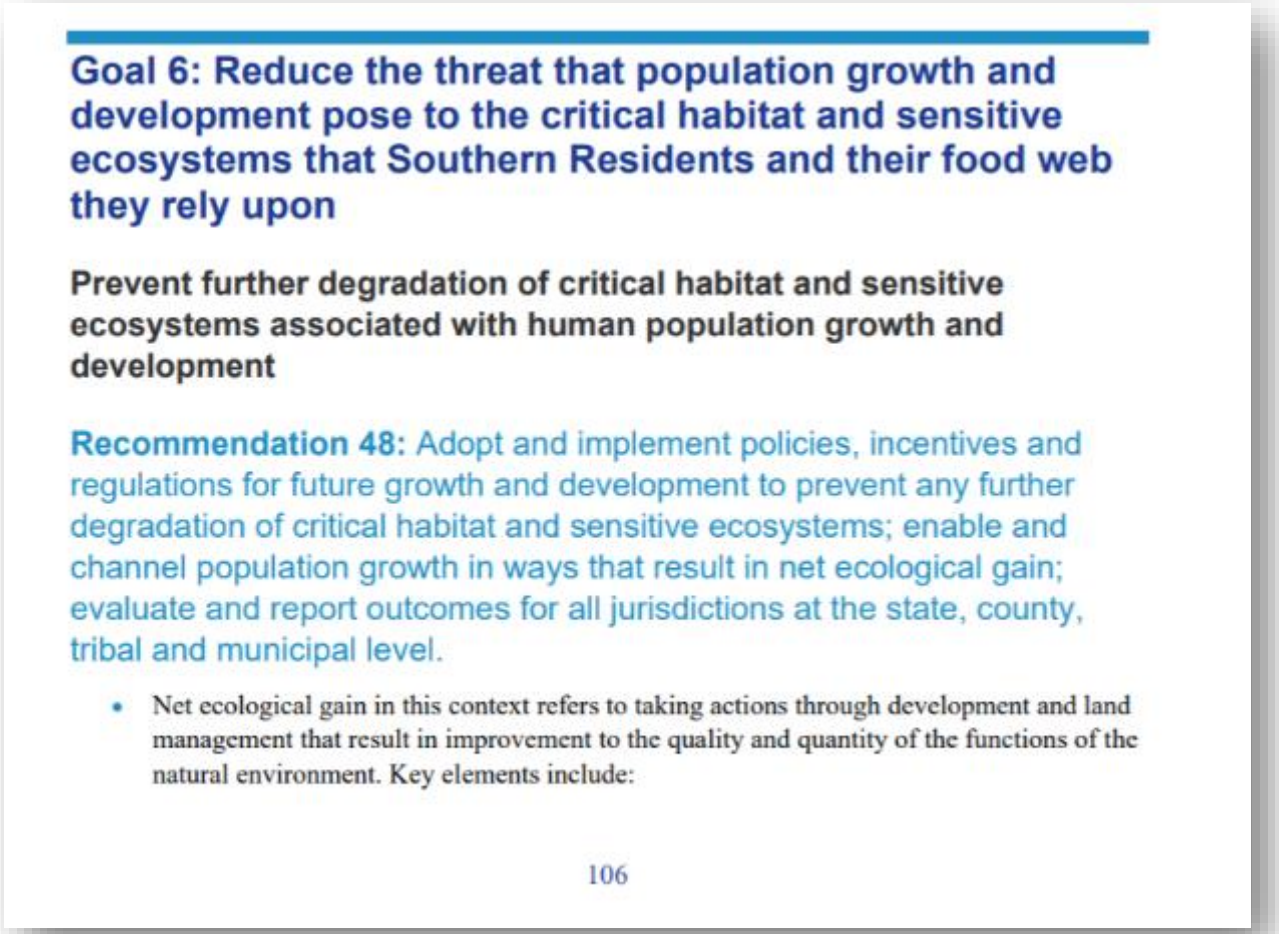
Figure 5. Washington population growth from 2000, projected to 2038 [39].



Two New Goals

Goal 6: Reduce the **threats from population growth and development** on the important habitats, sensitive ecosystems and food webs that Southern Residents orcas rely on.

Prey Availability (Population Growth)



Goal 6: Reduce the threat that population growth and development pose to the critical habitat and sensitive ecosystems that Southern Residents and their food web they rely upon

Prevent further degradation of critical habitat and sensitive ecosystems associated with human population growth and development

Recommendation 48: Adopt and implement policies, incentives and regulations for future growth and development to prevent any further degradation of critical habitat and sensitive ecosystems; enable and channel population growth in ways that result in net ecological gain; evaluate and report outcomes for all jurisdictions at the state, county, tribal and municipal level.

- Net ecological gain in this context refers to taking actions through development and land management that result in improvement to the quality and quantity of the functions of the natural environment. Key elements include:

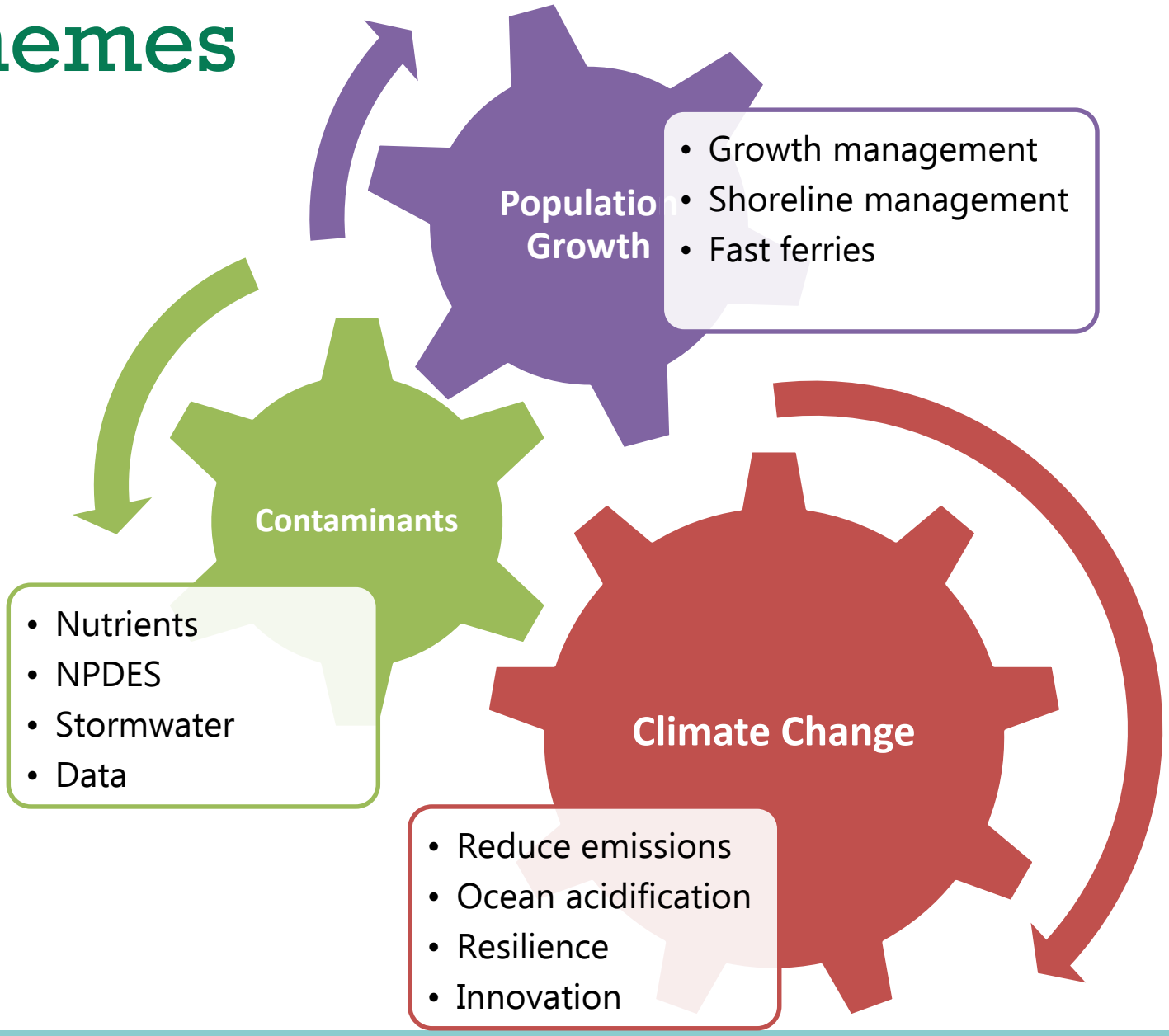
106

Department of Fish and Wildlife

Task Force Year 2 results & 13 new recommendations

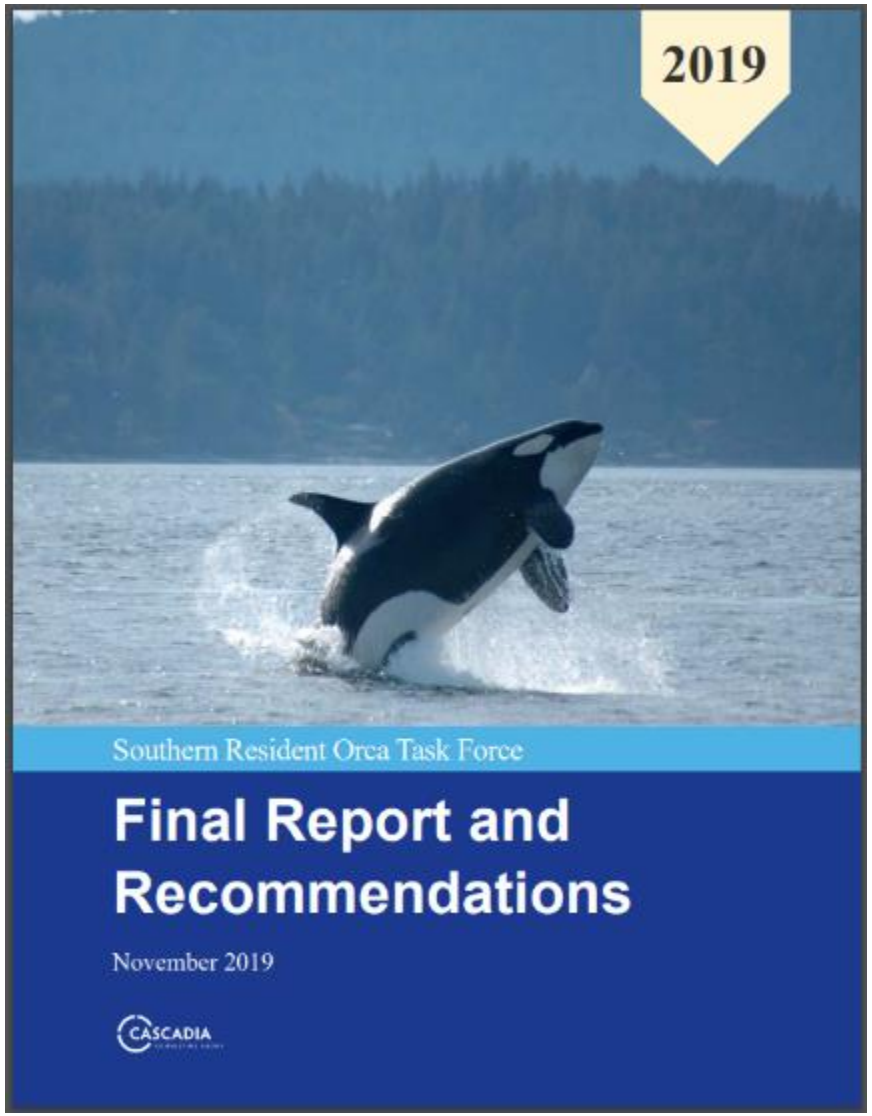
- Doubling down on 2018 recommendations
- Climate change (5)
- Population growth & development (2)
- Emergent issues: contaminants (5)
- Life beyond the Task Force (1)

Themes


Populatio
Growth
• Growth management
• Shoreline management
• Fast ferries
Contaminants
• Nutrients
• NPDES
• Stormwater
• Data
Climate Change
• Reduce emissions
• Ocean acidification
• Resilience
• Innovation

Report

https://www.governor.wa.gov/sites/default/files/OrcaTaskForce_FinalReportandRecommendations_11.07.19.pdf



What's next?

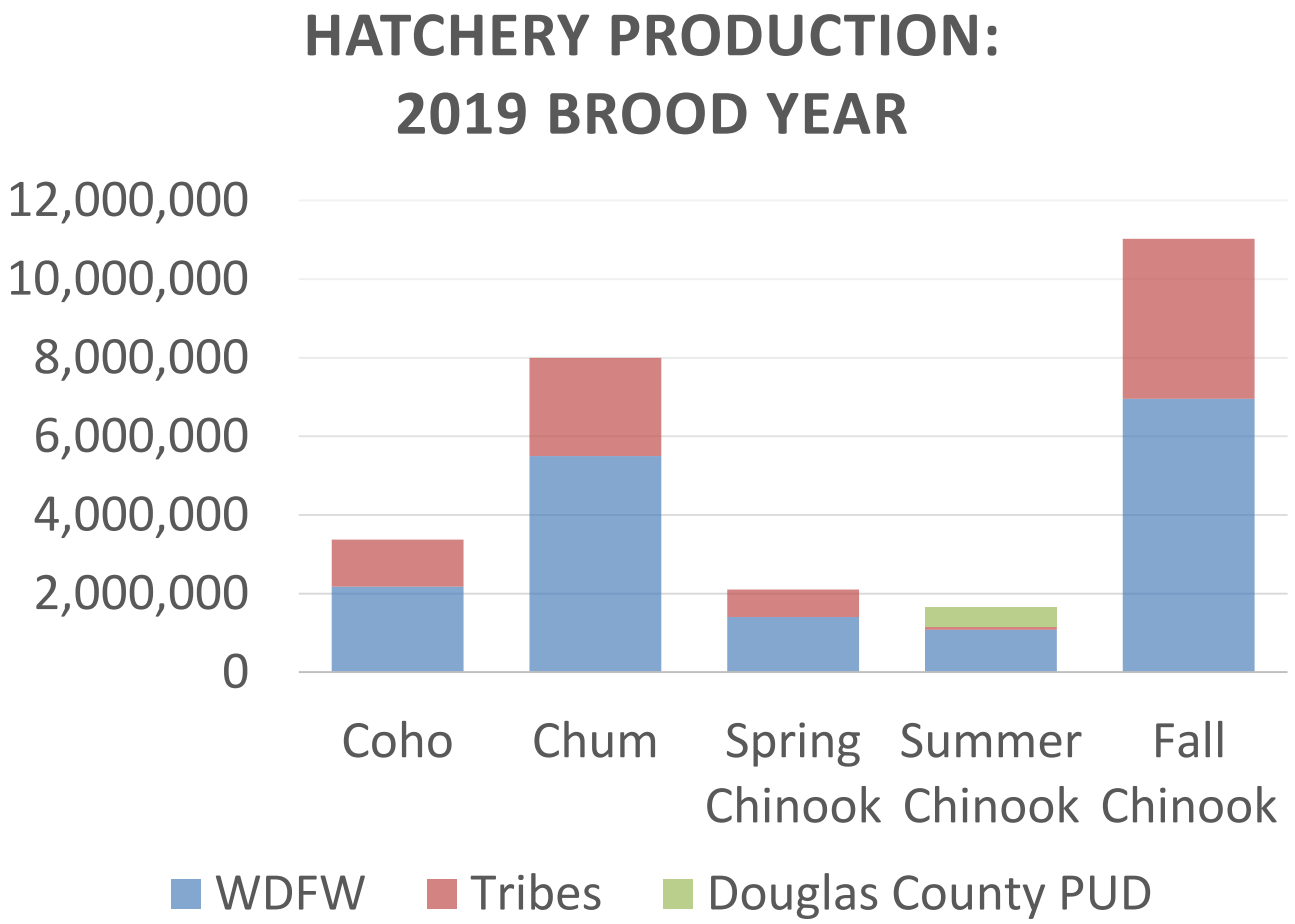
Legislative session

Implementation continues

Life after the Task Force

WDFW Implementation of 2018 SRKW Task Force Recommendations

Producing Prey



Total fish:
26,150,200

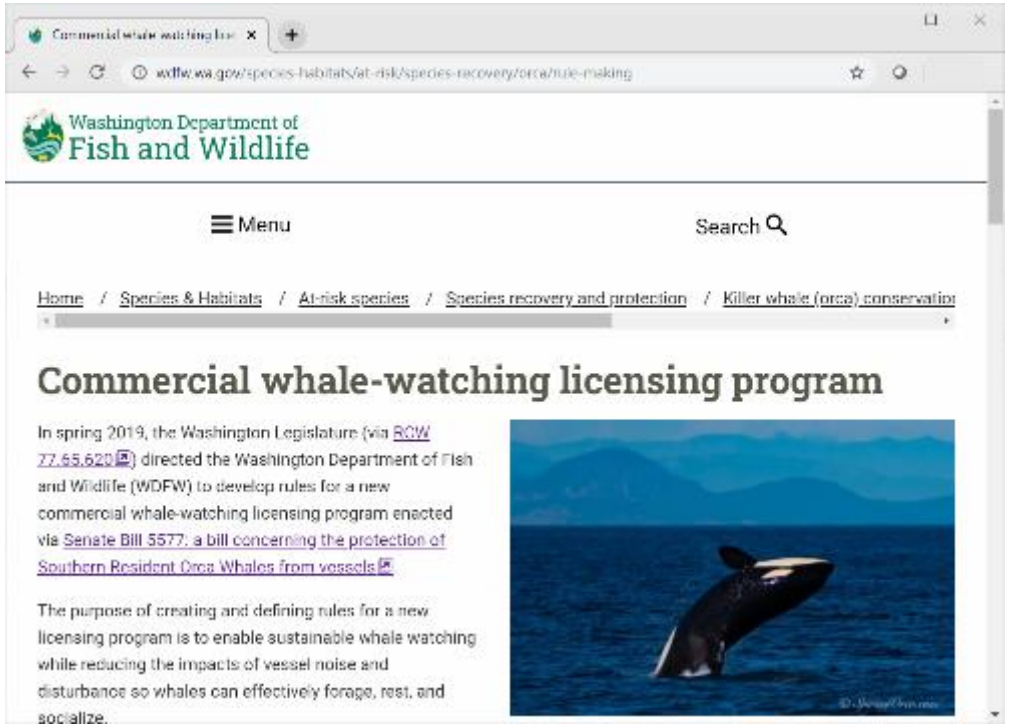
On the Water

Elaine Thompson AP Photo from July 31, 2015

- 105 whale patrols
- No violations issued, ~dozen warnings
- Increased outreach and education efforts

Commercial Whale Watching

Licensing program rulemaking underway: rules adopted by 1/1/21



- Advisory committee
- Intergovernmental coordination group
- Independent scientific panel

Protecting Habitat

Rulemaking initiated: HPA single family residence exemption

Seeking civil enforcement capacity in supplemental budget

Salmon Predation

- Warm water piscivorous fish rulemaking complete
- New limits in effect (2/18/20)

Salmon Predation

- Co-Managers Workshop- 11/1
- 2nd Transboundary Pinniped Science Workshop 11/20-21
- Columbia River recommendation- not funded, but included in WDFW supplemental budget request

Dams and Barriers

- Barrier analysis
- Fishways, flows, and screenings rulemaking

WDFW Implementation

- Supplemental budget request
- Ongoing support for implementation for SRKW

Associated Press photo

Southern Resident Killer Whales & Fisheries

- In April 2019,the Pacific Fishery Management Council tasked an Ad-Hoc Workgroup with reassessing the effects of Council-area ocean salmon fisheries on Southern Resident Killer Whales
- Workgroup has held series of public meetings, and drafted a Risk Assessment Framework – available on the Briefing Book page for the March Council meeting - https://www.pcouncil.org/documents/2020/02/e-3-a-srkw-workgroup-report-1-electronic-only.pdf/
- The Workgroup recommendation is to continue Workgroup process to develop potential Fishery Management Plan measures for SRKW based on the risk assessment
- NMFS will provide their annual guidance letter for 2020 to Council soon, and will include measures to protect SRKW. NMFS has been involved in the Workgroup's development of the risk assessment document, and will likely use that information in developing 2020 measures in guidance letter.

Questions?

Washington Department of FISH and WILDLIFE

Washington Department of FISH and WILDLIFE

Update on Environmental Conditions

Marisa N. C. Litz, PhD
marisa.litz@dfw.wa.gov

Outline

- Update on marine heatwave (a.k.a. the “warm blob”)
- Physical and biological observations
- NWFSC environmental indicators (stoplight chart)

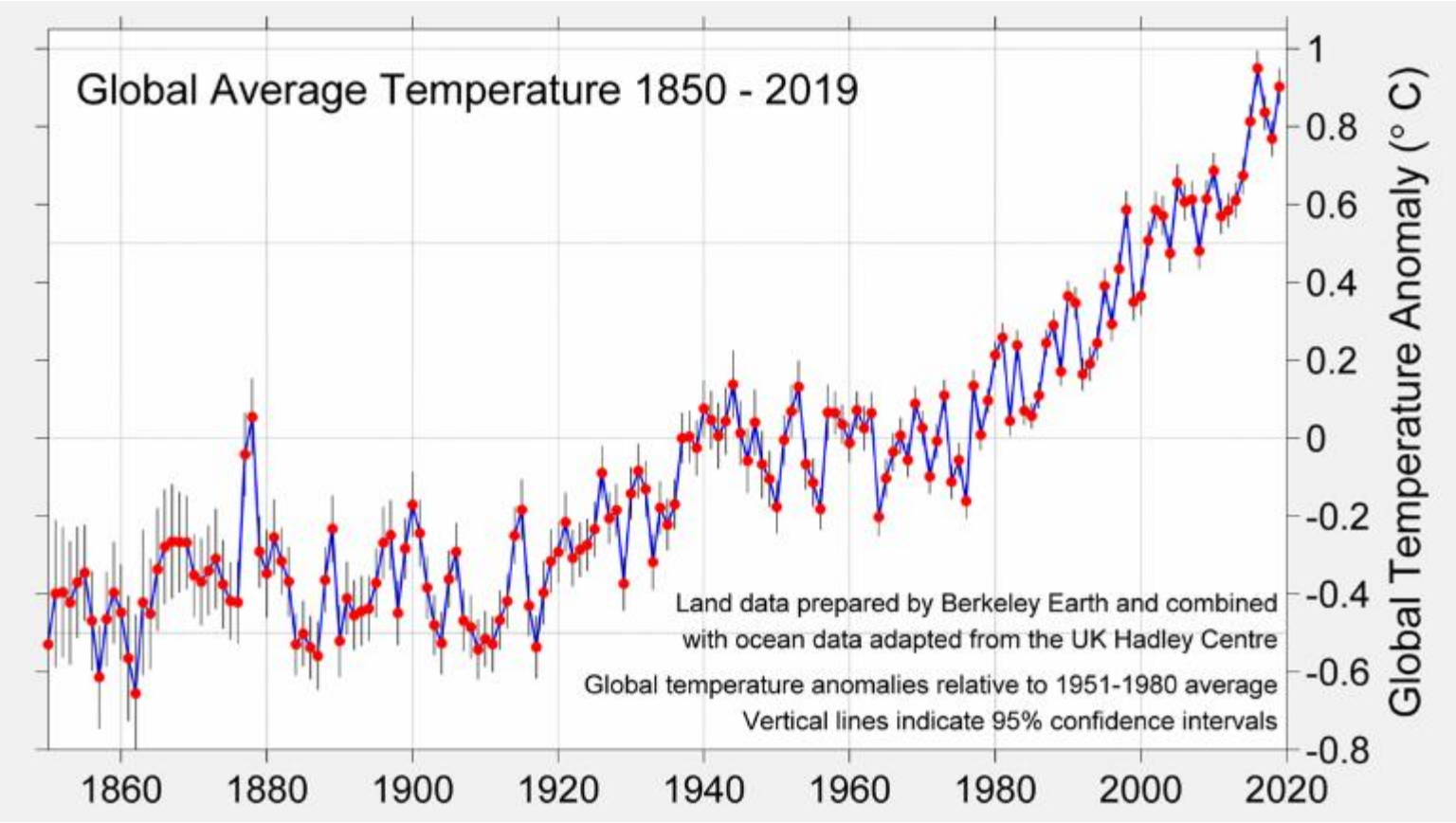
Take-Home Messages:

- Climate change is impacting salmon returns across the state of Washington

- Environmental stressors affect **BOTH** freshwater and marine life history phases

