



Weather and Water Update for Spring-Summer 2022

Weather Forecast Office
Reno, NV
Wednesday, March 16



*Tim Bardsley
NWS Reno
tim.bardsley@noaa.gov*

**Exceptionally wet
October & December.**

**Historically Dry
January & February**

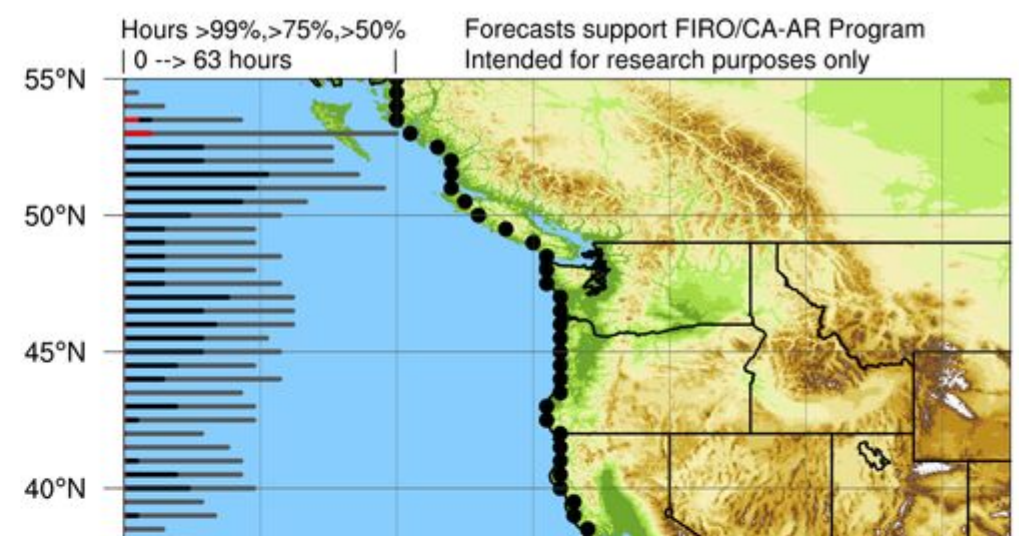
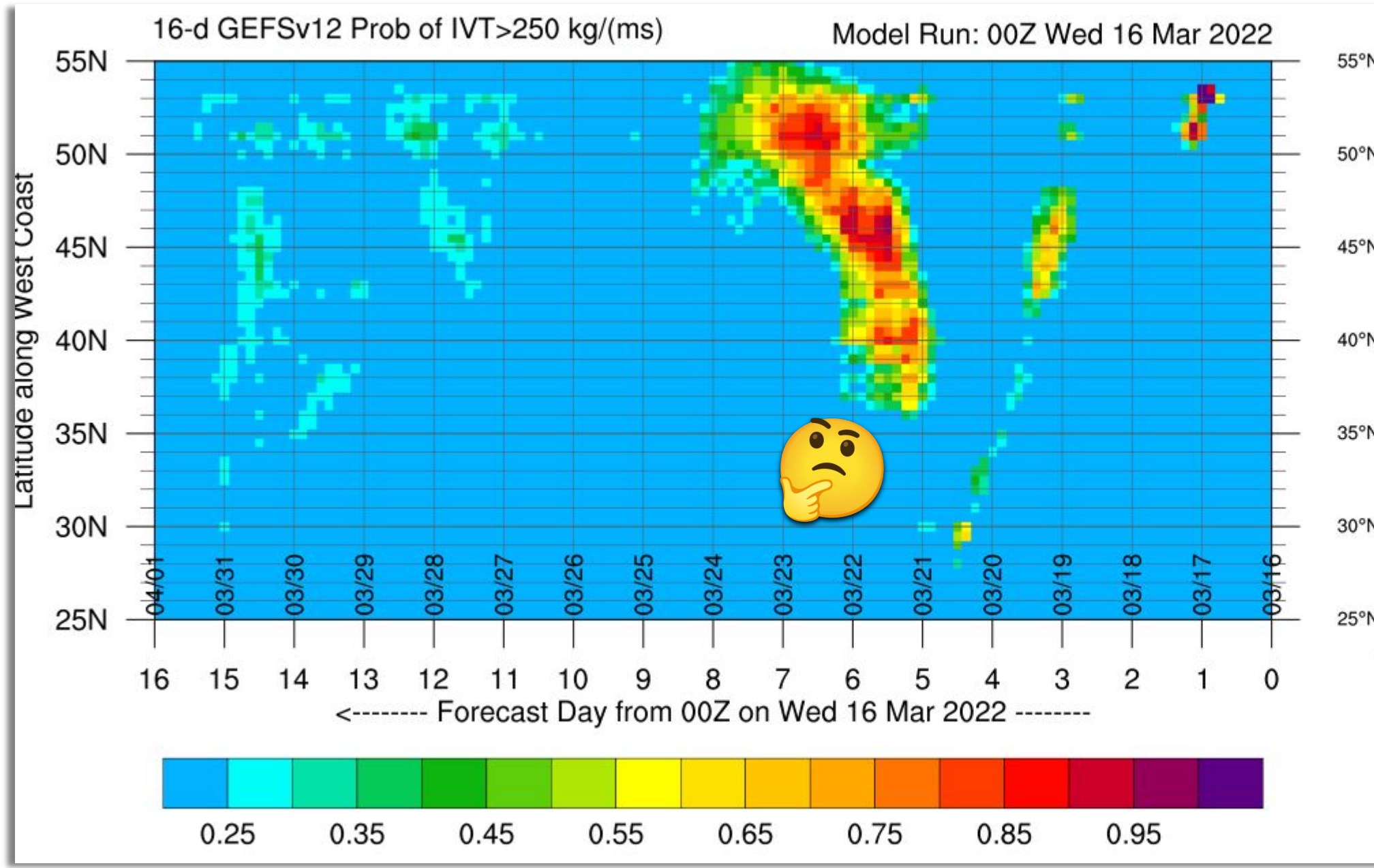
**Time is Running Out
for Winter.**

**What Do Spring &
Summer Have in Store?**

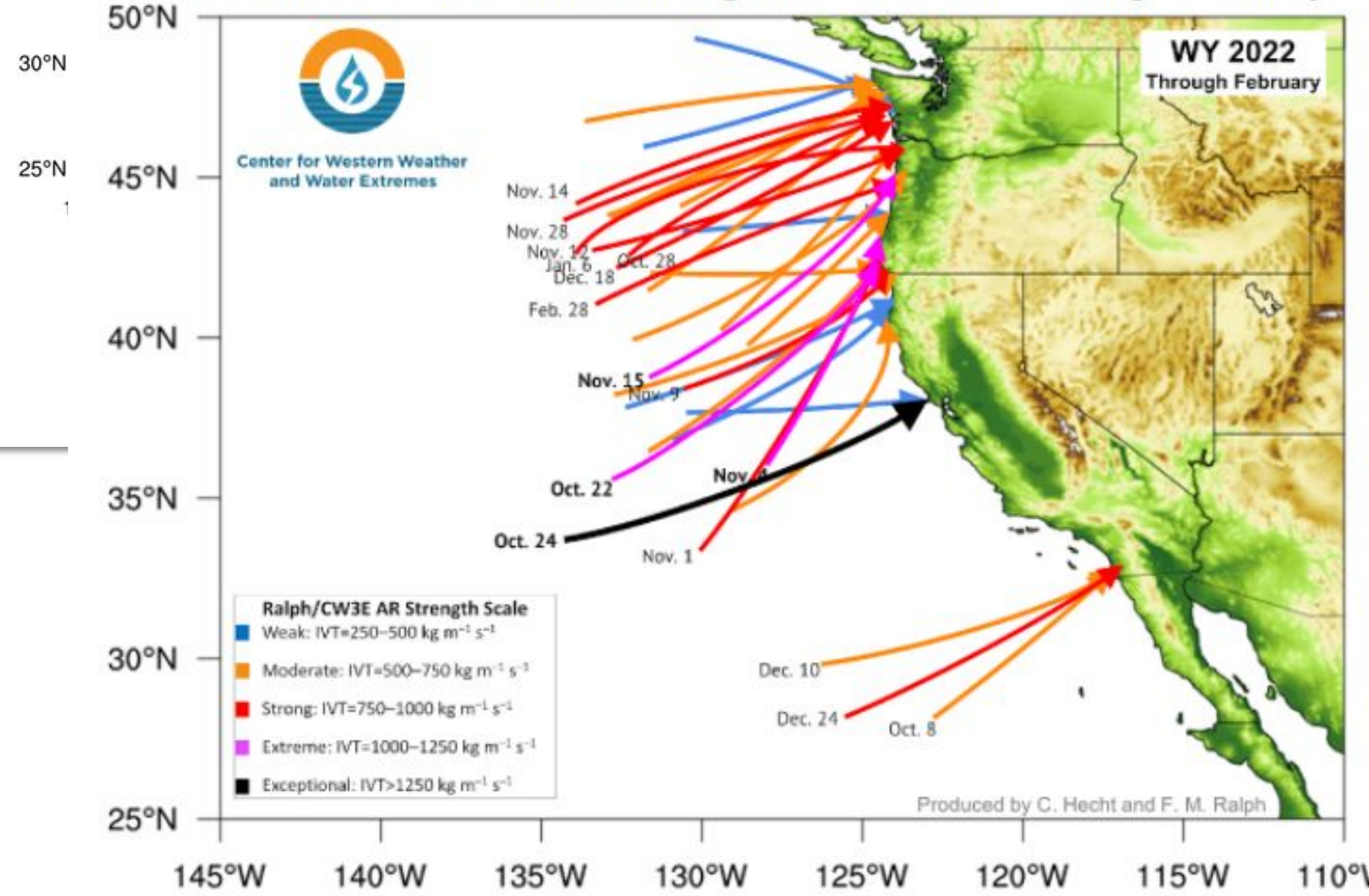


Atmospheric River Outlook and Observations

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Reno, NV
Wednesday, March 16

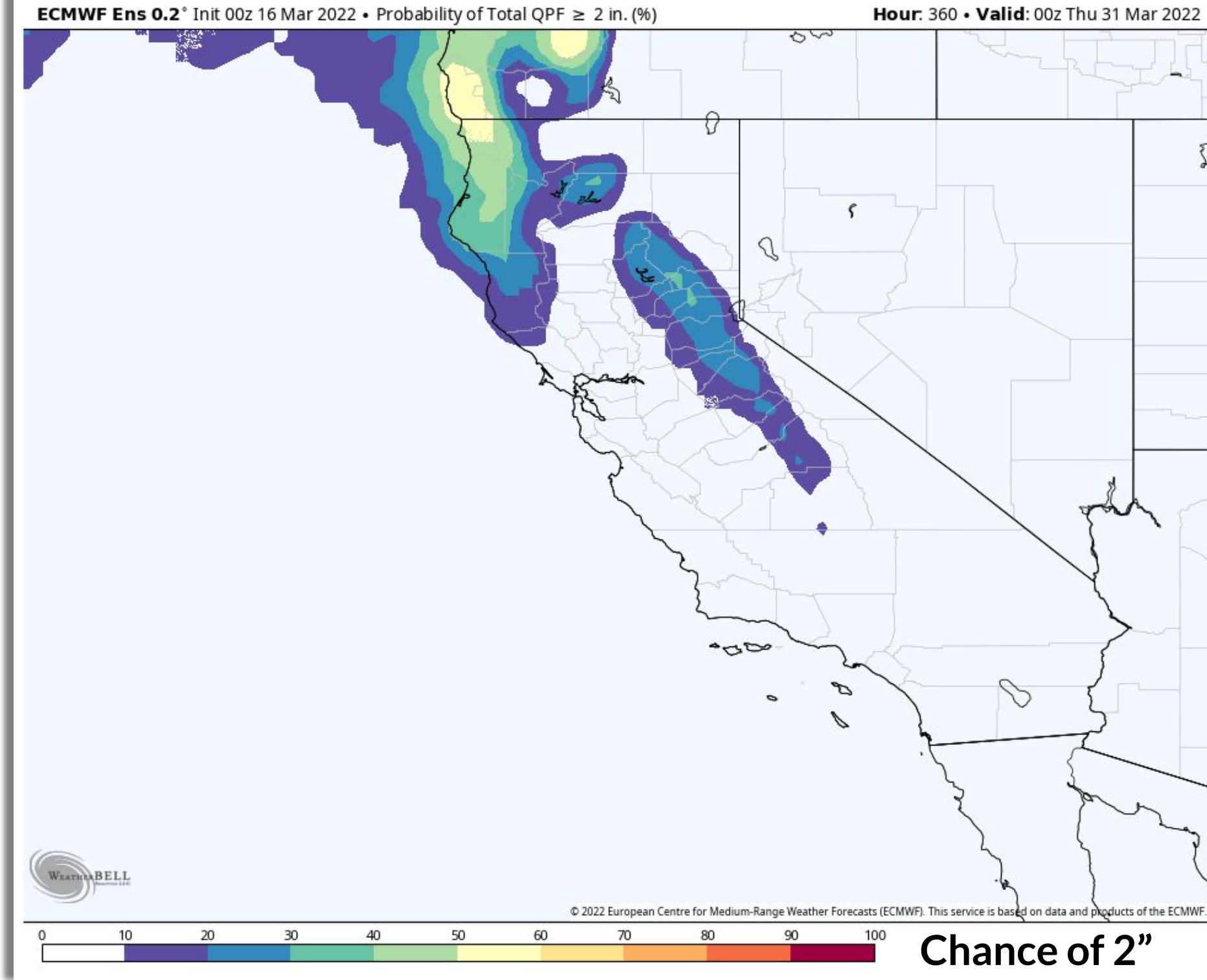
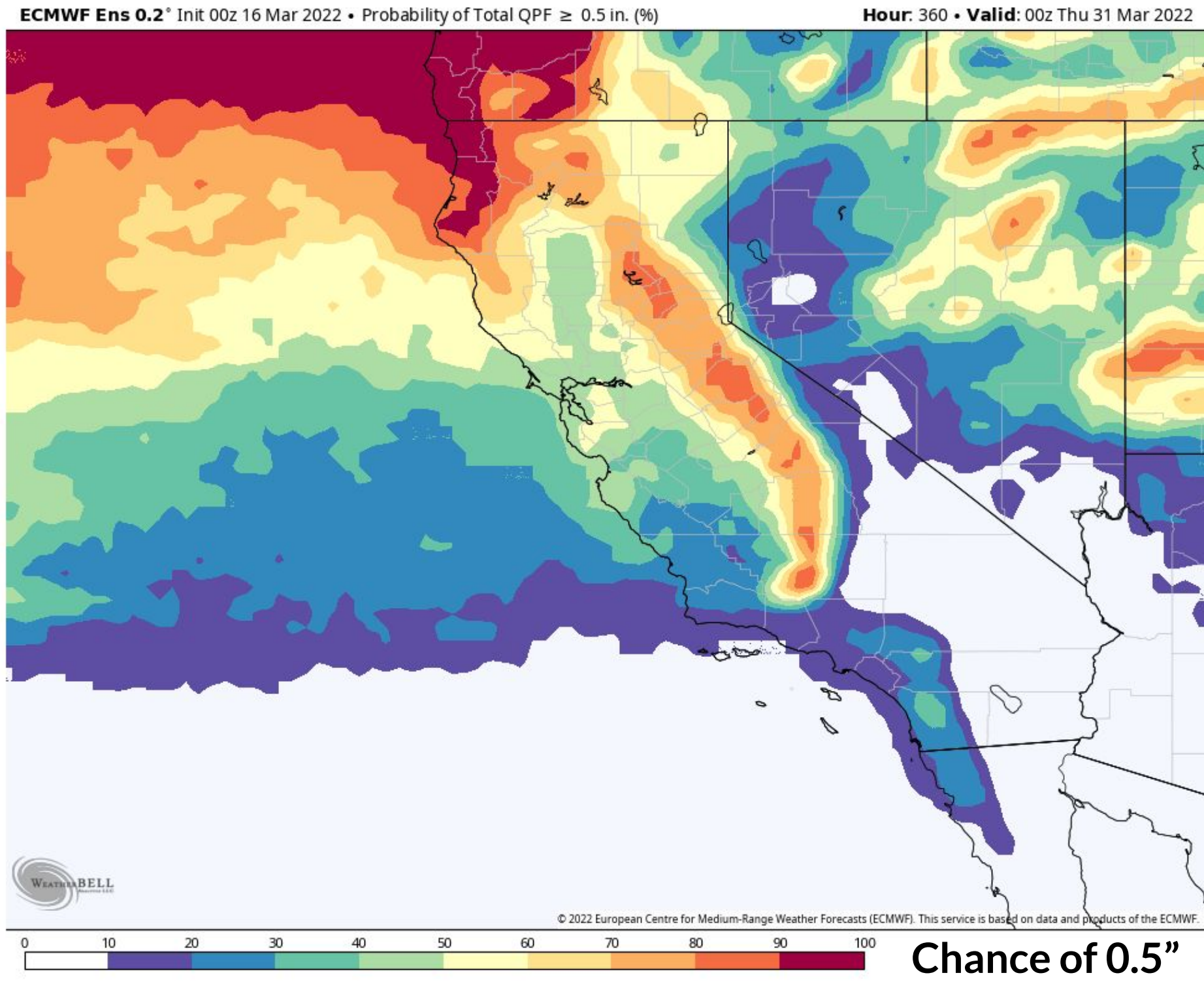


