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Northwest **Power** and **Conservation** Council

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May 7, 2024

MEMORANDUM

TO: Council Members

FROM: Dan Hua and Kate Self

SUBJECT: Basin Climate and Water Supply Outlook

BACKGROUND:

Presenter: Amy Burke, Senior Hydrologist, Northwest River Forecast Center, NOAA

Summary: Amy Burke will provide an update on current hydrologic and climatic conditions and seasonal water supply forecasts for the Columbia Basin. She will provide a brief background on the methods used by NOAA to develop the forecasts and discuss the current conditions and expectations for the upcoming water management season. This information is critical for informing decisions regarding dam management, hydropower production and fisheries operations across the Basin.

Relevance: The Mainstem Hydrosystem Flow and Passage strategy and the Climate Change strategy of the 2014/2020 Fish and Wildlife Program both call for the federal agencies to implement measures to better understand and track climate and river conditions and to use that information to identify and implement hydrosystem management actions that protect and improve conditions for fish. In addition, several applications of water supply forecasting for various seasonal time periods of a water year, which begins in October and ends in the following September, are in hydro-regulation planning studies. These include: (1) Biological Opinion (BiOP) operations at various hydropower projects such as setting the amount of spill, minimum and maximum flow constraints or flow in

turbines; (2) flood control operations which determine how much to draft various reservoirs to absorb the freshet runoff; (3) estimating the volume and timing of water to be released from Canadian reservoirs according to the Columbia River Treaty; and (4) setting hydro-regulations to ensure a high probability of refill for all reservoirs at the end of the water year. Results from these studies enable planners to determine operations of the hydrosystem projects, which include hydropower generation over the water year.

Background: Climate and water supply forecasting is a critical component of annual water management for Columbia River system operations. It also informs long-term planning and decision-making on operations that affect both hydropower supply and fish passage and survival. Annual planned actions for reservoir operations and fish passage during the fish migration seasons are described in the Corps of Engineers' [Water Management Plan](#) and [Fish Operations Plan](#). In-season adjustments on dam and reservoir operations to accommodate changing conditions are discussed and considered through regional forum processes such as the [Technical Management Team](#). All of these discussion and decision-making processes utilize the information provided on Basin water supply and runoff forecasting.

More Info: Forecast information and maps are available on the [Northwest River Forecast Center](#) website.



Northwest River Forecast Center

May 2024 Water Supply Briefing

Amy Burke, Senior Hydrologist
NWRFC.watersupply@noaa.gov

May 2024 Northwest Power and Conservation Council





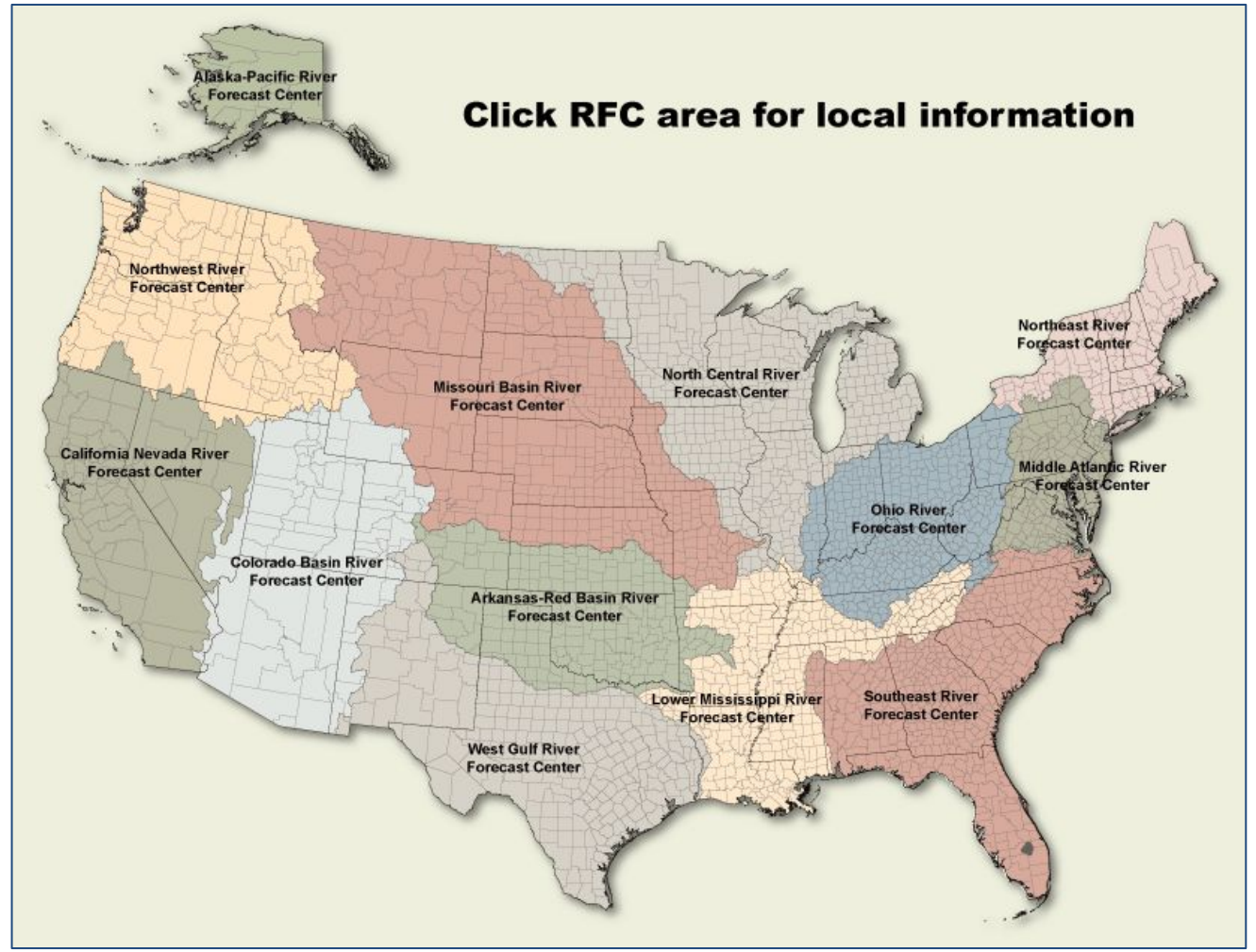
NWS River Forecast Centers



NOAA Mission: To understand and predict changes in the Earth's environment ... to meet our Nation's economic, social, and environmental needs

NWS Mission: The NWS provides weather, hydrologic, and climate forecasts and warnings ... for the protection of life and property and the enhancement of the national economy

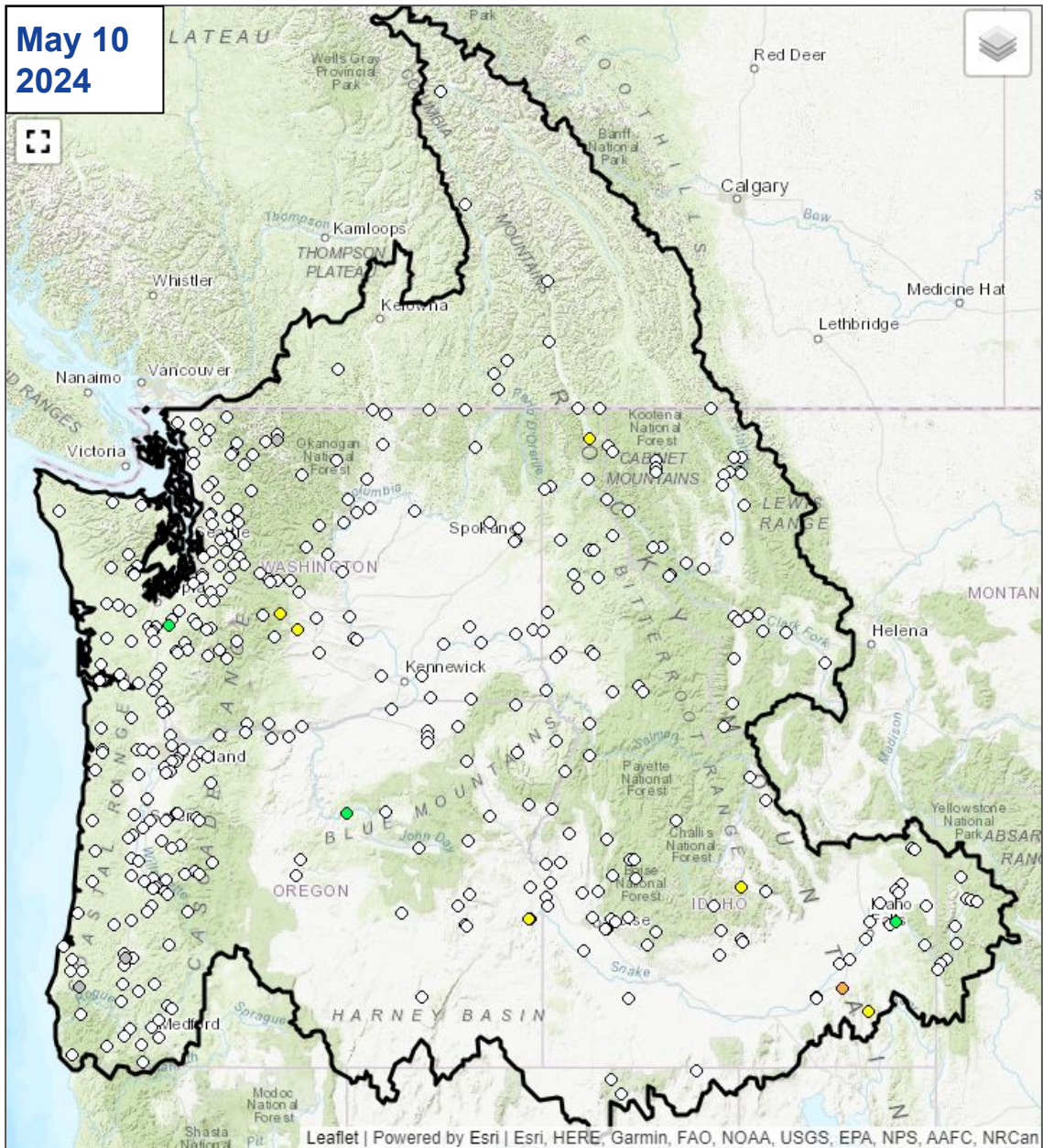
RFC Role: The River Forecast Centers carries out the NOAA and NWS missions by providing streamflow forecasts and information datasets for the well being of the public





