Public Meeting Guidelines and Etiquette

Please note the following guidelines for our meeting:

- Upon joining the virtual meeting, your microphone will be muted automatically.
- In case of any technical issues during the meeting, notify us in the chat, and we will help you. Please note that the chat will only be monitored for technical assistance.
- Public comments are welcome and will be rotated between in-person and virtual attendees.
- To ask a question or make a comment, please use your device's "raise hand" feature. If on the phone, dial *9 on Zoom , and if using a computer, click the hand/reactions icon at the bottom of your screen.
- During the comment period, the host will enable you to unmute yourself. You can then unmute yourself by pressing the mute button on your device or dialing *6 on your phone.
- Keep discussions focused on the agenda items and questions at hand. Offensive, disrespectful, or derogatory language, including profanity, personal attacks, threats, or insults towards individuals, governments, or organizations, is strictly prohibited.
- Assume positive intentions from those speaking and listen respectfully.
- To ensure a balanced discussion, limit your comments to two minutes with one clarifying follow-up question.
- Provide constructive feedback regarding the fisheries in which you participate. Remember that the most compelling comments are those that pertain to the topics under discussion.
- WDFW staff may close public comment to stay on schedule with the agenda or to provide others who still need to comment with an opportunity to speak.
- The Hybrid meetings will be recorded and posted online.
- If you have further questions or comments, please submit them in written format on our public comment webpage; Public input | Washington Department of Fish & Wildlife

Statewide Salmon Forecast Meeting
March 1, 2024

Washington Department of FISH and WILDLIFE

Meeting Agenda

Note: WDFW staff will take questions and comments following each presentation. Regional discussion sessions will provide opportunities to ask questions and provide comments as well.

9:00 – 9:30	**Introduction** • Welcome and Introduction • NOF 2024 Opening Remarks • North of Falcon – Setting Salmon Fisheries in 2024 • Southern Resident Killer Whale Discussion	 Mark Baltzell Kelly Susewind Kyle Adicks Julie Watson
9:30 – 11:00	**Salmon Forecasts 2024** • 2023/24 Environmental Outlook • Puget Sound and Coastal Chinook and Coho • Puget Sound and Coastal Chum, Pink, and Sockeye • Columbia River Salmon and Steelhead Stocks • PFMC Salmon Technical Team Review	 Marisa Litz Kirsten Simonsen Matthew Bogaard Shannon Conley Alex Safiq
11:00 – 2:00	**Regional Discussion Sessions** • Puget Sound Recreational • Ocean & Coastal • Puget Sound Commercial	 Mark, Derek, Kirsten and Reg. 6 & 4 staff Kyle(s), Marlene, Reg. 6 and Col R. staff Mickey, Kwasi, and Christina

Opening Remarks

Director – Kelly Susewind

Washington Department of FISH and WILDLIFE

Washington Department of FISH and WILDLIFE

North of Falcon – Setting Salmon Fishery Seasons for 2024

Kyle Adicks

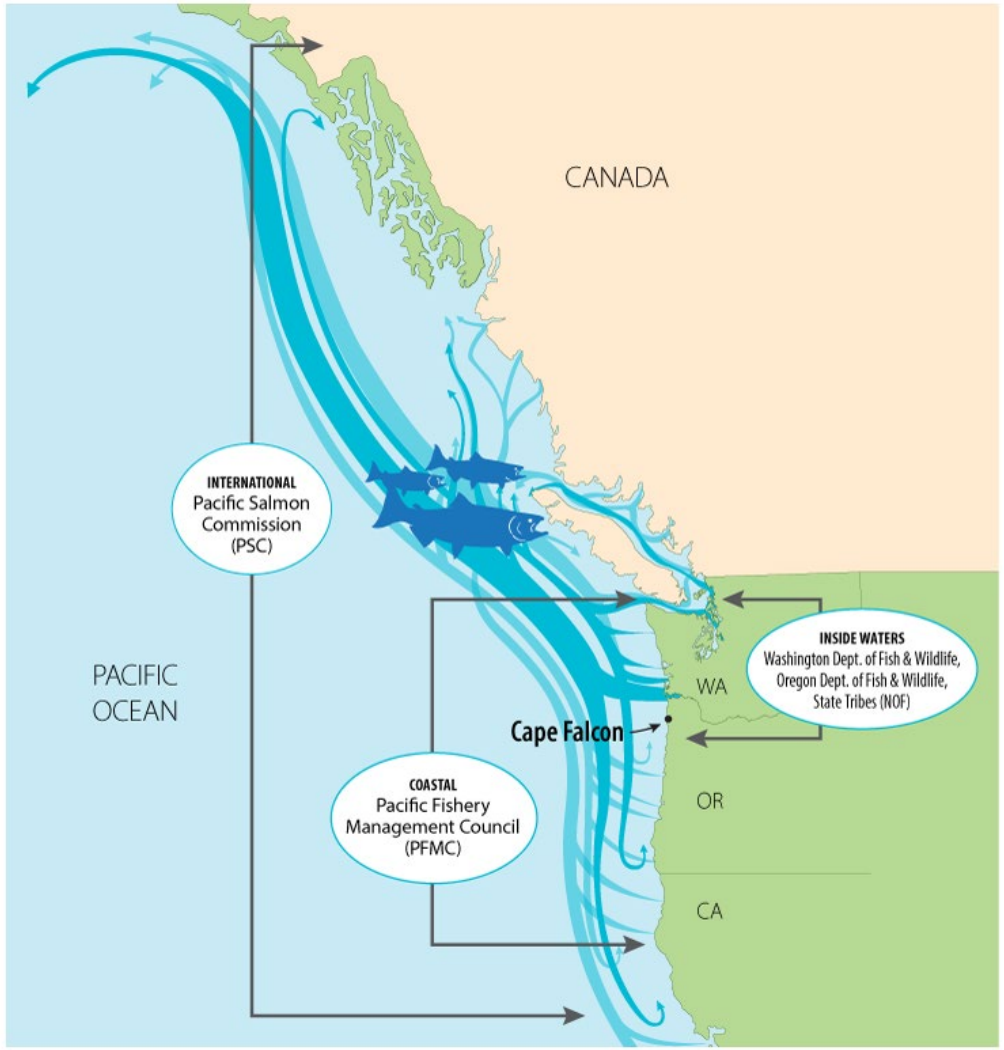
What is North of Falcon?

- North of Falcon is the annual, cooperative process to plan salmon seasons for Washington waters.
- The name refers to waters north of Oregon's Cape Falcon, which marks the southern border of Washington's management of salmon stocks.
- One component of a larger salmon season-setting process that also involves the state, tribal governments, federal regulators, other U.S. states, and Canada.

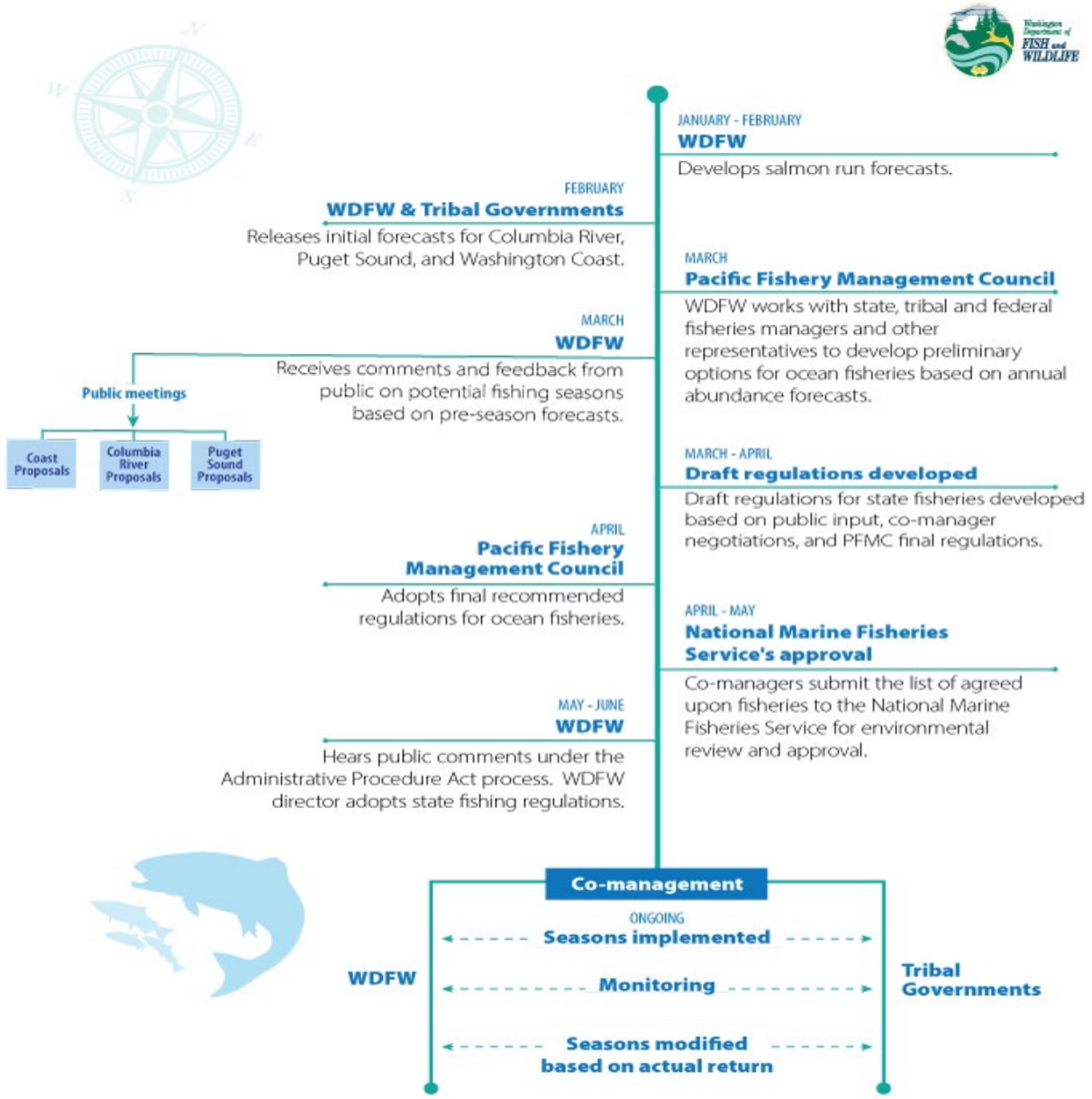
What guides North of Falcon?

Fishery managers must weigh many factors when developing salmon seasons, including:

- Endangered Species Act (ESA) constraints
- Commission policy
- Pacific Salmon Treaty obligations
- Tribal co-management: Washington's treaty tribes manage their own fisheries, sharing data and splitting harvest with the state
- Extensive monitoring and evaluation of fisheries statewide



North of Falcon timeline



2024 NOF Meeting Schedule

Meeting links and materials are available on the WDFW webpage
https://wdfw.wa.gov/fishing/management/north-falcon/public-meetings

Date	Purpose
Feb. 28	Willapa Bay – Grays Harbor Forecast Meeting
Mar. 1	Statewide Forecast Meeting
Mar. 6-11	Pacific Fishery Management Council Meeting – Fresno, CA
Mar. 13	North of Falcon #1 – Statewide Proposals
Mar. 19	Coastal Freshwater and PS Recreational Fisheries
Mar. 21	PS Freshwater and Marine Recreational Fisheries
Mar. 21	Columbia River Fisheries – downstream of Snake River

2024 NOF Meeting Schedule (cont.)

Meeting links and materials are available on the WDFW webpage
https://wdfw.wa.gov/fishing/management/north-falcon/public-meetings

Date	Purpose
Mar. 27	North of Falcon #2 – Statewide Fisheries
Mar. 27	Upper Columbia River and Snake River Fisheries
Mar. 28	Willapa Bay/Grays Harbor Fisheries
Apr. 6-11	Final Pacific Fishery Management Council Meeting – Seattle, WA

Learn more

To get up-to-date information about upcoming meetings, proposed seasons, updated forecasts, and opportunities for public comment, visit:

https://wdfw.wa.gov/nof

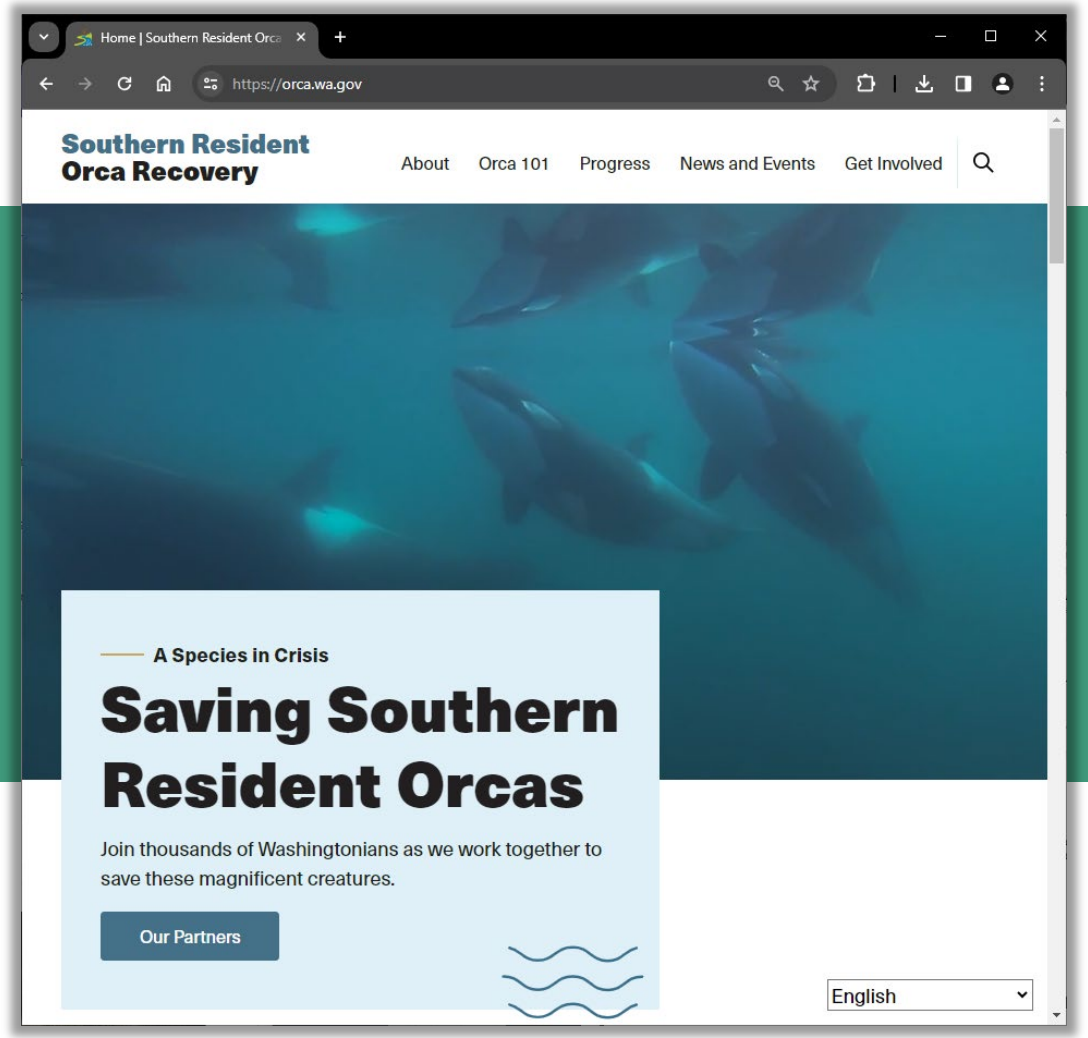
Southern Resident Orca Update & Reducing The Impact of Vessels

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

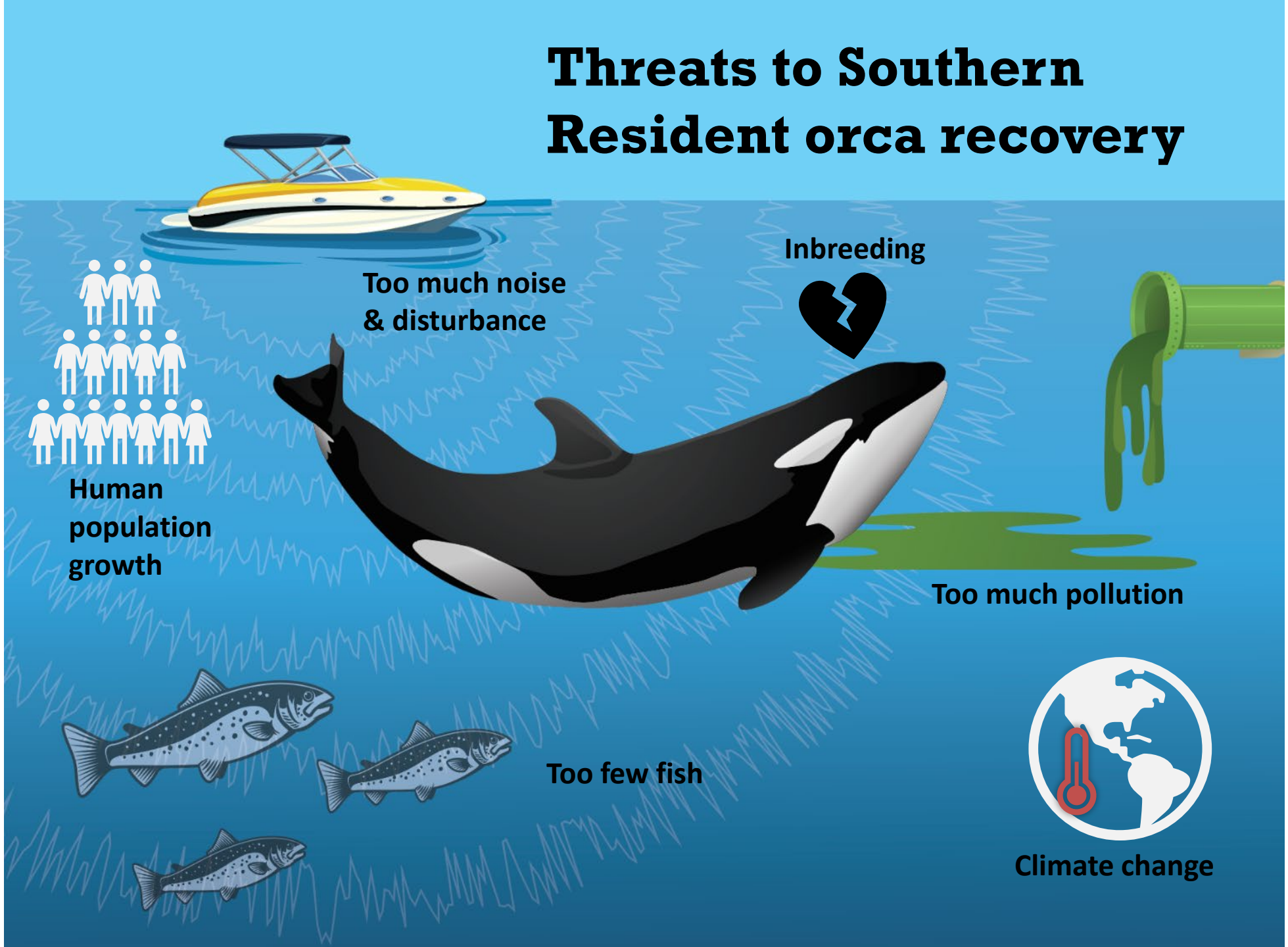
March 2024

Washington Department of FISH and WILDLIFE

Context


Home | Southern Resident Orca
https://orca.wa.gov
Southern Resident Orca Recovery
About
Orca 101
Progress
News and Events
Get Involved
A Species in Crisis
Saving Southern Resident Orcas
Join thousands of Washingtonians as we work together to save these magnificent creatures.
Our Partners
English

Threats to Southern Resident orca recovery



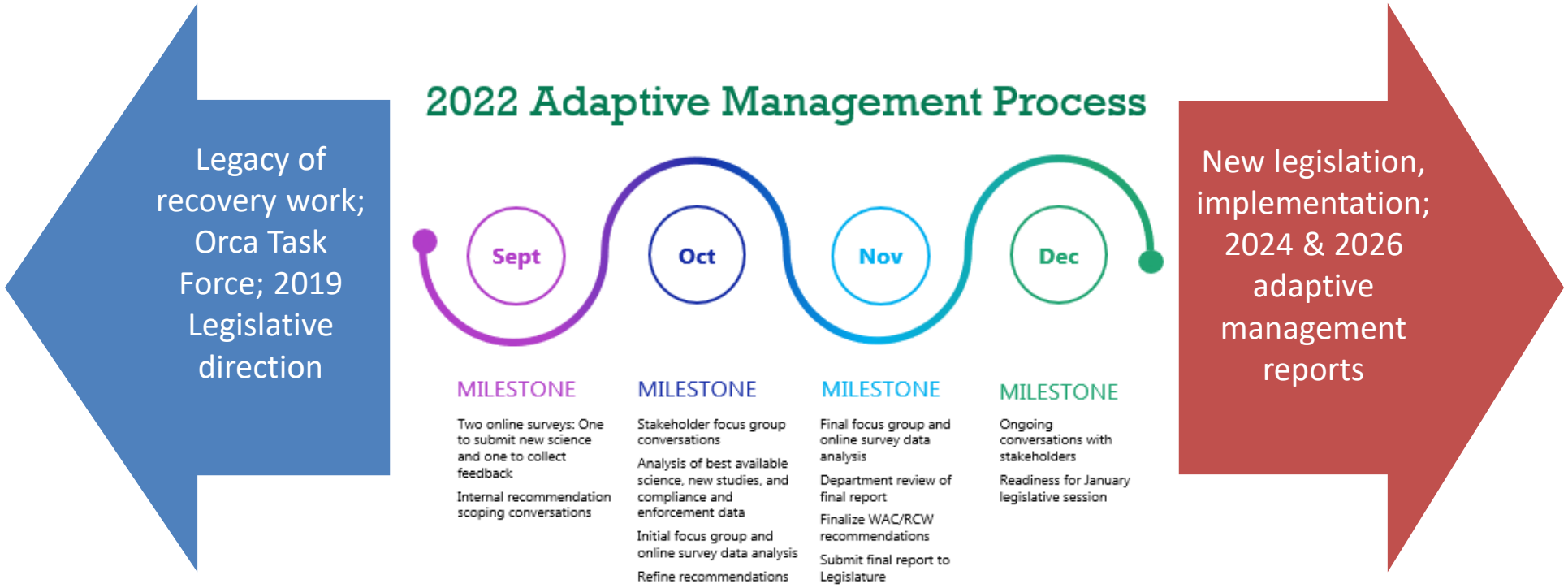
The Department is required to adaptively manage the CWW license program and rules.

"The Department shall complete an analysis and report…on the effectiveness of and any recommendations for changes to the **whale watching rules**, **license fee structure**, and **approach distance rules** [in 2022, 2024, and 2026]."

RCW 77.65.620 (5)

Adaptive Management Process

This work is embedded in a long-term recovery and adaptive management effort.



The adaptive management process was informed by several sources of data.

- Department review of relevant studies and best available science
- Third-party analysis of compliance, enforcement, and reporting data
- Third-party analysis of feedback collected through online survey and stakeholder focus groups
- Government partner coordination

Report Findings

Vessel traffic is linked to poor SRKW foraging.

- Foraging success decreases with vessels traveling within 1.5 km (1640 yards), even those operating at just 1-2 knots
- Foraging success further decreases with vessels closer than 400 yards
- Females are less successful than males (population-level implications)
- Whales dive more steeply
- Whale surface behavior increases

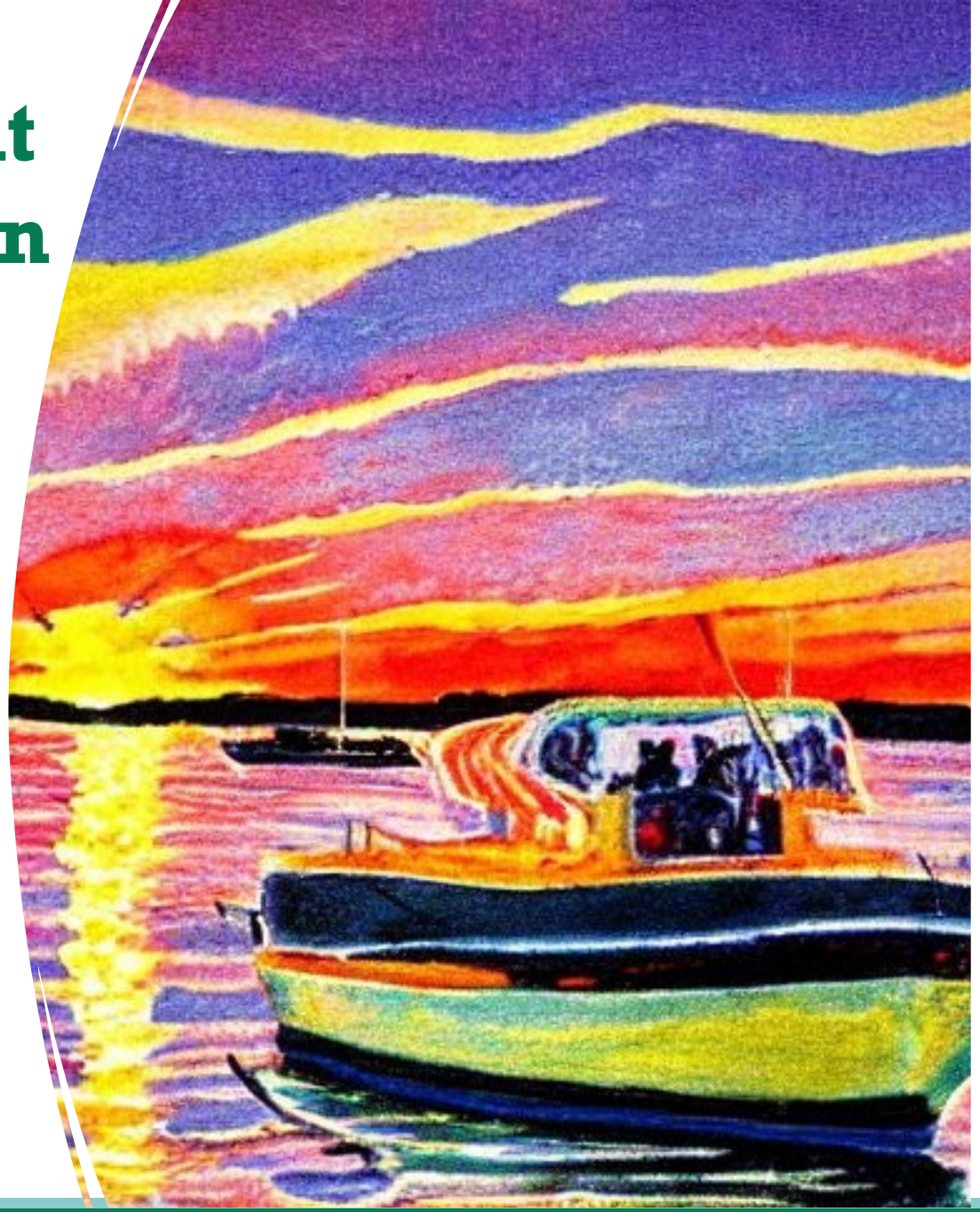
Key Findings

1. Vessel regulations could be improved to better support SRKW.
2. Vessel regulations are difficult to communicate and confusing for the average boater.
3. SRKW-viewing rules restrict CWW vessels more than other vessels.
4. License-holders likely comply with CWWLP requirements but cite administrative burdens.
5. The “sentinel” and “magnet” effects of CWW are not mutually exclusive and can co-occur.
6. The Department’s “vulnerable whales” process could be refined.
7. Increased WDFW Enforcement on-the-water presence would be appreciated by all stakeholders.

Outcomes & Next Steps

2022 Department Recommendation

Increase the vessel buffer around SRKW to 1,000 yards (approximately one-half nm) for all vessels, including CWW vessels, and make complementary changes to the commercial whale watching licensing program.



ESSB 5371 Adopted!

Signed 5/15/2023

Next Steps:

- Promote early adoption of 1,000-yard setback (-2025)
- Update and Promote Be Whale Wise campaign and messaging, expand outreach, improve tools
  - **Opportunity**: Orca Regulation Communications Advisory Group (ORCA Group) **workshops**
- Coordinate with NOAA and Canada on evolving regulations aimed at protecting SRKW from vessel impacts.

Washington Department of FISH and WILDLIFE

Questions?

