Washington Water Supply Availability Committee
Hosted by Jeff Marti

https://watech.webex.com/watech/j.php?MTID=m1f4934487004b1e9503d83245ebab3ab
Friday, Jan 14, 2022 10:00 am | 2 hours | (UTC-08:00) Pacific Time (US & Canada)
Meeting number: 2456 084 0237
Password: thinkSnow2022
Agenda: The Washington Water Supply Availability Committee meets periodically to monitor water supply conditions and forecasts.

Join by video system
Dial 24560840237@webex.com
You can also dial 173.243.2.68 and enter your meeting number.

Join by phone
+1-415-655-0001 US Toll
+1-206-207-1700 United States Toll (Seattle)

Access code: 245 608 40237

Washington Water Supply Availability Committee
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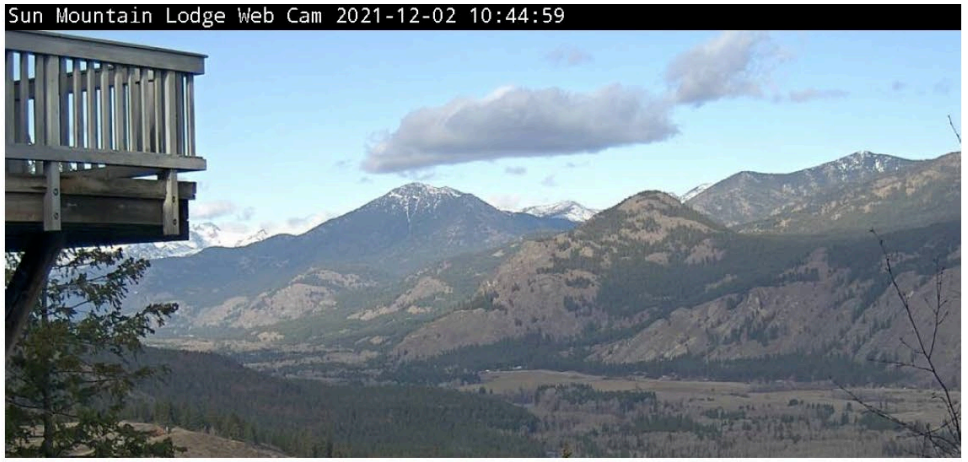
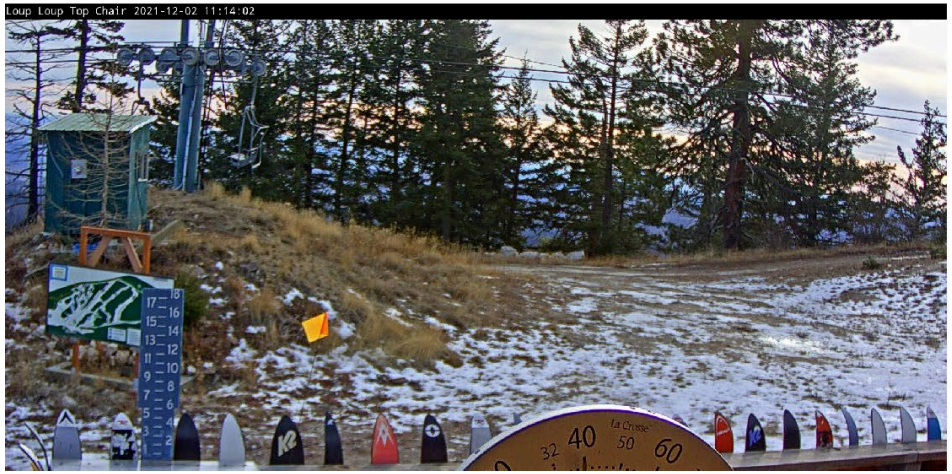
Access code: 245 608 40237

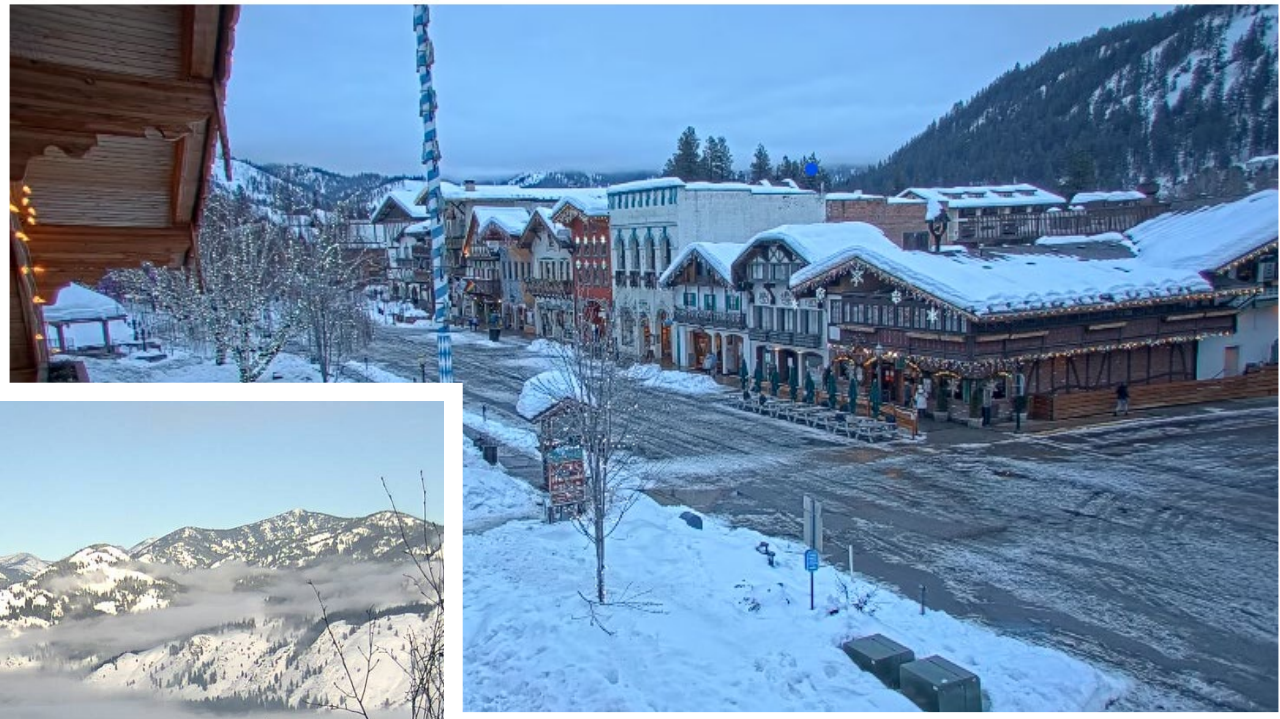
Friday, January 14, 2022				
Start Time	End Time	Duration, min	Description	Presenter
10:00	10:15	15	Welcome & Introductions	Jeff Marti
10:15	10:30	15	Mountain Report Streamflow Forecasts	Scott Pattee, NRCS
10:30	10:45	15	Regional Climate Perspective Recent precipitation and temperature Seasonal Forecasts/ENSO	Karin Bumbaco/Nick Bond, OWSC
10:45	11:00	15	Streamflow Conditions	Nick Sutfin, USGS
11:00	11:15	15	Streamflow Forecasting	Amy Burke, NWRFC Brent Bower, NWS Robin Fox, NWS
11:15	11:30	15	Yakima Project	Chris Lynch, BOR
11:30	11:40	10	Input from Other Attendees	All
11:40	11:45	5	Transition to Zoom NEXT MEETING: FRIDAY, FEBRUARY 18th	
	Total	1.75		

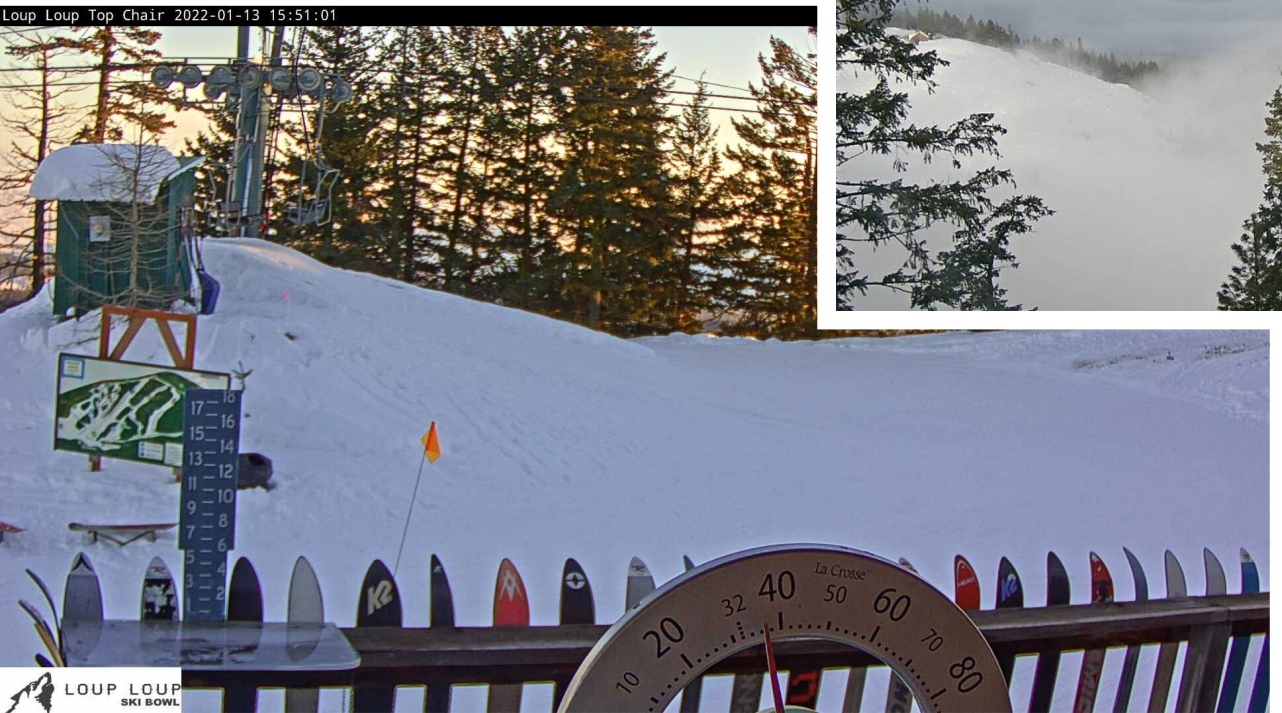

Park | Paradise | Henry M. Jackson Visitor Center | 12/02/2021 11:05:43 AM

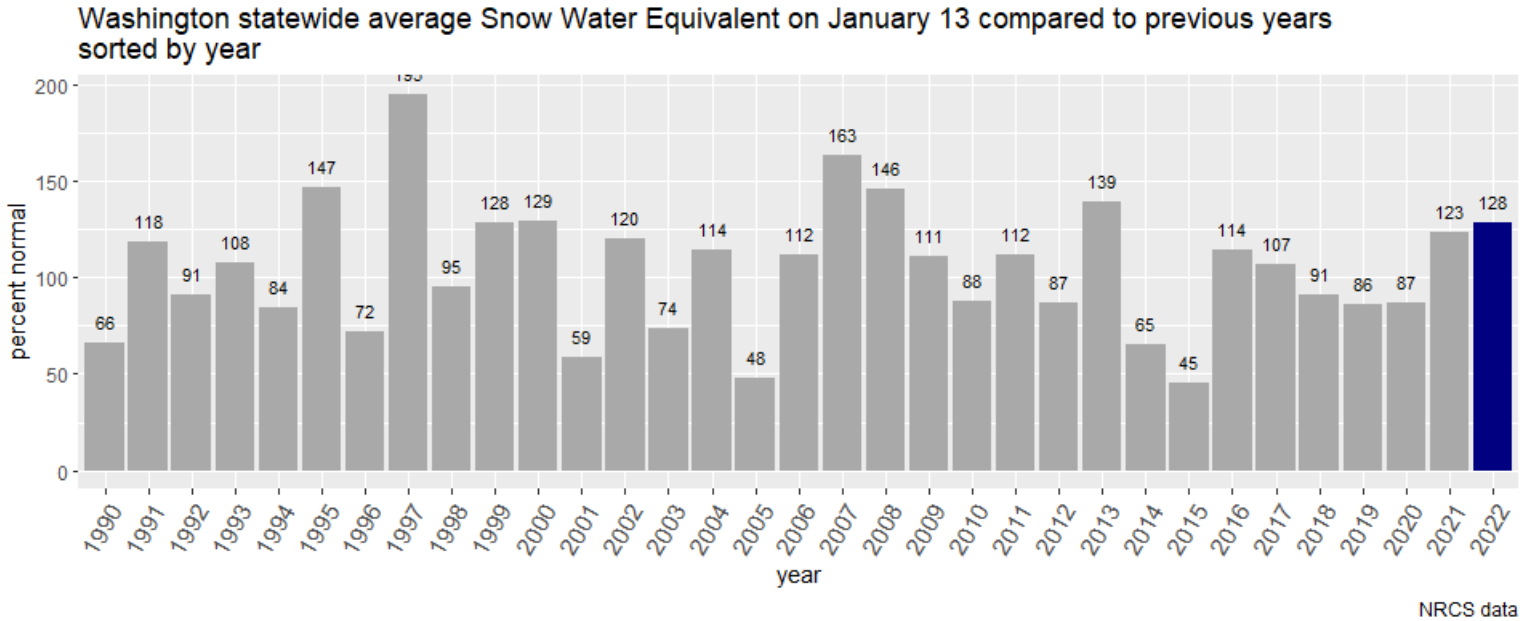

Sun Mountain Lodge Web Cam 2021-12-02 10:44:59

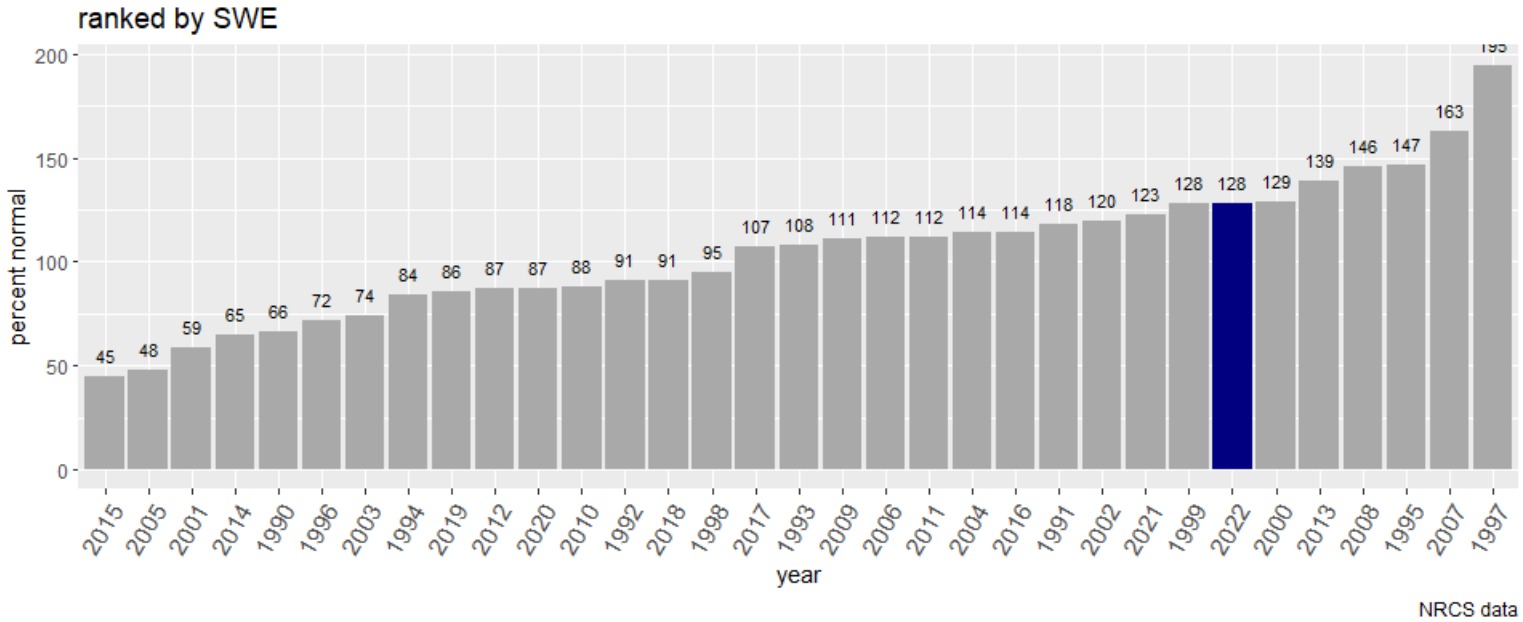

Loup Loup Top Chair 2021-12-02 11:14:02

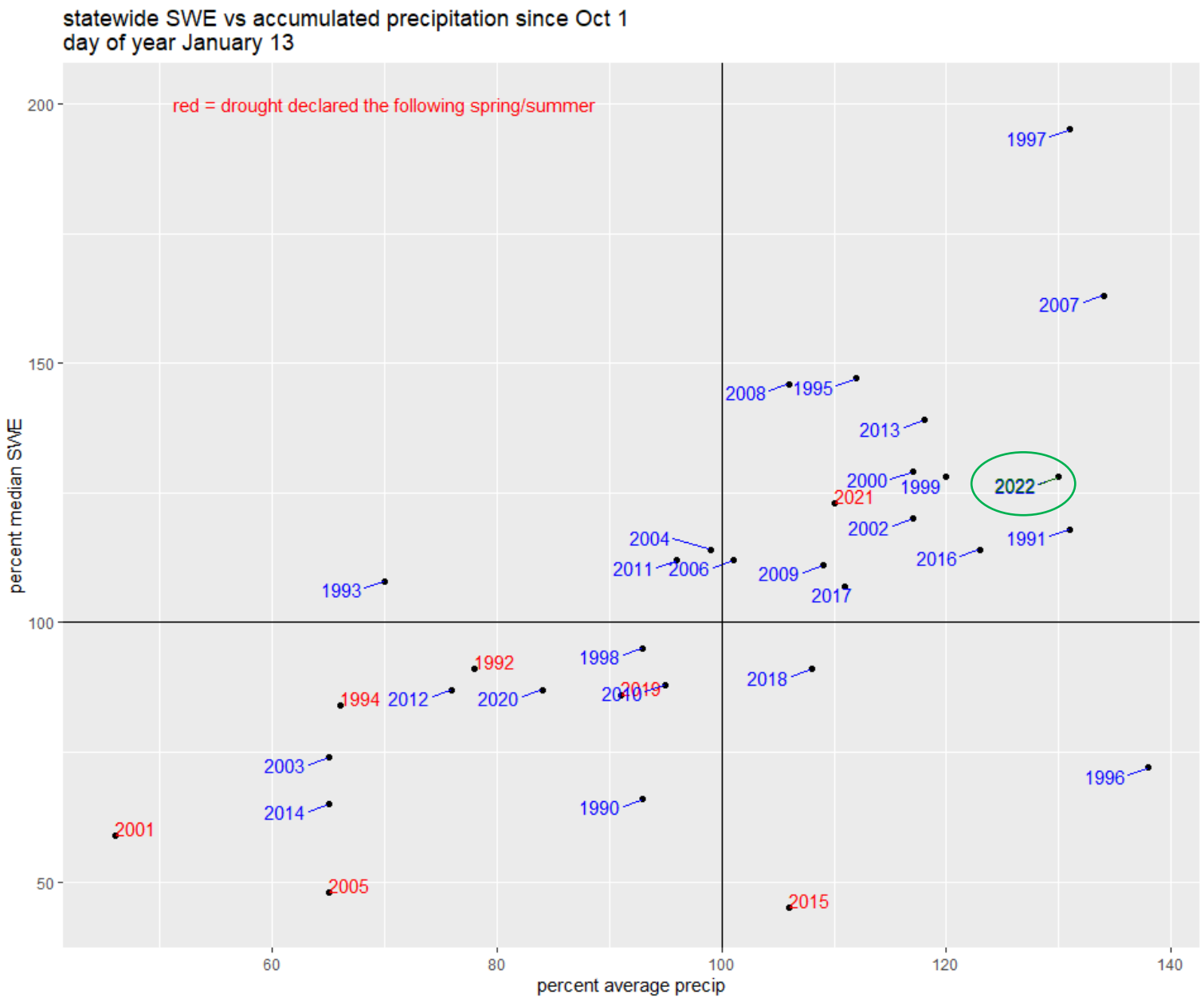

Mount Rainier National Park | Paradise | Henry M. Jackson Visitor Center | 01/11/2022 11:25:43 AM




Loup Loup Top Chair 2022-01-13 15:51:01
LOUP LOUP
SKI BOWL


Washington statewide average Snow Water Equivalent on January 13 compared to previous years
sorted by year
percent normal
year
NRCS data


ranked by SWE
percent normal
year
NRCS data


statewide SWE vs accumulated precipitation since Oct 1
day of year January 13
red = drought declared the following spring/summer
percent median SWE
percent average precip
200
150
100
50
60
80
100
120
140
1997
2007
2008
1995
2013
2000
1999
2022
2021
2002
1991
2004
2016
2011
2006
2009
2017
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1998
1992
2018
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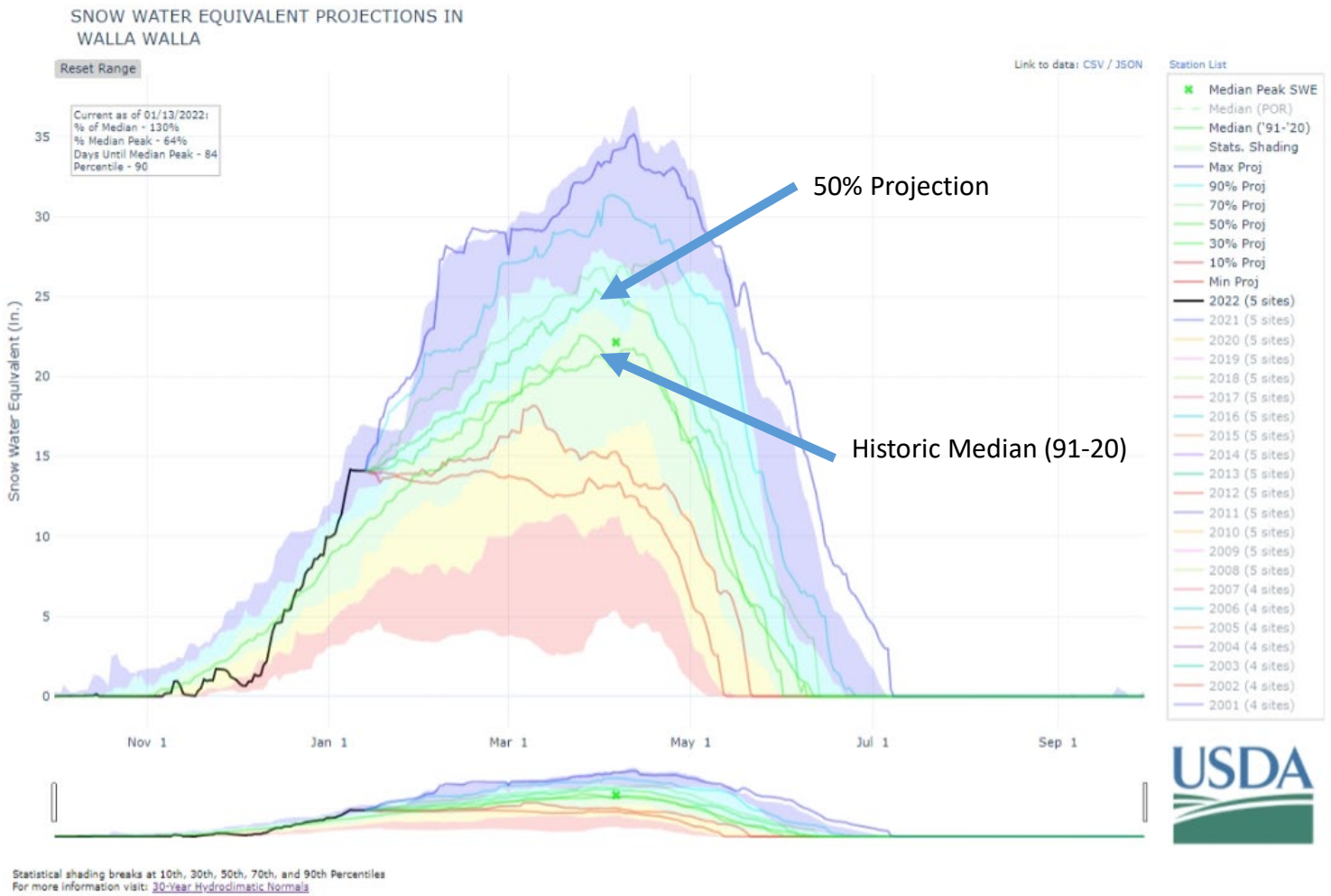
2020
2019
2003
1996
2014
1990
2001
2005
2015

End – Transition to Scott Pattee



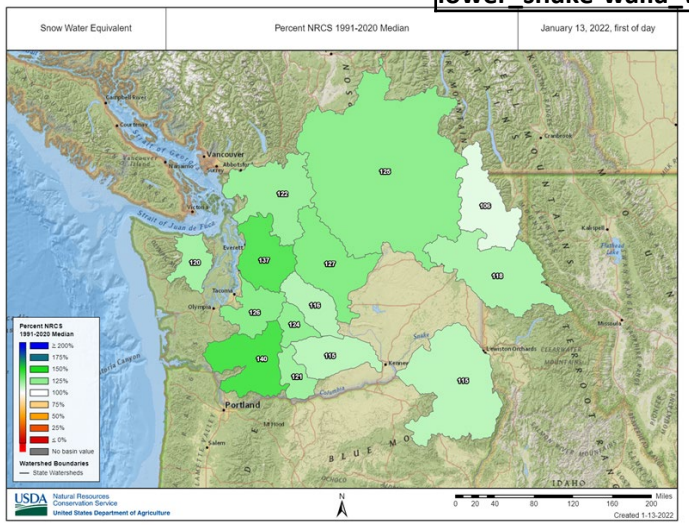
Projection Plot What-if

April 1 Projection ÷
Historic Median on April 1
= 119 Percent of Normal

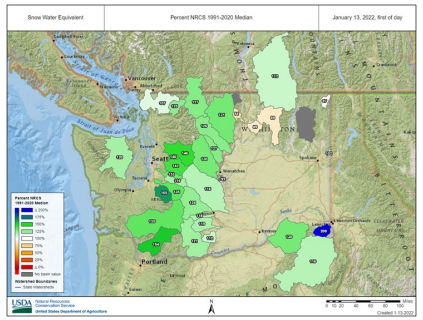
Basins: https://www.nrcs.usda.gov/Internet/WCIS/AWS_PLOTS/basinCharts/Proj/WTEQ/assocHUCwa_8/
Sub-basins: https://www.nrcs.usda.gov/Internet/WCIS/AWS_PLOTS/basinCharts/Proj/WTEQ/assocHUCwa2_8/

Basin SWE Projections 01-13-2022

basin	queryDate	projectionDate	Minpctproj	x10pctproj	x30pctproj	x50pctproj	x70pctproj	x90pctproj	Maxpctproj
olympic	01-13	04-01	51	64	82	105	109	118	161
north_puget_sound	01-13	04-01	71	81	89	103	110	121	141
central_puget_sound	01-13	04-01	57	78	96	114	130	162	174
south_puget_sound	01-13	04-01	58	89	103	115	126	148	160
lower_columbia	01-13	04-01	68	90	111	117	132	152	197
klickitat	01-13	04-01	56	71	94	109	115	122	179
central_columbia	01-13	04-01	69	90	105	115	121	136	156
upper_columbia	01-13	04-01	69	91	100	118	132	138	184
upper_yakima	01-13	04-01	45	78	93	106	114	129	160
naches	01-13	04-01	61	86	97	106	117	127	158
lower_yakima	01-13	04-01	48	69	91	101	106	117	177
lower_pend_oreille	01-13	04-01	67	86	94	104	111	125	154
spokane	01-13	04-01	60	88	106	116	122	139	159
lower_snake-walla_walla	01-13	04-01	52	80	104	111	120	135	145

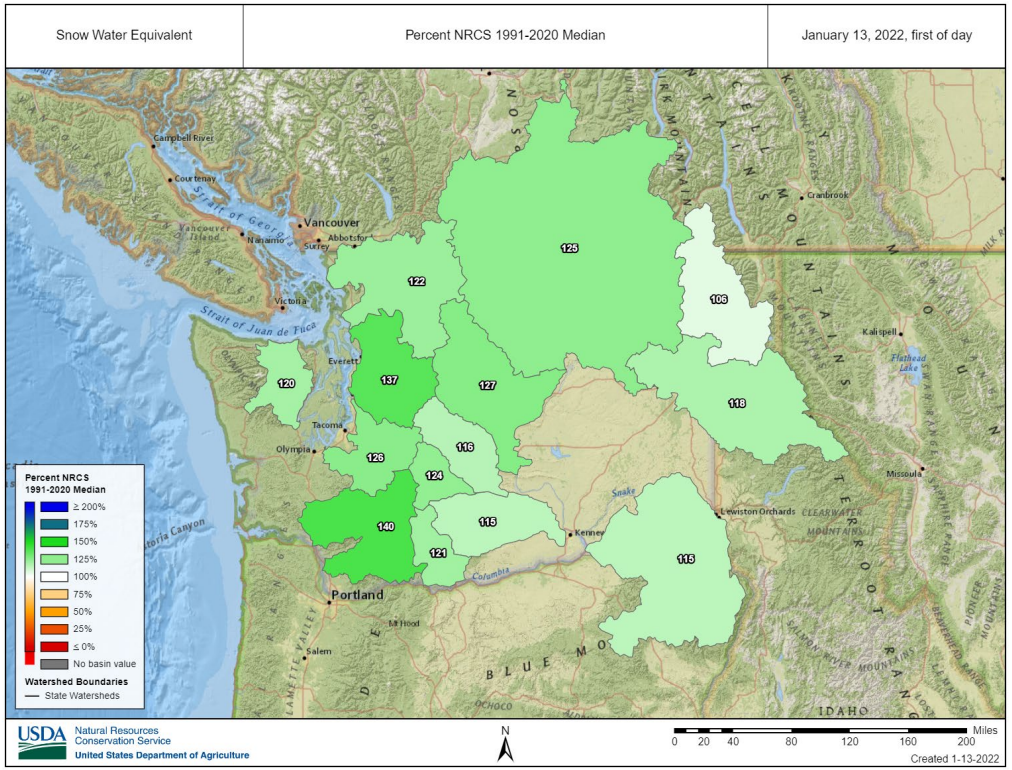


Sub-basin Projections 01-13-2022

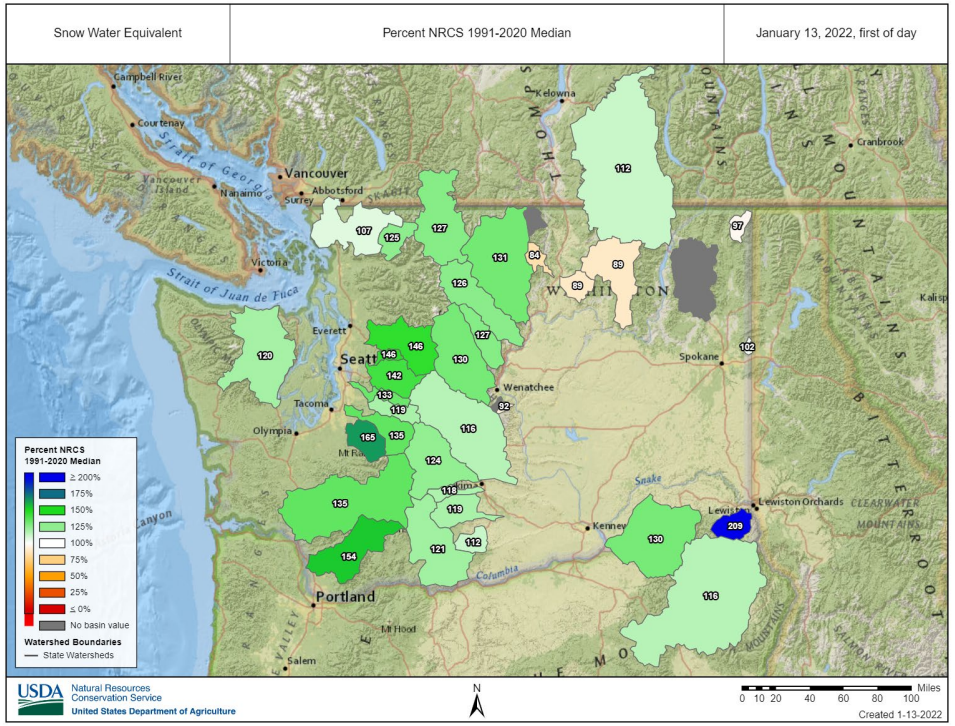


subbasins	queryDate	projectionDate	Minpctproj	x10pctproj	x30pctproj	x50pctproj	x70pctproj	x90pctproj	Maxpctproj
ahtanum	01-13	04-01	52	75	95	106	111	121	173
asotin	01-13	04-01	0	95	124	167	189	215	267
baker	01-13	04-01	72	84	96	104	116	121	136
cedar	01-13	04-01	61	78	99	120	133	165	190
colckum	01-13	04-01	0	54	77	92	116	147	212
concully_lake	01-13	04-01	50	67	74	89	106	138	161
cowlitz	01-13	04-01	68	89	103	110	126	137	175
entiat	01-13	04-01	35	88	103	110	130	147	178
grande_ronde	01-13	04-01	47	78	101	110	120	134	146
green	01-13	04-01	31	69	94	109	124	159	177
kettle	01-13	04-01	42	73	90	113	127	142	157
klickitat	01-13	04-01	56	71	94	109	115	122	179
lake_chelan	01-13	04-01	76	87	99	108	115	129	144
lewis	01-13	04-01	58	82	114	123	143	187	253
methow	01-13	04-01	79	94	110	116	128	140	165
naches	01-13	04-01	61	86	97	106	117	127	158
newman_lake	01-13	04-01	26	72	91	107	114	146	164
nooksack	01-13	04-01	44	64	81	92	107	116	142
olympic	01-13	04-01	51	64	82	105	109	118	161
omak	01-13	04-01	32	64	70	78	102	128	173
puyallup	01-13	04-01	0	91	113	121	151	203	292
sanpoil	01-13	04-01	32	64	70	78	102	128	173
satus	01-13	04-01	0	57	69	100	115	125	185
simcoe-toppenish	01-13	04-01	14	63	96	106	113	133	172
skagit	01-13	04-01	79	87	93	106	121	135	145
skykomish	01-13	04-01	53	80	93	113	126	159	163
snoqualmie	01-13	04-01	62	82	103	120	139	166	185
stemilt	01-13	04-01							
sullivan	01-13	04-01	68	79	88	99	104	118	151
tolt	01-13	04-01	14	79	91	106	131	166	169
upper_yakima	01-13	04-01	45	78	93	106	114	129	160
walla_walla	01-13	04-01	61	70	102	119	126	139	156
wenatchee	01-13	04-01	72	92	110	117	126	138	162
white	01-13	04-01	65	89	105	110	122	135	159

Basin Level



Sub-basin Level



MAP CONTROLS

Month: January

Day: 13

Go to Now

Relative date in URL

Basin Display

Basin Type

- Region (2-Digit HUC)
- Subregion (4-Digit HUC)
- Basin (6-Digit HUC)
- Subbasin (8-Digit HUC)

State-Specific Basins

- Alaska
- Alaska Subbasin
- Arizona
- California
- Colorado
- Colorado Subbasin
- Idaho
- Idaho Subbasin
- Montana
- Montana Subbasin
- Nevada
- Nevada Subbasin
- New Mexico
- Oregon
- Oregon Subbasin
- Utah
- Utah Subbasin
- Washington
- Washington Subbasin
- Wyoming
- Wyoming Subbasin

