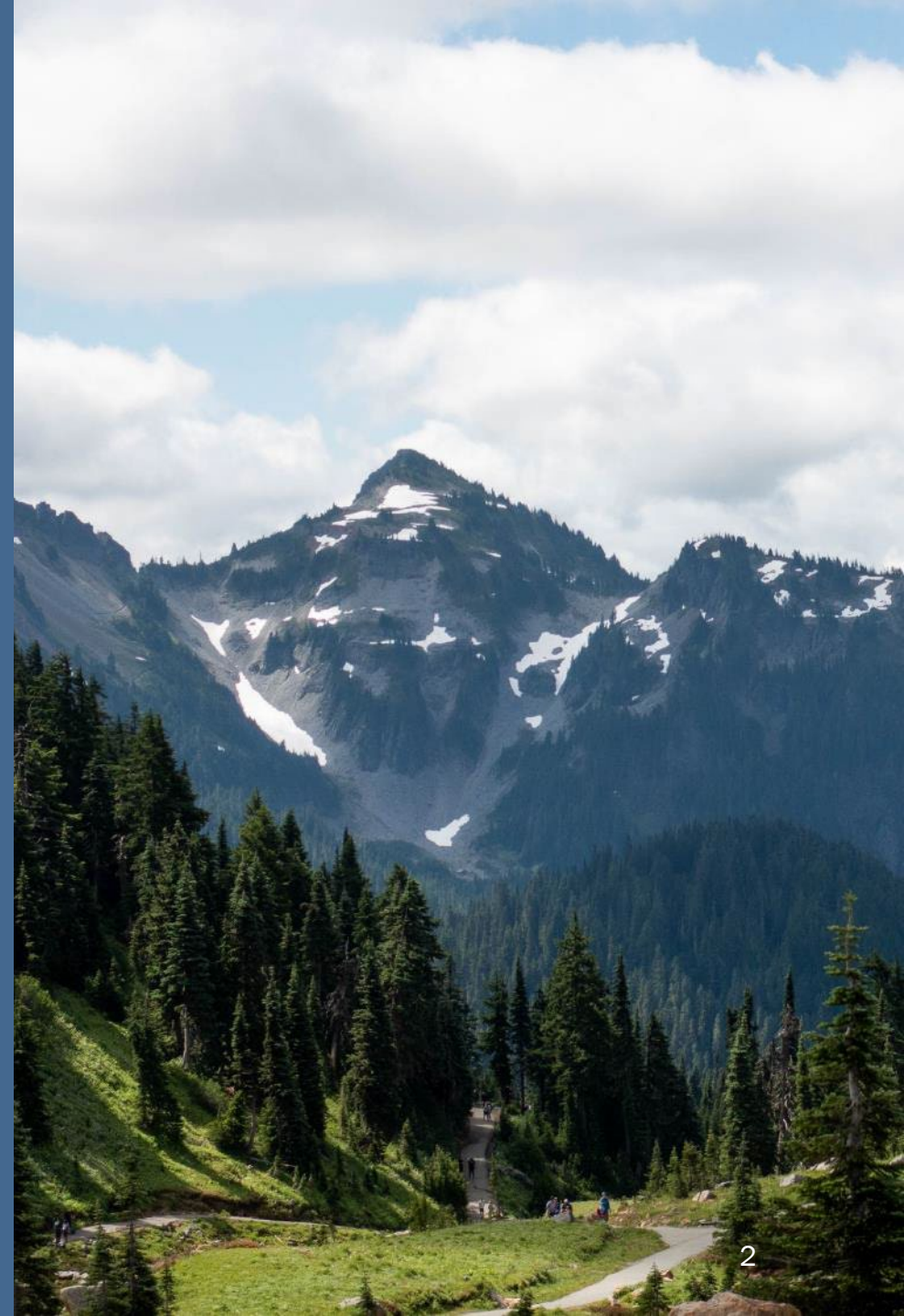


Water Supply Availability Committee

January 24, 2024



Recording!



Agenda

Time	Agenda item	Responsible
11:00a.m.	Welcome and agenda Committee role & declaration status	Caroline Mellor, Ecology
11:15a.m.	Regional Climate Setting / ENSO	Karin Bumbaco, OWSC
11:30a.m.	Mountain conditions	Matt Warbritton, NRCS
11:40a.m.	Streamflow and Groundwater	Nick Sutfin, USGS
11:50a.m.	Water Supply Forecasts	Amy Burke, NWRFC
12:00p.m.	Yakima Project	Chris Lynch, BOR
12:10p.m.	Discussion: What conditions and concerns do folks see on the ground?	All participants Ecology facilitates
12:25p.m.	Wrap-up and next steps	Caroline Mellor, Ecology

Meeting Objectives

- Share pertinent info and assess water supply conditions in Washington.
- Create a shared understanding of water supply conditions and forecasts

Committee Role

WSAC provides an important consultative and advisory role to Ecology related to:

- Current and forecasted water supply conditions;
- Whether the hydrologic drought threshold has been met or is likely to be met:
Seventy-five percent of normal water supply within a geographic area.

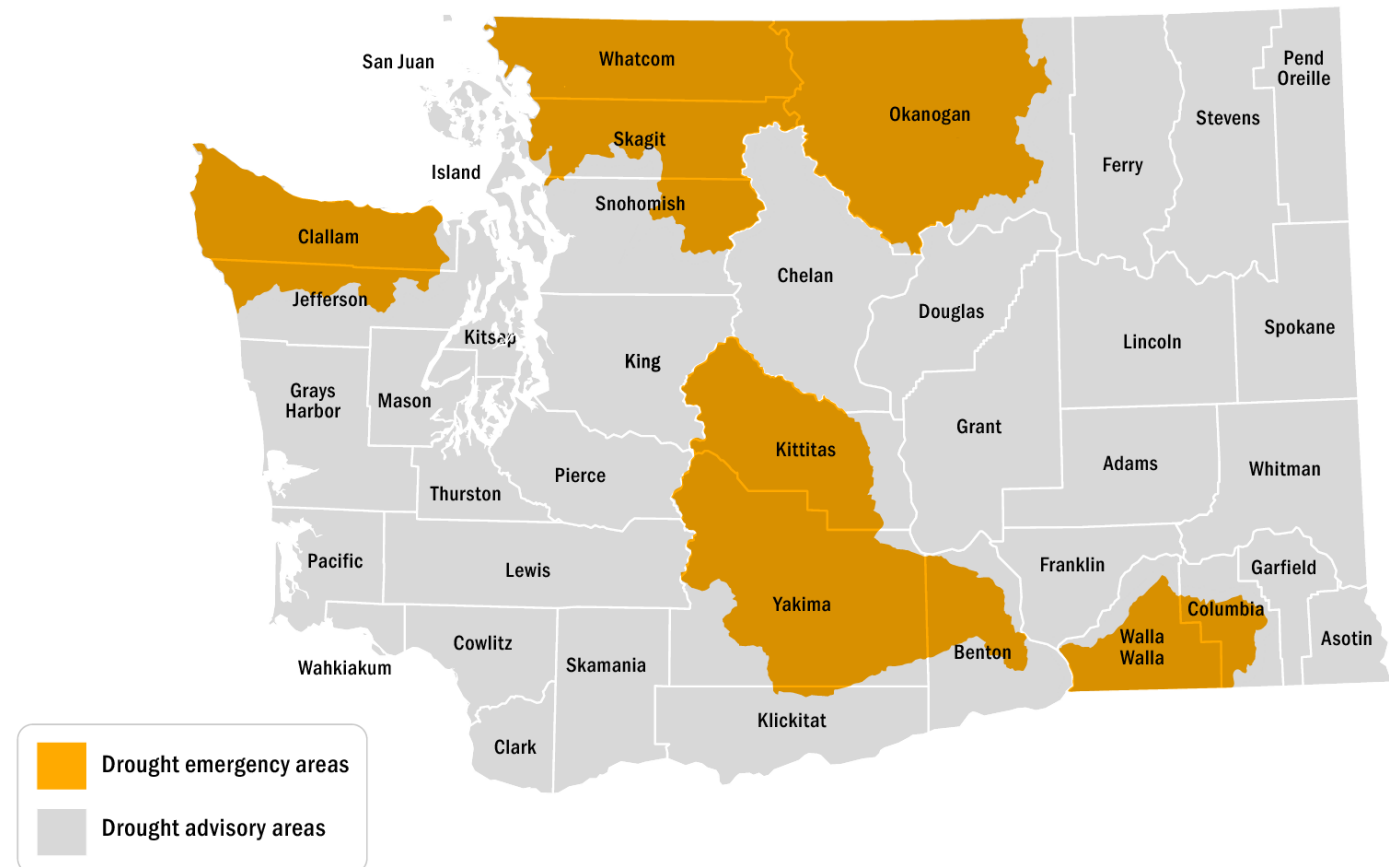
See: [RCW 43.83B.405](#) and [WAC 173-166-050](#).

Existing Drought Declaration Status

July 2023, Ecology declared a drought emergency for 12 watersheds in parts of Skagit, Whatcom, Clallam, Kittitas, Yakima, Snohomish, Jefferson, Walla Walla, Columbia, Okanogan, Benton, and Klickitat counties.

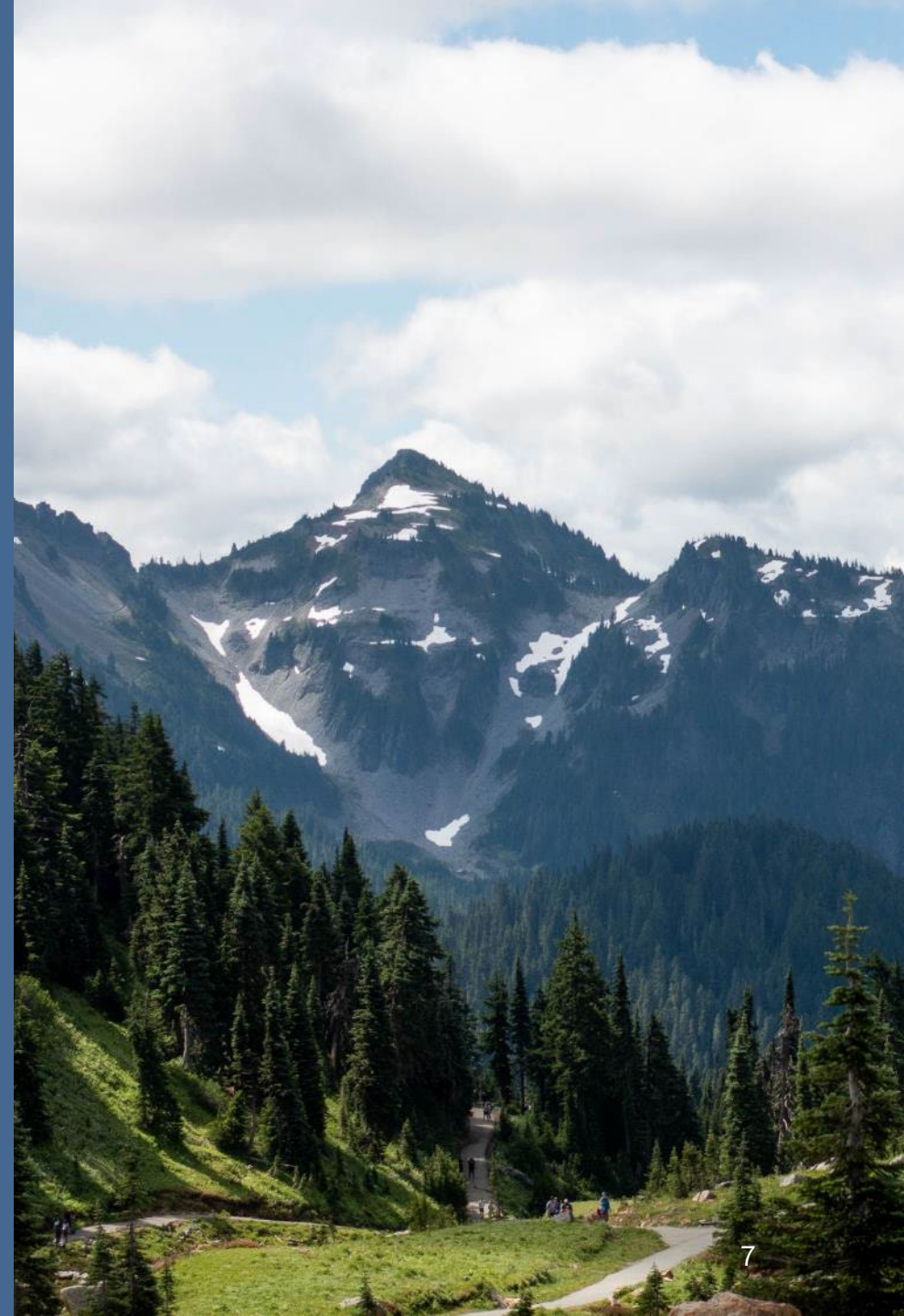
This is currently in effect through June 30, 2024.

Washington Drought Declaration Areas





Presenters



Discussion Question

Discussion Question: What conditions and concerns are folks seeing on the ground?

Next Steps

- Communications – WSAC website updated:
 - Meeting materials
 - Presentation recording
 - Social media outreach
- Next meeting
 - Tentatively February 28, 2024
- Ecology is closing monitoring conditions and coordinating with partners between meetings.



Thank you

Contact: Committee Chair (acting)

Caroline Mellor

Caroline.Mellor@ecy.wa.gov



Current Conditions and Seasonal Outlook

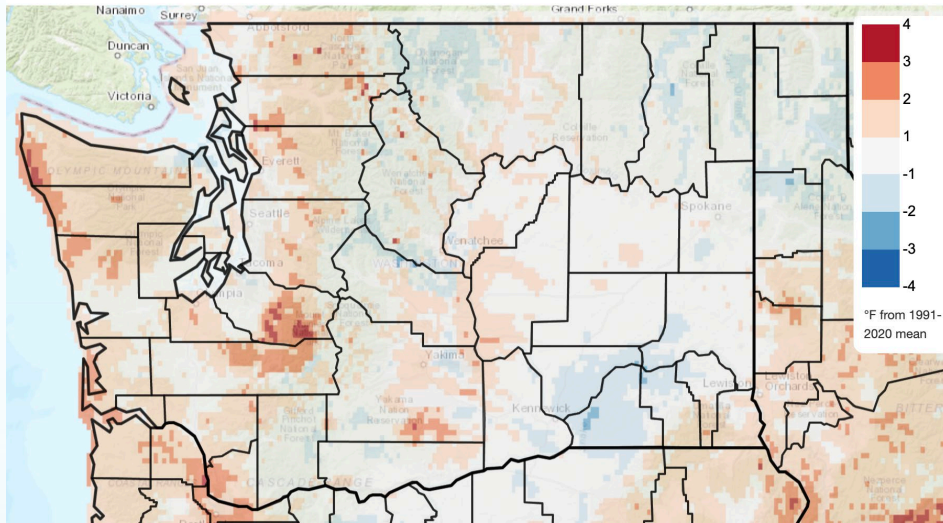
Karin Bumbaco & Nick Bond
Office of the Washington State Climatologist
Climate Impacts Group
University of Washington
24 January 2024

Water Year 2024

Temperature

Mean Daily Temperature Anomaly, Since Oct 1st

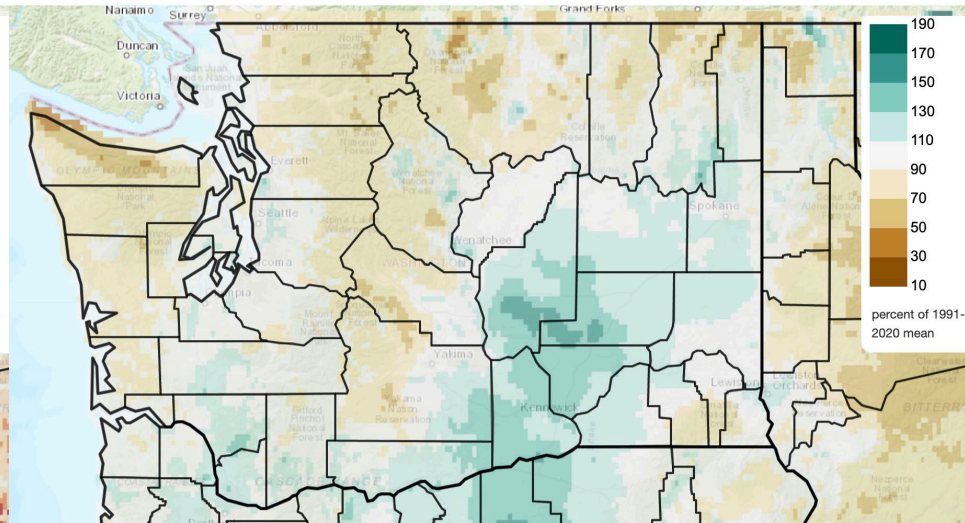
2023/10/01 - 2024/01/21



Precipitation

Total Precipitation Anomaly, Since Oct 1st

2023/10/01 - 2024/01/21



Climate Toolbox

- Averaged statewide, Oct-Dec ties 1933 as the 6th warmest (+2.4°F) start to the water year on record*
- Averaged statewide, Oct-Dec ranked as the 46th driest (-2.00")*, with 88% of normal

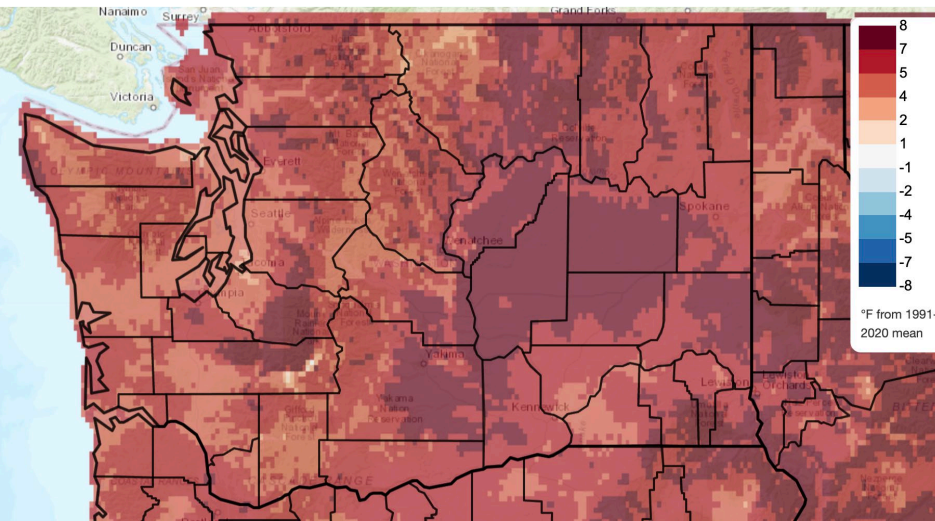
*Records since 1895; 1991-2020 normal

December 2023

Temperature

Mean Daily Temperature Anomaly, Last Full Month

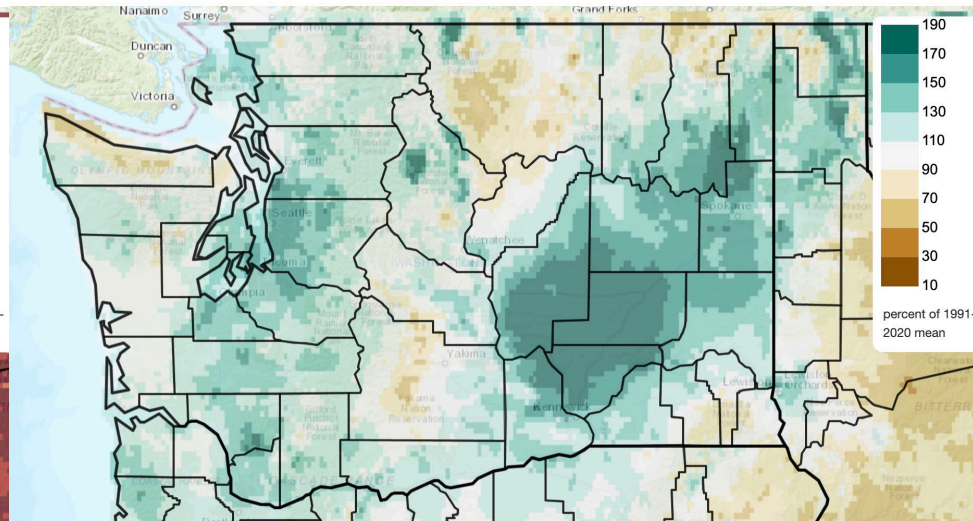
2023/12/01 - 2023/12/31



Precipitation

Total Precipitation Anomaly, Last Full Month

2023/12/01 - 2023/12/31



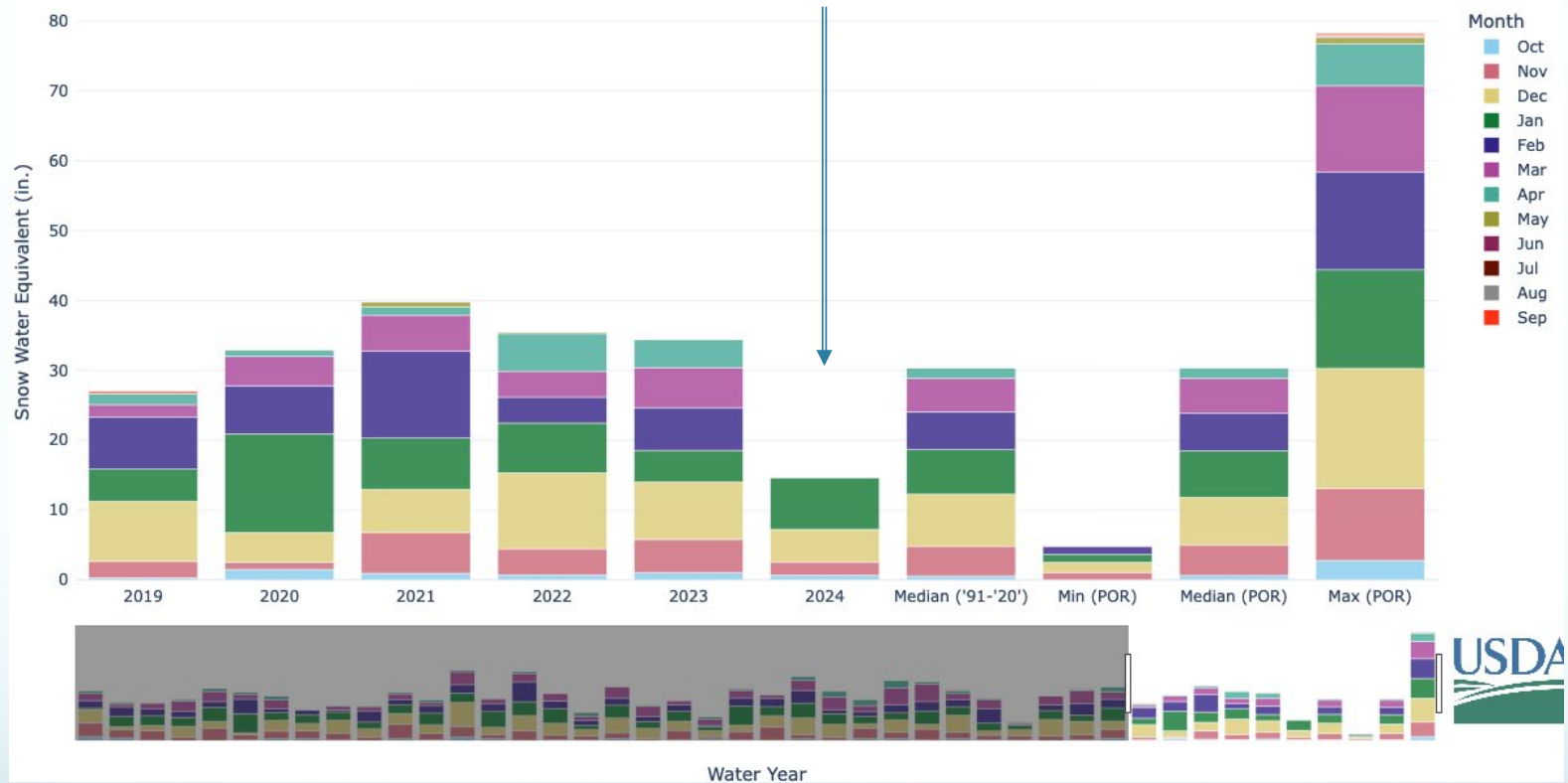
Climate Toolbox

- Averaged statewide, Dec was the 3rd warmest on record (+5.3°F)*
- Averaged statewide, Dec precipitation was above normal (113% of normal)

*Records since 1895; 1991-2020 normal

Snow Water Equivalent

STATE OF WASHINGTON MONTHLY SNOW WATER EQUIVALENT SUMMARY

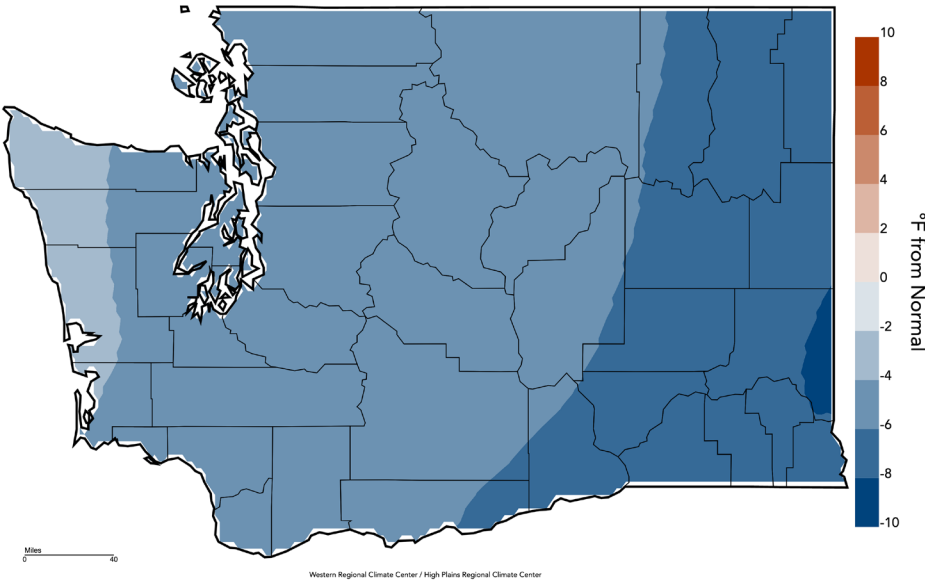


January 2024

Temperature

Washington Contours

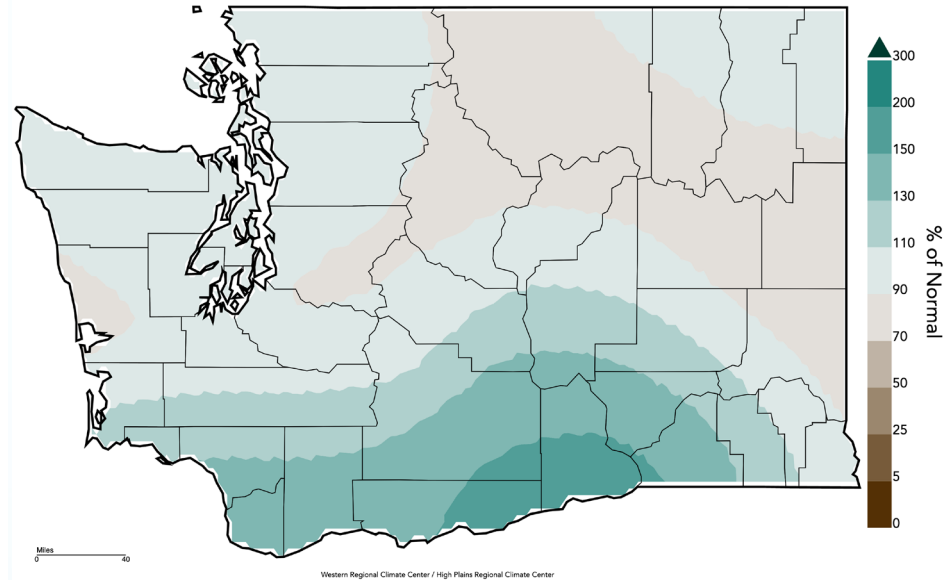
Mean Temperature Departure from Normal (January 1, 2024 - January 21, 2024)



Precipitation

Washington Contours

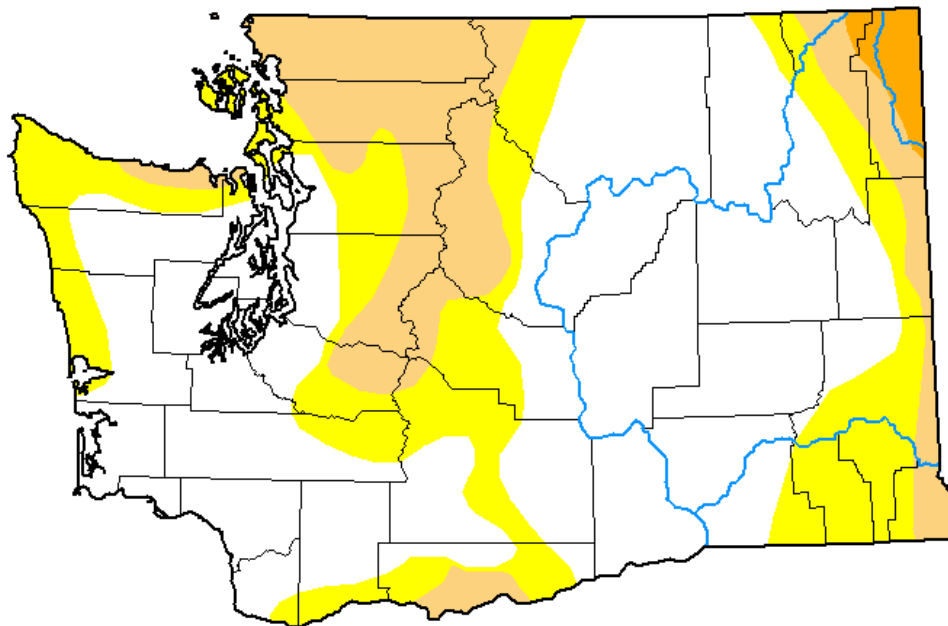
Total Precipitation Percent of Normal (January 1, 2024 - January 21, 2024)



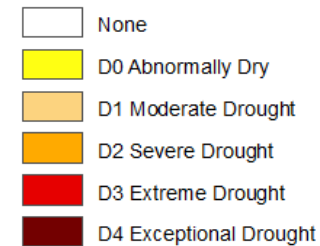
U.S. Drought Monitor

U.S. Drought Monitor Washington

January 16, 2024
(Released Thursday, Jan. 18, 2024)
Valid 7 a.m. EST



Intensity:



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

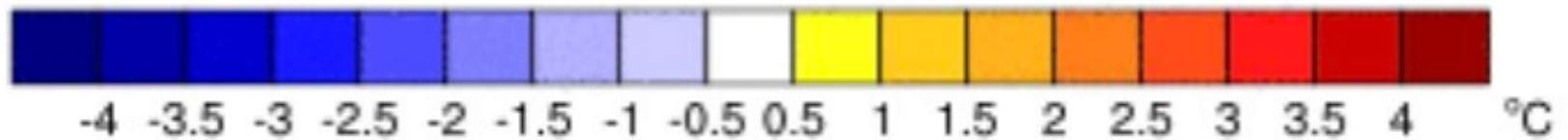
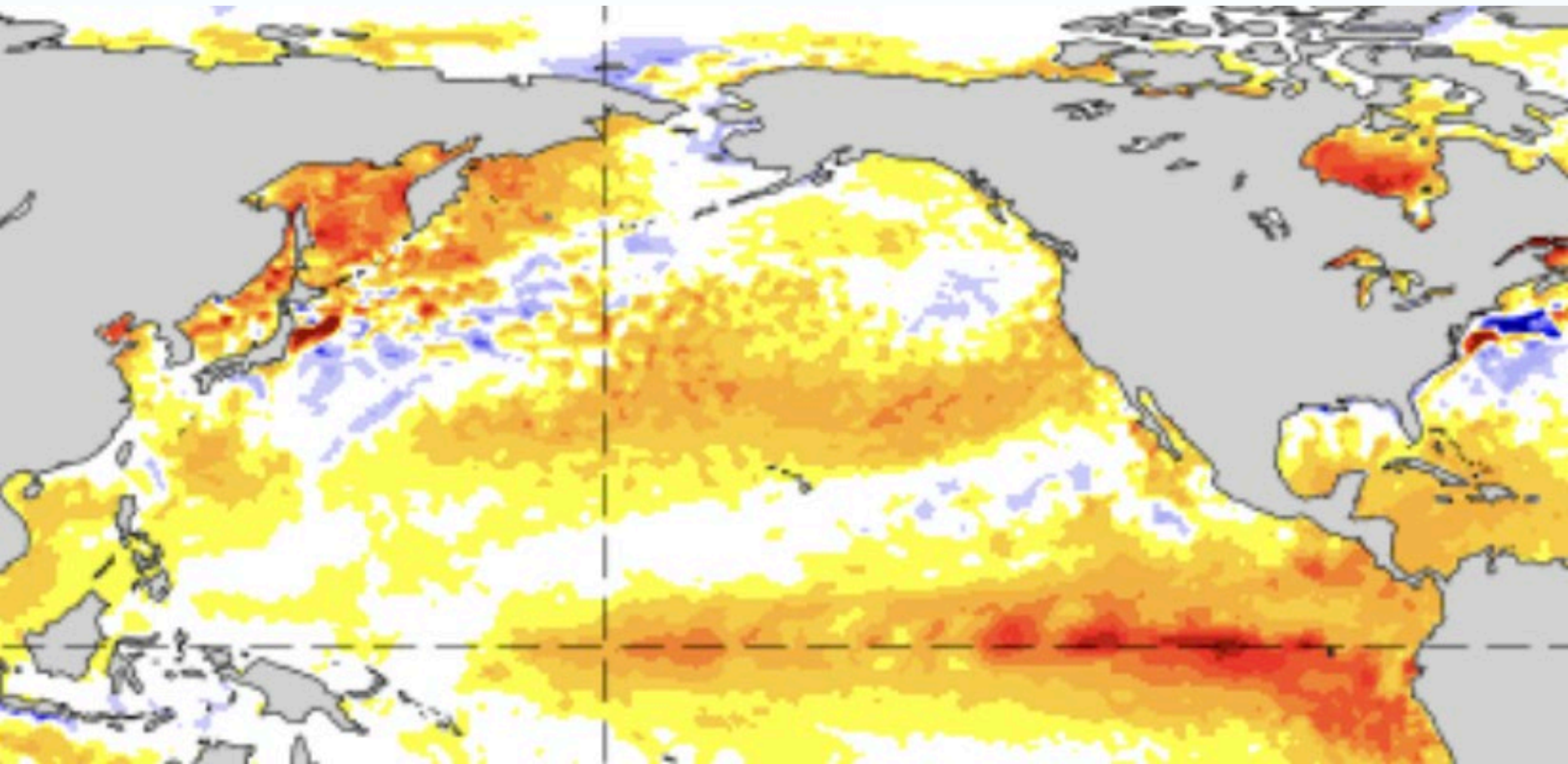
Author:

Adam Hartman
NOAA/NWS/NCEP/CPC



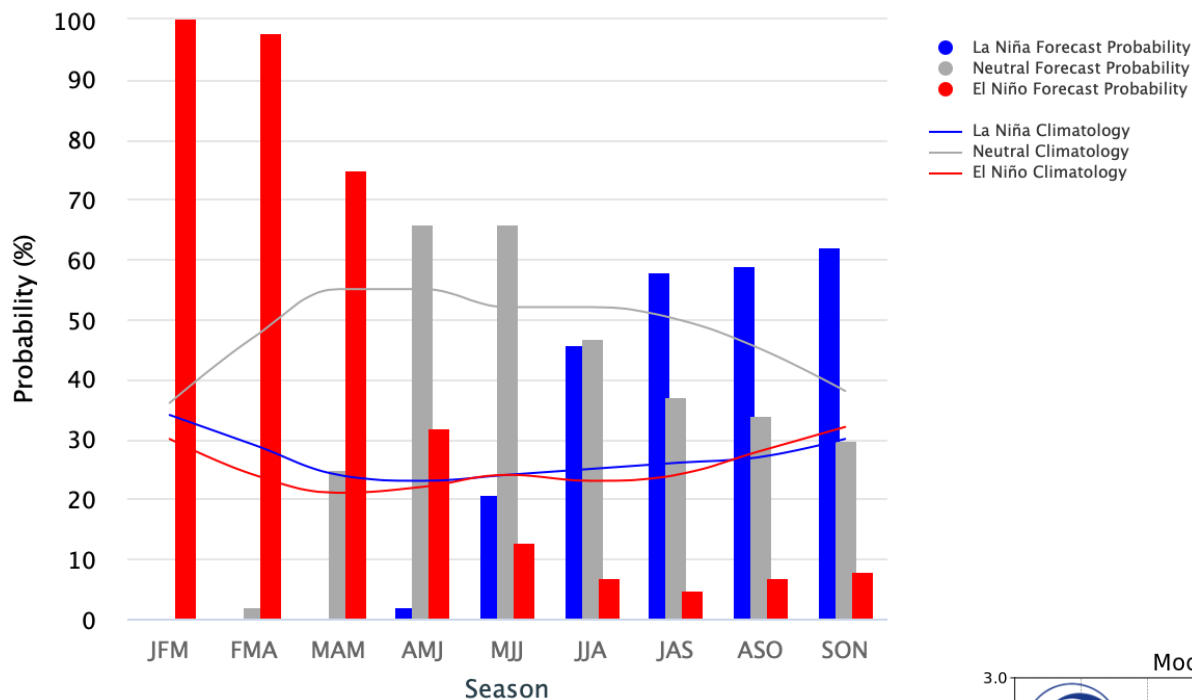
droughtmonitor.unl.edu

Sea Surface Temperature Anomalies: 15-21 Oct 2023

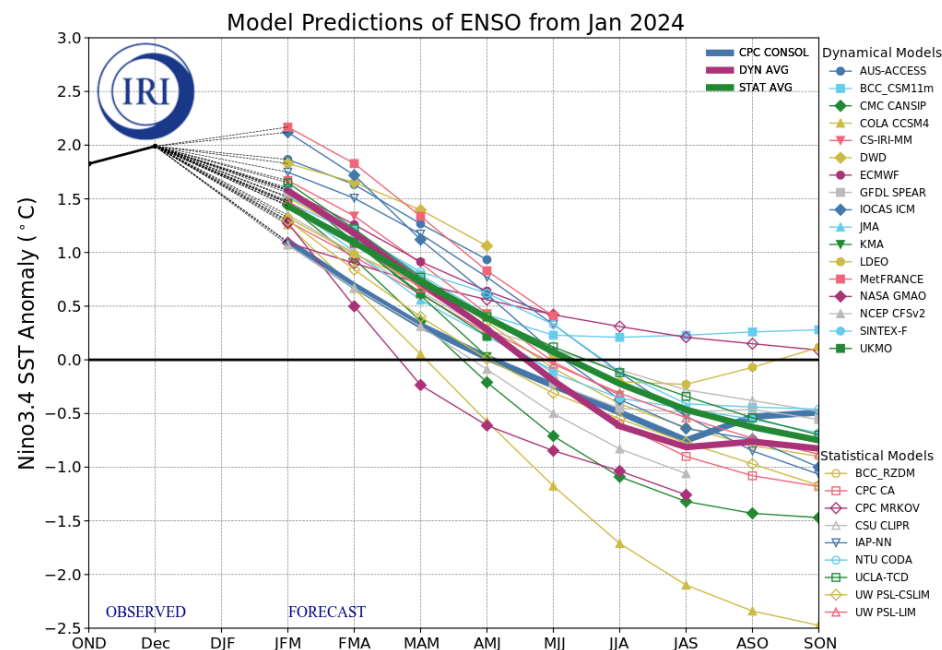


Mid-January 2024 IRI Model-Based Probabilistic ENSO Forecasts

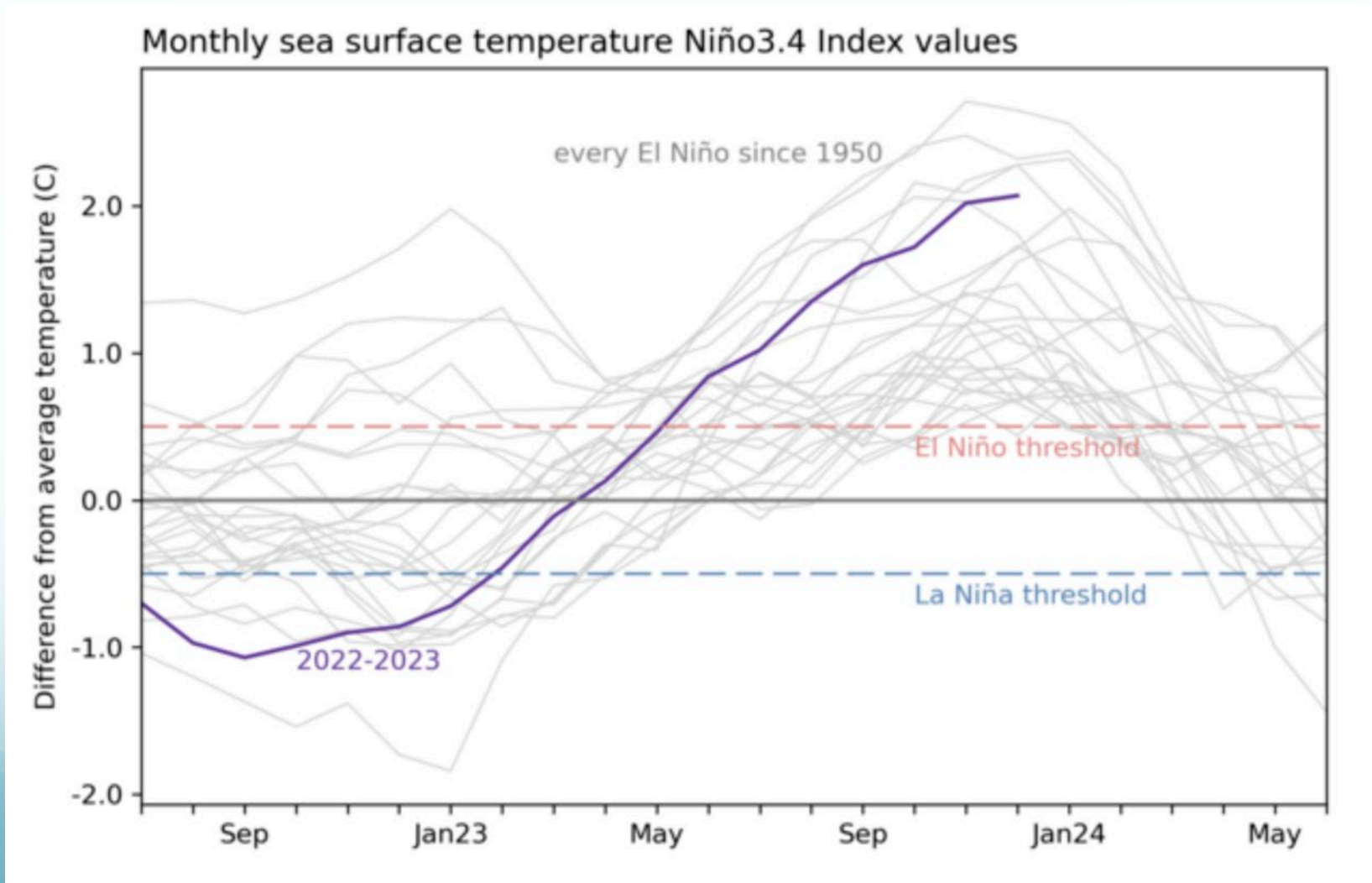
ENSO state based on NINO3.4 SST Anomaly Neutral ENSO: -0.5°C to 0.5°C



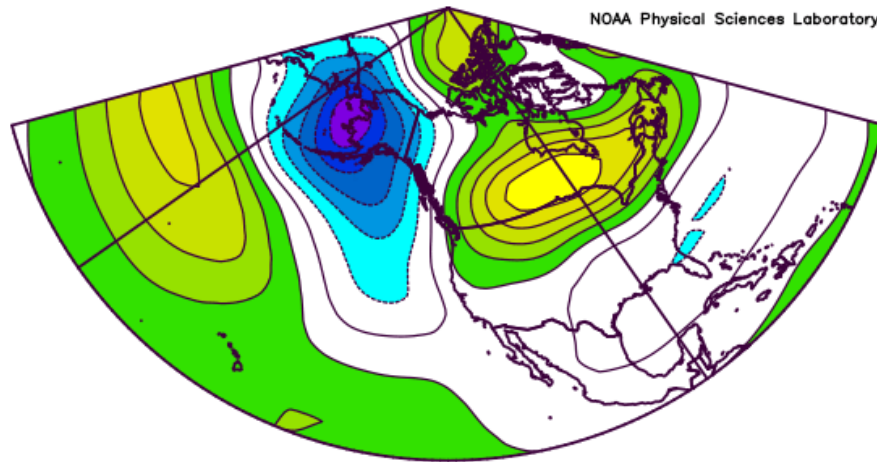
A transition from El Niño to La Niña is likely by the end of summer, which is generally the case



Did this El Niño end up in the strong category?

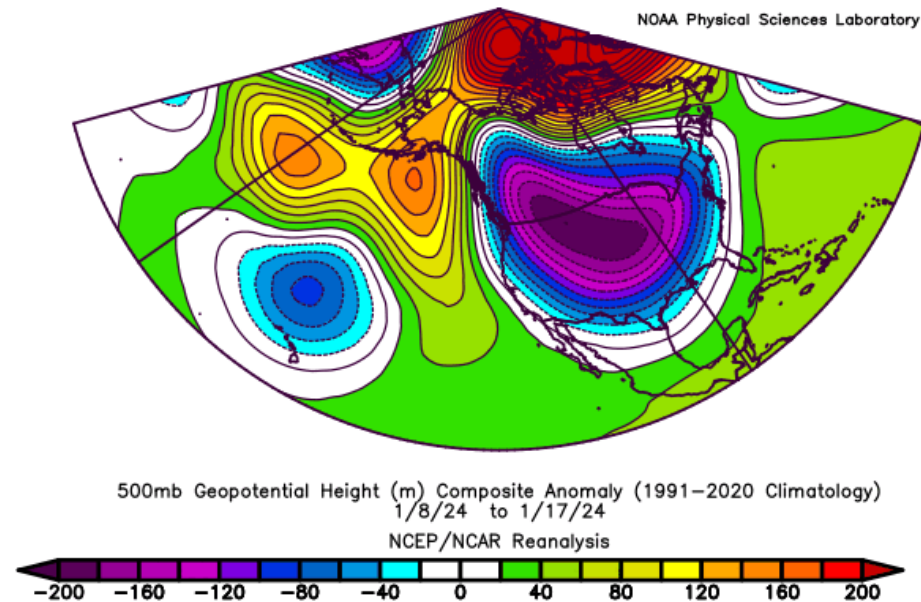


1 Dec – 7 Jan



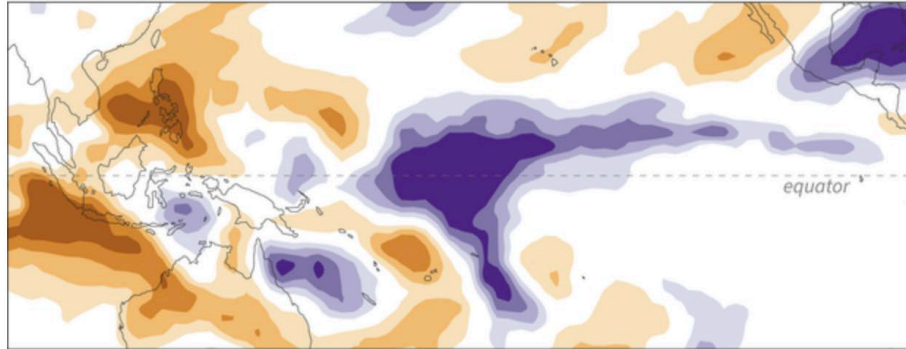
The atmospheric circulation pattern during weeks 2-3 of January 2024 was much different than that during the earlier part of the winter

8-17 Jan

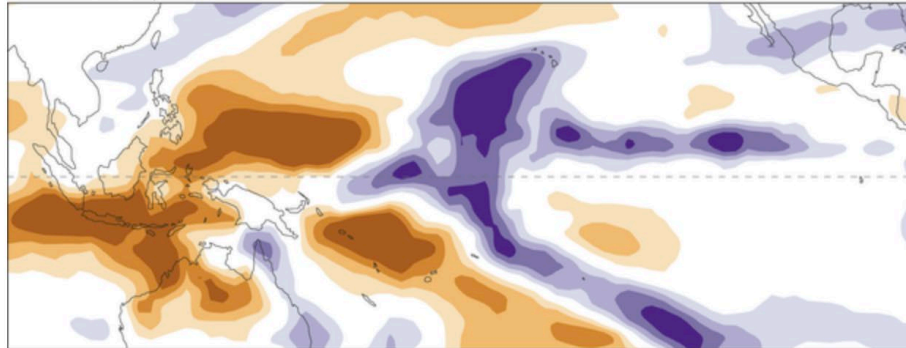


Outgoing longwave radiation (OLR)

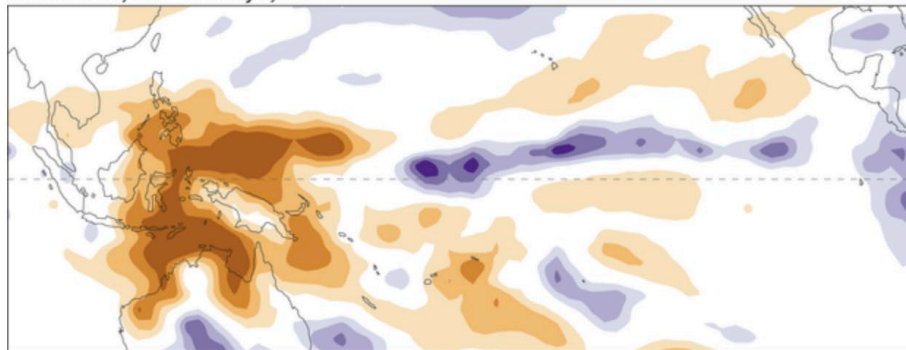
December 9–18, 2023



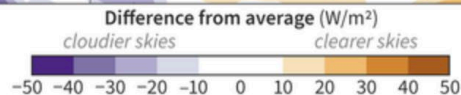
December 19–28, 2023



December 29, 2023–January 7, 2024



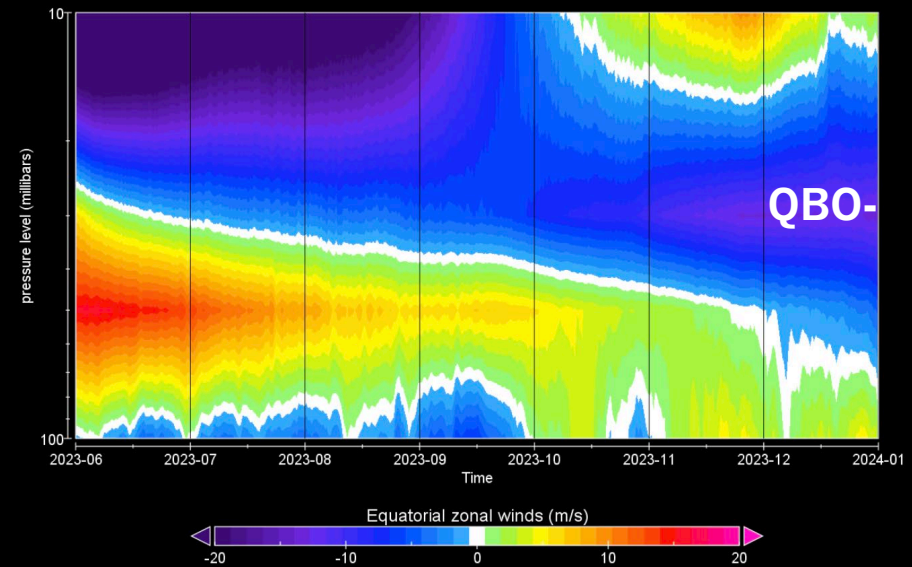
compared to 1981–2010



NOAA Climate.gov
Data: UMD OLR CDR

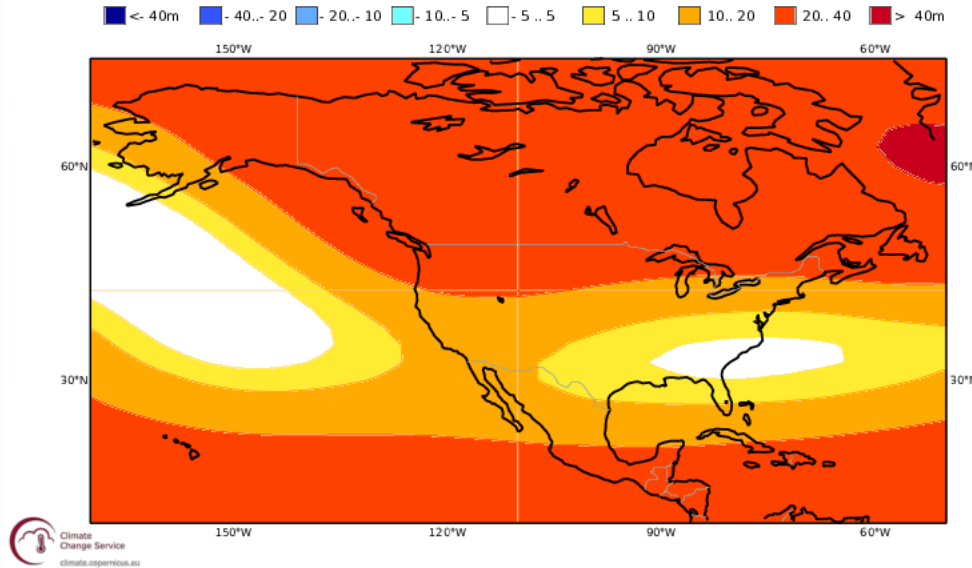
The combined effects of the MJO, and a breakdown of the polar vortex with a sudden stratospheric warming, is implicated in the cold-air outbreak that included the Pacific NW.

ECMWF Seasonal Forecast init: June 2023

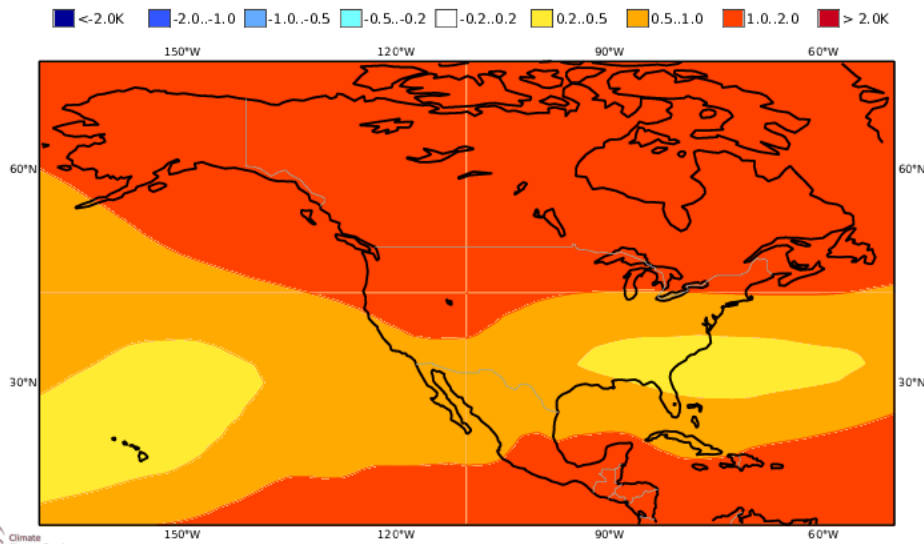


500 hPa Z

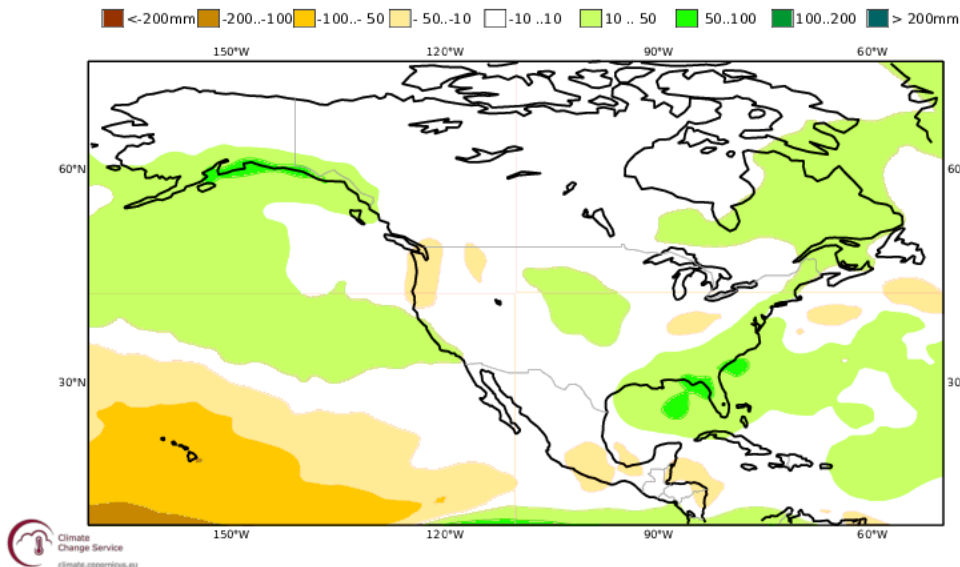
IMME Anomalies Feb-Apr 2024



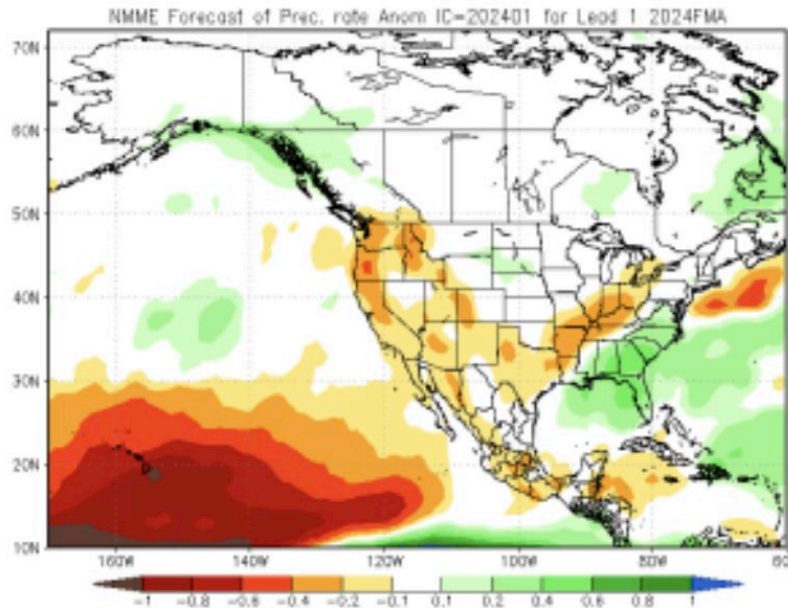
850 hPa T



Precipitation



NMME

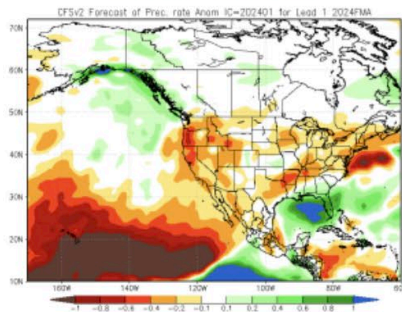


Climate Model Projections
for WA State during Feb-Apr:
Dry

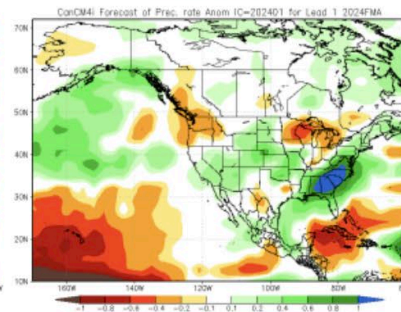
One outlier



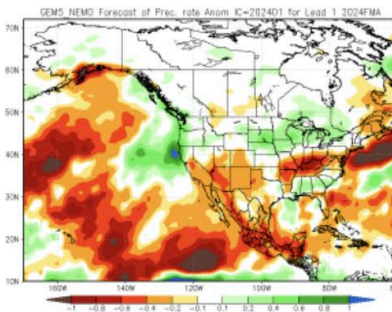
NCEP CFSv2



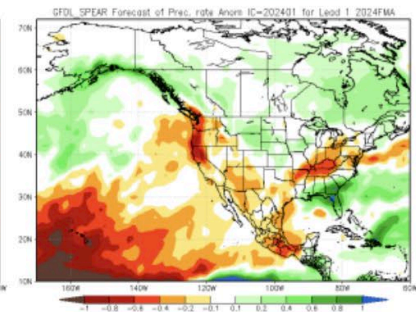
CanCM4i



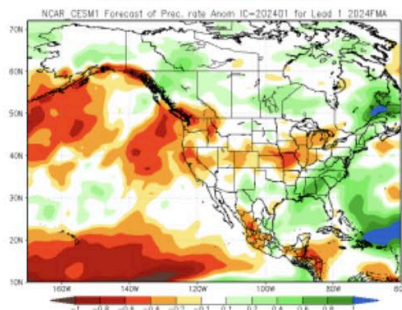
GEM5 NEMO



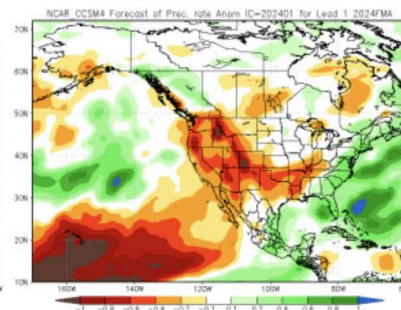
GFDL SPEAR



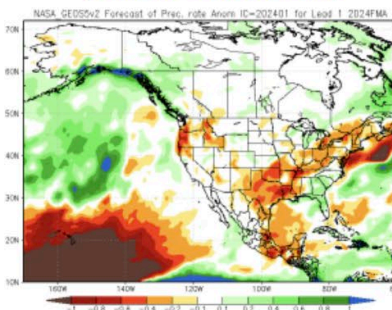
NCAR CESM1



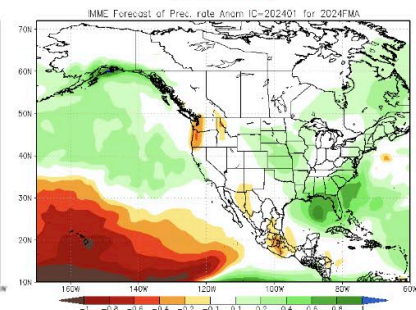
NCAR CCSM4



NASA GEOS5v2



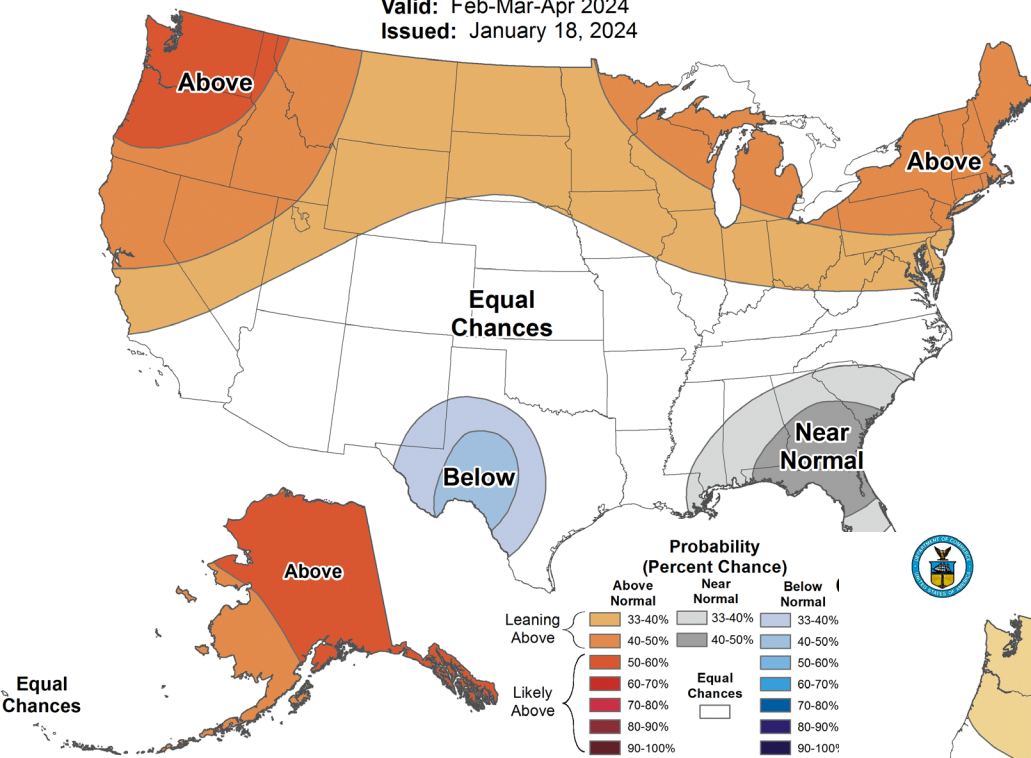
IMME





Seasonal Temperature Outlook

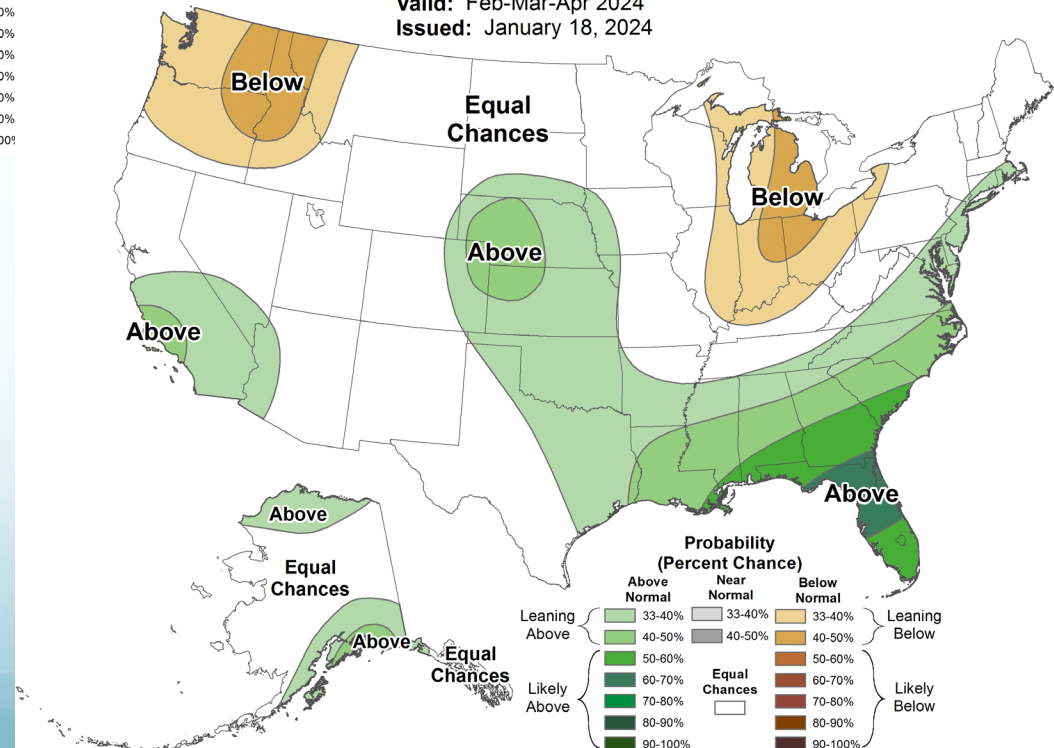
Valid: Feb-Mar-Apr 2024
Issued: January 18, 2024



NOAA/CPC Forecasts for Feb-Apr 2024

Seasonal Precipitation Outlook

Valid: Feb-Mar-Apr 2024
Issued: January 18, 2024



Summary

- Temperatures for the 2024 water year so far have mostly been above normal, even with our recent cold snap
- Water year precipitation has been below normal for most of the state
- The kind of cold weather we have recently enjoyed is rare during El Niño
- The remainder of winter is apt be warm, and perhaps a bit dry, relative to seasonal norms
- Sibling rivalry? El Niño is liable to be replaced by La Niña



USDA Natural Resources Conservation Service

Snow Survey and Water Supply Forecasting Program

Washington

Water Supply Availability Committee

January 24, 2024



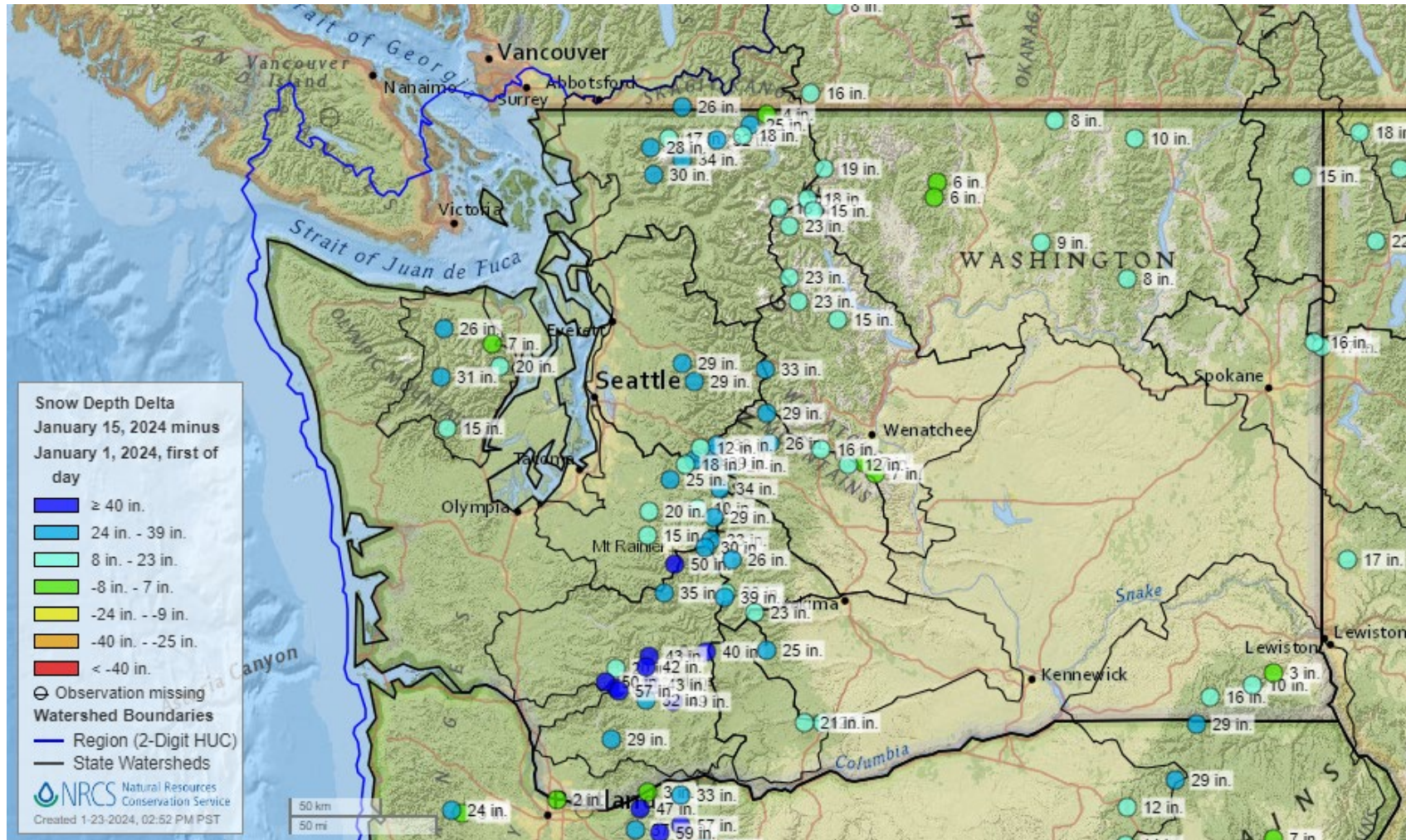
Glacier Peak (taken by Willie Webster, NWAC)