Julie.Watson@dfw.wa.gov

Washington Department of FISH and WILDLIFE

2023/2024 Environmental Outlook

Dr. Marisa Litz & Dr. Laurie Weitkamp (NOAA)

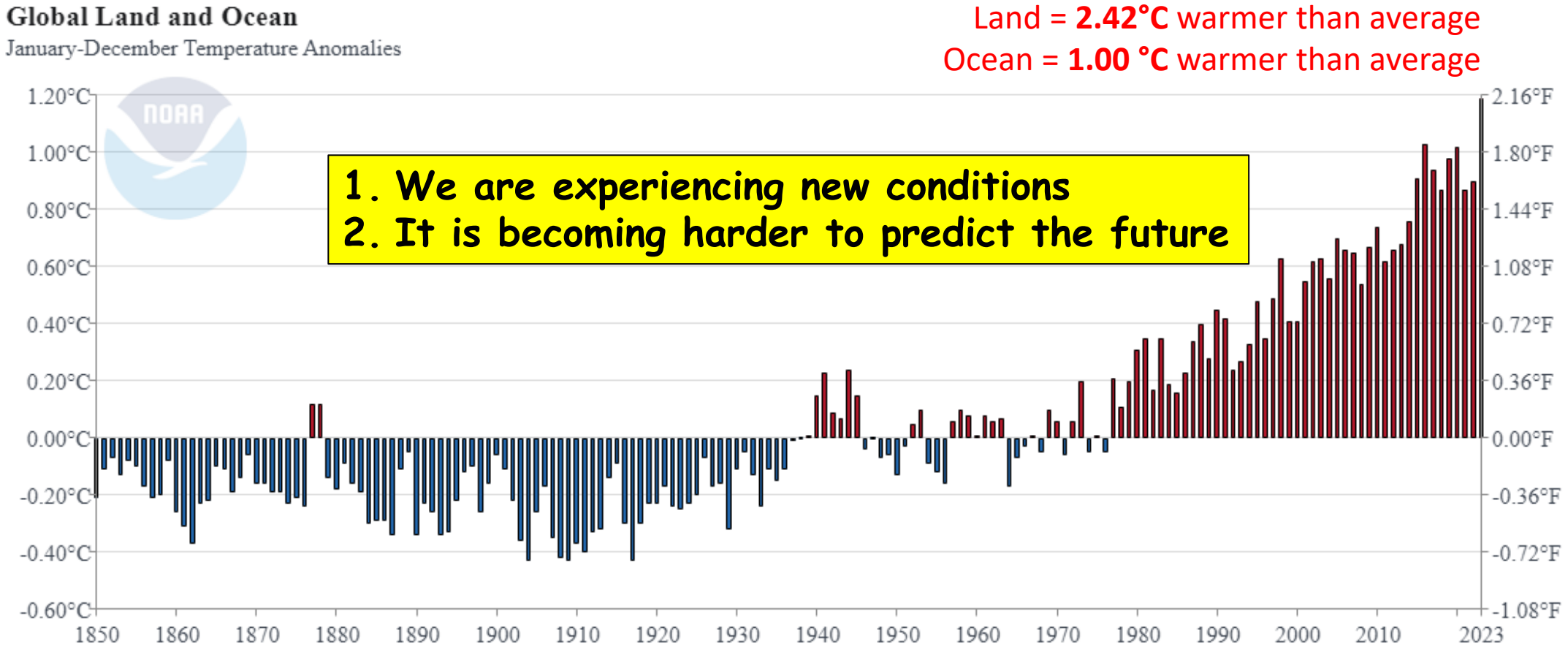
Outline

- Update on physical conditions (Temperature, El Niño, Marine Heatwaves)
- Notable biological observations
- NOAA environmental indicators (salmon stoplight chart)

Take-Home Messages:

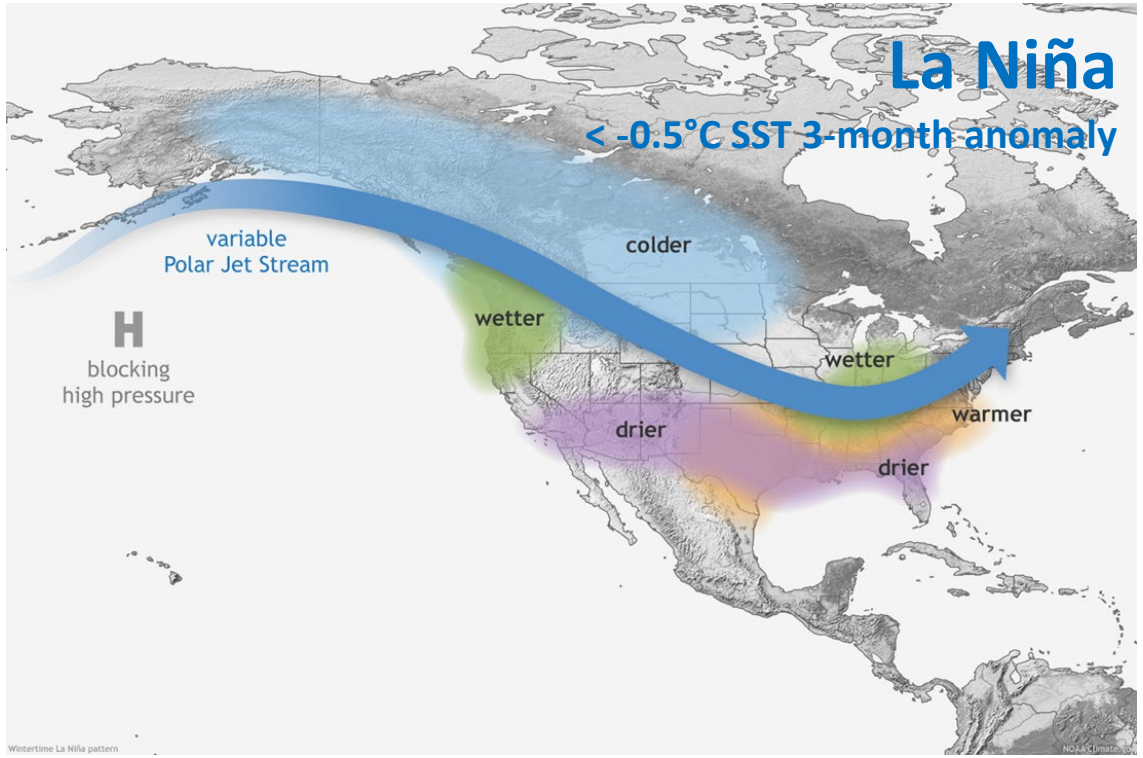
- Climate variability will continue to impact salmon returns in 2024
- Stressors affect **BOTH** freshwater and marine life history stages of salmon
- Effect of 2023-2024 warm El Niño still unknown

Global land and ocean surface temperatures warmest on record in 2023

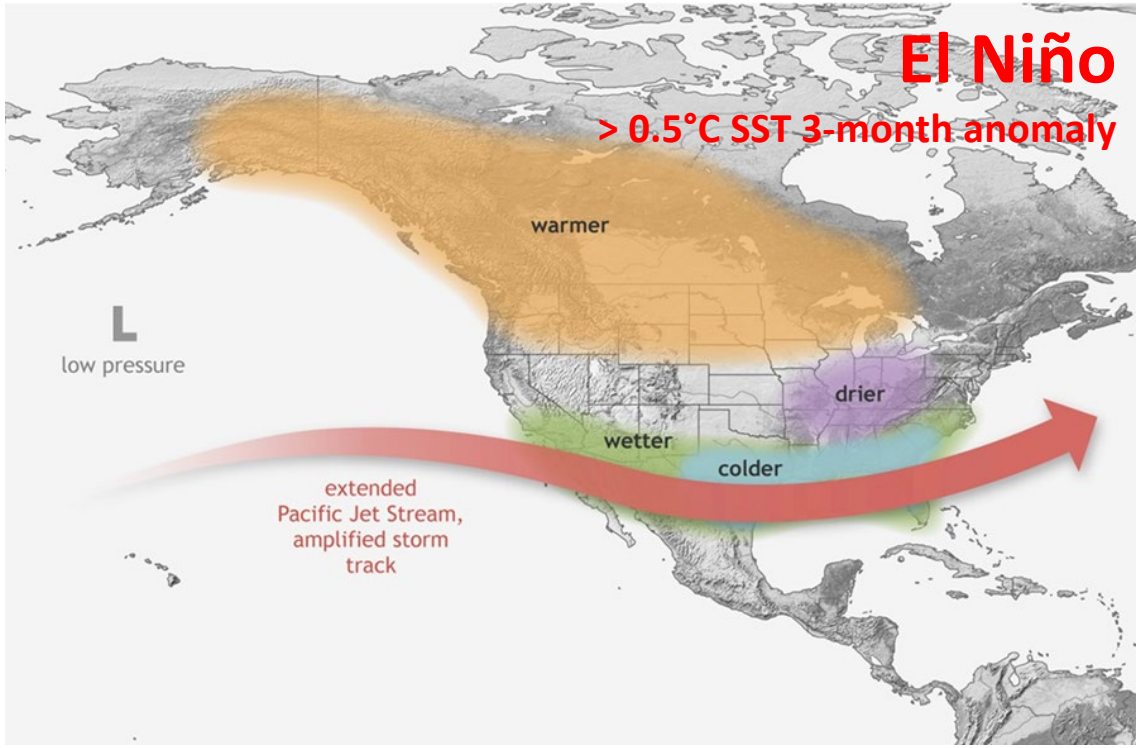


www.ncdc.noaa.gov

Three-peat La Niña Aug 2020-Jan 2023 was favorable for salmon marine survival



Good for PNW Salmon

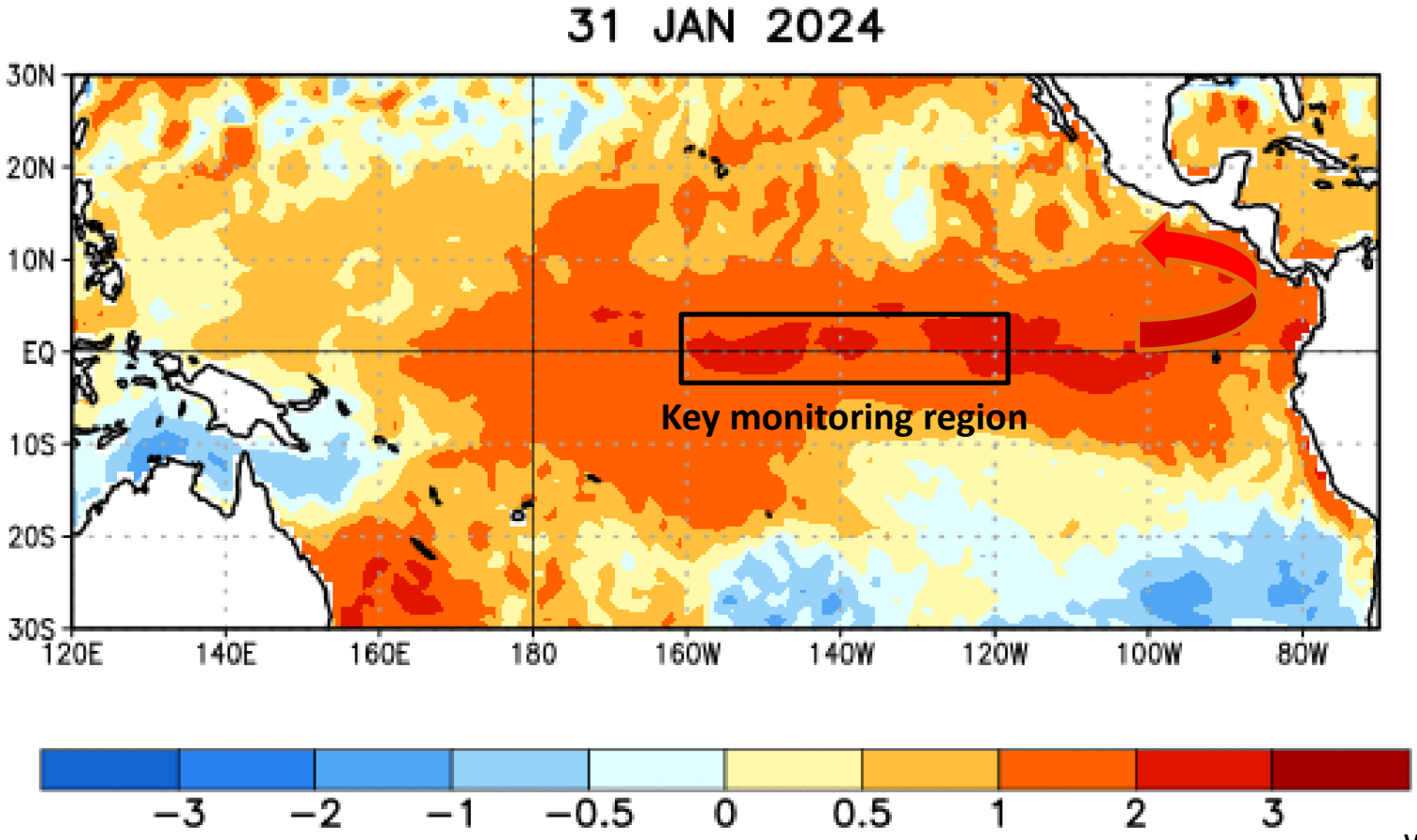


Bad for PNW Salmon

www.climate.gov

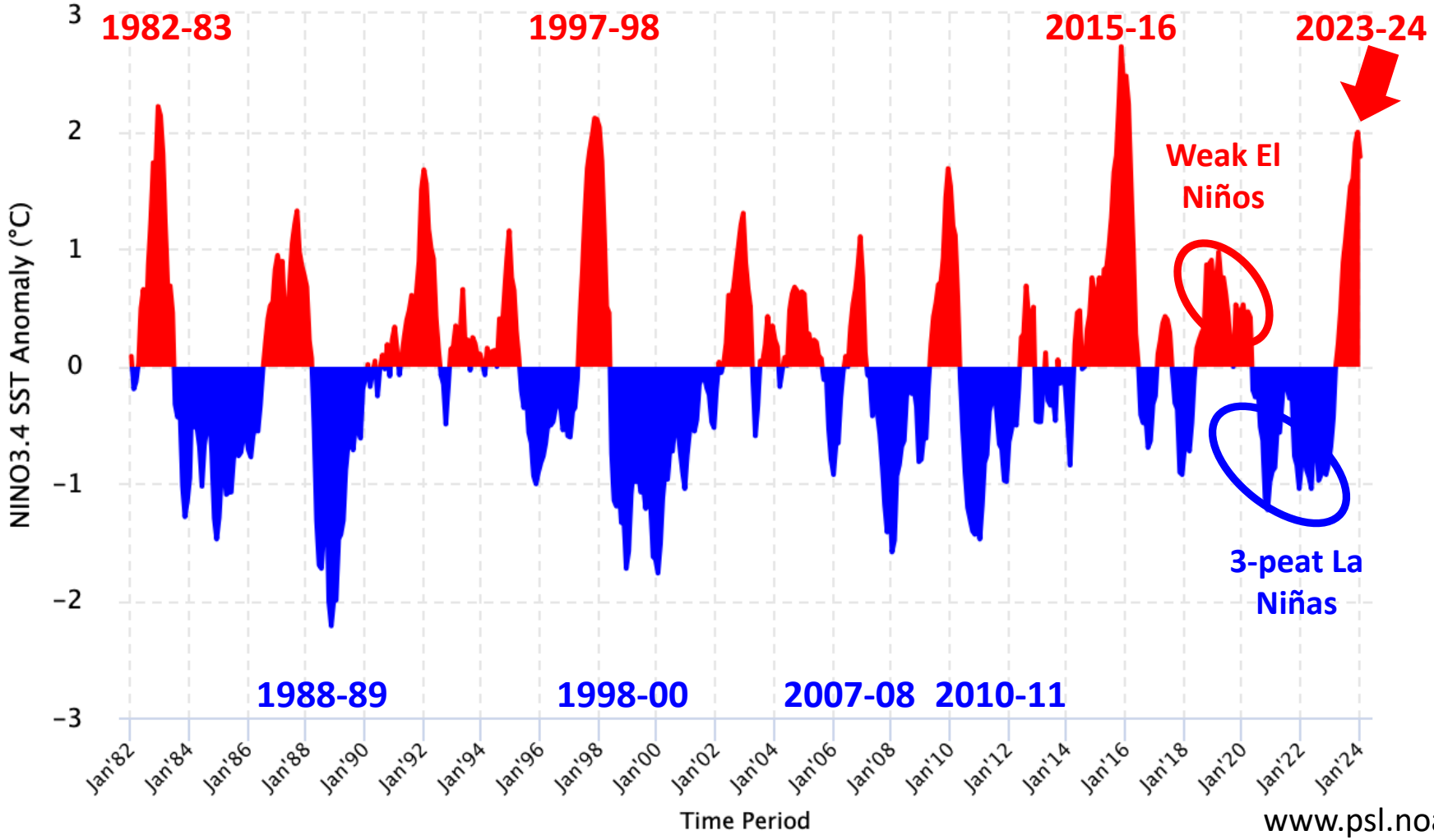
Current El Niño classified as strong, but impacts may be short-lived

Sea Surface Temperature (SST) Anomalies



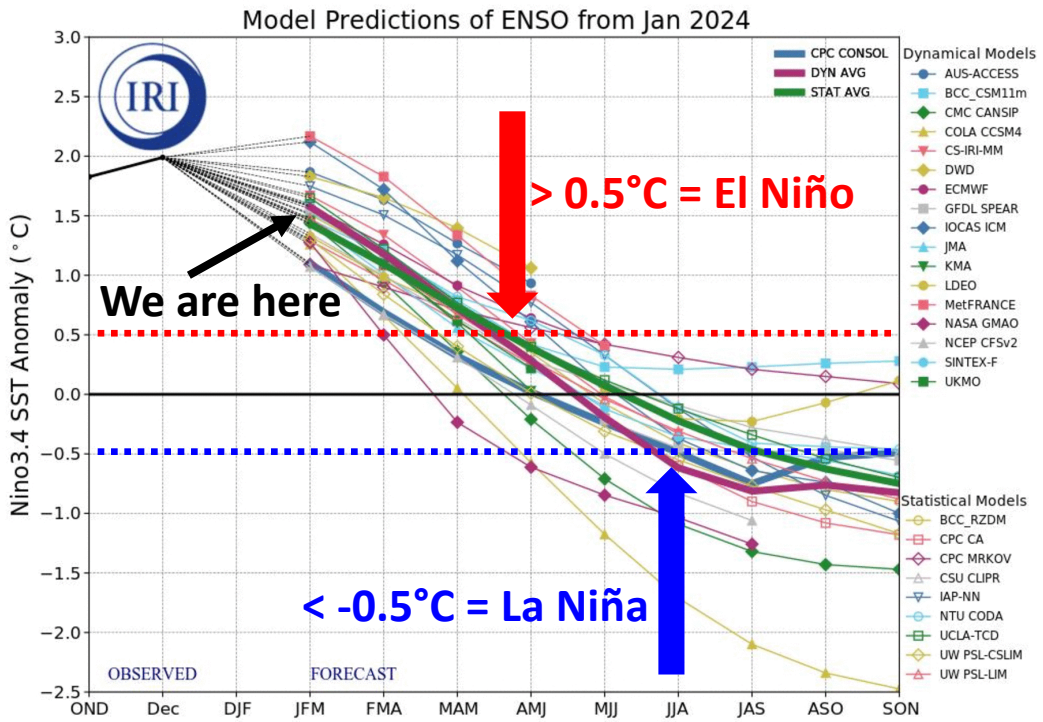
www.climate.gov/enso

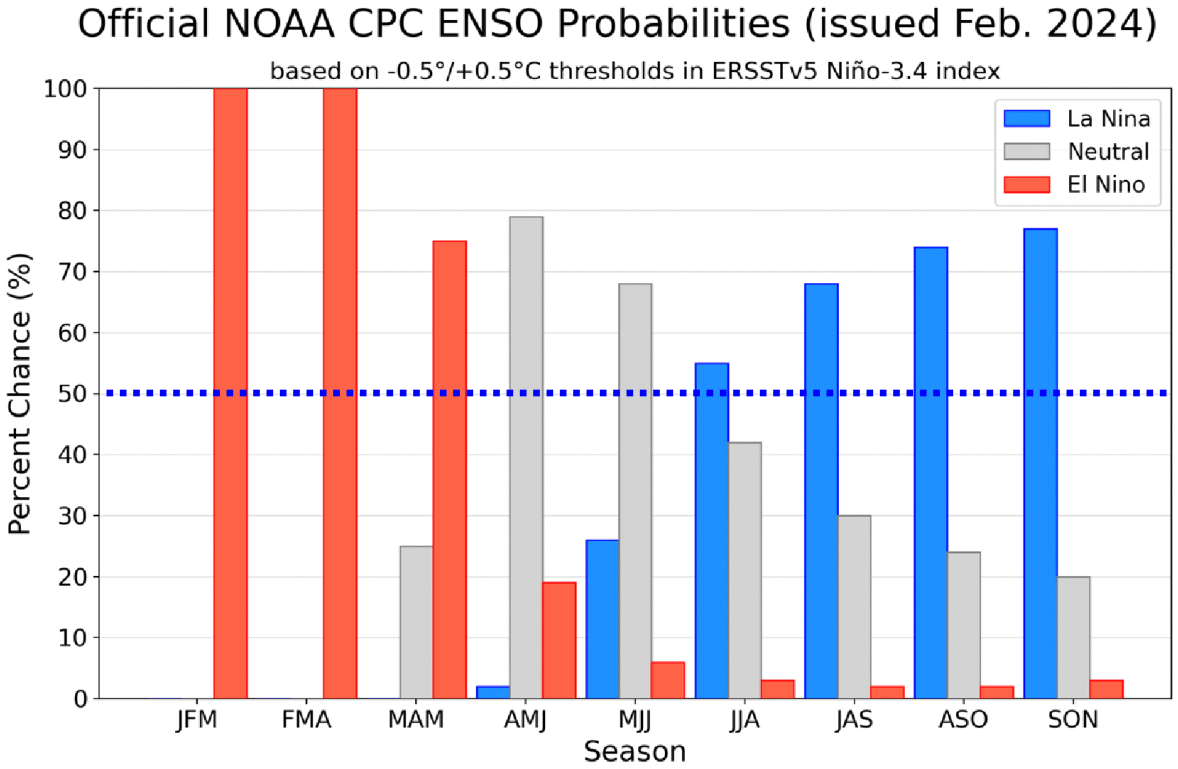
Strong El Niño's/La Niña's (1982-2024)



www.psl.noaa.gov/enso/mei/

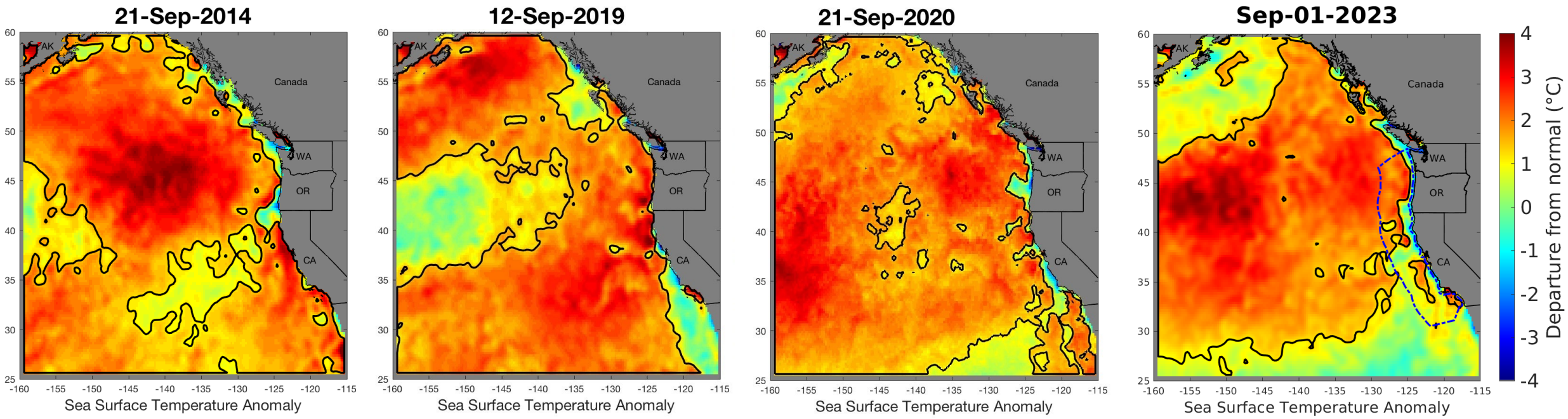
Models predict El Niño will end by spring with >50% chance of a La Niña by summer





www.climate.gov/enso

The "warm blob" formed May 2023 reached 7.6 million km^2 (4th largest by area)



2nd largest/1st longest event back to 1982

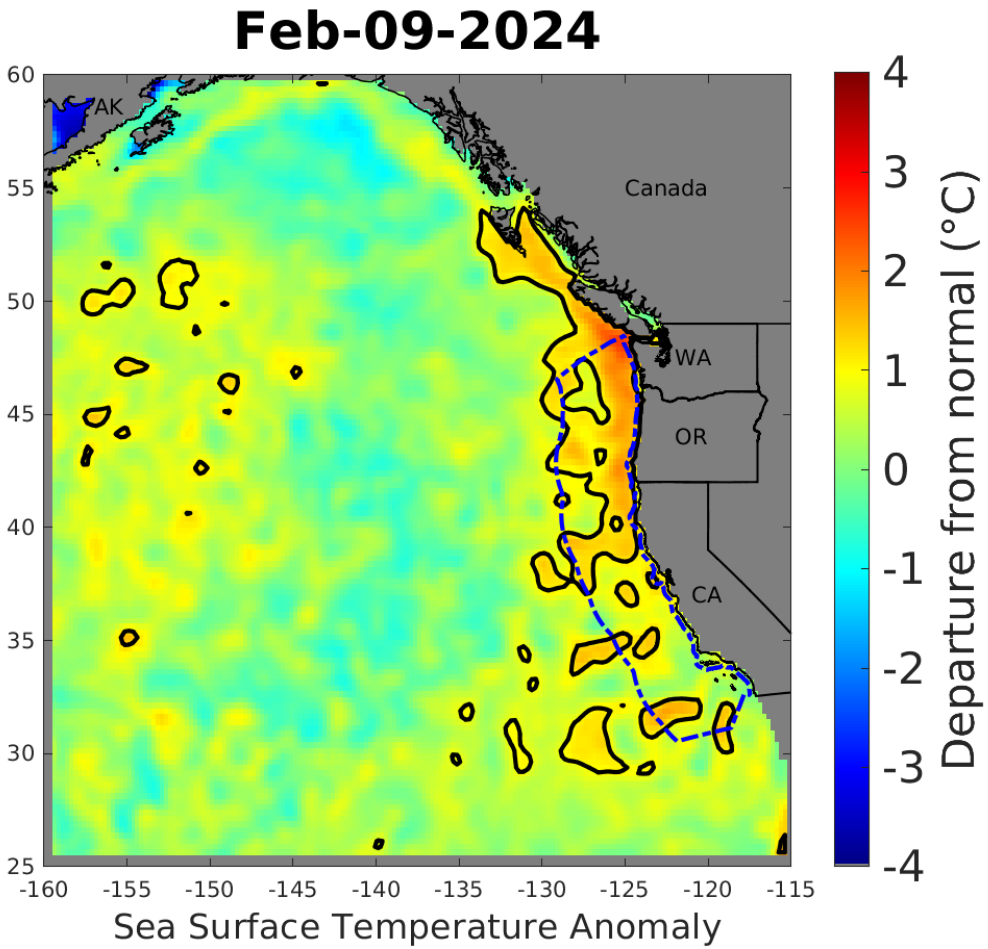
3rd largest/3rd longest event back to 1982

1st largest/4th longest event back to 1982

4th largest/7th longest event back to 1982

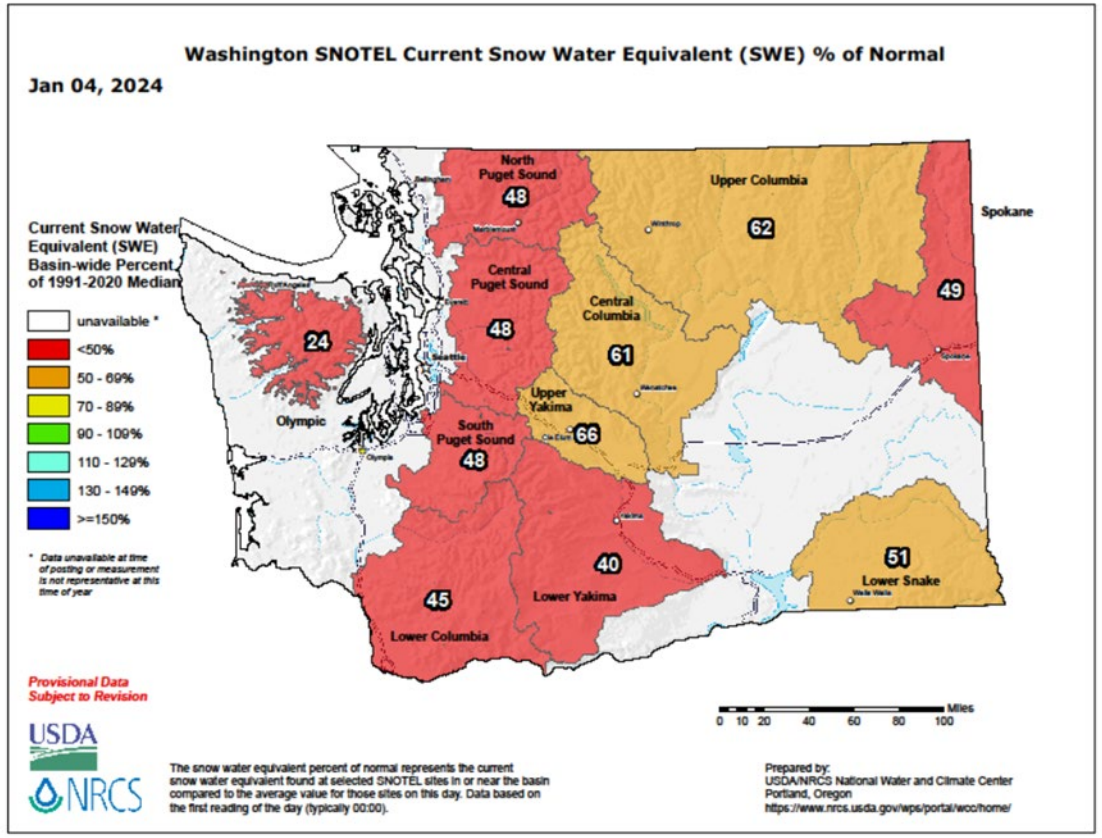
www.integratedecosystemassessment.noaa.gov/regions/california-current/cc-projects-blobtracker