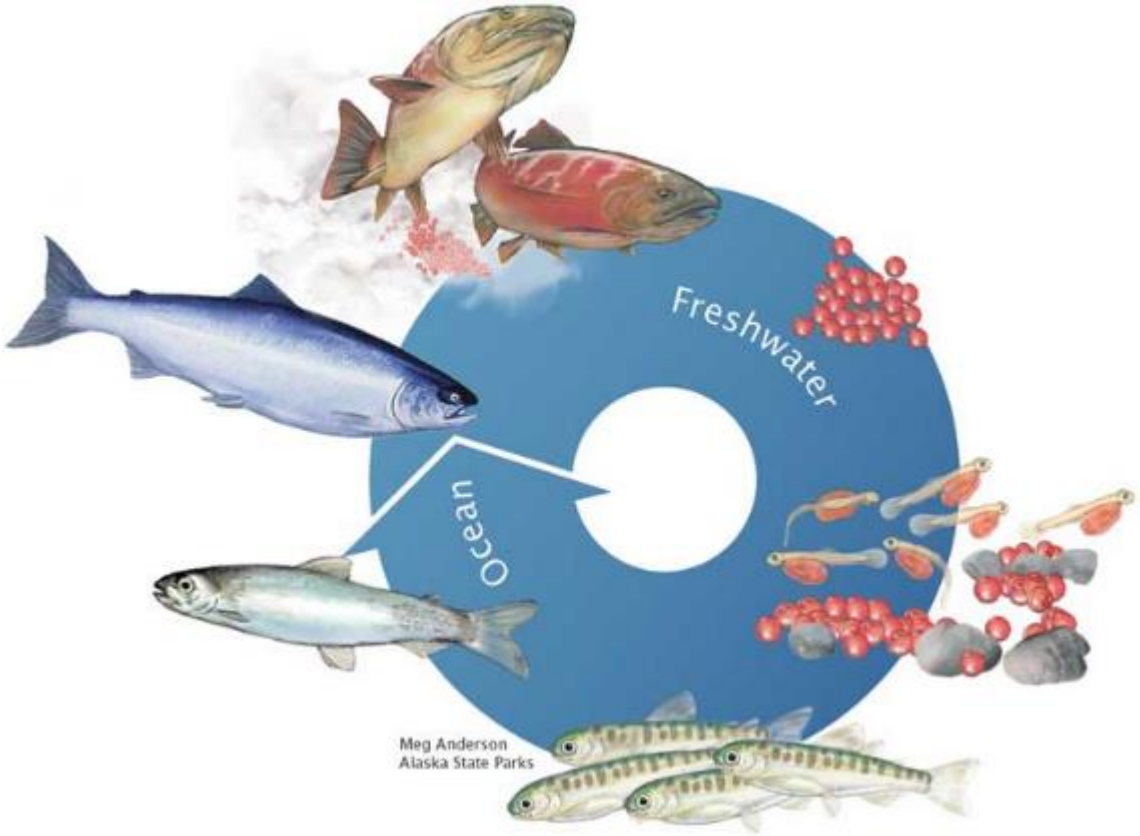
- Another year of poor returns expected in 2020

The global climate is warming



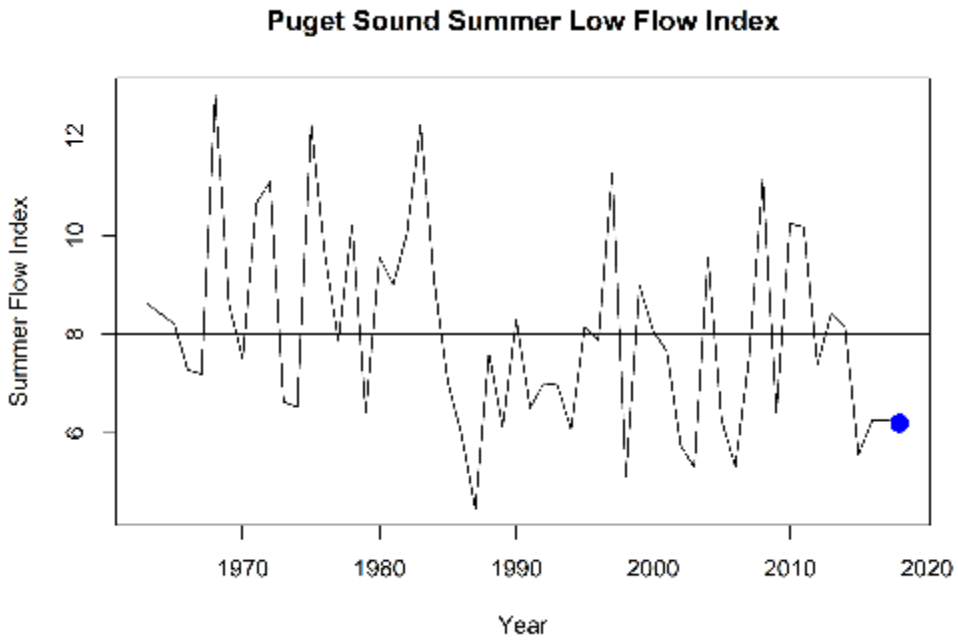
http://berkeleyearth.org/2019-temperatures/

Warming affects salmon at all life history stages



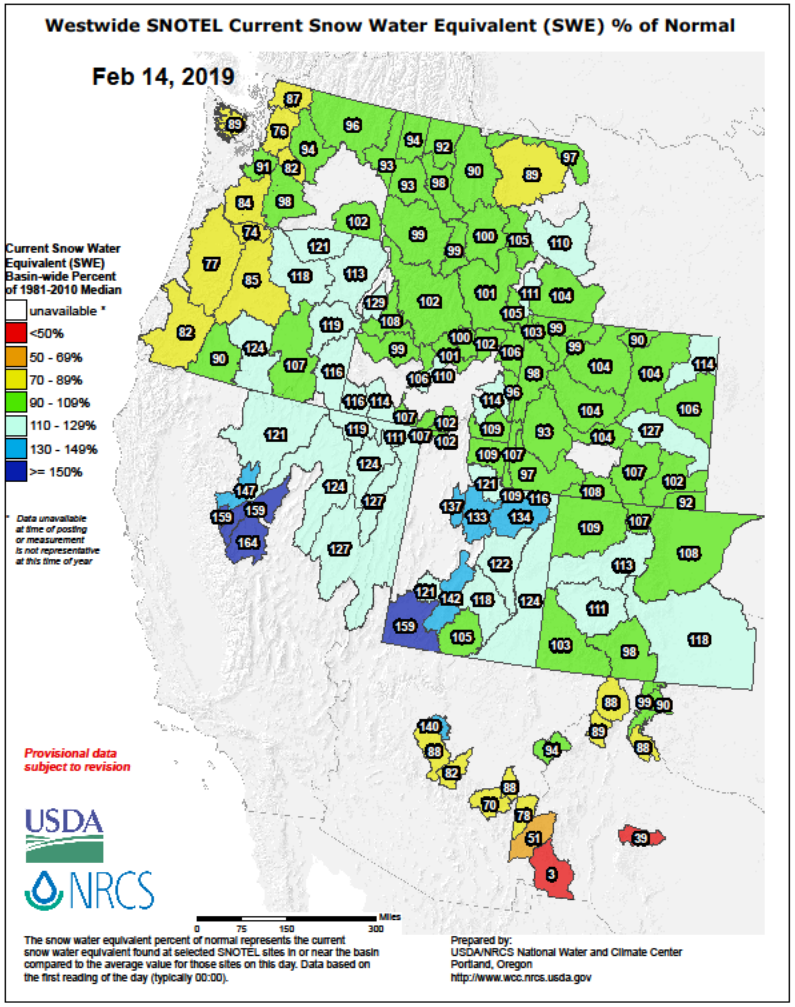
Terrestrial impacts on salmon production