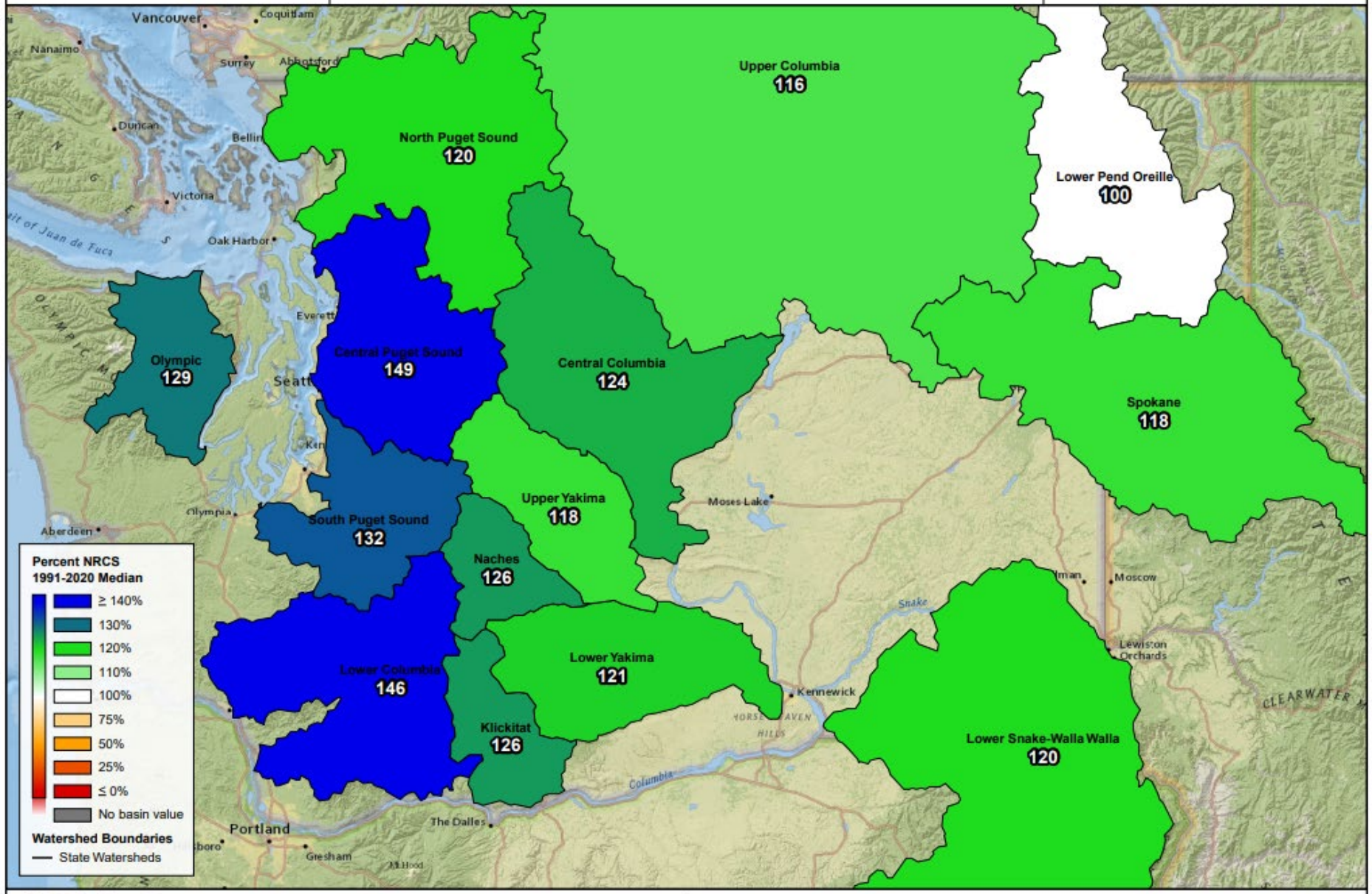
Basin Options

- [x] Include Associated Outside Stations

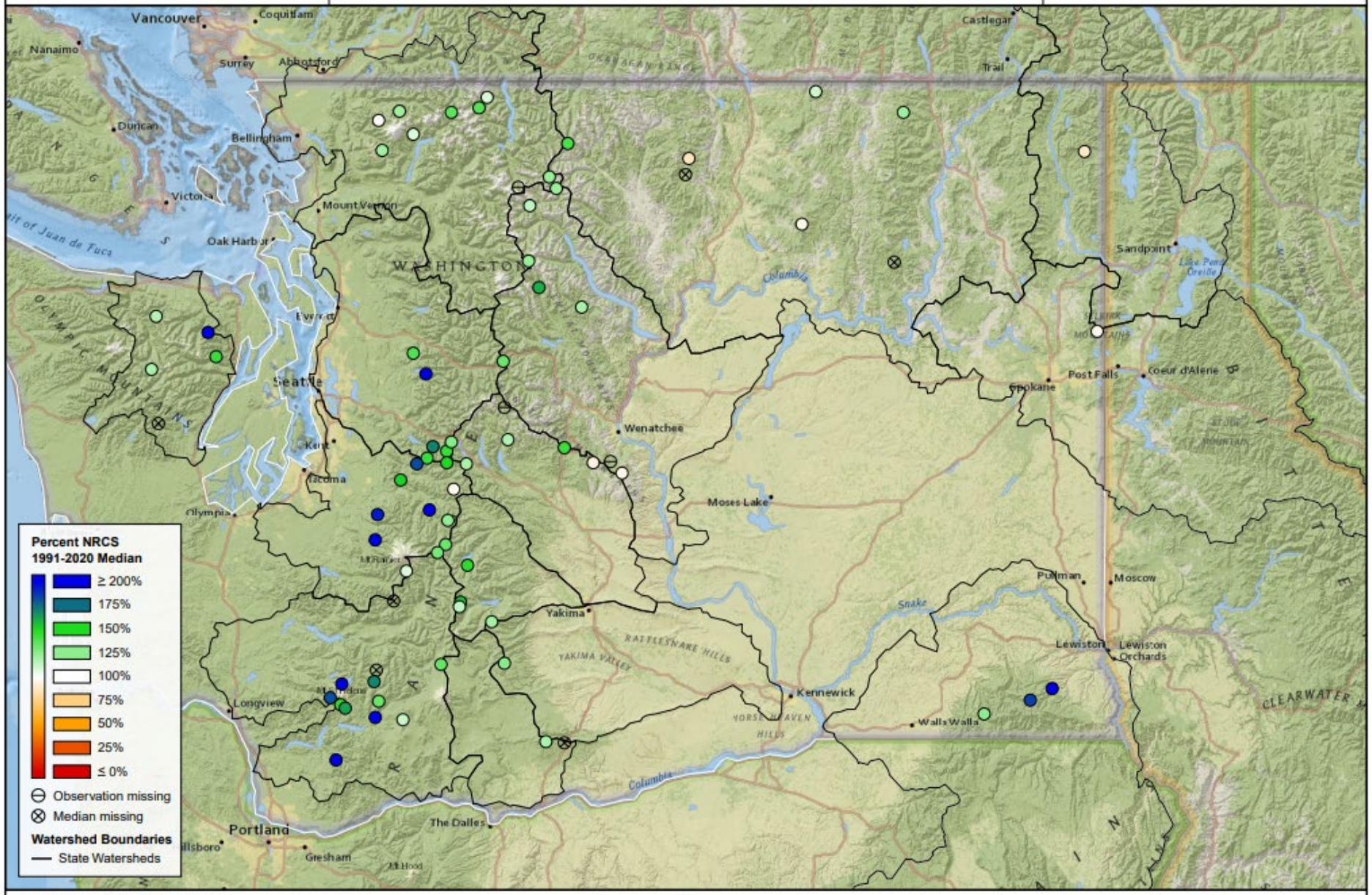
Data/Display Options

NRCS
Natural Resources
Conservation Service

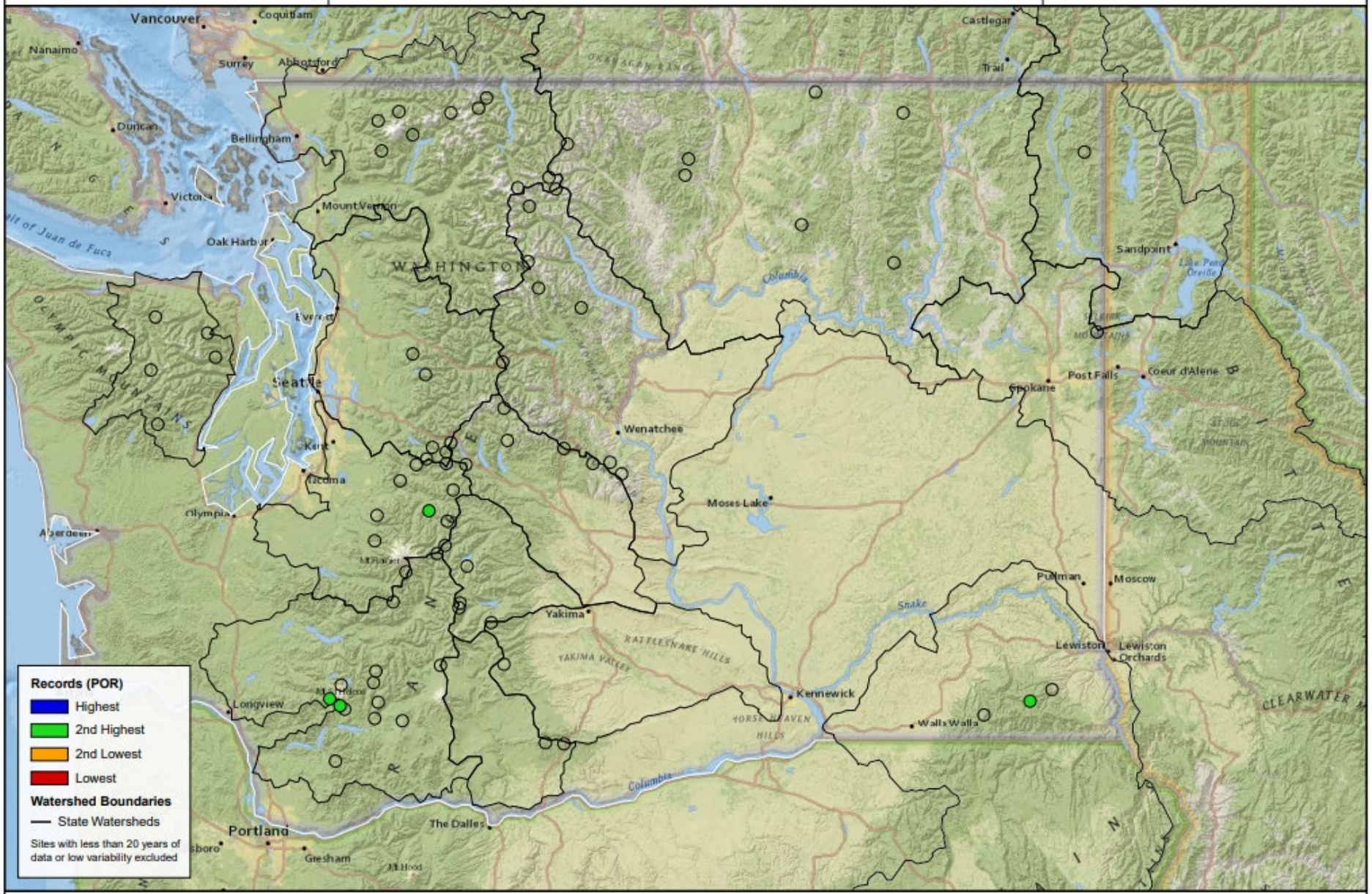
Snow Water Equivalent	Percent NRCS 1991-2020 Median	January 11, 2022, first of day



Snow Water Equivalent	Percent NRCS 1991-2020 Median	January 11, 2022, first of day



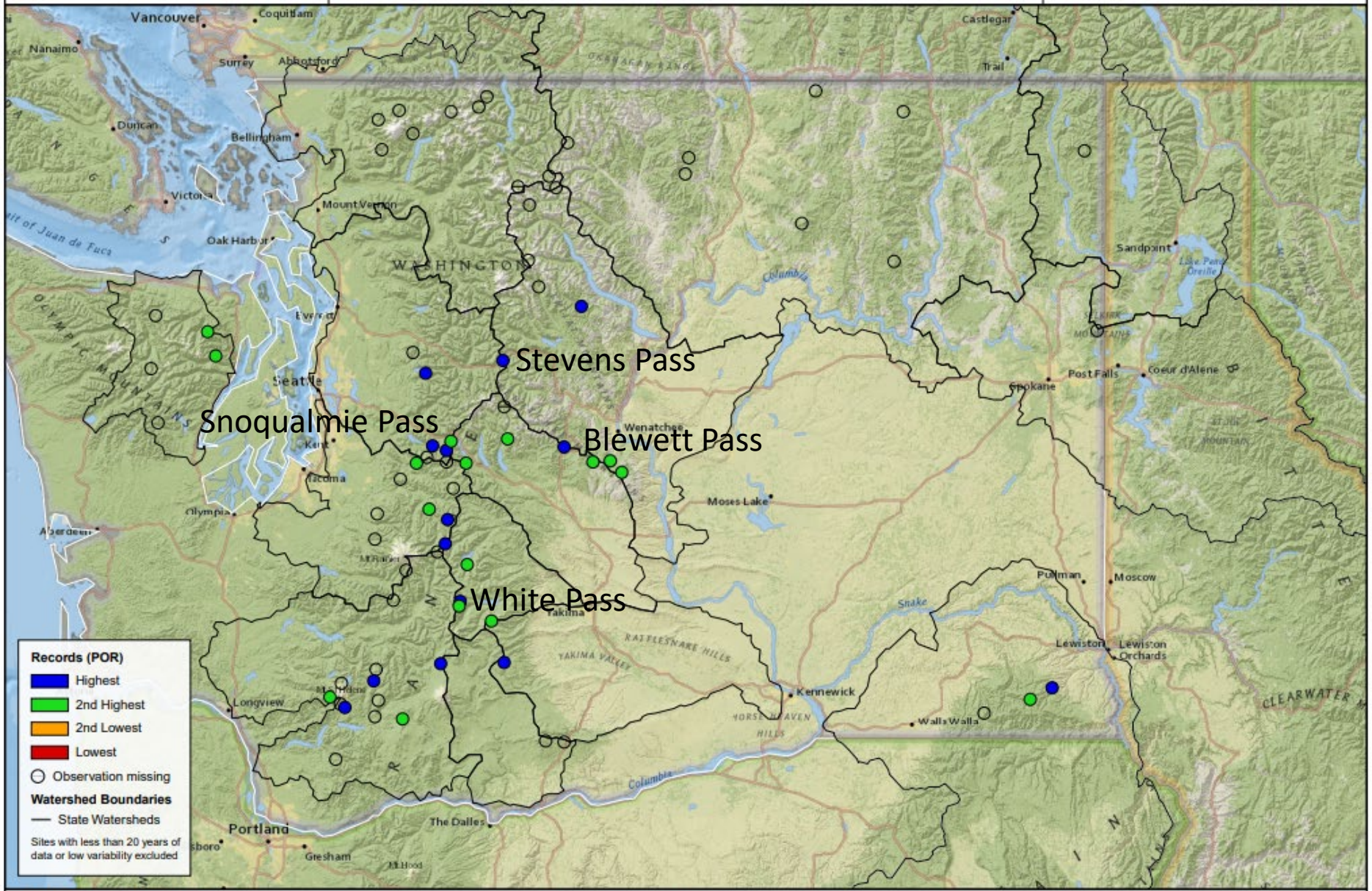
Snow Water Equivalent Delta	Records (POR)	January 1, 2022 - December 1, 2021, first of day



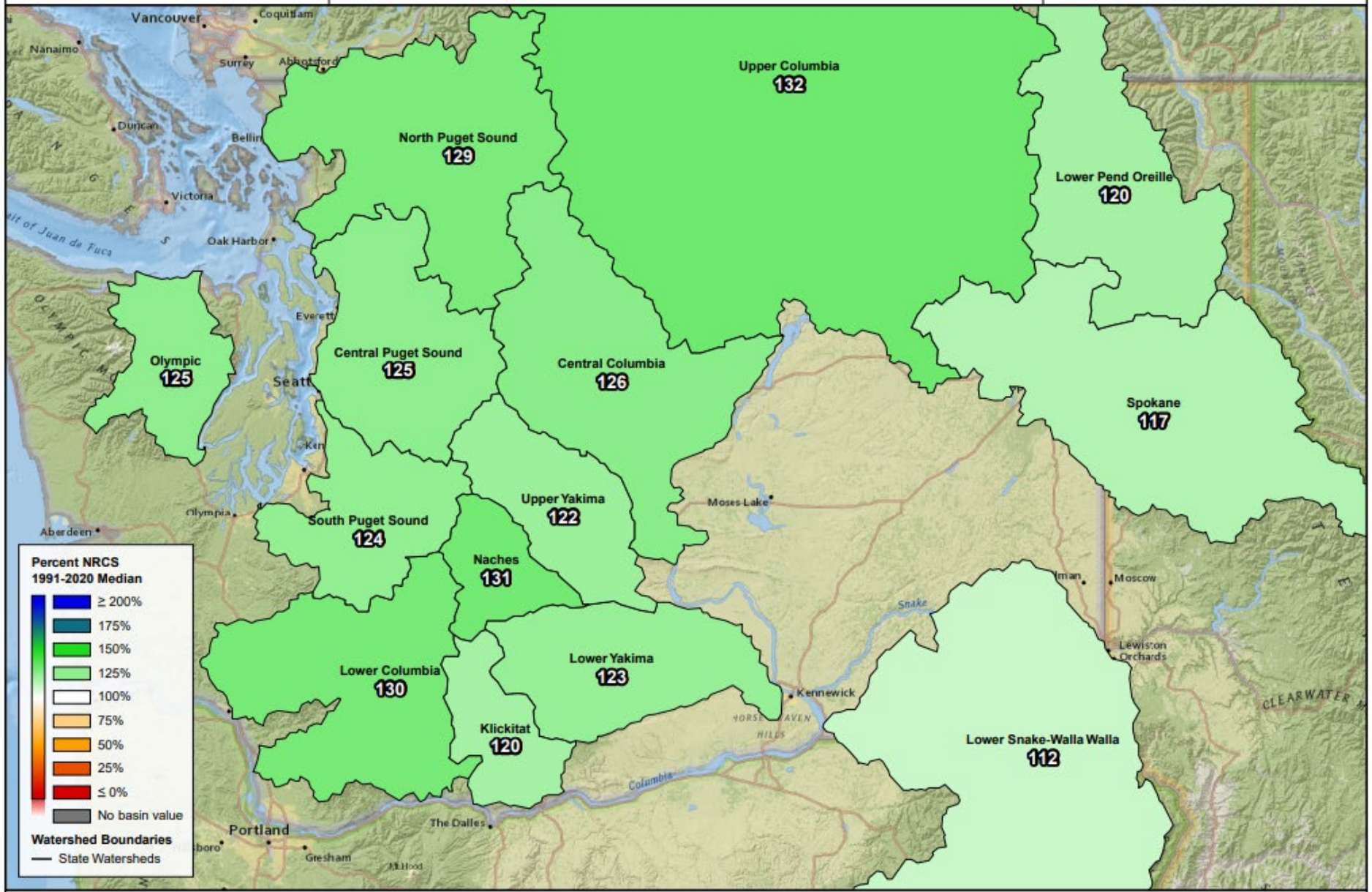
USDA Natural Resources Conservation Service
United States Department of Agriculture

Created 1-11-2022

Snow Water Equivalent Delta	Records (POR)	January 8, 2022 - December 31, 2021, first of day



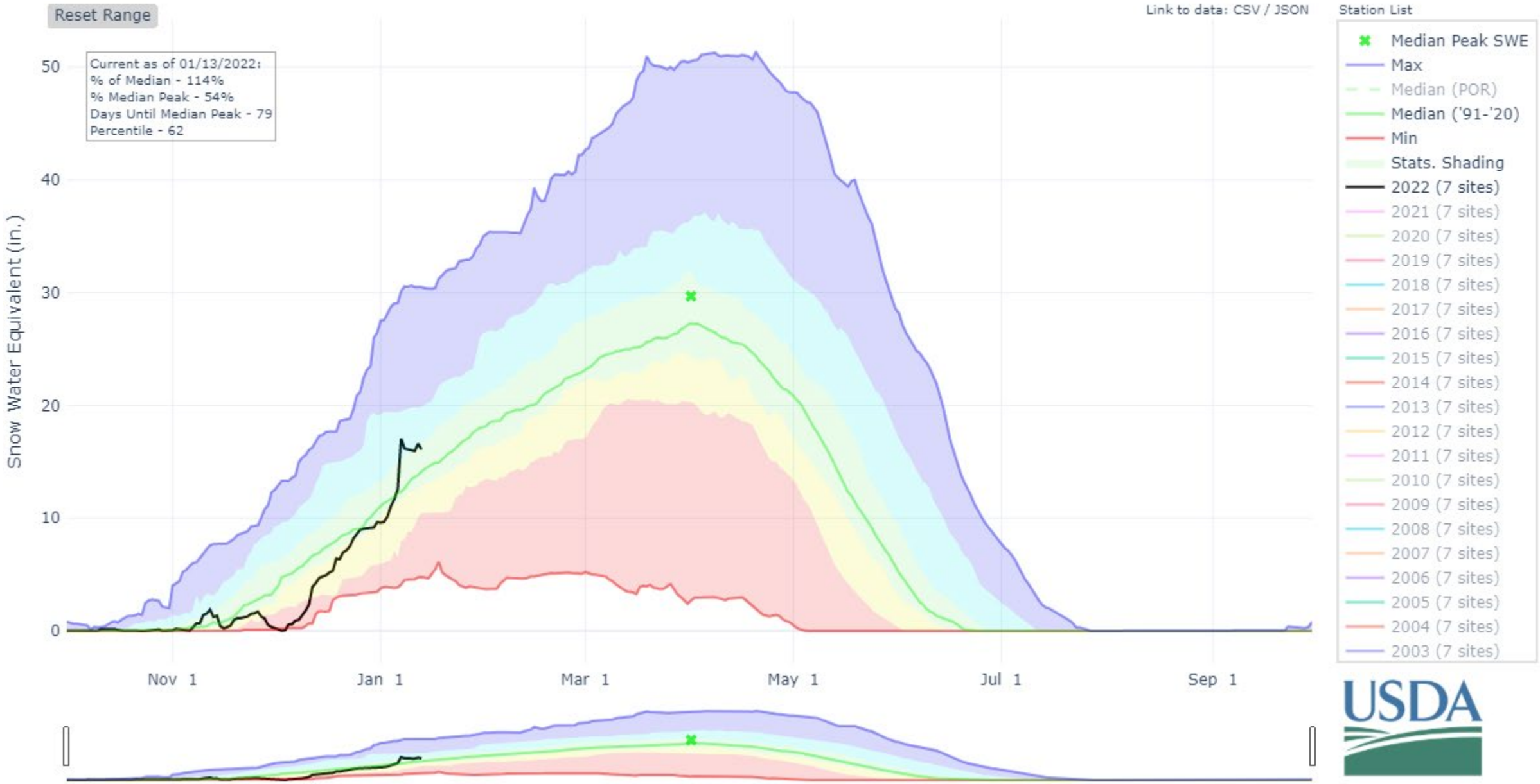
Water Year to Date Precipitation	Percent NRCS 1991-2020 Median	October 1, 2021 - January 10, 2022



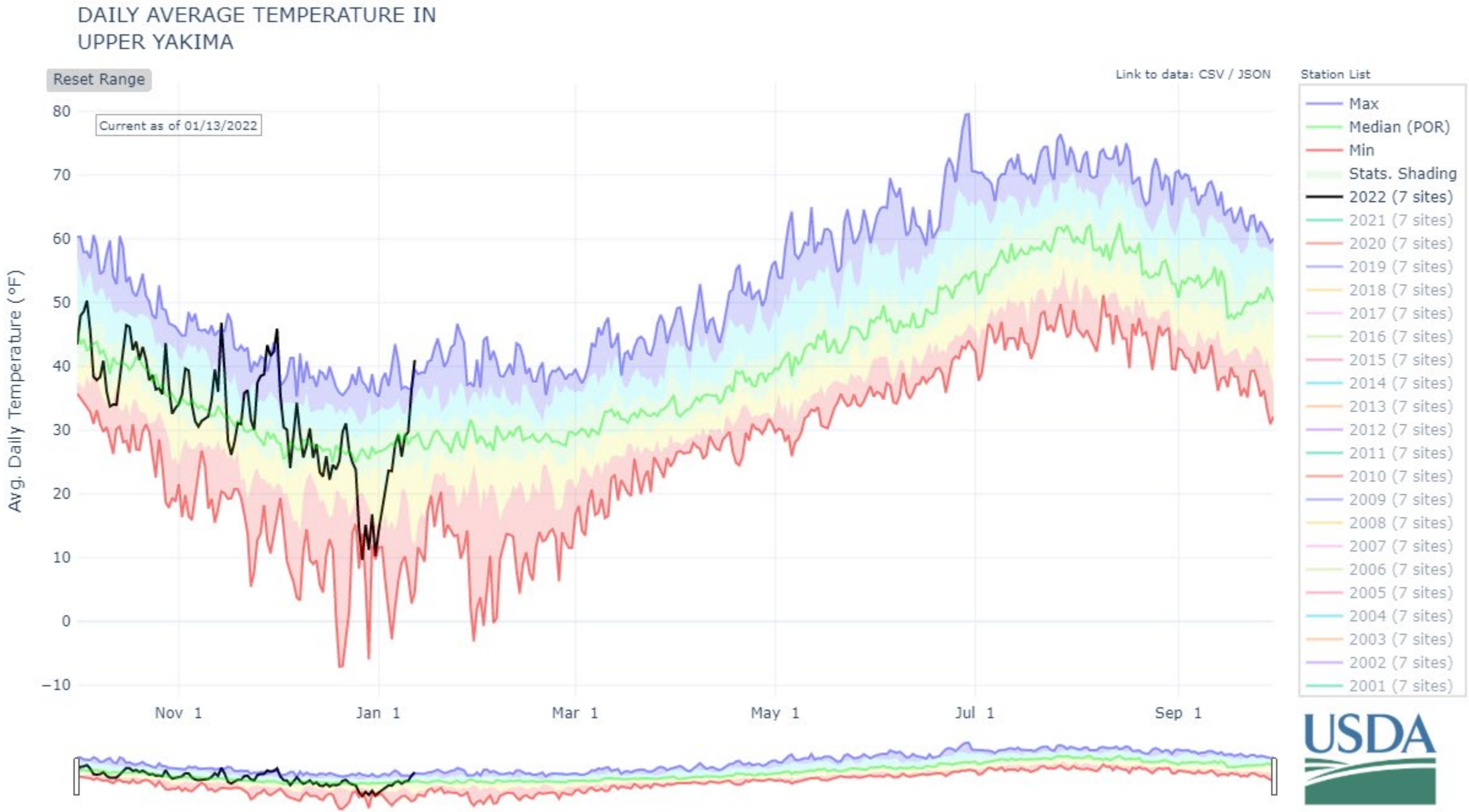
USDA Natural Resources Conservation Service
United States Department of Agriculture

Created 1-11-2022

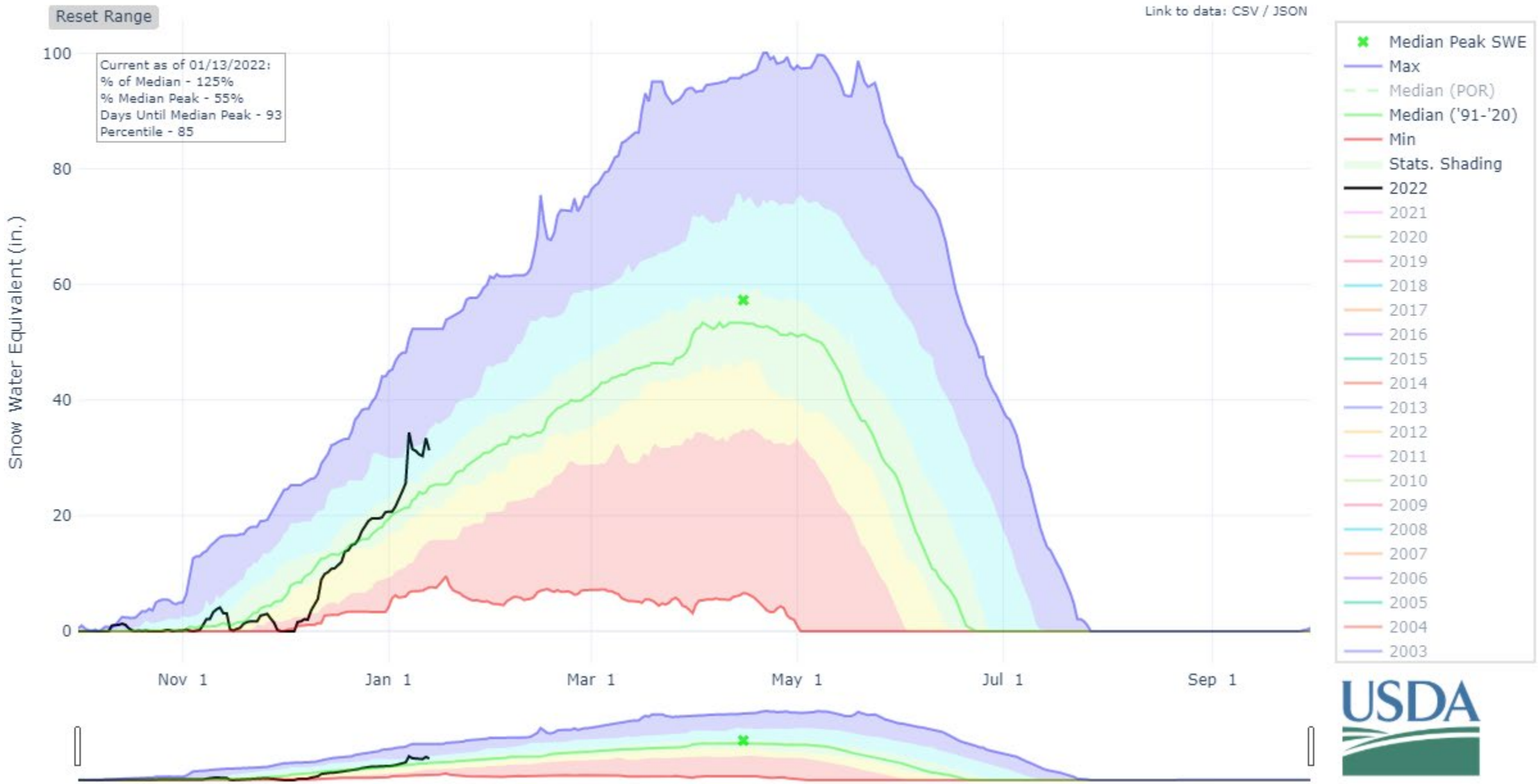
SNOW WATER EQUIVALENT IN UPPER YAKIMA



USDA


DAILY AVERAGE TEMPERATURE IN UPPER YAKIMA
Reset Range
Link to data: CSV / JSON
Station List
Current as of 01/13/2022
Avg. Daily Temperature (°F)
80
70
60
50
40
30
20
10
0
−10
Nov 1
Jan 1
Mar 1
May 1
Jul 1
Sep 1
Max
Median (POR)
Min
Stats. Shading
2022 (7 sites)
2021 (7 sites)
2020 (7 sites)
2019 (7 sites)
2018 (7 sites)
2017 (7 sites)
2016 (7 sites)
2015 (7 sites)
2014 (7 sites)
2013 (7 sites)
2012 (7 sites)
2011 (7 sites)
2010 (7 sites)
2009 (7 sites)
2008 (7 sites)
2007 (7 sites)
2006 (7 sites)
2005 (7 sites)
2004 (7 sites)
2003 (7 sites)
2002 (7 sites)
2001 (7 sites)
USDA

SNOW WATER EQUIVALENT AT OLALLIE MEADOWS



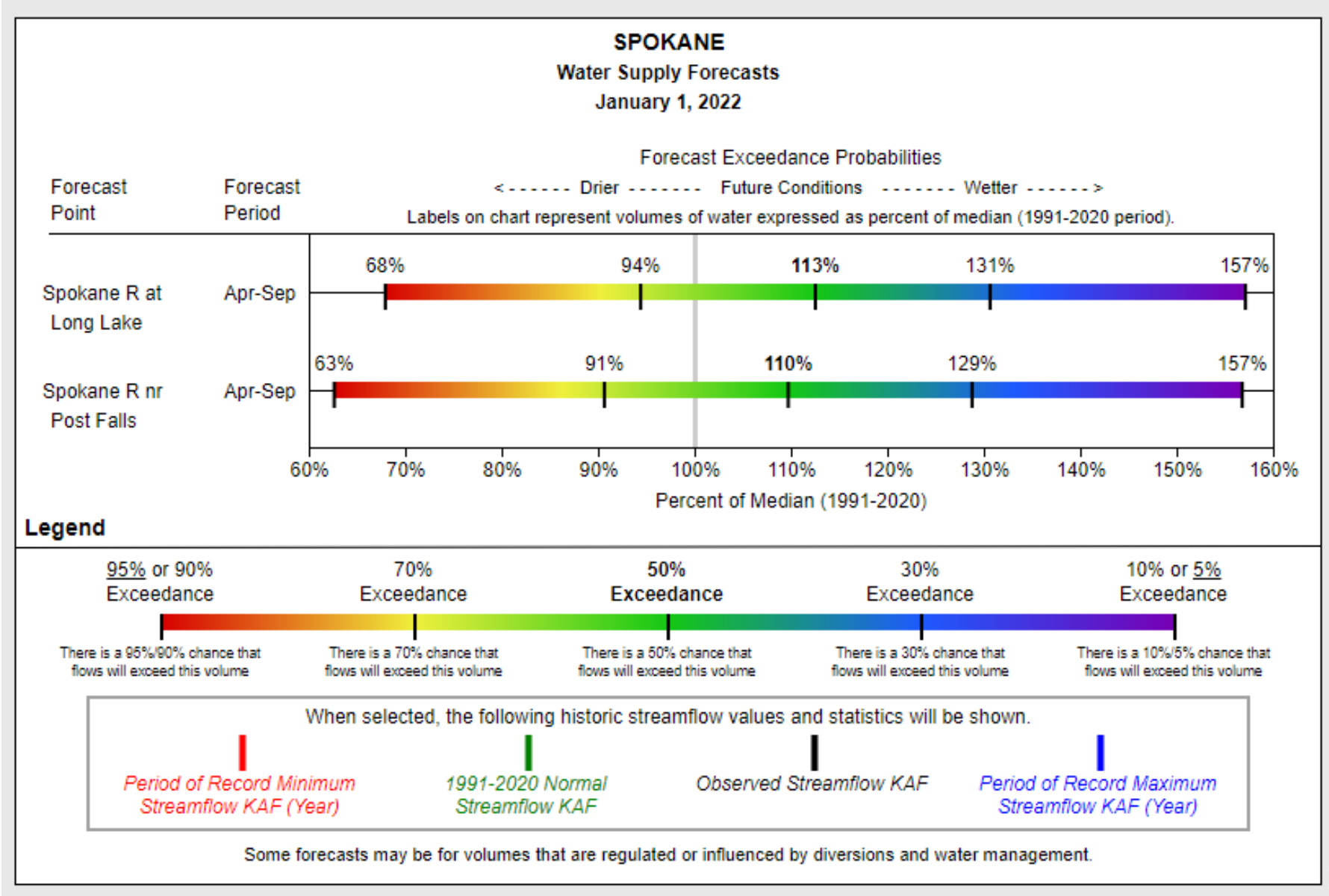
Olallie Meadows (672)
Washington SNOTEL Site - 4030 ft
Reporting Frequency: Daily; Date Range: 2022-01-01 to 2022-01-13

(As of: Thu Jan 13 16:02:33 GMT-08:00 2022)
Provisional data, subject to revision

Date	Snow Water Equivalent (in) Start of Day Values	Snow Depth (in) Start of Day Values	Precipitation Accumulation (in) Start of Day Values	Air Temperature Maximum (degF)	Air Temperature Minimum (degF)	Air Temperature Average (degF)
2022-01-01	20.7	63	56.1	24	7	14
2022-01-02	20.7	63	56.2	18	10	14
2022-01-03	21.6	66	57.1	28	16	22
2022-01-04	23.1	76	58.4	30	24	26
2022-01-05	24.2	81	59.6	29	24	26
2022-01-06	25.6	85	60.8	36	21	29
2022-01-07	34.4	96	68.1	38	26	31
2022-01-08	31.5	87	71.2	31	26	28
2022-01-09	31.2	86	71.2	33	27	30
2022-01-10	30.6	84	71.2	36	24	31
2022-01-11	30.3	85	71.2	43	33	38
2022-01-12	33.4	80	73.8	46	36	42
2022-01-13	31.3	78	74.9			

24	2022-01-06 00:00
23	2022-01-06 01:00
22	2022-01-06 02:00
22	2022-01-06 03:00
22	2022-01-06 04:00
22	2022-01-06 05:00
22	2022-01-06 06:00
22	2022-01-06 07:00
22	2022-01-06 08:00
21	2022-01-06 09:00
23	2022-01-06 10:00
32	2022-01-06 11:00
34	2022-01-06 12:00
34	2022-01-06 13:00
34	2022-01-06 14:00
34	2022-01-06 15:00
35	2022-01-06 16:00
35	2022-01-06 17:00
35	2022-01-06 18:00
36	2022-01-06 19:00
35	2022-01-06 20:00
35	2022-01-06 21:00
34	2022-01-06 22:00
34	2022-01-06 23:00
34	2022-01-07 00:00

Water Supply Forecasts



BETA FORECAST CHART TESTING SITE

Water Supply Forecast Chart

State: Washington

Basin: UPPER YAKIMA

Publication Year: 2022

Publication Date: January 1

Forecast Periods: All, February-July, February-September, March-July, March-August, March-September, April-July, April-August, April-September, May-July, May-August, May-September, June-July, June-August, June-September

Normal Type: Average / Median

Label Units: Volume in KAF / Percent of Normal

Forecast Labels: All Exceedances / 50% Exceedance Only

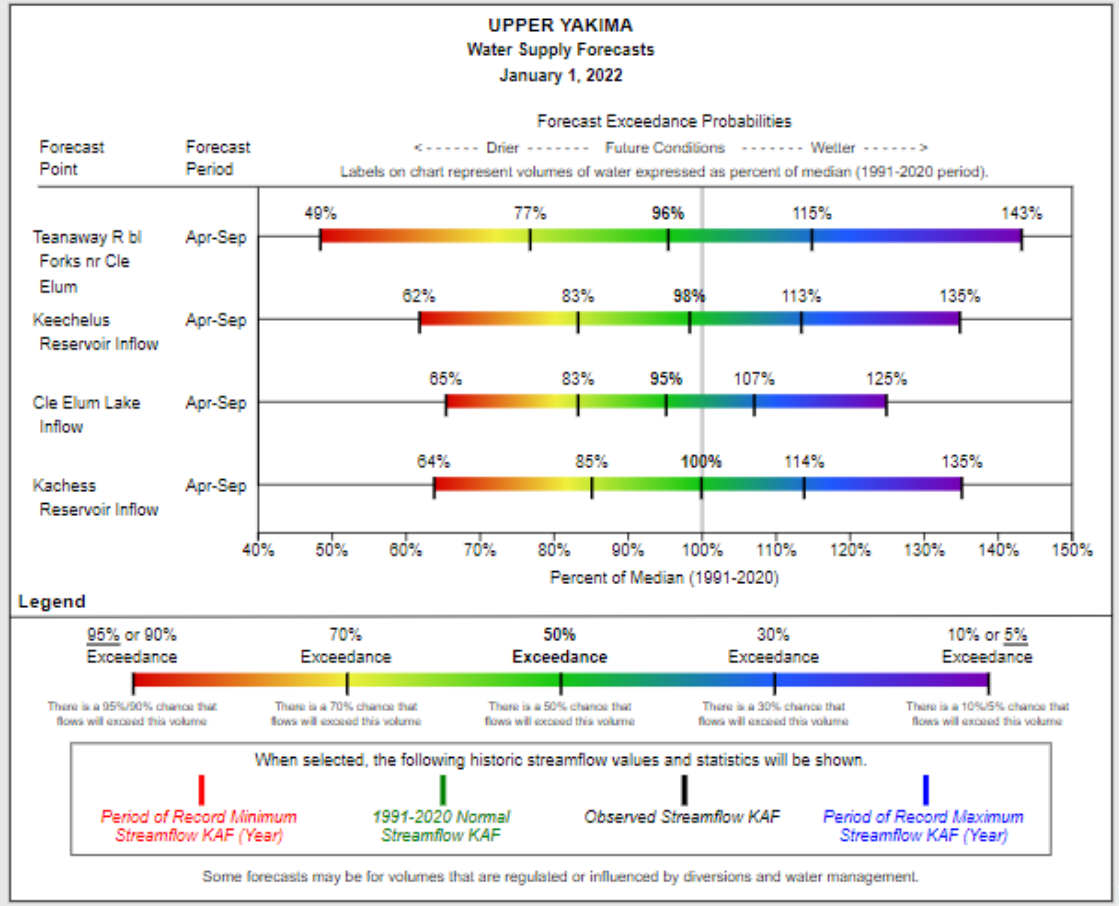
Include on Chart: Forecast (with label), Observed (with label), Normal (with label), Max (with label, with year), Min (with label, with year), Years of Observed Data

Display Options: Only Show Points With Forecast For Selected Period

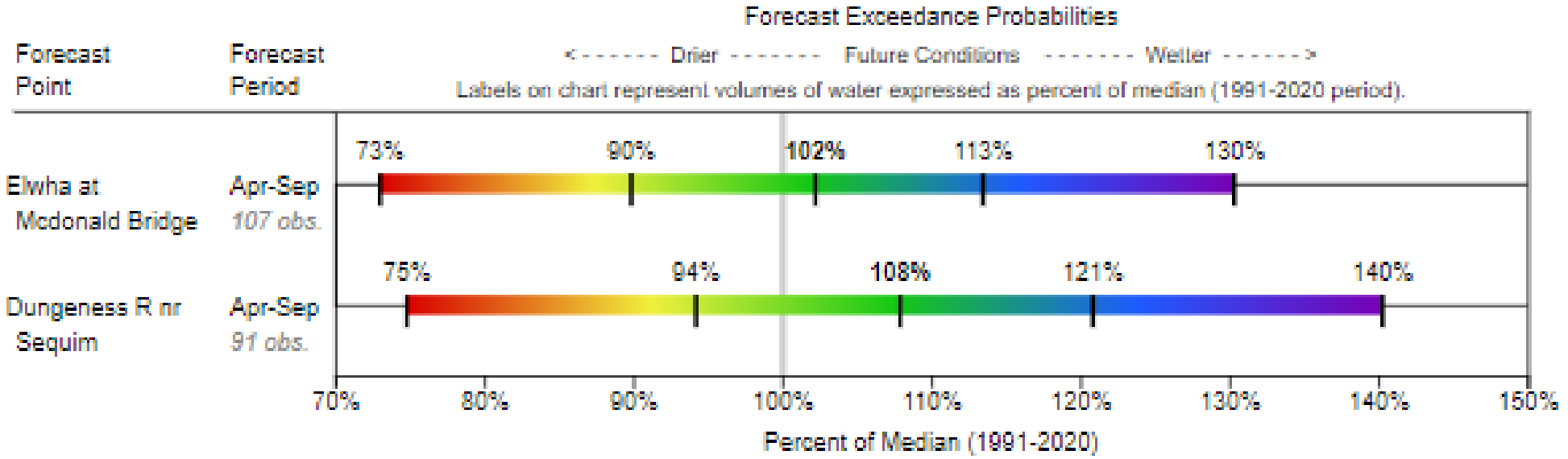
Chart Width: 800

Some web browsers may not support image export. Tested in Chrome 55, Firefox 50, and Safari 11.