Northwest River Forecast Center Overview

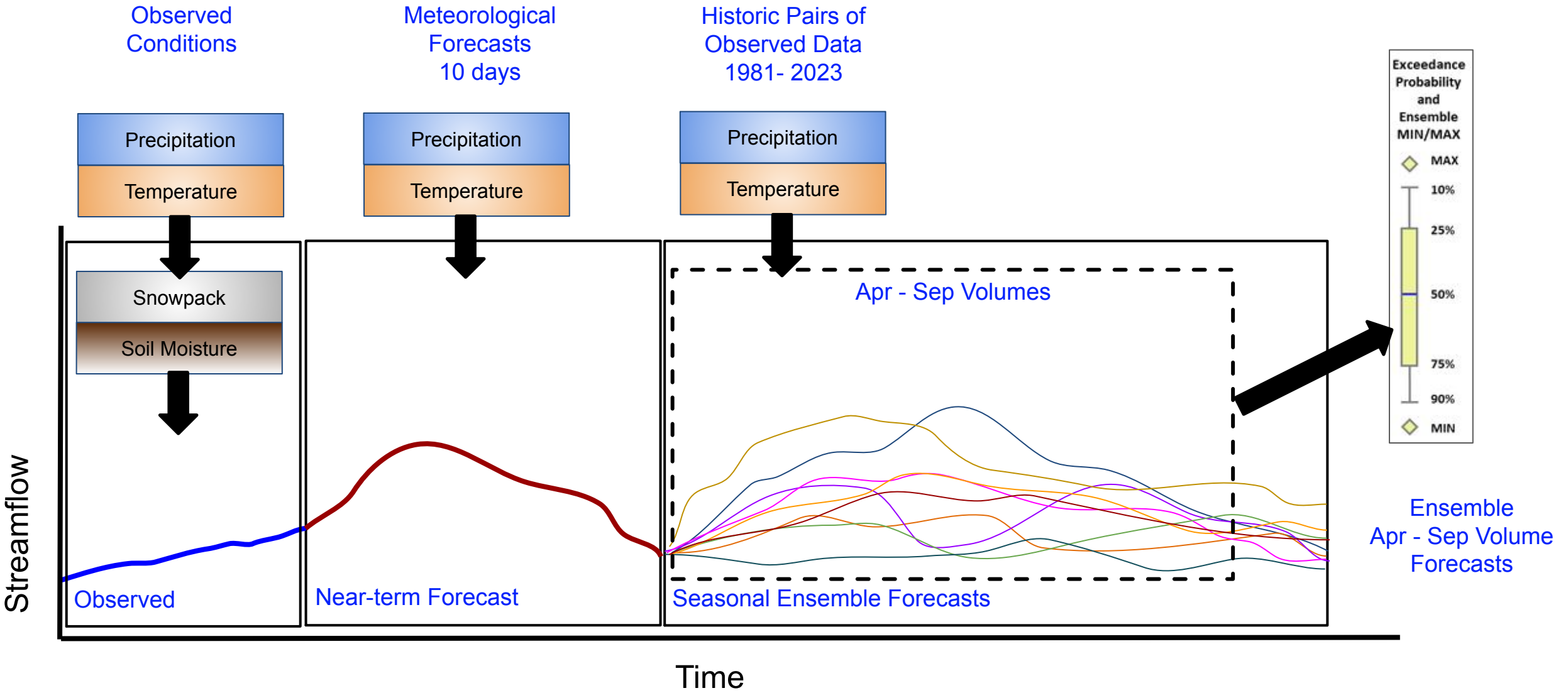
May 10
2024



- 326,000 Square Miles
 - 2 Countries
 - 6+ States
 - 10 NWS Weather Forecast Offices
 - 396 locations
- Geographic Diversity
 - Rainforest to Desert
 - Floods to Droughts
- NWRFC forecasts inform regional and local decisions:
 - Water Management
 - Hydropower
 - Public Safety
 - Drought Planning
 - River Navigation
 - Species Protection