Puget Sound Low Flow Index

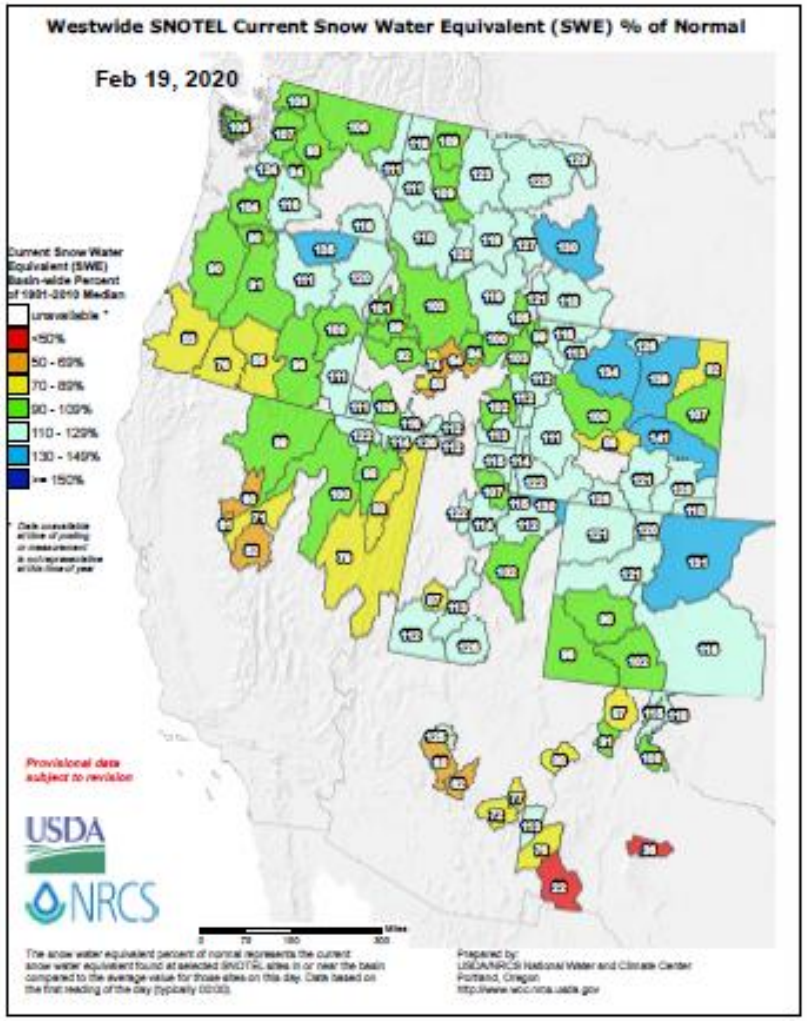


Current Snow Pack

Feb 2019



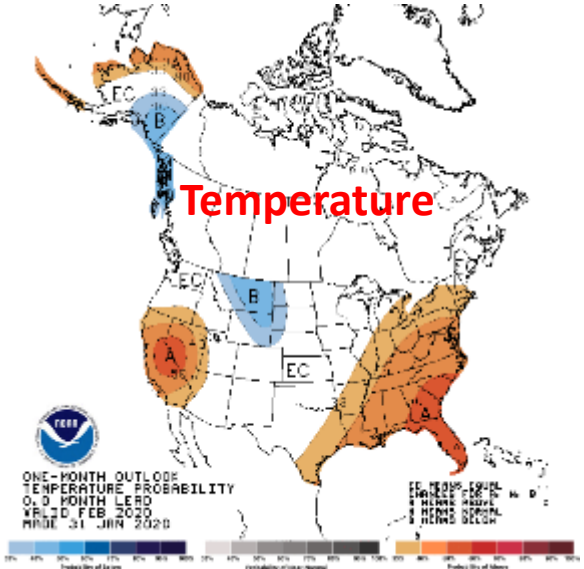
Feb 2020

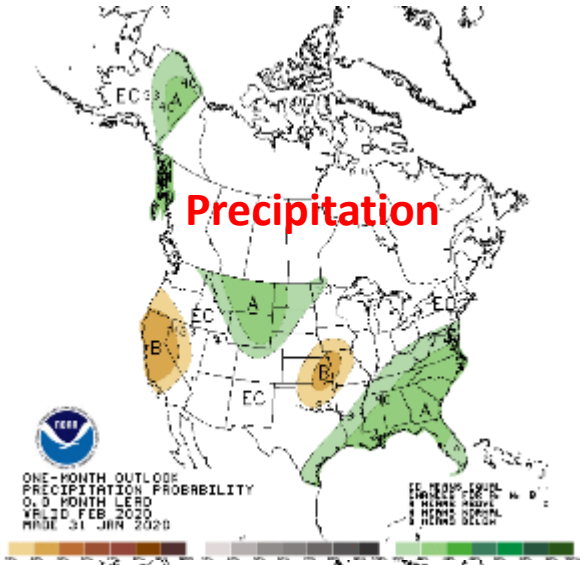


www.wcc.nrcs.usda.gov/gis/snow.html

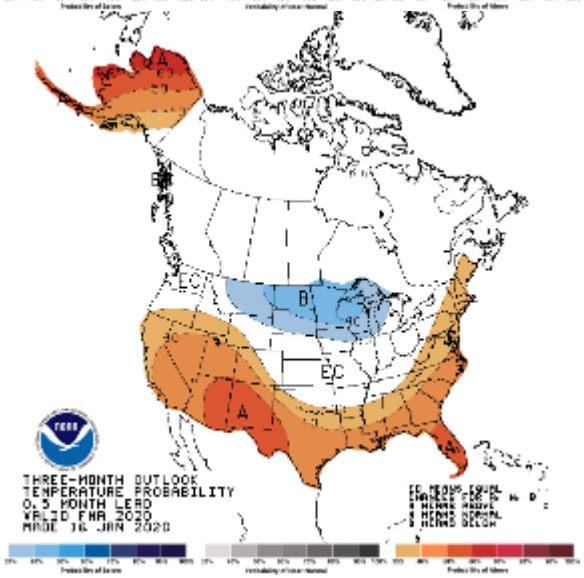
Terrestrial Climate Outlook

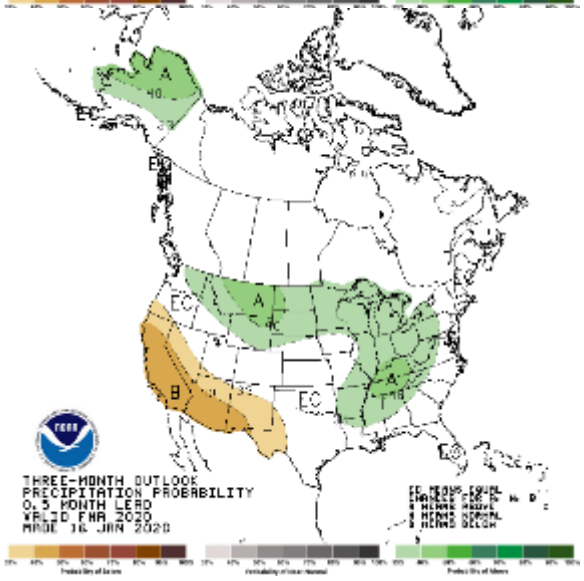
1 Month
Feb 2020





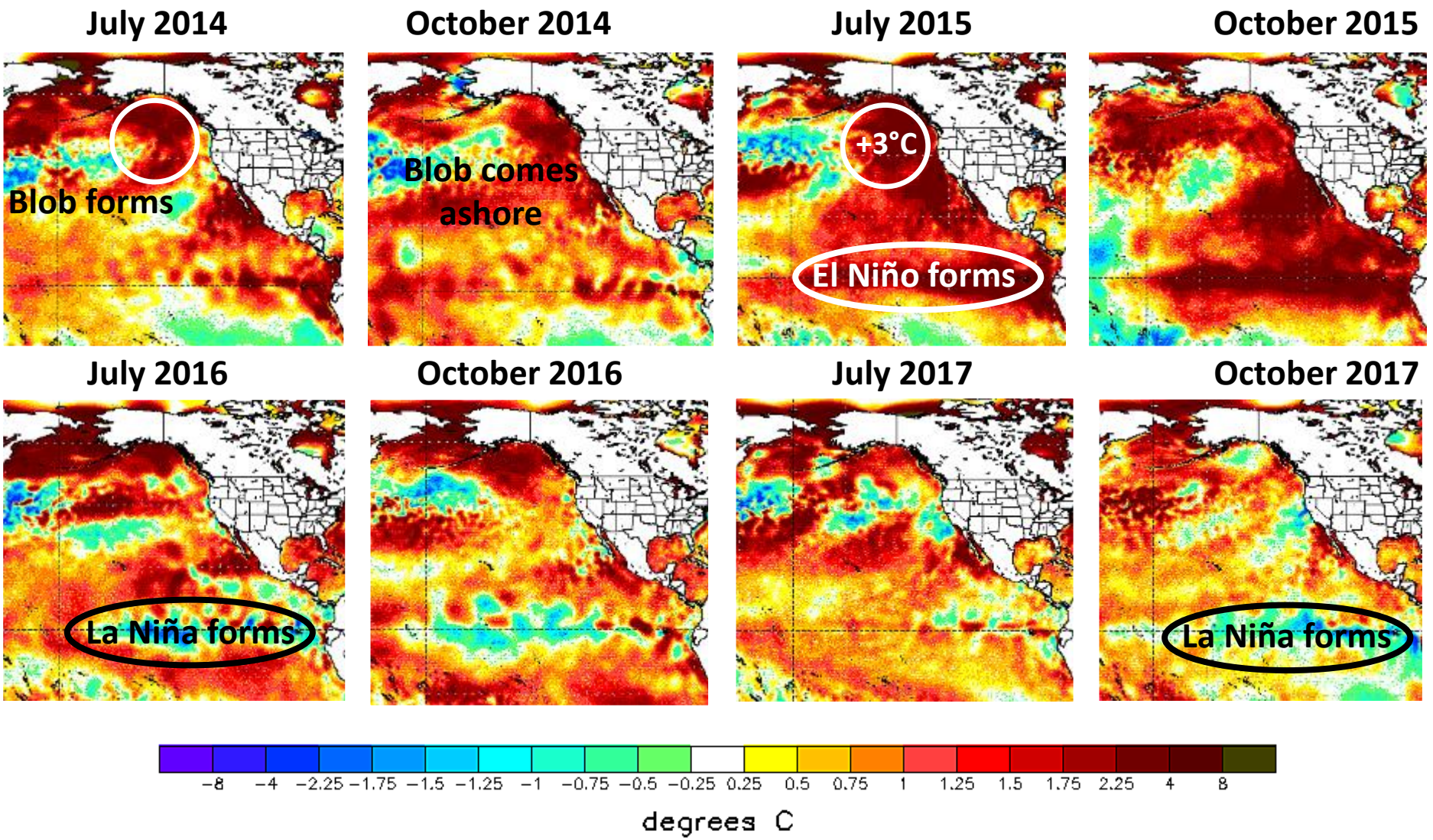
3 months:
Feb – Apr
2020





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

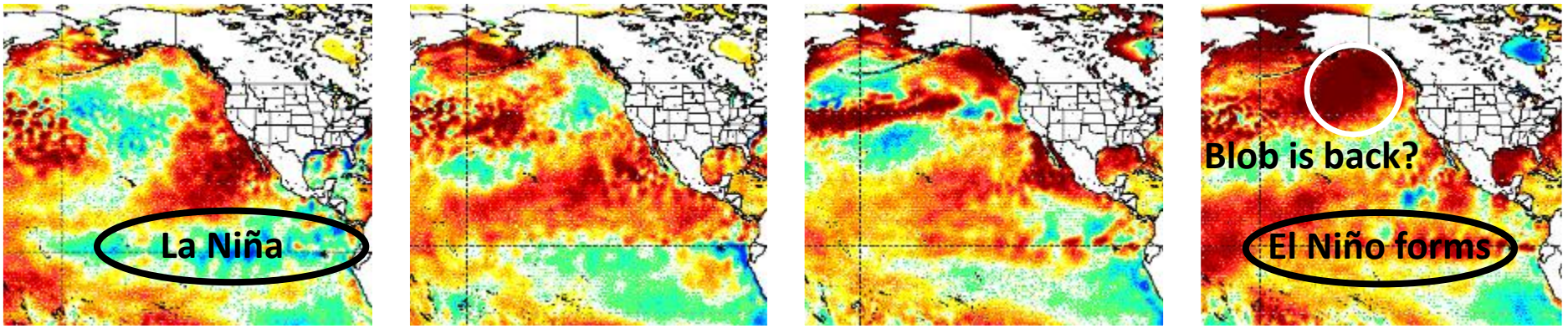
Sea Surface Temperature Anomalies



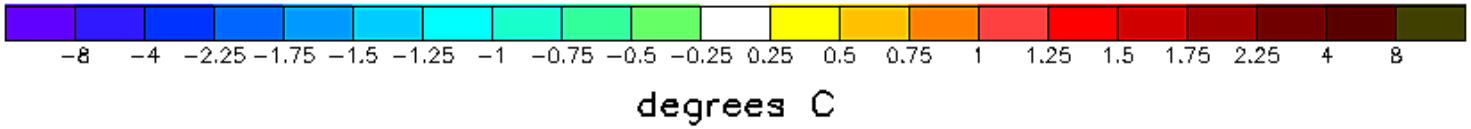
polar.ncep.noaa.gov/sst/ophi/

Sea Surface Temperature Anomalies

Jan 2018 | **April 2018** | **July 2018** | **October 2018**

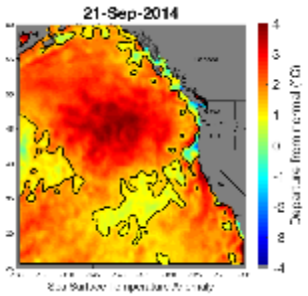


Weak La Niña dissipated in Spring 2018 and El Nino formed in Fall 2018

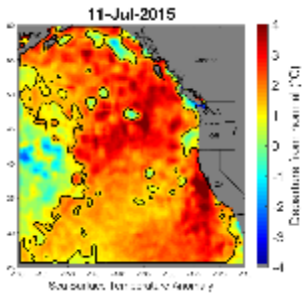


polar.ncep.noaa.gov/sst/ophi/

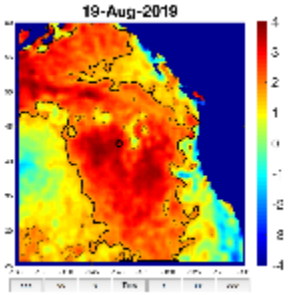
The Marine Heatwave



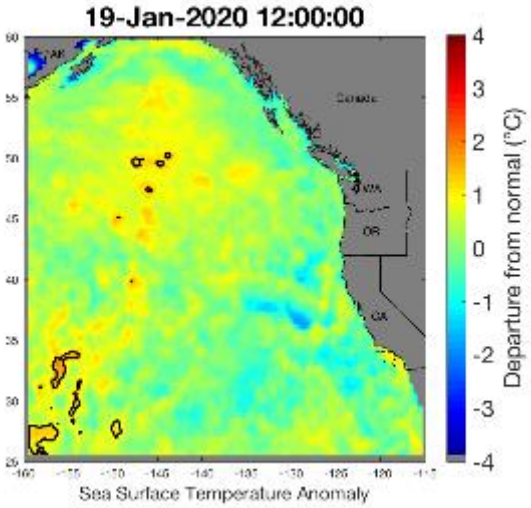
1) Sep 2014



2) July 2015



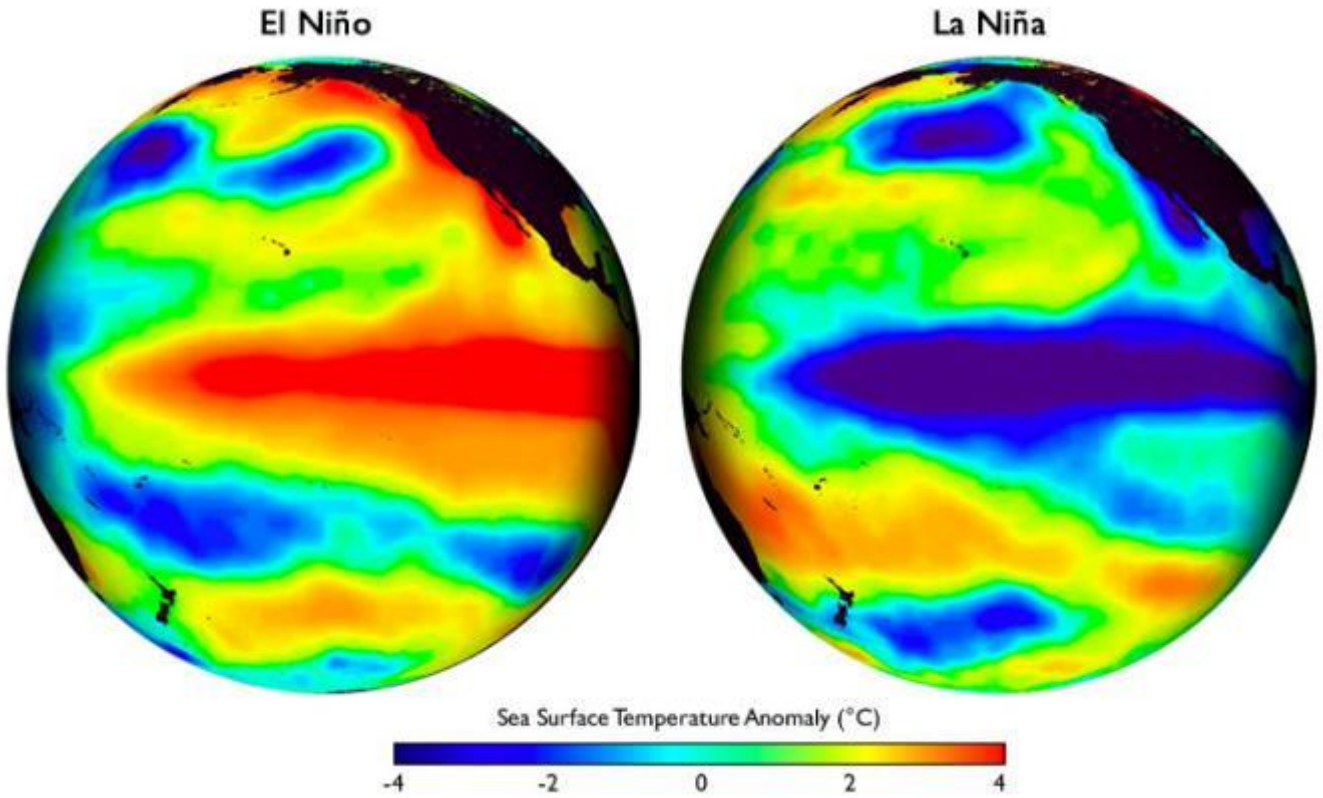
3) Aug 2019



4) Jan 2020

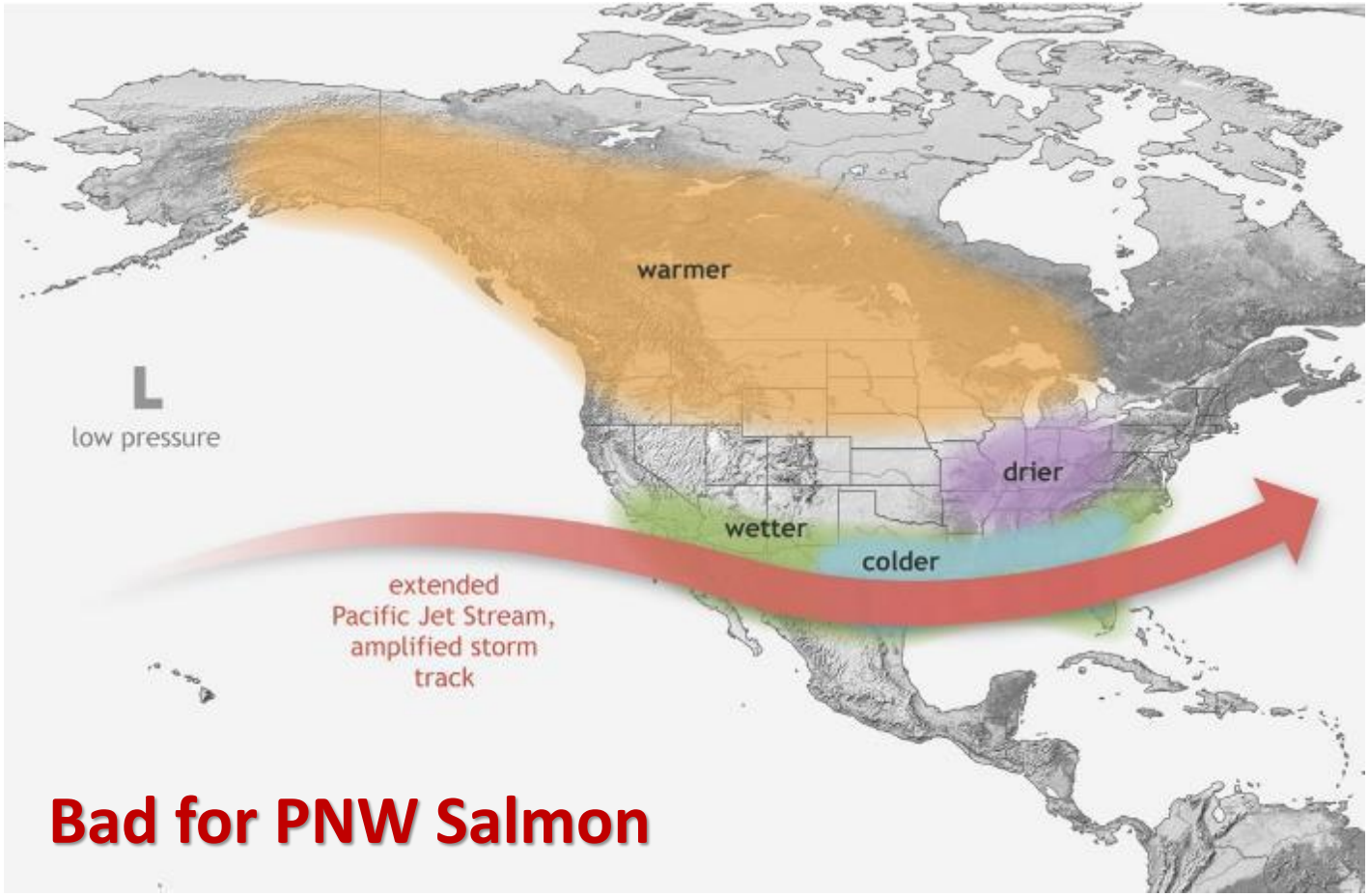
https://oceanview.pfeg.noaa.gov/projects/mhw/prev

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



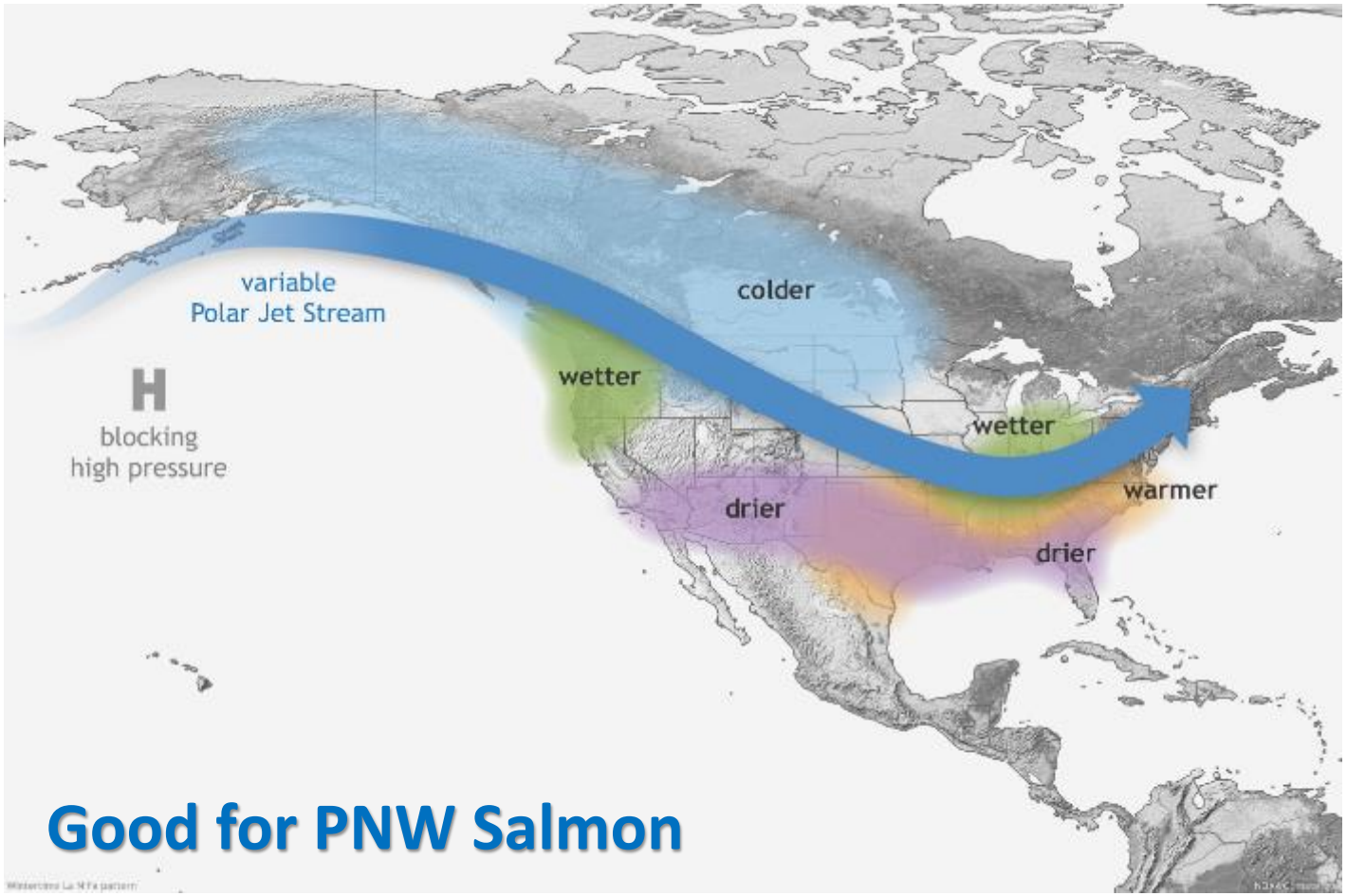
www.climate.gov/enso

Typical El Niño Pattern



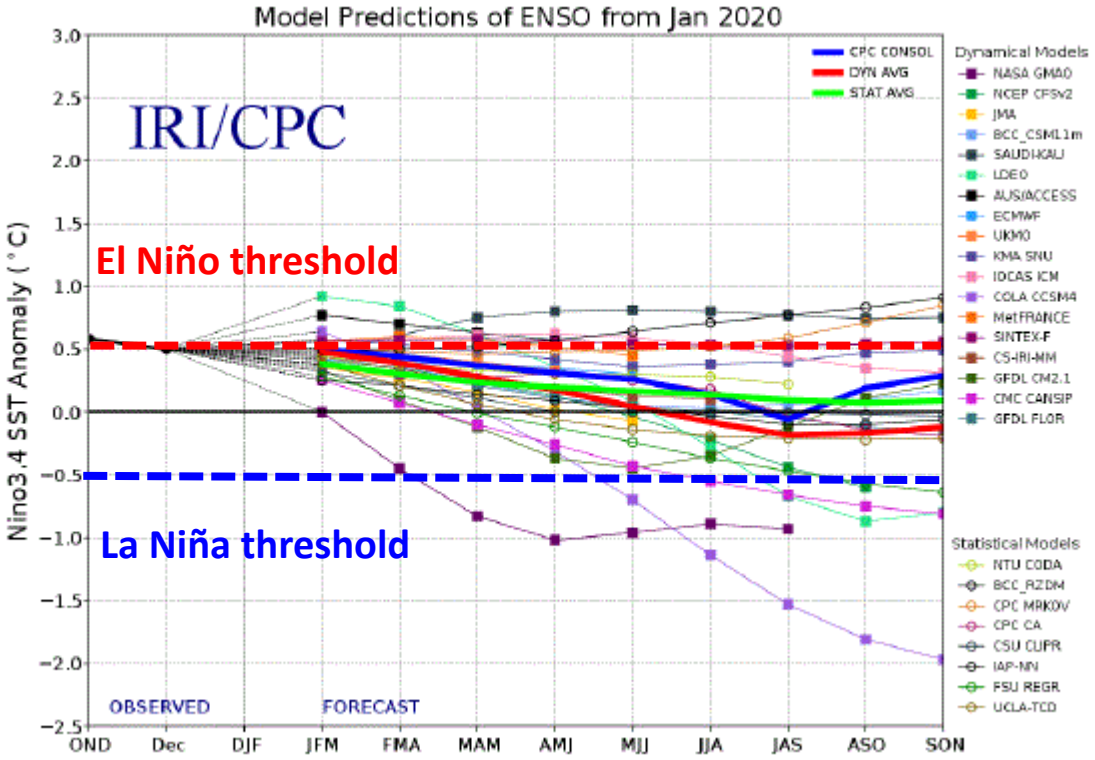
www.climate.gov

Typical La Niña Pattern



www.climate.gov

ENSO neutral through Summer 2020



www.cpc.ncep.noaa.gov/

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

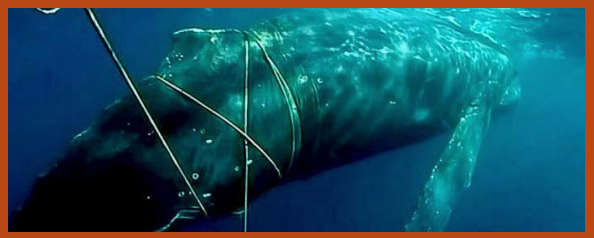
Whales feeding in estuaries

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

Biological Responses to the Warm Ocean

2018

Lots of juvenile crab

Record breaking opah caught off WA

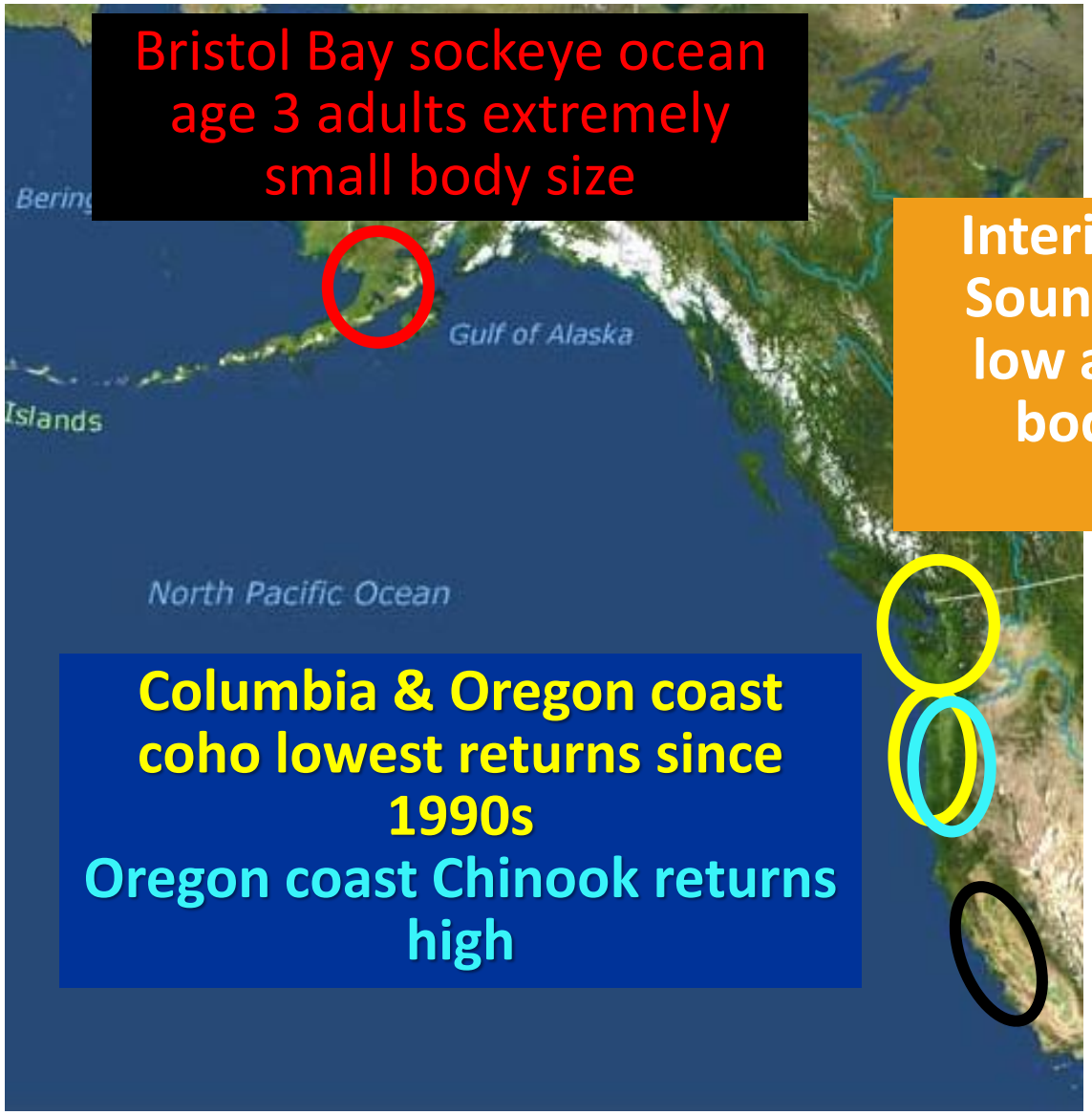
Mourning Orca mother carries dead calf for a record 17 days

2019

More tropical fish caught off WA: bluefin tuna and mahi mahi

Finescale triggerfish washes up on Long Beach, WA

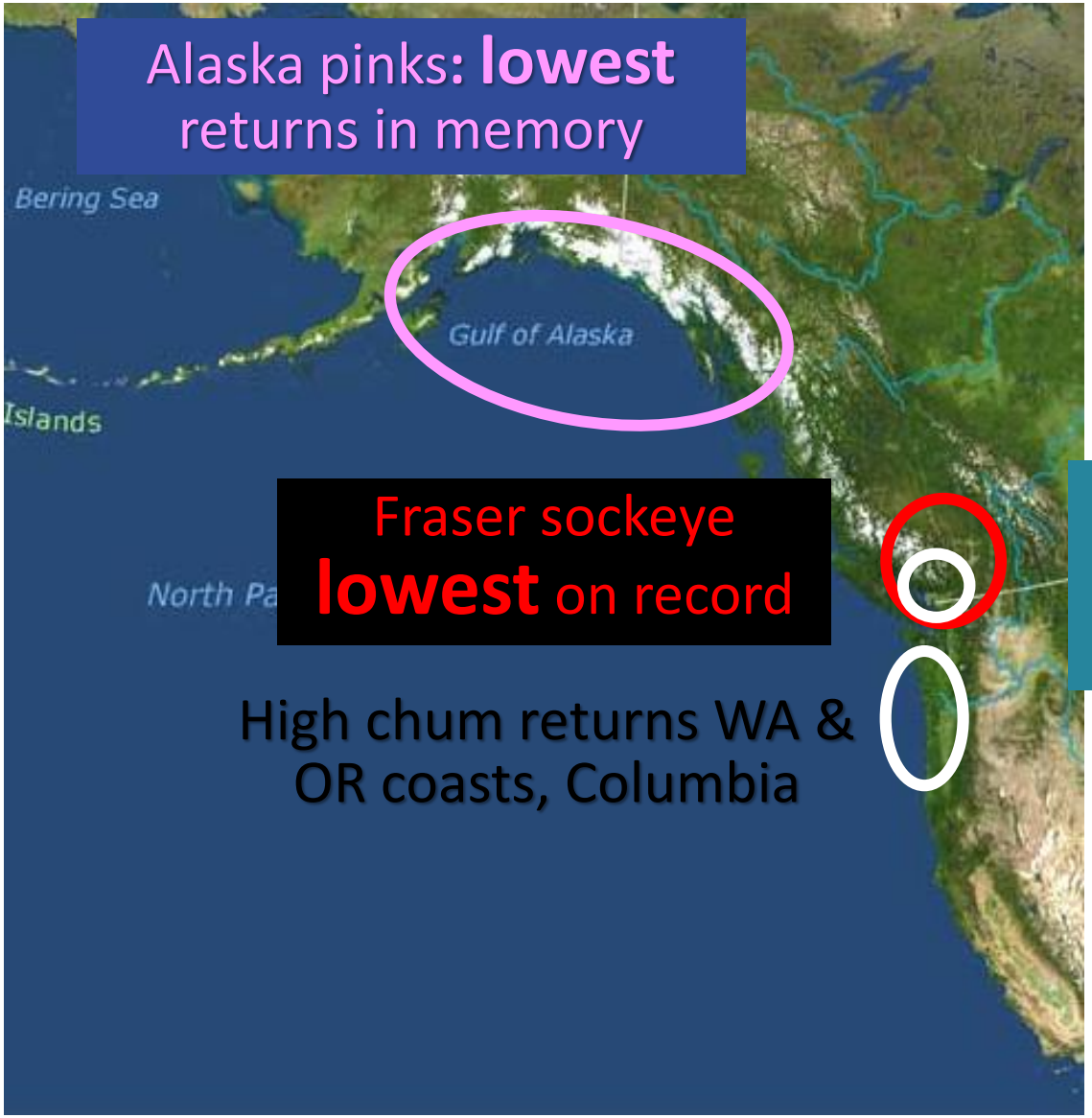
Unusual salmon observations in **2015**



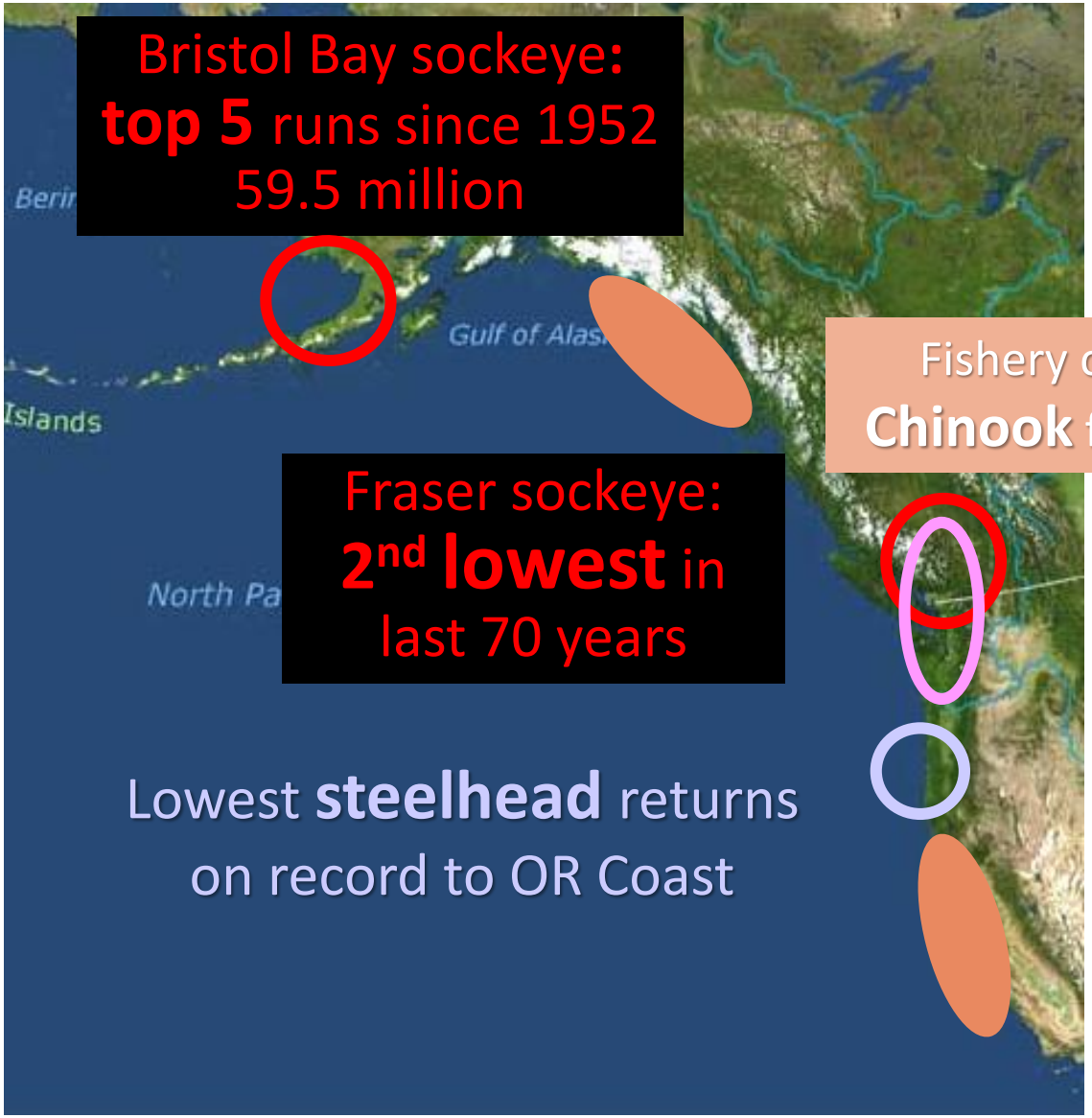
Interior Fraser & Puget Sound coho extremely low abundance, small body size, and low fecundity