Matt Warbritton
Supervisory Hydrologist
USDA NRCS SSWSF
Portland Data Collection Office
matt.warbritton@usda.gov
503-307-2829

Snowpack Conditions

Early January Storms

Change in snow depth from January 1-15



Snow Depth at SNOTEL Sites

Swift Creek (Helens) – 5.2 ft

Lost Horse (Yakama) – 2.1 ft

Paradise (Rainier) – 4.2 ft

Stevens Pass (Hwy 2) – 2.7 ft

MF Nooksack (Baker) – 2.3 ft

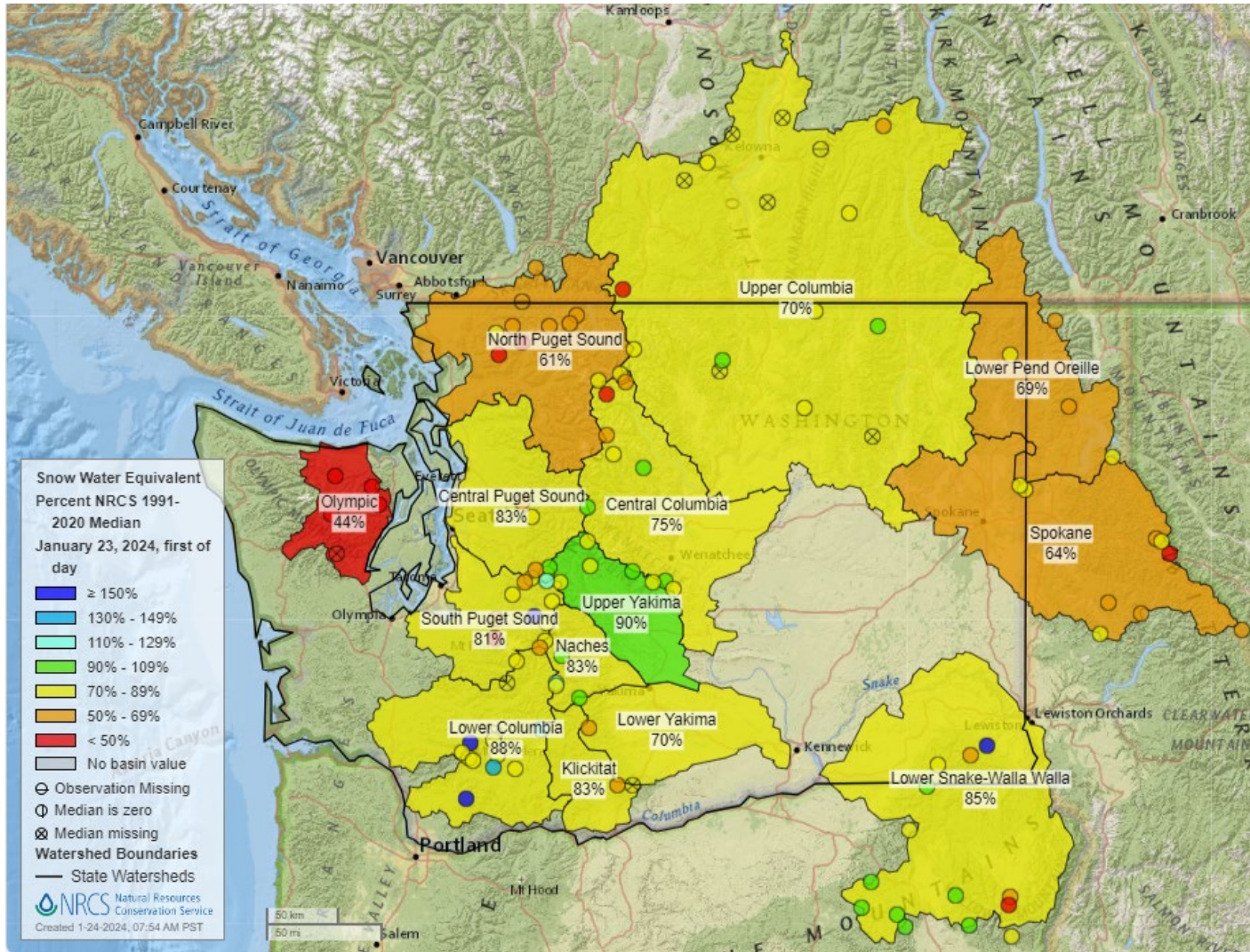
Buckinghorse (Olympics) – 2.6 ft

Touchet (Blues) – 1.3 ft

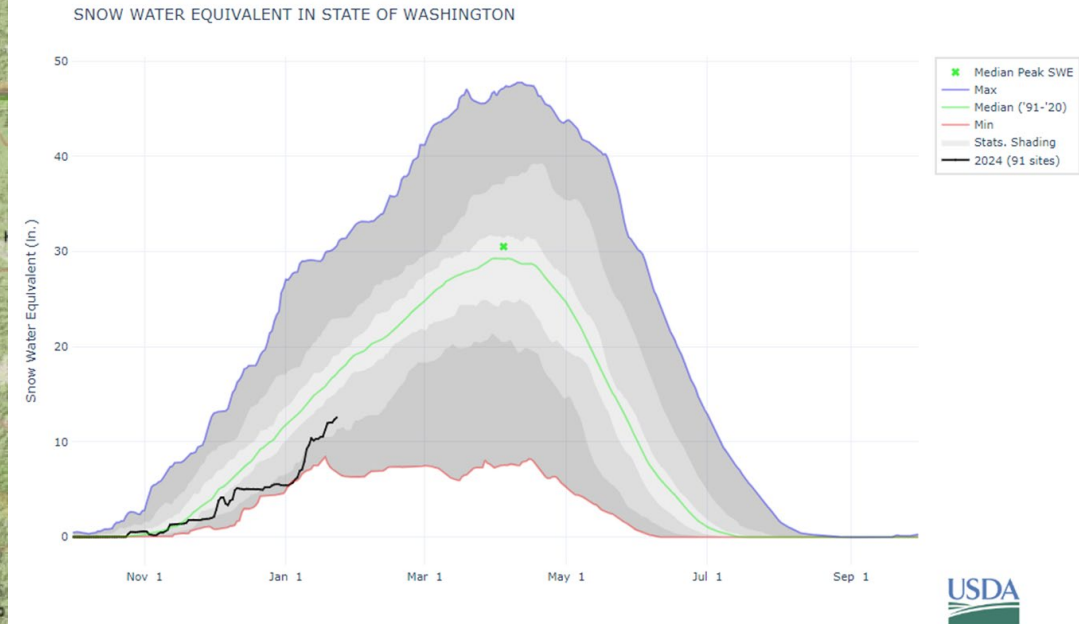
Gold Mountain (NE) – 0.7 ft

Quartz Peak (Spokane) – 1.3 ft

Snowpack Conditions

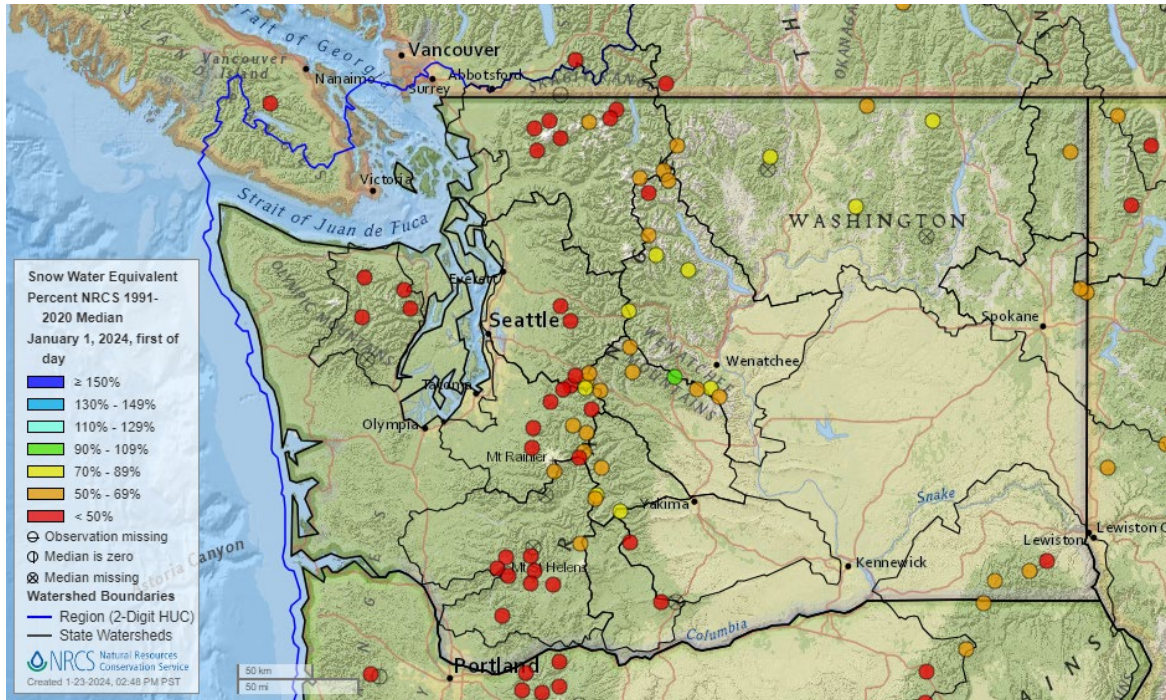


Statewide Snowpack:
75% of normal

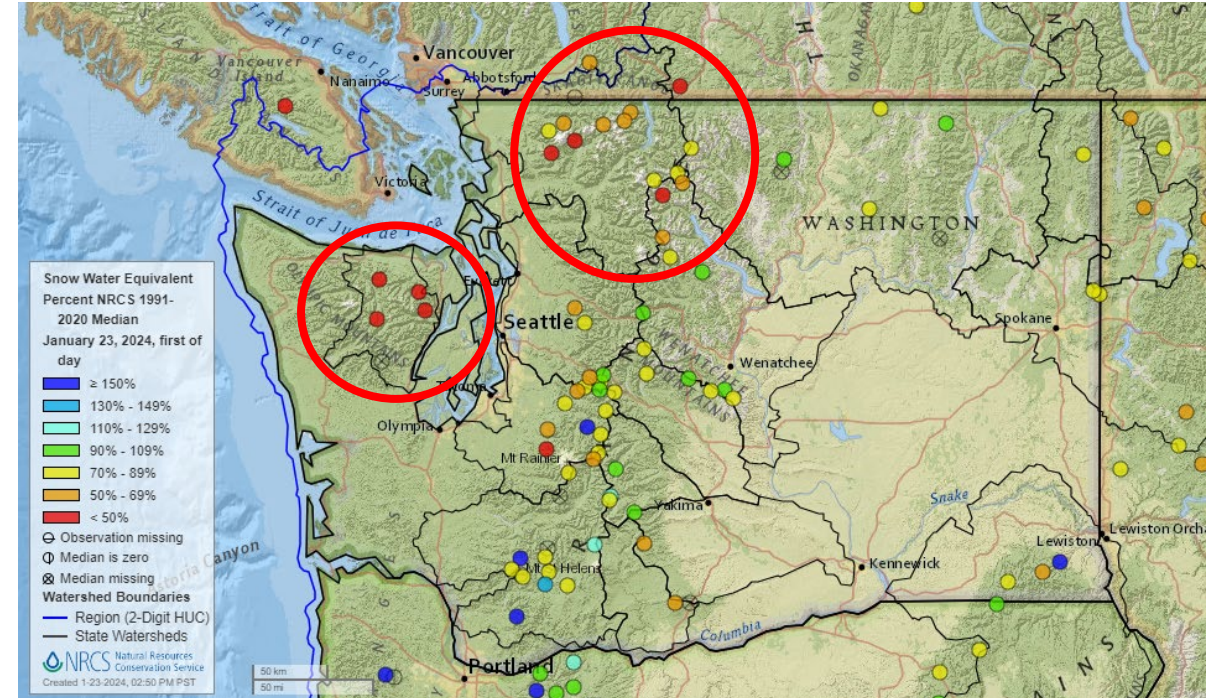


Change in Snowpack: January 1 vs January 23

January 1



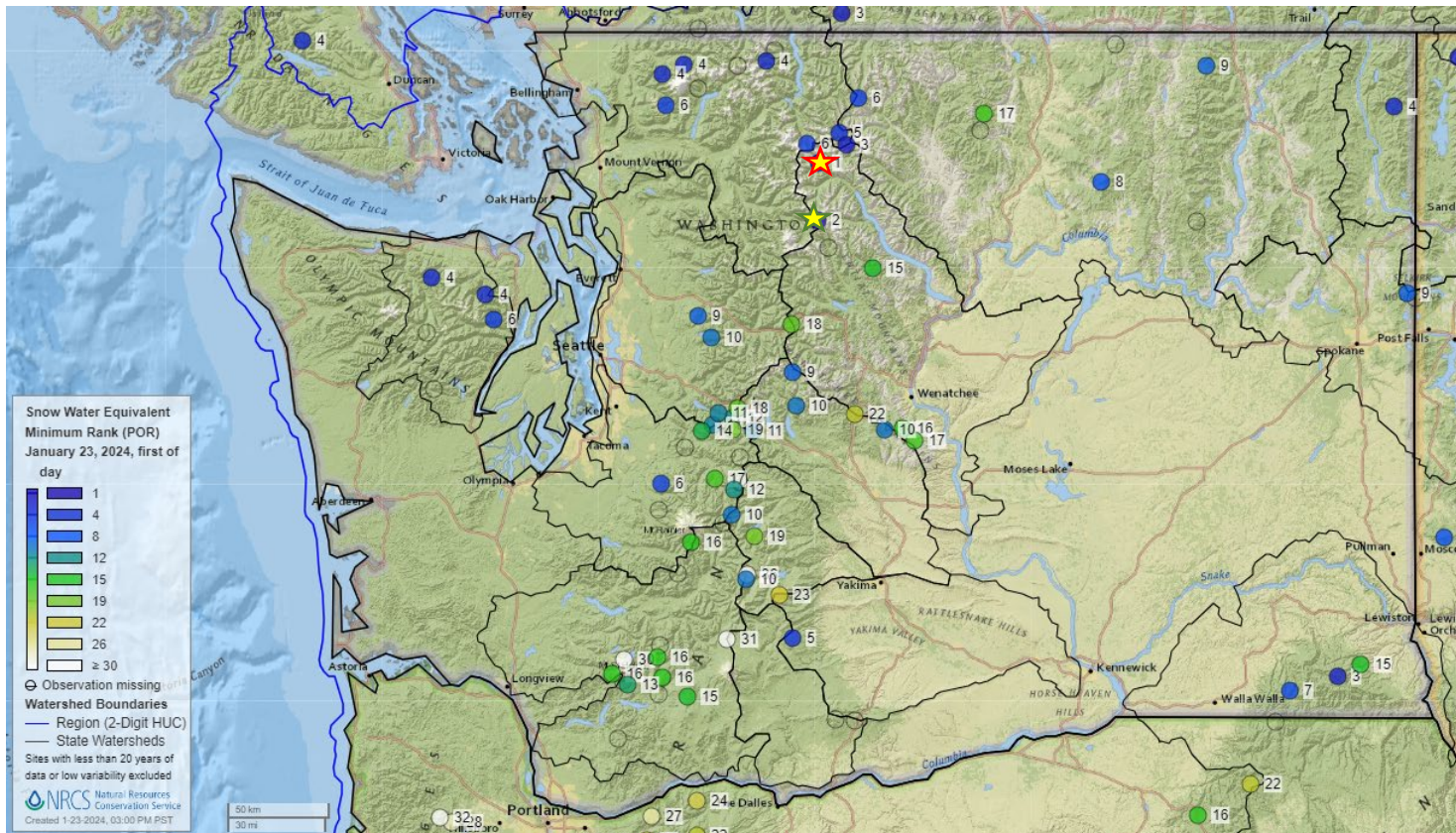
January 23



Snowpack Records?

Record low snowpack: Park Creek Ridge (since 1977)★

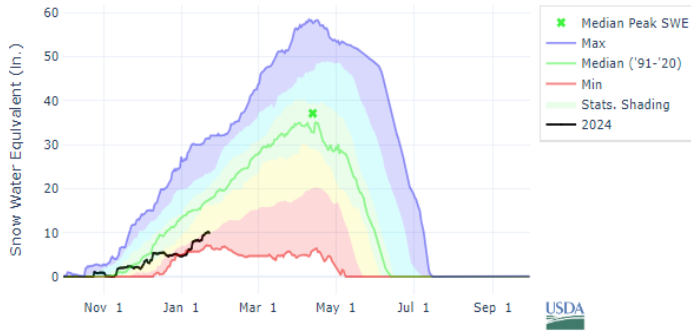
2nd lowest snowpack: Lyman Lake (since 1978)★



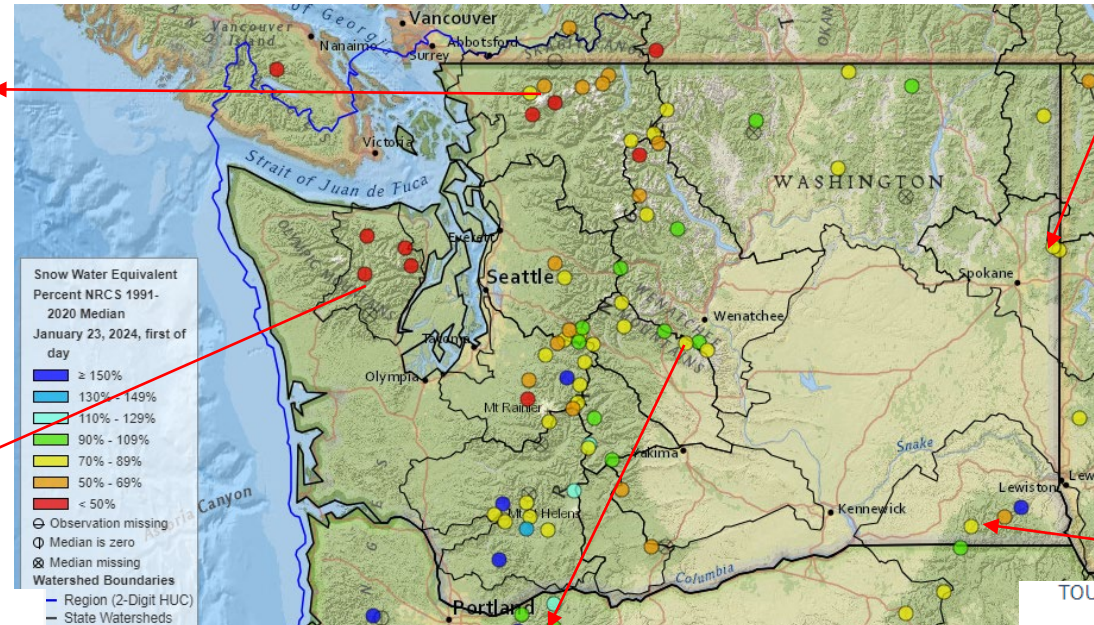
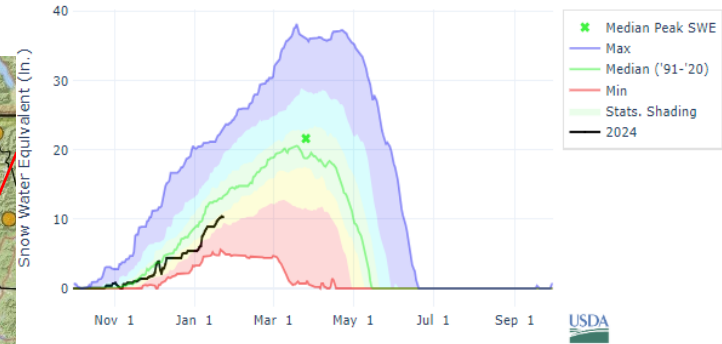
Snowpack Profiles



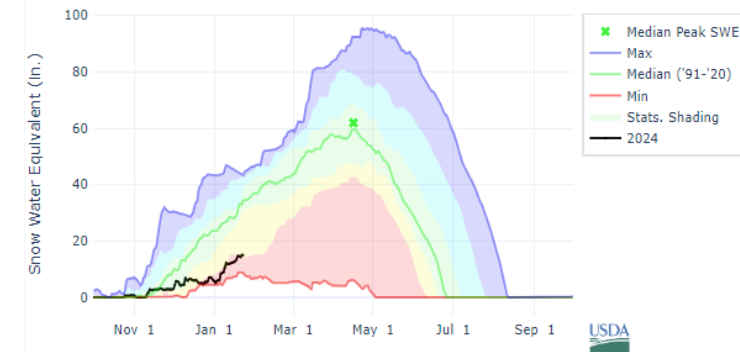
WELLS CREEK, WA (909) SNOW WATER EQUIVALENT



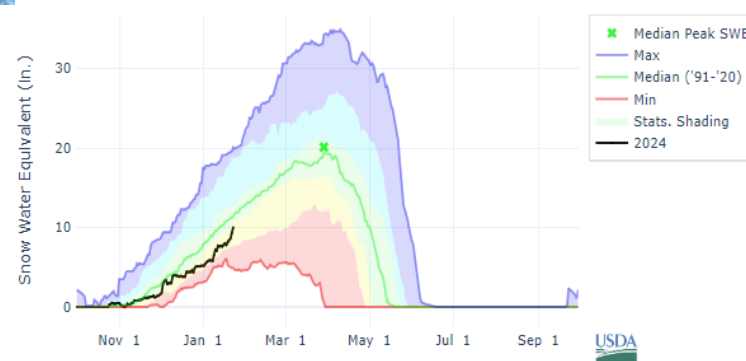
QUARTZ PEAK, WA (707) SNOW WATER EQUIVALENT



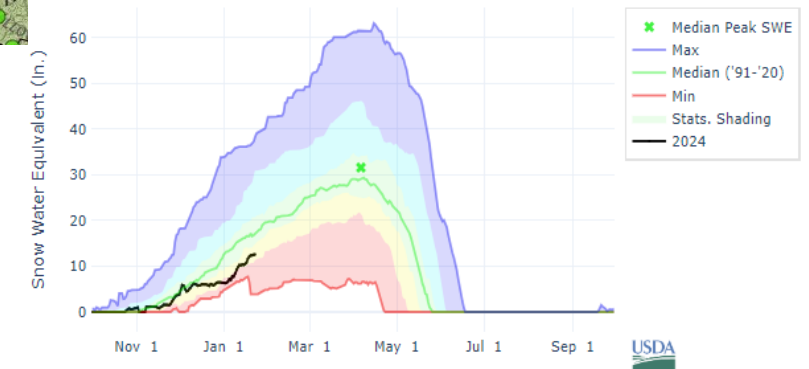
BUCKINGHORSE, WA (1107) SNOW WATER EQUIVALENT



GROUSE CAMP, WA (507) SNOW WATER EQUIVALENT



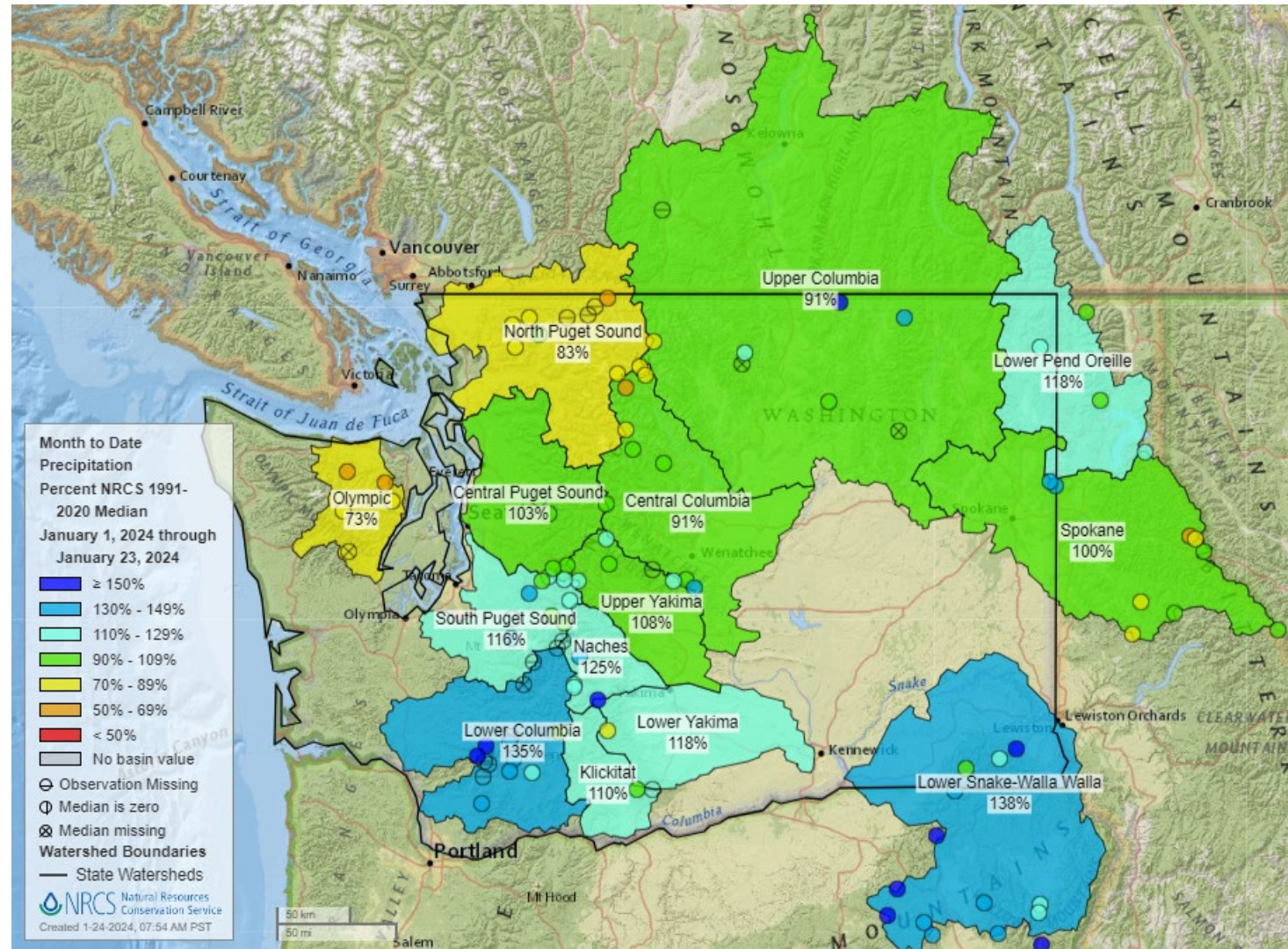
TOUCHET, WA (824) SNOW WATER EQUIVALENT



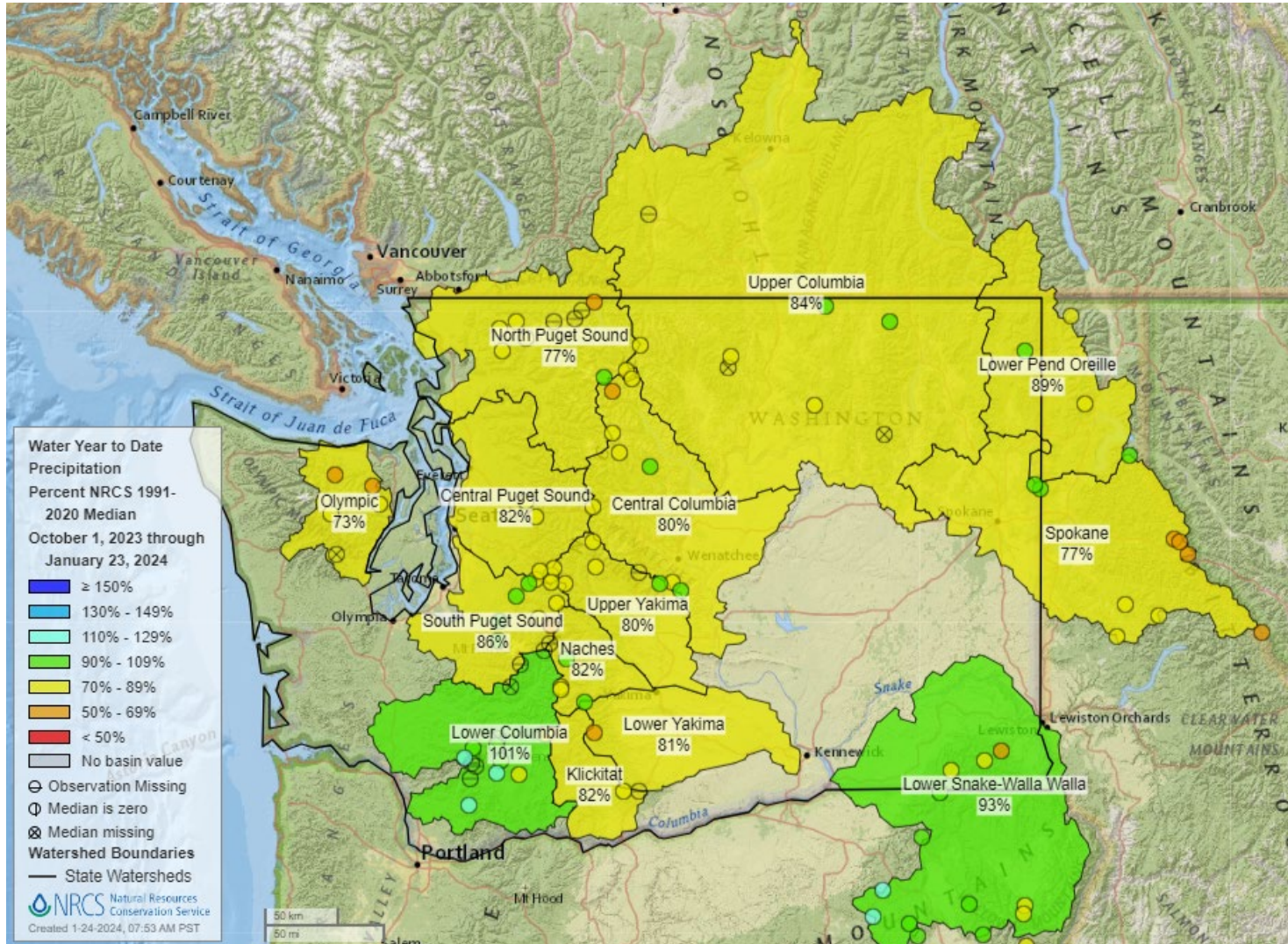


Precipitation Conditions

Month-to-Date Precipitation – Basin and Site Map

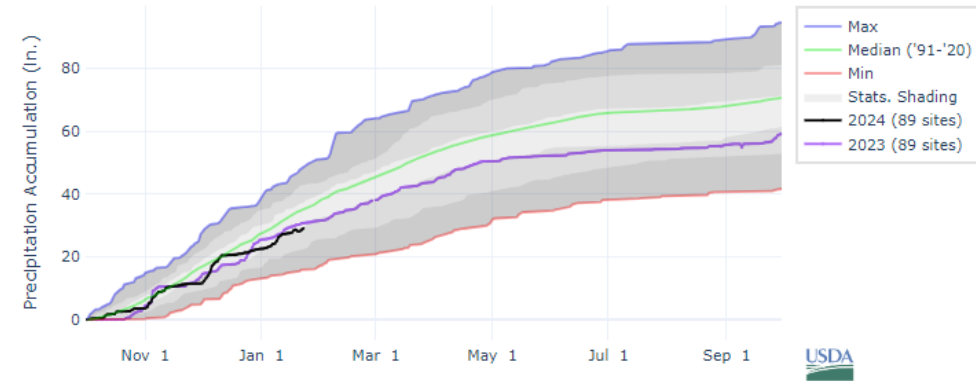


WYTD Precipitation – Basin Map



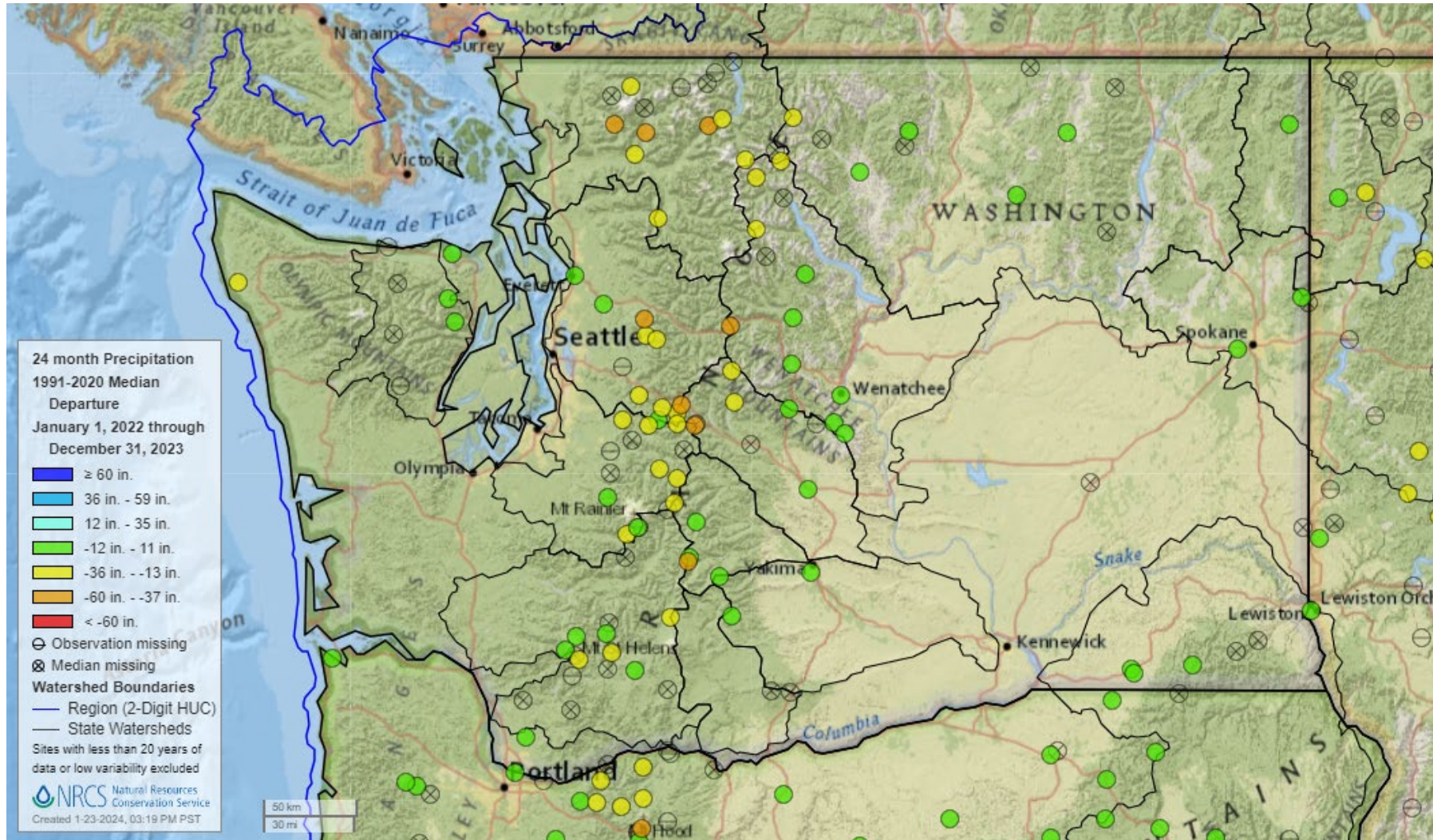
Statewide WYTD Precipitation:
86% of normal

