



DEPARTMENT OF
ECOLOGY
State of Washington

Drought and Water Supply Update

Columbia River Policy Advisory Group (CRPAG) Meeting

Caroline Mellor, Statewide Drought Lead

April 4, 2024

Quick agenda

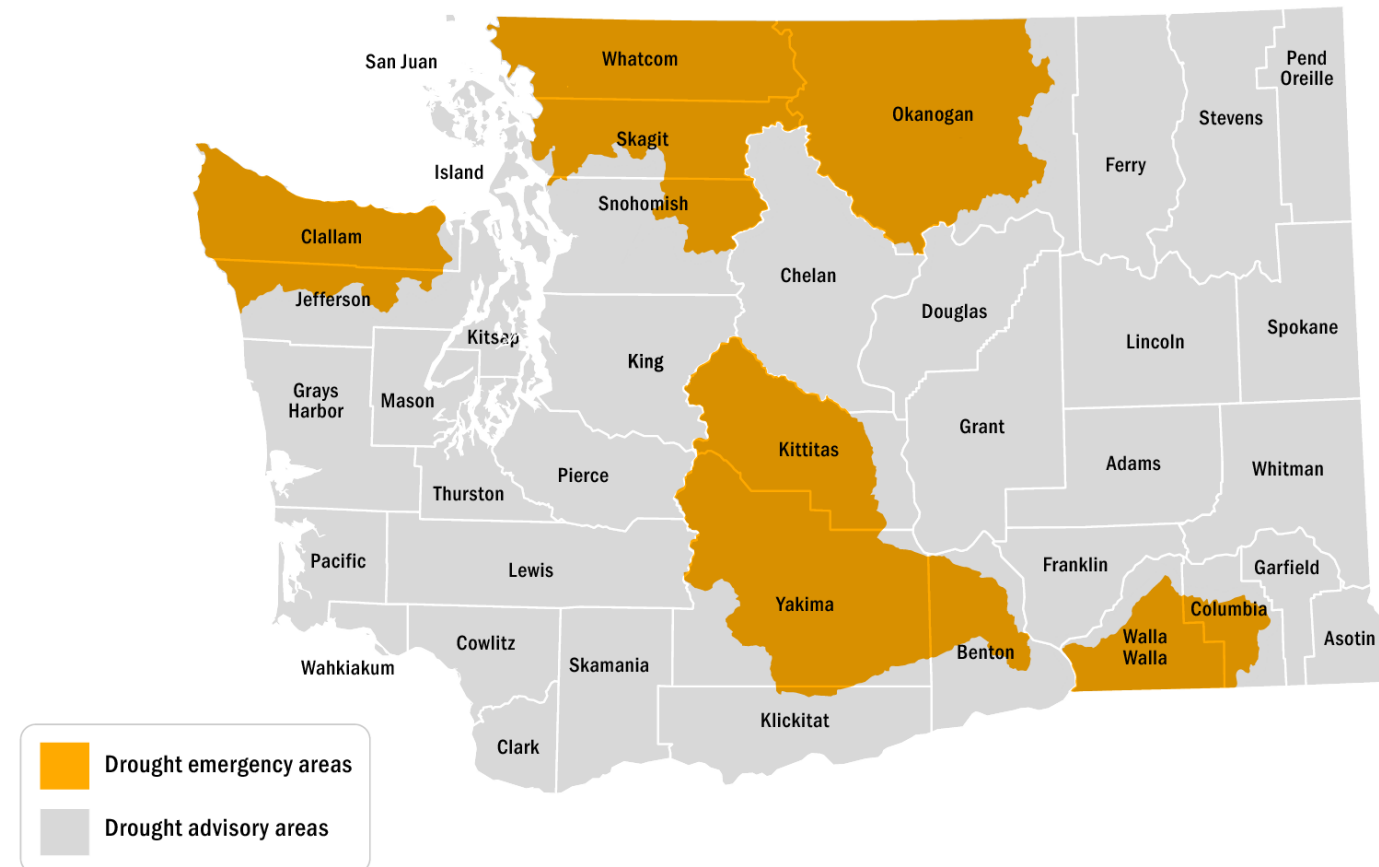
- 1** Goals for presentation
- 2** Drought declaration and process
- 3** Water supply and drought conditions update
- 4** Next steps for drought

Existing Drought Declaration

In 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



Drought Conditions

Drought conditions - two requirements:

- 1. Hydrologic threshold** – An area is receiving, or is projected to receive, less than seventy-five percent of normal water supply.
- 2. Hardship threshold** – Water users and the environment are or are expected to experience undue hardship.

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

Drought Declaration Process

1. **Water Supply Availability Committee (WSAC)** – Advises Ecology on if the hydrologic threshold has been met in geographic areas.
2. **Executive Water Emergency Committee (EWEC)** - Determines the hardship threshold and recommends to the Governor to declare a drought emergency in geographic areas.
3. **Governor** - Directs Ecology Director to issue an Order and Determination of drought emergency.

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

Expedite emergency
water transfer
applications.

Establish a grant
program to
mitigate hardships to
water users
and the environment.



**Provides
Ecology
with the
authority to:**

Emergency response funding

Grants to governmental entities:

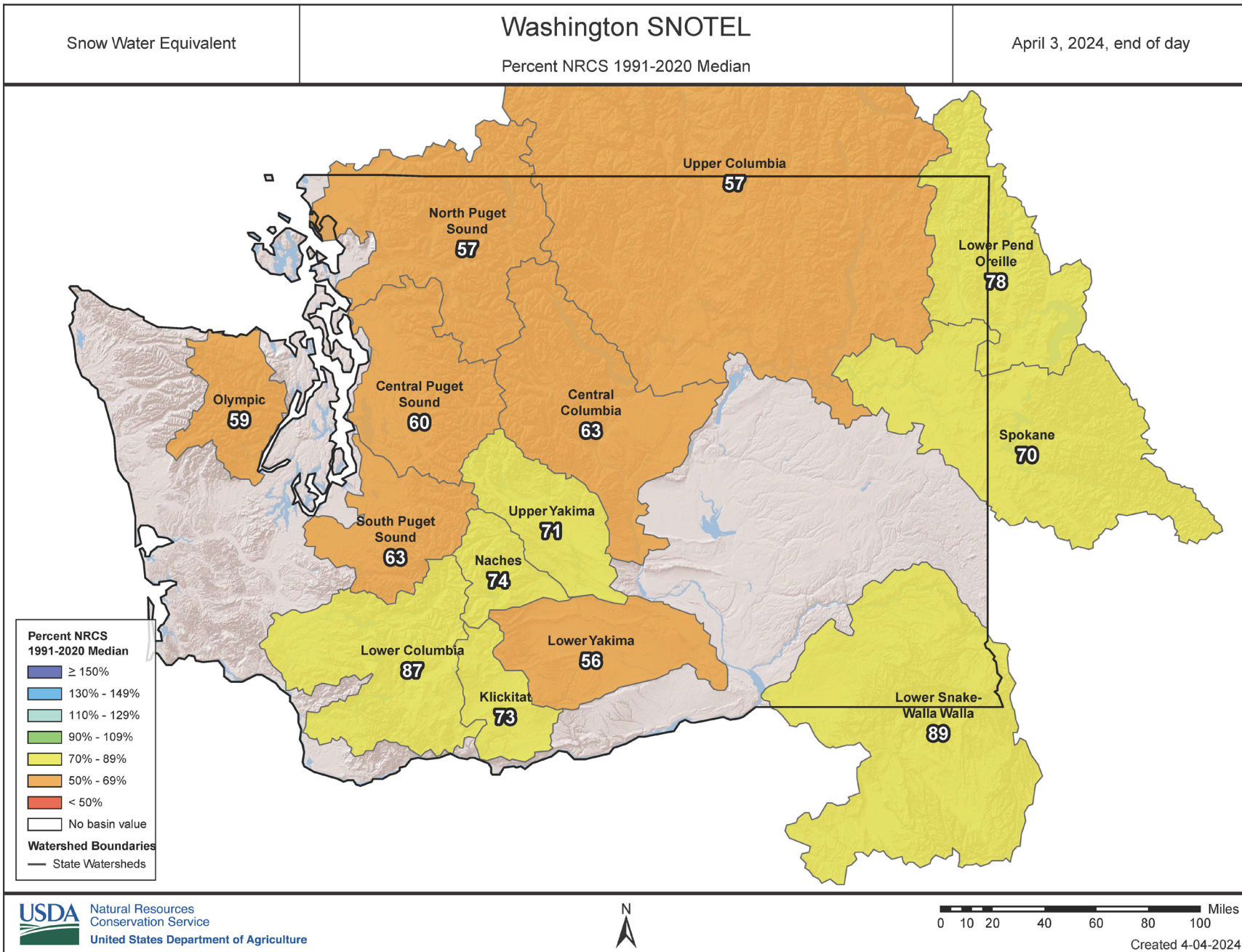
- Federally recognized tribes.
- Counties, cities, and towns.
- Water and sewer districts formed under chapter 57.02 RCW.
- Public utility districts formed under chapter 54.04 RCW.
- Port districts formed under chapter 53.04 RCW.
- Conservation districts formed under chapter 89.08 RCW.
- Irrigation districts formed under chapter 87.03 RCW.
- Watershed management partnerships formed under RCW 39.34.200.

Interagency agreements to state agencies



Drought Conditions and Water Supply Outlook





Snowpack Conditions

Statewide Snow Water Equivalent (SWE) = 67% today.

This date in 2015, Statewide SWE was 22%.

(Source: NRCS).

Snowpack as Snow Water Equivalent (SWE)

UPPER COLUMBIA							
Swamp Creek	3930	3.0	17.2 ₍₂₁₎	17	26.9	36.8 ₍₂₁₎	73
Gold Mountain	4390	0.3	N/A	*	15.1	N/A	*
Salmon Meadows	4460	5.4	9.4	57	12.5	13.2	95
Muckamuck	4470	0.0	N/A	*	12.9	N/A	*
Sentinel Butte	4680	6.5	8.7 ₍₁₇₎	75	13.5	12.8 ₍₁₇₎	105
Rainy Pass	4890	19.3	37.4	52	35.6	46.0	77
Moses Mtn	5010	9.1	15.6 ₍₂₉₎	58	14.7	17.4 ₍₂₉₎	84
Gold Axe Camp	5360	5.2	9.6 ₍₁₀₎	54	11.5	10.0 ₍₁₀₎	115
Harts Pass	6490	32.0	43.8	73	29.9	38.8	77
Basin Index (%)				57			83
CENTRAL COLUMBIA							
Trinity	2930	19.9	29.0 ₍₁₀₎	69	47.1	56.9 ₍₁₀₎	83
Fish Lake	3430	19.4	28.4	68	42.6	52.6	81
Pope Ridge	3590	8.6	14.5	59	25.1	28.0	90
Stevens Pass	3950	29.0	36.2	80	53.7	73.6	73
Blewett Pass	4240	5.5	11.8	47	26.5	27.2	97
Upper Wheeler	4330	9.7	11.6	84	20.3	19.9	102
Park Creek Ridge	4600	17.8	44.2	40	31.2	57.0	55
Rainy Pass	4890	19.3	37.4	52	35.6	46.0	77
Grouse Camp	5390	12.9	18.6	69	23.4	26.3	89
Trough	5480	11.3	9.8	115	21.9	19.9	110
Lyman Lake	5980	36.0	59.6	60	54.5	63.5	86
Basin Index (%)				63			81

LOWER COLUMBIA							
Pepper Creek	2140	0.1	2.4 ₍₁₃₎	4	61.7	53.6 ₍₁₃₎	115
Calamity	2500	0.1	1.2 ₍₁₂₎	8	86.6	77.7 ₍₁₂₎	111
Spencer Meadow	3400	21.2	27.7	77	87.6	78.4	112
June Lake	3440	38.2	39.6	96	141.3	132.0	107
Spirit Lake	3520	-M	1.0	*	69.7	70.6	99
Skate Creek	3770	27.0	N/A	*	71.3	N/A	*
Lone Pine	3930	36.8	37.8	97	90.7	80.4	113
Sheep Canyon	3990	36.8	33.8	109	128.3	106.4	121
Surprise Lakes	4290	38.1	46.2	82	76.1	83.2	91
Pinto Rock	4440	31.0	N/A	*	51.3	N/A	*
Swift Creek	4440	70.4	68.8 ₍₁₈₎	102	187.6	129.8 ₍₁₈₎	145
White Pass E.S.	4440	22.7	21.4	106	36.4	38.0	96
Potato Hill	4510	33.1	30.0	110	50.7	51.6	98
Paradise	5130	56.8	73.2	78	89.4	94.8	94
Cayuse Pass	5240	37.0	62.0 ₍₁₄₎	60	-M	75.0 ₍₁₁₎	*
Morse Lake	5410	46.0	53.0	87	64.6	68.0	95
Pigtail Peak	5800	39.4	53.1	74	47.6	66.8	71
Basin Index (%)				87			108

