

Washington Water Supply Availability Committee
Meeting ID: 833 6907 8232
Passcode: 339484
+12532158782,,83369078232#,,,,*339484# US

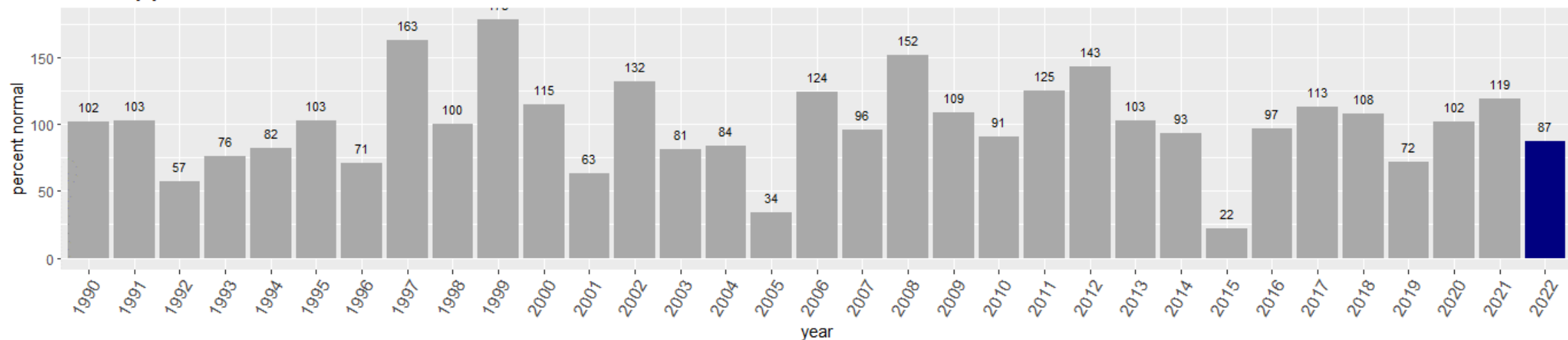
Friday, April 8, 2022				
Start Time	End Time	Duration, min	Description	
10:00	10:15	15	Welcome & Introductions	Jeff Marti
10:15	10:30	15	Mountain Report	Scott Pattee, NRCS
10:30	10:50	20	Regional Climate Setting ENSO	Karin Bumbaco, OWSC Nick Bond, OWSC
10:50	11:05	15	Streamflow and groundwater	Nick Sutfin, USGS
11:05	11:20	15	Water Supply Forecasts	Amy Burke, NWRFC Brent Bower, NWS Seattle Robin Fox, NWS Spokane
11:20	11:30	10	Yakima Project (tentative)	Chris Lynch
11:30	12:00	30	Reports from other managers Insights regarding current declaration Next meeting	Jeff Marti

Washington Drought Declaration Areas



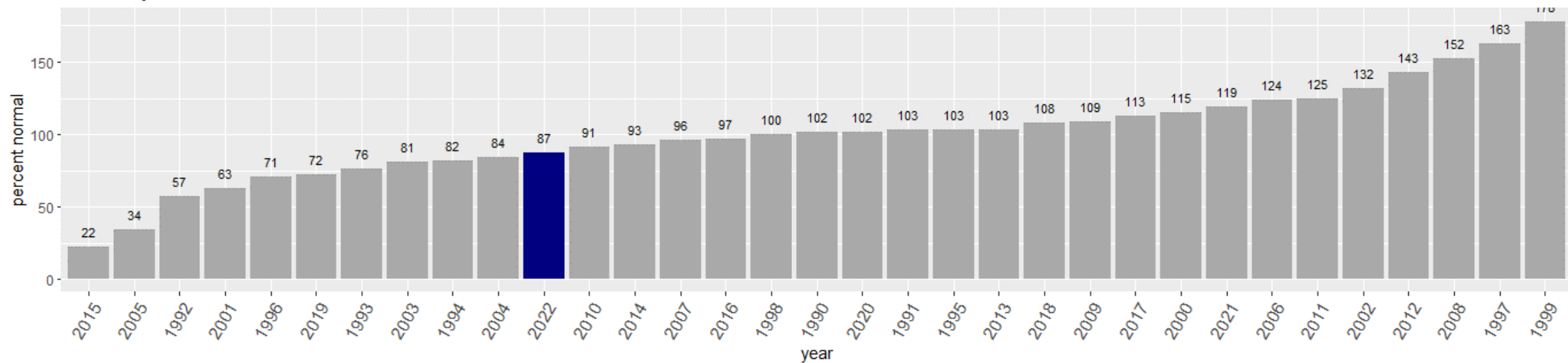
Declaration Date:
July 14, 2021
Expiration Date:
June 1, 2022

Washington statewide average Snow Water Equivalent on April 08 compared to previous years
sorted by year



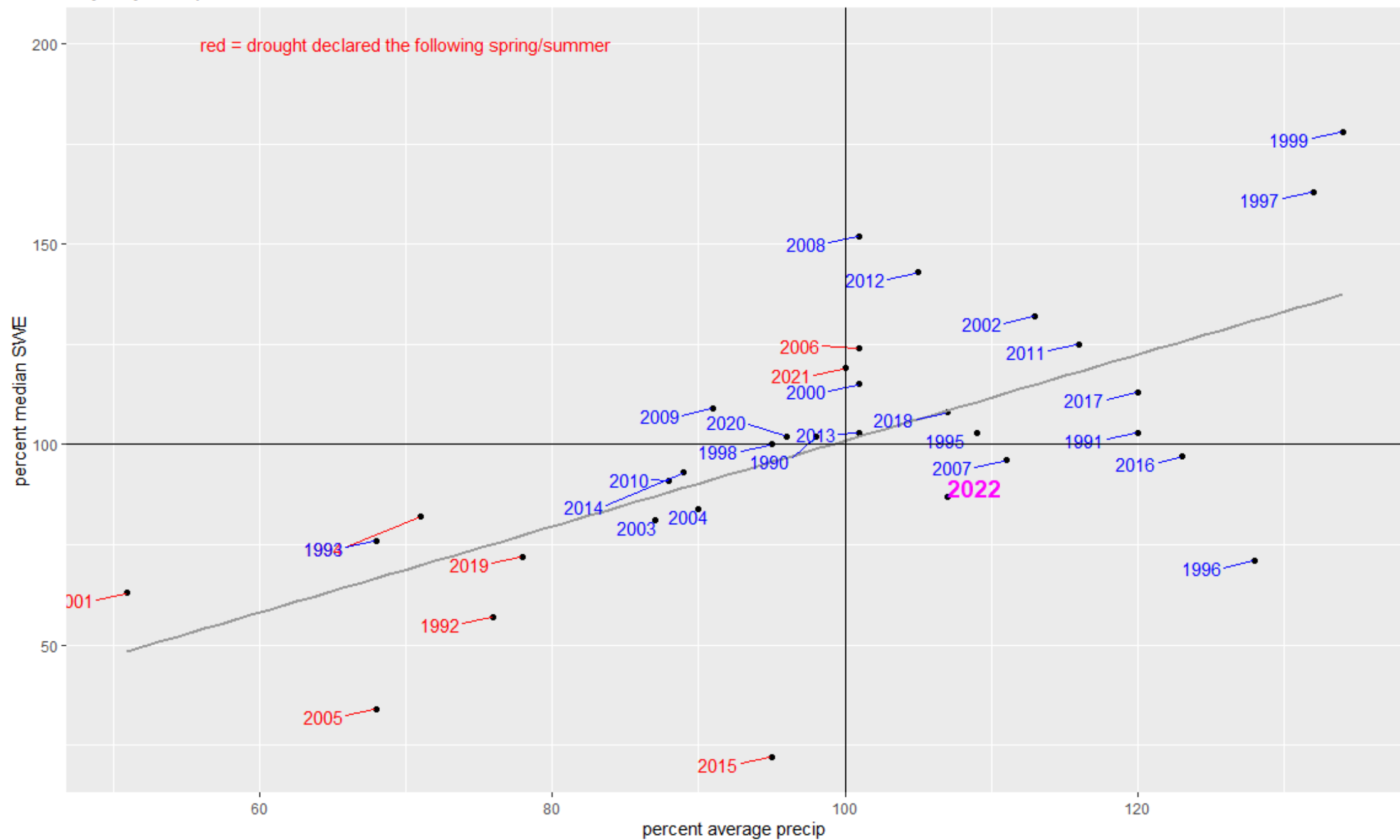
NRCS data (1991-2020 Normals)

ranked by SWE



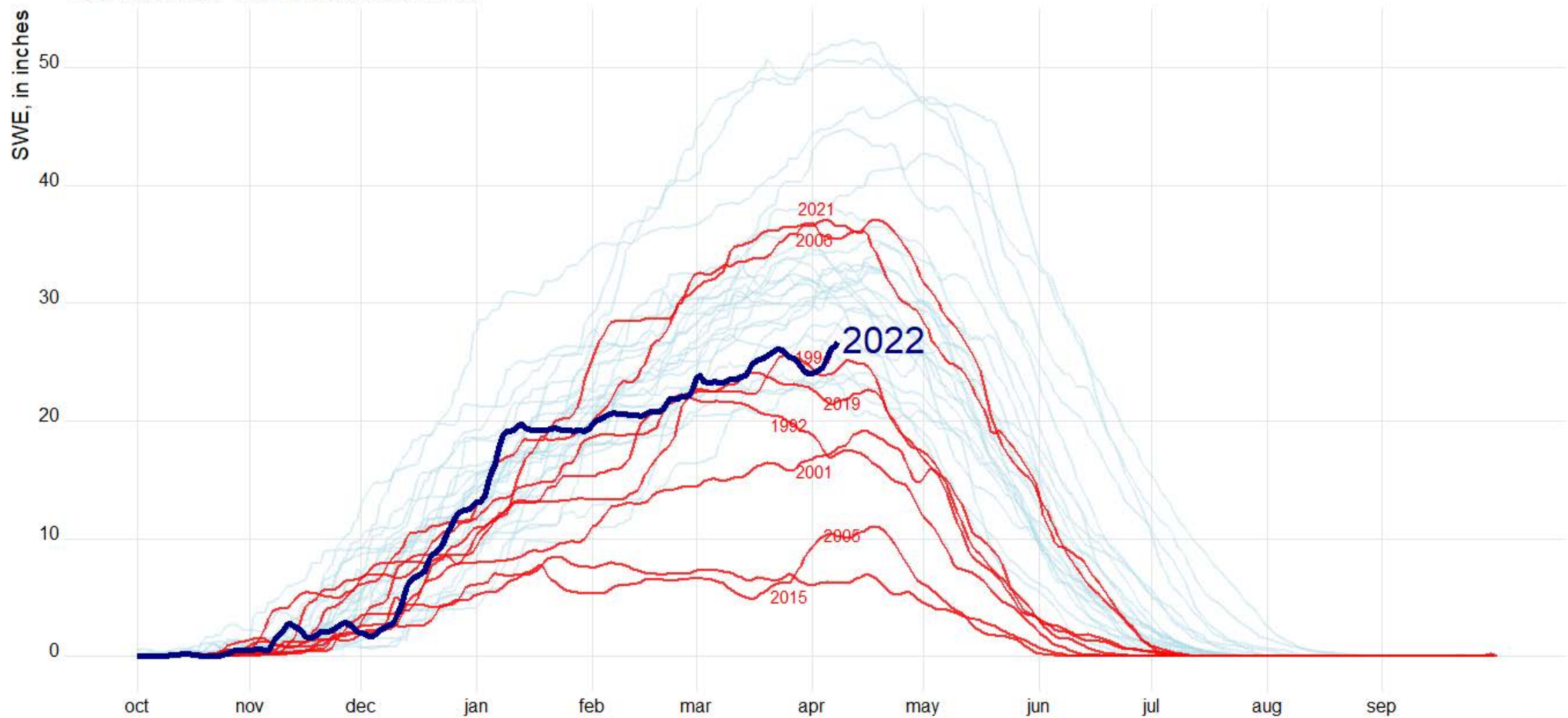
NRCS data (1991-2020 Normals)

statewide SWE vs accumulated precipitation since Oct 1
day of year April 08



Average Washington State SWE (SNOTEL)

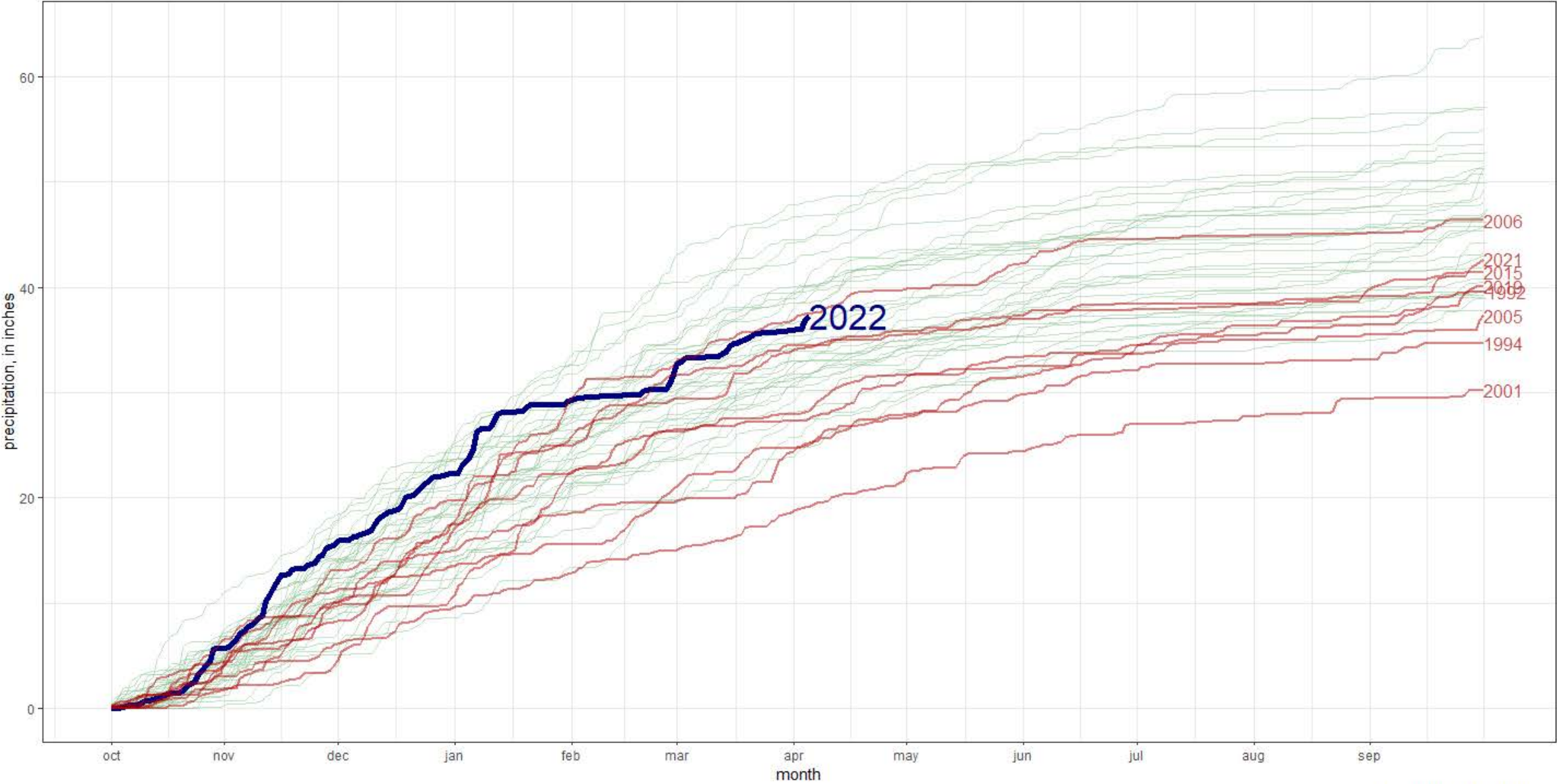
Water Years: 1990 - 2022 Created on: 2022-04-08



month
Data: NRCS

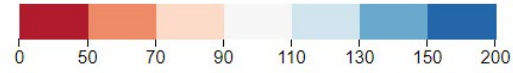
Washington State Statewide Cumulative Precipitation (gridMET)

POR: 1979-10-01 - 2022-04-04 Created on: 2022-04-07

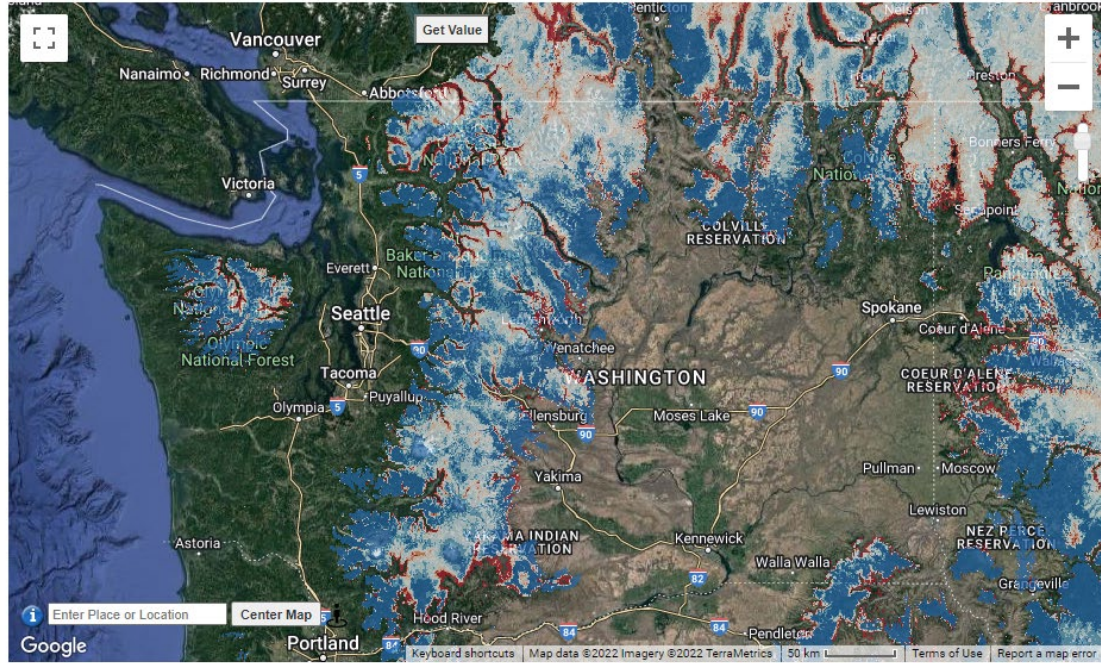


SWE Percent Of Average (SNODAS)

2021-04-01 to 2021-04-01, Mean, vs. 2004 - 2022



SWE Percent of Average (%) (masking below 0.01 %)



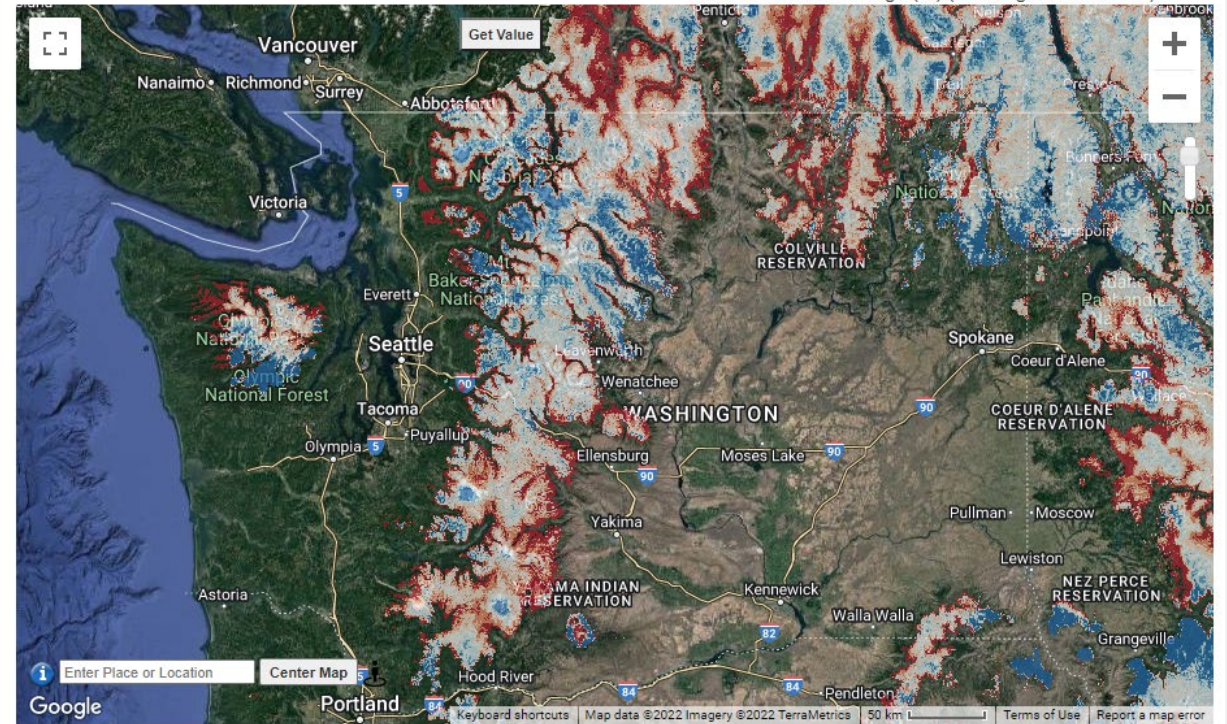
Generated by ClimateEngine.org

SWE Percent Of Average (SNODAS)

2022-04-01 to 2022-04-01, Mean, vs. 2004 - 2022

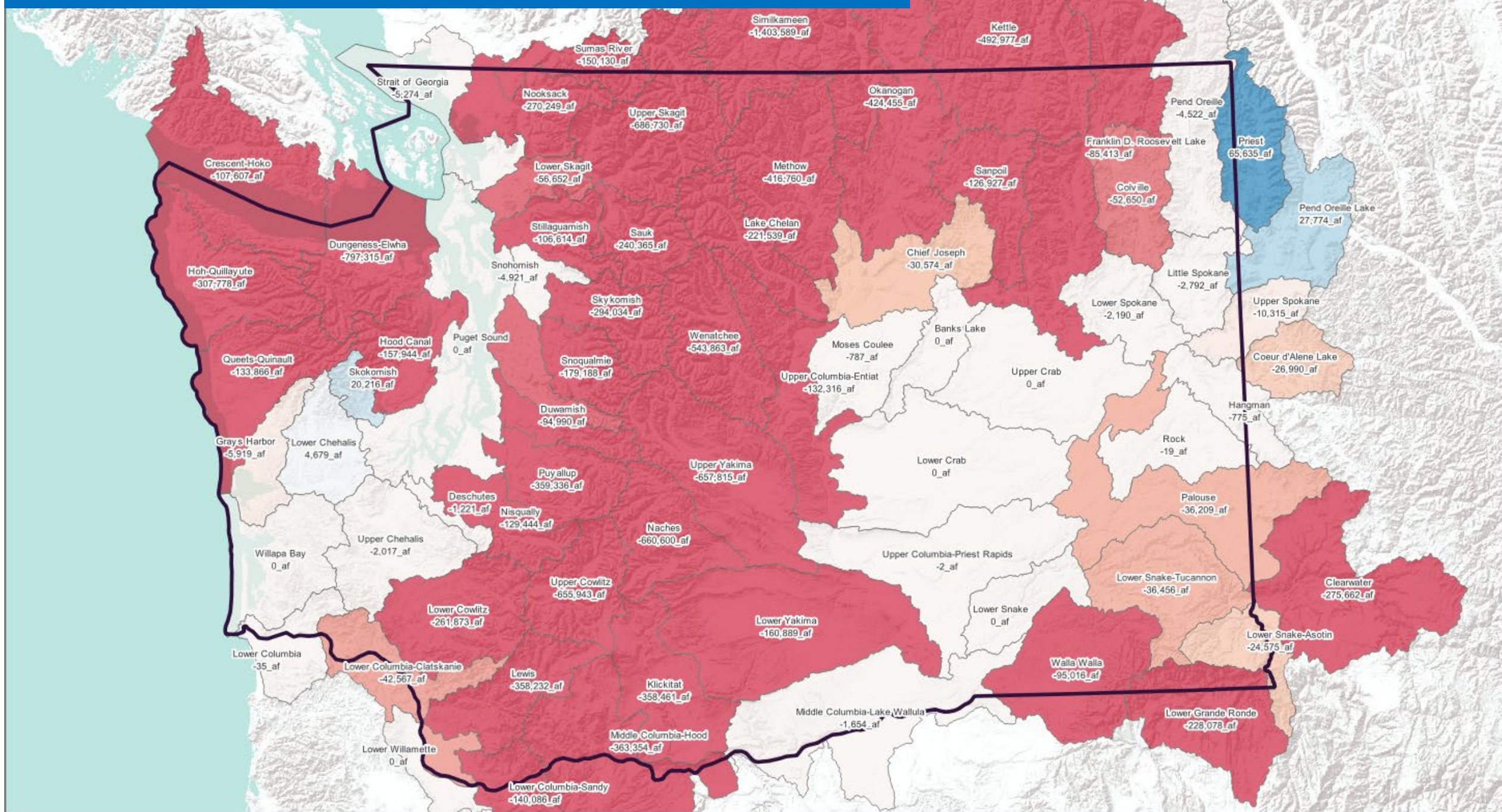


SWE Percent of Average (%) (masking below 0.01 %)



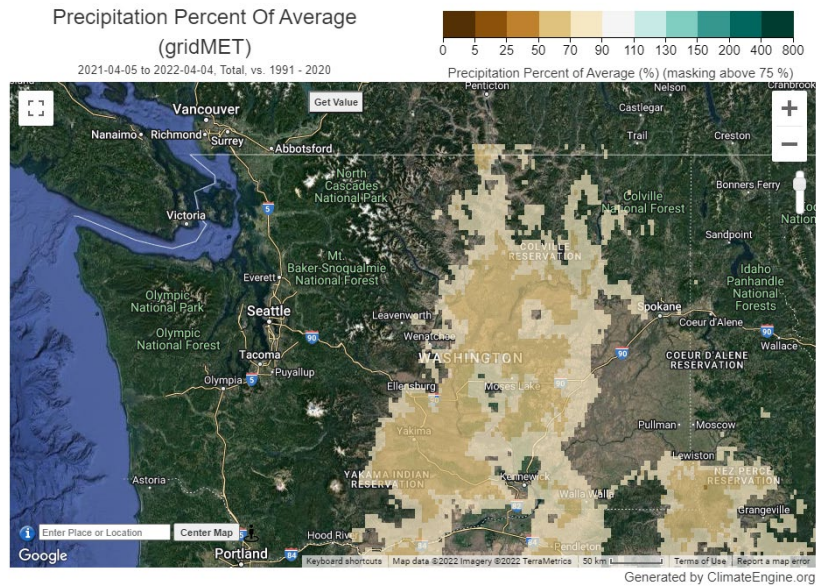
Generated by ClimateEngine.org

SNOW STORAGE DIFFERENCE by HUC 8: THIS YEAR VS LAST YEAR (April 1)



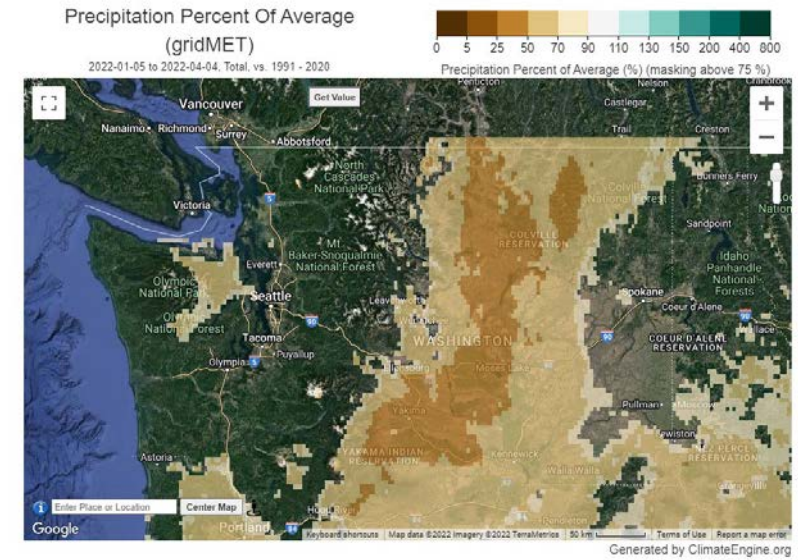
1 year

Precipitation Percent Of Average
(gridMET)



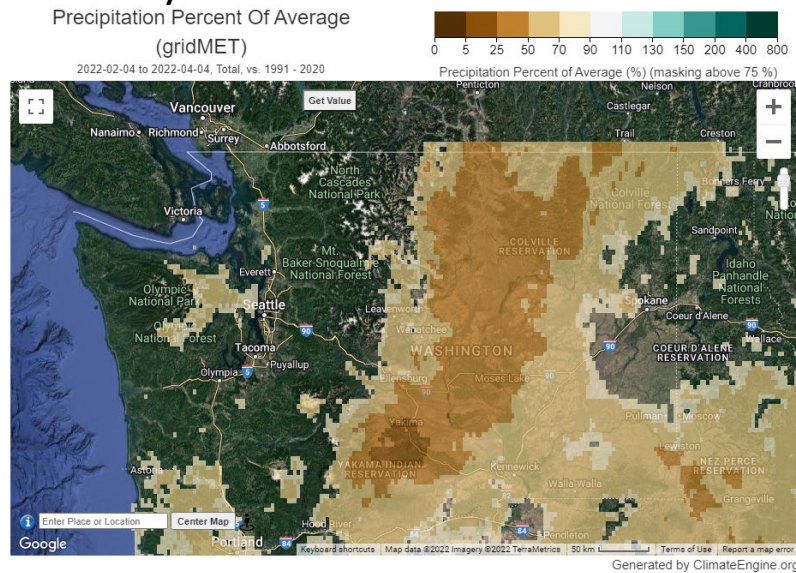
90 days

Precipitation Percent Of Average
(gridMET)



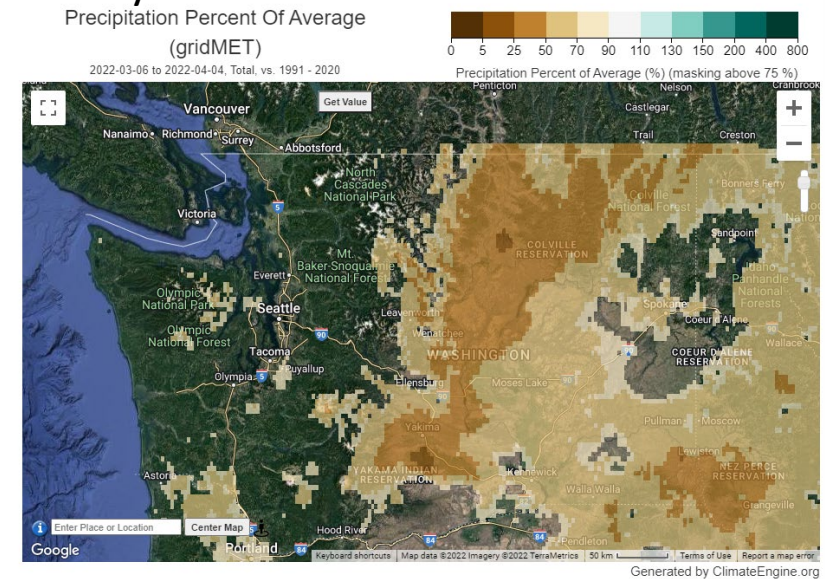
60 days

Precipitation Percent Of Average
(gridMET)

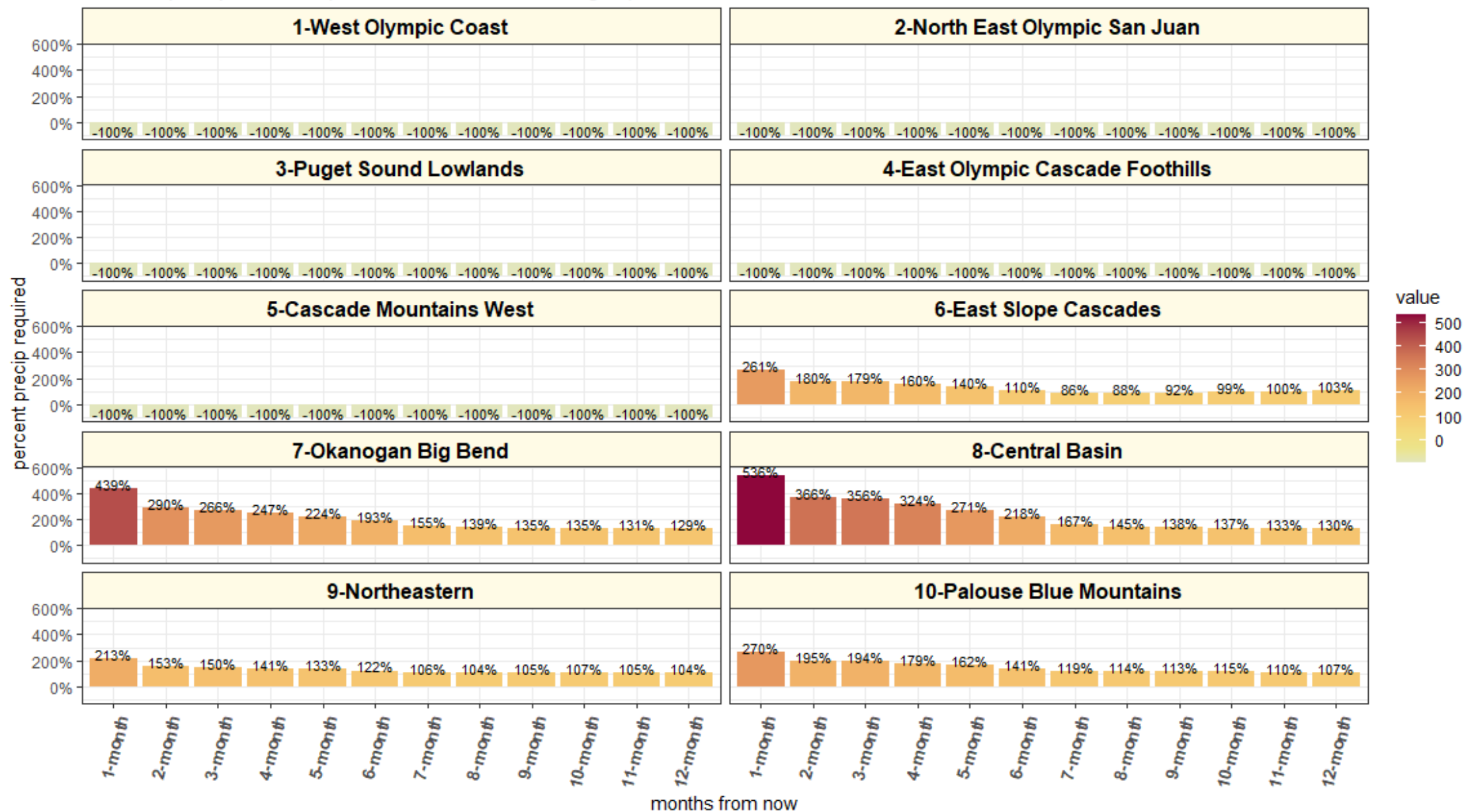


30 days

Precipitation Percent Of Average
(gridMET)



Percent precipitation required to end current drought | 2022-04-08



Data: NOAA Drought Termination Tool

Assumes climatological conditions for the remainder of the month.

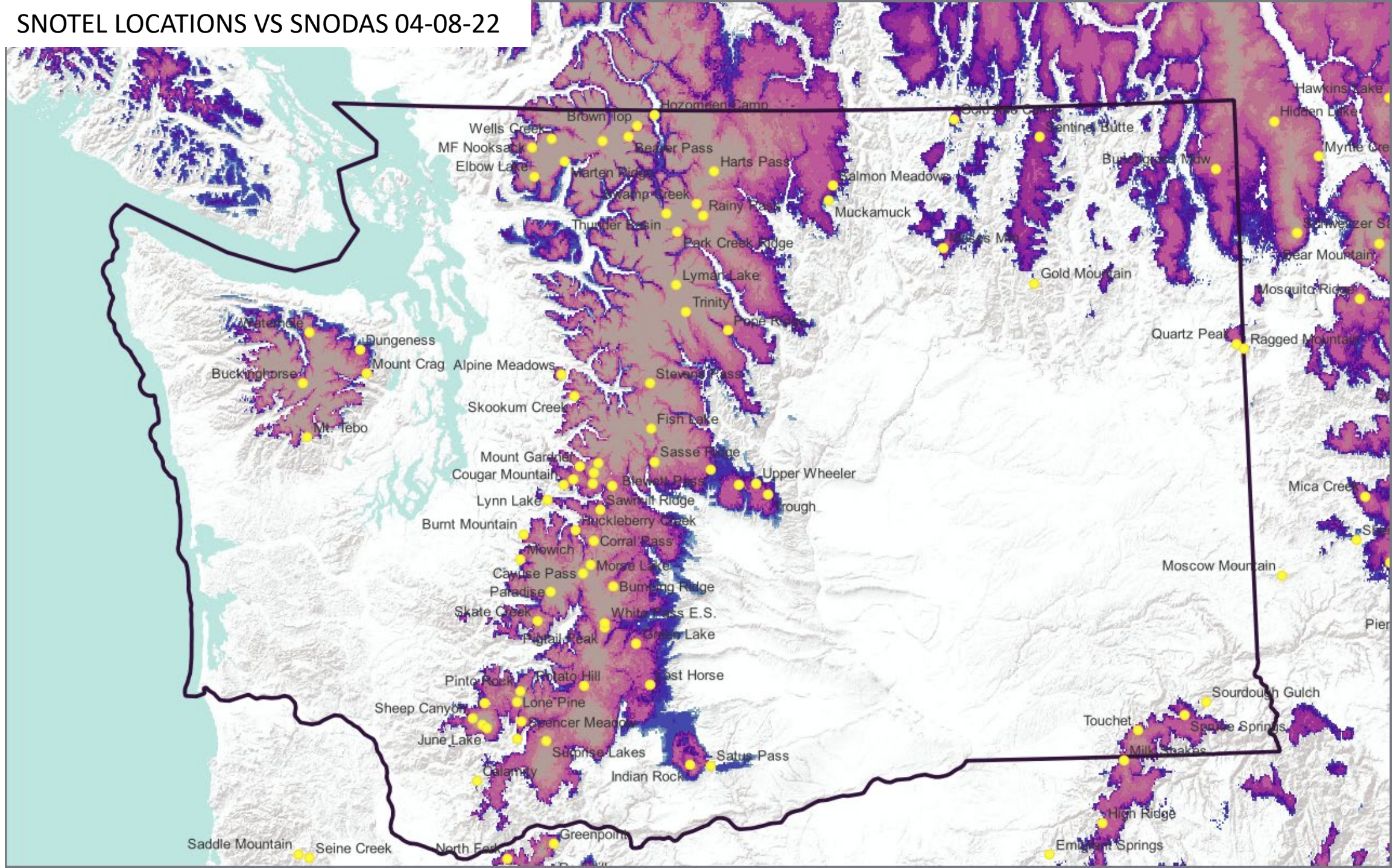
Monthly timesteps are not interdependent.

A drought is considered to be ameliorated when the PHDI is raised to -2.0, and ended when above -0.5.

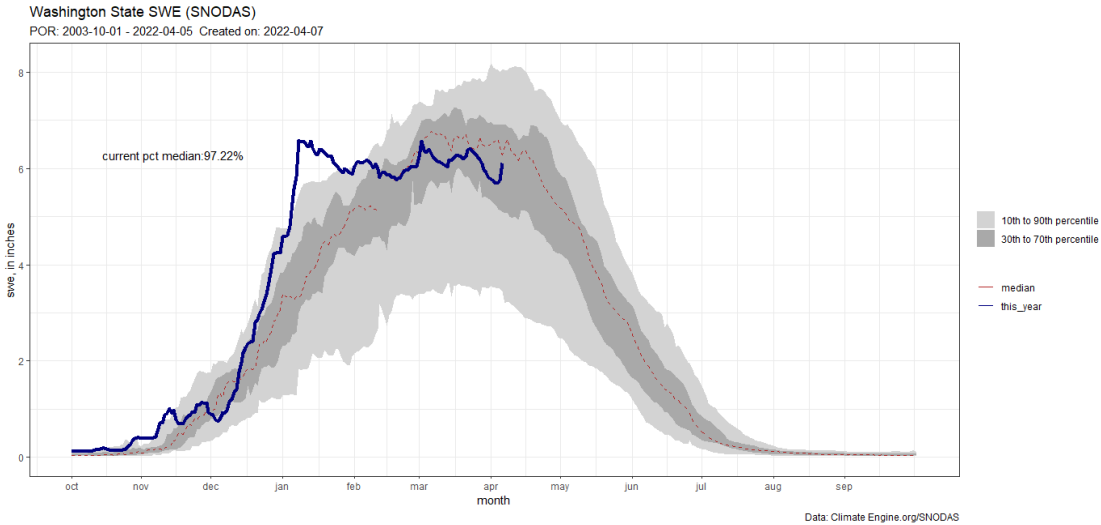
29	Wind - White Salmon	WHITE SALMON - NEAR UNDERWOOD	0.92	0.72	0.65	0.83	0.9	0.86
30	Klickitat	KLICKITAT - NEAR PITT	0.97	0.74	0.57	0.75	0.86	0.91
32	Walla Walla	MILL CREEK - NR WALLA WALLA	0.79	1.01	0.76	0.95	0.89	0.83
32	Walla Walla	WALLA WALLA - NEAR TOUCHET	0.59	0.62	0.59	0.7	0.62	0.74
34	Palouse	PALOUSE - AT HOOPER	0.51	0.5	0.62	0.52	0.35	0.79
34	Palouse	SF PALOUSE - AT PULLMAN	0.3	0.31	0.56	0.67	0.5	0.33
35	Snake River	SNAKE - NEAR ANATONE	0.7	0.67	0.55	0.63	0.84	0.96
37	Lower Yakima	YAKIMA - AT KIONA	1.18	0.92	0.77	0.71	0.79	0.85
37	Lower Yakima	YAKIMA - NEAR PARKER	1.2	0.91	0.76	0.69	0.76	0.85
38	Naches	BUMPING - BELOW BUMPING DAM	1.38	0.98	0.74	0.51	0.62	0.73
38	Naches	NACHES - NEAR CLIFFDEL	1.29	1.06	0.74	0.51	0.69	0.75
38	Naches	NACHES - NEAR NACHES	1.34	1.08	0.71	0.56	0.86	0.74
38	Naches	TIETON - AT TIETON DAM	1.32	1.08	0.82	0.76	1.11	1
39	Upper Yakima	CLE ELUM - NEAR ROSLYN	1.31	0.97	0.87	0.68	0.35	0.52
39	Upper Yakima	KACHESS - NEAR EASTON	1.34	0.9	0.79	0.72	0.64	0.43
39	Upper Yakima	TEANAWAY - BELOW FORKS	1.29	0.74	0.4	0.41	0.75	0.86
39	Upper Yakima	YAKIMA - AT EASTON	1.25	0.87	0.77	0.78	0.71	0.62
39	Upper Yakima	YAKIMA - AT UMTANUM	1.25	0.84	0.78	0.77	0.71	0.74
39	Upper Yakima	YAKIMA - NEAR MARTIN	1.19	0.96	0.77	0.74	0.61	0.7
40	Upper Yakima	YAKIMA - NEAR HORLICK	1.3	0.86	0.8	0.7	0.65	0.78
45	Wenatchee	WENATCHEE - AT PESHAISTIN	1.22	0.93	0.92	0.64	0.8	0.86
46	Entiat	ENTIAT - NEAR ARDENVOIR	1.46	1.07	0.85	0.63	0.7	0.85
47	Chelan	CHELAN - LAKE CHELAN DAM	1.2	0.81	0.97	0.76	0.75	0.77
47	Chelan	STEHEKIN - AT STEHEKIN	1.19	0.85	0.98	0.88	0.85	0.86
48	Methow	METHOW - AT WINTHROP	1.54	0.98	0.8	0.61	0.71	0.88
48	Methow	METHOW - NEAR PATEROS	1.5	0.99	0.81	0.63	0.76	0.96
49	Okanogan	OKANOGAN - AT MALOTT	2.1	1.05	0.88	0.61	0.65	0.92
49	Okanogan	OKANOGAN - AT OROVILLE	0.97	0.86	0.5	0.5	0.72	0.8
49	Okanogan	OKANOGAN - NEAR TONASKET	2.09	1.05	0.91	0.62	0.67	0.95
49	Okanogan	SIMILKAMEEN - NEAR NIGHTHAWK	2.18	1.15	1.02	0.83	0.85	1
54	Lower Spokane	SPOKANE - AT LONGLAKE	1.07	0.96	0.98	1.06	0.66	0.73
55	Little Spokane	LITTLE SPOKANE - AT DARTFORD	0.55	0.46	0.59	0.69	0.74	0.81
56	Hangman	HANGMAN CREEK - AT SPOKANE	0.48	0.48	0.77	0.85	0.89	1.07
57	Middle Spokane	SPOKANE - AT SPOKANE	1.1	0.98	1	1.07	0.65	0.75
59	Colville	COLVILLE - AT KETTLE FALLS	0.8	0.65	0.54	0.57	0.68	0.8
60	Kettle	KETTLE - AT LAURIER	1.12	0.89	0.74	0.64	0.76	0.81
60	Kettle	KETTLE - NEAR FERRY	1.4	0.95	0.77	0.62	0.86	1
NA	Columbia River	COLUMBIA - BLO ROCK ISLAND DAM	1.07	0.86	1.01	1.2	1.31	1.24
NA	Columbia River	COLUMBIA - CHIEF JOSEPH DAM	1.01	0.85	1.02	1.24	1.33	1.25
NA	Columbia River	COLUMBIA - GRAND COULEE DAM	1.01	0.85	1.02	1.24	1.33	1.25
NA	Columbia River	COLUMBIA - MCNARY DAM	0.97	0.84	0.91	1.1	1.23	1.17
NA	Columbia River	COLUMBIA - PRIEST RAPIDS DAM	1.07	0.86	1.01	1.2	1.31	1.24
NA	Columbia River	COLUMBIA - ROCKY REACH DAM	1.06	0.86	1.01	1.21	1.31	1.24
NA	Columbia River	COLUMBIA - THE DALLES DAM	0.96	0.84	0.91	1.1	1.21	1.15
NA	Columbia River	COLUMBIA - WANAPUM DAM	1.07	0.86	1.01	1.2	1.31	1.24
NA	Columbia River	COLUMBIA - WELLS DAM	1.05	0.86	1.02	1.22	1.32	1.24
NA	Snake River	SNAKE - ICE HARBOR DAM	0.81	0.77	0.63	0.66	0.85	0.96
NA	Snake River	SNAKE - LITTLE GOOSE DAM	0.81	0.77	0.62	0.66	0.85	0.96
NA	Snake River	SNAKE - LOWER GRANITE DAM	0.81	0.77	0.62	0.66	0.85	0.96
NA	Snake River	SNAKE - LOWER MONUMENTAL DAM	0.81	0.77	0.63	0.66	0.85	0.96

BASIN SWE PROJECTIONS										
Basins/Projection Periods			Current	Percentile Projections						
subbasins	queryDate	projectionDate	todaySWE	Minpctproj	x10pctproj	x30pctproj	x50pctproj	x70pctproj	x90pctproj	Maxpctproj
Ahtanum	04-08	05-01	65	8	21	41	52	61	74	86
Asotin	04-08	05-01	68	0	0	0	29	58	88	200
Baker	04-08	05-01	98	85	93	95	102	105	111	112
Cedar	04-08	05-01	93	67	74	95	105	113	126	150
Colckum	04-08	05-01	61	0	0	0	0	57	105	136
Concully Lake	04-08	05-01	20	0	0	0	0	0	0	0
Cowlitz	04-08	05-01	89	68	76	84	88	94	98	110
Entiat	04-08	05-01	58	0	0	0	0	19	39	100
Grande Ronde	04-08	05-01	69	9	17	50	60	69	80	103
Green	04-08	05-01	87	48	60	76	88	93	107	132
Kettle	04-08	05-01	63	0	0	0	62	100	167	258
Klickitat	04-08	05-01	63	1	25	42	52	65	74	95
Lake Chelan	04-08	05-01	90	71	82	87	92	97	99	107
Lewis	04-08	05-01	84	37	61	69	80	87	94	118
Methow	04-08	05-01	112	95	115	119	126	133	143	148
Naches	04-08	05-01	83	57	71	78	84	88	92	98
Newman Lake	04-08	05-01	81	0	3	36	62	83	132	210
Nooksack	04-08	05-01	87	63	73	83	88	92	98	110
Olympic	04-08	05-01	85	72	75	86	92	97	108	138
Omak	04-08	05-01	56	0	12	28	42	49	81	101
Puyallup	04-08	05-01	97	35	46	78	105	115	125	168
Sanpoil	04-08	05-01	56	0	12	28	42	49	81	101
Satus	04-08	05-01	10	0	0	0	0	1	6	9
Simcoe-Toppenish	04-08	05-01	50	0	0	0	14	23	52	69
Skagit	04-08	05-01	110	89	102	109	113	115	119	128
Skykomish	04-08	05-01	97	67	78	92	98	105	110	130
Snoqualmie	04-08	05-01	94	67	77	93	101	109	119	138
Stemilt	04-08	05-01	57	0	0	4	15	38	92	109
Sullivan	04-08	05-01	80	47	58	68	79	88	92	100
Tolt	04-08	05-01	91	61	73	83	93	101	109	128
Upper Yakima	04-08	05-01	81	42	58	69	78	83	92	106
Walla Walla	04-08	05-01	75	22	36	63	73	78	87	117
Wenatchee	04-08	05-01	87	55	67	78	89	95	102	109
White	04-08	05-01	83	63	78	85	90	92	94	105
NA	NA	Mean SWE	76	36	45	56	67	78	94	118