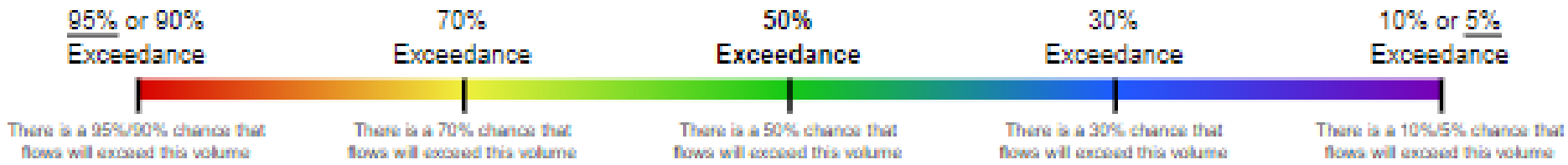
Export SVG | Export PNG



OLYMPIC
Water Supply Forecasts
January 1, 2022



Legend



When selected, the following historic streamflow values and statistics will be shown.

Period of Record Minimum Streamflow KAF (Year)

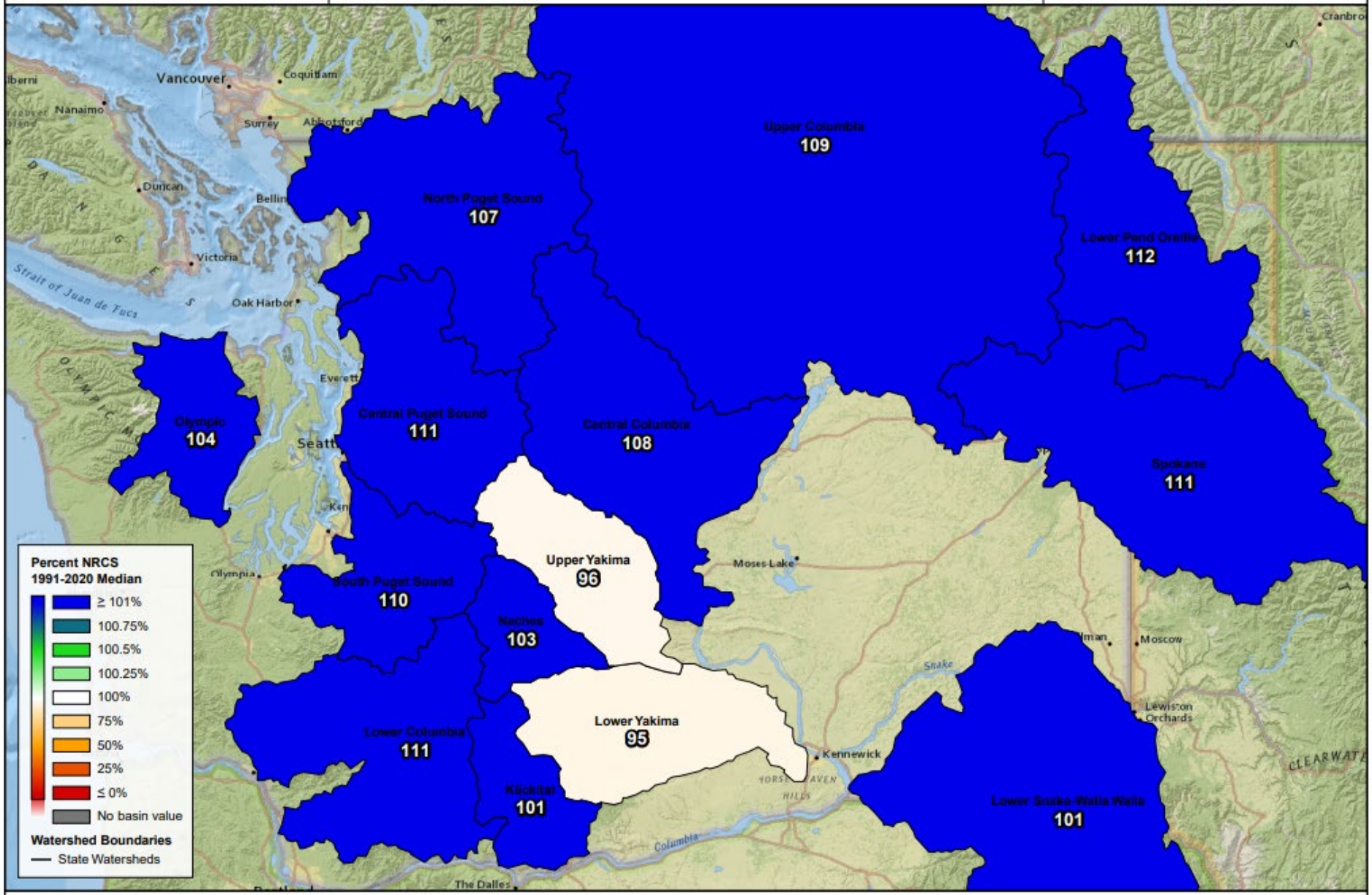
1991-2020 Normal Streamflow KAF

Observed Streamflow KAF

Period of Record Maximum Streamflow KAF (Year)

Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

Forecast Volume, 50% Exceedance Probability	Percent NRCS 1991-2020 Median	April - September, January 1, 2022

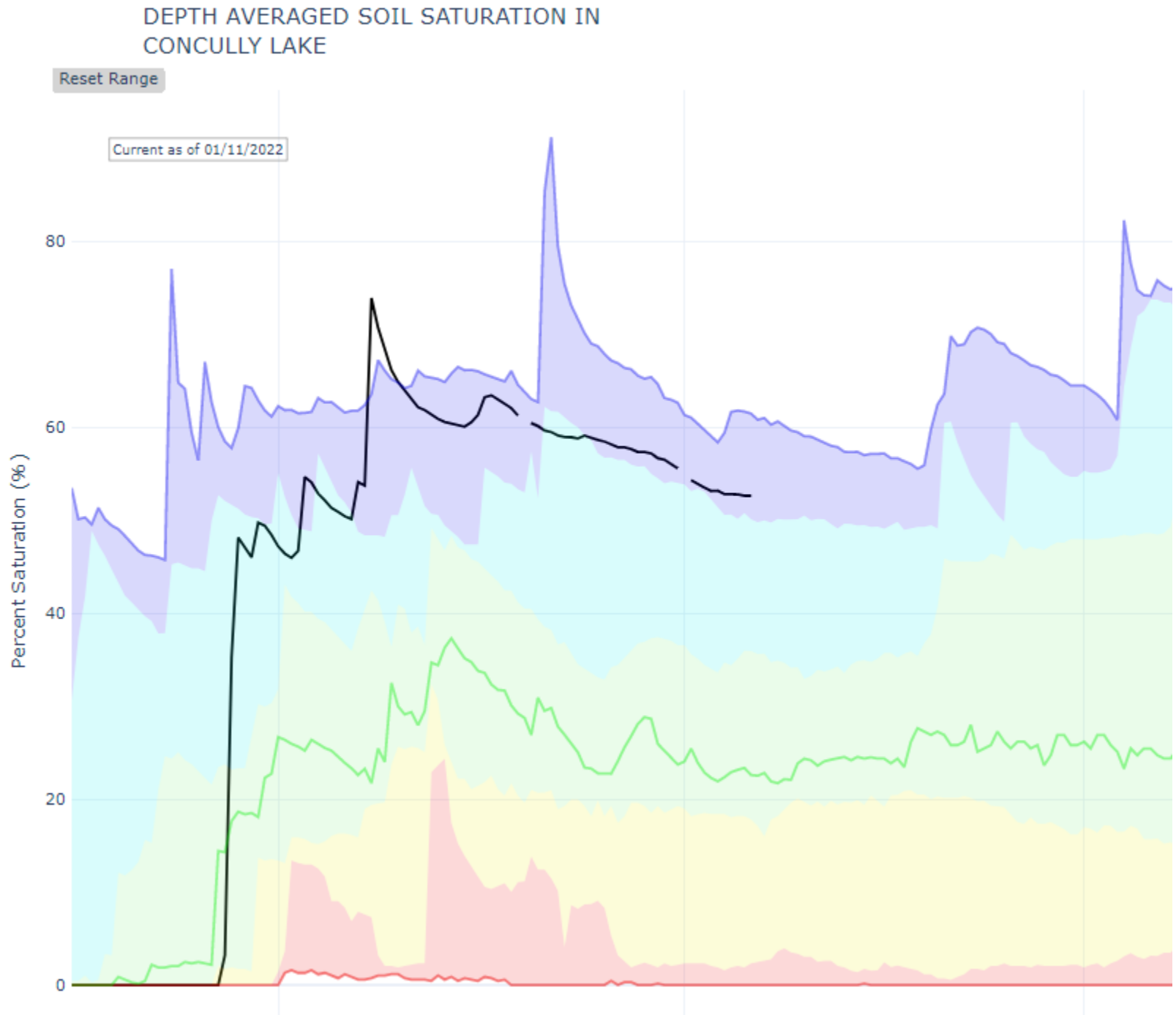


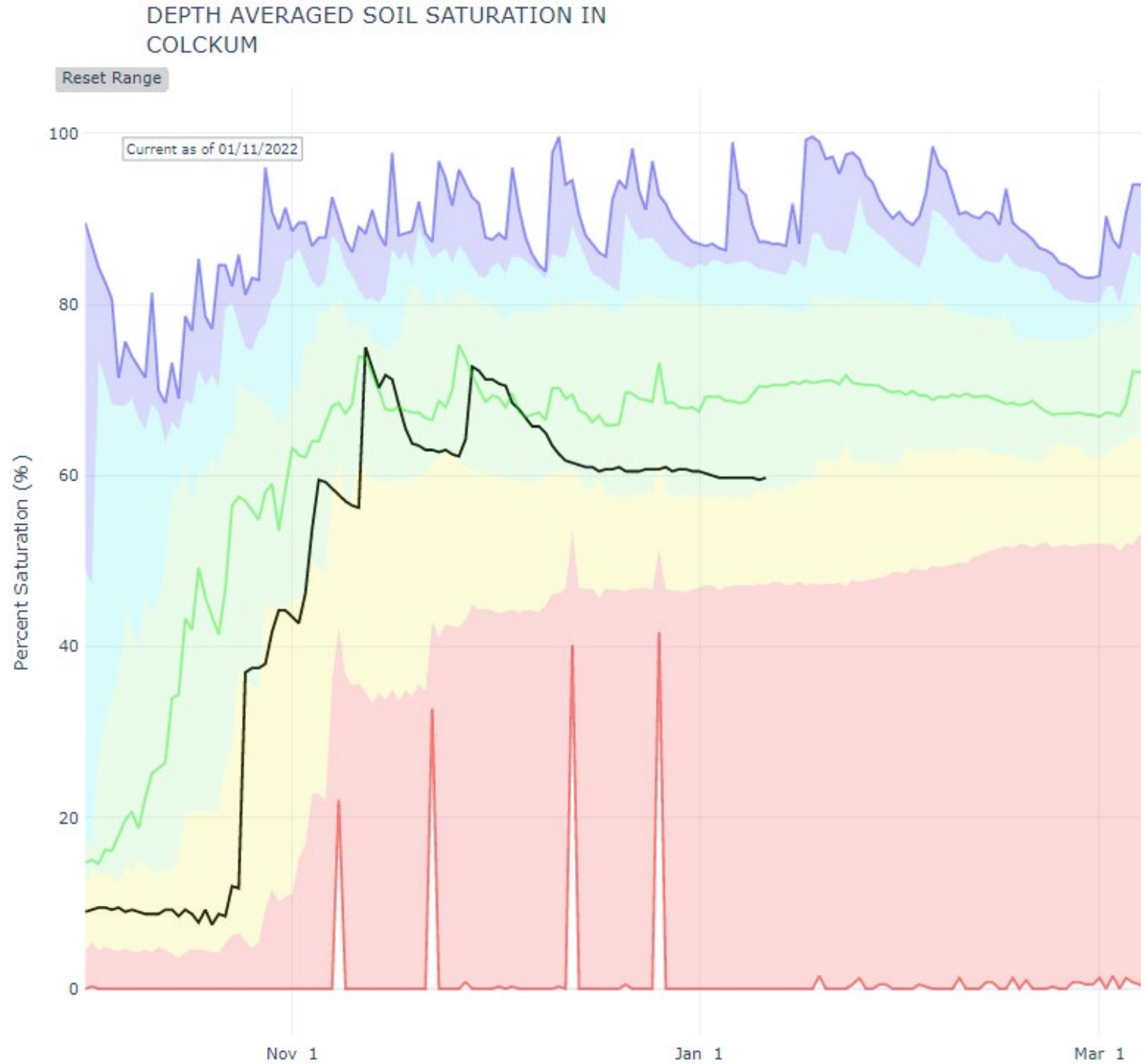
USDA Natural Resources Conservation Service
United States Department of Agriculture

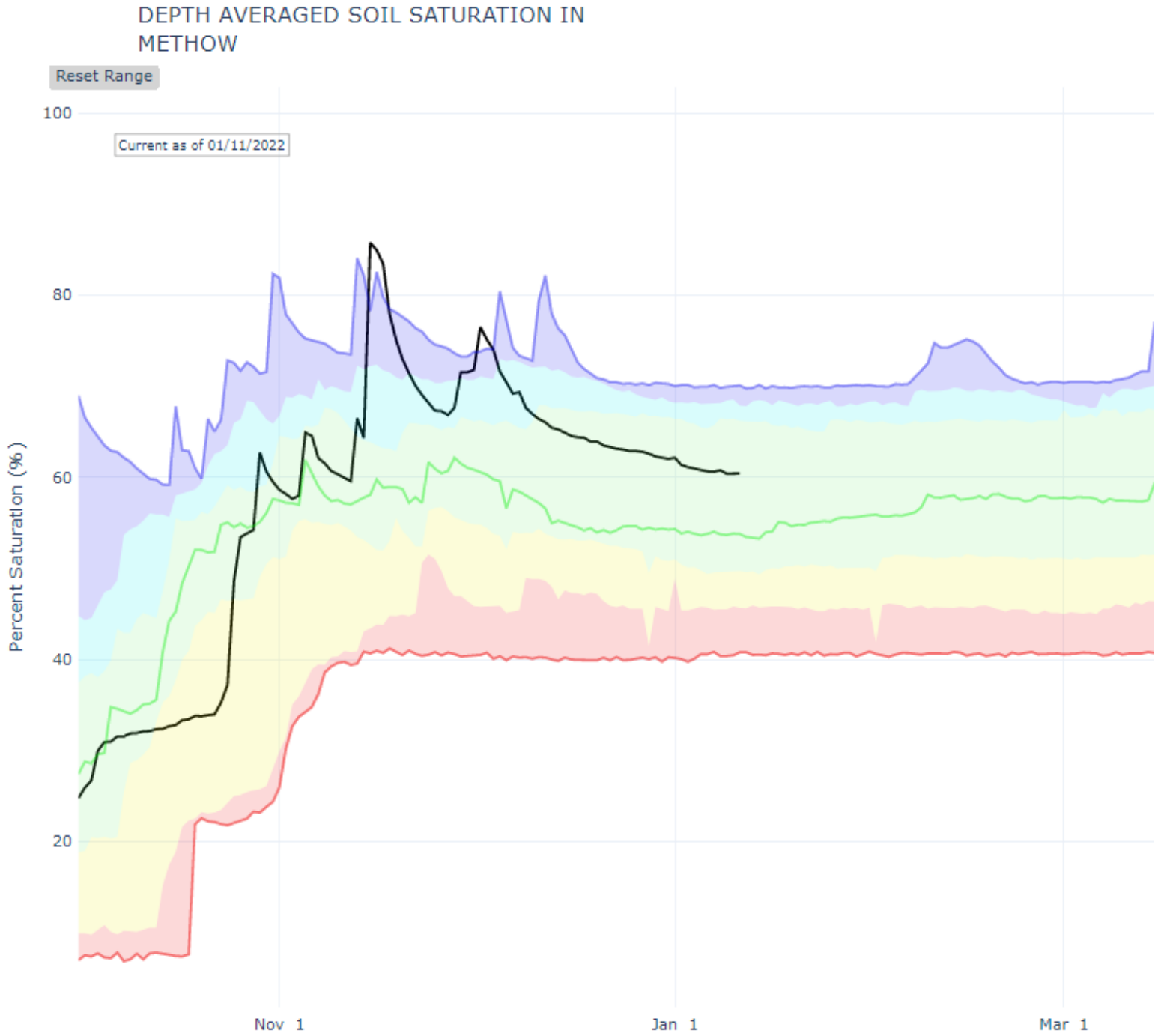
N

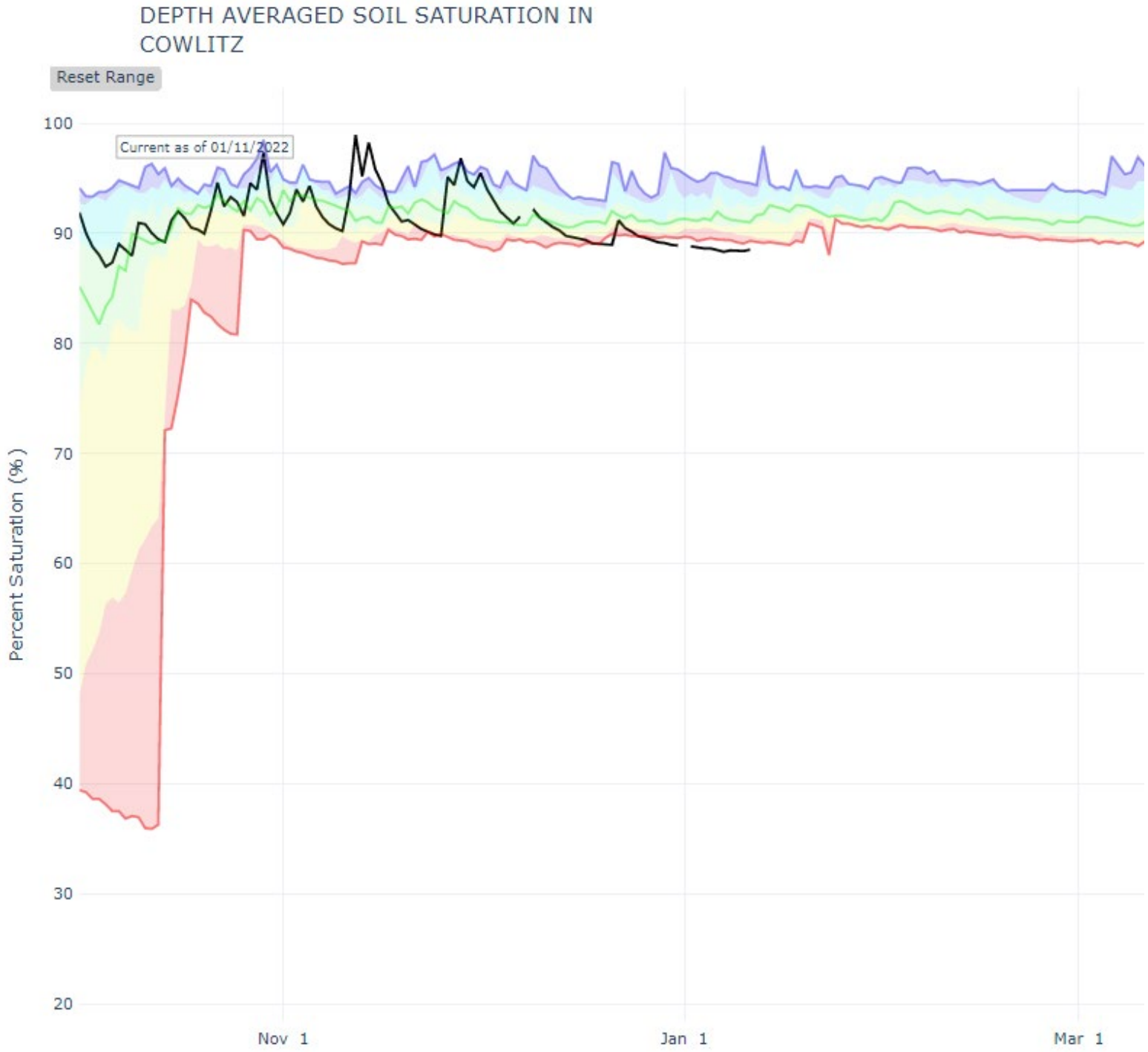
0 10 20 40 60 80 100 Miles

Created 1-11-2022


DEPTH AVERAGED SOIL SATURATION IN CONCULLY LAKE
Reset Range
Current as of 01/11/2022
Percent Saturation (%)
80
60
40
20
0


DEPTH AVERAGED SOIL SATURATION IN COLCKUM
Reset Range
Current as of 01/11/2022
Percent Saturation (%)
100
80
60
40
20
0
Nov 1
Jan 1
Mar 1


DEPTH AVERAGED SOIL SATURATION IN METHOW
Reset Range
Current as of 01/11/2022
100
80
60
40
20
Percent Saturation (%)
Nov 1
Jan 1
Mar 1


DEPTH AVERAGED SOIL SATURATION IN COWLITZ
Reset Range
Current as of 01/11/2022
Percent Saturation (%)
100
90
80
70
60
50
40
30
20
Nov 1
Jan 1
Mar 1

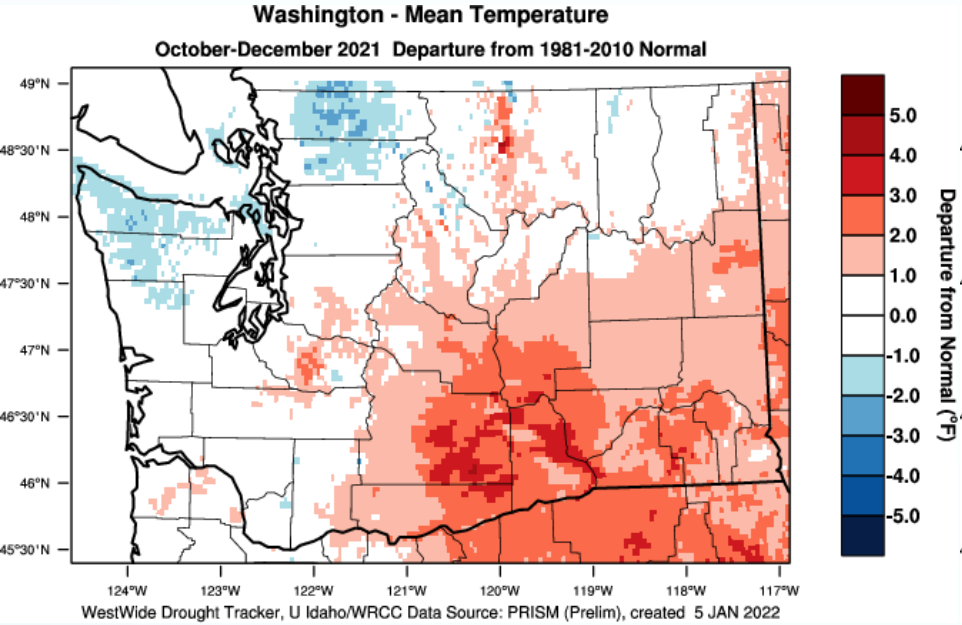
Cooperative Institute for
CLIMATE, OCEAN &
ECOSYSTEM STUDIES

Current Conditions and Seasonal Outlook

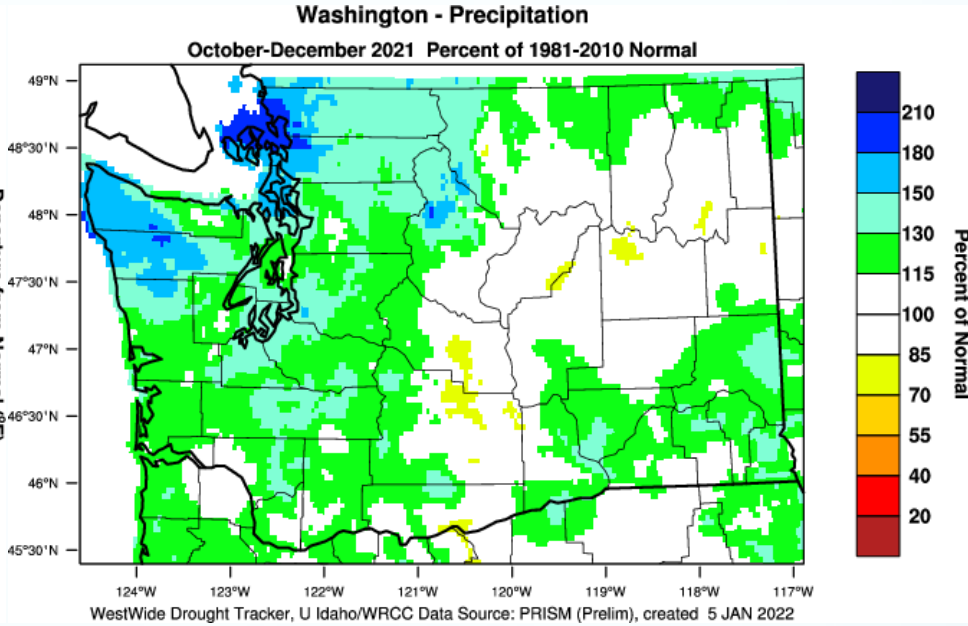
Nick Bond & Karin Bumbaco
Office of the Washington State Climatologist
Cooperative Institute for Climate, Ocean, and Ecosystem Studies
University of Washington
14 January 2022

Water Year 2022

Temperature



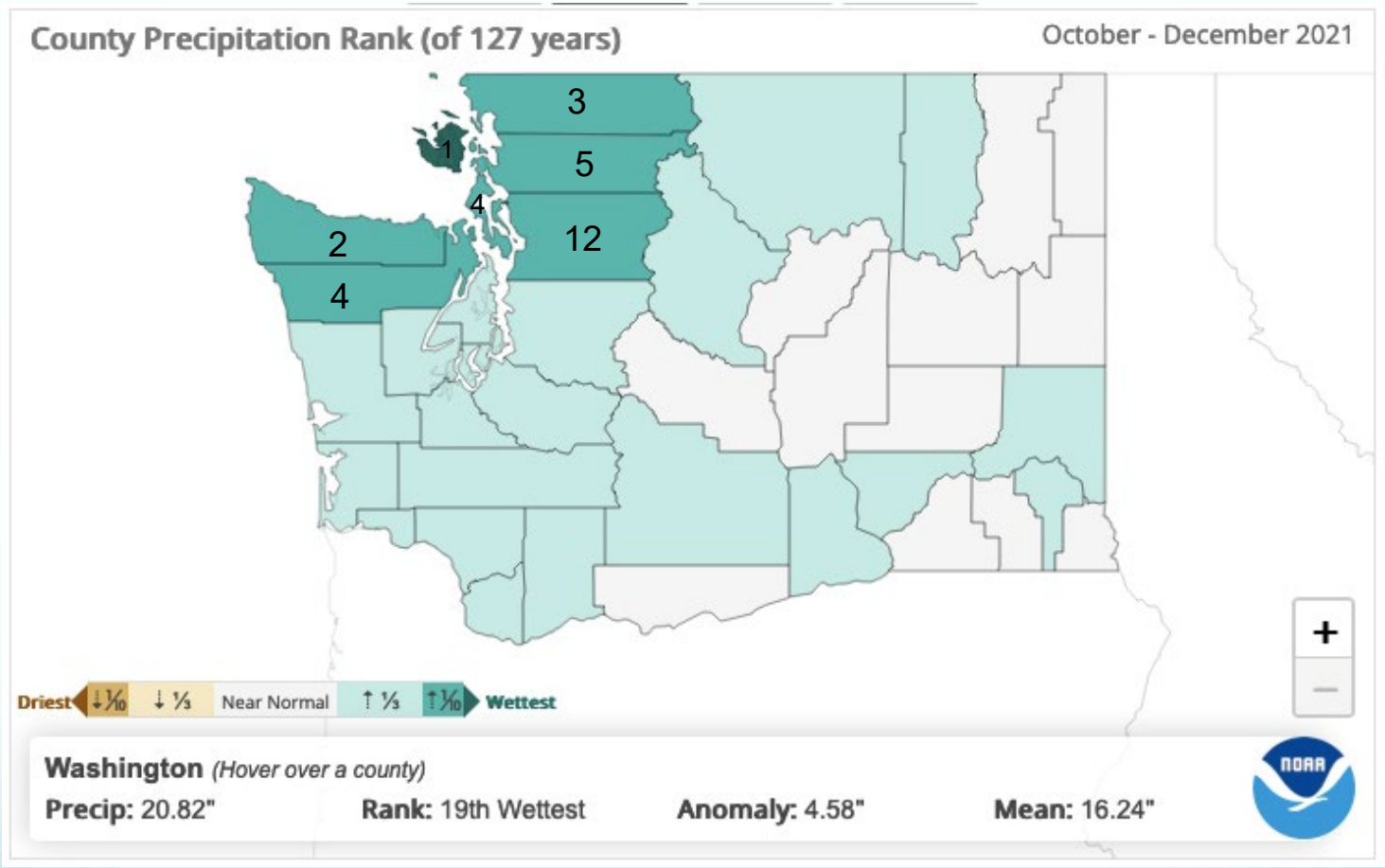
Precipitation



- Averaged statewide, Oct-Dec temperatures were near-normal* (+0.6ºF), but considerable variability
- Averaged statewide, Oct-Dec precipitation is 19th wettest on record, with 125% of normal* (+3.90”)

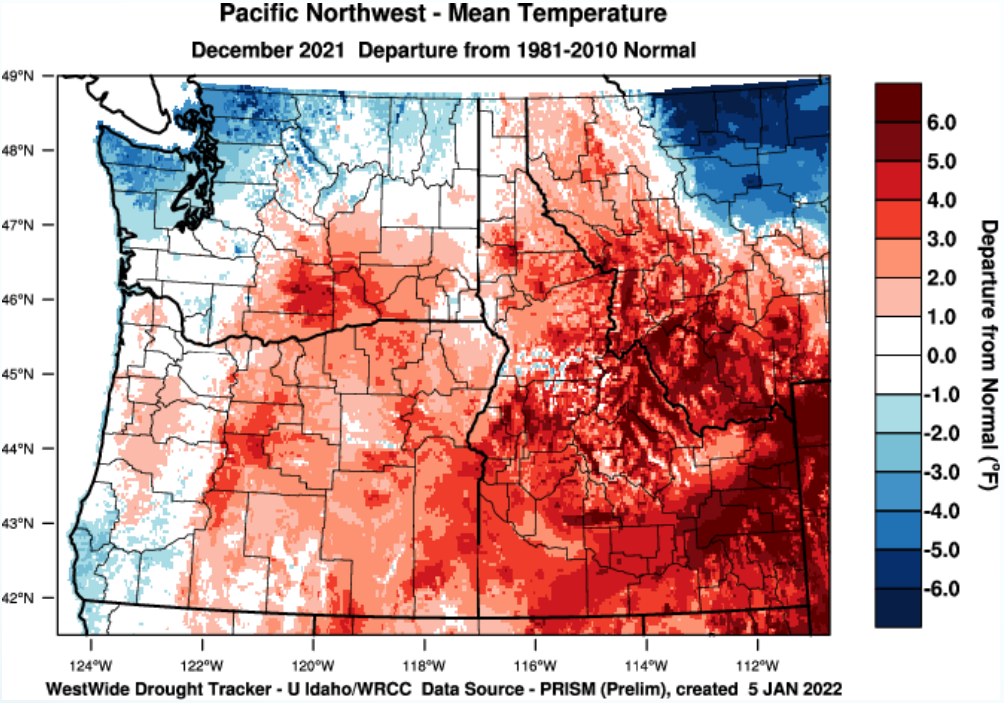
*1981-2010 normal; Records since 1895

Oct-Dec 2021 County Precipitation

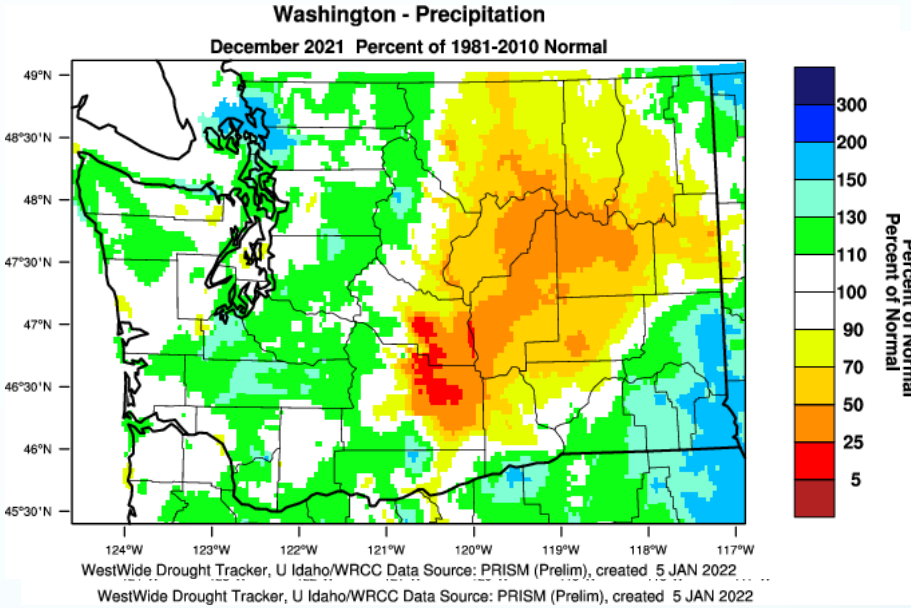


December 2021

Temperature



Precipitation

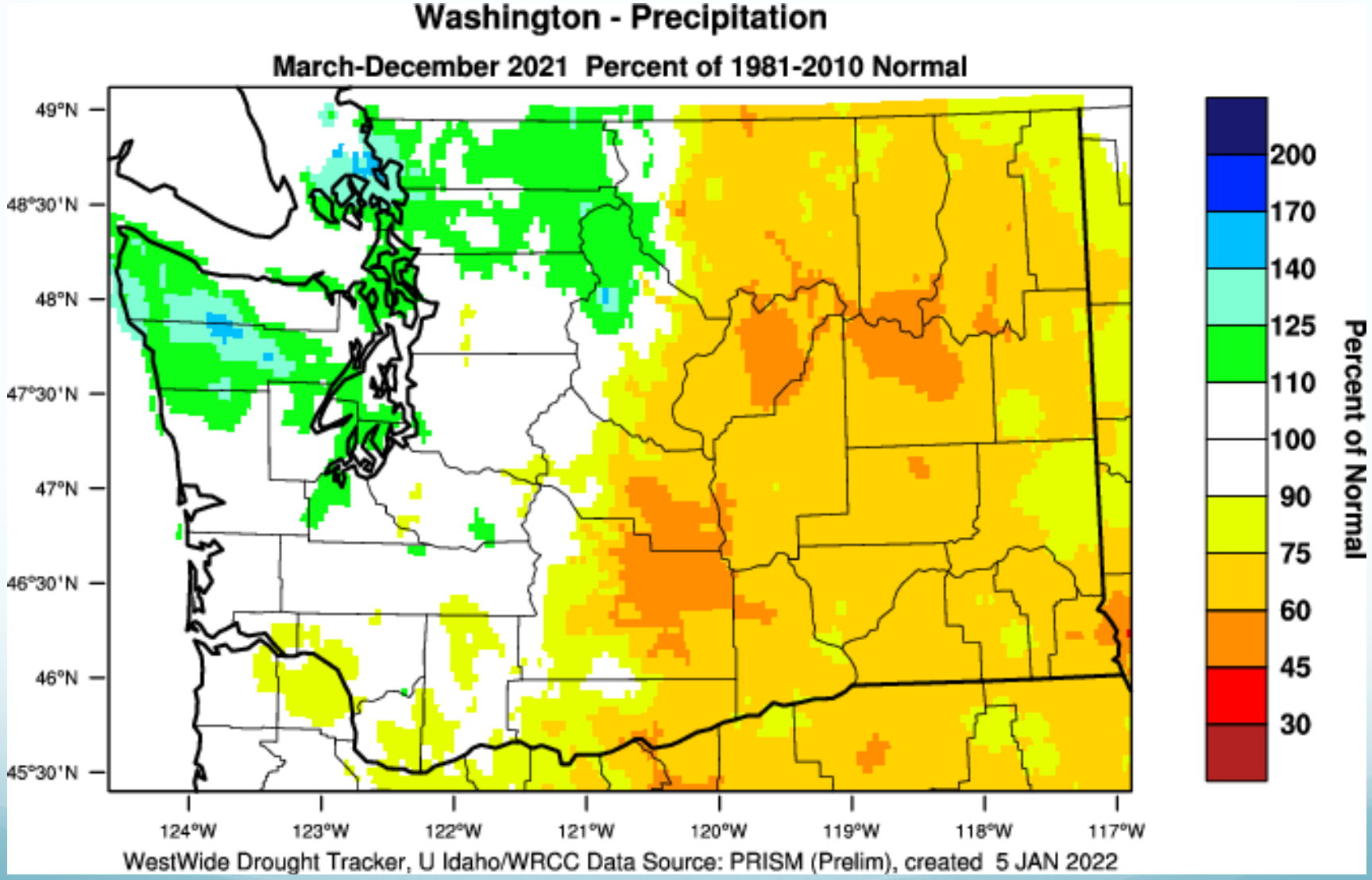


WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 5 JAN 2022

- Averaged statewide, December temperatures were near-normal (-0.7ºF)
- Averaged statewide, near-normal December precipitation (+0.21”)

*1981-2010 normal

Longer-term Precipitation



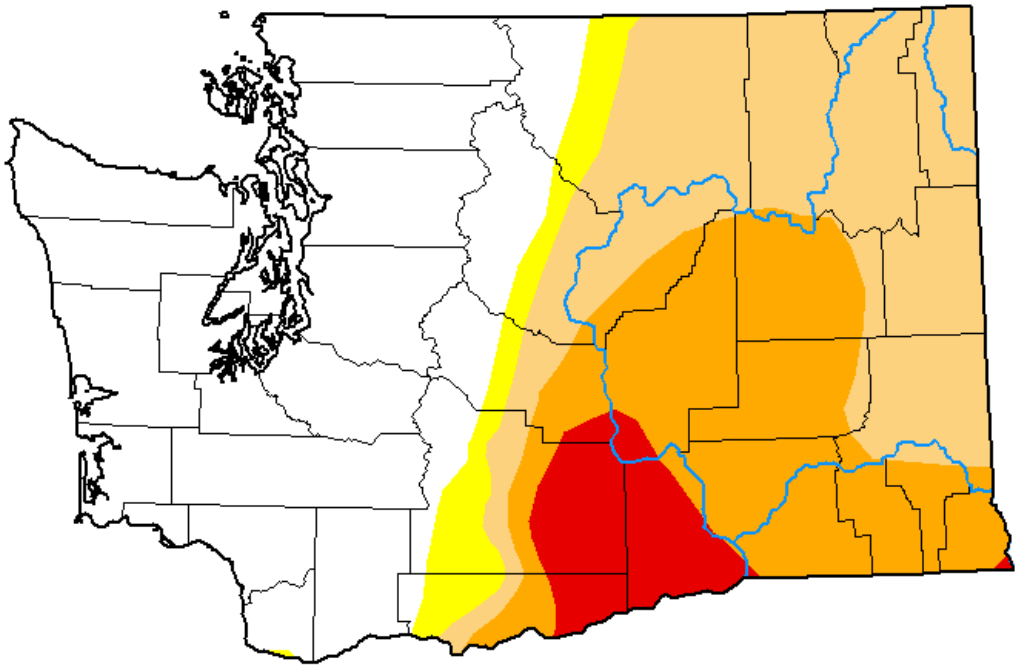
U.S. Drought Monitor

Washington

January 11, 2022

(Released Thursday, Jan. 13, 2022)

Valid 7 a.m. EST



Intensity:

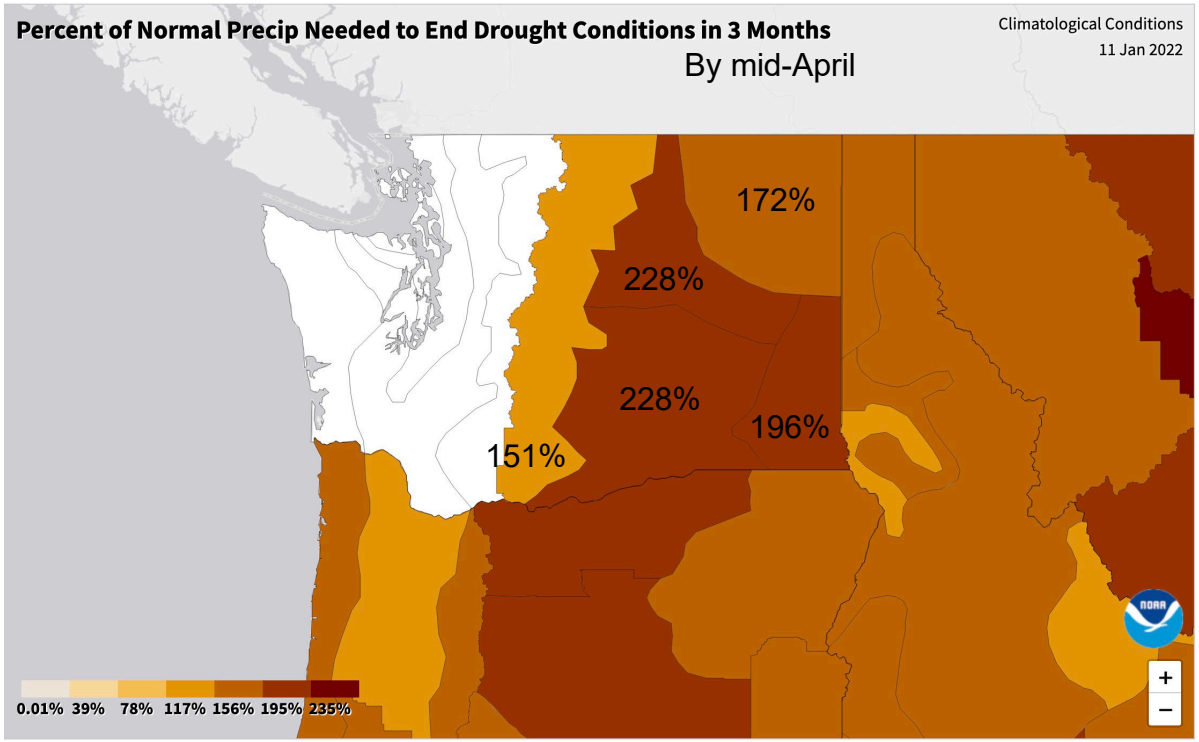
- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

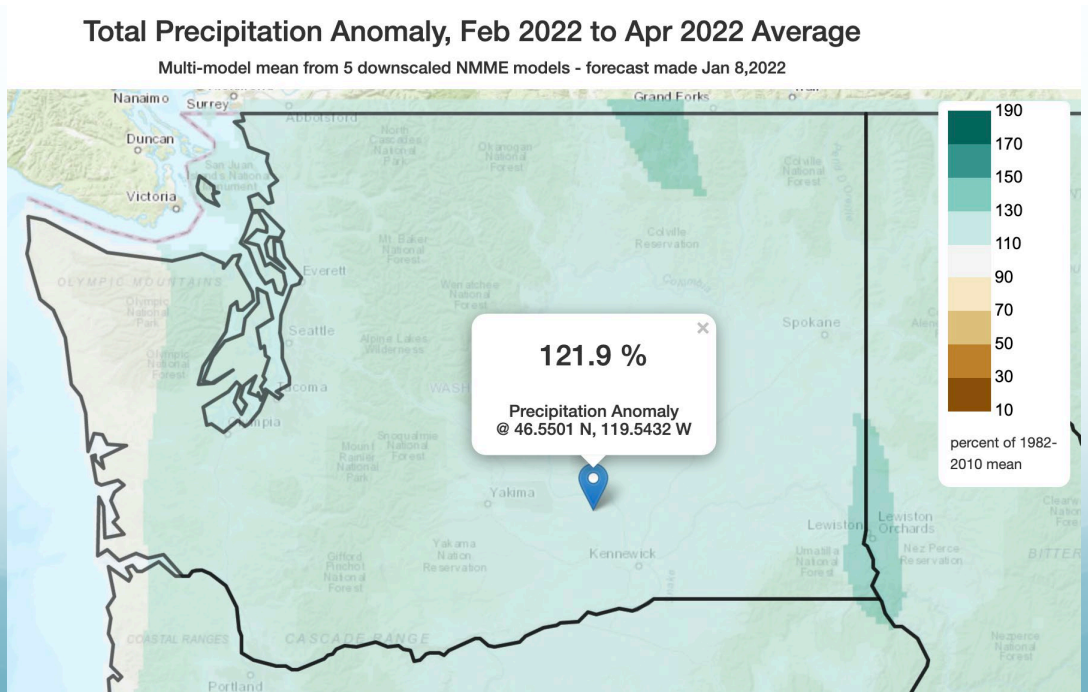
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

Author:

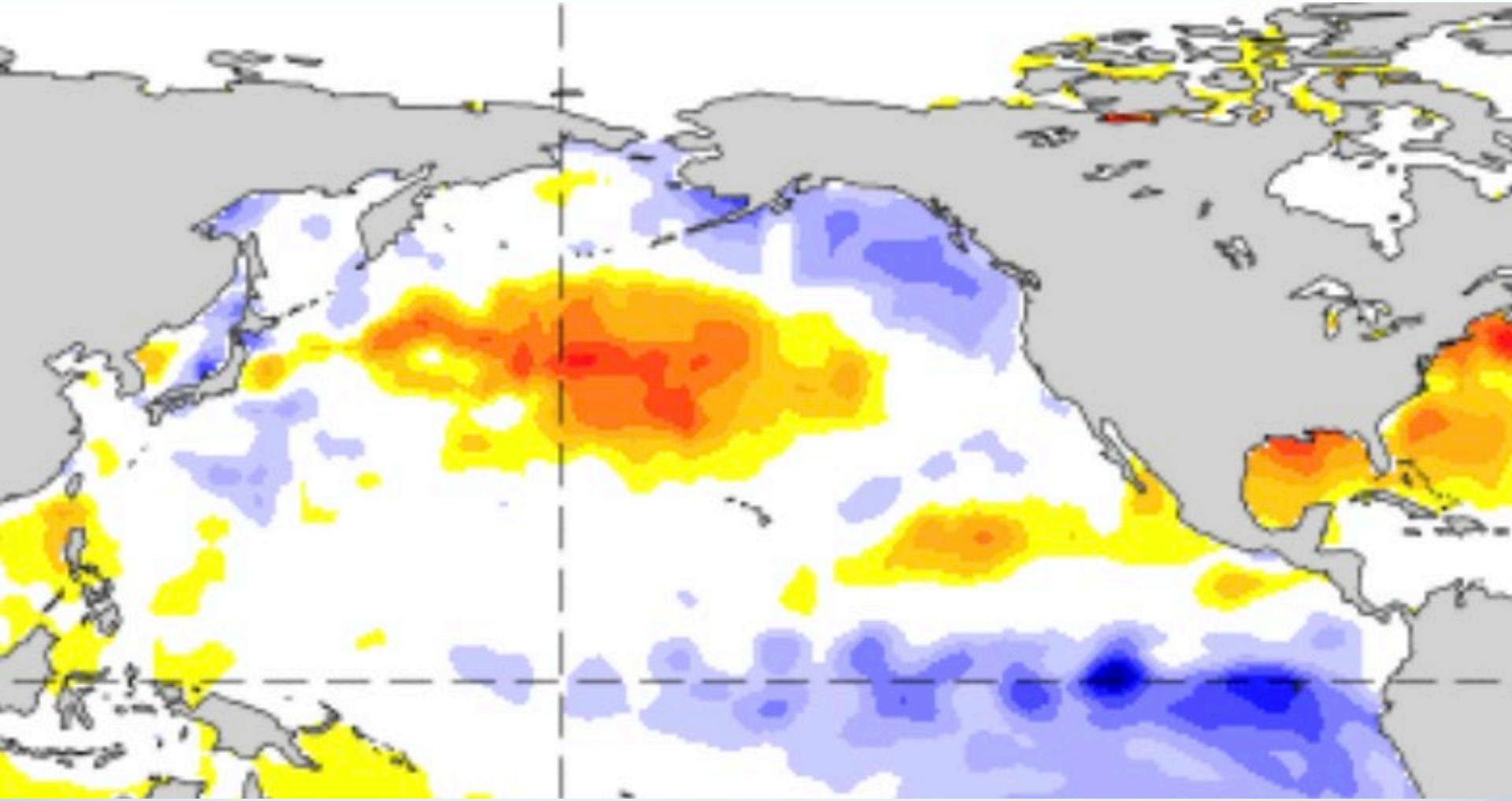
Richard Tinker
CPC/NOAA/NWS/NCEP

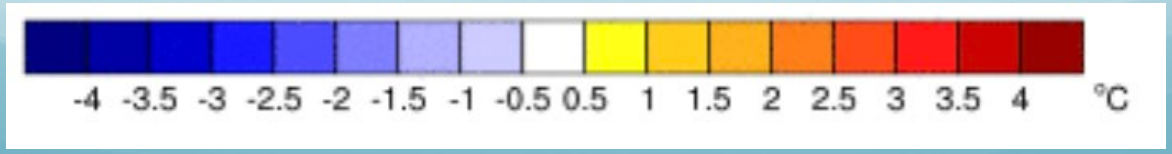
droughtmonitor.unl.edu


Percent of Normal Precip Needed to End Drought Conditions in 3 Months
By mid-April
Climatological Conditions
11 Jan 2022
172%
228%
228%
196%
151%
0.01% 39% 78% 117% 156% 195% 235%

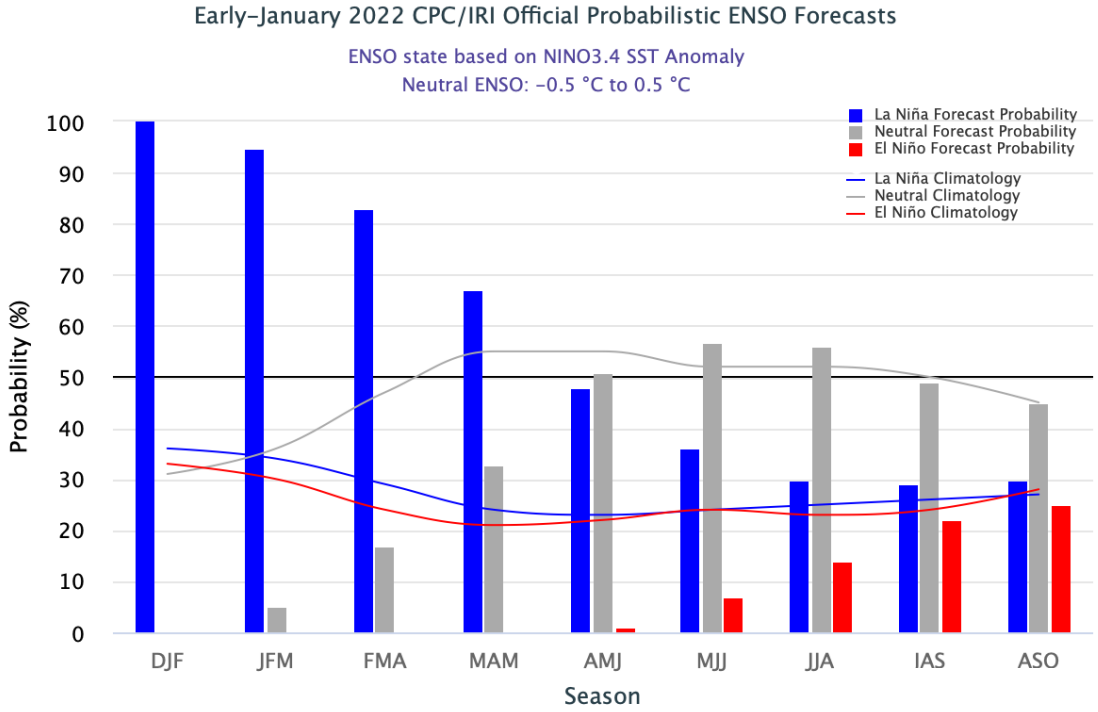

Total Precipitation Anomaly, Feb 2022 to Apr 2022 Average
Multi-model mean from 5 downscaled NMME models - forecast made Jan 8,2022
121.9 %
Precipitation Anomaly
@ 46.5501 N, 119.5432 W
190
170
150
130
110
90
70
50
30
10
percent of 1982-2010 mean
Nanaimo
Surrey
Duncan
Victoria
Everett
Seattle
Tacoma
Olympia
Yakima
Kennewick
Spokane
Lewiston
Portland

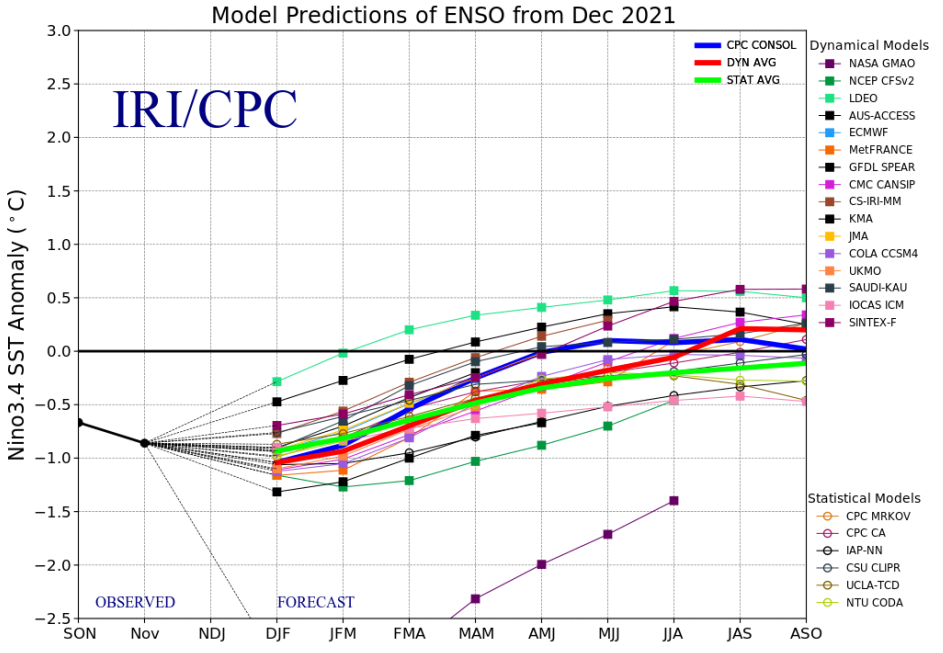
Sea Surface Temperature Anomalies: 2-8 January 2022





ENSO Predictions

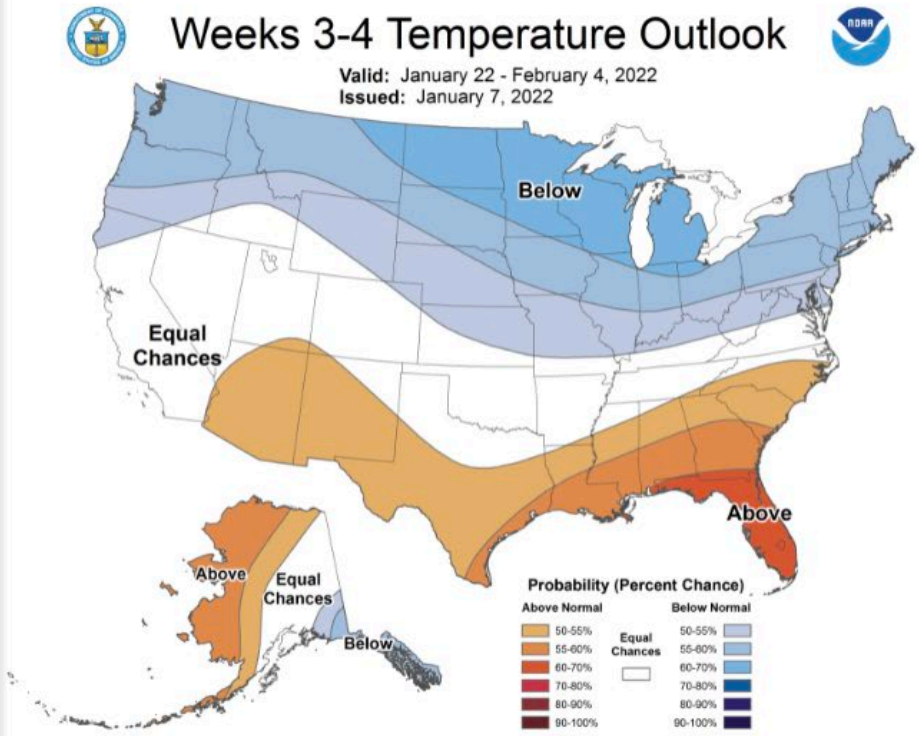




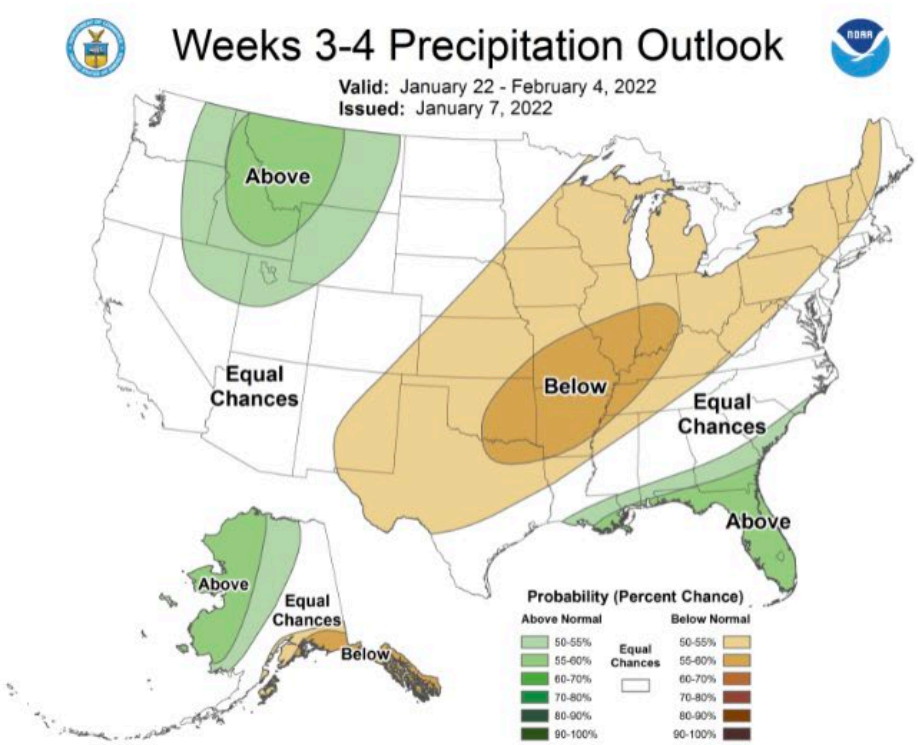
Week 3-4 Outlooks

Valid: 22 Jan 2022 to 04 Feb 2022
Updated: 07 Jan 2022

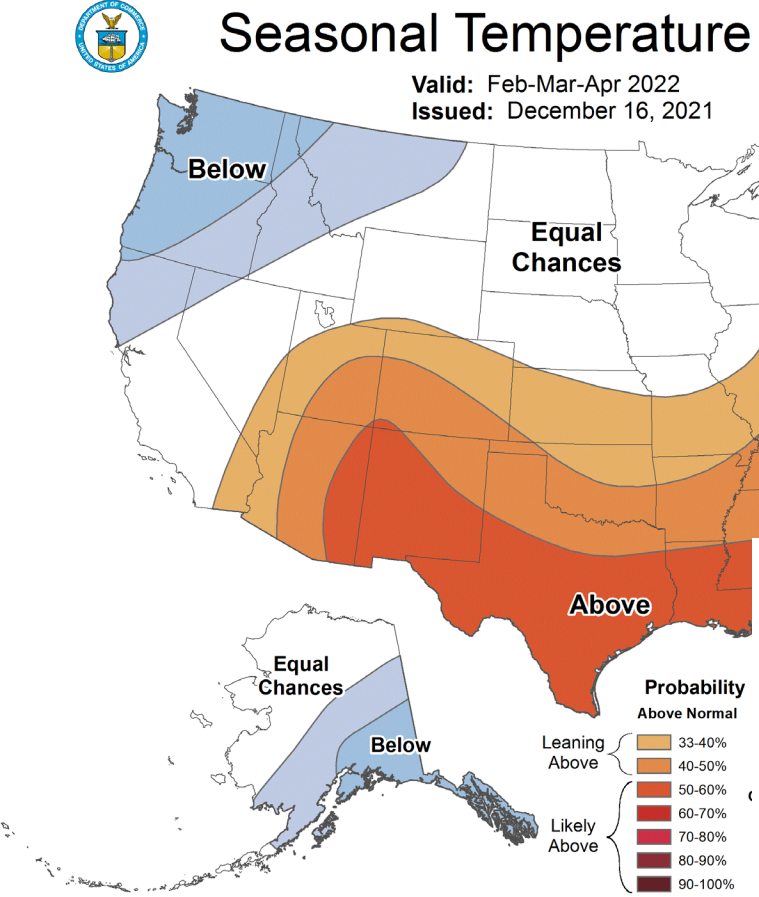
Temperature Probability

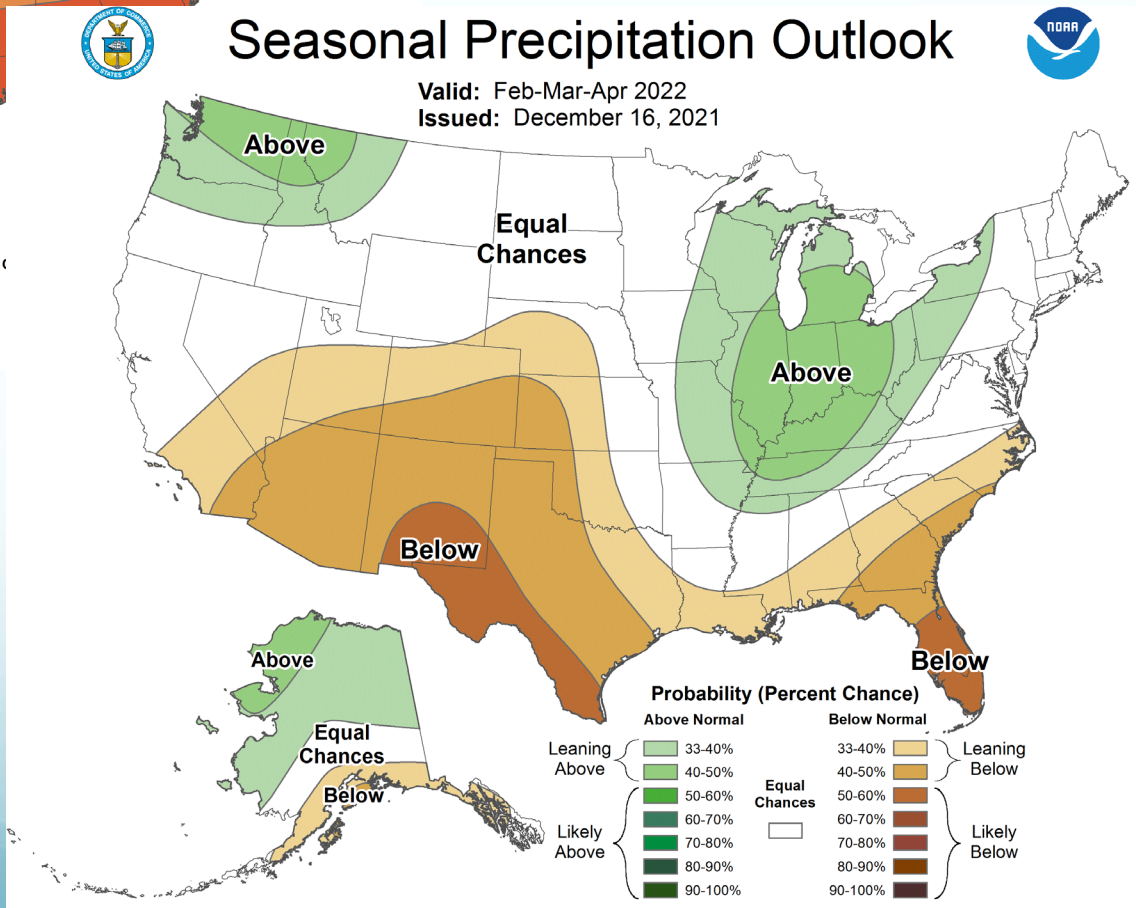


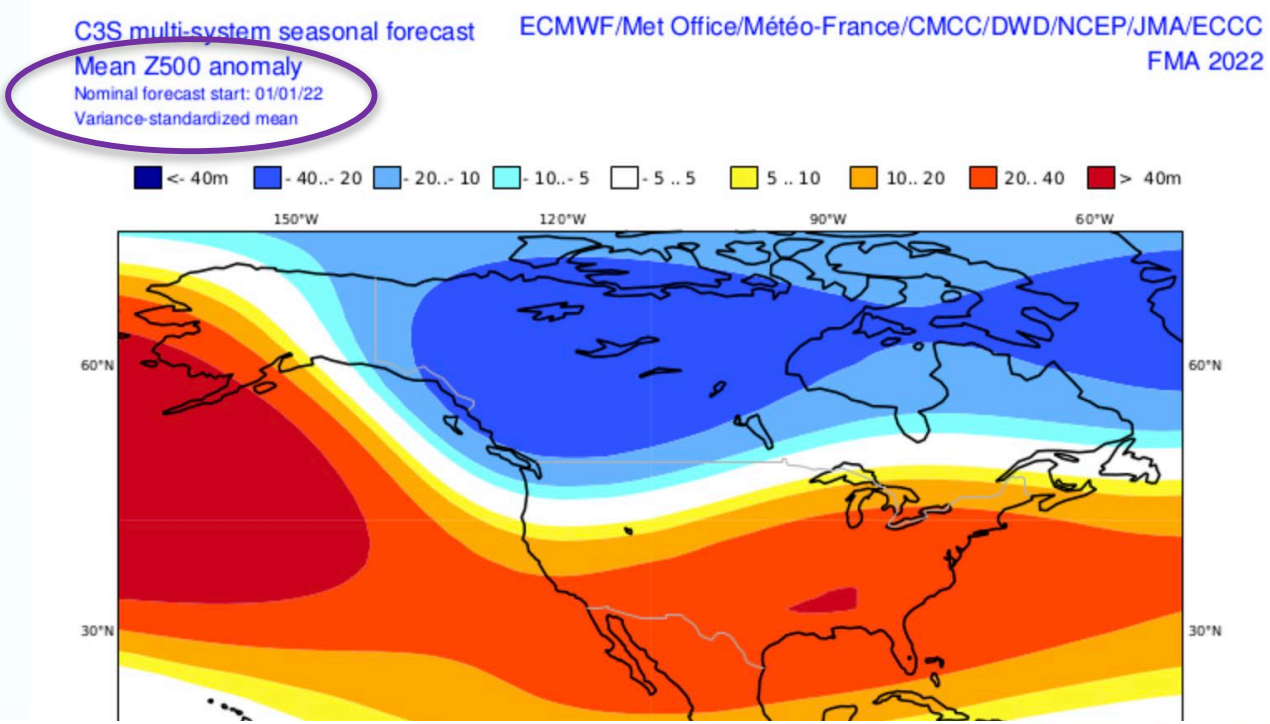
Precipitation Probability (Experimental)



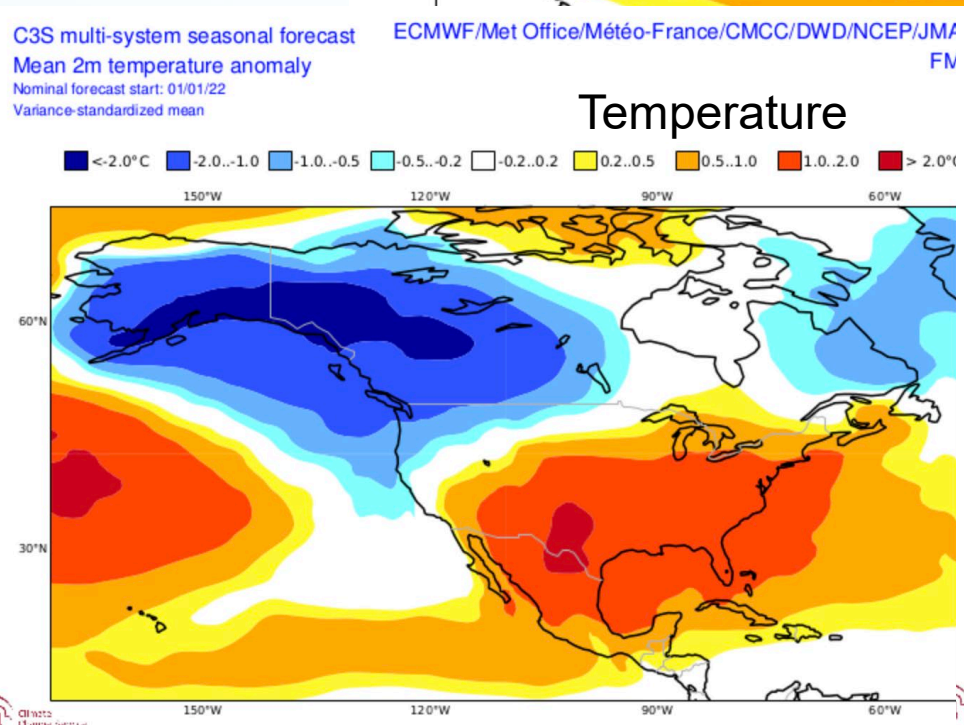
NOAA/CPC Forecasts for Feb-Apr 2022



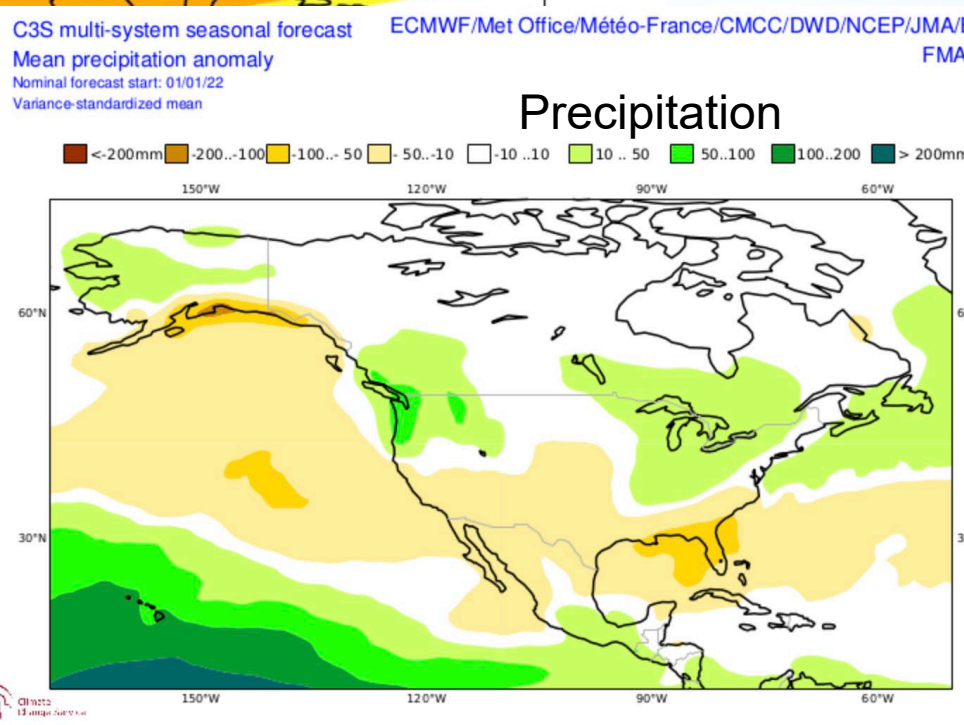




Forecasts from IMME



Temperature



Precipitation

Summary

- Water year 2022 has been wetter than normal, especially for western WA
- The long-term precipitation deficits in eastern WA are still there and unlikely to completely disappear by spring
- Mother Nature apparently has taken to heart the textbook relationship between La Niña and mountain snowpacks in WA state
- I am not packing away my long johns quite yet

Streamflow Conditions in Washington State as of January 14, 2022

Presented
to
The Washington State
Water Supply Availability Committee
on
Jan. 14, 2022

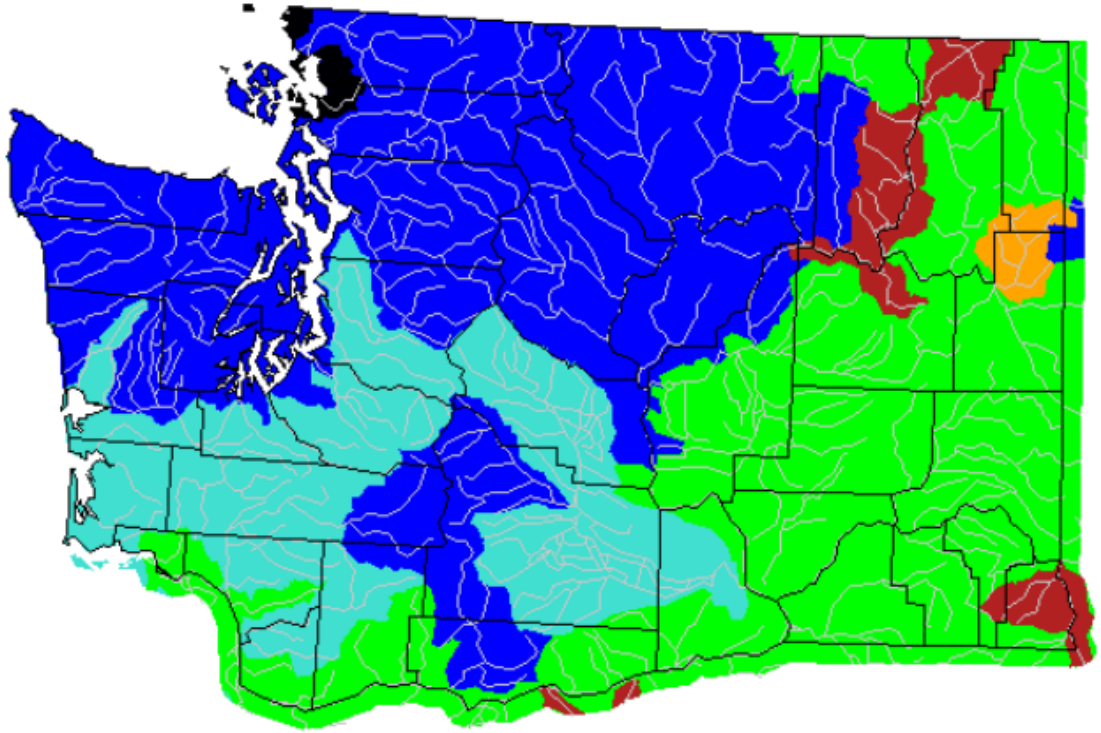
by
Nicholas Sutfin
USGS Washington Water Science Center