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

Unusual salmon observations in **2016**



Unusual salmon observations in **2017**

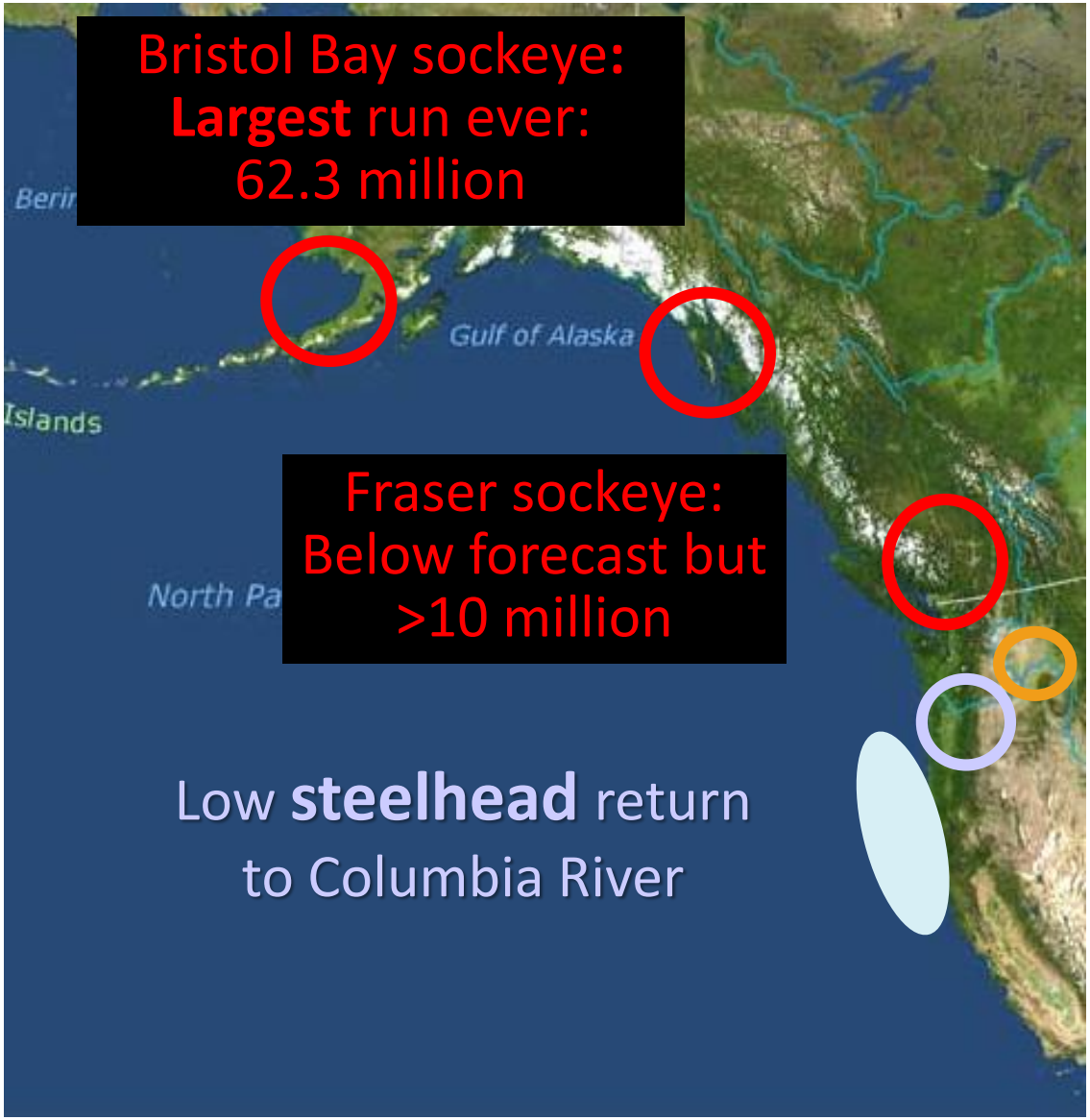


Highest **chum** harvest ever in Alaska

Fishery closures for **Chinook** from CA to BC

Fraser and PS **pinks**: lowest run in decades

Unusual salmon observations in **2018**

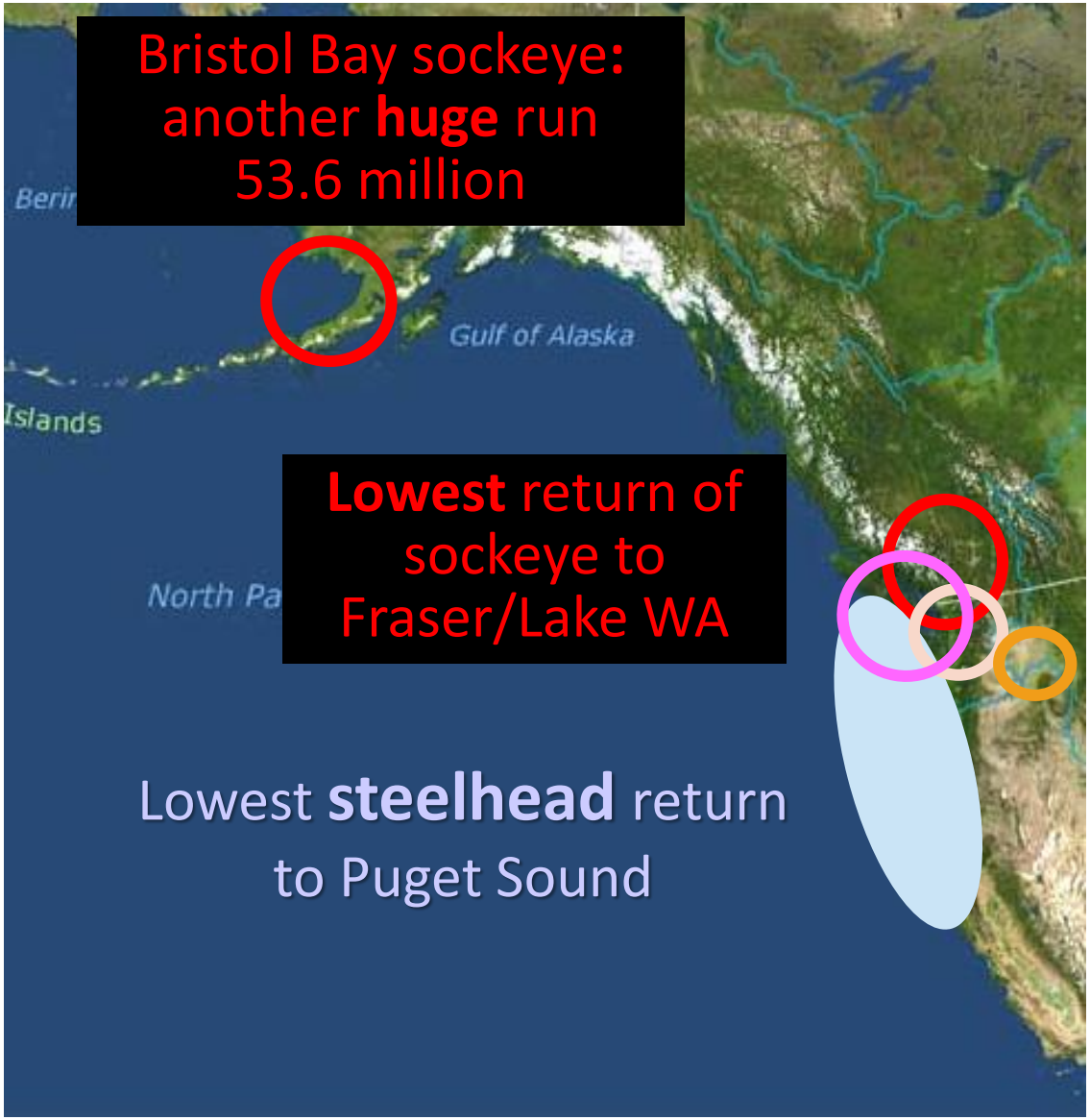


Poor sockeye, pink, and coho run in SE Alaska

High **shad** returns on Columbia River

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

Unusual salmon observations in **2019**



Poor pink and **chum returns** to PS and Fraser

High **shad** returns on Columbia River

Coho came in below forecast in OR/WA

Salmon Indicators: Bad -> Fair -> Good

		Year																				
	Ecosystem Indicators	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*
Basin-scale physical indices	PDO (Sum Dec-March)	19	6	3	13	7	21	12	17	14	9	5	1	16	4	2	8	10	22	20	18	11	15
	PDO (Sum May-Sept)	10	4	6	5	11	17	16	18	12	14	2	9	7	3	1	8	20	22	21	15	13	19
	ONI (Average Jan-June)	21	1	1	7	14	16	15	17	9	12	3	11	18	4	6	8	10	19	22	13	5	20
Regional physical indices	SST NDBC buoys (°C; May-Sept)	17	6	8	4	5	11	22	12	2	14	1	10	3	7	9	16	20	19	18	13	15	21
	Upper 20 m T (°C; Nov-Mar)	21	11	8	10	6	15	16	13	12	5	1	9	18	4	3	7	2	22	20	19	14	17
	Upper 20 m T (°C; May-Sept)	16	11	13	4	1	3	22	19	8	10	2	5	17	7	6	18	20	9	14	12	15	21
	Deep temperature (°C; May-Sept)	22	6	8	4	1	10	12	16	11	5	2	7	14	9	3	15	21	19	13	18	20	17
	Deep salinity (May-Sept)	21	3	11	4	5	18	19	12	7	1	2	16	20	15	14	13	22	17	9	8	6	10
Regional biological indices	Copepod richness anom. (no. species; May-Sept)	20	2	1	7	6	15	14	19	16	10	8	9	18	4	5	3	11	21	22	17	13	12
	N. copepod biomass anom. (mg C m^{-3}; May-Sept)	20	15	11	12	4	17	14	21	16	13	7	10	9	1	3	5	6	18	22	19	8	2
	S. copepod biomass anom. (mg C m^{-3}; May-Sept)	22	2	5	4	3	15	16	21	14	10	1	7	17	9	8	6	11	19	20	18	13	12
	Biological transition (day of year)	19	11	6	7	8	15	12	20	14	3	1	2	17	4	9	5	10	21	21	18	13	15
	Nearshore Ichthyoplankton (mg C 1,000 m^{-3}; Jan-Mar)	17	3	11	6	1	21	22	15	8	17	3	13	2	7	5	10	19	14	15	12	9	20
	Nearshore & offshore Ichthyoplankton community index (PCO axis 1 scores; Jan-Mar)	11	6	5	9	8	13	16	20	1	14	3	12	15	4	2	7	10	18	21	22	17	19
	Chinook salmon juvenile catches (no. km^{-1}; June)	20	4	5	17	8	12	18	21	13	11	1	6	7	16	2	3	10	14	19	22	15	9
	Coho salmon juvenile catches (no. km^{-1}; June)	20	8	14	6	7	3	17	21	18	4	5	10	11	16	19	1	13	9	15	22	2	12
	Mean of ranks	18.5	6.2	7.3	7.4	5.9	13.9	16.4	17.6	10.9	9.5	2.9	8.6	13.1	7.1	6.1	8.3	13.4	17.7	18.3	16.6	11.8	15.1
	Rank of the mean rank	22	4	6	7	2	15	17	19	11	10	1	9	13	5	3	8	14	20	21	18	12	16

2019 = Ranked 16th


Questions?

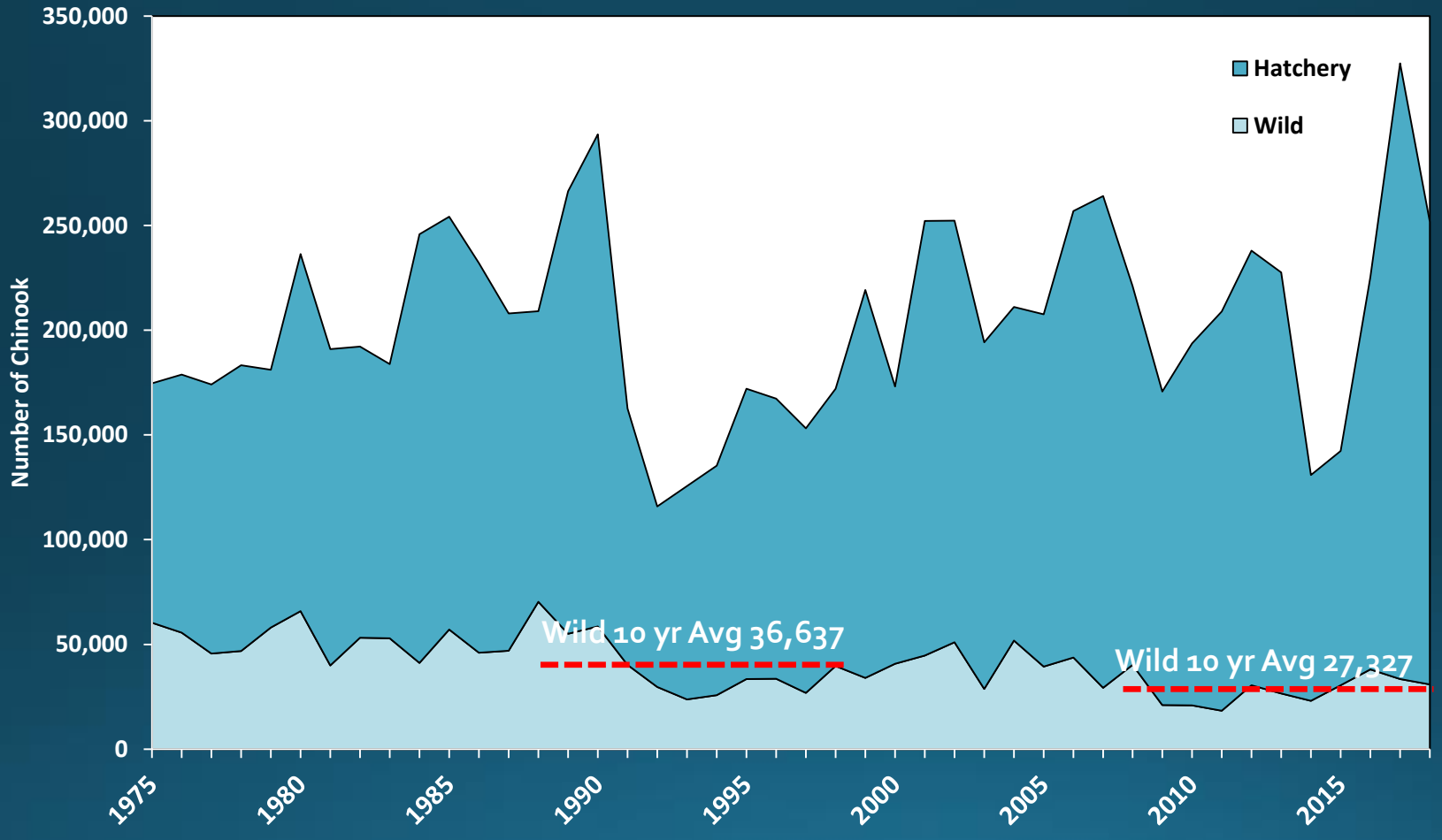
Washington Department of FISH and WILDLIFE

WA Coast and Puget Sound 2019 Returns and 2020 Forecasts

Mickey Agha, PhD

Chinook Salmon

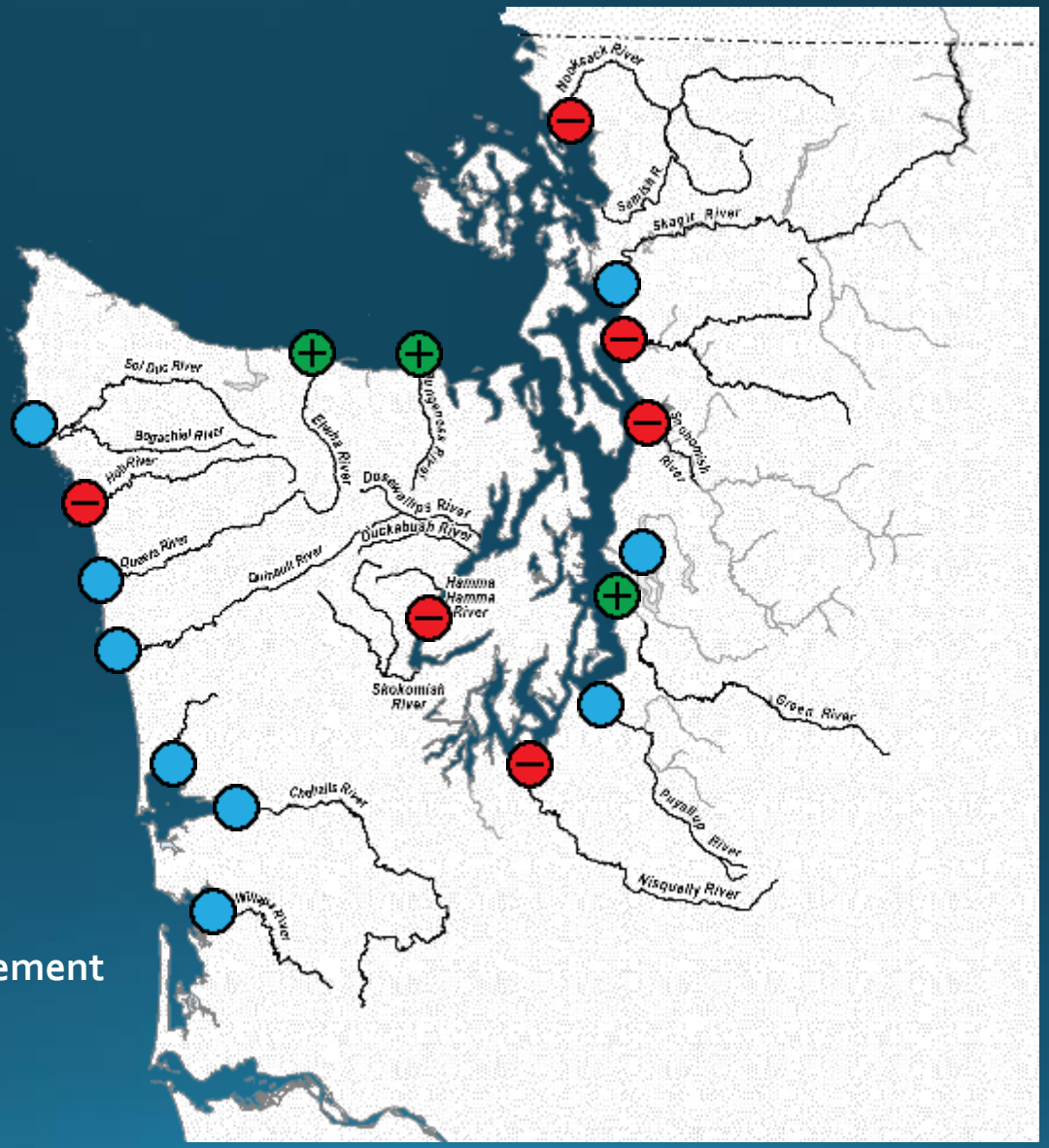
Chinook Historical Runsize – Puget Sound



Wild Chinook ⬇~25% since 10yr avg. prior to listing under ESA in 1999

2019 Wild Fall Chinook Returns

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

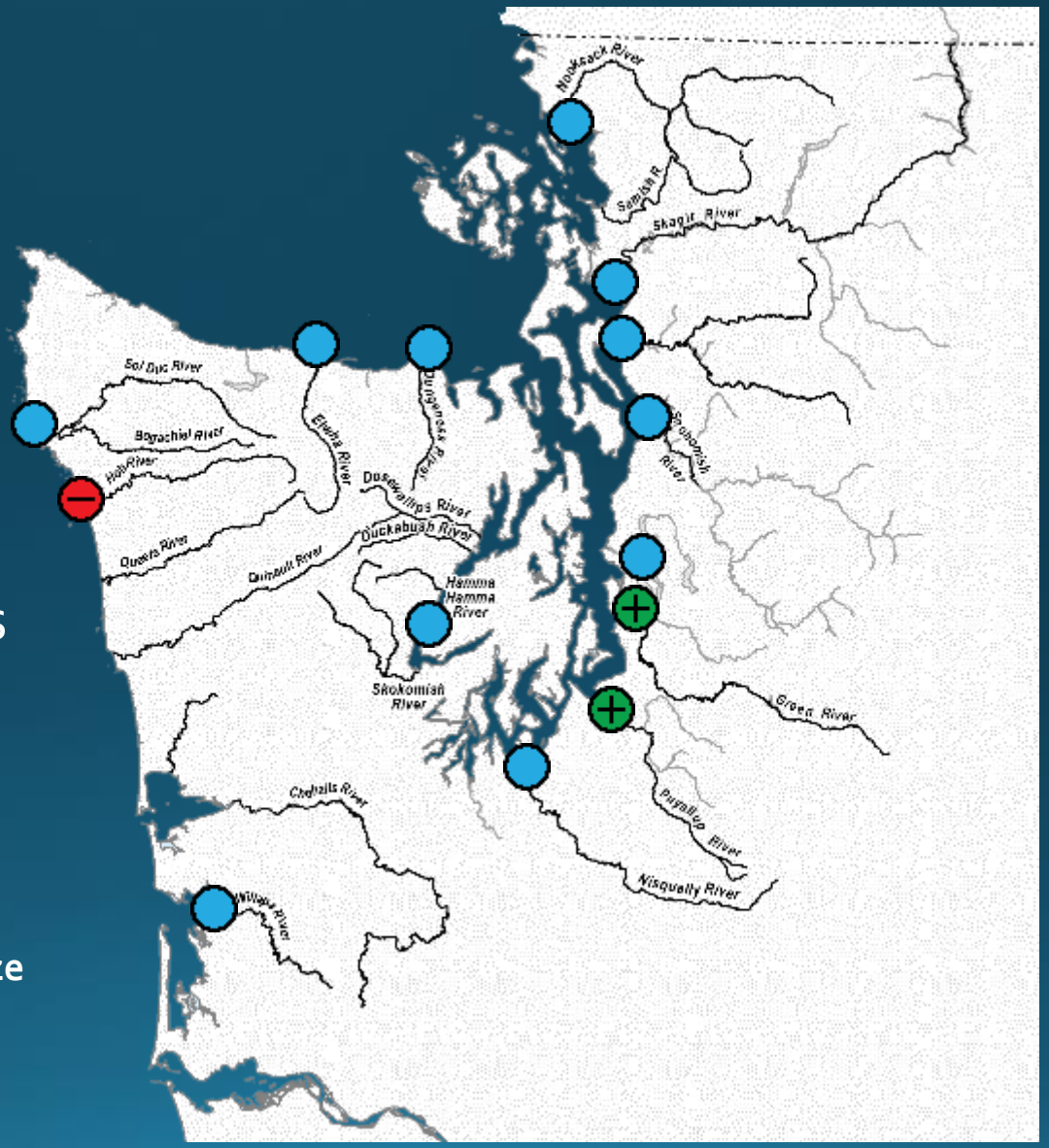


Relative to Recent 10yr Avg. Escapement

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

2020 Wild Fall Chinook Forecasts

- Forecasts range from Poor to Good for both Puget Sound and Coast
- Puget Sound wild forecasts ⬇ 6% relative to 10 year avg

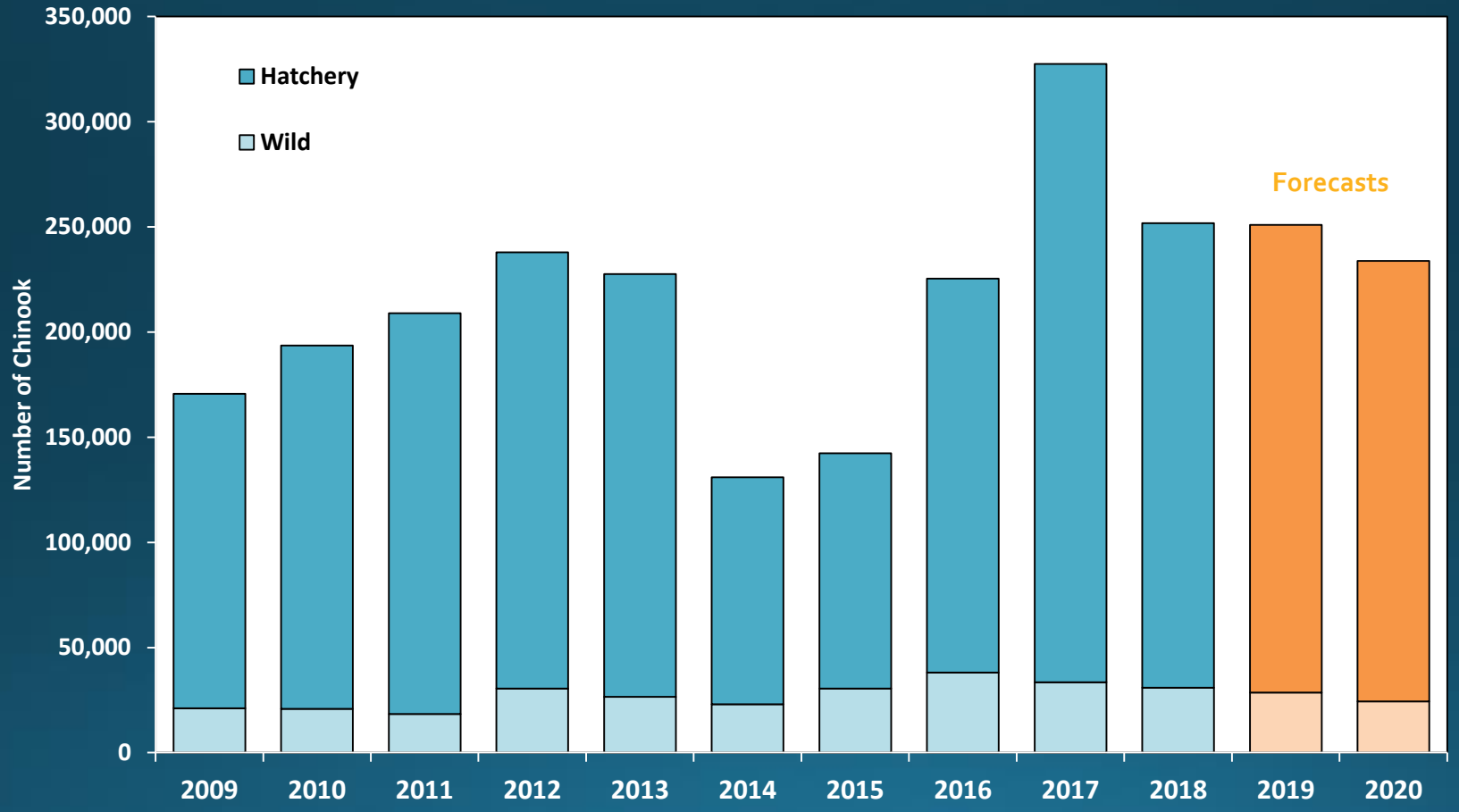


Relative to Recent 10yr Avg. Runsize

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

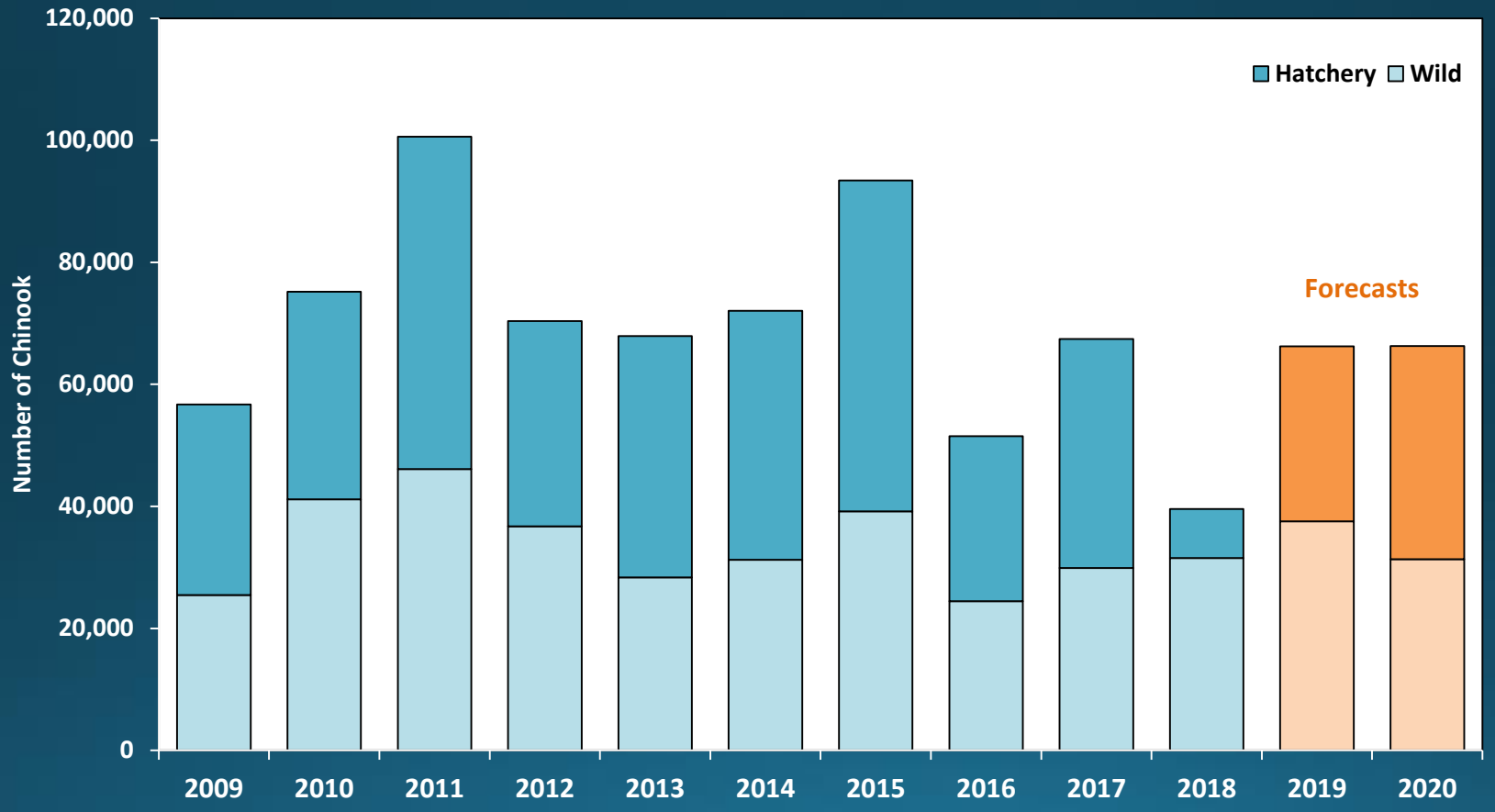
P. Sound Hatchery Chinook Forecasts

Puget Sound hatchery Chinook forecast ⬆ 14% from recent 10 year avg
(⬇ 6% from 2019 forecast)