Oct 1 – April 3 Water Year Precipitation

Upper Columbia Basin

DIVISION NAME	OBSERVED (in)	NORMAL (in)	DEPARTURE (in)	PERCENT of NORMAL
Clark Fork River Basin	9.8	16.4	-6.7	59
Flathead River Basin	15.3	22.0	-6.8	69
Pend Oreille River Basin abv Waneta Dam	14.2	20.4	-6.3	69
Kootenai River Basin	18.3	23.7	-5.4	77
Spokane River Basin	21.8	29.2	-7.4	75
Columbia River Basin abv Arrow Dam	28.8	33.6	-4.8	86

Middle Columbia Basin

DIVISION NAME	OBSERVED (in)	NORMAL (in)	DEPARTURE (in)	PERCENT of NORMAL
Middle Columbia Upper Tributaries	16.6	21.6	-5.0	77
Yakima River Basin abv Kiona	19.5	24.3	-4.8	80
Middle Columbia Lower Tributaries	16.2	16.7	-0.5	97

Columbia River Main Stem

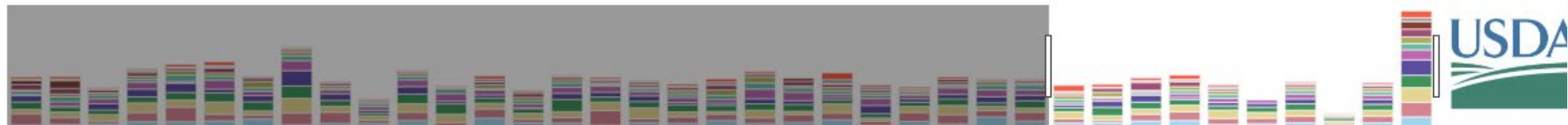
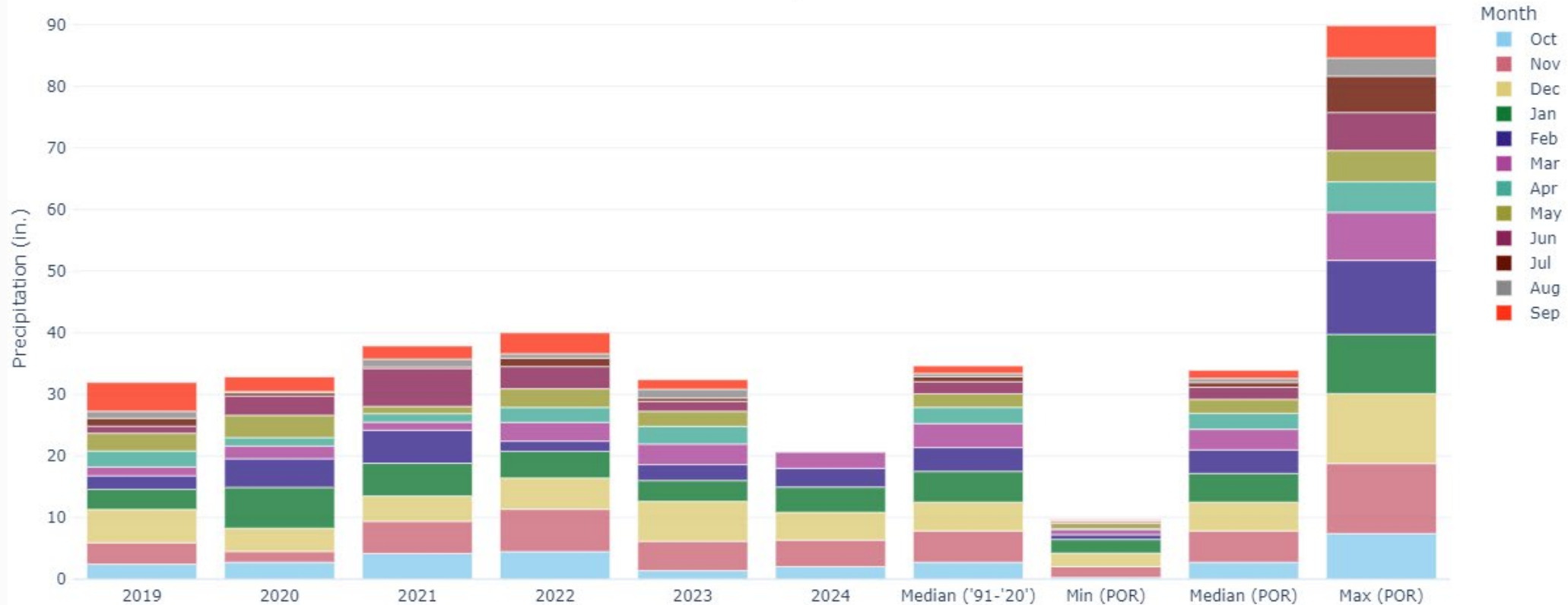
DIVISION NAME	OBSERVED (in)	NORMAL (in)	DEPARTURE (in)	PERCENT of NORMAL
Columbia River Basin abv Grand Coulee	18.9	23.9	-5.0	79
Columbia River Basin abv The Dalles	15.7	18.2	-2.5	86

Source: [NW River Forecast Center](#)

Water Year Precipitation

UPPER COLUMBIA MONTHLY PRECIPITATION SUMMARY

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

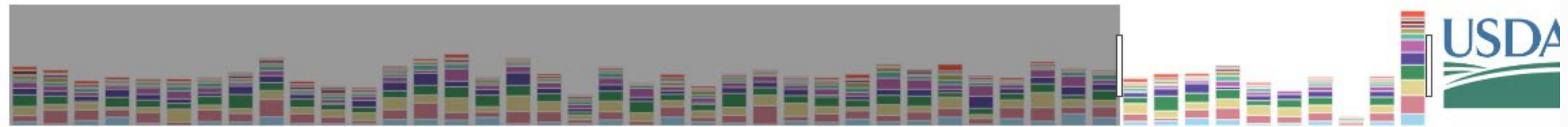
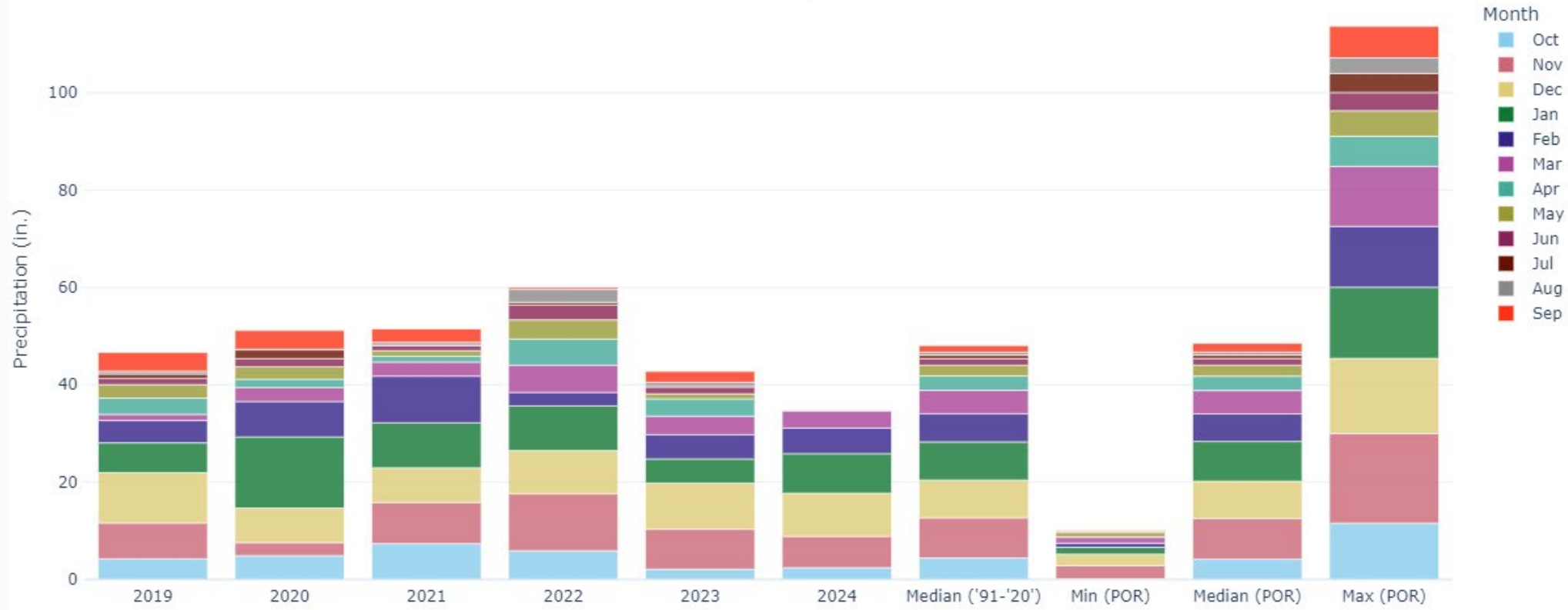


Water Year

Water Year Precipitation

CENTRAL COLUMBIA MONTHLY PRECIPITATION SUMMARY

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

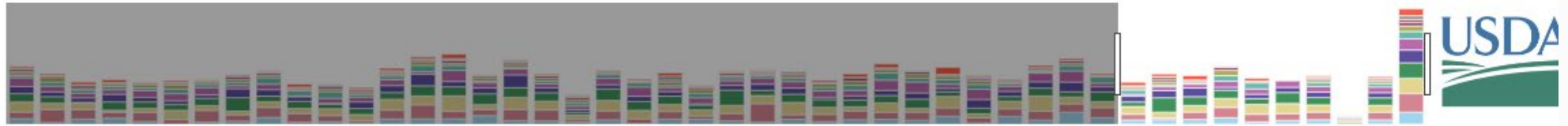
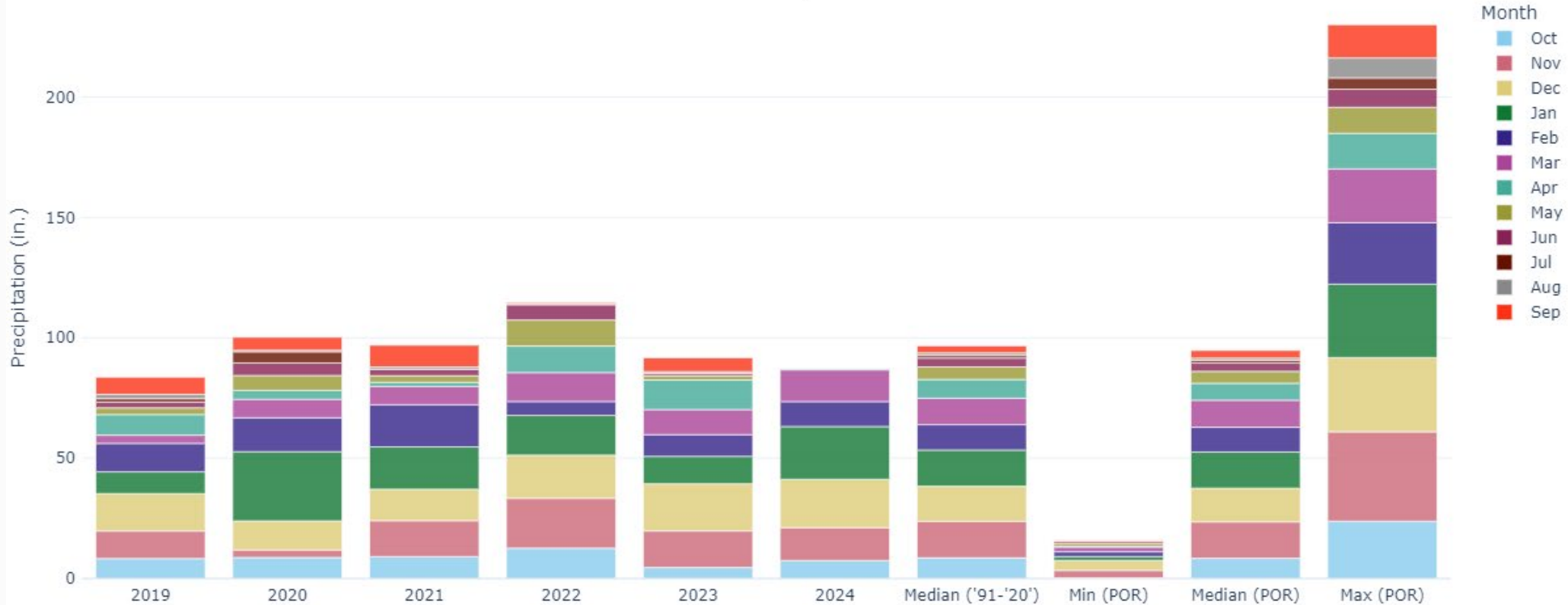