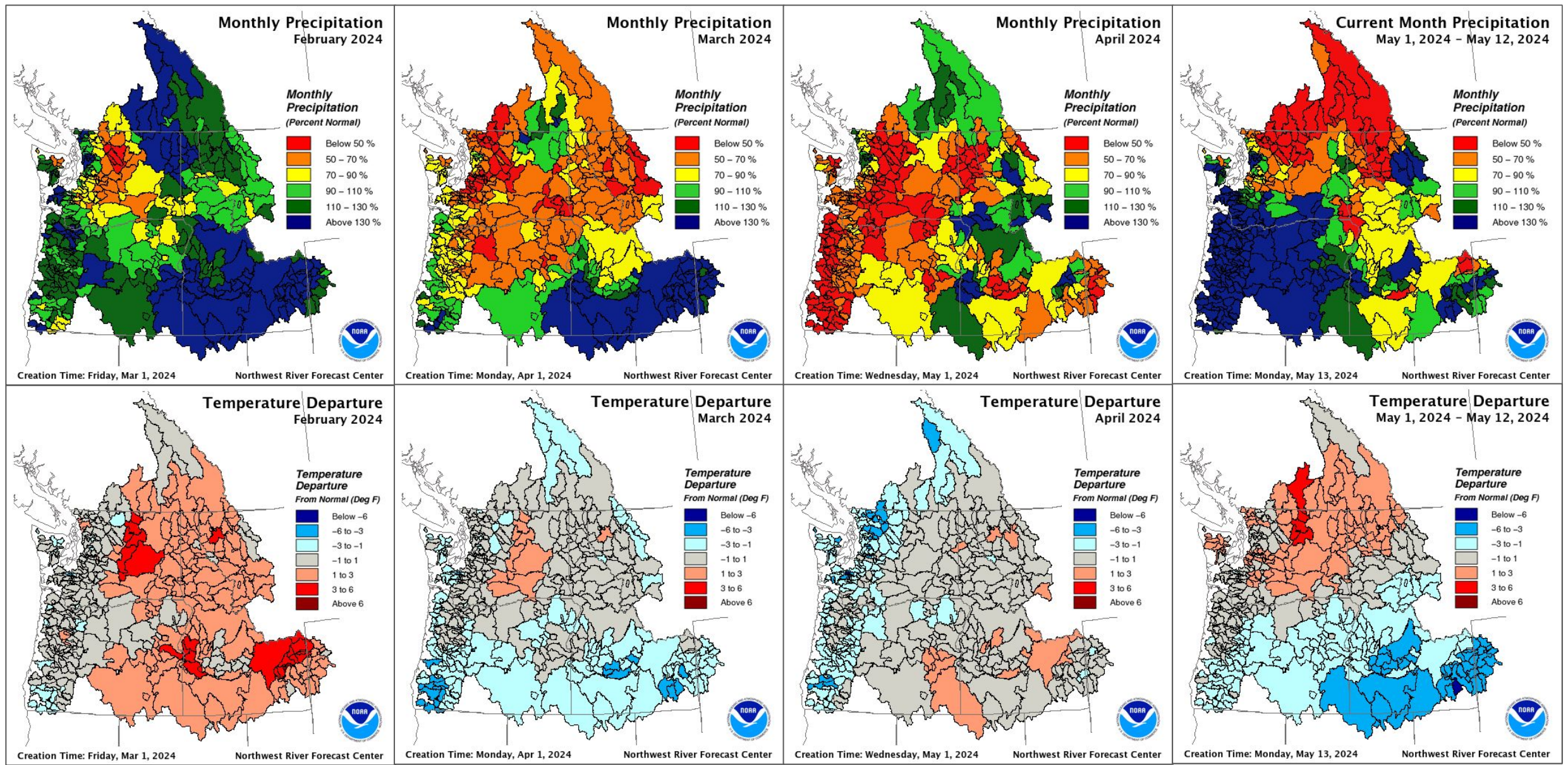


NWRFC Forecast Technique: Ensemble Streamflow Prediction



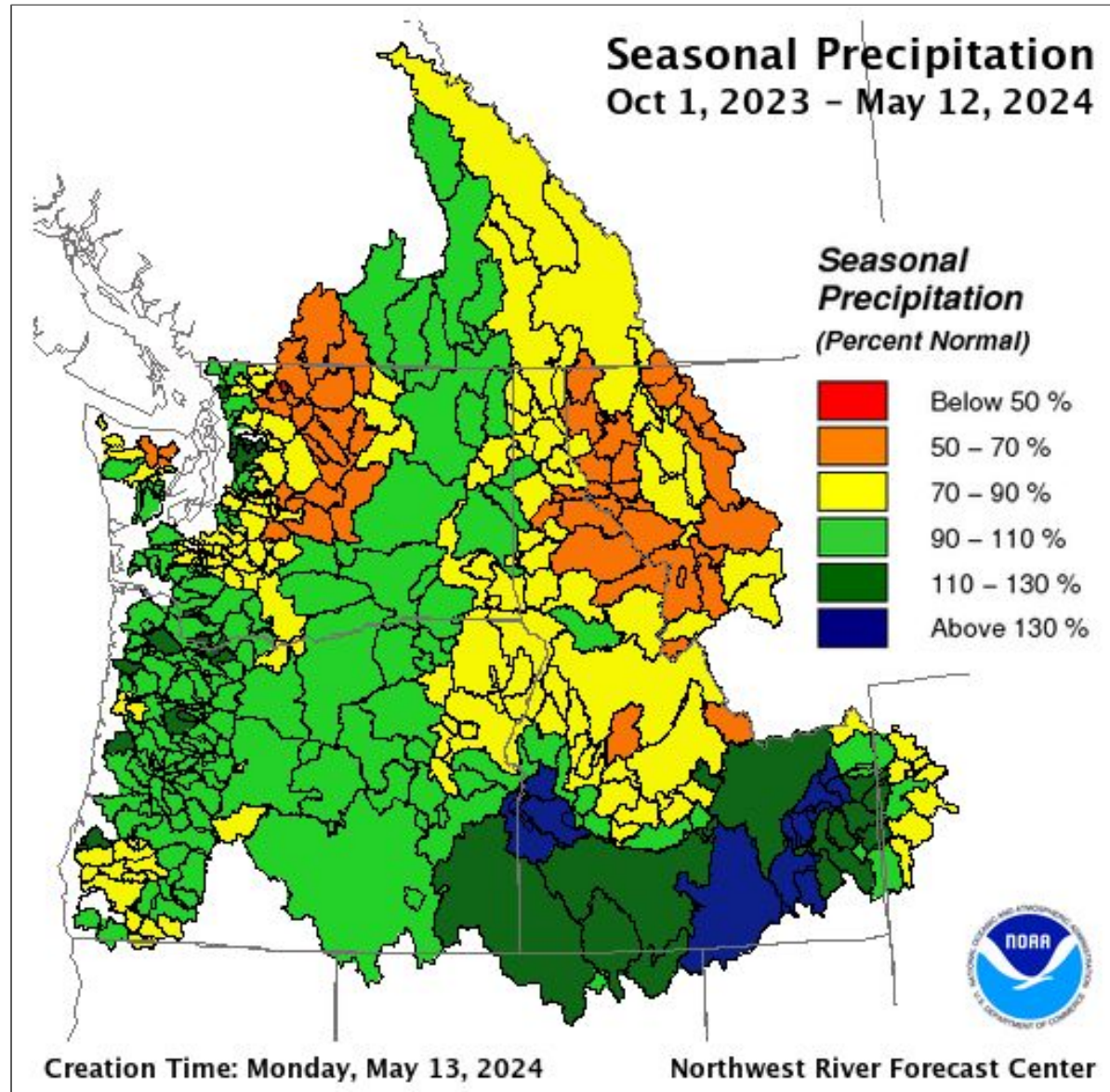


Observed Monthly Precipitation and Temperature

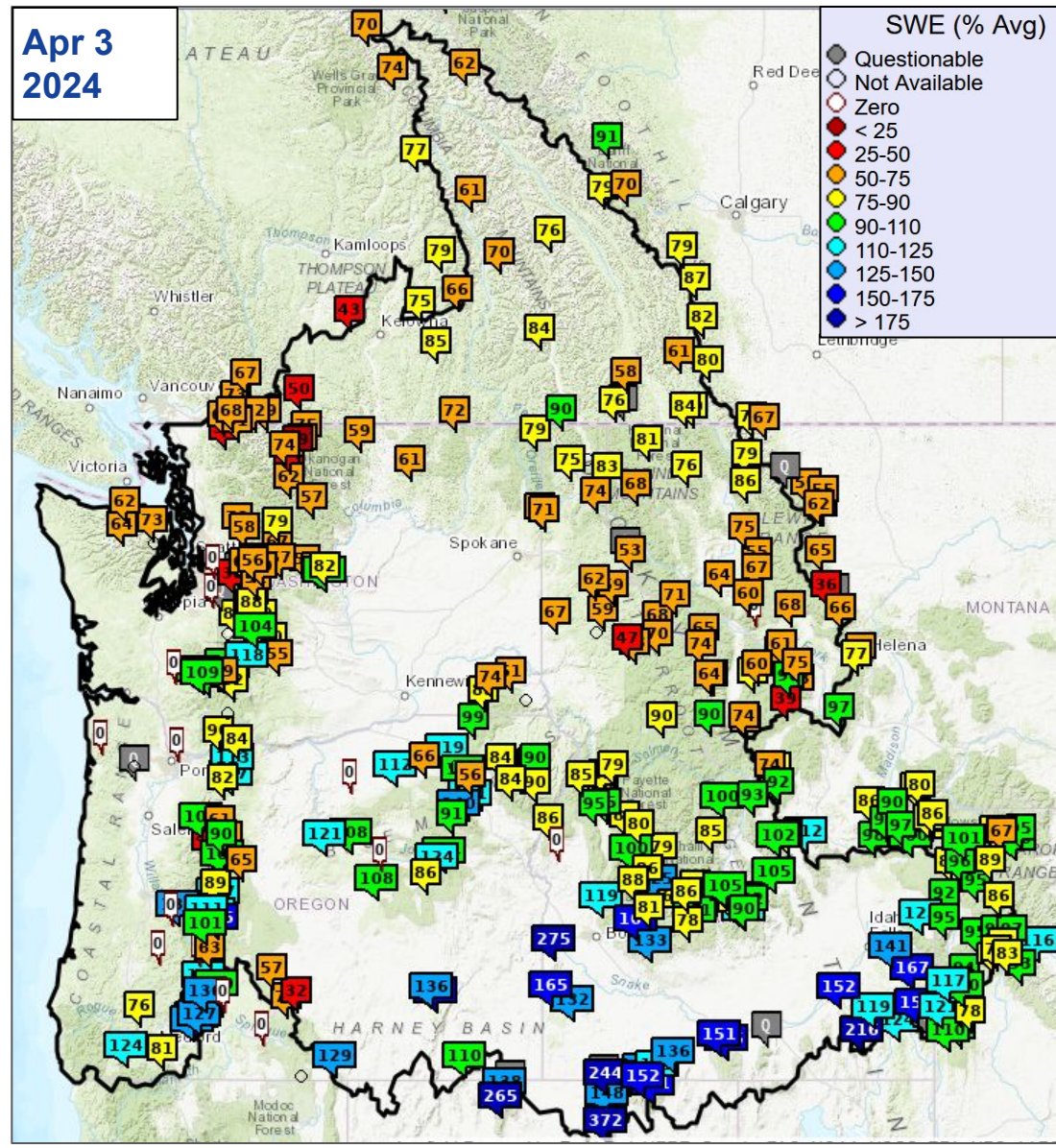




Water Year to Date Precipitation



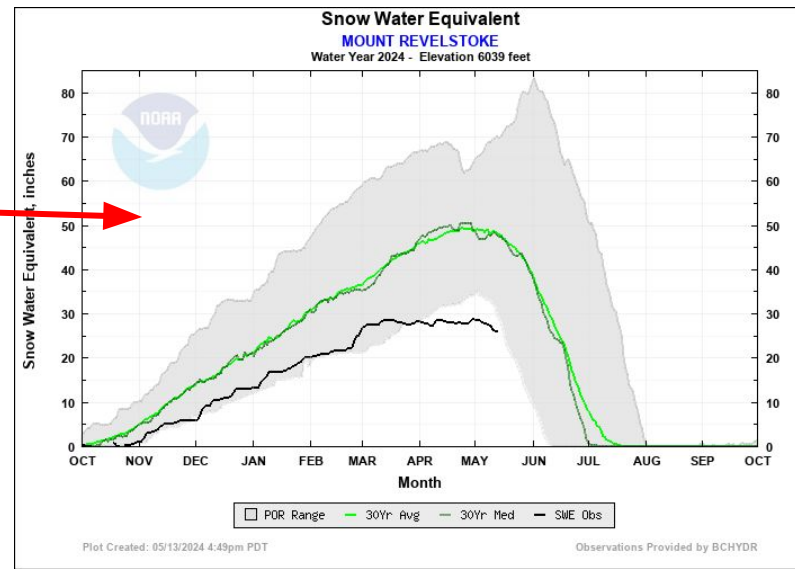
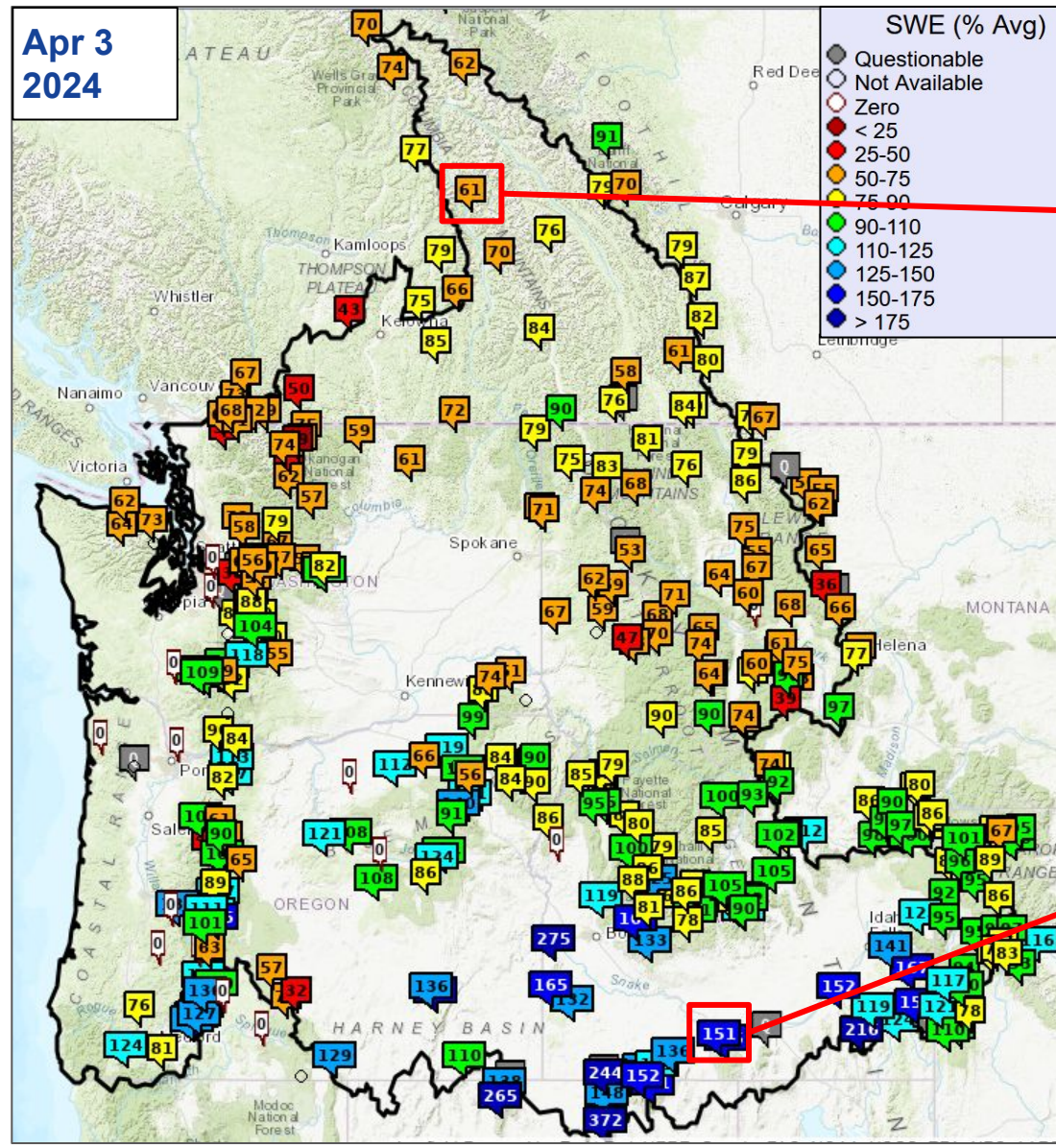
Snowpack



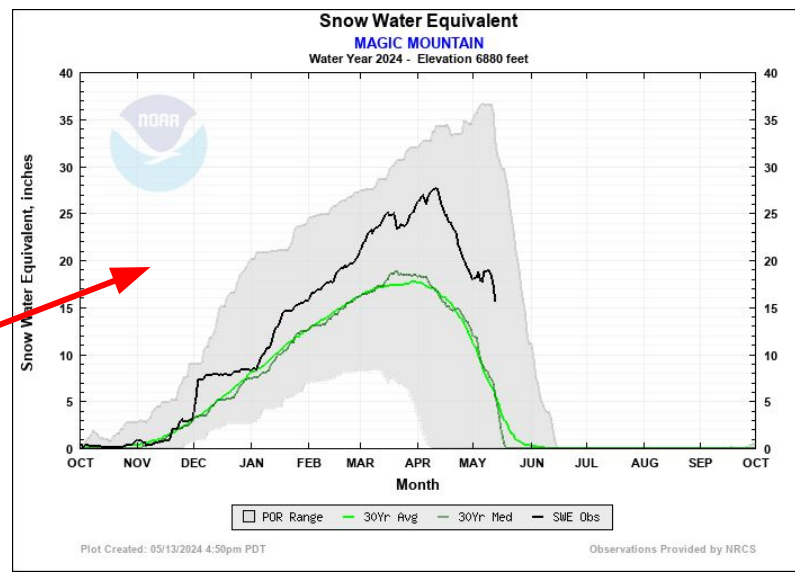
SWE = Snow Water Equivalent
(Inches of water in the Snowpack)

Snow data from Natural Resources Conservation Service, BC Hydro, Ministry of Environment and Climate Change Strategy, and Alberta Environment and Parks.