Coastal Hatchery Chinook Forecasts

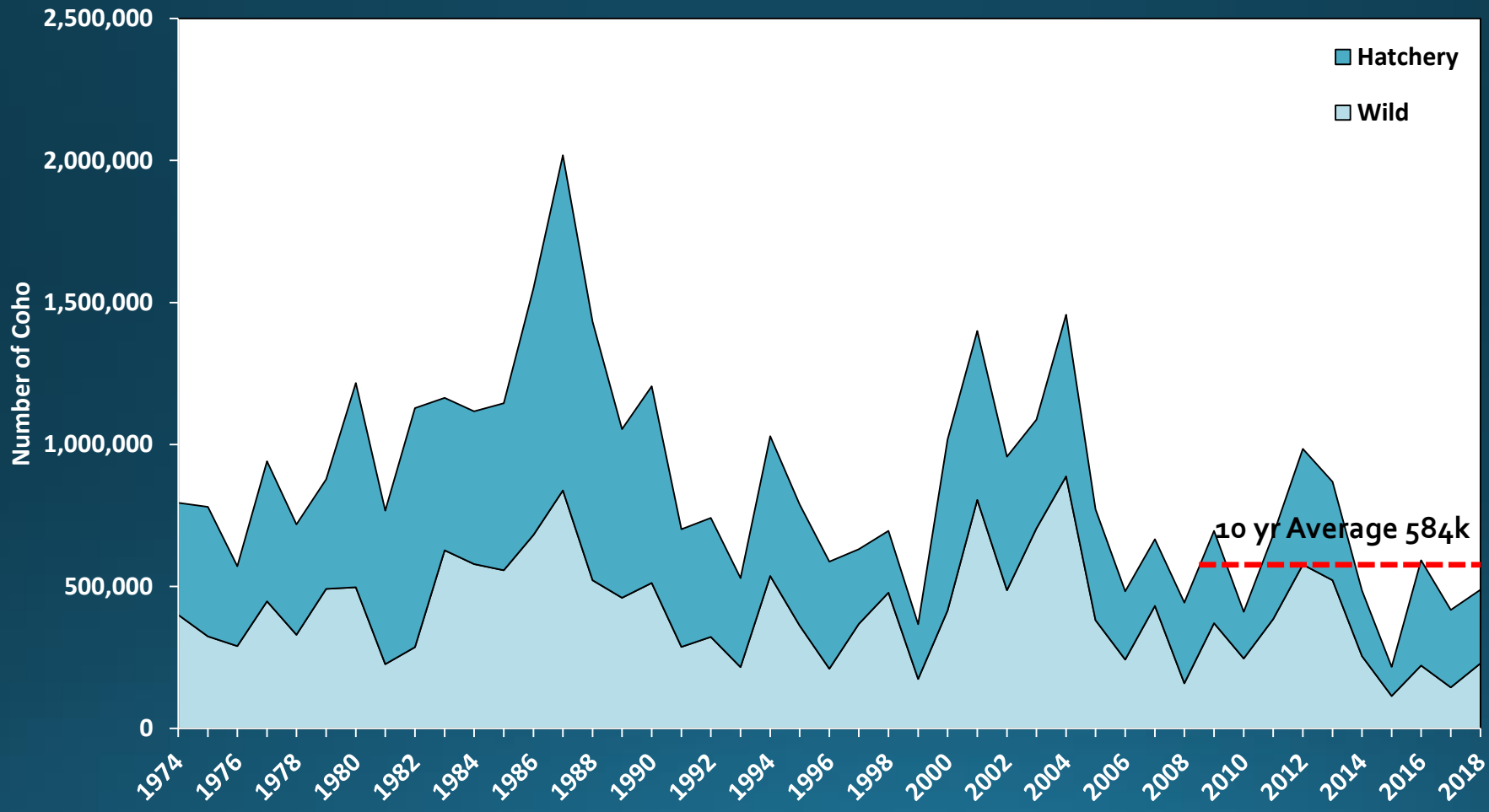
Coastal Hatchery Chinook forecast ⬇ 5% from recent 10 yr avg.
(⬆ <1% from 2019 Forecast)



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

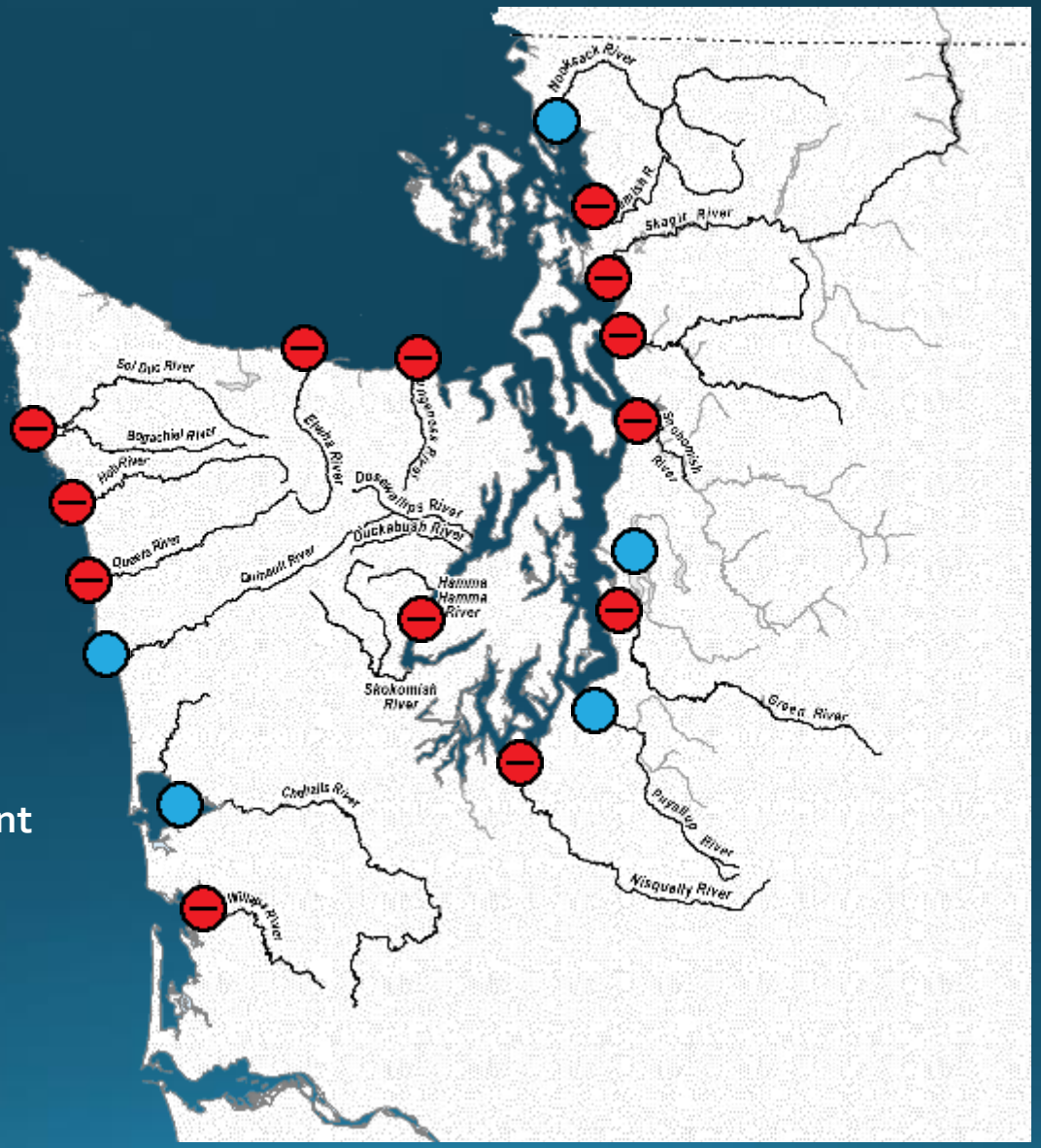
Coho

Coho Historical Runsize – Puget Sound



2019 Wild Coho Returns

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



Relative to Recent 10yr Avg. Escapement

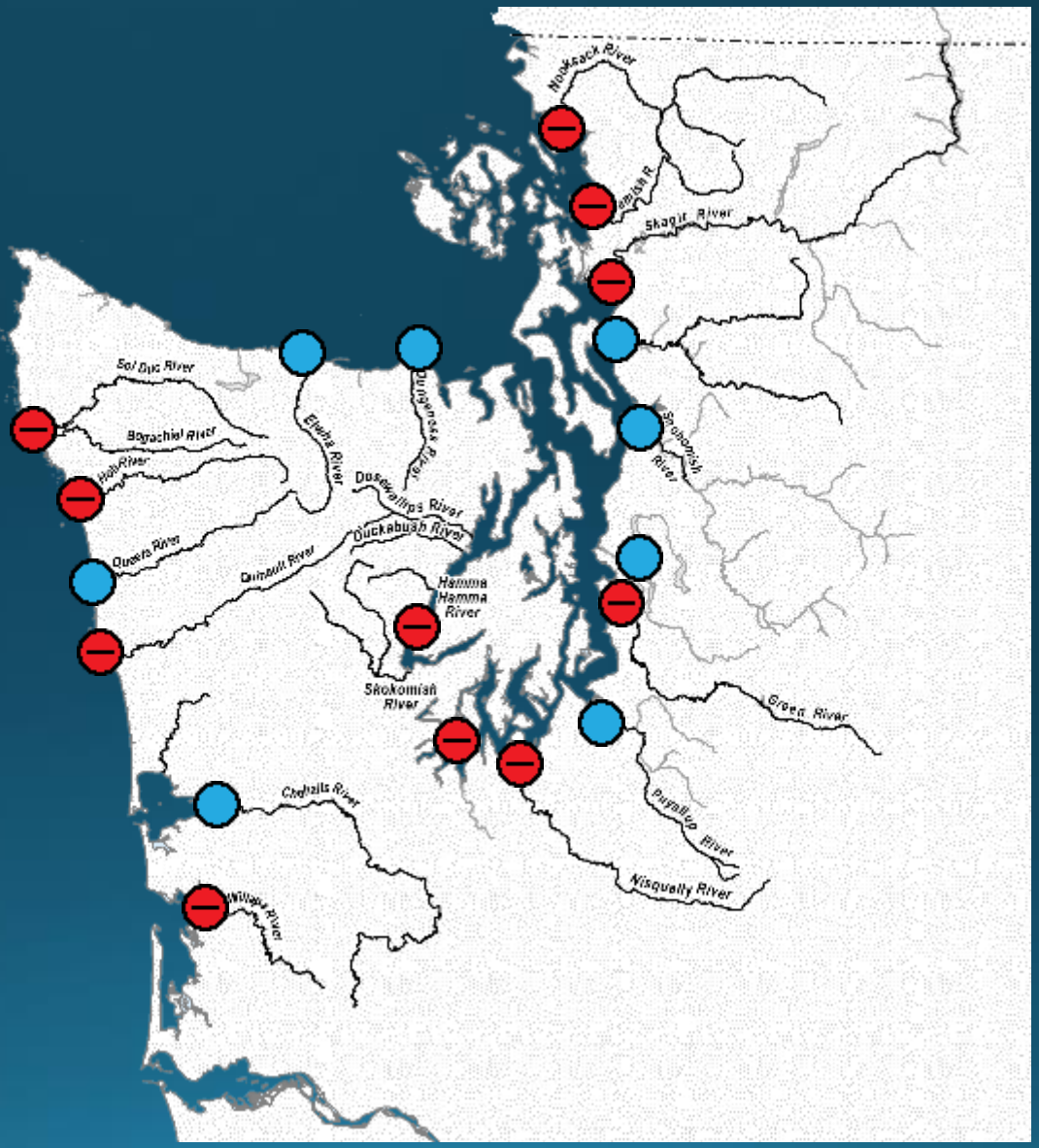
- Good > 125%
- Neutral 75-125%
- Poor < 75%

2020 Wild Coho Forecasts

- Forecasts range from Poor to Neutral across Puget Sound; ⬇ 48%
- Poor to Neutral on coast; ⬇ 25%

Relative to Recent 10yr Avg. Runsize

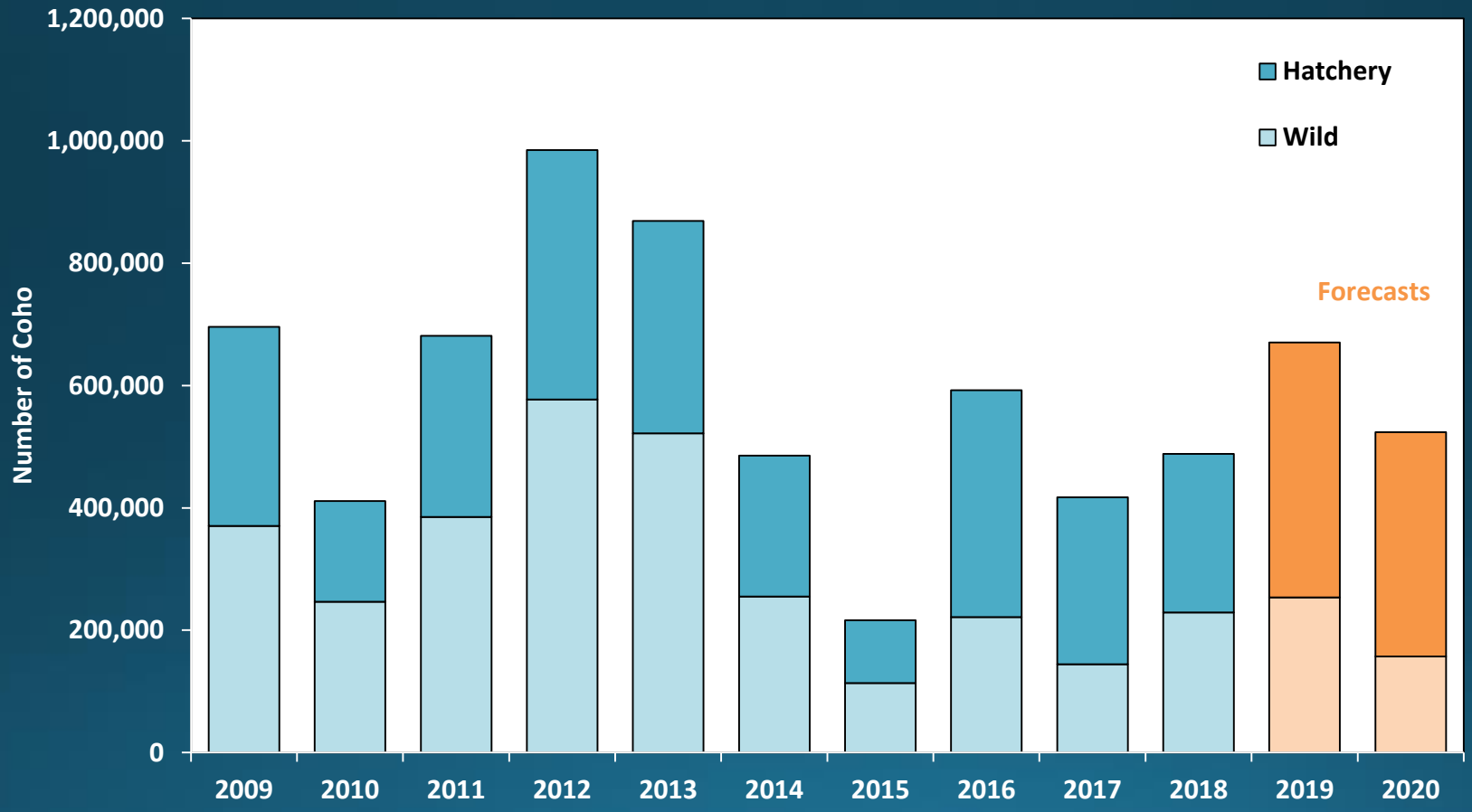
- Good > 125%
- Neutral 75-125%
- Poor < 75%



*Willapa Forecast under review, subject to possible change

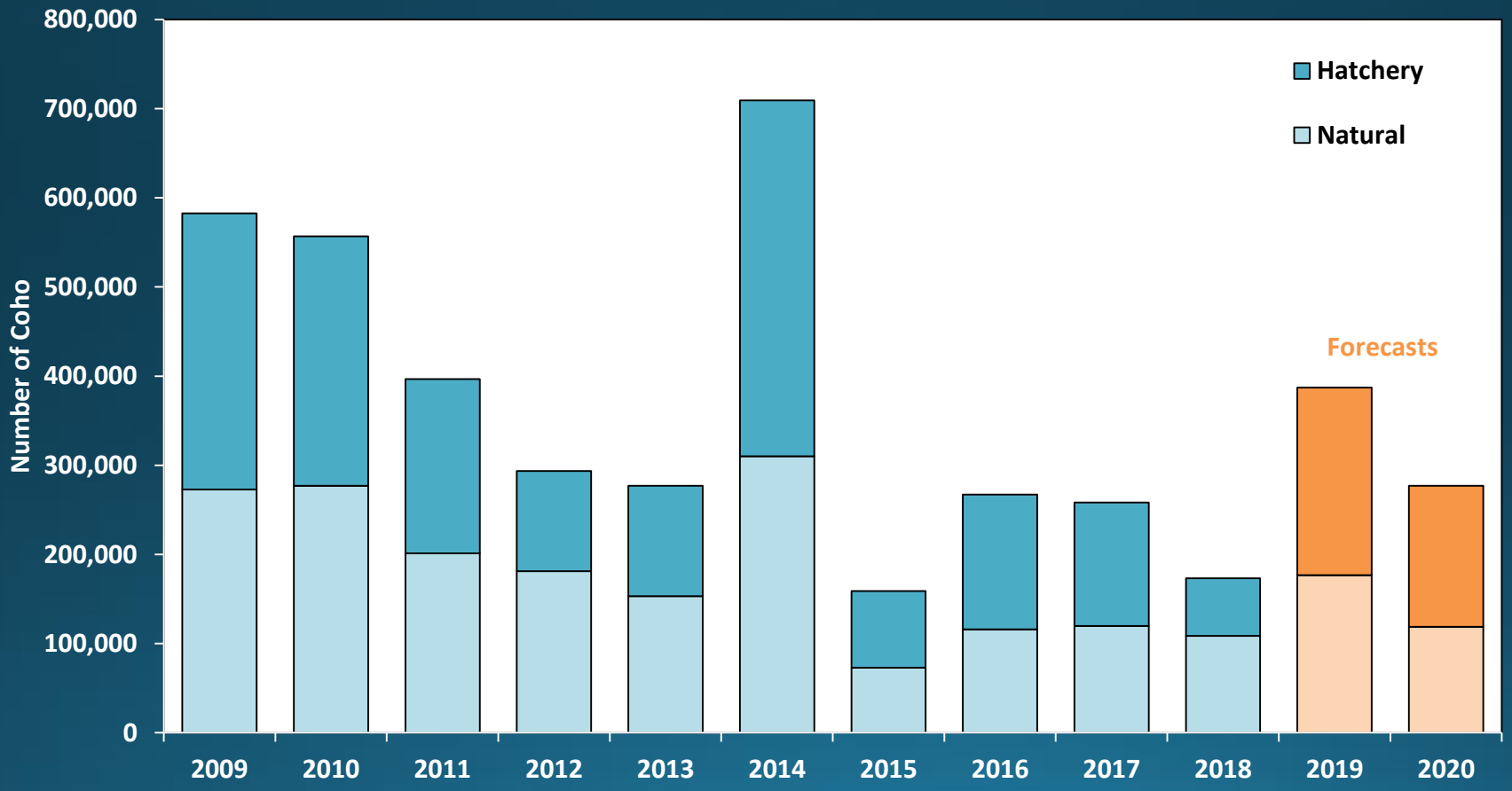
P. Sound Hatchery Coho Forecasts

Puget Sound Hatchery Coho forecast ⬆ 32% from recent 10 year avg.
(⬇ 12% from 2019 forecast)



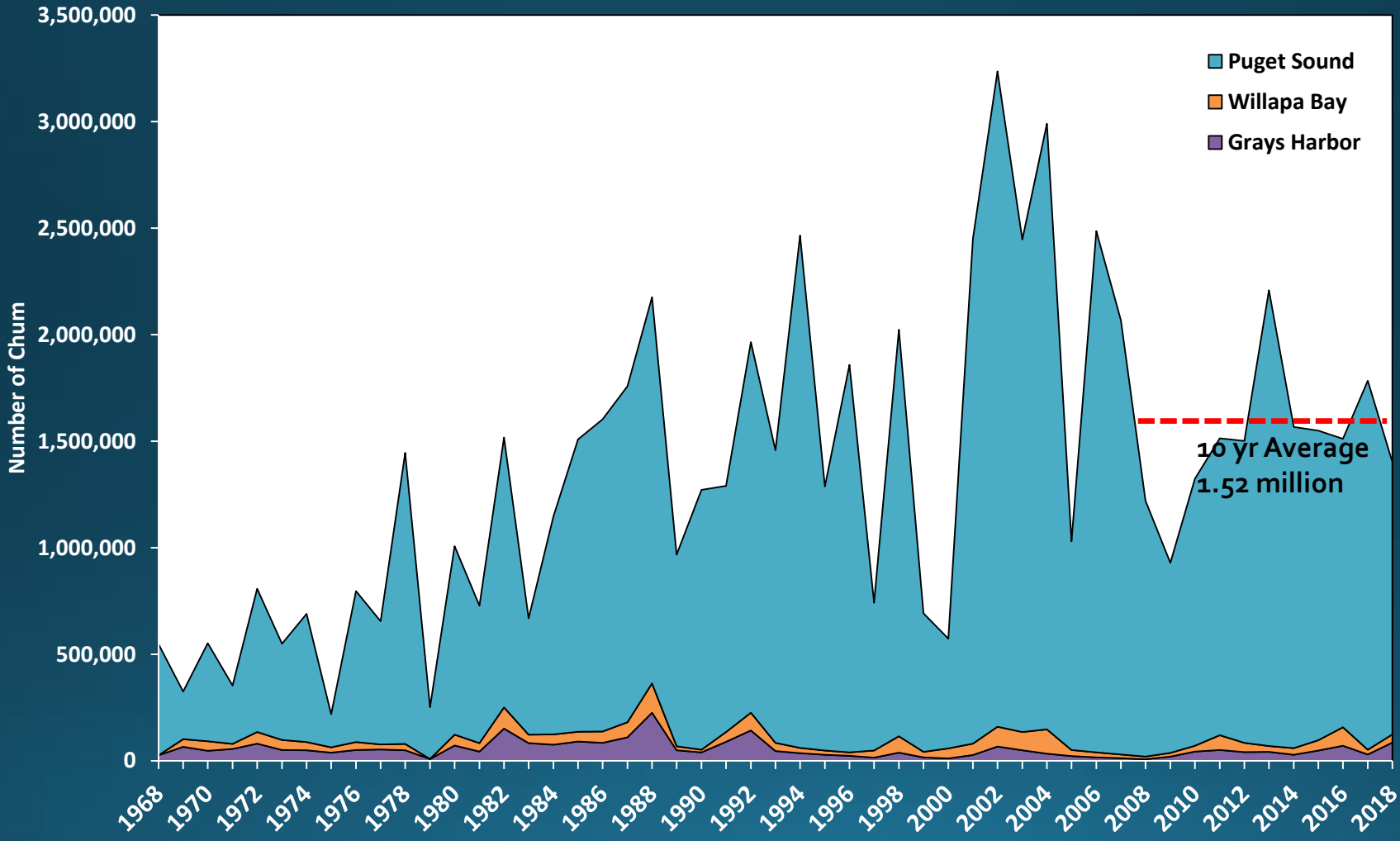
Coastal Hatchery Coho Forecasts

Coastal Hatchery Coho forecast ⬇ 15% from recent 10 year avg.
(⬇ 25% from 2019 forecast)