Water Year

Water Year Precipitation

LOWER COLUMBIA MONTHLY PRECIPITATION SUMMARY

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



Water Year

Water Year Projection SWE by Basin

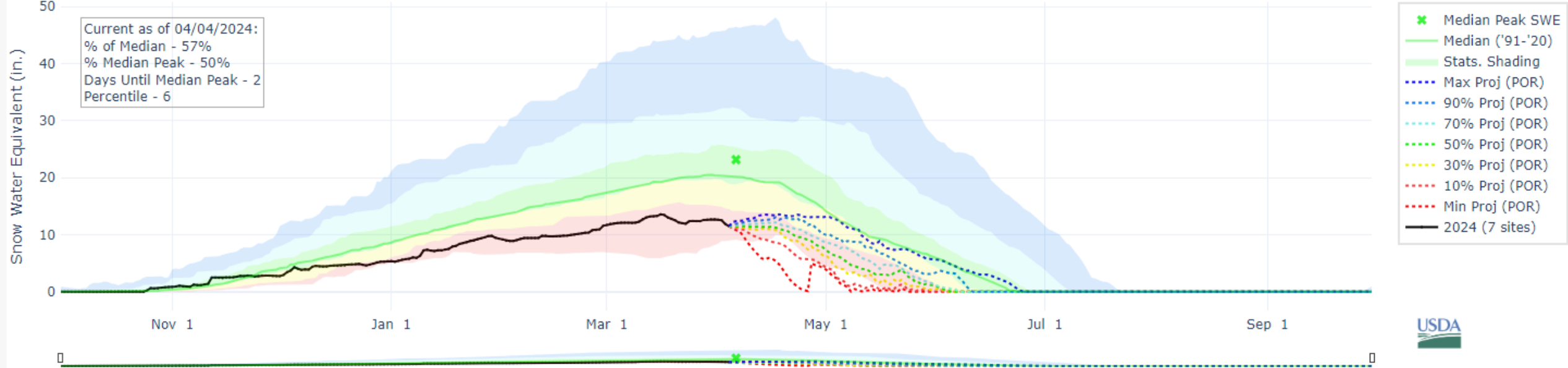
SNOW WATER EQUIVALENT PROJECTION IN UPPER COLUMBIA

Reset Range

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

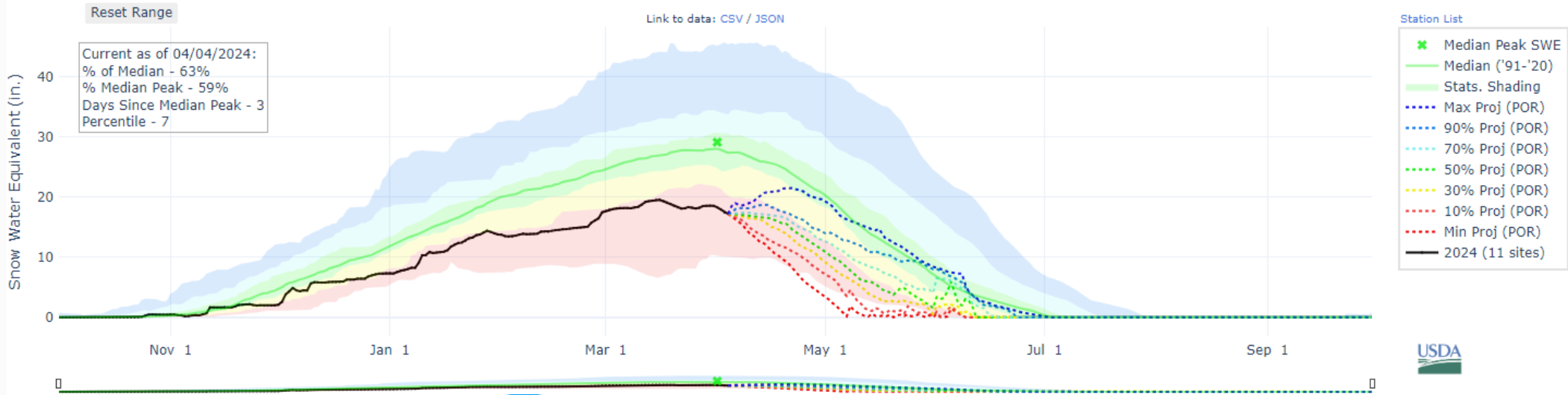
[Station List](#)

Current as of 04/04/2024:
% of Median - 57%
% Median Peak - 50%
Days Until Median Peak - 2
Percentile - 6

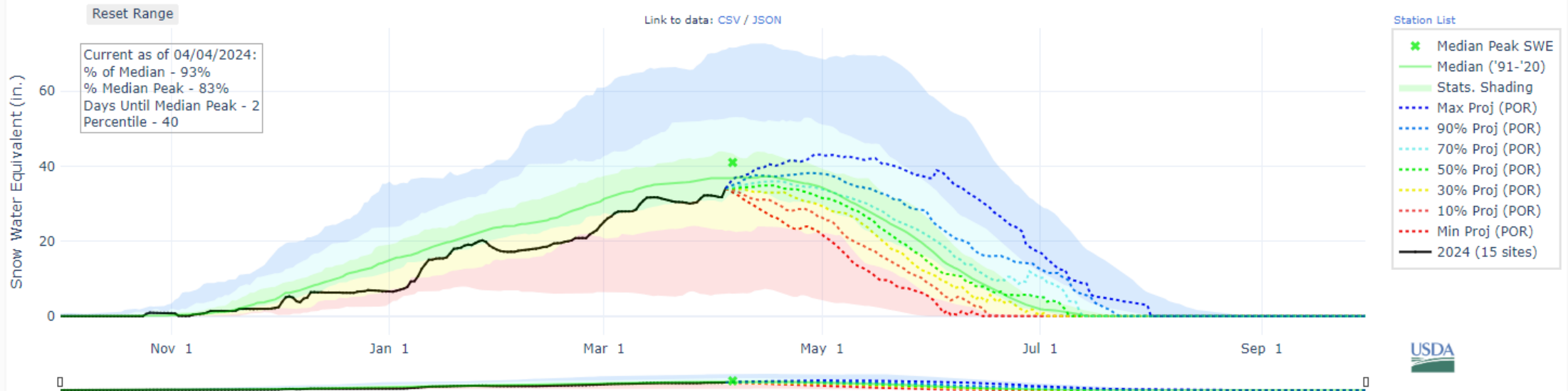


Water Year Projection SWE by Basin

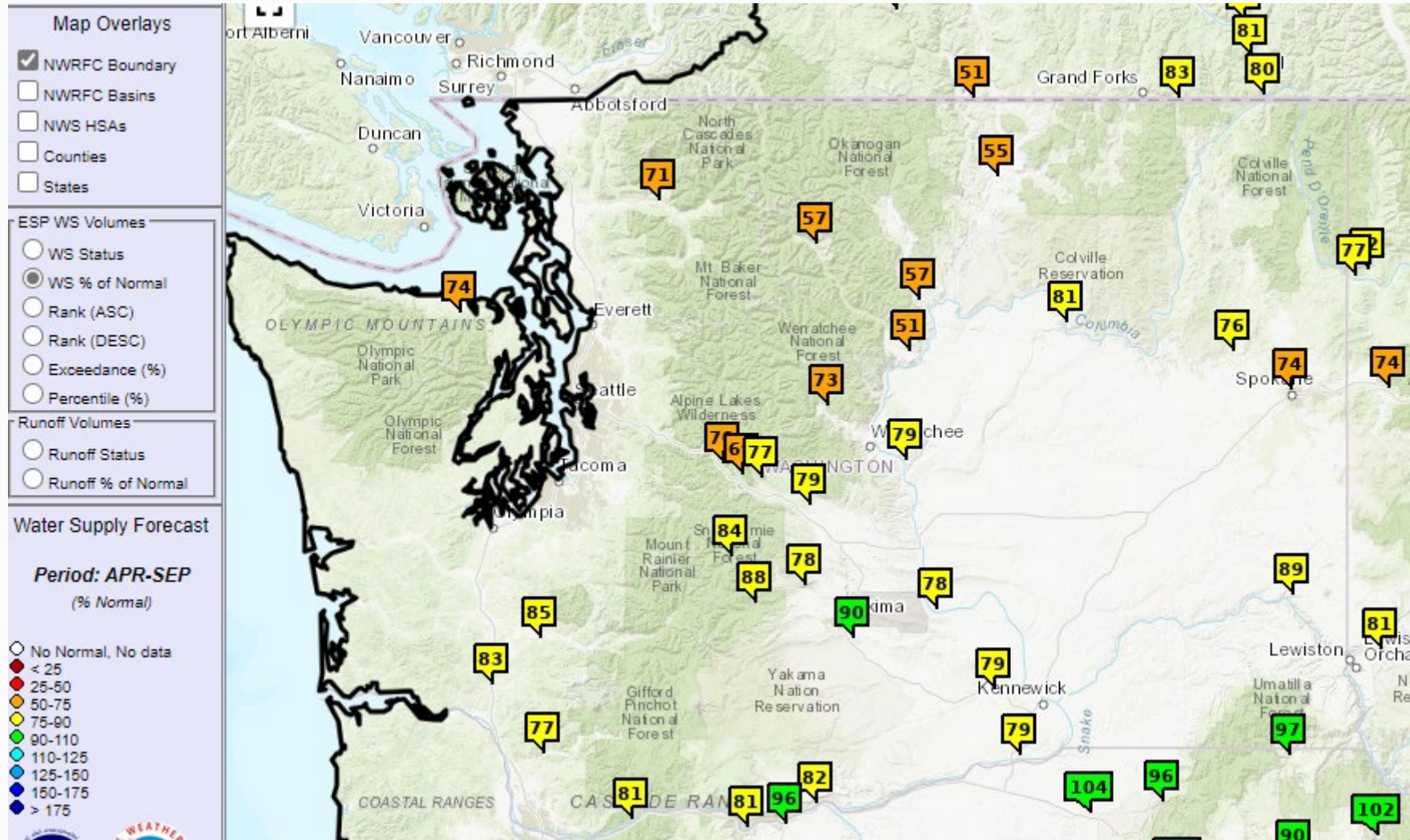
SNOW WATER EQUIVALENT PROJECTION IN CENTRAL COLUMBIA



SNOW WATER EQUIVALENT PROJECTION IN LOWER COLUMBIA

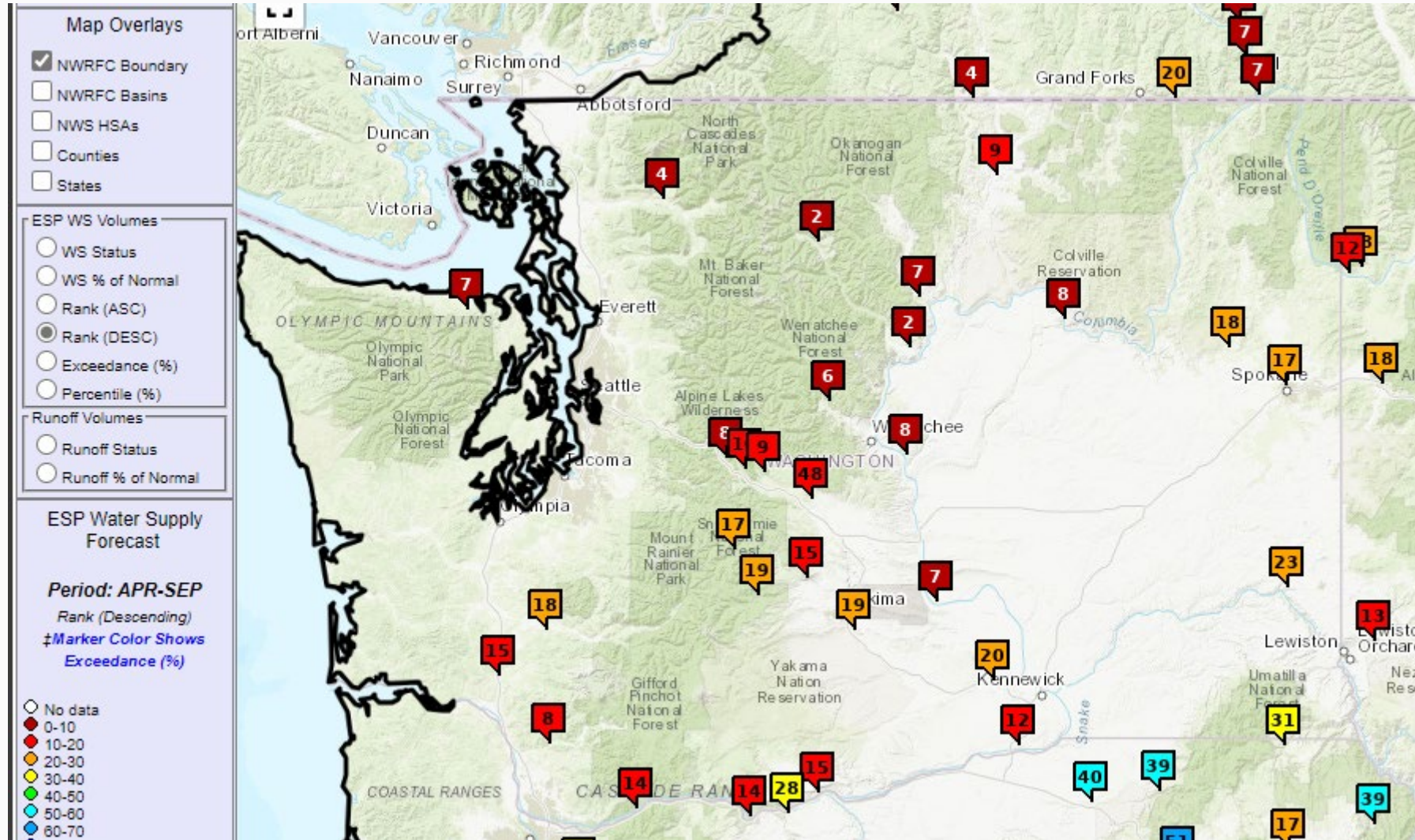


Streamflow forecast as % of normal



Source: [NW River Forecast Center](#)