PRECIPITATION ACCUMULATION IN STATE OF WASHINGTON



Precipitation: Compounding Deficits

24-month Precipitation – Normal Departure



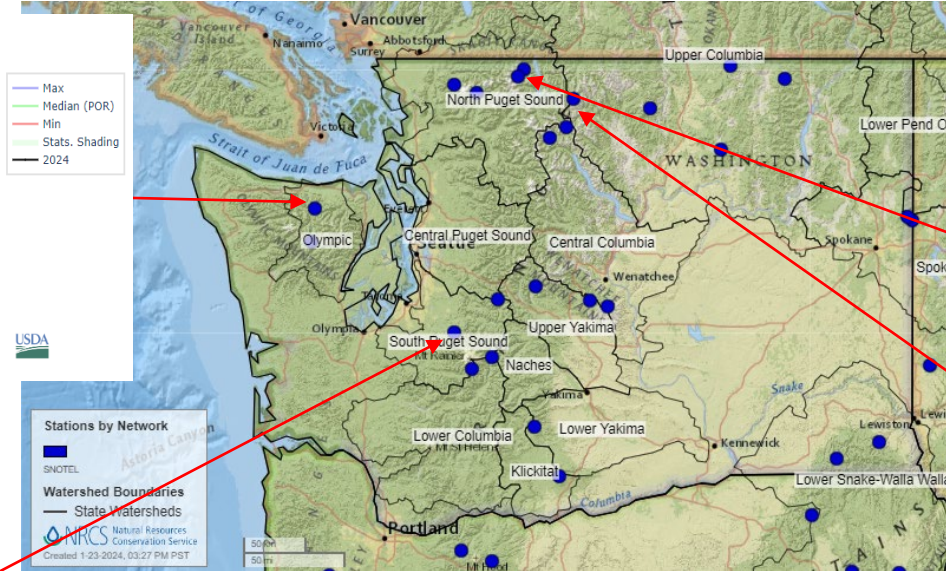
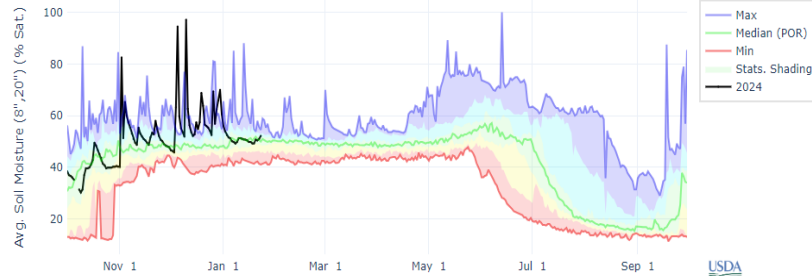


Soil Moisture

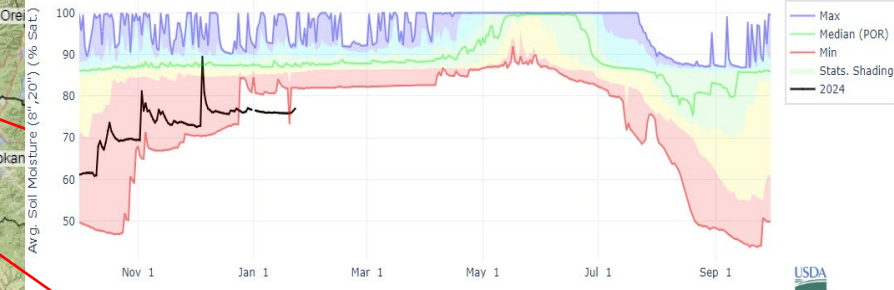
Soil Moisture

WY 2024 – Select Site Charts

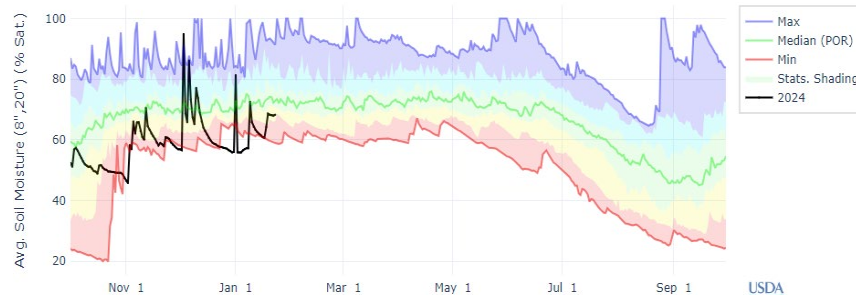
BUCKINGHORSE, WA (1107) AVG. SOIL MOISTURE (8",20")



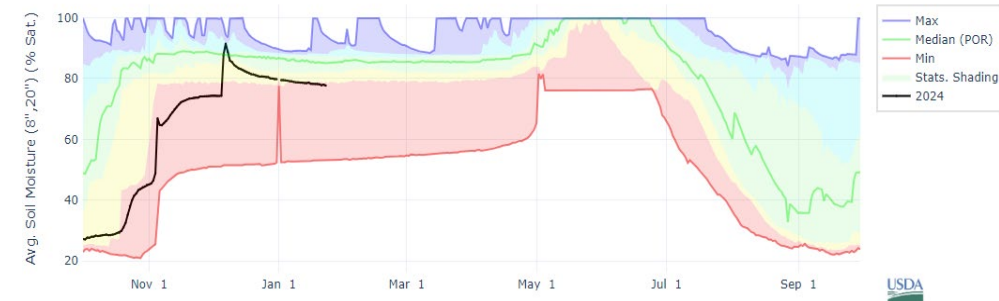
BEAVER PASS, WA (990) AVG. SOIL MOISTURE (8",20")



BURNT MOUNTAIN, WA (942) AVG. SOIL MOISTURE (8",20")



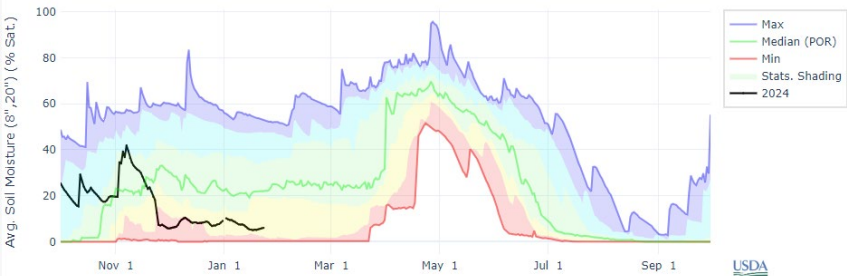
RAINY PASS, WA (711) AVG. SOIL MOISTURE (8",20")



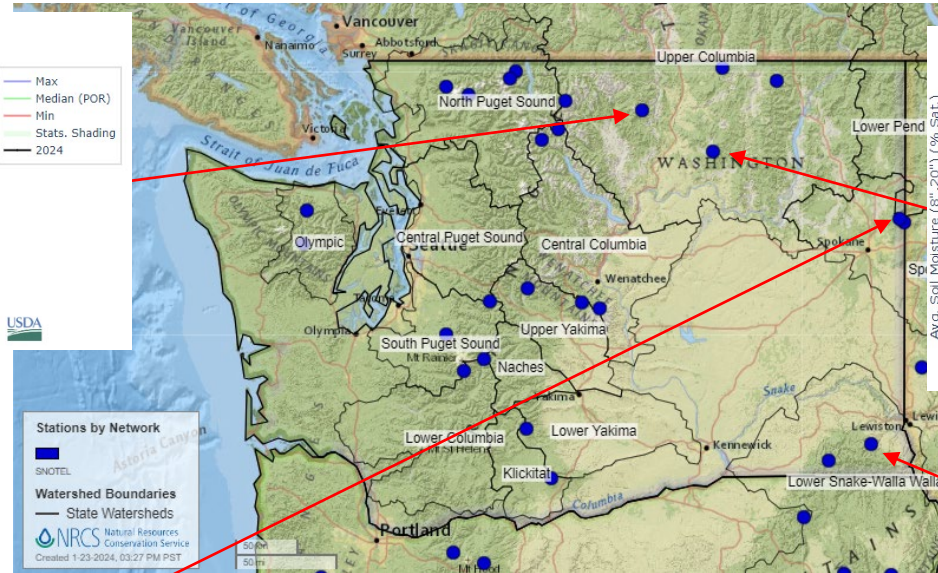
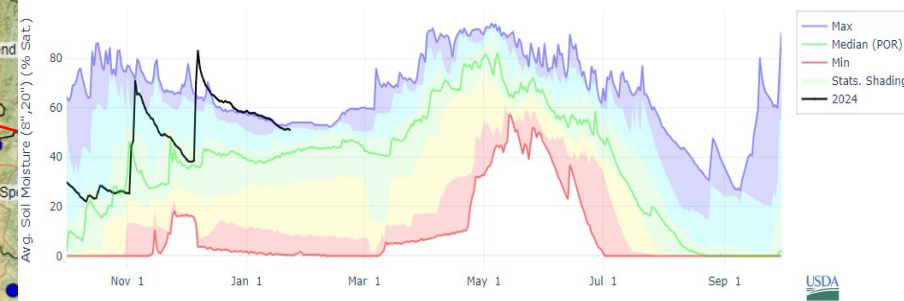
Soil Moisture

WY 2024 – Select Site Charts

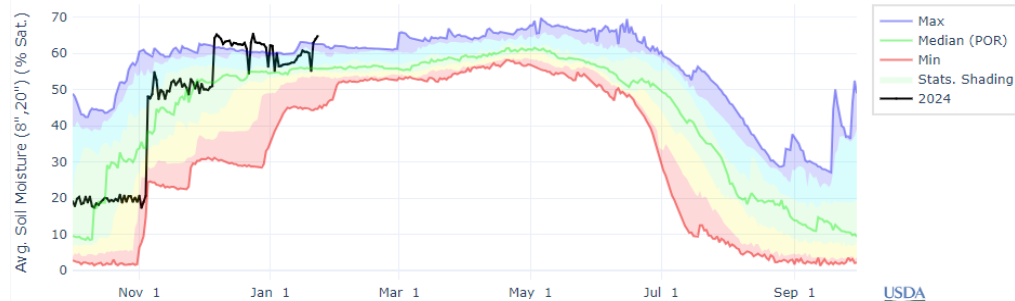
SALMON MEADOWS, WA (728) AVG. SOIL MOISTURE (8",20")



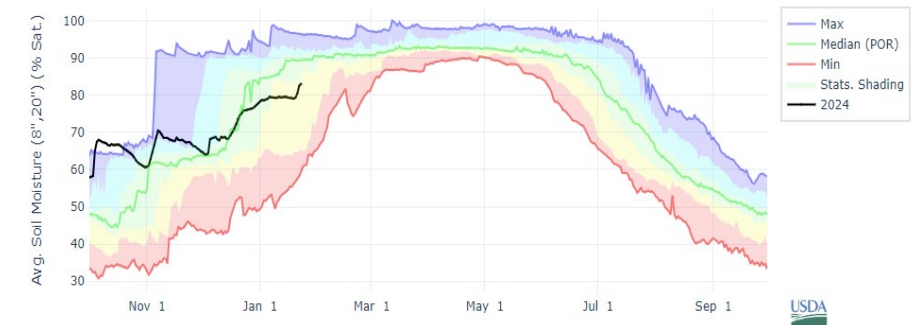
MOSES MTN, WA (644) AVG. SOIL MOISTURE (8",20")



RAGGED MOUNTAIN, ID (1081) AVG. SOIL MOISTURE (8",20")



SOURDOUGH GULCH, WA (985) AVG. SOIL MOISTURE (8",20")



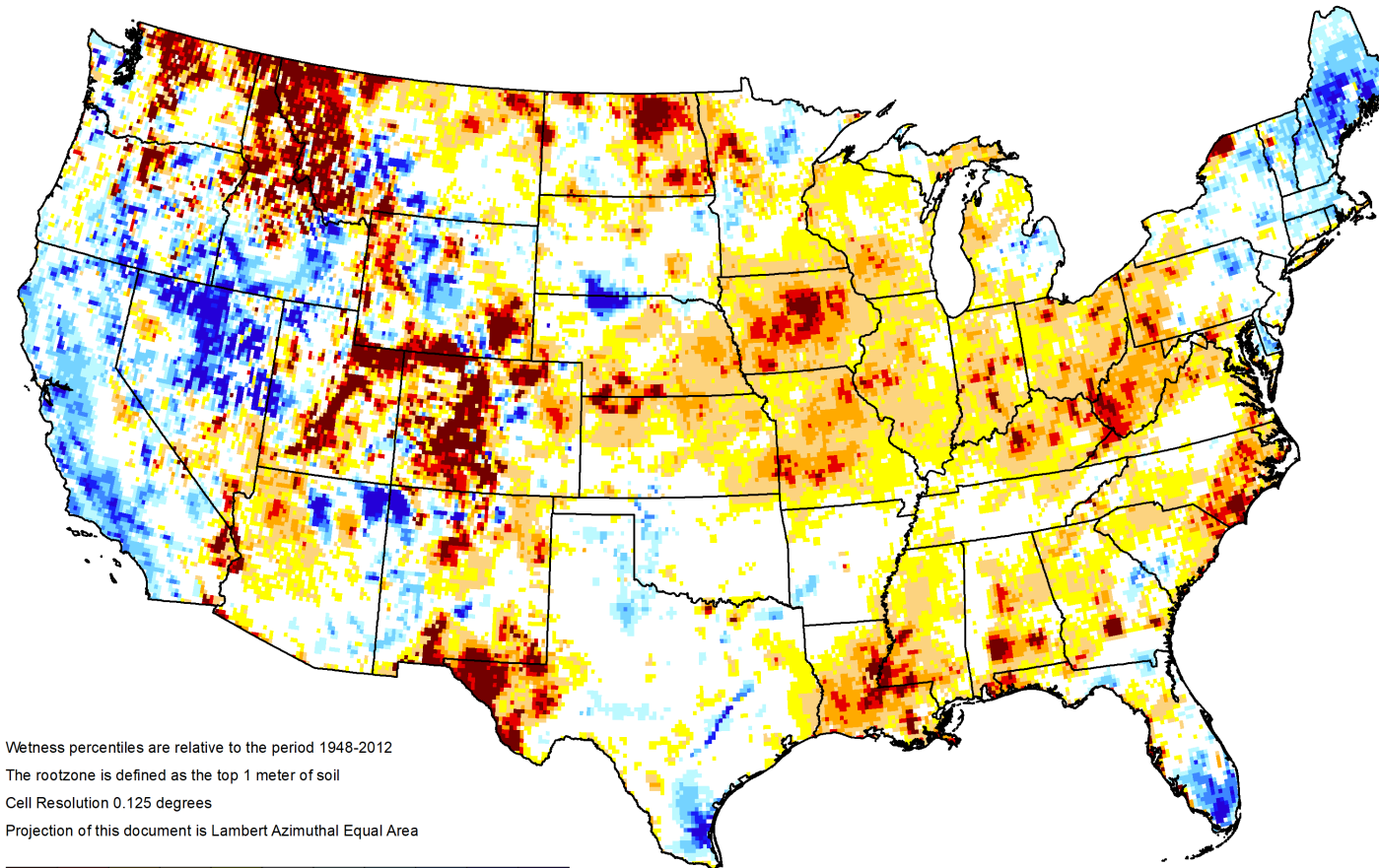
Soil Moisture

NASA GRACE

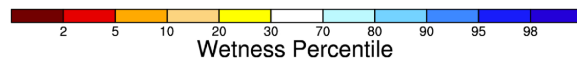


GRACE-Based Root Zone Soil Moisture Drought Indicator

January 22, 2024



Wetness percentiles are relative to the period 1948-2012
The rootzone is defined as the top 1 meter of soil
Cell Resolution 0.125 degrees
Projection of this document is Lambert Azimuthal Equal Area



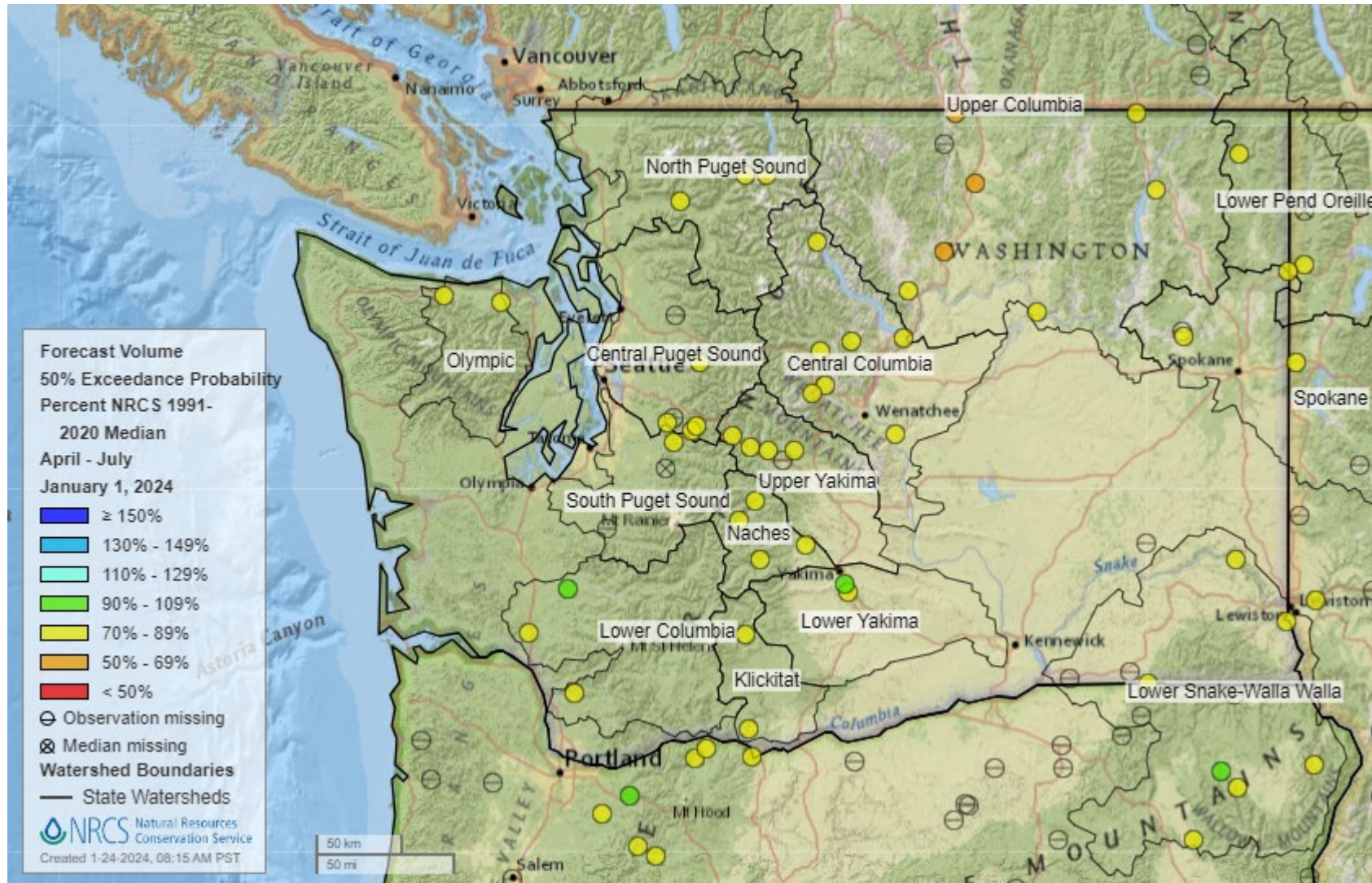
<https://nasagrace.unl.edu>



Water Supply Outlook

January 1: Water Supply Forecasts

April-September Volumetric Streamflow



Next distribution: week of Feb. 5
Reports available [here](#)

Thank you!

Matt Warbritton
Supervisory Hydrologist
USDA NRCS SSWSF
Portland Data Collection Office
matt.warbritton@usda.gov
503-307-2829

[Washington Snow Survey and Water
Supply Program Website](#)

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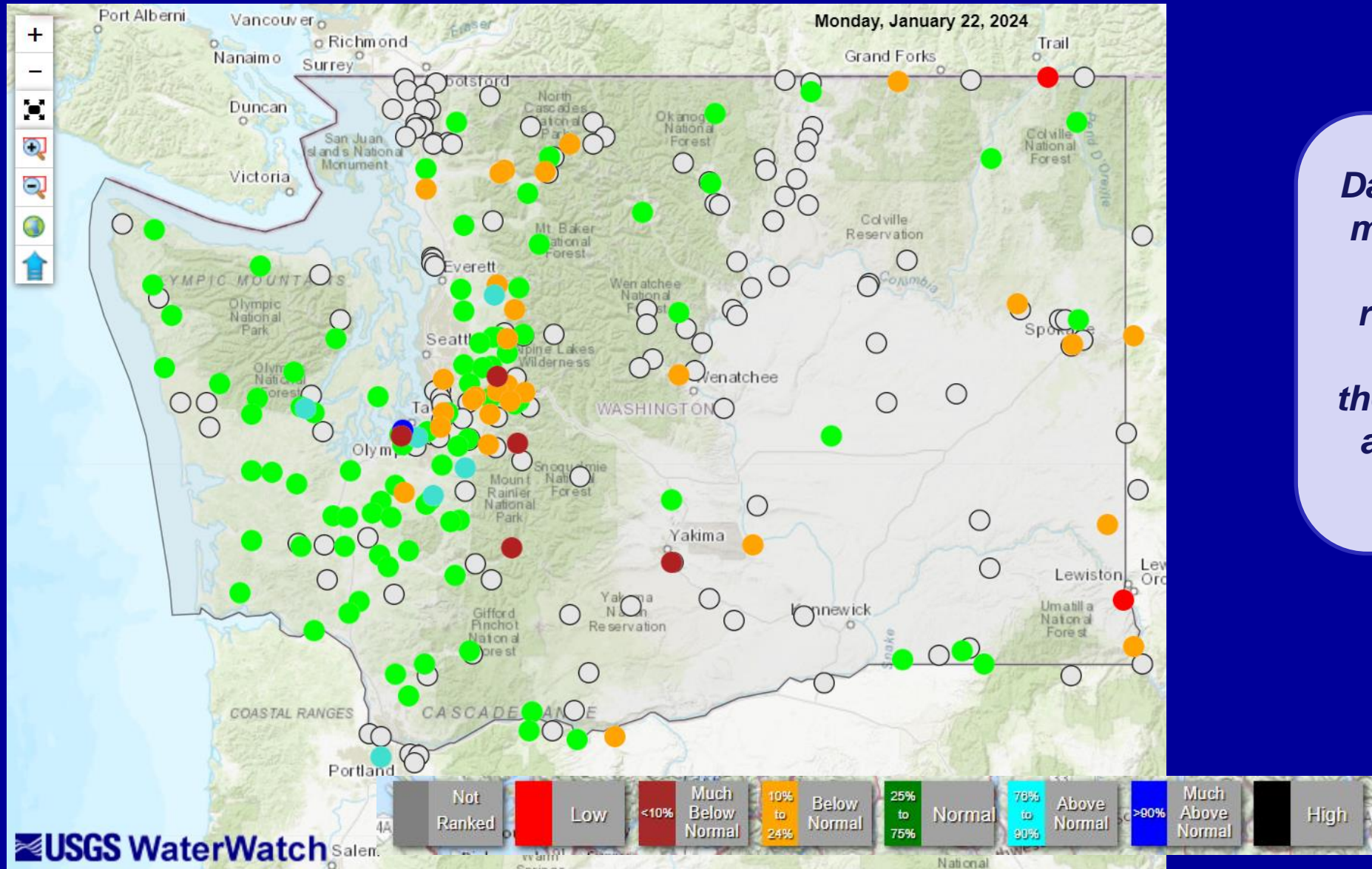
To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at [How to File a Program Discrimination Complaint](#) and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: program.intake@usda.gov.

Streamflow & Groundwater Conditions in Washington State as of 23 Jan. 2024

Presented to
The Washington State Water Supply Availability Committee on 24 Jan. 2024
by Nicholas Sutfin, USGS Washington Water Science Center

Data presented here may be provisional and subject to revision until they have been thoroughly reviewed and received final approval.

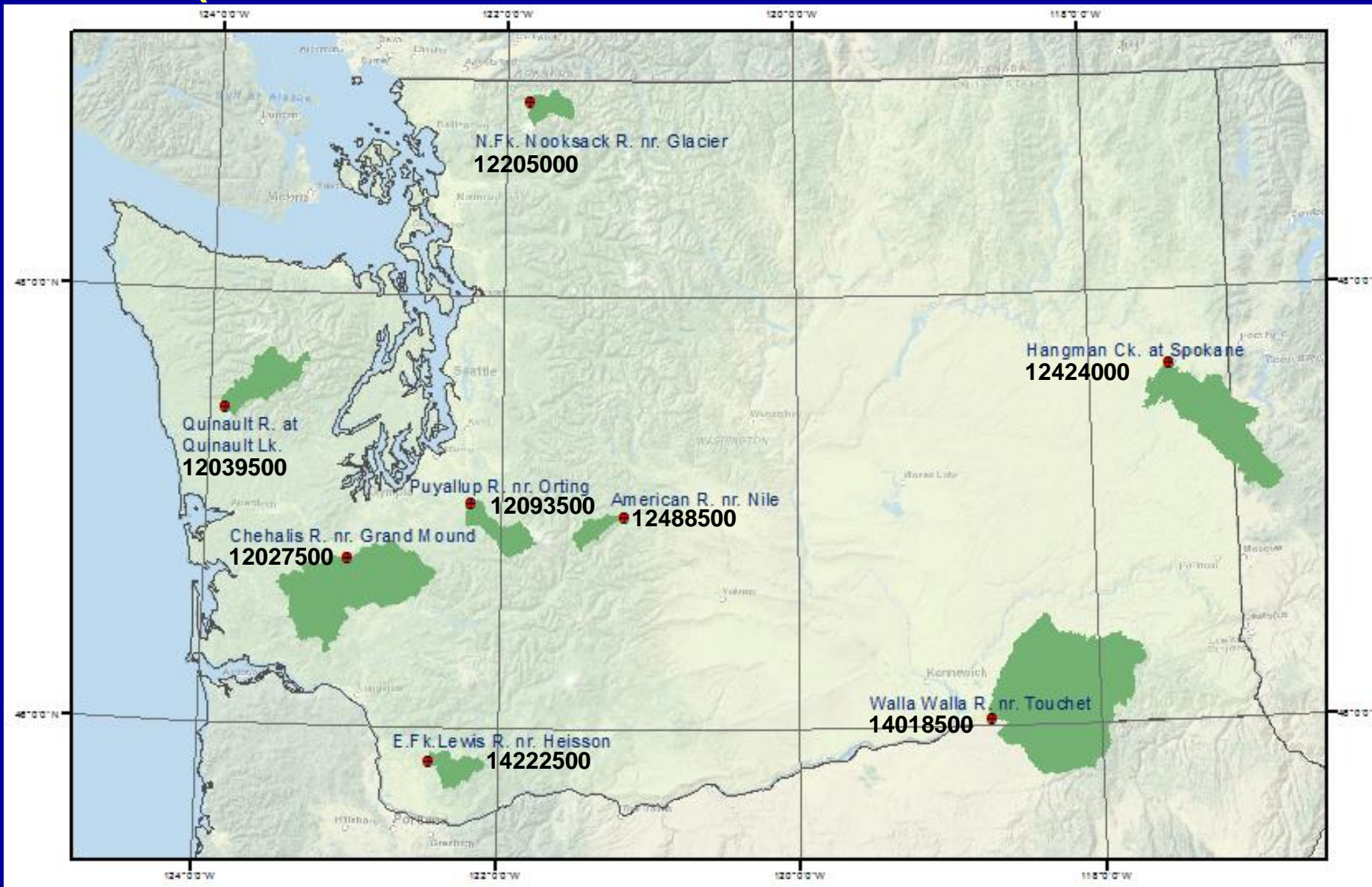
7-day Average Streamflow Conditions as of 23 Jan. 2024



Data presented here may be provisional and subject to revision until they have been thoroughly reviewed and received final approval.

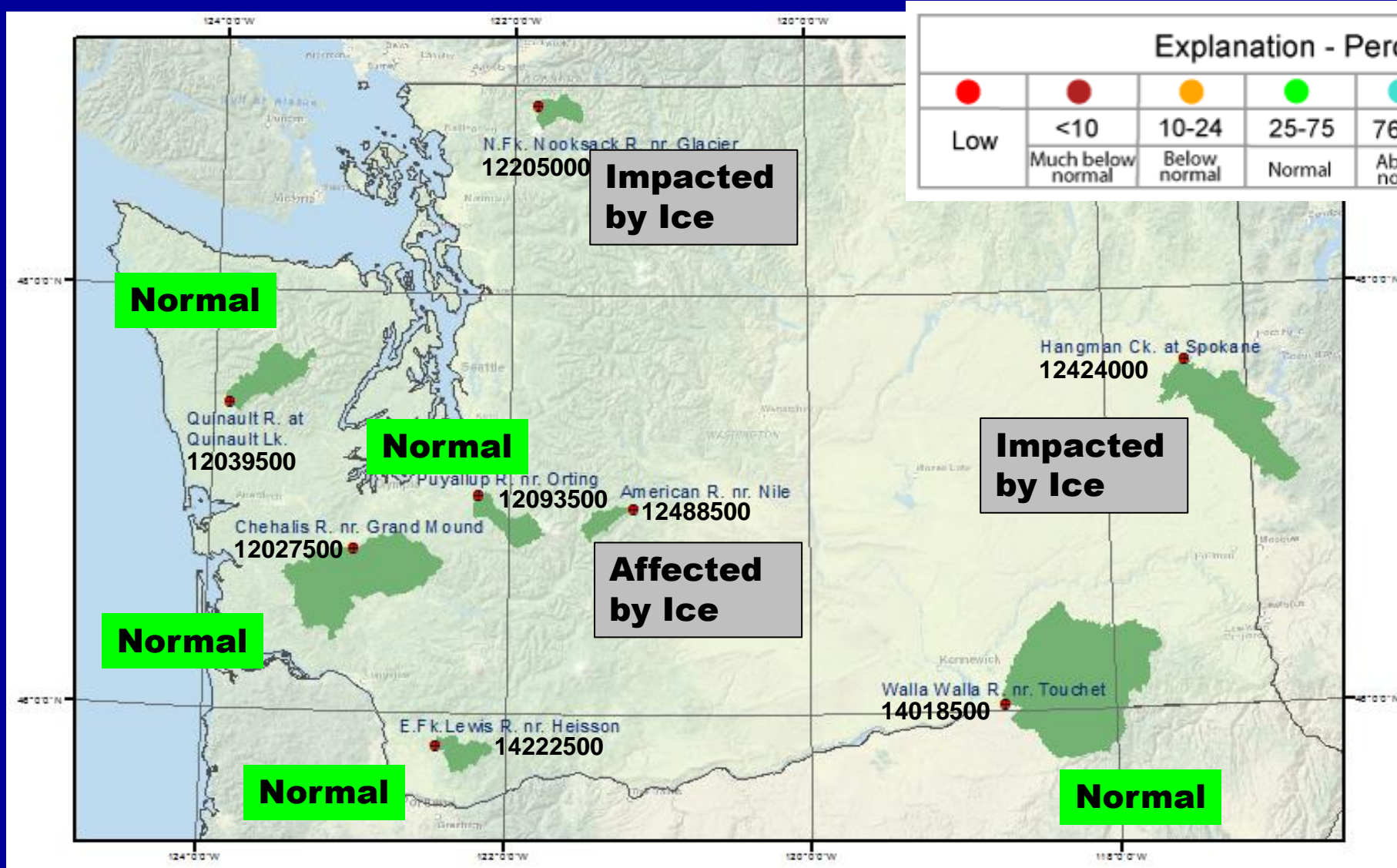
Index Gaging Stations

(Stations that measure natural or near-natural streamflow)



Index Gaging Stations

7-day average streamflow (as of 23 Jan. 2024)

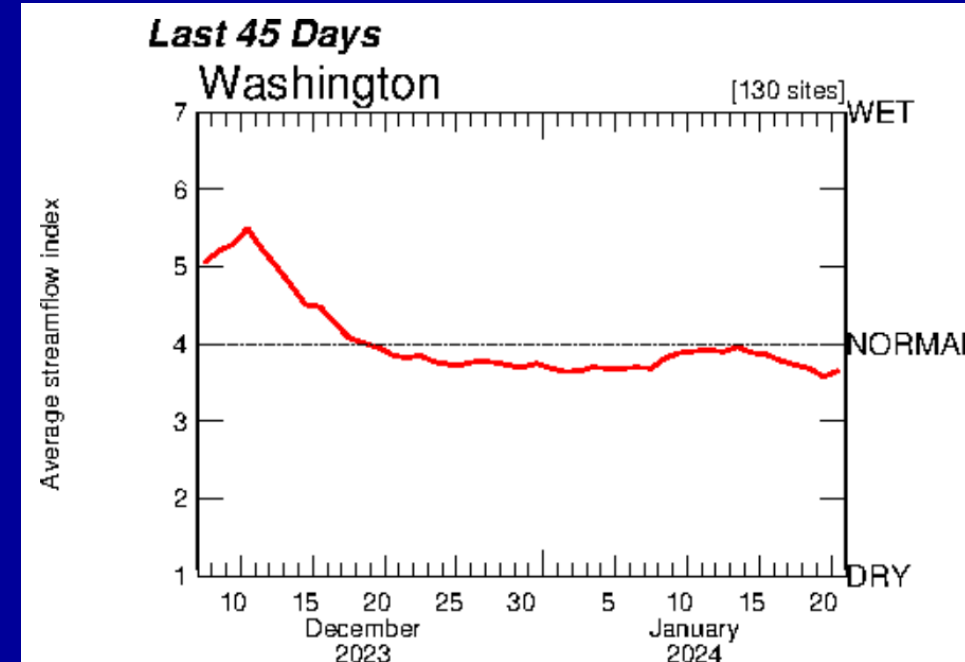
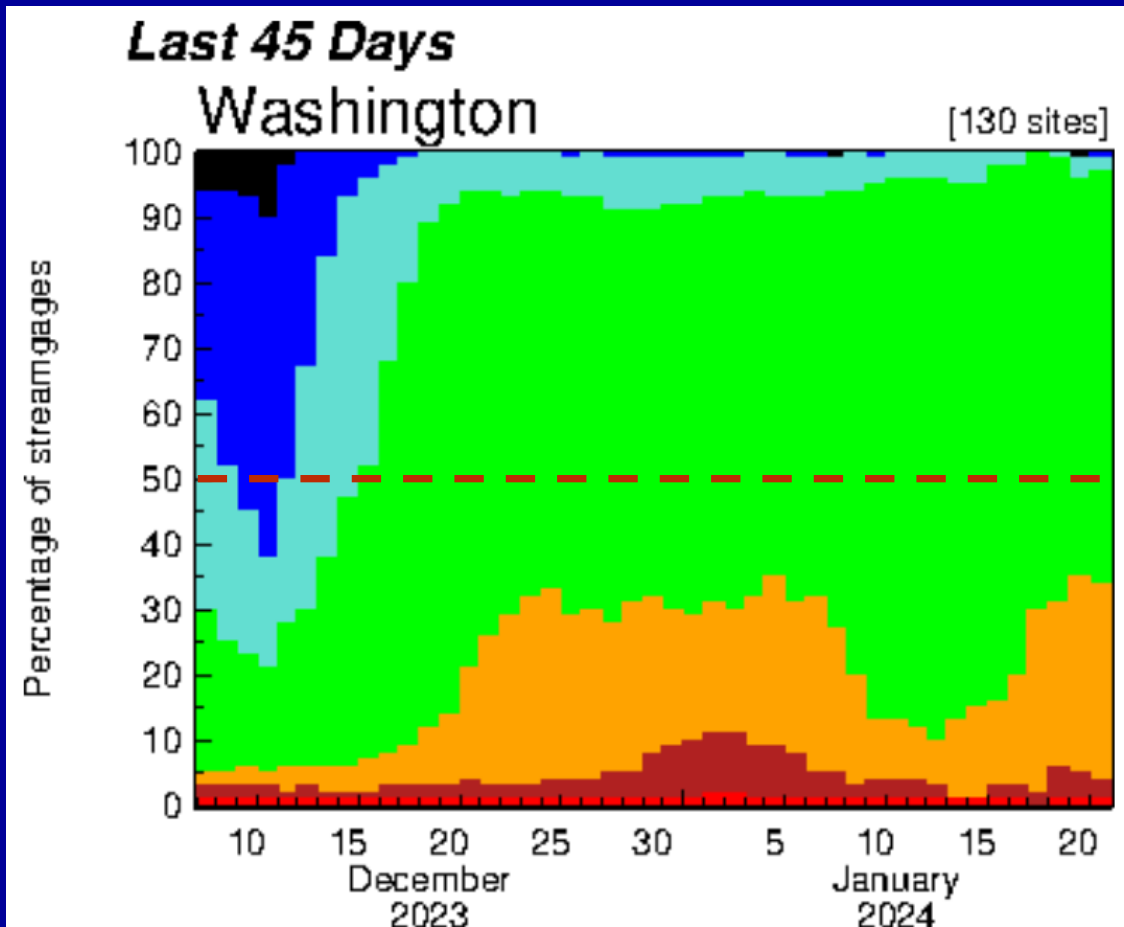


Explanation - Percentile classes							
Low	<10 Much below normal	10-24 Below normal	25-75 Normal	76-90 Above normal	>90 Much above normal	High	Not-ranked

Data presented here may be provisional and subject to revision until they have been thoroughly reviewed and received final approval.