34 atmospheric rivers made landfall over the U.S. West Coast during Water Year 2022 through February



Atmospheric River landfall charts from Center for Western Weather & Water Extremes. AR's account for a large portion of annual totals!

What Are the Odds of Something Big?



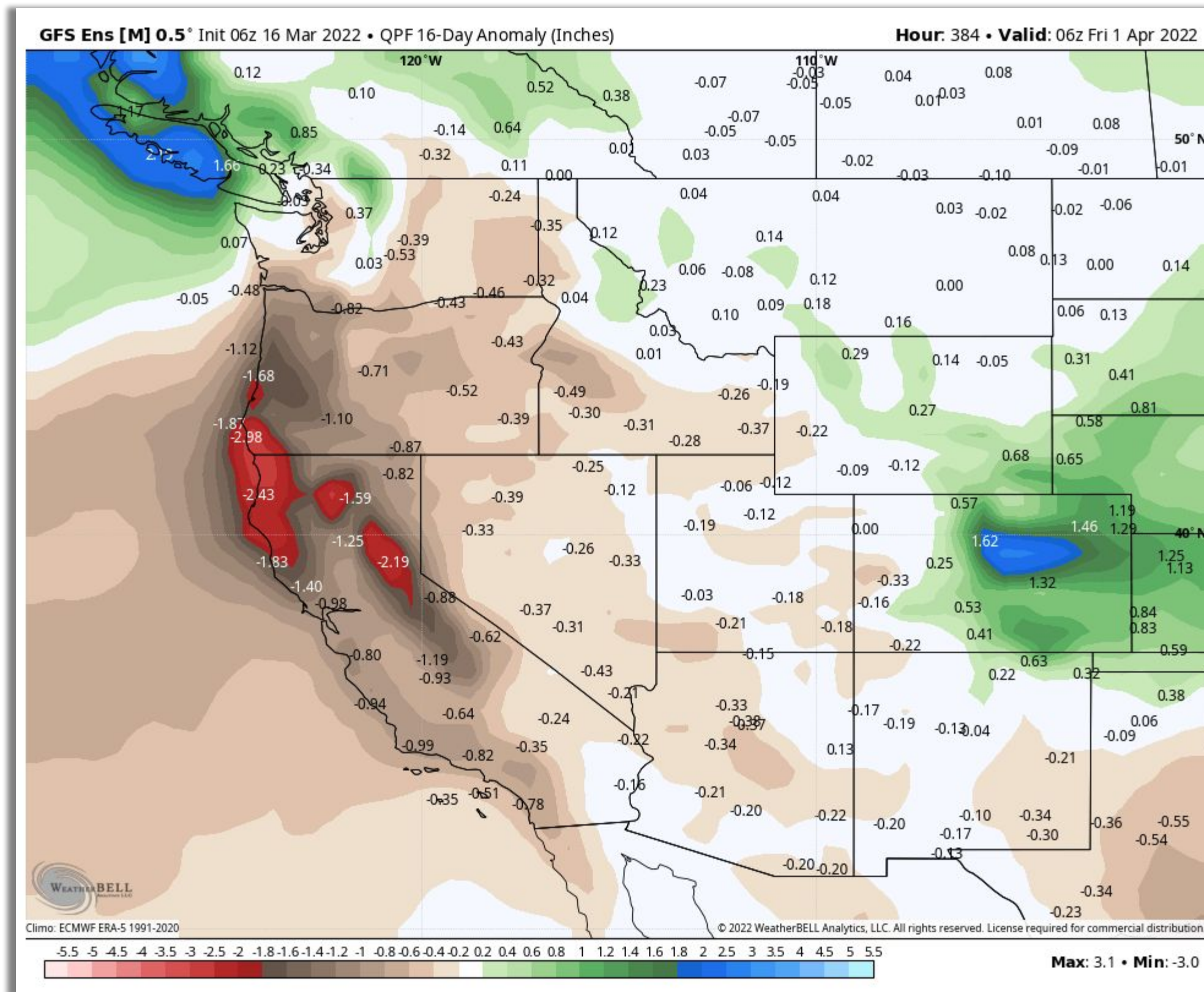
Images show threshold probabilities for total precipitation through March 30th.
Low end storms, but large game-changer storms looking unlikely.



Not Surprising, No Blue Next Two Weeks

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Wednesday, March 16

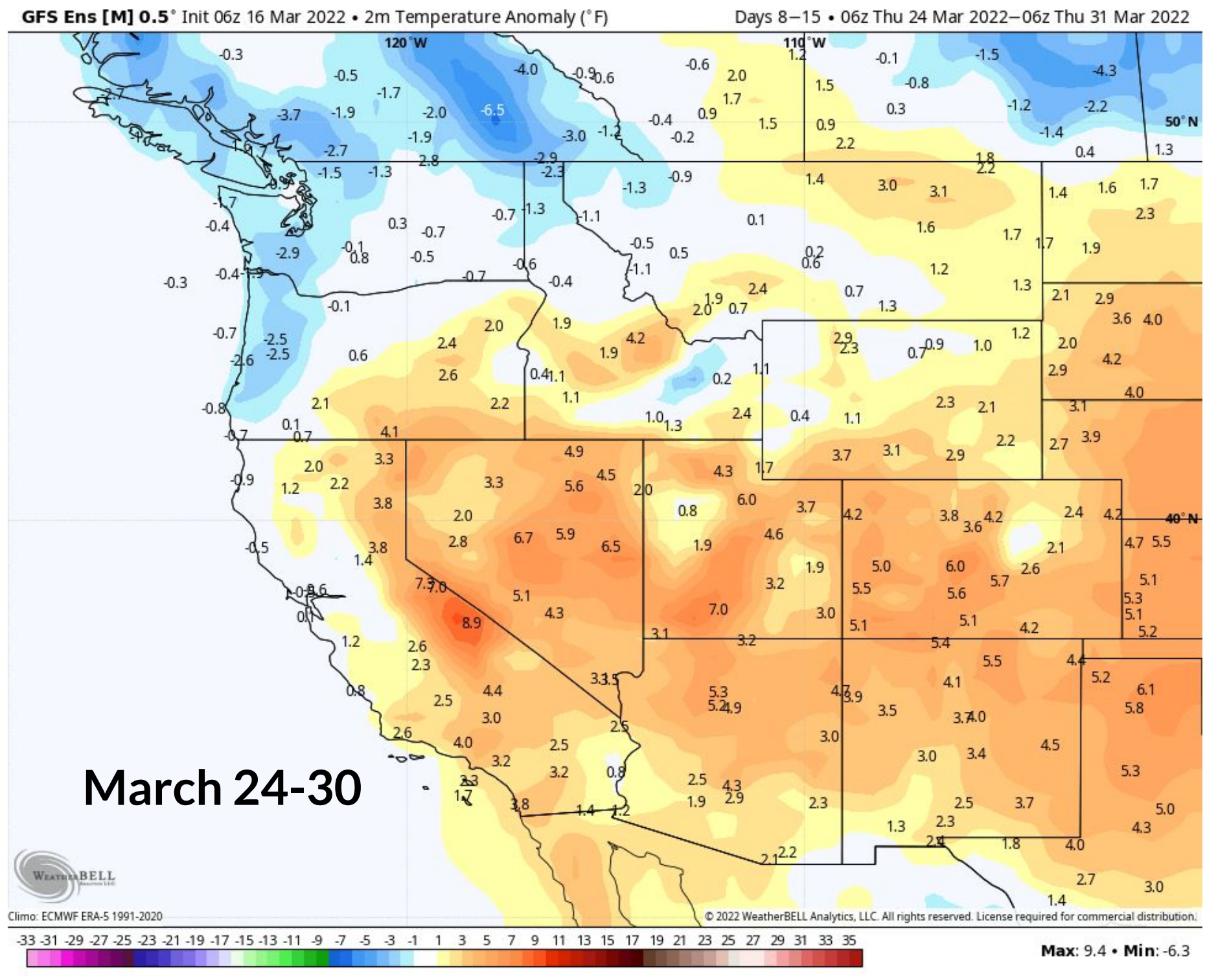
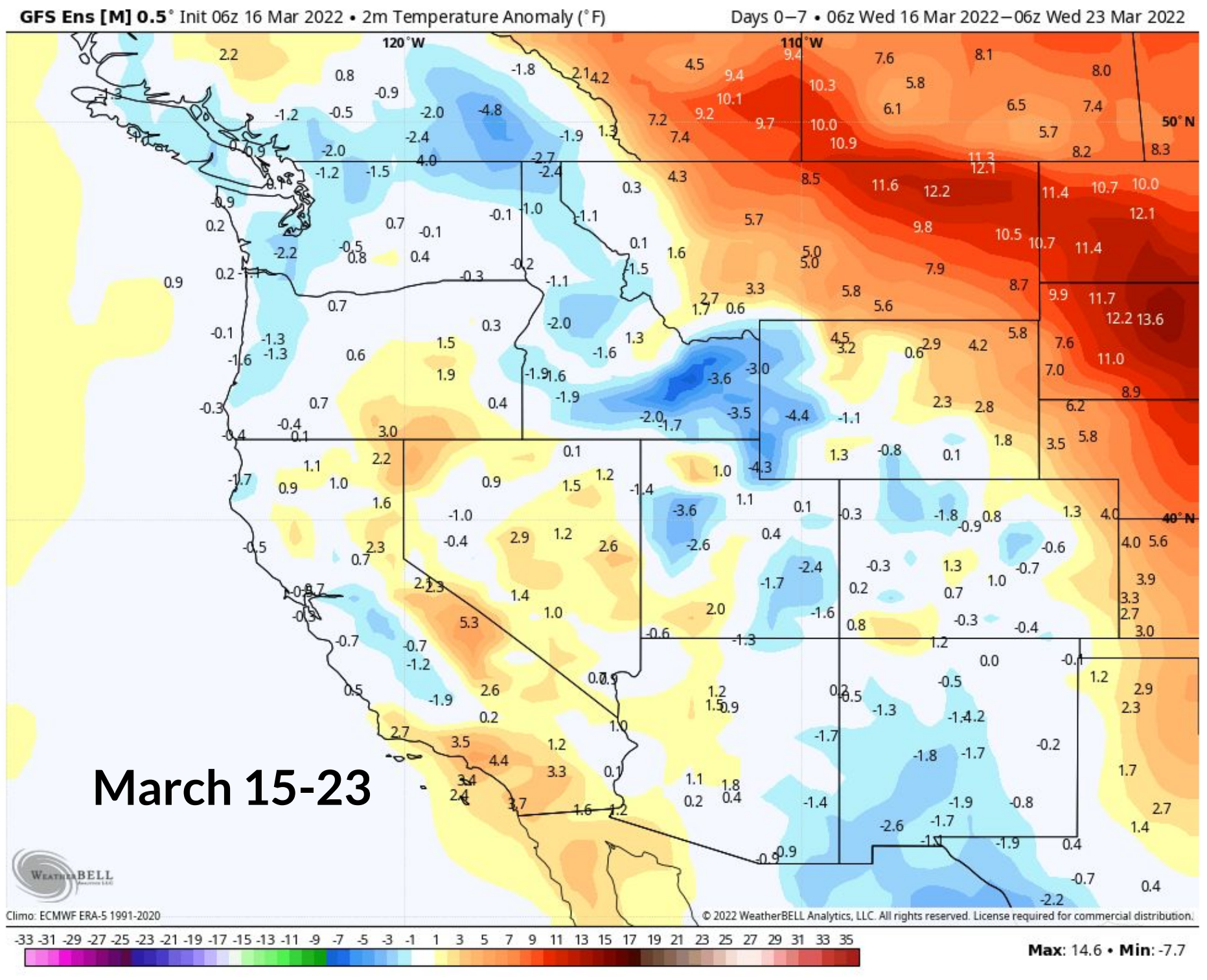
Lack of big storms stands out when comparing forecast precipitation to normal.