USGS
science for a changing world

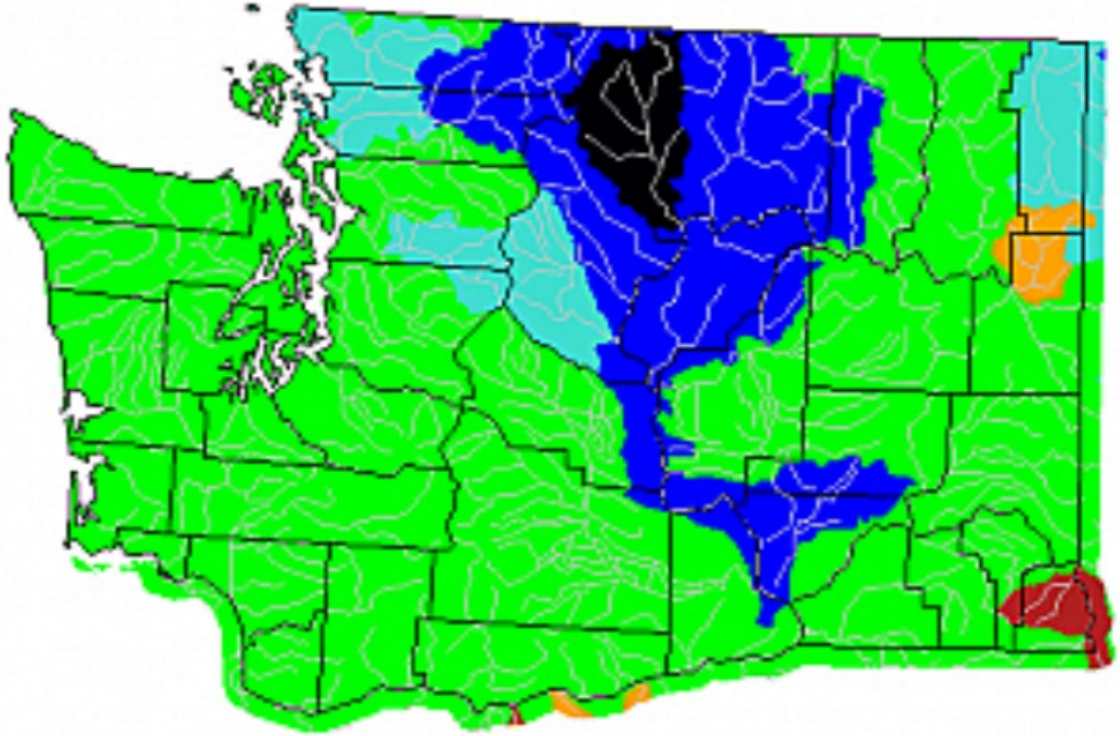
http://wa.water.usgs.gov

Monthly average streamflow for Nov. and Dec. 2021

November 2021



December 2021



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

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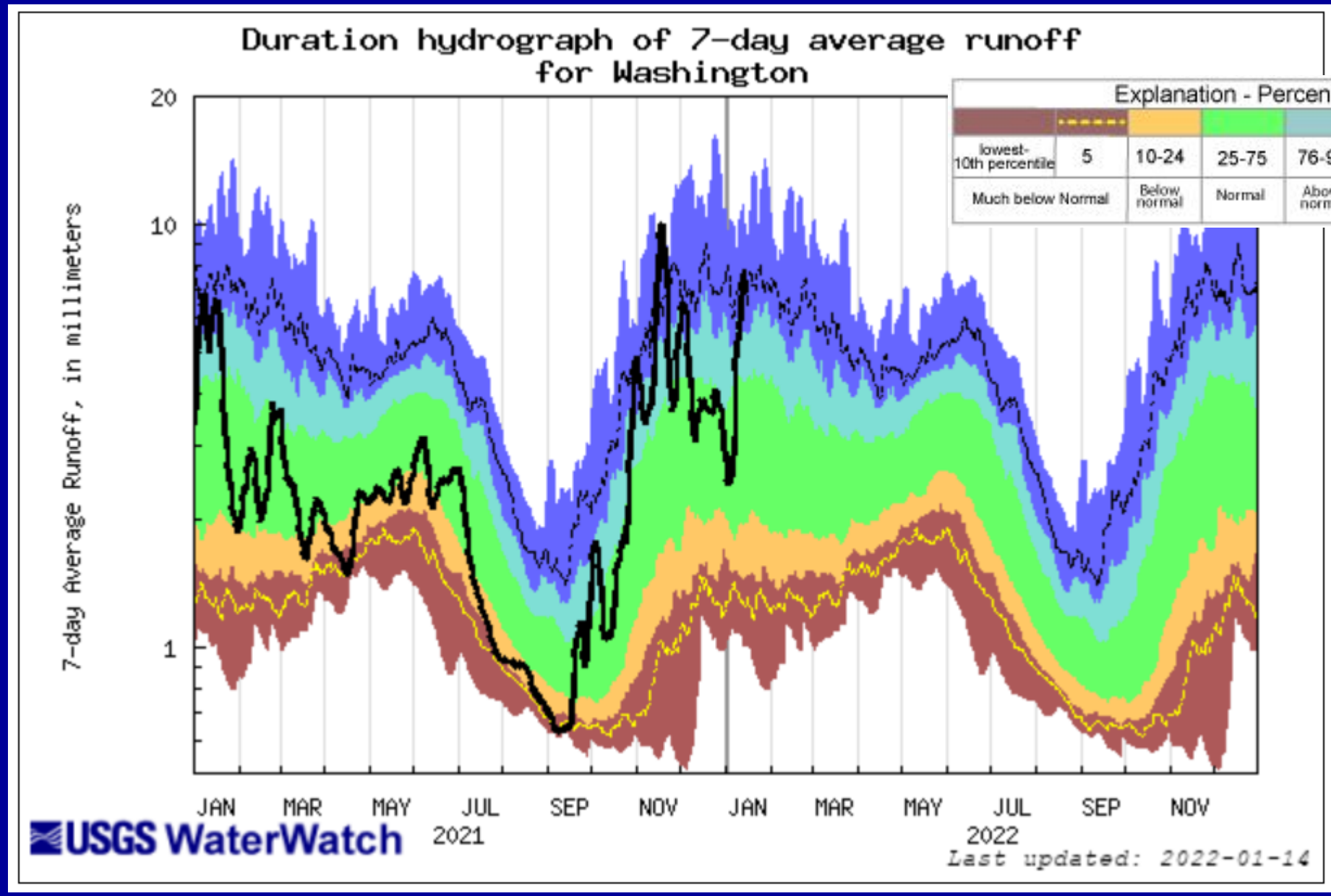
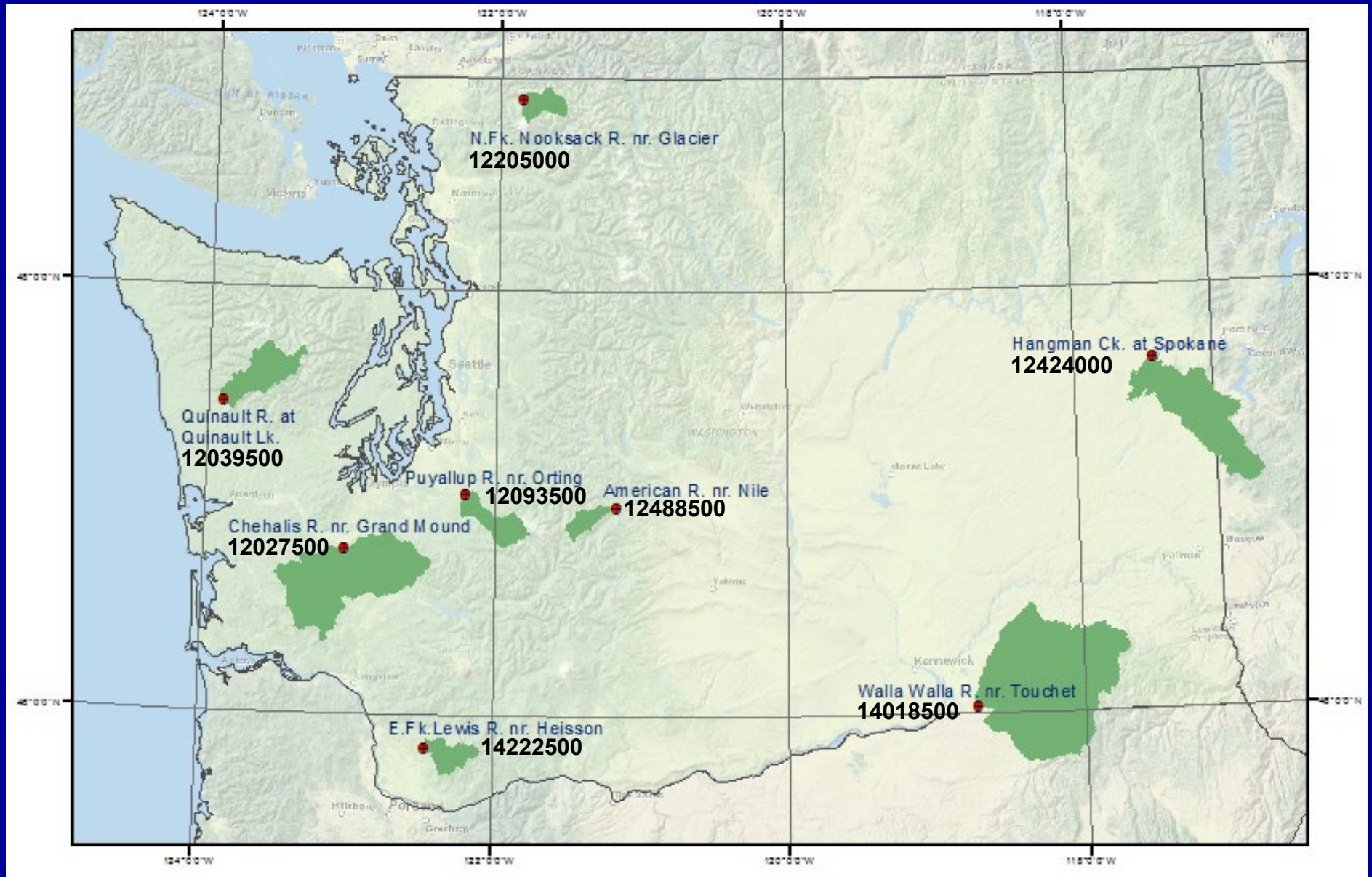
Duration Hydrograph, Washington State

7-day Average Streamflow (as of Jan. 14, 2022) is above normal

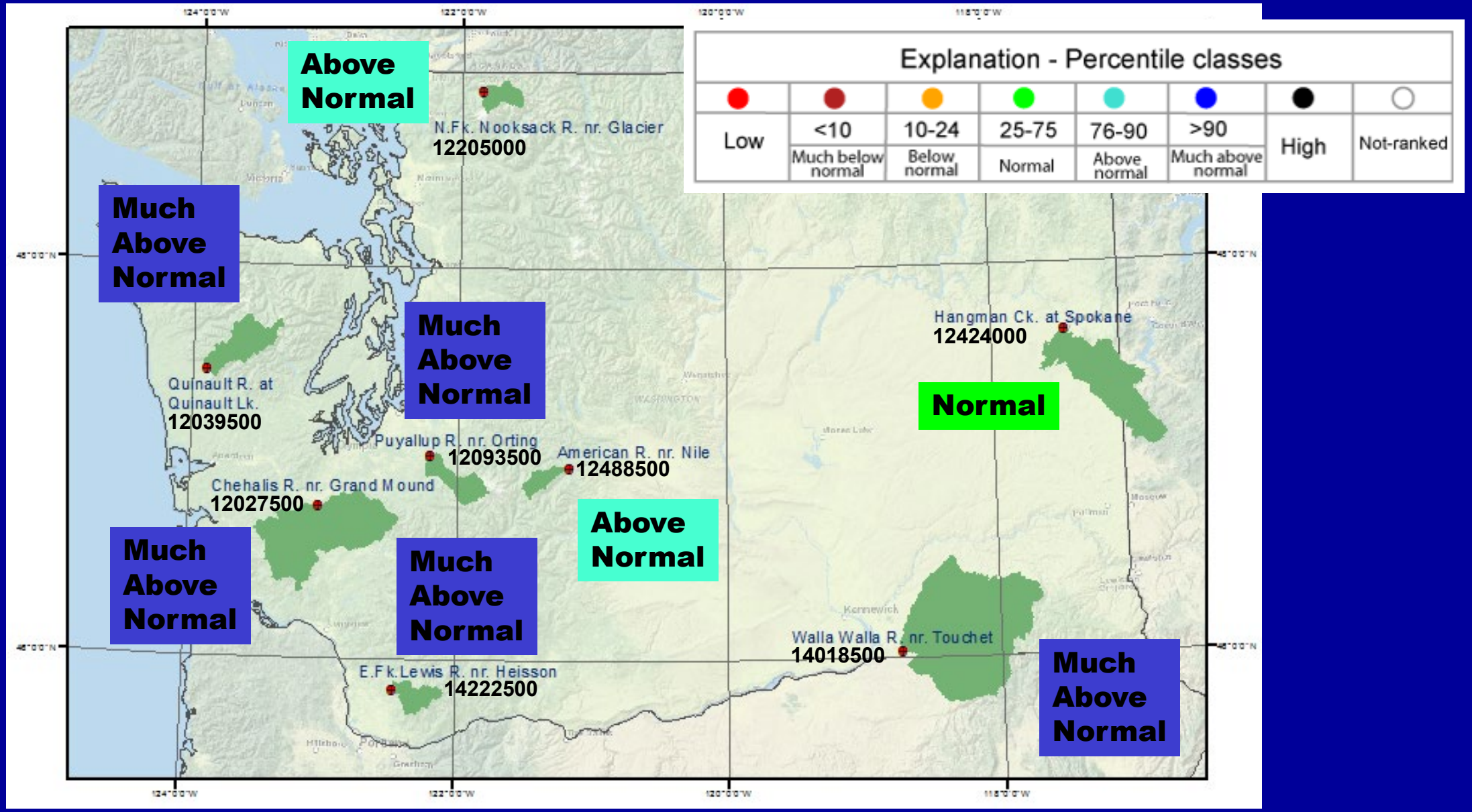


Index Gaging Stations

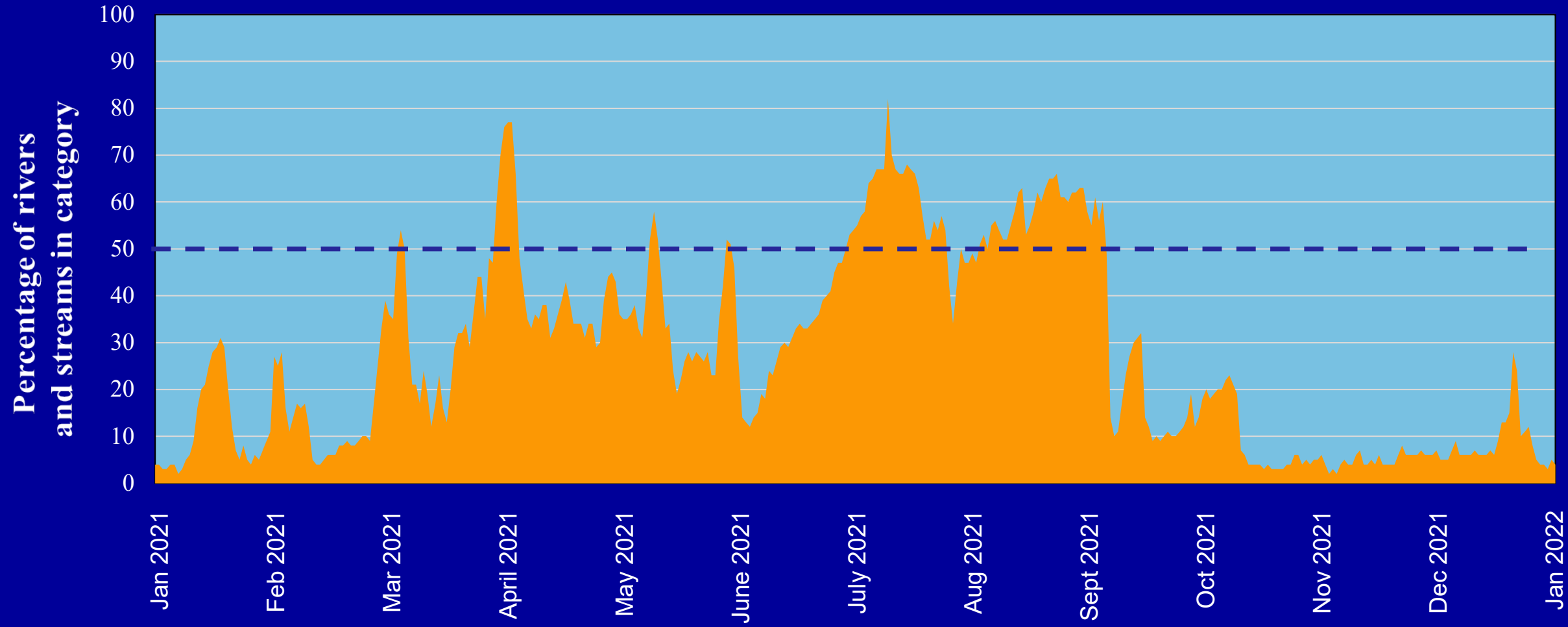
(Stations that measure natural or near-natural streamflow)



Index Gaging Stations, 7-day average streamflow (as of Jan. 14, 2022)



Daily streamflow in Washington Rivers compared to historical streamflow, January 2021 – January 2022



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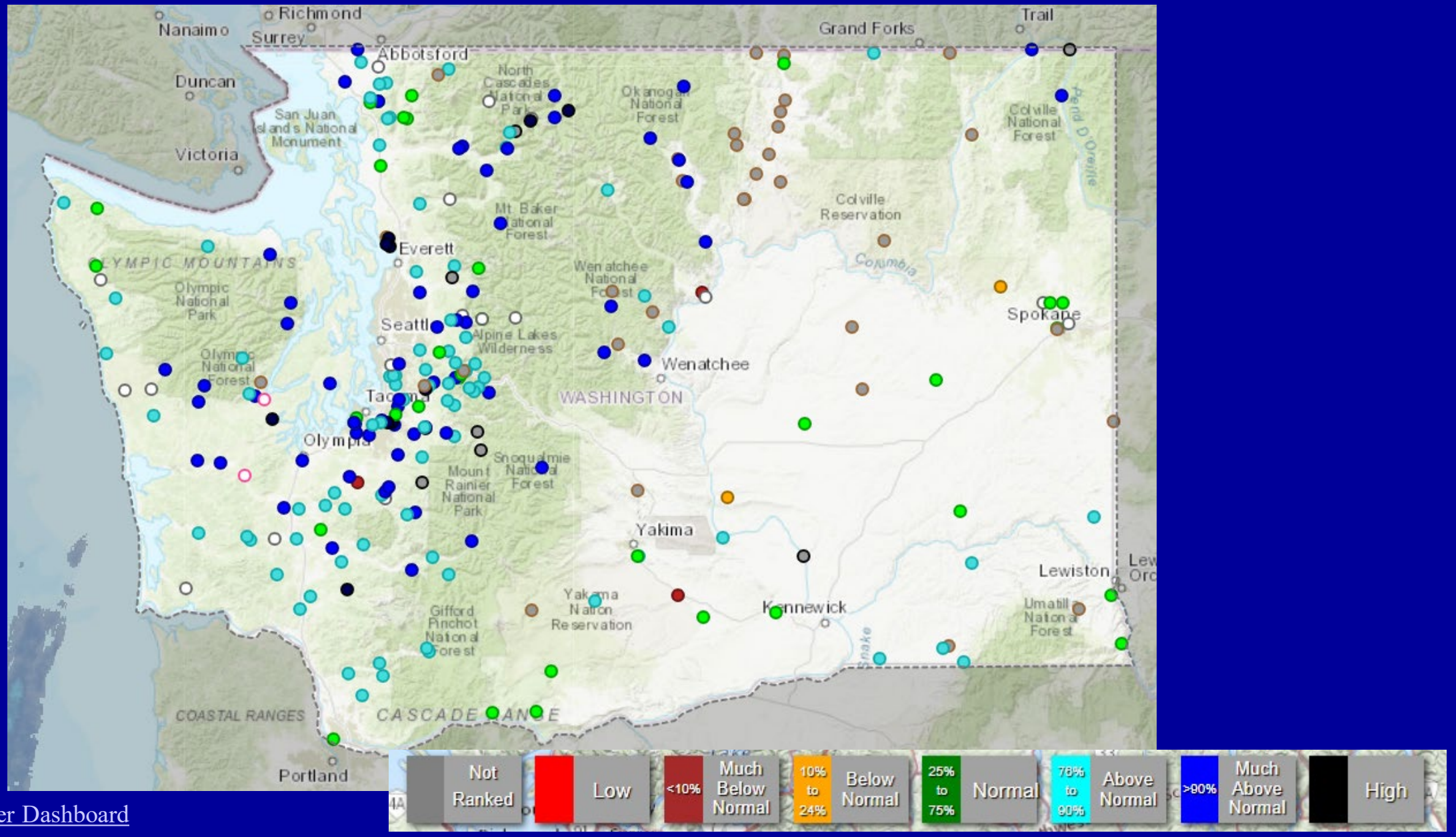
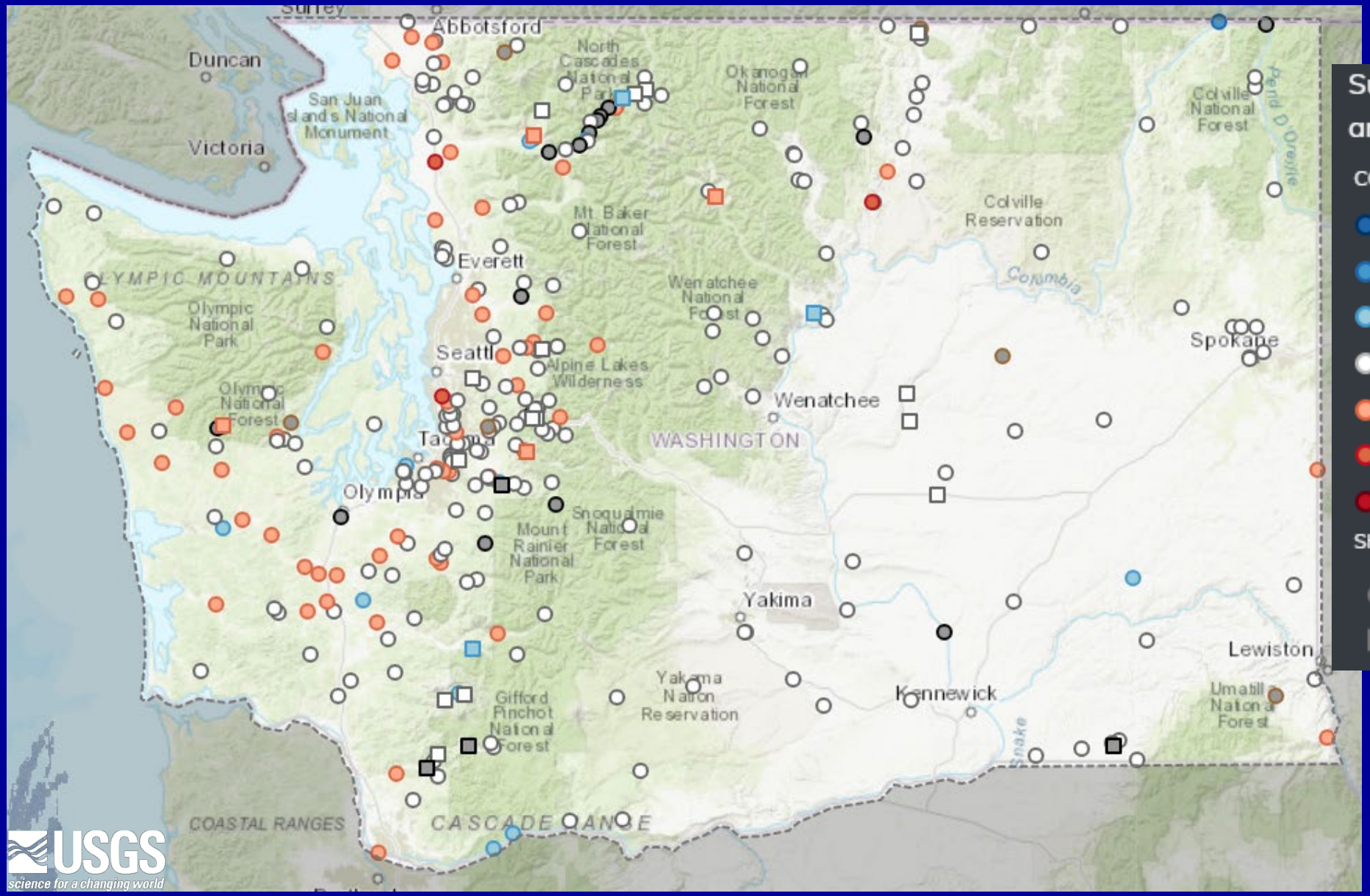
WA Current Streamflow Conditions, Jan 14, 2022



USGS | National Water Dashboard

Rising and Falling conditions of WA streams on Jan. 14th, 2022



Surface-Water Levels: Rising and falling

COLOR – CHANGE

- Water level rising ≥ 1 foot/hour
- Water level rising ≥ 0.5 – 1 foot/hour
- Water level rising ≥ 0.05 – 0.5 foot/hour
- Water level changing < 0.05 foot/hour
- Water level falling ≥ 0.05 – 0.5 foot/hour
- Water level falling ≥ 0.5 – 1 foot/hour
- Water level falling ≥ 1 foot/hour

SHAPE – SITE TYPE

Stream · Lake · Wetland · Estuary · Coastal

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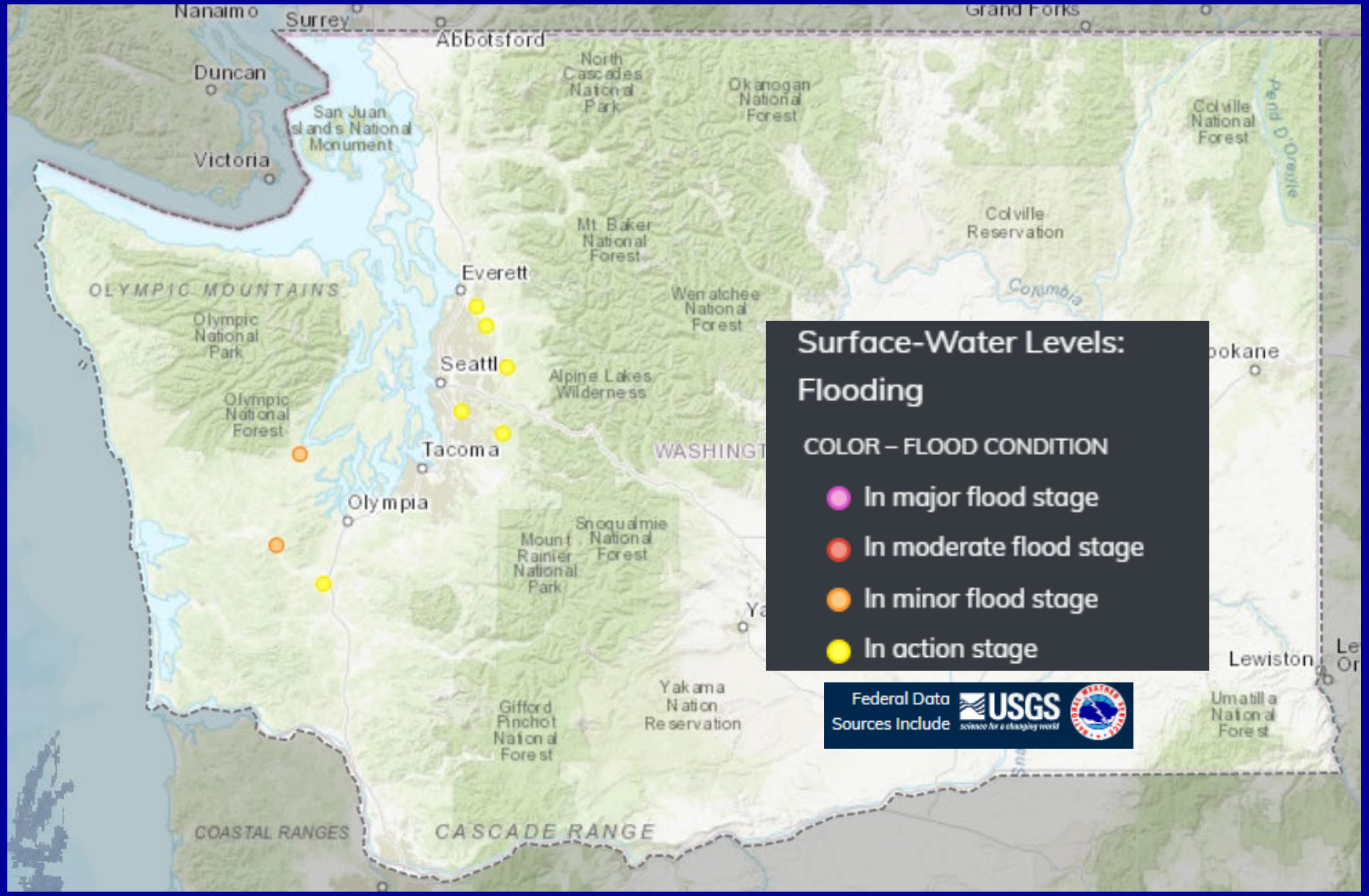
Flood status of WA streams on January 14th, 2022



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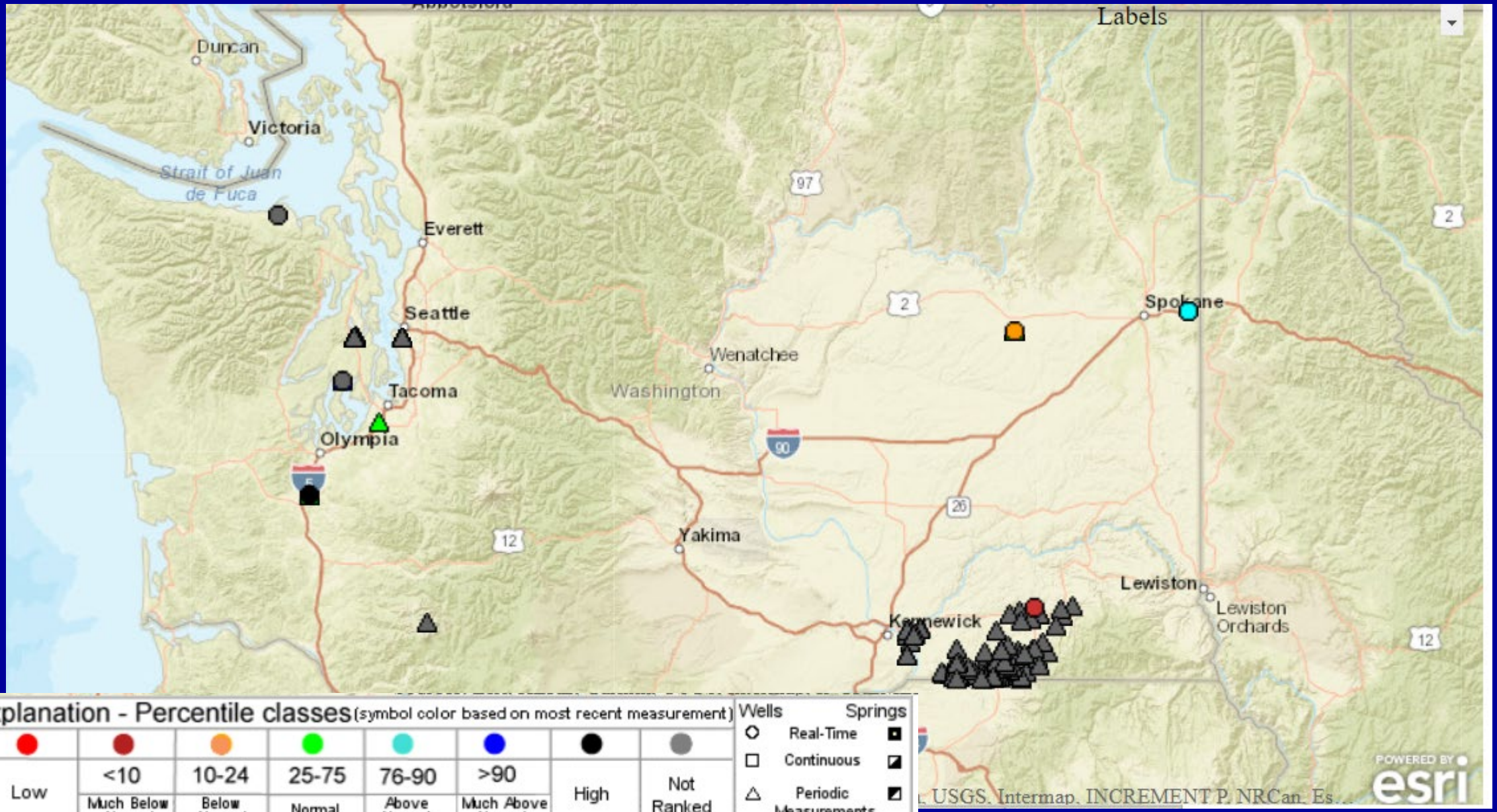
WA Current Groundwater Conditions (Jan. 14th, 2022)



Explanation - Percentile classes (symbol color based on most recent measurement)							
Low	<10 Much Below Normal	10-24 Below Normal	25-75 Normal	76-90 Above Normal	>90 Much Above Normal	High	Not Ranked

Wells	Springs
Real-Time	
Continuous	
Periodic Measurements	

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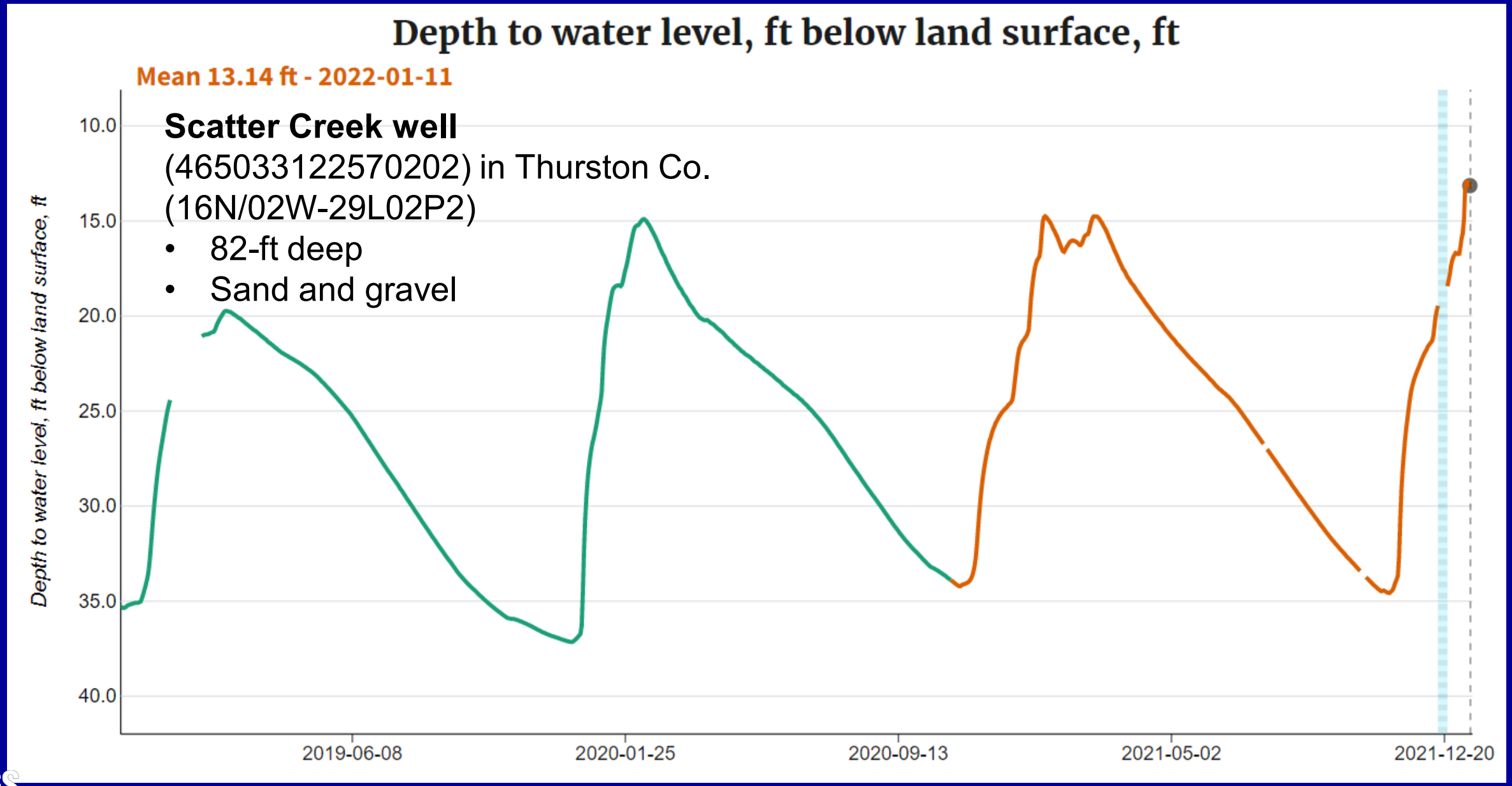
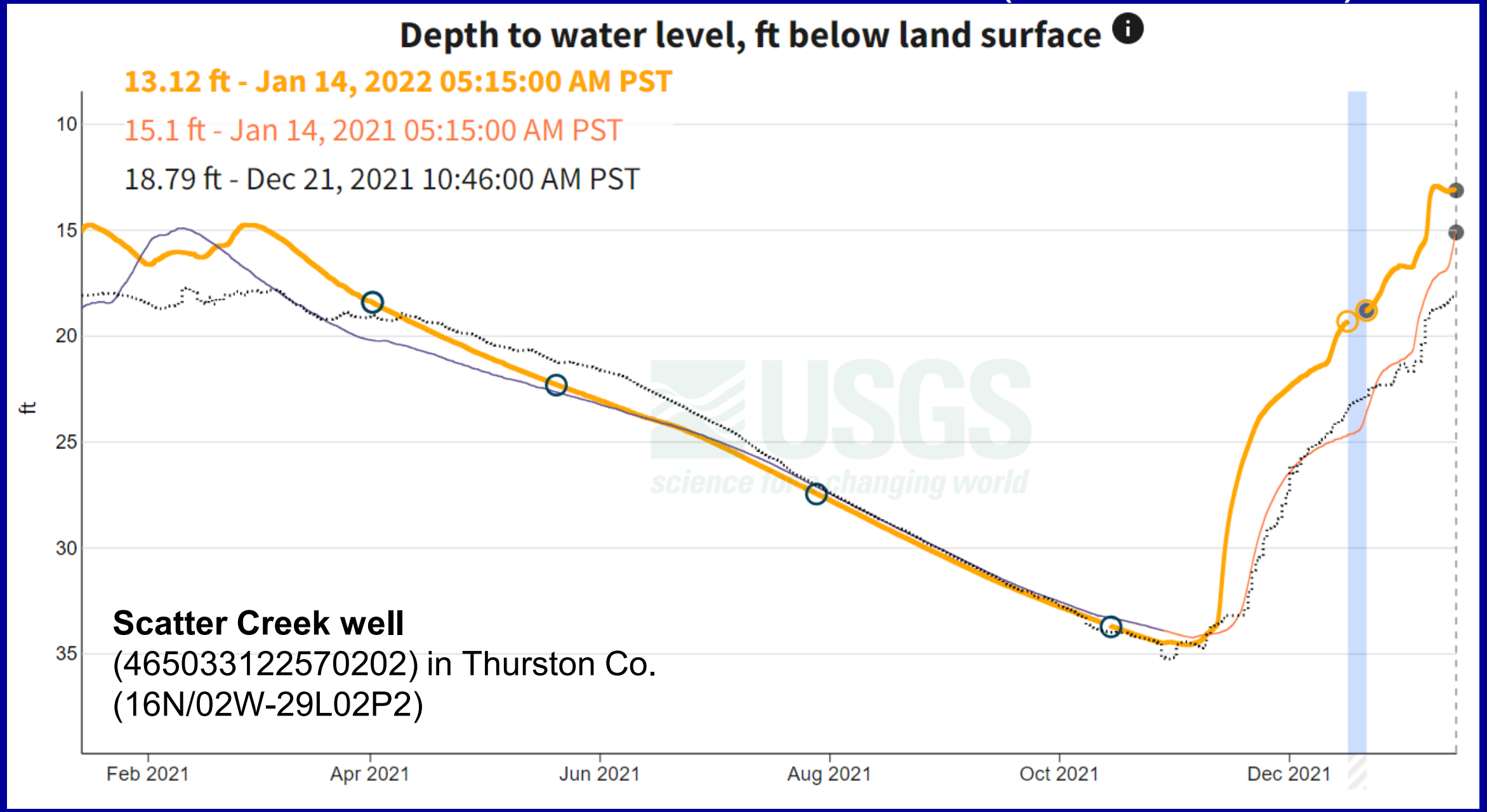
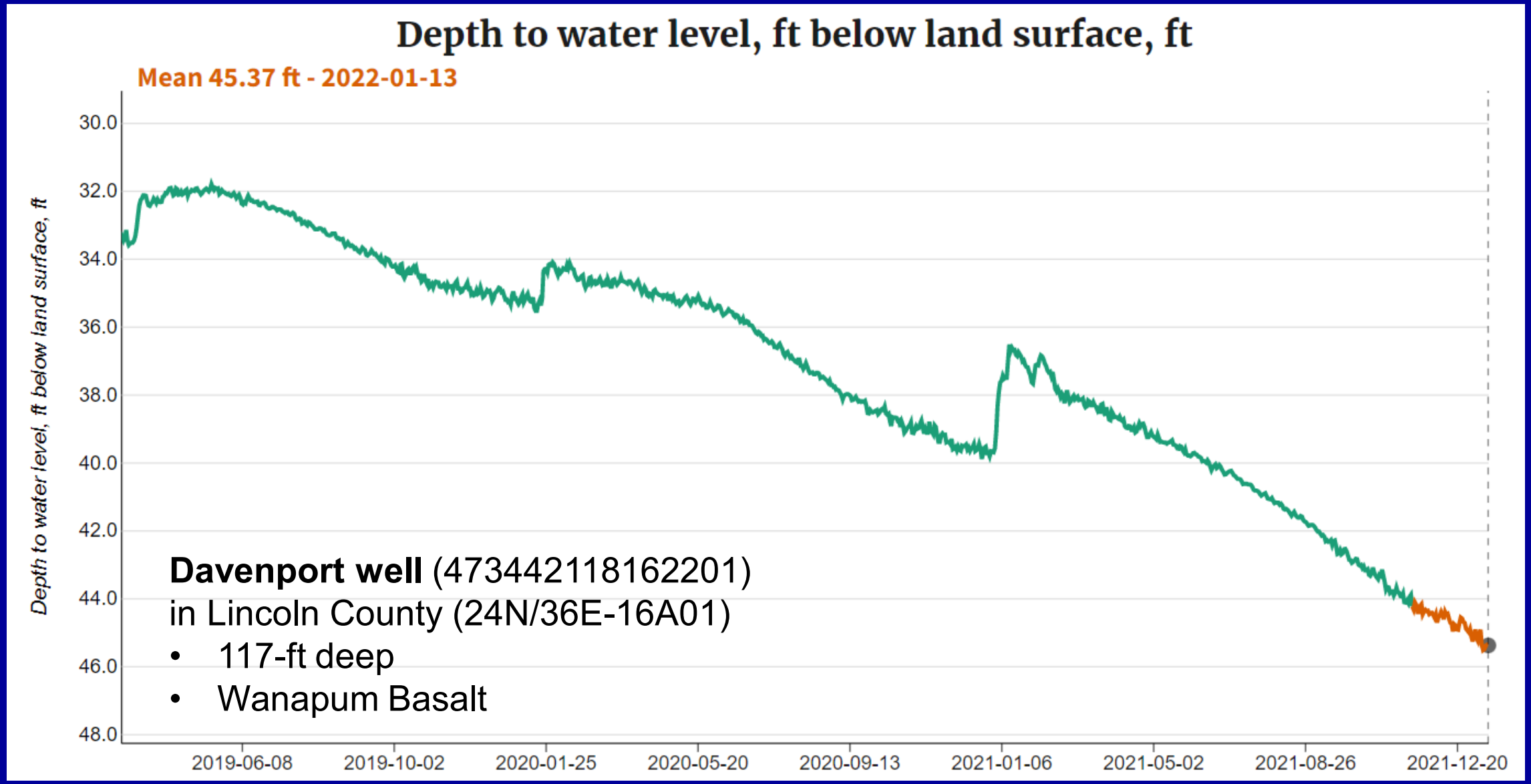
WA Current Groundwater Conditions (Jan. 14, 2022)



WA Current Groundwater Conditions (Jan. 14, 2022)