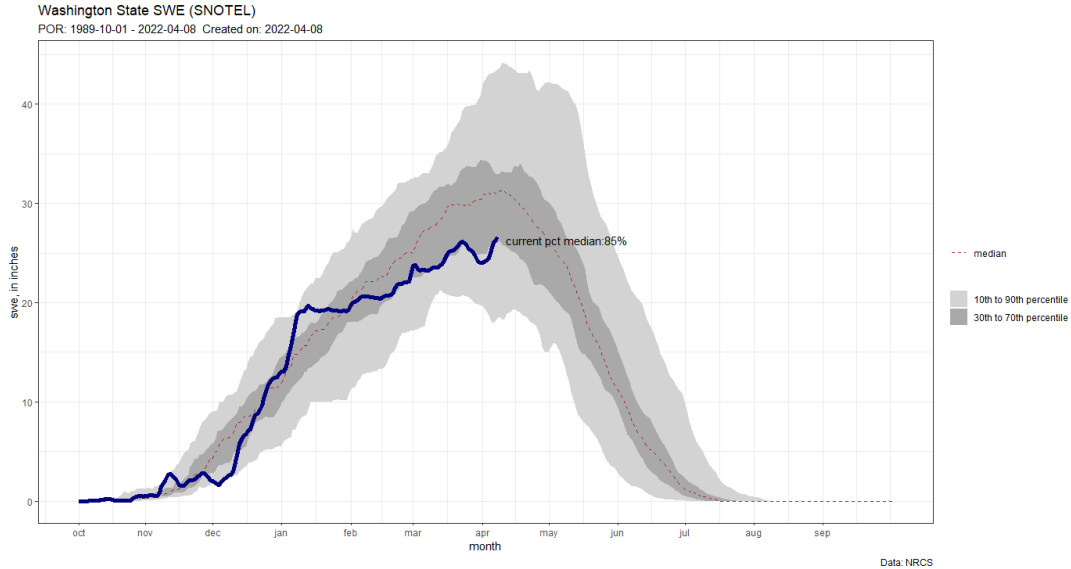
SNOTEL LOCATIONS VS SNODAS 04-08-22



Statewide SNODAS: 97% of Median POR (2003-2022)

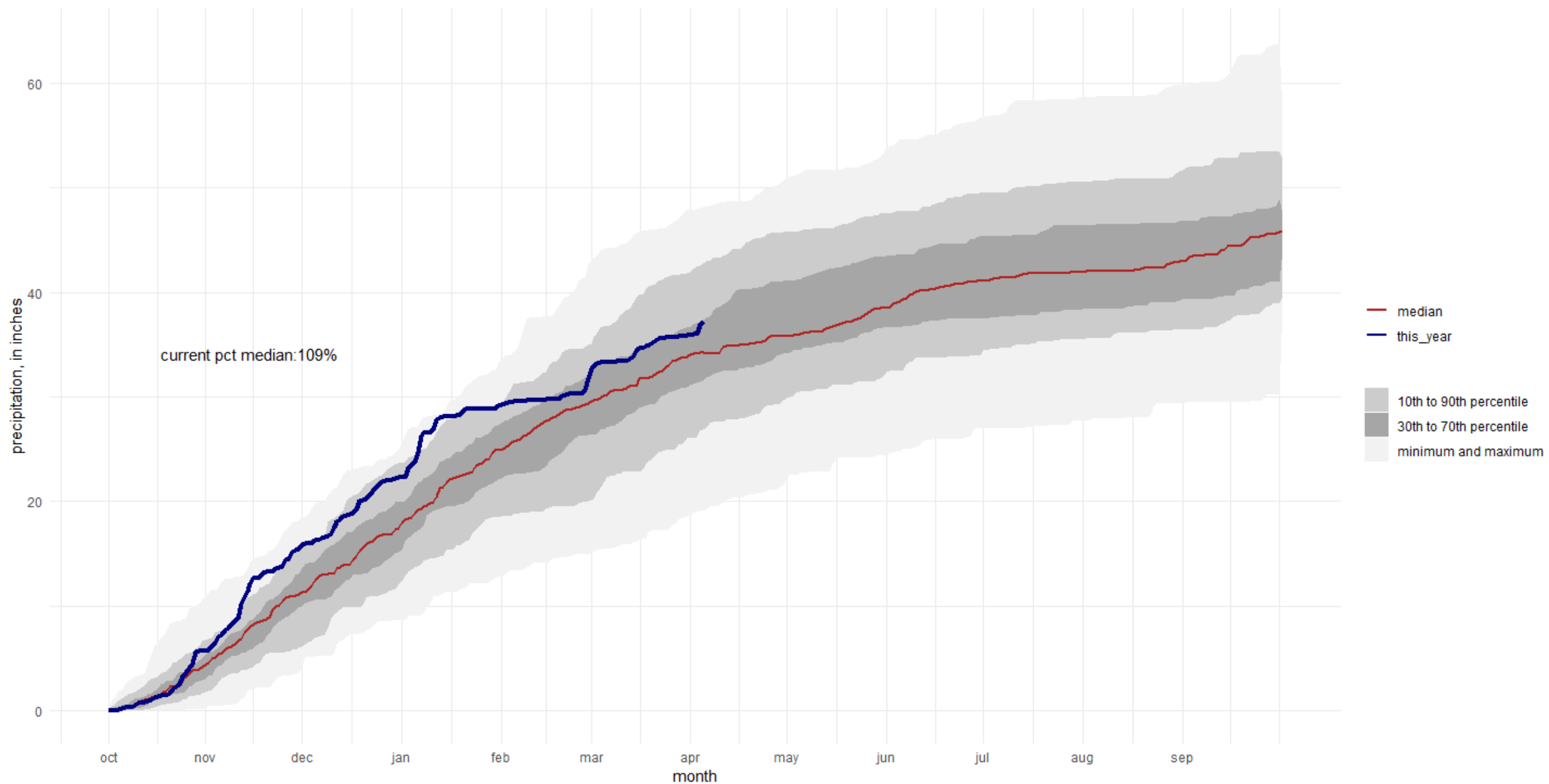


Statewide SNOTEL: 85% of Median (unofficial) POR (1989-2022)



Washington State Cumulative Statewide Precipitation (gridMET)

POR: 1979-10-01 - 2022-04-04 Created on: 2022-04-07



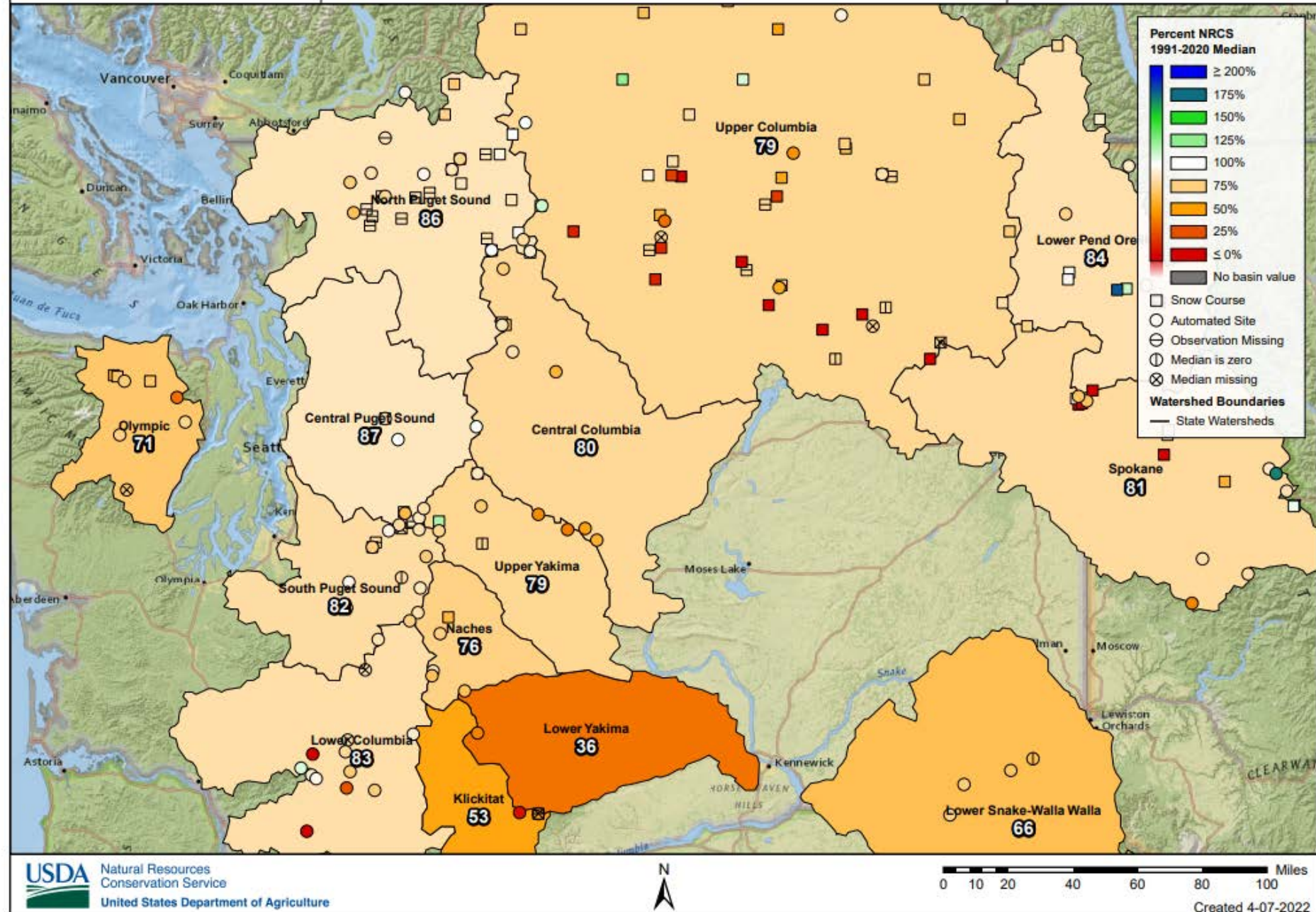


WSAC March 2022

Snow Water Equivalent

Percent NRCS 1991-2020 Median

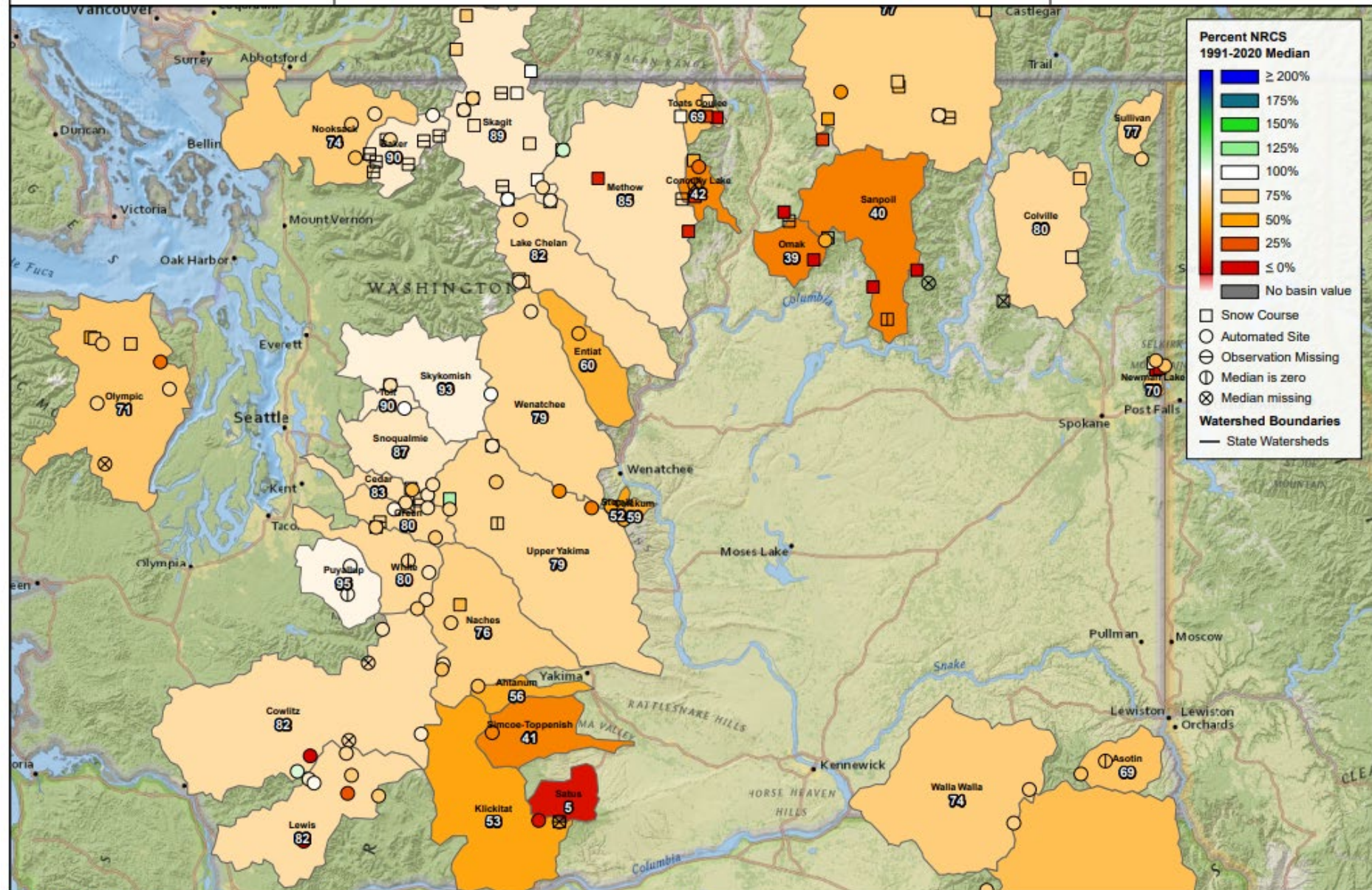
End of March, 2022



Snow Water Equivalent

Percent NRCS 1991-2020 Median

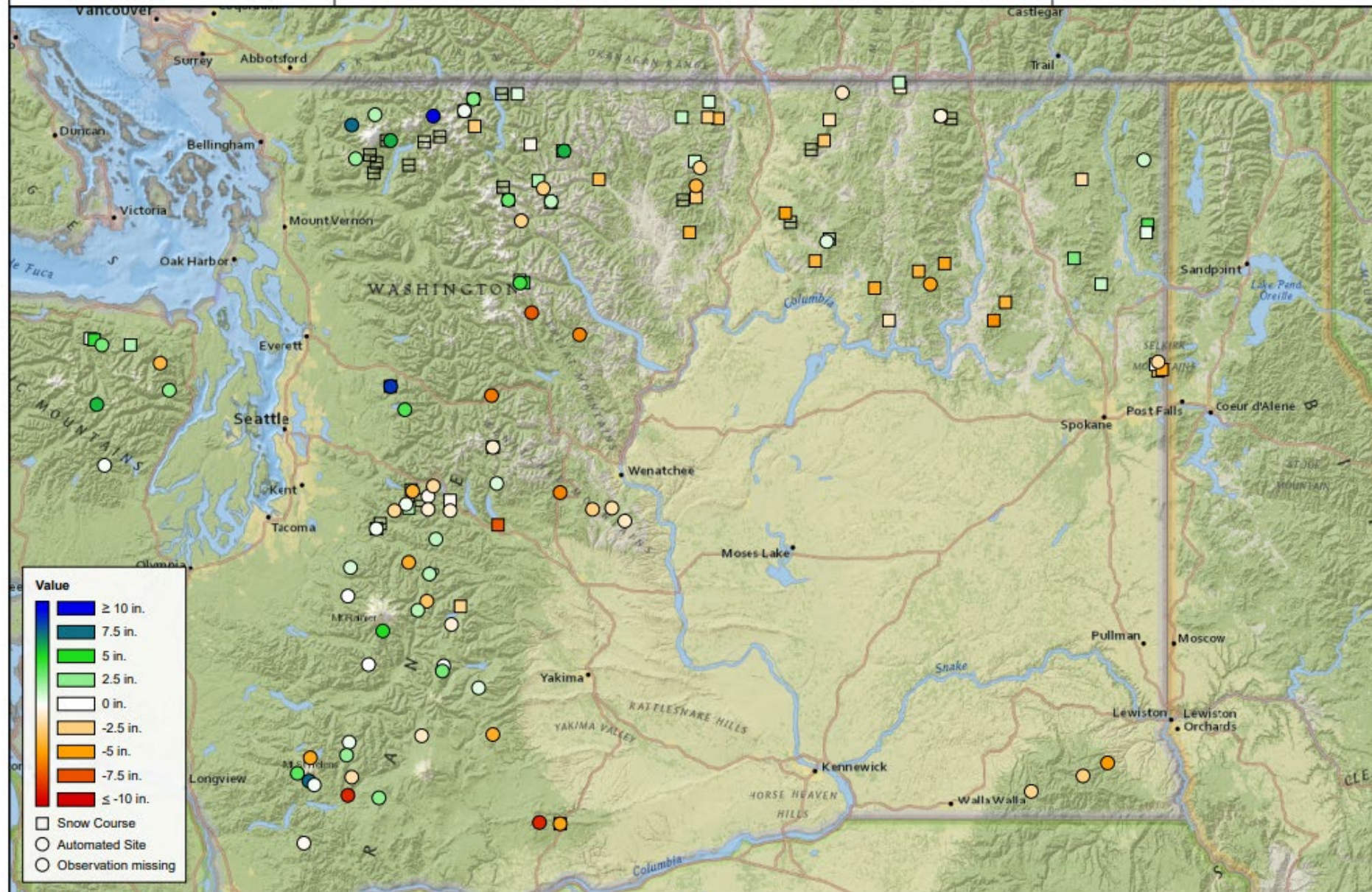
End of March, 2022

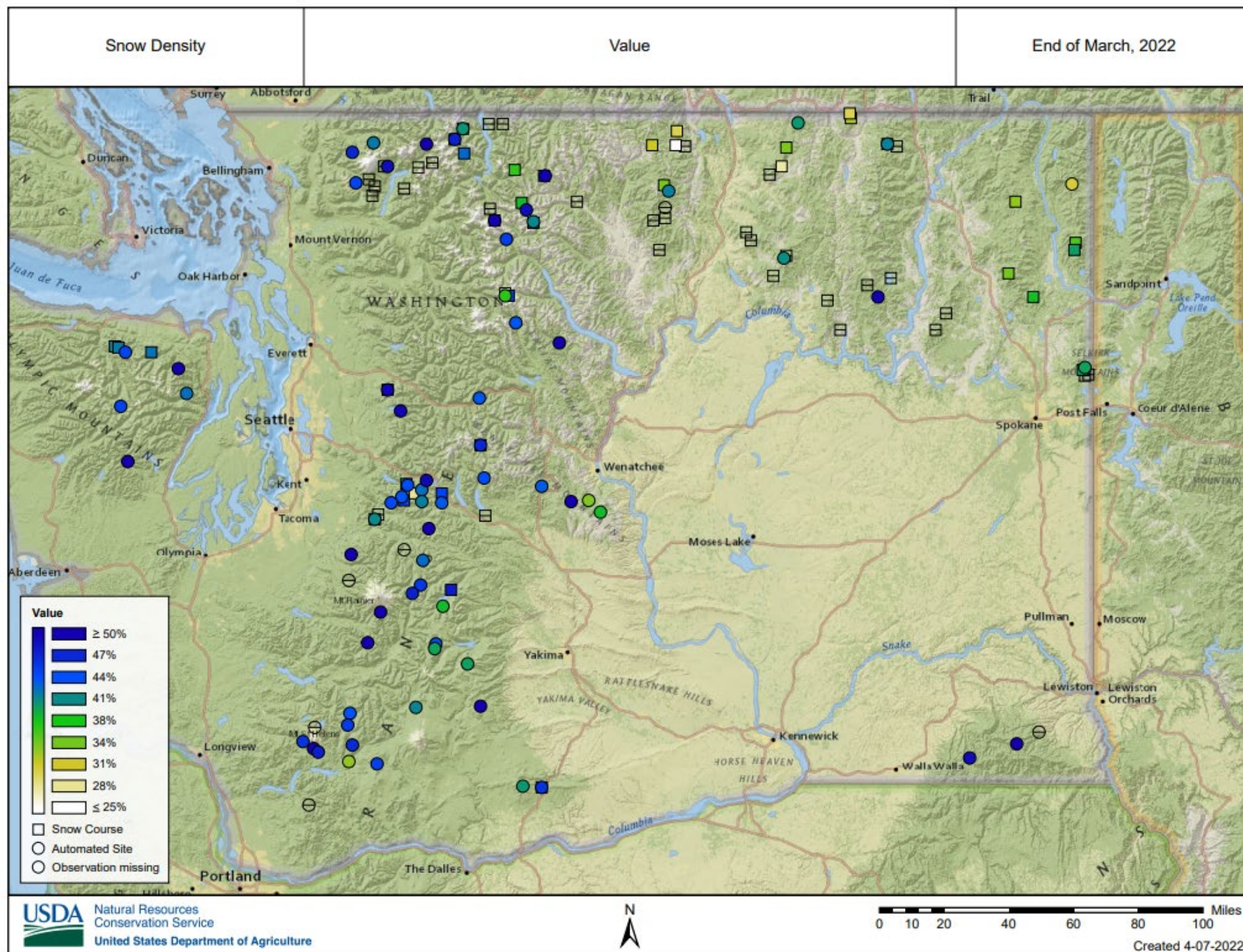


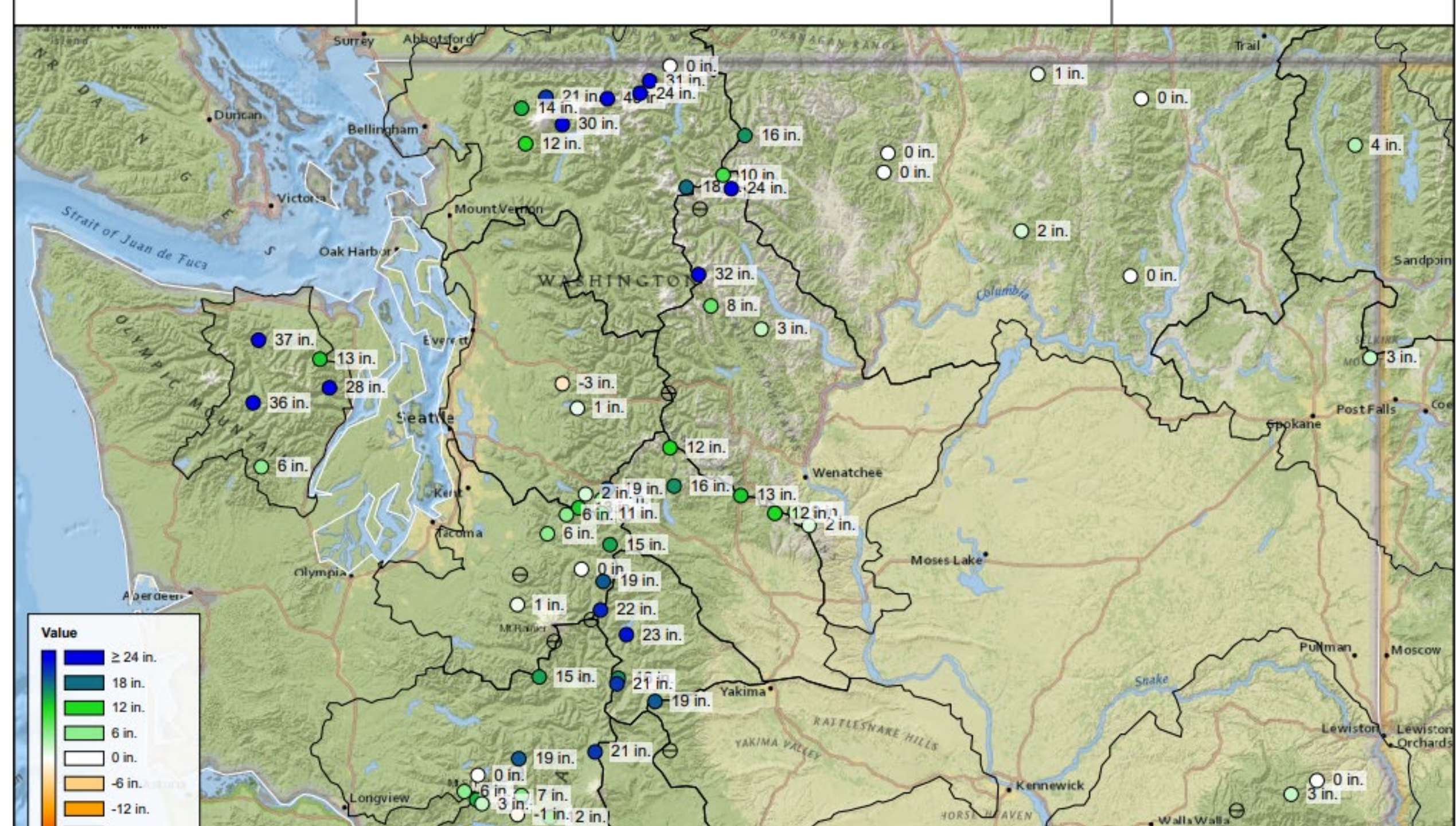
Snow Water Equivalent Delta

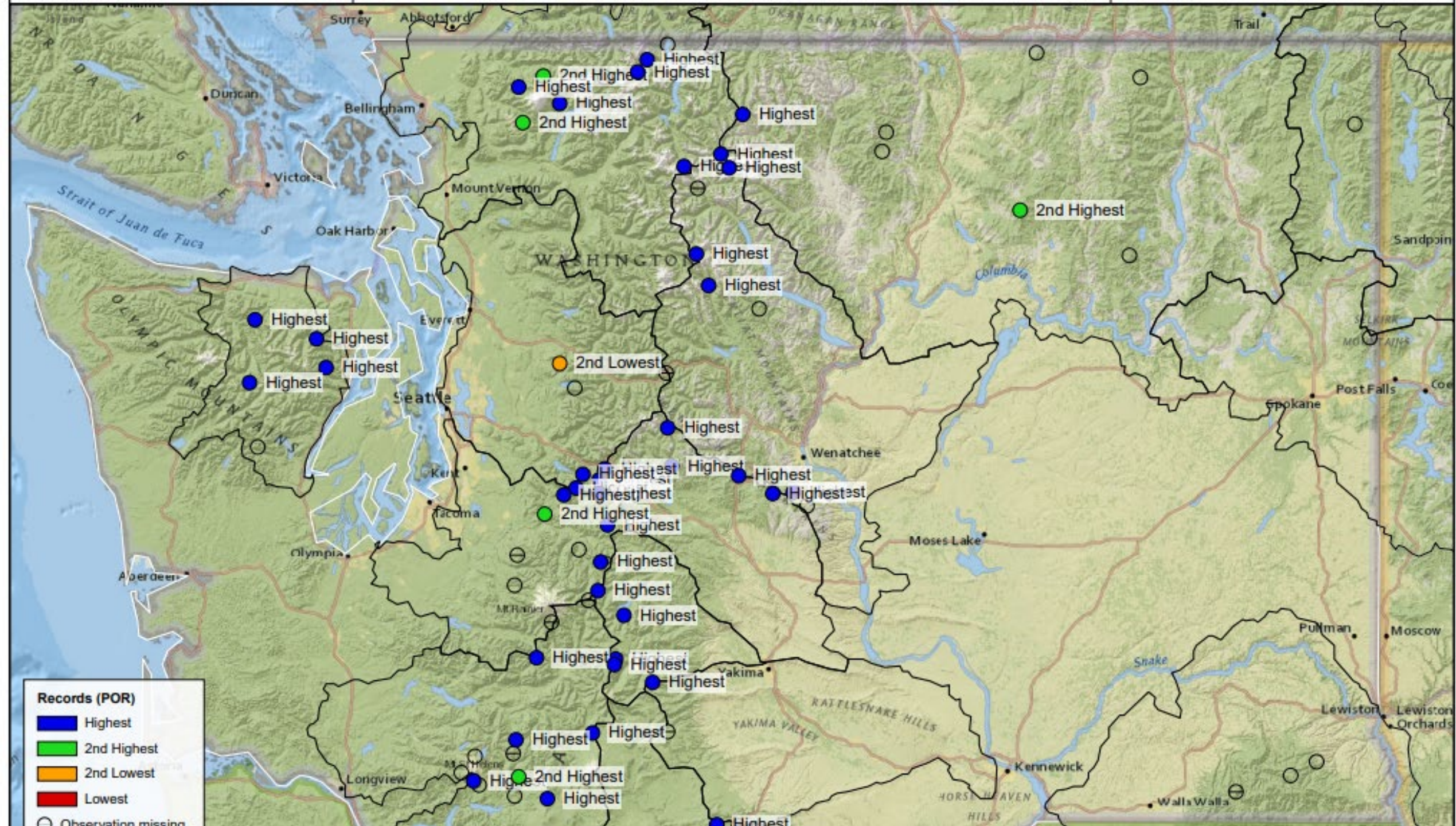
Value

End of March, 2022 -
End of February, 2022





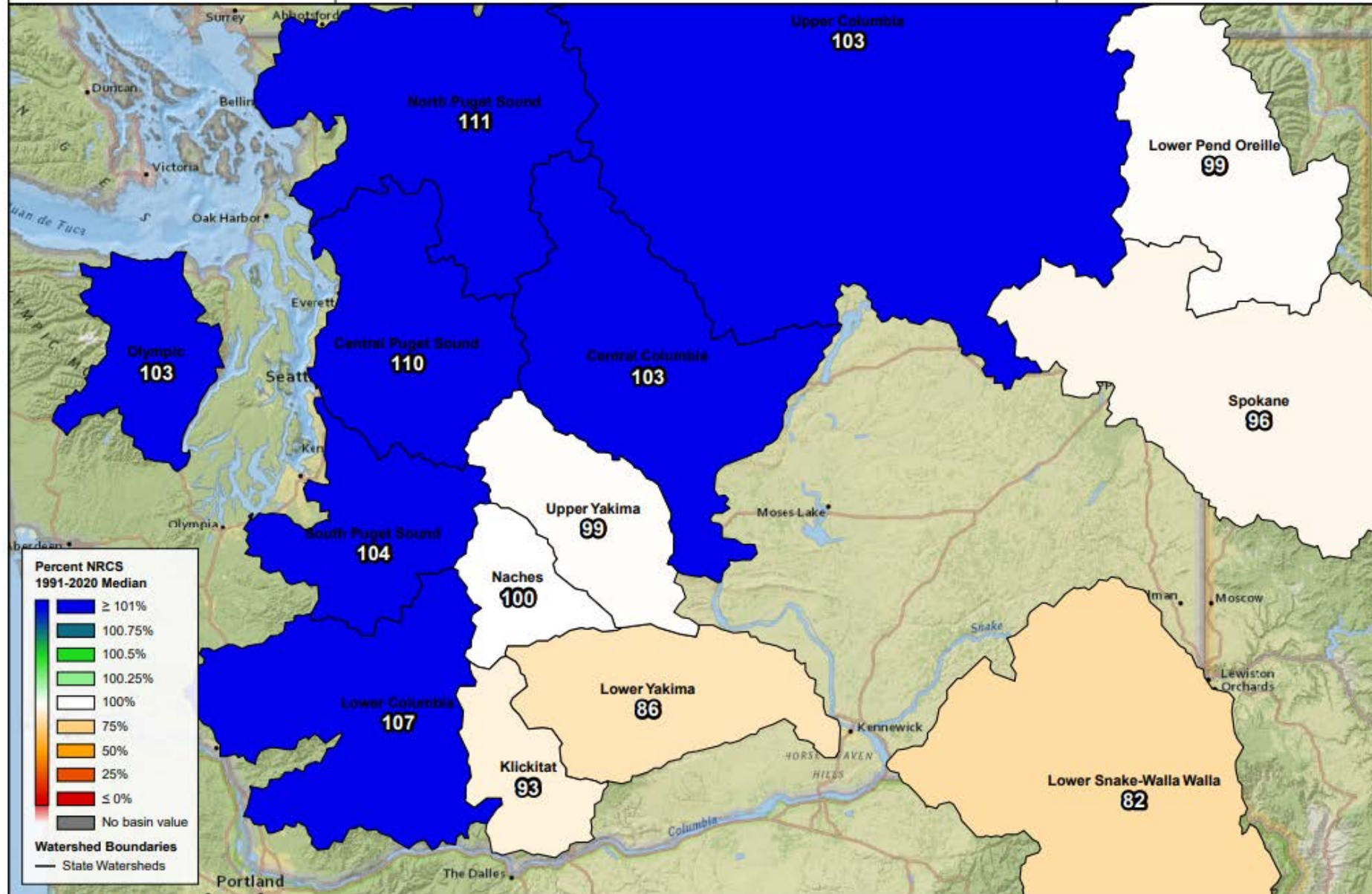




Water Year to Date Precipitation

Percent NRCS 1991-2020 Median

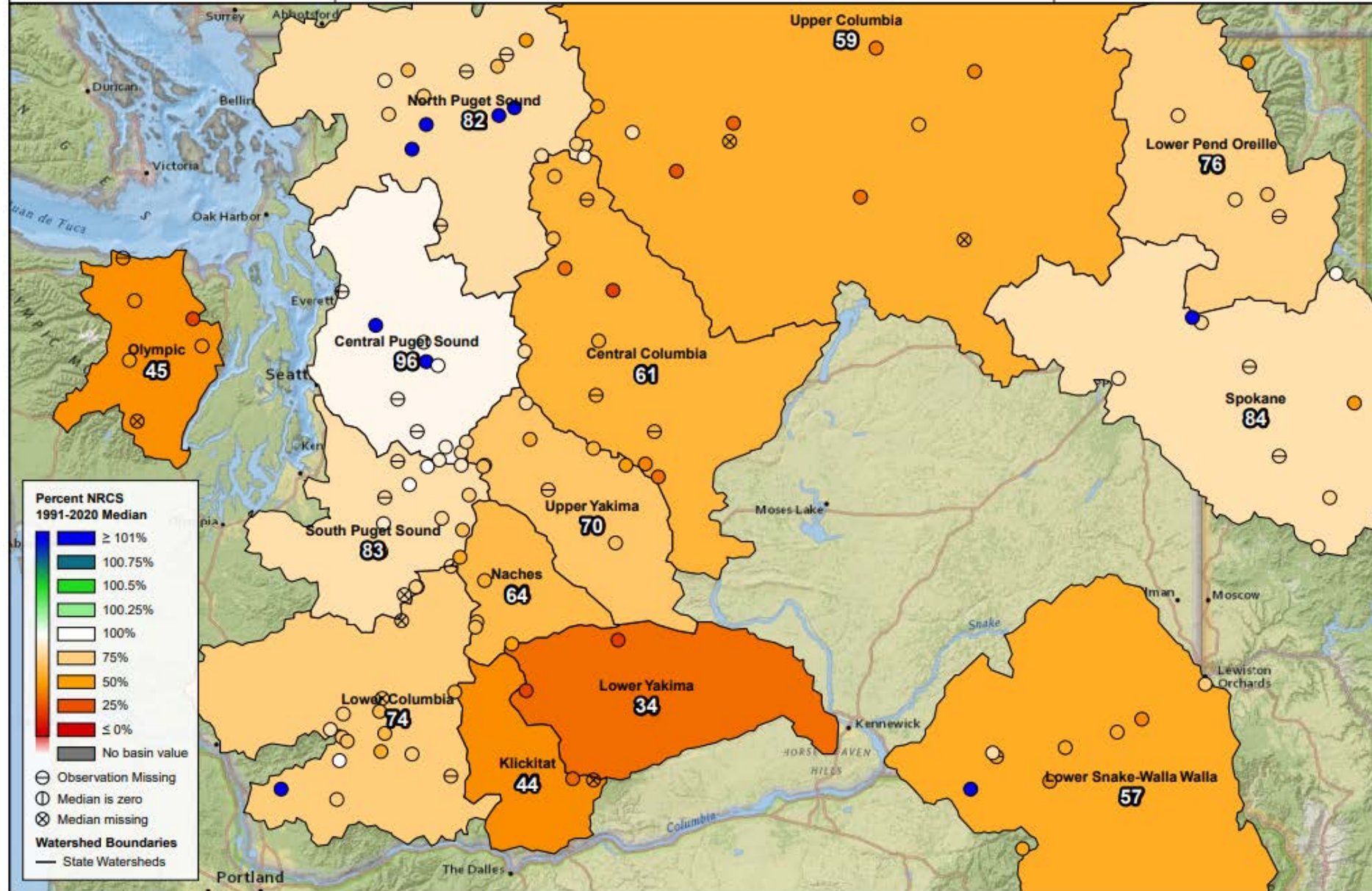
October 1, 2021 - March 31, 2022



1 month Precipitation

Percent NRCS 1991-2020 Median

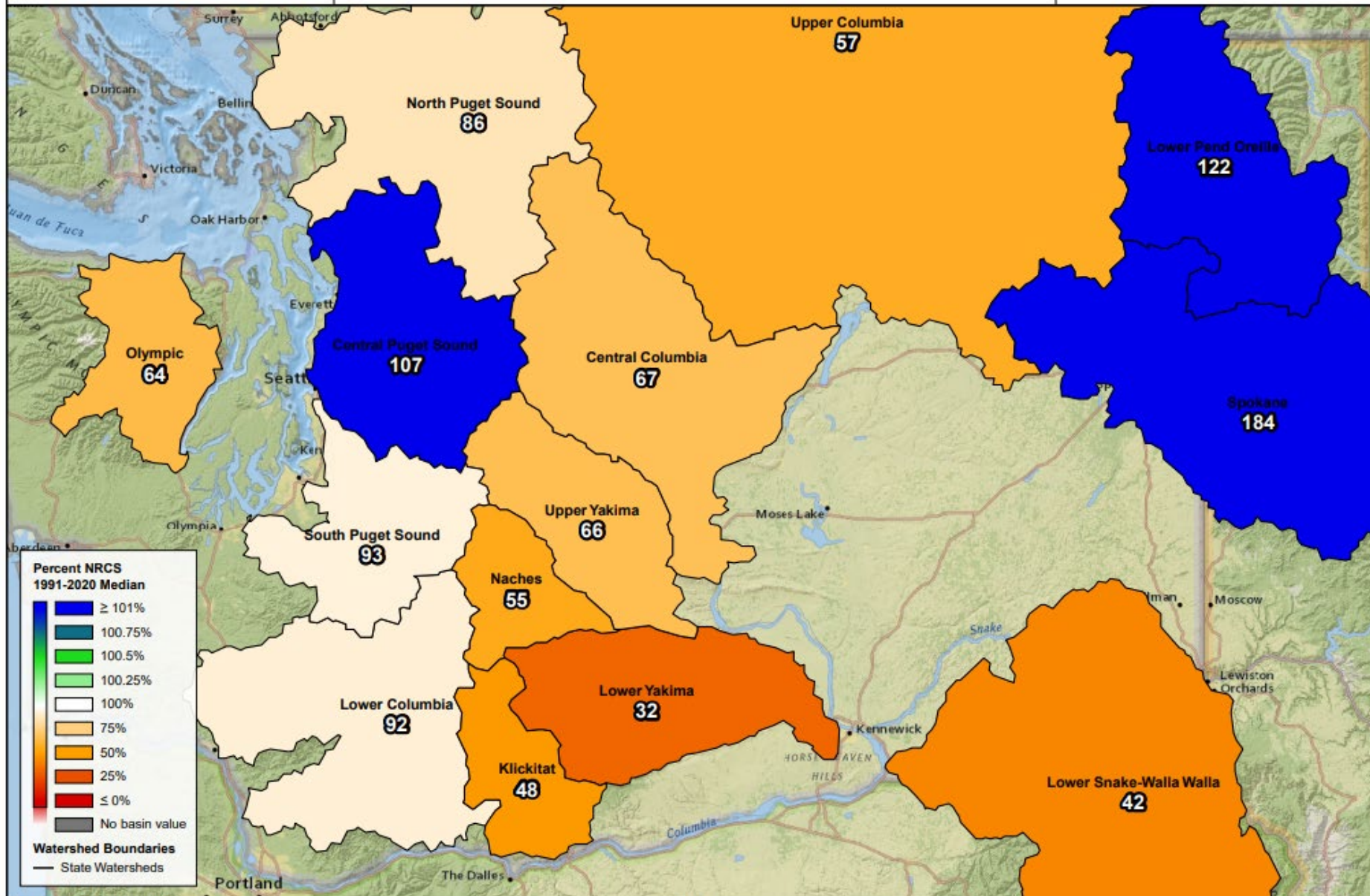
March 1, 2022 - March 31, 2022



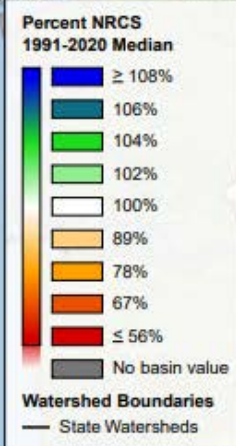
Month to Date Precipitation

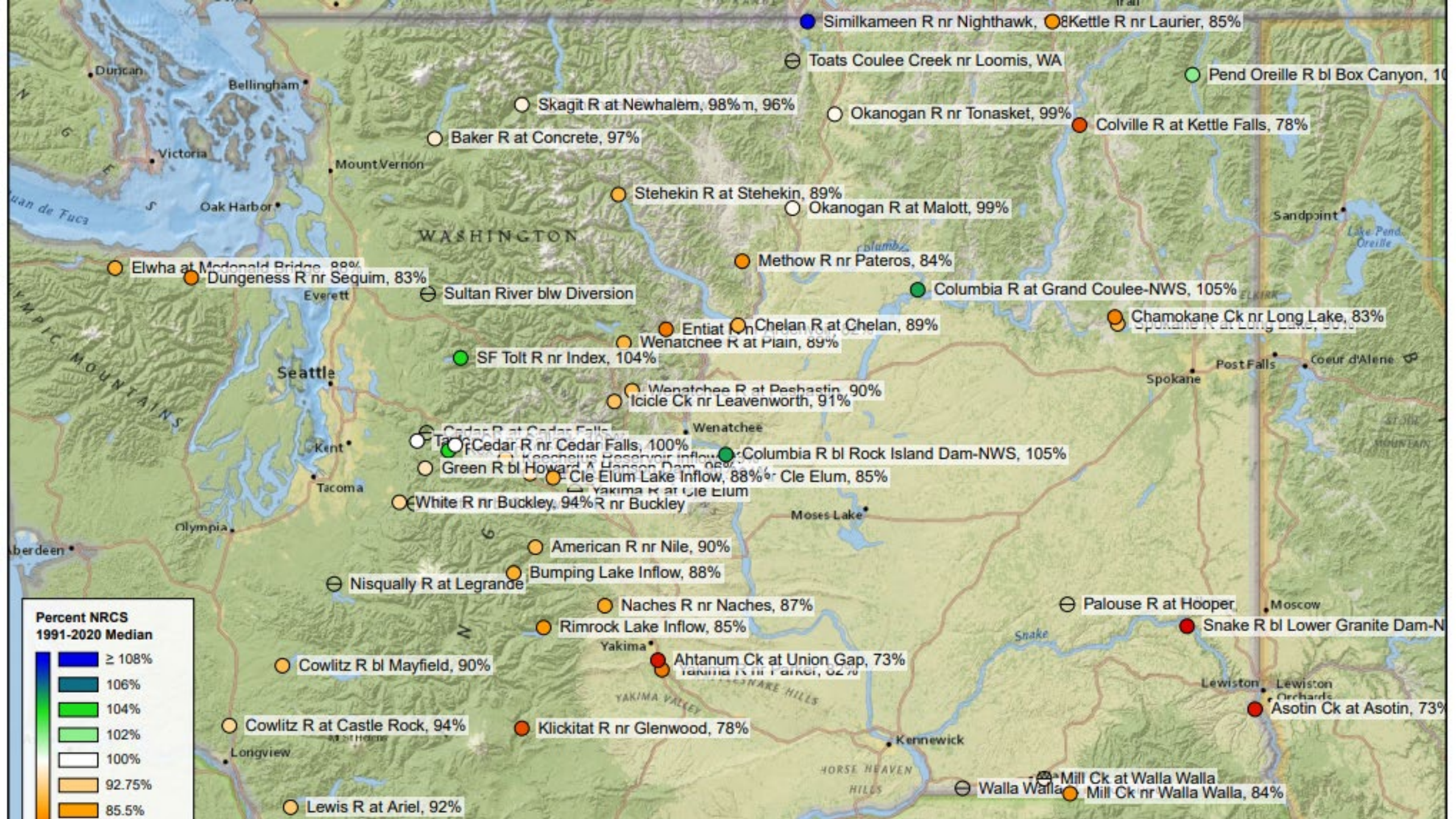
Percent NRCS 1991-2020 Median

March 1, 2022 - March 7, 2022



Primary Period, April 1, 2022





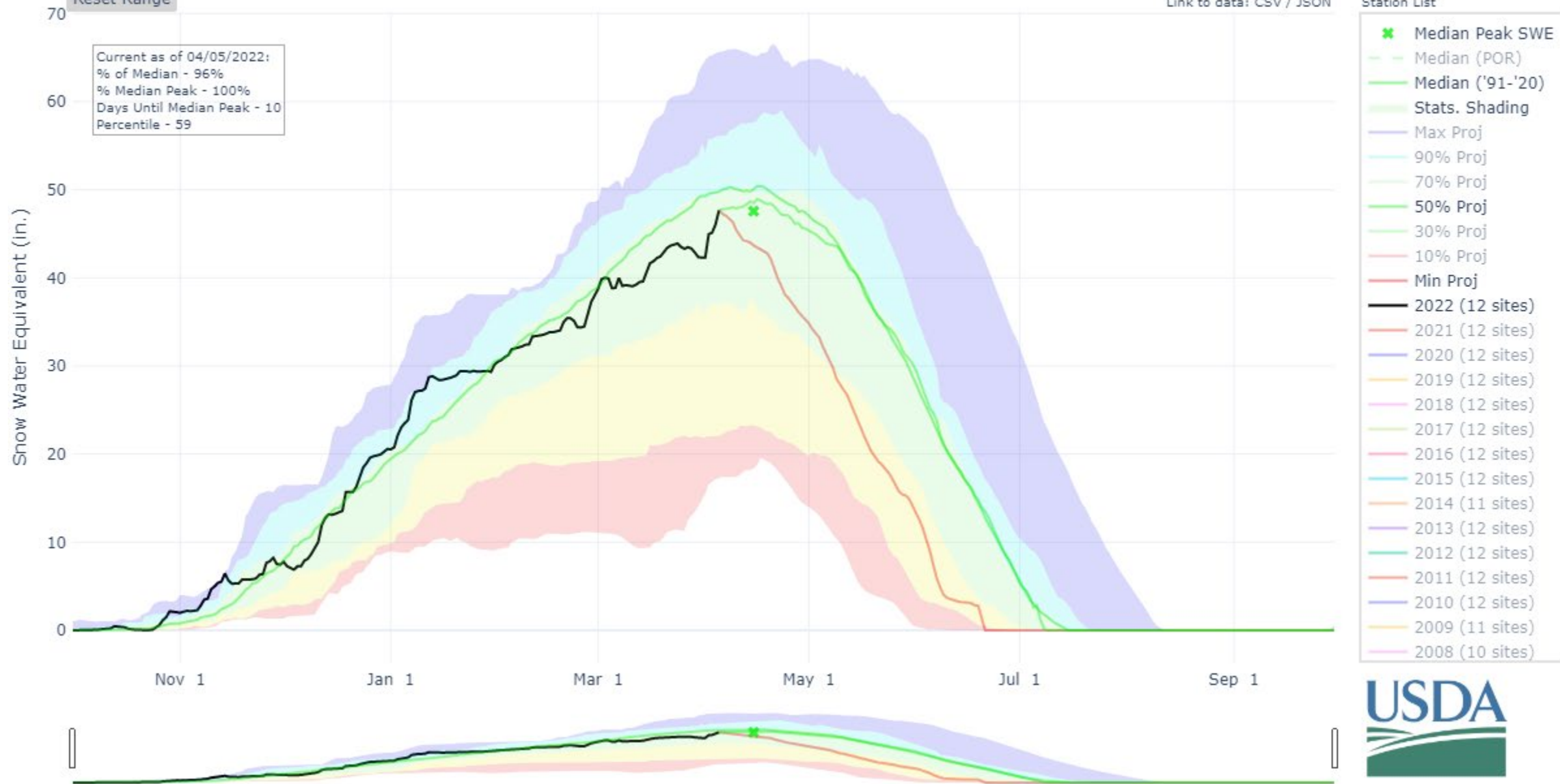
SNOW WATER EQUIVALENT PROJECTIONS IN NORTH PUGET SOUND

Reset Range

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

Station List

Current as of 04/05/2022:
% of Median - 96%
% Median Peak - 100%
Days Until Median Peak - 10
Percentile - 59