7-day average streamflow compared to historical streamflow, Dec. 2023 to Jan. 2024

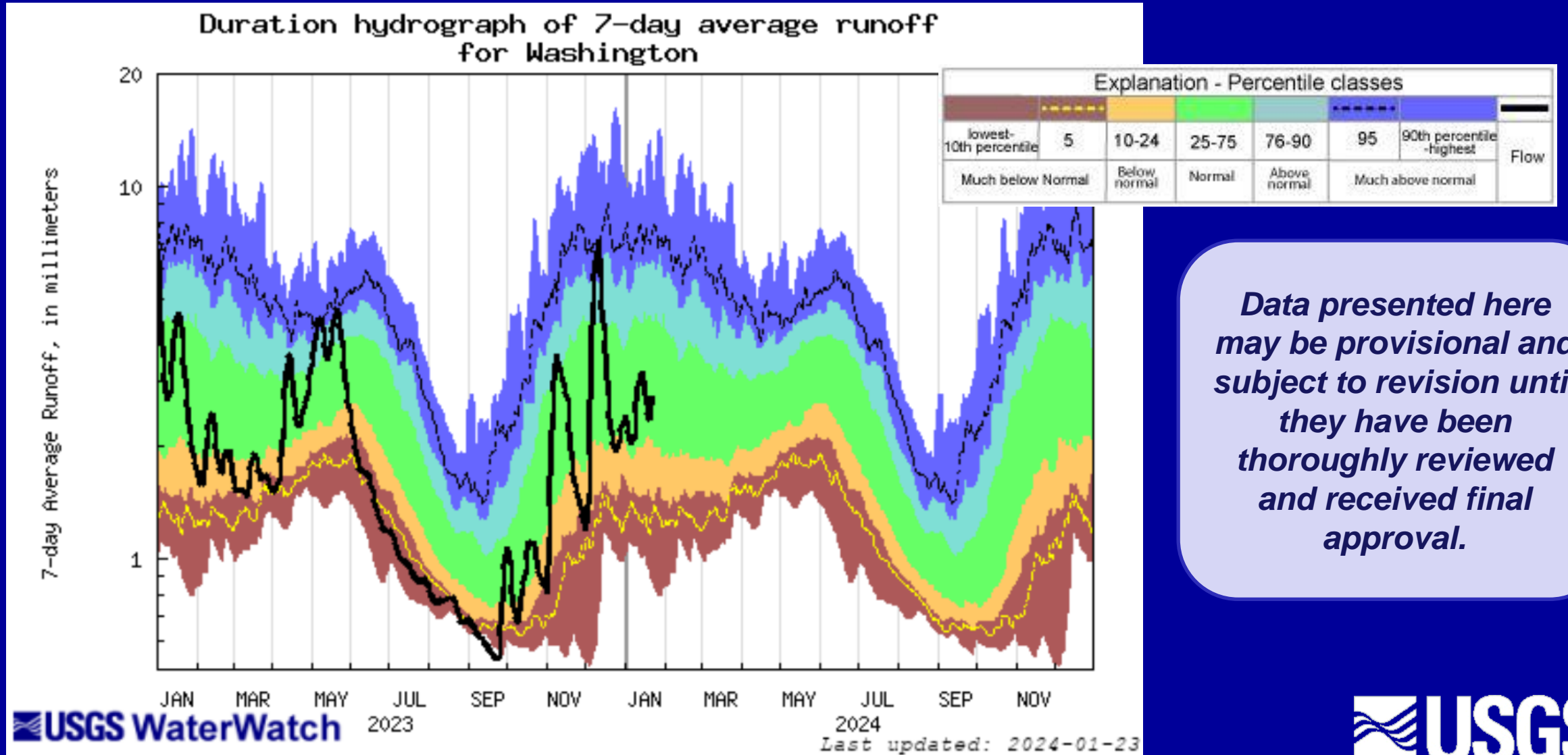
Data presented here may be provisional and subject to revision until they have been thoroughly reviewed and received final approval.



Explanation - Percentile classes						
Low	<10	10-24	25-75	76-90	>90	High
	Much below normal	Below normal	Normal	Above normal	Much above normal	

Duration Hydrograph

7-day average streamflow (as of 23 Jan. 2024) is below normal

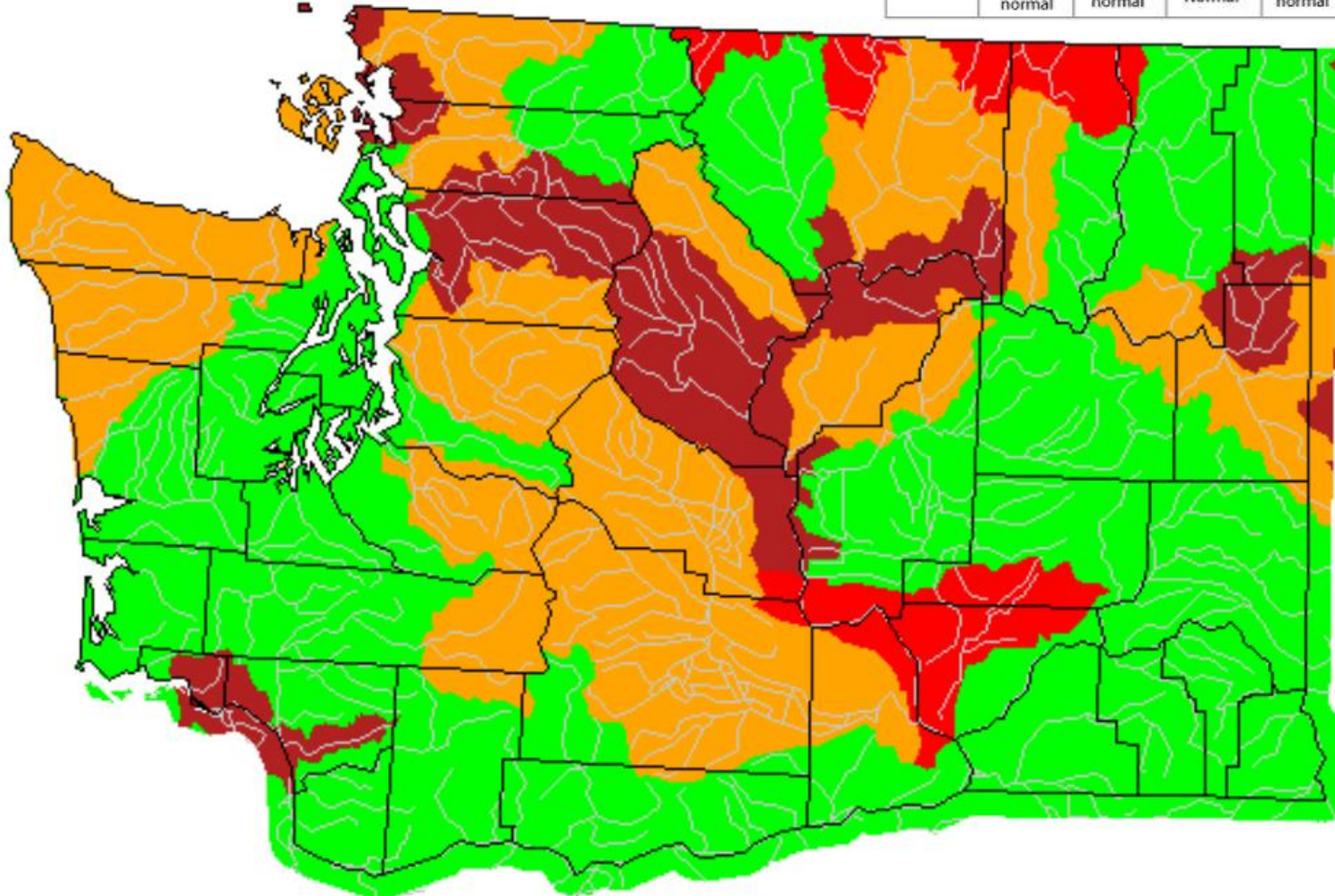


Data presented here may be provisional and subject to revision until they have been thoroughly reviewed and received final approval.








Monthly average streamflow compared to historical streamflow

October 2023

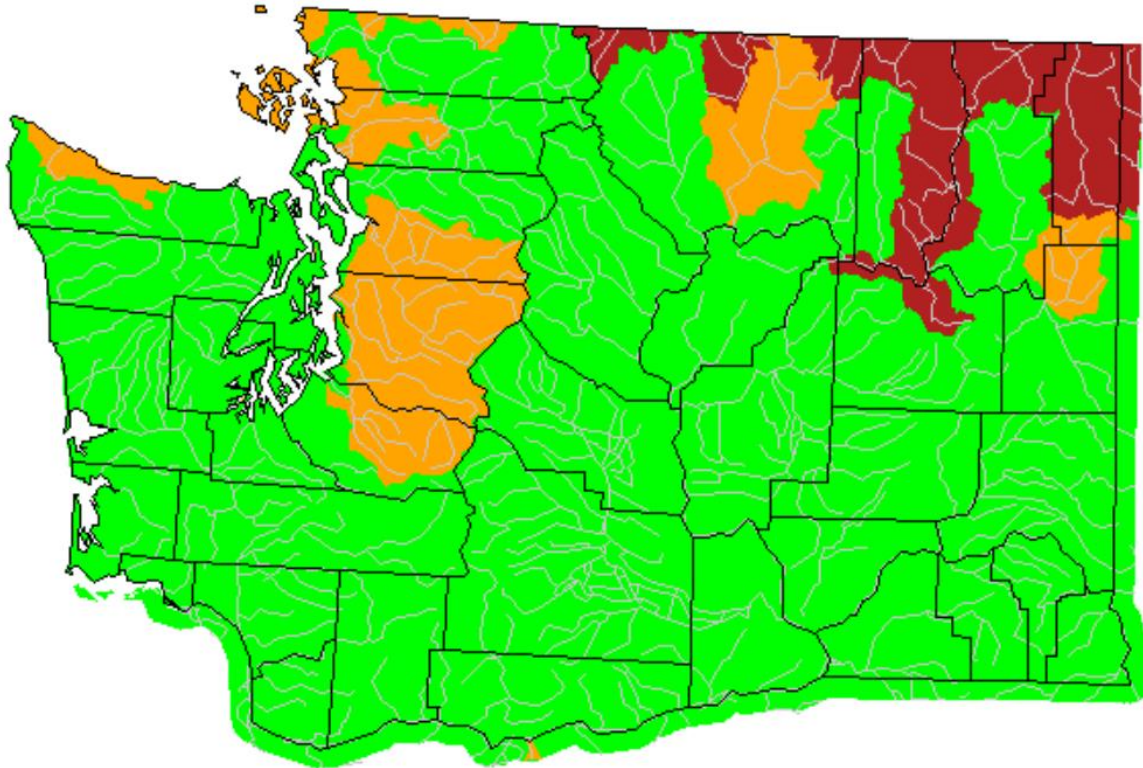
Explanation - Percentile classes						
Low	<10	10-24	25-75	76-90	>90	High
	Much below normal	Below normal	Normal	Above normal	Much above normal	



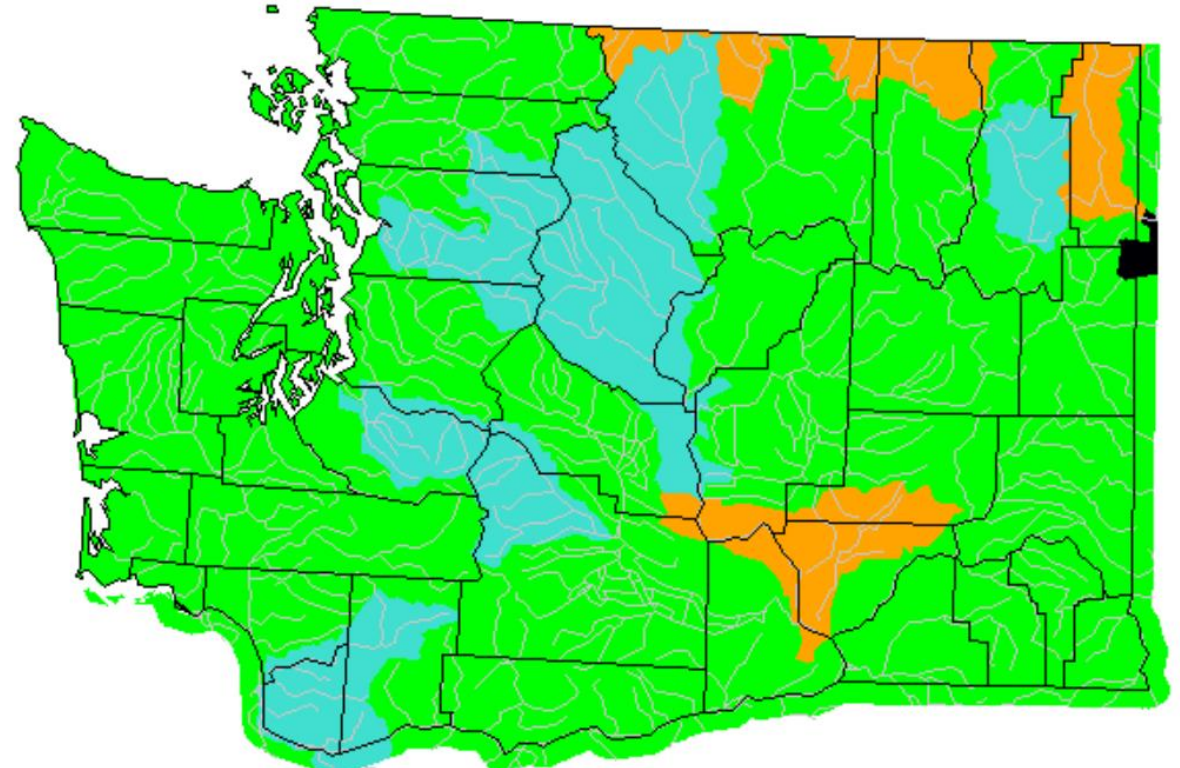
Monthly average streamflow compared to historical streamflow

Explanation - Percentile classes						
						
Low	<10	10-24	25-75	76-90	>90	High
	Much below normal	Below normal	Normal	Above normal	Much above normal	

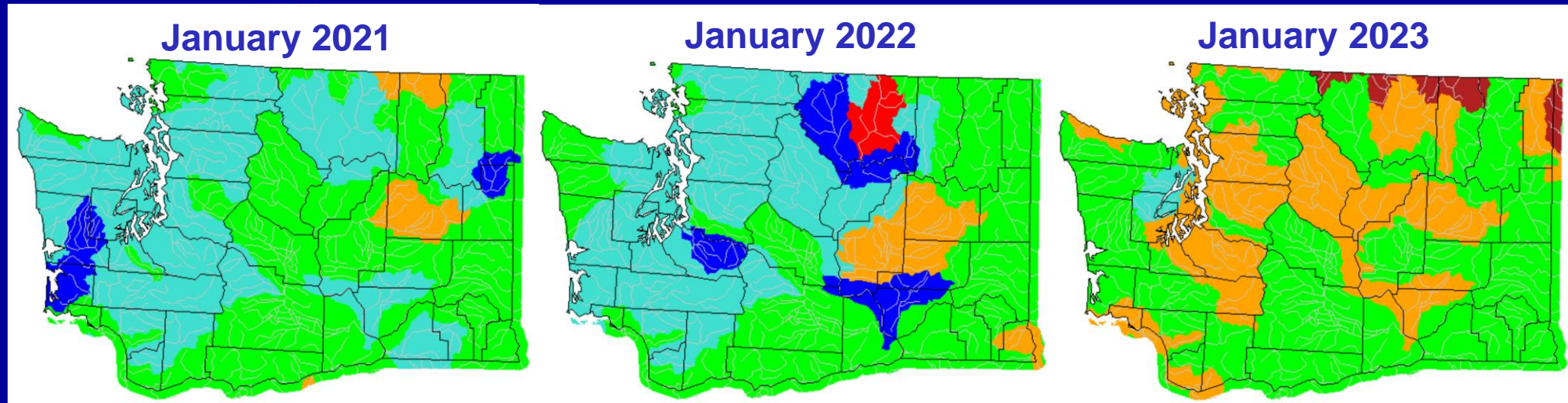
November 2023



December 2023



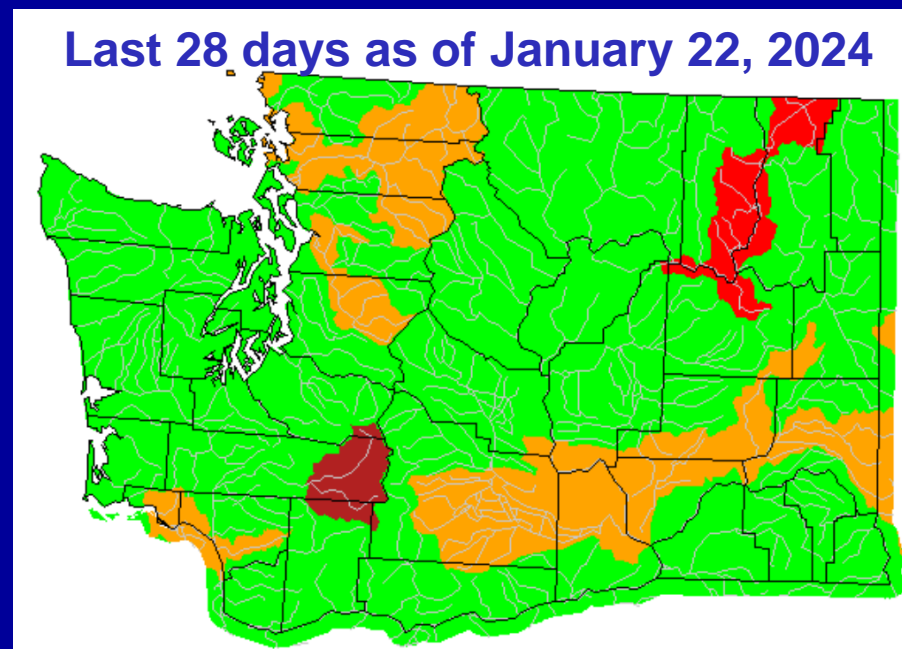
Monthly average streamflow compared to historical streamflow



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Explanation - Percentile classes						
Low	<10	10-24	25-75	76-90	>90	High
	Much below normal	Below normal	Normal	Above normal	Much above normal	

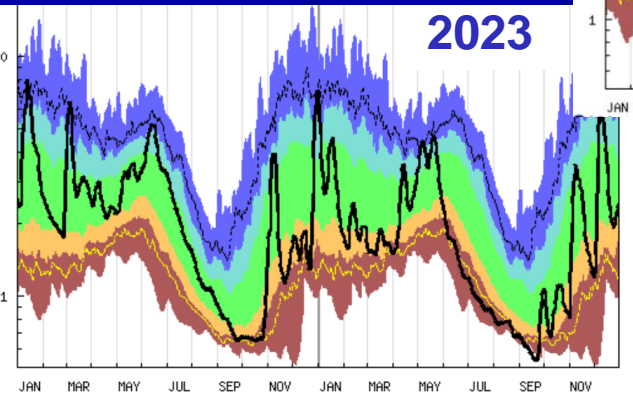
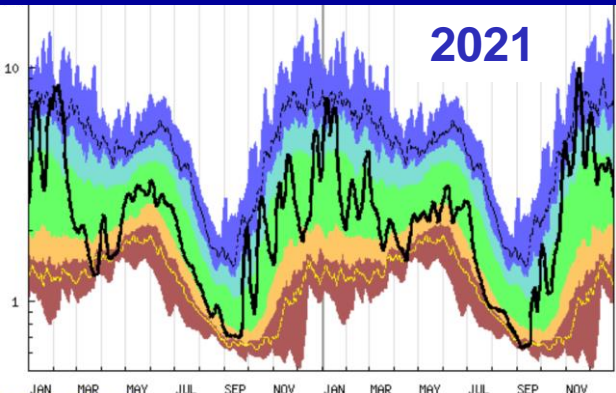
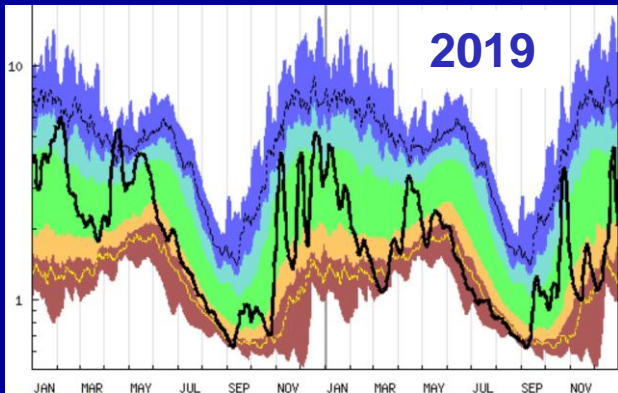
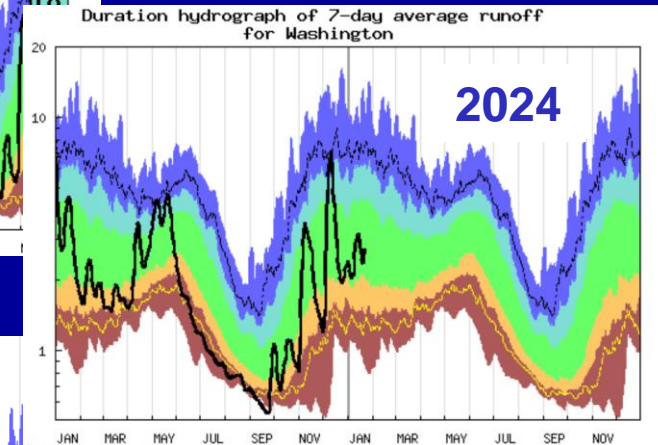
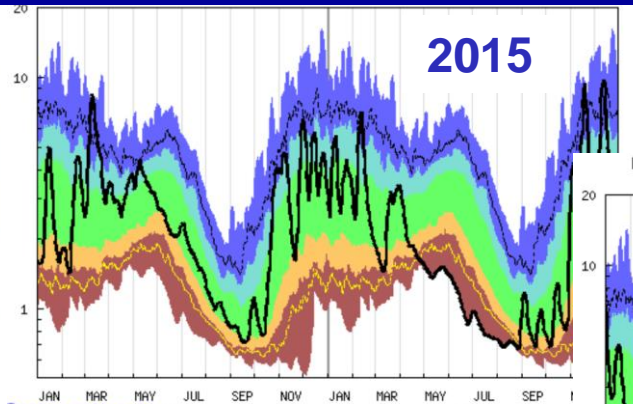
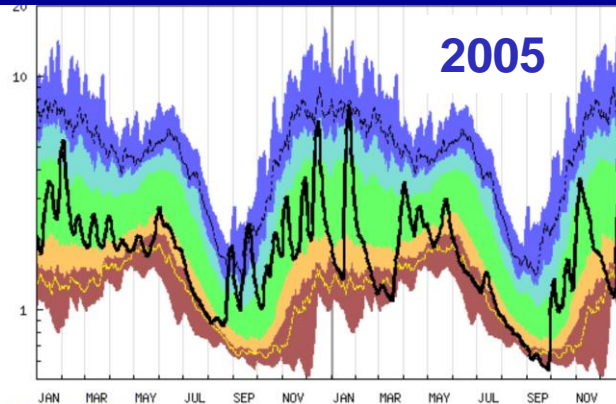
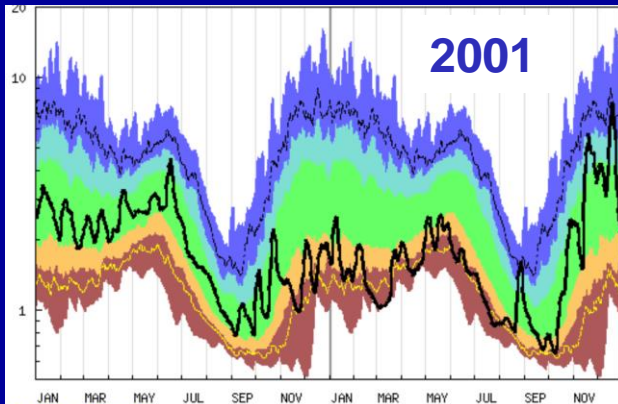
<https://waterwatch.usgs.gov/>



7-day average runoff compared to historical runoff

Data presented here may be provisional and subject to revision until they have been thoroughly reviewed and received final approval.

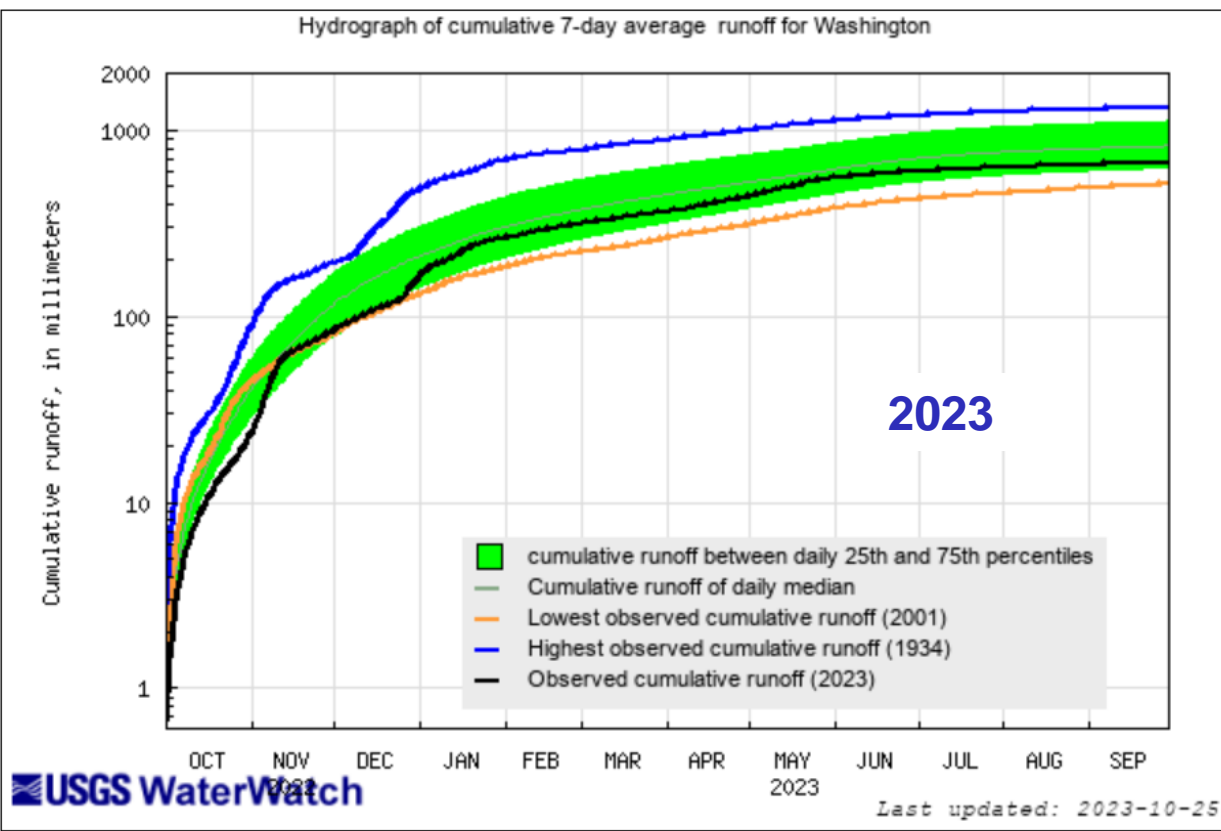
Explanation - Percentile classes					
Low	<10	10-24	25-75	76-90	>90
	Much below normal	Below normal	Normal	Above normal	Much above normal
					High



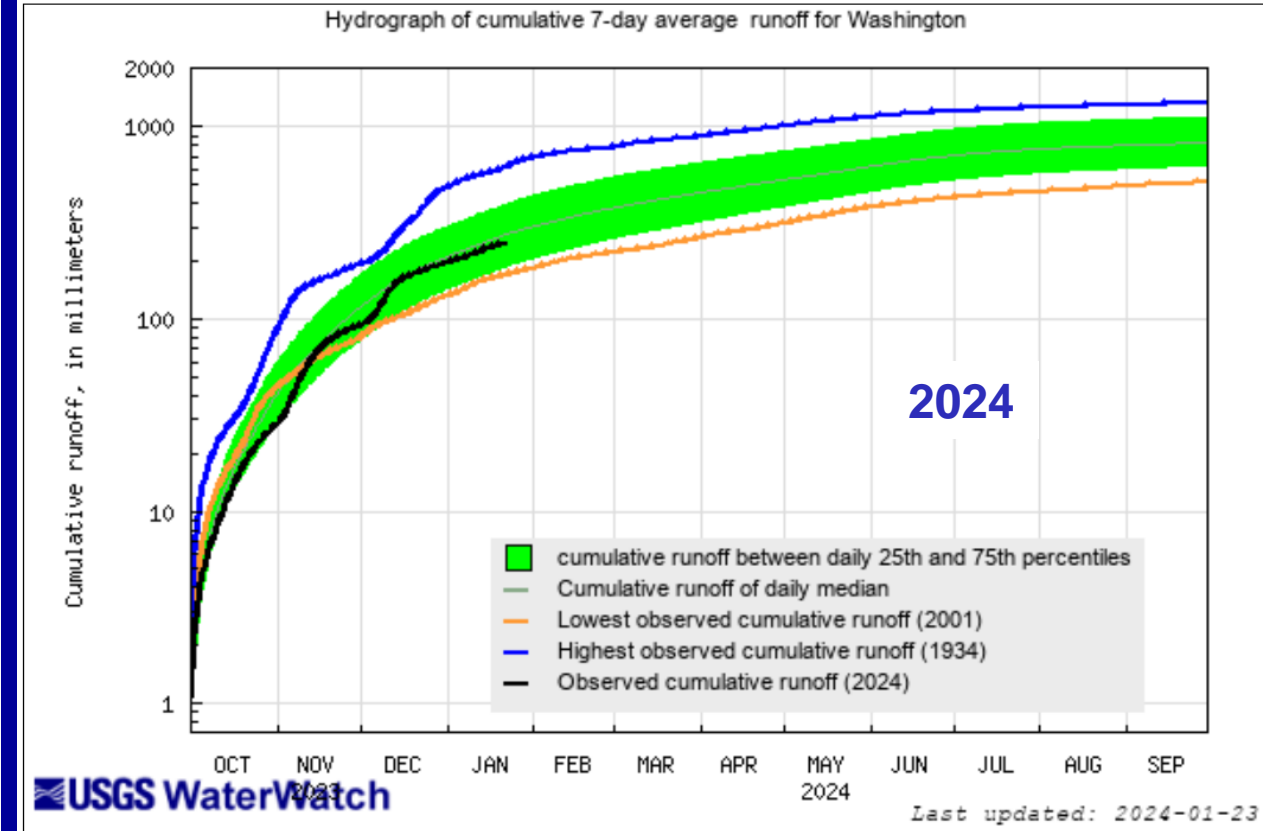
Cumulative runoff hydrograph

(Area-based runoff based on 7-day average)