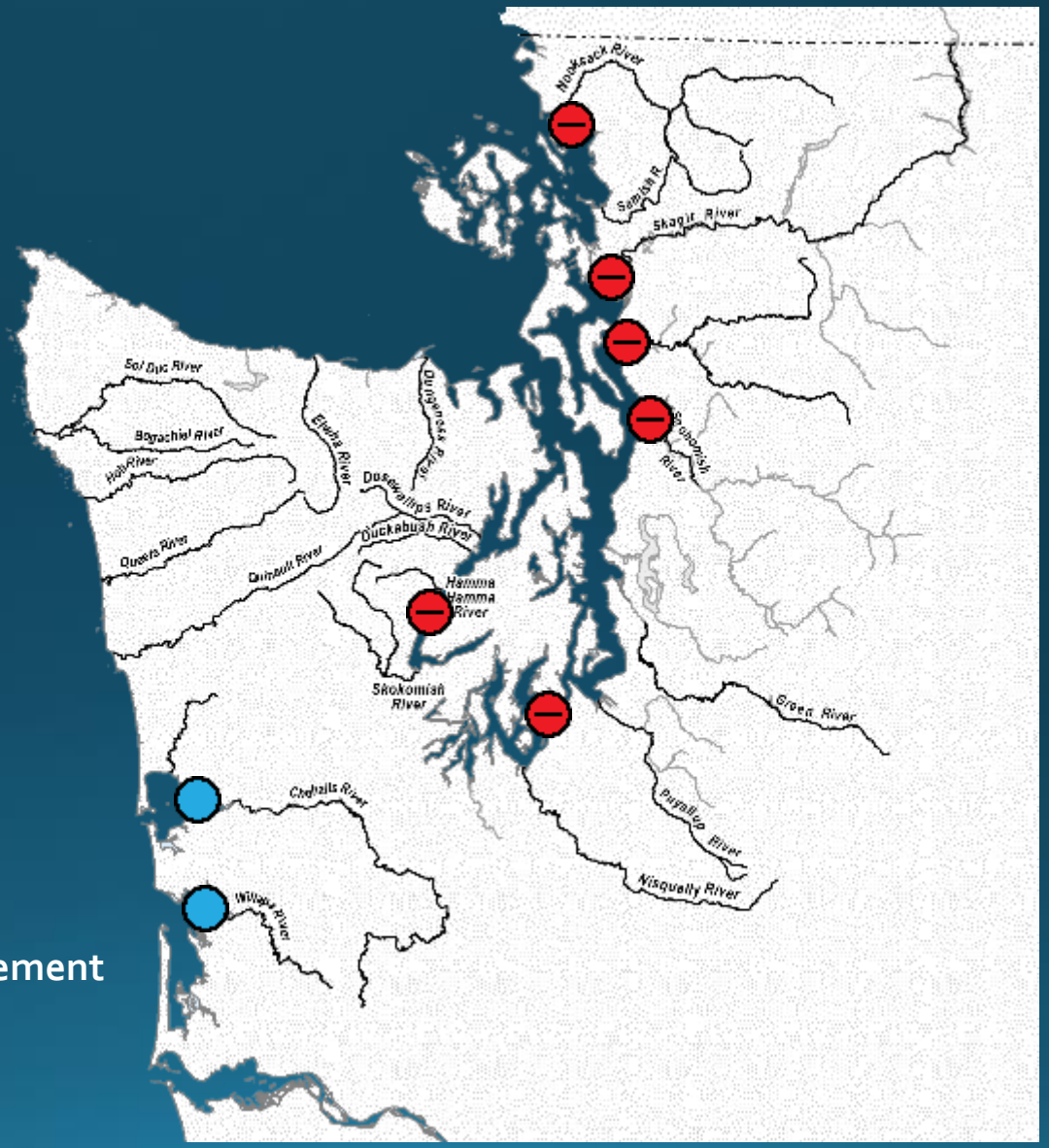
Chum

Chum Historical Runsize



2019 Fall Chum Returns

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

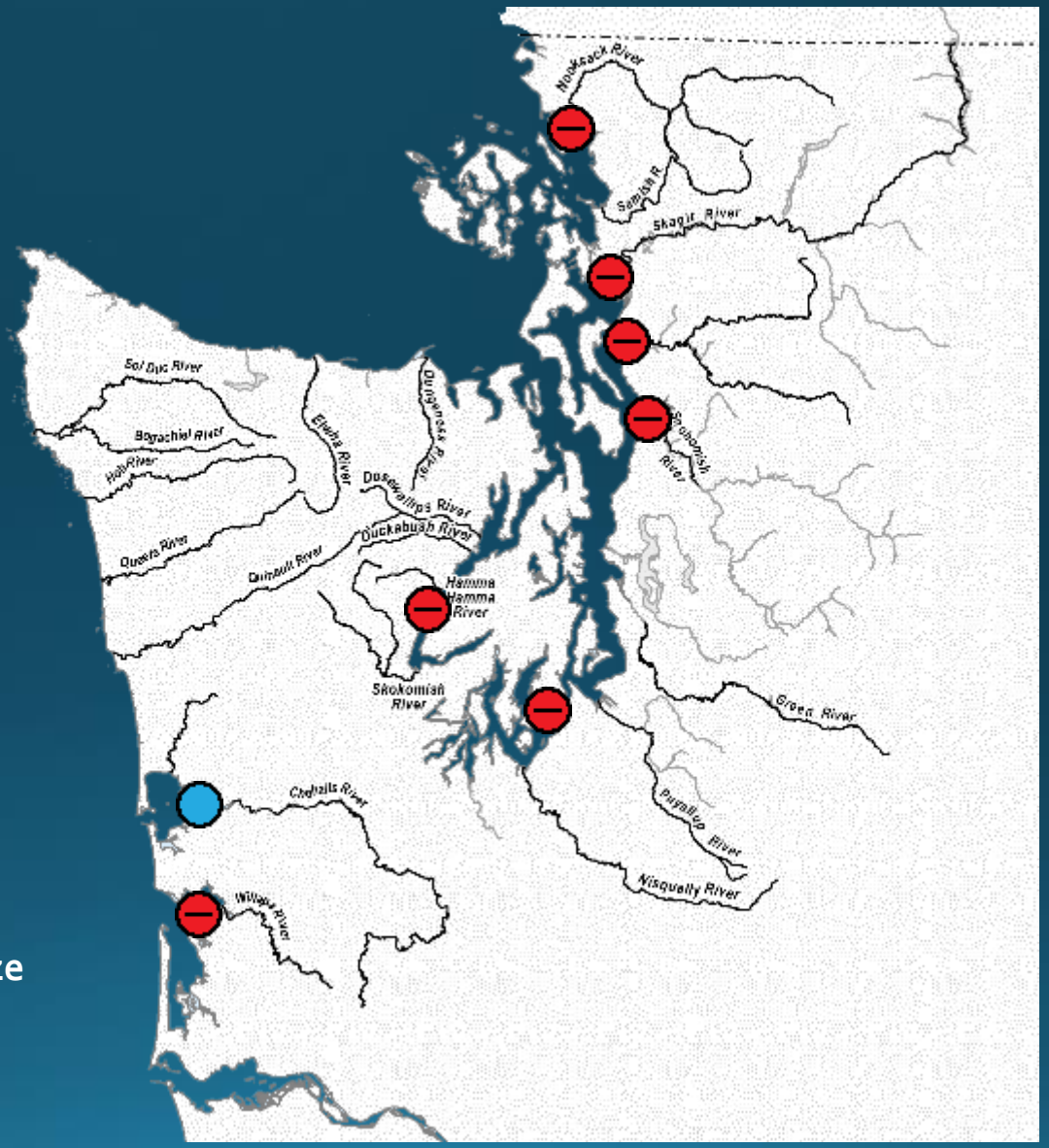


Relative to Recent 10yr Avg. Escapement

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

2020 Fall Chum Forecast

- Forecasts range from Neutral to Poor
- Hood Canal - 472k
- Central/S. Sound – 309k
- Coast – Willapa – 41k
  Grays H – 33k

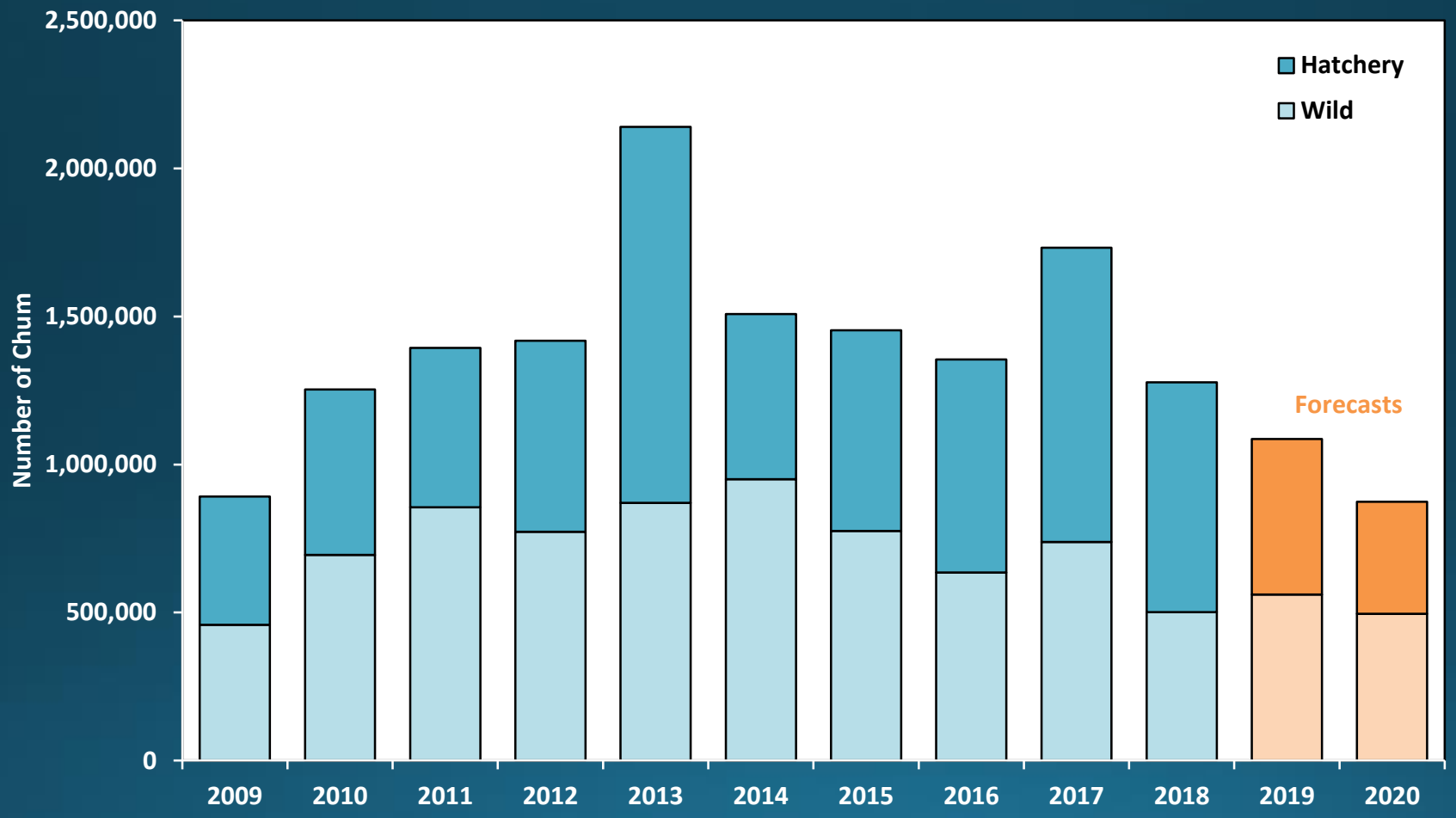


Relative to Recent 10yr Avg. Runsize

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

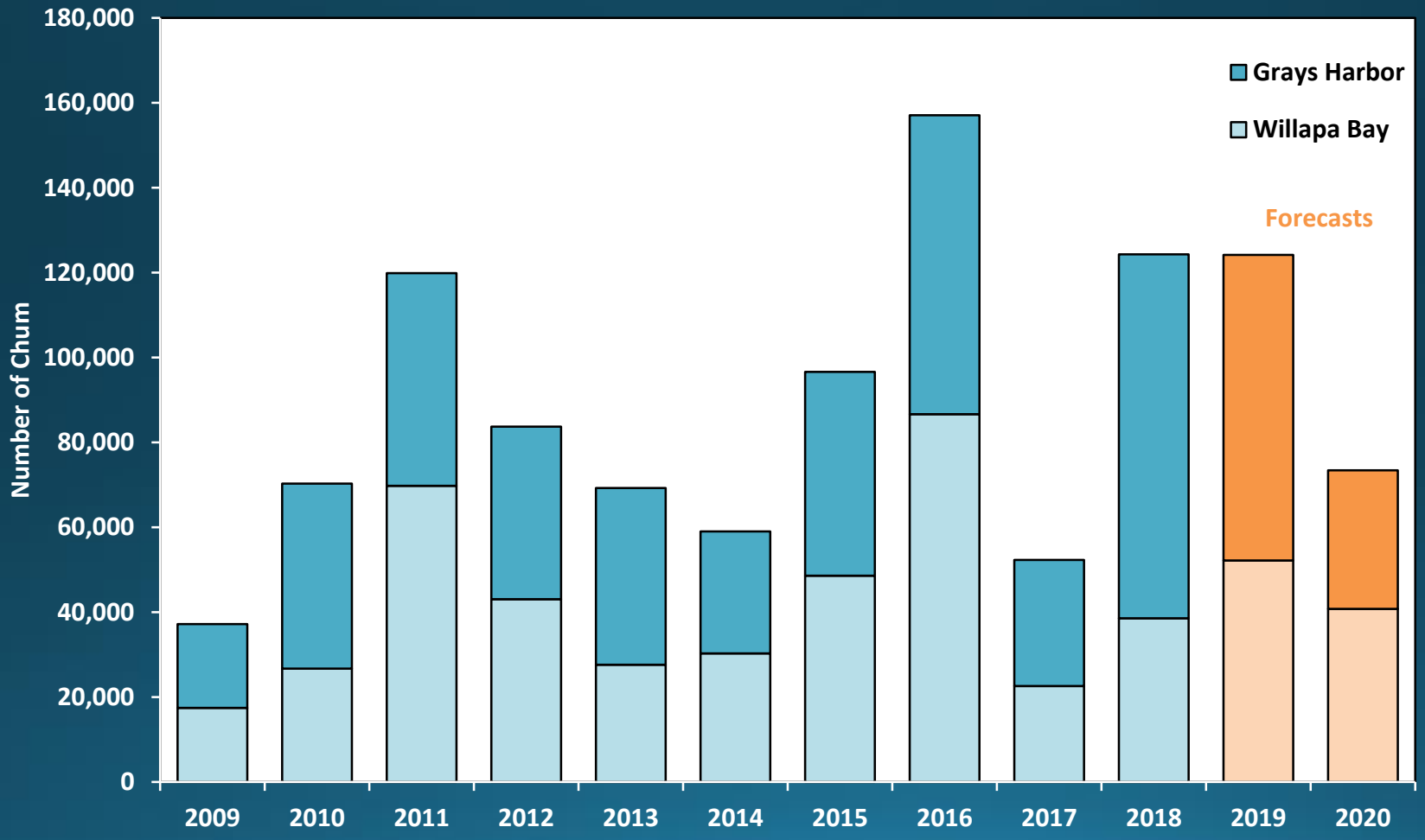
Puget Sound Chum Forecasts

Hatchery ⬇ 48% and Wild ⬇ 32% over recent 10 year avg.



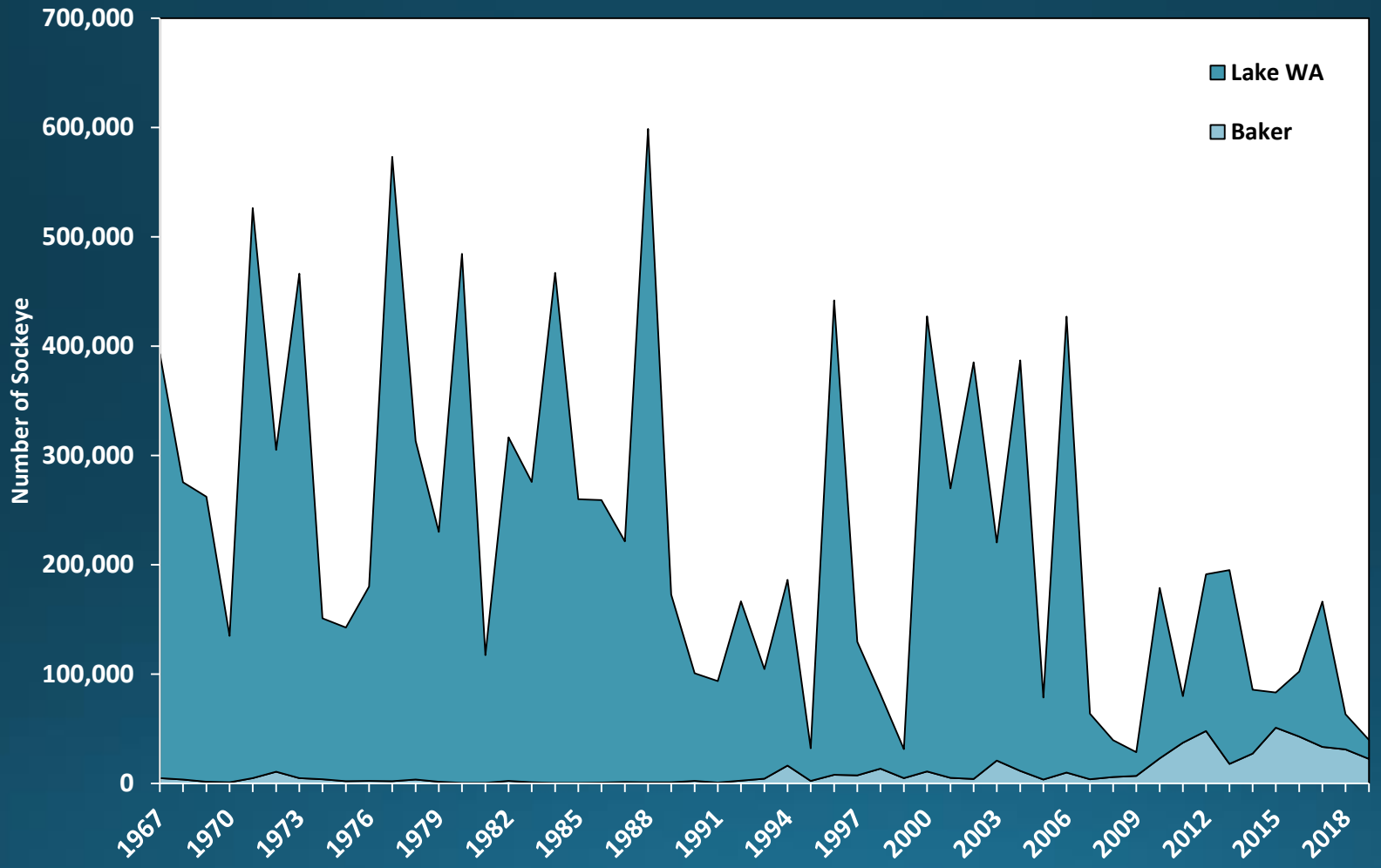
Coastal Chum Forecasts

Willapa Bay ⬆ 1% and Grays Harbor ⬇ 28% over recent 10 year avg.



Sockeye

Puget Sound Sockeye Runsize



2019 Sockeye Returns

- Returns were Poor in Puget Sound and Columbia River

Relative to Recent 10yr Avg. Escapement

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

2020 Sockeye Forecast

- Baker Lake – TBD*
- Lake WA – 20,166k
- Columbia river - 246,300k

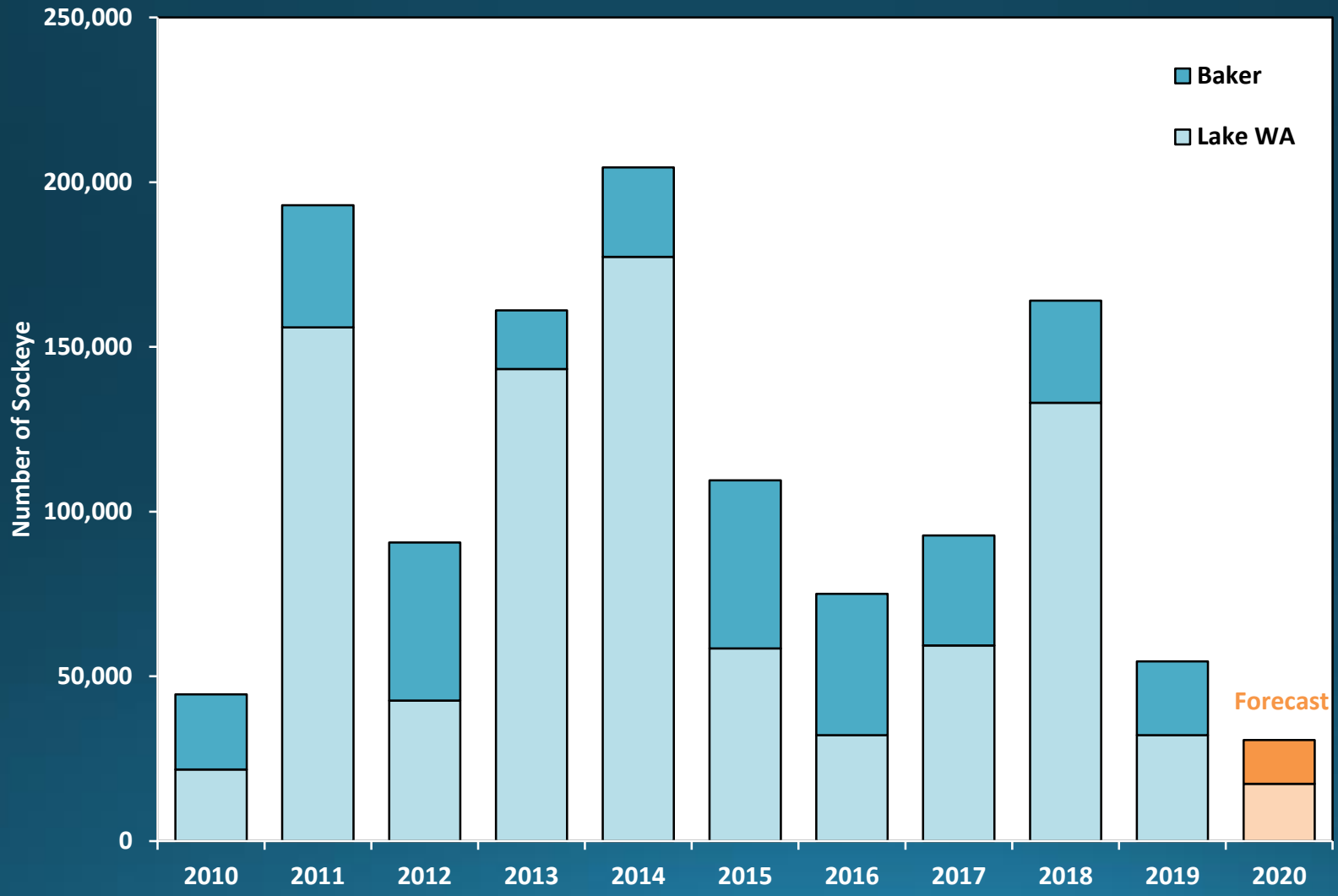
Relative to Recent 10yr Avg. Runsize

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

*Baker Lake TBD – 2020 estimate under further review, preliminary estimates are 50-60% below recent 10 year average