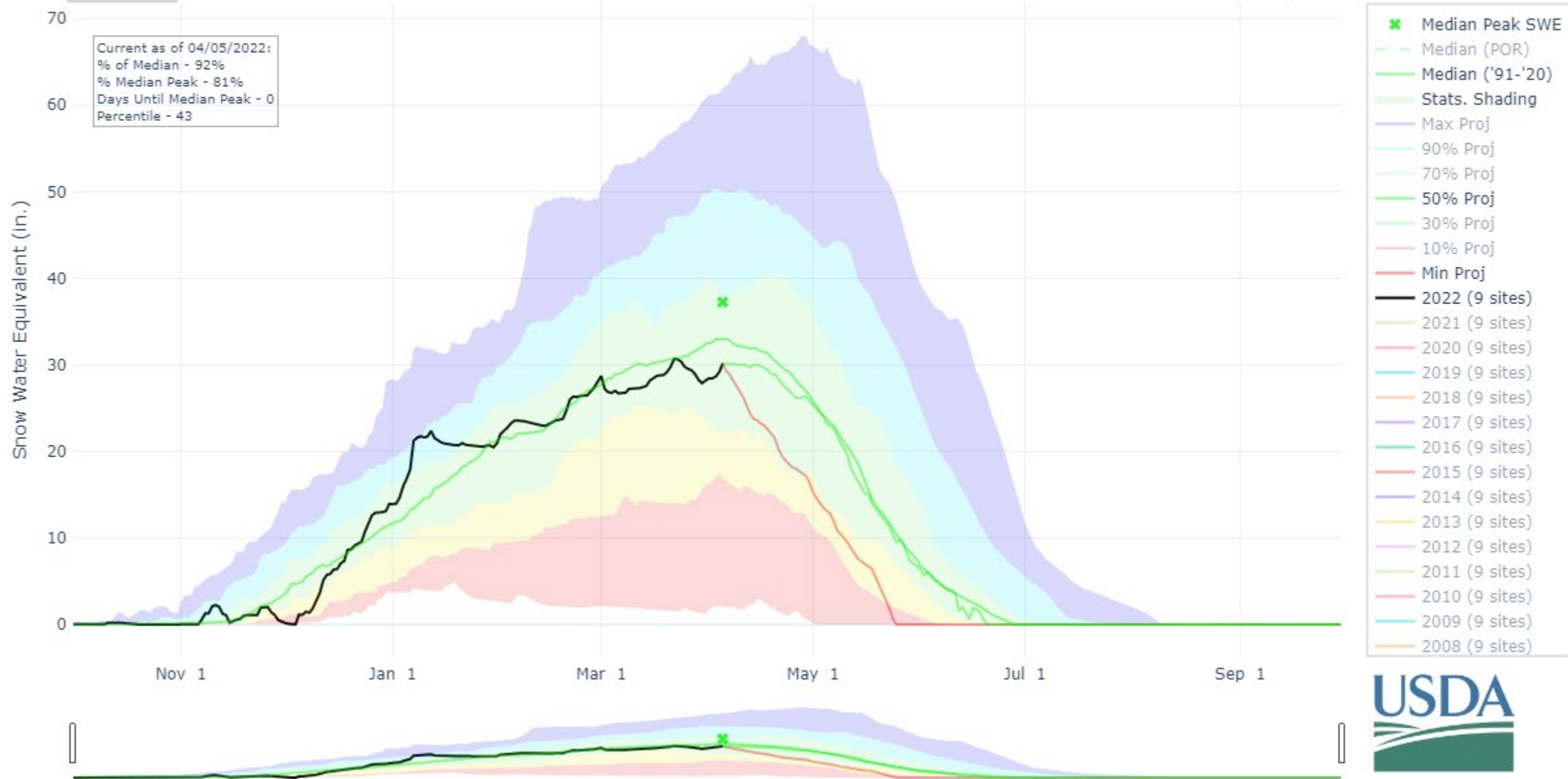


SNOW WATER EQUIVALENT PROJECTIONS IN CENTRAL PUGET SOUND

Reset Range

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

Station List

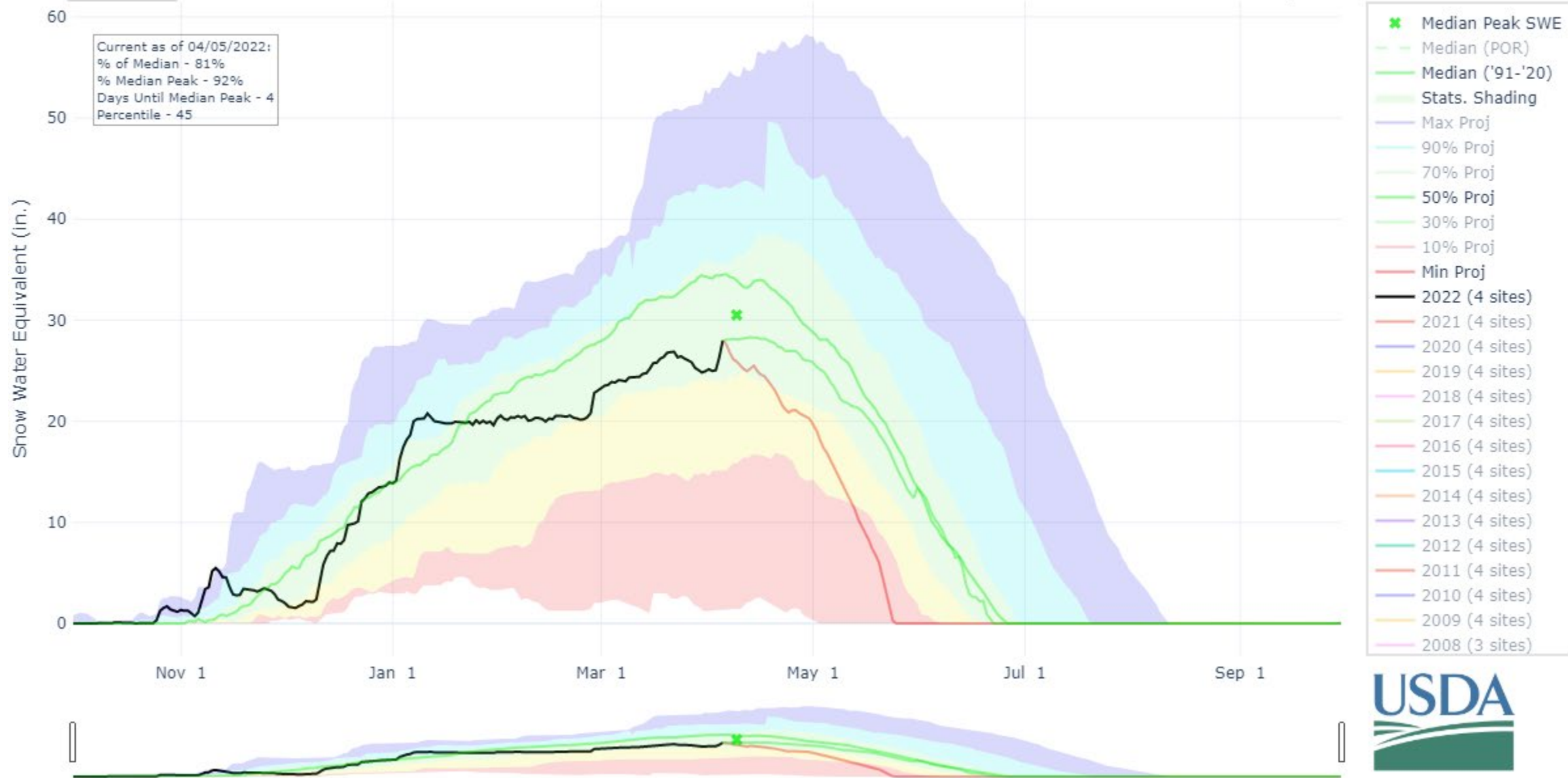


SNOW WATER EQUIVALENT PROJECTIONS IN OLYMPIC

Reset Range

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

Station List

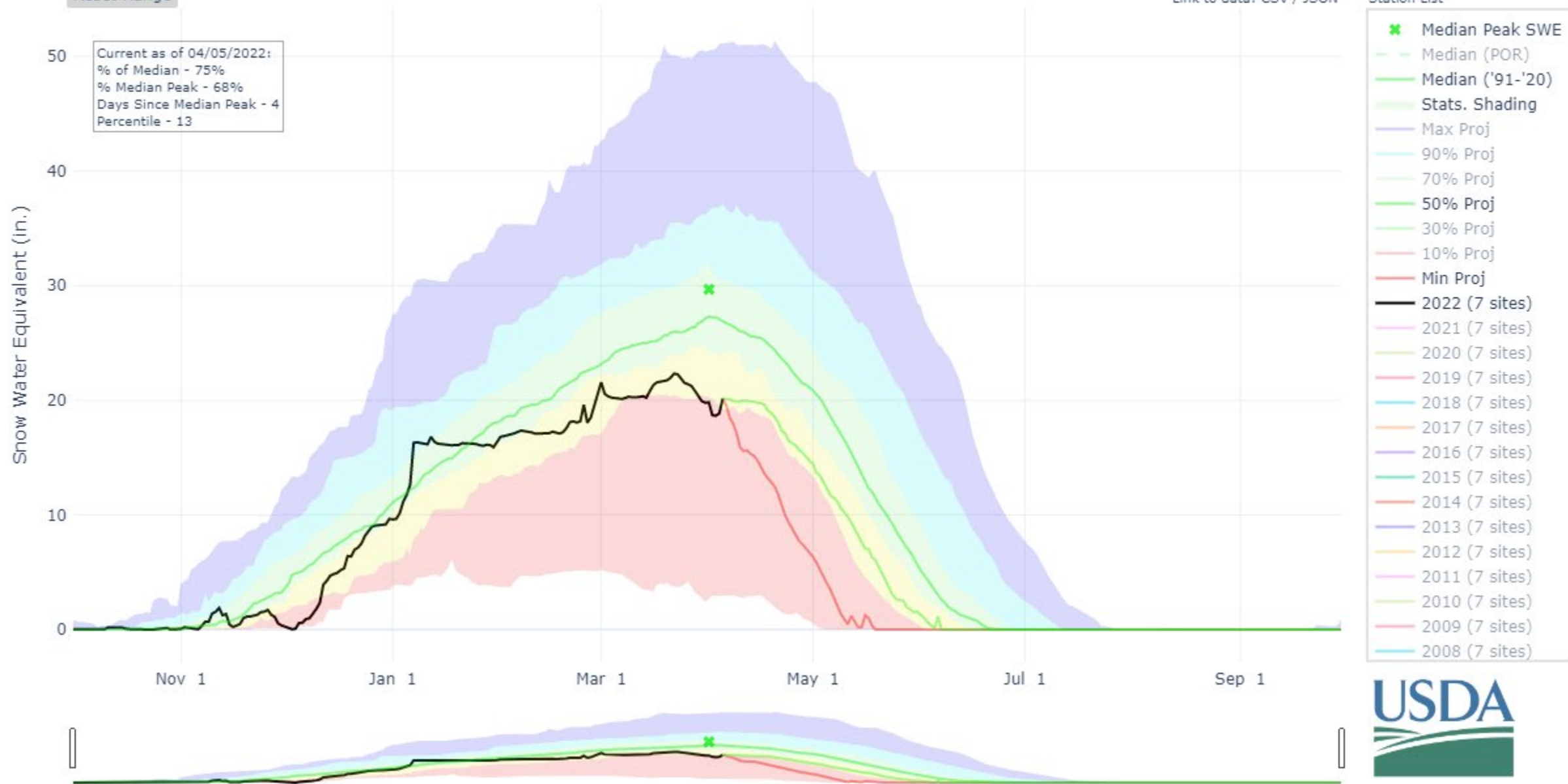


SNOW WATER EQUIVALENT PROJECTIONS IN UPPER YAKIMA

Reset Range

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

Station List

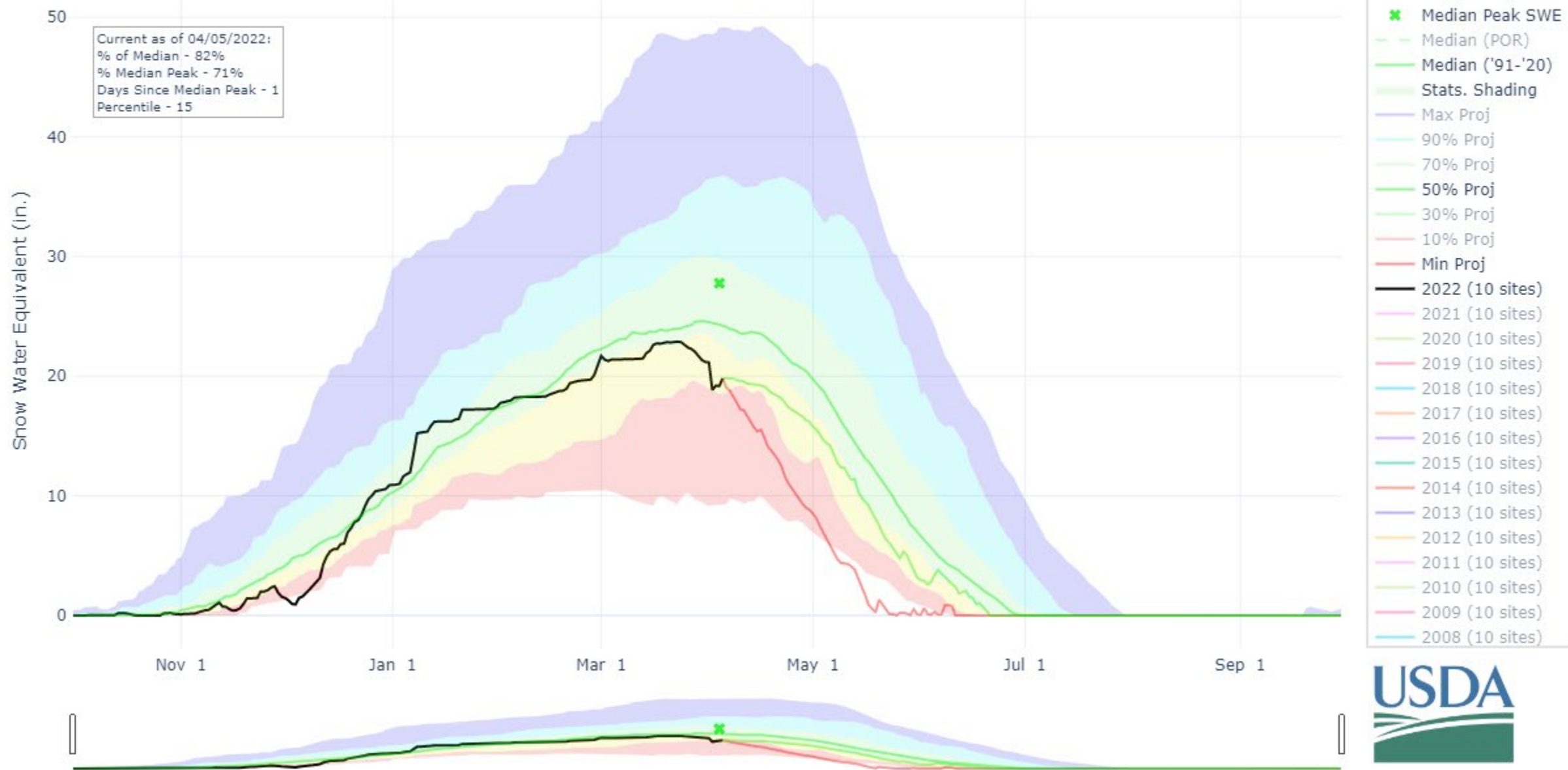


SNOW WATER EQUIVALENT PROJECTIONS IN SPOKANE

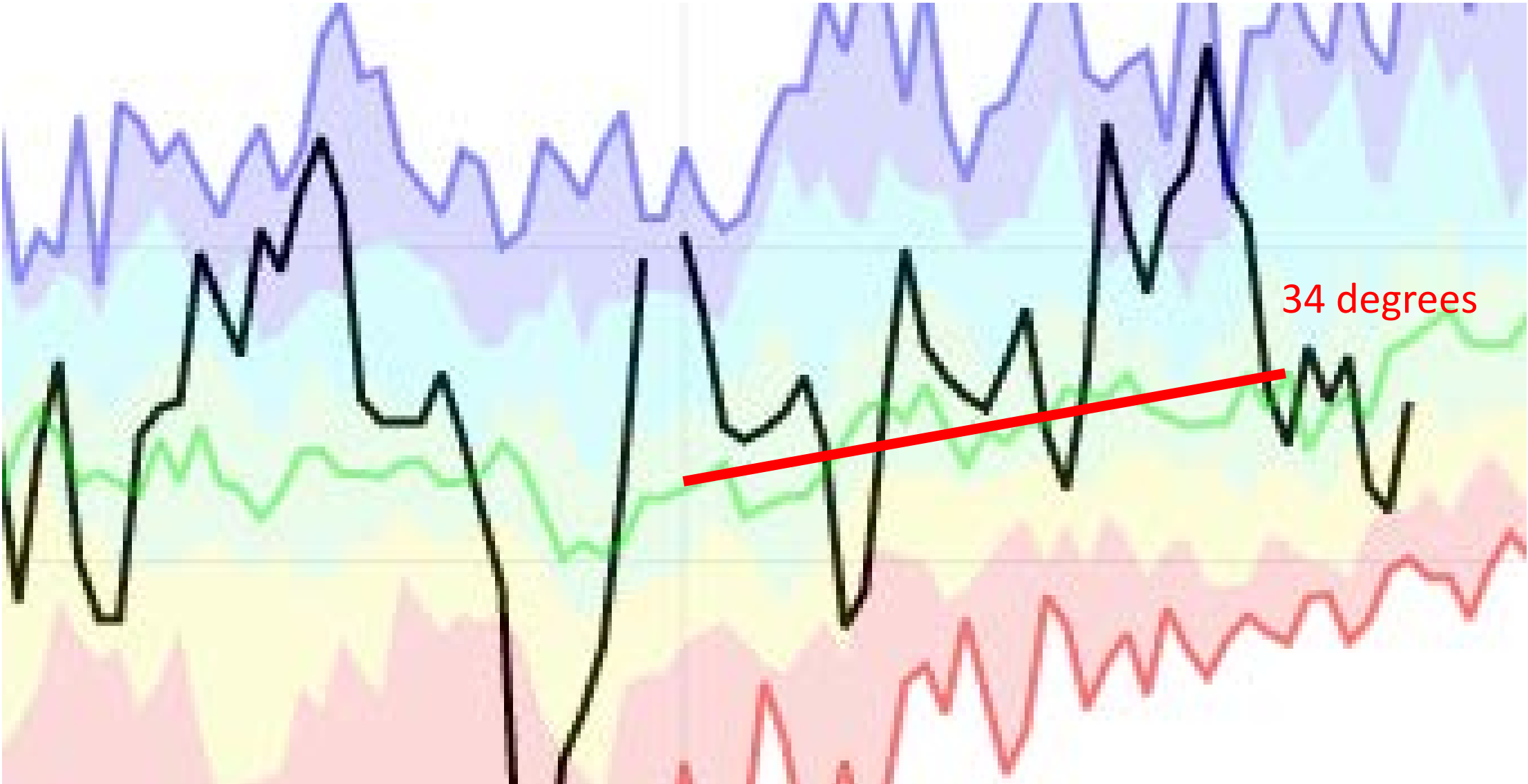
Reset Range

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

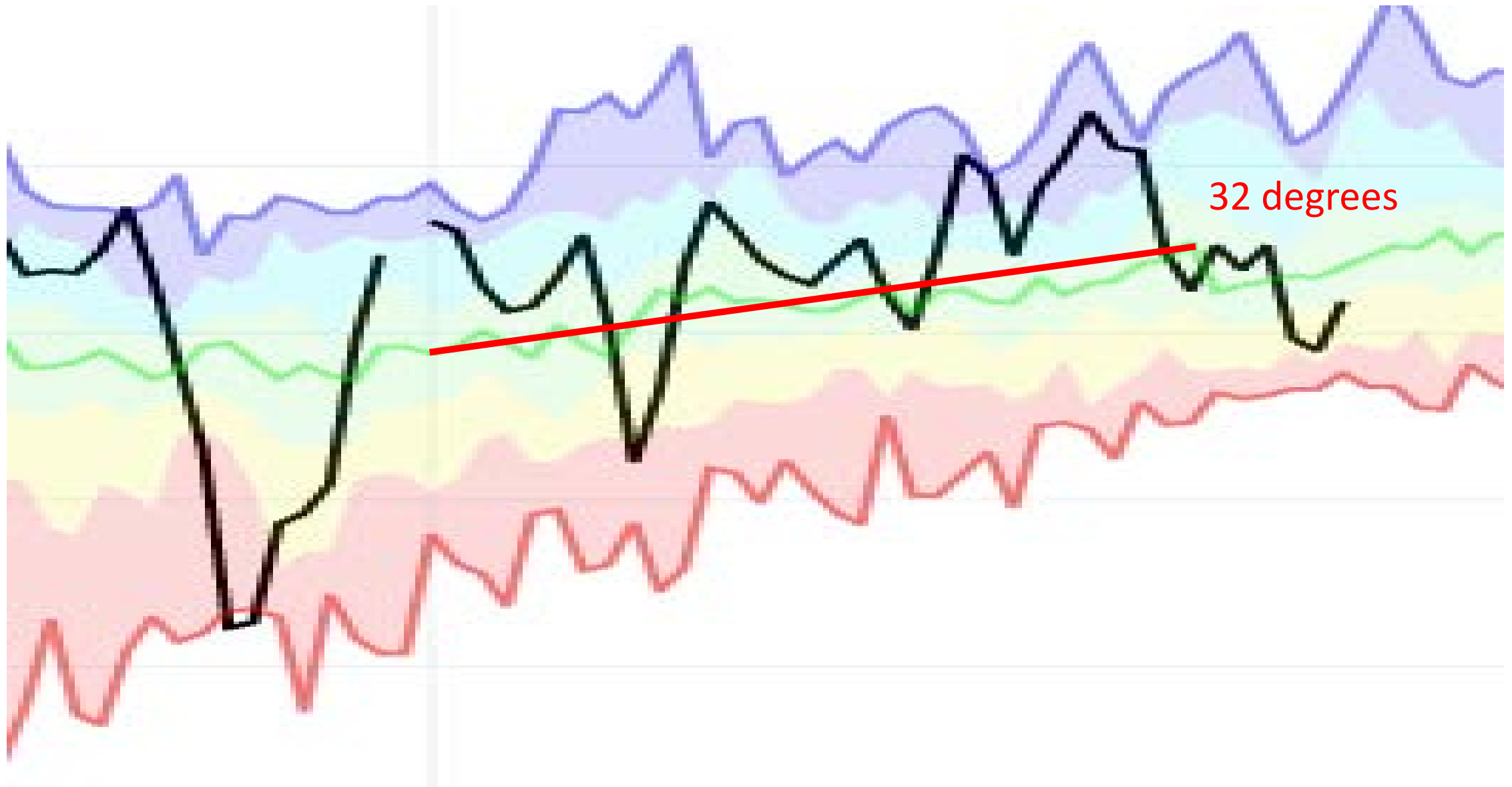
Station List



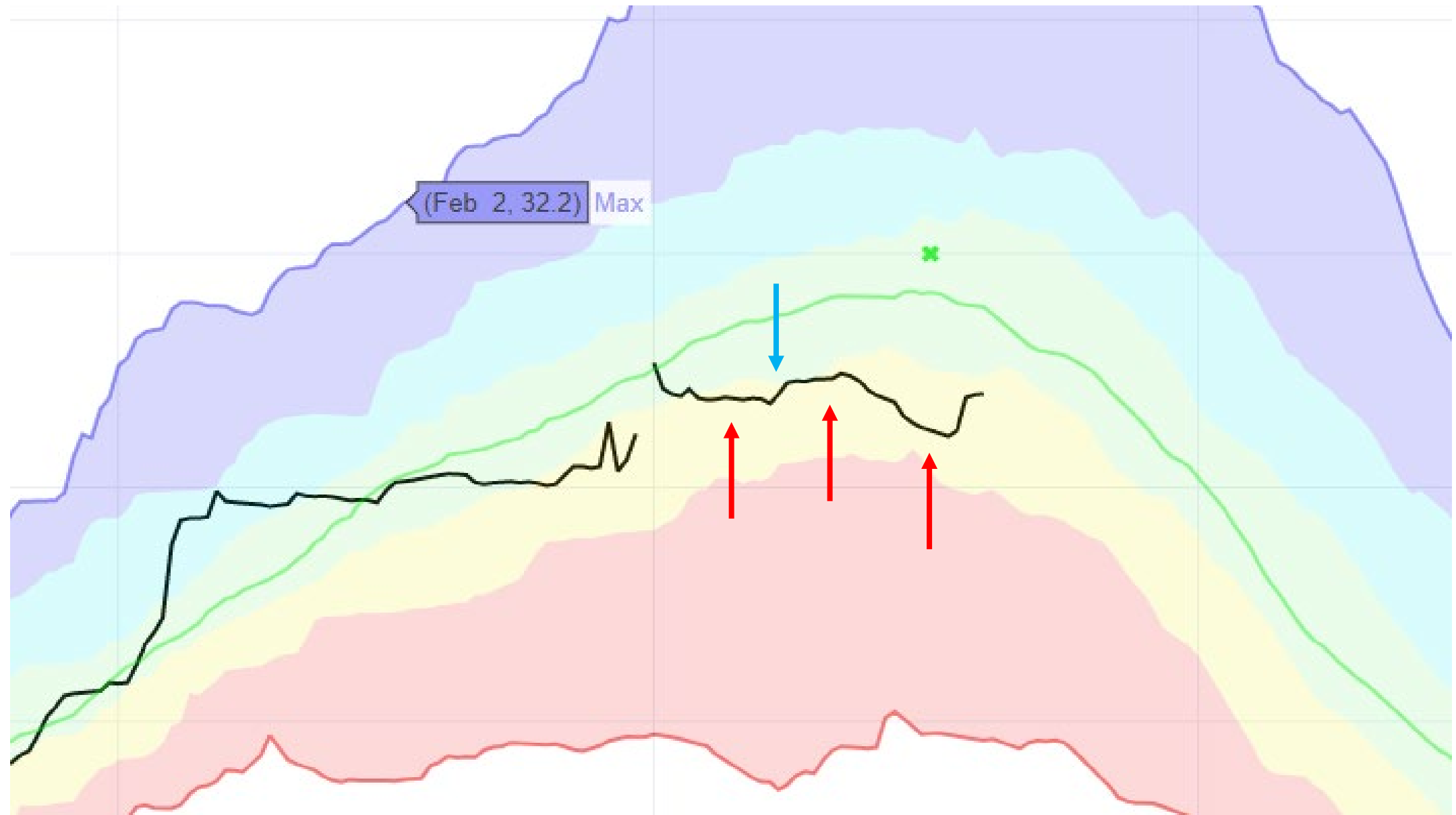
Cedar River Daily Average Temperature for March



Wenatchee River Daily Average Temperature for March



SNOW WATER EQUIVALENT IN WENATCHEE







Office of the Washington State Climatologist



Current Conditions and Seasonal Outlook

Nick Bond & Karin Bumbaco

Office of the Washington State Climatologist

Cooperative Institute for Climate, Ocean, and Ecosystem Studies

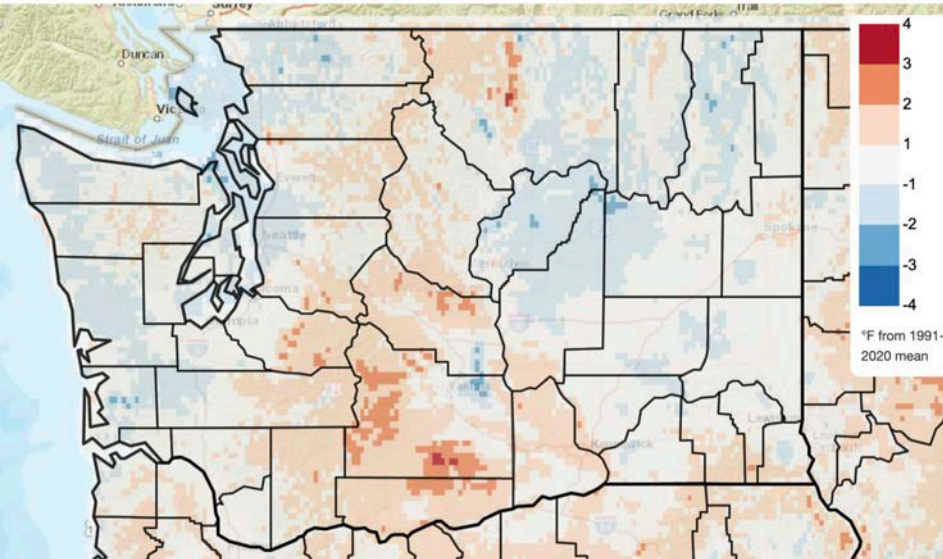
University of Washington

8 April 2022

Water Year 2022

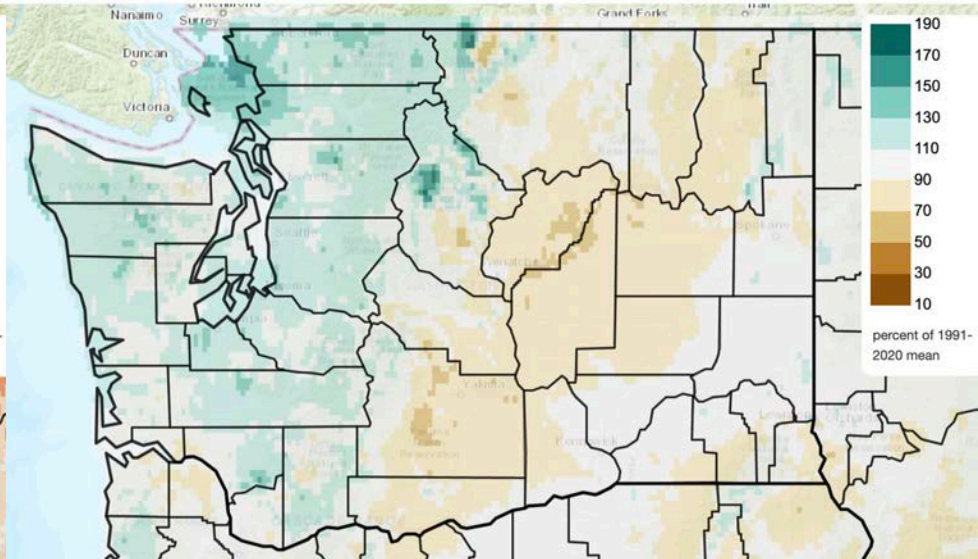
Mean Daily Temperature Anomaly, Since Oct 1st

2021/10/01 - 2022/04/05



Total Precipitation Anomaly, Since Oct 1st

2021/10/01 - 2022/04/05



Climate Toolbox

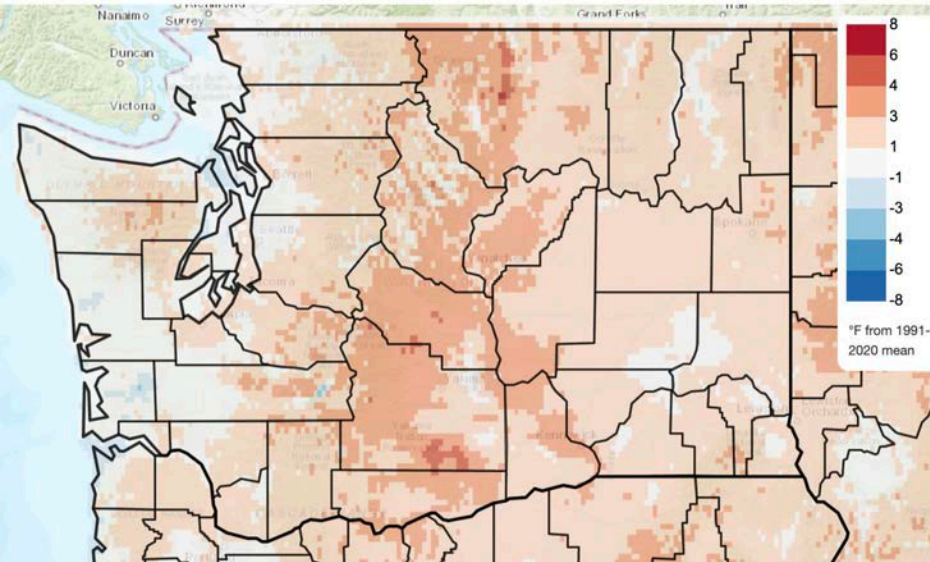
- Average WA Oct-**Feb** temperatures near-normal* (-0.1°F)
- Average WA Oct-**Feb** precipitation above normal (+3.02"), ranking as the 40th wettest

*1991-2020 normal; records since 1895

March 2022

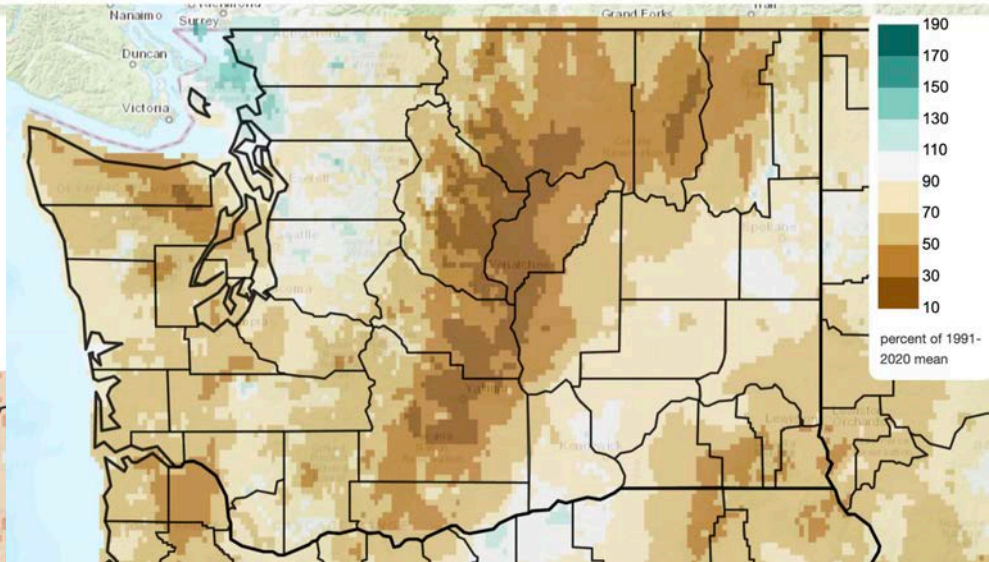
Mean Daily Temperature Anomaly, Last Full Month

2022/03/01 - 2022/03/31



Total Precipitation Anomaly, Last Full Month

2022/03/01 - 2022/03/31



Climate Toolbox

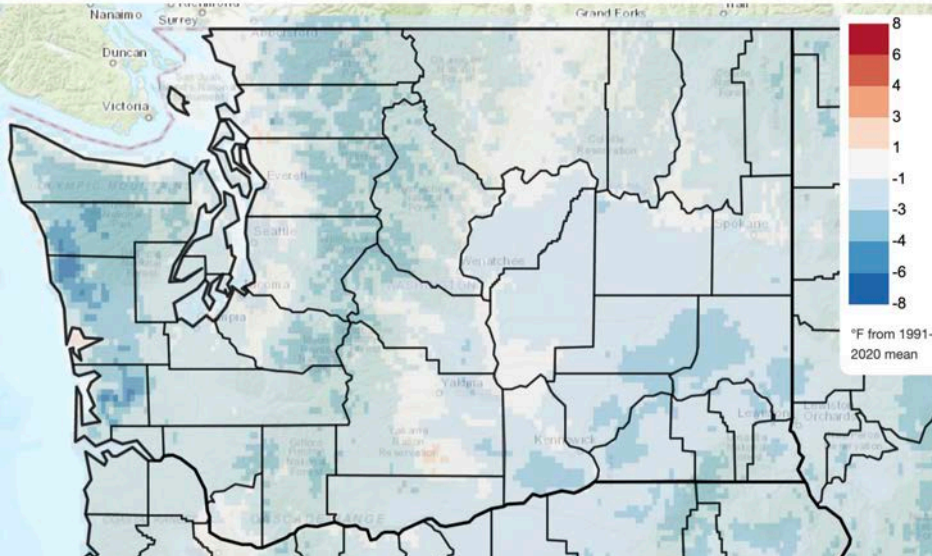
- March had above normal temperatures, particularly east of the Cascades
- March precipitation was below normal

*1991-2020 normal; records since 1895

April so far....

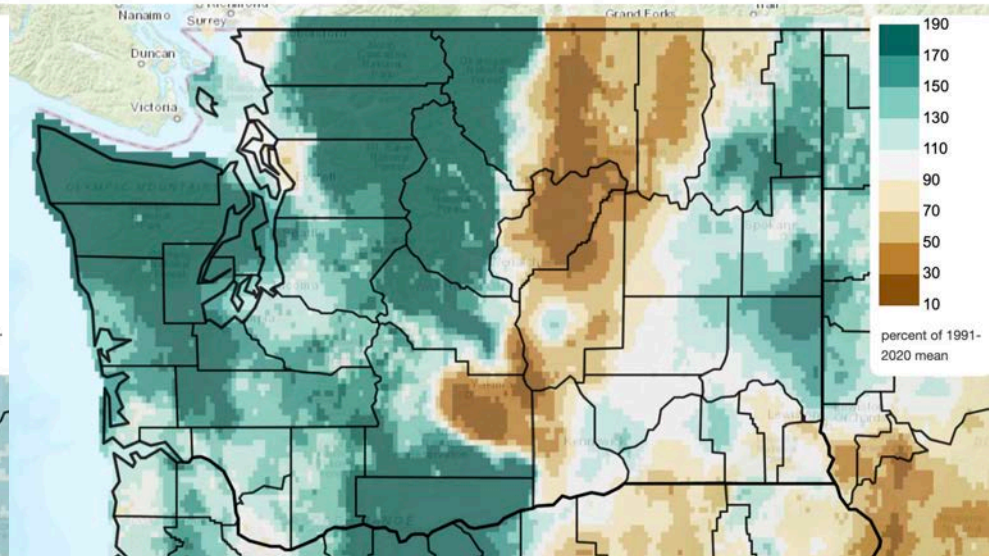
Mean Daily Temperature Anomaly, Last 7 Days

2022/03/30 - 2022/04/05



Total Precipitation Anomaly, Last 7 Days

2022/03/30 - 2022/04/05

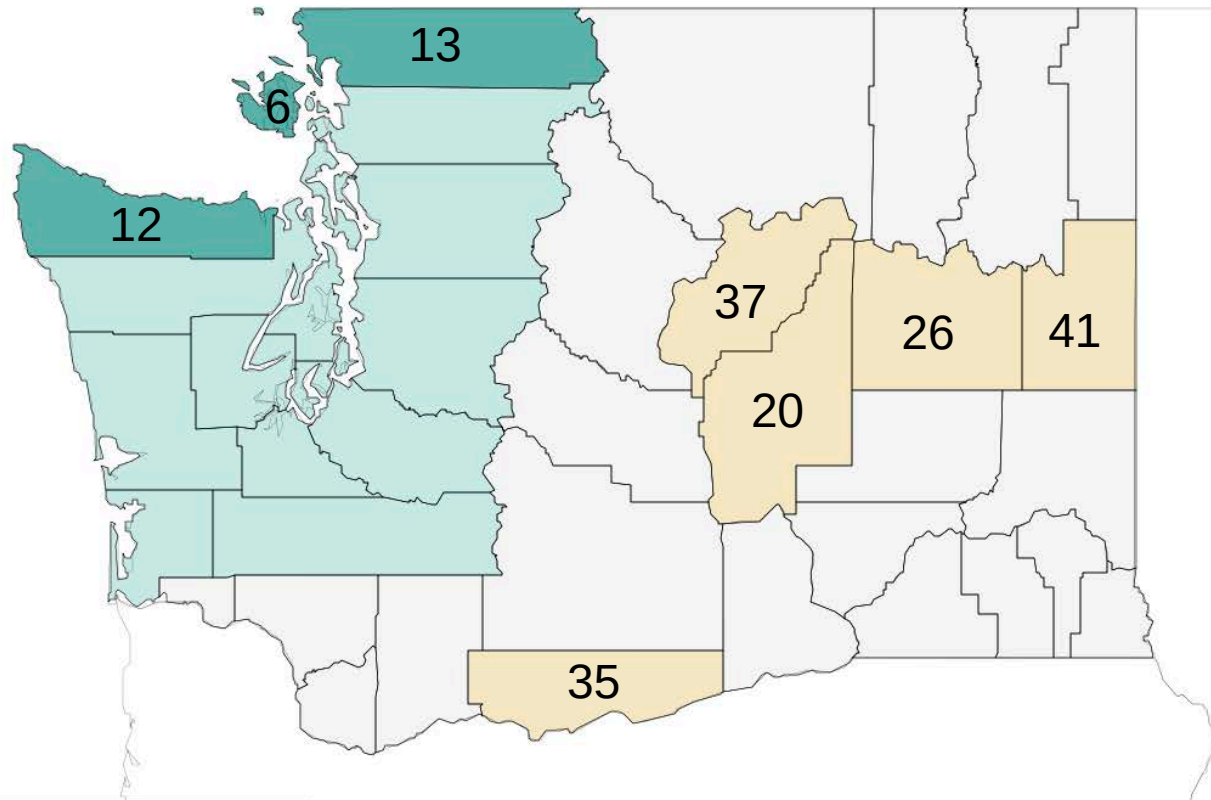


Climate Toolbox

Precipitation Rank Oct-Feb

County Precipitation Rank (of 127 years)

October 2021 - February 2022



Driest $\downarrow \frac{1}{10}$ $\downarrow \frac{1}{3}$ Near Normal $\uparrow \frac{1}{3}$ $\uparrow \frac{1}{10}$ Wettest

Washington (Hover over a county)

Precip: 30.59"

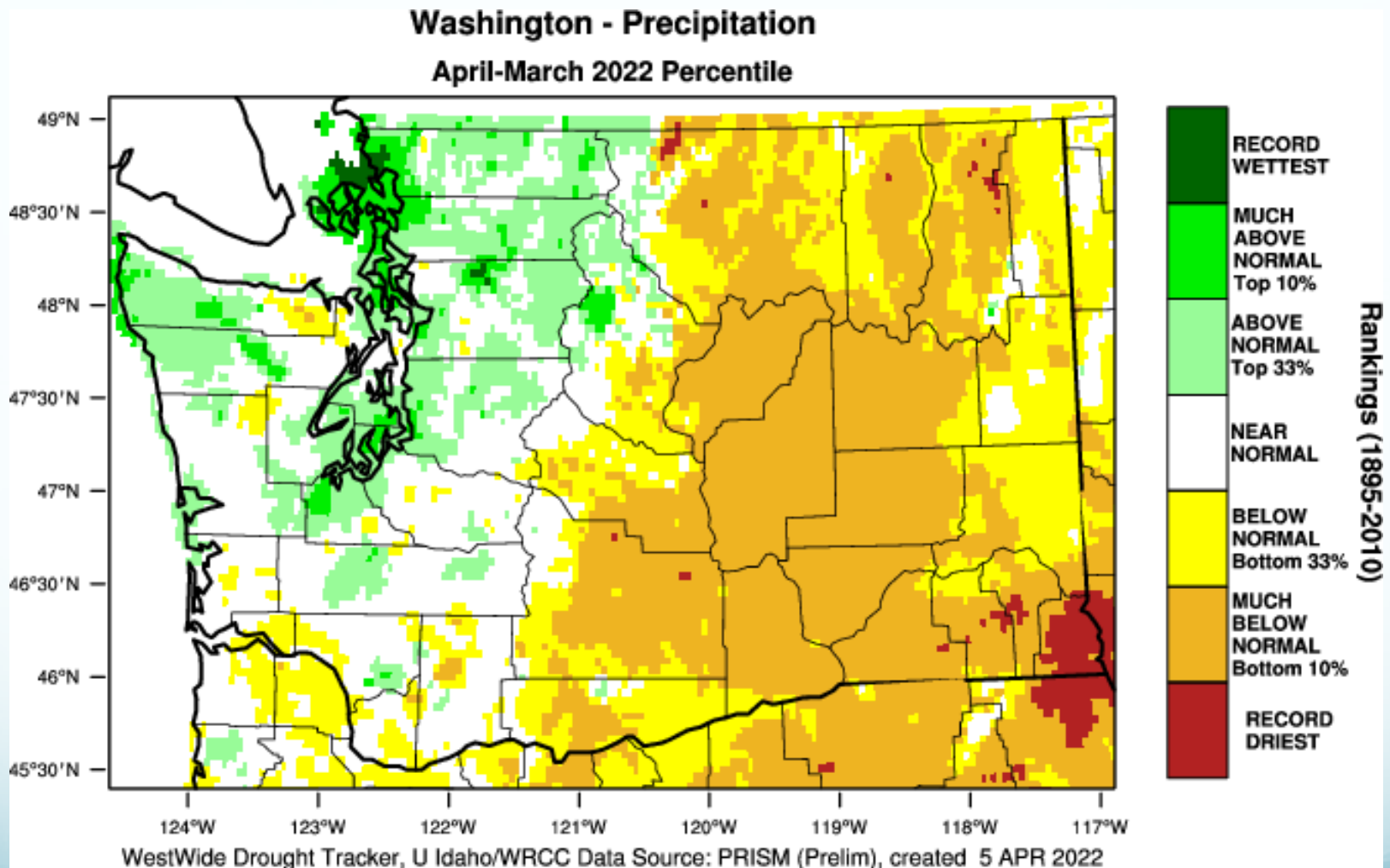
Rank: 40th Wettest

Anomaly: 3.46"

Mean: 27.13"

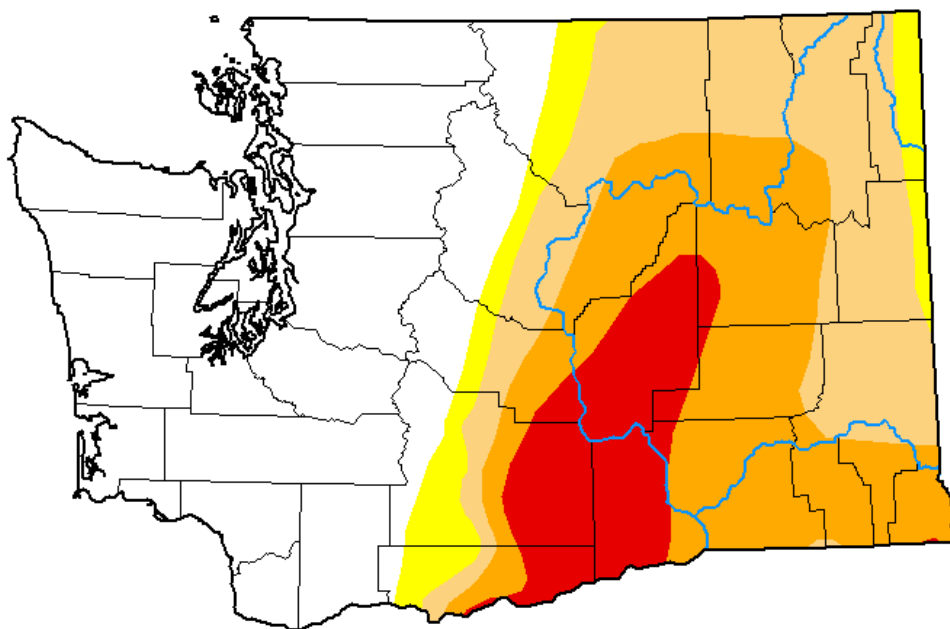


Precip: April 2021-March 2022



U.S. Drought Monitor Washington

April 5, 2022
(Released Thursday, Apr. 7, 2022)
Valid 8 a.m. EDT



Intensity:

-  None
-  D0 Abnormally Dry
-  D1 Moderate Drought
-  D2 Severe Drought
-  D3 Extreme Drought
-  D4 Exceptional Drought

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:

Deborah Bathke
National Drought Mitigation Center



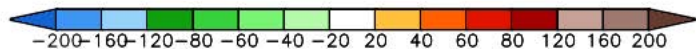
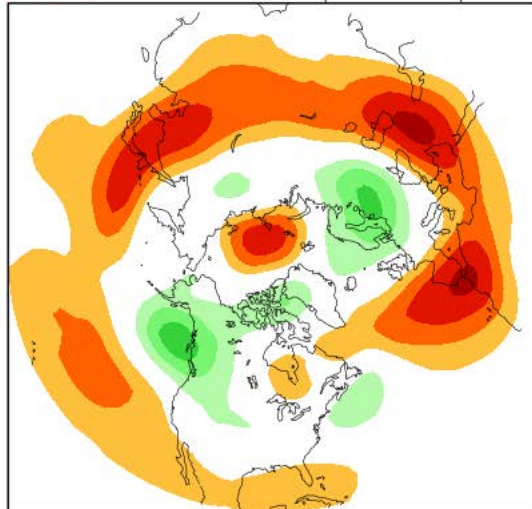
droughtmonitor.unl.edu

Weeks 3-4 CFS Forecasts from 23 March 2022

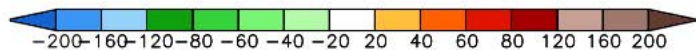
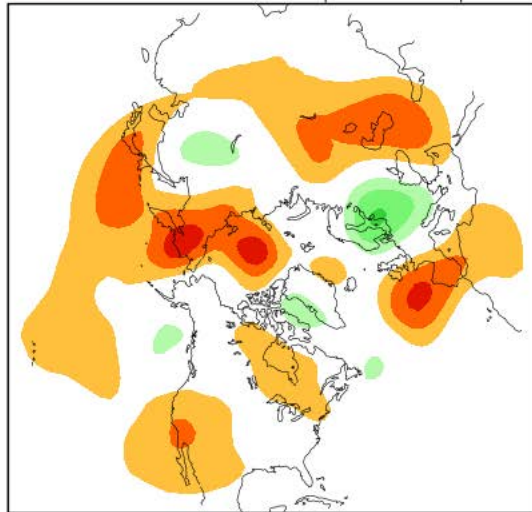
CFSv2 Weeks 3 & 4 500 hPa Z Anomalies (m)