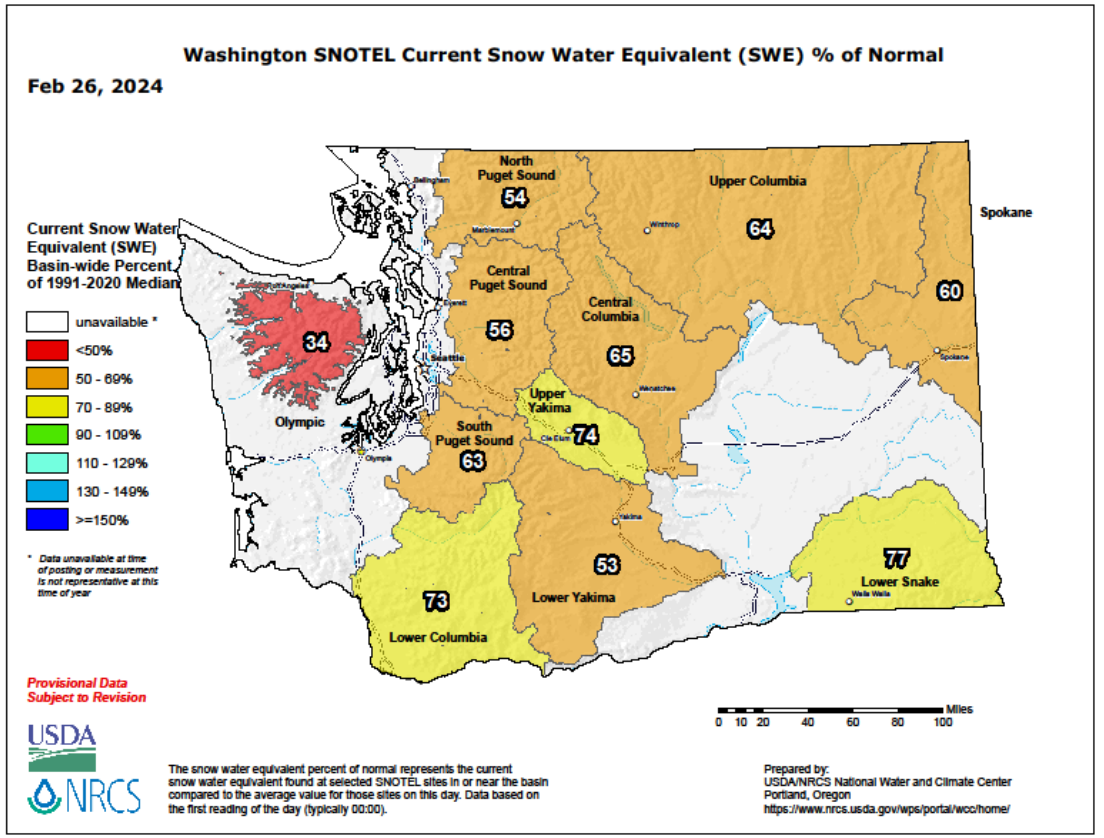
Current conditions: warm nearshore SSTs



www.integratedecosystemassessment.noaa.gov/regions/california-current/cc-projects-blobtracker

Snowpack tracking 60% of normal, causing low water supply in 2024

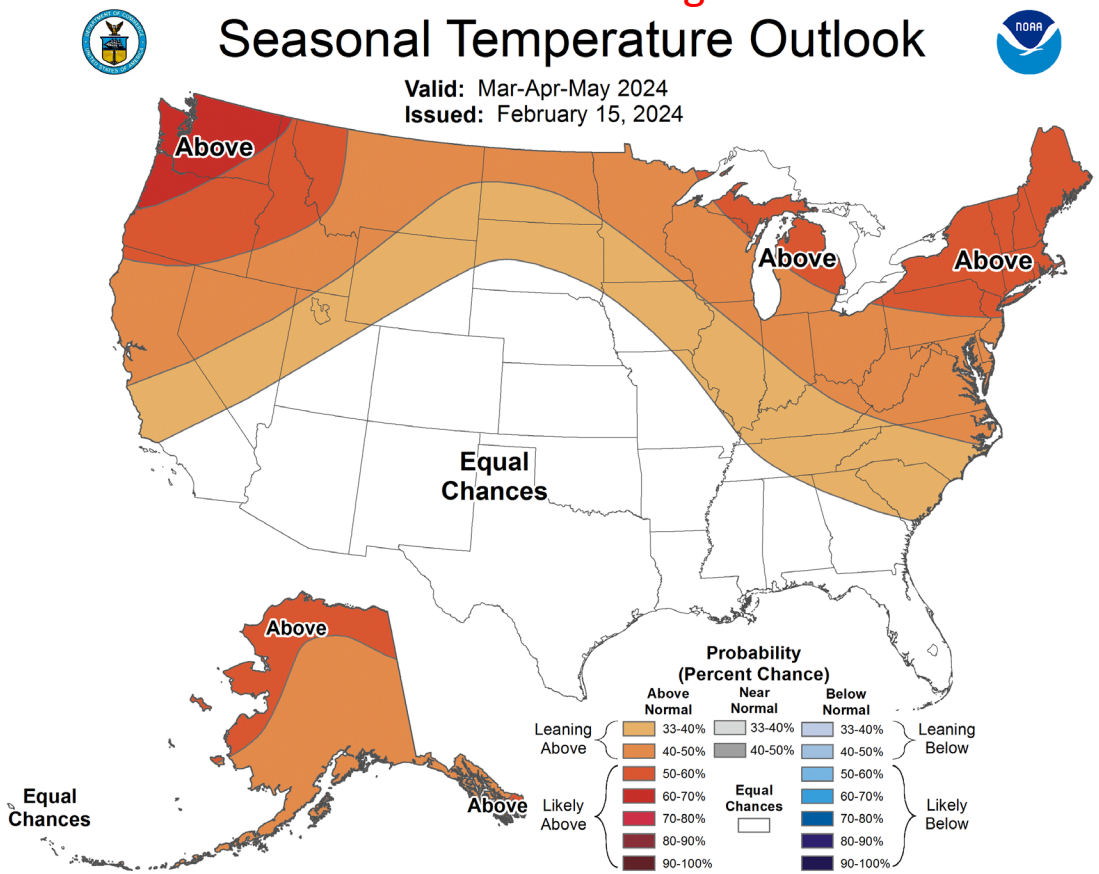




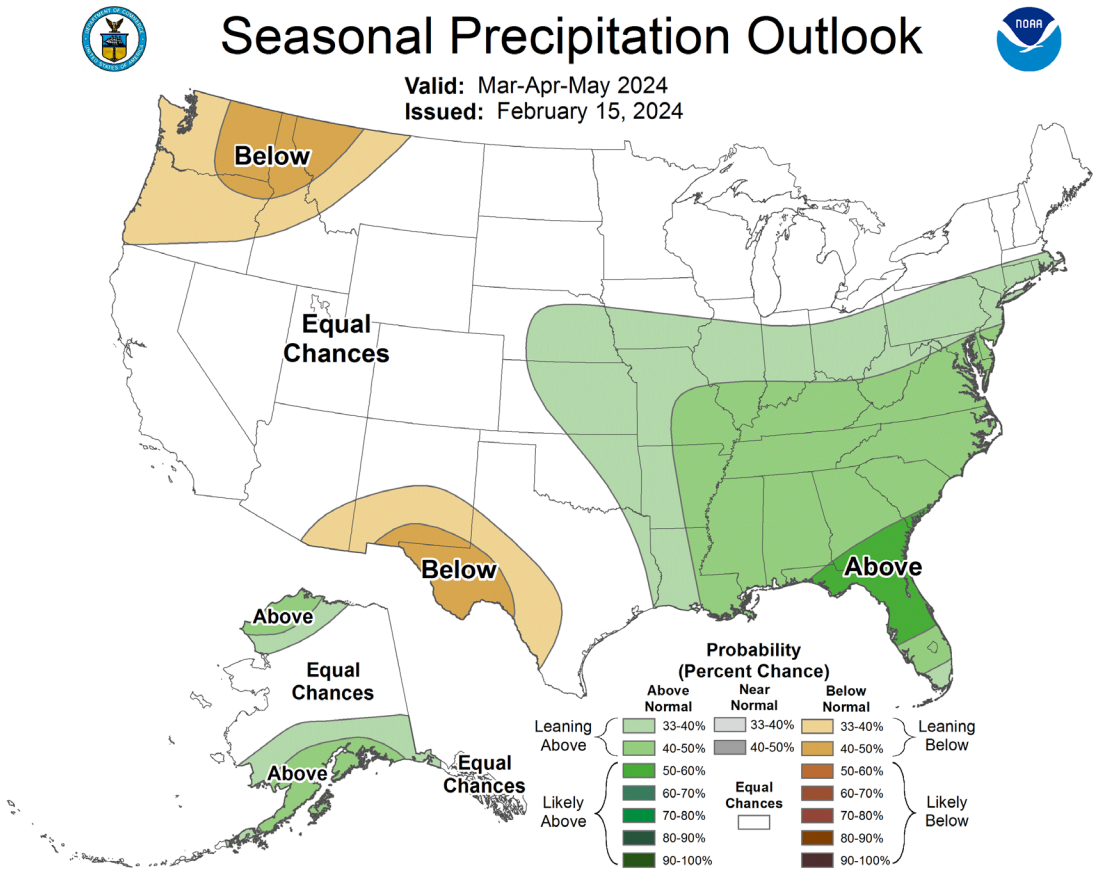
www.wcc.nrcs.usda.gov

Outlook over next 3 months (Mar-May)

Temperature: 60-70% chance temperatures will be ***warmer*** than average



Precipitation: 30-50% chance precipitation will be ***below*** average



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

Biological responses to the warming ocean

2021

Tropical fish such as opah off Seaside

39-fold increase in market squid off WA

Billions of organisms die in June heat wave

Dungeness crab season started on time with high landings

2022

More tropical fish caught off WA: shortbill spearfish and mahi mahi

Closure of snow crab fishery in AK for the first time in history

European green crab invasion continues north and east

2023

Bluefin tuna washed up on Orcas Island

Salmon spawning in the Arctic: Anaktuvuk River

King of the salmon

New record 21.0 lb mahi mahi caught off Washington

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	2019	2020	2021	2022	2023
CLIMATE & ATMOSPHERIC	PDO (Sum Dec-March)	23	9	5	17	10	25	16	21	18	13	7	2	20	6	4	11	14	26	24	22	15	19	12	8	3	1
	PDO (Sum May-Sept)	14	5	11	8	13	23	18	21	17	19	7	16	9	4	3	10	24	26	25	20	15	22	12	6	2	1
	ONI (Average Jan-June)	25	1	1	9	17	19	18	21	10	15	3	13	22	6	8	10	12	23	26	16	7	24	20	5	4	14
LOCAL PHYSICAL	SST NDBC buoys (°C; May-Sept)	21	7	9	5	6	13	26	14	2	17	1	12	3	8	10	19	24	23	22	15	18	25	11	4	20	16
	Upper 20 m T (°C; Nov-Mar)	25	14	11	13	8	19	20	16	17	7	1	12	22	6	4	9	3	26	24	23	18	21	2	10	15	5
	Upper 20 m T (°C; May-Sept)	18	12	14	5	1	3	26	21	10	11	2	7	19	9	8	20	24	15	16	13	17	25	23	4	22	6
	Deep Temp (°C; May-Sept)	25	7	10	5	1																		26	3	23	22
	Deep Salinity (May-Sept)	25	4	12	5	7																		24	1	23	19
LOCAL BIOLOGICAL	Copepod richness (May-Sept anom)	24	3	1	11	10																		7	5	2	8
	N copepod biomass (May-Sept anom)	24	19	14	15	6	21	18	25	20	16	9	13	11	3	5	7	8	22	26	23	10	4	2	1	17	12
	S copepod biomass (May-Sept anom)	26	2	7	4	3	18	20	25	17	14	1	9	21	13	10	8	15	23	24	22	16	19	12	5	6	11
	Biological transition	24	14	10	9	12	19	15	23	18	5	1	2	21	3	13	6	6	24	24	22	17	19	8	11	4	16
	Nearshore Ichthyoplankton (Jan-Mar)	21	4	14	8	1	25	26	20	11	22	3	17	2	10	5	13	23	18	19	16	12	24	9	6	15	7
	Near & offshore Ichthyoplankton (community index Jan-Mar)	11	6	4	8	10	13	20	24	1	16	3	12	18	5	2	7	9	22	25	26	21	23	19	15	14	17
	Chinook salmon juvenile catch	23	2	7	20	6	10	18	25	14	12	1	8	5	16	3	4	9	17	22	26	21	15	24	13	11	19
	Coho salmon juvenile catch	24	13	21	5	7	6	23	25	19	2	4	10	11	20	15	1	12	18	17	26	3	16	22	14	9	8

Red = warm years

Physical indicators: Pacific Decadal Oscillation (PDO) the best

Biological indicators (e.g., prey) were good to average in 2023

Juveniles entering ocean in 2023 = Ranked 11th out of 26 years

www.nwfsc.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	2018	2019	2020	2021	2022	2023
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LOCAL PHYSICAL	SST NDBC buoys (°C; May-Sept)	21	7	9	5	6	13	26	14	2	17	1	12	3	8	10	19	24	23	22	15	18	25	11	4	20	16
	Upper 20 m T (°C; Nov-Mar)	25	14	11	13	8	19	20	16	17	7	1	12	22	6	4	9	3	26	24	23	18	21	2	10	15	5
	Upper 20 m T (°C; May-Sept)	18	12	14	5	1	3	26	21	10	11	2	7	19	9	8	20	24	15	16	13	17	25	23	4	22	6
	Deep Temp (°C; May-Sept)	25	7	10	5	1																		26	3	23	22
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	S copepod biomass (May-Sept anom)	26	2	7	4	3	18	20	25	17	14	1	9	21	13	10	8	15	23	24	22	16	19	12	5	6	11
	Biological transition	24	14	10	9	12	19	15	23	18	5	1	2	21	3	13	6	6	24	24	22	17	19	8	11	4	16
	Nearshore Ichthyoplankton (Jan-Mar)	21	4	14	8	1	25	26	20	11	22	3	17	2	10	5	13	23	18	19	16	12	24	9	6	15	7
	Near & offshore Ichthyoplankton (community index Jan-Mar)	11	6	4	8	10	13	20	24	1	16	3	12	18	5	2	7	9	22	25	26	21	23	19	15	14	17
	Chinook salmon juvenile catch	23	2	7	20	6	10	18	25	14	12	1	8	5	16	3	4	9	17	22	26	21	15	24	13	11	19
	Coho salmon juvenile catch	24	13	21	5	7	6	23	25	19	2	4	10	11	20	15	1	12	18	17	26	3	16	22	14	9	8

Green = cool years

Physical indicators: Pacific Decadal Oscillation (PDO) the best

Biological indicators (e.g., prey) were good to average in 2023

Juveniles entering ocean in 2023 = Ranked 11th out of 26 years

www.nwfsc.noaa.gov

Basin Scale Indicators: El Niño and PDO no longer in phase (unusual)

ECOSYSTEM INDICATORS		1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
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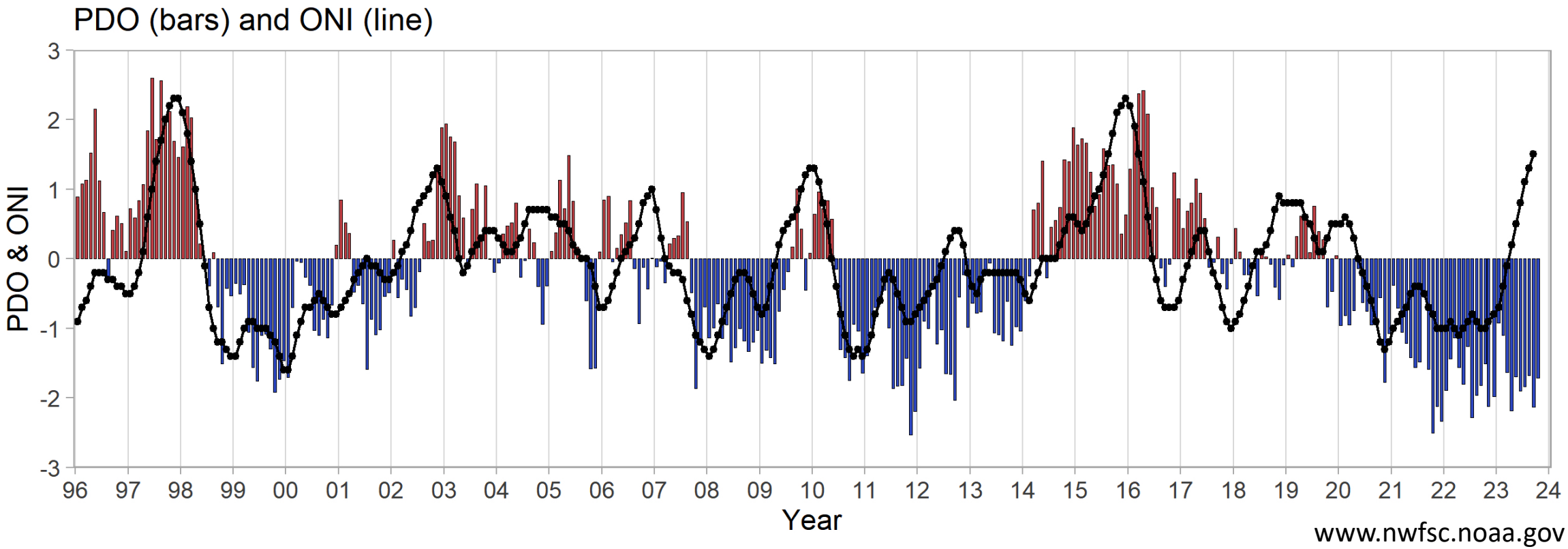
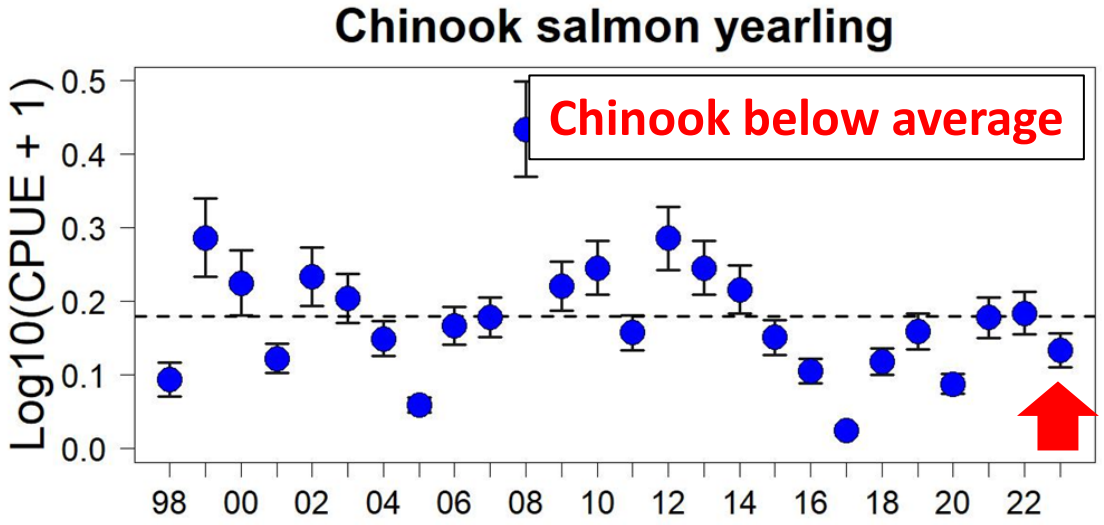
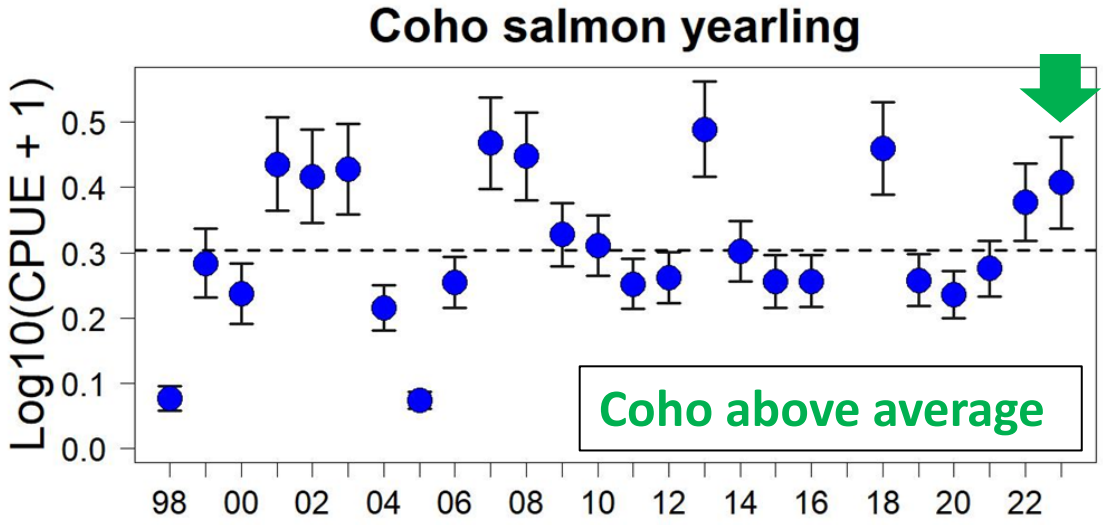


www.nwfsc.noaa.gov

Local Biological Indicators: Salmon and prey

	ECOSYSTEM INDICATORS	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
LOCAL BIOLOGICAL	Copepod richness (May-Sept anom)	24	3	1	11	10	19	18	23	20	14	12	13	22	6	9	4	15	25	26	21	17	16	7	5	2	8
	N copepod biomass (May-Sept anom)	24	19	14	15	6	21	18	25	20	16	9	13	11	3	5	7	8	22	26	23	10	4	2	1	17	12
	S copepod biomass (May-Sept anom)	26	2	7	4	3	18	20	25	17	14	1	9	21	13	10	8	15	23	24	22	16	19	12	5	6	11
	Biological transition	24	14	10	9	12	19	15	23	18	5	1	2	21	3	13	6	6	24	24	22	17	19	8	11	4	16
	Nearshore Ichthyoplankton (Jan-Mar)	21	4	14	8	1	25	26	20	11	22	3	17	2	10	5	13	23	18	19	16	12	24	9	6	15	7
	Near & offshore Ichthyoplankton (community index Jan-Mar)	11	6	4	8	10	13	20	24	1	16	3	12	18	5	2	7	9	22	25	26	21	23	19	15	14	17
	Chinook salmon juvenile catch	23	2	7	20	6	10	18	25	14	12	1	8	5	16	3	4	9	17	22	26	21	15	24	13	11	19
	Coho salmon juvenile catch	24	13	21	5	7	6	23	25	19	2	4	10	11	20	15	1	12	18	17	26	3	16	22	14	9	8

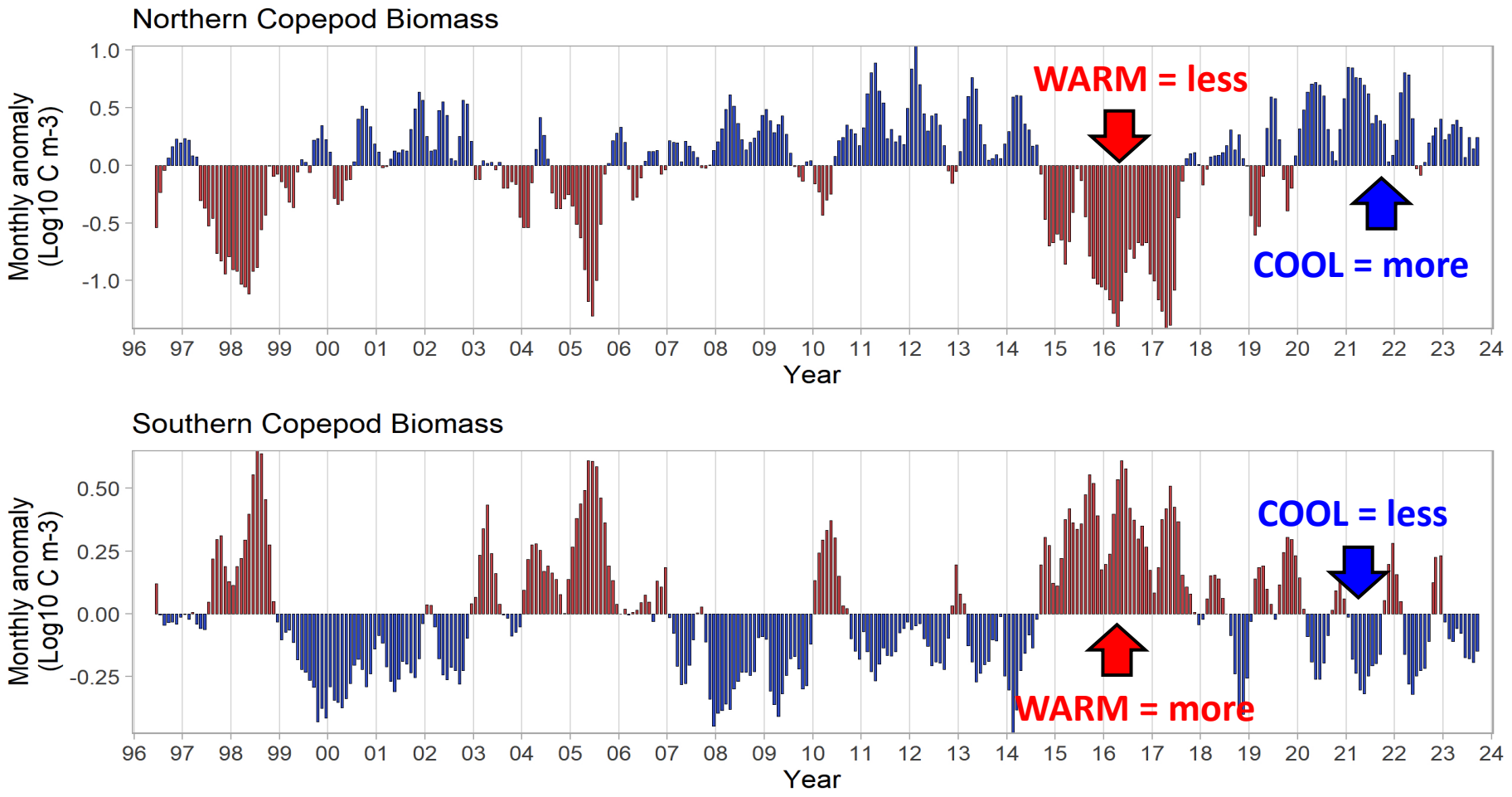




Rank = 19 of 26 years

Rank = 8 of 26 years

Zooplankton (prey) species = "cool" conditions



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Conclusions

- Smolts entering the ocean experienced good ocean conditions the last 3 years (2021-2023)
- El Niño impacts in Washington minimal, but keep an eye on:
  - ✓ Sea surface temperature, marine heatwaves
  - ✓ Snowpack (drought, low flow, warm summer stream temperatures)
- Transition to La Niña this summer could improve marine survival of salmon rearing in the ocean