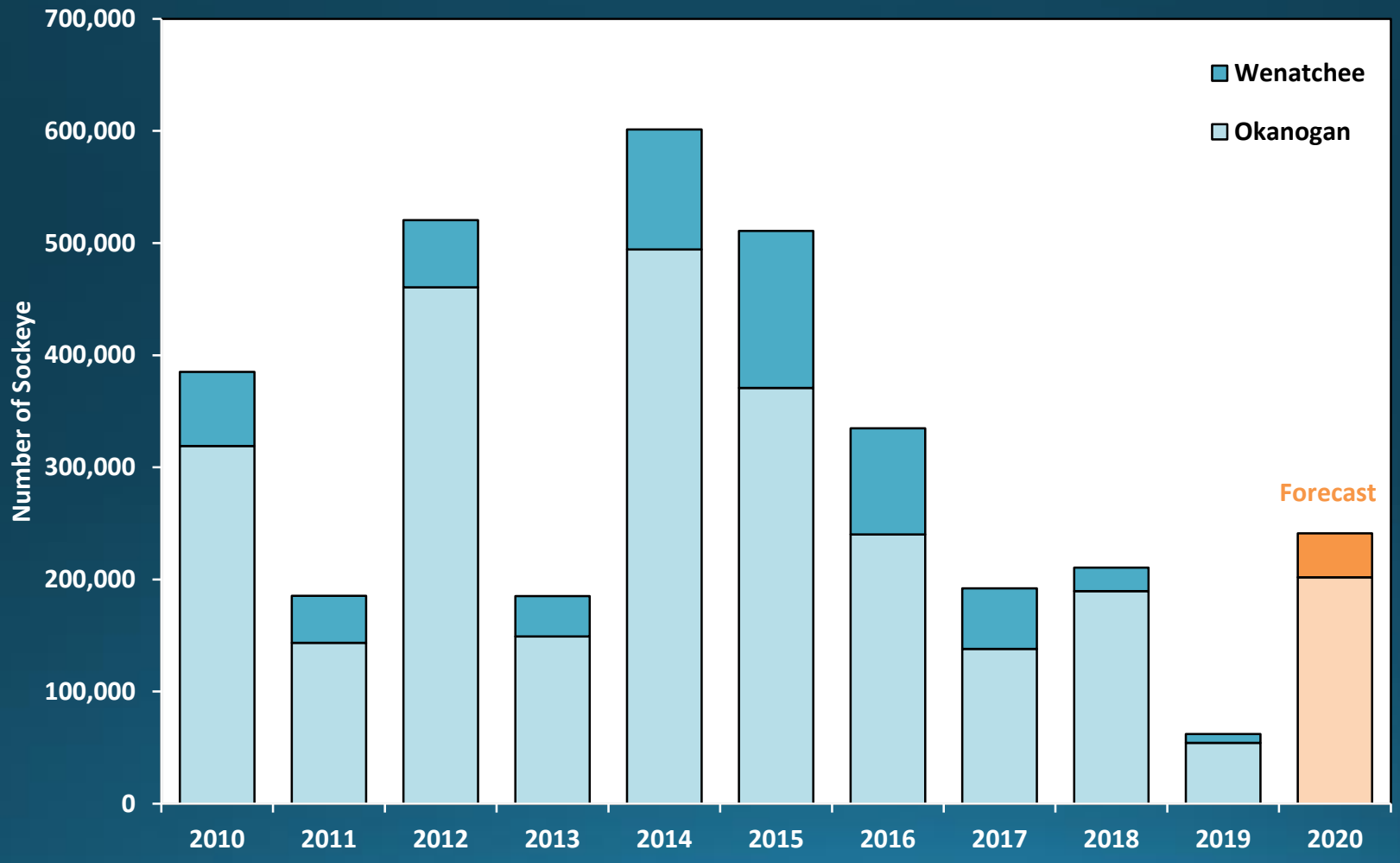
Puget Sound Sockeye Forecasts

Lake WA ⬇ 80% and Baker ⬇ 60% over recent 10 year avg.



Columbia Sockeye Forecasts

Lake Wenatchee ⬇ 37% and Okanogan ⬇ 21% over recent 10 year avg.



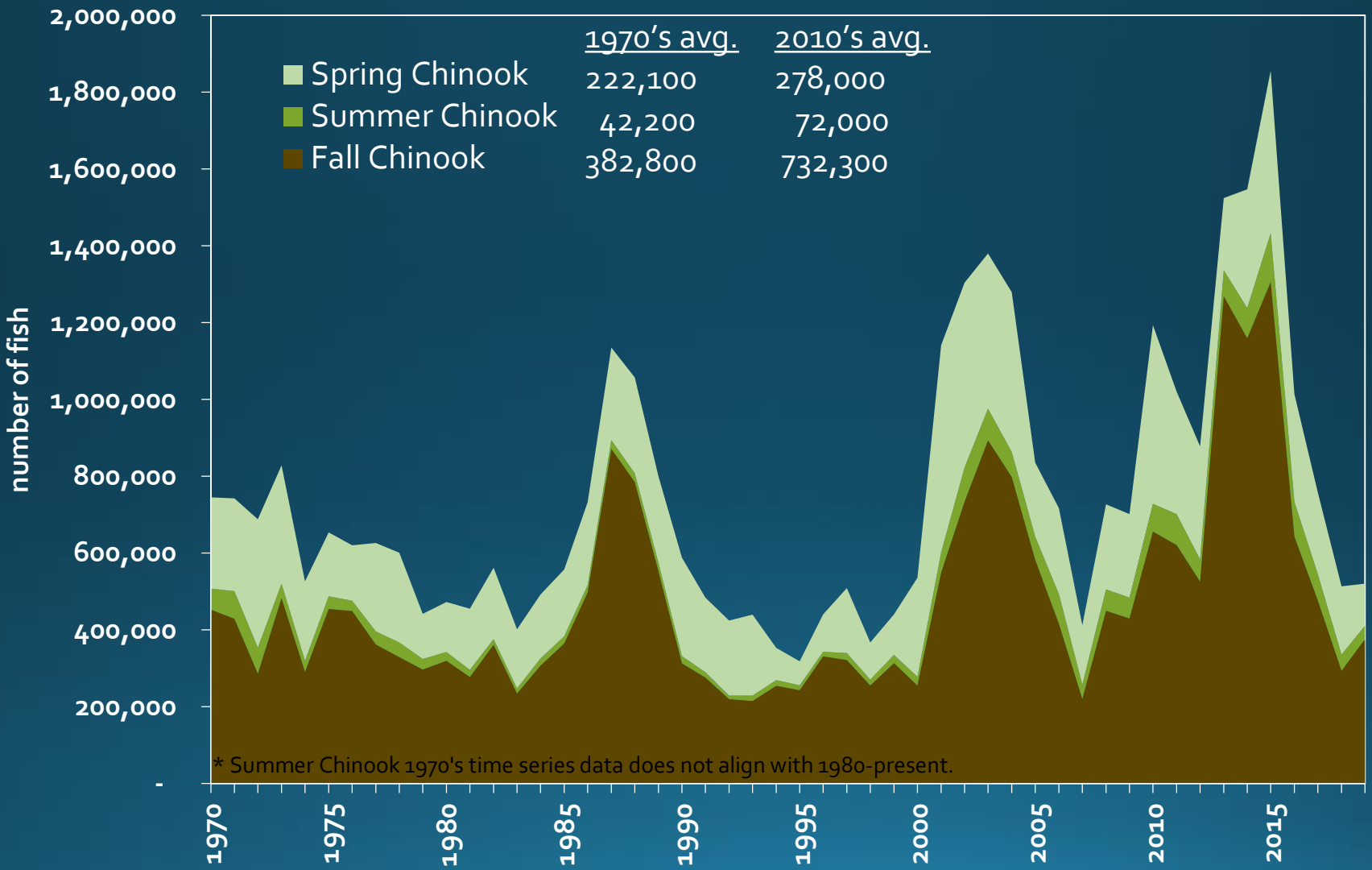
Washington Department of FISH and WILDLIFE

WA Columbia River Chinook and Coho 2019 Returns and 2020 Forecasts

Tim Sippel, PhD

Chinook Salmon

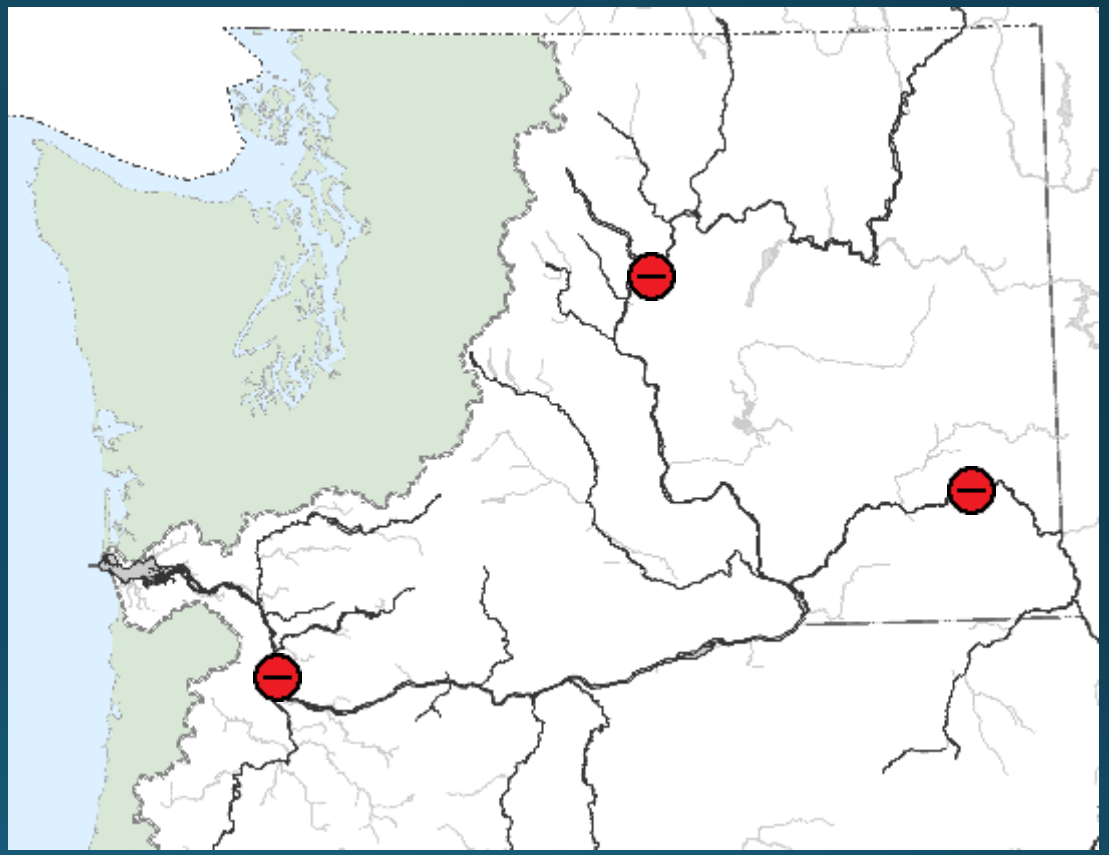
Chinook Historical Runsize – Columbia River



2019 Spring/Summer Chinook Returns

Returns

- Lower Spring – 37k (41%)
- Upriver Spring – 73k (37%)
- Summer – 35k (47%)



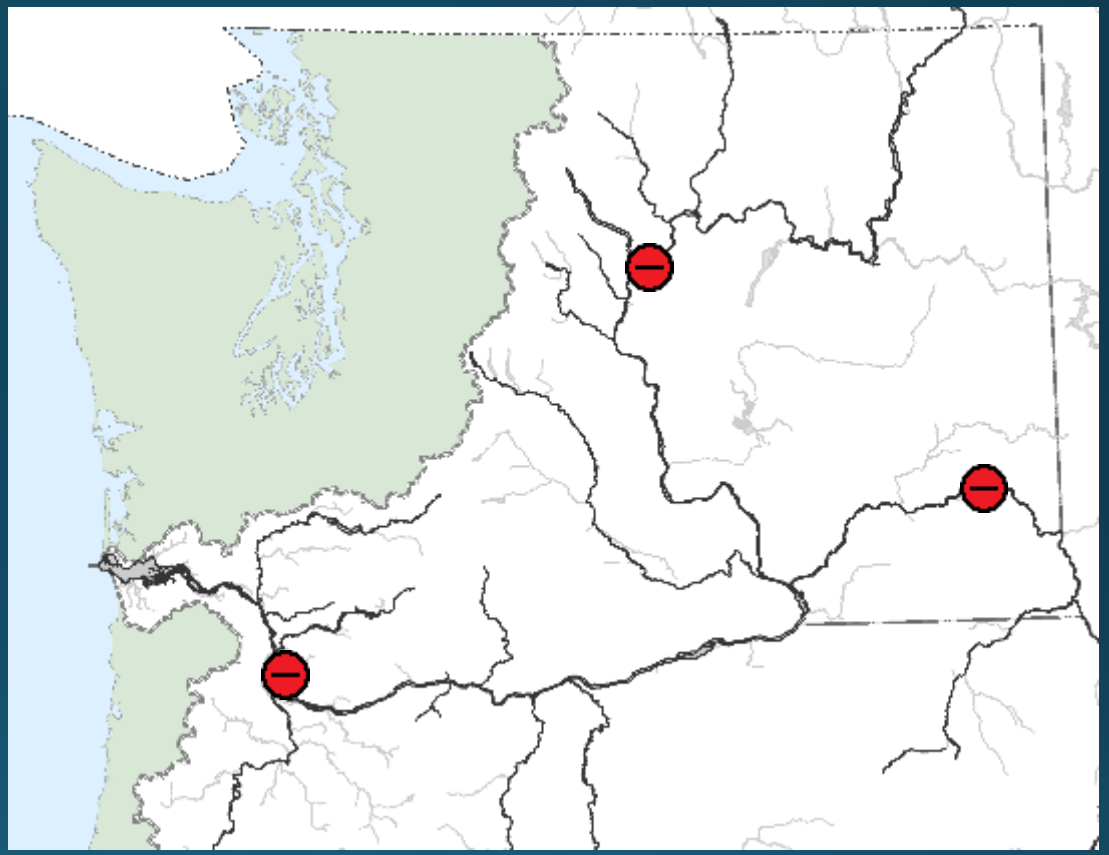
Relative to Recent 10yr Avg. Escapement

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

2020 Spring/Summer Chinook Forecasts

Forecasts in Columbia River range from

- Lower Spring – 54k (65%)
- Upriver Spring – 82k (43%)
- Summer – 38k (43%)



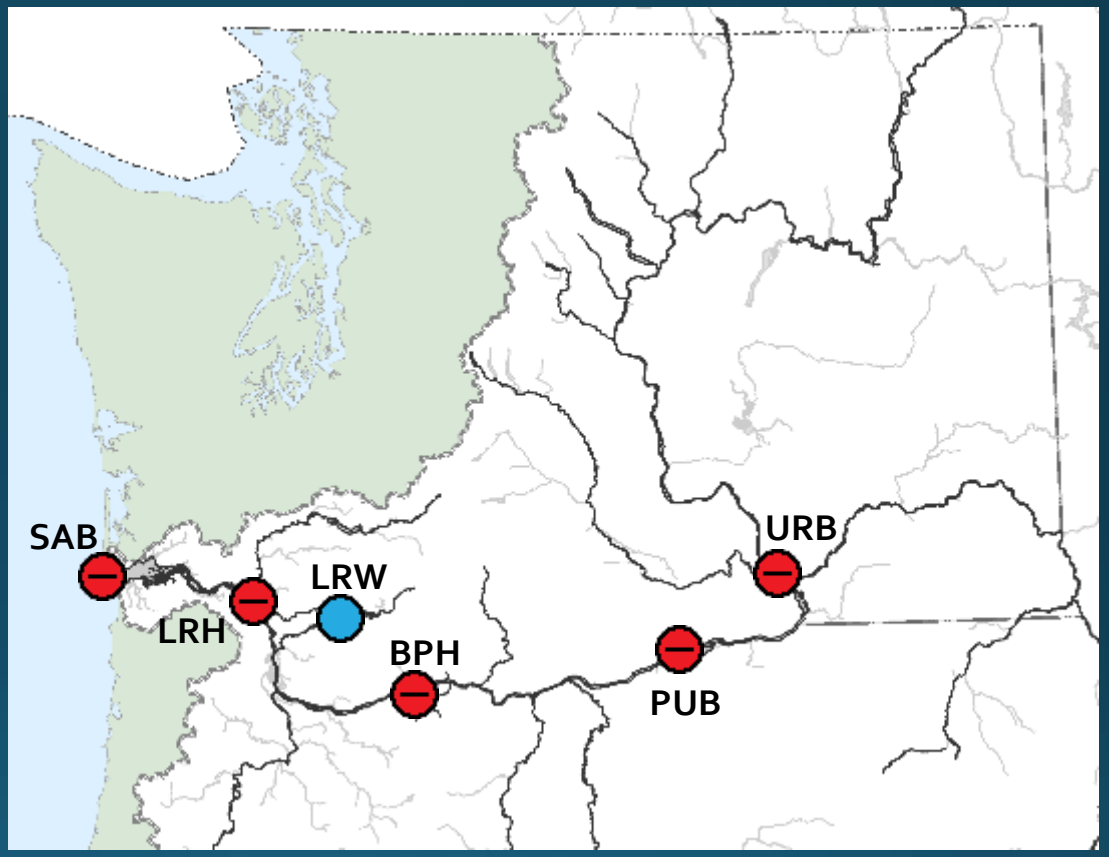
Relative to Recent 10yr Avg. Runsize

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

2019 Fall Chinook Returns

Returns

- SAB (Select Area Bright) – 0.9k (8%)
- LRH (Lower River Hatchery) – 49k (54%)
- LRW (Lower River Wild) – 17k (105%)
- BPH (Bonneville Pool Hatchery) – 29k (36%)
- PUB (Pool Upriver Bright) – 58k (68%)
- URB (Upriver Bright) – 212k (50%)



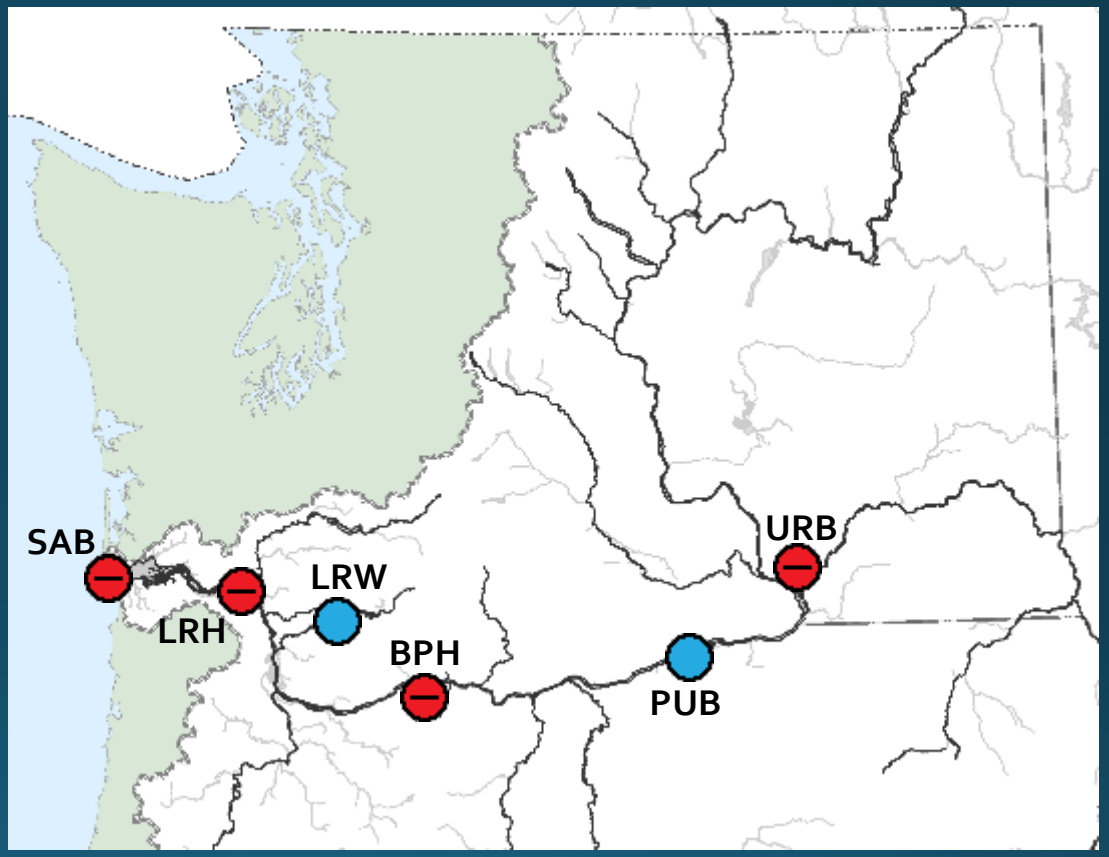
Relative to Recent 10yr Avg. Escapement

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

2020 Fall Chinook Forecasts

Forecasts in Columbia River range from

- SAB (Select Area Bright) – 1.0k (9%)
- LRH (Lower River Hatchery) – 51k (58%)
- LRW (Lower River Wild) – 20k (118%)
- BPH (Bonneville Pool Hatchery) – 46k (59%)
- PUB (Pool Upriver Bright) – 72k (82%)
- URB (Upriver Bright) – 233k (55%)

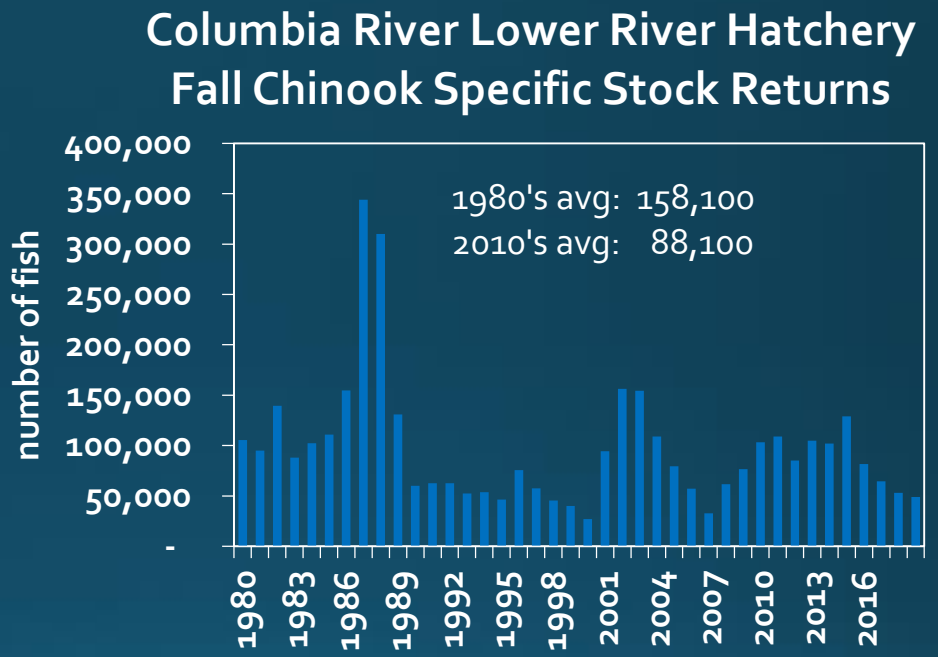


Relative to Recent 10yr Avg. Runsize

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

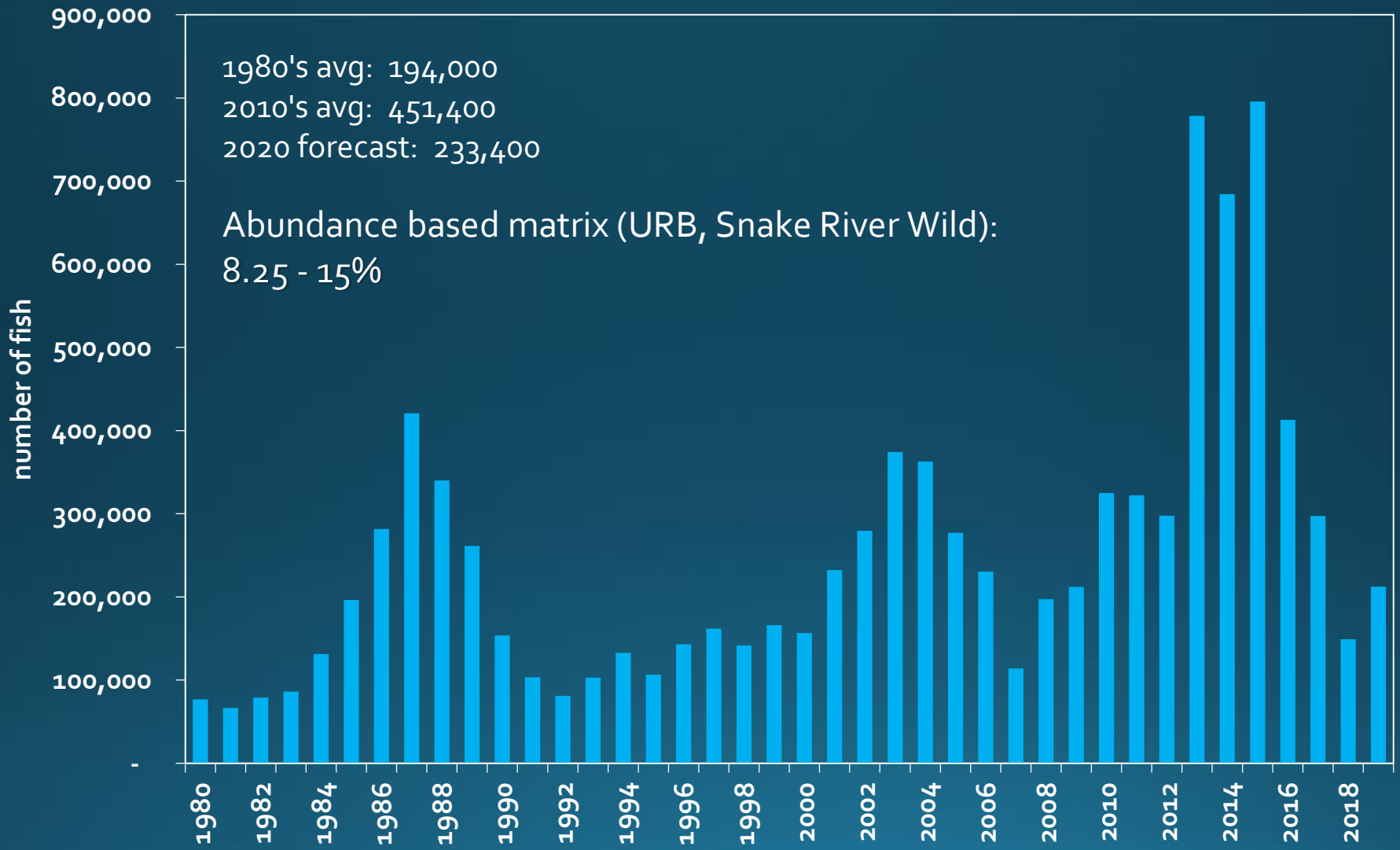
Lower Columbia River Tule Exploitation Rate (ER) Matrix