16 Member Ensemble Mean Forecast from 23Mar2022

Week 3 7Apr2022–13Apr2022



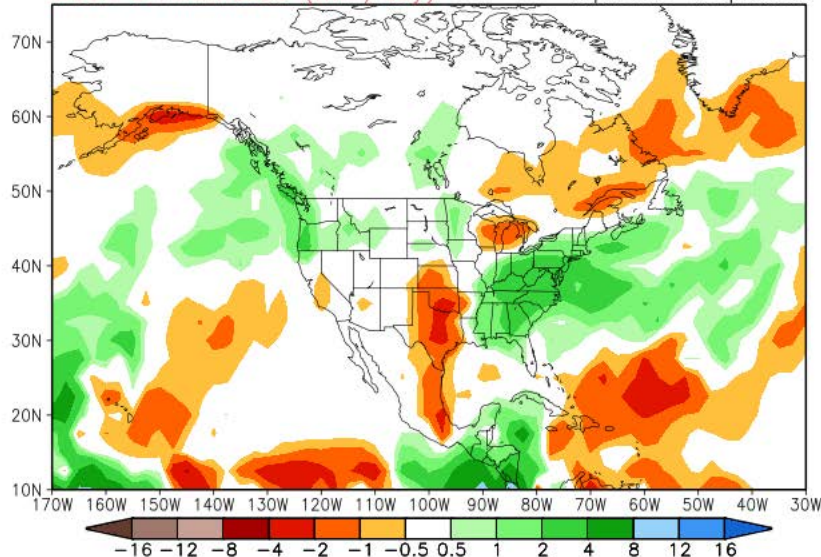
Week 4 14Apr2022–20Apr2022



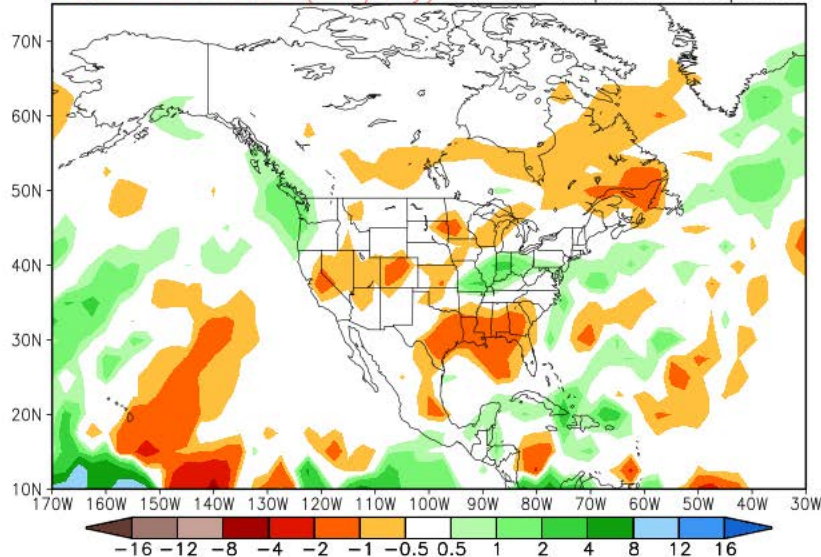
CFSv2 Weeks 3 & 4 Precipitation

16 Member Ensemble Mean Forecast from 23Mar2022

Week 3 Anomalies (mm/day) 7Apr2022–13Apr2022

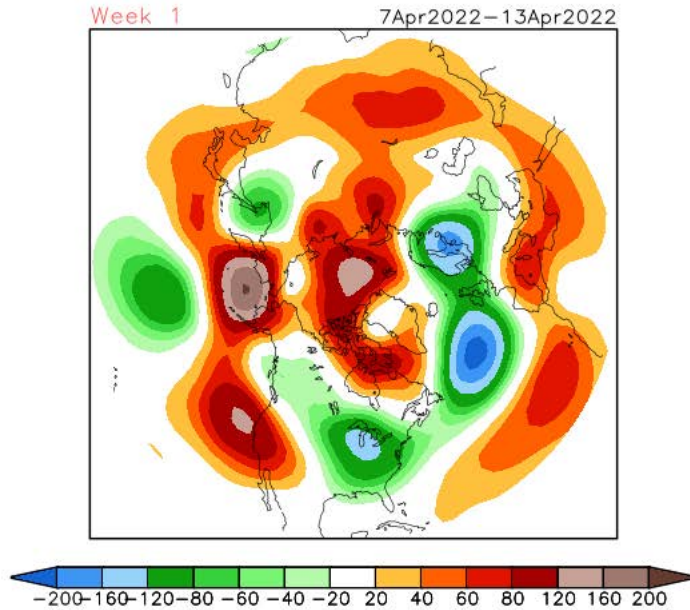


Week 4 Anomalies (mm/day) 14Apr2022–20Apr2022

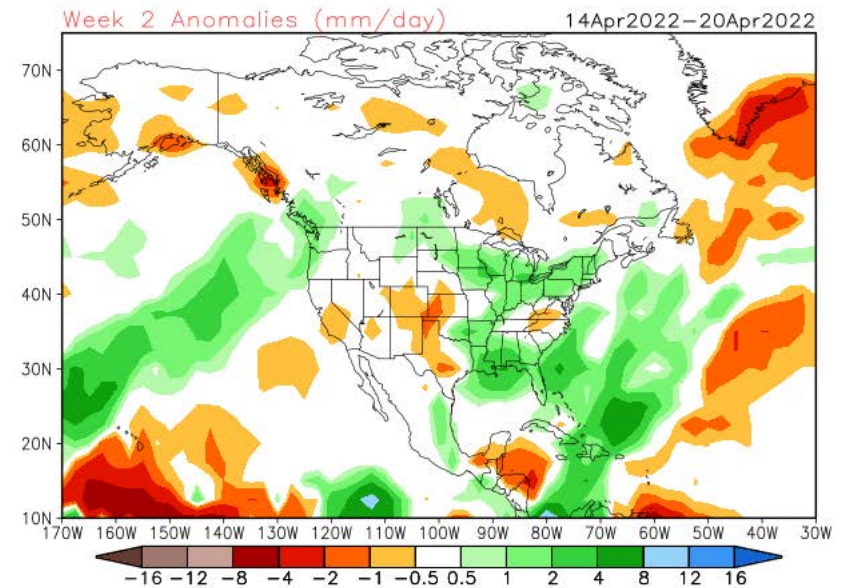
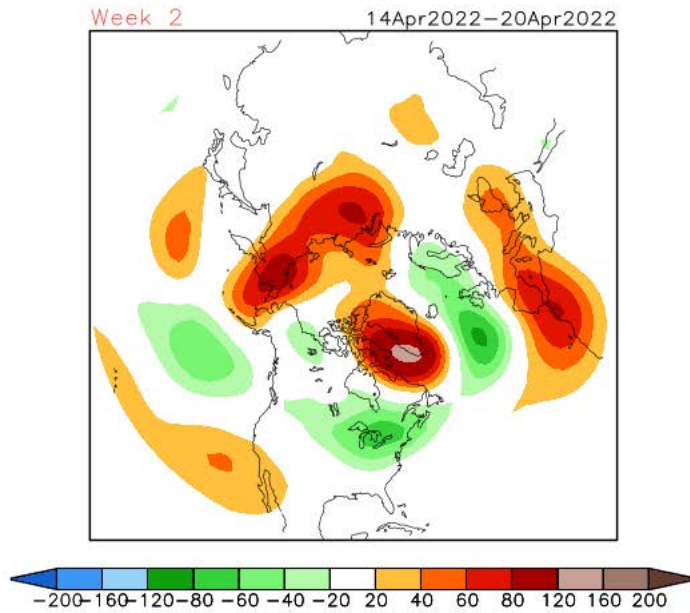
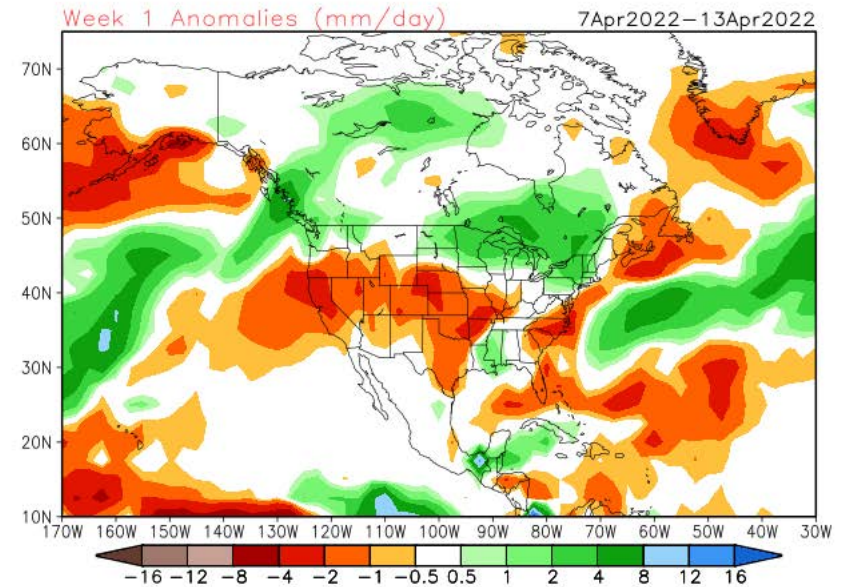


Weeks 1-2 CFS Forecasts from 7 April 2022

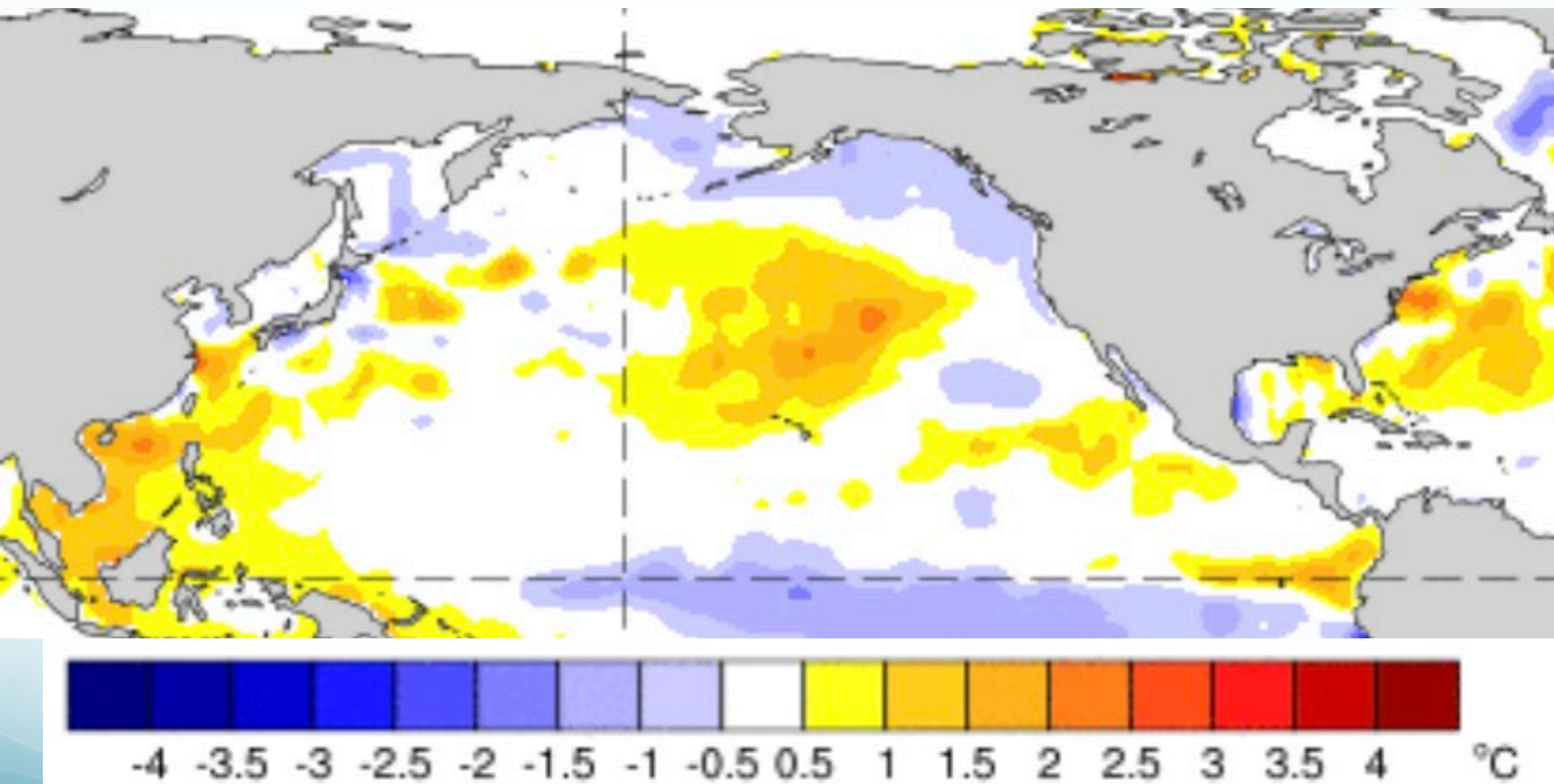
CFSv2 Weeks 1 & 2 500 hPa Z Anomalies (m)
16 Member Ensemble Mean Forecast from 06Apr2022



CFSv2 Weeks 1 & 2 Precipitation
16 Member Ensemble Mean Forecast from 06Apr2022



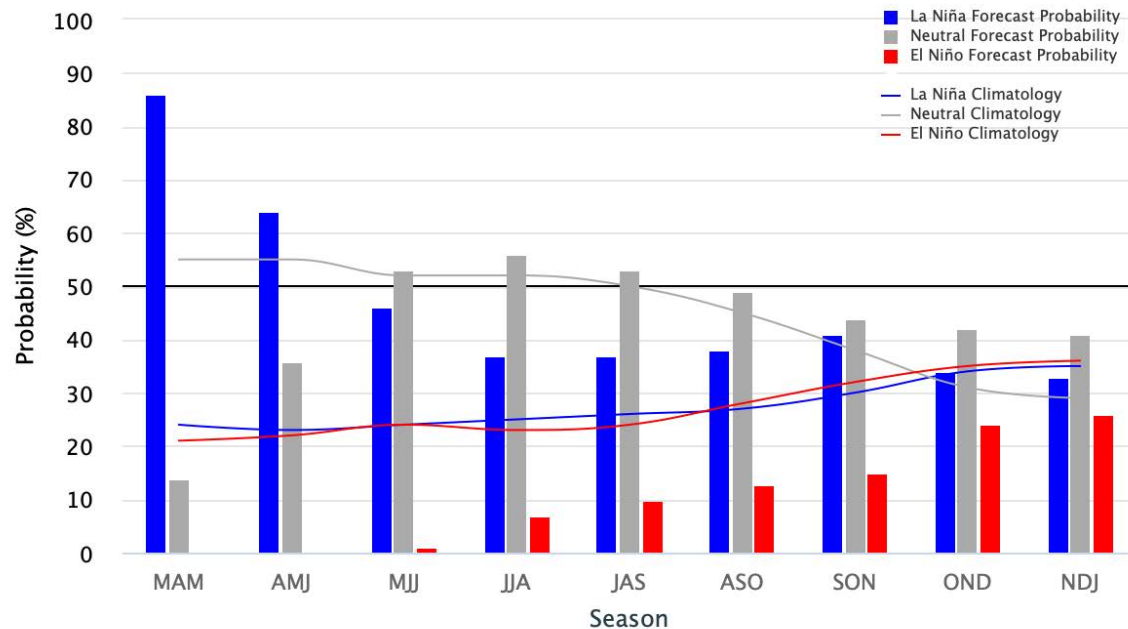
Sea Surface Temperature Anomalies: 27 March – 2 April 2022



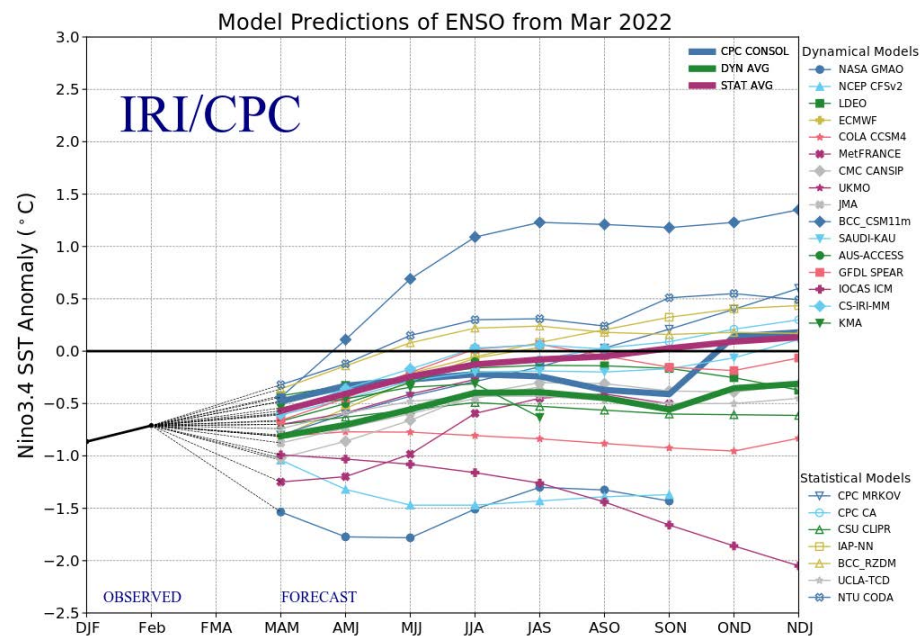
Mid-March 2022 IRI/CPC Model-Based Probabilistic ENSO Forecasts

ENSO state based on NINO3.4 SST Anomaly

Neutral ENSO: -0.5°C to 0.5°C



Latest ENSO predictions indicate that La Nina is a bit less likely than neutral conditions through the remainder of 2022



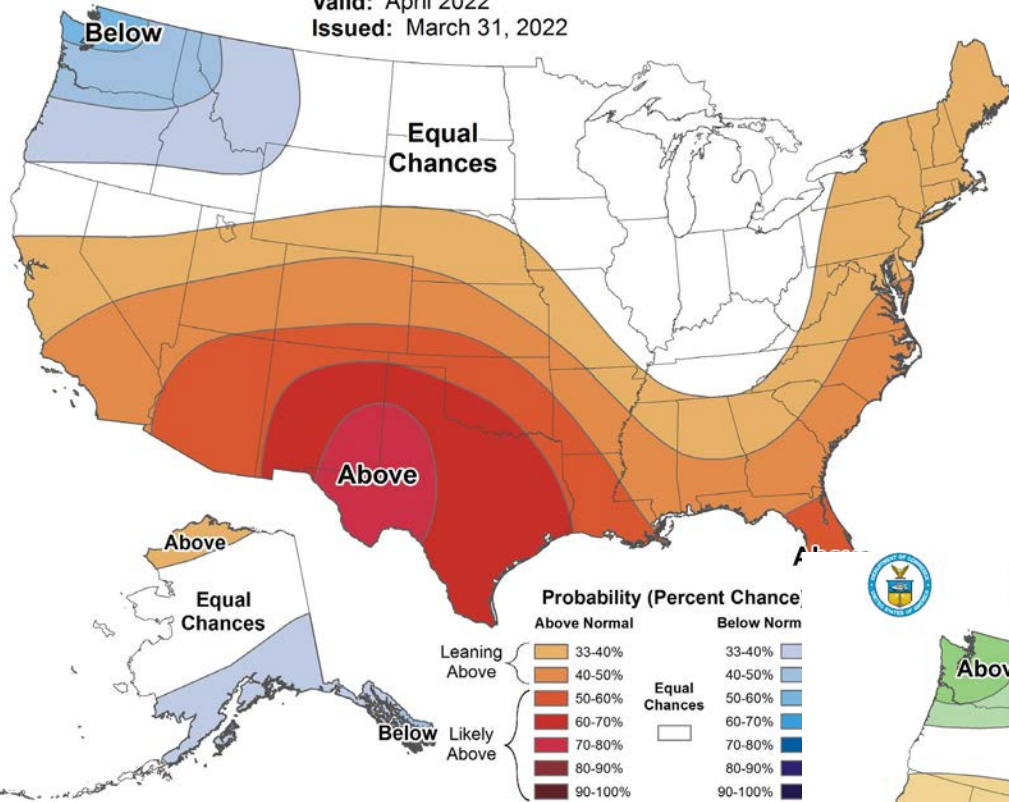


Monthly Temperature Outlook

Valid: April 2022
Issued: March 31, 2022

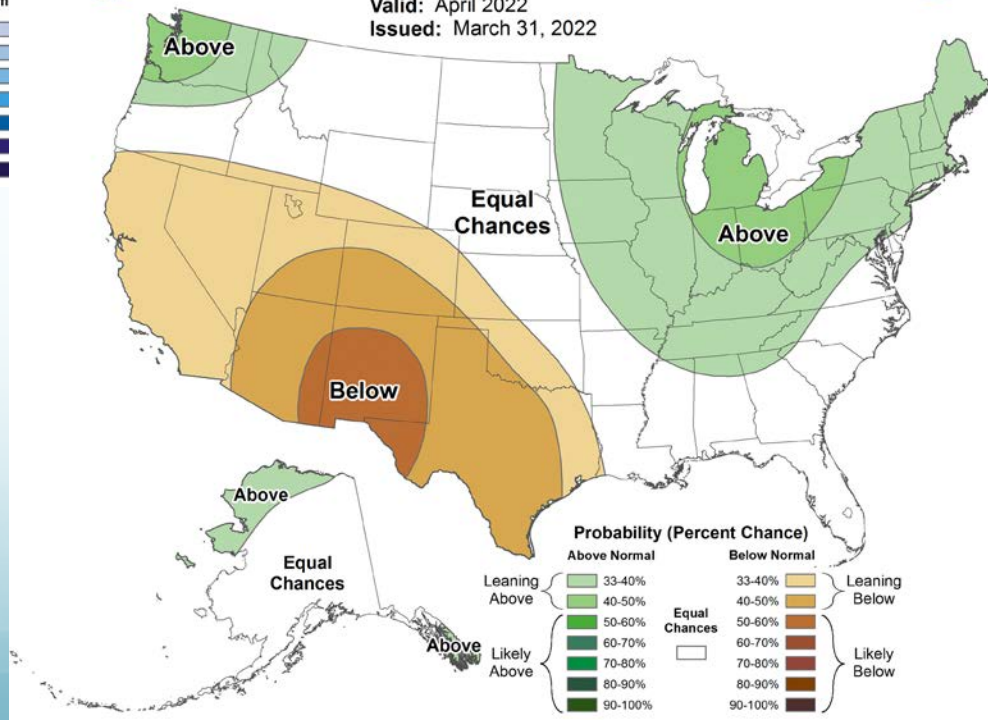


NOAA/CPC Forecasts for April 2022



Monthly Precipitation Outlook

Valid: April 2022
Issued: March 31, 2022

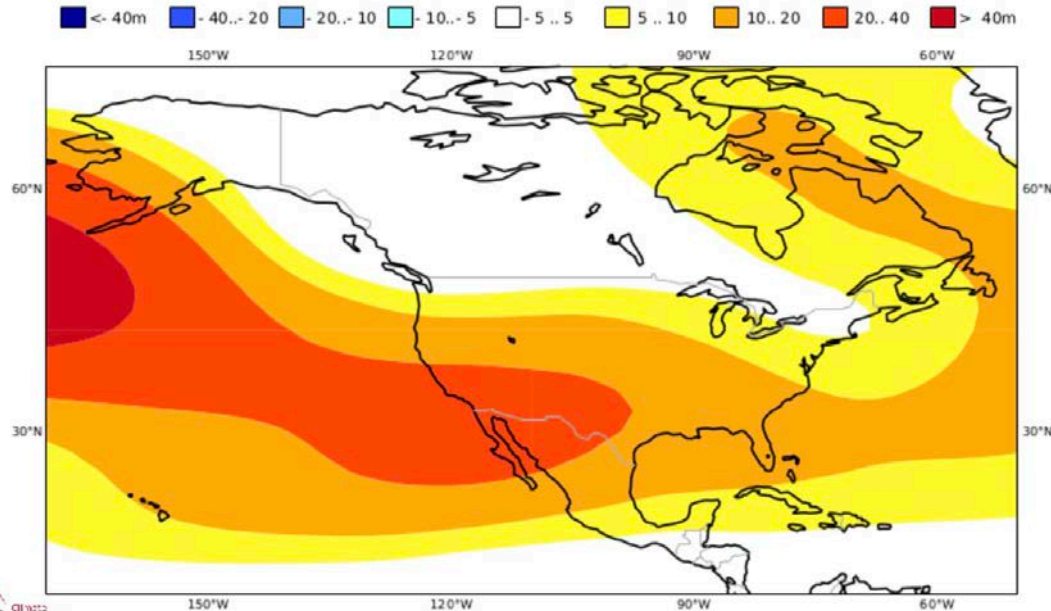


C3S multi-system seasonal forecast
Mean Z500 anomaly
Nominal forecast start: 01/03/22
Variance-standardized mean

ECMWF/Met Office/Météo-France/CMCC/DWD/NCEP/JMA/ECCC
AMJ 2022

500 hPa

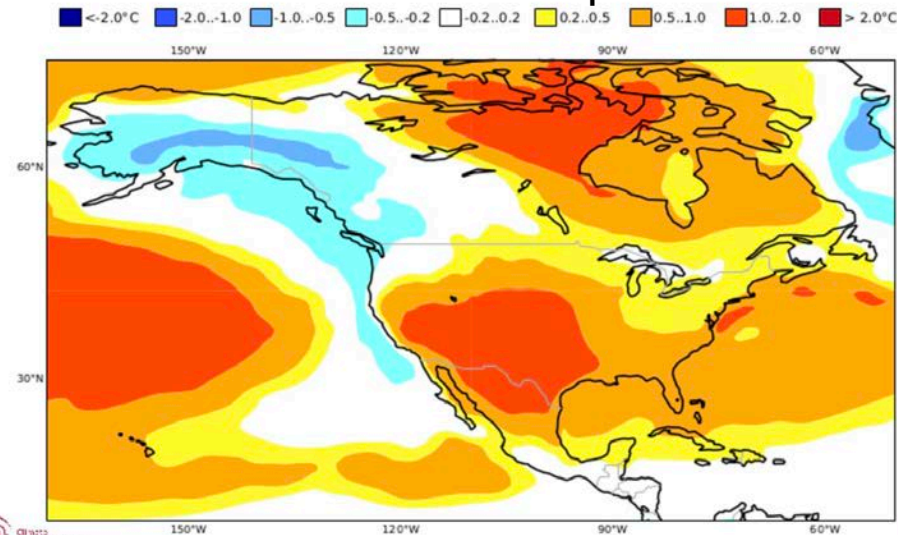
Forecasts
from IMME



C3S multi-system seasonal forecast
Mean 2m temperature anomaly
Nominal forecast start: 01/03/22
Variance-standardized mean

ECMWF/Met Office/Météo-France/CMCC/DWD/NCEP/JMA
AM

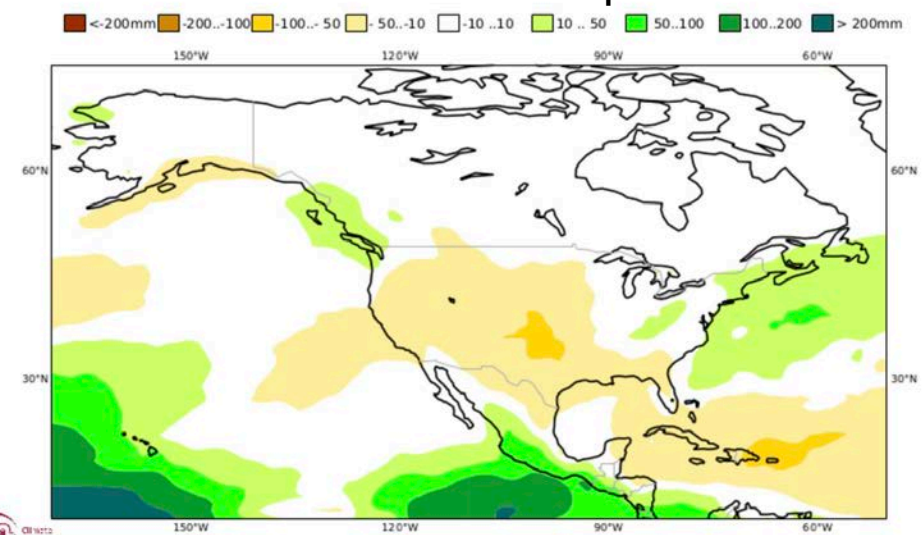
Temperature



C3S multi-system seasonal forecast
Mean precipitation anomaly
Nominal forecast start: 01/03/22
Variance-standardized mean

ECMWF/Met Office/Météo-France/CMCC/DWD/NCEP/JMA/ECCC
AMJ 2022

Precipitation





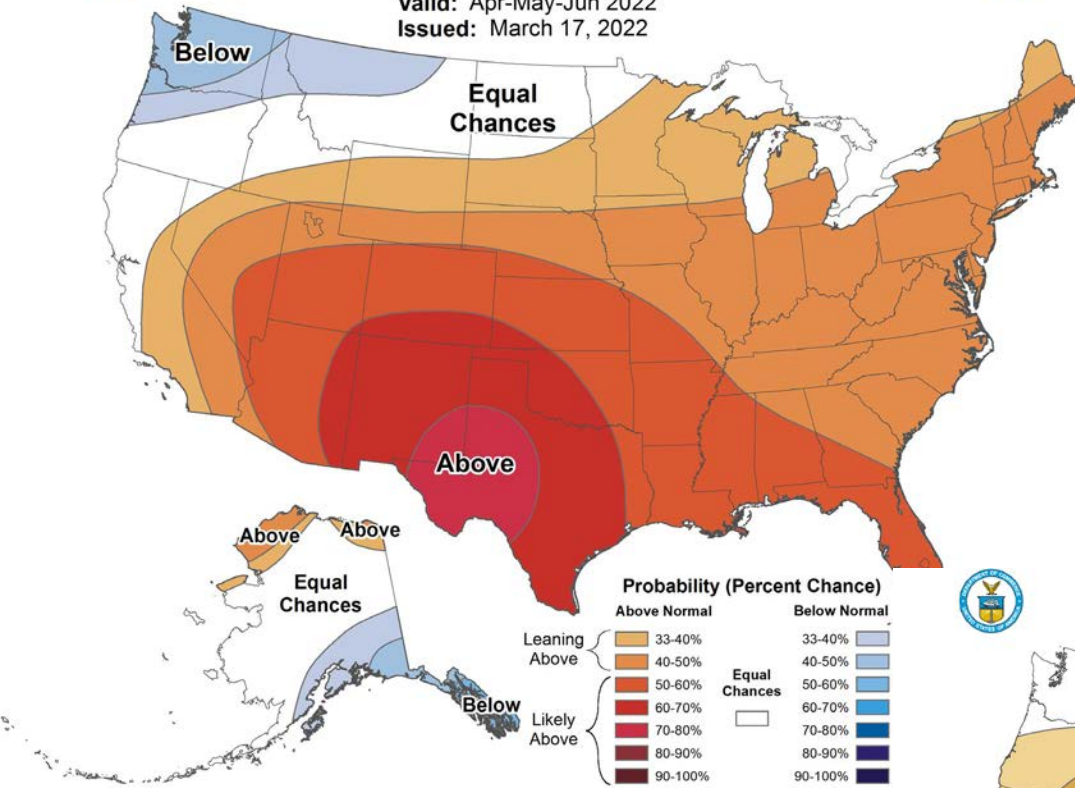
Seasonal Temperature Outlook

Valid: Apr-May-Jun 2022

Issued: March 17, 2022



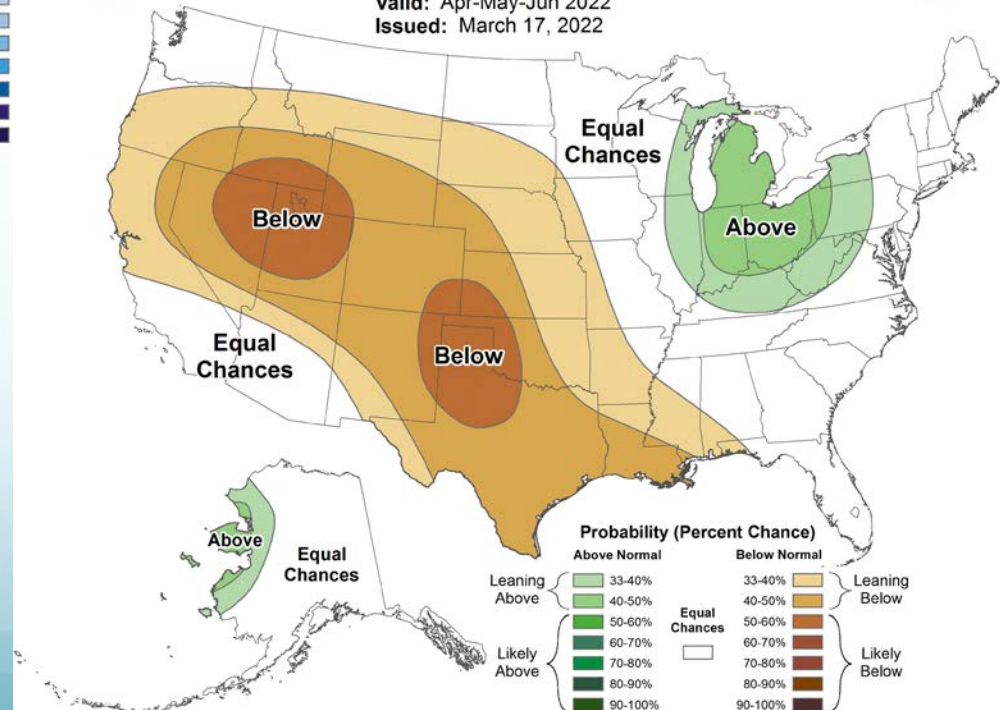
NOAA/CPC Forecasts for AMJ 2022



Seasonal Precipitation Outlook

Valid: Apr-May-Jun 2022

Issued: March 17, 2022



Summer 2022 is liable to be warm and dry in the PNW, based on climate model simulations and recent trends

C3S multi-system seasonal forecast

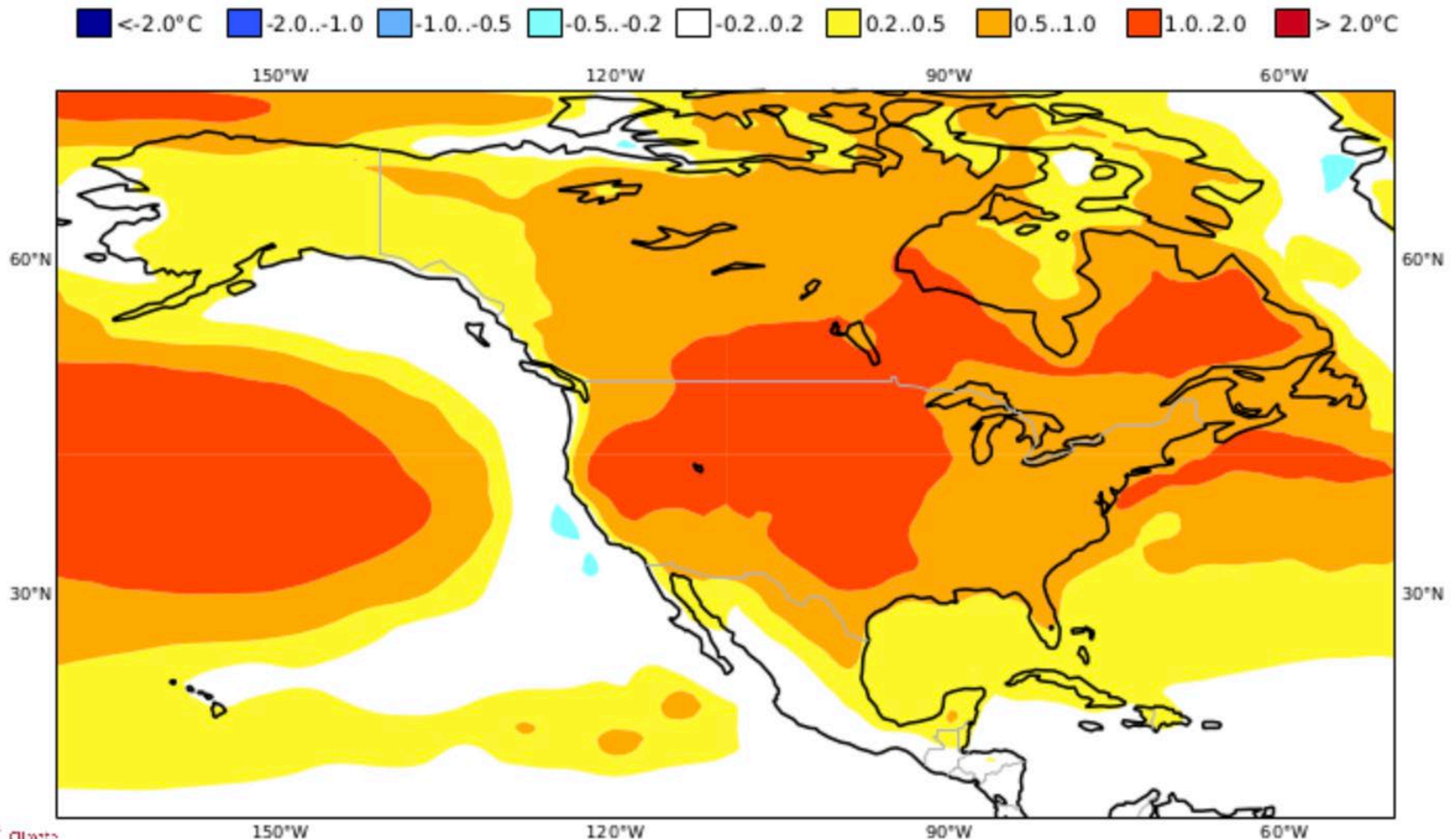
ECMWF/Met Office/Météo-France/CMCC/DWD/NCEP/JMA/ECCC

Mean 2m temperature anomaly

JJA 2022

Nominal forecast start: 01/03/22

Variance-standardized mean



Summary

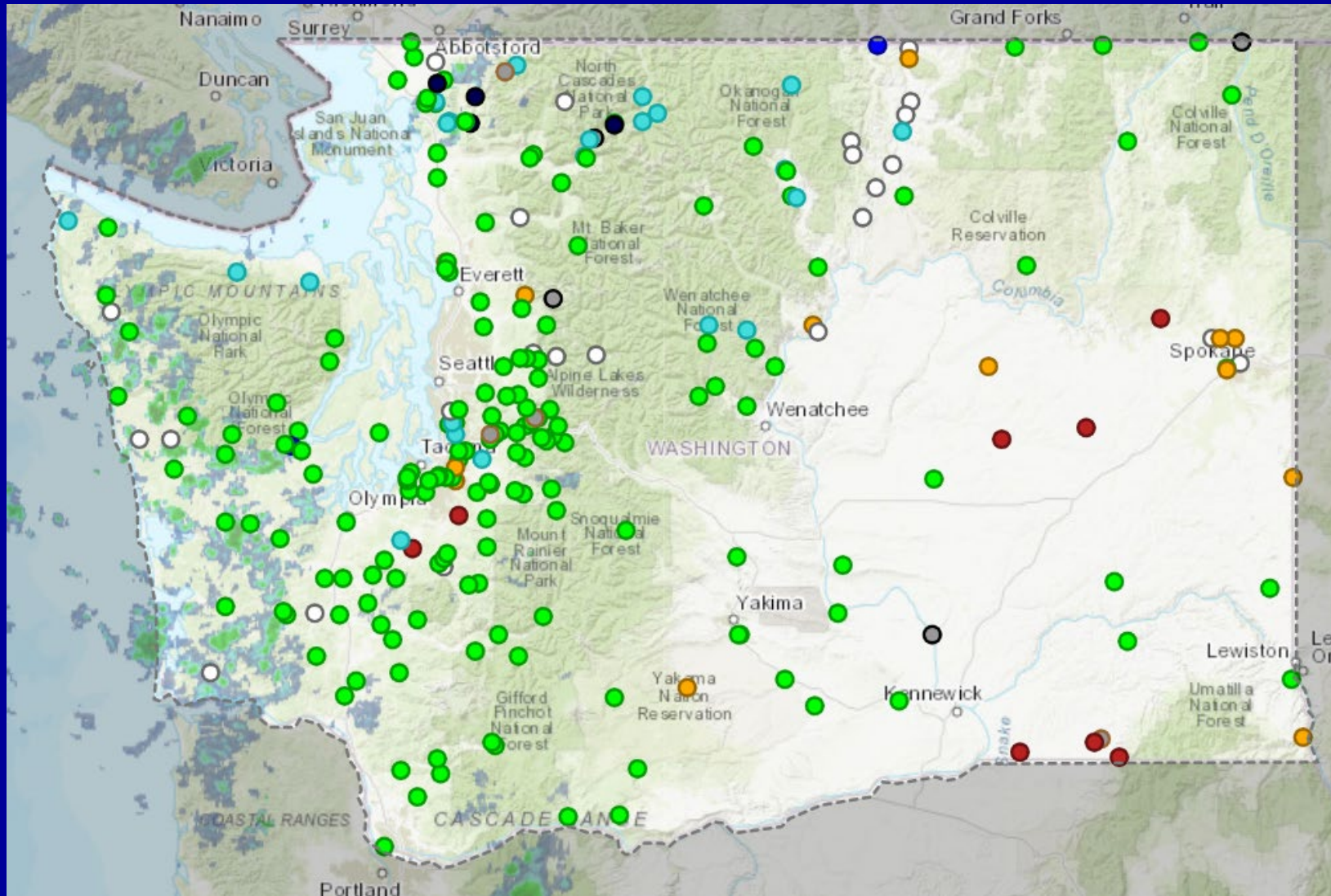
- Water year 2022 precipitation has been above normal in western WA but below normal in eastern WA
 - WY precipitation ranks in the lower third for Douglas, Grant, Lincoln, Spokane, and Klickitat counties
- Longer term precipitation deficits (12 months+) remain in eastern WA
- While some relatively cool weather is in the offing for this weekend and beyond, our interest is shifting to the rate of snow melt in the next couple of months and the demand for water this summer
- And the slugs are glad that there is little indication that the spring of 2022 will be as warm and dry as the spring of 2021...

Streamflow & Groundwater Conditions in Washington State as of April 8th, 2022

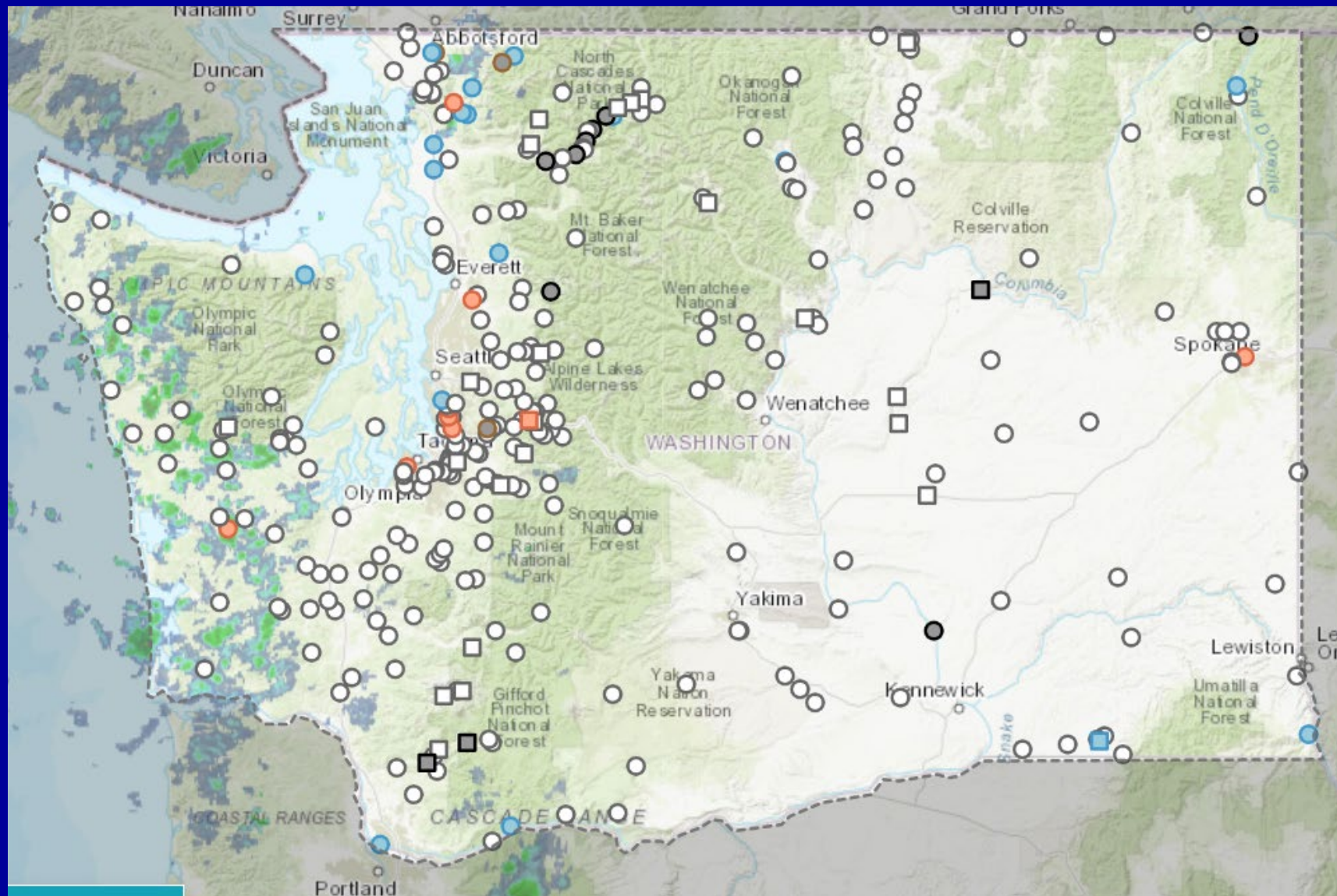
Presented
to
The Washington State
Water Supply Availability Committee
on
April 8th, 2022

by
Nicholas Sutfin
USGS Washington Water Science Center

WA Current Streamflow Conditions, April 8th, 2022



Rising and Falling conditions of WA streams on April 8th, 2022



Surface-Water Levels: Rising and falling

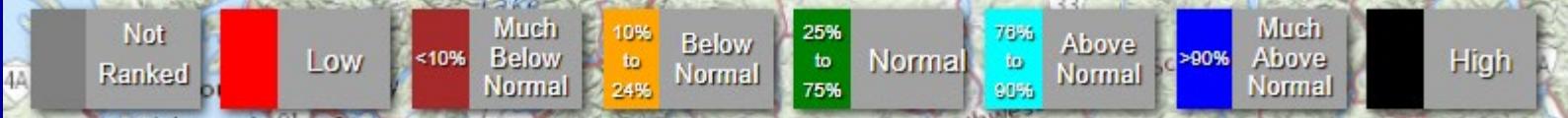
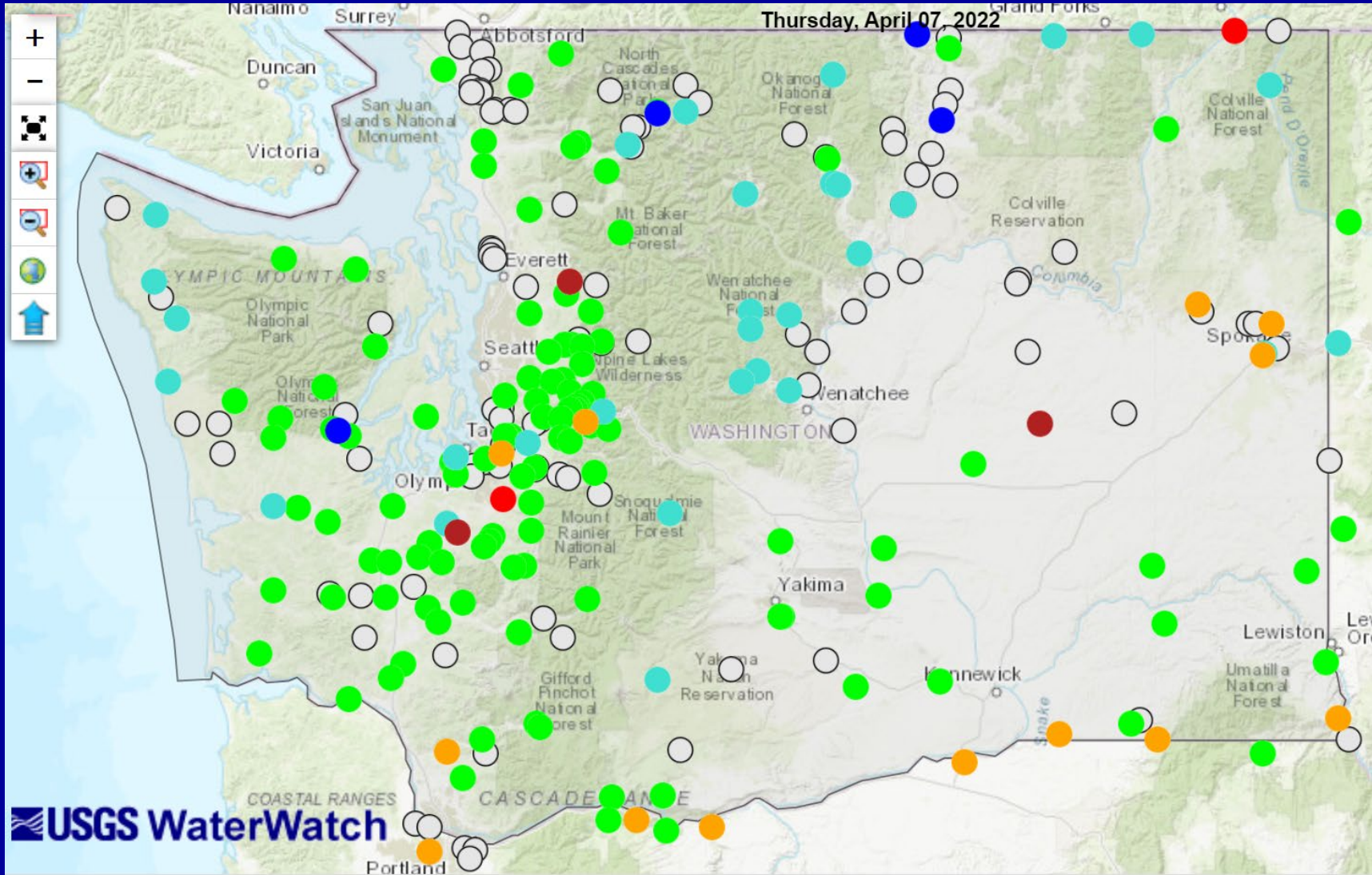
COLOR – CHANGE