Streamflow forecast compared to record



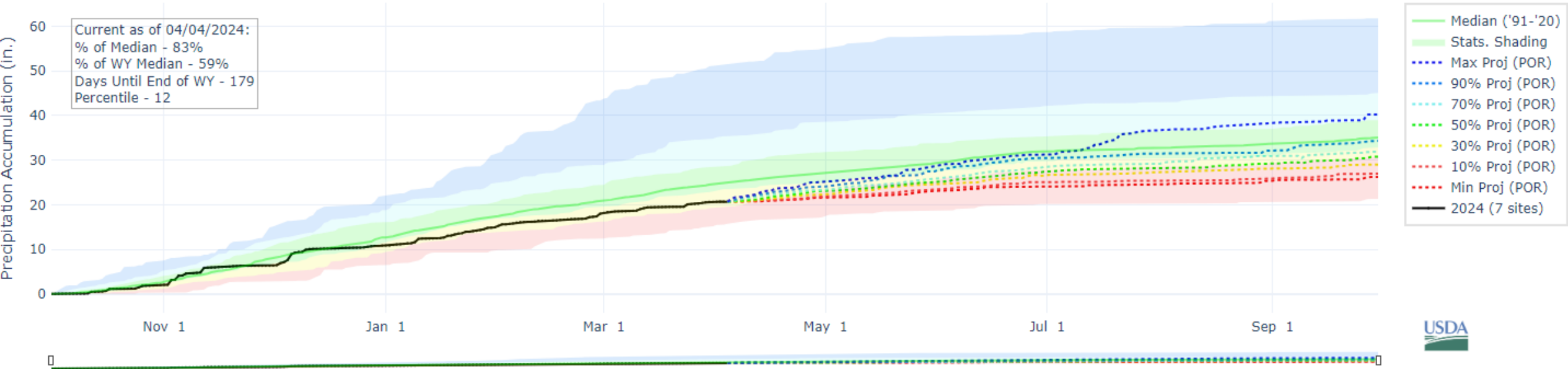
Water Year Projection Precipitation

PRECIPITATION ACCUMULATION PROJECTION IN UPPER COLUMBIA

Reset Range

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

Current as of 04/04/2024:
% of Median - 83%
% of WY Median - 59%
Days Until End of WY - 179
Percentile - 12

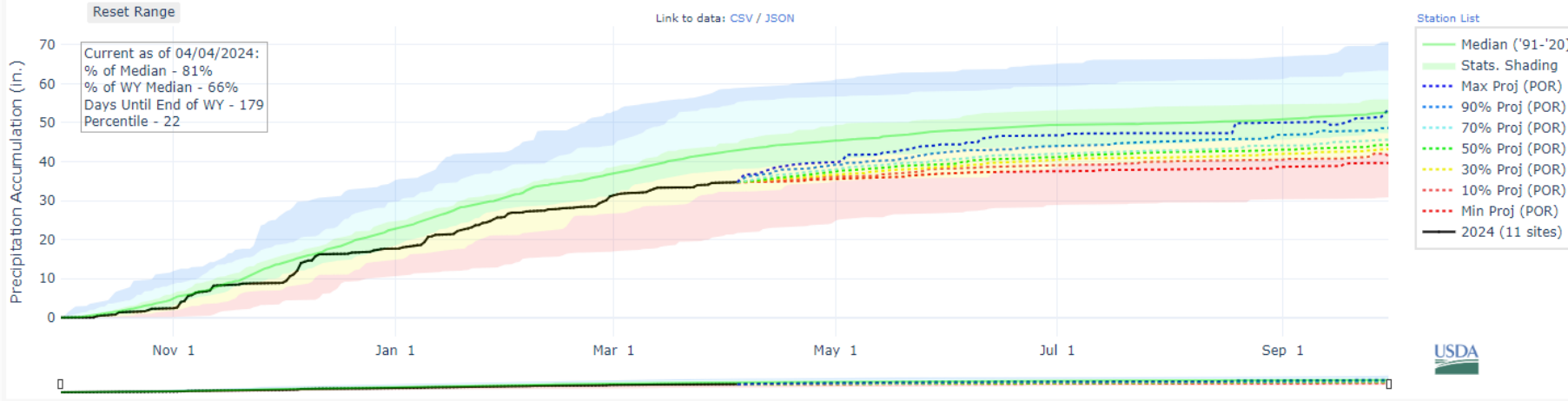


Source: [NRCS Basin Plots](#)

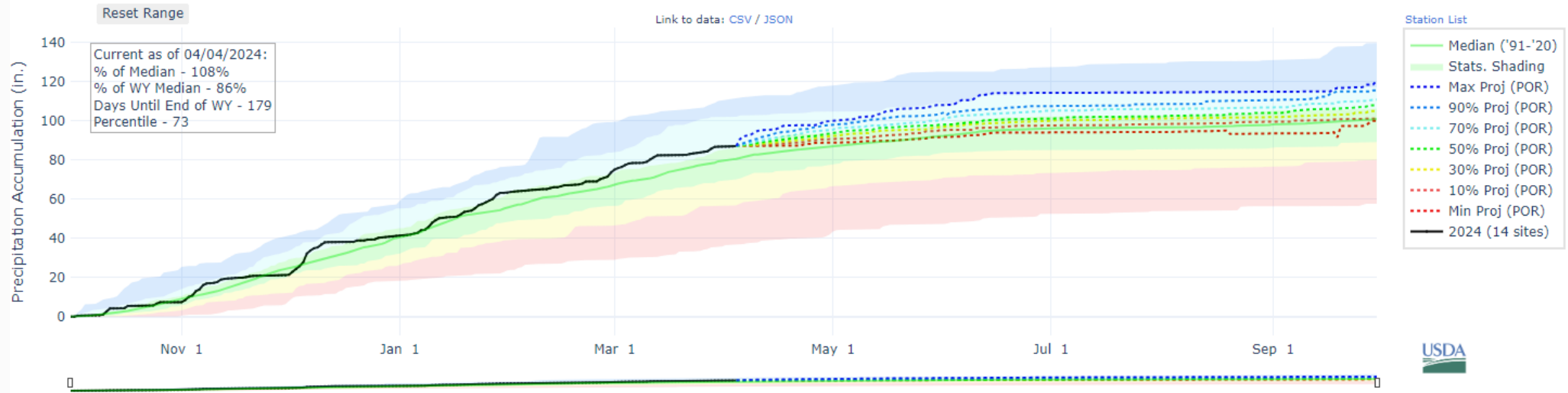
Water Year Projection Precipitation

Add Title Active Only Greyscale Stats. Clear Controls Clear Annotation Fullscreen

PRECIPITATION ACCUMULATION PROJECTION IN CENTRAL COLUMBIA



PRECIPITATION ACCUMULATION PROJECTION IN LOWER COLUMBIA



NWRFC Water Supply Briefing – April 4

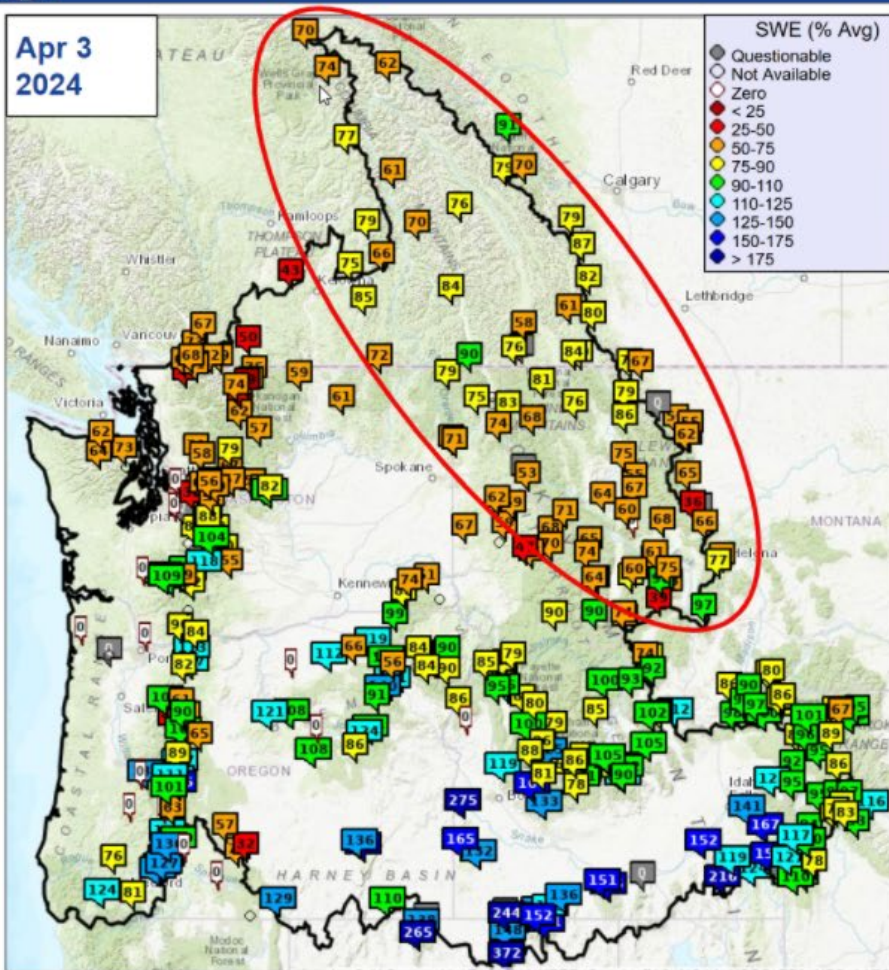


Key Takeaways

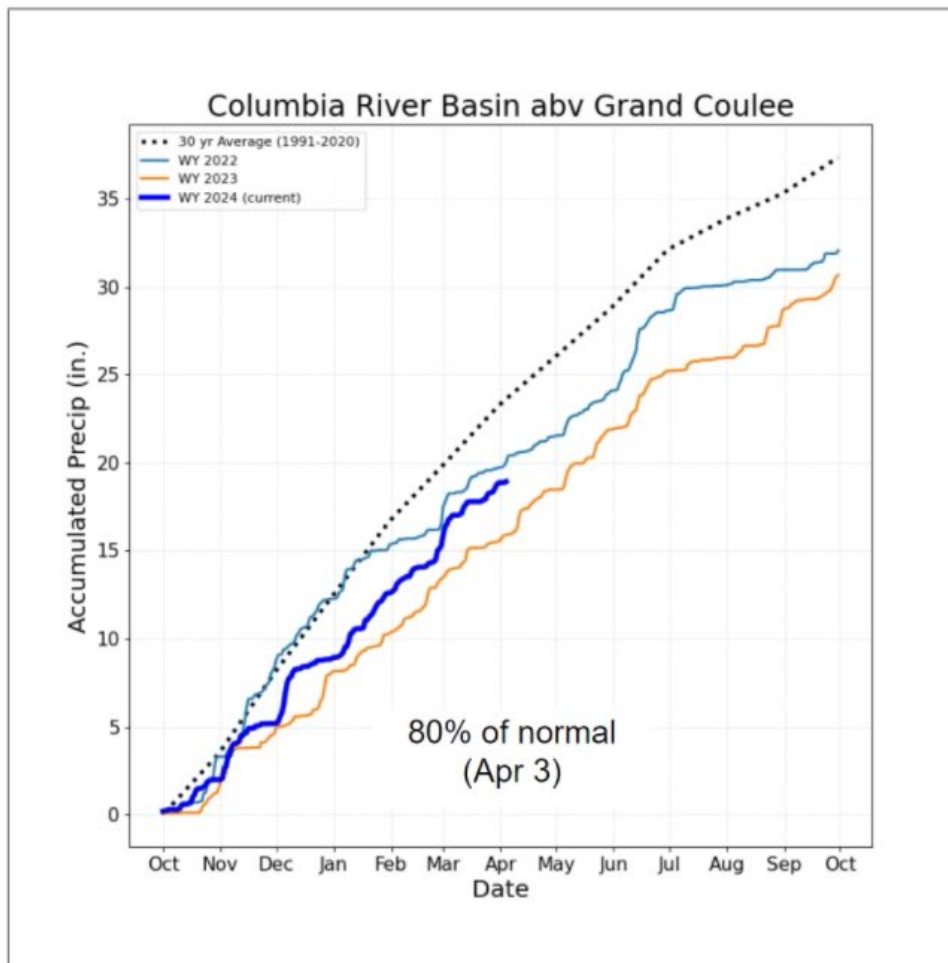
- Water year to date precipitation and current snowpack are stratified geographically, with well below normal conditions in the northern, mountainous areas and near to well above normal conditions in the south
- Some warm spells this past month have melted off mid-to-lower elevation snow
- Water supply forecasts largely mimic precipitation and snow conditions with extremely dry forecasts in the north (Canadian portion of the Columbia River Basin) and very wet forecasts in the south