2024 Water year (as of 23 Jan. 2024) is normal

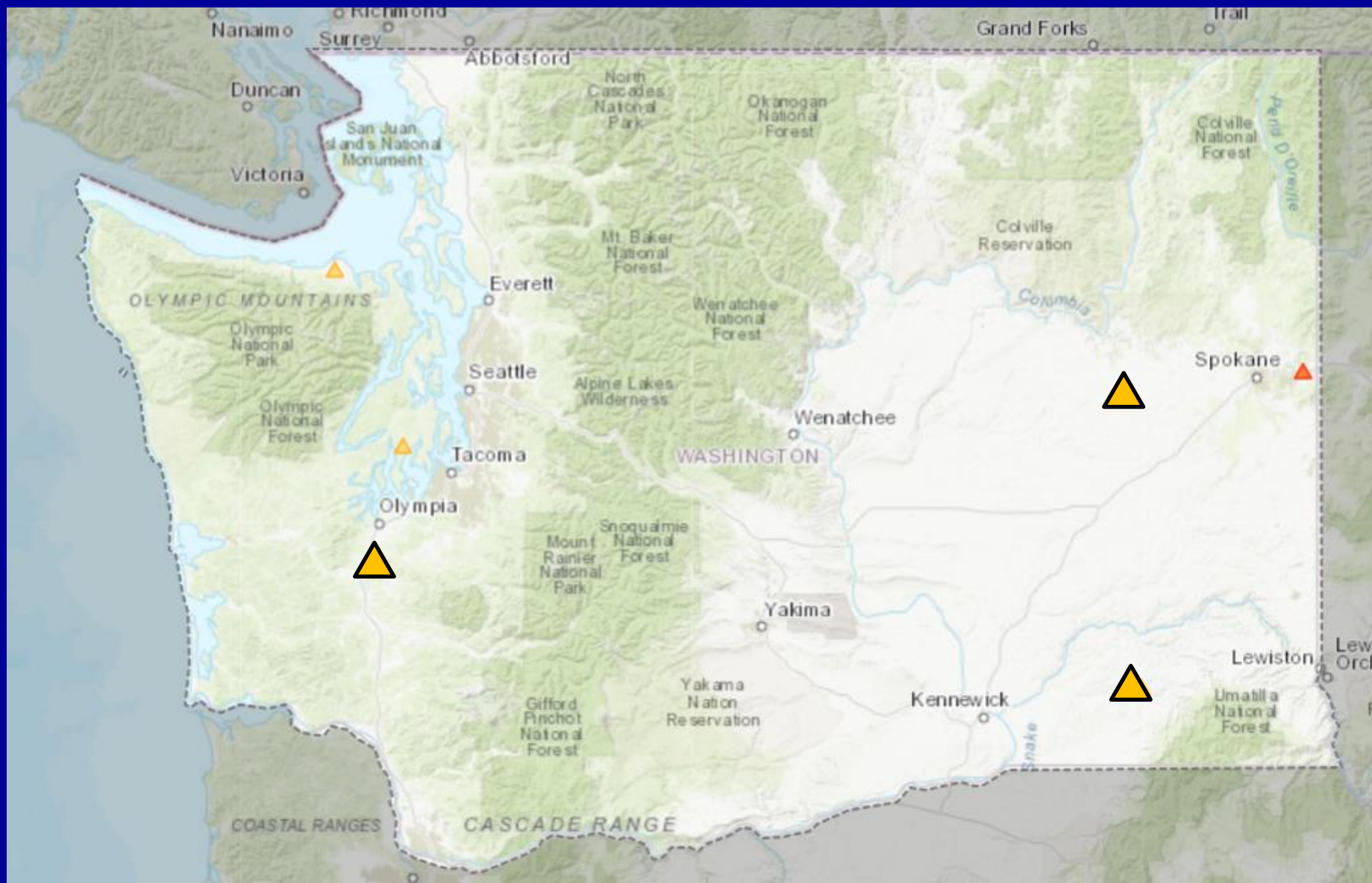


2023 water year



2024 water year

Three reference groundwater wells



Groundwater Levels

DEPTH TO WATER

▲ 0 – 50 feet

▲ > 50 – 100 feet

▲ > 100 – 150 feet

▲ > 150 – 200 feet

▲ > 200 – 250 feet

▲ > 250 feet

▲ Measurement flag

▲ Recent measurement unavailable

▲ Depth to water unavailable

Scatter Creek Well Groundwater Conditions

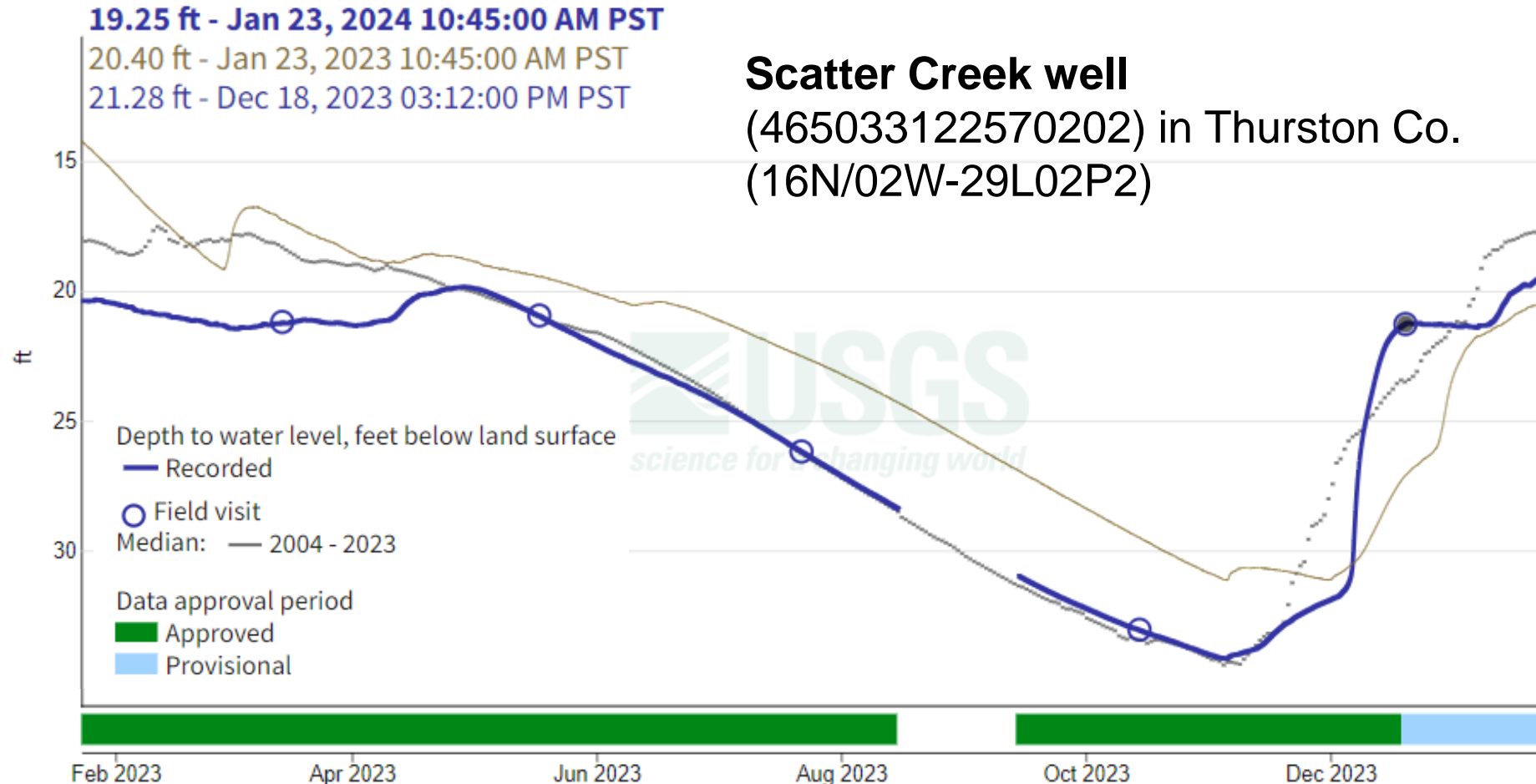
16N/02W-29L02P2 - 465033122570202

January 23, 2023 - January 23, 2024

Depth to water level, feet below land surface

Scatter Creek well

(465033122570202) in Thurston Co.
(16N/02W-29L02P2)



Data presented here may be provisional and subject to revision until they have been thoroughly reviewed and received final approval.

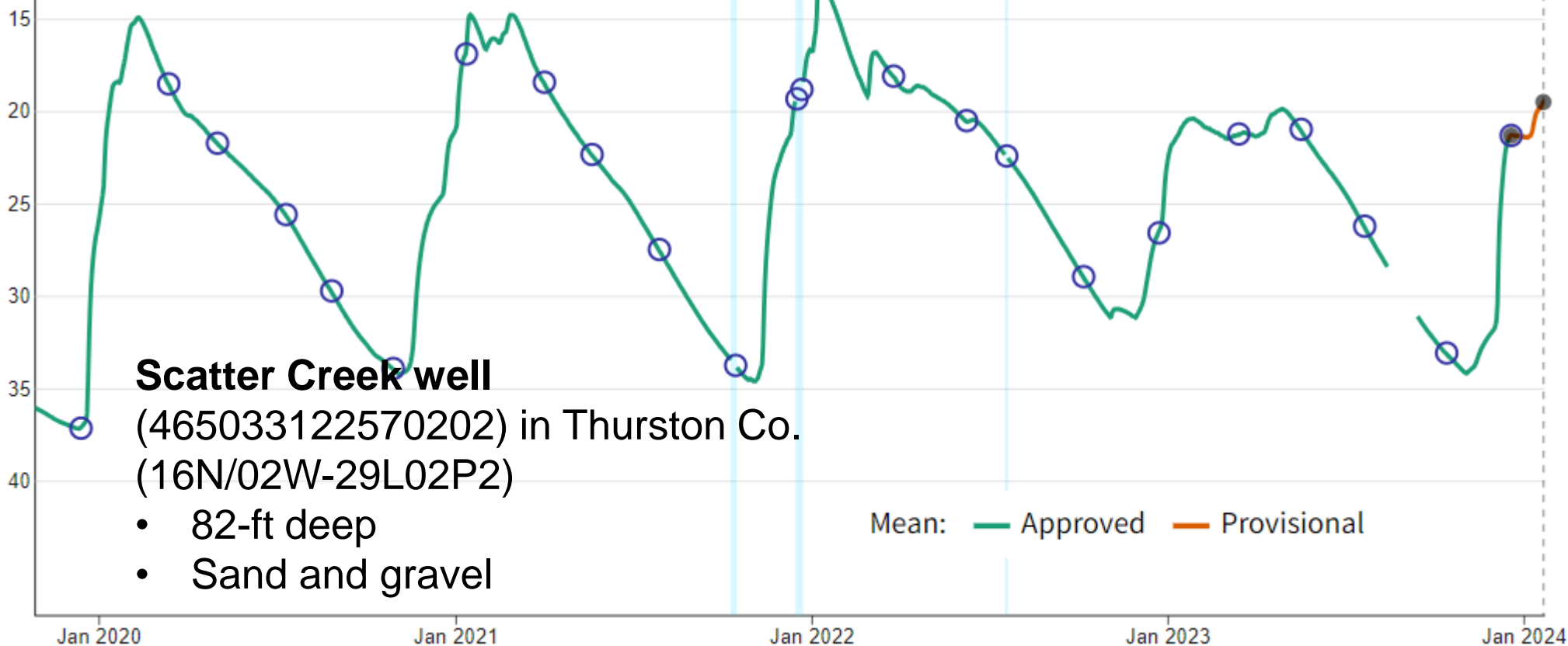
Scatter Creek Well Groundwater Conditions

Depth to water level, ft below land surface, ft

Mean 19.47 ft - 2024-01-21

Visit 21.28 - 2023-12-18

Mean: — Approved — Provisional — Equipment malfunction
Field visit: ○ Approved



Data presented here may be provisional and subject to revision until they have been thoroughly reviewed and received final approval.

Davenport Well Groundwater Conditions

24N/36E-16A01 - 473442118162201

January 23, 2023 - January 23, 2024

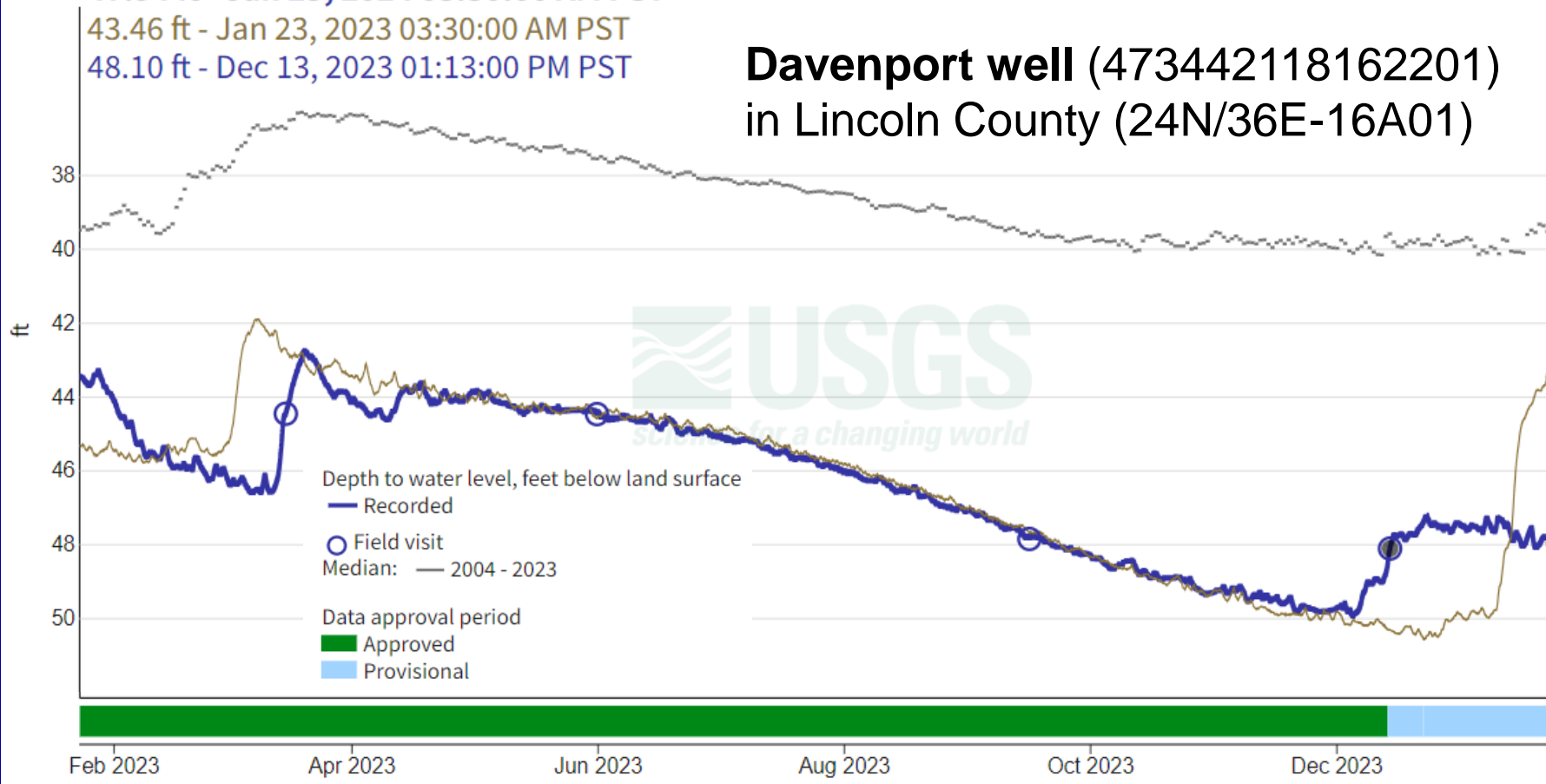
Depth to water level, feet below land surface

47.94 ft - Jan 23, 2024 03:30:00 AM PST

43.46 ft - Jan 23, 2023 03:30:00 AM PST

48.10 ft - Dec 13, 2023 01:13:00 PM PST

Davenport well (473442118162201)
in Lincoln County (24N/36E-16A01)



Data presented here may be provisional and subject to revision until they have been thoroughly reviewed and received final approval.

Davenport Well Groundwater Conditions

Depth to water level, ft below land surface, ft

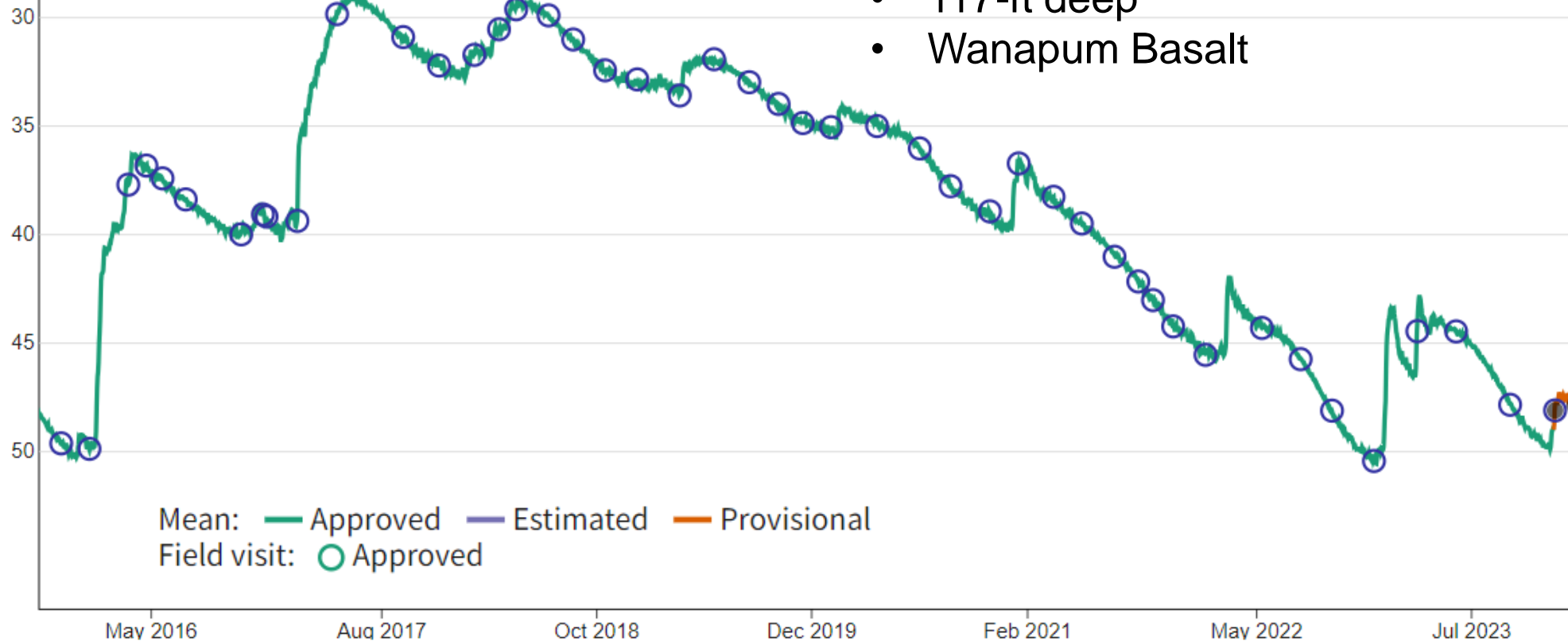
Mean 47.86 ft - 2024-01-22

Visit 48.10 - 2023-12-13

Davenport well

(473442118162201) in Lincoln County (24N/36E-16A01)

- 117-ft deep
- Wanapum Basalt



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Whetstone Well Groundwater Conditions

10N/37E-23R01 - 461935118081501

January 23, 2023 - January 23, 2024

Depth to water level, feet below land surface

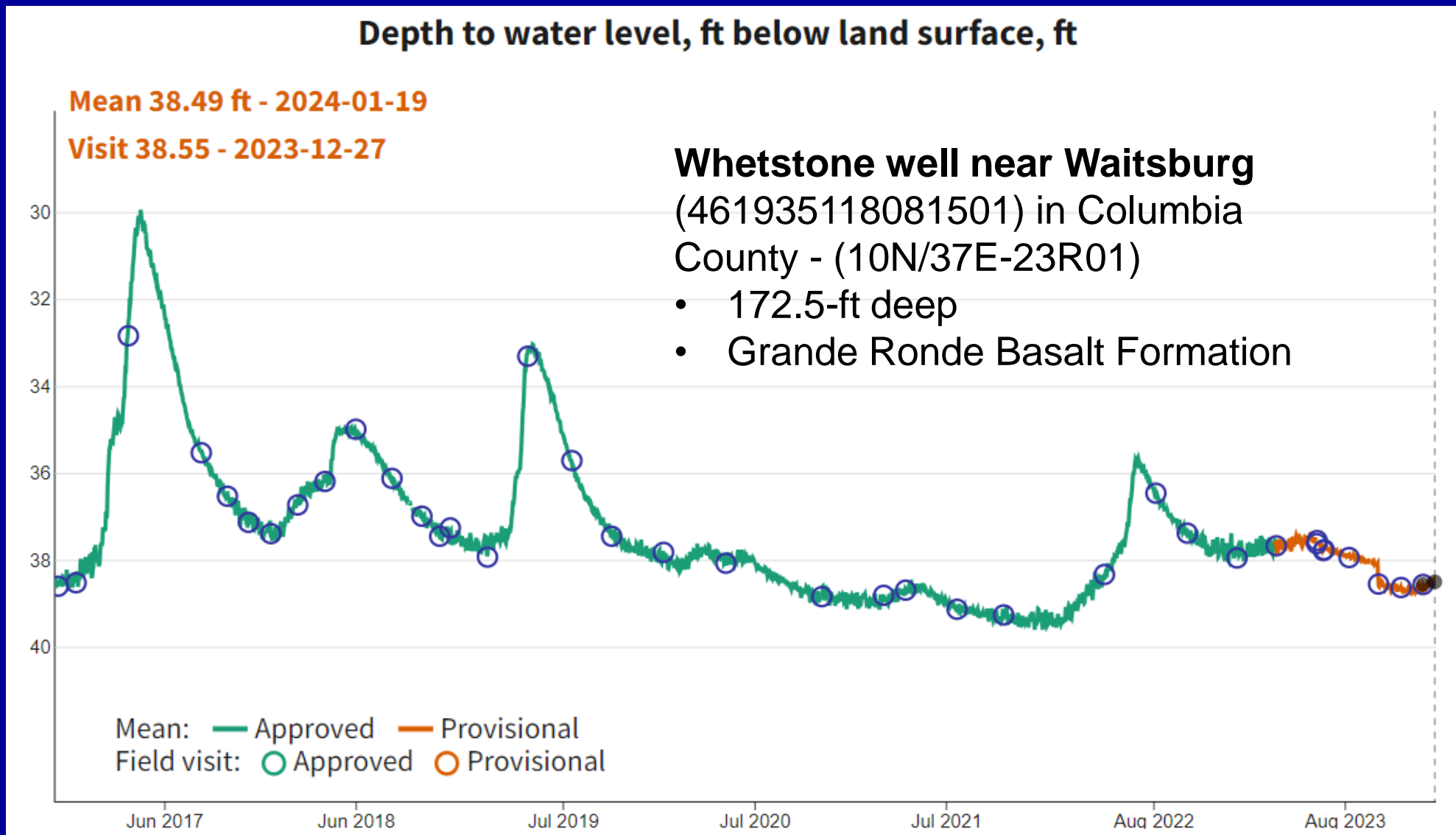
38.44 ft - Jan 23, 2024 03:45:00 AM PST

38.55 ft - Dec 27, 2023 08:55:00 AM PST



Data presented here may be provisional and subject to revision until they have been thoroughly reviewed and received final approval.

Whetstone Well Groundwater Conditions



Data presented here may be provisional and subject to revision until they have been thoroughly reviewed and received final approval.

Summary of Washington Streamflow conditions as of 23 Jan. 2024

- **7-day average streamflow statewide is normal**
- 7-day average streamflow at eight index gaging stations:

Normal

- Chehalis River nr. Grand Mound
- EF Lewis River
- Quinault River
- Walla Walla River
- Puyallup River nr. Orting

Affected by ice

- NF Nooksack River
- Hangman Creek
- American River

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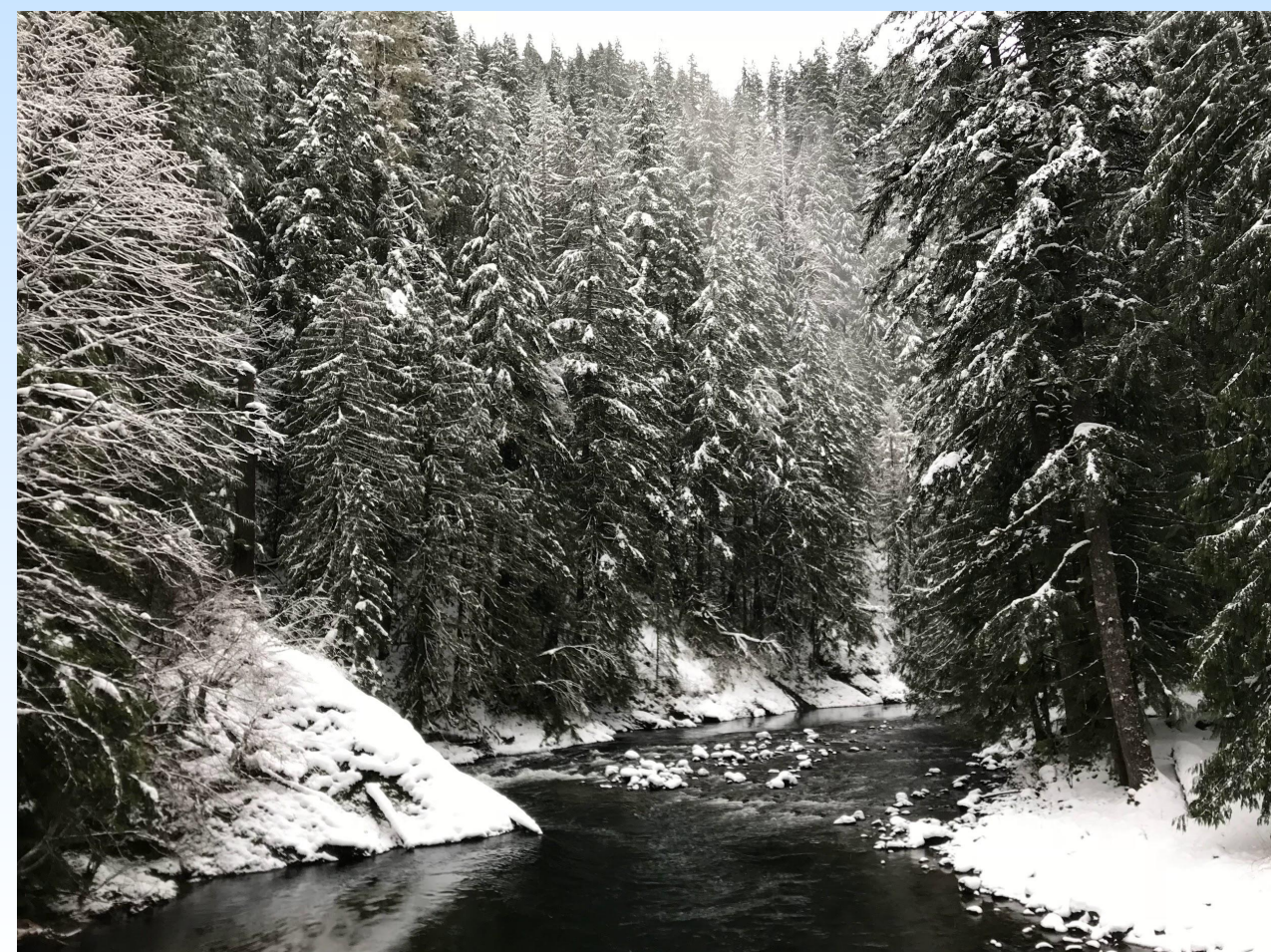


Northwest River Forecast Center

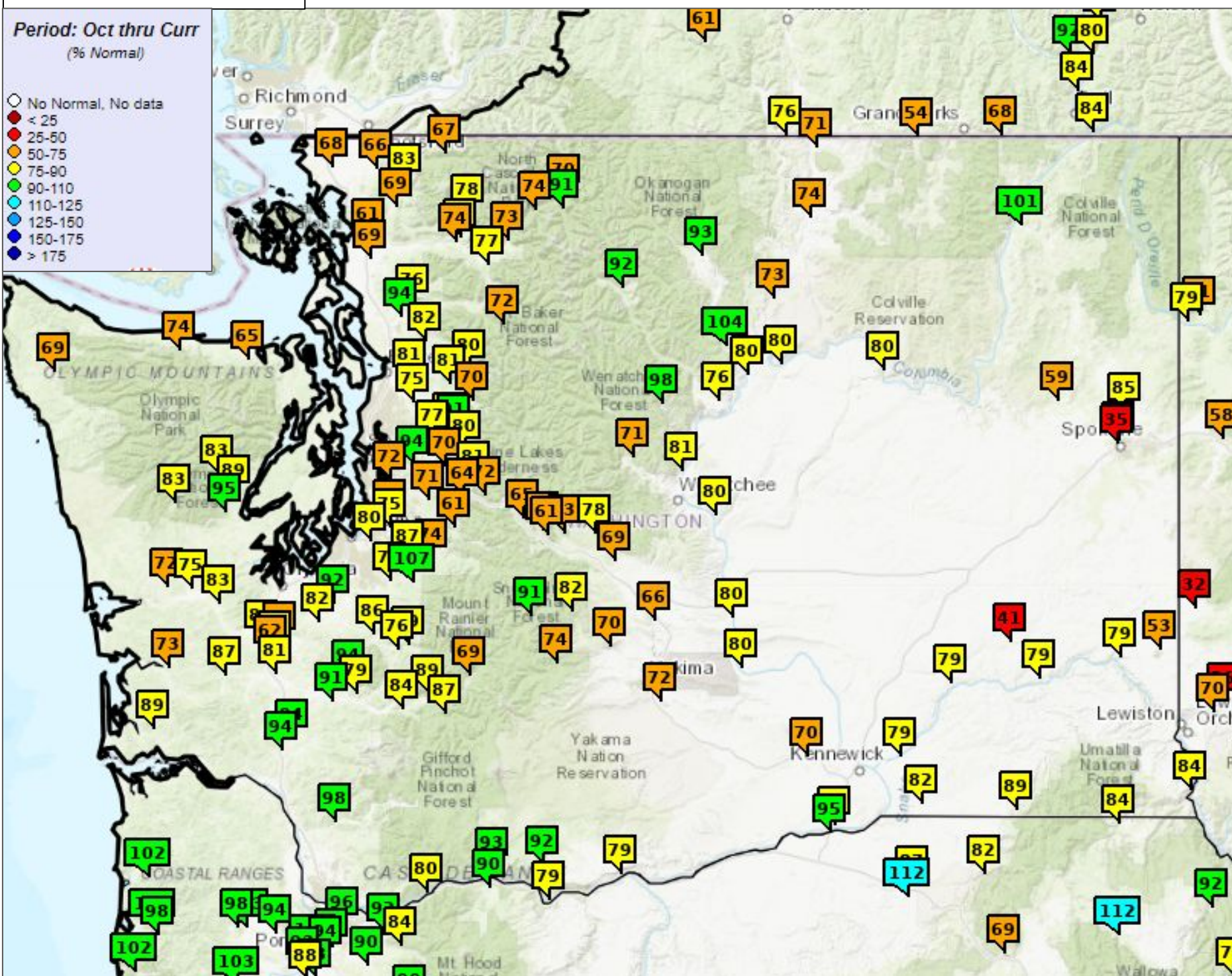
Jan 2024 Washington Water Supply Briefing