- Water level rising ≥ 1 foot/hour
- Water level rising $\geq 0.5 - 1$ foot/hour
- Water level rising $\geq 0.05 - 0.5$ foot/hour
- Water level changing < 0.05 foot/hour
- Water level falling $\geq 0.05 - 0.5$ foot/hour
- Water level falling $\geq 0.5 - 1$ foot/hour
- Water level falling ≥ 1 foot/hour

SHAPE – SITE TYPE

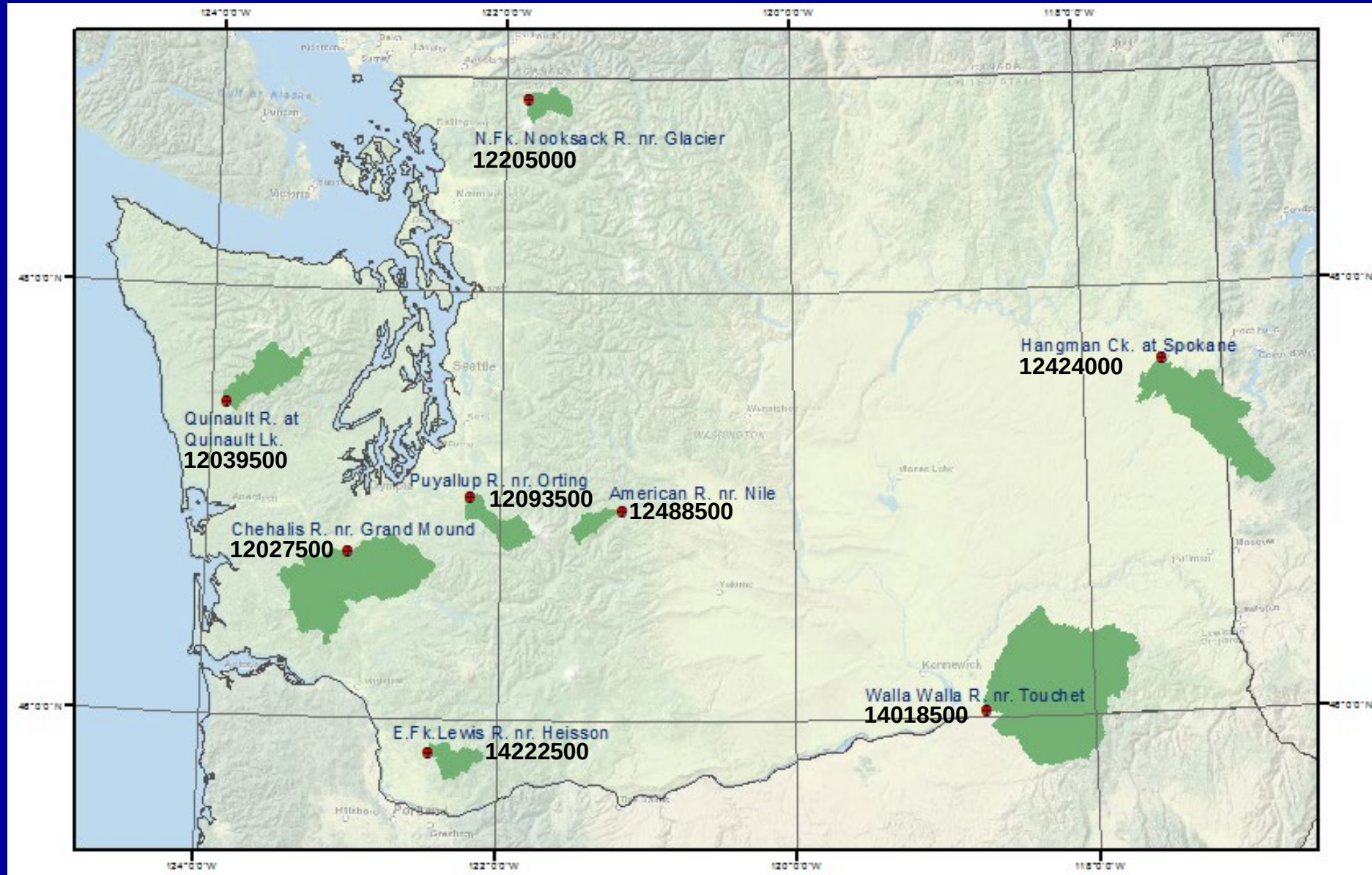
- Stream
- Lake
- Wetland
- Estuary
- Coastal

WA 7-day Average Streamflow Conditions as of April 8th, 2022

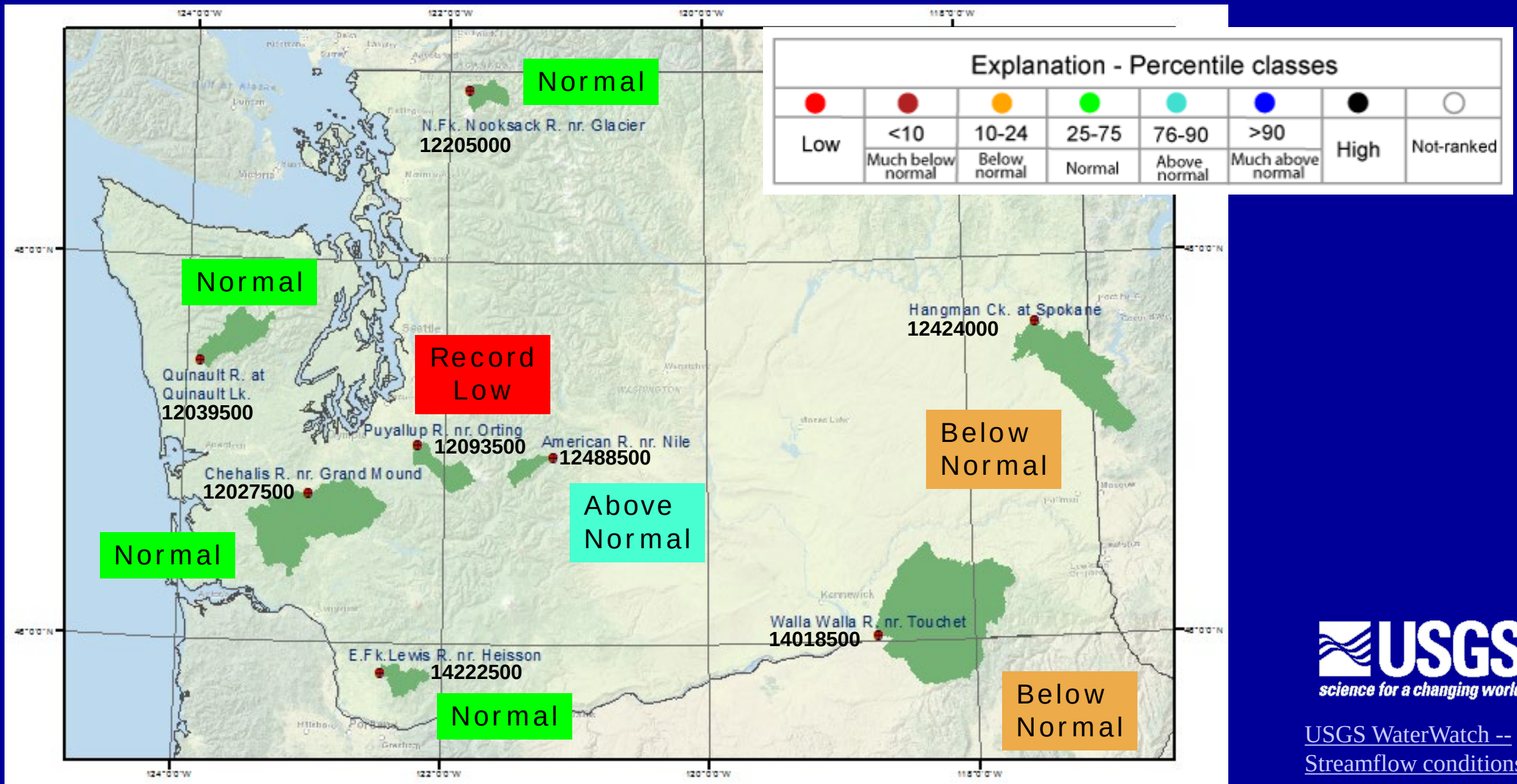


Index Gaging Stations

(Stations that measure natural or near-natural streamflow)

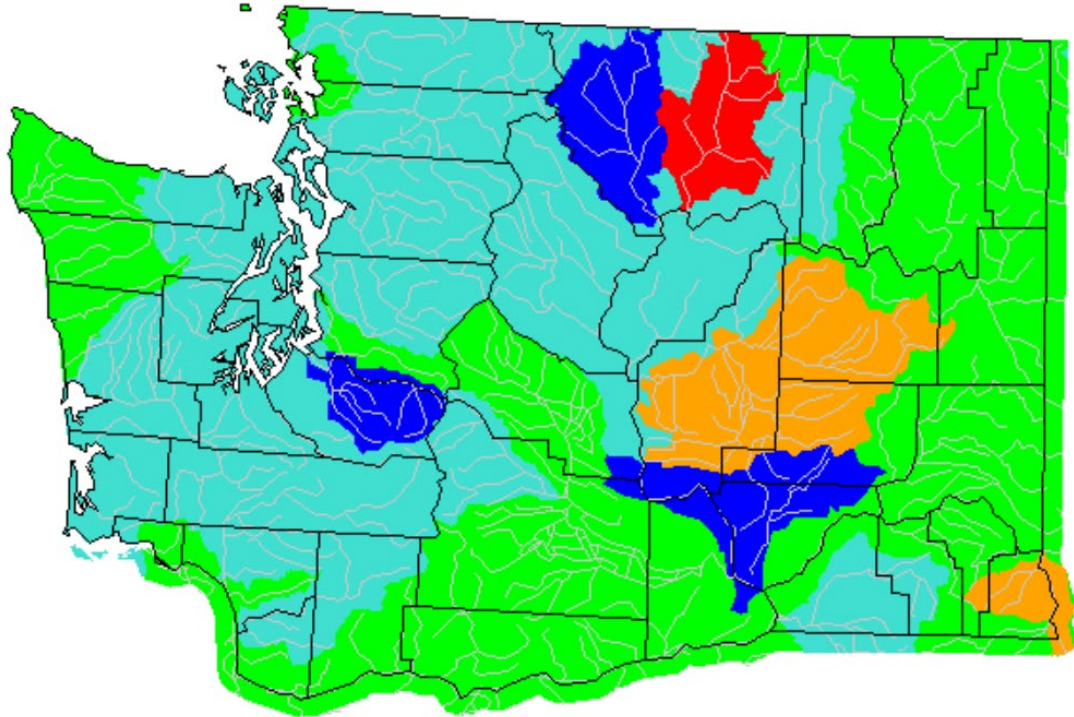


Index Gaging Stations, 7-day average streamflow (as of April 8th, 2022)

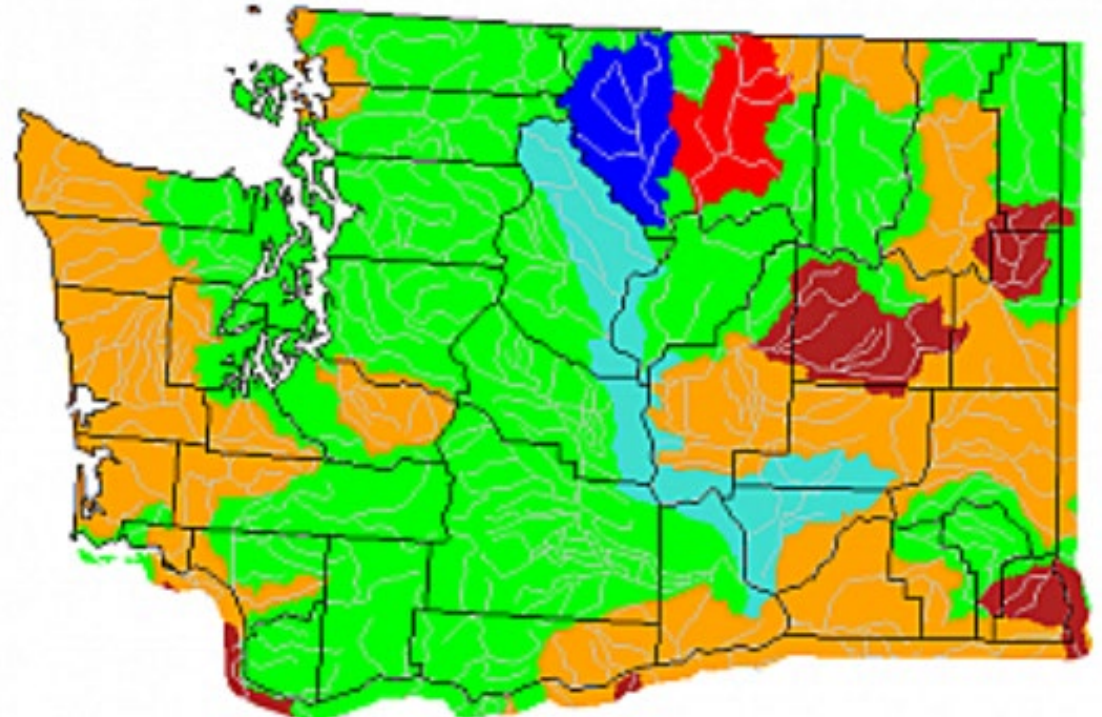


Monthly average streamflow compared to historical record for Jan. 2022 & Feb. 2022

January 2022

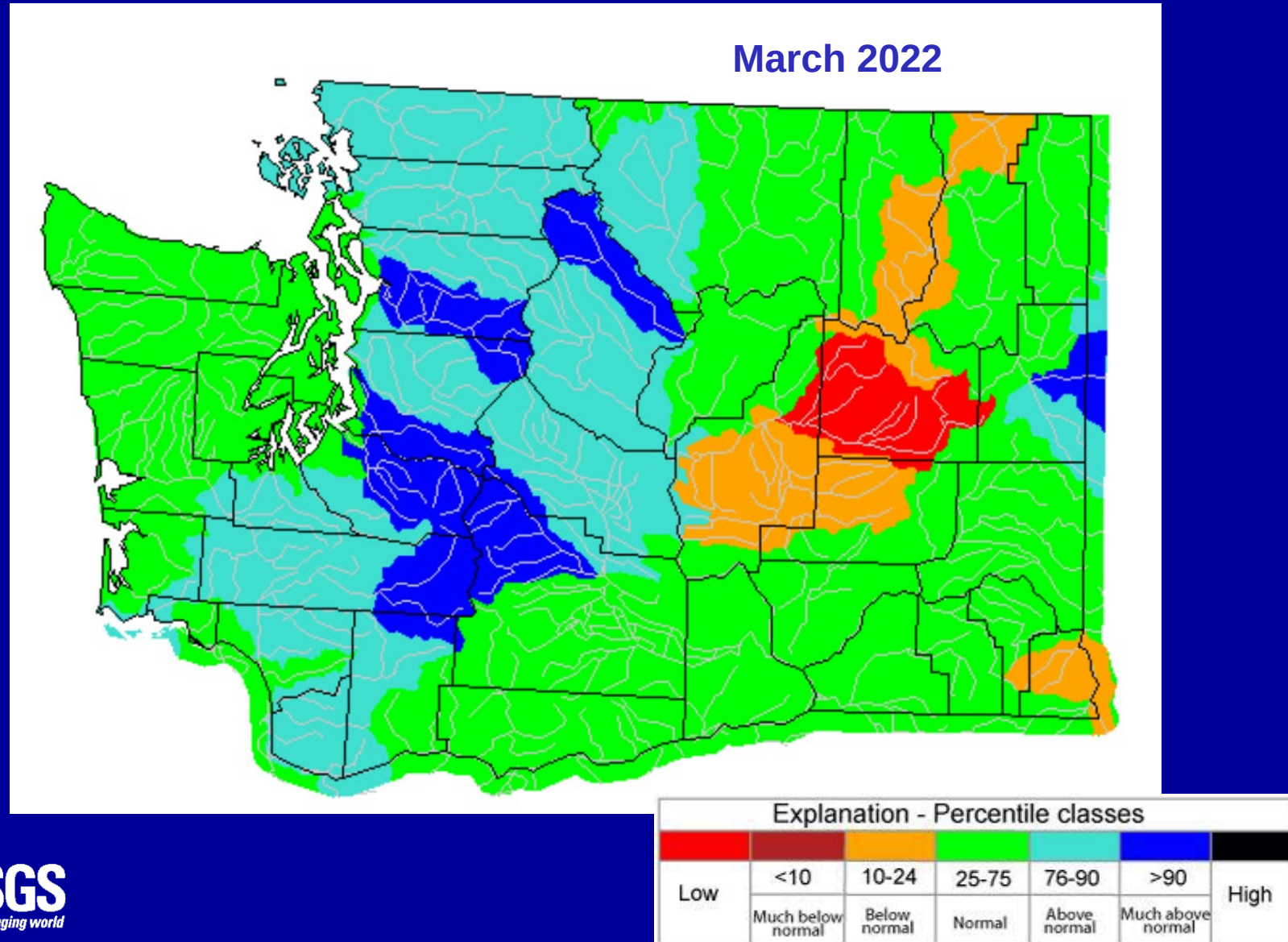


Feb. 2022

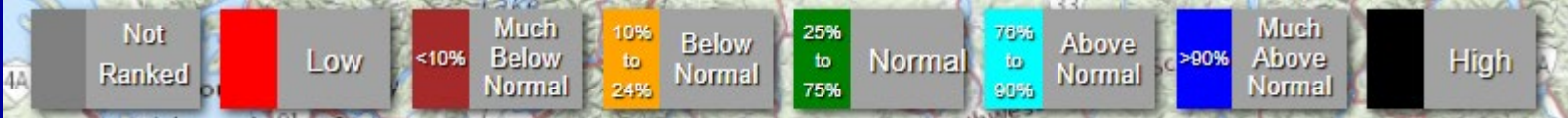
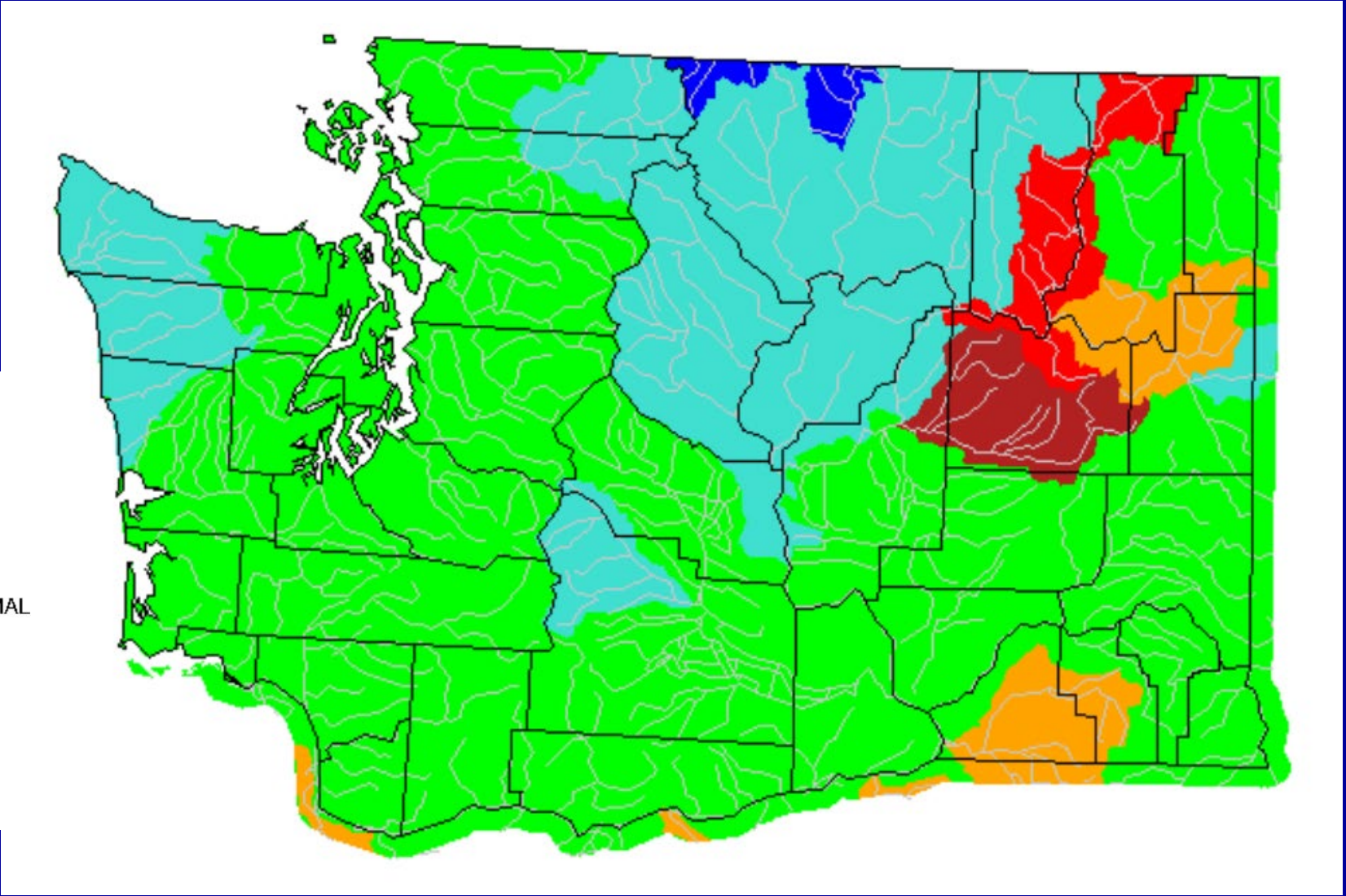
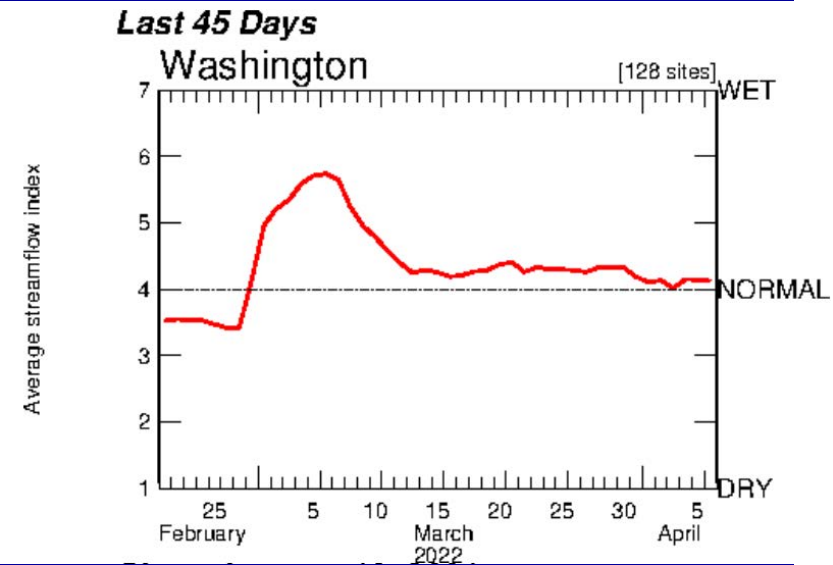


Explanation - Percentile classes						
						
Low	<10	10-24	25-75	76-90	>90	High
	Much below normal	Below normal	Normal	Above normal	Much above normal	

Monthly average streamflow compared to historical record for March 2022

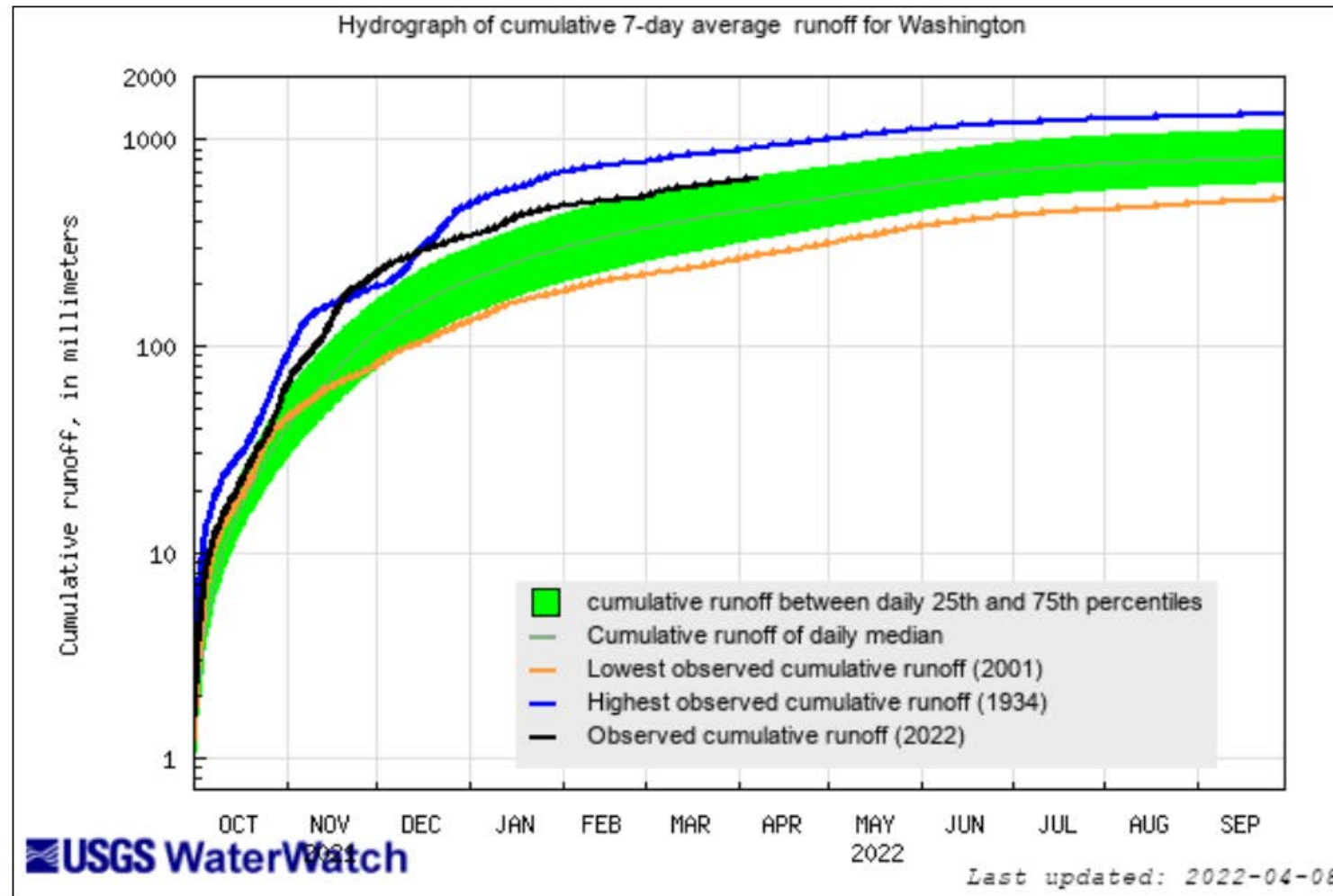


WA 7-day Average Streamflow Conditions as of April 8th, 2022



Duration Hydrograph, Washington State

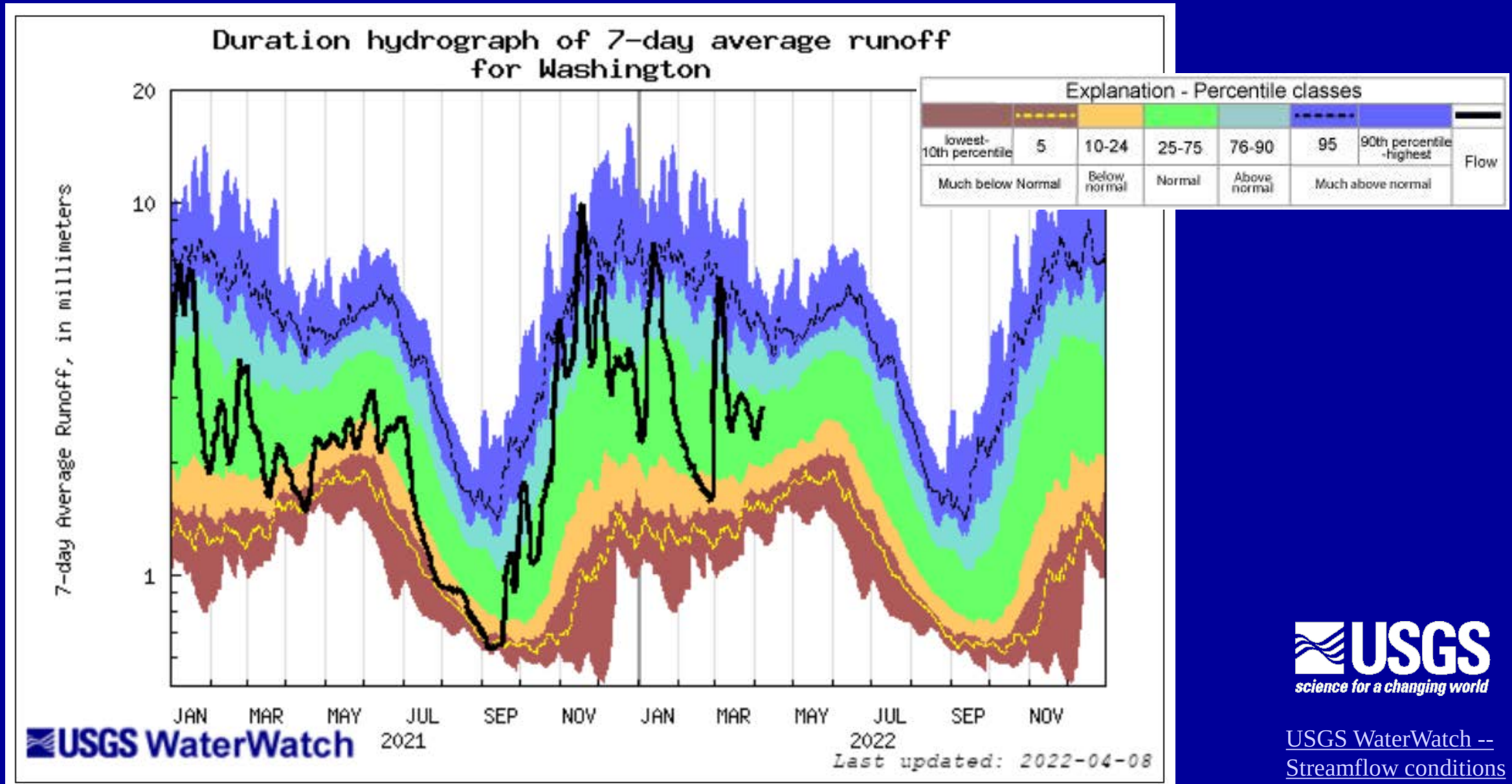
7-day Average Streamflow (as of April 8th, 2022) is normal



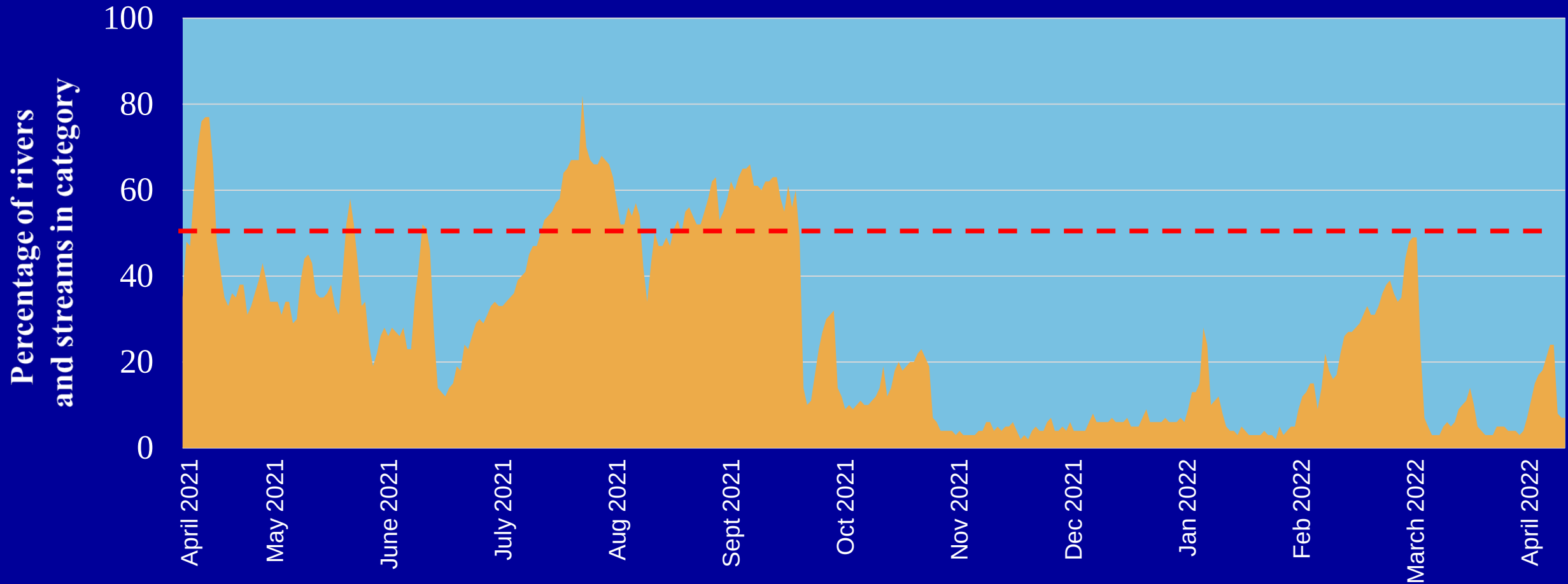
Explanation - Percentile classes							Flow
lowest-10th percentile	5	10-24	25-75	76-90	95	90th percentile-highest	
Much below Normal	Below normal	Normal	Above normal	Much above normal			

Duration Hydrograph, Washington State

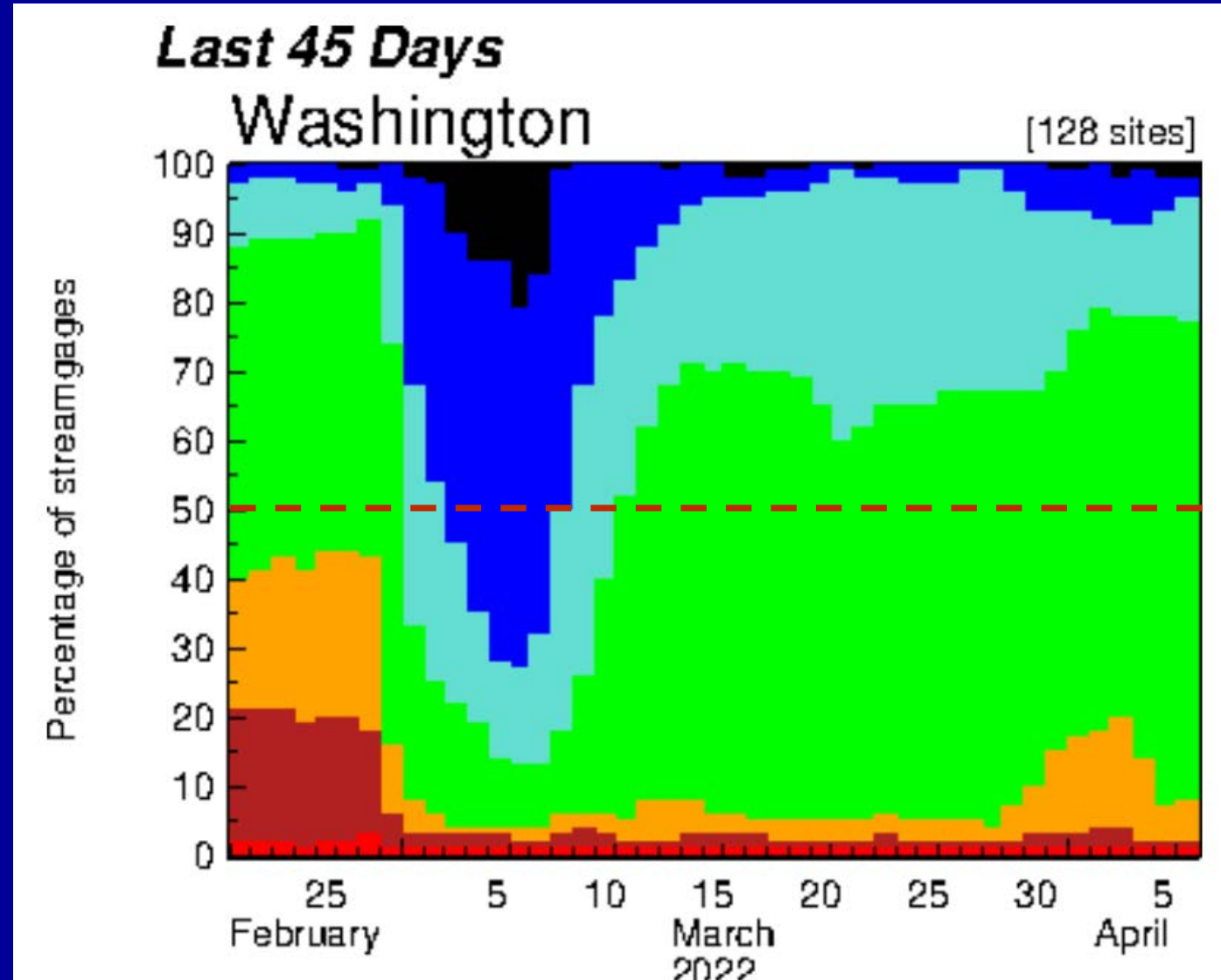
7-day Average Streamflow (as of April 8th, 2022) is normal



Daily streamflow in Washington rivers compared to historical streamflow, April 2021 – April 2022

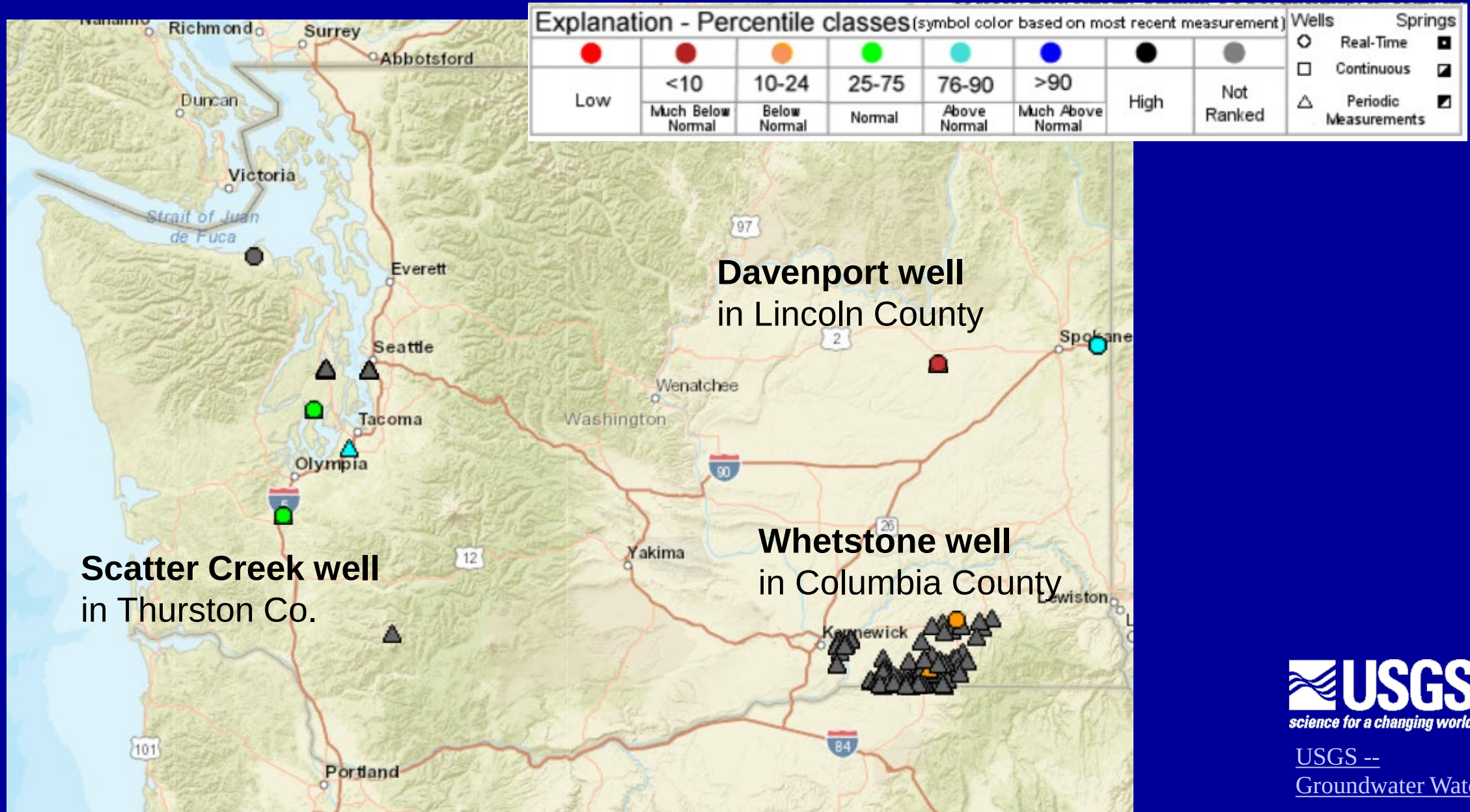


Daily streamflow in Washington Rivers compared to historical streamflow, February – April 2022

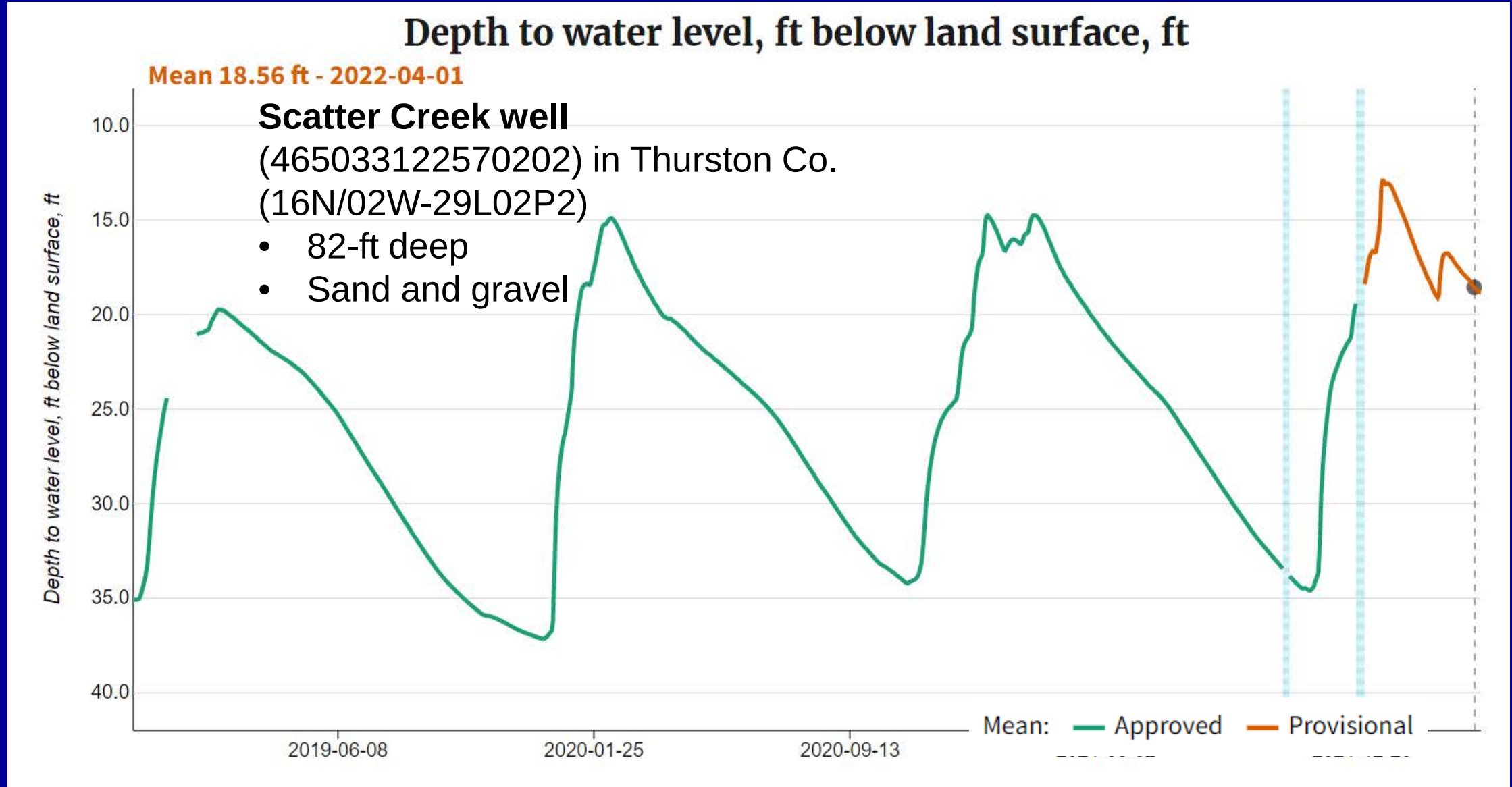


Explanation - Percentile classes						
Low	<10	10-24	25-75	76-90	>90	High
	Much below normal	Below normal	Normal	Above normal	Much above normal	

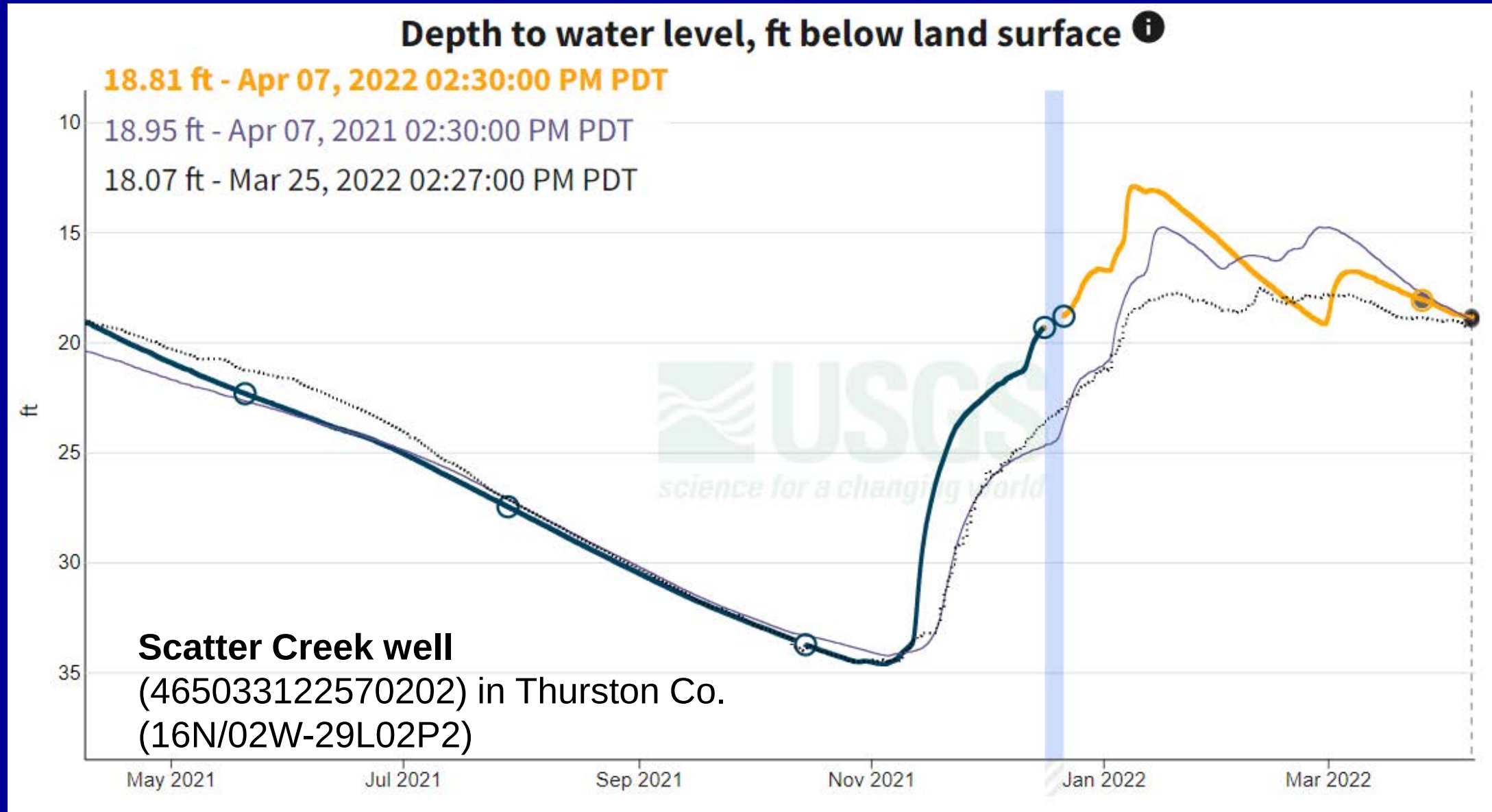
WA Current Groundwater Conditions (April 8th, 2022)