Questions

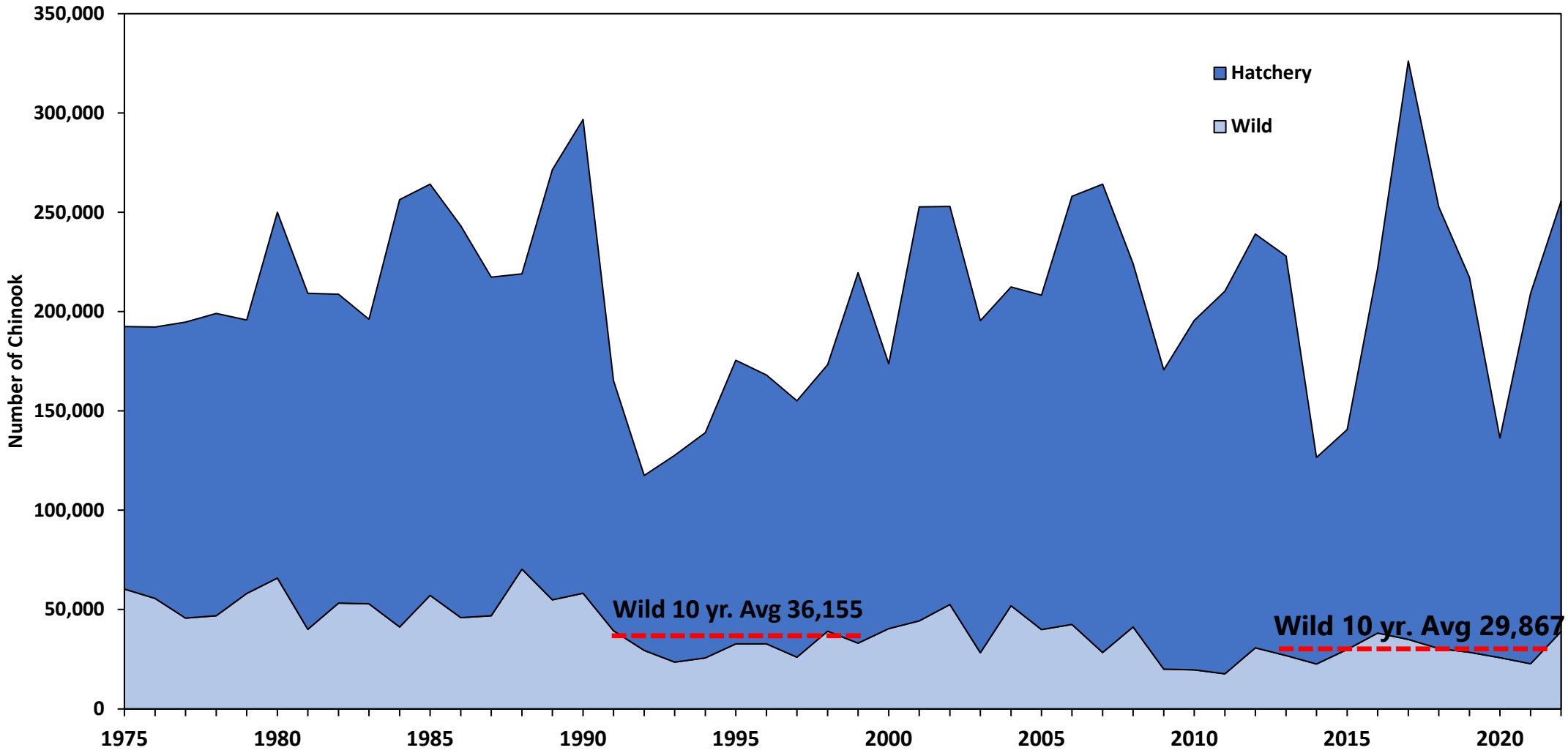
Washington Department of FISH and WILDLIFE

WA Coast and Puget Sound 2023 Returns and 2024 Forecasts

Kirsten Simonsen, PhD and Matthew Bogaard, MSc

Chinook

Chinook Historical Runsize – Puget Sound



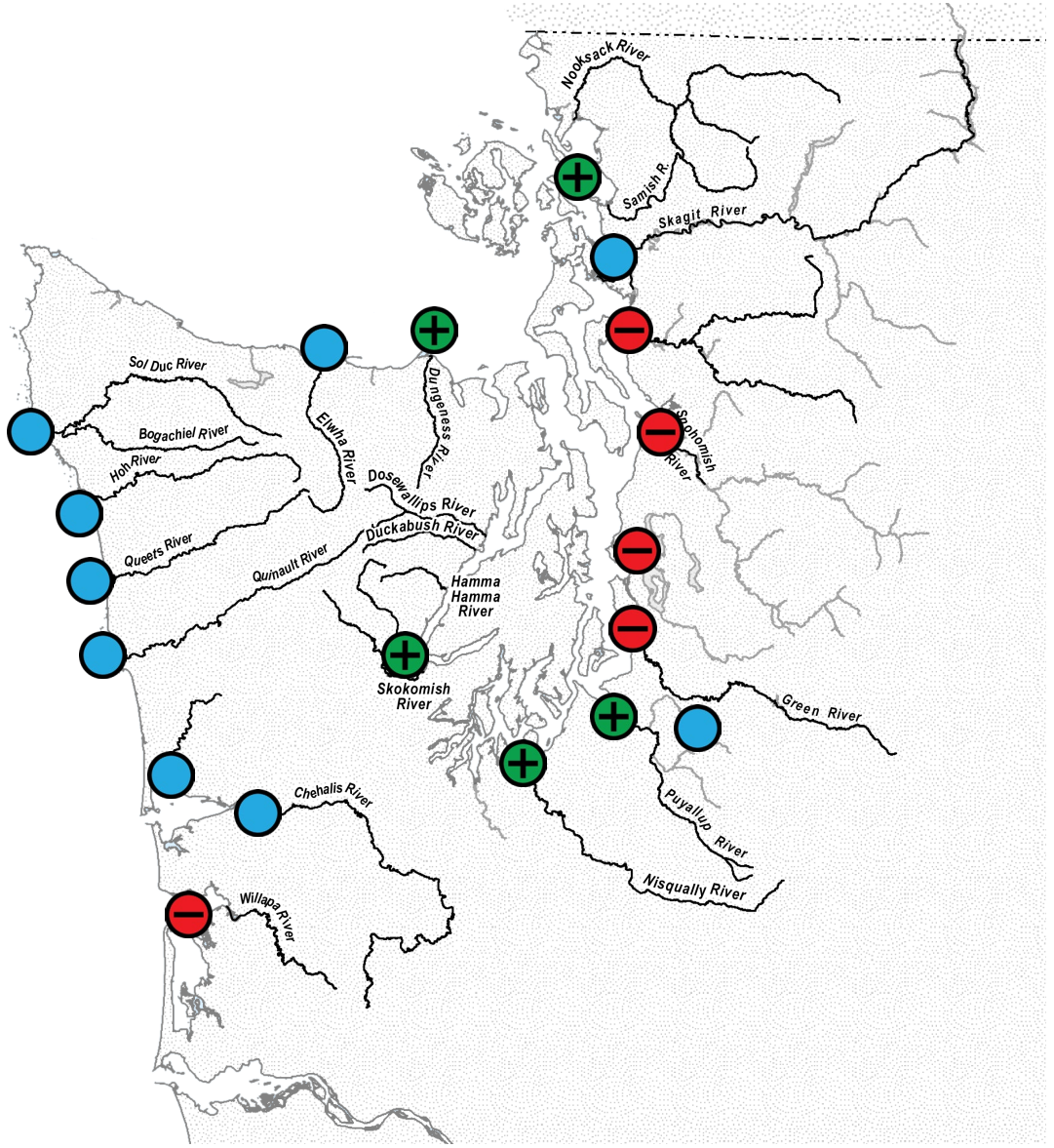
Wild Chinook ⬇~28% since 10yr avg. prior to listing under ESA in 1999

2023 Fall Chinook Returns

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

Relative to Recent 10yr Avg. Runsize

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

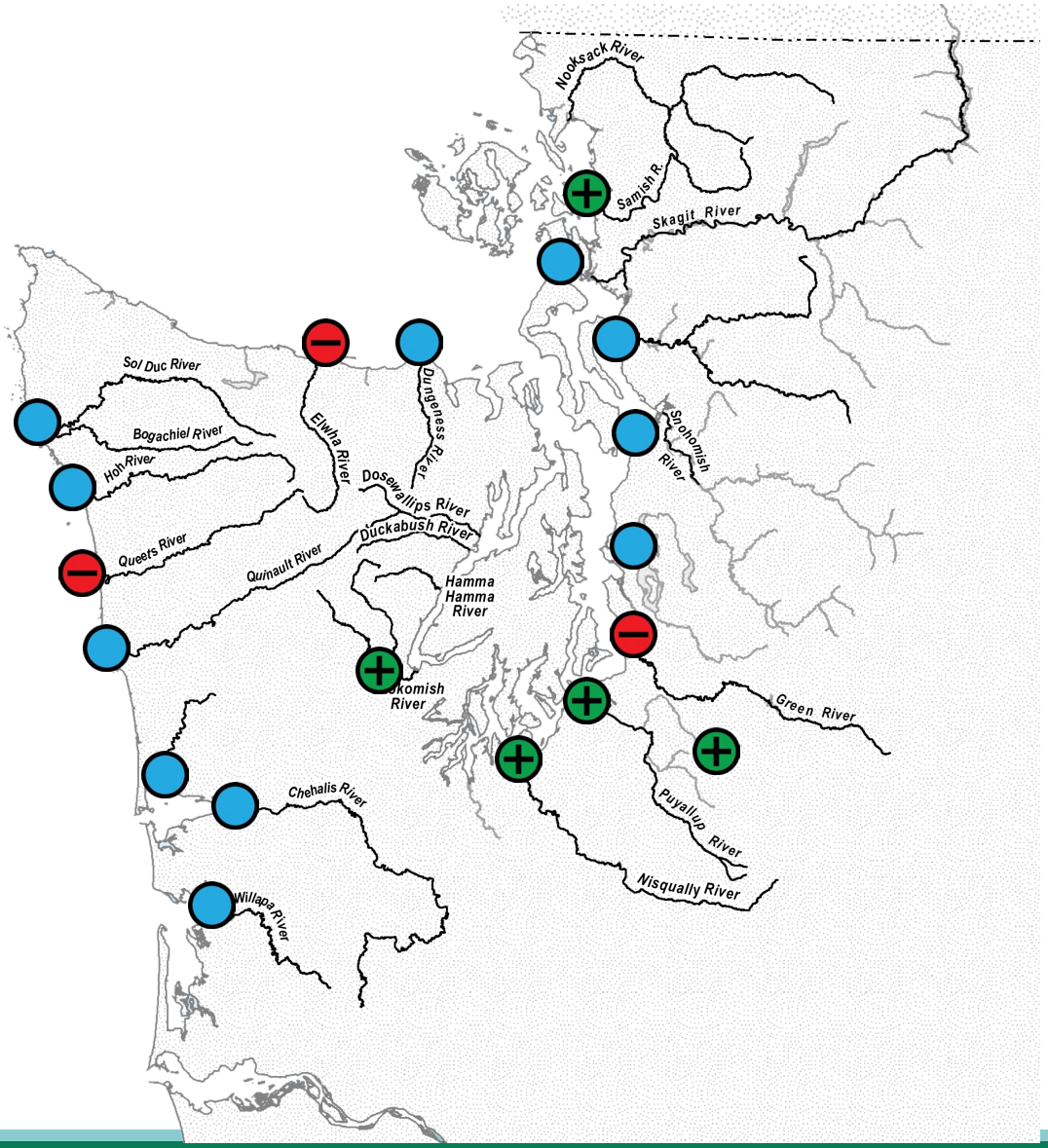


2024 Fall Chinook Forecasts

- Forecasts mostly range from **Neutral** to **Good** for Puget Sound and **Neutral** for the Coast
- Puget Sound – **251,333 Total**
  - **223,179 H / 28,154 W**
- Coast – **73,181 Total**
  - **36,437 H / 36,744 W**

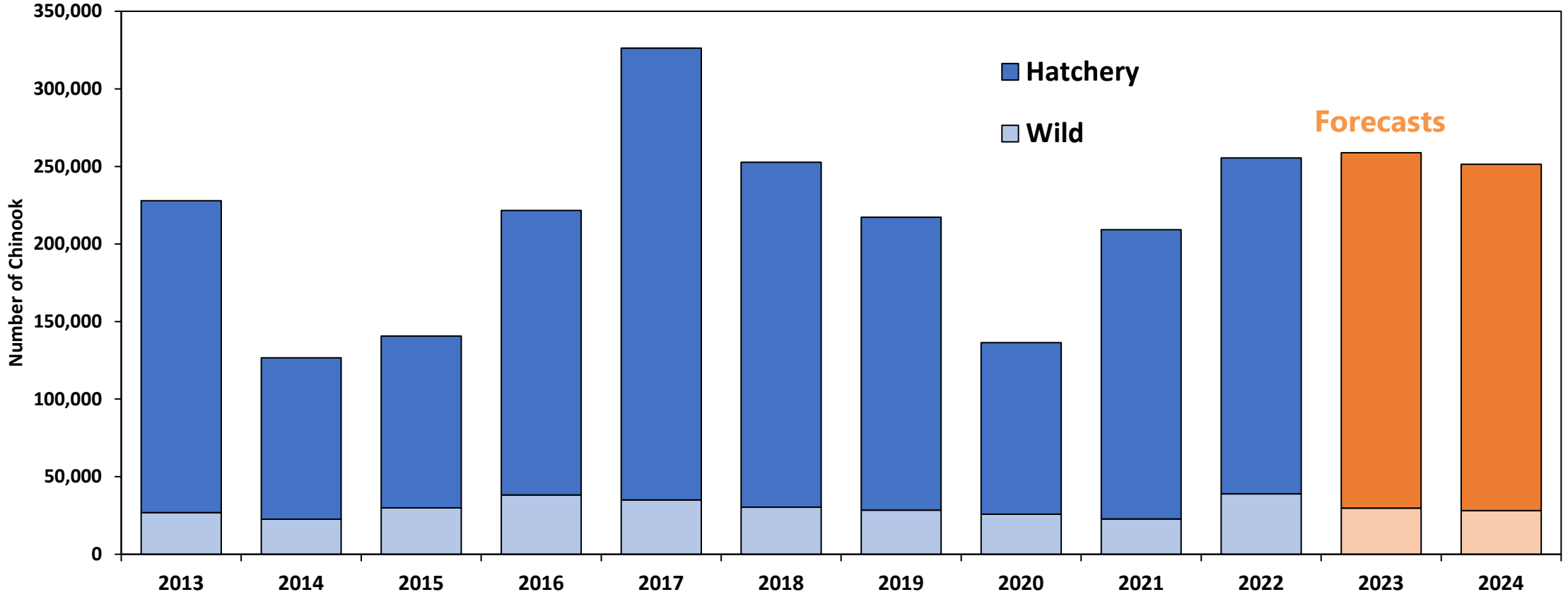
Relative to Recent 10yr Avg. Runsize

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



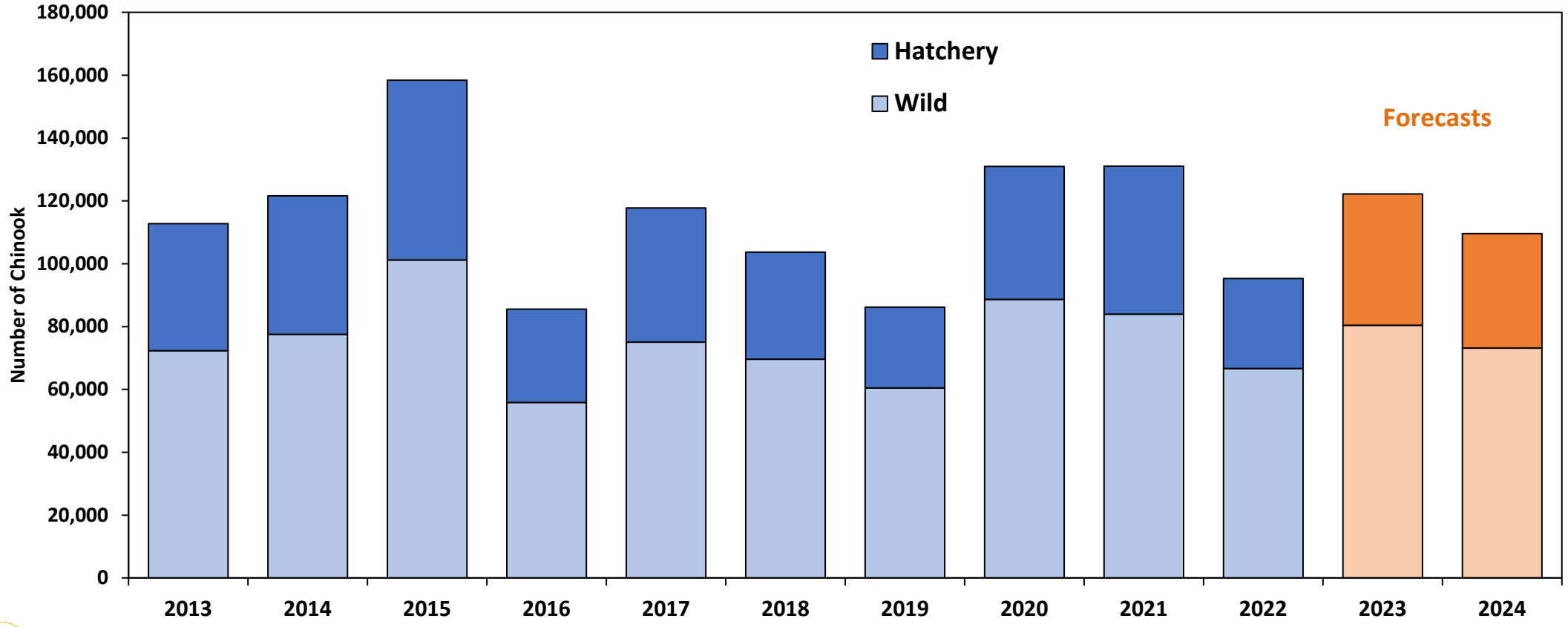
Puget Sound Chinook Forecasts

- Hatchery ⬆ **22%** and Wild ⬇ **6%** over recent 10-year average adult return
- Hatchery ⬇ **3%** and Wild ⬇ **5%** compared to 2023 forecast
- Total PS Chinook ⬆ **17%** from the 10 yr. avg runsize and ⬇ **3%** from last years forecast



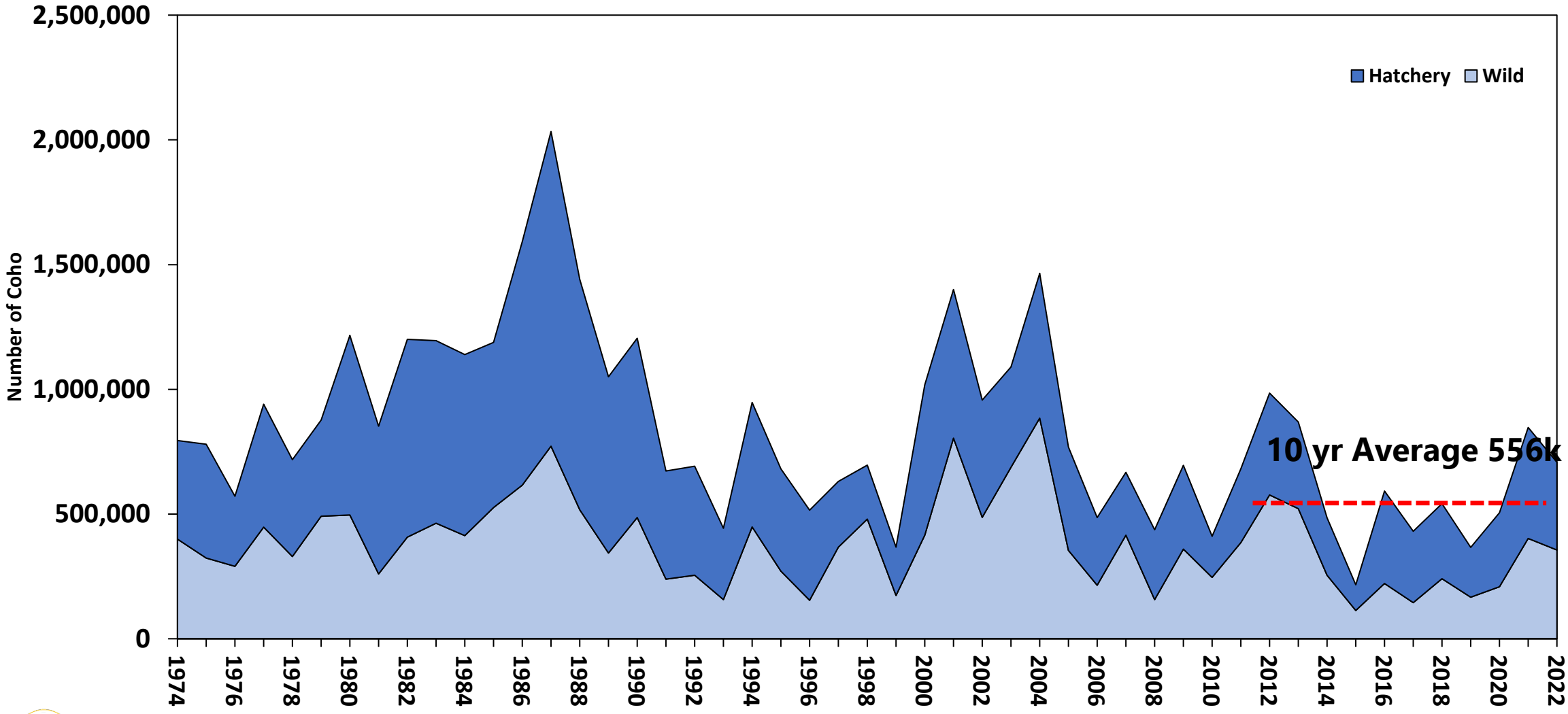
Coastal Chinook Forecasts

- Hatchery ⬇ **7%** and Wild ⬆ **2%** over recent 10-year average adult return
- Hatchery ⬇ **13%** and Wild ⬇ **5%** compared to 2023 forecast
- Total Chinook ⬇ **3%** from the 10 yr. avg runsize and ⬇ **9%** from last years forecast



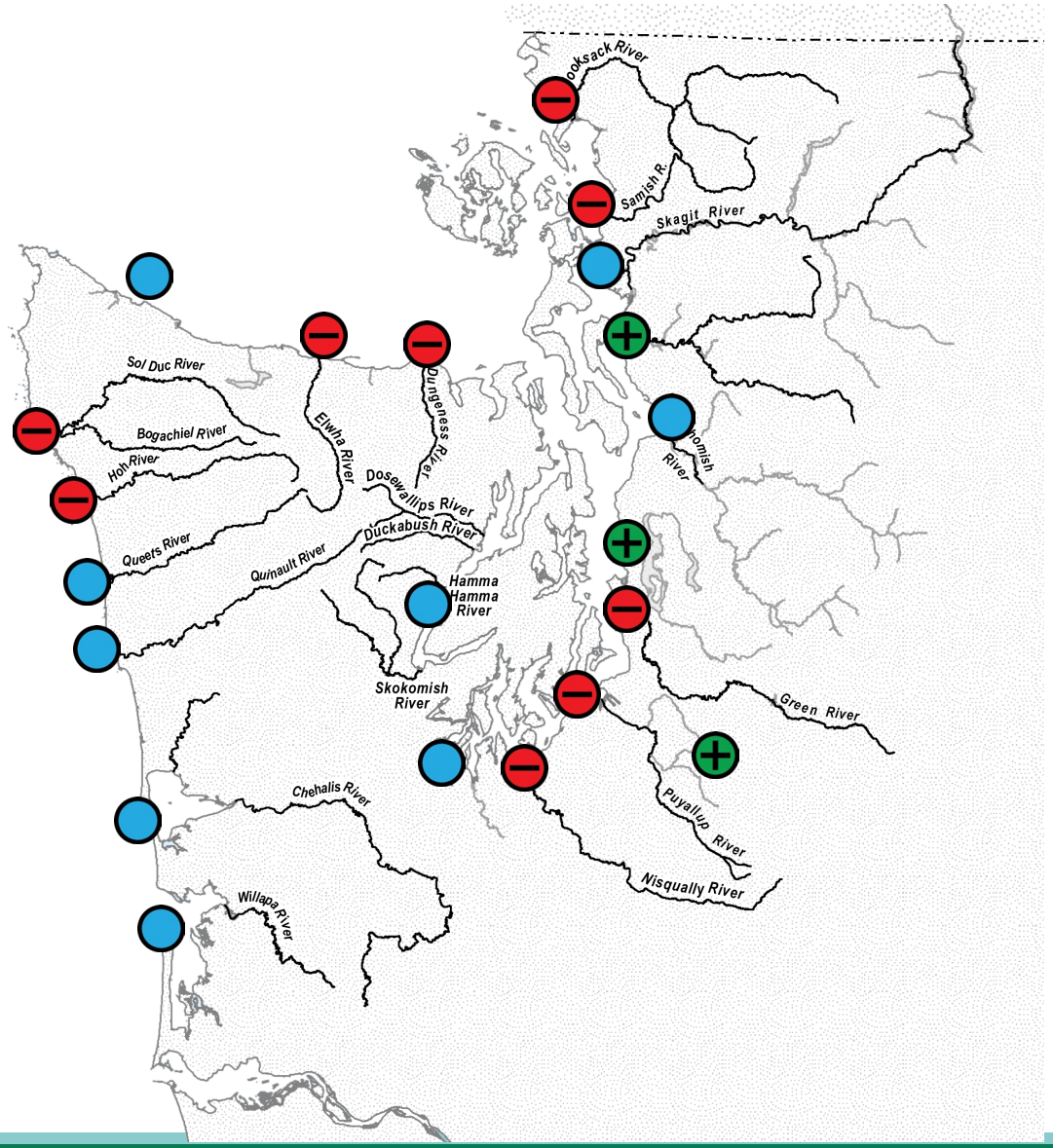
Coho

Coho Historical Runsize – Puget Sound



2023 Coho Returns

- All returns are preliminary
- Returns ranged from **Good** to **Poor** for Puget Sound
- Returns for the coast were **Neutral** to **Poor**



Relative to Recent 10yr Avg. Runsize

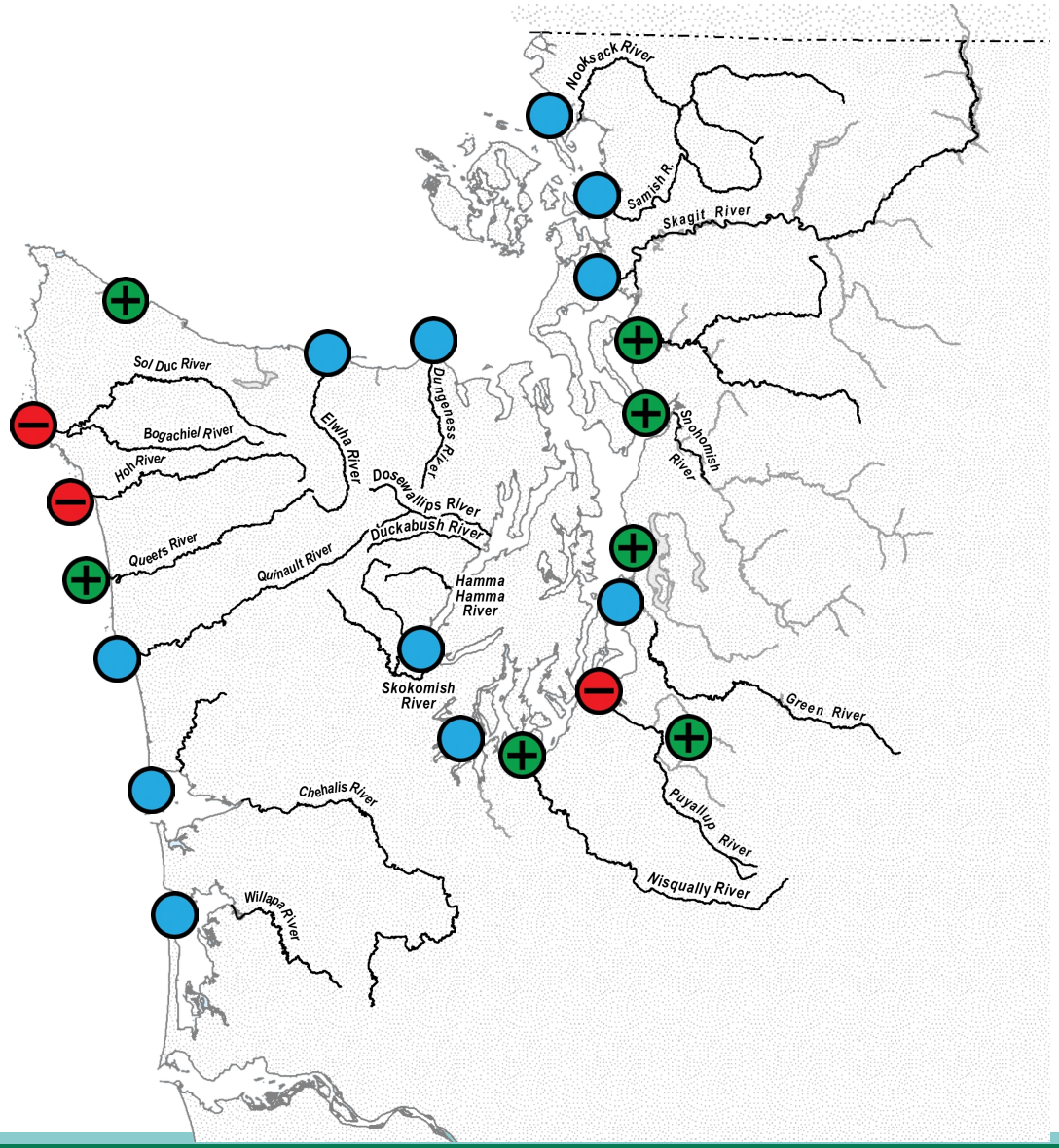
- Good > 125%
- Neutral 75-125%
- Poor < 75%