Temperatures: Spring Variability then Warm

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Reno, NV
Wednesday, March 16



Some ups and downs, typical of spring, but a trend toward warmer than normal conditions as we head to late-March. Signs of fire major heat up.

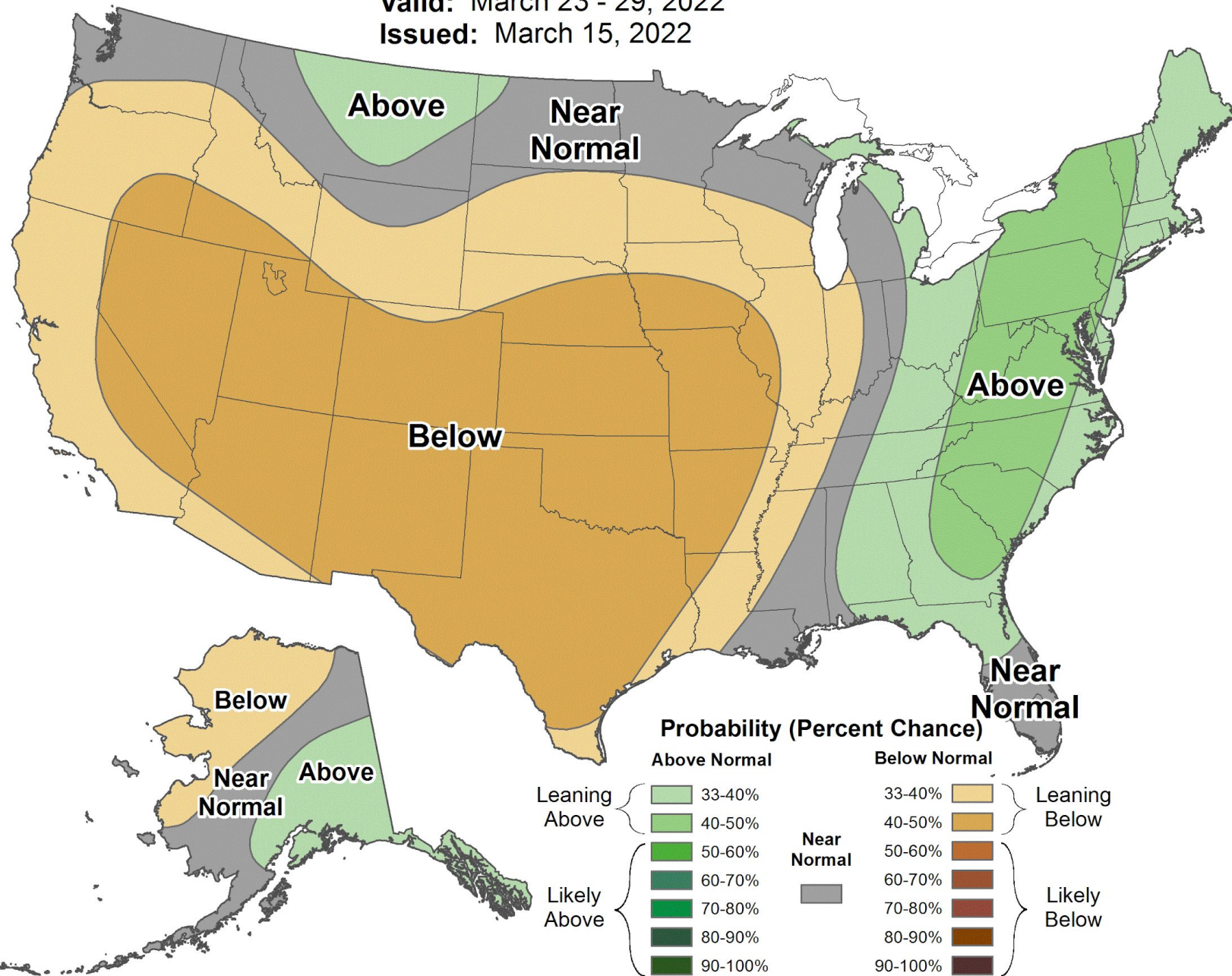
Late March - Looking Dry and Warm



8-14 Day Precipitation Outlook



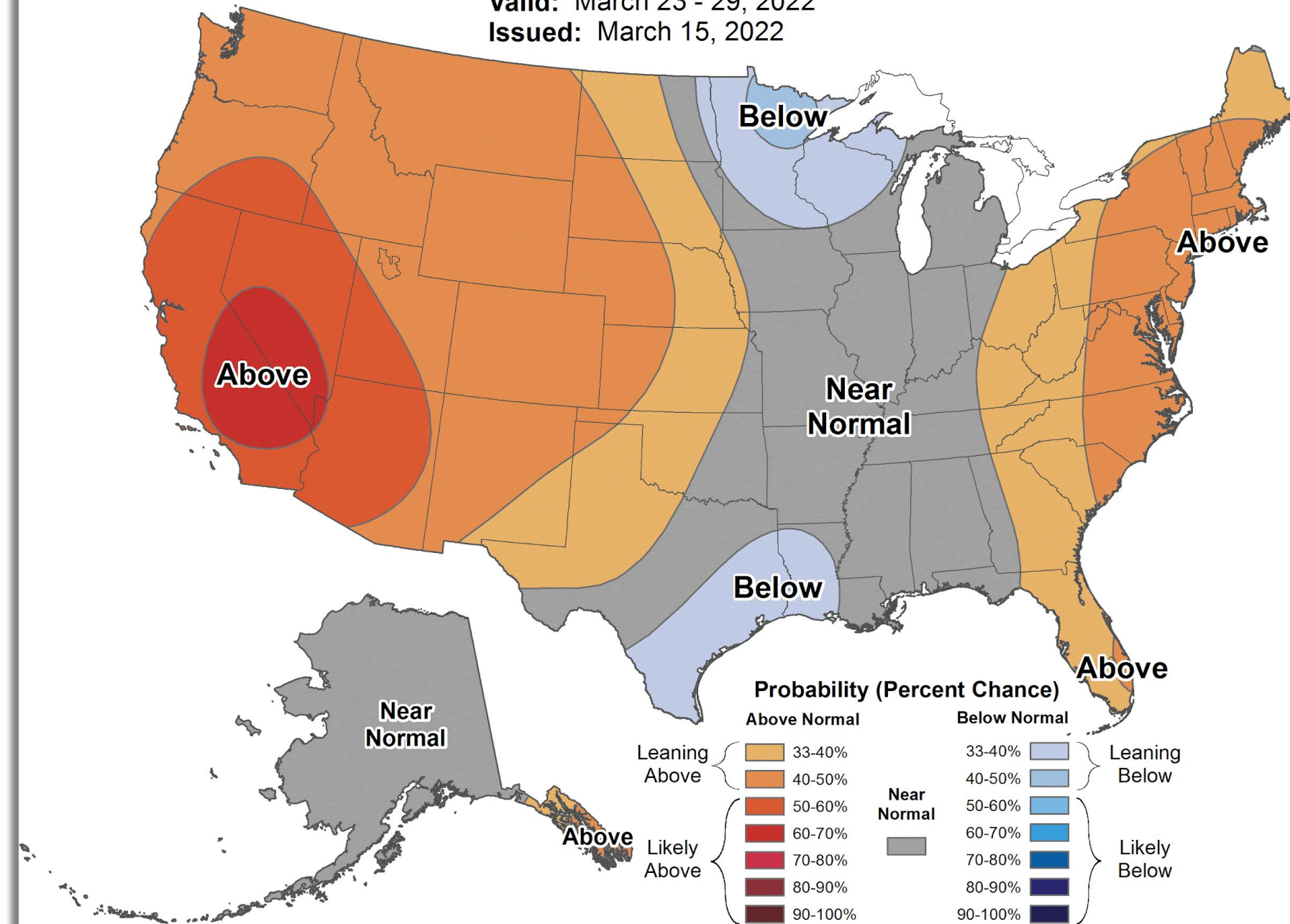
Valid: March 23 - 29, 2022
Issued: March 15, 2022

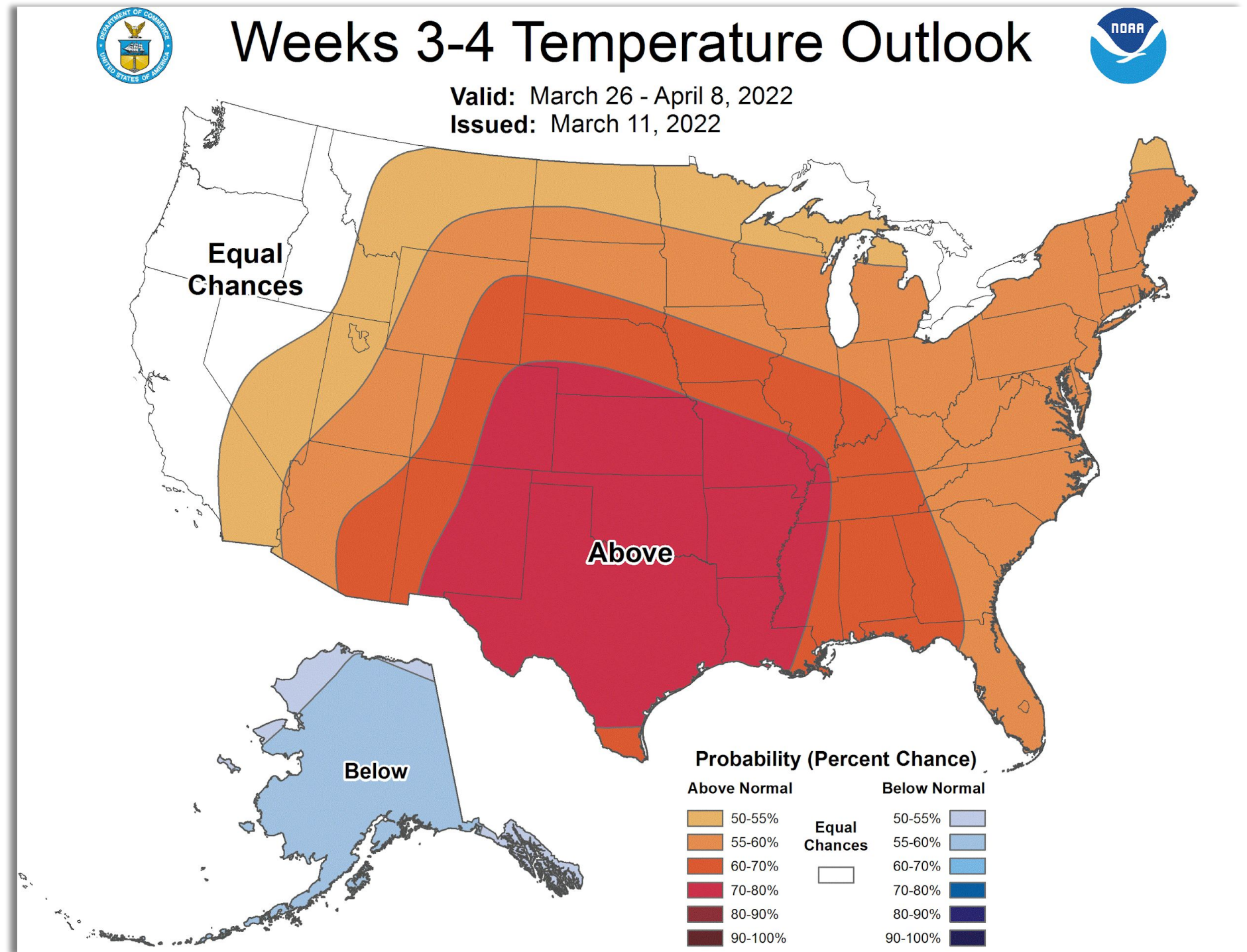
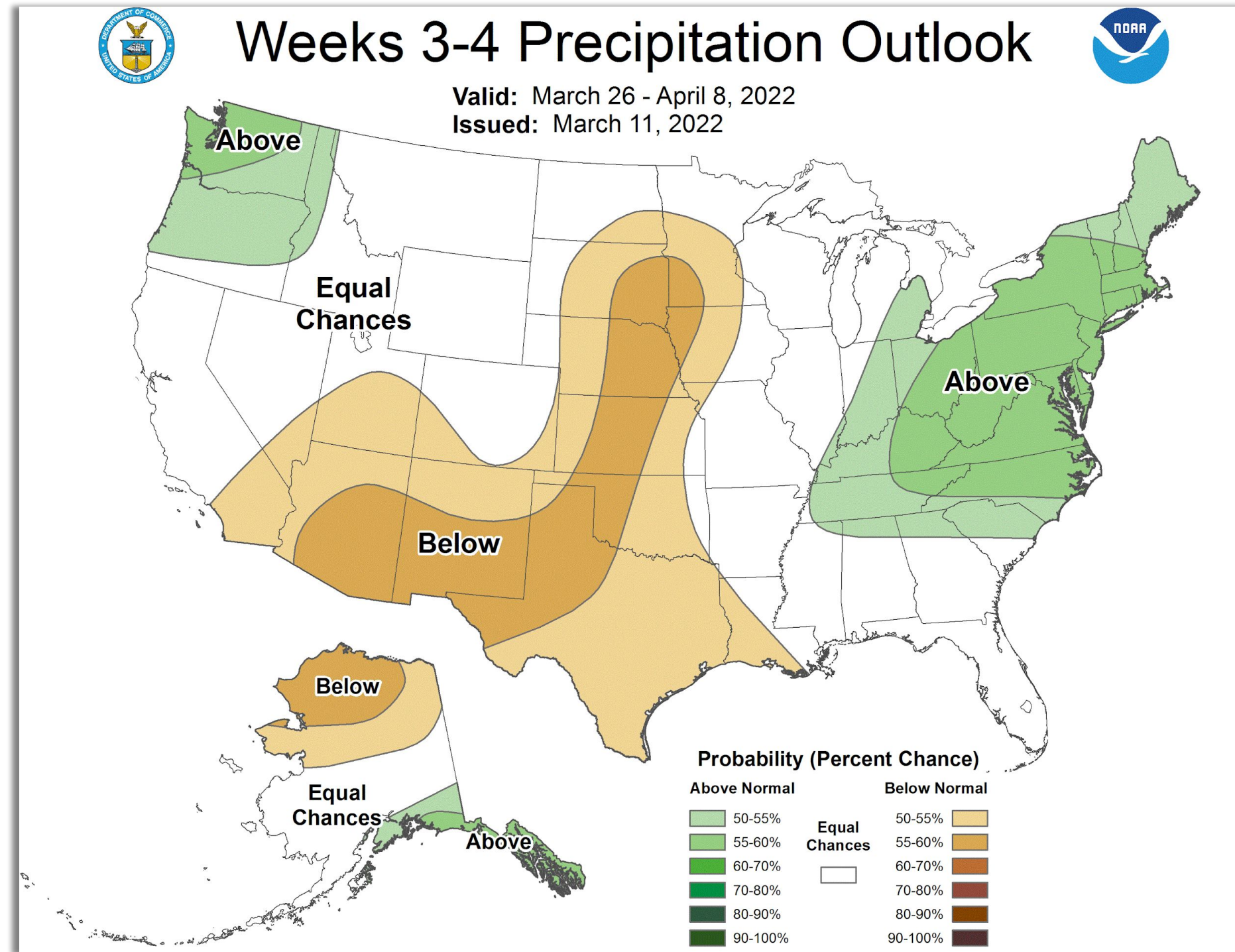