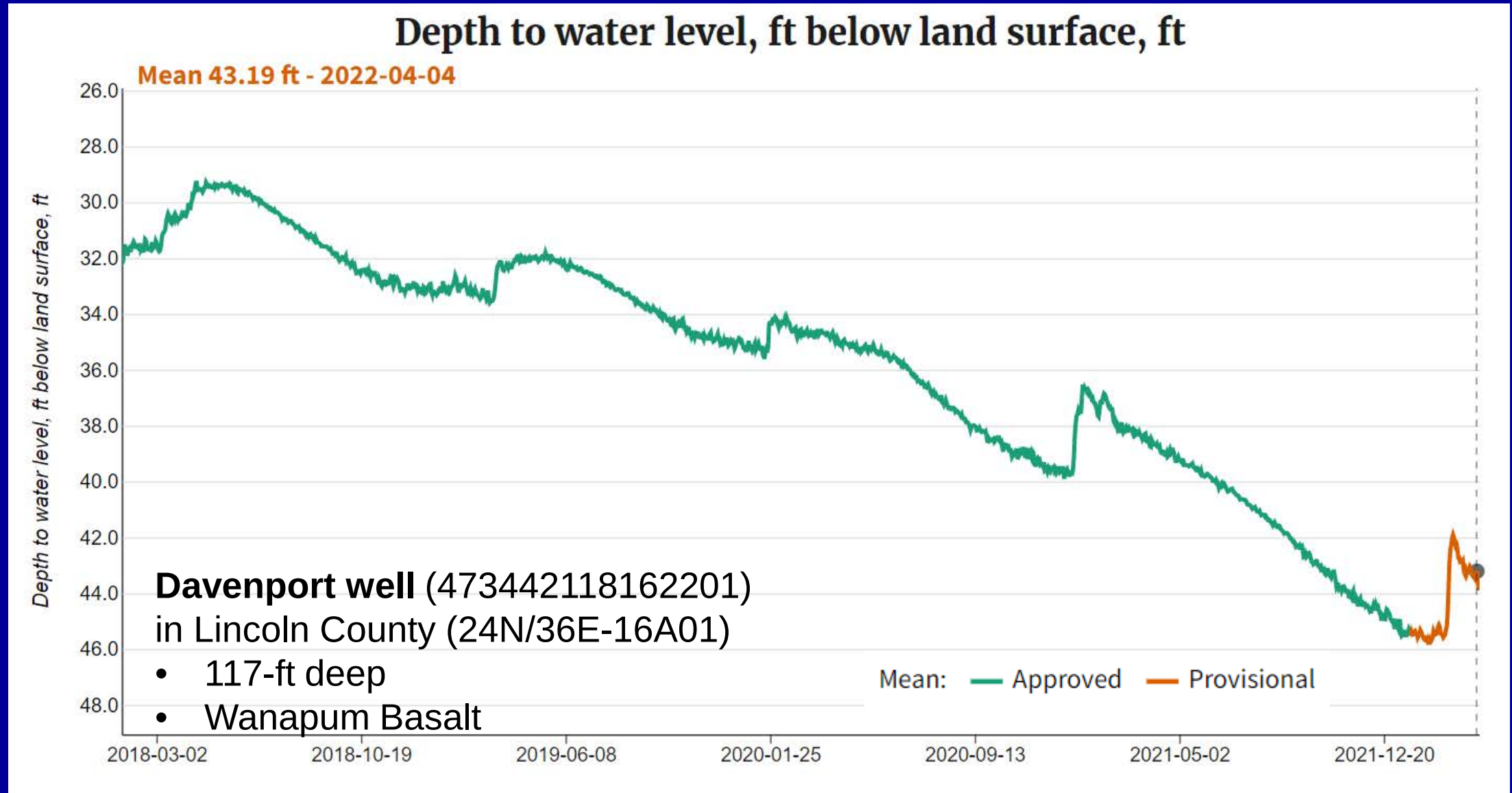
Scatter Creek Well Groundwater Conditions (April 8th, 2022)



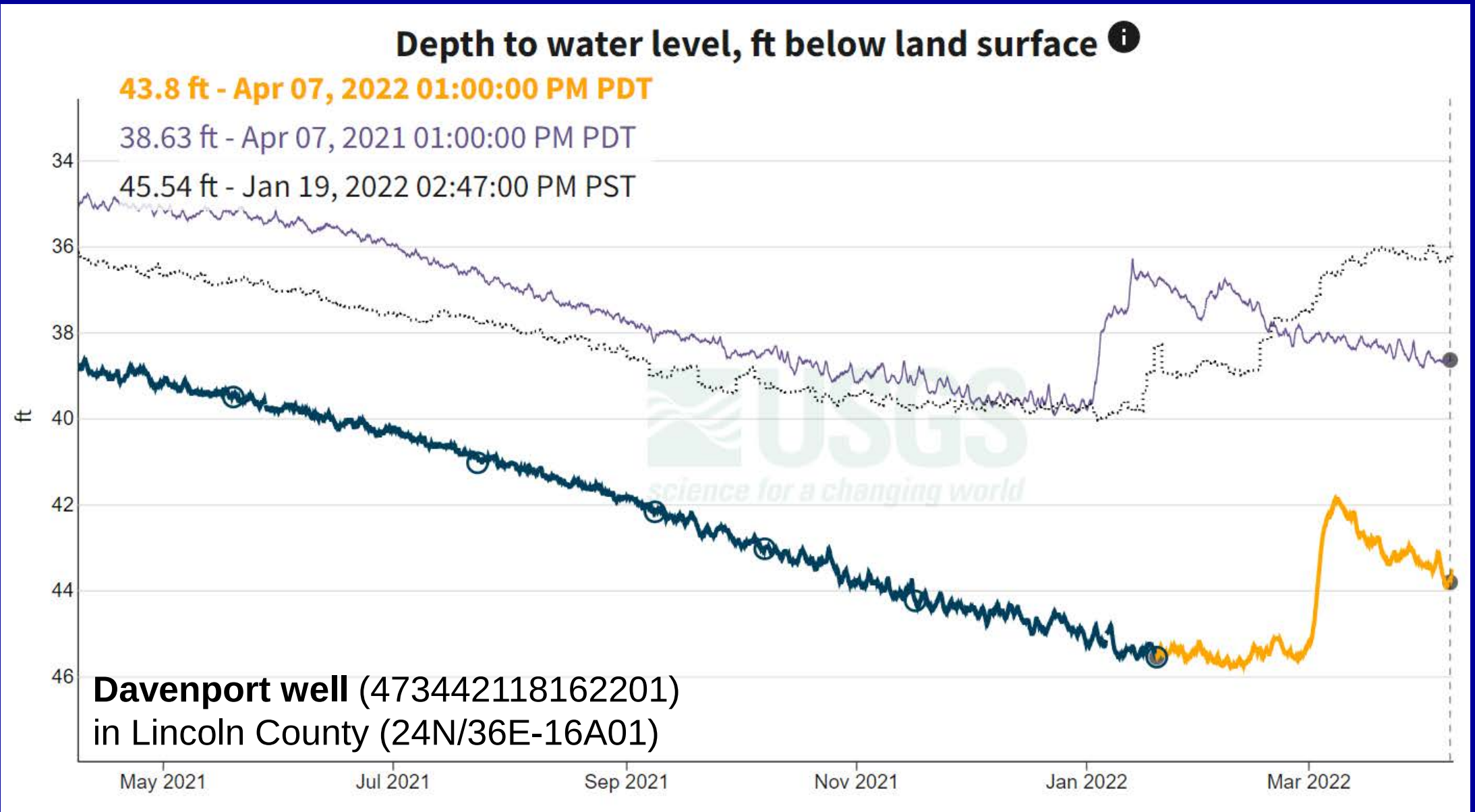
Scatter Creek Well Groundwater Conditions (April 8th, 2022)



Davenport Well Groundwater Conditions (April 8th, 2022)



Davenport Well Groundwater Conditions (April 8th, 2022)



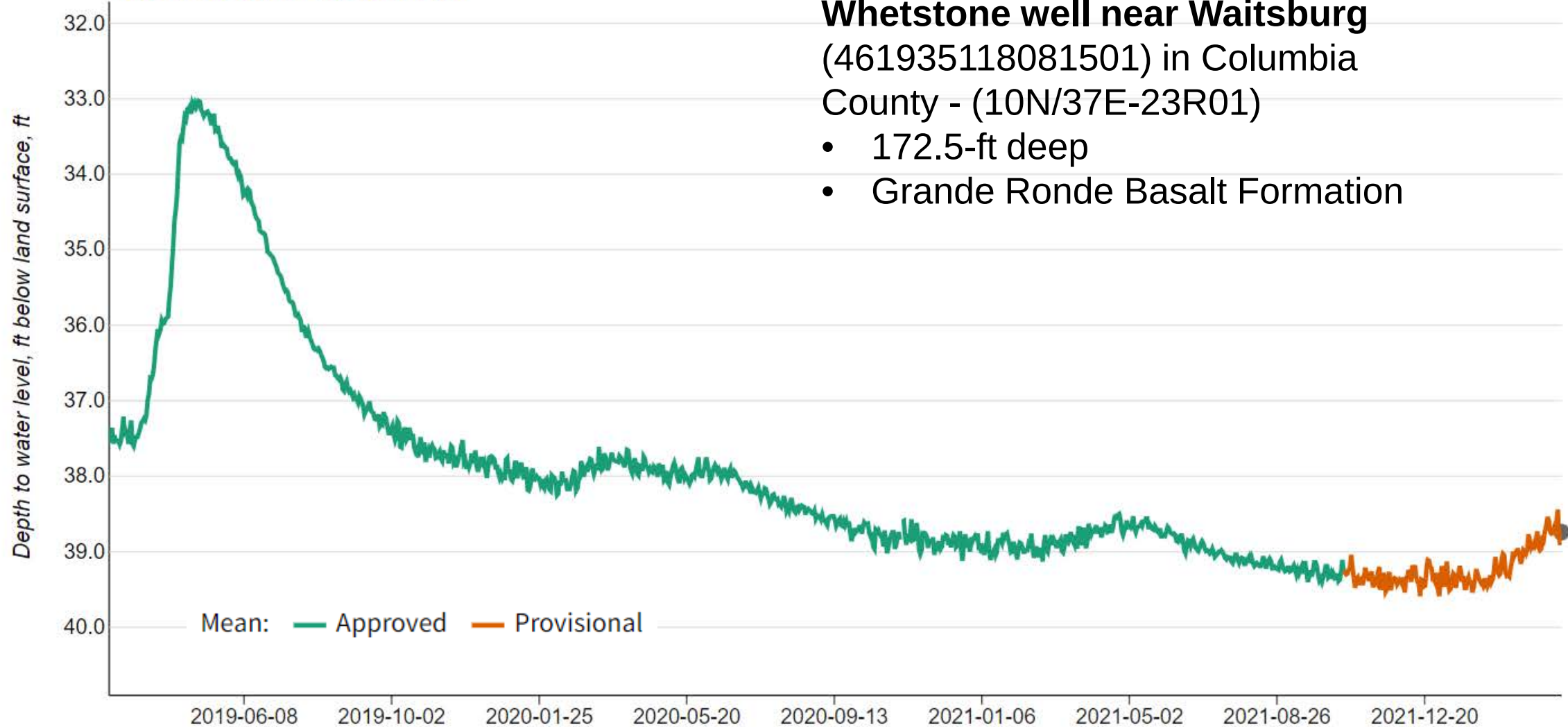
Whetstone Well Groundwater Conditions (April 8th, 2022)

Depth to water level, ft below land surface, ft

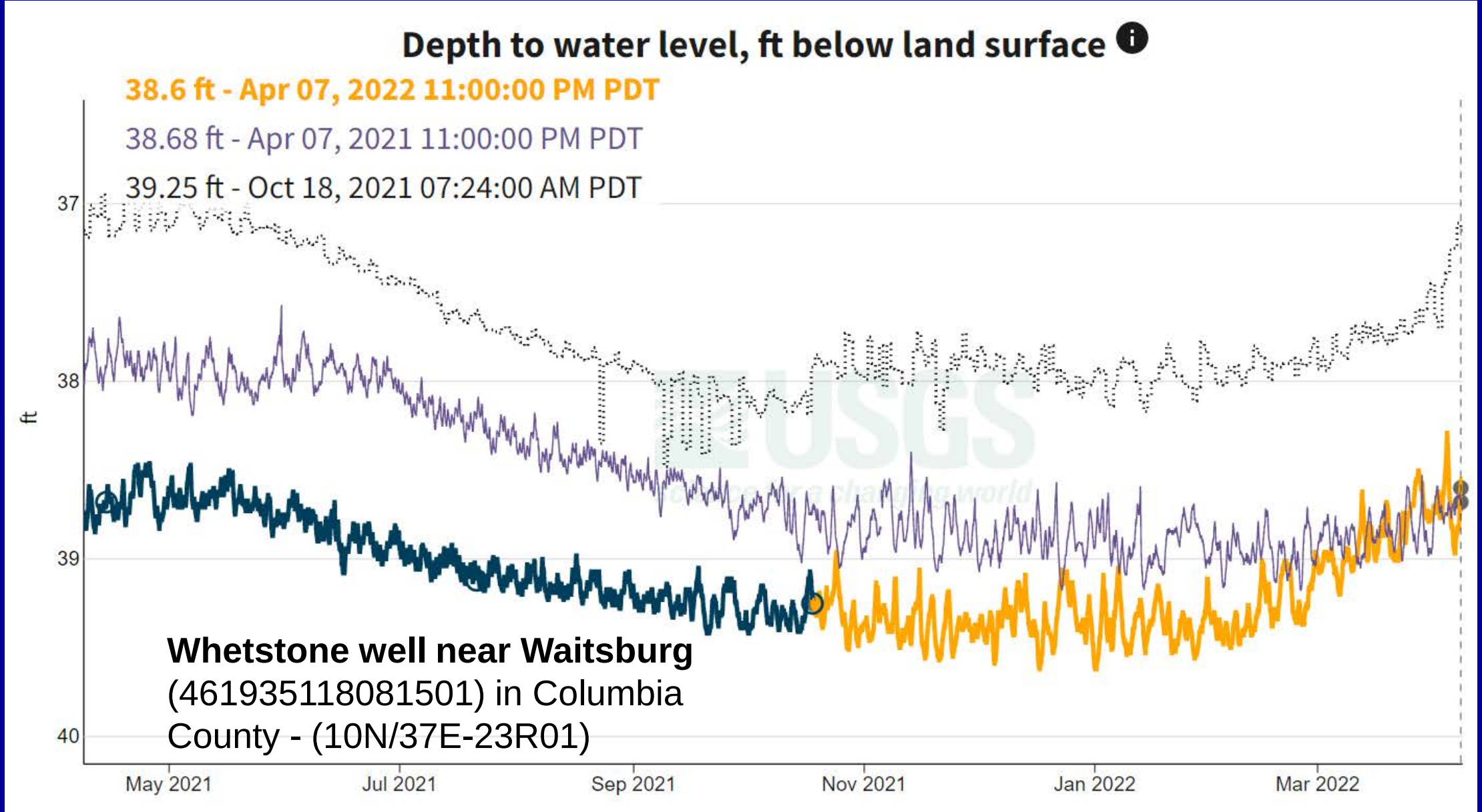
Mean 38.74 ft - 2022-04-07

Whetstone well near Waitsburg
(461935118081501) in Columbia
County - (10N/37E-23R01)

- 172.5-ft deep
- Grande Ronde Basalt Formation

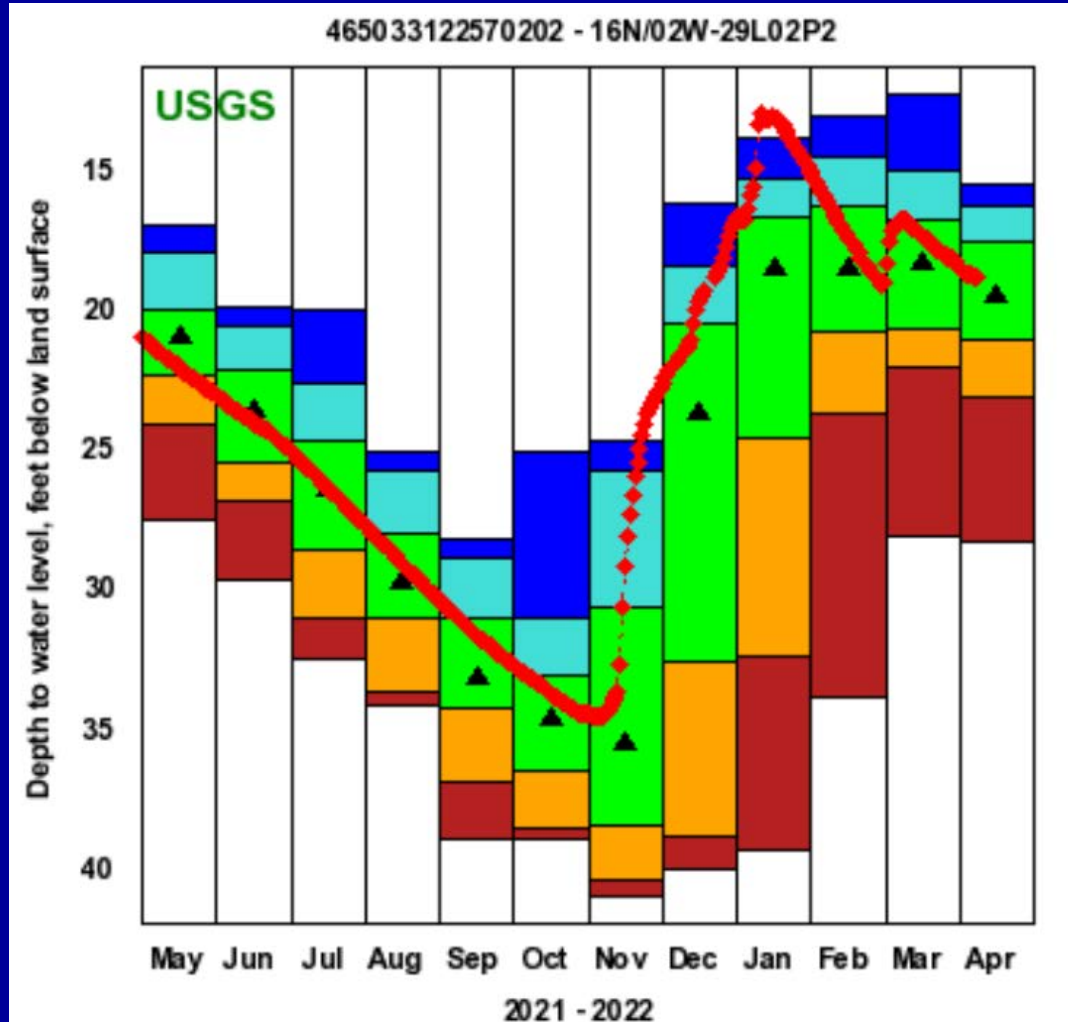


Whetstone Well Groundwater Conditions (April 8th, 2022)

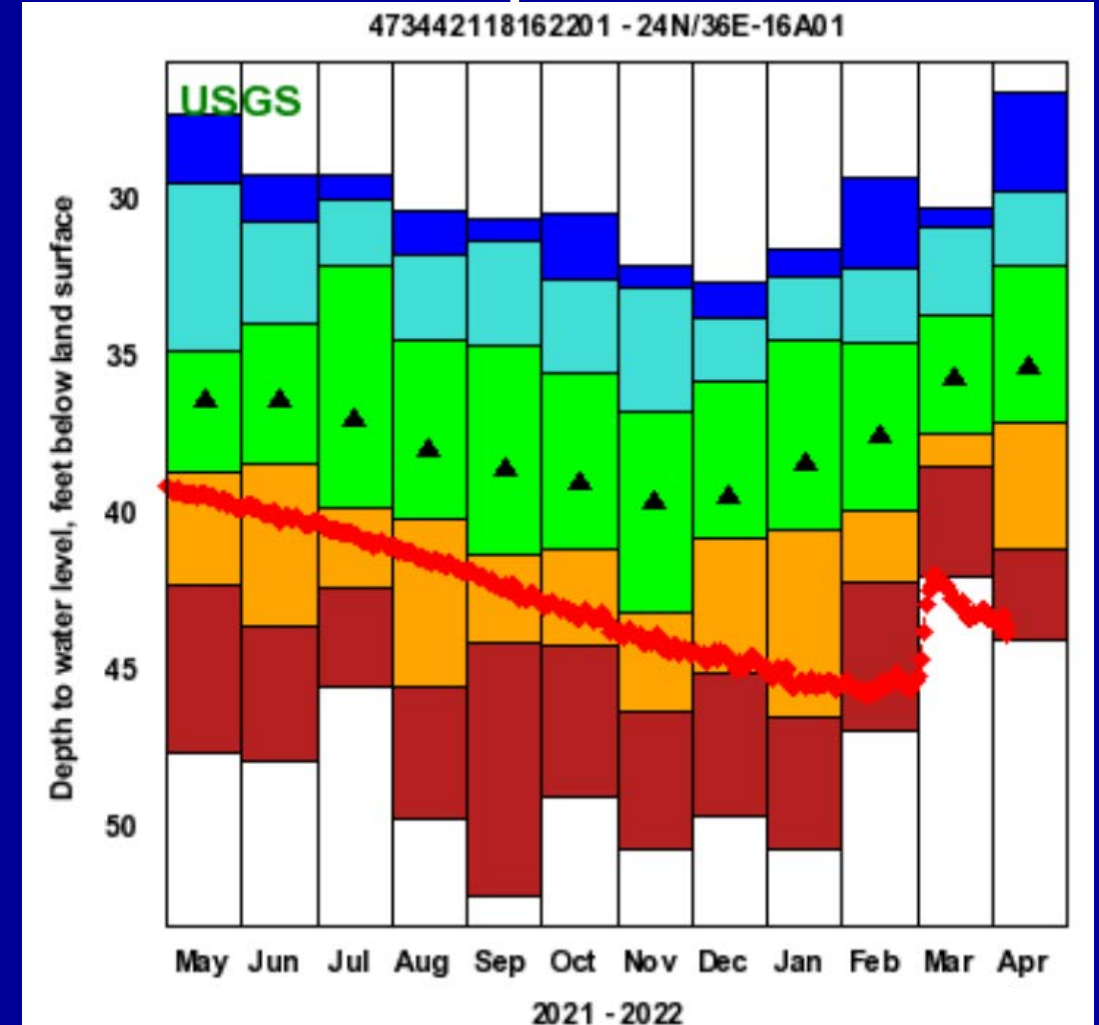


WA Current Groundwater Conditions (April 8th, 2022)

Scatter Creek well



Davenport well



WA Current Groundwater Conditions (April 8th, 2022)

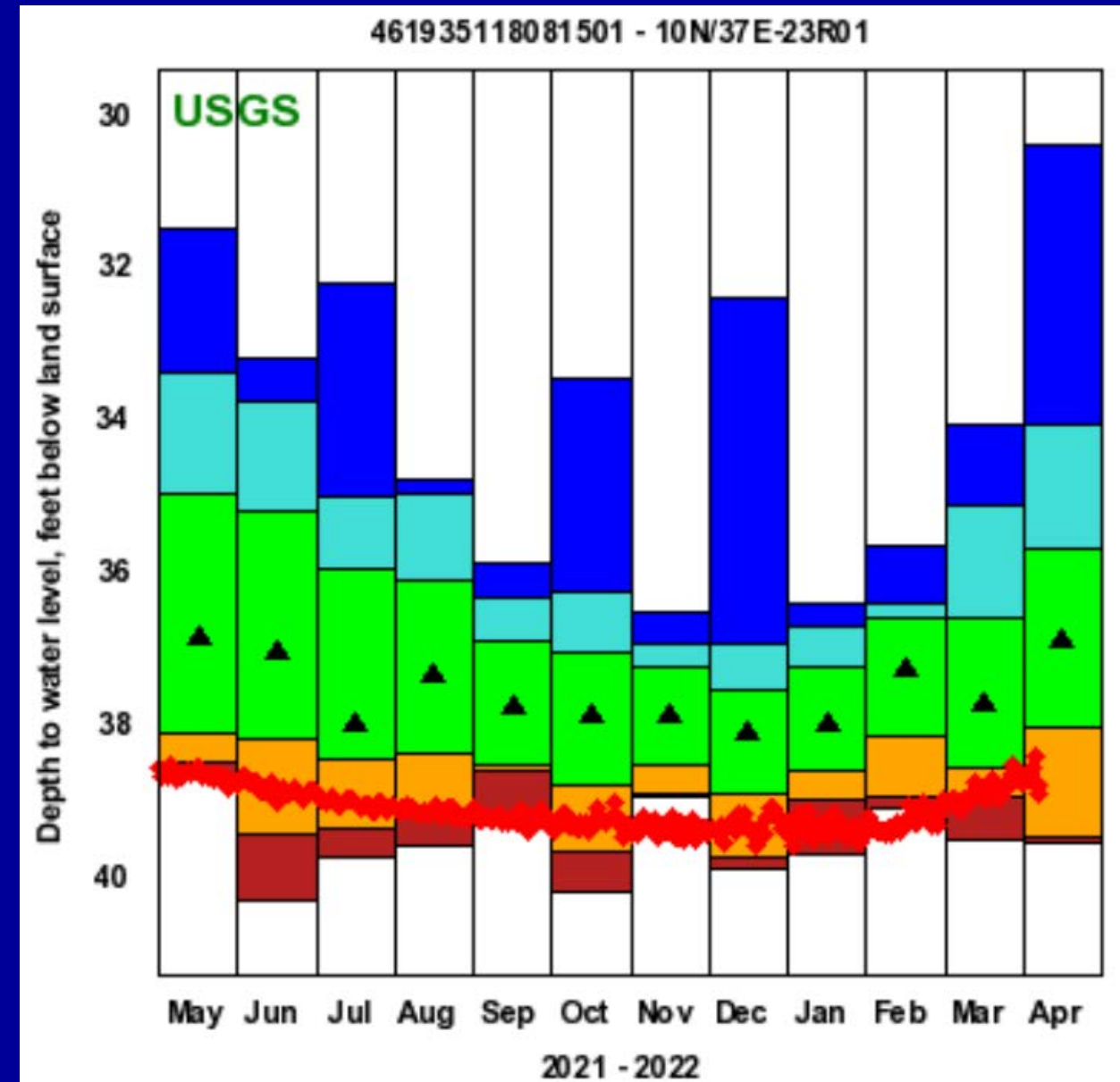
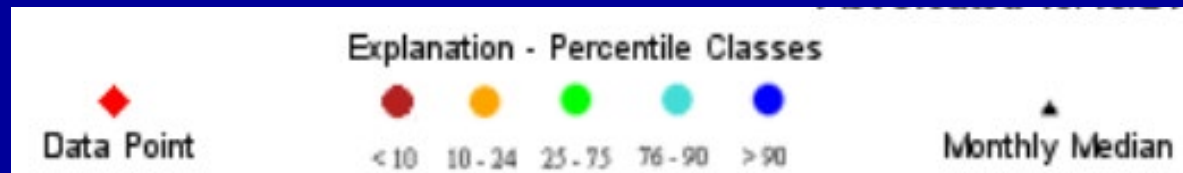
Whetstone well near Waitsburg

(461935118081501)

in Columbia County

(10N/37E-23R01)

- 172.5-ft deep
- Grande Ronde Basalt Formation



Summary of Washington Streamflow & GW conditions as of April 8th, 2022

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

West-central WA

- Puyallup River nr. Orting – Record low
- American River - Above normal

Western WA

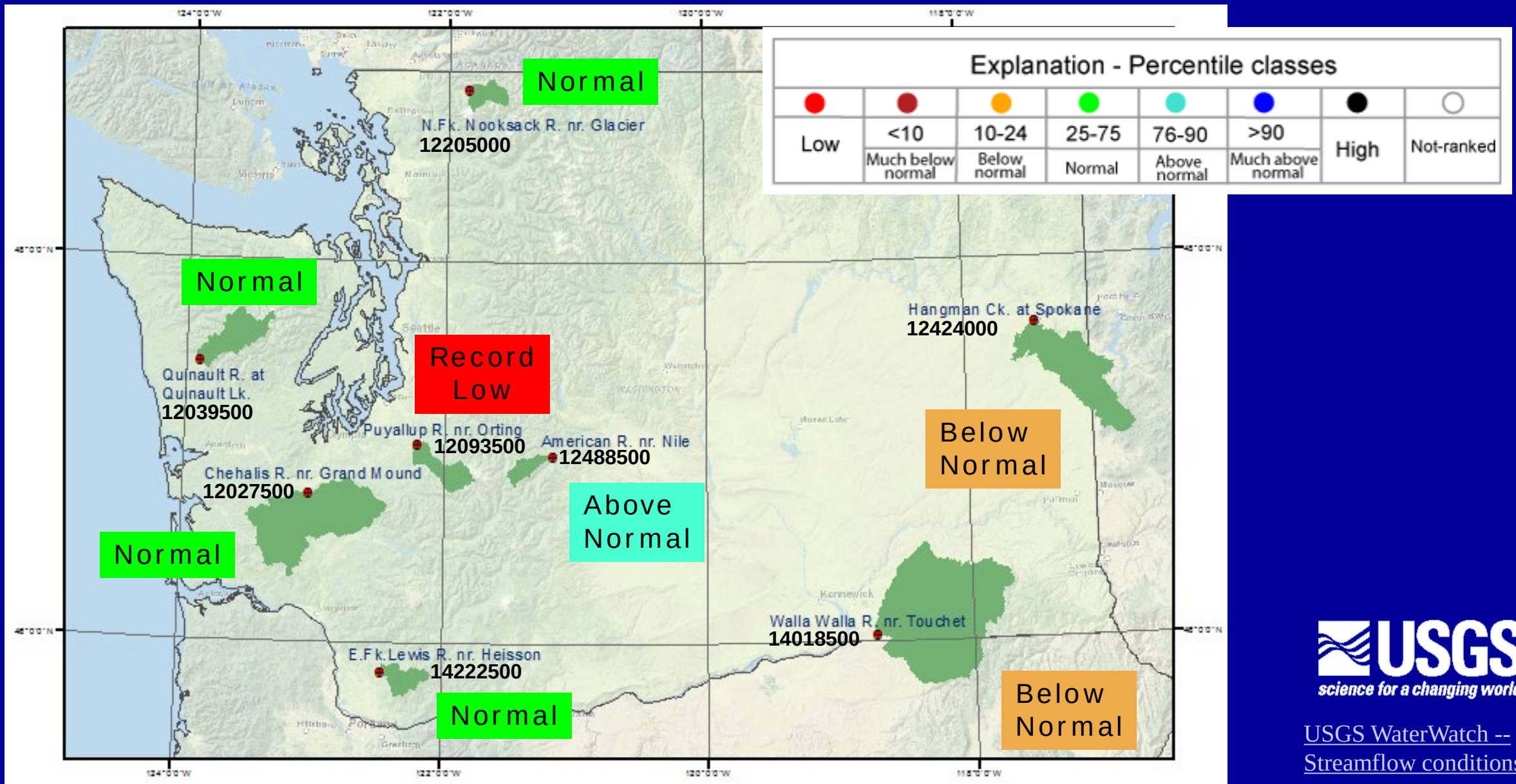
- Quinault River –Normal
- EF Lewis River – Normal
- Chehalis River nr. Grand Mound – Normal
- NF Nooksack River – Normal

Eastern WA

- Hangman Creek – Below normal
- Walla Walla River – Below normal

- Index groundwater sites: **(below normal)**
 - Scatter Creek well (west) – Normal
 - Davenport well (east) – Much below normal
 - Waitsburg well - Below normal

Index Gaging Stations, 7-day average streamflow (as of April 8th, 2022)





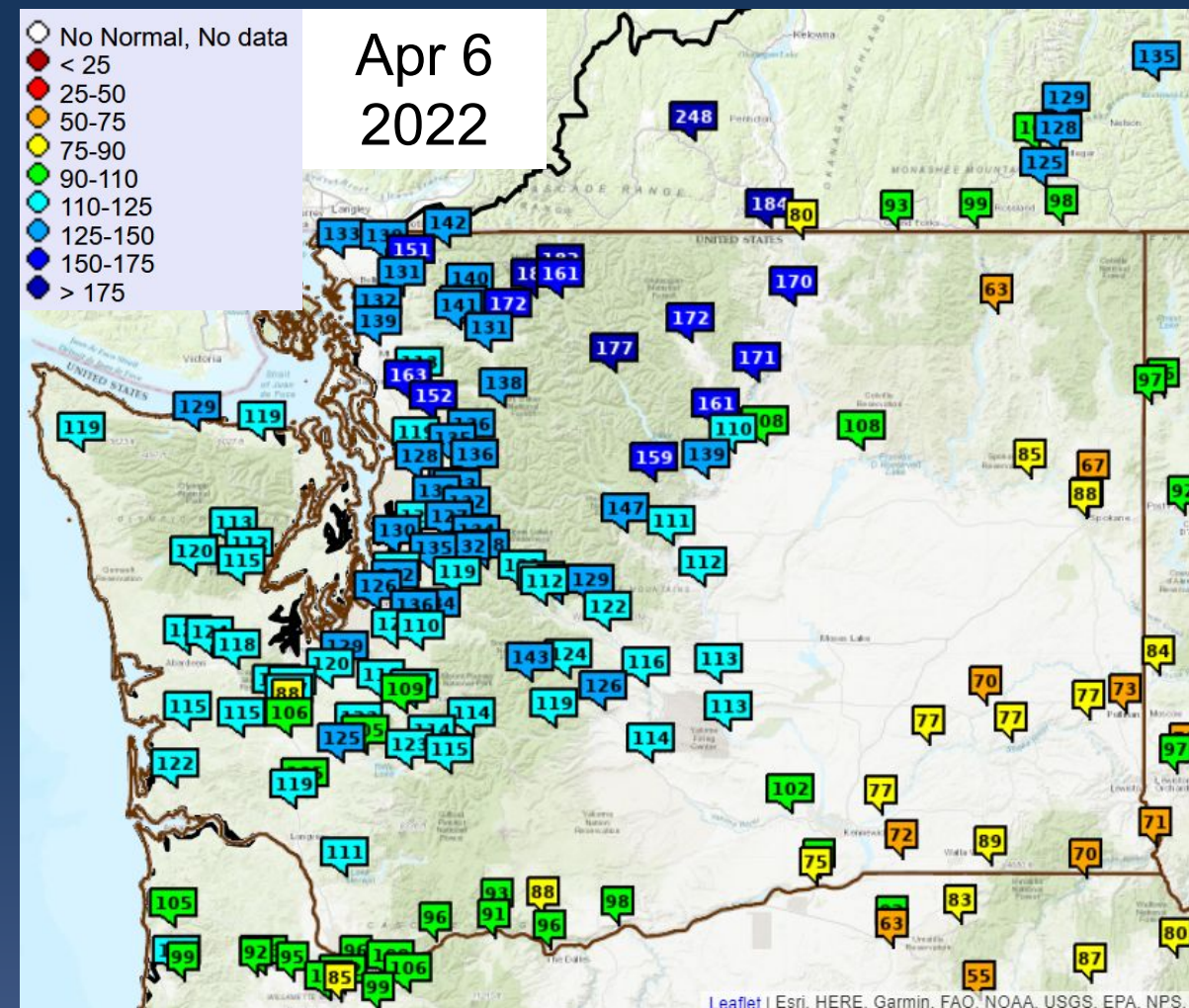
Washington Water Supply Availability Committee Meeting April 8, 2022

Amy Burke
NWRFC.watersupply@noaa.gov

Brent Bower
brent.bower@noaa.gov



Year to Date Adjusted Natural Runoff - OR, WA



% Normal Runoff Oct 1- Apr 6

Washington

Δ since Mar 2

Skagit nr Mt Vernon	139	-5
Dungeness nr Sequim	119	-6
Chehalis at Porter	118	-3
Okanogan at Malott	172	-25
Methow nr Pateros	163	-23
Yakima at Parker	115	6
Walla Walla nr Touchet	72	8



Natural ESP10 - WA

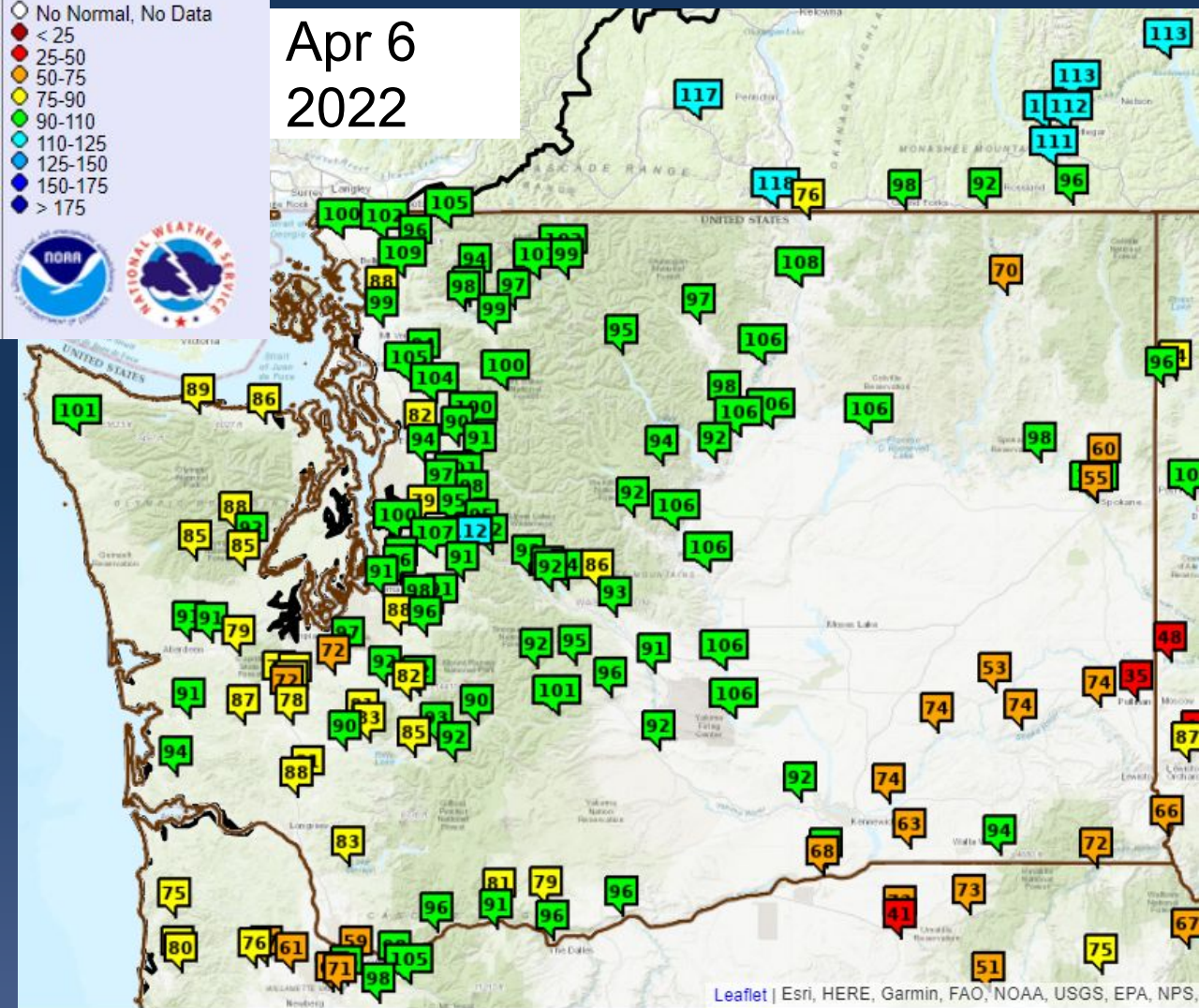
ESP Natural Forecast

Period: APR-SEP
Forecast (% Normal)

○ No Normal, No Data
● < 25
● 25-50
● 50-75
● 75-90
● 90-110
● 110-125
● 125-150
● 150-175
● > 175



Apr 6
2022



% Normal Apr -Sep Volume

Washington

Δ since Mar 2

Skagit nr Mt Vernon	99	4
Dungeness nr Sequim	86	2
Chehalis at Porter	79	-8
Okanogan at Malott	106	1
Methow nr Pateros	98	4
Yakima at Parker	92	7
Walla Walla nr Touchet	63	-11



Natural ESP10 - Rankings

Apr 7
2022

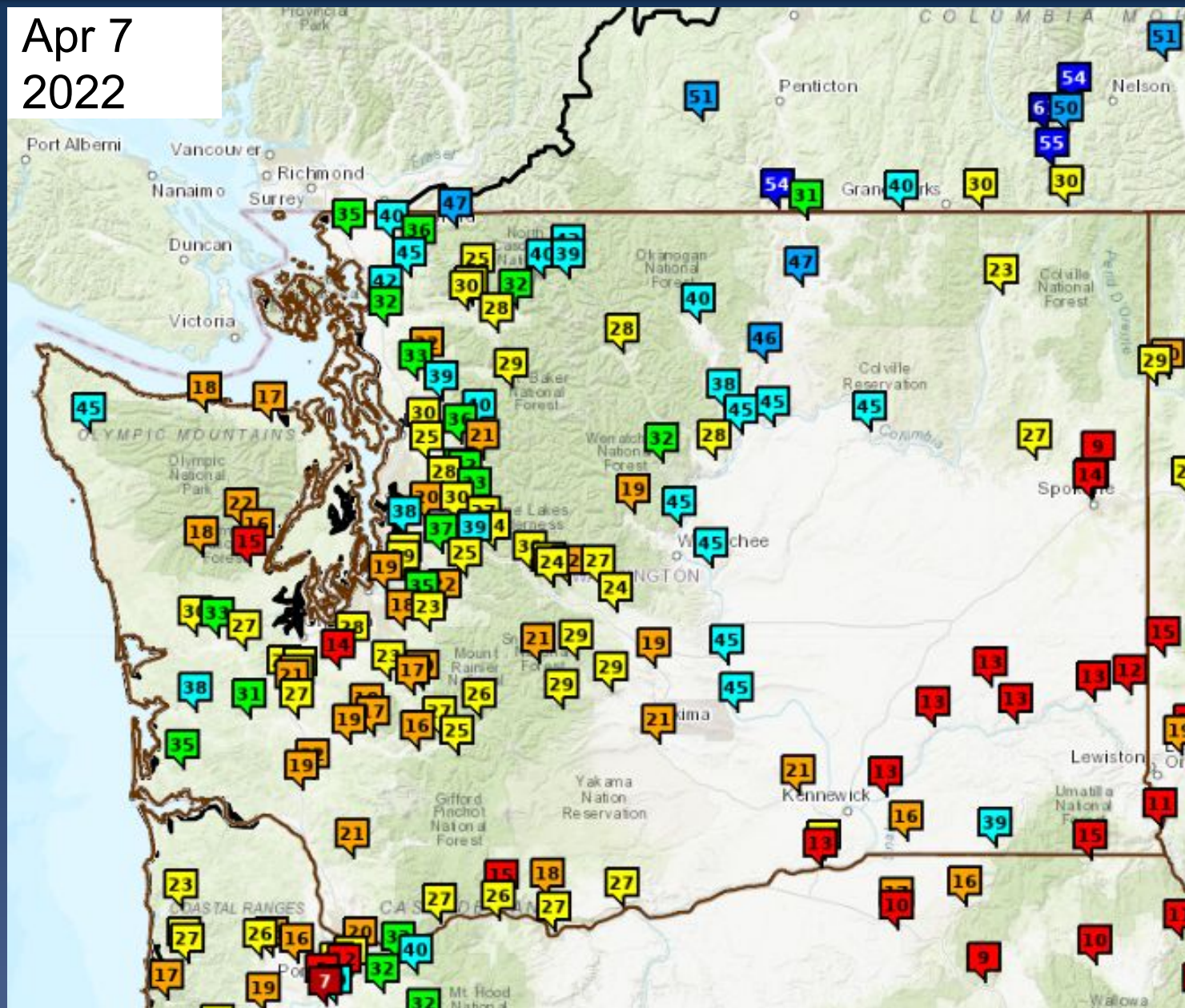
ESP Natural Forecast

Period: APR-SEP

Rank (Descending)

Marker Color Shows
Percentile (%)

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





A couple of notes about forecasts this time of year

- We are entering the Apr-Sep period. Consider looking at the monthly forecasts.
- Forecasts become sensitive to adjustments to our modeled snowpack and the precip forecast.



DUNGENESS - NEAR SEQUIM (DRSW1) Forecasts for Water Year 2022

Official Water Supply

ESP with 10 Days QPF Ensemble: 2022-04-06 Issued: 2022-04-06

Forecast Period	Forecasts Are in KAF				30 Year Average (1991-2020)
	90 %	50 %	% Average	10 %	
APR-SEP	113	125	86	150	145
APR-JUL	95	108	89	128	121
JAN-SEP	186	198	90	223	219
JAN-JUL	168	181	93	202	195
OCT-SEP	284	296	103	321	287

Experimental Water Supply

HEFS with 15 days EQPF Ensemble: 2022-04-06 Issued: 2022-04-06

APR-SEP	118	130	90	156	145
APR-JUL	98	111	92	132	121
JAN-SEP	191	203	93	230	219
JAN-JUL	171	184	95	206	195
OCT-SEP	289	301	105	328	287

Reference

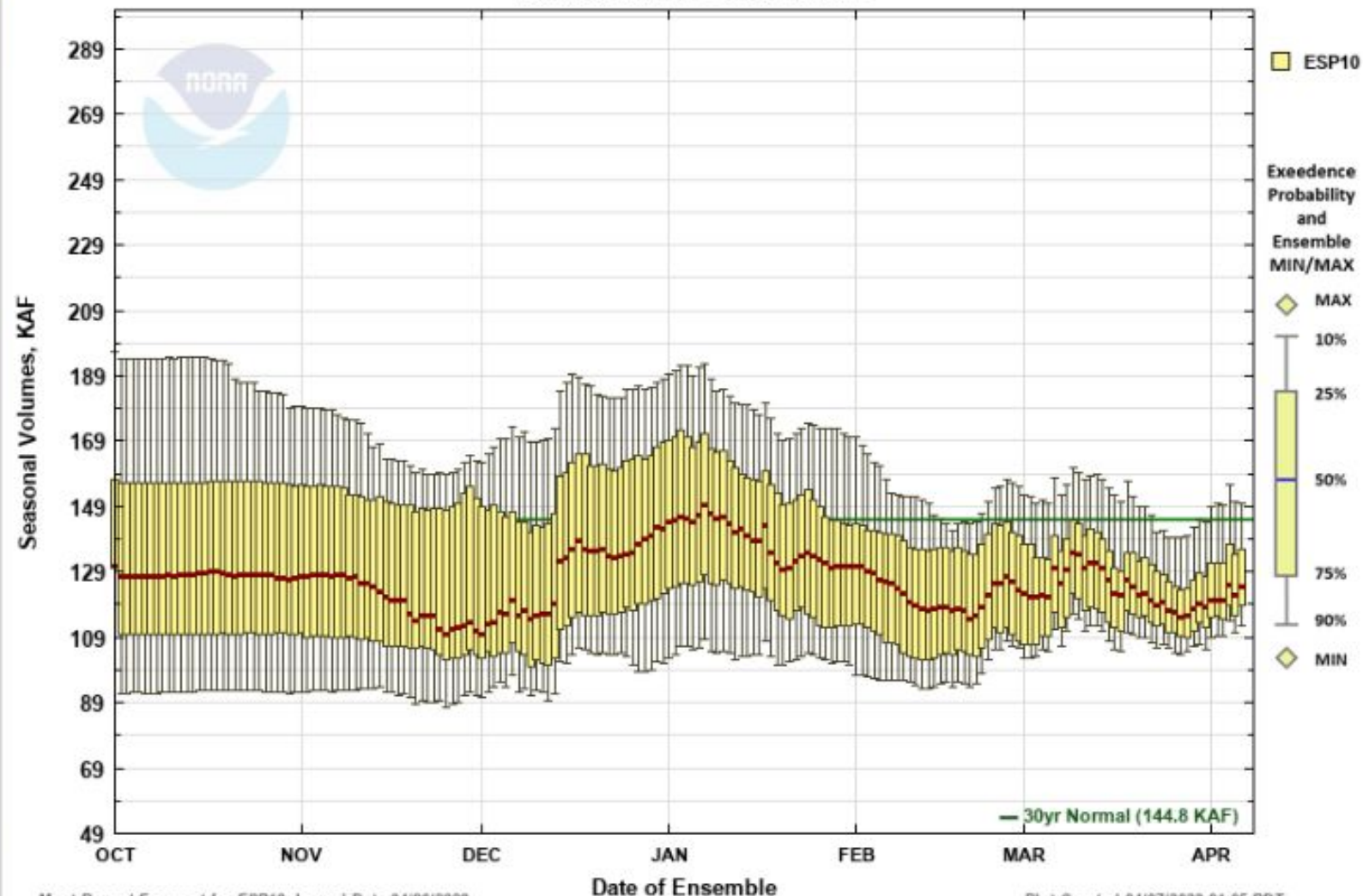
ESP with 0 Days QPF Ensemble: 2022-04-06 Issued: 2022-04-06

APR-SEP	120	132	91	156	145
APR-JUL	100	114	94	132	121
JAN-SEP	193	205	94	229	219
JAN-JUL	173	187	96	206	195
OCT-SEP	291	303	105	327	287

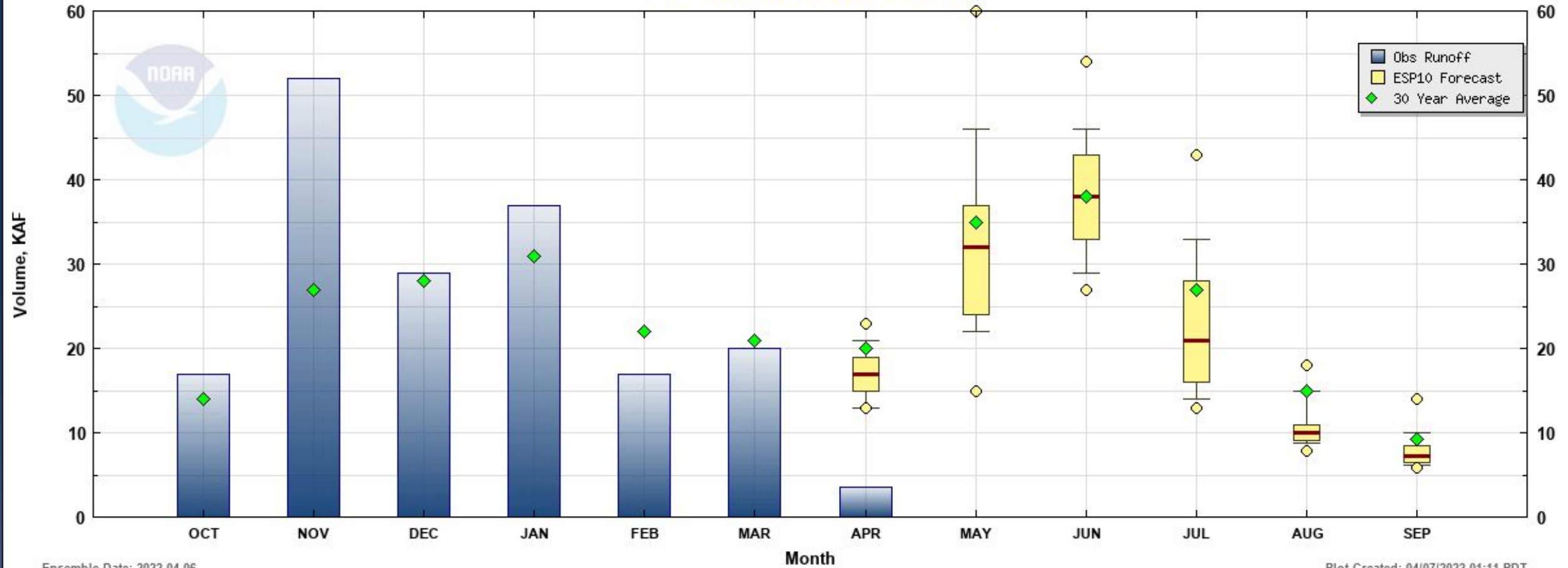
Move the mouse over the desired "Forecast Period" to display a graph.