Snowpack



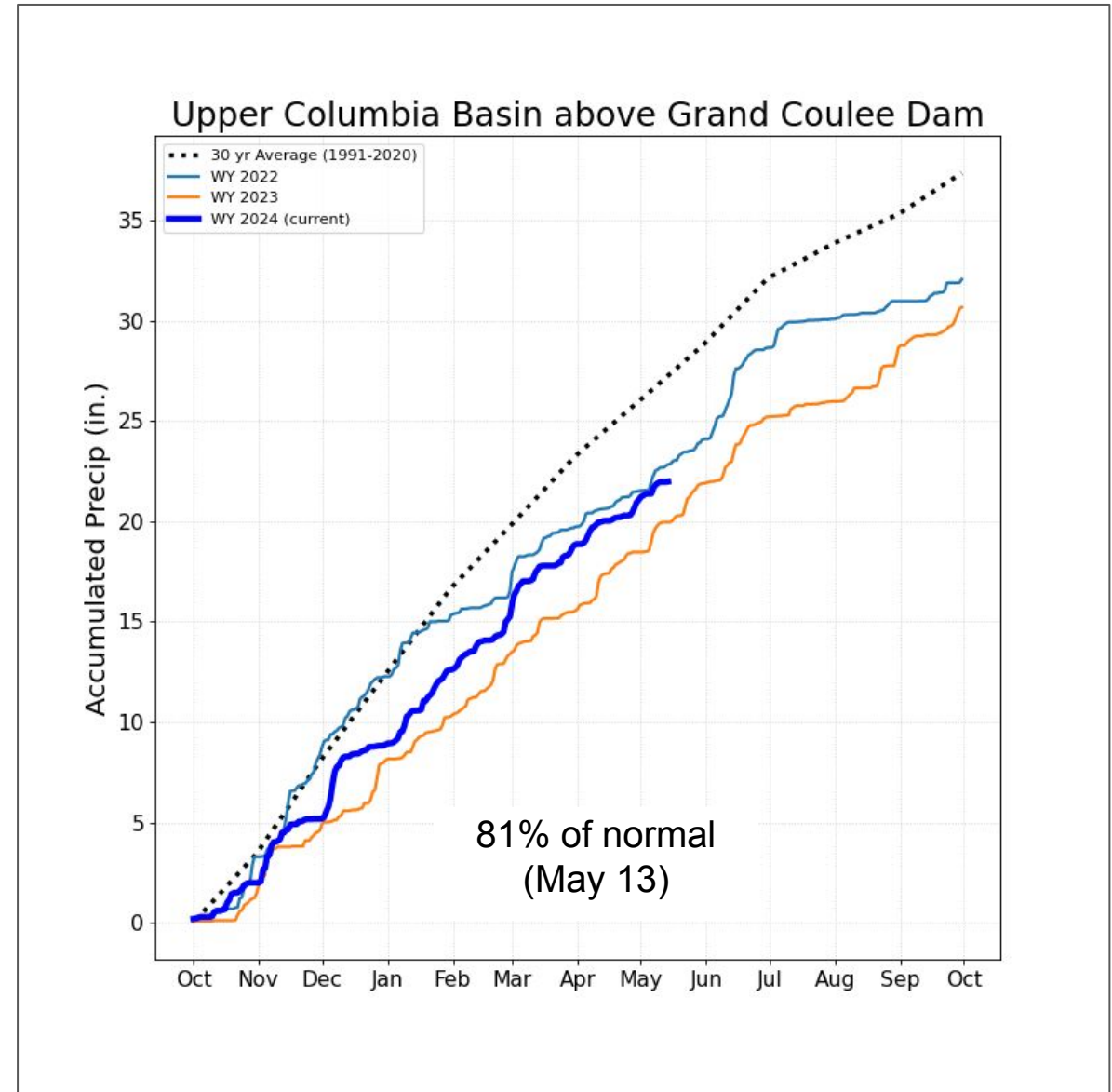
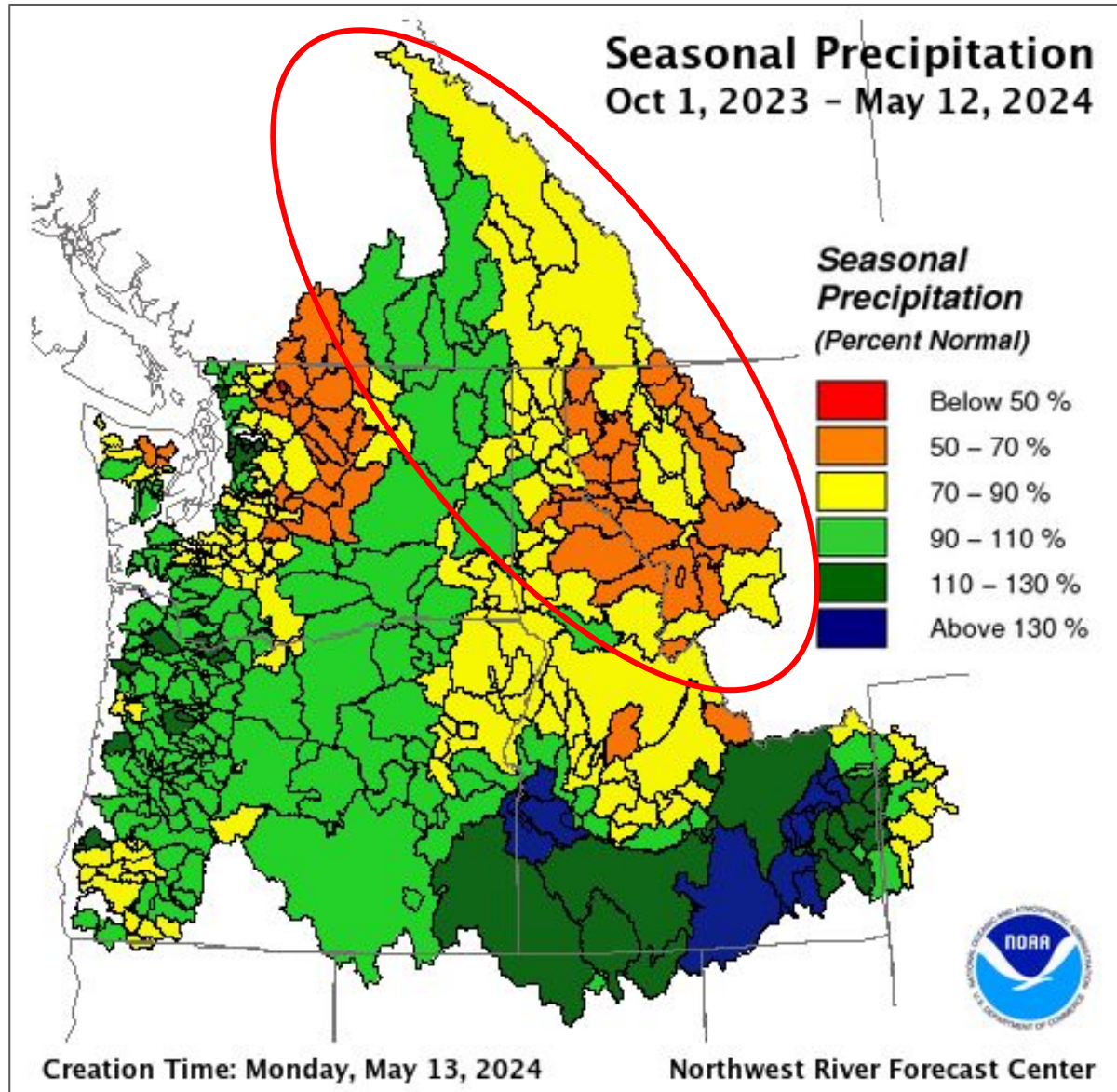
Record low snowpacks in northern areas of our domain.



Higher than normal snowpacks in the south.

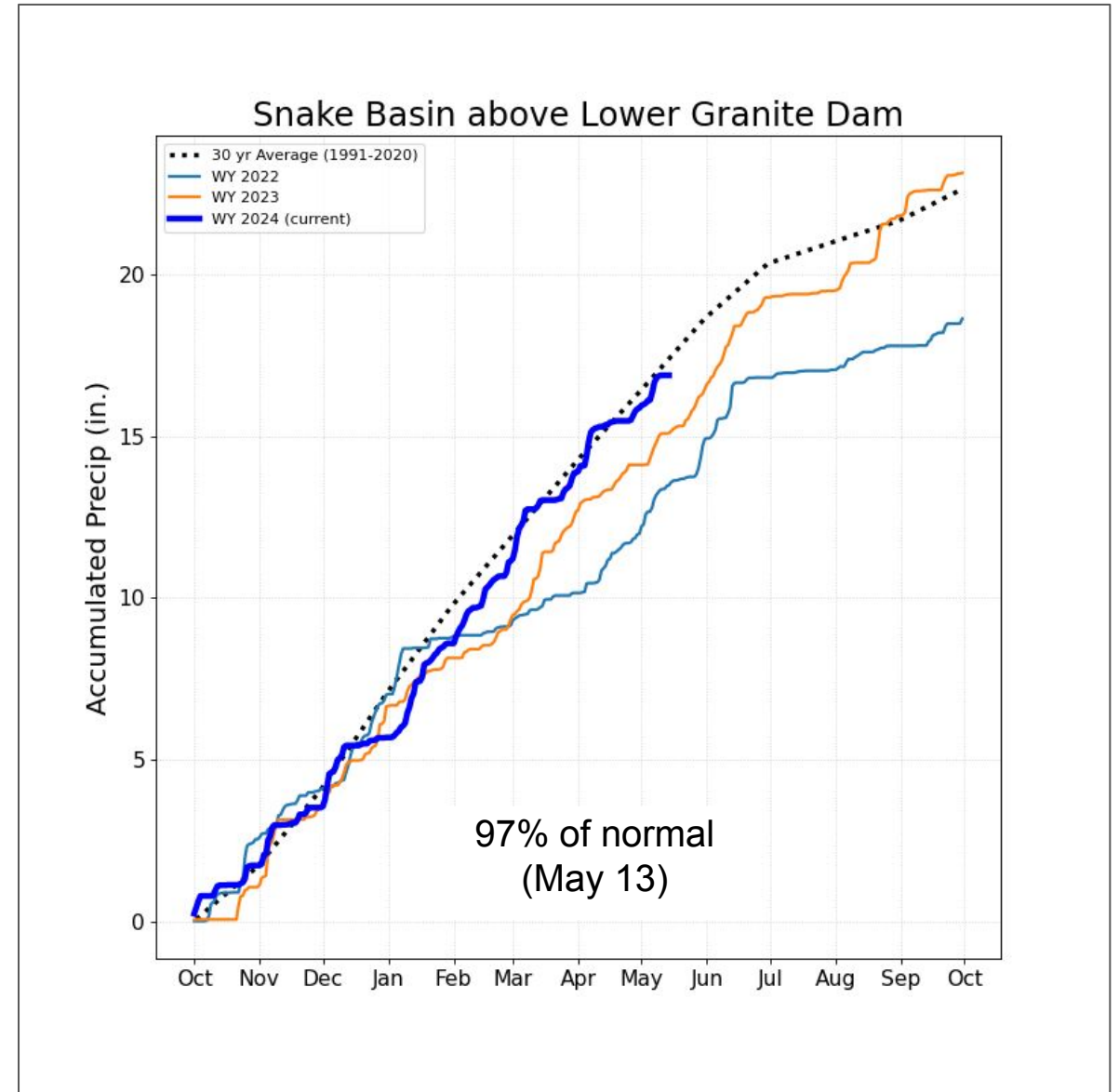
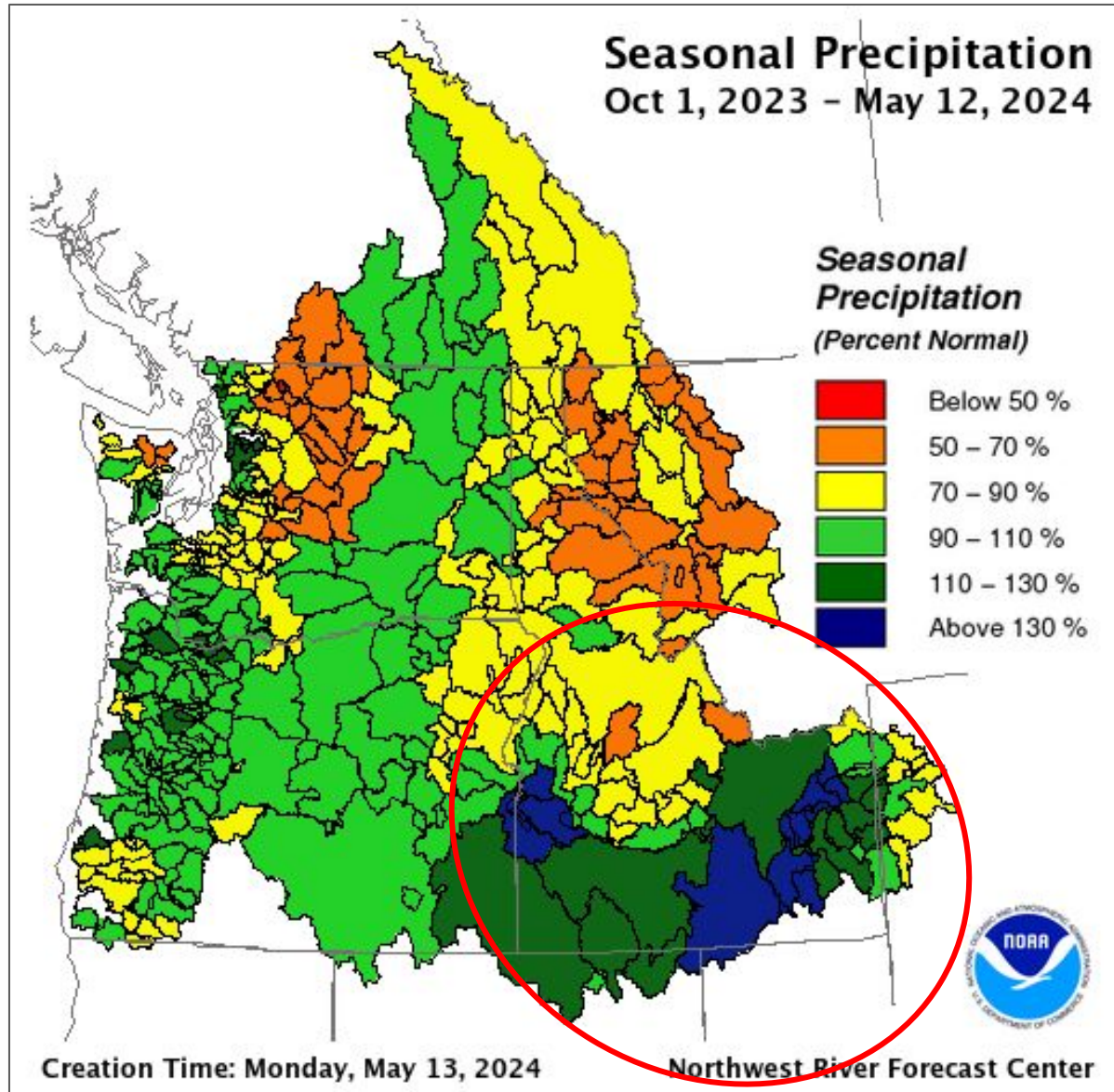
Snow data from Natural Resources Conservation Service, BC Hydro, Ministry of Environment and Climate Change Strategy, and Alberta Environment and Parks.