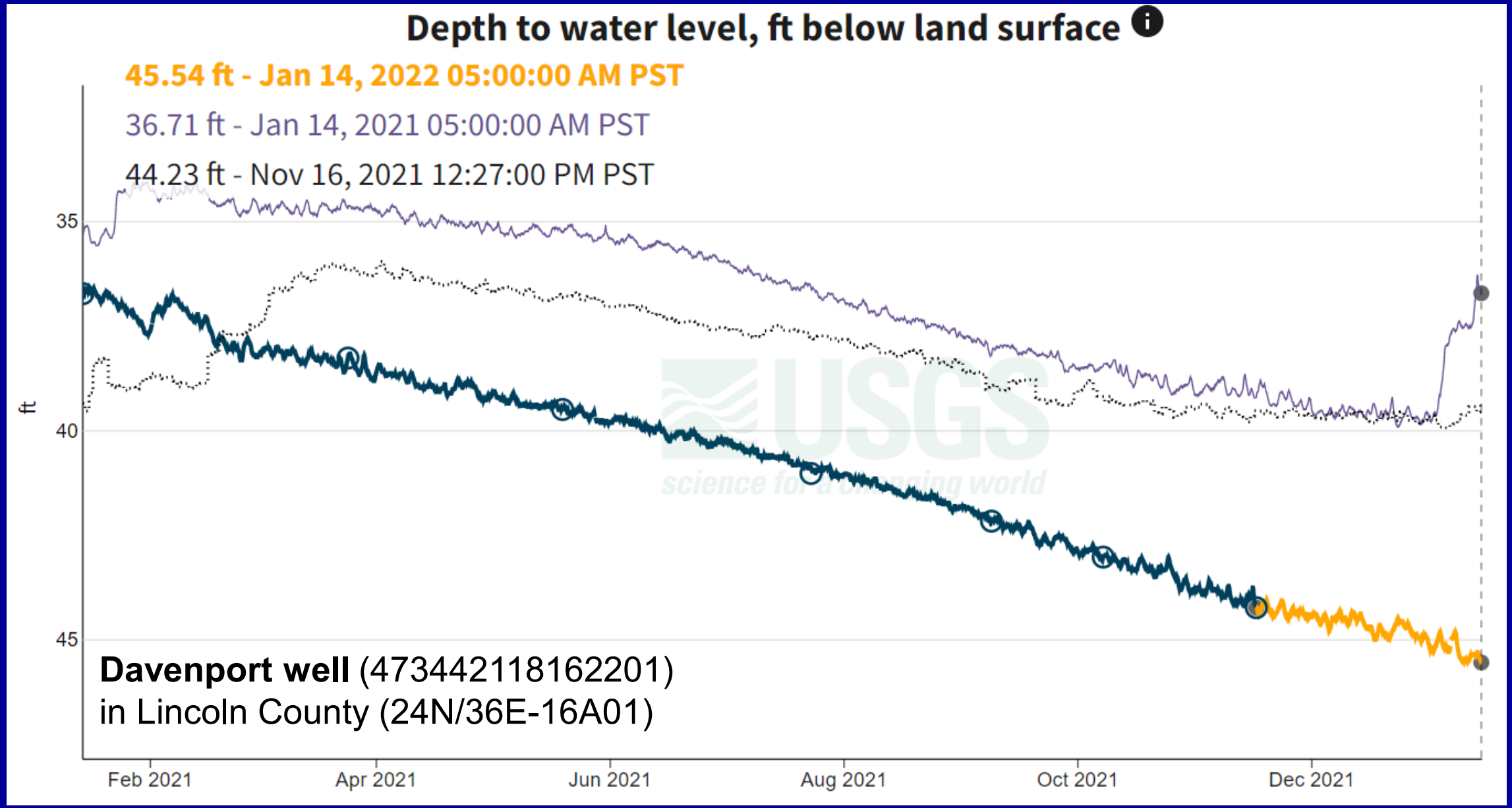
WA Current Groundwater Conditions (Jan. 13, 2022)



USGS science for a changing world

Climate Response Network - USGS Water Data for the Nation

WA Current Groundwater Conditions (Jan. 14, 2022)

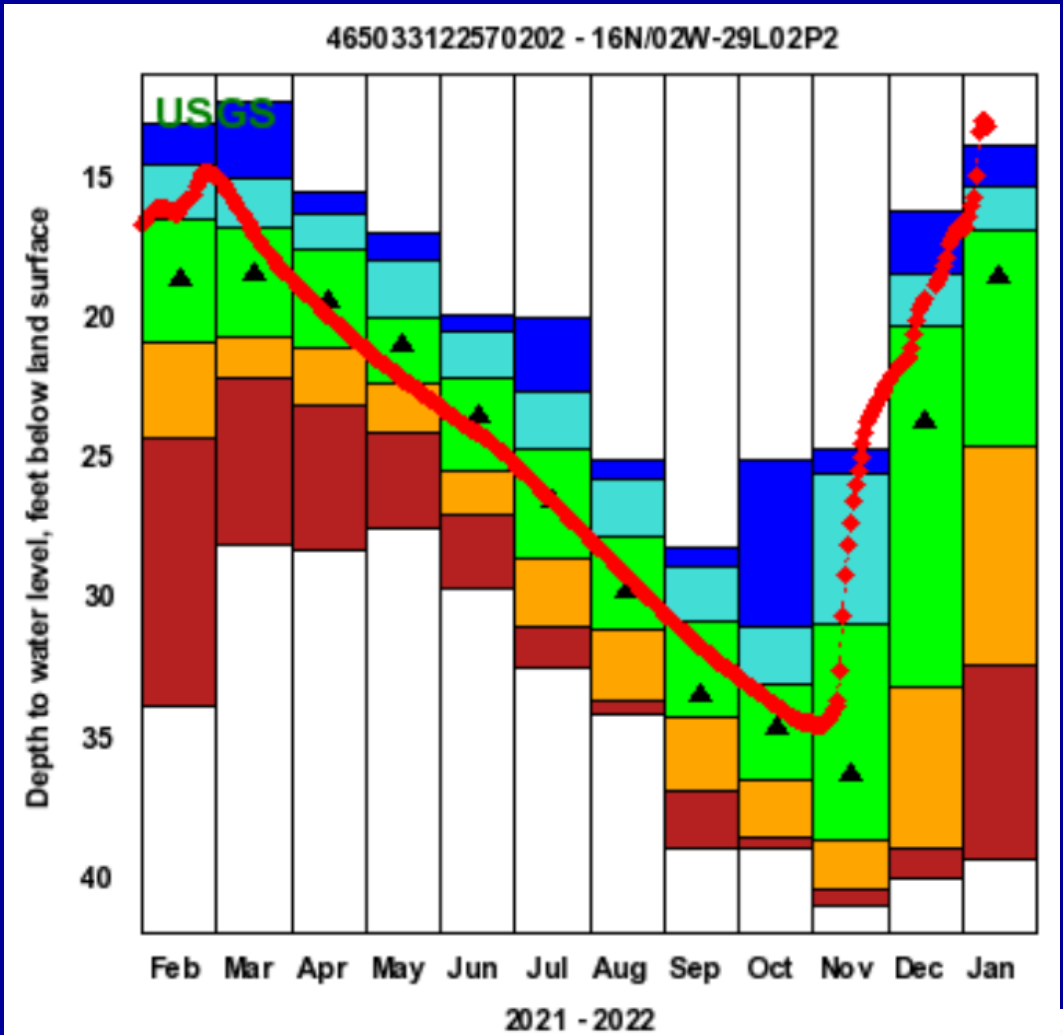


USGS science for a changing world

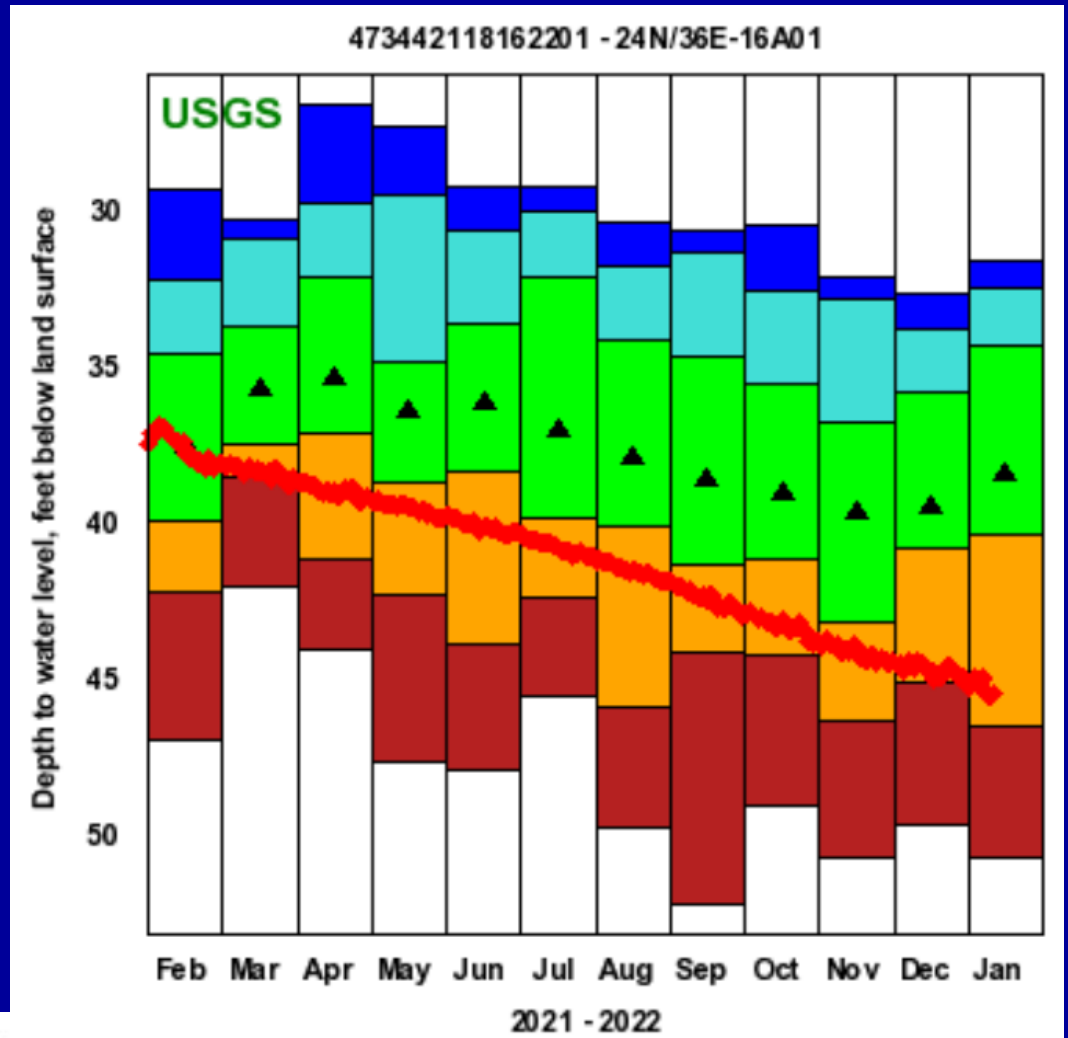
Climate Response Network - USGS Water Data for the Nation

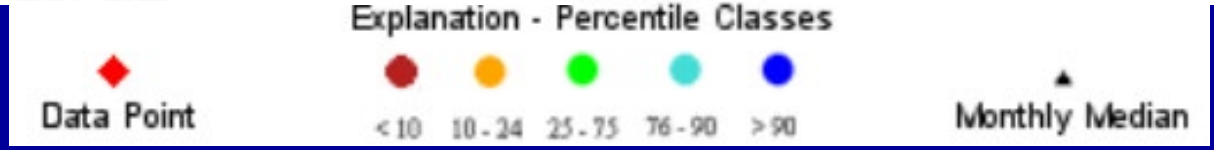
WA Current Groundwater Conditions (Jan. 14th, 2022)

Scatter Creek well



Davenport well





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Summary
Streamflow & GW conditions as of January 14th, 2022

- **7-day average streamflow statewide is much above normal (~95th percentile).**
- 7-day average streamflow at eight index gaging stations:
    - Chehalis River nr. Grand Mound - **Much above normal**
    - Quinault River – **Much Above Normal**
    - Puyallup River nr. Orting - **Much above normal**
    - EF Lewis River – **Much above normal**
    - Walla Walla River – **Much above normal**
    - American River - **Above normal**
    - NF Nooksack River – **Above normal**
    - Hangman Creek – **Normal**
- Index groundwater sites:
    - Davenport well (east) – **Below normal**
    - Scatter Creek well (west) – **Much above normal**

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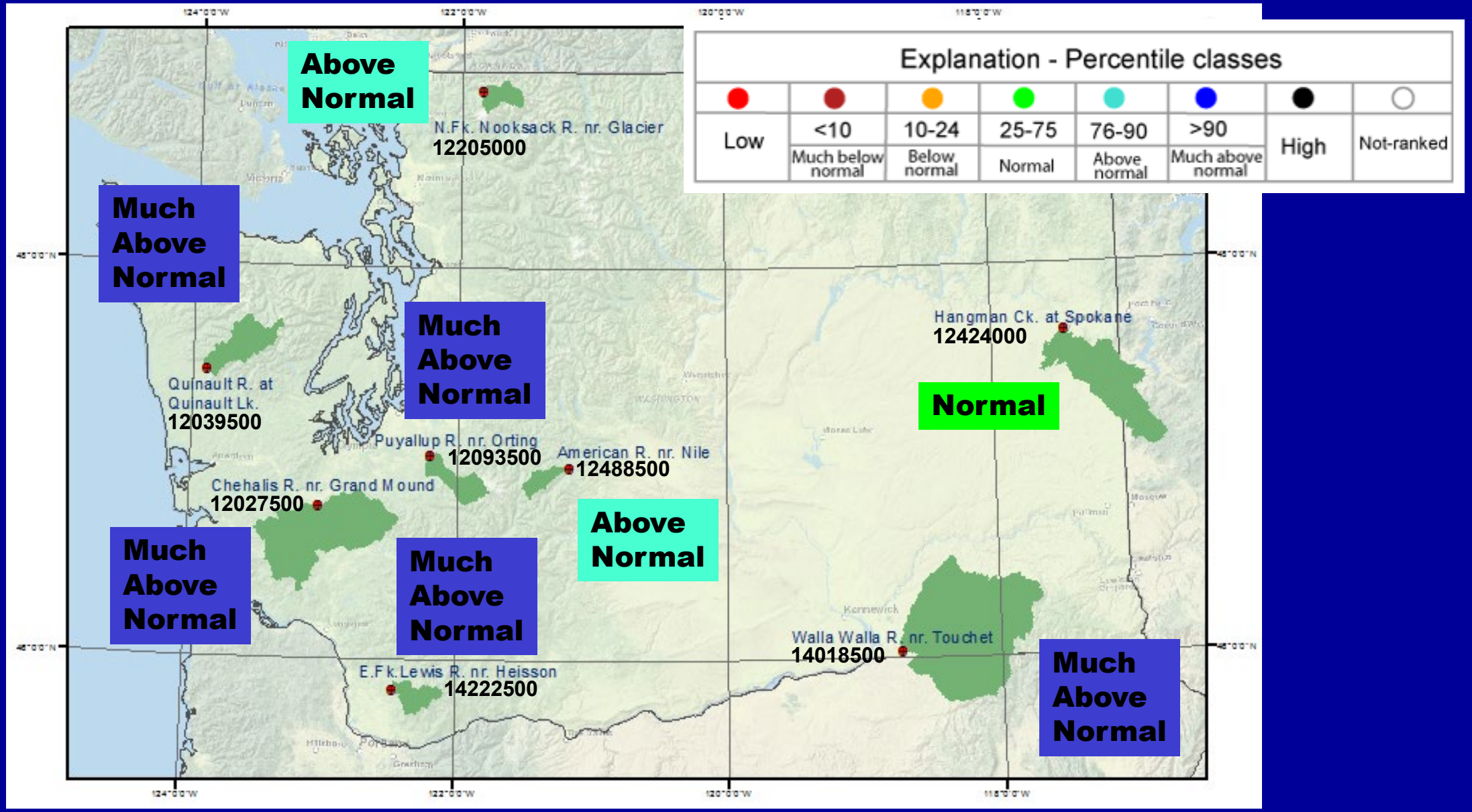
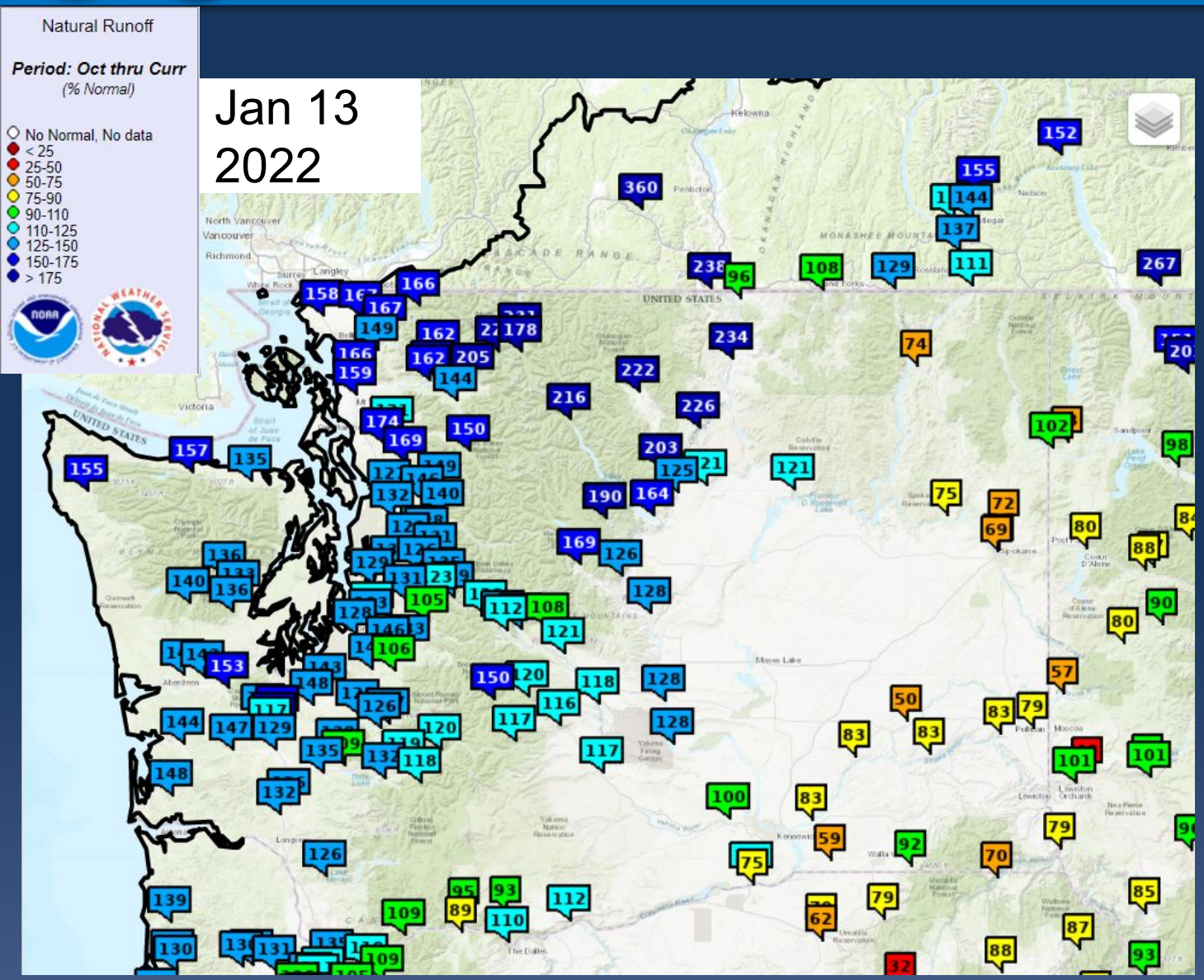
Index Gaging Stations, 7-day average streamflow (as of Jan. 14, 2022)



Natural Runoff - WA

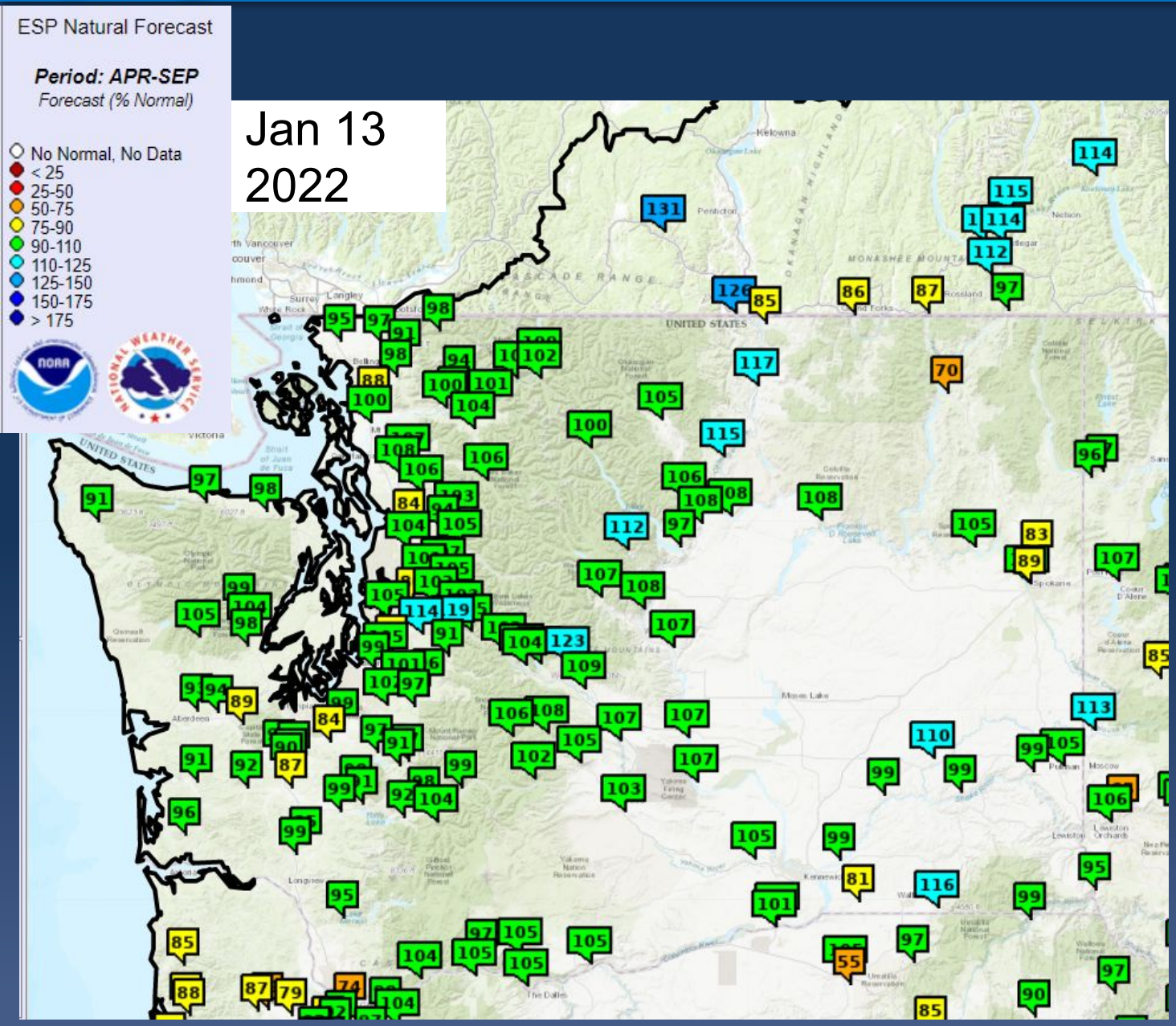


% Normal Natural Runoff Vol Oct 1- Jan 13

Washington

Skagit nr Mt Vernon	159
Dungeness nr Sequim	135
Chehalis at Porter	153
Okanogan at Malott	226
Methow nr Pateros	203
Yakima at Parker	117
Walla Walla nr Touchet	59

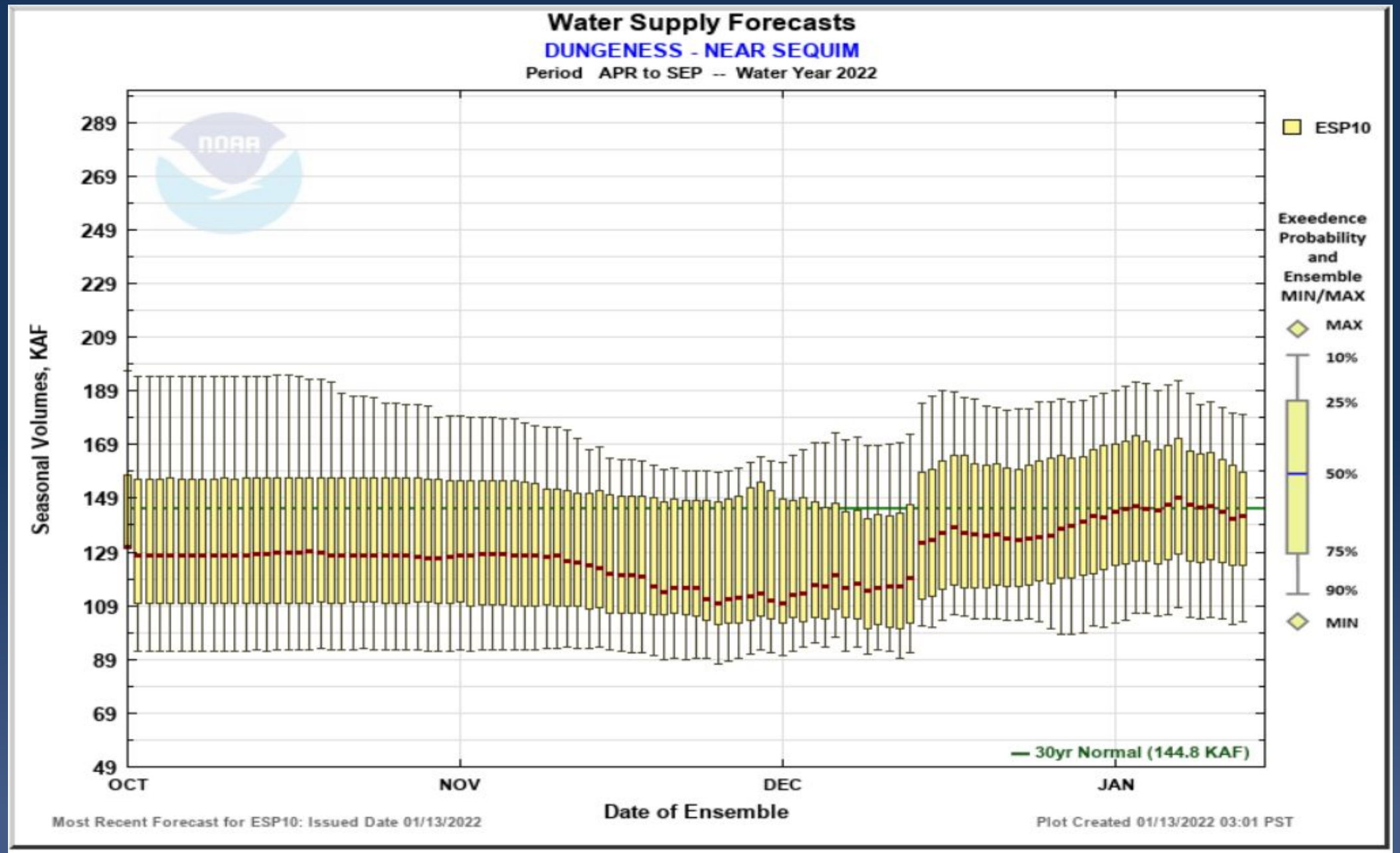
Natural ESP10 - WA

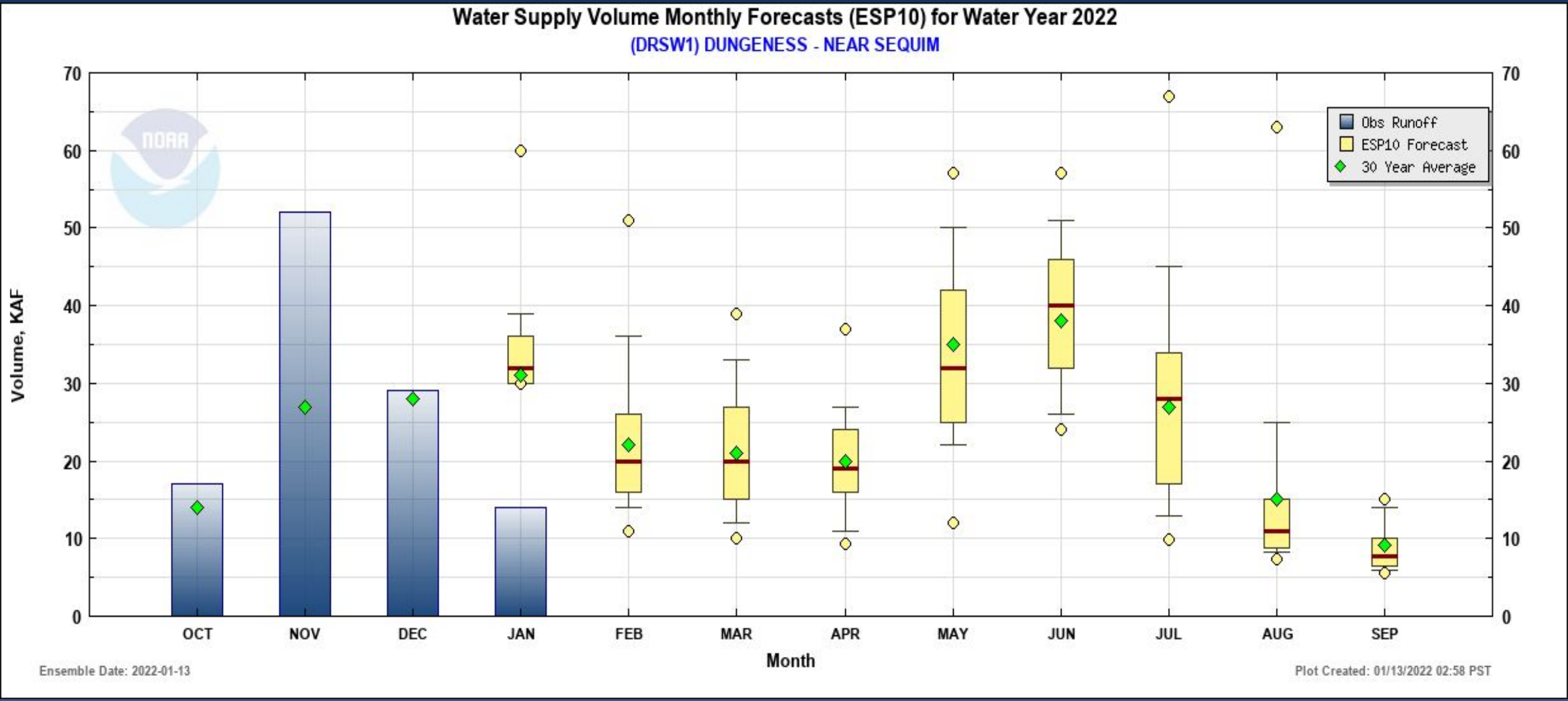


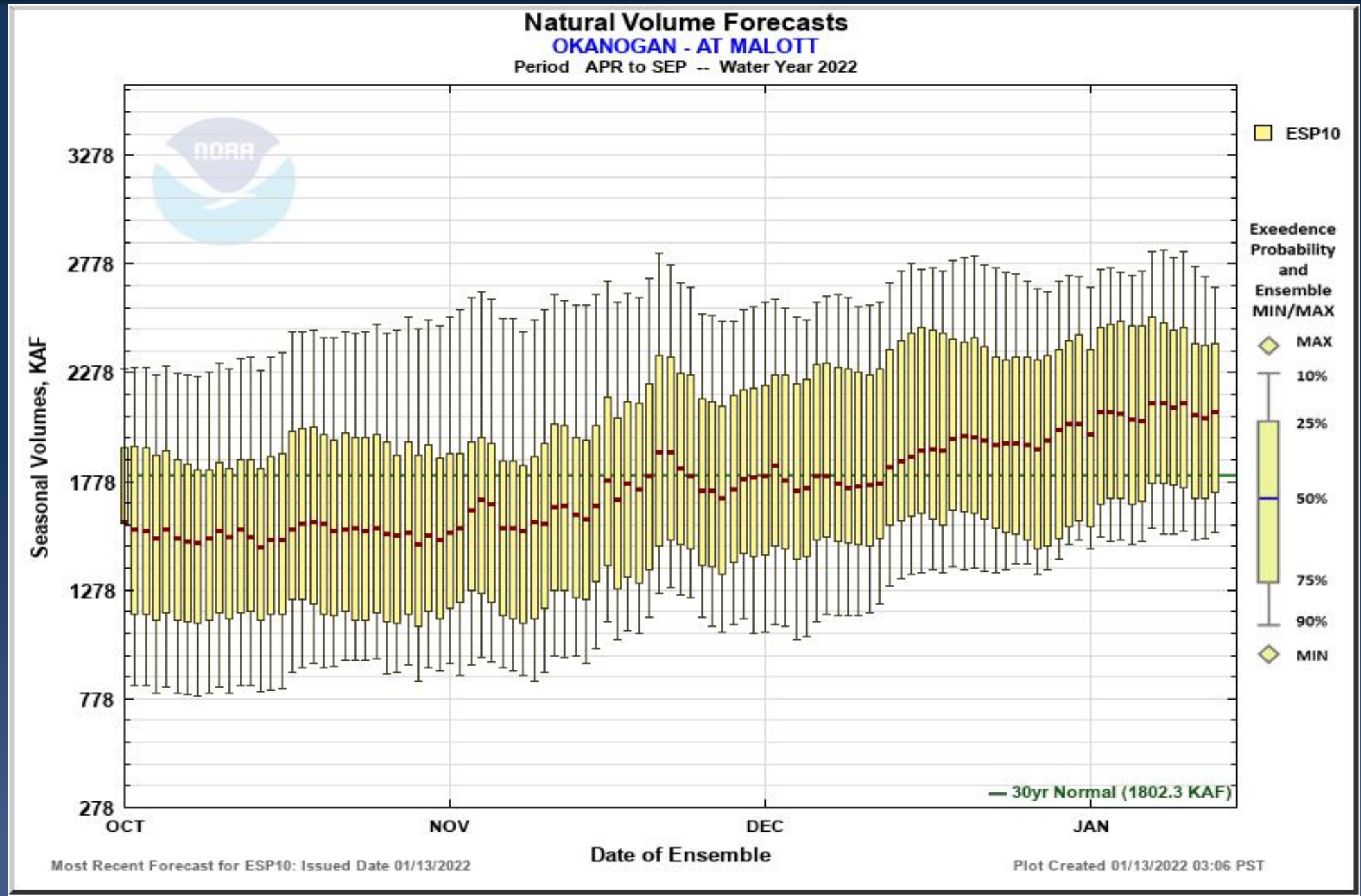
Forecast % Normal Apr -Sep Vol

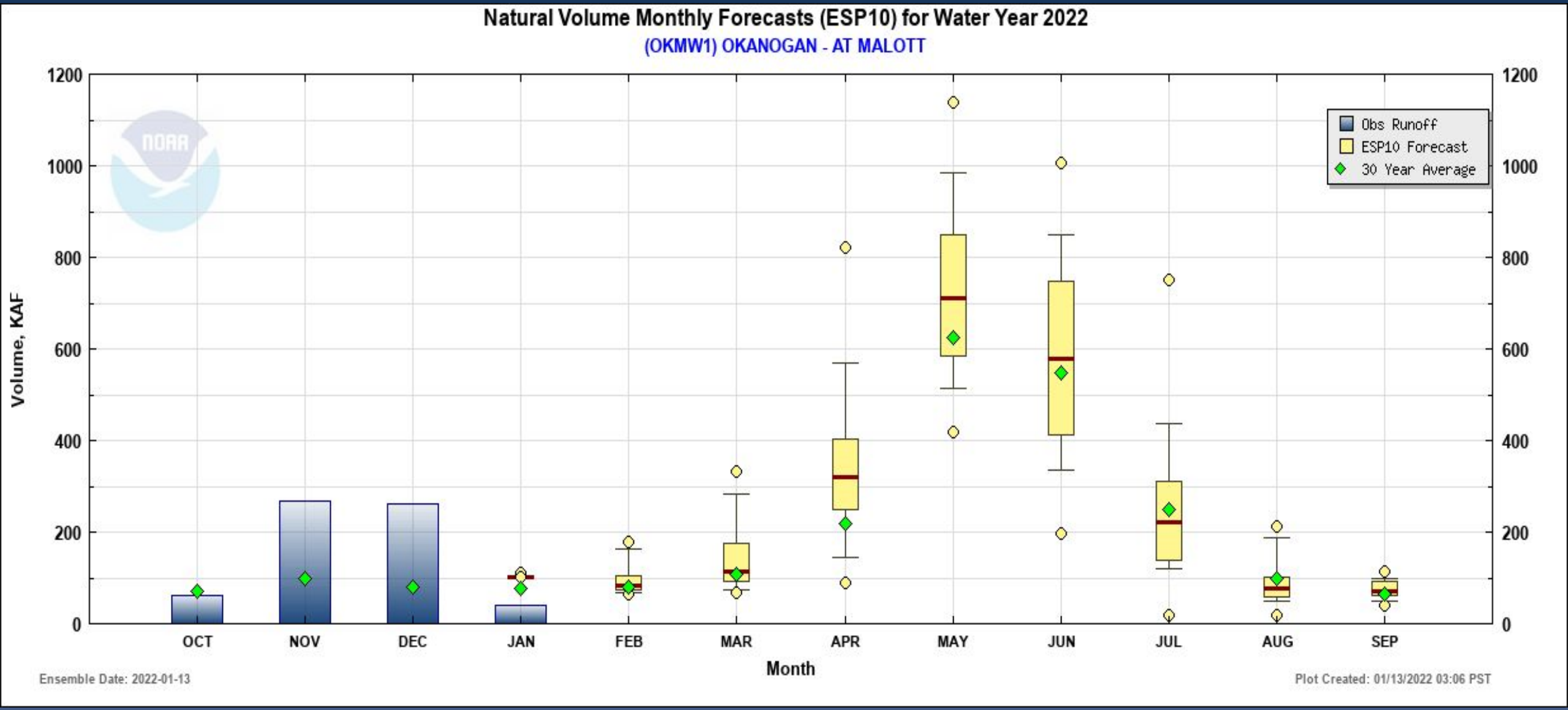
Washington

Skagit nr Mt Vernon	100
Dungeness nr Sequim	98
Chehalis at Porter	89
Okanogan at Malott	115
Methow nr Pateros	106
Yakima at Parker	103
Walla Walla nr Touchet	81