Natural Volume Forecasts DUNGENESS - NEAR SEQUIM

Period APR to SEP -- Water Year 2022



Natural Volume Monthly Forecasts (ESP10) for Water Year 2022 (DRSW1) DUNGENESS - NEAR SEQUIM





CHEHALIS - AT PORTER (CRPW1) Forecasts for Water Year 2022

Official Water Supply

ESP with 10 Days QPF Ensemble: 2022-04-06 Issued: 2022-04-06

Forecast Period	Forecasts Are in KAF				30 Year Average (1991-2020)
	90 %	50 %	% Average	10 %	
APR-SEP	340	474	79	657	598
APR-JUL	302	406	74	594	545
JAN-SEP	1867	2001	100	2185	2001
JAN-JUL	1829	1933	99	2121	1948
OCT-SEP	3154	3289	111	3472	2961

Experimental Water Supply

HEFS with 15 days EQPF Ensemble: 2022-04-06 Issued: 2022-04-06

APR-SEP	369	518	87	747	598
APR-JUL	331	456	84	686	545
JAN-SEP	1896	2045	102	2274	2001
JAN-JUL	1859	1983	102	2213	1948
OCT-SEP	3183	3333	113	3562	2961

Reference

ESP with 0 Days QPF Ensemble: 2022-04-06 Issued: 2022-04-06

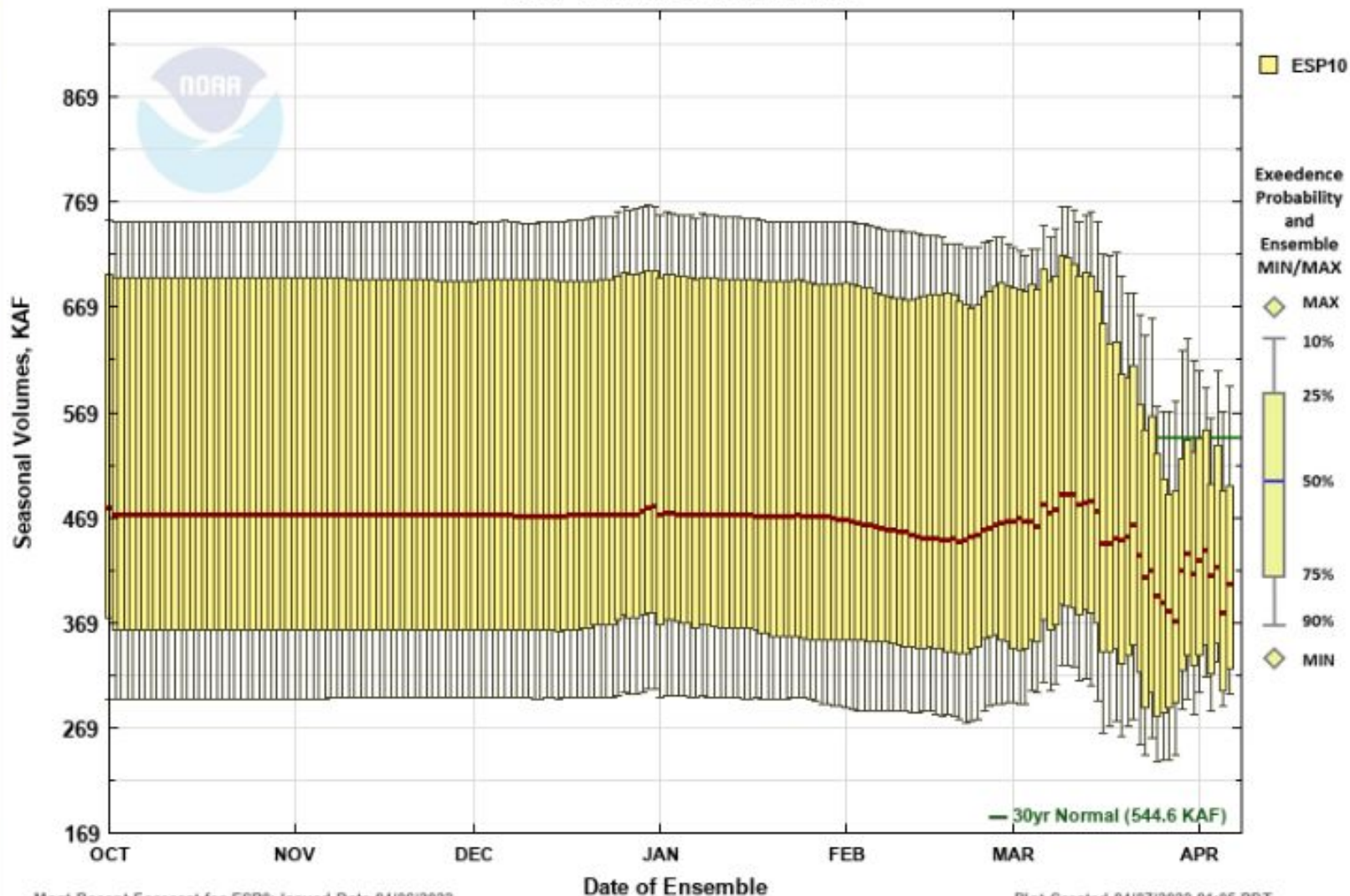
APR-SEP	377	526	88	769	598
APR-JUL	337	484	89	675	545
JAN-SEP	1904	2053	103	2297	2001
JAN-JUL	1864	2011	103	2202	1948
OCT-SEP	3191	3341	113	3584	2961

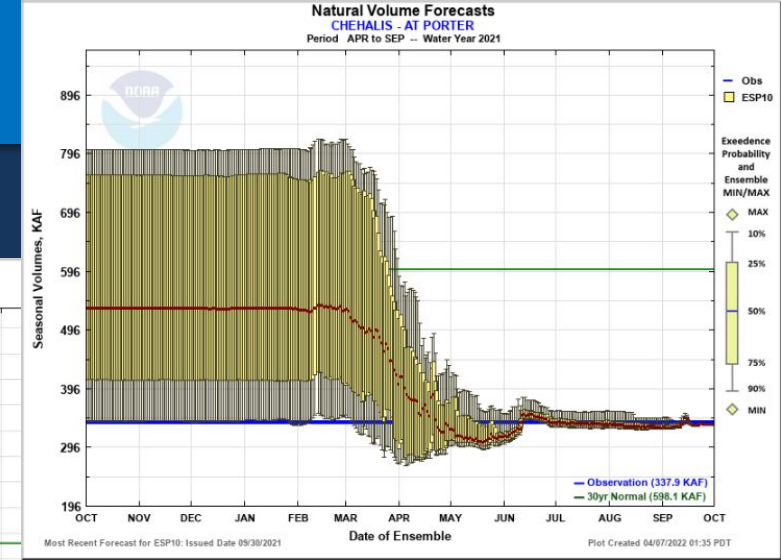
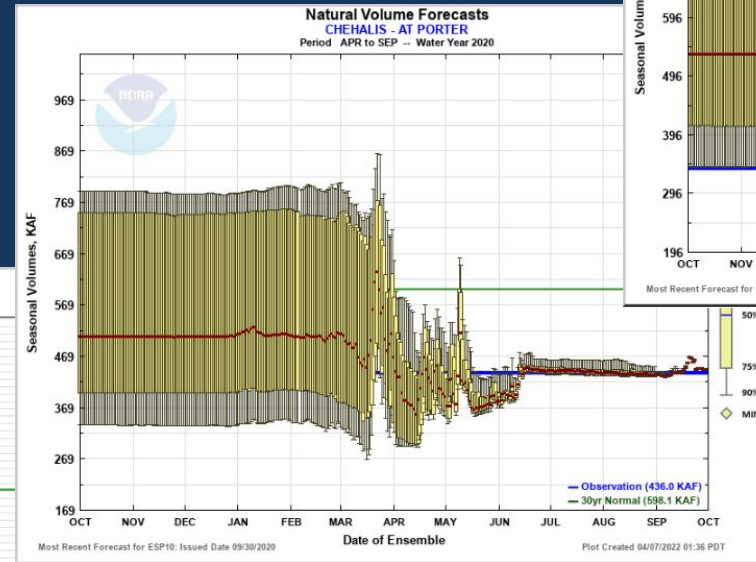
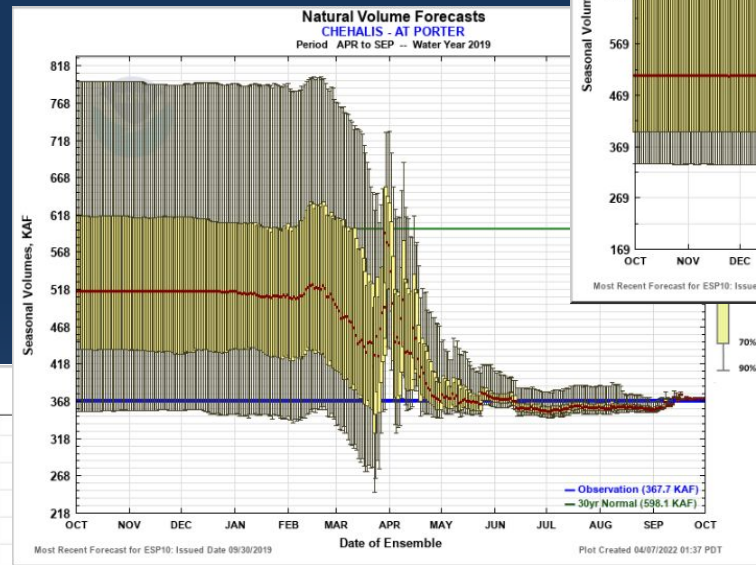
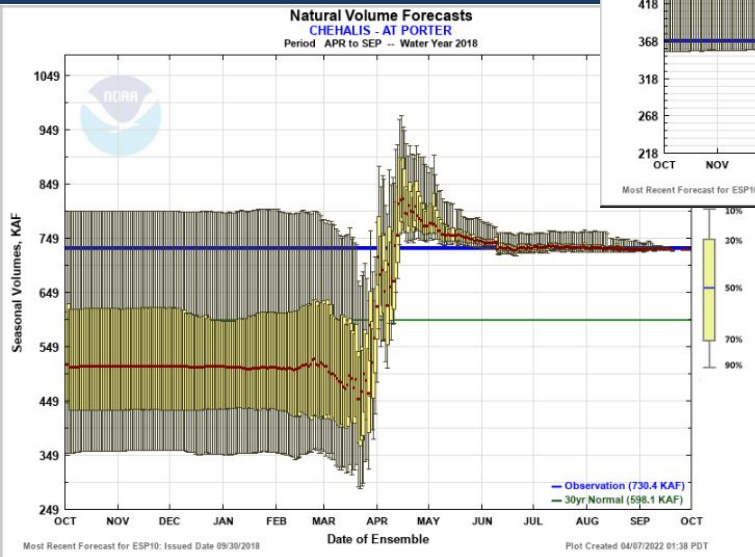
Move the mouse over the desired "Forecast Period" to display a graph.

Natural Volume Forecasts

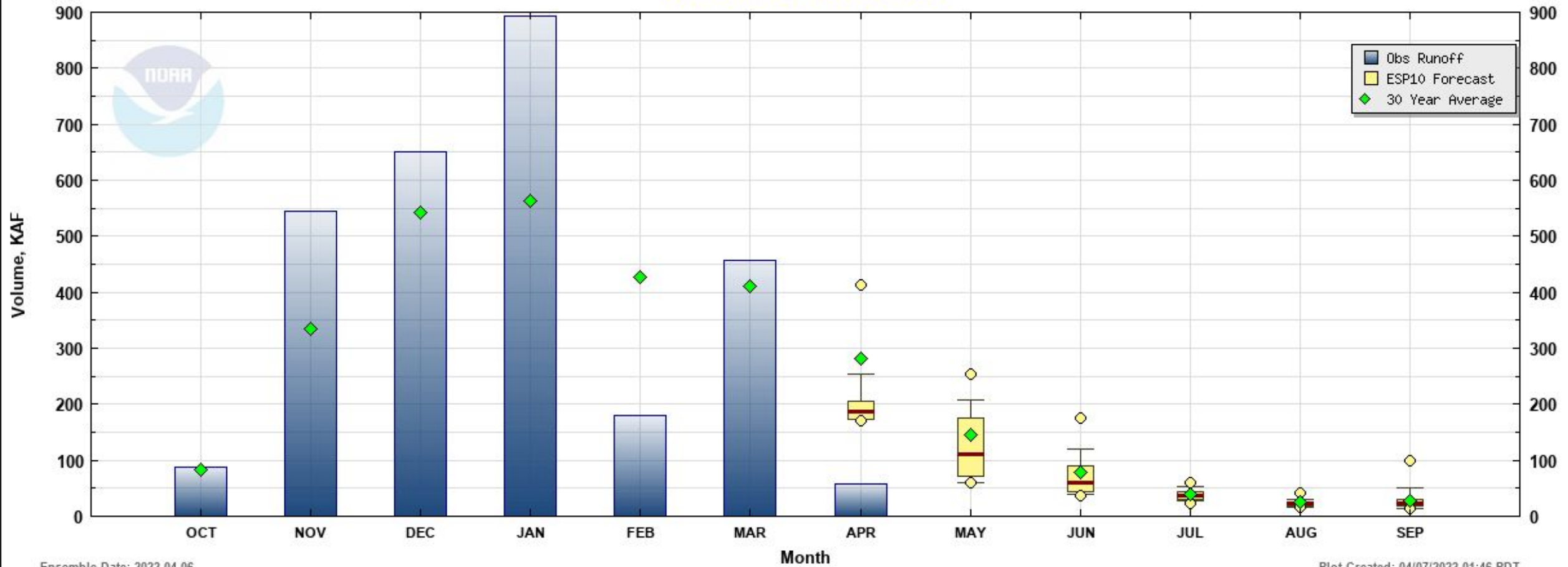
CHEHALIS - AT PORTER

Period APR to JUL -- Water Year 2022





Natural Volume Monthly Forecasts (ESP10) for Water Year 2022 (CRPW1) CHEHALIS - AT PORTER



Ensemble Date: 2022-04-06

Plot Created: 04/07/2022 01:46 PDT



OKANOOGAN - NEAR TONASKET (TONW1) Forecasts for Water Year 2022

Official Water Supply

ESP with 10 Days QPF Ensemble: 2022-04-07 Issued: 2022-04-07

Forecast Period	Forecasts Are in KAF				30 Year Average (1991-2020)
	90 %	50 %	% Average	10 %	
APR-SEP	1620	1864	106	2209	1761
APR-JUL	1529	1743	109	2059	1605
JAN-SEP	1915	2158	107	2504	2016
JAN-JUL	1824	2038	110	2354	1859
OCT-SEP	2507	2750	122	3095	2255

Experimental Water Supply

HEFS with 15 days EQPF Ensemble: 2022-04-07 Issued: 2022-04-07

APR-SEP	1635	1932	110	2214	1761
APR-JUL	1520	1785	111	2035	1605
JAN-SEP	1929	2226	110	2508	2016
JAN-JUL	1814	2080	112	2329	1859
OCT-SEP	2521	2818	125	3100	2255

Reference

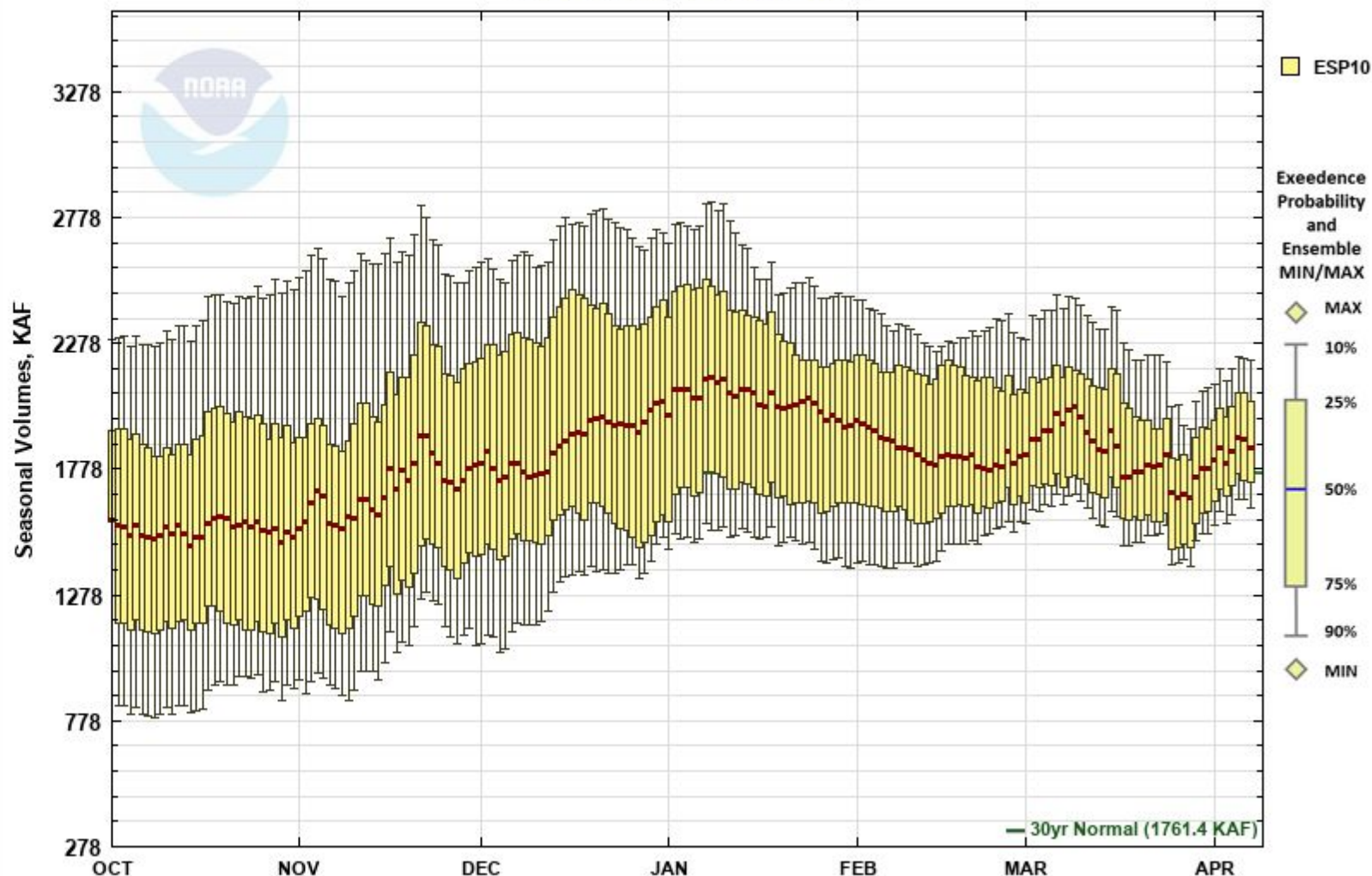
ESP with 0 Days QPF Ensemble: 2022-04-07 Issued: 2022-04-07

APR-SEP	1628	1914	109	2197	1761
APR-JUL	1520	1769	110	2034	1605
JAN-SEP	1923	2209	110	2491	2016
JAN-JUL	1815	2064	111	2329	1859
OCT-SEP	2514	2800	124	3083	2255

Move the mouse over the desired "Forecast Period" to display a graph.

Natural Volume Forecasts OKANOOGAN - NEAR TONASKET

Period APR to SEP -- Water Year 2022



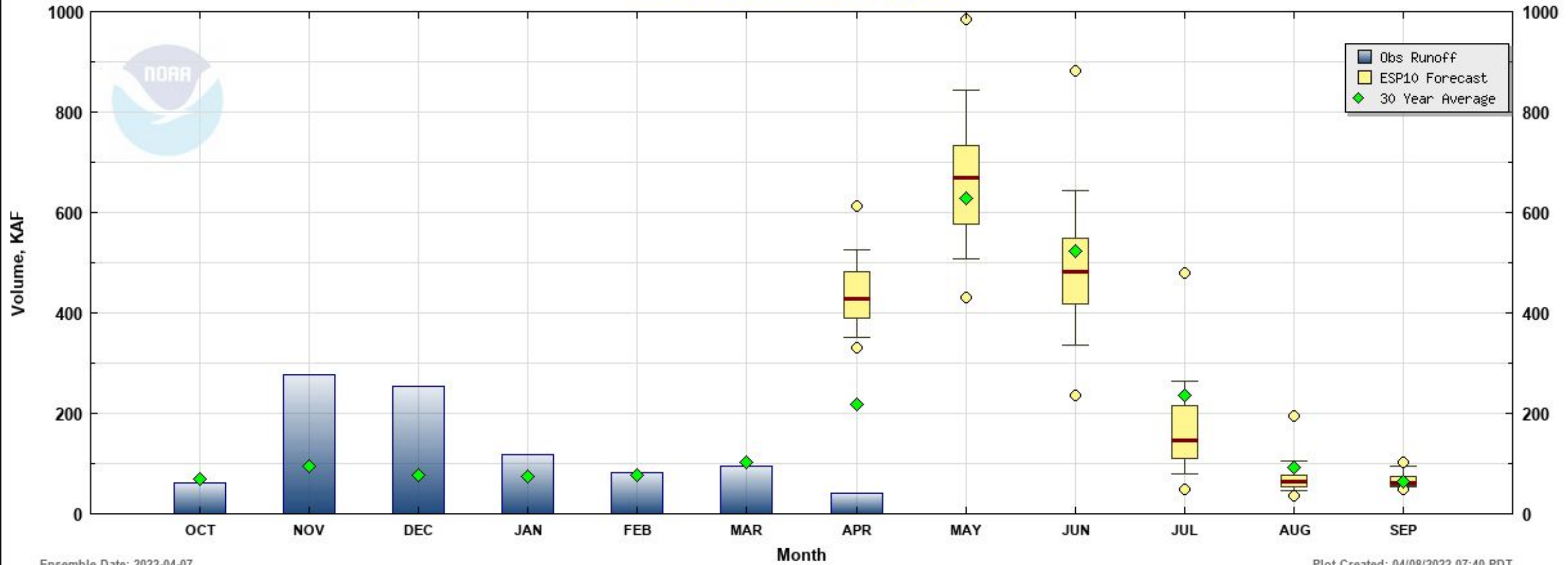
Most Recent Forecast for ESP10: Issued Date 04/07/2022

Date of Ensemble

Plot Created 04/08/2022 07:43 PDT

Natural Volume Monthly Forecasts (ESP10) for Water Year 2022

(TONW1) OKANOGAN - NEAR TONASKET



Ensemble Date: 2022-04-07

Plot Created: 04/08/2022 07:40 PDT



YAKIMA - NEAR PARKER (PARW1)

Forecasts for Water Year 2022

Official Water Supply

ESP with 10 Days QPF Ensemble: 2022-04-06 Issued: 2022-04-06

Forecast Period	Forecasts Are in KAF				30 Year Average (1991-2020)
	90 %	50 %	% Average	10 %	
APR-SEP	1785	1930	92	2092	2102
APR-JUL	1618	1751	92	1904	1899
JAN-SEP	2732	2877	97	3039	2974
JAN-JUL	2565	2699	97	2852	2770
OCT-SEP	3513	3658	102	3820	3576

Experimental Water Supply

HEFS with 15 days EQPF Ensemble: 2022-04-06 Issued: 2022-04-06

APR-SEP	1784	1963	93	2108	2102
APR-JUL	1625	1791	94	1918	1899
JAN-SEP	2732	2910	98	3055	2974
JAN-JUL	2572	2738	99	2865	2770
OCT-SEP	3513	3691	103	3836	3576

Reference

ESP with 0 Days QPF Ensemble: 2022-04-06 Issued: 2022-04-06

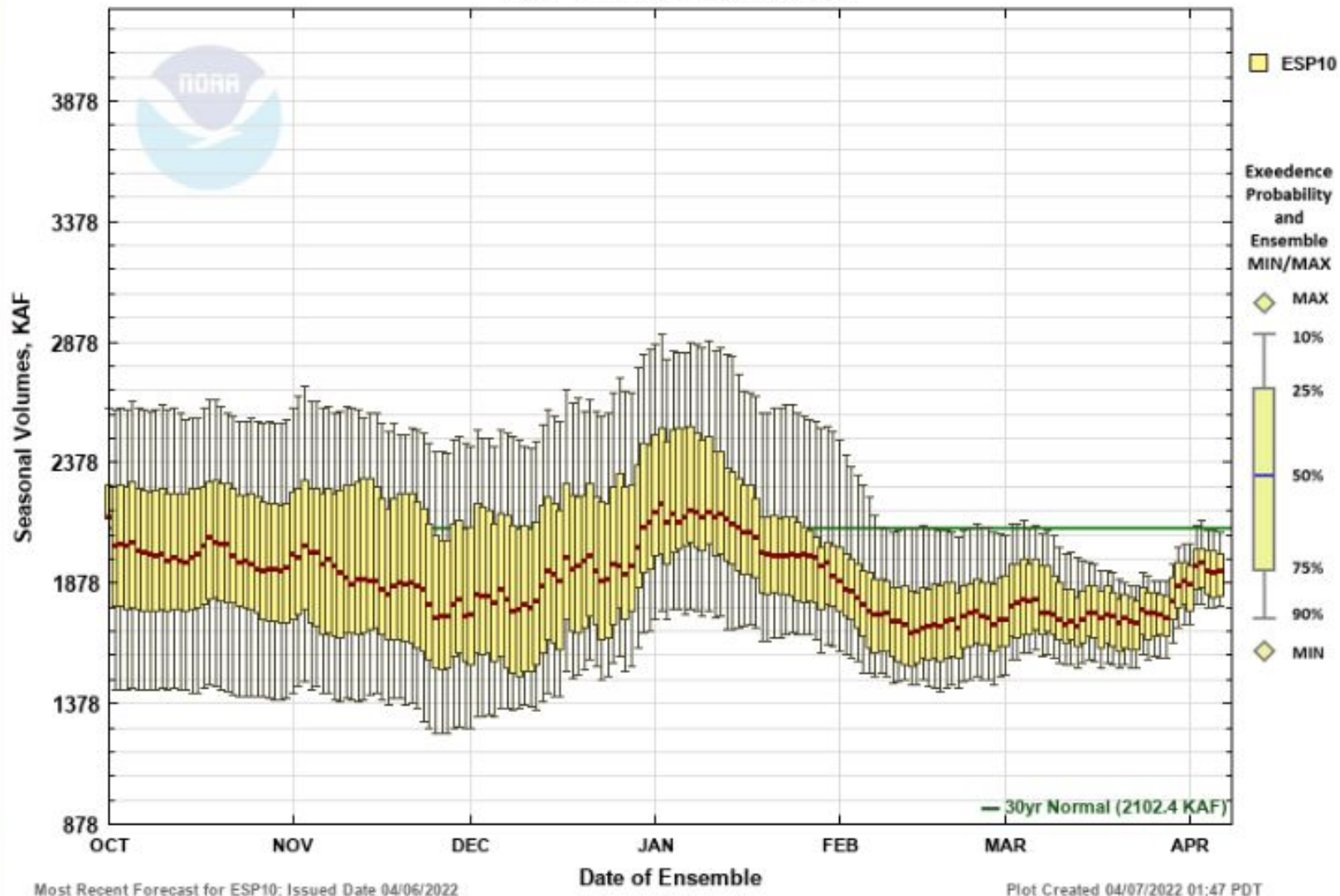
APR-SEP	1797	1987	95	2119	2102
APR-JUL	1623	1819	96	1933	1899
JAN-SEP	2744	2934	99	3066	2974
JAN-JUL	2570	2766	100	2880	2770
OCT-SEP	3525	3715	104	3847	3576

Move the mouse over the desired "Forecast Period" to display a graph.

Natural Volume Forecasts

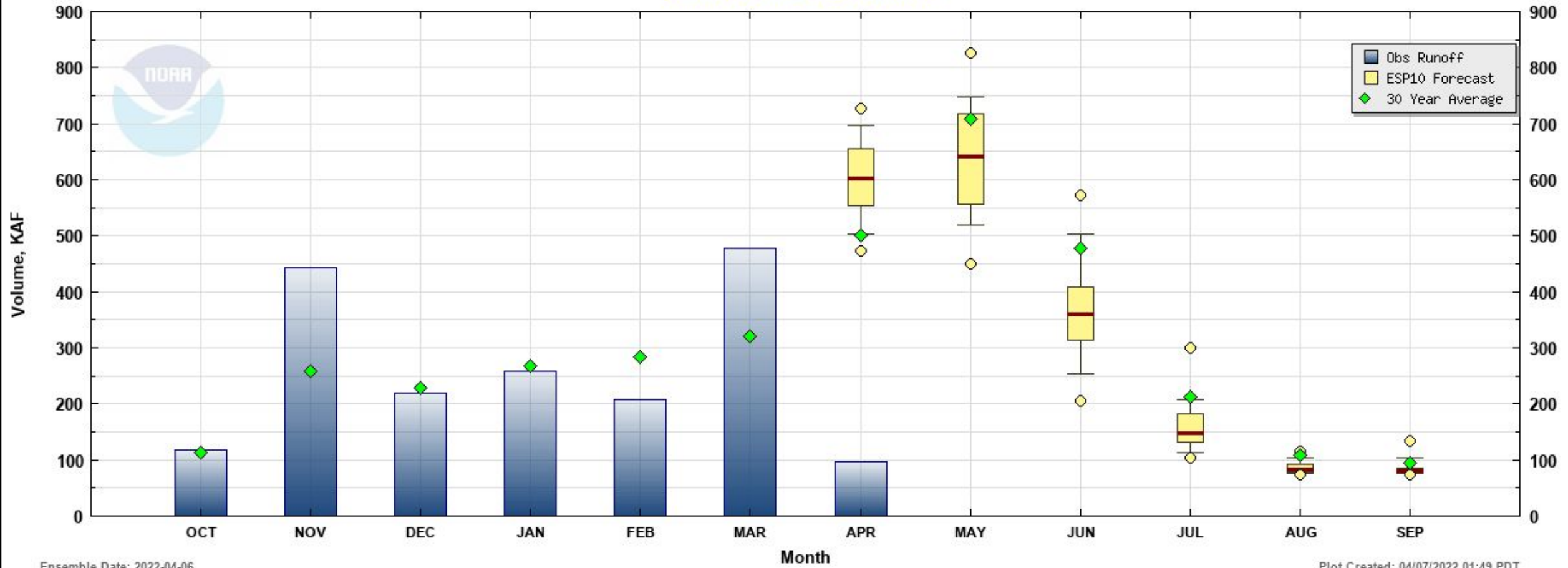
YAKIMA - NEAR PARKER

Period APR to SEP -- Water Year 2022



Natural Volume Monthly Forecasts (ESP10) for Water Year 2022

(PARW1) YAKIMA - NEAR PARKER



Ensemble Date: 2022-04-06

Plot Created: 04/07/2022 01:49 PDT



WALLA WALLA - NEAR TOUCHET (TCHW1) Forecasts for Water Year 2022

Official Water Supply

ESP with 10 Days QPF Ensemble: 2022-04-06 Issued: 2022-04-06

Forecast Period	Forecasts Are in KAF				30 Year Average (1991-2020)
	90 %	50 %	% Average	10 %	
APR-SEP	90	109	63	143	173
APR-JUL	81	99	62	130	158
JAN-SEP	264	283	72	317	393
JAN-JUL	256	273	72	305	379
OCT-SEP	301	320	70	354	460

Experimental Water Supply

HEFS with 15 days EQPF Ensemble: 2022-04-06 Issued: 2022-04-06

APR-SEP	94	118	68	153	173
APR-JUL	85	107	68	140	158
JAN-SEP	268	293	74	328	393
JAN-JUL	259	282	74	315	379
OCT-SEP	305	329	72	365	460

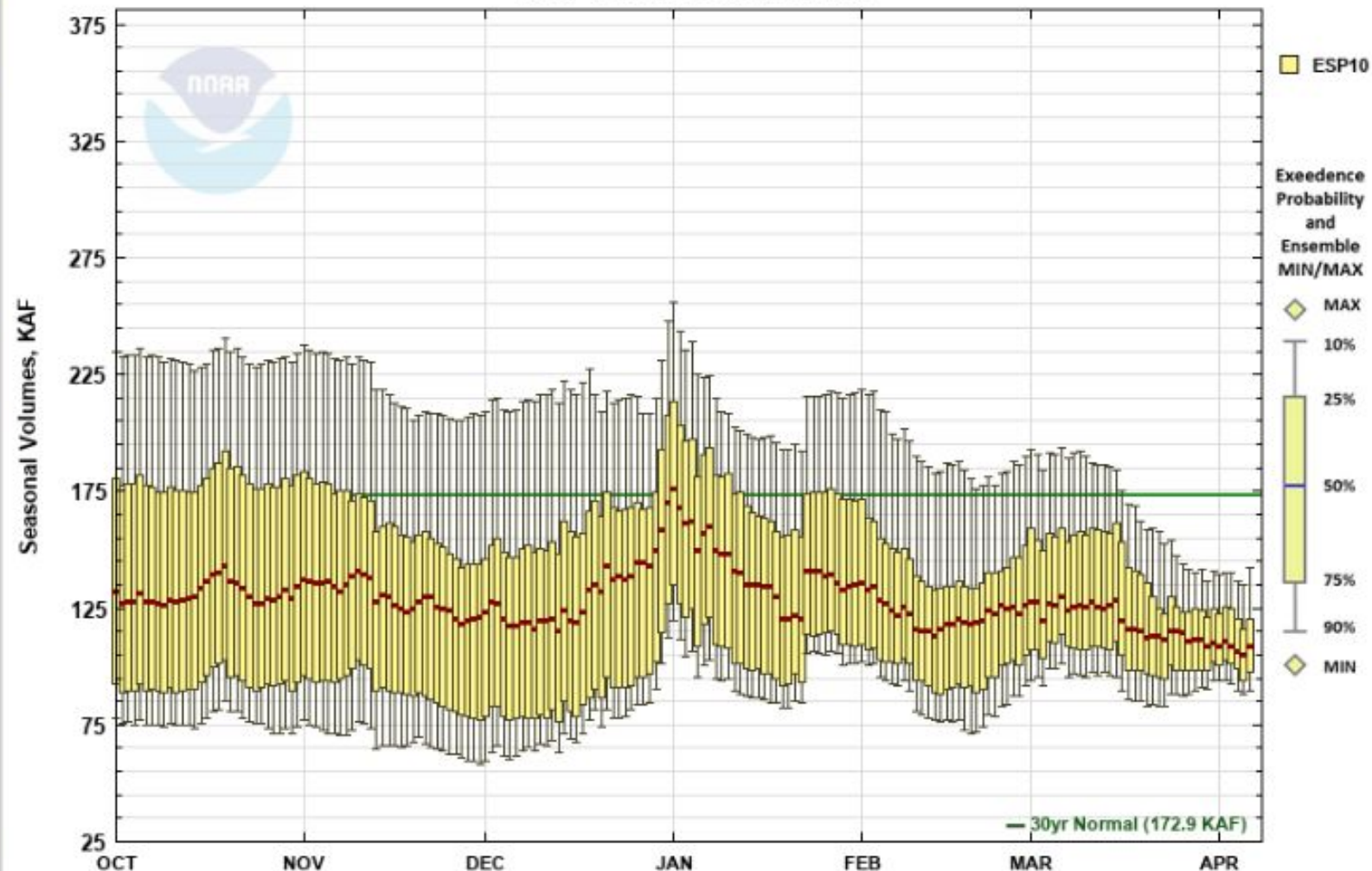
Reference

ESP with 0 Days QPF Ensemble: 2022-04-06 Issued: 2022-04-06

APR-SEP	95	121	70	154	173
APR-JUL	86	109	69	140	158
JAN-SEP	270	295	75	329	393
JAN-JUL	261	284	75	314	379
OCT-SEP	306	332	72	365	460

Move the mouse over the desired "Forecast Period" to display a graph.

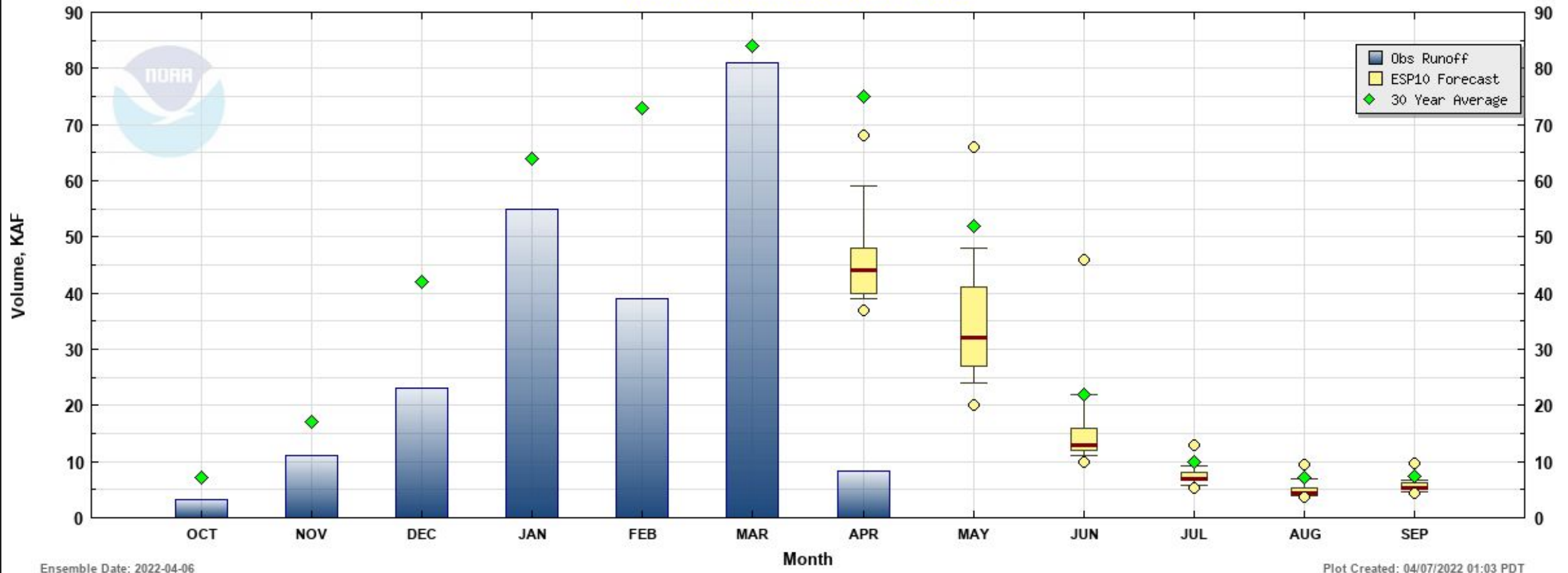
Natural Volume Forecasts WALLA WALLA - NEAR TOUCHET Period APR to SEP -- Water Year 2022



Most Recent Forecast for ESP10: Issued Date 04/06/2022

Plot Created 04/07/2022 01:01 PDT

Natural Volume Monthly Forecasts (ESP10) for Water Year 2022 (TCHW1) WALLA WALLA - NEAR TOUCHET



Ensemble Date: 2022-04-06

Plot Created: 04/07/2022 01:03 PDT



COLUMBIA - THE DALLES DAM (TDAO3) Forecasts for Water Year 2022

Official Water Supply

ESP with 10 Days QPF Ensemble: 2022-04-07 Issued: 2022-04-07

Forecast Period	Forecasts Are in KAF				30 Year Average (1991-2020)
	90 %	50 %	% Average	10 %	
APR-SEP	88202	93633	96	105023	97491
APR-JUL	71226	78178	93	87425	83913
APR-AUG	81858	87352	95	98861	92087
JAN-SEP	106485	111916	95	123306	118196
JAN-JUL	89509	96462	92	105709	104619
OCT-SEP	124855	130286	97	141676	134443

Experimental Water Supply

HEFS with 15 days EQPF Ensemble: 2022-04-06 Issued: 2022-04-06

APR-SEP	89322	95953	98	106011	97491
APR-JUL	73982	80088	95	87504	83913
APR-AUG	82961	89927	98	99280	92087
JAN-SEP	107610	114241	97	124299	118196
JAN-JUL	92269	98376	94	105791	104619
OCT-SEP	125980	132611	99	142669	134443

Reference

ESP with 0 Days QPF Ensemble: 2022-04-07 Issued: 2022-04-07

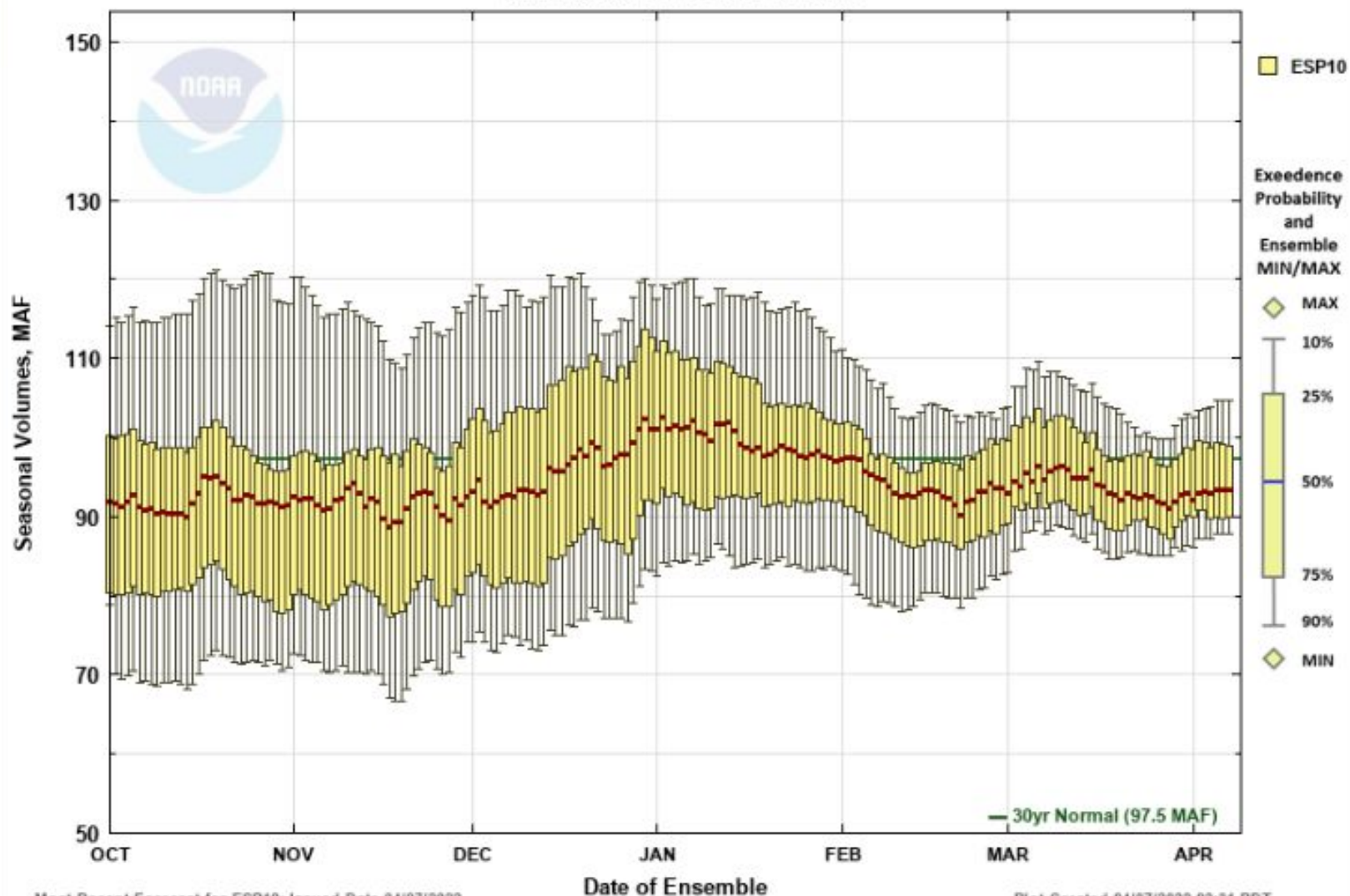
APR-SEP	90338	96235	99	105799	97491
APR-JUL	74501	80755	96	87835	83913
APR-AUG	84533	90243	98	99157	92087
JAN-SEP	108622	114518	97	124082	118196
JAN-JUL	92785	99038	95	106119	104619
OCT-SEP	126992	132888	99	142452	134443

Move the mouse over the desired "Forecast Period" to display a graph

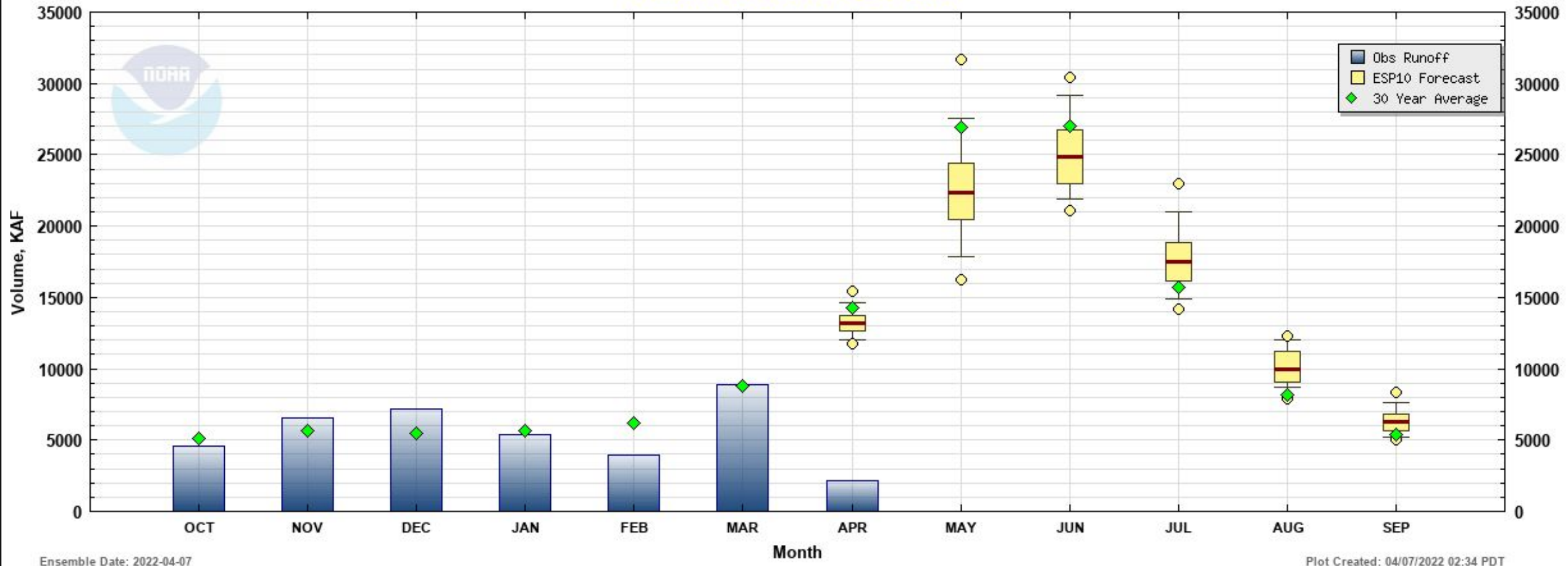
Natural Volume Forecasts

COLUMBIA - THE DALLES DAM

Period APR to SEP -- Water Year 2022



Natural Volume Monthly Forecasts (ESP10) for Water Year 2022 (TDAO3) COLUMBIA - THE DALLES DAM