Snowpack and Precipitation



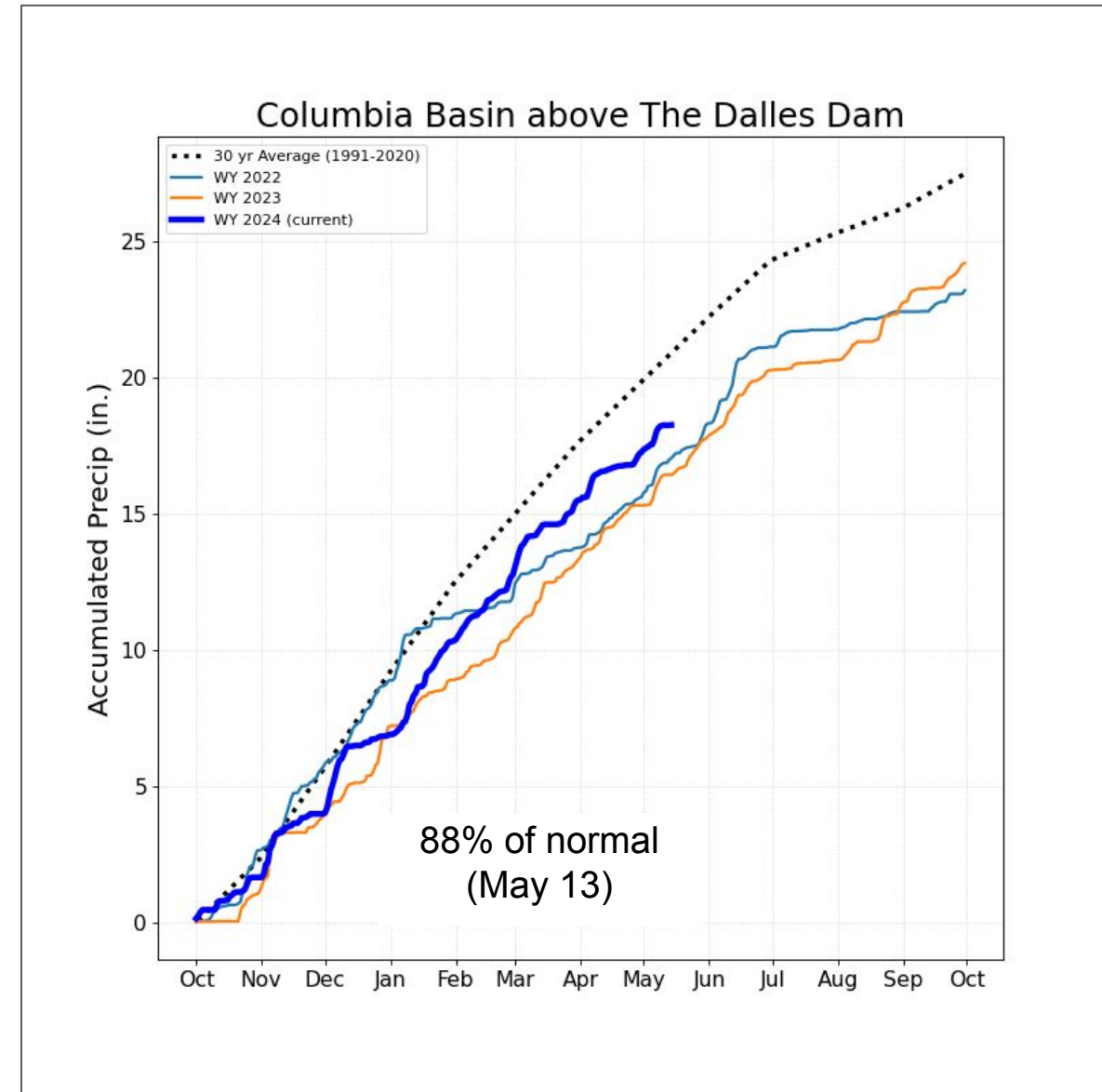
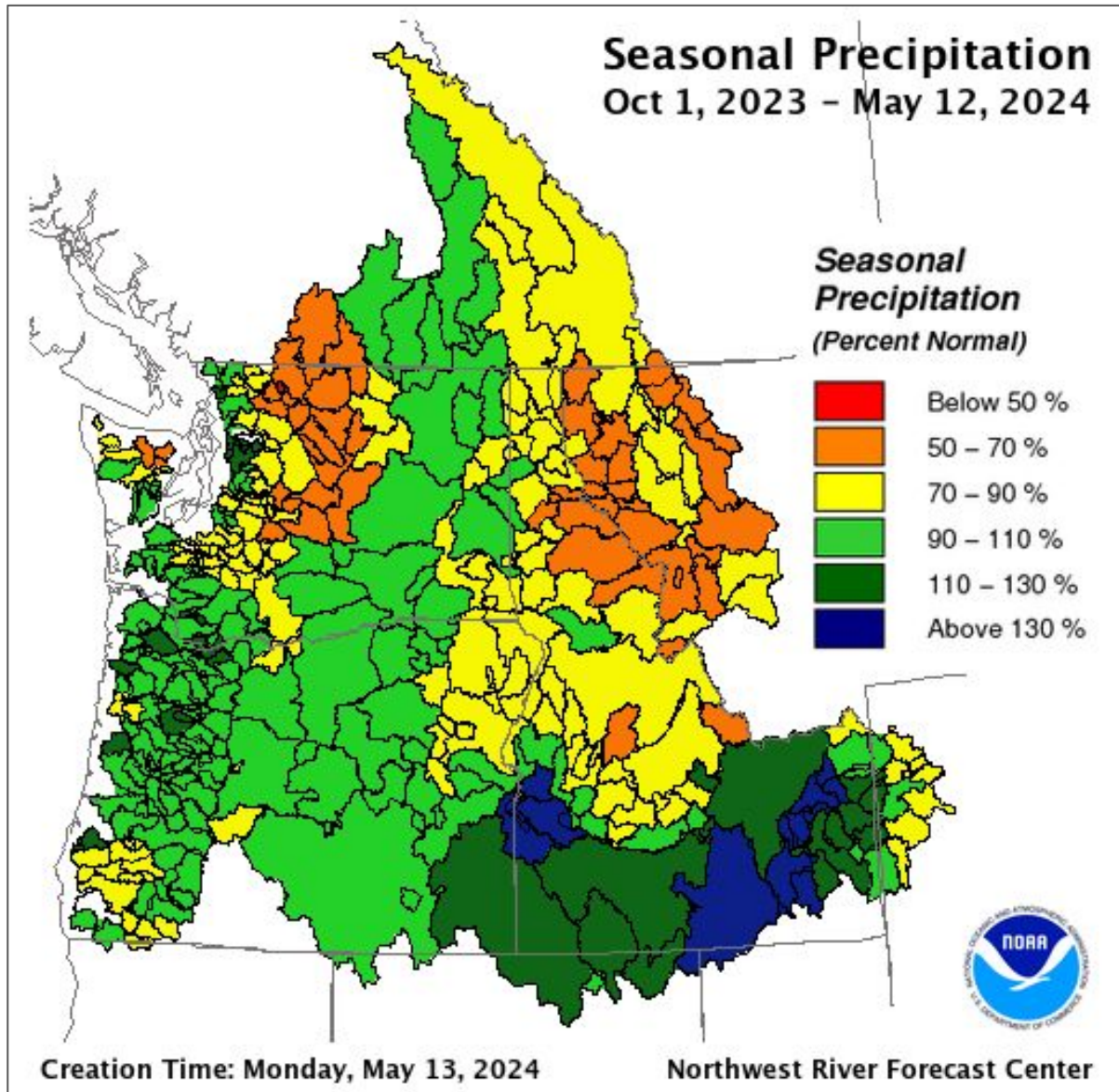
Precip averages from PRISM, OSU and PCIC.

Snowpack and Precipitation



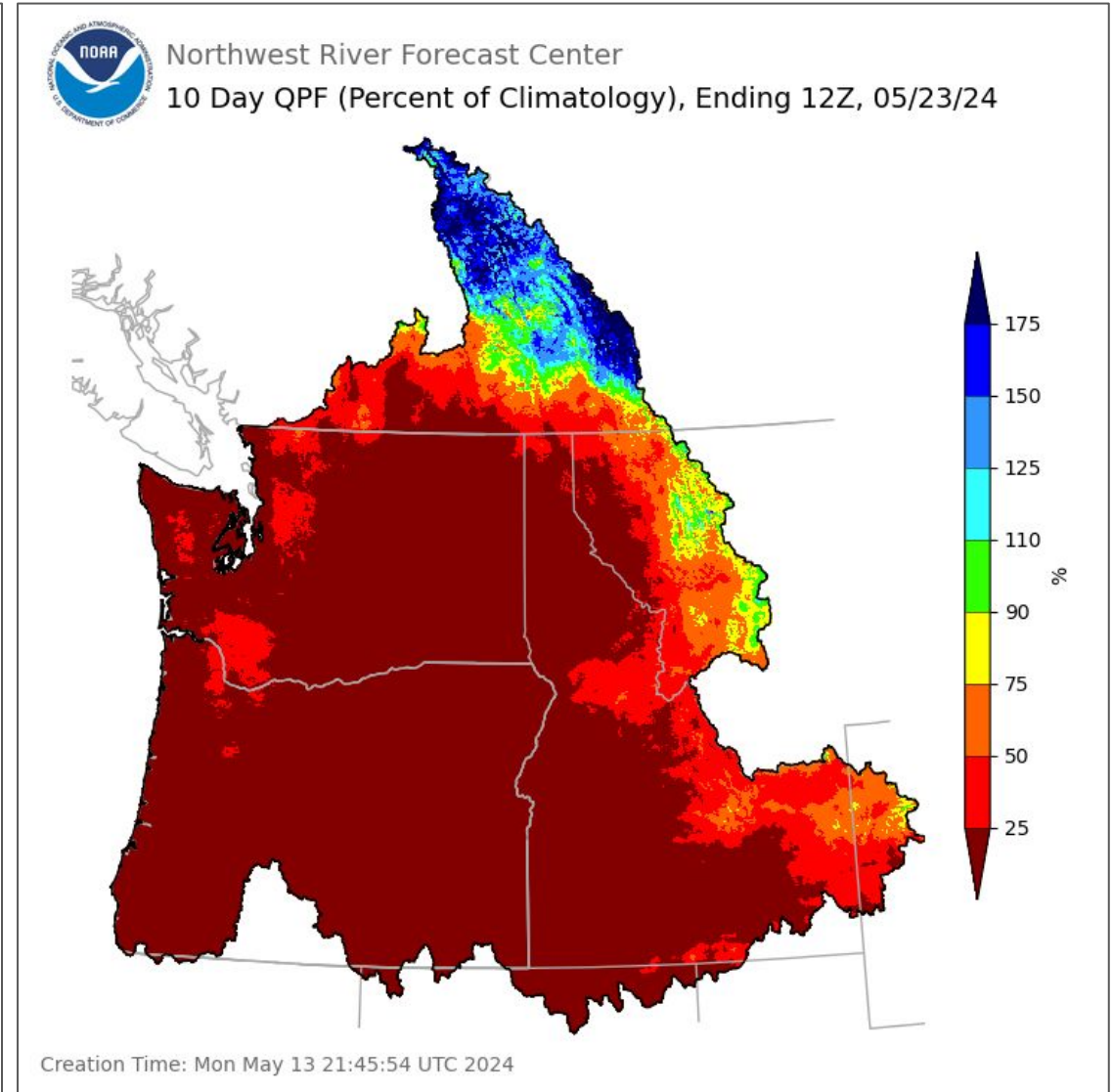
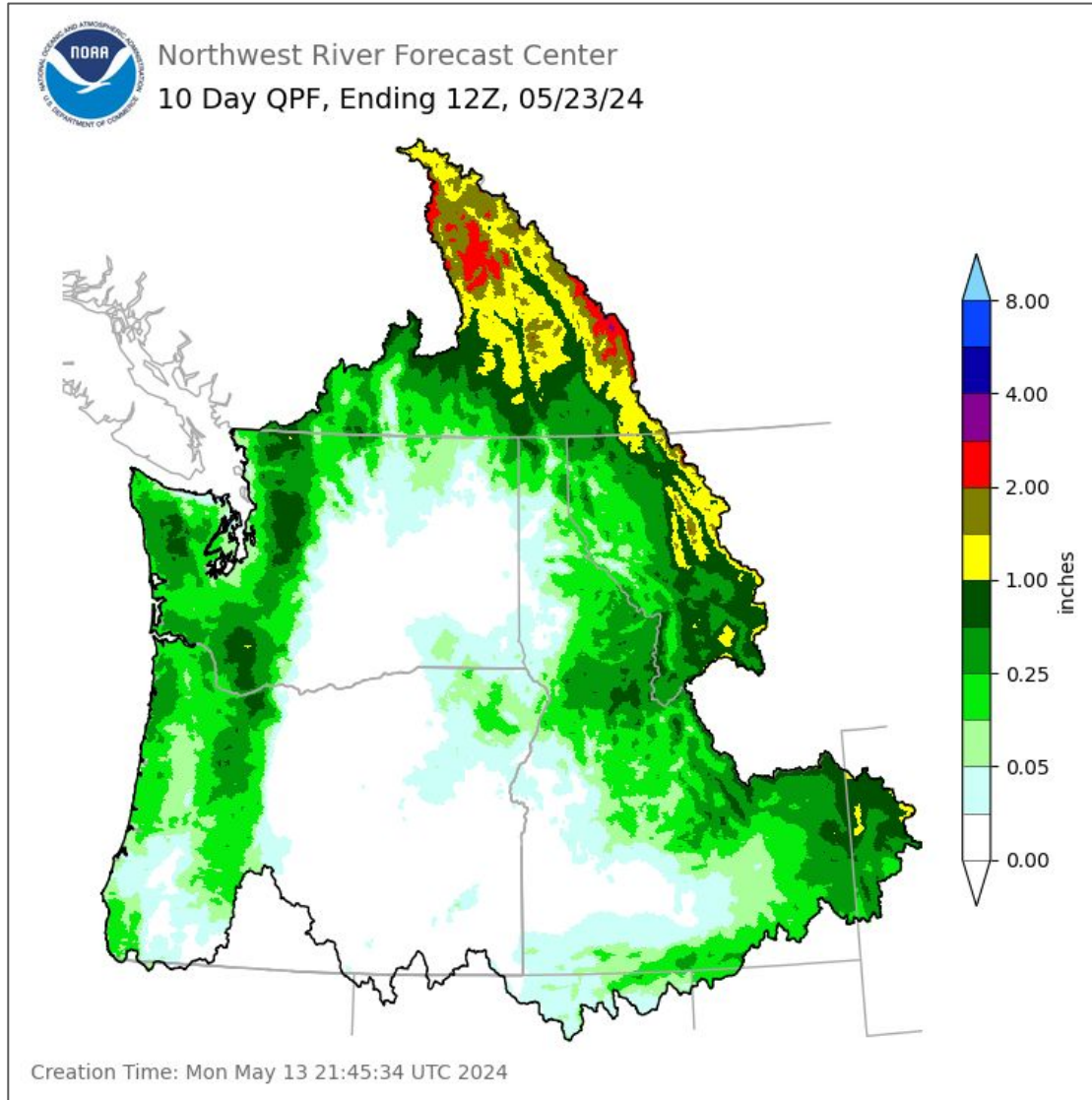
Precip averages from PRISM, OSU and PCIC.