2024 Coho Forecasts

- Forecasts range mostly from **Neutral** to **Good** across Puget Sound
  - **722,134 Total**
    - **419,966 H / 302,168 W**
- Forecasts range mostly from **Neutral** to **Poor** across the Coast
  - **383,908 Total**
    - **225,951 H / 157,957 W**

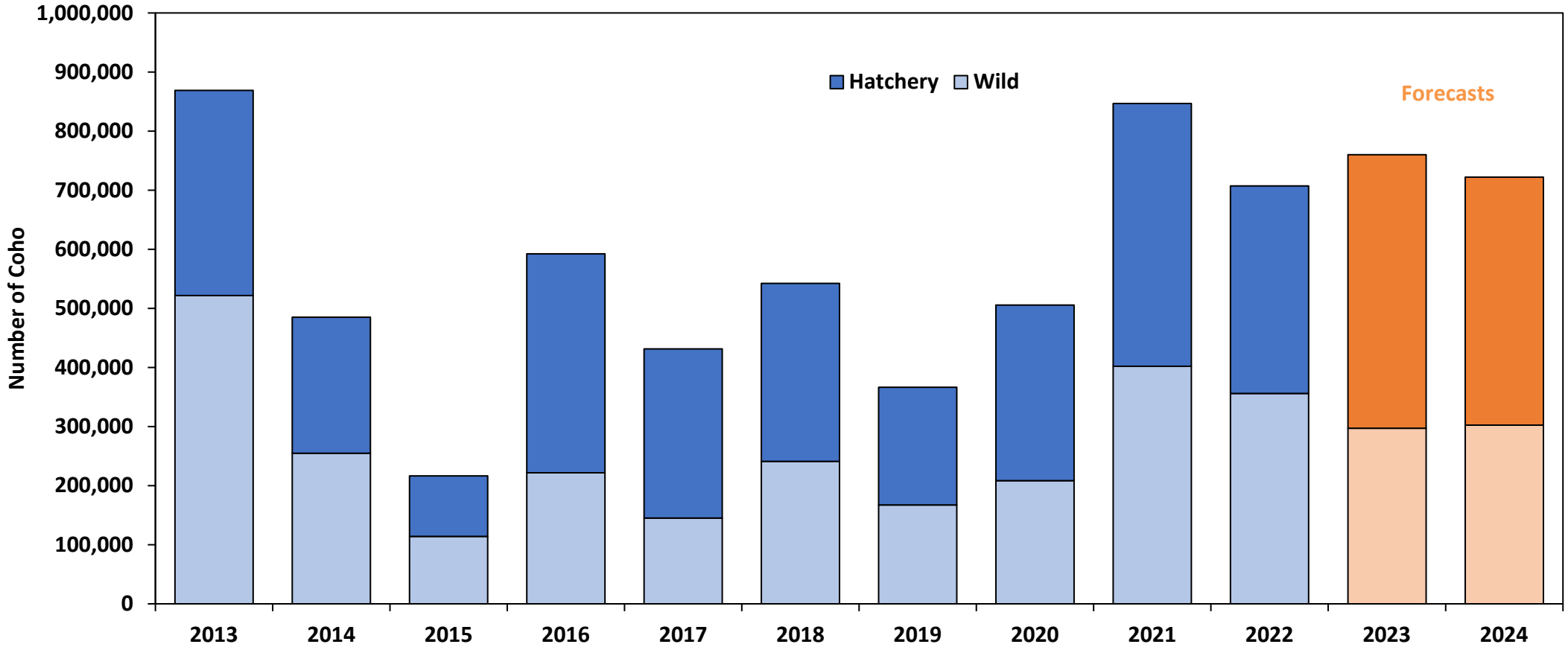
Relative to Recent 10yr Avg. Runsize

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



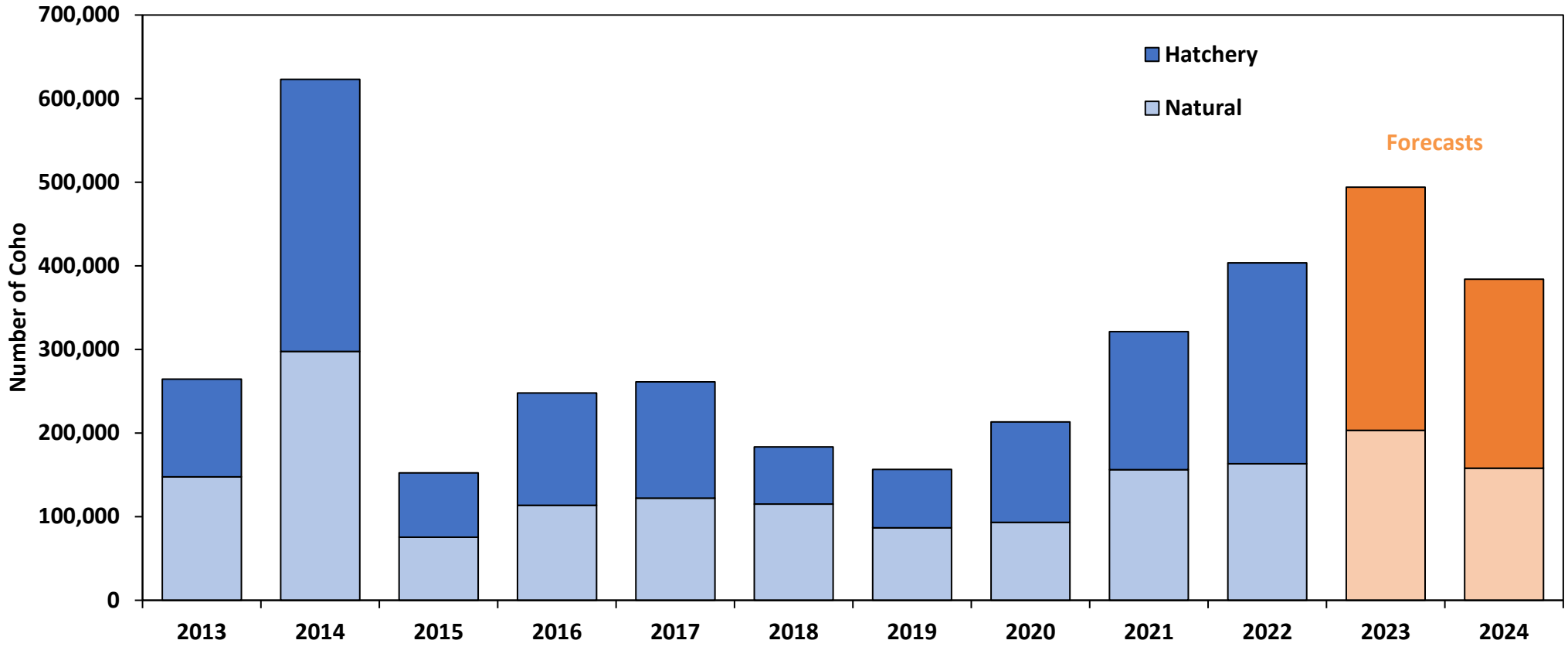
Puget Sound Coho Forecasts

- Hatchery ⬆ **43%** and Wild ⬆ **15%** over recent 10-year average
- Hatchery ⬇ **9%** and Wild ⬆ **2%** compared to 2023 forecast
- Total PS Coho ⬆ **30%** from the 10 yr. avg runsize and ⬇ **5%** from last years forecast



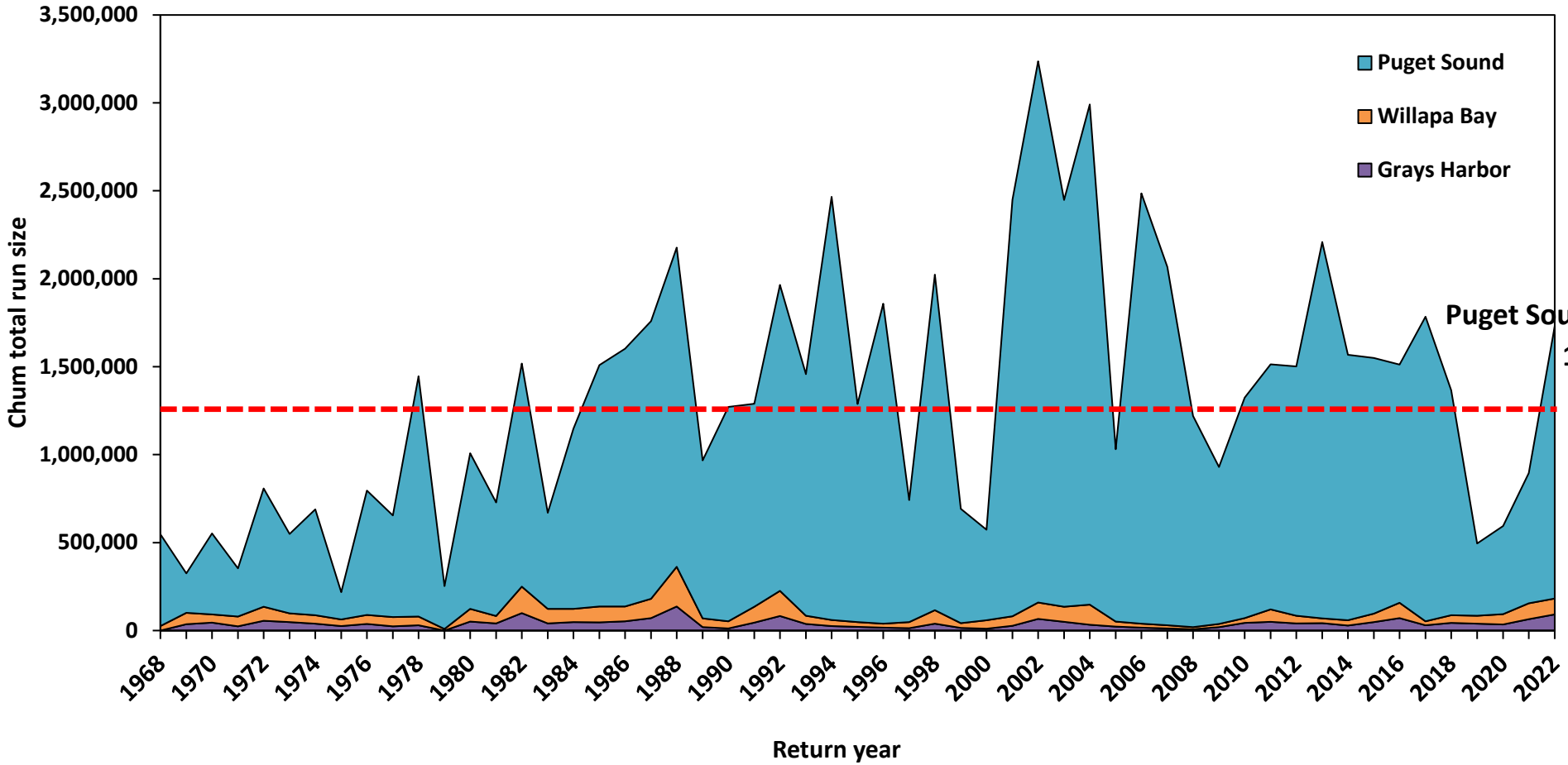
Coastal Coho Forecasts

- Hatchery ⬆ **52%** and Wild ⬆ **15%** over recent 10-year average adult return
- Hatchery and Wild ⬇ **22%** compared to 2023 forecast
- Total Coho ⬆ **35%** from the 10 yr. avg runsize and ⬇ **22%** from last years forecast



Chum

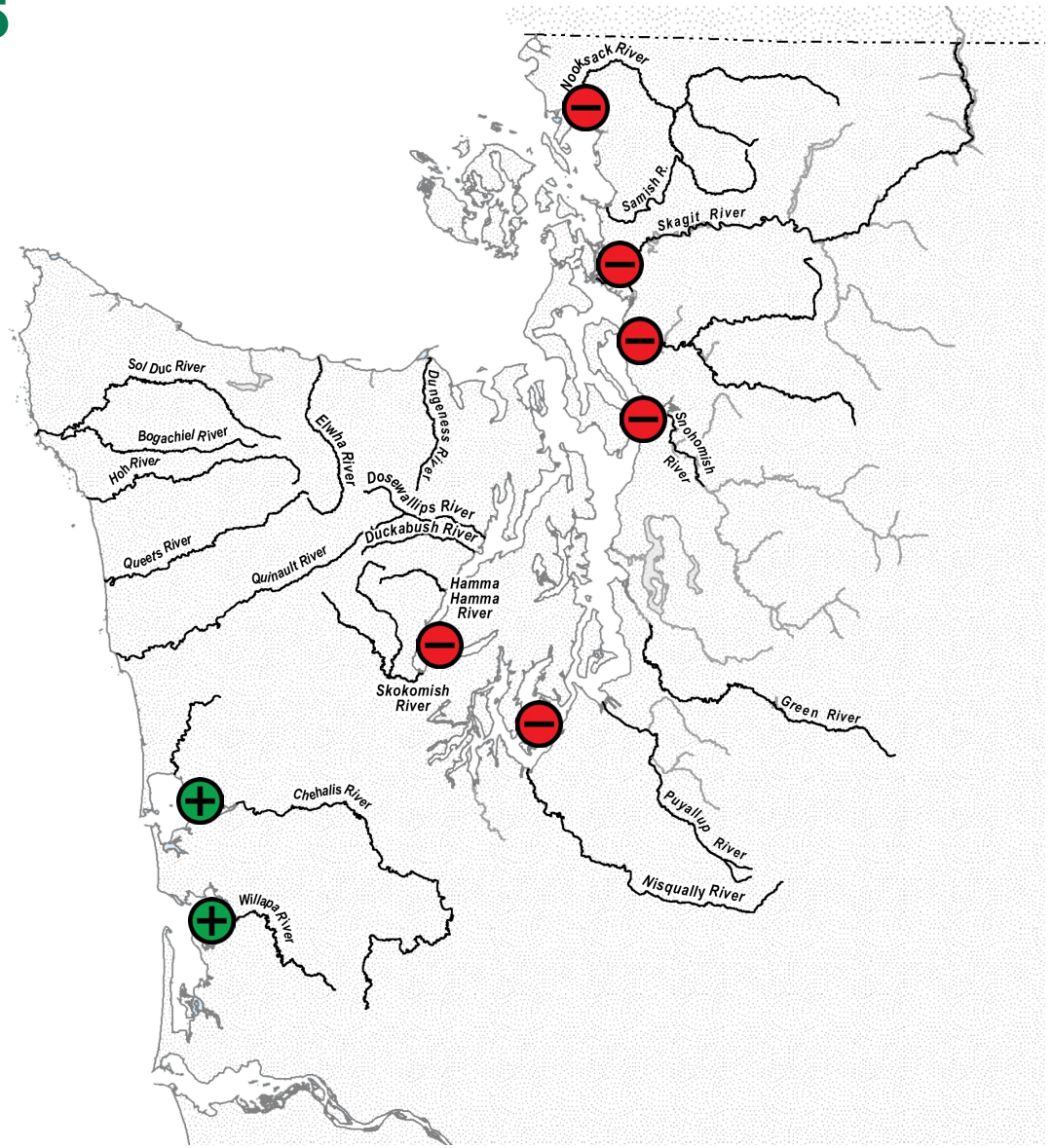
Chum Historical Run Size



2023 Fall Chum Returns

Relative to Recent 10yr Avg. Escapement

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



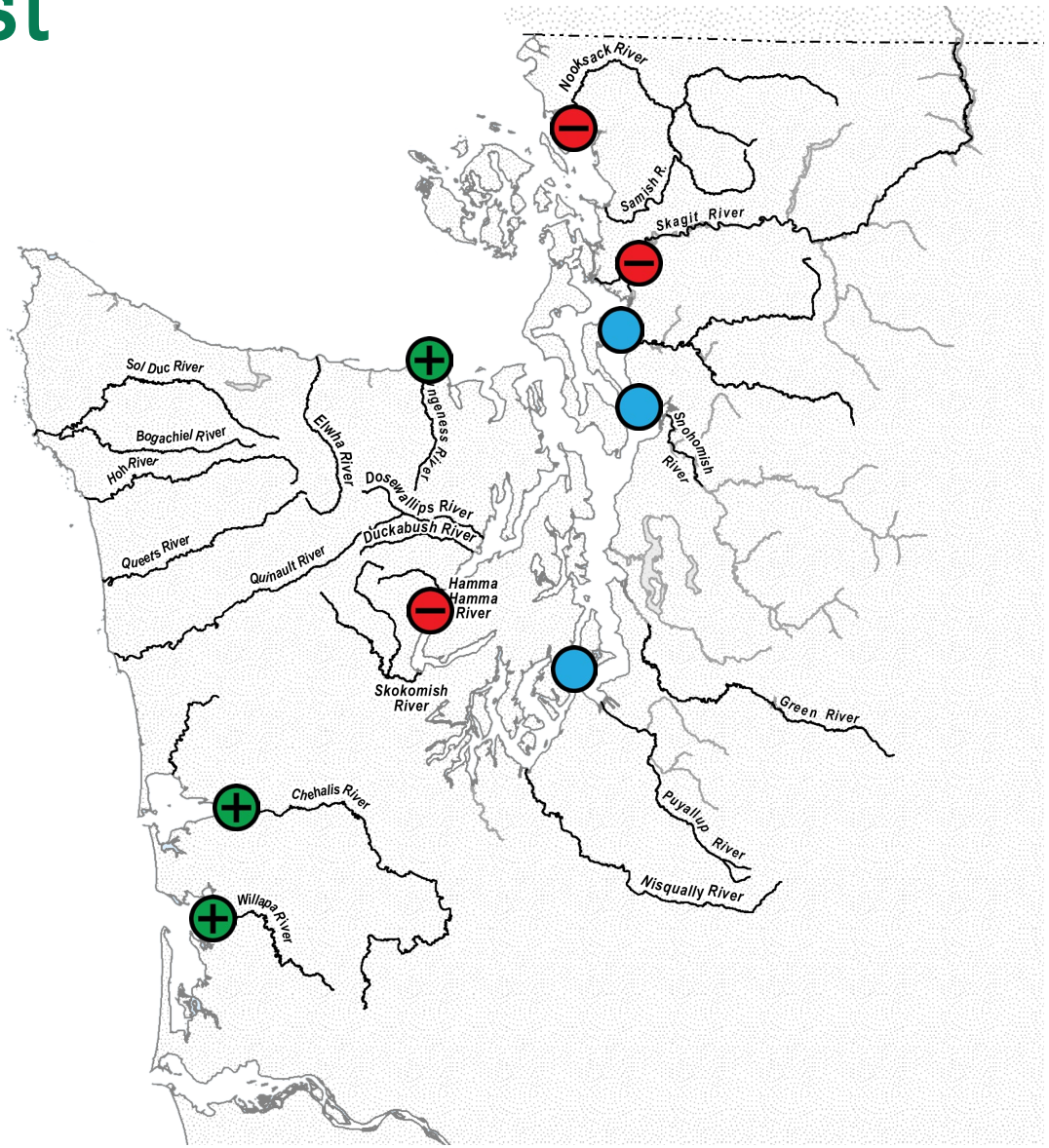
- Returns were **Poor** throughout Puget Sound
- Returns were **Good** along the coast
- HC and South Sound are relative to in-season updated run sizes, not escapement

2024 Fall Chum Forecast

Relative to Recent 10yr Avg. Run size

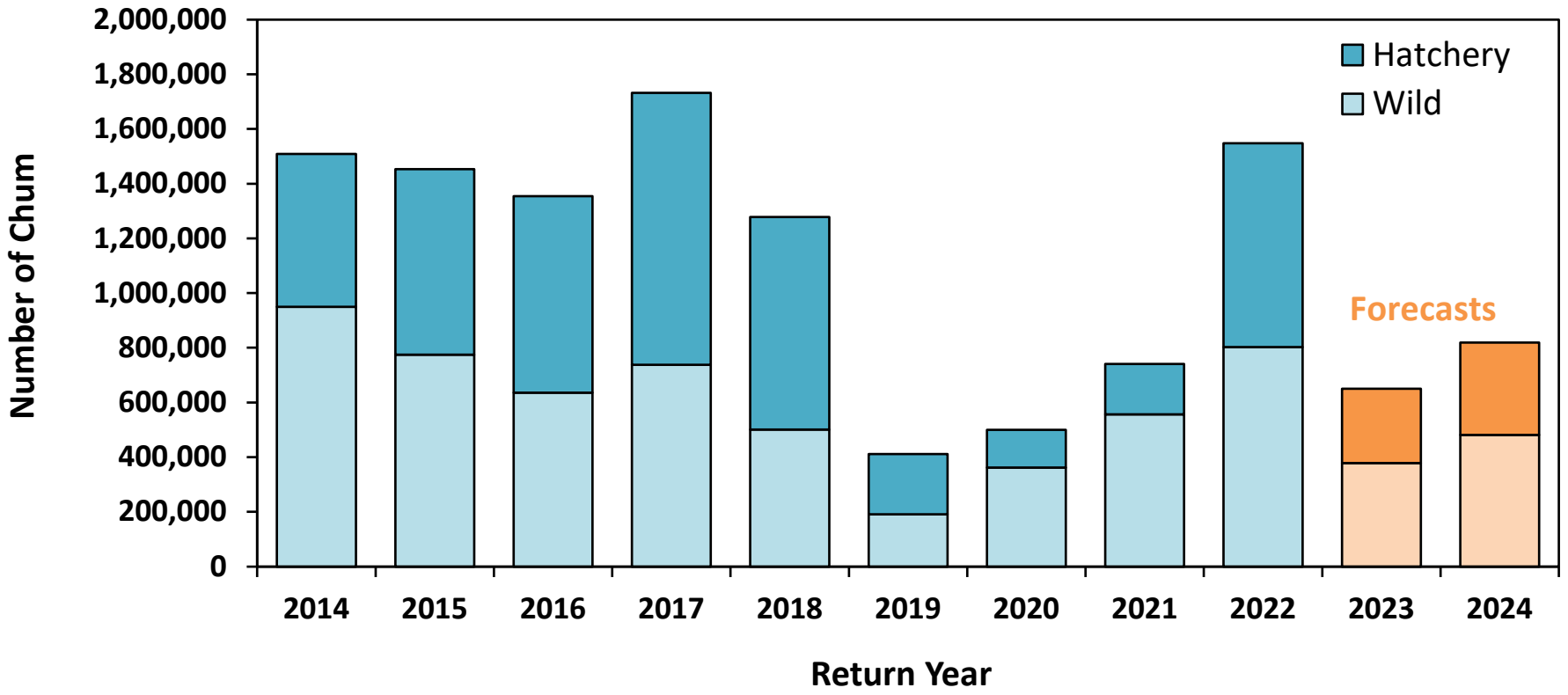
- Good > 125%
- Neutral 75-125%
- Poor < 75%

- Forecasts range from **Poor** to Neutral in Puget Sound
- Hood Canal – 254,900
- Central/S. Sound – 486,562
- Willapa – 80k
- Grays H – 69k



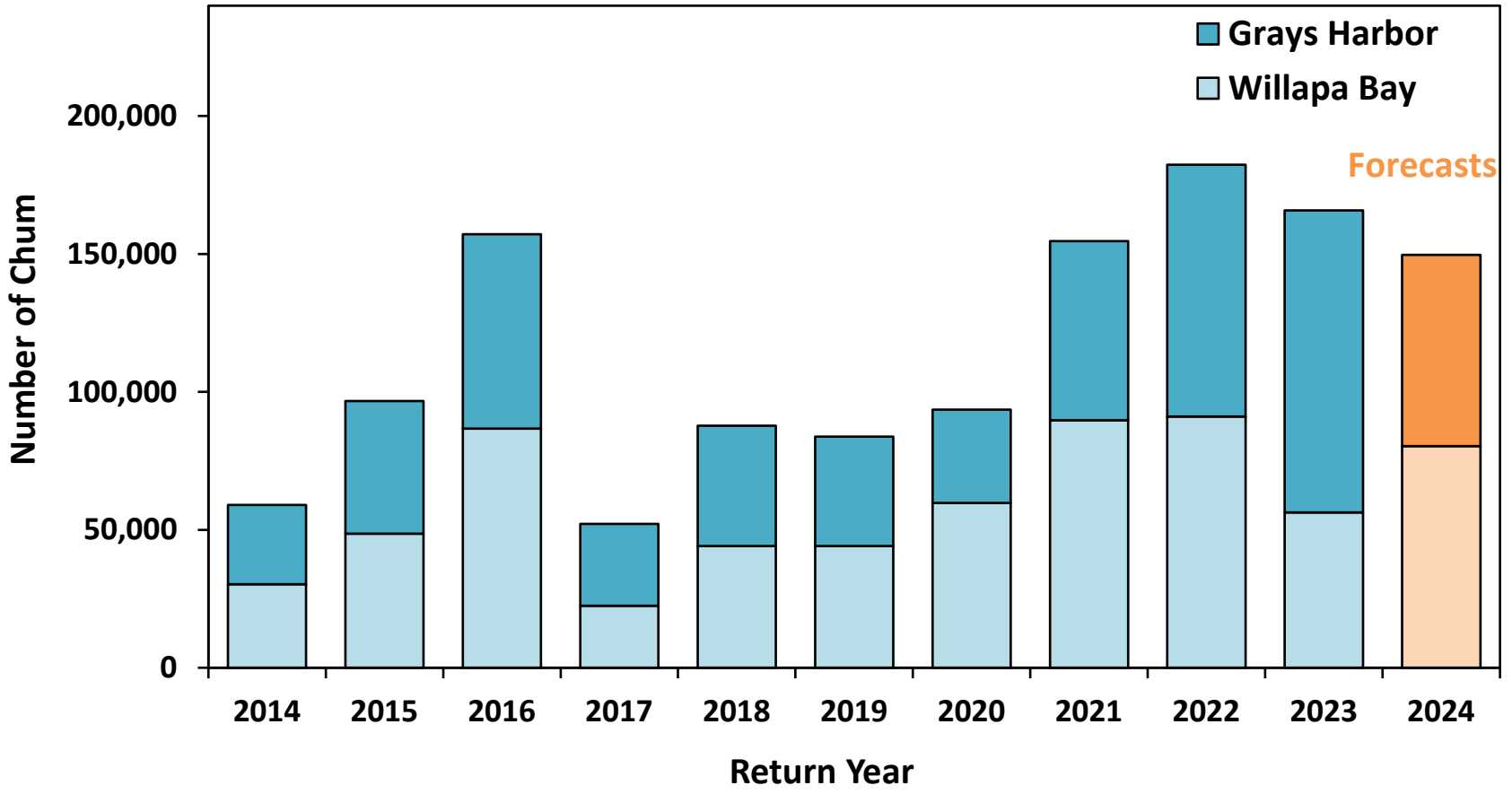
Puget Sound Fall Chum Forecasts

Hatchery ⬇ **46%** and Wild ⬇ **25%** over recent 10-year avg.