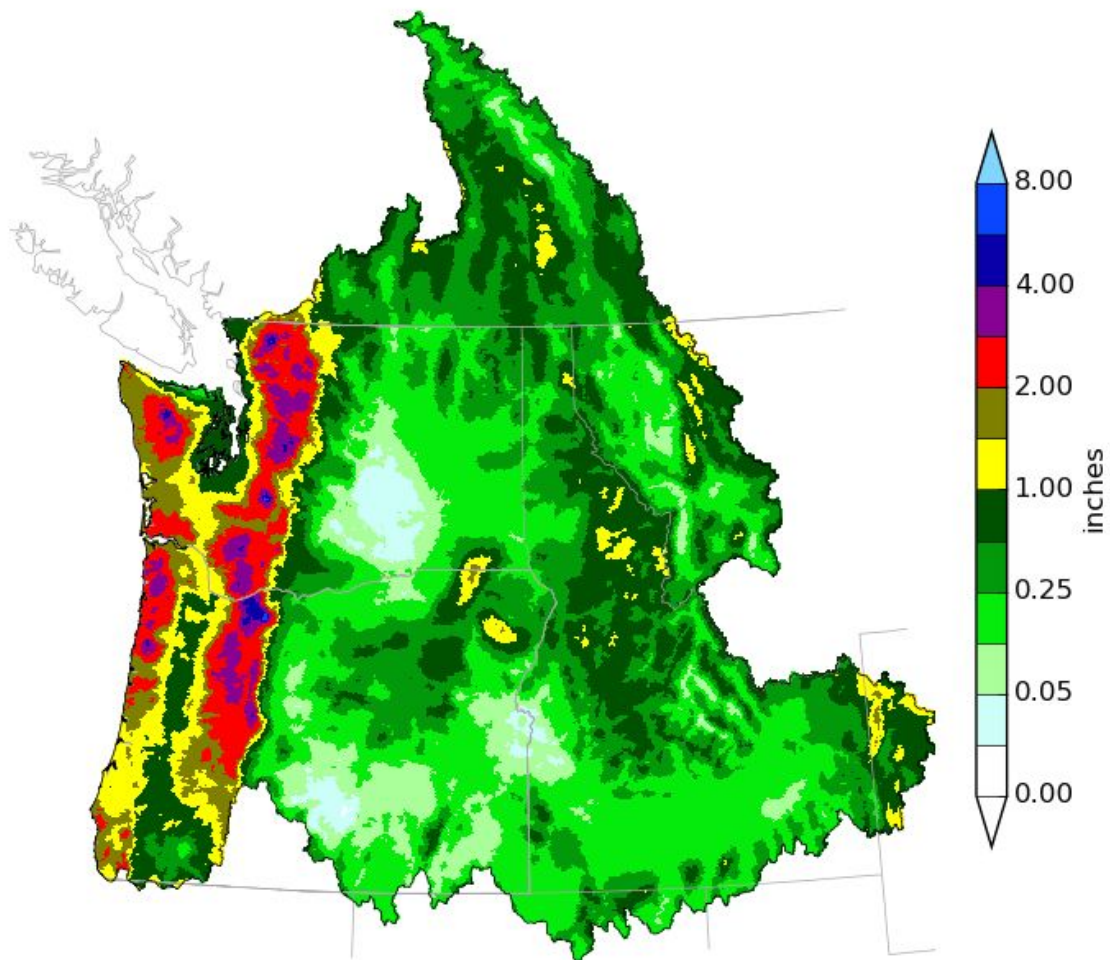




Precipitation Forecast (Apr 6-17)



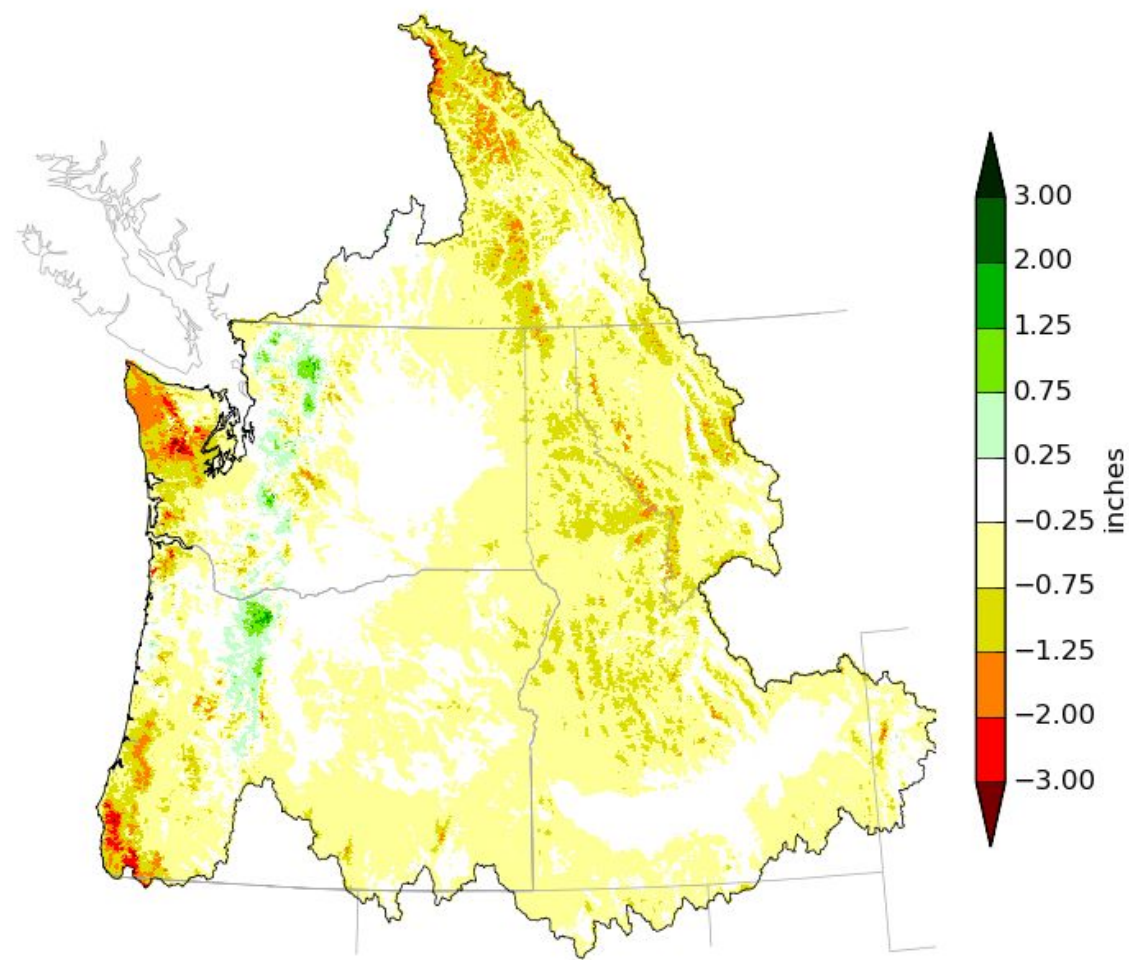
Northwest River Forecast Center
10 Day QPF, Ending 12Z, 04/17/22



Creation Time: Thu Apr 7 15:04:41 UTC 2022



Northwest River Forecast Center
10 Day QPF (Deviation from Climatology), Ending 12Z, 04/17/22

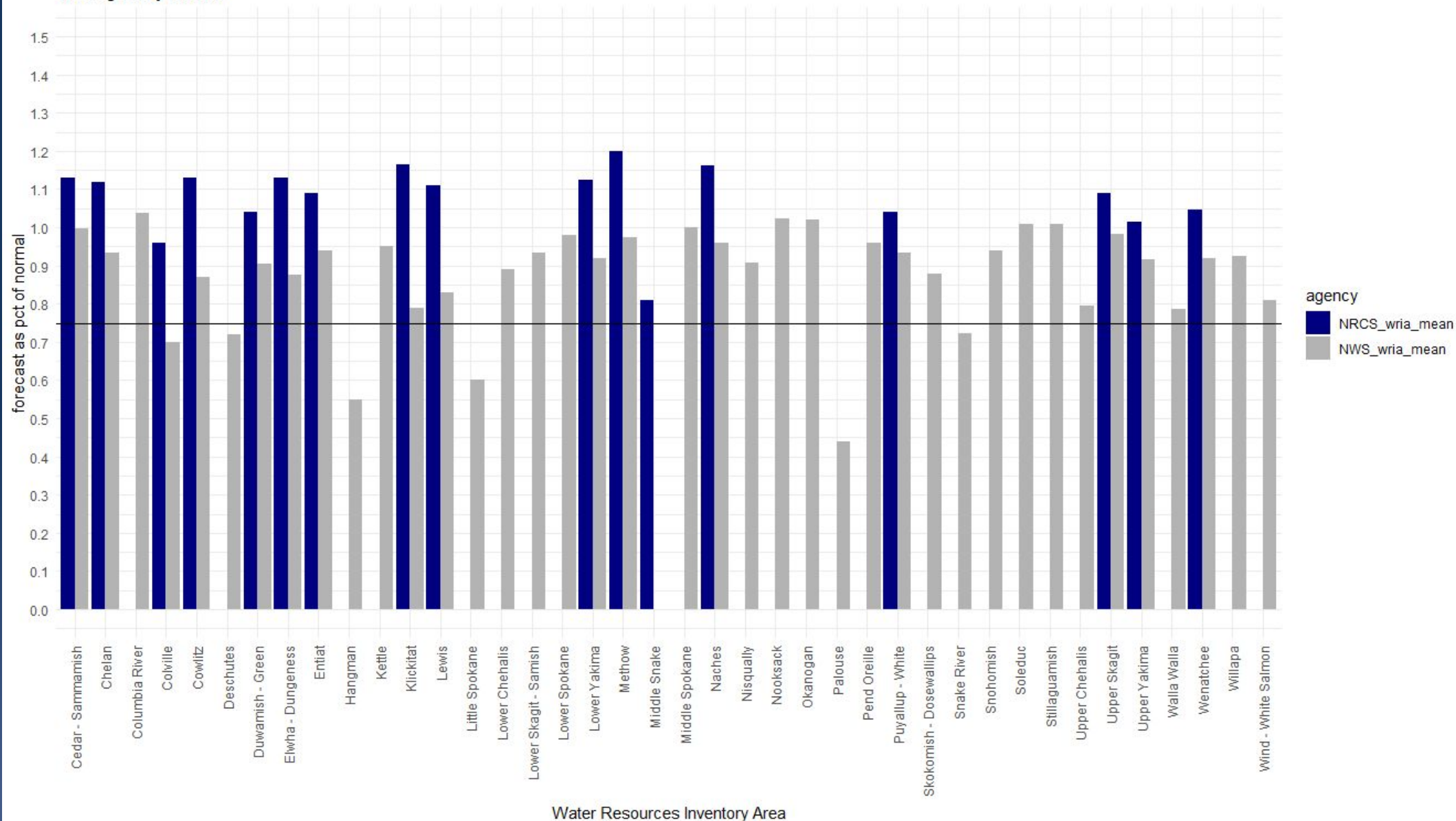


Creation Time: Thu Apr 7 15:05:56 UTC 2022



Jeff Marti's piggyback slides

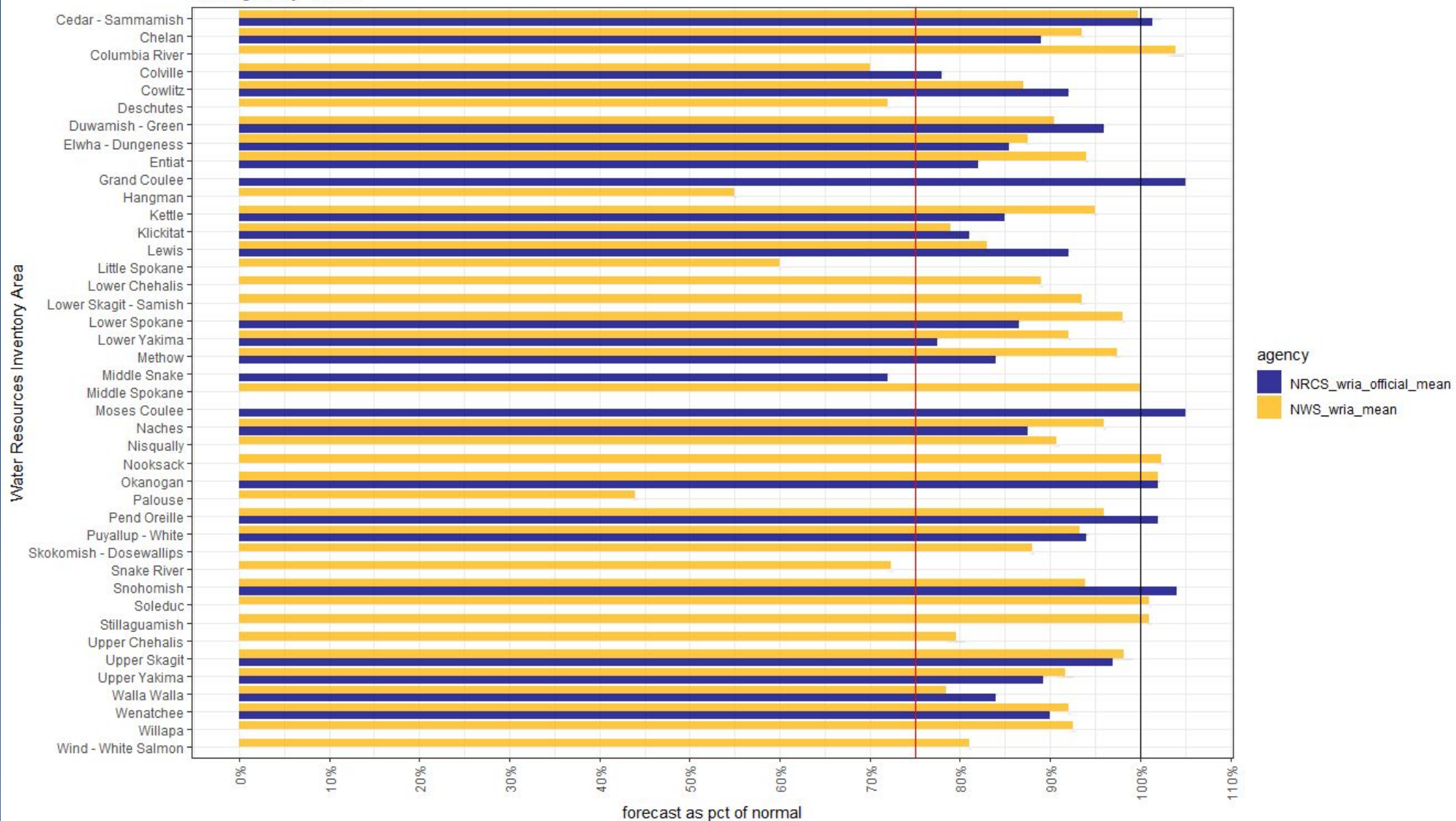
Comparison of NRCS (APR-JUL, unofficial daily forecasts) and NWS (APR-SEP) Water Supply Forecasts averaged by WRIA





Jeff Marti's piggyback slides

Comparison of NRCS (Apr 1) and NWS (Apr 6) Water Supply Forecasts (APR-SEP)
averaged by WRIA





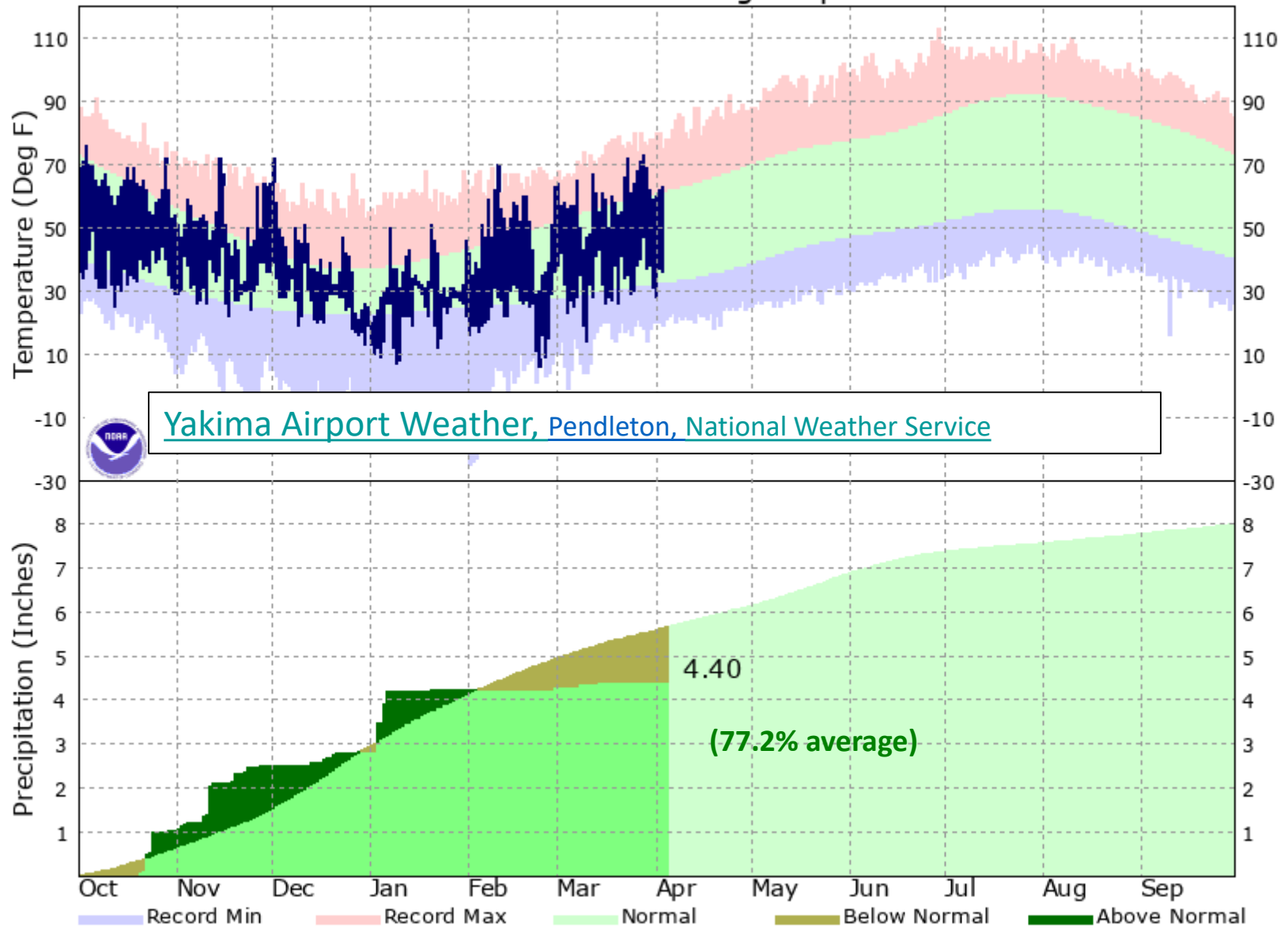
— BUREAU OF —
RECLAMATION

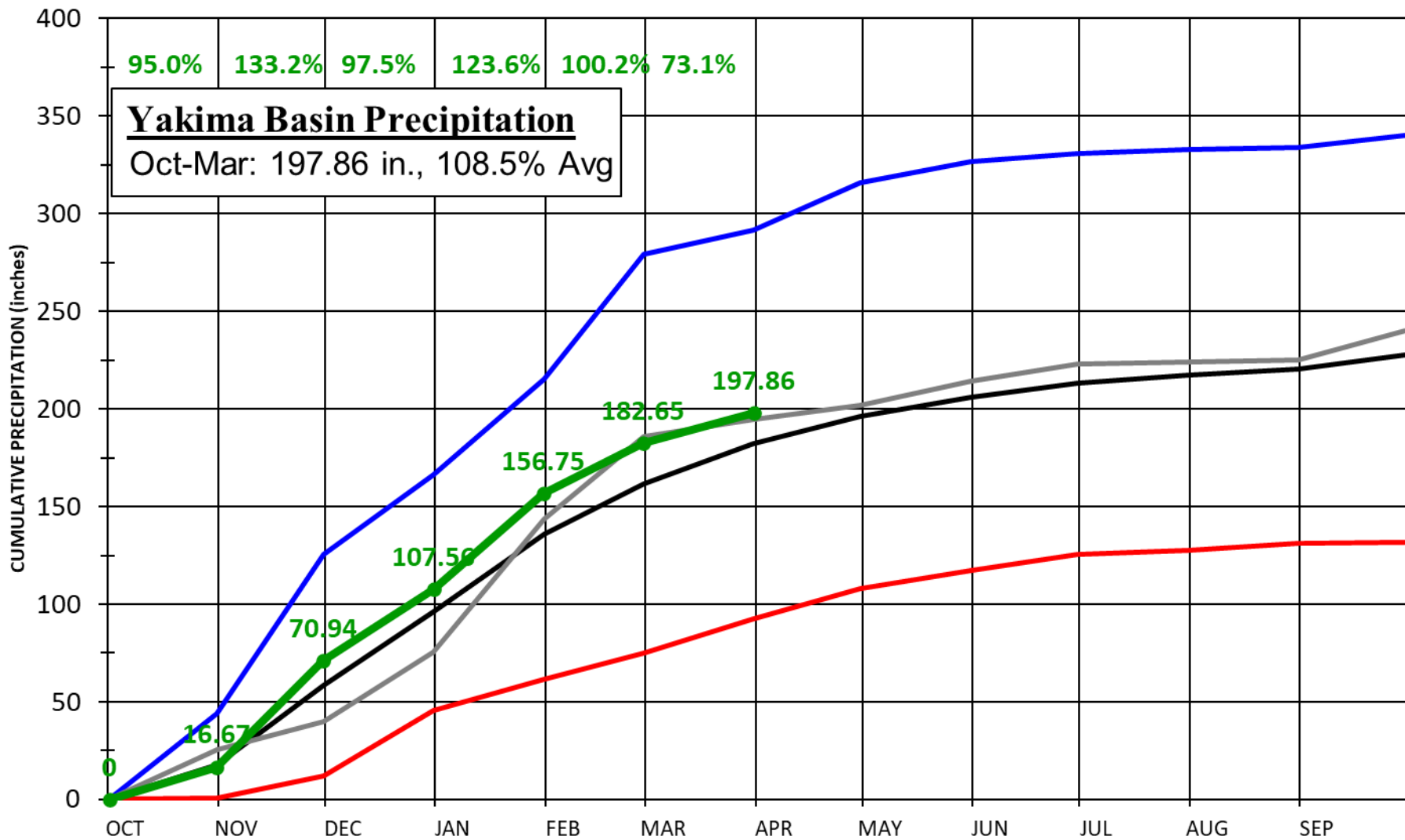
Yakima River Operations & Water Supply for WaSAC

Yakima Basin, Washington

Apr 8, 2022, WY 2022

KYKM - Oct 2021 Through Sep 2022

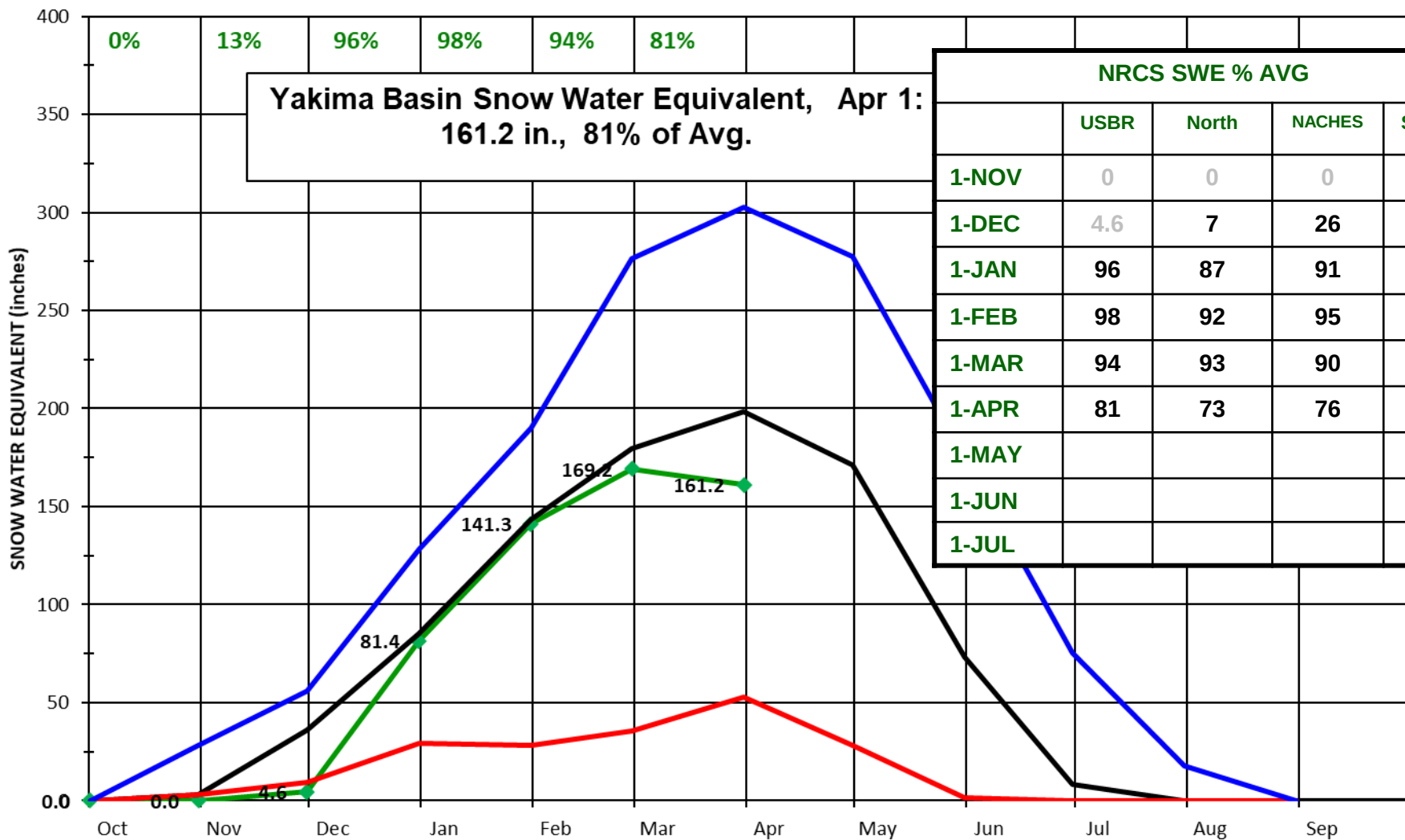




— Maximum — Average
 — Minimum — WY2020
 ● WY 2022

YAKIMA BASIN
 Combined Cumulative Precipitation
 5 Reservoir Sites
 WATER YEARS 1981-2010

UNITED STATES
 DEPARTMENT OF THE INTERIOR
 BUREAU OF RECLAMATION
 YAKIMA FIELD OFFICE
 1917 MARSH ROAD
 YAKIMA, WA 98901



SNOW WATER EQUIVALENT IN YAKIMA

Reset Range

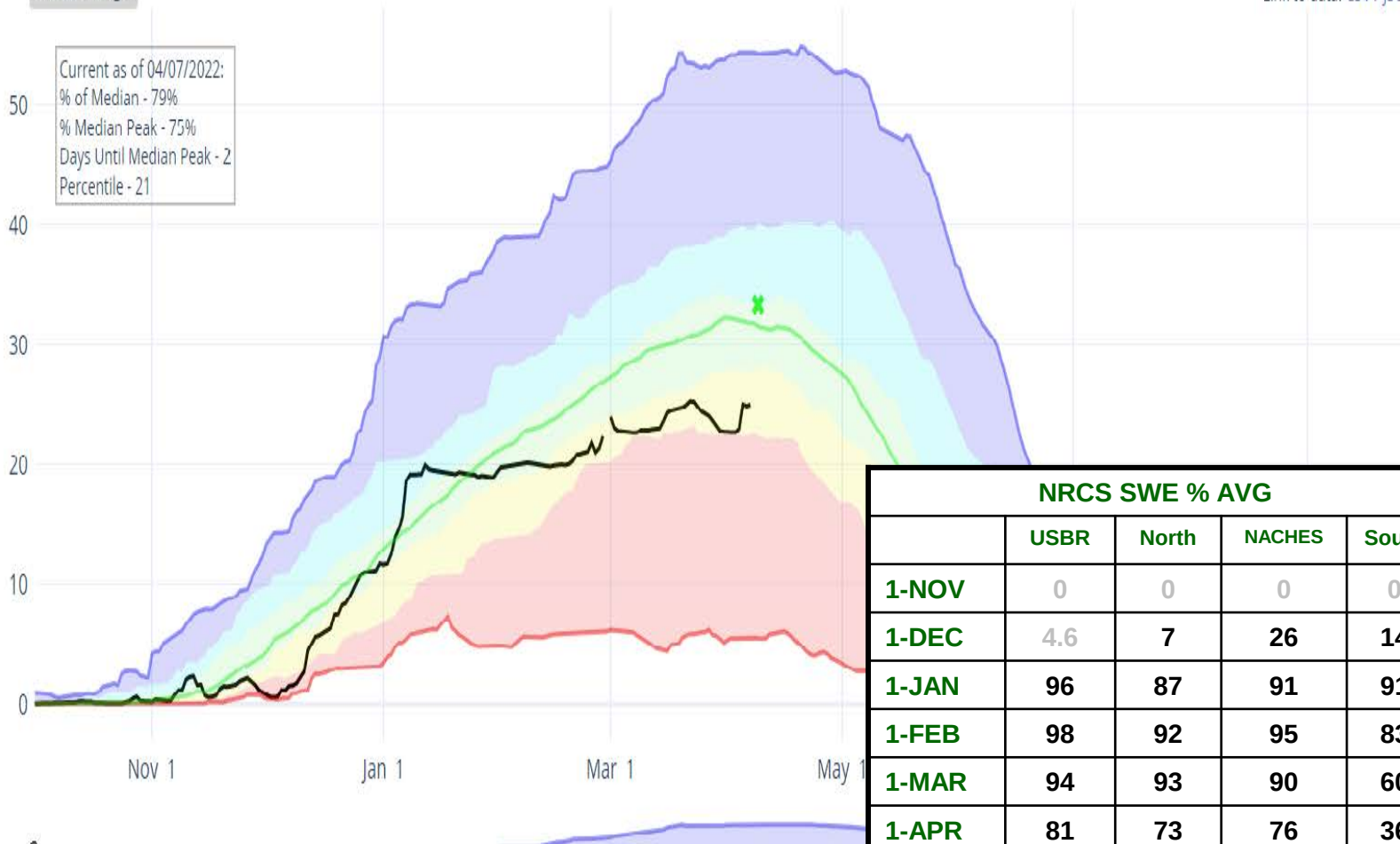
[Link to data: CSV / JSON](#)

[Station List](#)

Current as of 04/07/2022:
% of Median - 79%
% Median Peak - 75%
Days Until Median Peak - 2
Percentile - 21

- ✕ Median Peak SWE
- Max
- - - Median (POR)
- Median ('91-'20)
- Min
- Stats. Shading
- 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)
- 2013 (17 sites)
- 2012 (17 sites)

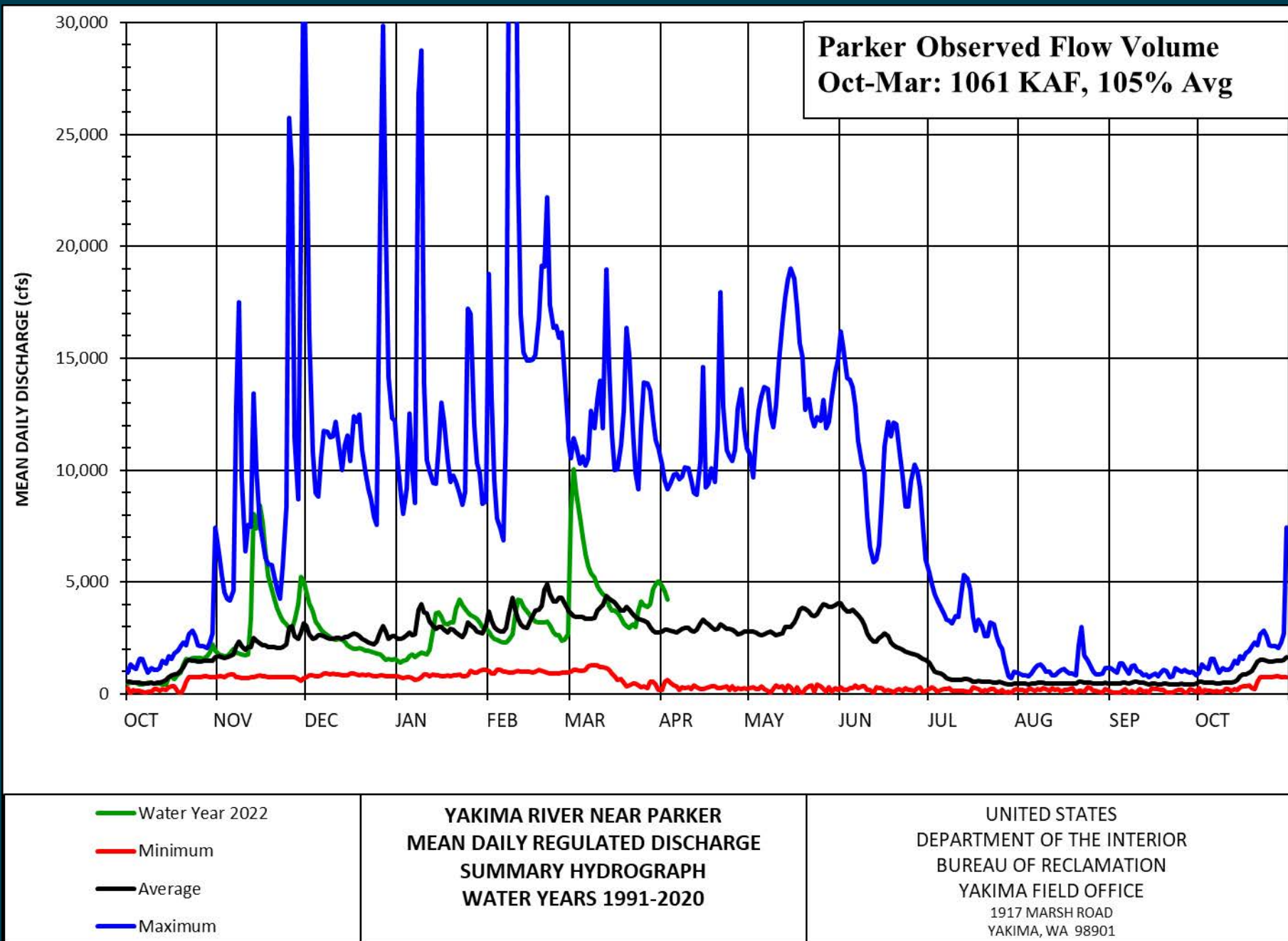
Snow Water Equivalent (in.)

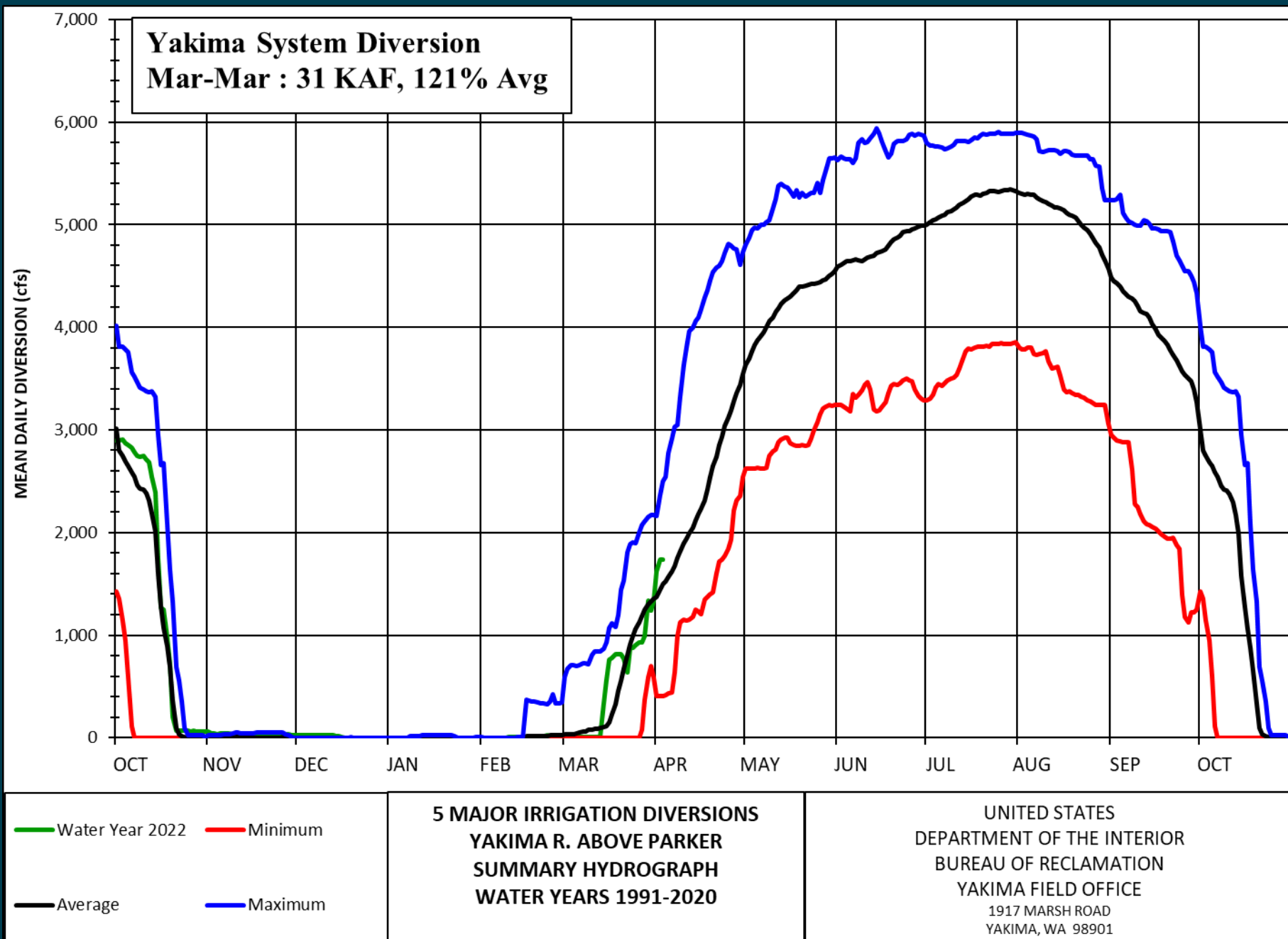


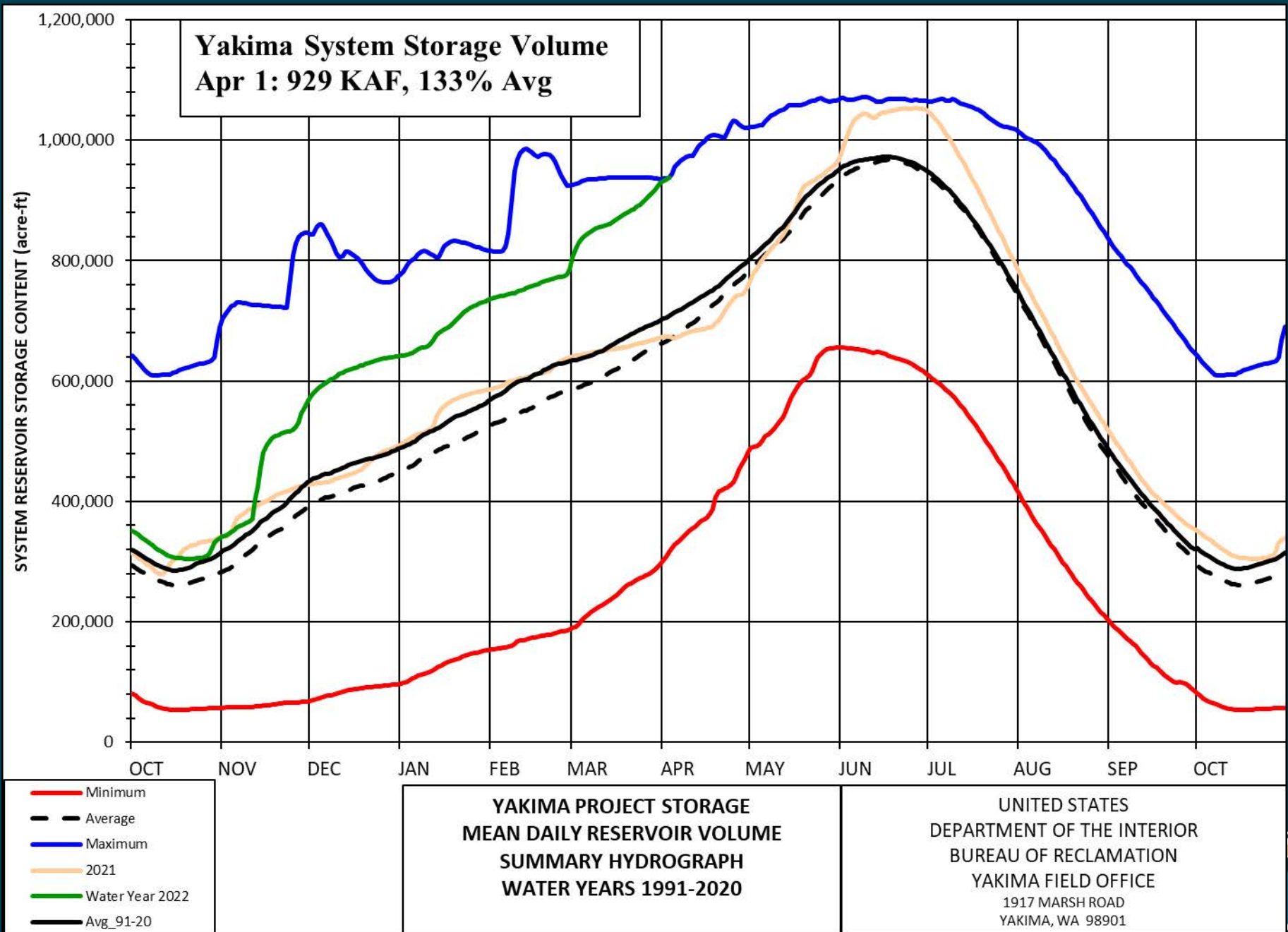
NRCS SWE % AVG

	USBR	North	NACHES	South
1-NOV	0	0	0	0
1-DEC	4.6	7	26	14
1-JAN	96	87	91	91
1-FEB	98	92	95	83
1-MAR	94	93	90	60
1-APR	81	73	76	36
1-MAY				
1-JUN				
1-JUL				







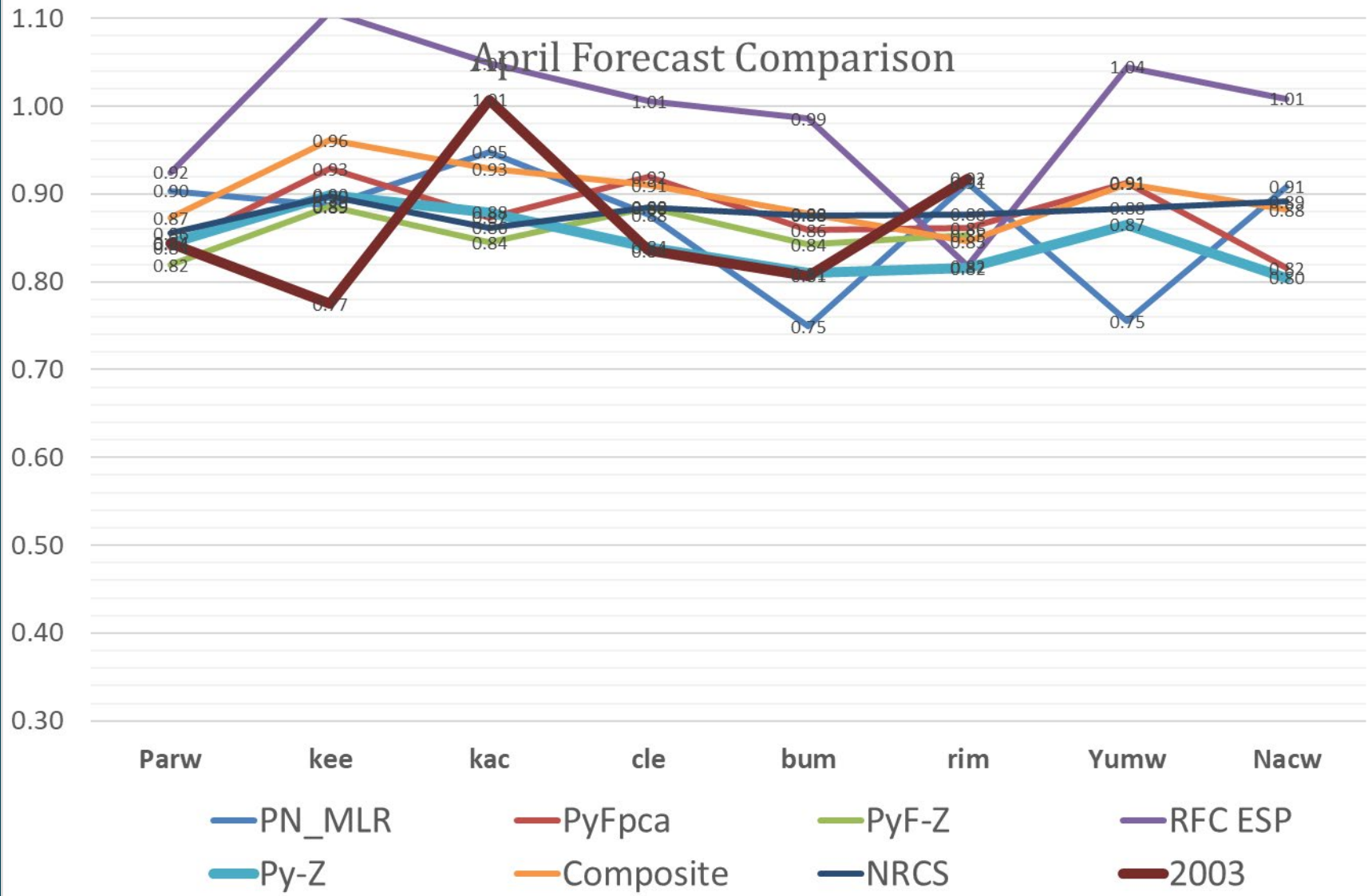


Yakima Subbasin forecasts

Apr, 2022	Low	Adopted	High	Low	Adopted	High
Parw	1139251	1393000	1656425	65%	86 %	105%
kee	89940	107700	130893	69%	90 %	110%
kac	77315	91200	107316	69%	86 %	103%
cle	313586	353400	402763	75%	88 %	101%
bum	83947	98100	114391	68%	88 %	106%
rim	135027	161100	189001	72%	88 %	103%
Yumw	598267	692581	810220	72%	88 %	104%
Nacw	486267	571700	667477	66%	89 %	112%



April Forecast Comparison



Reservoir Refill (April 7, 2022 outlook)

- Cle spillway+2' fish flume April 8, opening on April 18.
- Cle: will fill
- Kee: will fill
- Kac: will fill
- Bum: will fill
- Rim: will fill



April 1, 2022 TWSA ESTIMATE

April 1 - September 30

Parameter*	+/-/=	Low	Adopted	High
Apr 1-Sep 30 Natural Flow at Parker est.	+	1182	1554	1915
Return Flow Estimate, est	+	335	340	350
April 1, Reservoir Content, est	+	929	929	929
TWSA	=	2445	2822	3193
SEP 30 EST RESERVOIR CONTENT	-	76	76	206
FLOW OVER SUNNYSIDE DAM	-	339	509	678
TWSA FOR IRRIGATION	=	2030	2237	2309
NONPRORATABLE ENTITLEMENT	-	1070	1070	1070
REMAINING TWSA	=	960	1167	1239
PRORATABLE ENTITLEMENT		1239	1239	1239
% RATIO= REMAINING TWSA/PRORATABLE ENTITLEMENT		77 %	94 %	100 %
TITLE XII FLOW TARGET, cfs	April	300	400	500
Added flow available, cfs ***		121	126	128
Non-storeable Portion of added flow, cfs		13	13	13
Storable portion of added flow, cfs		108	114	115
BA May Pulse Flow Volume		Mid-BA	Mid-BA	High-BA

*Values are in 1,000 ac-ft unless otherwise specified.

*** State & YRBWEP Trust, Acquisition, & Conservation additions to Title XII flow range from 121 to 128 cfs.



April 1, 2021 TWSA Comparison

April 1 - September 30

Parameter	" +/-/="	Mar's 2022	Apr 2022	Apr 2021
Apr 1-Sep 30 Natural Flow at Parker est.	+	1569	1554	2166
Return Flow Estimate	+	350	340	350
April 1, Reservoir Content	+	900	929	672
TWSA	=	2819	2822	3188
SEP 30 EST RESERVOIR CONTENT*	-	76	76	201
FLOW OVER SUNNYSIDE DAM	-	480	509	678
TWSA FOR IRRIGATION	=	2263	2237	2309
NONPRORATABLE ENTITLEMENT	-	1070	1070	1070
REMAINING TWSA	=	1193	1167	1239
PRORATABLE ENTITLEMENT		1239	1239	1239
% RATIO= REMAINING TWSA/PRORATABLE ENTITLEMENT		96%	94%	96%
TITLE XII FLOW REQUIREMENTS, cfs	April	400	400	400
TOTAL FLOW AVAILABLE AT PARKER, cfs **		527	526	525

*Values are in 1,000 ac-ft unless otherwise specified.

** State & YRBWEP Trust, Acquisition, & Conservation additions to Title XII flow.



Yakima Basin Outmigration Flows

Table 2-14. Minimum volume of water (acre-feet) that will be available in April and May during years when water prorationing levels are equal to or greater than 70% to provide outmigration flows. Outmigration flows are measured at Tieton Dam (RIM), Cle Elum Dam (CLE), and Yakima River at Easton gage (EASW).

	Monthly Min. acre-feet for Outmigration Flows		
April TWSA (MAF)	< 2.36	2.36 - 3.13	> 3.13
May TWSA (MAF)	< 2.20	2.20 – 2.61	> 2.61
RIM	4,500	8,400	14,800
CLE	4,200	9,900	18,800
EASW	3,700	4,800	9,900

WY2022 Apr TWSA=2.822 MAF

WY2022May TWSA=???? MAF

Easton (EASW) can be met from unregulated local inflow below Kee and Kac.

Hydrologic Summary

- Precipitation has been fickle.
- Snow is below average.
- System storage , 929 KAF, 133% of average.
- All reservoirs will refill.
- Spring flows are in the mid BA range.
- Runoff forecast is in the 85 to 90 % range.
- Proratioing is 94%.