Snowpack and Precipitation



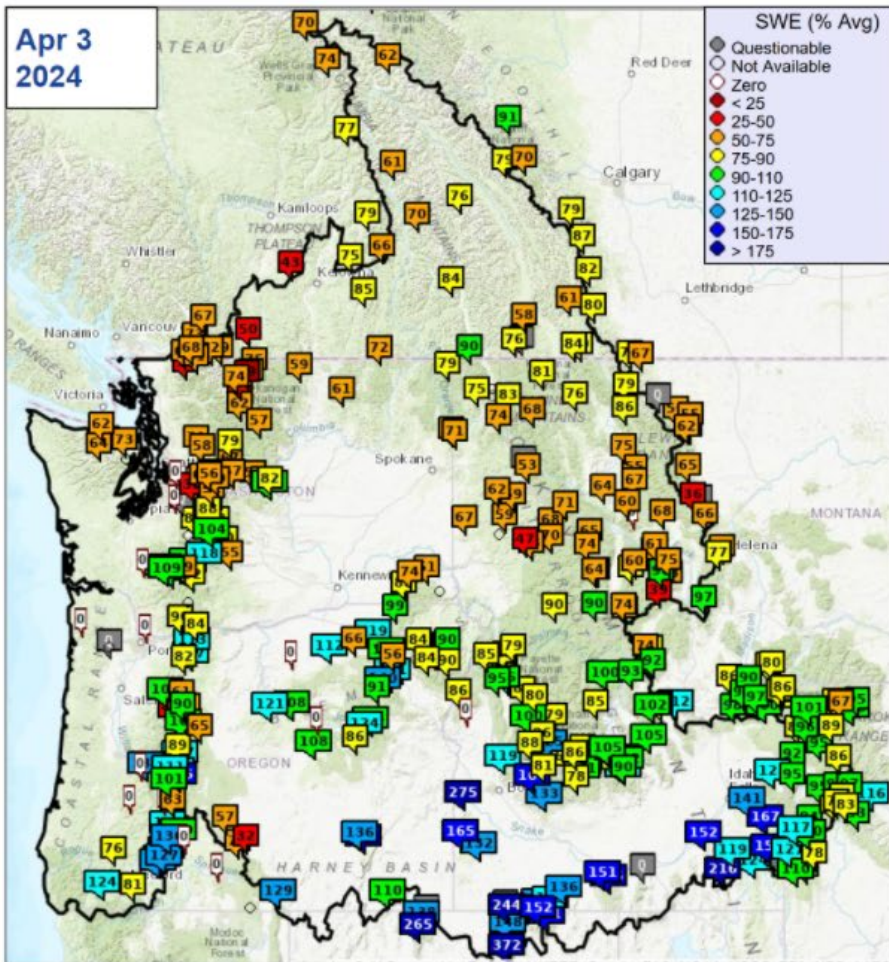
Snow data from Natural Resources Conservation Service, BC Hydro, Ministry of Environment and Climate Change Strategy, and Alberta Environment and Parks.



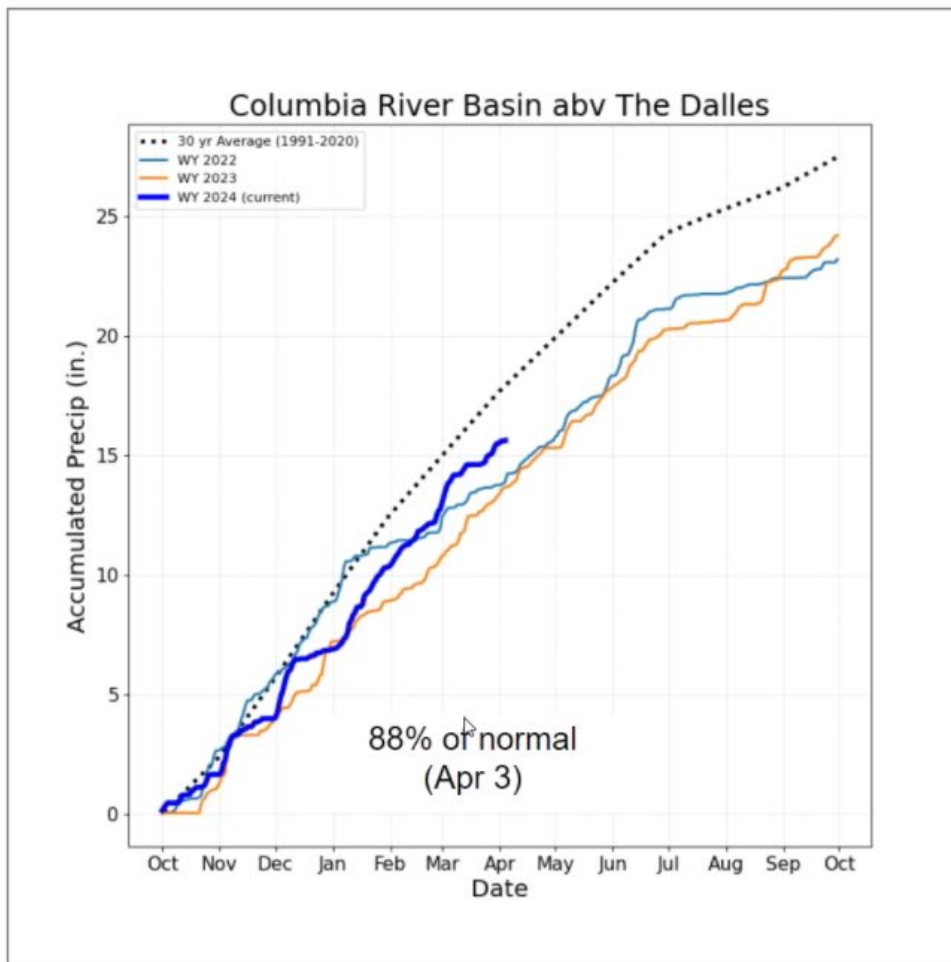
Precip averages from PRISM, OSU and PCIC.



Snowpack and Precipitation



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



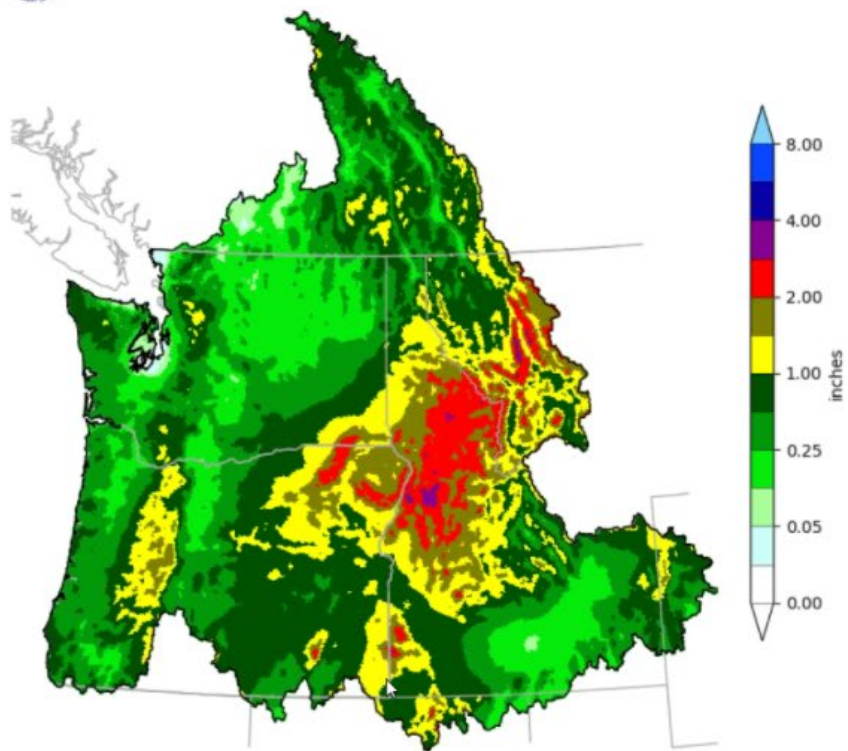
Precip averages from PRISM, OSU and PCIC.



10 Day Precipitation Forecast used in ESP10



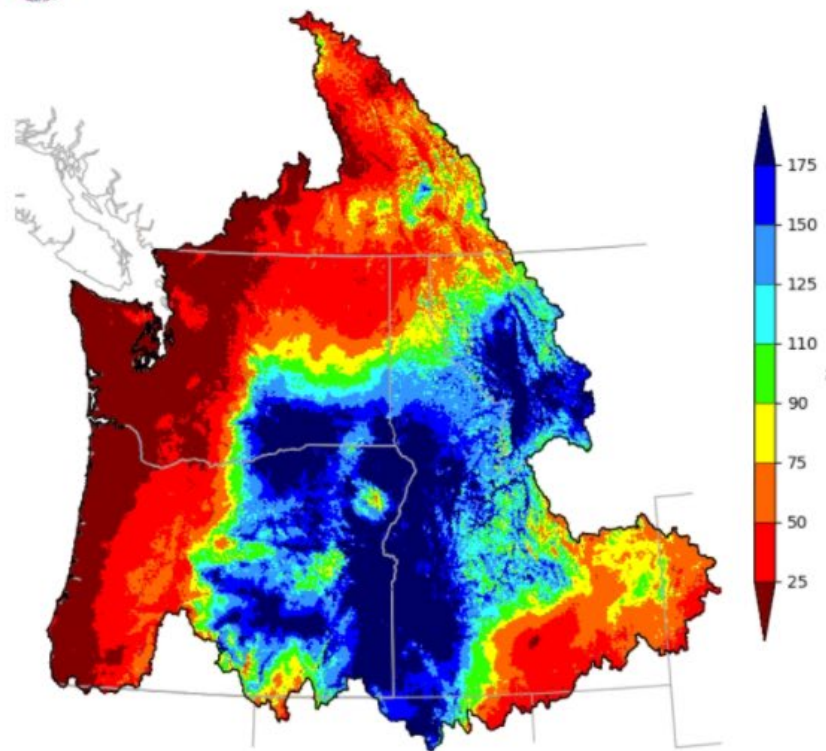
Northwest River Forecast Center
10 Day QPF, Ending 12Z, 04/13/24



Creation Time: Wed Apr 3 14:55:56 UTC 2024



Northwest River Forecast Center
10 Day QPF (Percent of Climatology), Ending 12Z, 04/13/24



Creation Time: Wed Apr 3 14:56:14 UTC 2024

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

% Normal Apr-Sep Volume

Upper Columbia Basin

Δ since Mar 7

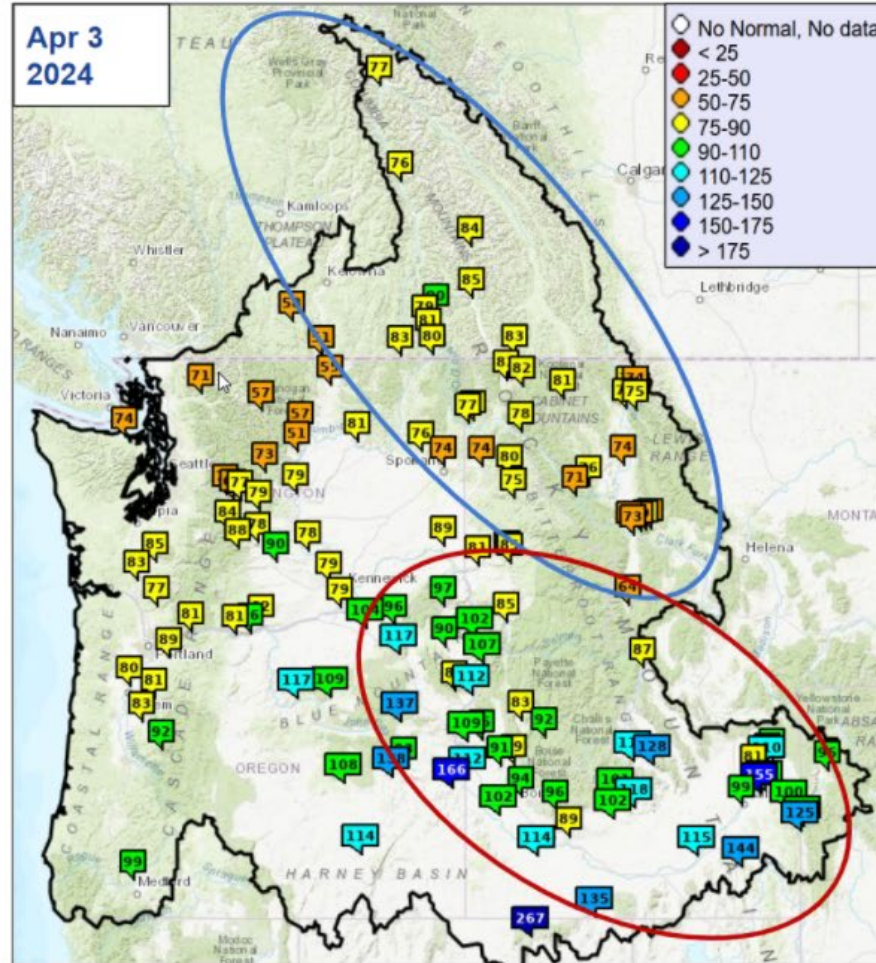
Mica	77	-5
Duncan	84	-3
Queens Bay	85	-1
Libby	81	2
Hungry Horse	75	1
Grand Coulee	81	-2