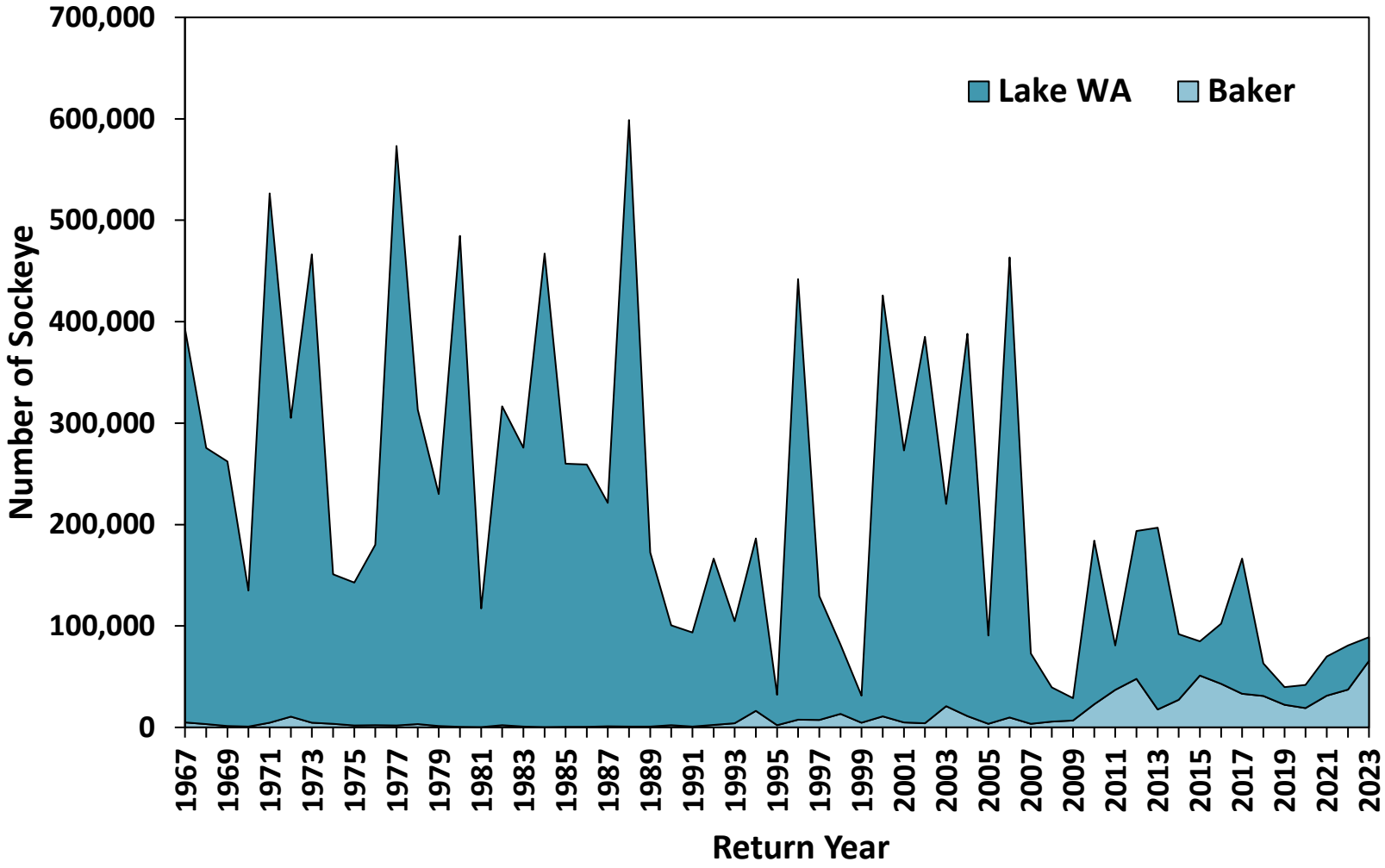
Coastal Chum Forecasts

Willapa Bay ⬆ **40%** and Grays Harbor ⬆ **24%** over recent 10-year avg.



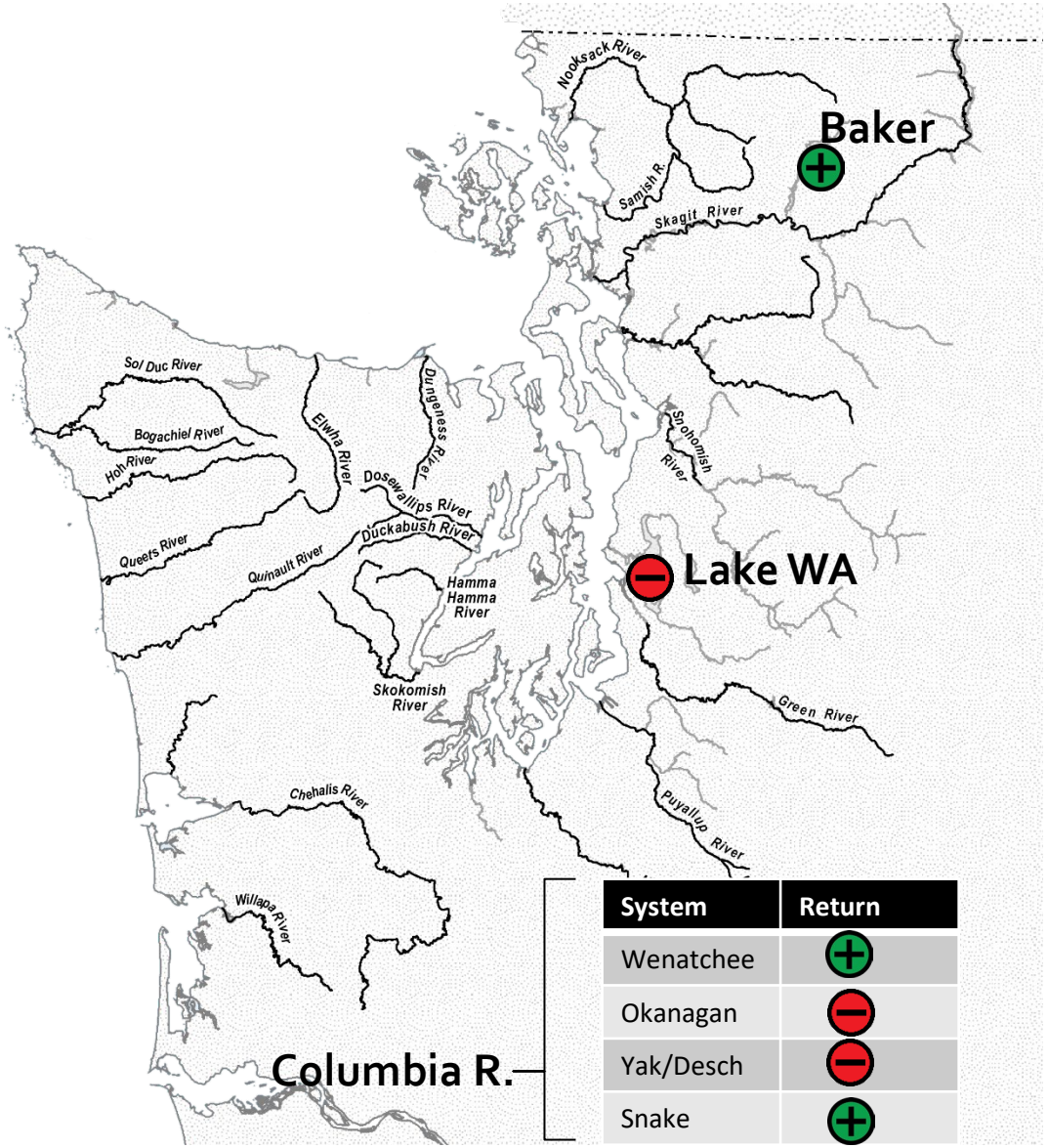
Sockeye

Puget Sound Sockeye Run Size



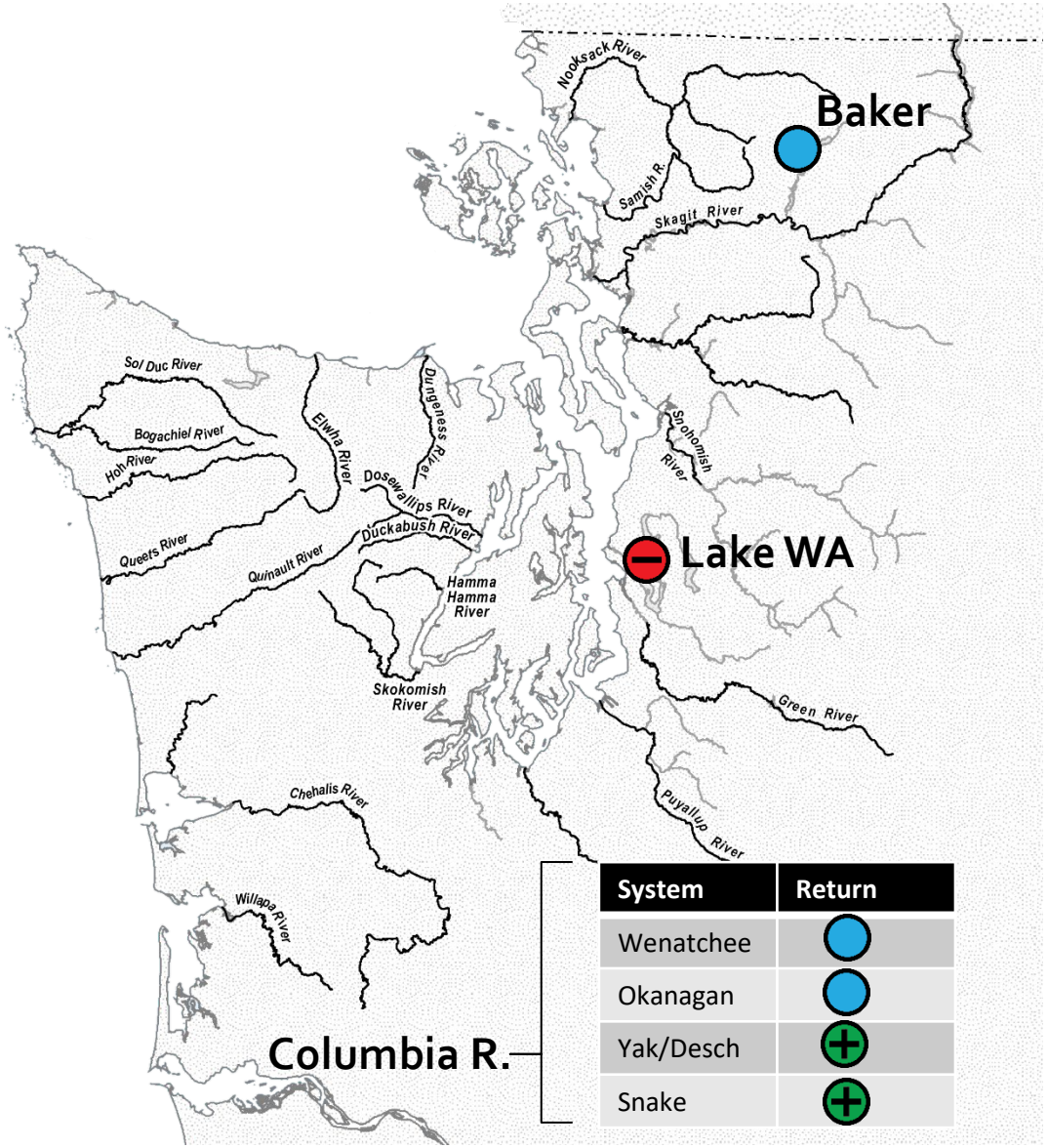
2023 Sockeye Returns

- Returns were **Good** and **Poor** in Puget Sound
- Total Columbia River return was **Neutral** with stock specific returns ranging from **Good** to **Poor**



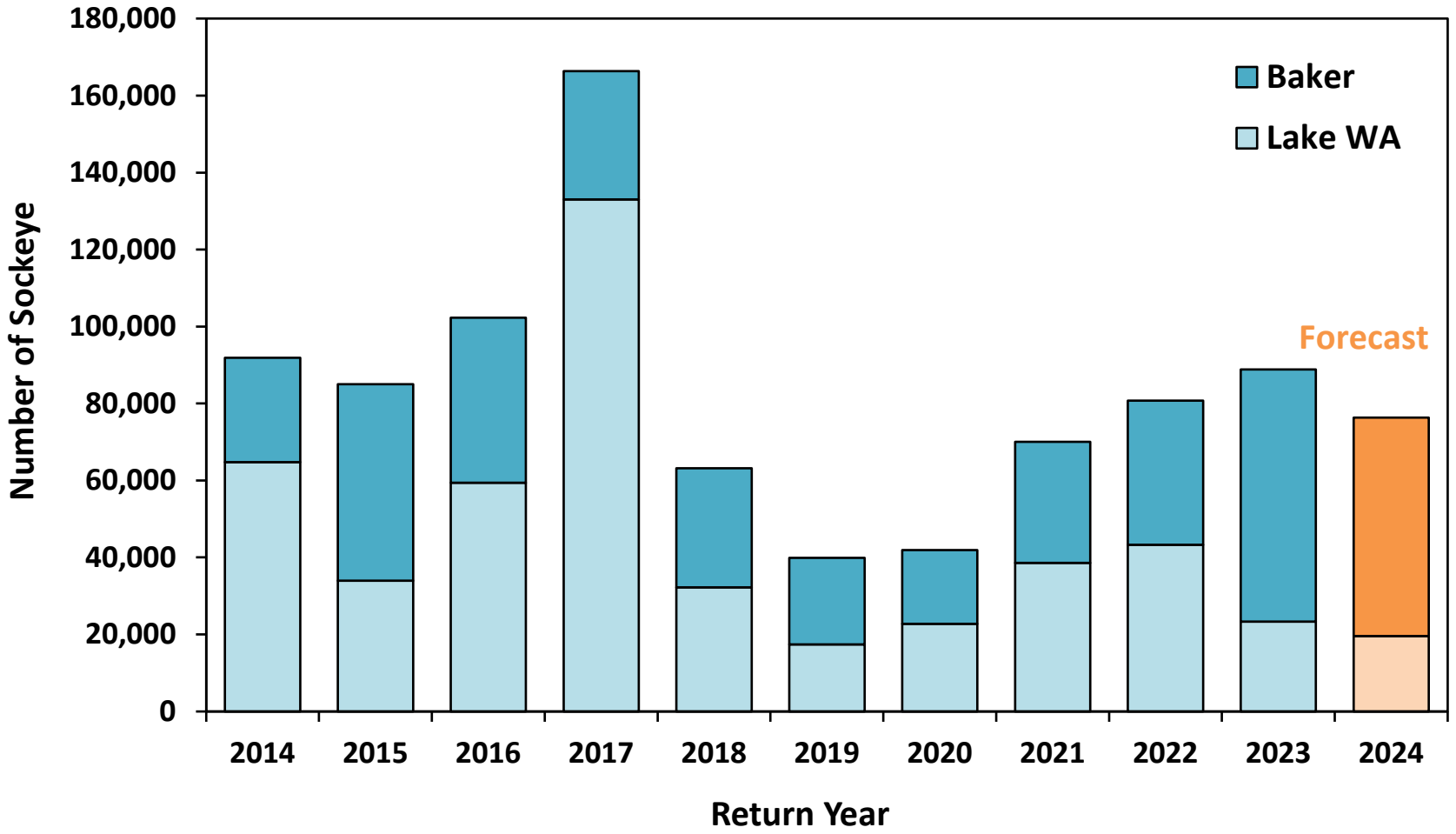
2024 Sockeye Forecast

- Baker Lake – 56,750
- Lake WA – 19,574
- Columbia River – 401,700
  - Wenatchee – 97,000
  - Okanagan – 288,700
  - Yakima/Deschutes – 12,200
  - Snake River – 3,800



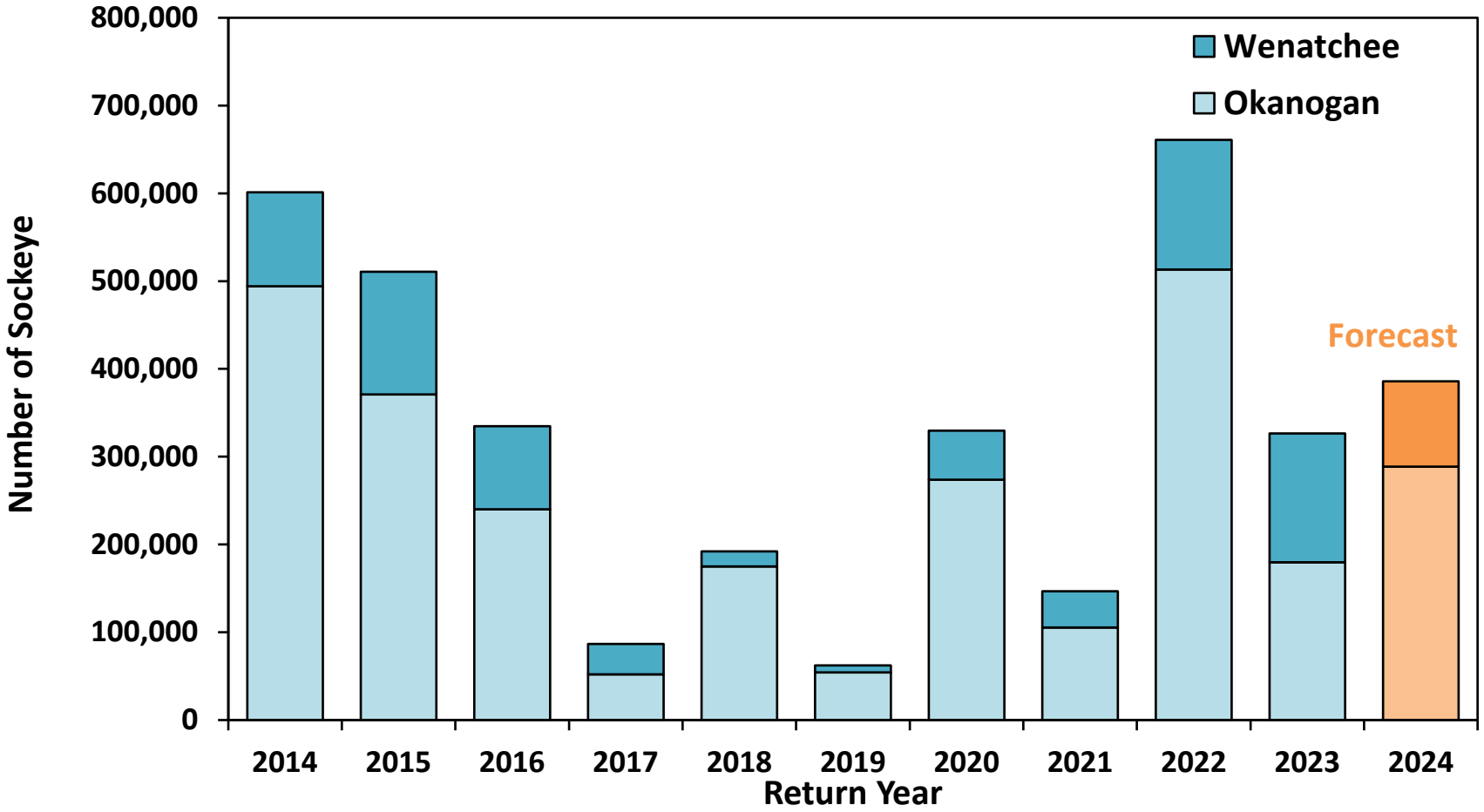
Puget Sound Sockeye Forecasts

Lake WA ⬇ **58%** and Baker ⬆ **57%** over recent 10-year avg.



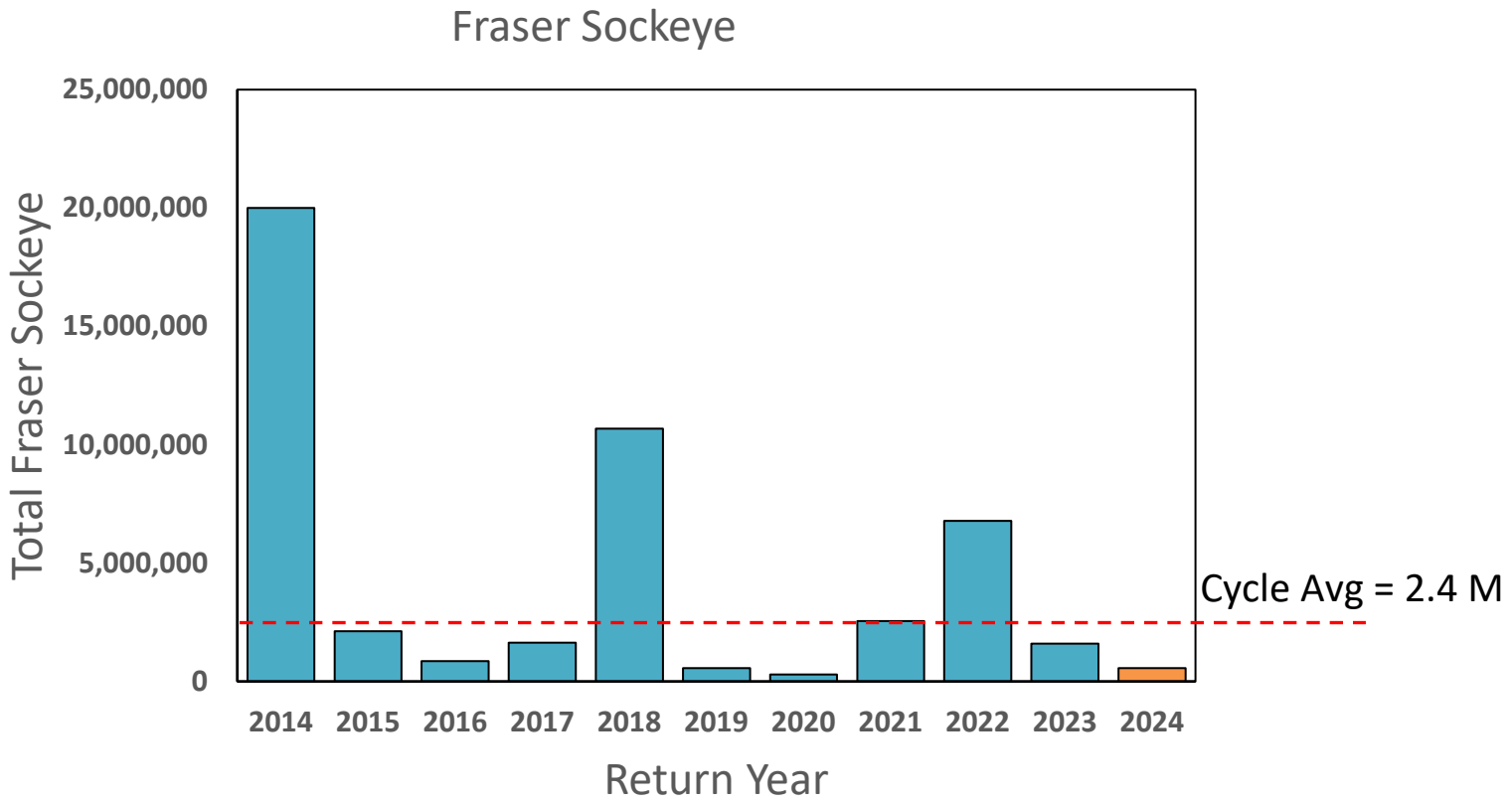
Columbia Sockeye Forecasts

Lake Wenatchee ⬆ **23%** and Okanogan ⬆ **16%** over recent 10-year avg.



2024 Fraser River Sockeye Forecast

- 2020 was the lowest return on record for Fraser Sockeye
- Total Fraser Sockeye – **567k**
  - Early Stuart – 200k
  - Early Summer – 159k
  - Summer – 379k
  - Late – 29k
- Lowest forecast on record



Questions

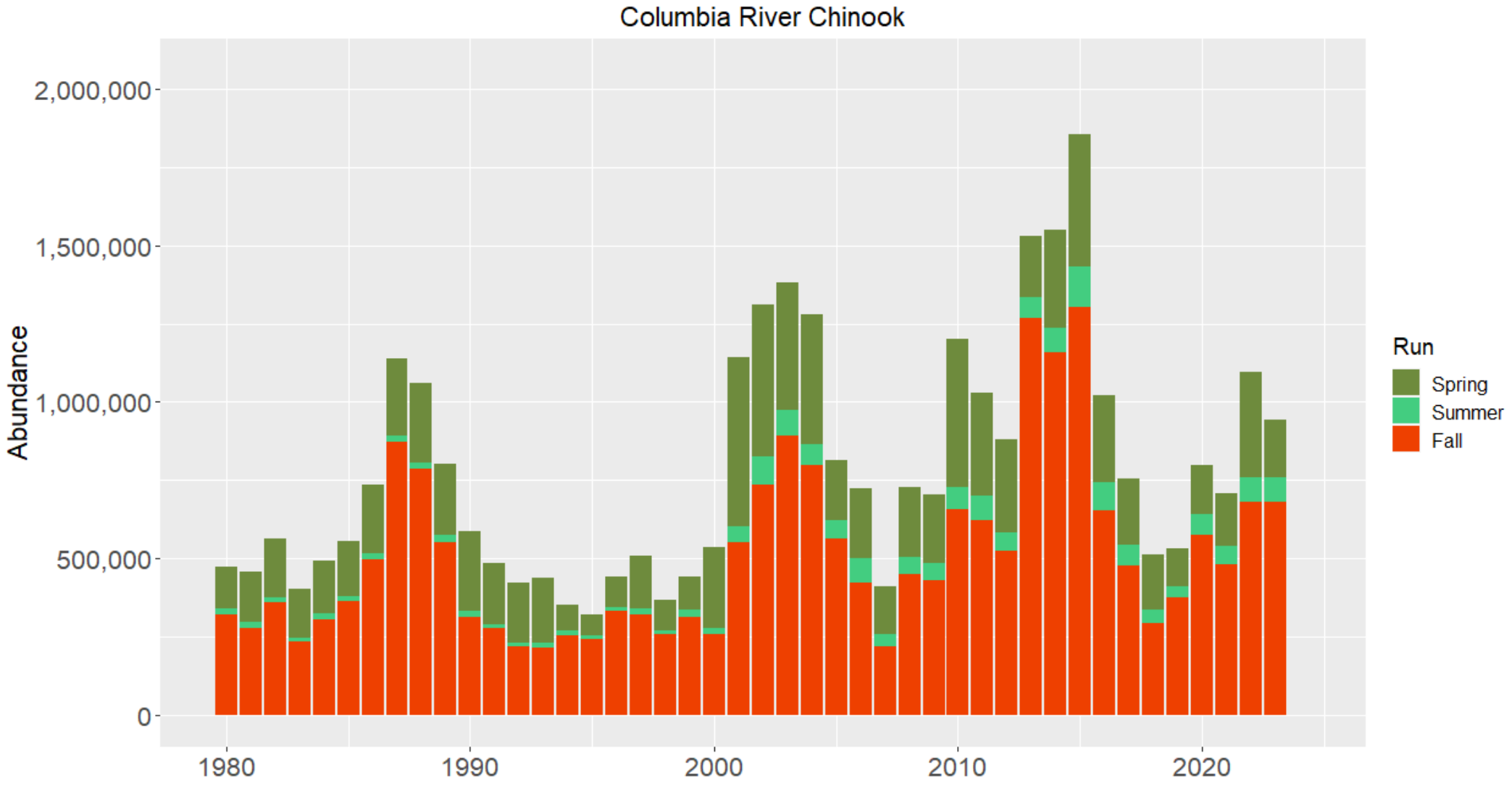
Washington Department of FISH and WILDLIFE