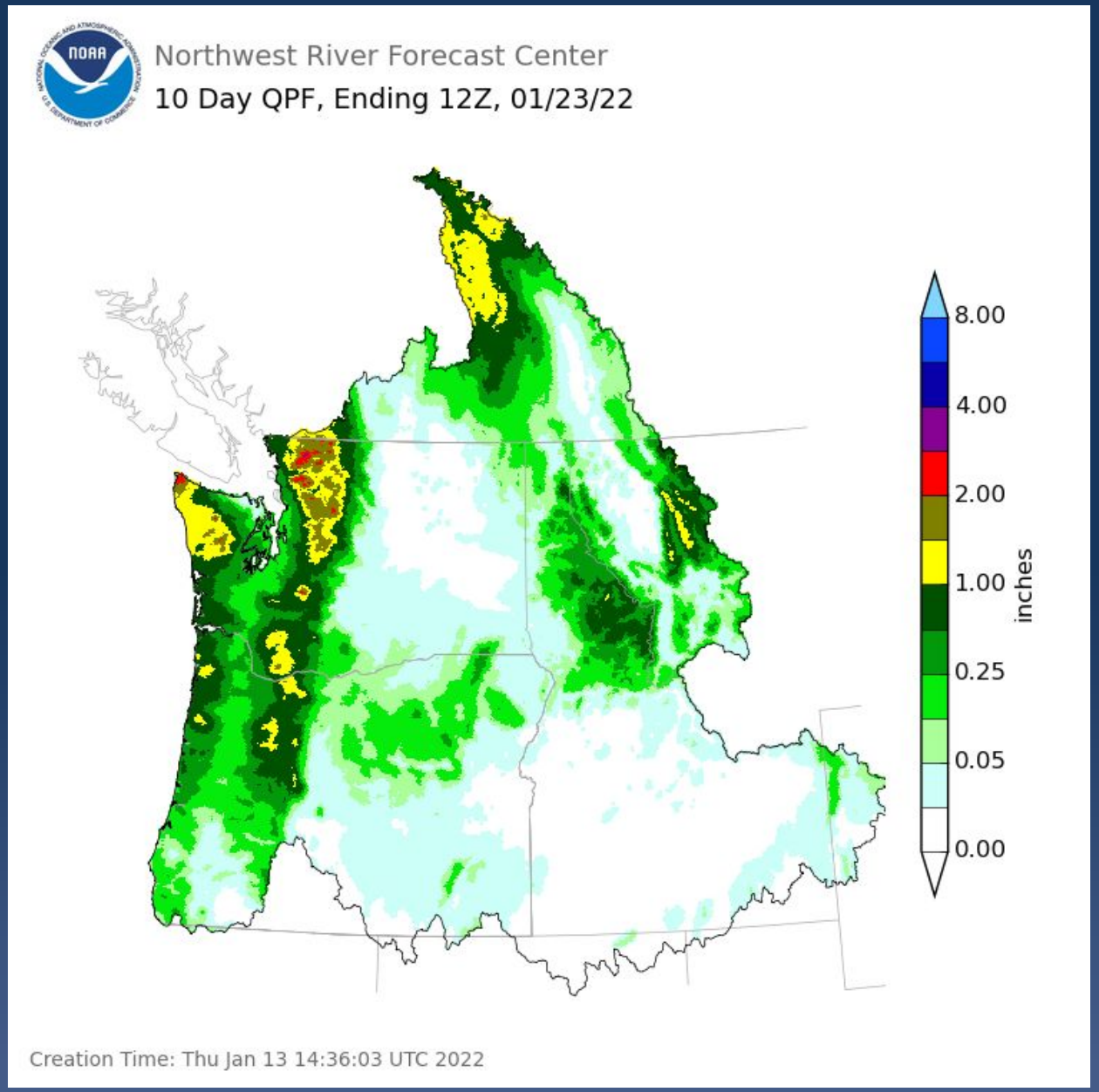

Water Supply Forecasts
DUNGENESS - NEAR SEQUIM
Period APR to SEP -- Water Year 2022
Seasonal Volumes, KAF
289
269
249
229
209
189
169
149
129
109
89
69
49
OCT
NOV
DEC
JAN
Date of Ensemble
ESP10
Exeedence Probability and Ensemble MIN/MAX
MAX
10%
25%
50%
75%
90%
MIN
— 30yr Normal (144.8 KAF)
Most Recent Forecast for ESP10: Issued Date 01/13/2022
Plot Created 01/13/2022 03:01 PST

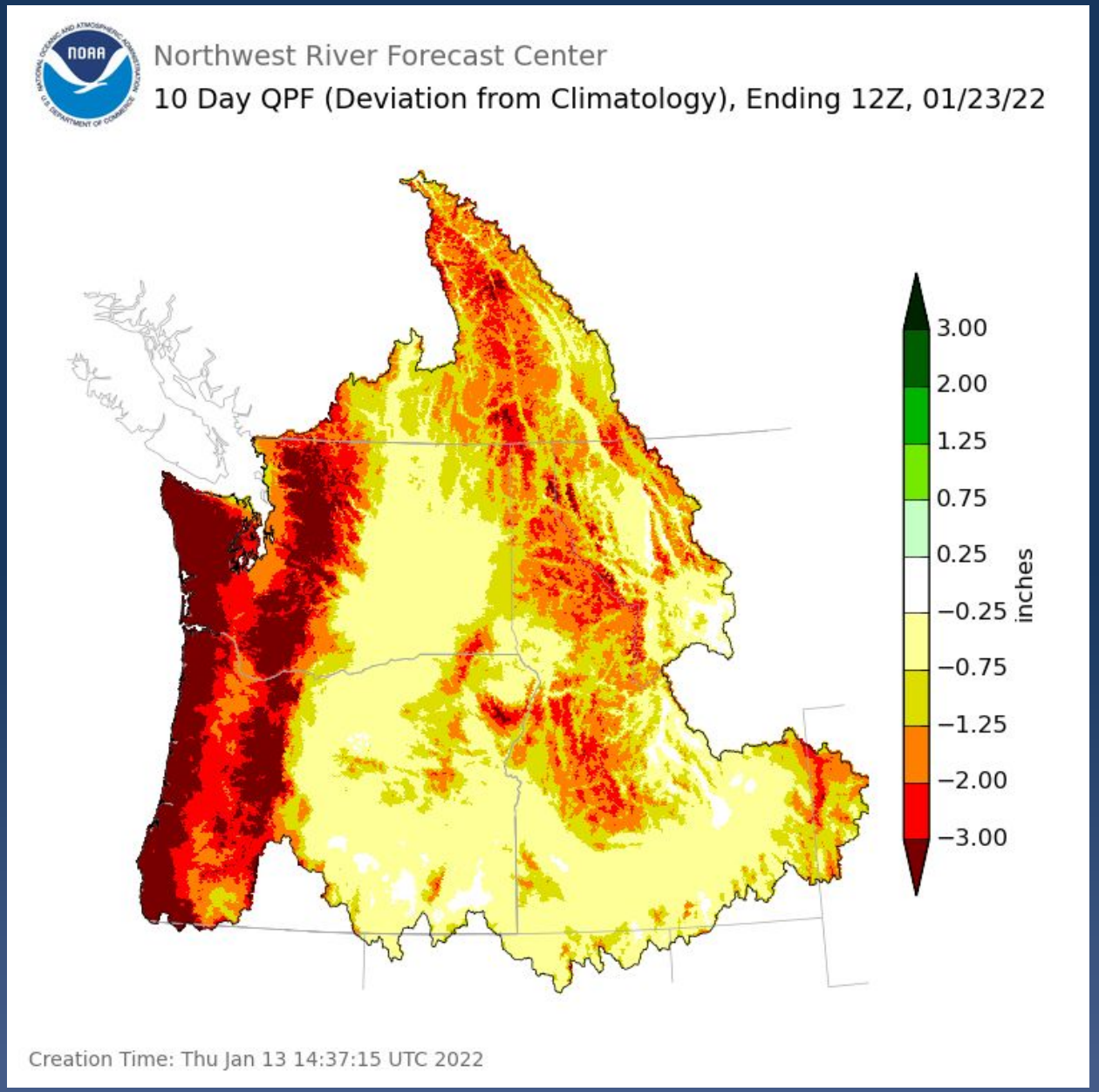

Water Supply Volume Monthly Forecasts (ESP10) for Water Year 2022
(DRSW1) DUNGENESS - NEAR SEQUIM
Obs Runoff
ESP10 Forecast
30 Year Average
Volume, KAF
Month
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
0
10
20
30
40
50
60
70
Ensemble Date: 2022-01-13
Plot Created: 01/13/2022 02:58 PST


Natural Volume Forecasts
OKANOGAN - AT MALOTT
Period APR to SEP -- Water Year 2022
Seasonal Volumes, KAF
3278
2778
2278
1778
1278
778
278
OCT
NOV
DEC
JAN
Date of Ensemble
ESP10
Exeedence Probability and Ensemble MIN/MAX
MAX
10%
25%
50%
75%
90%
MIN
30yr Normal (1802.3 KAF)
Most Recent Forecast for ESP10: Issued Date 01/13/2022
Plot Created 01/13/2022 03:06 PST


Natural Volume Monthly Forecasts (ESP10) for Water Year 2022
(OKMW1) OKANOGAN - AT MALOTT
Obs Runoff
ESP10 Forecast
30 Year Average
Volume, KAF
0
200
400
600
800
1000
1200
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
Month
Ensemble Date: 2022-01-13
Plot Created: 01/13/2022 03:06 PST

Precipitation Forecast (Jan 14-23)





NWRFC Runoff and SWE Normals

NWRFC has updated our 30 year period for runoff and snow water equivalent normals.

The 30 year period now consists of water years 1991-2020.

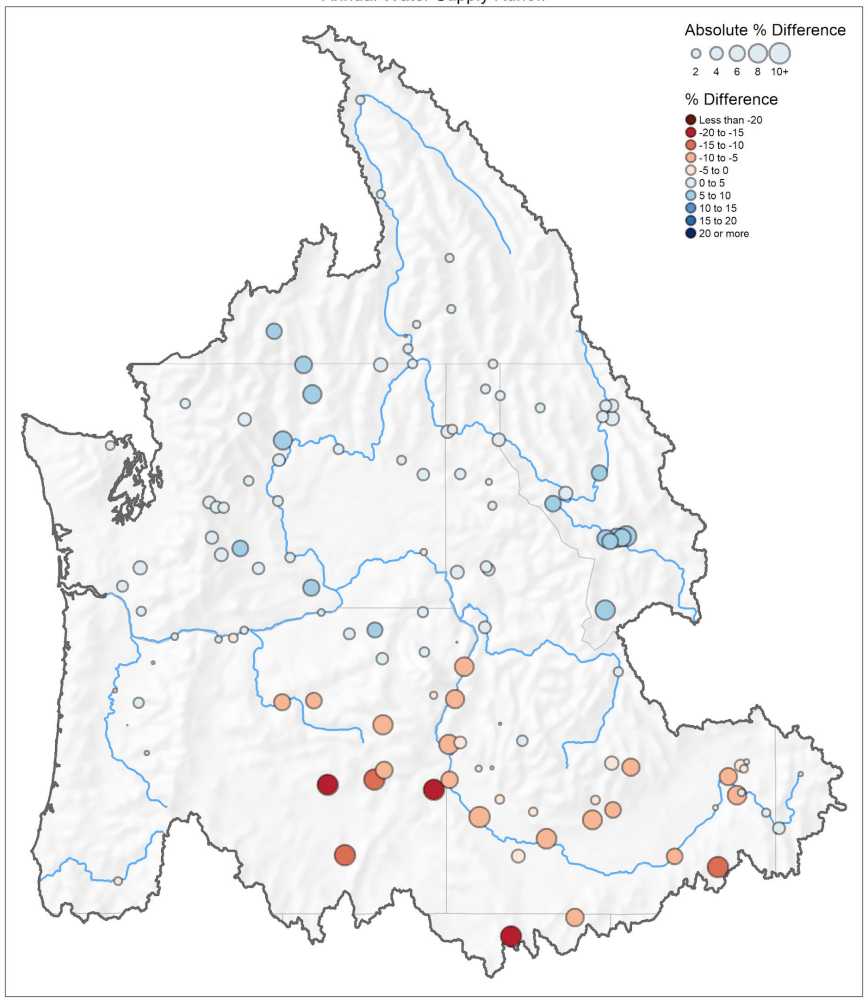
Data used to produce these normals was provided by many partner agencies.

https://www.nwrfc.noaa.gov/ws/docs/NWRFC_1991-2020_Normals_Update_Documentation.pdf

NWRFC Runoff Normals

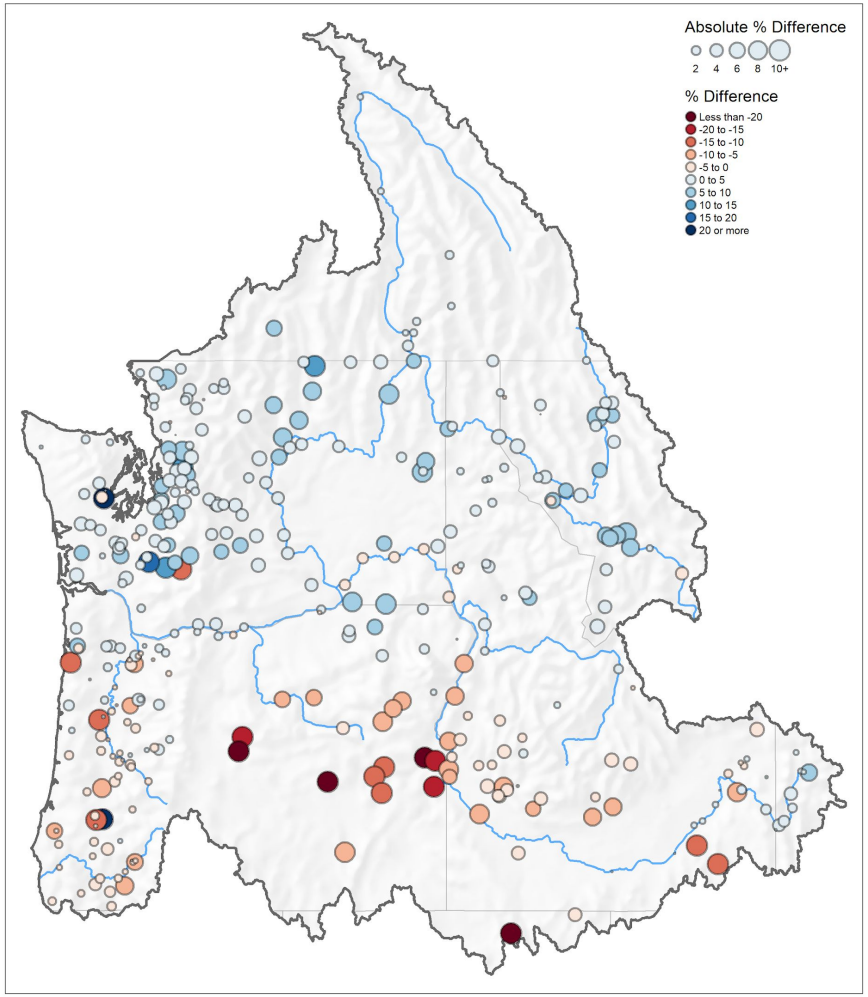
WS Runoff Normals

Percent Difference between WY1991-2020 and WY1981-2010 for
Annual Water Supply Runoff

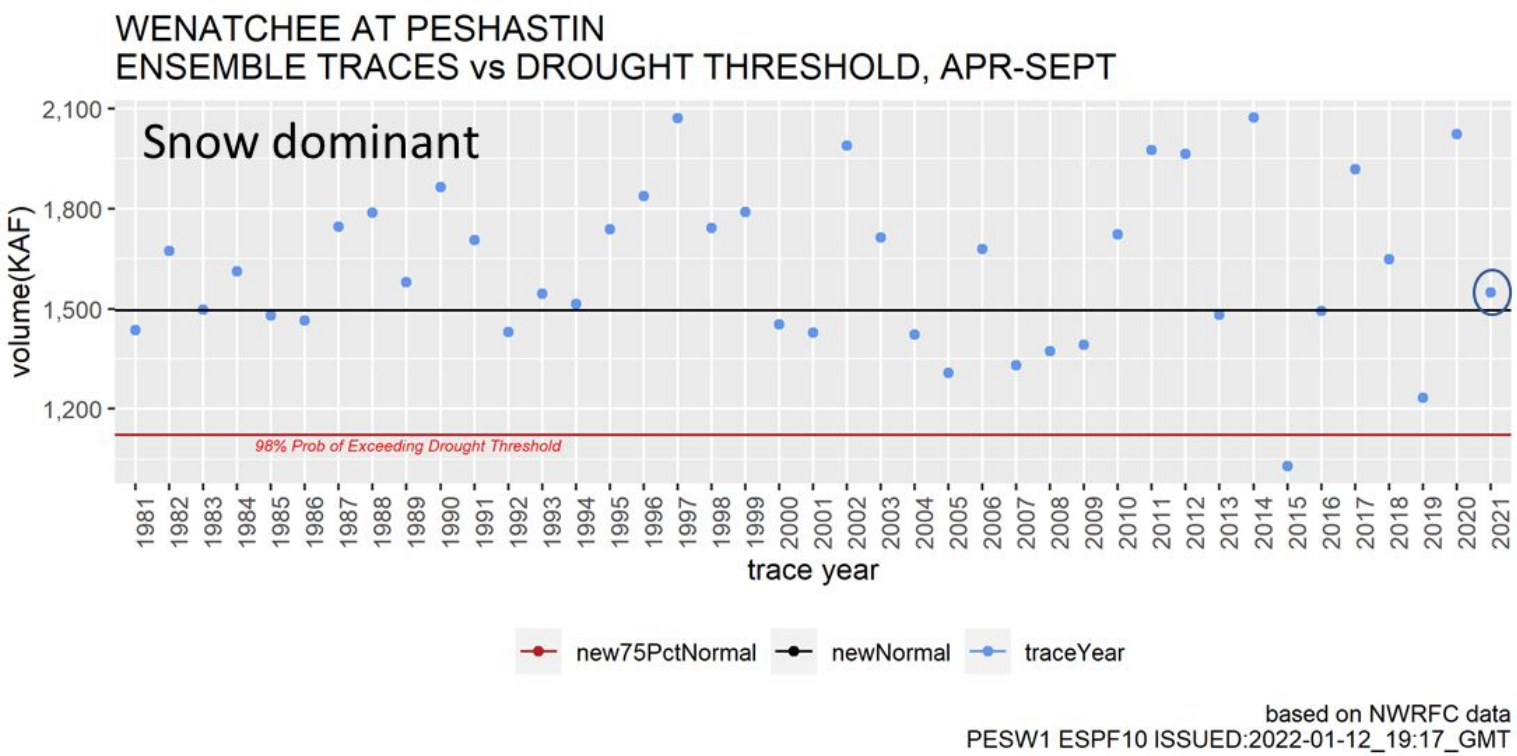


Natural Runoff Normals

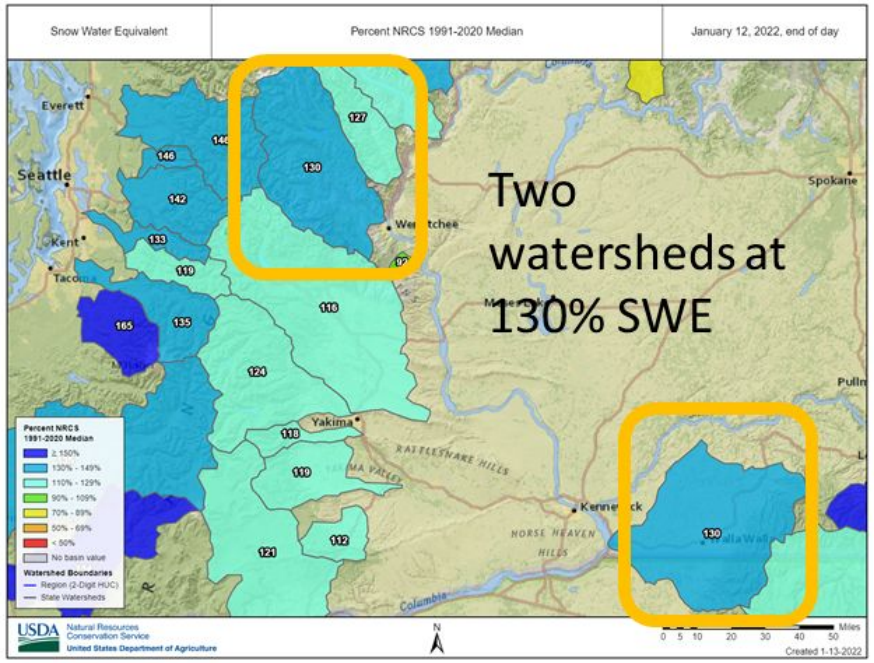
Percent Difference between WY1991-2020 and WY1981-2010 for
Annual Natural Runoff

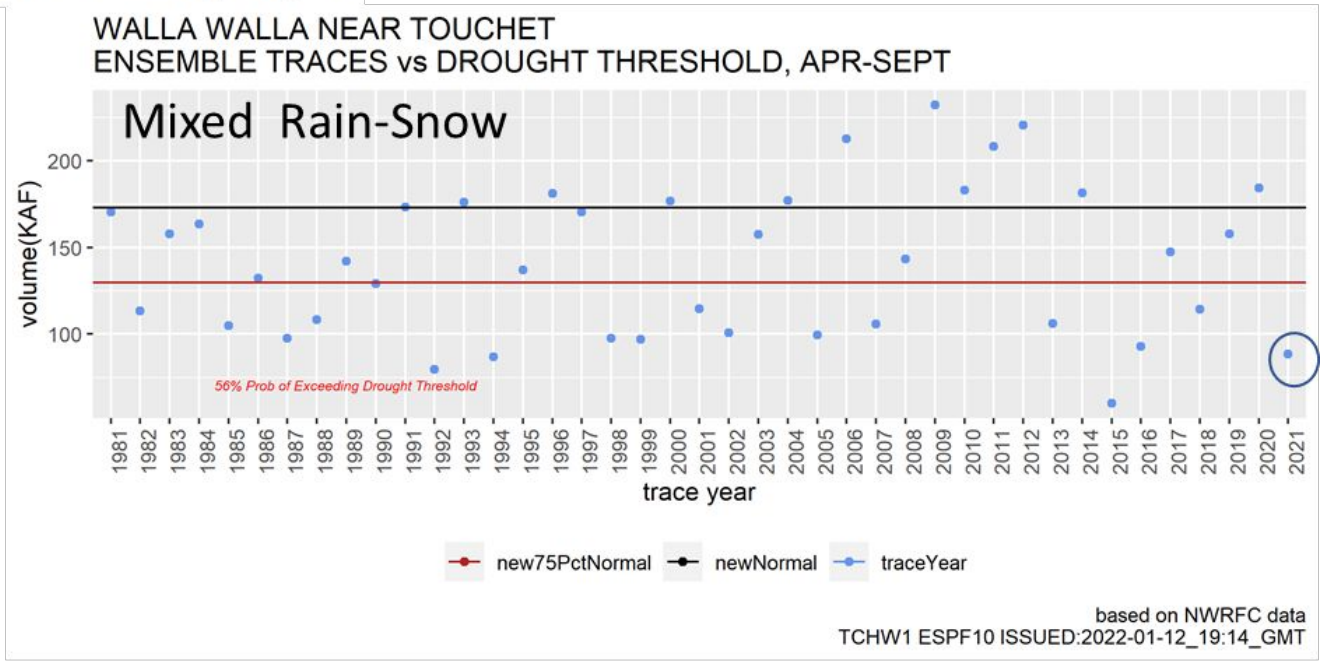


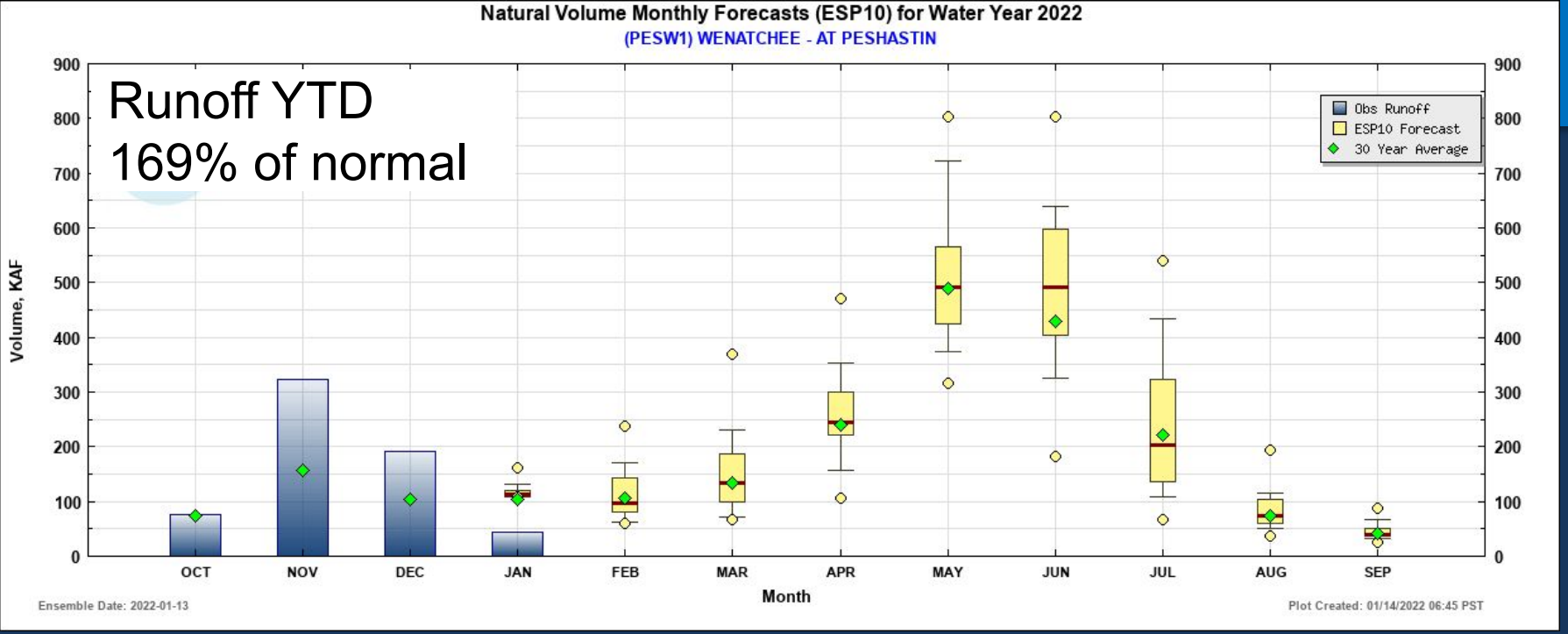
https://www.nwrfc.noaa.gov/ws/docs/NWRFC_1991-2020_Normals_Update_Documentation.pdf

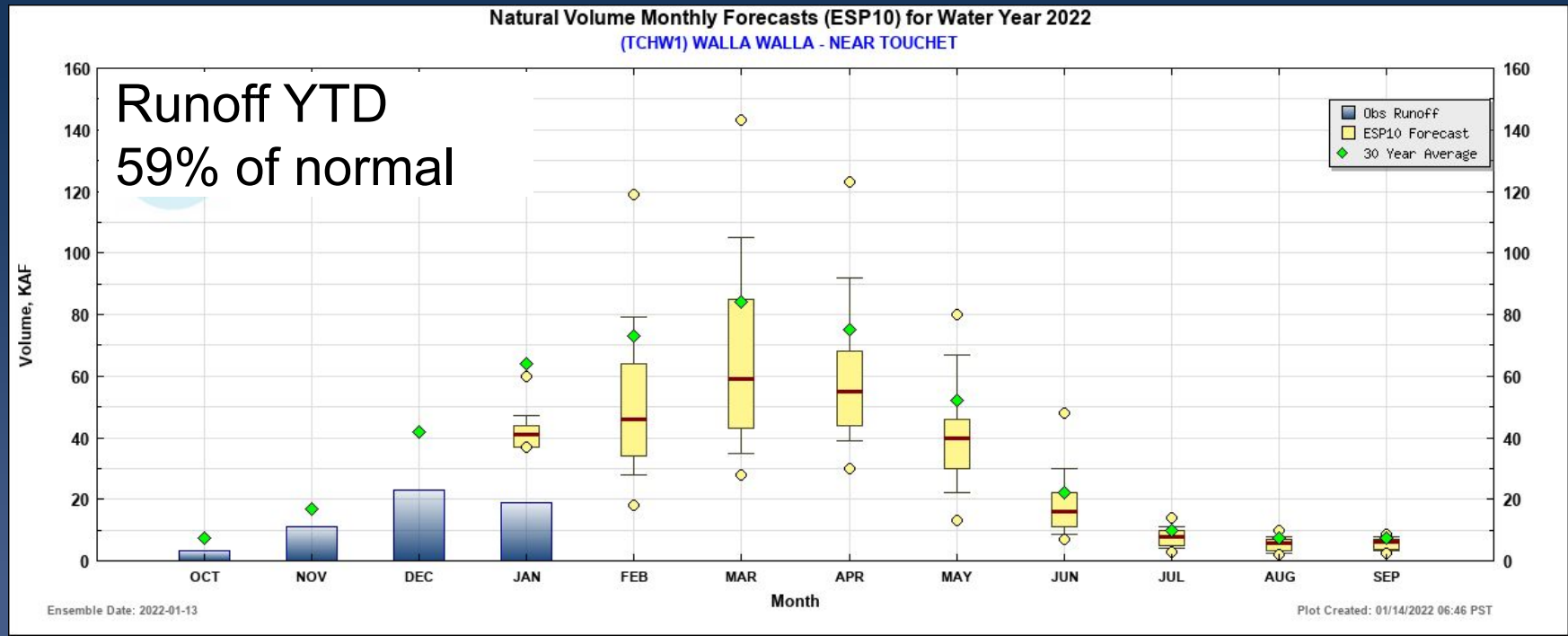


◯ =2021 trace year



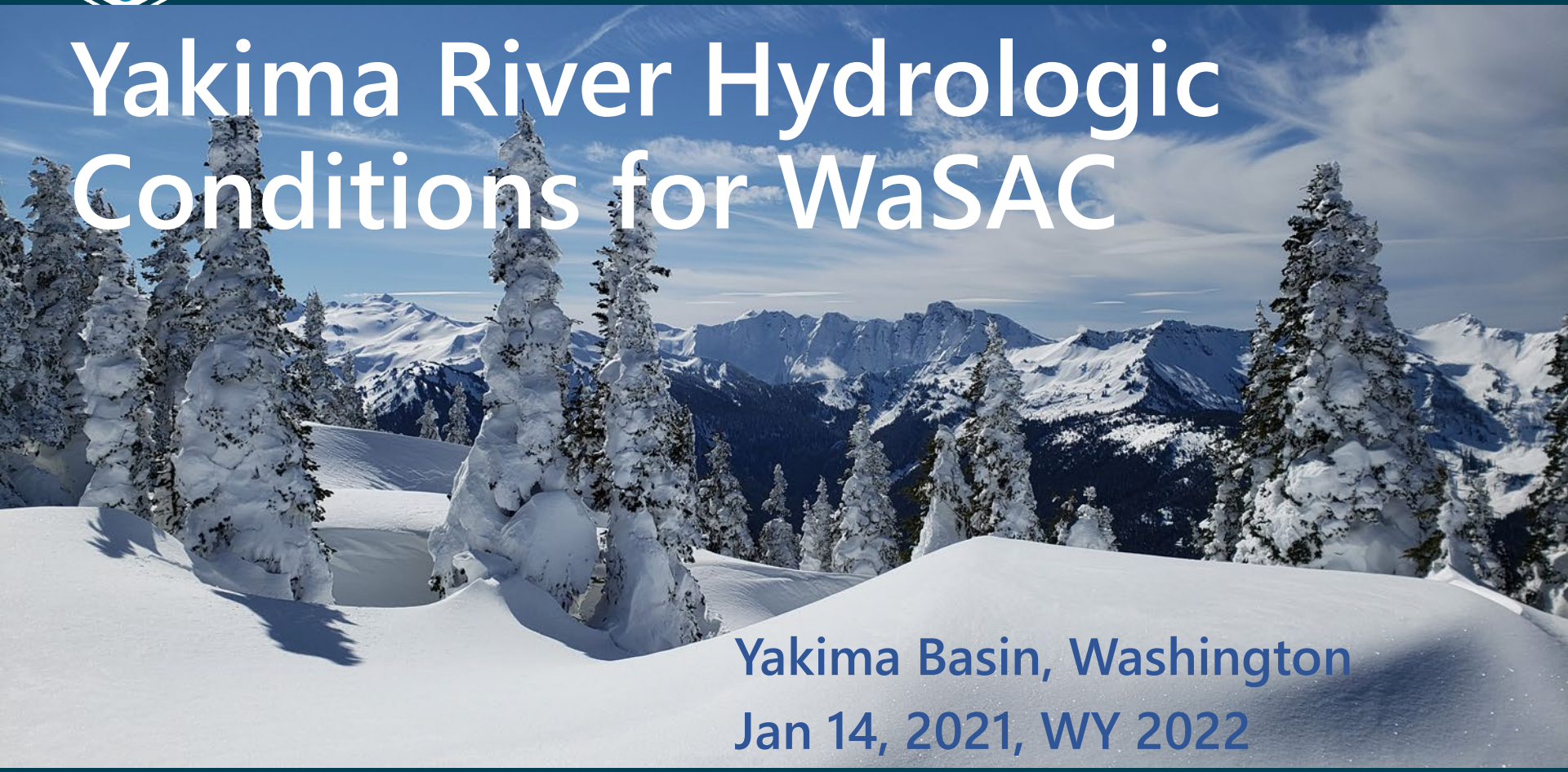



Natural Volume Monthly Forecasts (ESP10) for Water Year 2022
(PESW1) WENATCHEE - AT PESHASTIN
Runoff YTD
169% of normal
Obs Runoff
ESP10 Forecast
30 Year Average
Volume, KAF
Month
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
Ensemble Date: 2022-01-13
Plot Created: 01/14/2022 06:45 PST


Natural Volume Monthly Forecasts (ESP10) for Water Year 2022
(TCHW1) WALLA WALLA - NEAR TOUCHET
Runoff YTD
59% of normal
Obs Runoff
ESP10 Forecast
30 Year Average
Volume, KAF
Month
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
Ensemble Date: 2022-01-13
Plot Created: 01/14/2022 06:46 PST

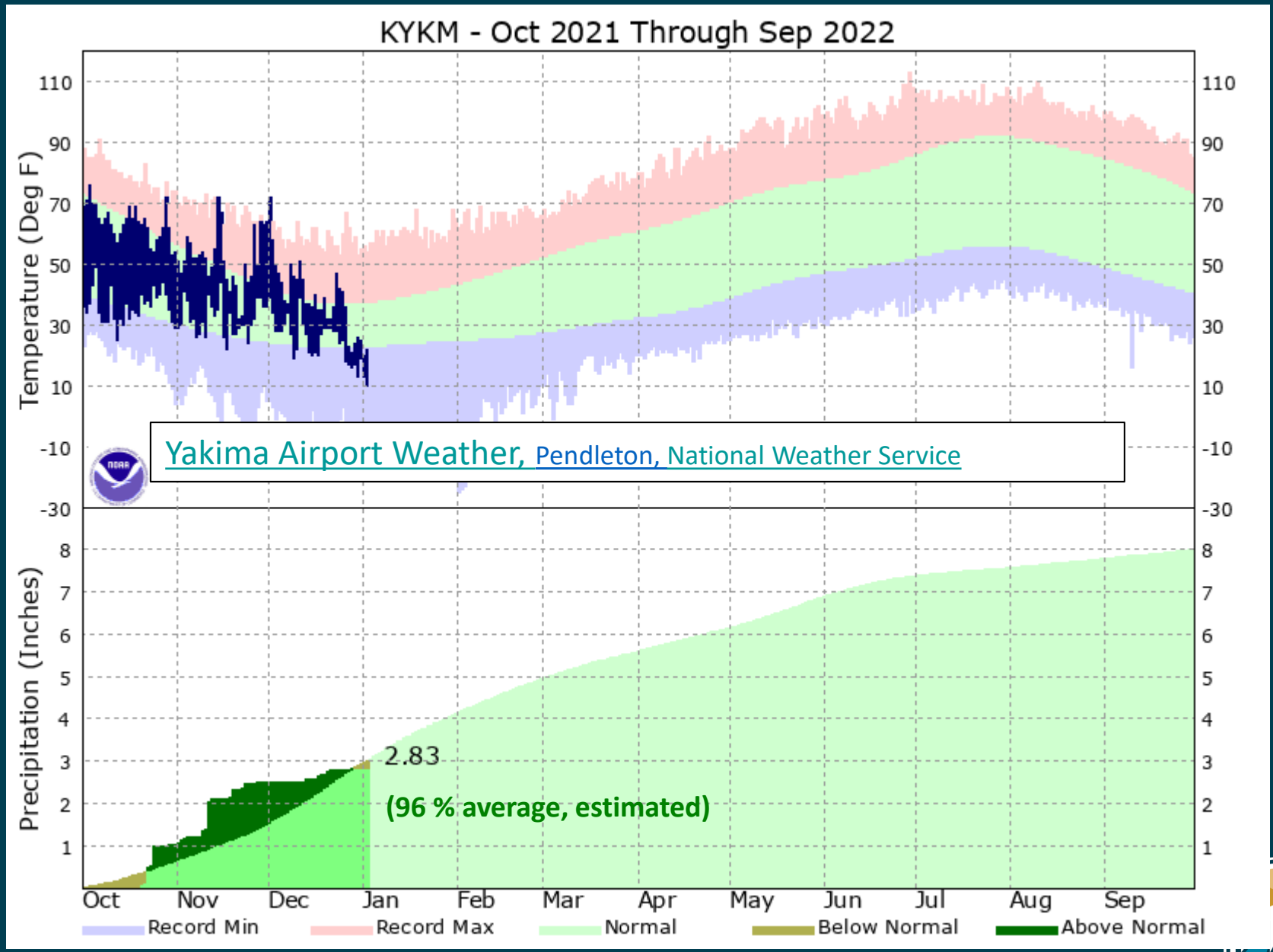
BUREAU OF RECLAMATION

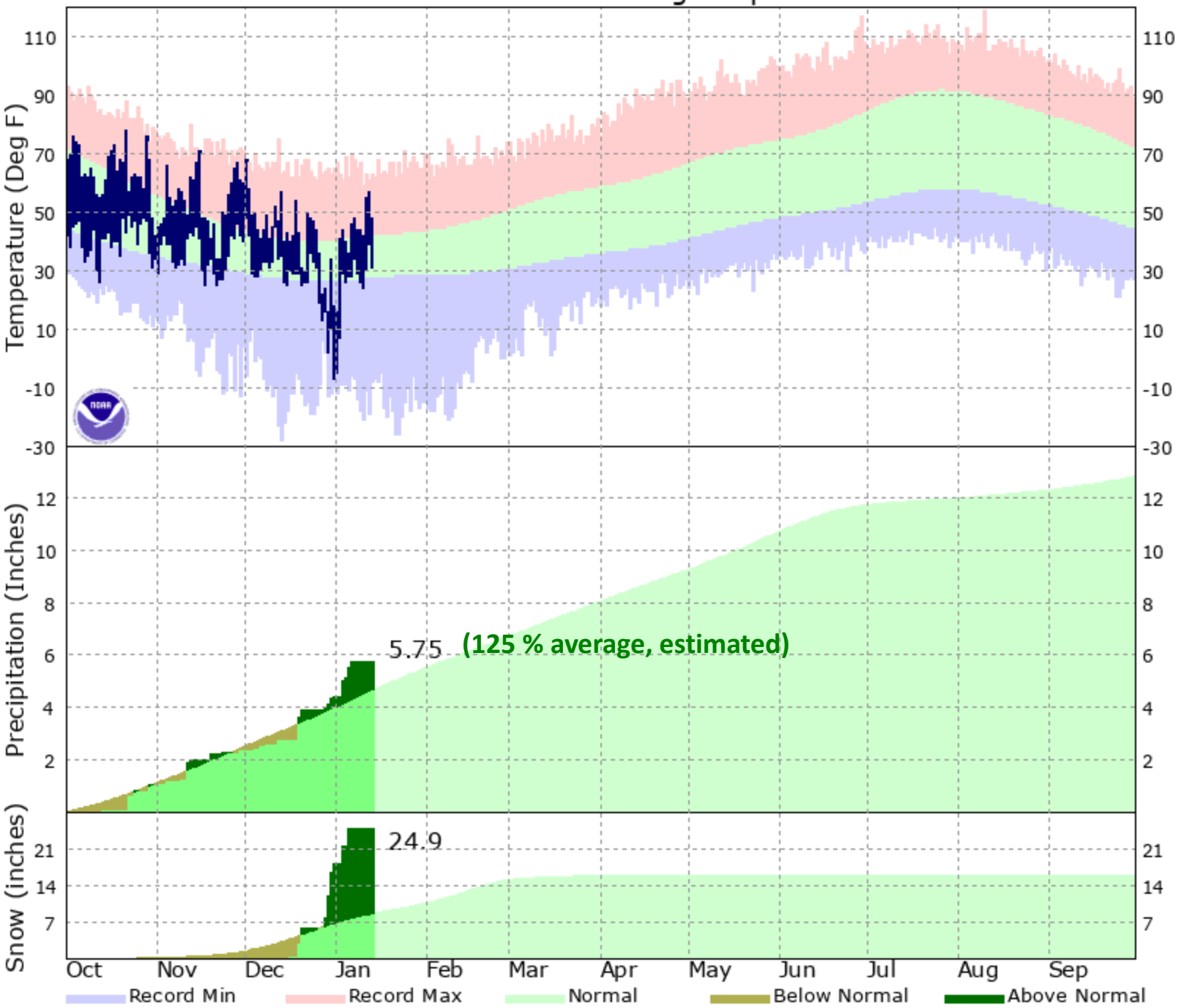
Yakima River Hydrologic Conditions for WaSAC