Snowpack and Precipitation



Precip averages from PRISM, OSU and PCIC.

10 Day Precipitation Forecast used in ESP10



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).

ESP10 Water Supply Forecasts Ranked

Apr-Sep Volume

Upper Columbia Basin

Mica	1
Duncan	10
Queens Bay	13
Libby	12
Hungry Horse	6
Grand Coulee	6

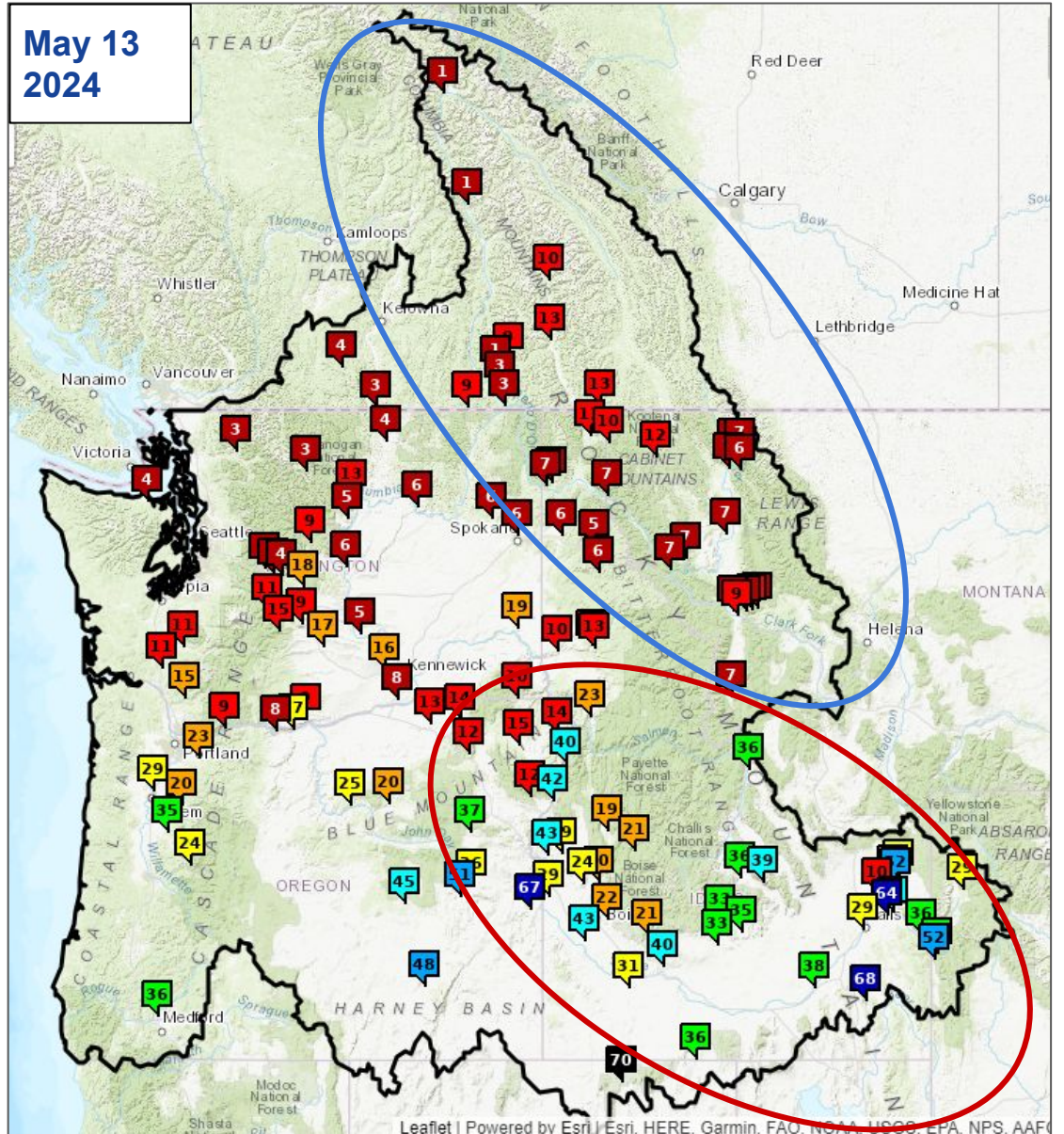
Snake River Basin

American Falls	38
Lucky Peak	22
Dworshak	9
Lower Granite	19

Lower Columbia Basin

The Dalles	8
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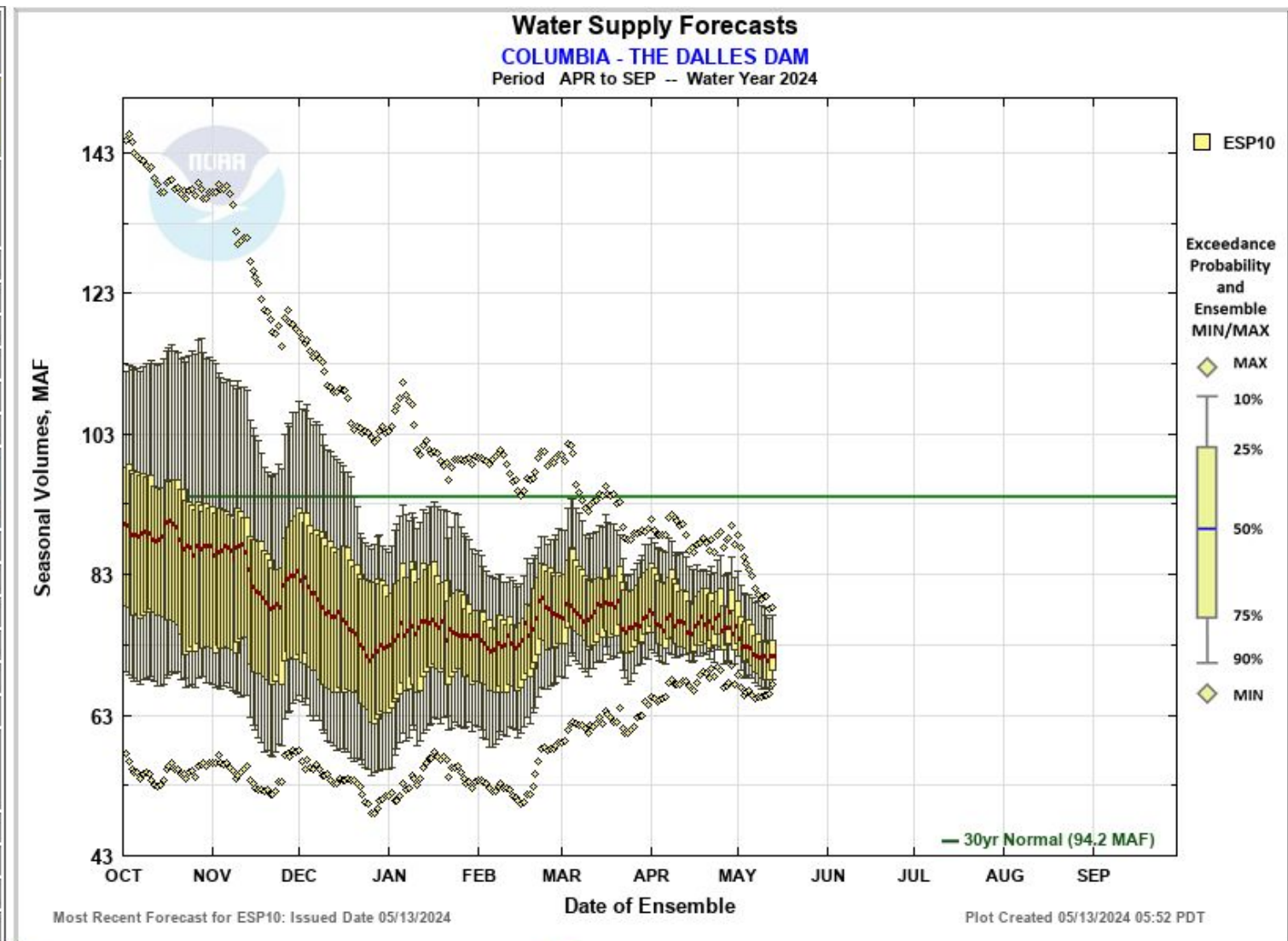
Ranked (1 is lowest)