Snake River Basin

American Falls	115	-3
Lucky Peak	94	-9
Dworshak	76	0
Lower Granite	89	2

Lower Columbia Basin

The Dalles	81	-2
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nwrfc.noaa.gov/ws/index.html?version=20190313v1



Natural Water Supply Forecasts

% Normal Apr-Sep Volume

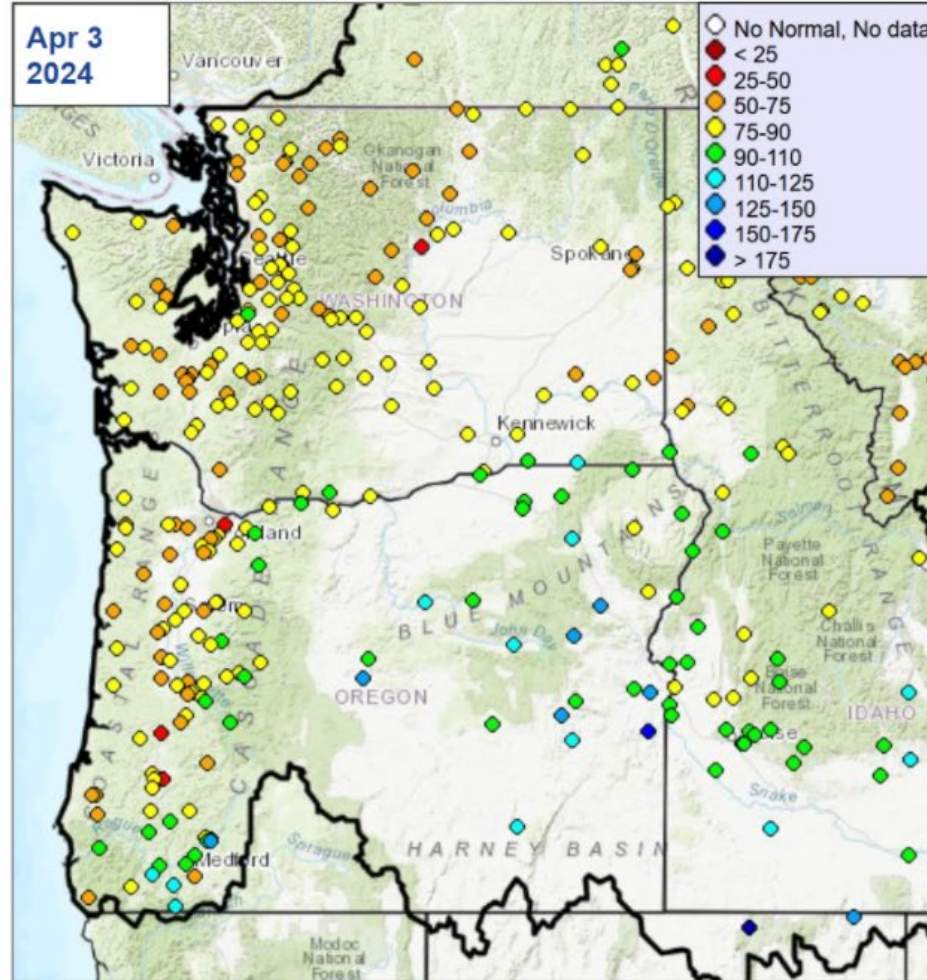
Washington

Δ since Mar 7

Skagit near Mt Vernon	70	-13
Dungeness near Sequim	74	-15
Chehalis at Porter	74	-16
Okanogan at Malott	55	-4
Methow near Pateros	57	-8
Yakima at Parker	83	-5
Walla Walla near Touchet	93	10

Oregon

Willamette at Salem	78	-13
Rogue at Raygold	101	-16
Umatilla at Pendleton	104	7
Grande Ronde at Troy	97	1
Crooked near Prineville	136	14
Owyhee Dam	165	17



nwrfc.noaa.gov/natural/index.html?version=20190313v1

15



ESP10 Water Supply Forecast

COLUMBIA - THE DALLES DAM (TDAO3) Forecasts for Water Year 2024

Official Water Supply

ESP with 10 Days QPF Ensemble: 2024-04-03 Issued: 2024-04-03

Forecast Period	Forecasts Are in KAF				30 Year Average (1991-2020)
	90 %	50 %	% Average	10 %	
APR-SEP	71432	76391	81	86831	94166
APR-JUL	59432	65544	80	75298	81933
APR-AUG	66697	71691	80	82134	89196
JAN-SEP	90752	95711	83	106151	115946
JAN-JUL	78753	84865	82	94618	103714
OCT-SEP	104006	108965	82	119405	132314

Experimental Water Supply

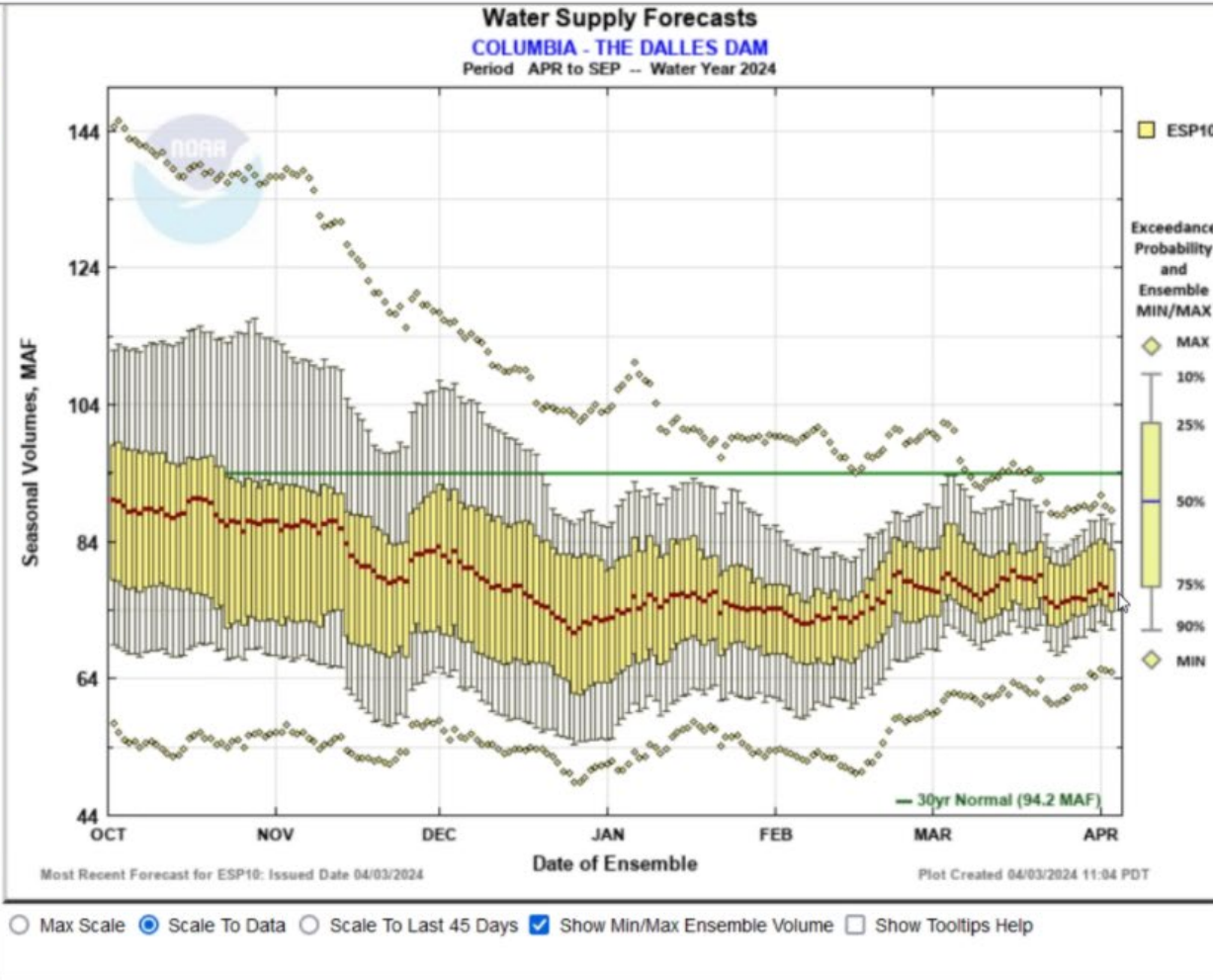
HEFS with 15 days EQPF Ensemble: 2024-04-03 Issued: 2024-04-03

APR-SEP	70742	78065	83	87136	94166
APR-JUL	60669	66897	82	75429	81933
APR-AUG	66226	72880	82	82448	89196
JAN-SEP	90062	97386	84	106456	115946
JAN-JUL	79990	86217	83	94750	103714
OCT-SEP	103317	110640	84	119711	132314

Reference

ESP with 0 Days QPF Ensemble: 2024-04-03 Issued: 2024-04-03

APR-SEP	69629	77189	82	84821	94166
APR-JUL	59906	65862	80	73251	81933
APR-AUG	65525	72175	81	80081	89196
JAN-SEP	88950	96509	83	104141	115946
JAN-JUL	79226	85183	82	92571	103714
OCT-SEP	102204	109763	83	117395	132314