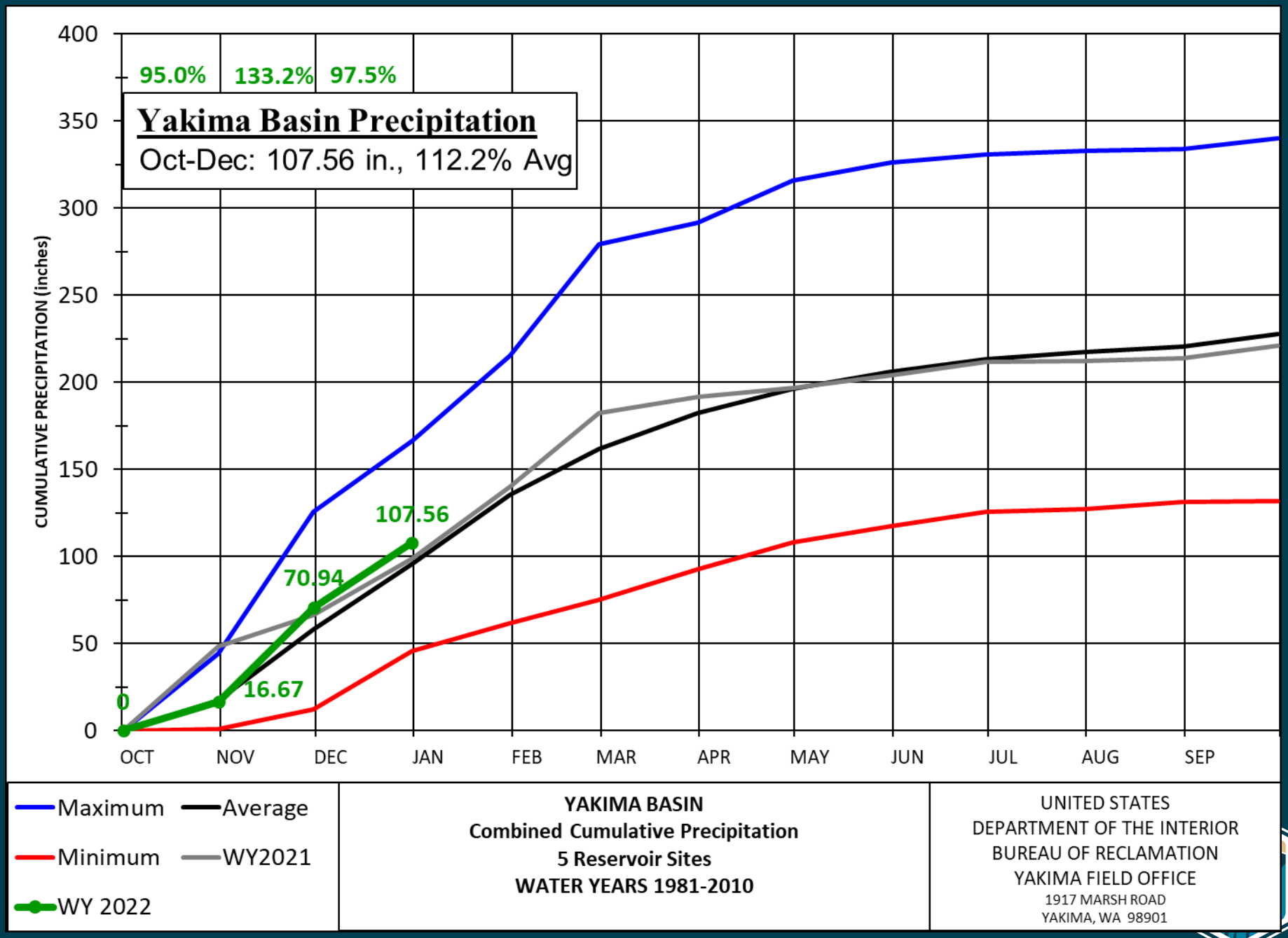


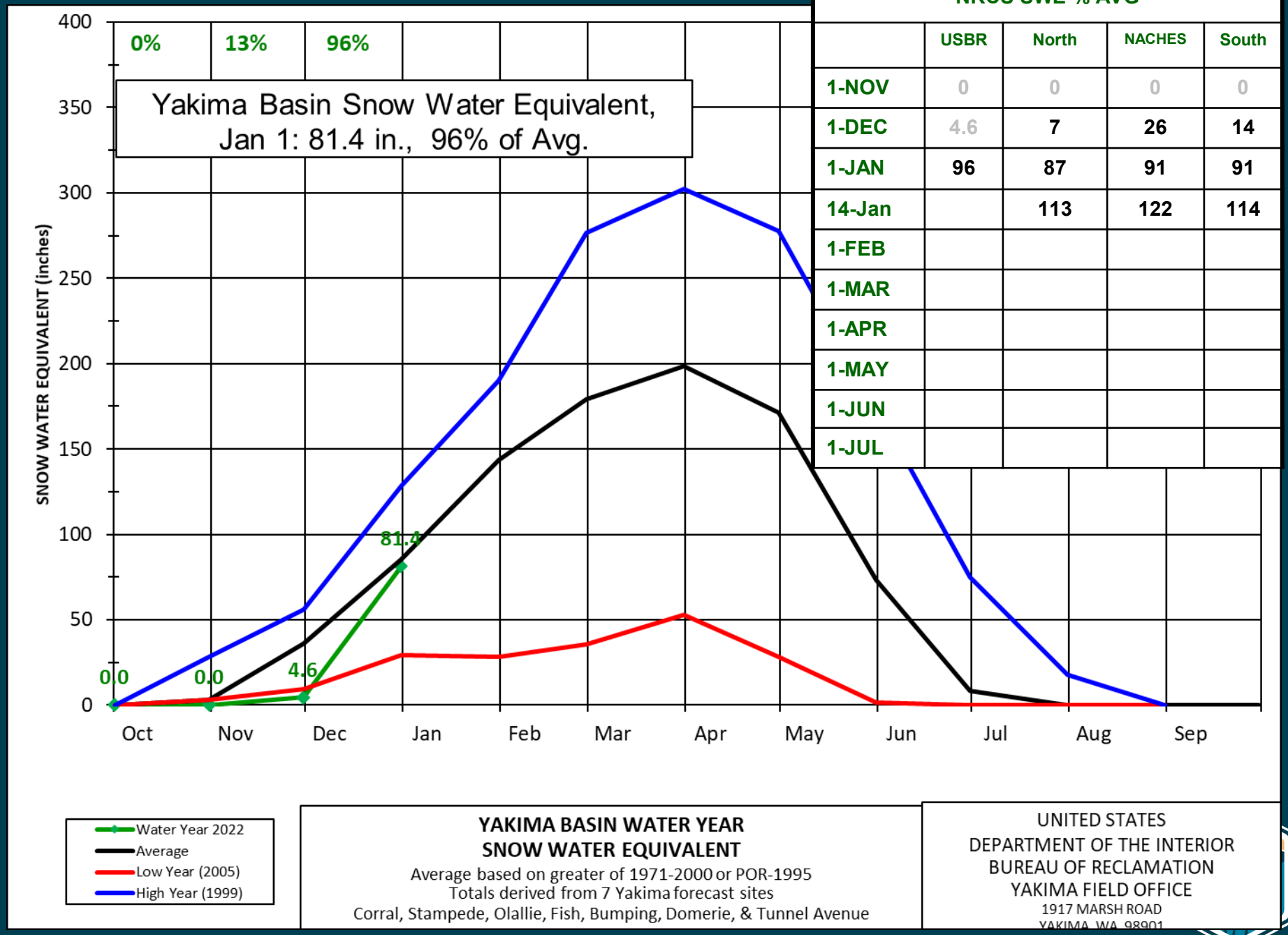
Yakima Basin, Washington

Jan 14, 2021, WY 2022


KYKM - Oct 2021 Through Sep 2022
Temperature (Deg F)
110
90
70
50
30
10
-10
-30
Yakima Airport Weather, Pendleton, National Weather Service
Precipitation (Inches)
8
7
6
5
4
3
2
1
2.83
(96 % average, estimated)
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Record Min
Record Max
Normal
Below Normal
Above Normal


KPDT - Oct 2021 Through Sep 2022
Temperature (Deg F)
110
90
70
50
30
10
-10
-30
Precipitation (Inches)
12
10
8
6
4
2
5.75
(125 % average, estimated)
Snow (inches)
21
14
7
24.9
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Record Min
Record Max
Normal
Below Normal
Above Normal


95.0%
133.2%
97.5%
Yakima Basin Precipitation
Oct-Dec: 107.56 in., 112.2% Avg
CUMULATIVE PRECIPITATION (inches)
400
350
300
250
200
150
100
50
0
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
107.56
70.94
16.67
0
Maximum
Average
Minimum
WY2021
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



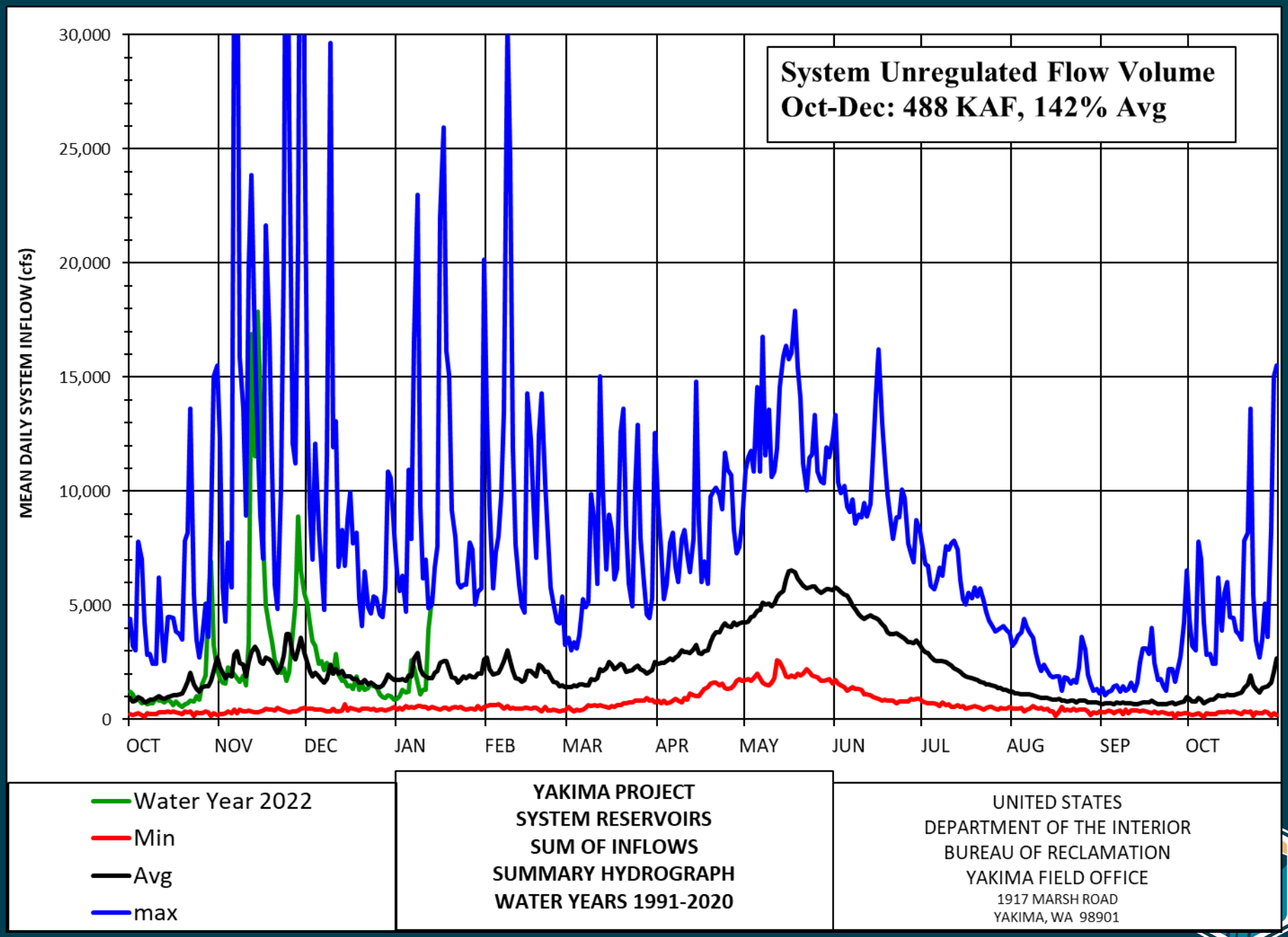
NRCS SWE % AVG

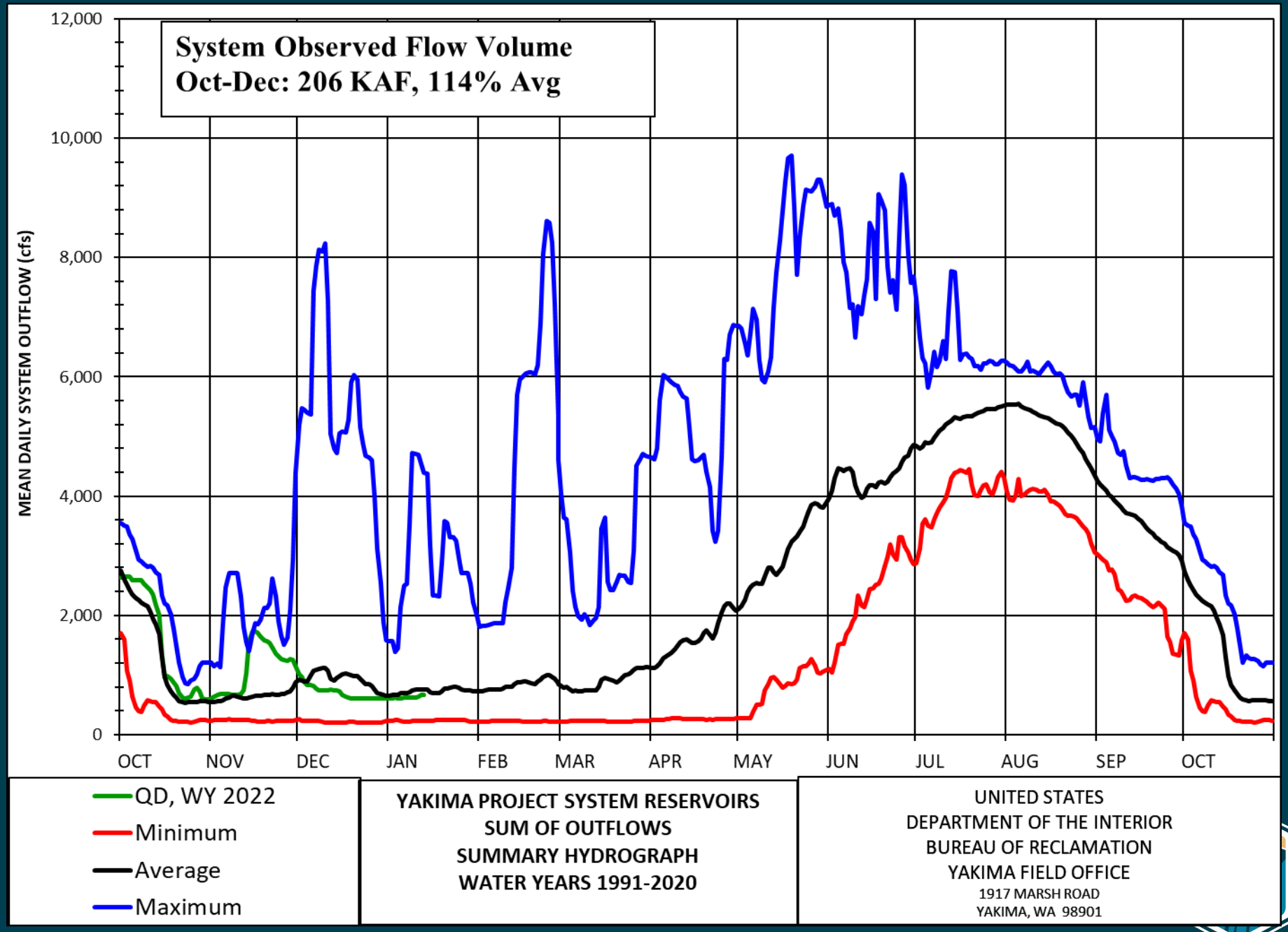
	USBR	North	NACHES	South
1-NOV	0	0	0	0
1-DEC	4.6	7	26	14
1-JAN	96	87	91	91
14-Jan		113	122	114
1-FEB				
1-MAR				
1-APR				
1-MAY				
1-JUN				
1-JUL				

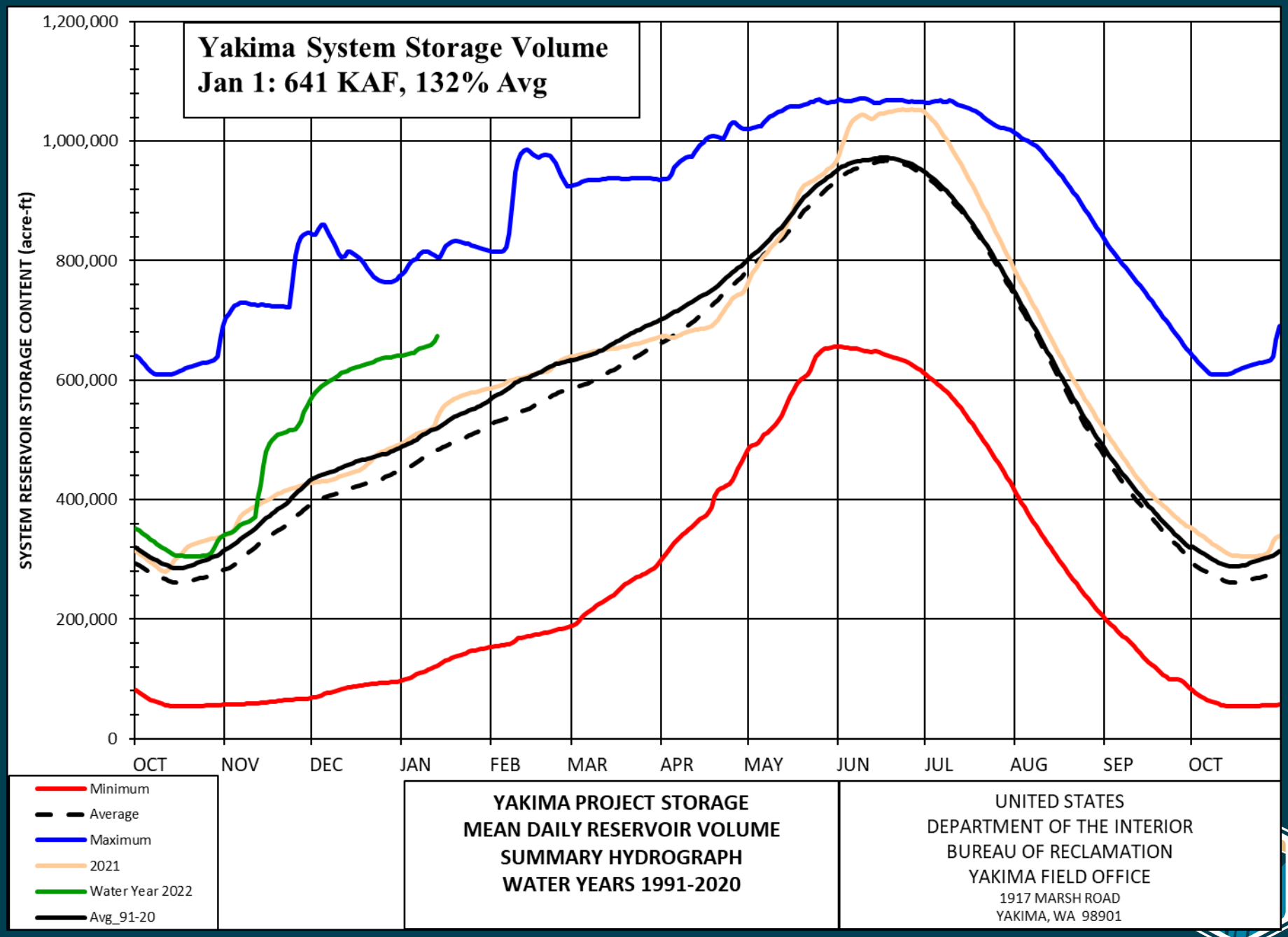
YAKIMA BASIN WATER YEAR
SNOW WATER EQUIVALENT

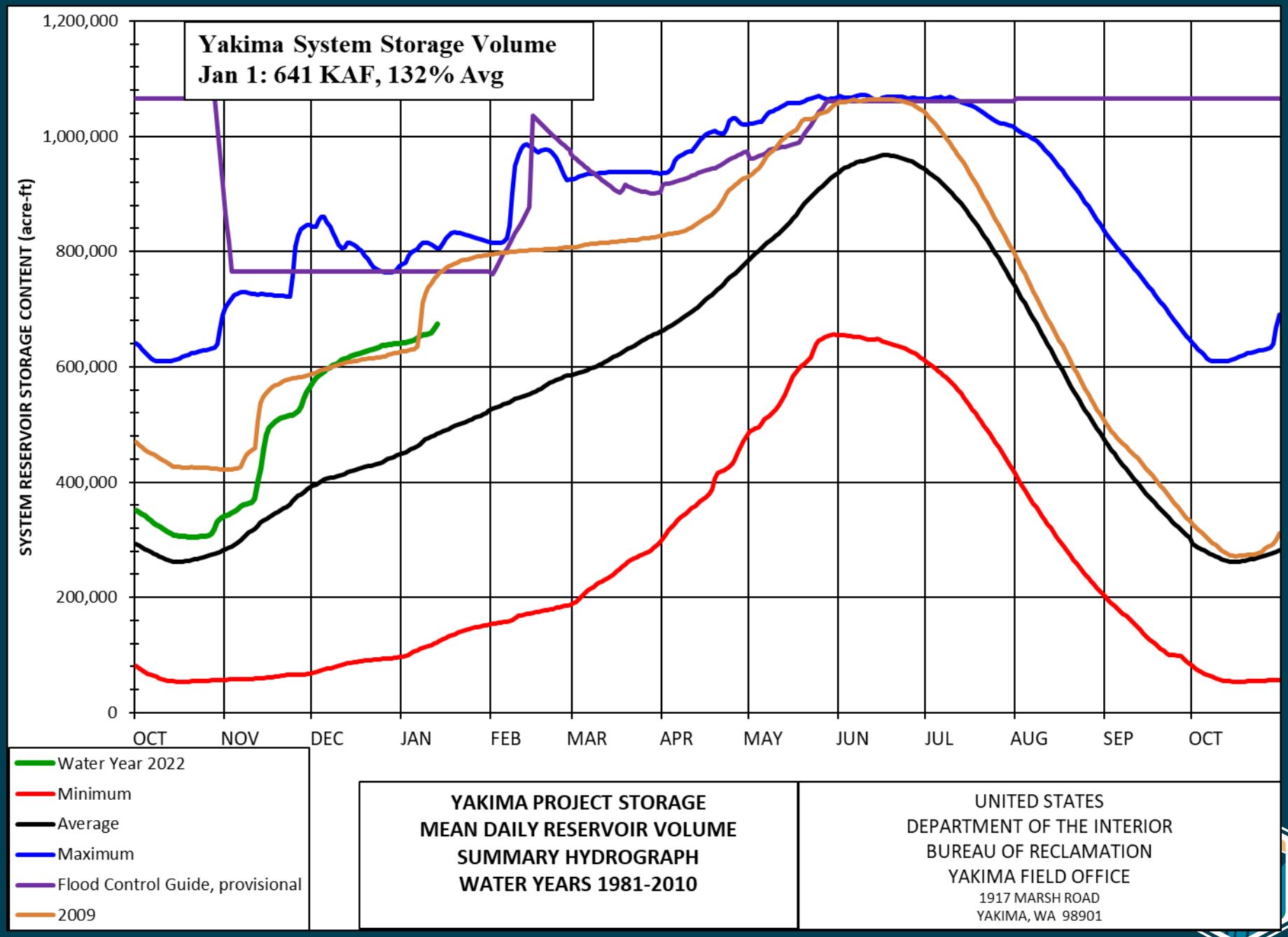
Average based on greater of 1971-2000 or POR-1995
Totals derived from 7 Yakima forecast sites
Corral, Stampede, Olallie, Fish, Bumping, Domerie, & Tunnel Avenue

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

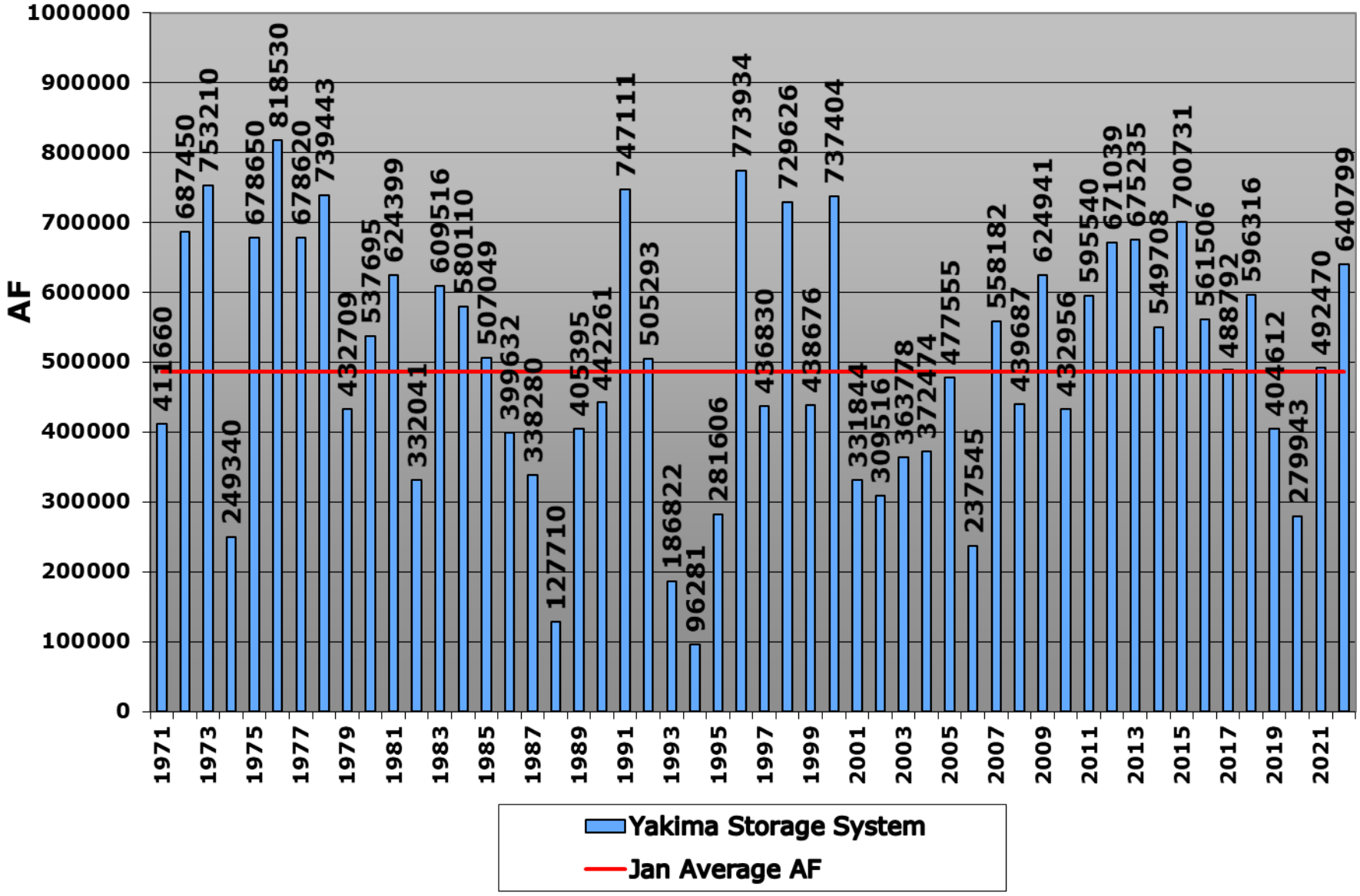

System Unregulated Flow Volume
Oct-Dec: 488 KAF, 142% Avg
MEAN DAILY SYSTEM INFLOW (cfs)
30,000
25,000
20,000
15,000
10,000
5,000
0
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
Water Year 2022
Min
Avg
max
YAKIMA PROJECT
SYSTEM RESERVOIRS
SUM OF INFLOWS
SUMMARY HYDROGRAPH
WATER YEARS 1991-2020
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
YAKIMA FIELD OFFICE
1917 MARSH ROAD
YAKIMA, WA 98901


System Observed Flow Volume
Oct-Dec: 206 KAF, 114% Avg
MEAN DAILY SYSTEM OUTFLOW (cfs)
12,000
10,000
8,000
6,000
4,000
2,000
0
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
QD, WY 2022
Minimum
Average
Maximum
YAKIMA PROJECT SYSTEM RESERVOIRS
SUM OF OUTFLOWS
SUMMARY HYDROGRAPH
WATER YEARS 1991-2020
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
YAKIMA FIELD OFFICE
1917 MARSH ROAD
YAKIMA, WA 98901

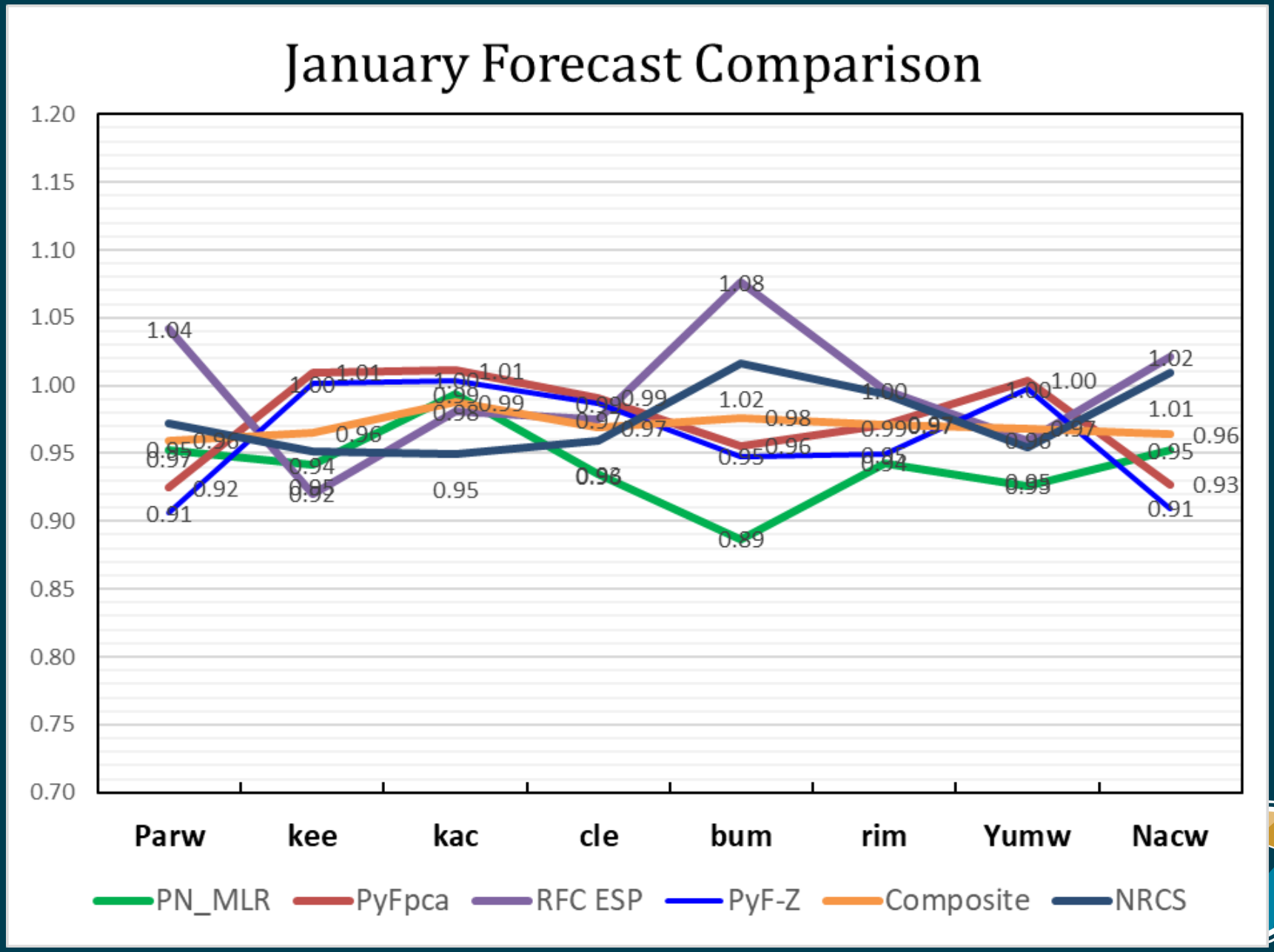

Yakima System Storage Volume
Jan 1: 641 KAF, 132% Avg
SYSTEM RESERVOIR STORAGE CONTENT (acre-ft)
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
Minimum
Average
Maximum
2021
Water Year 2022
Avg_91-20
YAKIMA PROJECT STORAGE
MEAN DAILY RESERVOIR VOLUME
SUMMARY HYDROGRAPH
WATER YEARS 1991-2020
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
YAKIMA FIELD OFFICE
1917 MARSH ROAD
YAKIMA, WA 98901


Yakima System Storage Volume
Jan 1: 641 KAF, 132% Avg
SYSTEM RESERVOIR STORAGE CONTENT (acre-ft)
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
Water Year 2022
Minimum
Average
Maximum
Flood Control Guide, provisional
2009
YAKIMA PROJECT STORAGE
MEAN DAILY RESERVOIR VOLUME
SUMMARY HYDROGRAPH
WATER YEARS 1981-2010
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
YAKIMA FIELD OFFICE
1917 MARSH ROAD
YAKIMA, WA 98901

Yakima Basin Storage, Historical Comparison

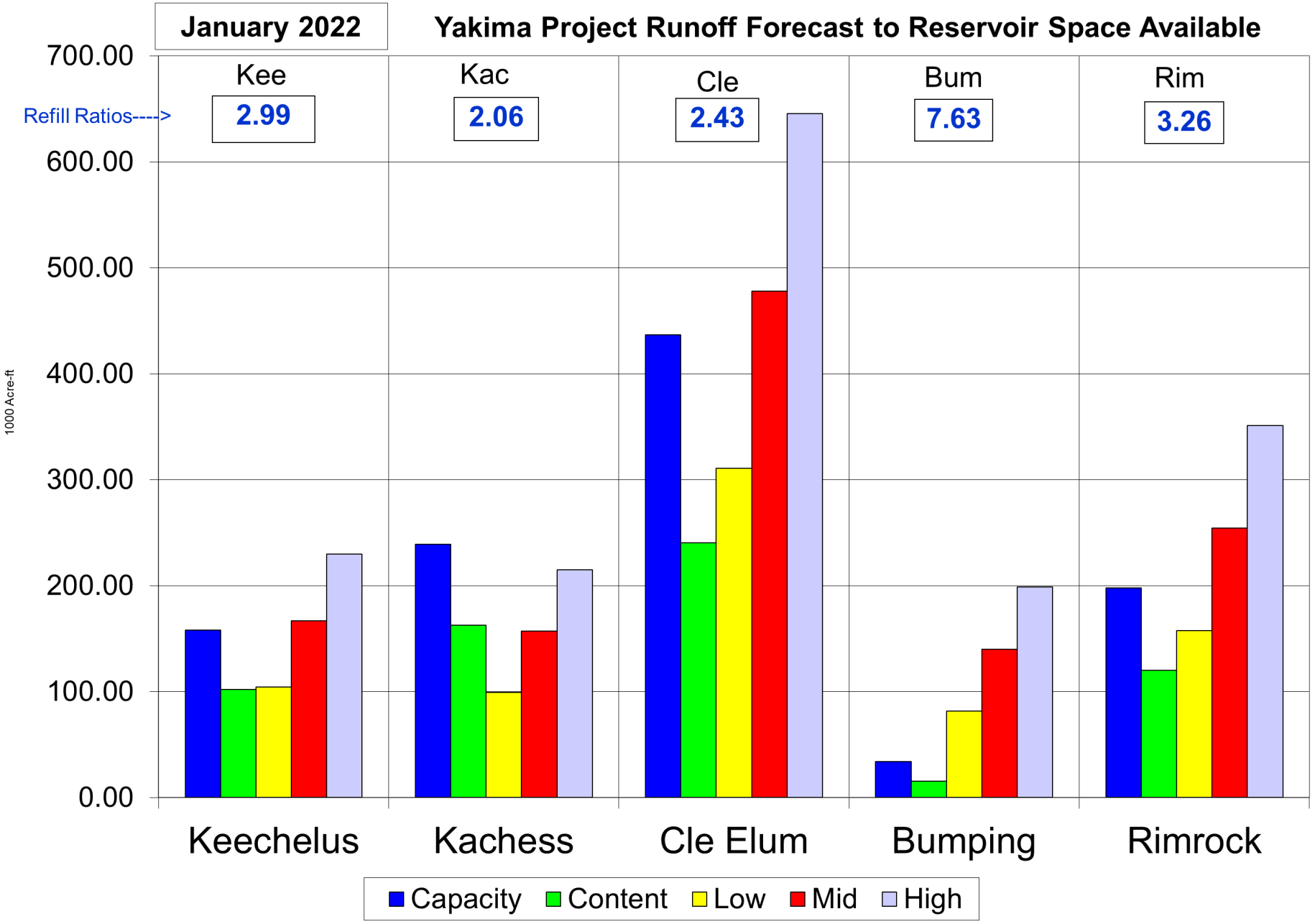


Yakima Subbasin forecasts



Yakima Subbasin forecasts

Yakima Basin Forecasts, Jan-Jul, AF						
January 1, 2022	Min	MLR	Max	Min	MLR %	Max
Parw	**1373800**	**2454700**	**3535600**	**53%**	**95%**	**137%**
kee	**104200**	**166900**	**229600**	**59%**	**94%**	**130%**
kac	**99400**	**157200**	**215000**	**63%**	**99%**	**136%**
cle	**310600**	**478100**	**645600**	**61%**	**93%**	**126%**
bum	**81500**	**140100**	**198800**	**52%**	**89%**	**126%**
rim	**157600**	**254300**	**351000**	**58%**	**94%**	**130%**
Yumw	**649800**	**1045000**	**1440200**	**58%**	**93%**	**128%**
Nacw	**585400**	**982700**	**1380100**	**57%**	**95%**	**134%**


January 2022
Yakima Project Runoff Forecast to Reservoir Space Available
Kee
Kac
Cle
Bum
Rim
Refill Ratios---->
2.99
2.06
2.43
7.63
3.26
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
1000 Acre-ft
Keechelus
Kachess
Cle Elum
Bumping
Rimrock
Capacity
Content
Low
Mid
High

Hydrologic Summary

- Precipitation has been good, and snow is above normal after a slow start.
- System storage is 667 KAF, 128% average, 63 % full.
- All refill ratios are above 2, good.
- Runoff forecasts are in the 90% to 100% range although they have likely improved since Jan 1.