ESP10 Water Supply Forecast

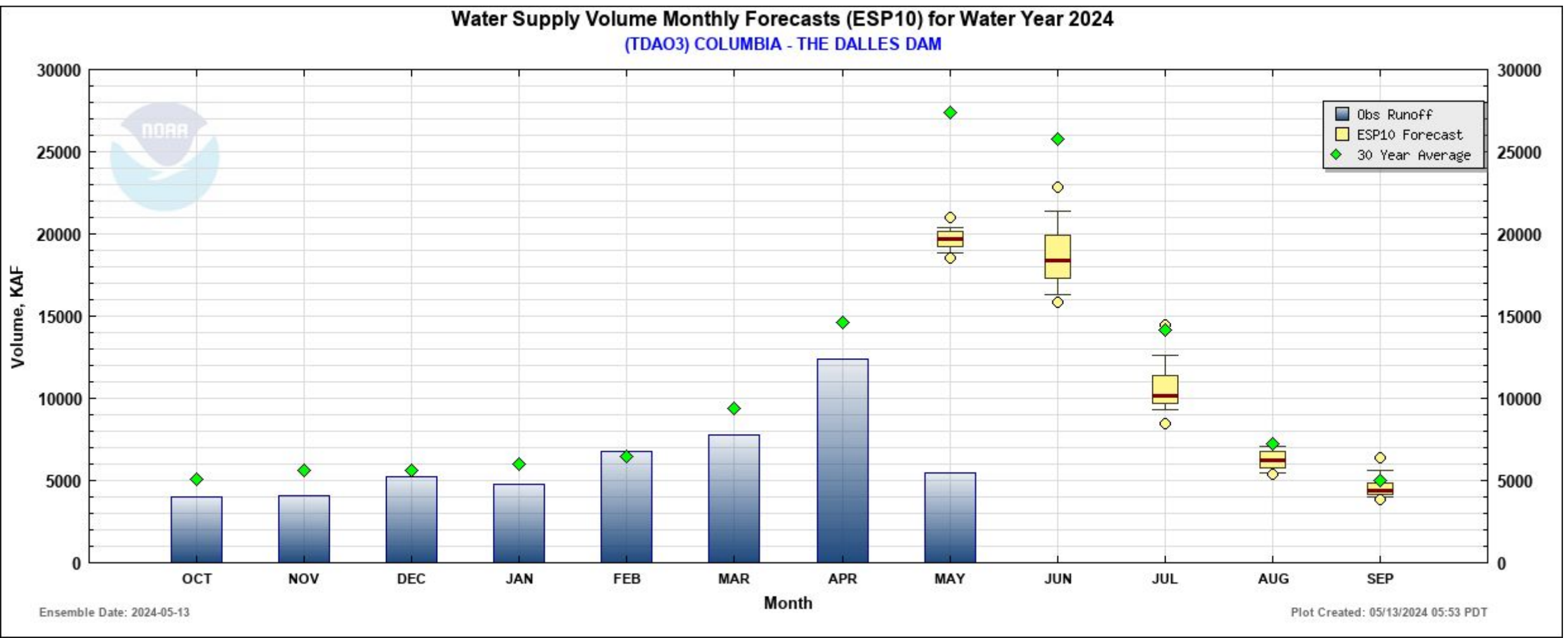
COLUMBIA - THE DALLES DAM (TDAO3) Forecasts for Water Year 2024					
Official Water Supply					
ESP with 10 Days QPF Ensemble: 2024-05-13 Issued: 2024-05-13					
Forecast Period	Forecasts Are in KAF				30 Year Average (1991-2020)
	90 %	50 %	% Average	10 %	
APR-SEP	68051	71530	76	77411	94166
APR-JUL	57791	60409	74	66161	81933
APR-AUG	63807	66639	75	73008	89196
JAN-SEP	87389	90868	78	96749	115946
JAN-JUL	77129	79747	77	85498	103714
OCT-SEP	100643	104122	79	110003	132314
Experimental Water Supply					
HEFS with 15 days EQPF Ensemble: 2024-05-13 Issued: 2024-05-13					
APR-SEP	68230	72183	77	79286	94166
APR-JUL	57794	61242	75	67849	81933
APR-AUG	63666	67445	76	74834	89196
JAN-SEP	87568	91521	79	98624	115946
JAN-JUL	77132	80580	78	87187	103714
OCT-SEP	100822	104775	79	111878	132314
Reference					
ESP with 0 Days QPF Ensemble: 2024-05-13 Issued: 2024-05-13					
APR-SEP	68910	73456	78	80857	94166
APR-JUL	58288	62523	76	69446	81933
APR-AUG	64608	68705	77	76450	89196
JAN-SEP	88248	92794	80	100194	115946
JAN-JUL	77626	81861	79	88784	103714
OCT-SEP	101502	106048	80	113449	132314
Move the mouse over the desired "Forecast Period" to display a graph.					



Max Scale
 Scale To Data
 Scale To Last 45 Days
 Show Min/Max Ensemble Volume
 Show Tooltips Help

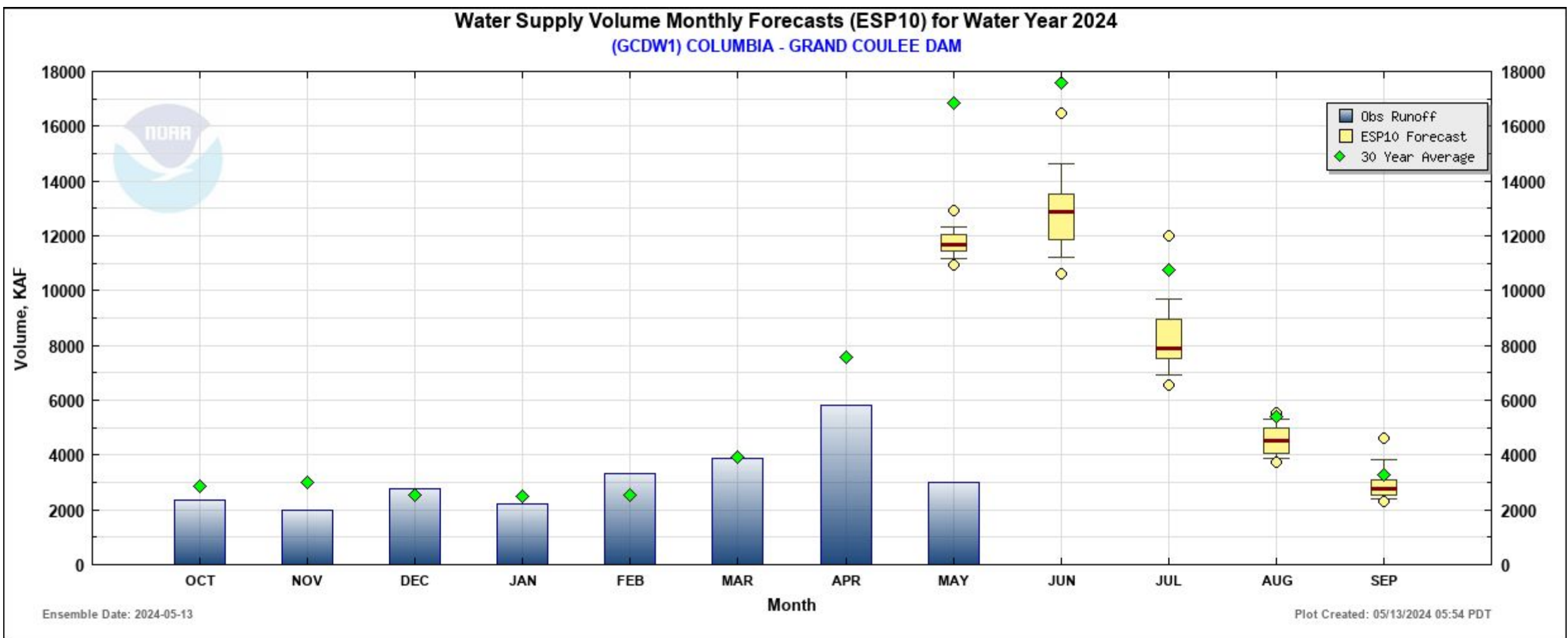


ESP10 Monthly Water Supply Forecast



nwrfc.noaa.gov/water_supply/monthly/monthly_forecasts.php?id=TDAO3

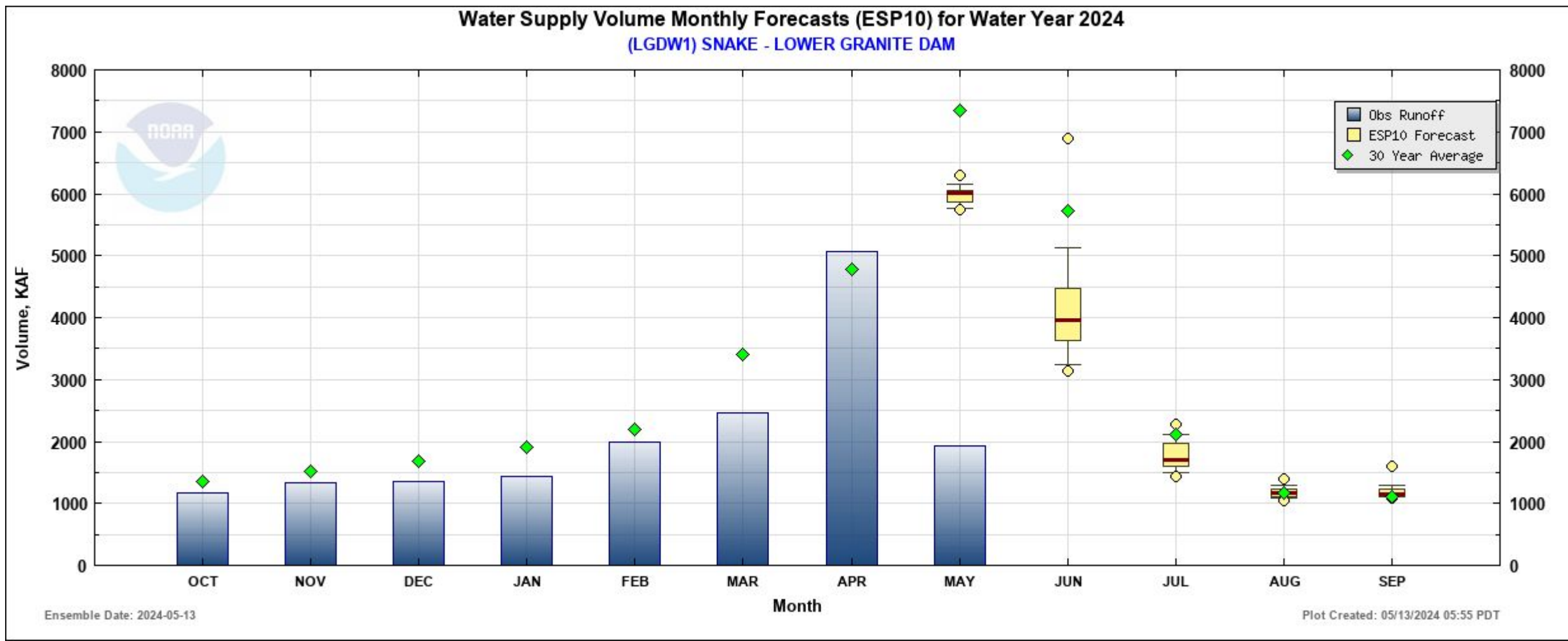
ESP10 Monthly Water Supply Forecast



nwrfc.noaa.gov/water_supply/monthly/monthly_forecasts.php?id=TDA03



ESP10 Monthly Water Supply Forecast



nwrfc.noaa.gov/water_supply/monthly/monthly_forecasts.php?id=GCDW1



Key Takeaways

- Water year total precipitation and snowpacks are stratified, with below normal amounts in the north and above normal amounts in the south.
- Snow melt is underway!
- The 10 day forecast (as of May 13) is warmer and drier than normal.
- Observed runoff and water supply forecasts are well below normal in the north (Canadian portion of the Columbia River Basin) above normal forecasts in the south.
- Some northern snowpacks and water supply forecasts are record low!