8-14 Day Temperature Outlook



Valid: March 23 - 29, 2022
Issued: March 15, 2022





Typically at 3-4 week lead times is where we look for major pattern shifts toward super wet or dry.

Not seeing that here - so no clear signal either way for the Sierra.

Can't rule out low-moderate end storms which are less predictable at these lead times.

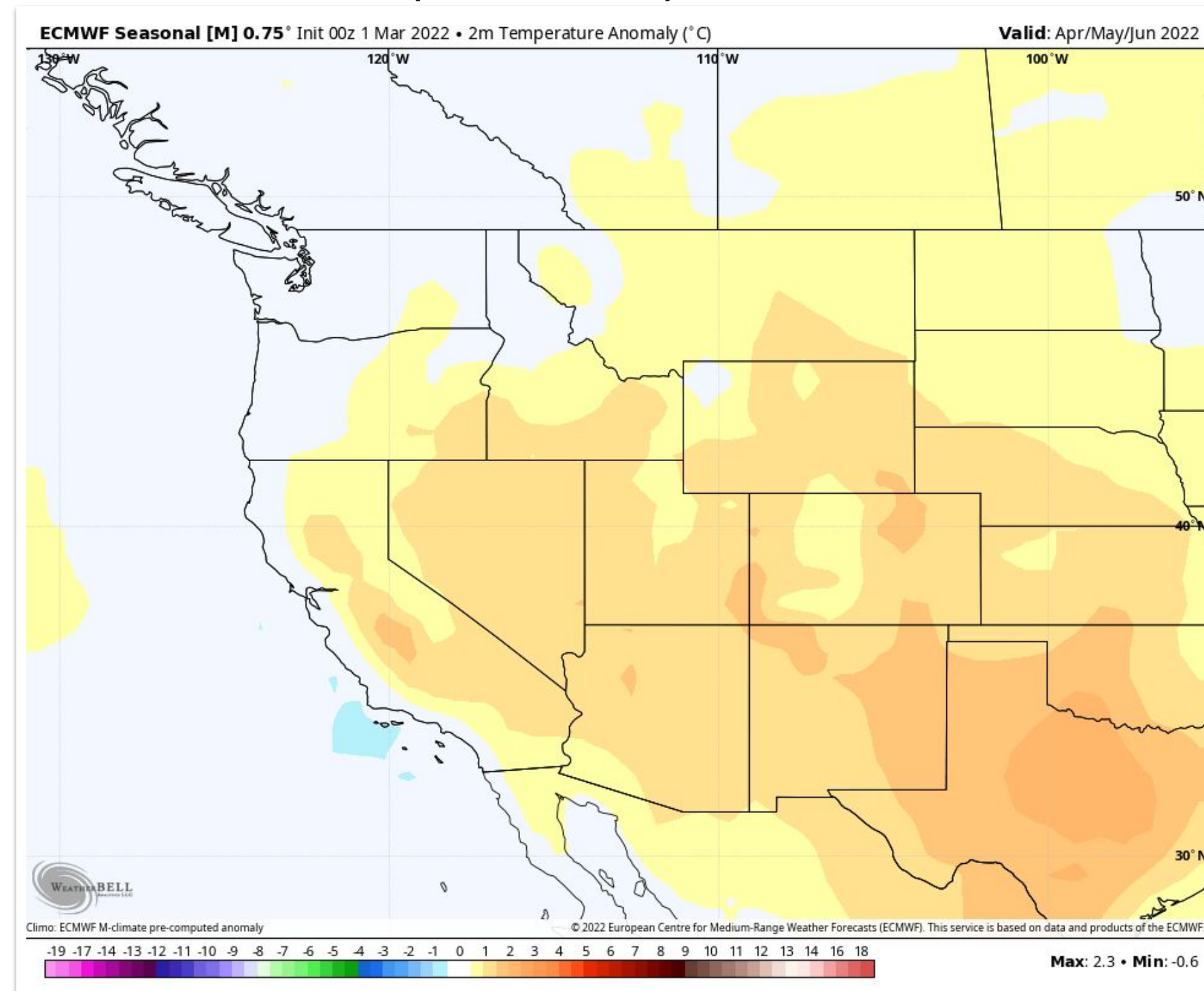
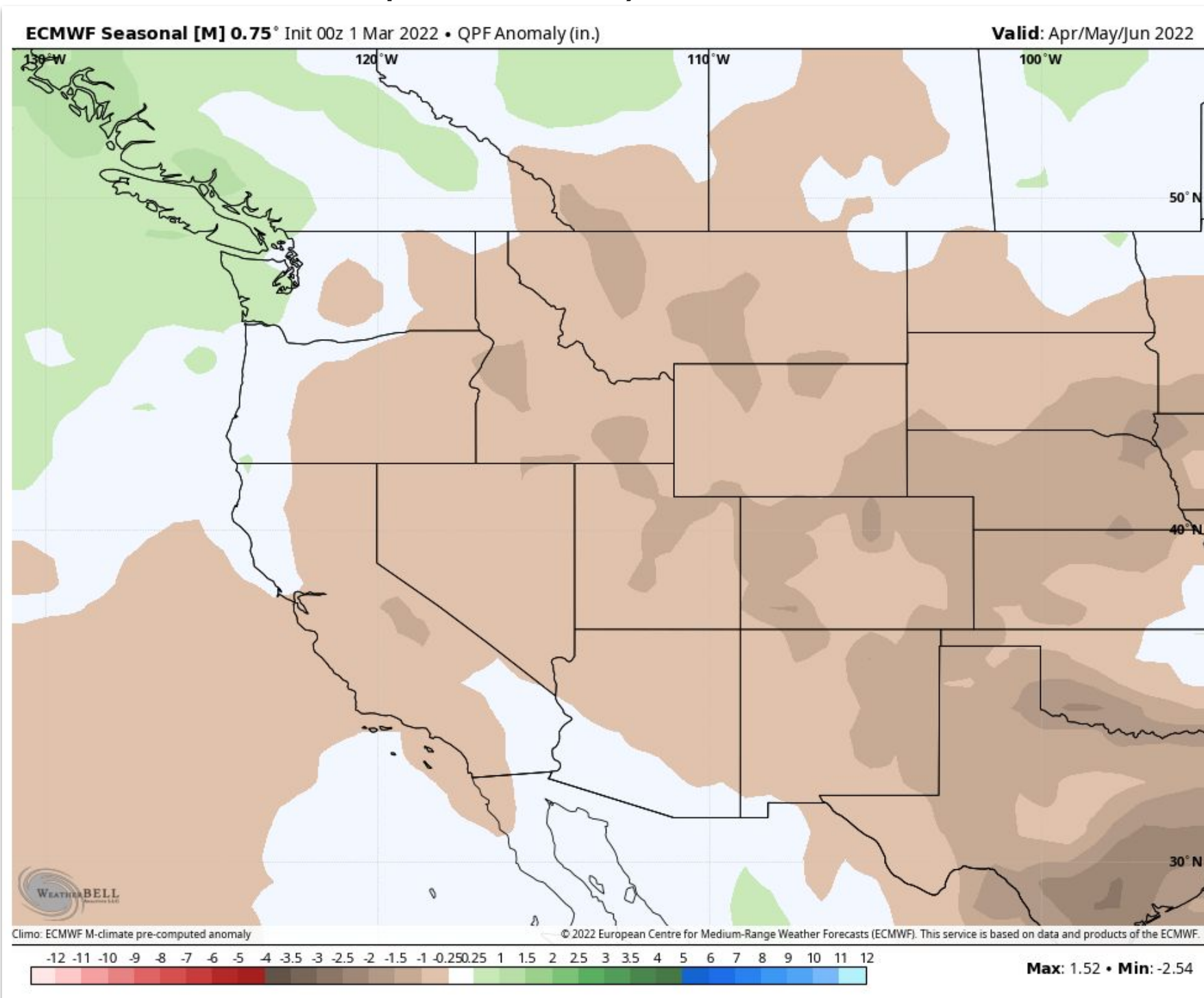


What's Spring Have in Store (April-July)?

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Reno, NV
Wednesday, March 16

Precipitation Anomaly

Temperature Anomaly



Several seasonal models have similar simulations for Apr-June in our area. The CPC seasonal outlooks will be updated tomorrow 3/17 and can be found [here](#).



Snowpack and Water Supply Update

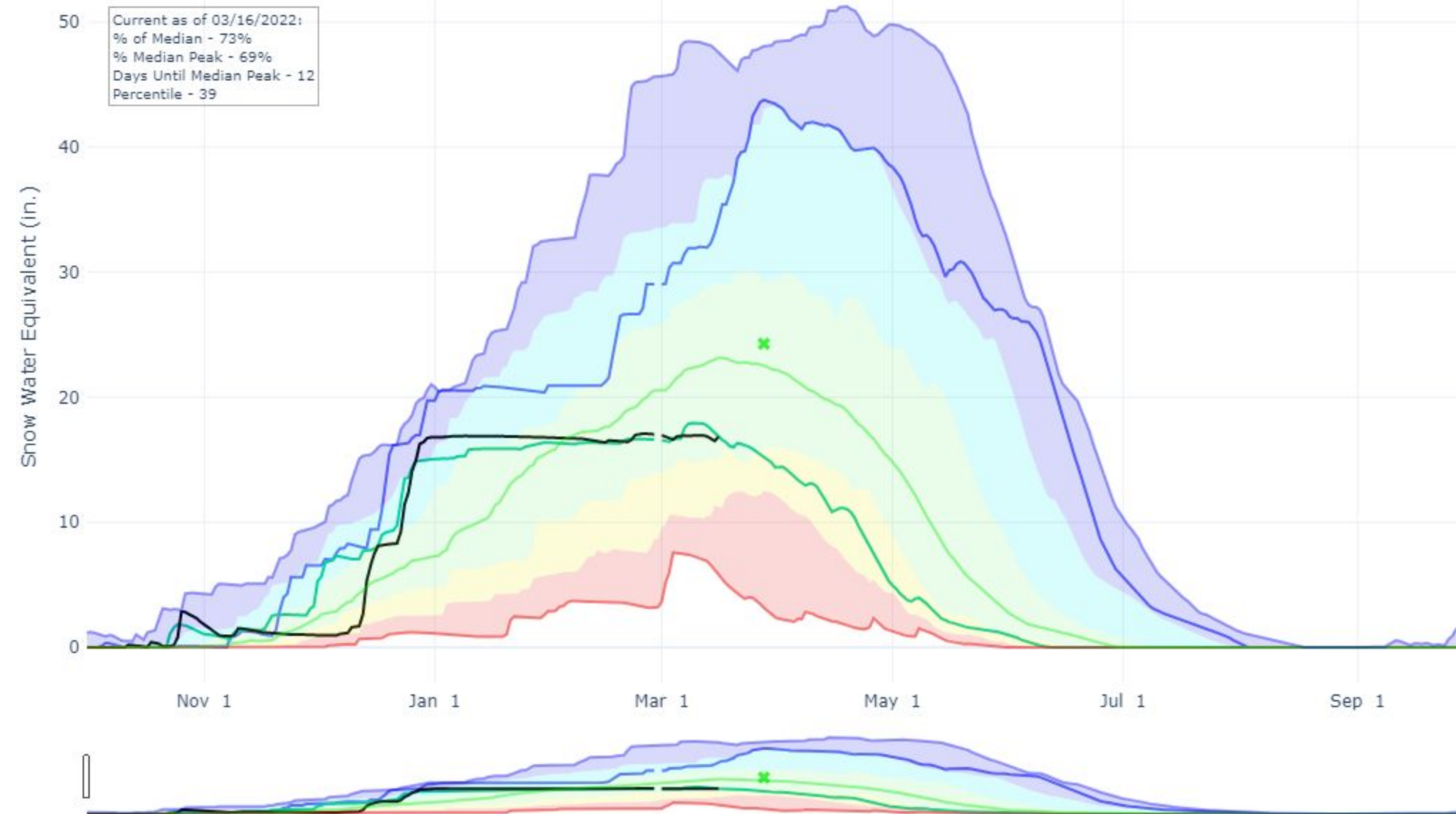
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Reno, NV
Wednesday, March 16

SNOW WATER EQUIVALENT IN EASTERN SIERRA

Reset Range

Link to data: CSV / JSON

Station List



Good news first:

- Water year to date precipitation is near normal.
- Wet soils under snowpack will improve runoff efficiency.
- Decent observed flows to date.
- **Very low snowmelt flood risk**

Not so good news:

- ~55 day mid winter snow drought with record low January and February precipitation at many sites.
- Recent “storms” did little for water supply.
- Late winter warm periods have ripened the snowpack.
- Declining water supply outlooks.
- Miracle March? Nope.