Columbia River 2023 Returns and 2024 Forecasts

Shannon Conley

Columbia River

Chinook



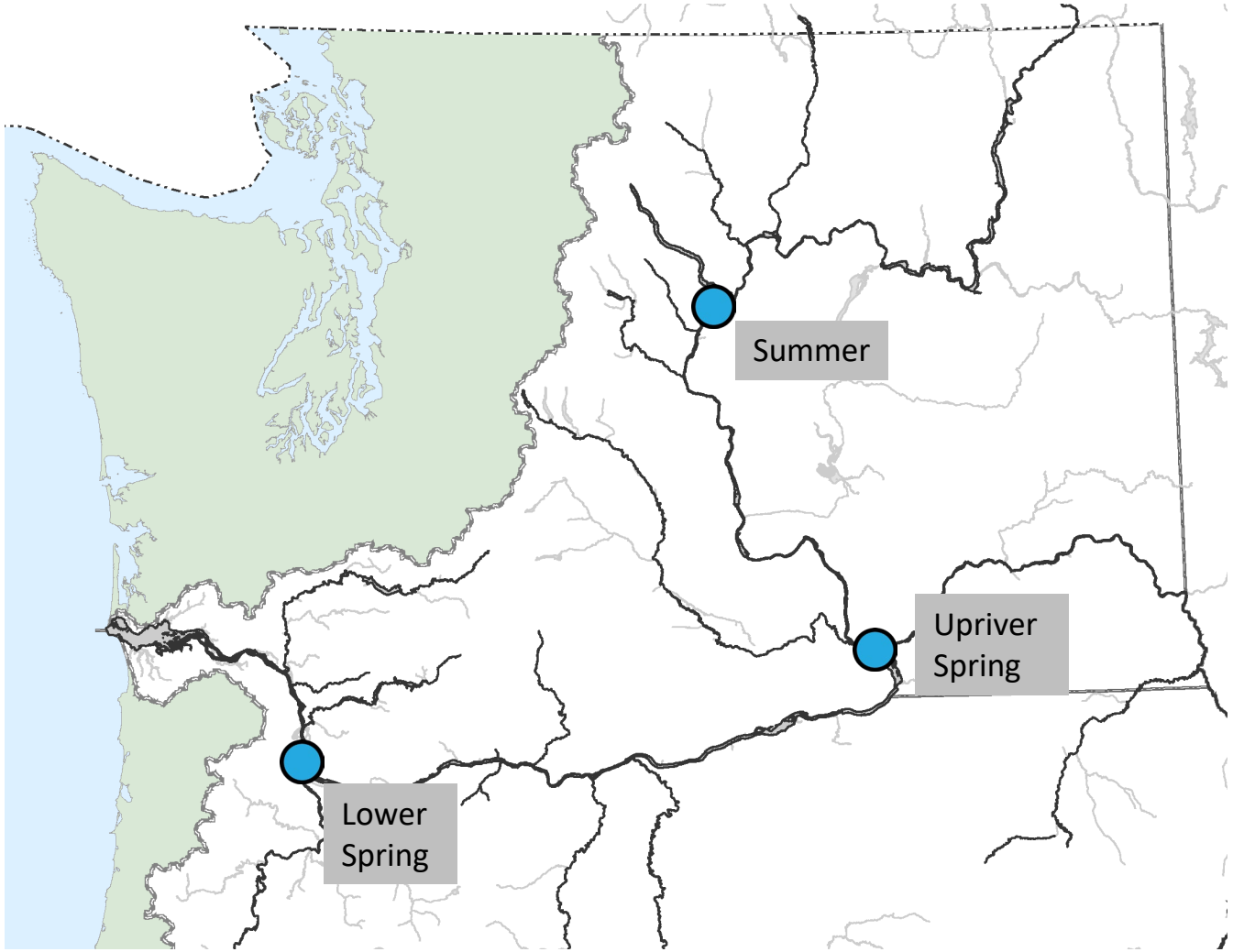
**Run sizes to river mouth*

2023 Spring/Summer Chinook Returns

Relative to Recent 10yr Avg. Run Size

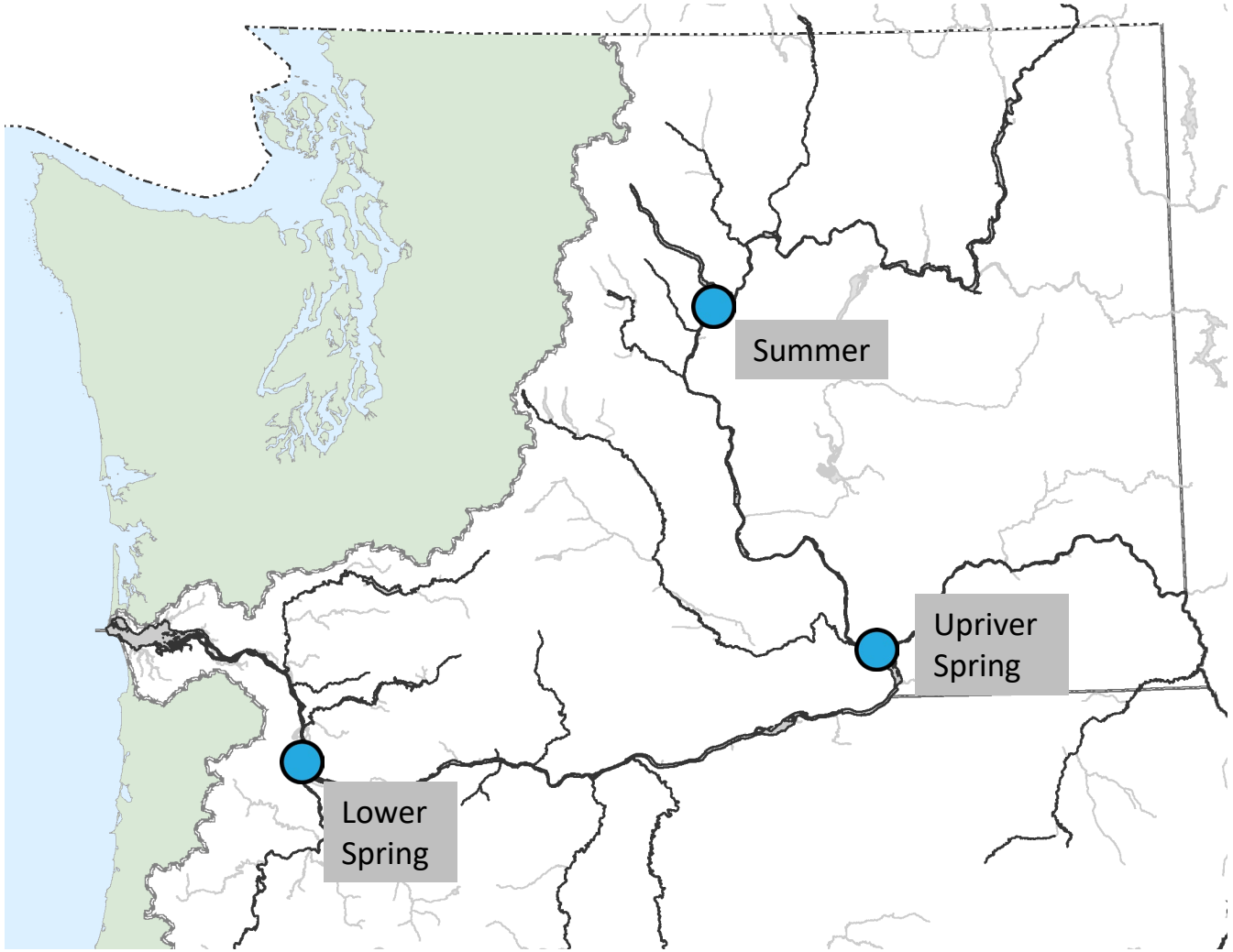
- > 125%
- 75-125%
- < 75%

- Lower Spring – 75,407 (97%)
  - Cowlitz, Kalama, Lewis, Sandy, Willamette, and Select Areas
- Upriver Spring – 141,179 (94%)
  - Upstream of Bonneville Dam
- Summer – 54,722 (77%)
  - Upper Columbia



2024 Spring/Summer Chinook Forecasts

- Lower Spring – 84,600 (107%)
- Upriver Spring – 121,000 (79%)
  - Snake River wild forecast is 8% of the total upriver run
- Summer – 53,000 (76%)



2023 Fall Chinook Returns

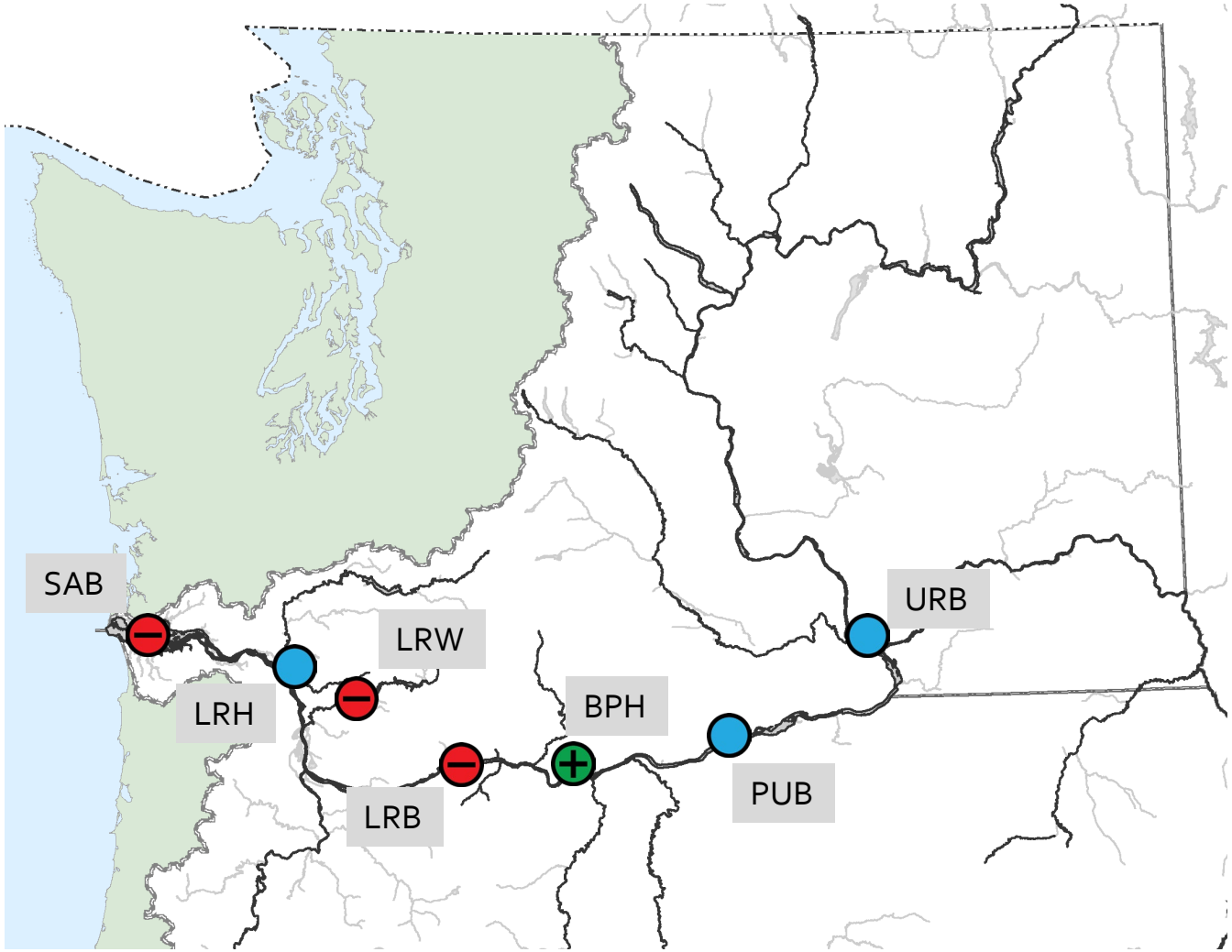
Tule stock

- LRH (Lower River Hatchery) – 87,127 (106%)
- BPH (Bonneville Pool Hatchery) – 198,864 (218%)

Bright Stock

- SAB (Select Area Bright) – 1,742 (24%)
- LRW (Lower River Wild) – 11,415 (60%)
- LRB (Lower River Bright) – 3,160 (52%)
- PUB (Pool Upriver Bright) – 78,938 (83%)
- URB (Upriver Bright) – 338,991 (82%)

Total Fall – 720,237 (99%)



2024 Fall Chinook Forecasts

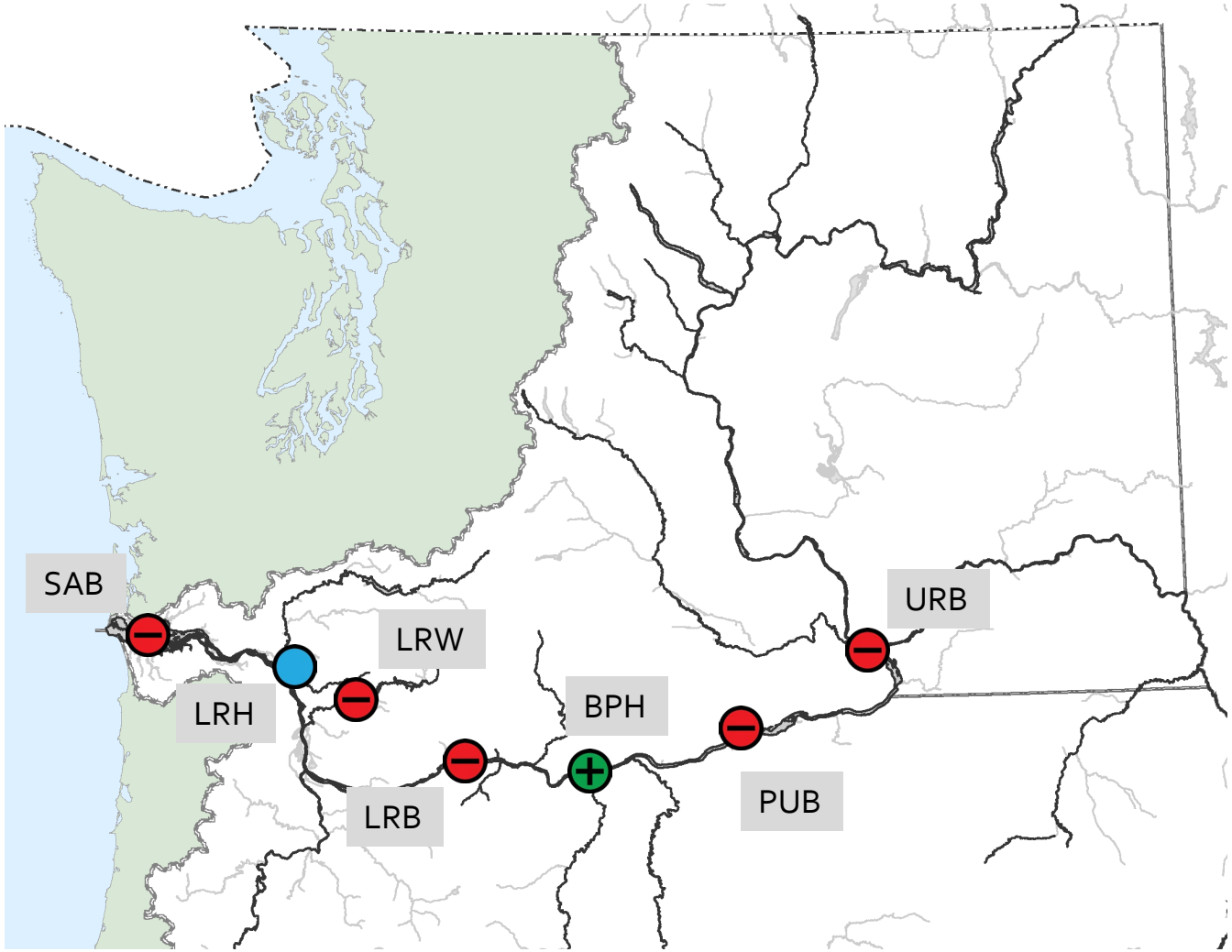
Tule stock

- LRH (Lower River Hatchery) – 85,500 (106%)
- BPH (Bonneville Pool Hatchery) – 129,800 (127%)

Bright Stock

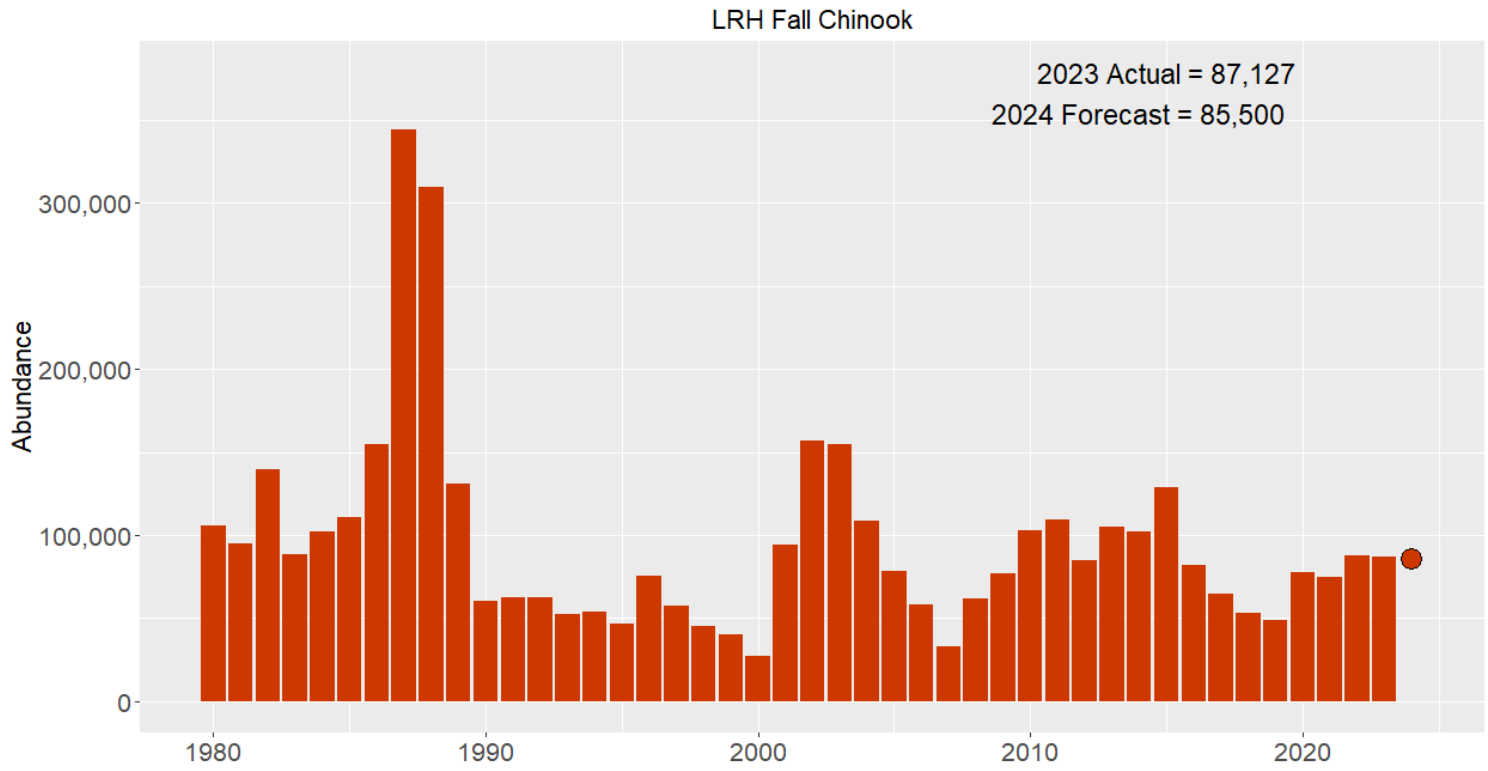
- SAB (Select Area Bright) – 300 (6%)
- LRW (Lower River Wild) – 10,500 (60%)
- LRB (Lower River Bright) – 2,400 (38%)
- PUB (Pool Upriver Bright) – 61,000 (74%)
- URB (Upriver Bright) – 258,300 (70%)

Total Fall – 547,800 (81%)



Lower Columbia River Tule Exploitation Rate (ER) Matrix

LRH Run Size	LCR Tule ER
<24,000	30%
24,000 – 31,000	35%
31,000 – 67,000	38%
>67,000	**41%**

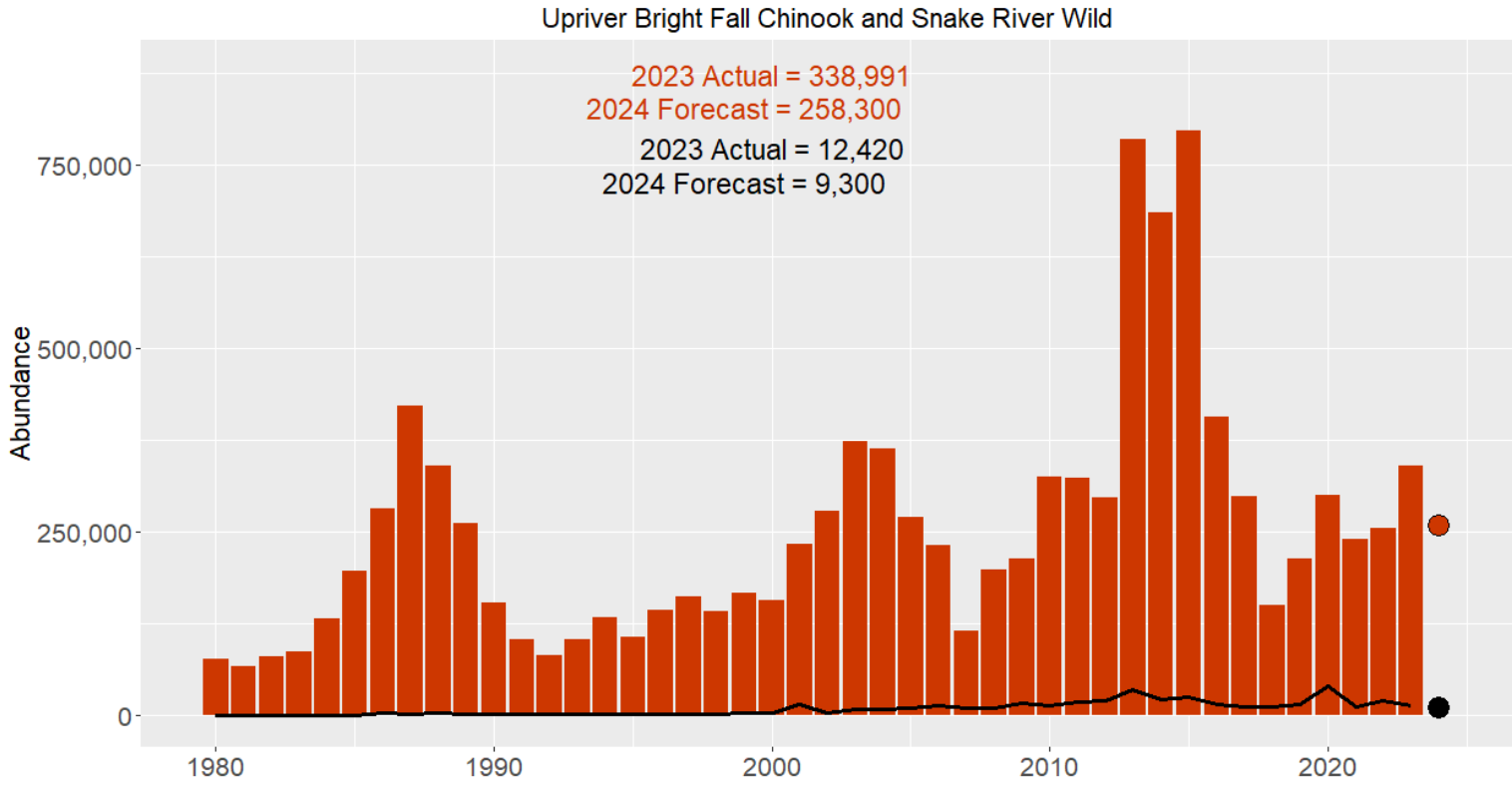


- Incorporates revised abundance tiers during most recent 'Periodic Review' to reflect reduction in hatchery production.
- Expected to be managed to a limit of 41% ER for ocean and in-river fisheries combined.

URB Harvest Rate Schedule

URB Run Size	NT Harvest Rate
<60,000	1.5%
60,000-119,999	4%
120,000-200,000	8.25%
>200,000	**15%**

Snake River Wild Run Size	NT Harvest Rate
<1,000	1.5%
1,000-1,999	4%
2,000-4,999	8.25%
5,000-5,999	8.25%
6,000-7,999	11%
8,000+	**15%**



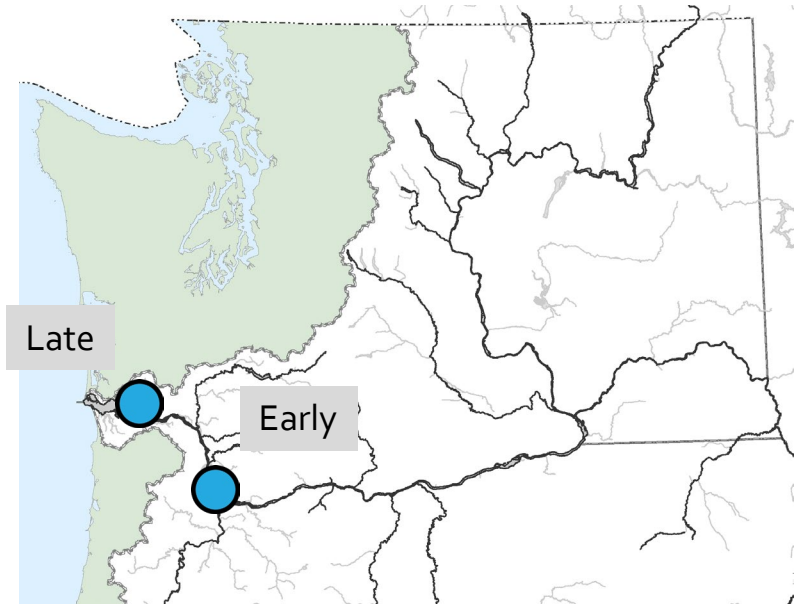
- The most constraining of the URB and Snake River Wild run sizes determine the in-river non-treaty harvest rate within the *U.S. v OR* 2018-2027 Management Agreement.
  - URB/SRW expected to be managed to a limit of 15% harvest rate for in-river fisheries.

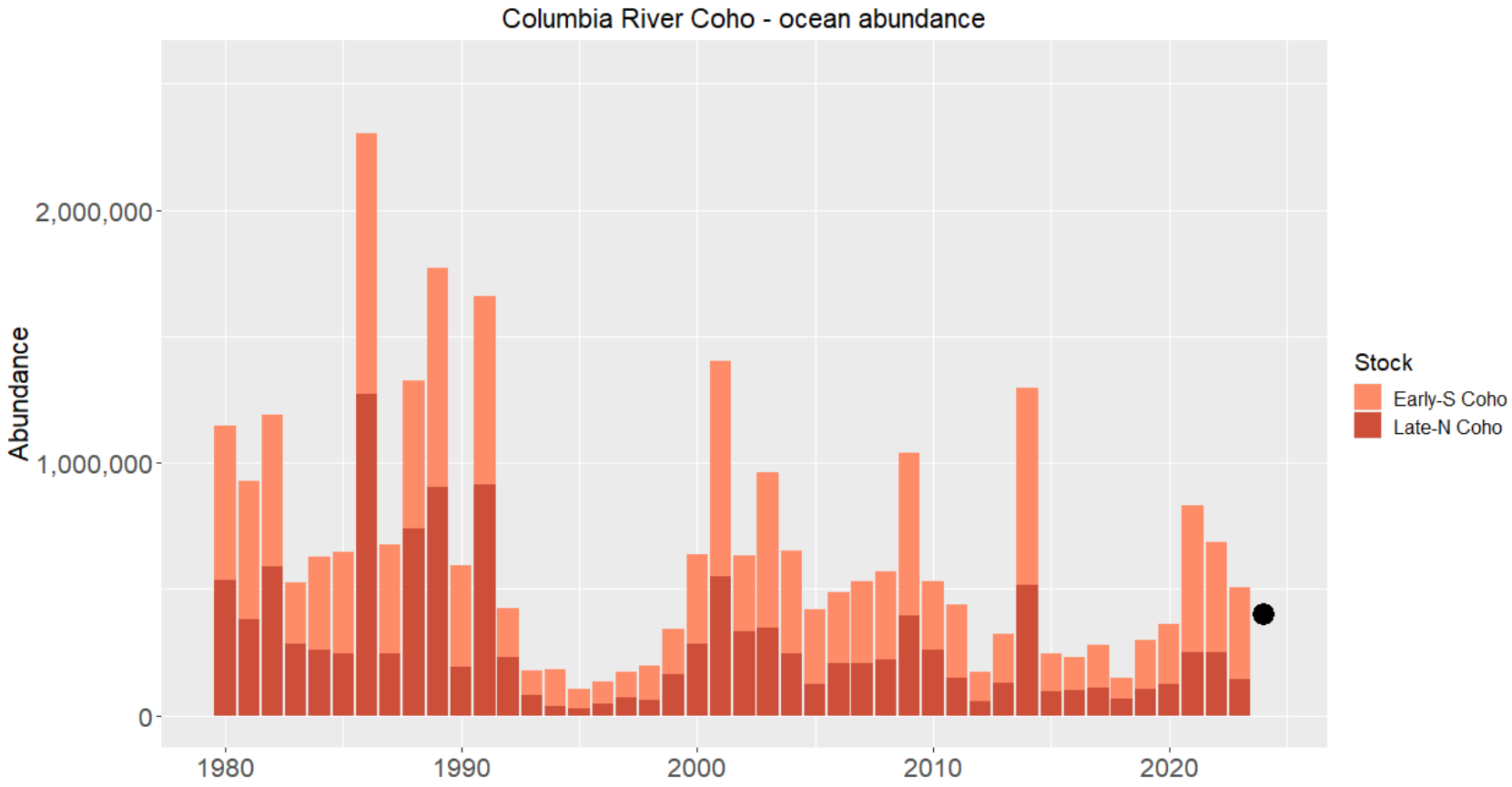
Coho

2023 Coho Returns (ocean abundance*)

- Early – 365,283 (121%)
- Late – 143,578 (81%)

Total – 508,861 (106%)