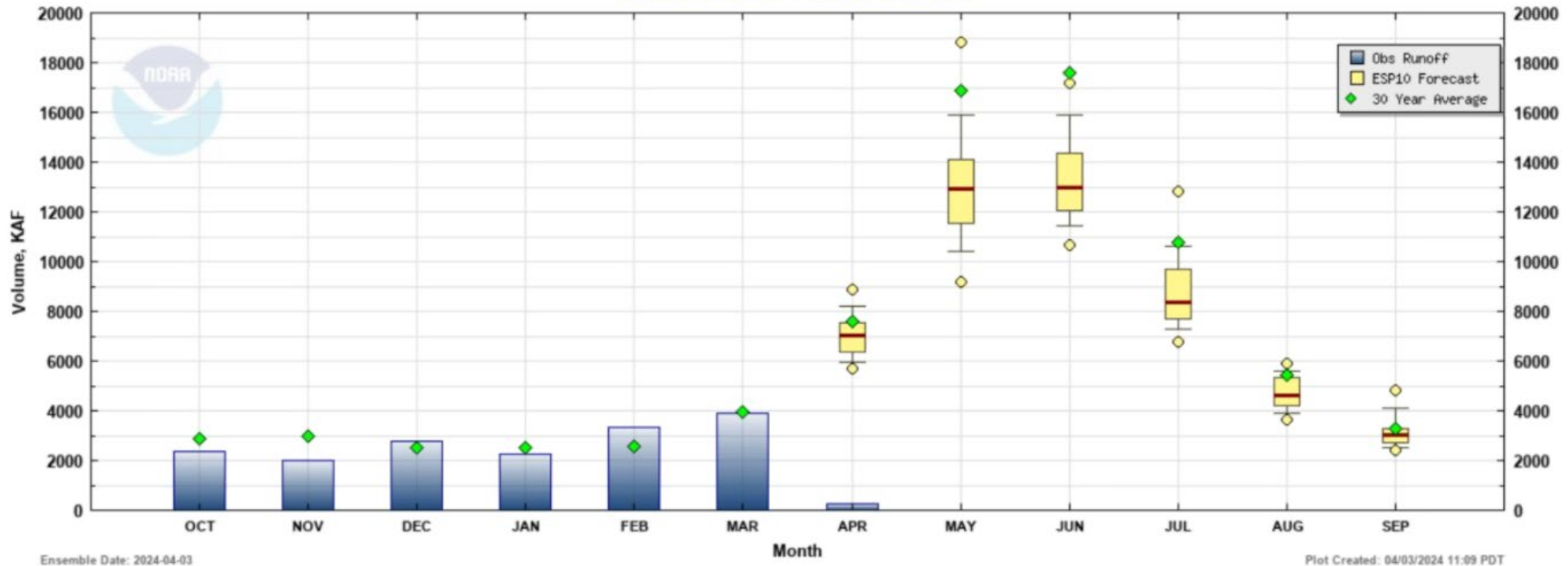


nwrfc.noaa.gov/water_supply/ws_forecasts.php?id=TDAO3



ESP10 Monthly Water Supply Forecast

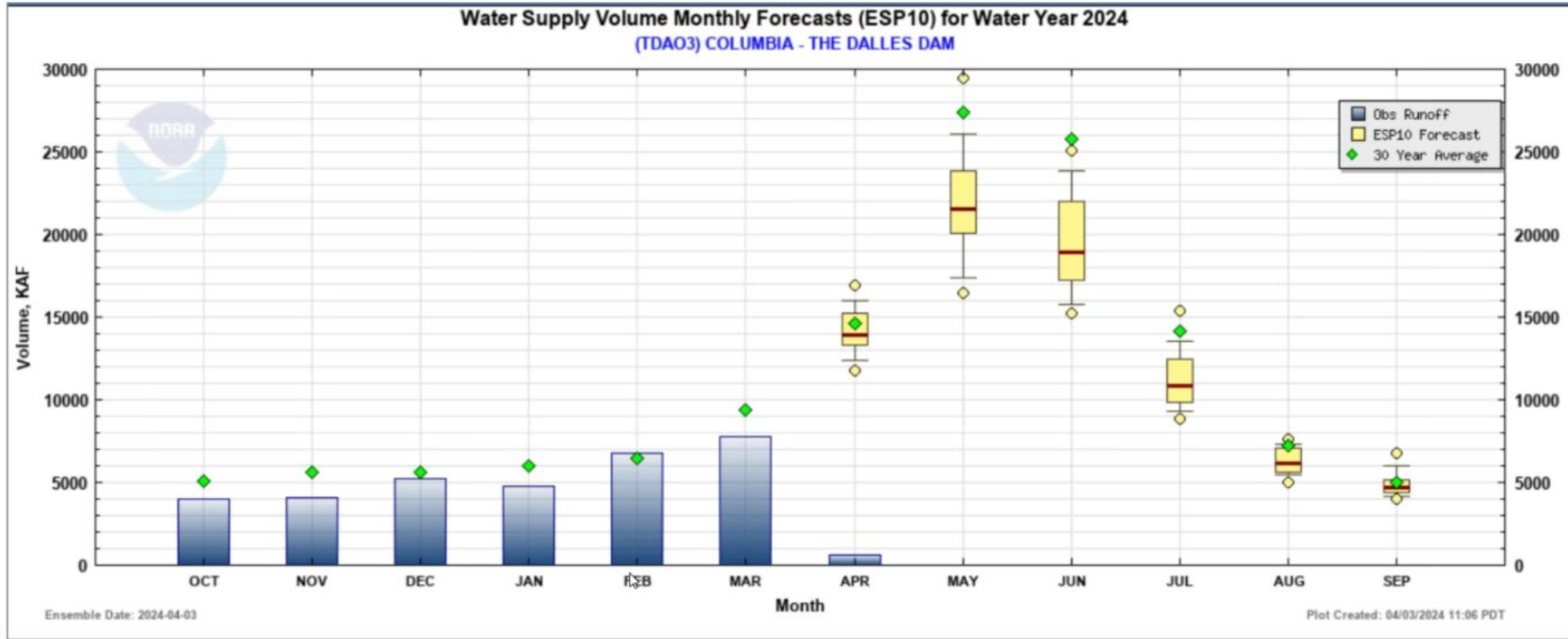
Water Supply Volume Monthly Forecasts (ESP10) for Water Year 2024
(GCDW1) COLUMBIA - GRAND COULEE DAM



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



ESP10 Monthly Water Supply Forecast



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

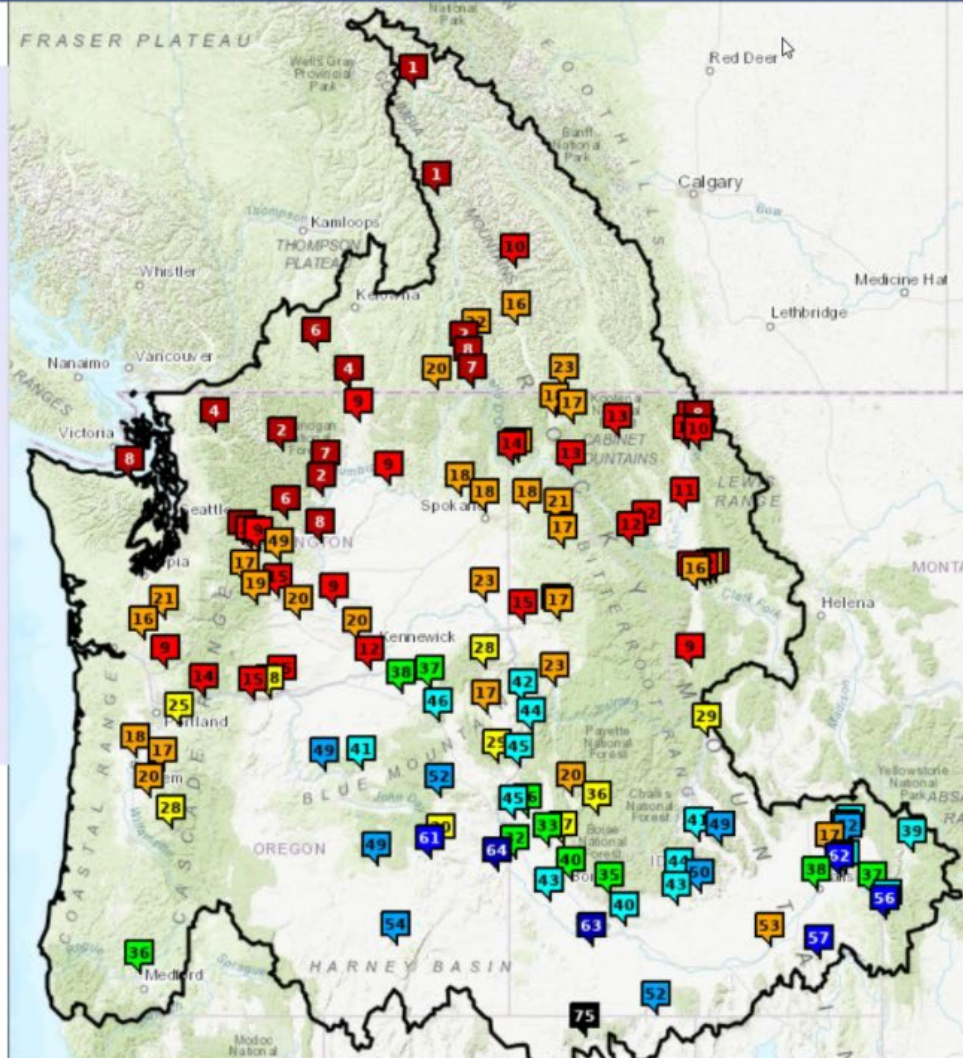


Water Supply Forecast Rankings (Descending Order)

ESP Water Supply Forecast

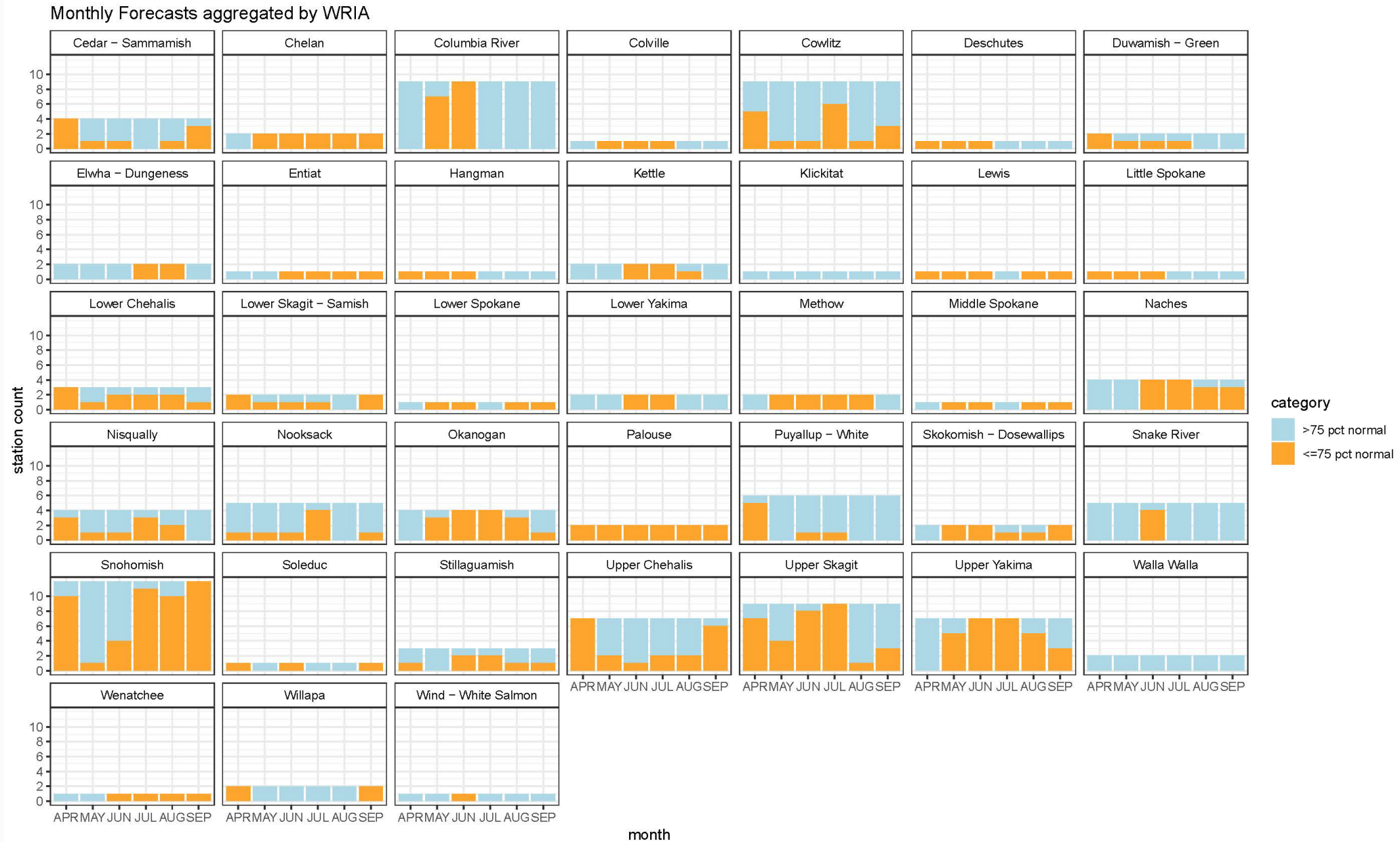
Period: APR-SEP
Rank (Descending)
Marker Color Shows Exceedance (%)

- No data
- 0-10
- 10-20
- 20-30
- 30-40
- 40-50
- 50-60
- 60-70
- 70-80
- 80-90
- 90-100