Eastern Sierra Snowpack

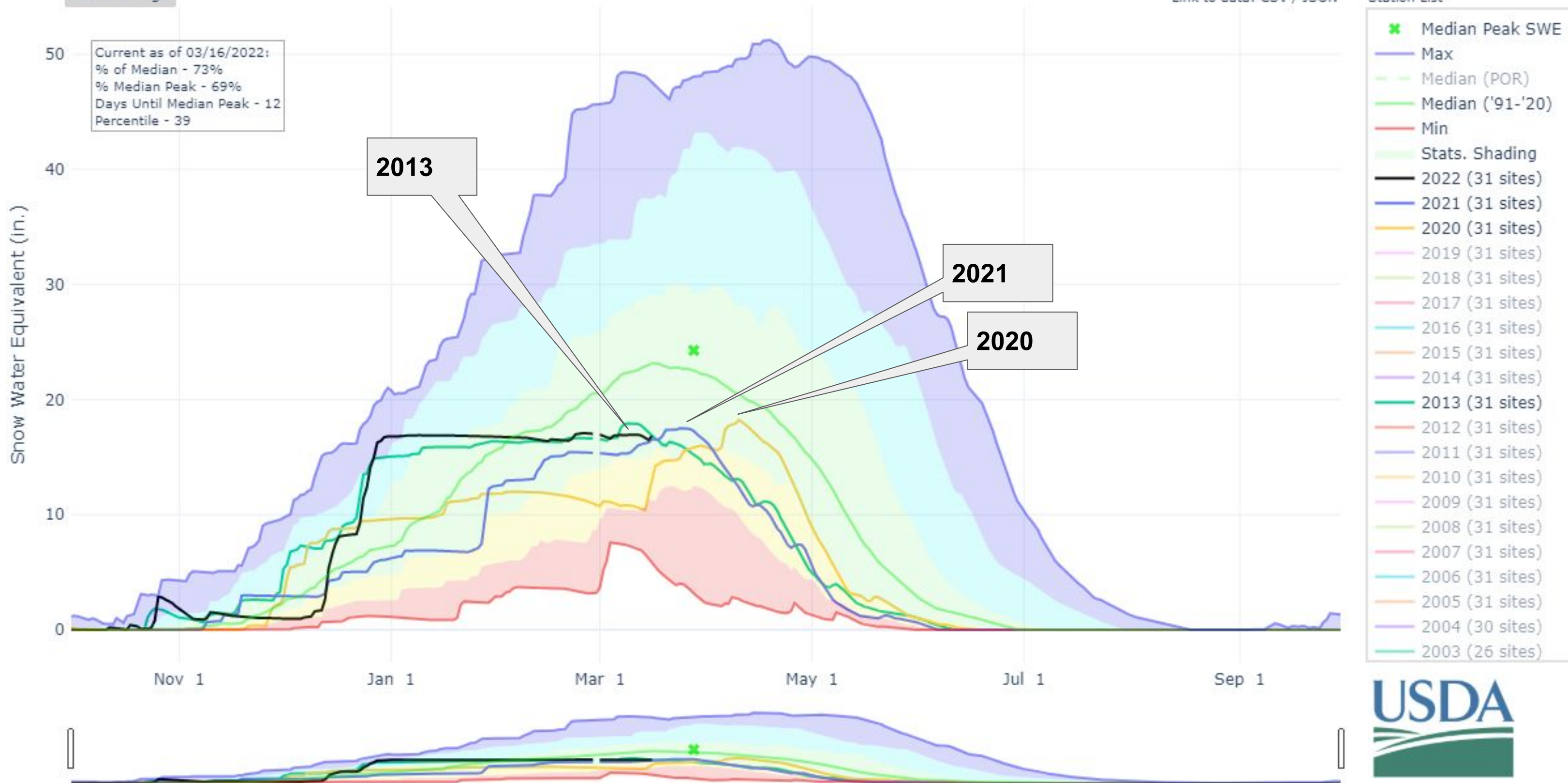
SNOW WATER EQUIVALENT IN EASTERN SIERRA

Reset Range

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

Station List

Current as of 03/16/2022:
% of Median - 73%
% Median Peak - 69%
Days Until Median Peak - 12
Percentile - 39





Humboldt Snowpack

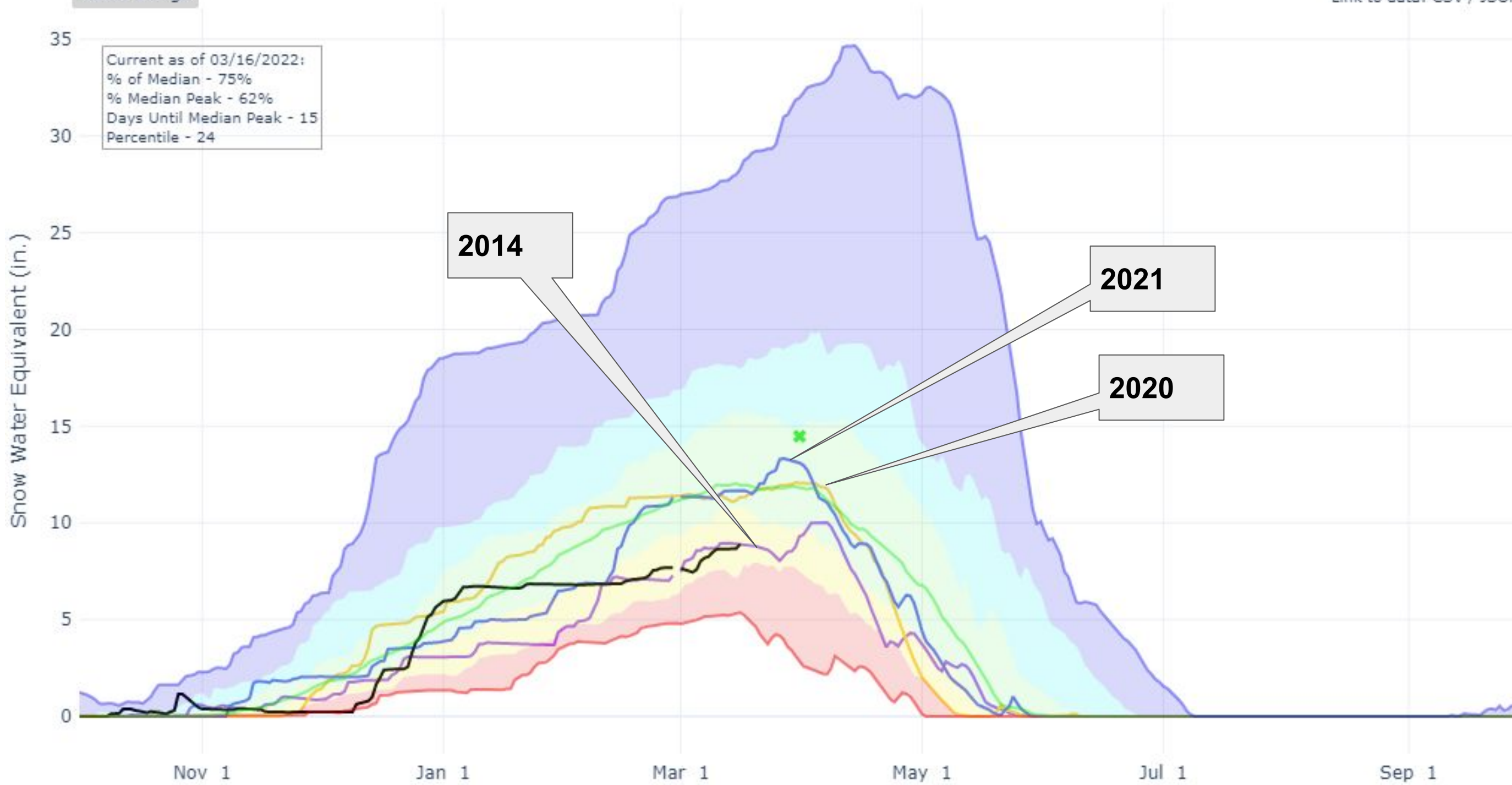
SNOW WATER EQUIVALENT IN HUMBOLDT

Reset Range

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

Station List

Current as of 03/16/2022:
% of Median - 75%
% Median Peak - 62%
Days Until Median Peak - 15
Percentile - 24



- * Median Peak SWE
- Max
- Median (POR)
- Median ('91-'20)
- Min
- Stats. Shading
- 2022 (16 sites)
- 2021 (16 sites)
- 2020 (16 sites)
- 2019 (16 sites)
- 2018 (16 sites)
- 2017 (16 sites)
- 2016 (16 sites)
- 2015 (16 sites)
- 2014 (16 sites)
- 2013 (15 sites)
- 2012 (15 sites)
- 2011 (15 sites)
- 2010 (15 sites)
- 2009 (14 sites)
- 2008 (14 sites)
- 2007 (14 sites)
- 2006 (14 sites)
- 2005 (14 sites)
- 2004 (14 sites)
- 2003 (14 sites)