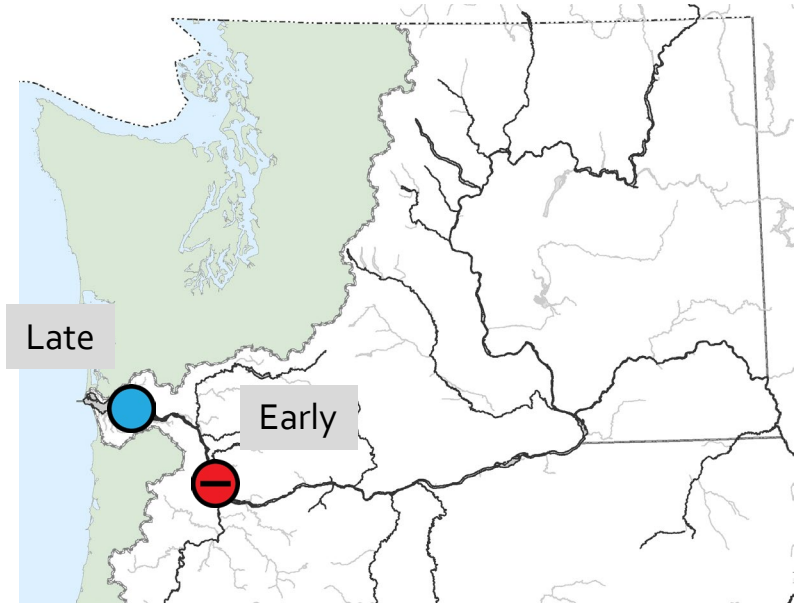


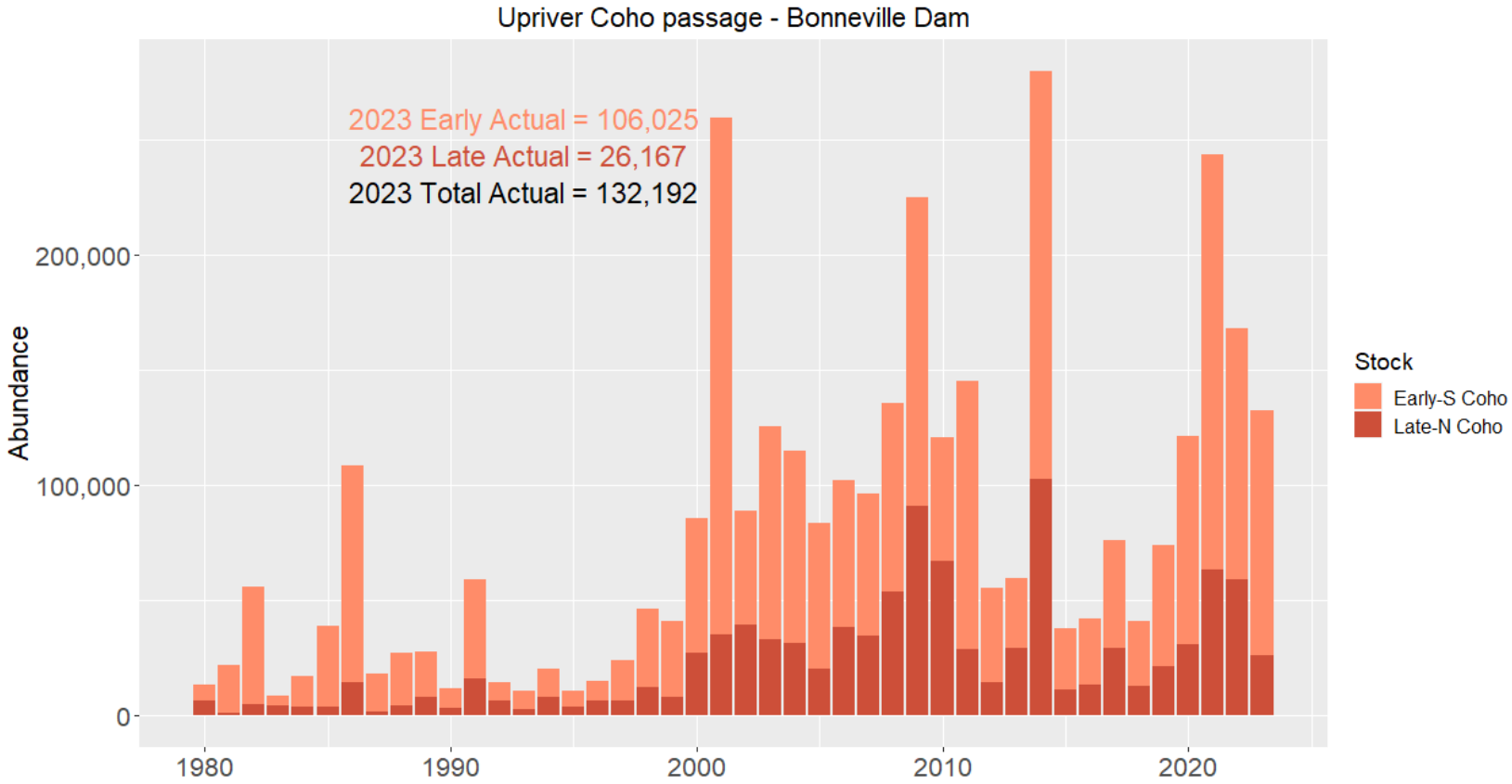
**Pre-ocean and in-river fisheries estimate*

2024 Coho Forecasts (ocean abundance)

- Early – 227,500 (71%)
- Late – 173,600 (97%)

Total – 401,100 (81%)





Lower Columbia Natural Coho Exploitation Rate (ER) Matrix

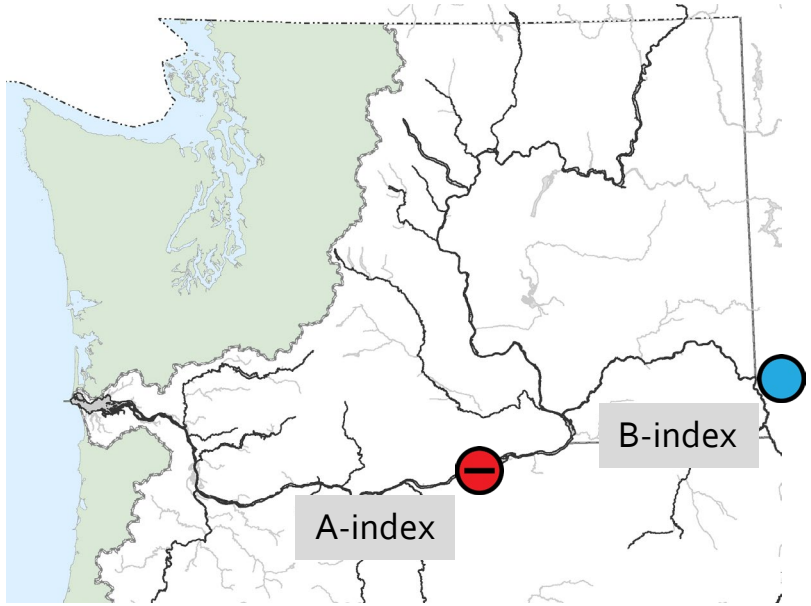
- Marine survival index is **high** (0.38%).
- LCN Coho expected to be managed to a limit of **23% ER** for ocean and in-river fisheries combined.

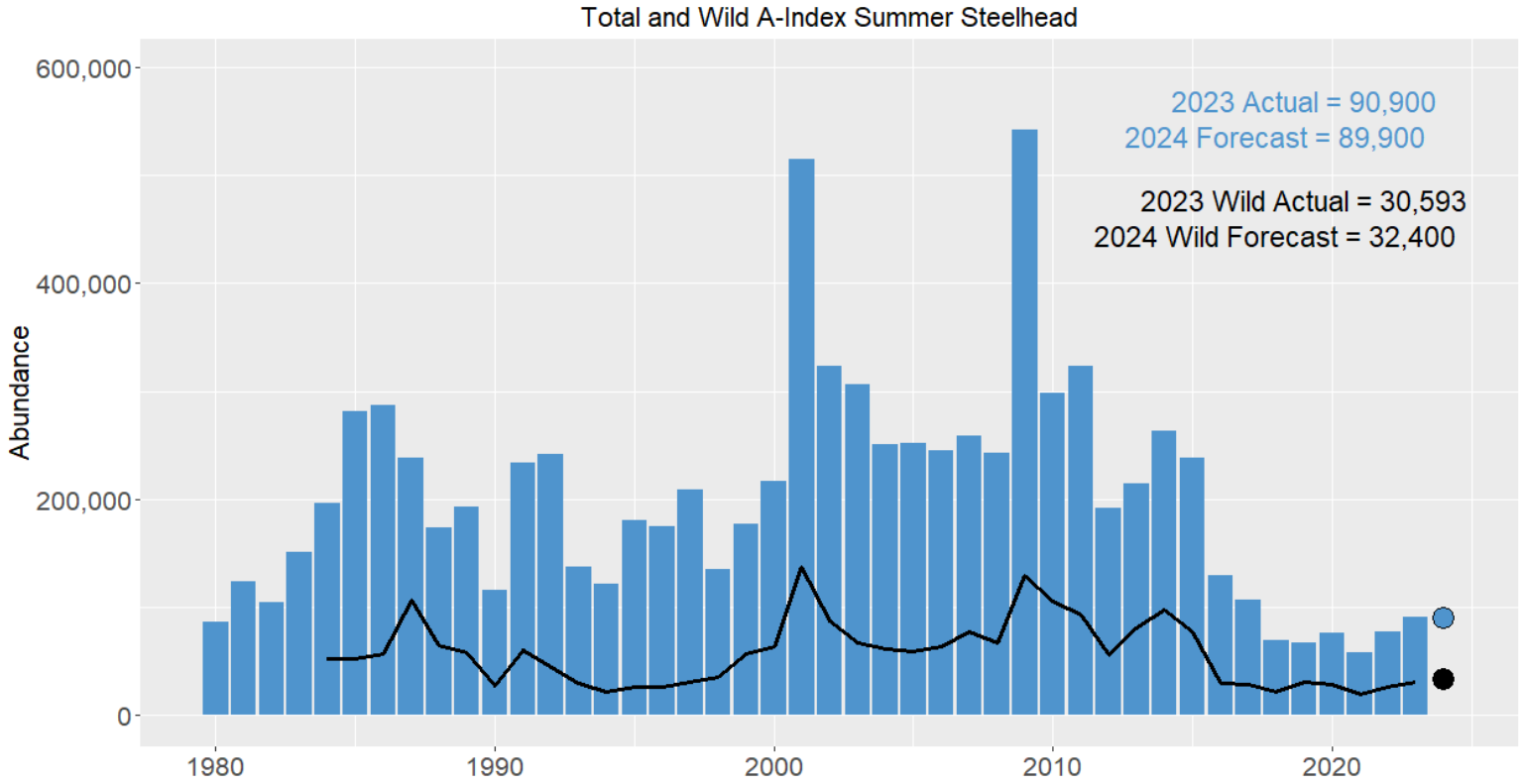
Marine Survival Index		**ER**
Very Low	≤ 0.06%	10%
Low	≤ 0.08%	15%
Medium	≤ 0.17%	18%
High	**≤ 0.40%**	**23%**
Very High	> 0.40%	30%

Steelhead

2023 Steelhead Returns

- A-index* – 90,900 (71%)
  - Wild – 30,593 (66%)
- B-index* – 19,787 (82%)
  - Wild – 1,616 (37%)

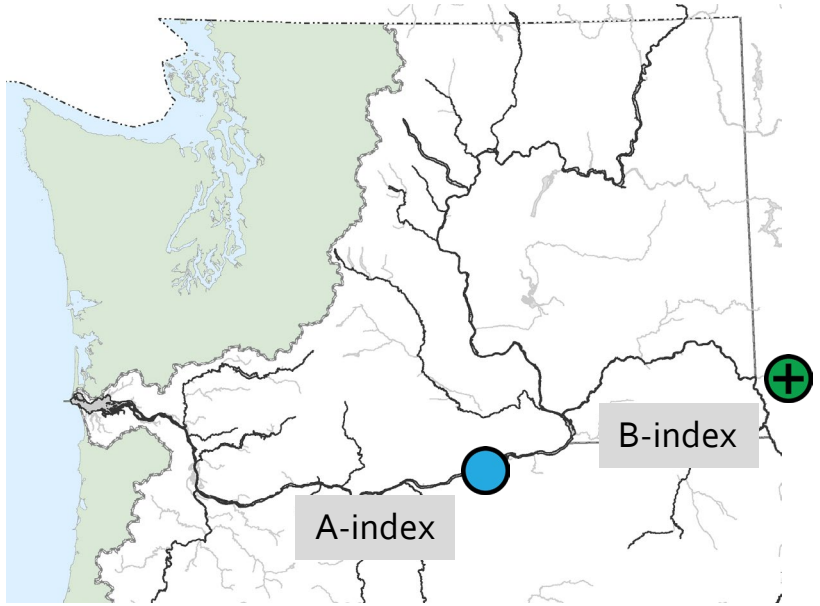


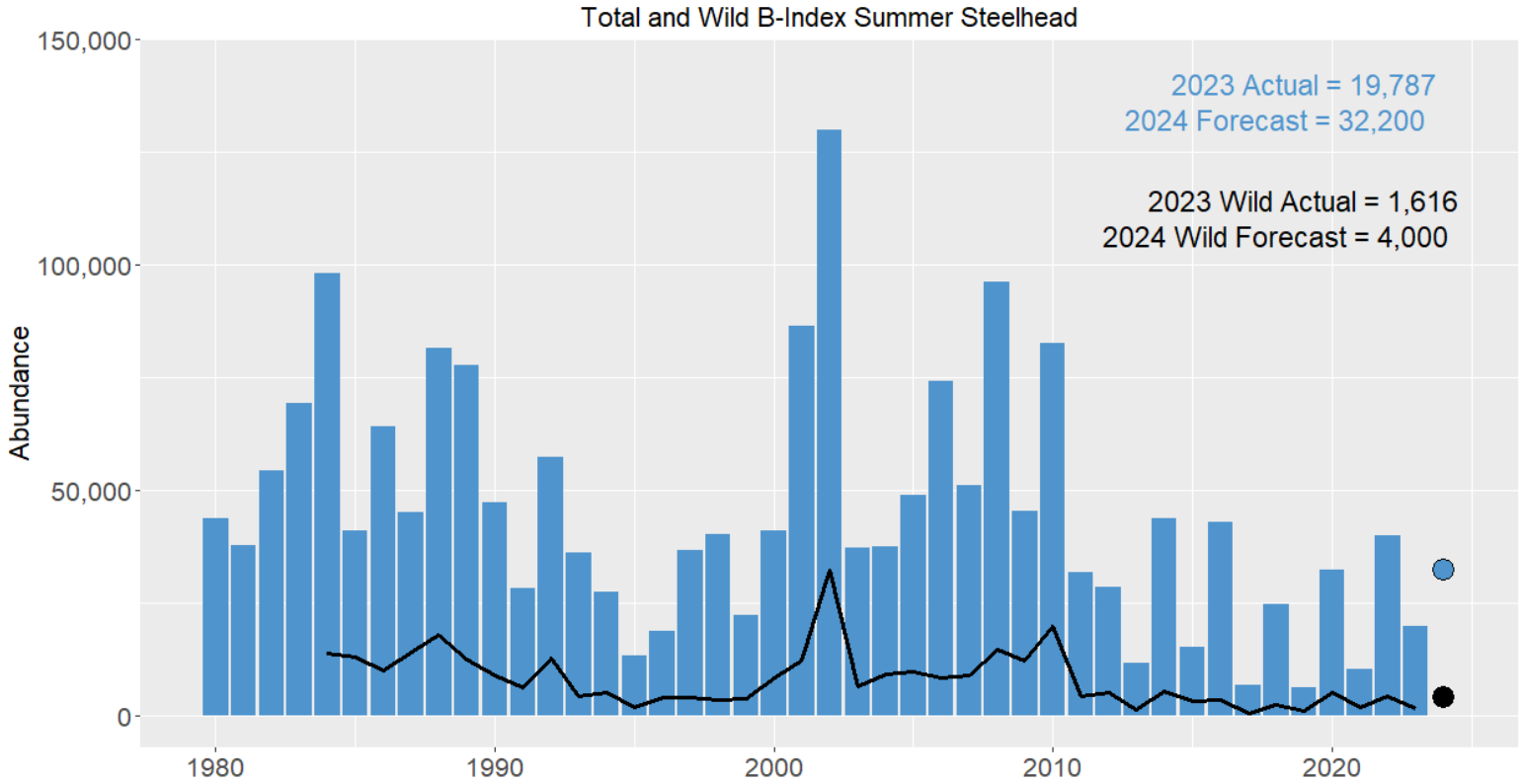


*Includes hatchery and wild combined

2024 Steelhead Forecast

- A-index* – 89,900 (77%)
  - Wild – 32,400 (80%)
- B-index* – 32,200 (129%)
  - Wild – 4,000 (95%)





*Includes hatchery and wild combined

Questions

Washington Department of FISH and WILDLIFE

Pacific Fishery Management Council Salmon Technical Team Review

Alex Safiq, PhD

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	2019	2020	2021	2022	2023	2024	Methodology for 2024 Prediction and Source
Sacramento River							
Fall (Sacramento Index)	379.6	473.2	271.0	396.5	169.8	213.6	Log-log regression of the Sacramento Index on jack escapement from the previous year, accounting for lag-1 autocorrelated errors. STT.
Winter (age-3 absent fishing)	1.9	3.1	9.1	6.0	4.5	1.1	Gaussian process model applied to a time series of the SRWC age-3 escapement absent fishing. NMFS.
Klamath River (Ocean Abundance)							
Fall	274.2	186.6	181.5	200.1	103.8	180.7	Linear regression analysis of age-specific ocean abundance estimates on river runs of same cohort. STT.
Oregon Coast							
North and South/Local Migrating	--	--	--	--	--	--	None.
Columbia River (Ocean Escapement)							
Cowlitz Spring	1.3	1.4	1.8	4.1	9.0	4.7	Cowlitz, Kalama, and Lewis: Age-specific linear regressions of cohort returns in previous run years. WDFW.
Kalama Spring	1.4	1.0	2.2	2.0	2.4	1.9	
Lewis Spring	1.5	1.4	2.4	2.4	4.7	3.4	
Sandy Spring	5.5	5.2	5.3	5.6	7.8	7.7	Recent 3-year average. ODFW.
Willamette Spring	40.2	40.8	50.1	51.2	71.0	48.7	Age-specific linear regressions of cohort returns in previous run years. ODFW. Forecast includes adult fish only.
Upriver Spring [a/]	99.3	81.7	75.2	122.9	198.6	121.0	Columbia River Upriver Spring and Summer Chinook: RMSE-weighted average of age-specific cohort ratios and sibling regression models. Columbia River TAC subgroup and WDFW.
Upriver Summer [b/]	35.9	38.3	77.6	57.5	84.8	53.0	
LRW Fall	13.7	19.7	20.0	10.8	8.6	10.5	Columbia River Fall Chinook: Root Mean Squared Error (RMSE)-weighted average of age-specific cohort ratios and sibling regression models. Columbia River TAC subgroup and WDFW.
LRH Fall	54.5	51.0	73.1	73.0	77.1	85.5	
SCH Fall	46.0	46.2	46.8	91.2	136.1	129.8	
MCB Fall	64.7	79.7	86.2	78.9	52.6	63.4	
URB Fall	158.4	233.4	354.2	230.4	272.4	258.3	

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		2019	2020	2021	2022	2023	2024	Methodology for 2024 Prediction and Source
Washington Coast								
Willapa Bay Fall	Natural	4.3	2.9	3.9	3.1	2.8	3.5	Total recruit/spawner predictor
	Hatchery	23.6	28.3	30.5	30.1	27.5	27.3	Total recruit/spawner predictor
Grays Harbor Fall	Natural	18.0	15.0	15.5	17.9	15.0	14.3	Combination of geometric mean of recent year returns and linear relationships of sibling recruits per spawner.
	Hatchery	7.7	6.9	7.6	8.6	5.9	5.3	Combination of recent year smolt return rates and log linear regressions of sibling returns per smolt.
Quinault Spring/Summer	Natural	NA	NA	NA	NA	NA	NA	
	Hatchery	NA	NA	NA	NA	NA	NA	
Quinault Fall	Natural	5.3	4.2	6.0	3.2	4.0	4.3	Recent 5-year mean return rates, applied to brood year natural spawning escapements of age 3-6 returns.
	Hatchery	2.7	4.5	4.9	5.6	7.6	3.4	Recent 5-year mean terminal return rates (return/smolt release) for age 3-6 adult returns.
Queets Spring/Sum	Natural	0.6	0.6	0.6	0.6	0.4	0.4	Recent 5-year (2019-2023) mean terminal run size.
Queets Fall	Natural	3.4	4.1	4.3	5.3	4.3	2.6	Recent return/spawner rates; 10-yr mean for age 3, 5-yr mean for age 4+.
	Hatchery	0.8	0.7	0.6	0.5	0.8	0.4	Recent year return/smolt release adjusted by brood performance.
Hoh Spring/Summer	Natural	1.0	0.8	1.0	0.7	1.0	1.1	Spring/Summer: 5-year mean recruit/spawner adjusted by previous performance.
Hoh Fall	Natural	2.5	2.6	2.6	3.4	2.6	3.5	Fall: Recent 3-year mean recruit/spawner adjusted by previous performance.
	Hatchery							Recent 2-year mean returns per smolt for age 3-4 and adjusted mean for age 5-6.
Quillayute Spring		2.1	2.4	2.6	3.0	2.8	2.5	
Quillayute Sum/Fall	Natural	7.9	9.8	9.6	8.8	11.3	10.1	Summer: Recent 5-year mean adjusted by previous brood performance. Fall: Recent 3-year mean return/spawner adjusted by previous brood performance.
Hoko[c/]	Natural	2.8	2.6	1.3	0.9	2.8	3.9	Escapement without fishing, includes supplemental. Sibling regressions using data from return years 1989-2022.
North Coast Totals								
Spring/Summer	*Natural*	*1.7*	*1.4*	*1.5*	*1.3*	*1.4*	*1.5*	
Fall	*Natural*	*19.2*	*20.6*	*22.5*	*20.7*	*22.1*	*20.5*	
Spring/Summer	*Hatchery*	*2.1*	*2.4*	*2.6*	*3.0*	*2.8*	*2.5*	
Fall	*Hatchery*	*3.5*	*5.2*	*5.5*	*6.1*	*8.4*	*3.8*	

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		2019	2020	2021	2022	2023	2024	Methodology for 2024 Prediction and Source
Puget Sound summer/fall[d/]								
Nooksack/Samish	Hatchery	21.3	18.2	18.9	28.1	41.2	40.9	Three year average return rate
East Sound Bay	Hatchery	0.3	0.3	0.6	0.4	0.2	0.2	Three year average return rate
Skagit	Natural	13.6	12.9	10.5	12.5	12.2	10.4	Natural: Hierarchical Bayesian model to estimate the spawner-recruit dynamics. Hatchery: One year ahead forecasts generated using Chinook run sizes and GAM and ARIMA models.
	Hatchery	0.3	0.5	0.5	0.5	0.5	0.6	
Stillaguamish	Natural	0.9	0.9	0.9	0.9	1.2	0.9	Natural plus hatchery. Multiple regression environmental model (Environmental Model to Predict Adult Returns, EMPAR).
Snohomish[e/]	Natural	3.2	3.0	2.9	2.4	3.4	2.7	Natural fingerling and yearling age-specific return rates predicted with multiple regression environmental models (EMPAR).
	Hatchery	7.0	6.8	6.1	6.0	7.5	8.4	Average return rates by age and life history type of the three most recent completed brood returns (BYs 2016-2018) applied to hatchery releases of age 2-5 fish (BYs 2019-2022) expected to return in 2024.
Tulalip[e/]	Hatchery	12.5	6.0	5.8	7.7	5.5	5.9	Age-specific return rates predicted with multiple regression environmental model (EMPAR).
South Puget Sound	Natural	8.4	5.8	7.0	6.9	7.0	7.3	Natural: Lake Washington; 4-yr avg recruit per spawner for age 3, 3-yr avg sibling ratios for ages 4 & 5. Green; 3-yr average return rates. Puyallup; climate relationship for age 3, sibling relationship for age 4, 5-yr average return per spawner for age 5. Nisqually; smolt to adult return average since 2015 (5-yr avg for age 3, 4-yr avg for age 4, 3-yr avg for age 5). Hatchery: Variety of recent year average return rates or sibling relationships.
	Hatchery	99.9	100.7	78.8	90.3	90.4	90.5	
Hood Canal	Natural	1.2	4.6	5.7	5.4	3.2	4.3	Includes hatchery strays to spawning grounds in Skokomish River. Proportioned using Hood Canal terminal run reconstruction-based relative contribution of the individual management units for 2019-2023 return years. Area 12B returns derived by applying an average proportion of natural origin recruits returning to area 12B for 2019-2023.
	Hatchery	66.0	67.6	64.1	51.9	53.6	56.3	Brood 2019 fingerling lbs released from WDFW facilities in 2020, multiplied by the average of post-season estimated terminal area return rates for the last 5 years (2019-2023).
Strait of Juan de Fuca Including Dungeness spring run	Natural	8.3	5.0	5.5	5.0	3.7	4.3	Natural and hatchery. Elwha estimated by all year average smolt to adult return rate, natural component based on 13-yr average hatchery/wild proportion. Dungeness natural and hatchery estimated using all-year and 3-yr average smolt to adult return rates.

a/ Since 2005, the upriver spring Chinook run includes Snake River summer Chinook.
b/ Since 2005, the upriver summer Chinook run includes only upper Columbia summer Chinook, and not Snake River summer Chinook.
c/ Expected spawning escapement without fishing.
d/ Unless otherwise noted, Puget Sounds forecasts are in units of terminal run size.
e/ Includes a mixture of runsize types including escapement without fishing and terminal run. 2024 values are terminal runsize.

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 and Stock or Stock Group	Source	2019	2020	2021	2022	2023	2024	Methodology for 2024 Prediction and Source
OPI Area Total Abundance (California, Oregon Coasts, and Columbia River)		1,009.6	268.7	1,732.9	1,225.9	1,135.7	636.3	Abundance of all OPI components based on post-season coho FRAM runs; prior to 2008 only fishery impacts south of Leadbetter Point were used (traditional OPI accounting). OPITT, see Chapter III for details.
OPI Public	Hatchery	933.5	185.7	1607.9	1003.5	896.9	403.1	OPIH: ARIMA-based MAPE weigthed ensemble forecast. Columbia early/late and Coastal proportions based on jacks; Coastal N/S proportions based on smolts.
Columbia River Early		545.0	130.7	1014.0	592.5	481.8	227.5	
Columbia River Late		360.6	50.3	576.0	404.7	404.3	173.6	
Coastal N. of Cape Blanco		12.0	2.4	6.4	1.9	3.0	0.6	
Coastal S. of Cape Blanco		15.9	2.3	11.5	4.4	7.8	1.4	
Lower Columbia River (LCN)	Natural	36.9	24.8	39.2	65.7	45.5	87.8	Oregon: recent three year average return; Washington: natural smolt production multiplied by 2021 brood marine survival rate. Abundance is subset of early/late hatchery abundance above.
Oregon Coast (OCN)	Natural	76.1	83.0	125.0	222.4	238.8	233.2	Rivers: Generalized additive model (GAM) relating ocean recruits to parental spawners and marine environmental variables. See text in Chapter III for details. Lakes: recent three year average abundance.
Washington Coast								
Willapa	Natural	63.4	17.9	19.0	35.8	42.7	29.5	Washington Coast stocks: A variety of methods were used, primarily based on smolt production and survival. See text in Chapter III for details.
	Hatchery	94.0	51.8	61.6	74.7	111.0	91.5	
Grays Harbor	Natural	71.5	50.0	44.8	120.4	102.8	74.9	
	Hatchery	64.3	42.3	31.7	78.3	111.4	68.2	
Quinault	Natural	13.9	17.5	15.0	19.4	23.6	25.3	
	Hatchery	26.9	27.0	24.6	42.7	30.6	34.7	
Queets	Natural	11.1	7.8	3.9	18.2	12.4	12.9	
	Hatchery	13.2	10.9	11.8	22.2	14.9	18.9	
Hoh	Natural	7.0	4.2	3.0	4.7	6.5	4.9	

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 and Stock or Stock Group	Source	2019	2020	2021	2022	2023	2024	Methodology for 2024 Prediction and Source
Quillayute Fall	Natural	14.7	9.2	7.5	12.5	13.5	10.2	For all Washington Coast stocks: A variety of methods were used, primarily based on smolt production and survival. See text in Chapter III for details.
	Hatchery	17.0	13.0	15.1	20.3	19.1	10.3	
Quillayute Summer	Natural	1.2	0.8	0.3	0.9	1.6	0.4	
	Hatchery	3.4	3.4	3.4	4.6	3.9	2.3	
North Coast Independent Tributaries	Natural	8.1	5.1	4.7	18.0	13.5	4.9	
	Hatchery	12.5	1.3	0.1	0.1	11.8	9.0	
WA Coast Total	*Natural*	*191.0*	*112.4*	*98.4*	*229.8*	*216.6*	*162.9*	
	Hatchery	*231.3*	*149.6*	*148.2*	*243.0*	*302.7*	*234.9*	
Puget Sound								
Strait of Juan de Fuca	Natural	8.8	7.5	6.7	7.3	15.6	19.7	
	Hatchery	16.8	20.6	12.5	12.7	21.8	22.6	For all Puget Sound stocks: A variety of methods were used, 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.
Nooksack-Samish	Natural	25.1	15.4	35.3	36.0	29.5	35.1	
	Hatchery	59.8	42.5	54.6	73.8	66.6	72.3	
Skagit	Natural	57.9	31.0	58.4	80.4	43.1	63.4	
	Hatchery	9.9	18.2	22.0	21.3	21.1	27.3	
Stillaguamish	Natural	23.8	19.5	26.8	24.9	30.2	30.8	
	Hatchery	2.2	2.3	4.0	1.9	1.7	0.9	
Snohomish	Natural	62.6	39.0	60.0	64.2	76.5	71.6	
	Hatchery	43.7	26.6	29.9	22.6	64.0	34.7	
South Sound	Natural	30.4	7.3	27.5	31.0	58.3	38.1	
	Hatchery	180.4	164.0	192.7	208.5	218.8	201.9	
Hood Canal	Natural	40.1	35.0	28.8	20.2	37.9	36.5	
	Hatchery	87.9	72.2	55.7	61.4	74.8	67.2	
Puget Sound Total	*Natural*	*248.8*	*154.6*	*243.5*	*264.0*	*291.2*	*295.3*	
	Hatchery	*400.7*	*346.3*	*371.4*	*402.3*	*468.8*	*426.9*	

Questions

Thank you for participating