76-year history

Streamflow forecasts by basin



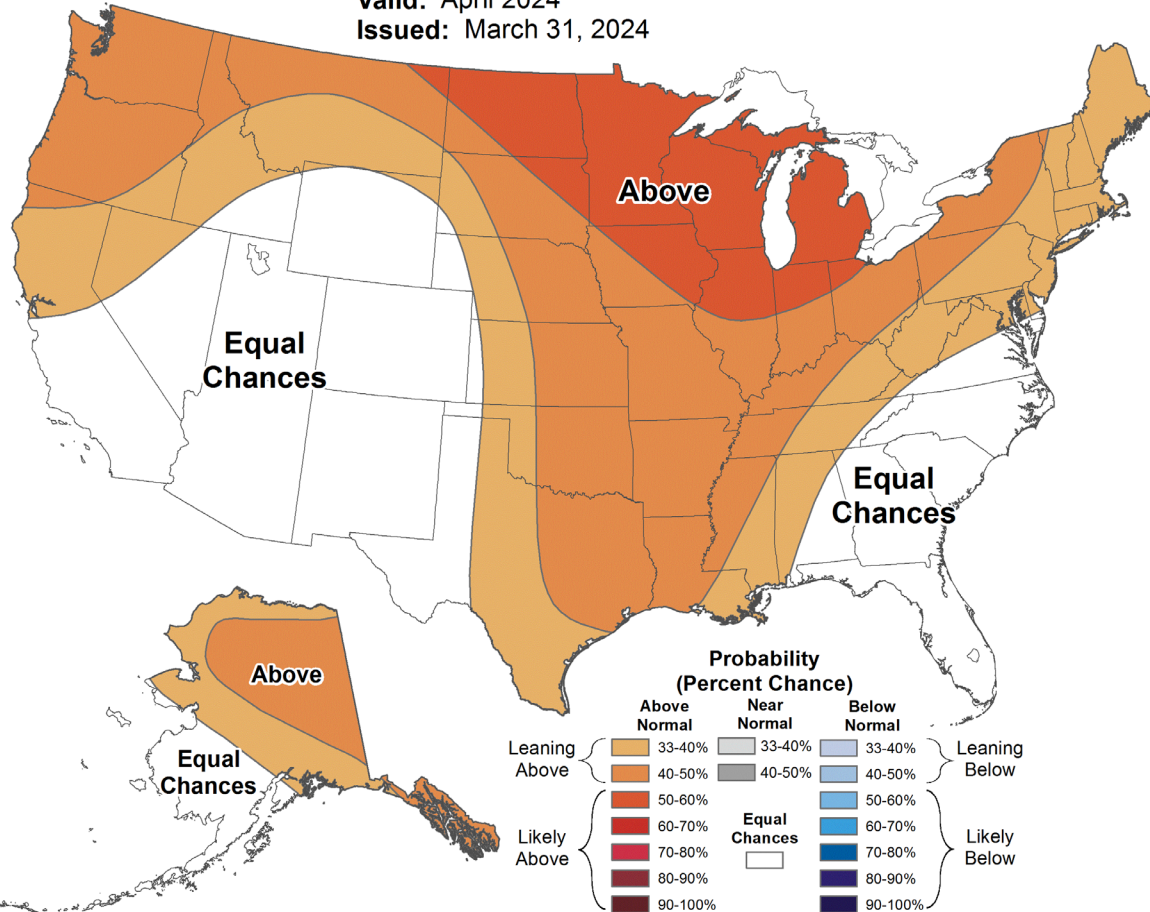
Outlook – Next Month



Monthly Temperature Outlook



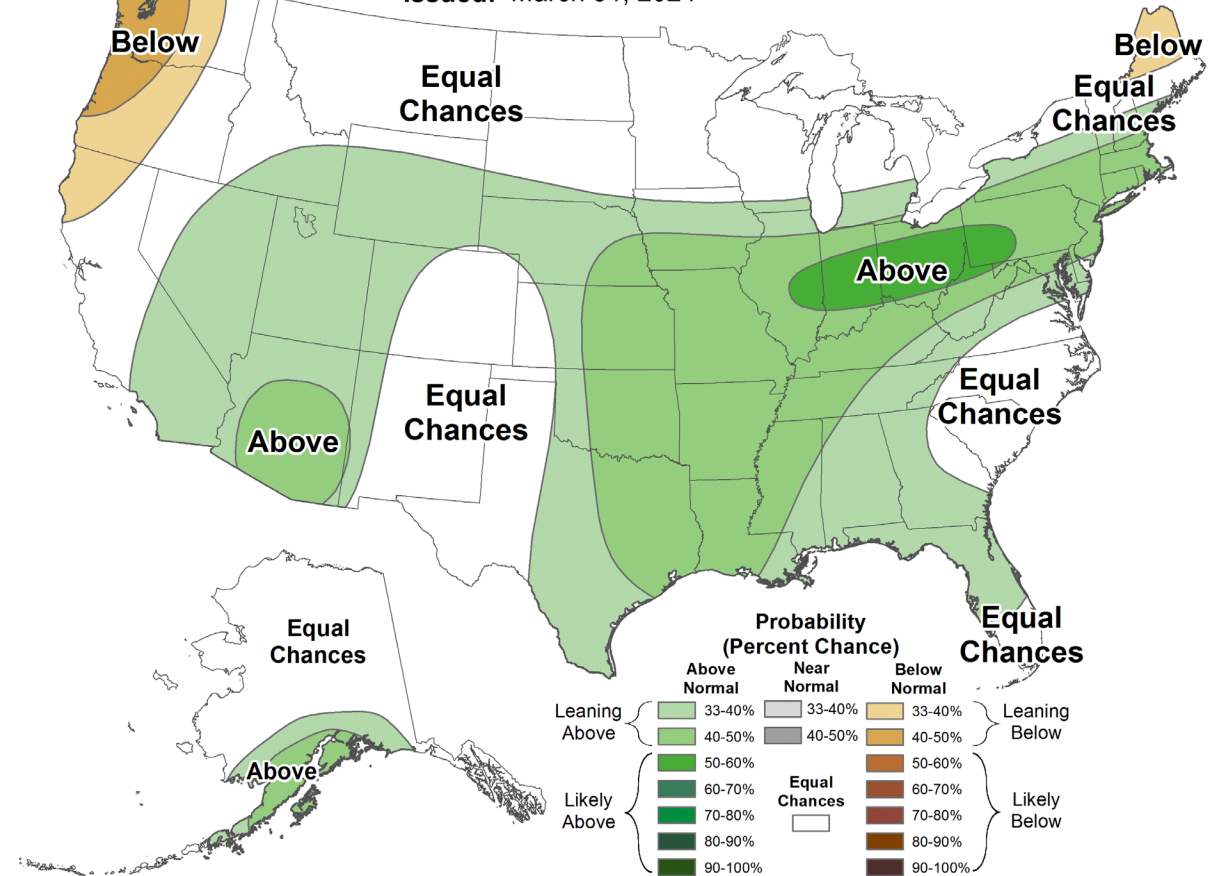
Valid: April 2024
Issued: March 31, 2024



Monthly Precipitation Outlook



Valid: April 2024
Issued: March 31, 2024



Valid: April 2024, Issued: March 31
(Climate Prediction Center, NOAA)

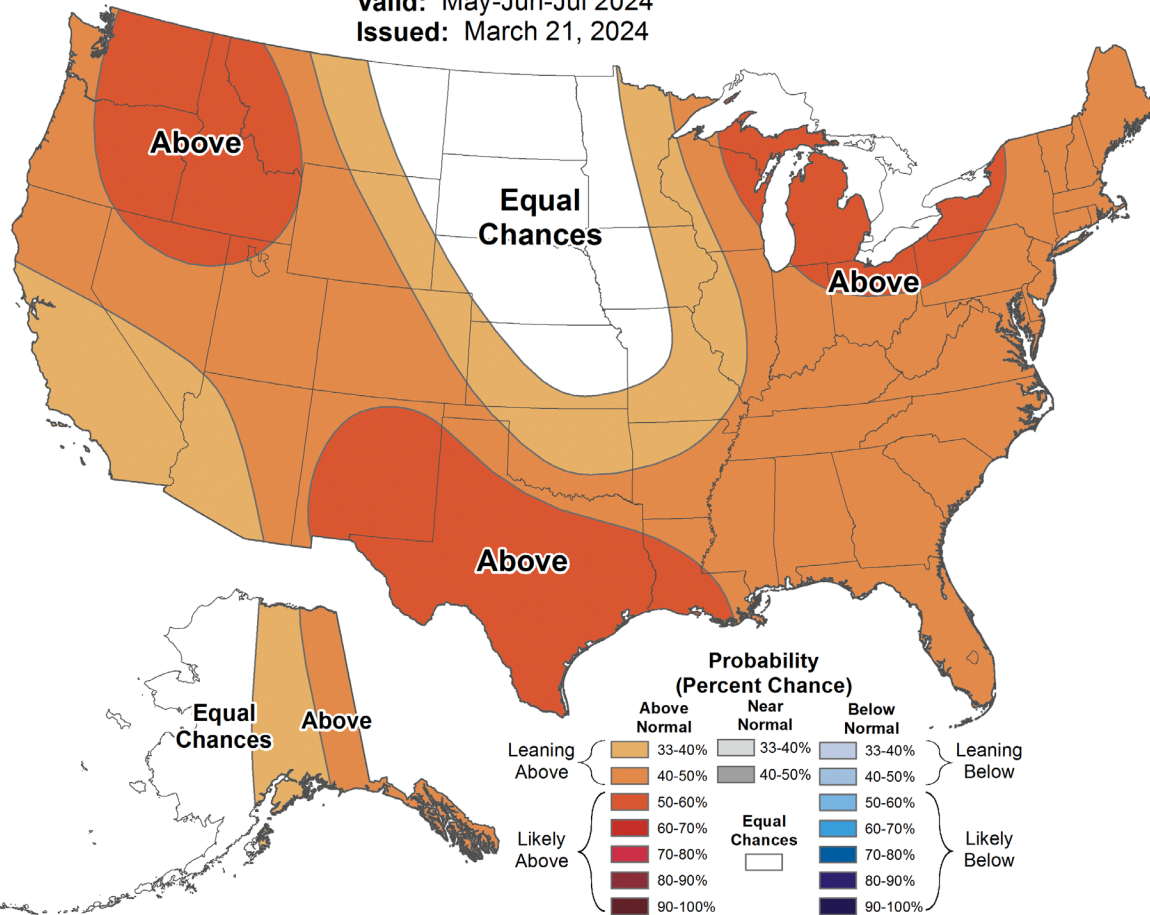
Outlook - Three-Month



Seasonal Temperature Outlook



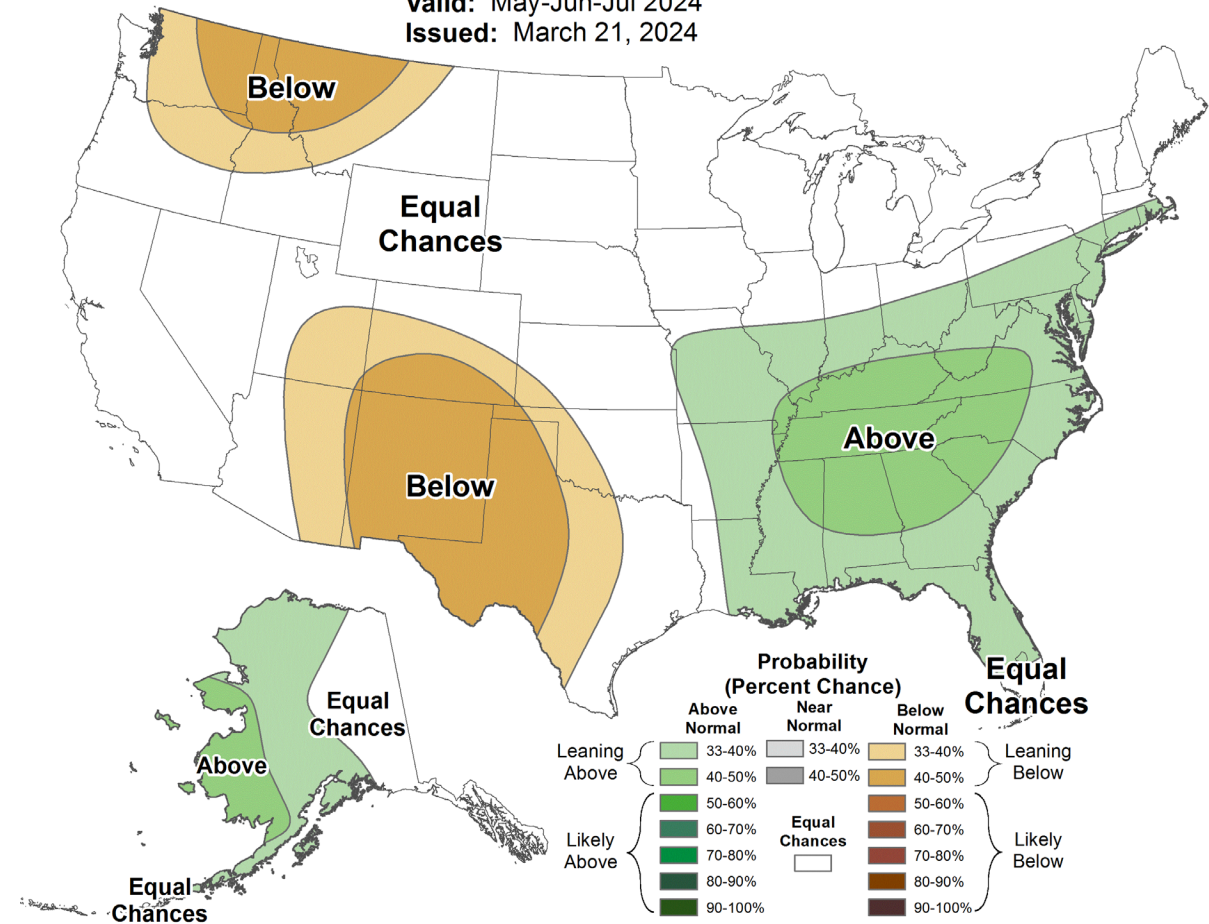
Valid: May-Jun-Jul 2024
Issued: March 21, 2024



Seasonal Precipitation Outlook



Valid: May-Jun-Jul 2024
Issued: March 21, 2024



Valid: May-June-July, 2024; Issued March 21
(Climate Prediction Center, NOAA)

Drought Conditions Updates

- Water year 2024 has had above normal temperatures and normal to below normal precipitation for a majority of WA
(Source: [Office of the WA State Climatologist](#)).
- Water supply forecasts are a mix of normal to below normal, with some areas quite low compared to their historical record.

Takeaways

- Water users should plan for a drier than normal year. The magnitude of impacts is different for different areas of the state.
- Ecology is closing monitoring conditions and coordinating with partners.

Next Steps for drought

- Communications
 - [WSAC website](#) updated with meeting materials and presentation recording:
 - Latest [blog post](#)
- Next WSAC (Water Supply Availability Committee):
 - March 27, 2024 – Most recent
 - Next: Last week of April



Questions?



DEPARTMENT OF
ECOLOGY
State of Washington



Thank you

Caroline Mellor

Statewide Drought Lead

Caroline.Mellor@ecy.wa.gov