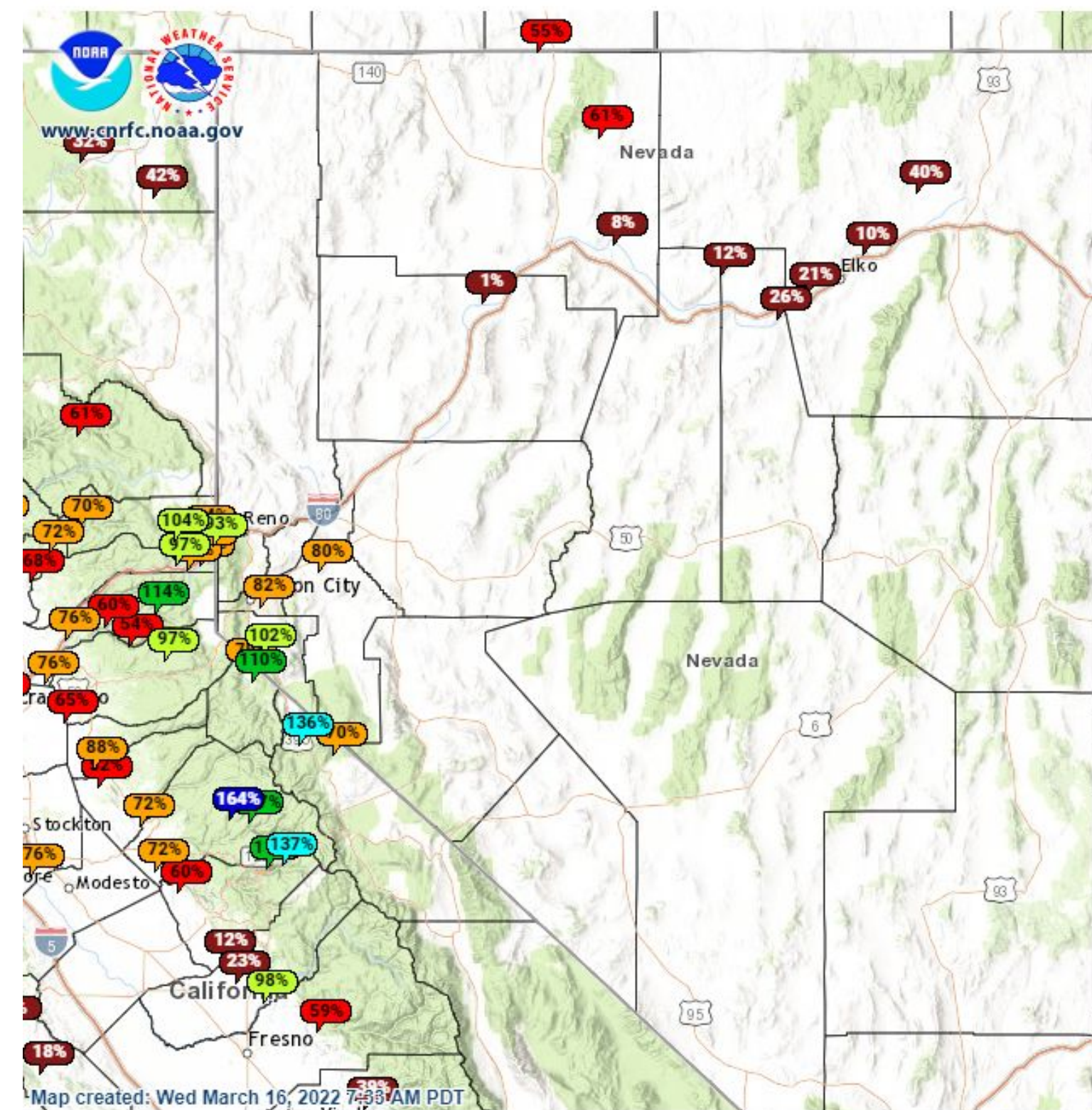




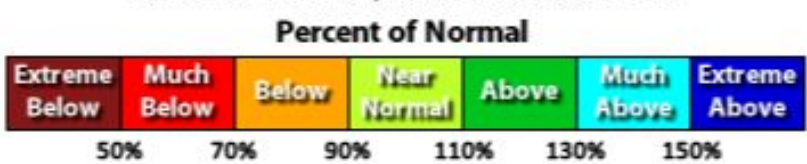
Observed Streamflows

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Wednesday, March 16

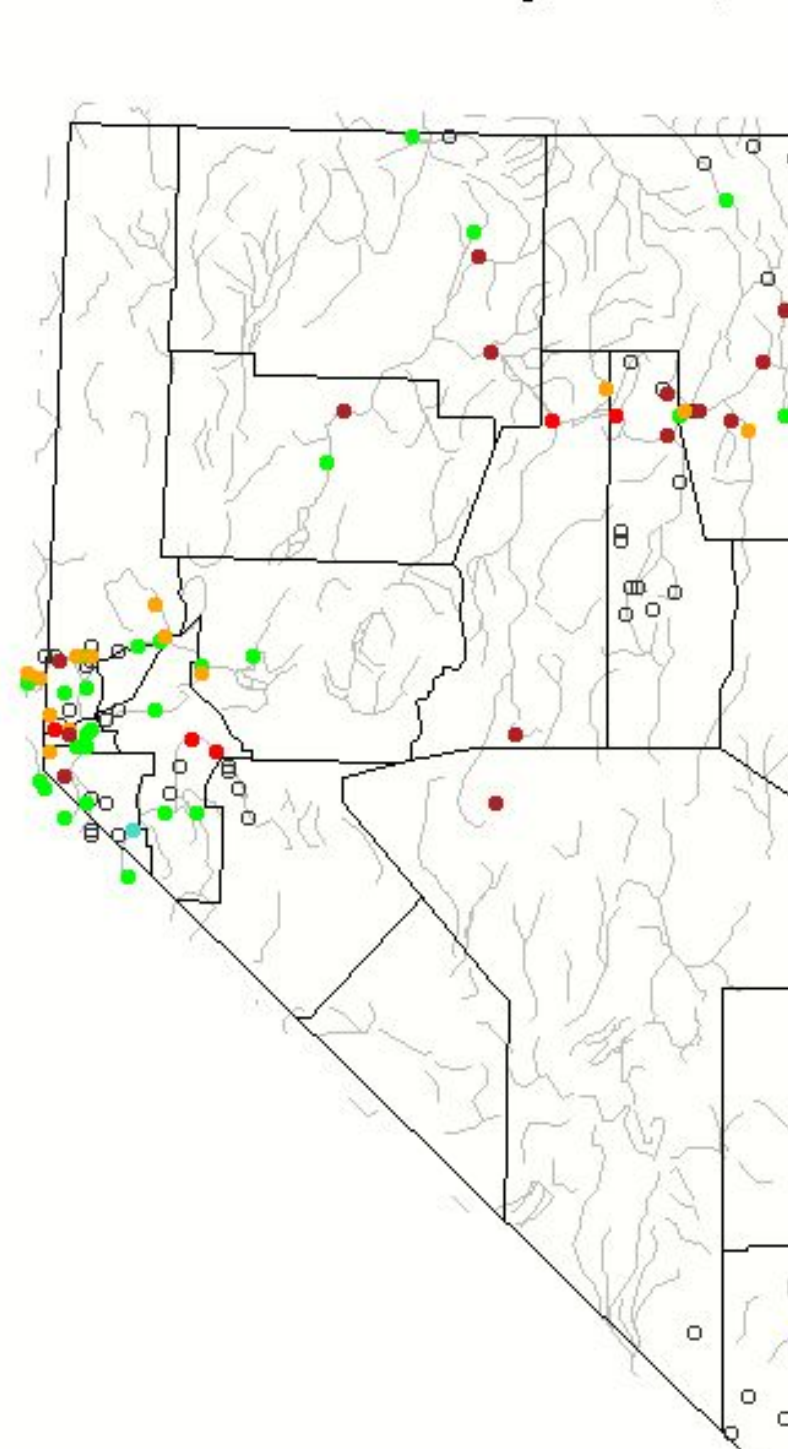
WY to Date Observed Flows



Valid: Tue Mar 15, 2022 at 5:00 AM PDT

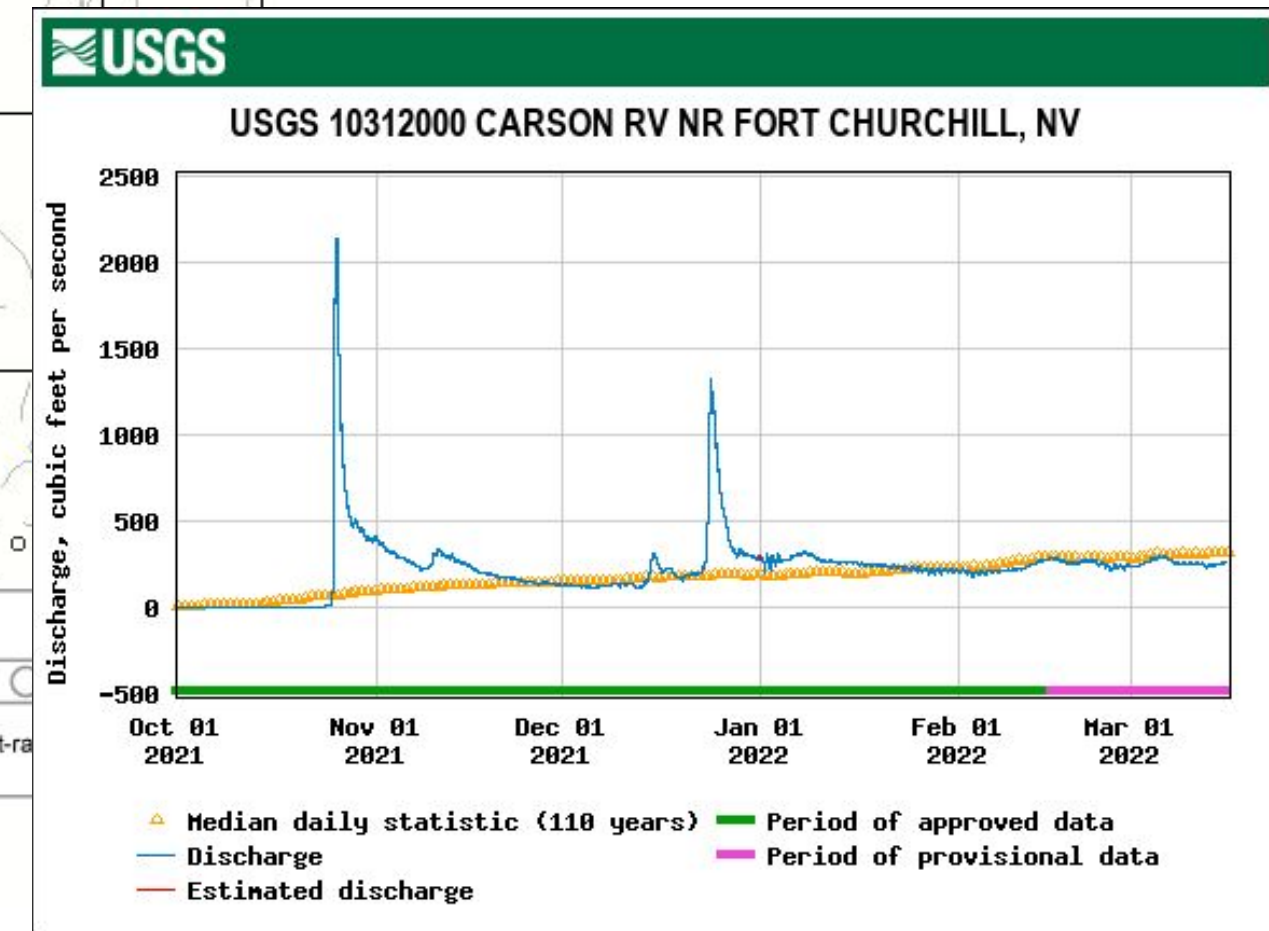
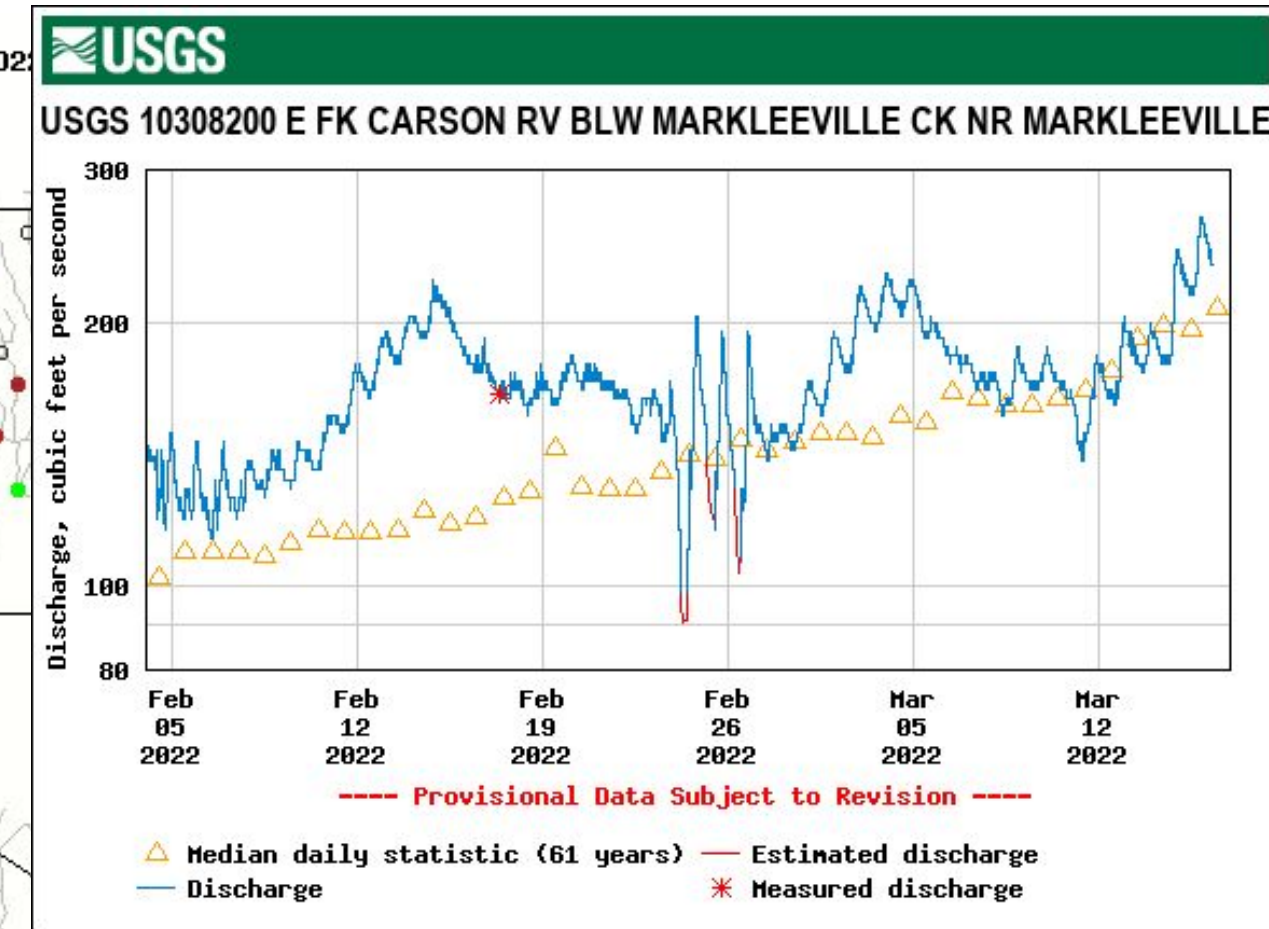