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



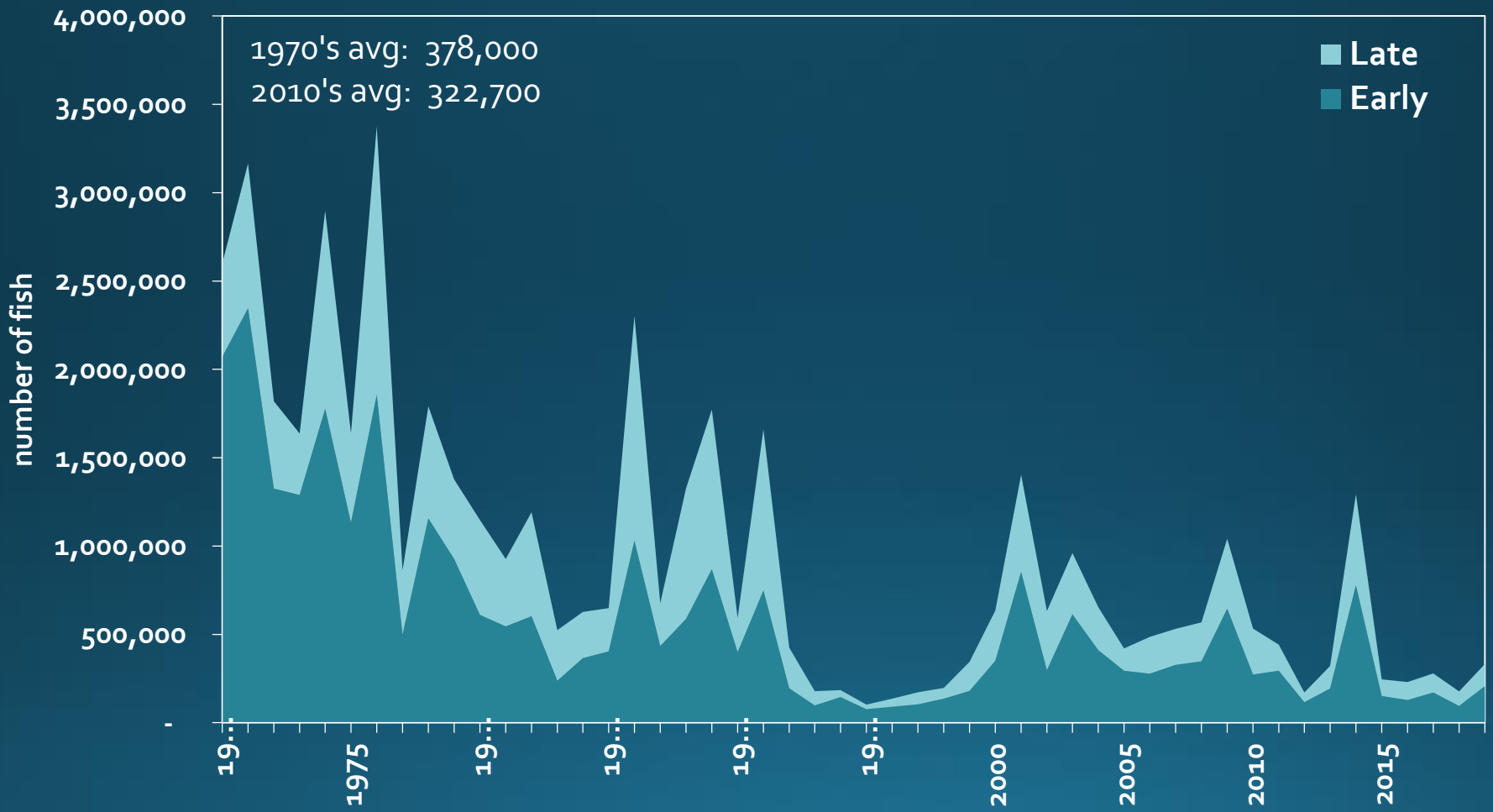
- LRH is down 42% compared to the previous 10 year return.
- 2020 LRH forecast of 51,000 will manage in ocean and in-river fisheries to not to exceed a 38% ER.

Chinook Historical Runsize – URB



Coho

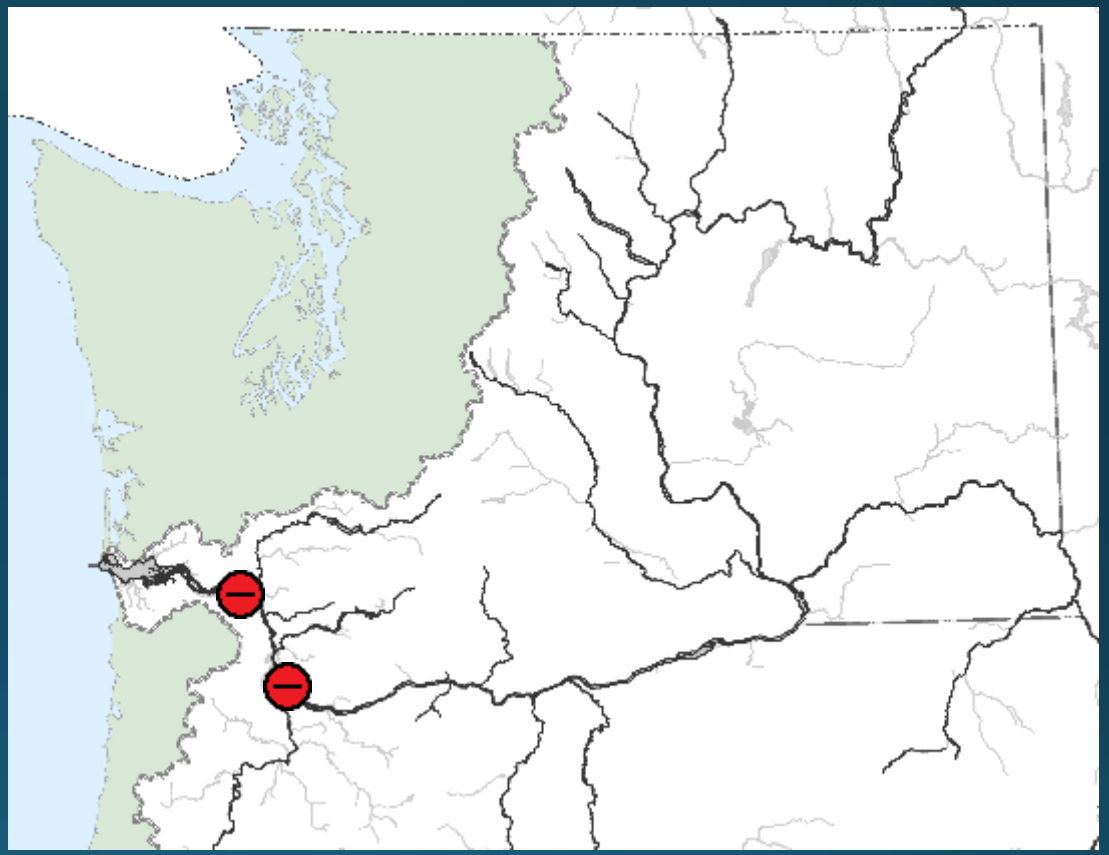
Coho Ocean Abundance – Columbia River



2019 Coho Returns (ocean abundance)

Returns:

- Early – 207k (73%)
- Late –124k (66%)



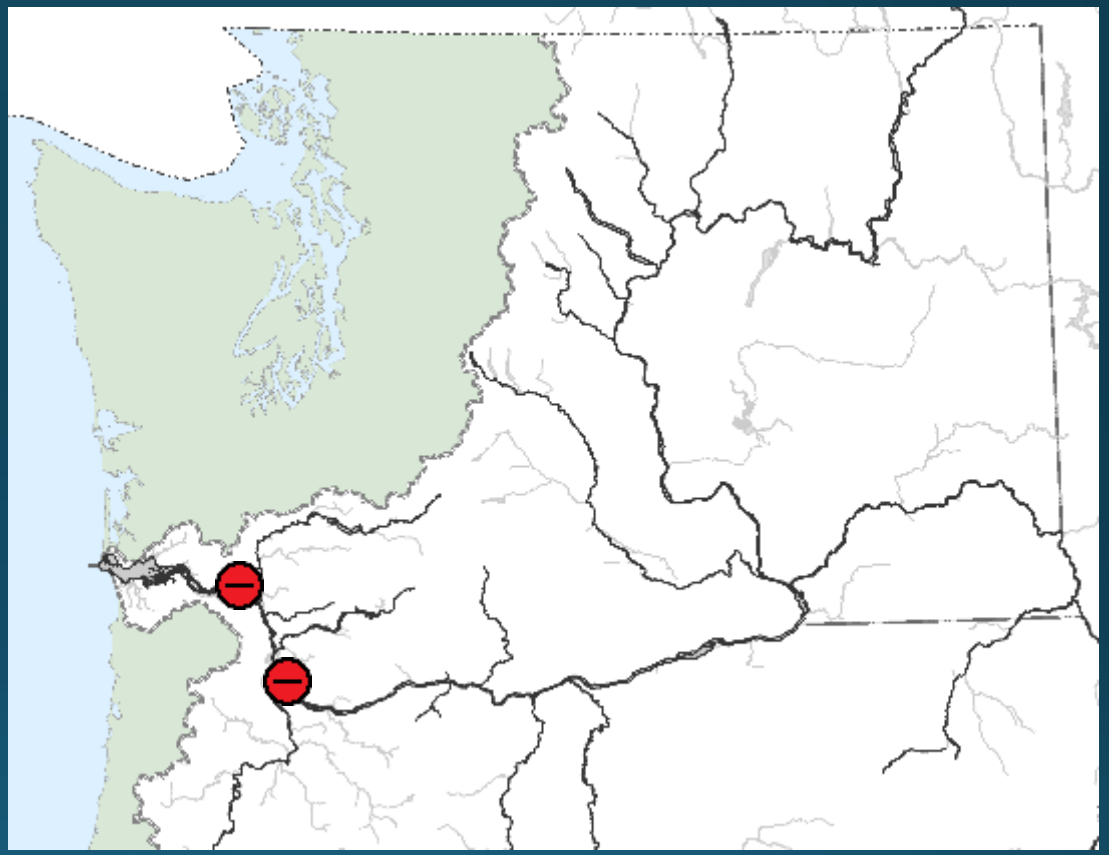
Relative to Recent 10yr Avg. Escapement

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

2020 Coho Forecasts (ocean abundance)

Forecasts in Columbia River range from

- Early – 131k (54%)
- Late – 50k (31%)



Relative to Recent 10yr Avg. Runsize

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

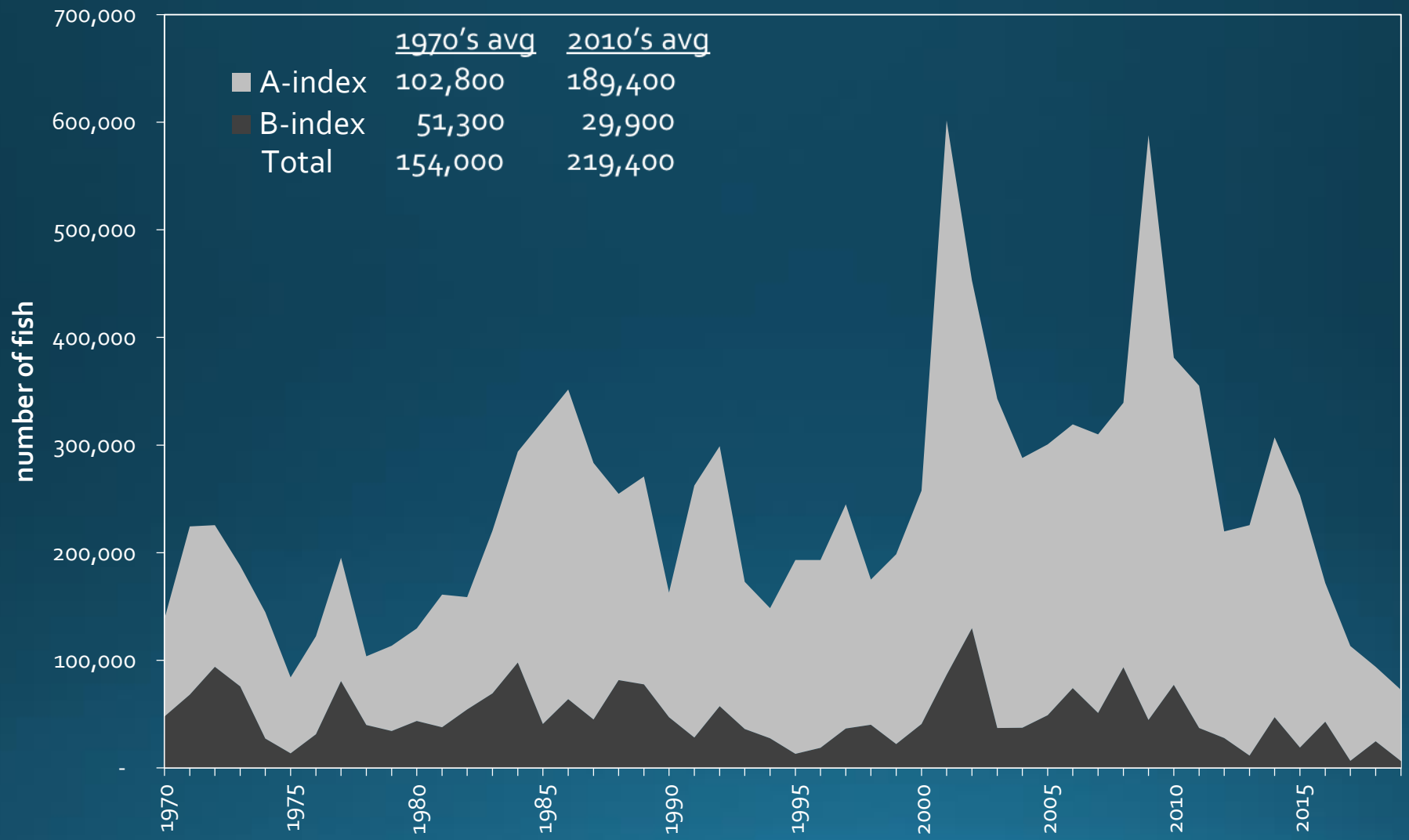
Lower Columbia Natural Coho Exploitation Rate (ER) Matrix

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 0.09% (medium).
- Parental escapement exceeds 30% of full seeding on index sites.
- Exploitation rate for 2020 is 18%.

Steelhead

Upriver Summer Steelhead



2019 Steelhead Returns

Returns

- A-index – 66k (28%)
- B-index –6.3k (19%)

Relative to Recent 10yr Avg. Escapement

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

2020 Steelhead Forecasts

Forecasts in Columbia River range from

- A-index – 86k (45%)
- B-index – 9.6k (32%)

Relative to Recent 10yr Avg. Runsize

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

Washington Department of FISH and WILDLIFE

2020 PFMC Update

Kyle Vandegraaf

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					
	2015	2016	2017	2018	2019	2020
Sacramento River						
Fall (Sacramento Index)	652.0	299.6	230.7	229.4	379.6	473.2
Winter (age-3 absent fishing)	--	--	--	1.6	1.9	3.1
Klamath River (Ocean Abundance)						
Fall	423.8	142.2	54.2	359.2	274.2	186.6
Oregon Coast						
North and South/Local Migrating	--	--	--	--	--	--
Columbia River (Ocean Escapement)						
Cowlitz Spring	11.2	25.1	17.1	5.2	1.3	1.4
Kalama Spring	1.9	4.9	3.1	1.5	1.4	1.0
Lewis Spring	1.1	1.0	0.7	3.7	1.5	1.4
Willamette Spring	55.4	68.7	38.1	53.8	40.2	40.8
Sandy Spring	5.5	NA	3.6	5.3	5.5	5.2
Upriver Spring [a/]	232.5	188.8	160.4	166.7	99.3	81.7
Upriver Summer [b/]	73.0	93.3	63.1	67.3	35.9	38.3
LRW Fall	18.9	22.2	12.5	7.6	13.7	19.7
LRH Fall	94.9	133.7	92.4	62.4	54.5	51.0
SCH Fall	160.5	89.6	158.4	50.1	46.0	46.2
MCB Fall	113.3	101.0	45.6	36.4	56.7	71.8
URB Fall	500.3	589.0	260.0	200.1	158.4	233.4

https://www.pcouncil.org/safe-documents-3/

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 2015	2016	2017	2018	2019	2020
Washington Coast							
Willapa Bay Fall	Natural	3.8	3.3	4.2	3.8	4.3	2.9
	Hatchery	31.0	36.2	34.3	40.3	23.6	28.3
Quinault Spring/Summer	Natural						
Grays Harbor Fall	Natural	--	--	--	16.4	18.0	NA
	Hatchery	--	--	--	4.8	7.7	NA
Quinault Spring/Summer	Natural	NA	NA	NA	NA	NA	NA
	Hatchery	--	--	--	4.8	NA	NA
Quinault Fall	Natural	8.1	5.5	5.9	5.2	5.3	NA
	Hatchery	4.0	5.3	4.4	3.1	2.7	NA
Queets Spring/Summer	Natural	0.4	0.5	0.5	0.5	0.6	NA
Queets Fall	Natural	4.3	4.9	3.7	3.3	3.4	NA
	Hatchery	1.5	1.7	0.9	0.6	0.8	NA
Hoh Spring/Summer	Natural	0.8	0.9	1.0	1.1	1.0	0.8
Hoh Fall	Natural	2.6	1.8	2.7	2.6	2.5	2.6
Quillayute Spring	Hatchery	1.7	1.8	2.2	2.1	2.1	2.4
Quillayute Summer/Fall	Natural	8.5	7.5	7.6	8.0	7.9	9.8
Hoko[c/]	Natural	3.3	2.9	1.5	1.5	2.8	2.6
North Coast Totals							
Spring/Summer	*Natural*	*1.2*	*1.4*	*1.5*	*1.6*	*1.7*	*NA*
Fall	*Natural*	*23.5*	*19.7*	*19.9*	*19.1*	*19.2*	*NA*
Spring/Summer	*Hatchery*	*1.7*	*1.8*	*2.2*	*2.1*	*2.1*	*2.4*
Fall	*Hatchery*	*5.5*	*7.0*	*5.3*	*3.7*	*3.5*	*NA*

https://www.pcouncil.org/safe-documents-3/

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					
		2015	2016	2017	2018	2019	2020
Puget Sound summer/fall[d/]							
Nooksack/Samish	Hatchery	38.6	27.9	21.2	24.6	21.3	18.2
East Sound Bay	Hatchery	1.2	0.7	0.8	0.7	0.3	0.3
Skagit	Natural	11.8	15.1	15.8	13.3	13.6	12.9
	Hatchery	0.6	0.4	0.4	0.3	0.3	0.5
Stillaguamish[e/]	Natural	0.5	0.5	1.5	1.6	0.9	0.9
Snohomish[e/]	Natural	4.2	3.3	3.4	3.5	3.2	3.0
	Hatchery	3.3	5.0	4.8	6.5	7.0	6.8
Tulalip[e/]	Hatchery	1.3	1.4	5.3	7.5	12.5	6.0
South Puget Sound	Natural	3.8	4.5	4.7	4.8	8.4	5.8
	Hatchery	62.4	43.1	80.4	123.6	99.9	100.7
Hood Canal	Natural	3.1	2.3	2.5	3.9	1.2	4.6
	Hatchery	59	42.7	48.3	57.6	66.0	67.6
Strait of Juan de Fuca Including Dungeness spring run	Natural	4.9	3.7	3.1	6.0	8.3	5.0

https://www.pcouncil.org/safe-documents-3/

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 2015	2016	2017	2018	2019	2020
OPI Area Total Abundance (California, Oregon Coasts, and Columbia River)		1,015.0	549.2	496.2	349.0	1,009.6	268.7
OPI Public	Hatchery	808.4	396.5	394.3	294.1	933.5	185.7
Columbia River Early		515.2	153.7	231.7	164.7	545.0	130.7
Columbia River Late		261.8	226.9	154.6	121.5	360.6	50.3
Coastal N. of Cape Blanco		6.9	5.5	3.5	3.3	12.0	2.4
Coastal S. of Cape Blanco		24.4	10.4	4.5	4.6	15.9	2.3
Lower Columbia River	Natural	35.9	40.0	30.1	21.9	36.9	24.6
Oregon Coast (OCN)	Natural	206.6	152.7	101.9	54.9	76.1	83.0
Washington Coast							
Willapa	Natural	42.9	39.5	36.7	20.6	63.4	17.9
	Hatchery	57.7	28.1	55.0	44.5	94.0	51.8
Grays Harbor	Natural	142.6	35.7	50.0	42.4	71.5	50.0
	Hatchery	46.6	22.9	36.4	51.4	64.3	42.3
Quinault	Natural	44.2	17.1	26.3	25.4	13.9	17.5
	Hatchery	24.9	19.8	29.4	29.6	26.9	27.0
Queets	Natural	7.5	3.5	6.5	7.0	11.1	7.8
	Hatchery	11.3	4.5	13.7	10.8	13.2	10.9
Hoh	Natural	5.1	2.1	6.2	5.8	7.0	4.2

https://www.pcouncil.org/safe-documents-3/

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 2015	2016	2017	2018	2019	2020
Quillayute Fall	Natural	10.5	4.5	15.8	10.6	14.7	9.2
	Hatchery	8.0	6.4	17.6	16.5	17.0	13.0
Quillayute Summer	Natural	1.2	0.3	1.5	2.7	1.2	0.8
	Hatchery	2.2	1.4	3.4	3.3	3.4	3.4
North Coast Independent Tributaries	Natural	11.7	1.9	6.5	4.1	8.1	5.1
	Hatchery	11.9	2.5	0.2	7.9	12.5	1.3
WA Coast Total	*Natural*	*265.6*	*104.6*	*149.5*	*118.7*	*191.0*	*112.4*
	Hatchery	*162.6*	*85.6*	*155.6*	*164.1*	*231.3*	*149.6*
Puget Sound							
Strait of Juan de Fuca	Natural	11.1	4.4	13.1	7.2	8.8	7.5
	Hatchery	11.1	3.9	15.4	10.6	16.8	20.6
Nooksack-Samish	Natural	28.1	9.0	13.2	20.6	25.1	15.4
	Hatchery	50.8	28.8	45.6	61.3	59.8	42.5
Skagit	Natural	121.4	8.9	11.2	59.2	57.9	31.0
	Hatchery	19.5	4.9	7.6	13.1	9.9	18.2
Stillaguamish	Natural	31.3	2.8	7.6	19.0	23.8	19.5
	Hatchery	0.0	0.0	1.5	0.0	2.2	2.3
Snohomish	Natural	151.5	20.6	107.3	65.9	62.6	39.0
	Hatchery	53.9	16.7	62.0	38.3	43.7	26.6
South Sound	Natural	63.0	9.9	20.2	15.0	30.4	7.3
	Hatchery	180.2	27.1	102.4	103.0	180.4	164.0
Hood Canal	Natural	61.5	35.3	115.6	59.5	40.1	35.0
	Hatchery	108.4	83.5	74.9	84.5	87.9	72.2
Puget Sound Total	*Natural*	*467.9*	*91.0*	*288.3*	*246.4*	*248.8*	*154.6*
	Hatchery	*423.9*	*165.0*	*309.3*	*310.8*	*400.7*	*346.3*

https://www.pcouncil.org/safe-documents-3/