Amy Burke, Hydrologist

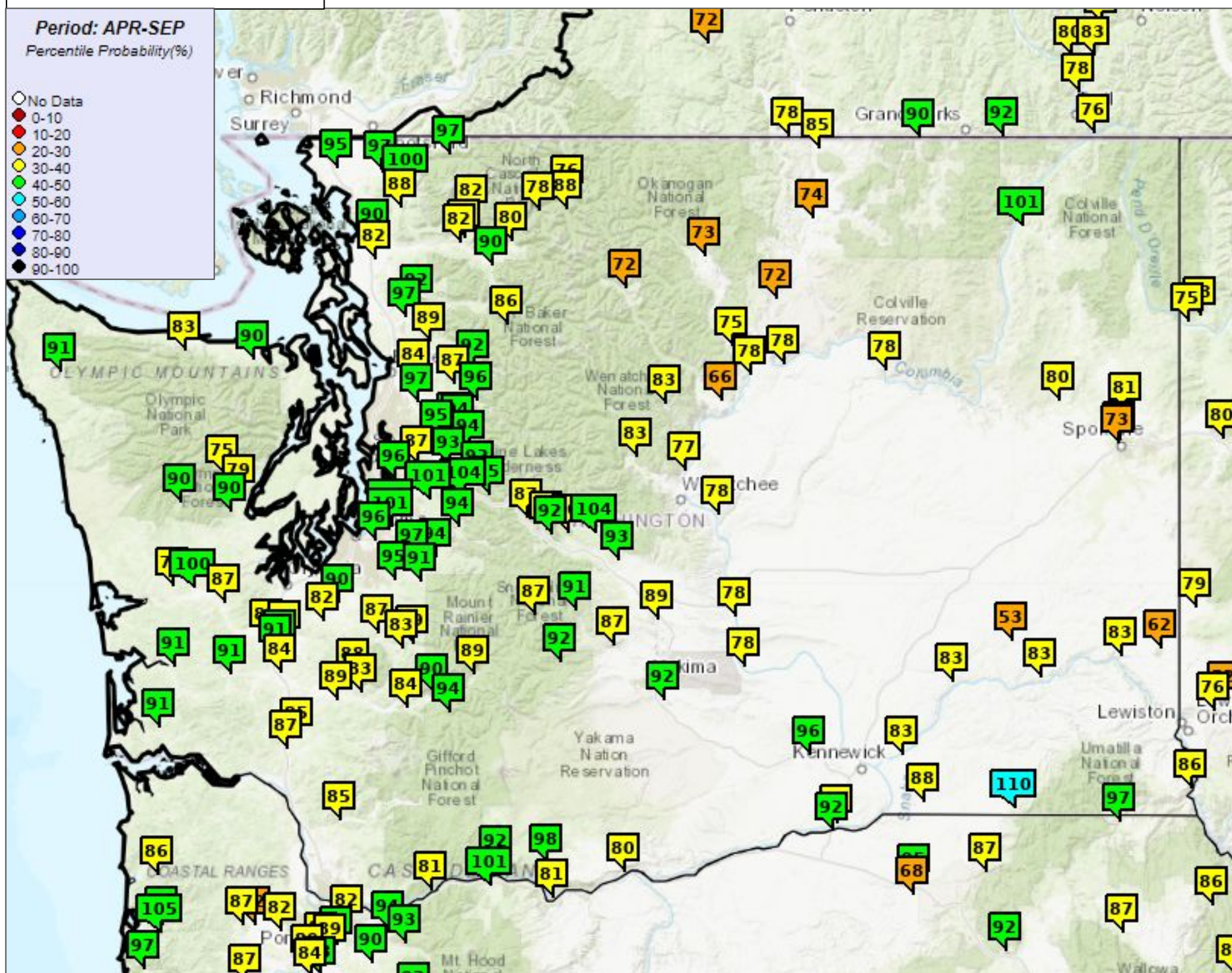
NWRFC.watersupply@noaa.gov



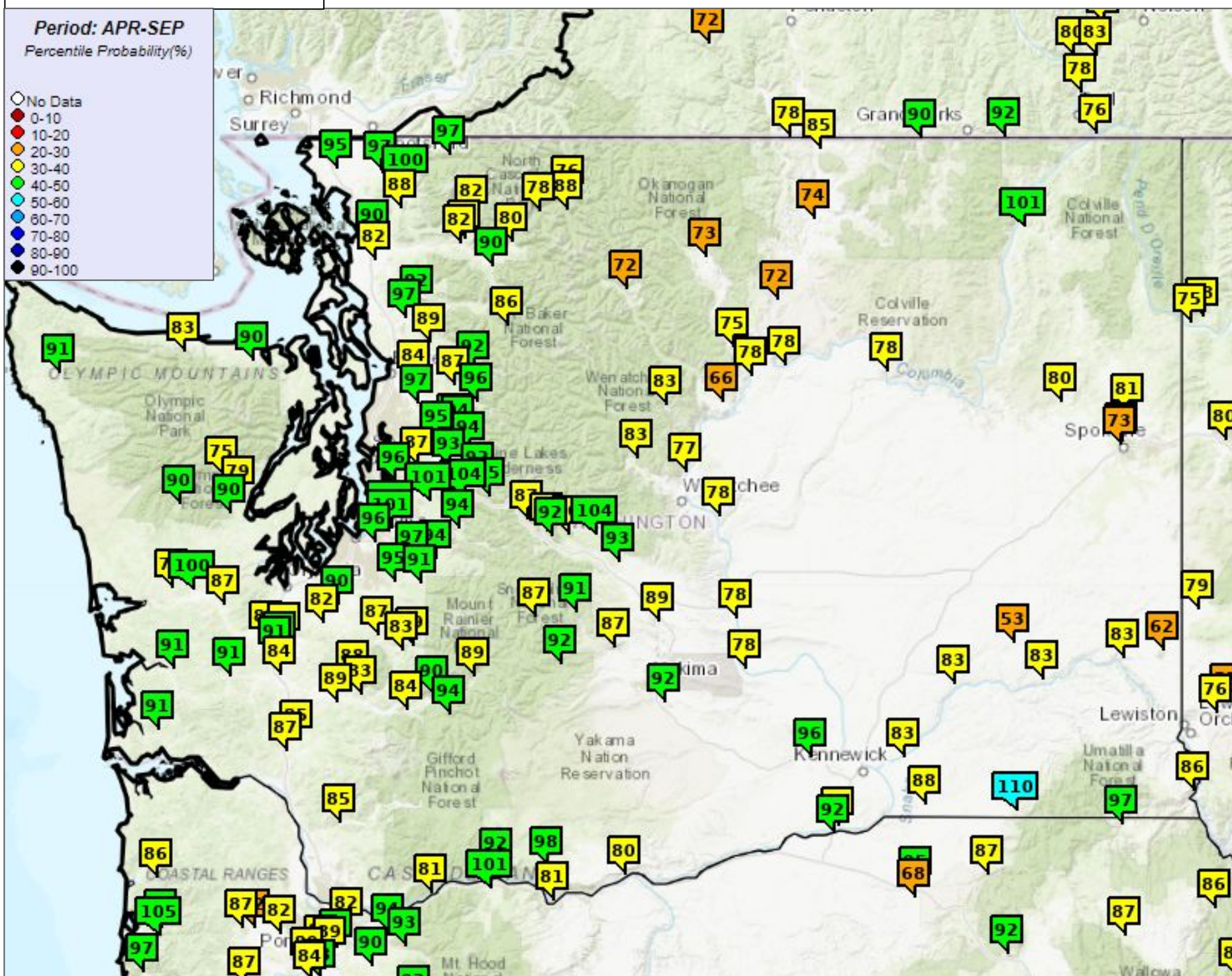
Oct - Sep Runoff



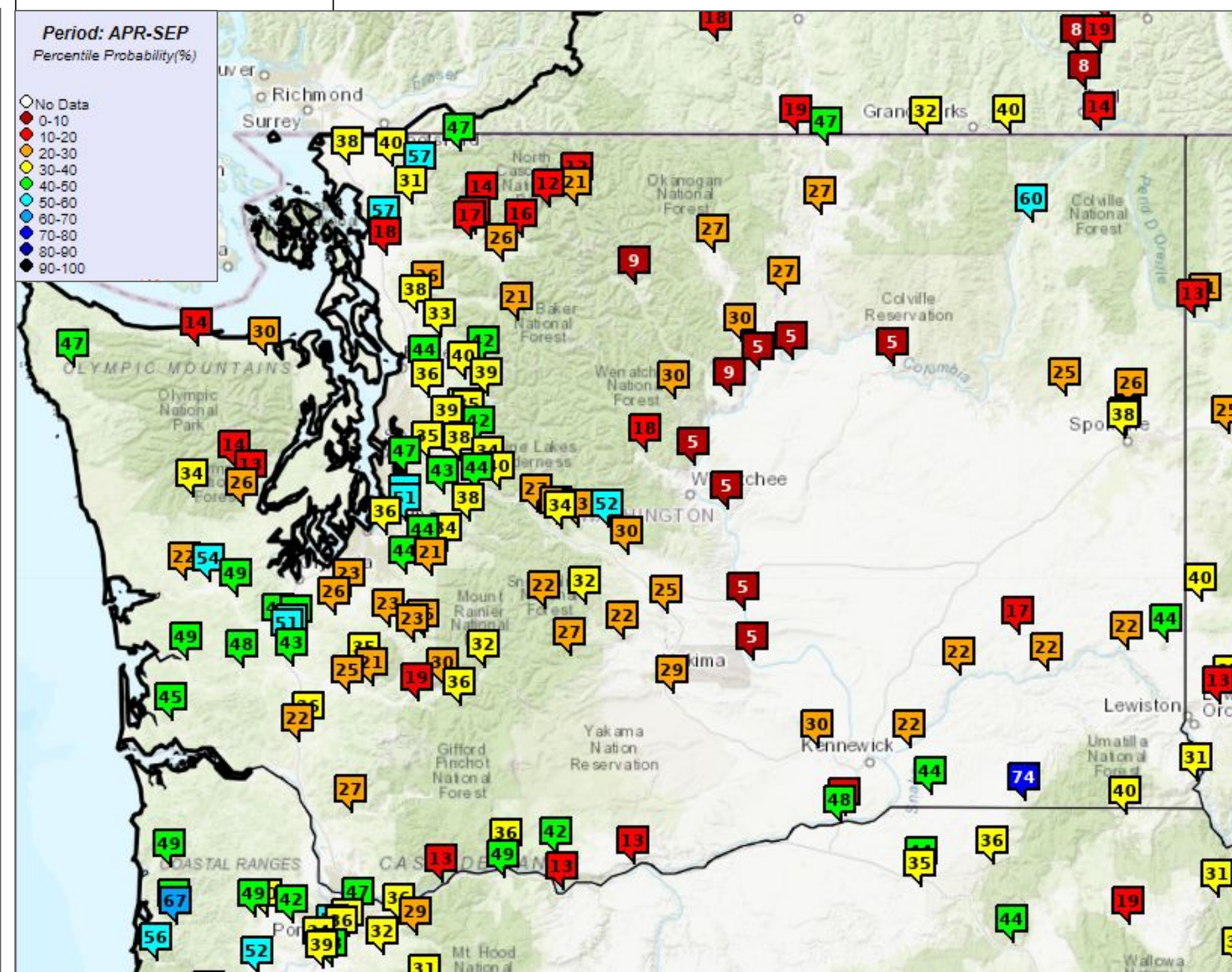
Apr - Sep Forecast
Percent Normal

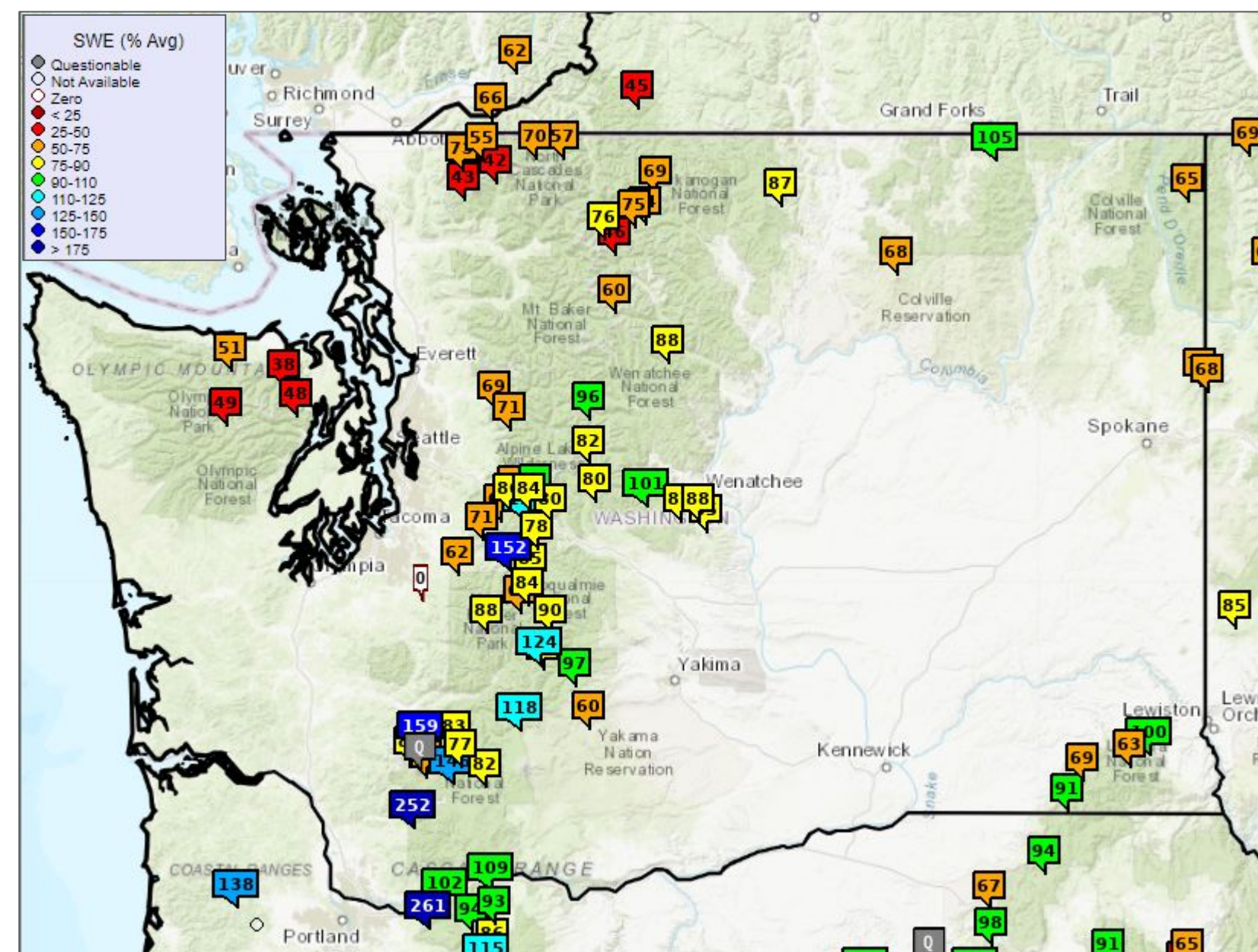
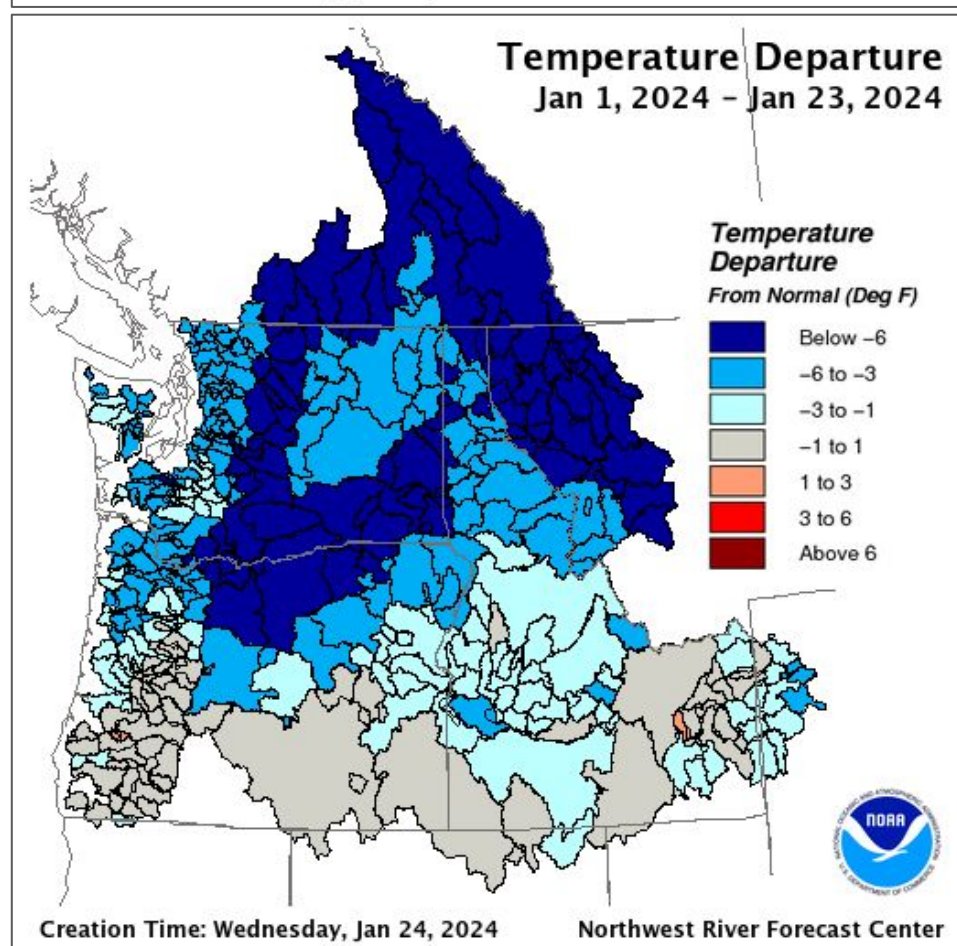
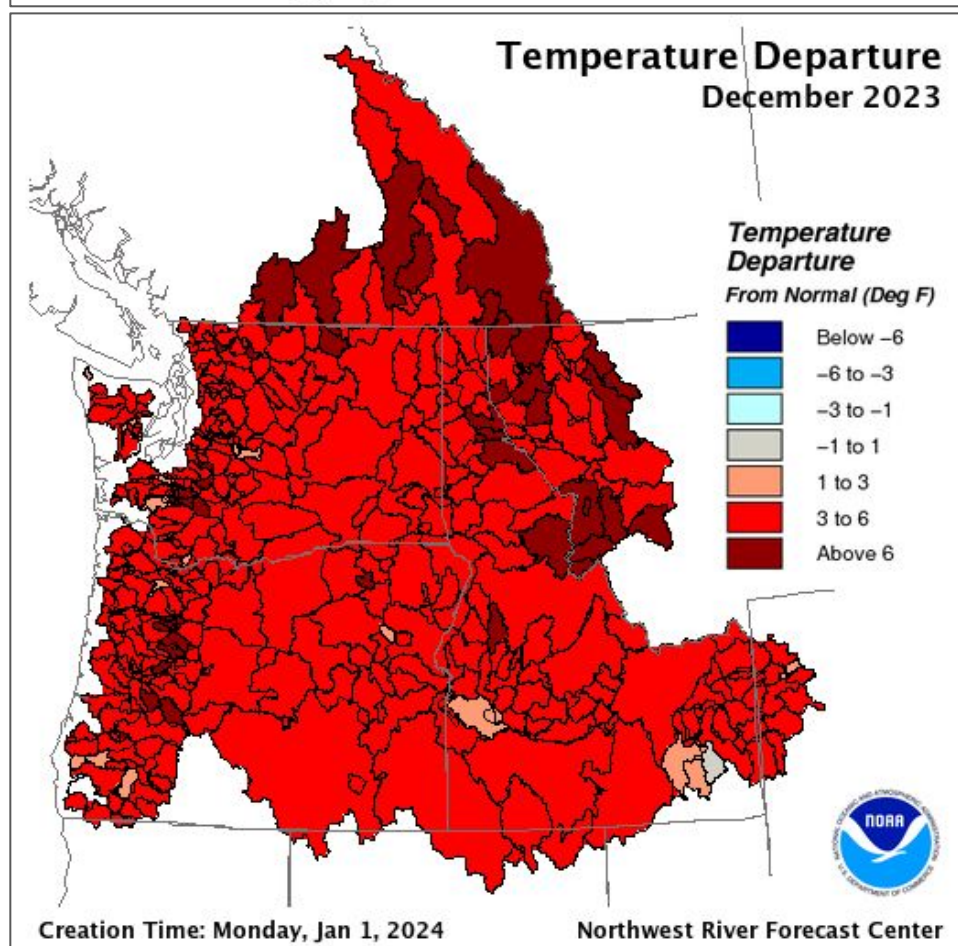
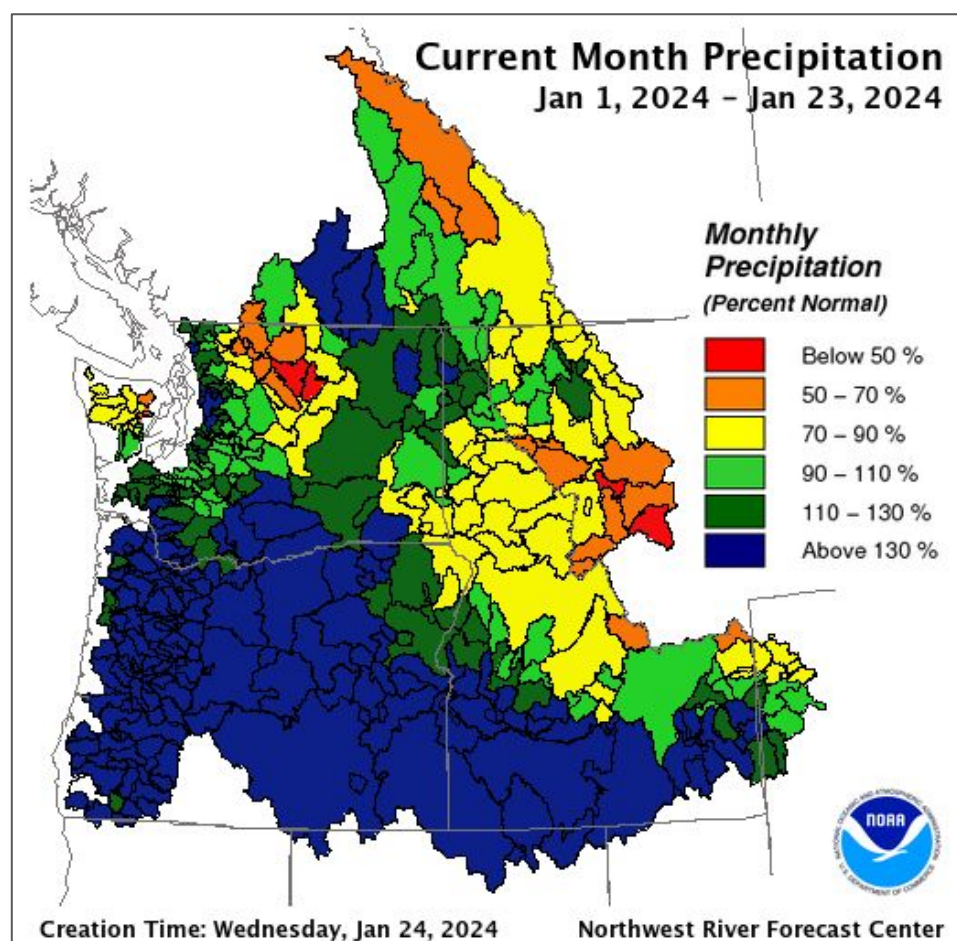
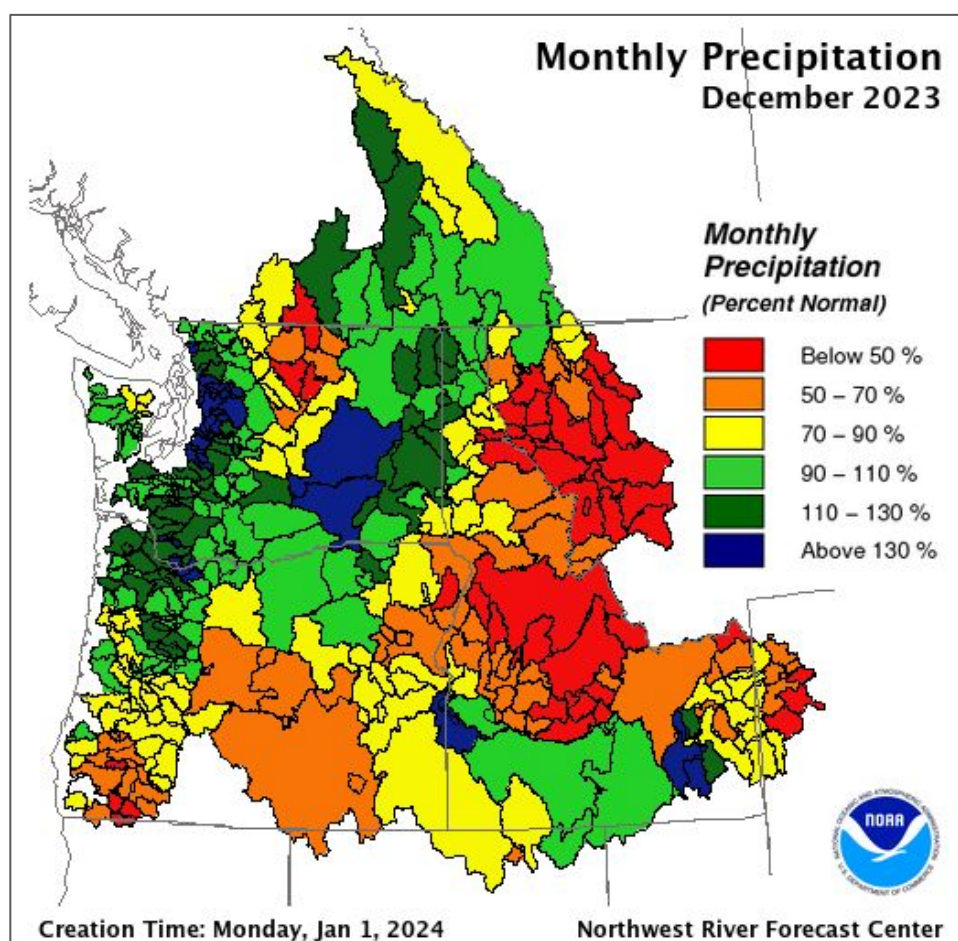


Apr - Sep Forecast
Percent Normal

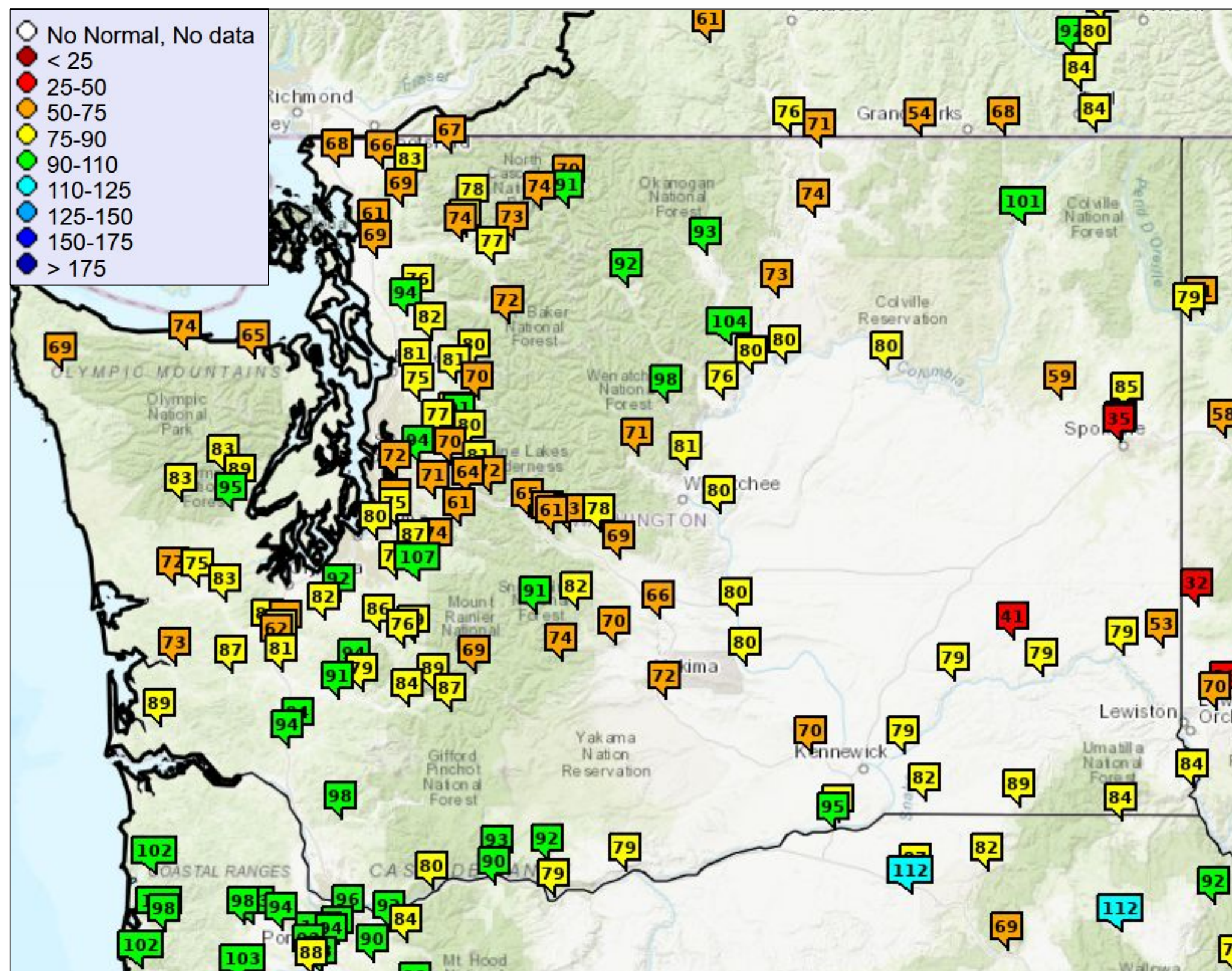


Apr - Sep Forecast
Percentile

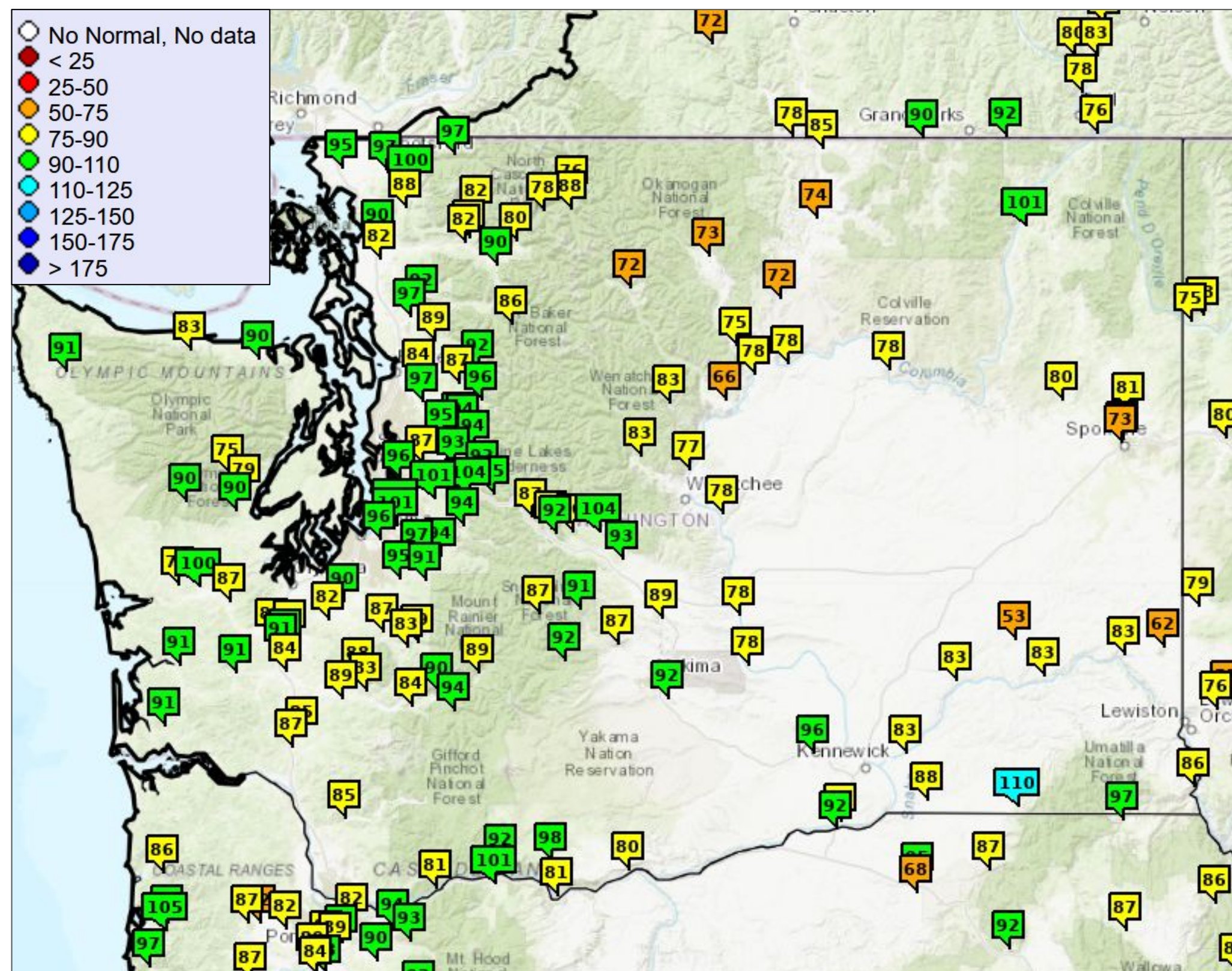


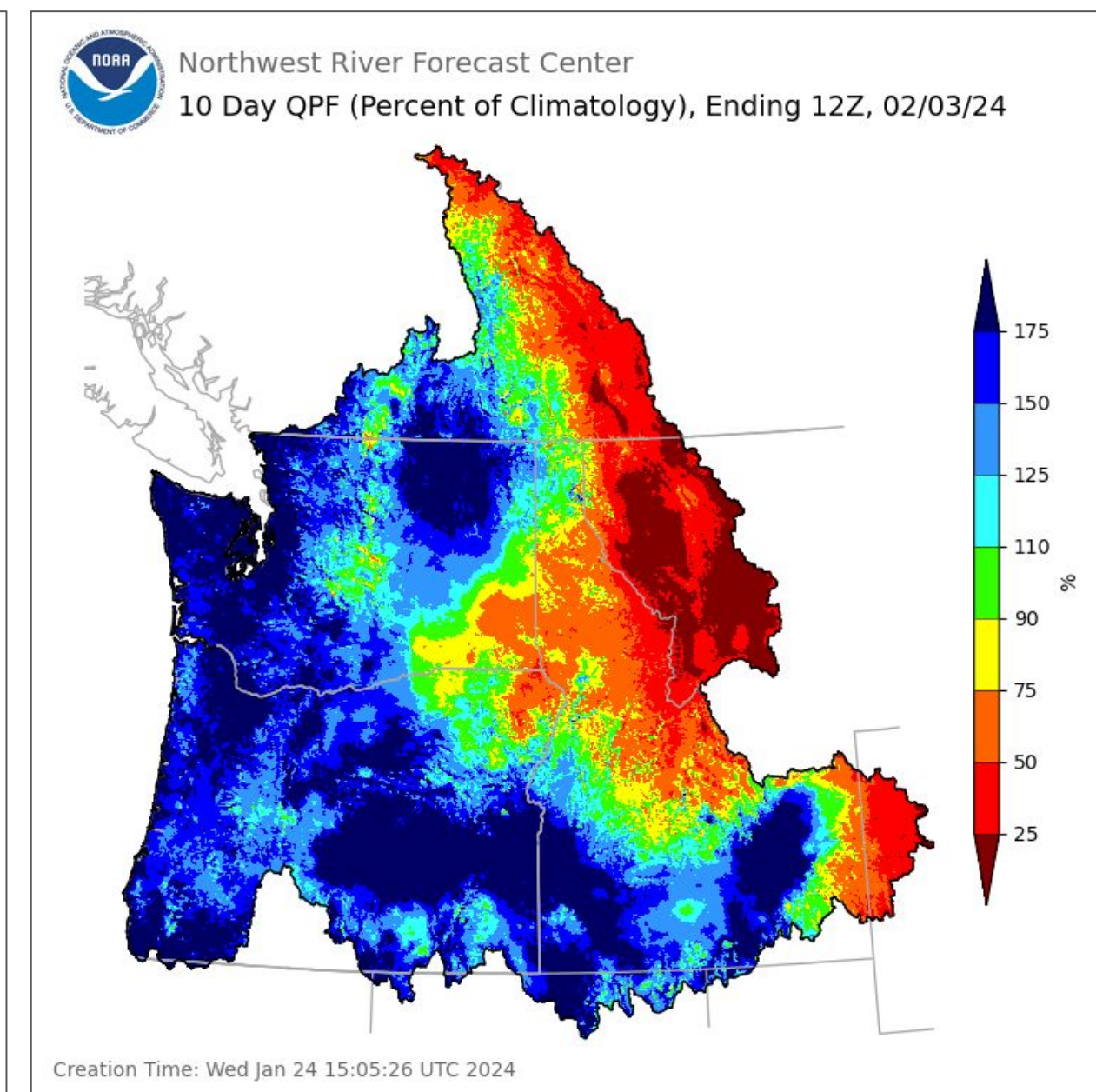
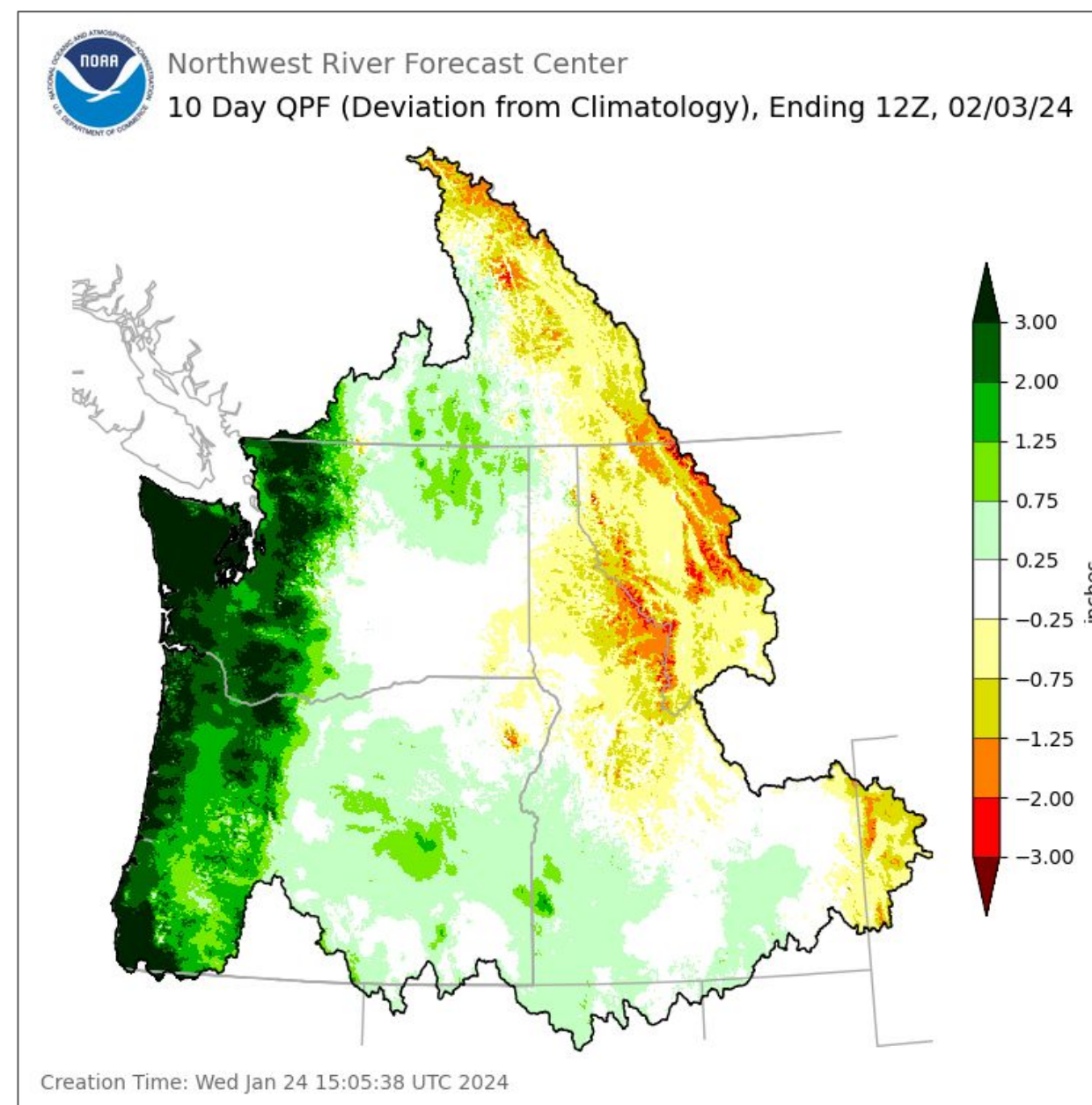
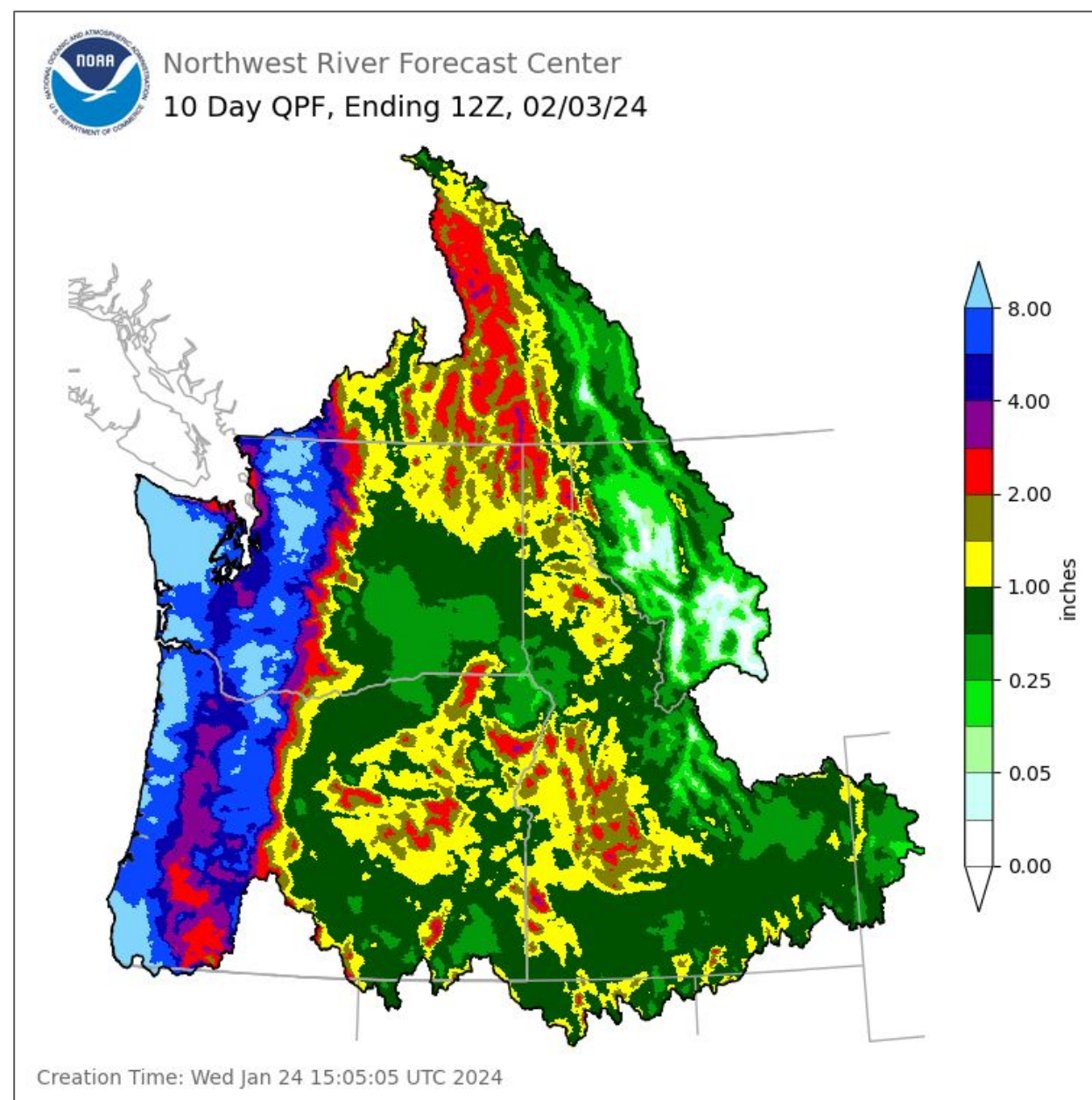