Schedule for Live Water Supply Briefings

Jun

6

All presentations held at 10:00 am Pacific Time
unless noted otherwise

[Click here for Registration](#)



nwrfc.watersupply@noaa.gov



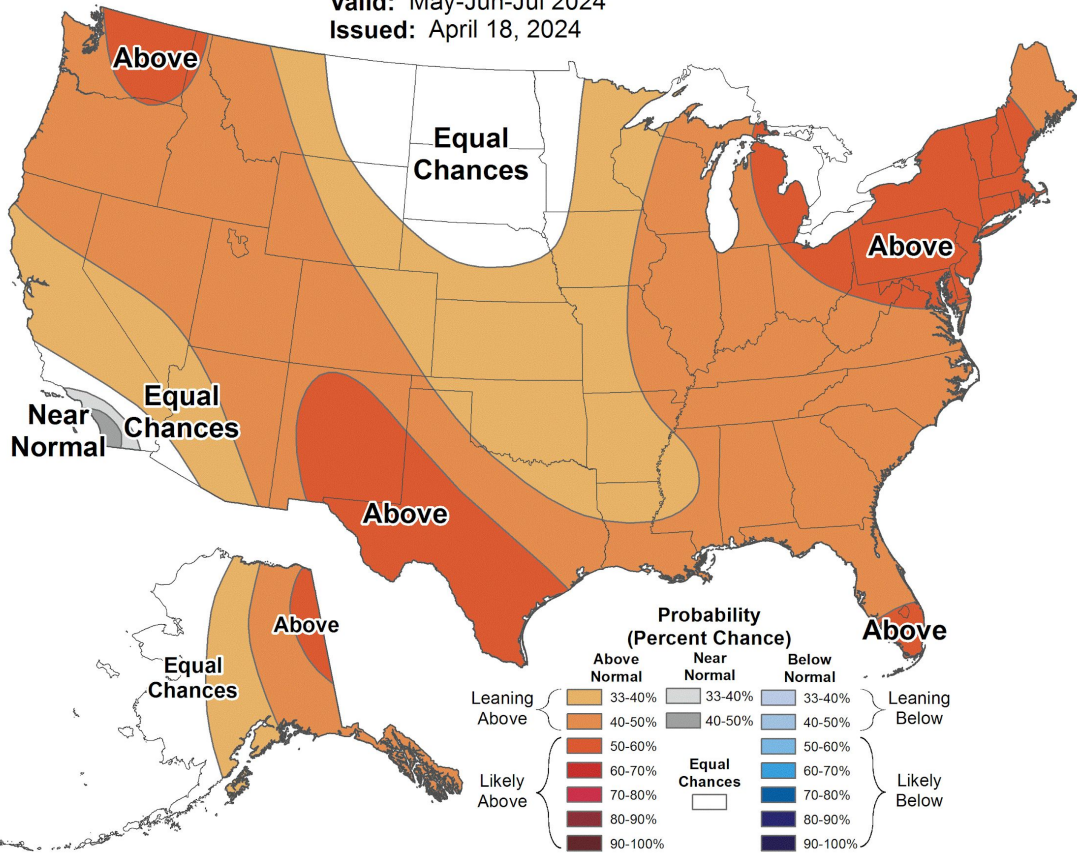
(503) 326-7291



nwrfc.noaa.gov

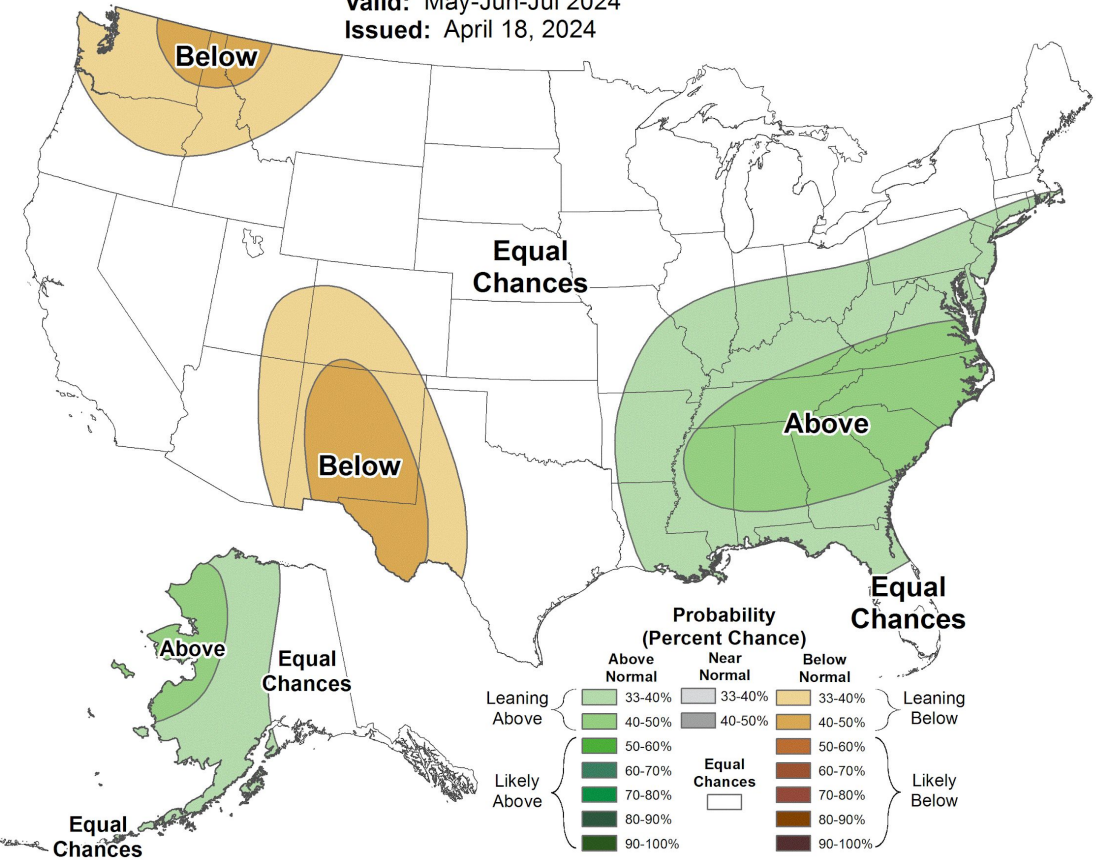
Seasonal Temperature Outlook

Valid: May-Jun-Jul 2024
 Issued: April 18, 2024



Seasonal Precipitation Outlook

Valid: May-Jun-Jul 2024
 Issued: April 18, 2024



ENSO prediction for beyond this water year

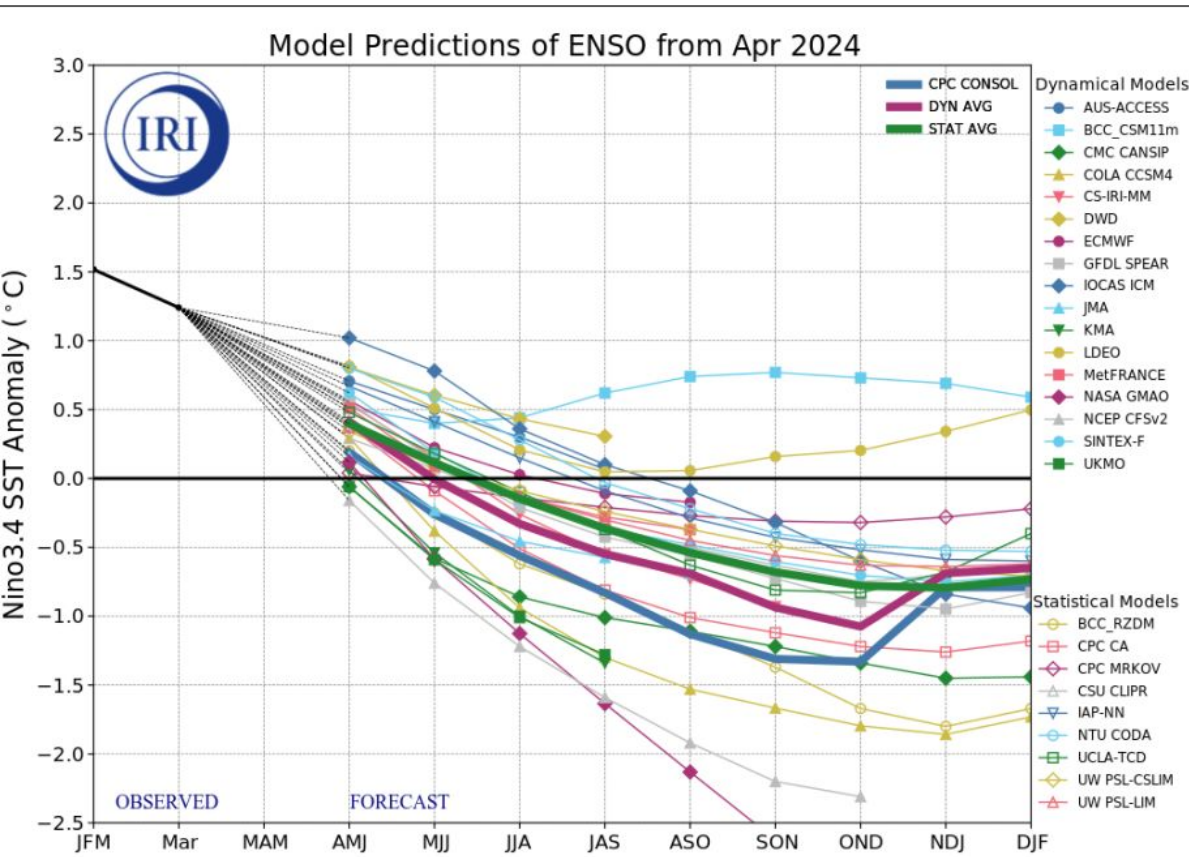


Figure provided by the International Research Institute (IRI) for Climate and Society (updated 19 April 2024).

The majority of models indicate a transition to ENSO-neutral during April-June 2024.

After a brief period of ENSO-neutral conditions, most models indicate a transition to La Niña around July-September 2024.

These climate predictions are not included in NWRFC forecasts!

ENSO prediction for beyond this water year

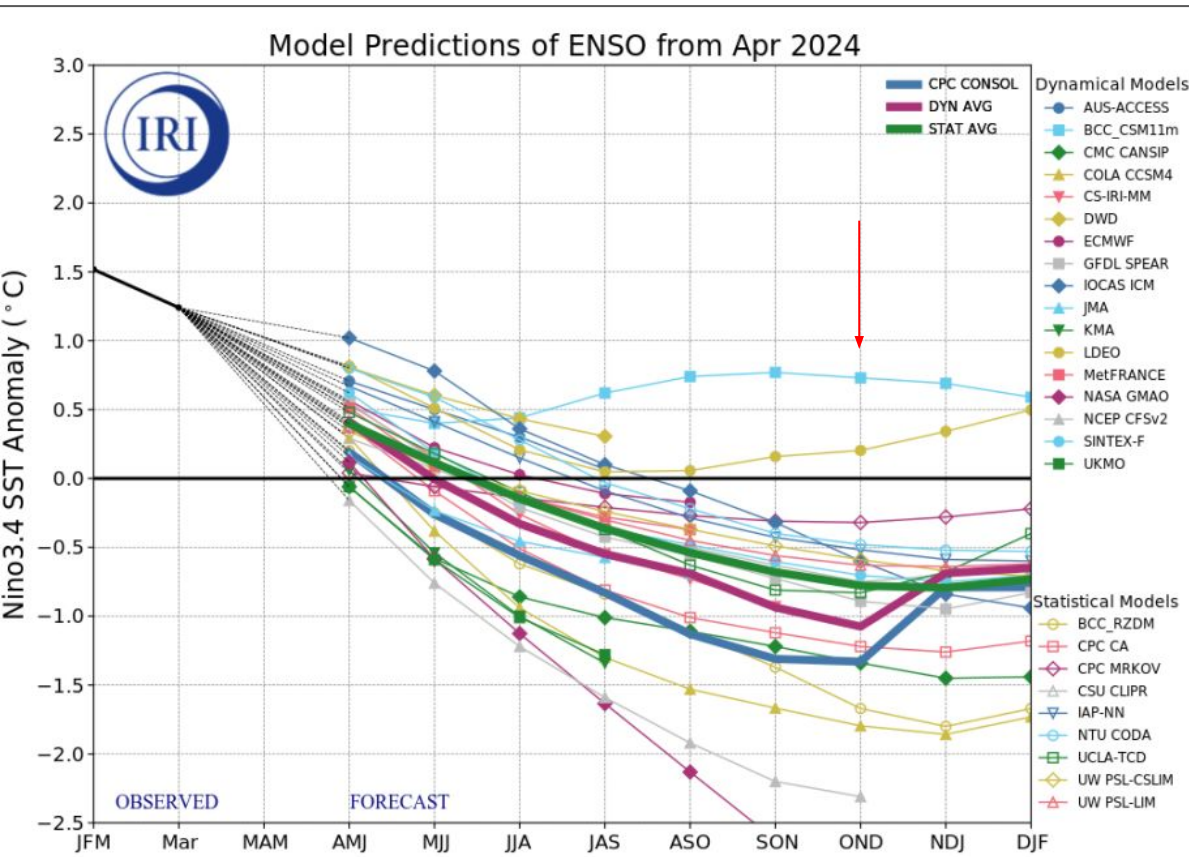


Figure provided by the International Research Institute (IRI) for Climate and Society (updated 19 April 2024).