Tuesday, March 15, 2022



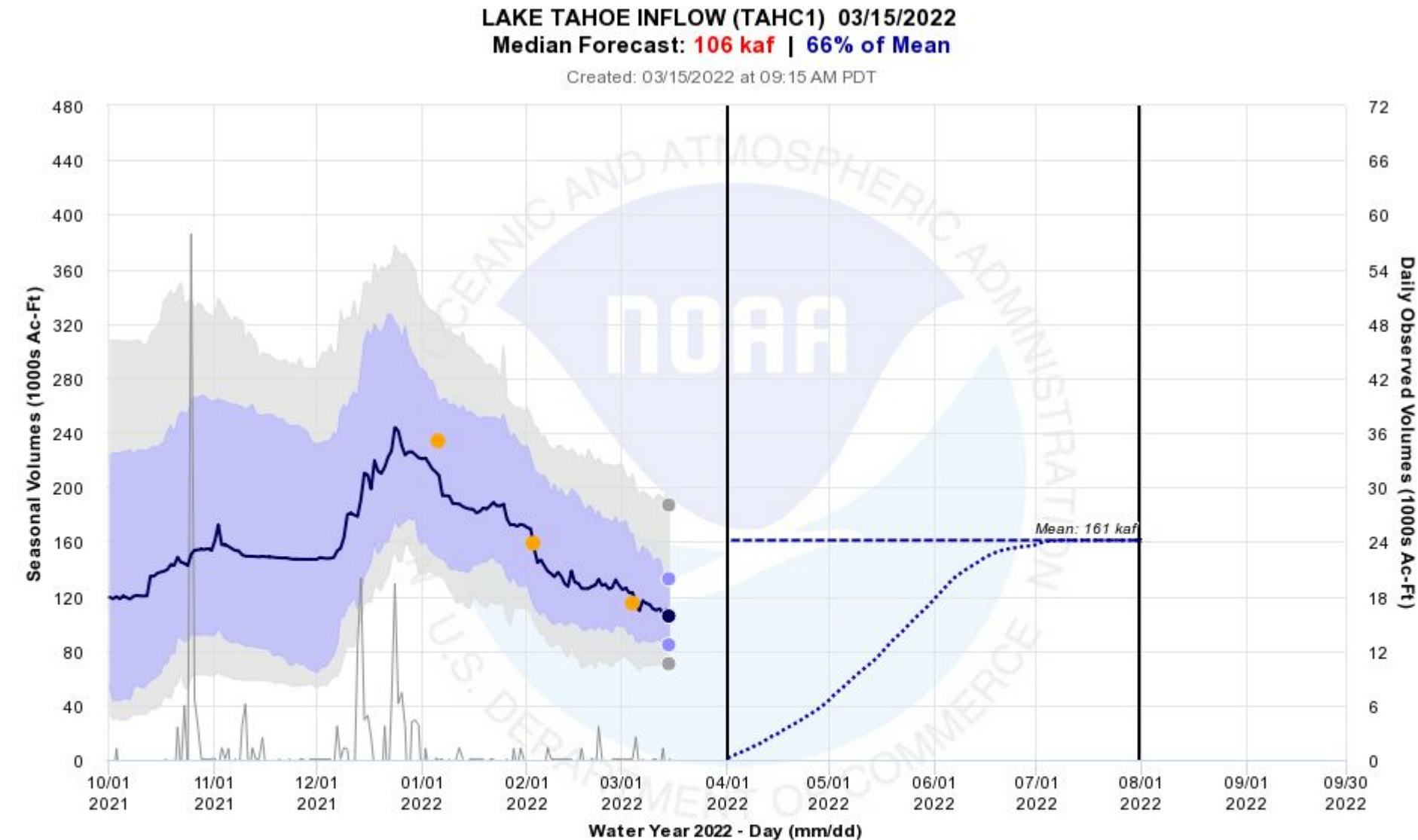
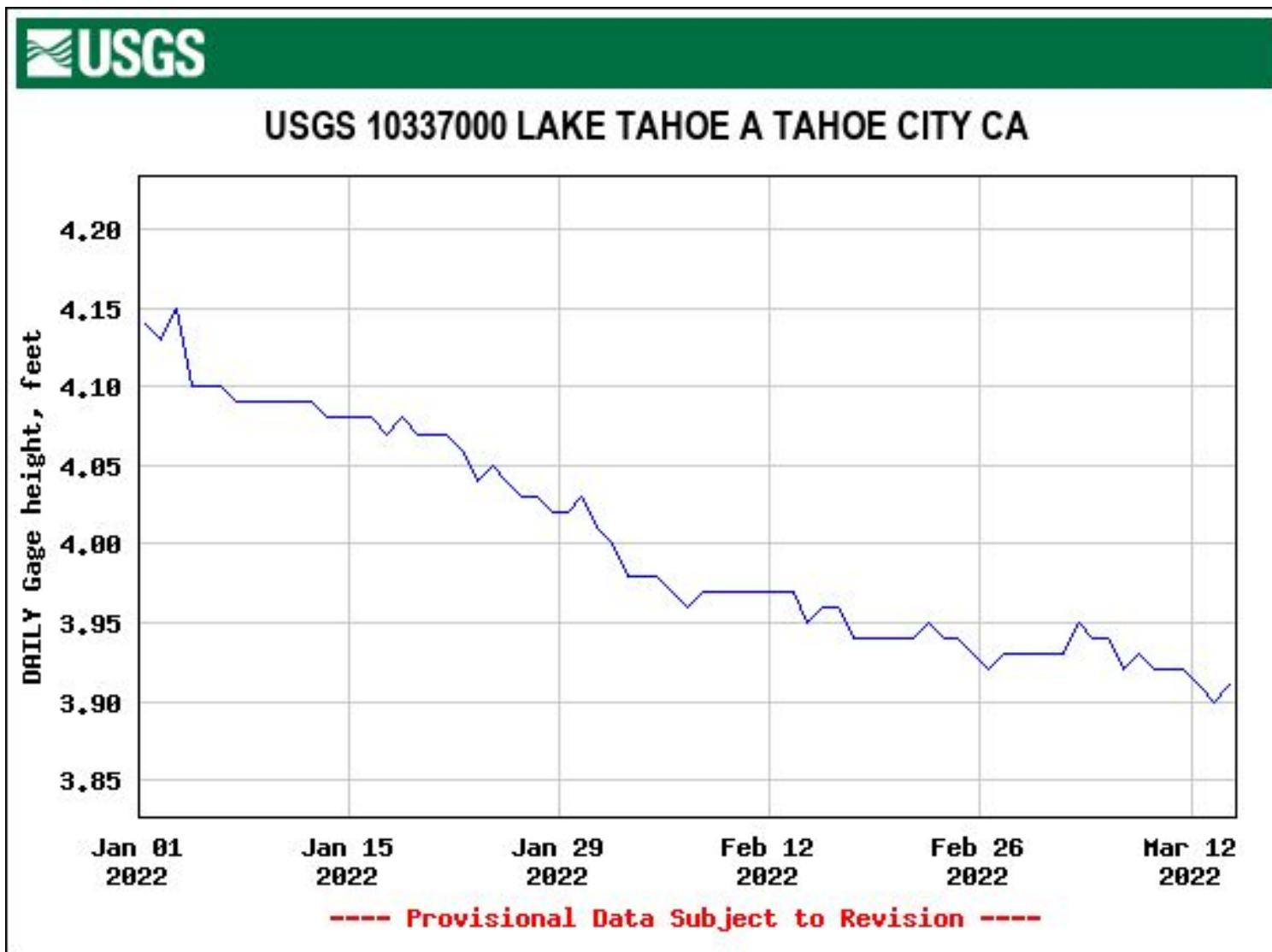
Explanation - Percentile classes

Low	<10	10-24	25-75	76-90	>90	High	Not-r
	Much below normal	Below normal	Normal	Above normal	Much above normal		





Another Drought Indicator

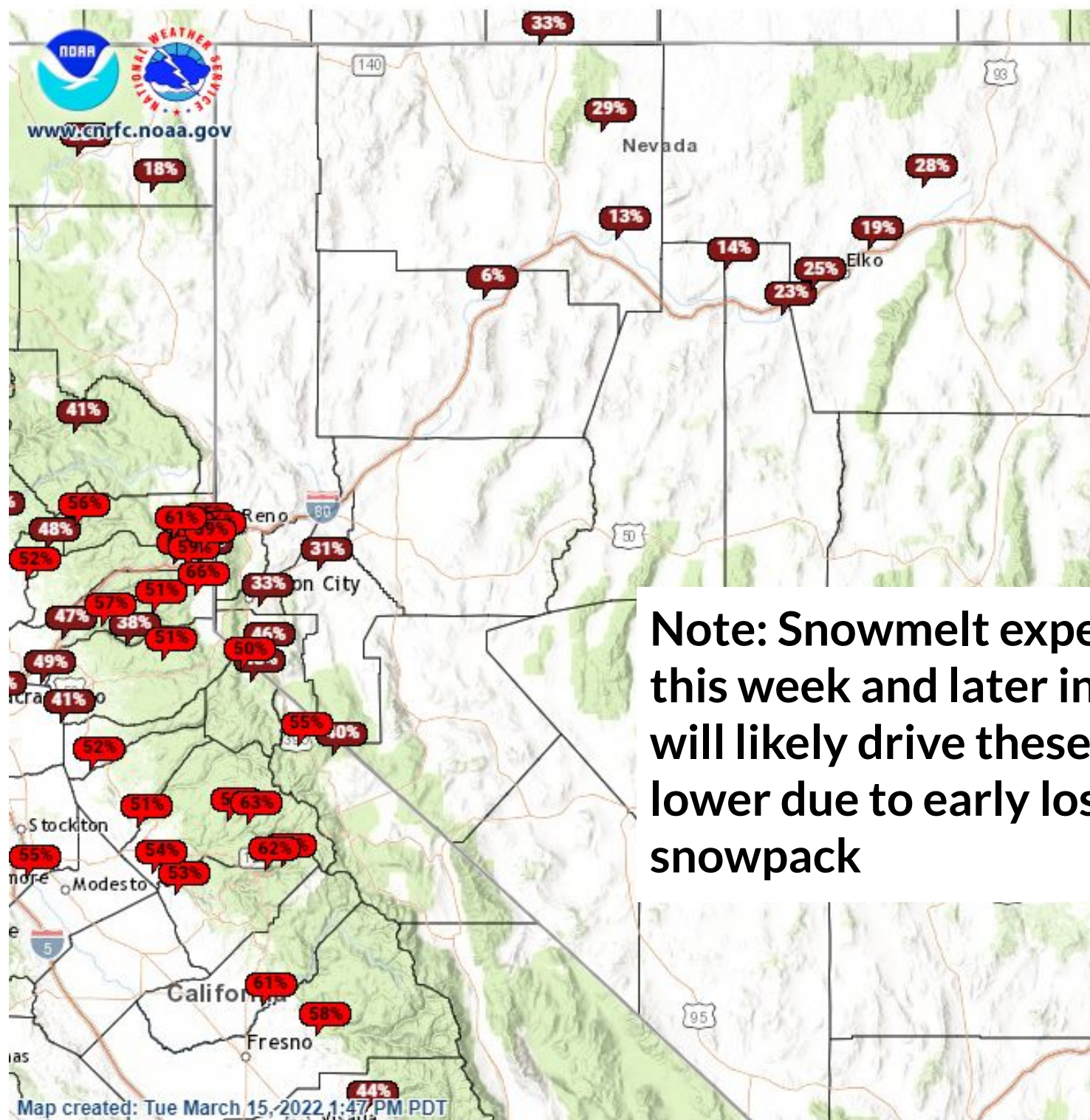


Observed Season to Date Percent of Mean: N/A% (M kaf) Season to Date Mean: kaf
 Historical Apr-Jul Vol Max: 454 kaf in 2017 Historical Apr-Jul Vol Min: Not Available
 This product only considers meteorological uncertainty and does not account for hydrologic uncertainty.
 Means/medians are based on the period of Water Years 1980 through 2020.
 Legend entries below can be toggled on/off.

- January and February declines in Tahoe not unprecedented, but estimated net inflow was 2nd worst Jan-Feb period in record (2013 was slight worse and 1991 slightly better)
- 2020 and 2021 Water Year combined net inflows were 2nd worst 2 year period on record (1987-88 was worse)
- 2020-2022 Water Years on track to be 3rd worst unique 3 WY period for net inflows.

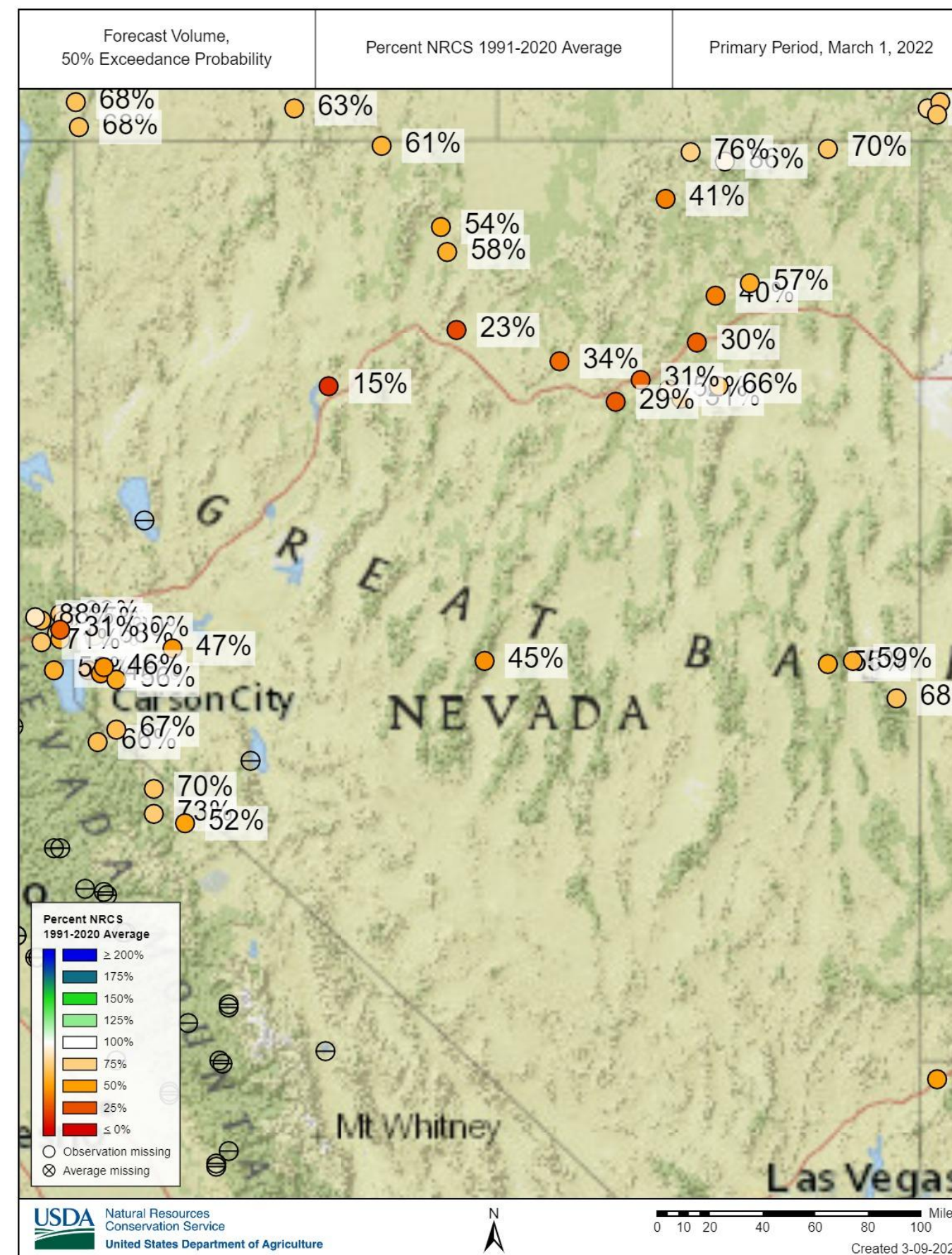
- Apr-Jul Vol Mean
- NWS/NRCS Coord. Apr-Jul Fcs
- ESP Apr-Jul Fcst 25/75%
- Record High
- Apr-Jul Vol Median
- Season to Date Obs
- ESP Apr-Jul Fcst 10/90%
- ▼ Snow Model Updates
- Season to Date Mean
- Daily Obs
- ESP Apr-Jul Fcst Max/Min
- Season to Date Median
- ESP Apr-Jul Fcst 50%
- Record Low

NWS CNRFC April-July Forecasts (3/15/22)



Note: Snowmelt expected later this week and later in March will likely drive these numbers lower due to early losses in snowpack

NRCS Seasonal Forecasts (3/1/22)