Forecast Point	% Normal Runoff Oct 1 - Jan 23
Skagit nr Mt Vernon	69
Dungeness nr Sequim	65
Chehalis at Porter	83
Okanogan at Malott	73
Methow nr Pateros	104
Yakima at Parker	72
Walla Walla nr Touchet	82



Forecast Point	% Normal Apr - Sep Vol
Skagit nr Mt Vernon	82
Dungeness nr Sequim	90
Chehalis at Porter	72
Okanogan at Malott	83
Methow nr Pateros	75
Yakima at Parker	92
Walla Walla nr Touchet	88





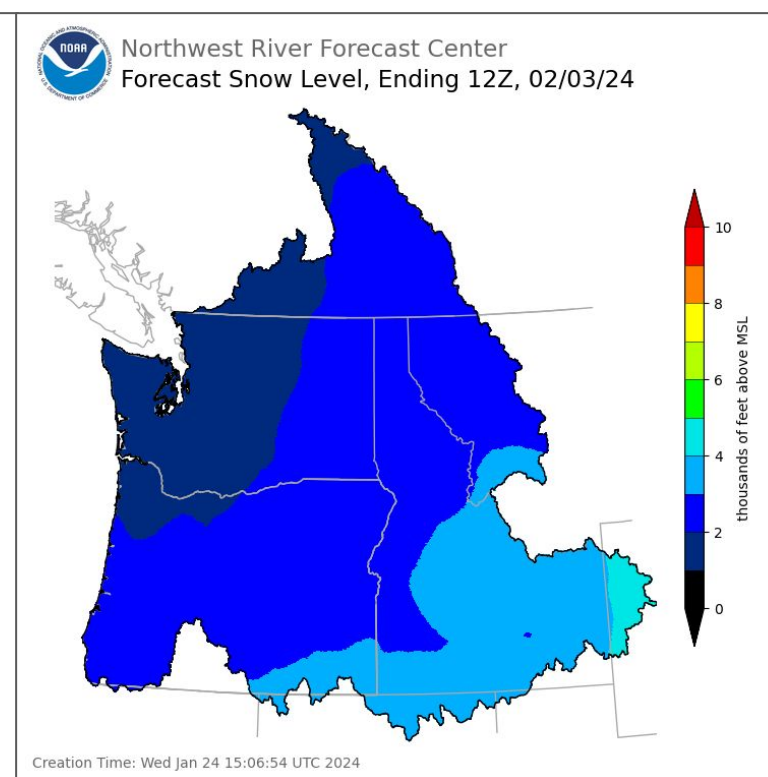
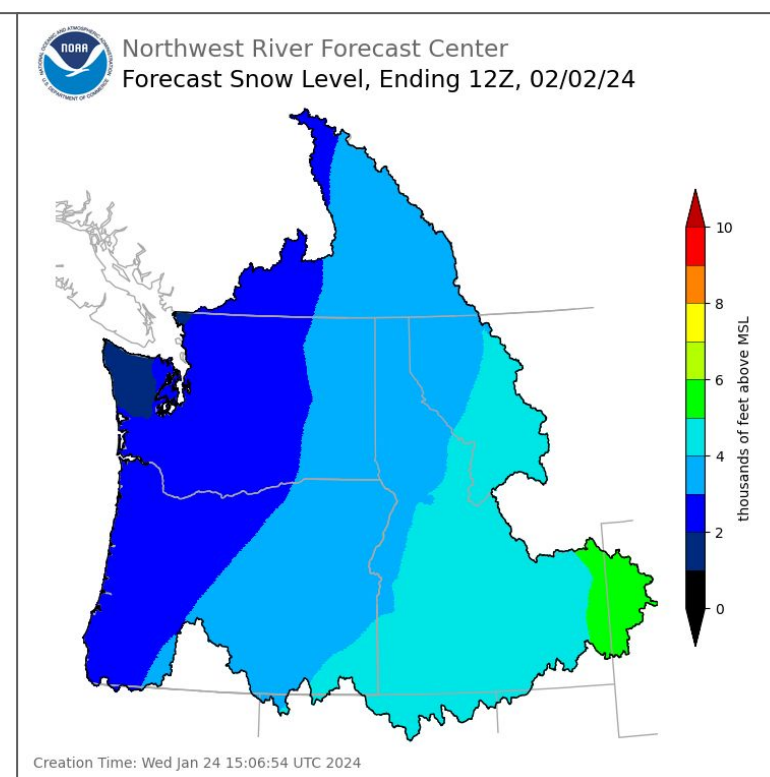
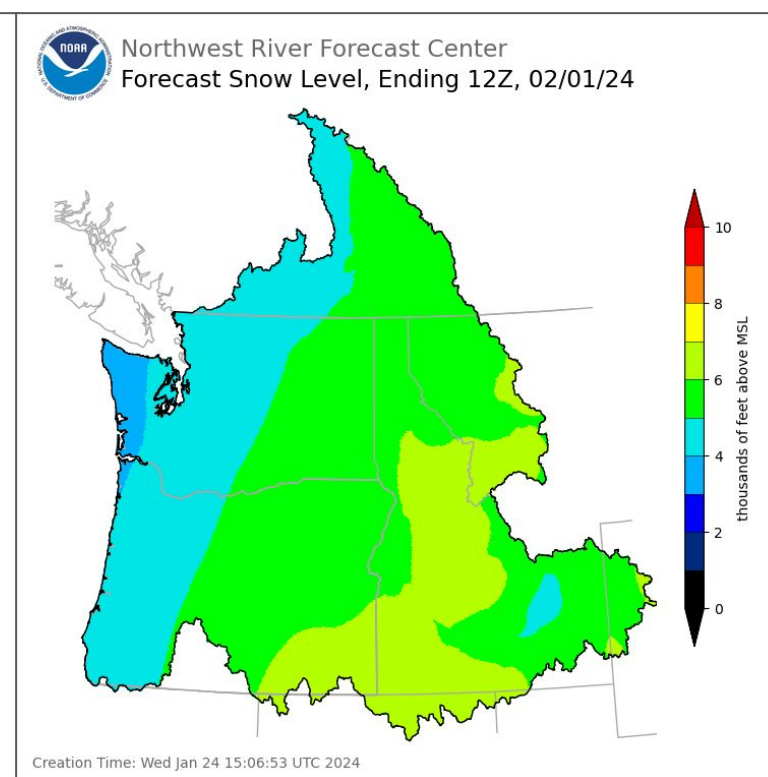
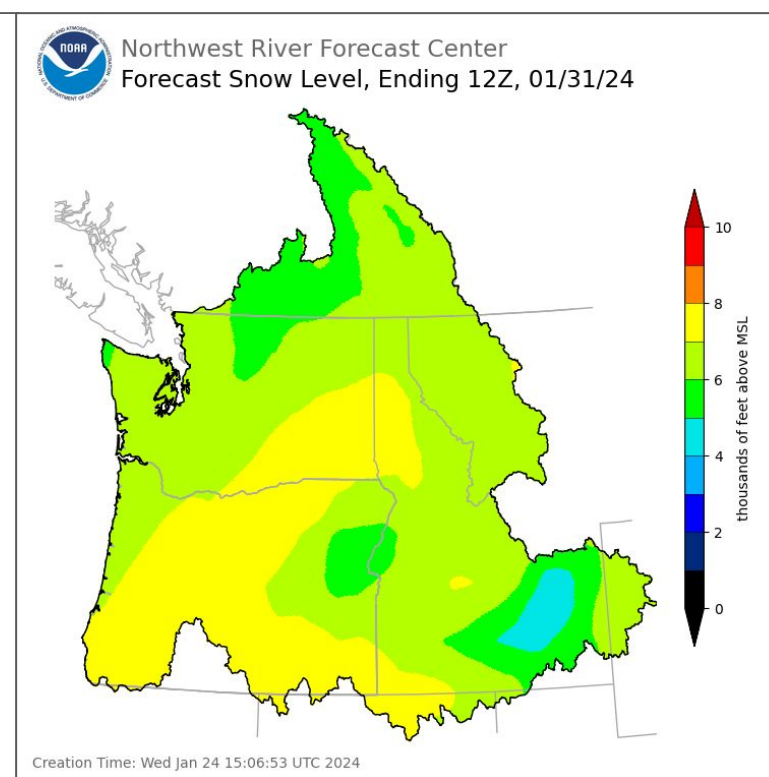
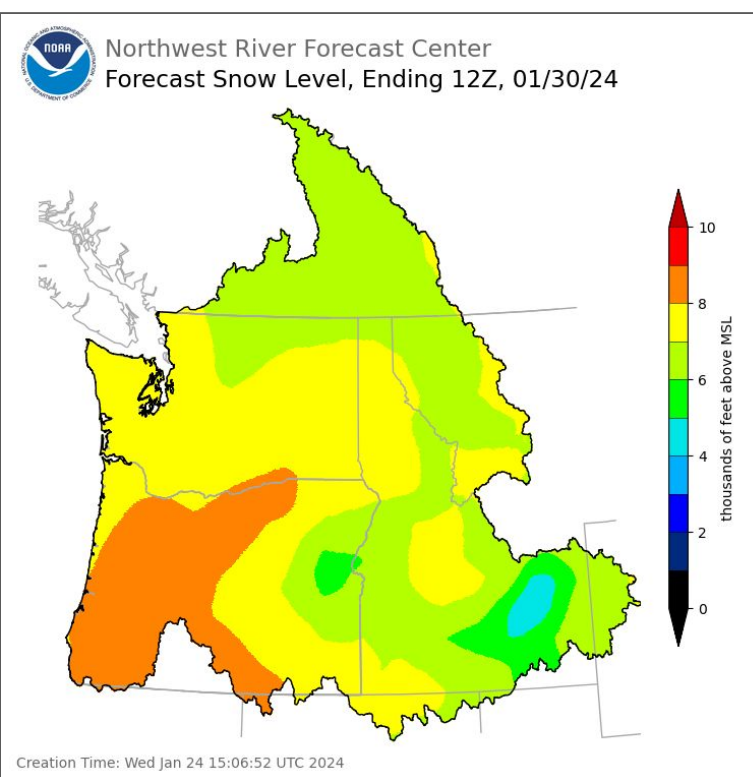
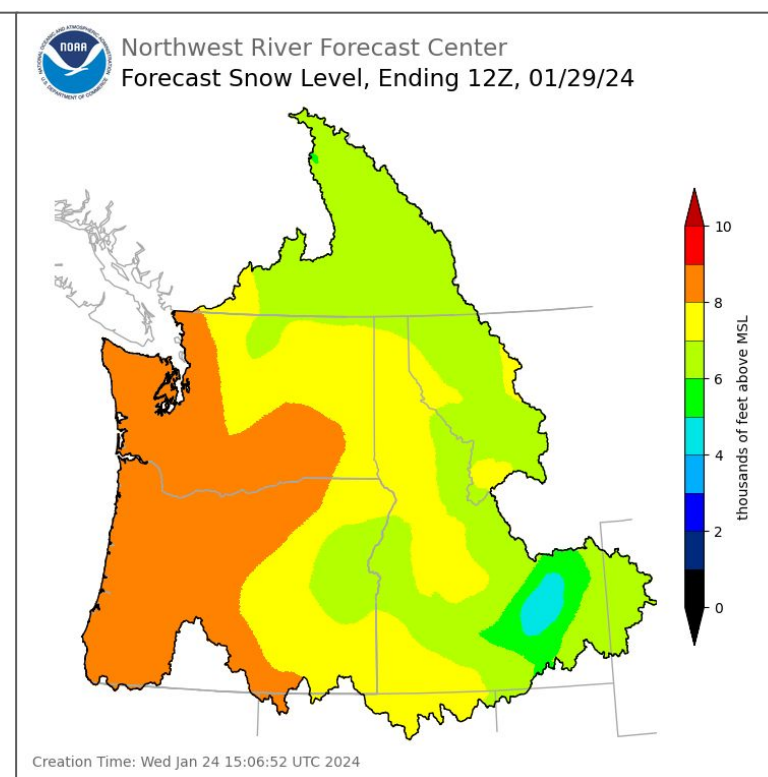
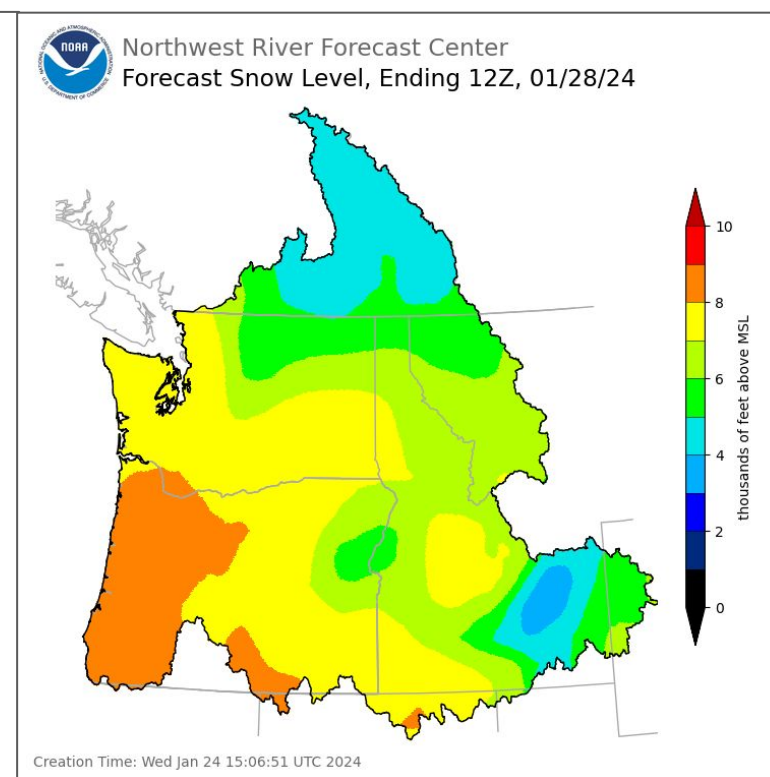
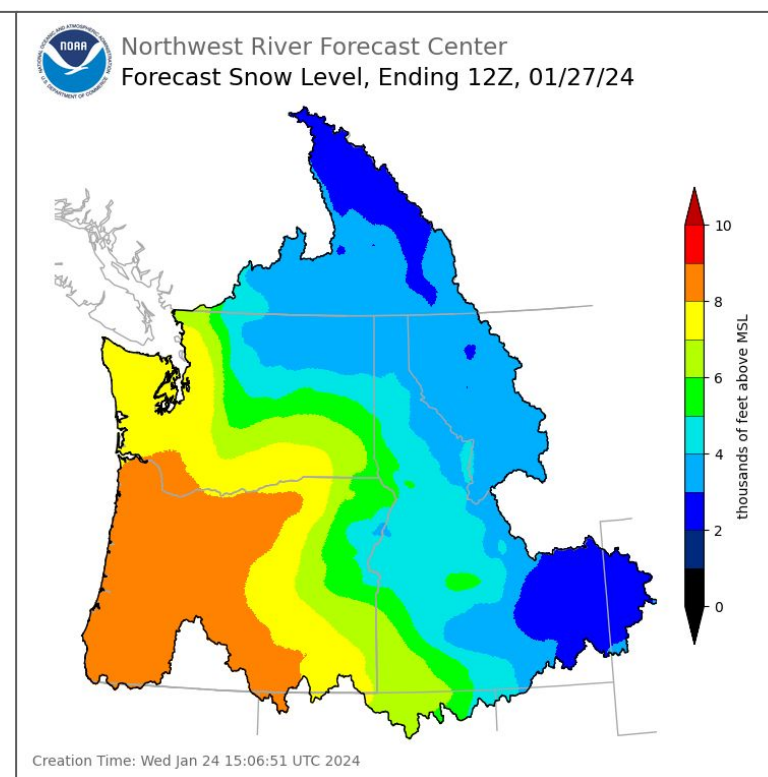
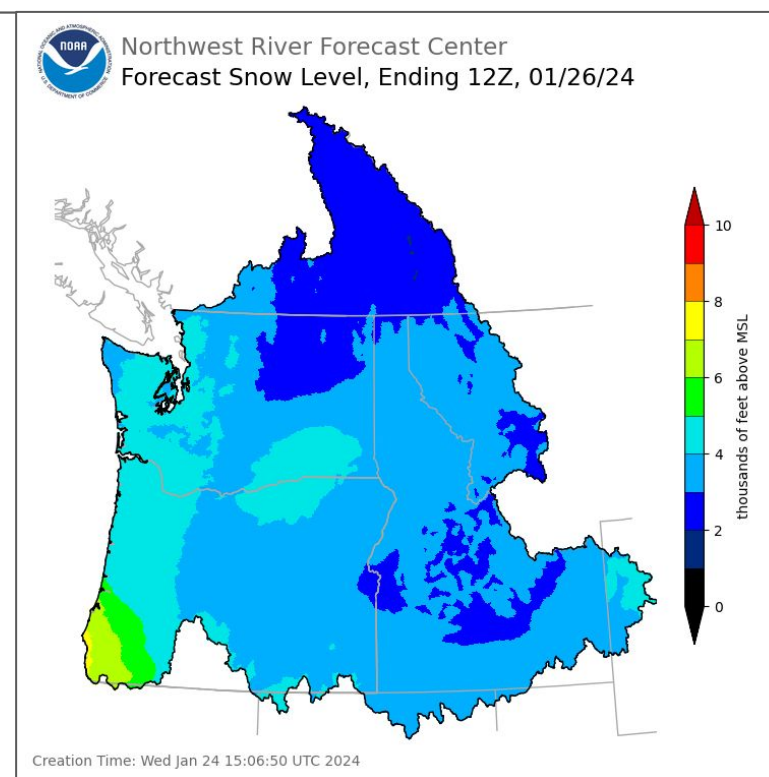
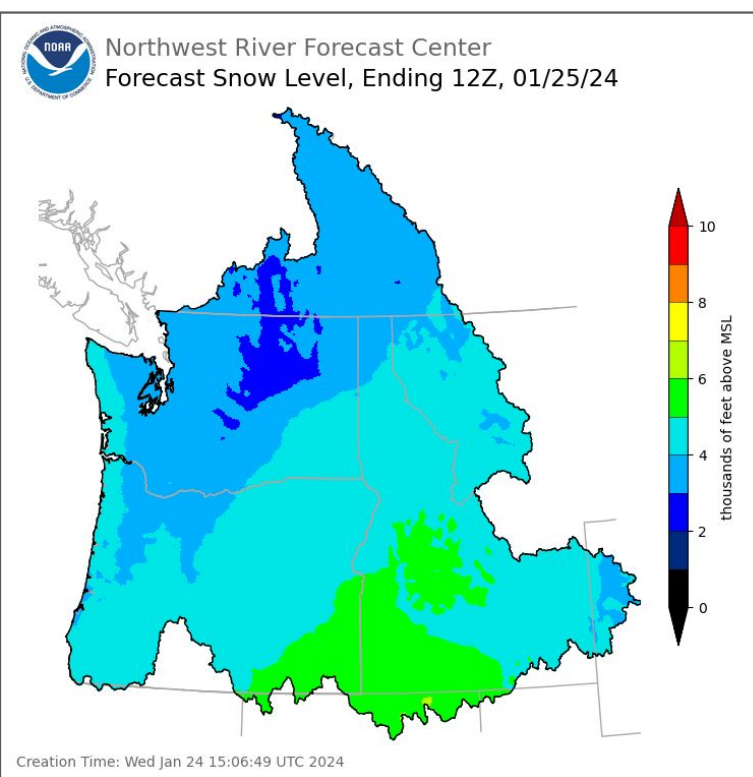
Quantitative Precipitation Forecast (QPF) Sources
 Days 1 - 2 NWS Weather Forecast Offices (WFO) in the US, WPC in BC
 Days 3 - 7 NWS Weather Prediction Center (WPC)
 Days 8 - 10 NWS National Blend of Models (NBM)



10 Day Snow Level Forecast

NWRFC

Jan 24, 2024



- Water year 2024 has been drier and warmer than normal
- Snowpacks are below normal
- Runoff volumes since October 1 are mostly below normal
- Water supply forecasts are a mix of normal to below normal, percentiles are quite low in some places
- Next 10 days expected to bring more than normal precipitation to western Washington but temperature are expected to be warm.



Yakima River Operations & Water Supply Meeting



Meeting starts at 10:30 AM

Reset Range

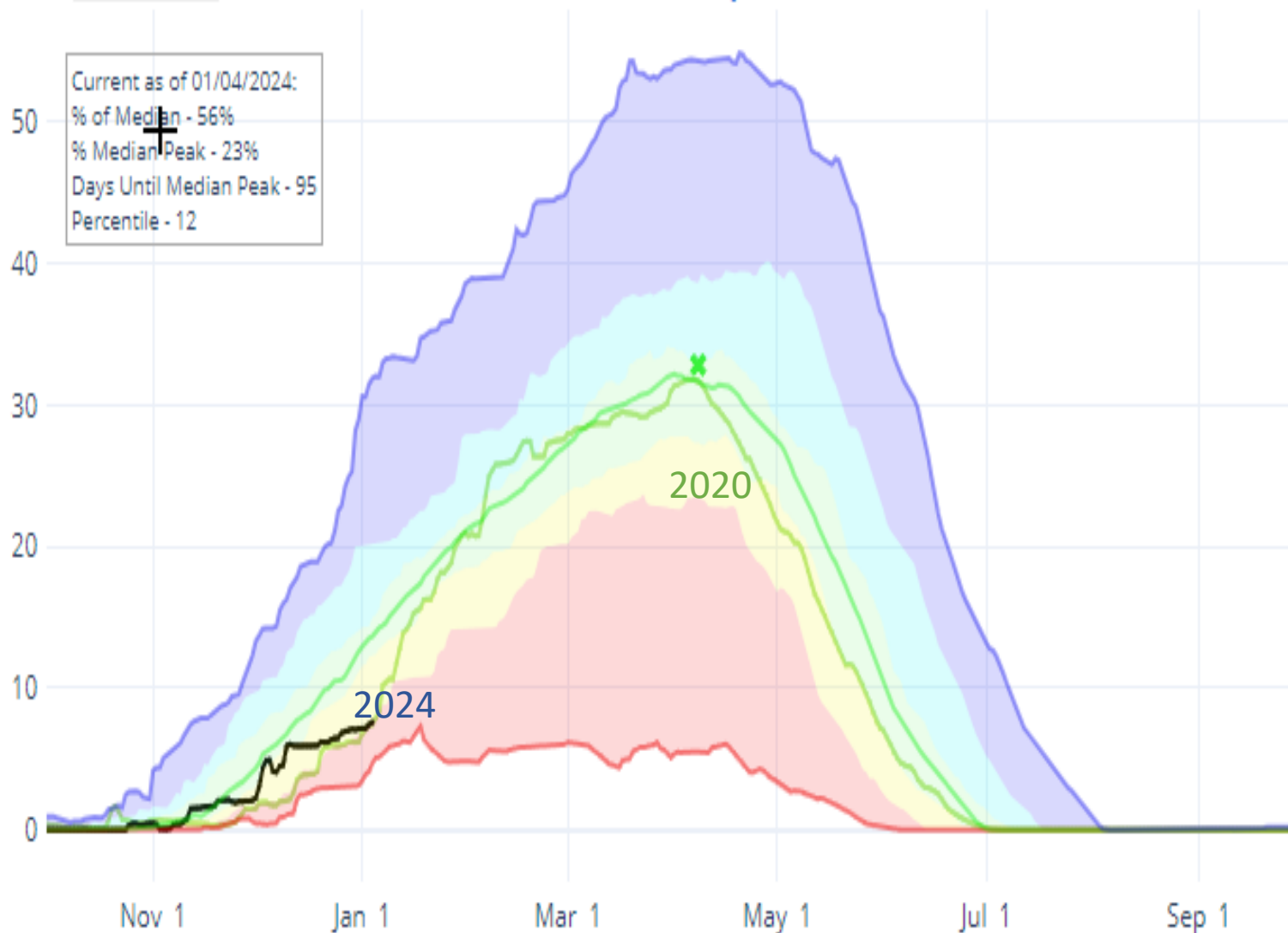
Link to data: [CSV](#) / [JSON](#)



Station List

Snow Water Equivalent (in.)

Current as of 01/04/2024:
% of Median - 56%
% Median Peak - 23%
Days Until Median Peak - 95
Percentile - 12



✕ Median Peak SWE

— Max

--- Median (POR)

— Median ('91-'20)

— Min

Stats. Shading

— 2024 (17 sites)

— 2023 (17 sites)

— 2022 (17 sites)

— 2021 (16 sites)

— 2020 (17 sites)

— 2019 (17 sites)

— 2018 (16 sites)

— 2017 (17 sites)

— 2016 (17 sites)

— 2015 (17 sites)

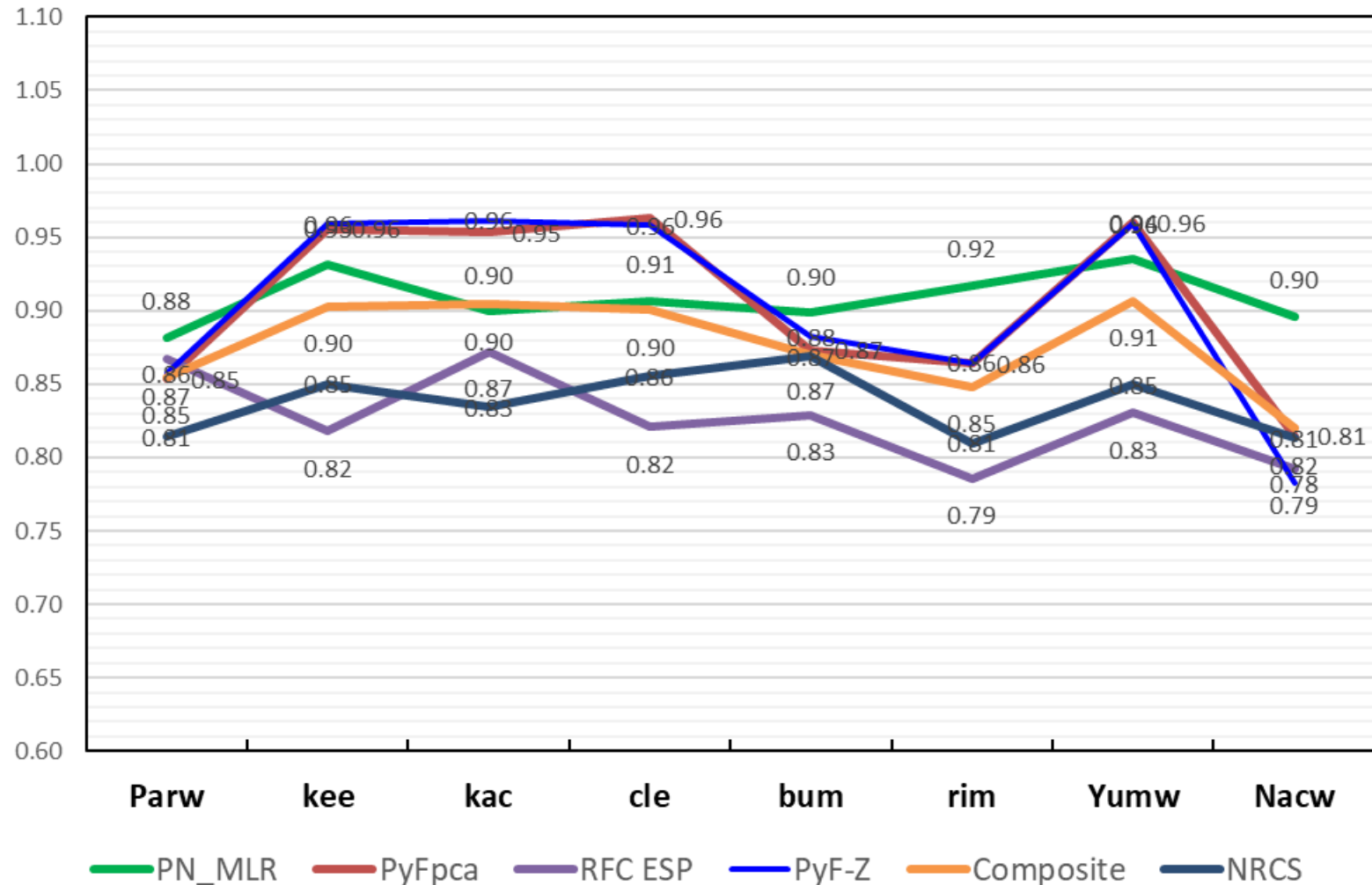
— 2014 (17 sites)

USDA



Yakima Subbasin forecasts, WY24

January Forecast Comparison

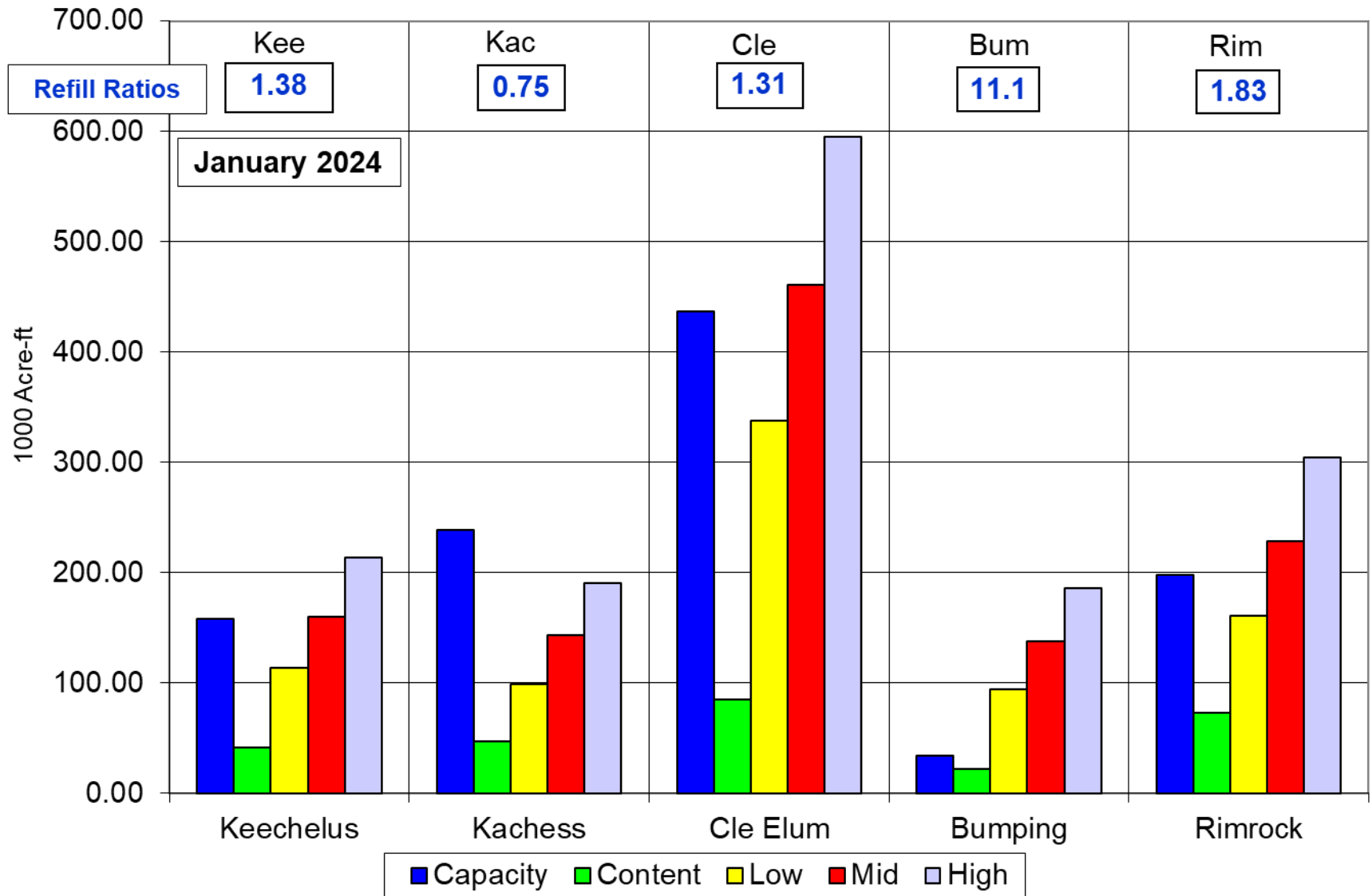


Yakima Subbasin forecasts

Yakima Basin Forecasts, Jan-Jul, AF						
Jan, 2024	Min	Composite	Max	Min	Composite	Max
Parw	1457187	2201709	3026197	57%	85%	117%
kee	113320	160052	213370	64%	90%	120%
kac	99125	143044	190565	63%	90%	120%
cle	337950	460816	595143	66%	90%	116%
bum	94543	137513	186028	60%	87%	118%
rim	161239	228828	304545	60%	85%	113%
Yumw	733660	1022912	1340544	65%	91%	119%
Nacw	531695	846035	1175537	52%	82%	114%



Yakima Project Runoff Forecast to Reservoir Space Available



Hydrologic Summary

- Yakima Reservoir Storage is low, 268, 55% avg.
- Went from 3rd lowest to 6th lowest (1971-2023).
- Fall precip and flows were low
- Dec was wet
- YRBWEP Conservation: 22.4 KAF
- Spawning flows are set to the BA minimum.
- Forecasts are not too grim in January, as is typical.