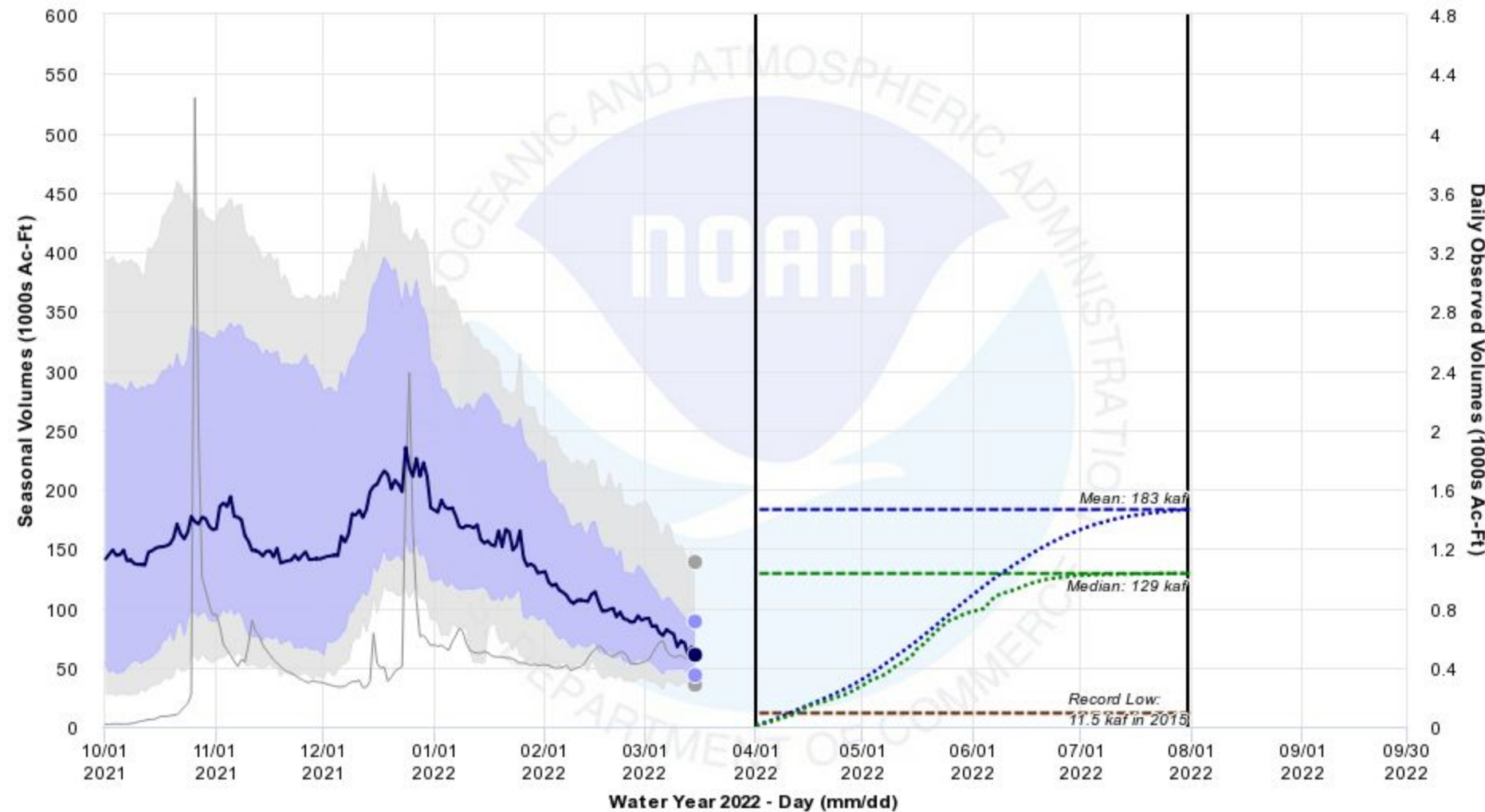


April-July 2022 Water Supply Forecasts

Weather Forecast Office
Reno, NV
Wednesday, March 16

CARSON - CARSON CITY, NR (STWN2) 03/15/2022
Median Forecast: 60.5 kaf | 33% of Mean | 47% of Median

Created: 03/15/2022 at 09:15 AM PDT



Observed Season to Date Percent of Mean: N/A% (M kaf) Season to Date Mean: kaf
 Historical Apr-Jul Vol Max: 558 kaf in 2017 Historical Apr-Jul Vol Min: 11.5 kaf in 2015

This product only considers meteorological uncertainty and does not account for hydrologic uncertainty.

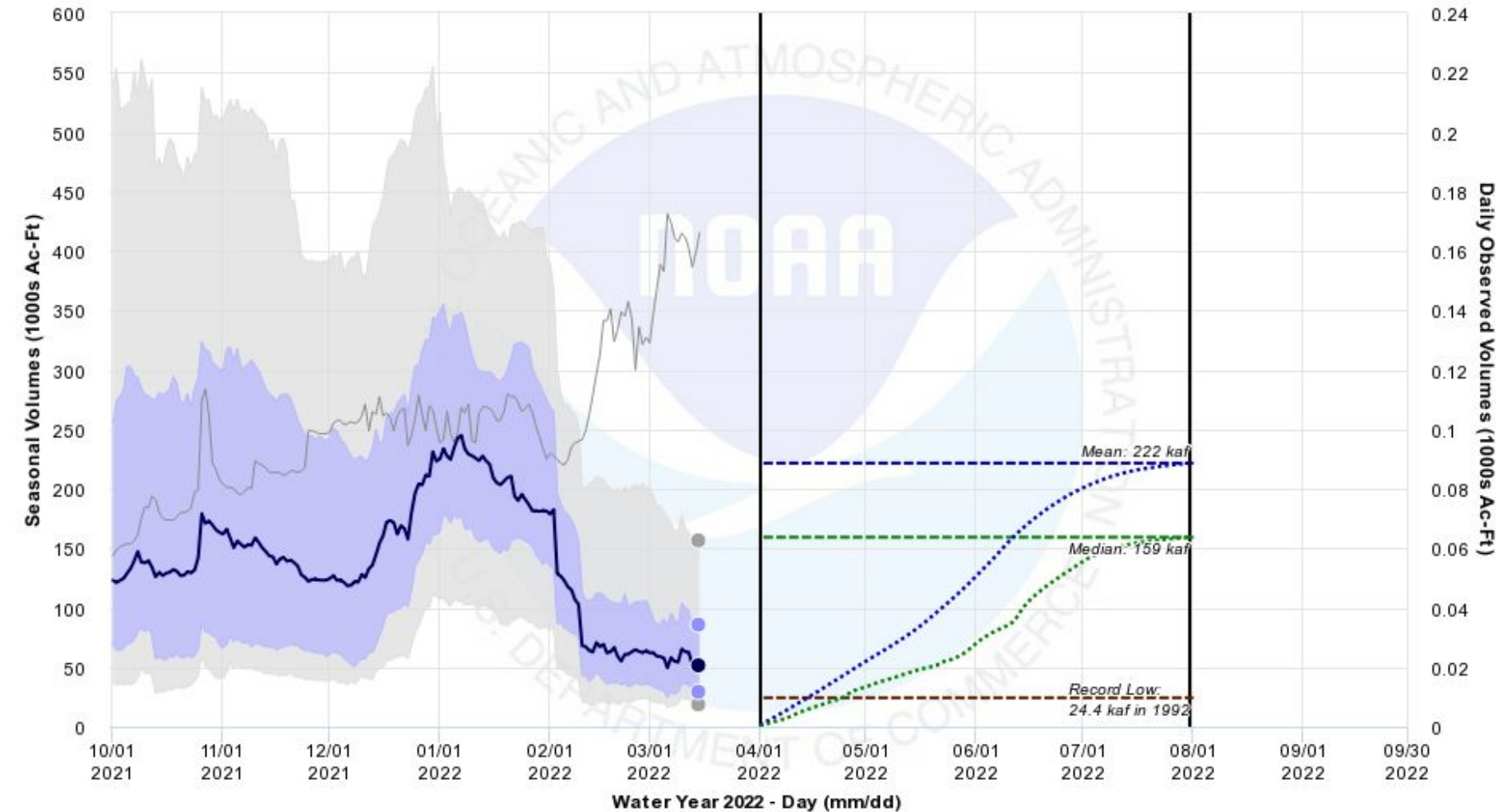
Means/medians are based on the period of Water Years 1980 through 2020.

Legend entries below can be toggled on/off.

- Apr-Jul Vol Mean
- Apr-Jul Vol Median
- Season to Date Mean
- ◆ Season to Date Median
- Season to Date Obs
- Daily Obs
- ESP Apr-Jul Fcst 50%
- ESP Apr-Jul Fcst 25/75%
- ESP Apr-Jul Fcst 10/90%
- ESP Apr-Jul Fcst Max/Min
- Record Low
- Record High
- ▼ Snow Model Updates

HUMBOLDT - PALISADE (PALN2) 03/15/2022
Median Forecast: 51.6 kaf | 23% of Mean | 32% of Median

Created: 03/15/2022 at 09:28 AM PDT



Observed Season to Date Percent of Mean: N/A% (M kaf) Season to Date Mean: kaf
 Historical Apr-Jul Vol Max: 999 kaf in 1984 Historical Apr-Jul Vol Min: 24.4 kaf in 1992

This product only considers meteorological uncertainty and does not account for hydrologic uncertainty.

Means/medians are based on the period of Water Years 1980 through 2020.

Legend entries below can be toggled on/off.

- Apr-Jul Vol Mean
- Apr-Jul Vol Median
- Season to Date Mean
- ◆ Season to Date Median
- Season to Date Obs
- Daily Obs
- ESP Apr-Jul Fcst 50%
- ESP Apr-Jul Fcst 25/75%
- ESP Apr-Jul Fcst 10/90%
- ESP Apr-Jul Fcst Max/Min
- Record Low
- Record High
- ▼ Snow Model Updates

CNRFC 90% exceedance 35 KAF 2021 Obs = 26 KAF, 2013 Obs = 47 KAF. NRCS, March 1st. 50th is 100 KAF

CNRFC 90% exceedance 19KAF 2021 Obs = 53.5 KAF, 2014 Obs = 49.6 KAF. NRCS March 1st. 0th is 57 KAF

**** Note CNRFC seasonal forecast model only accounts for meteorological uncertainty, not hydrologic uncertainty. Bounds get artificially narrow after ~ early April**

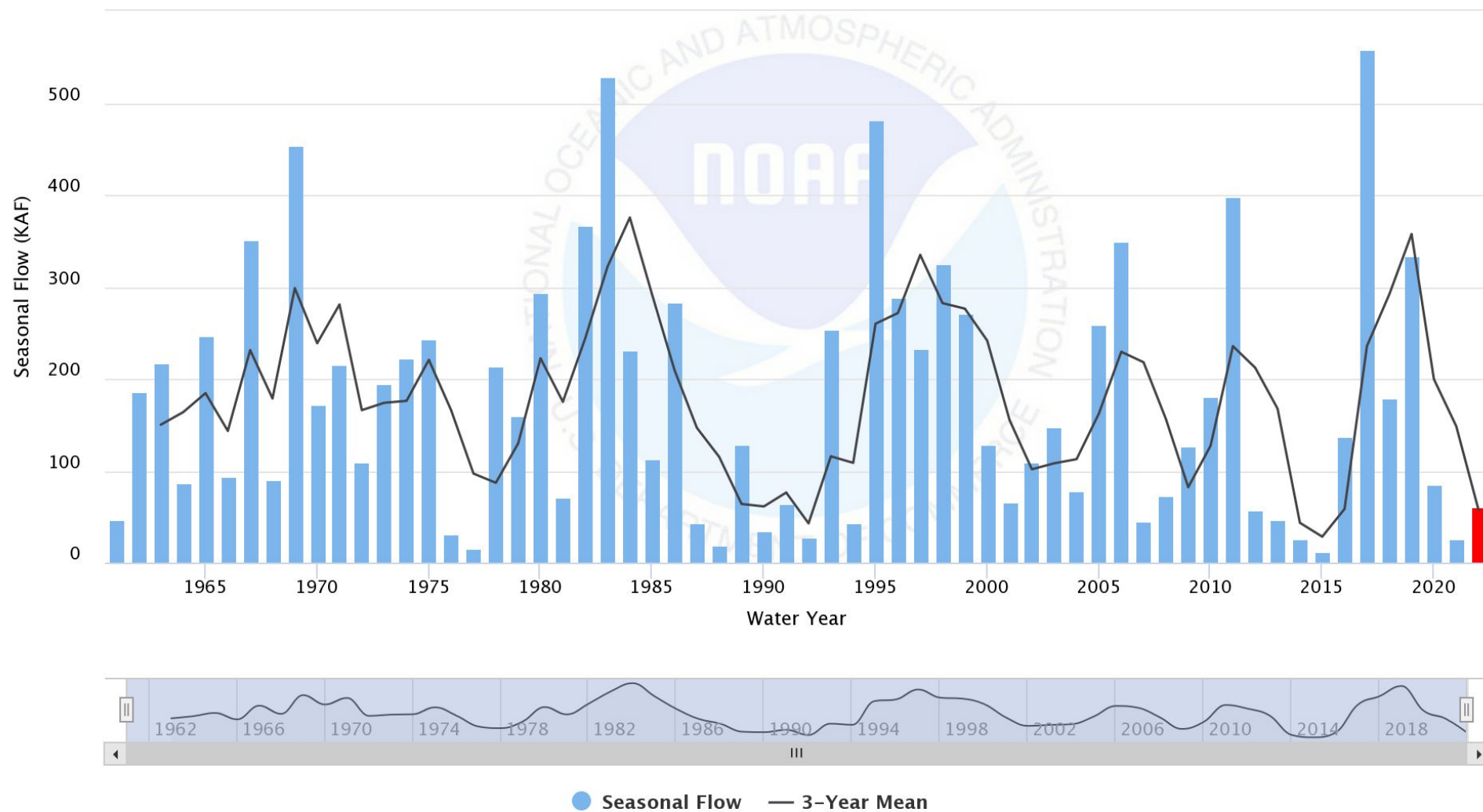


April-July Forecasts

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Reno, NV
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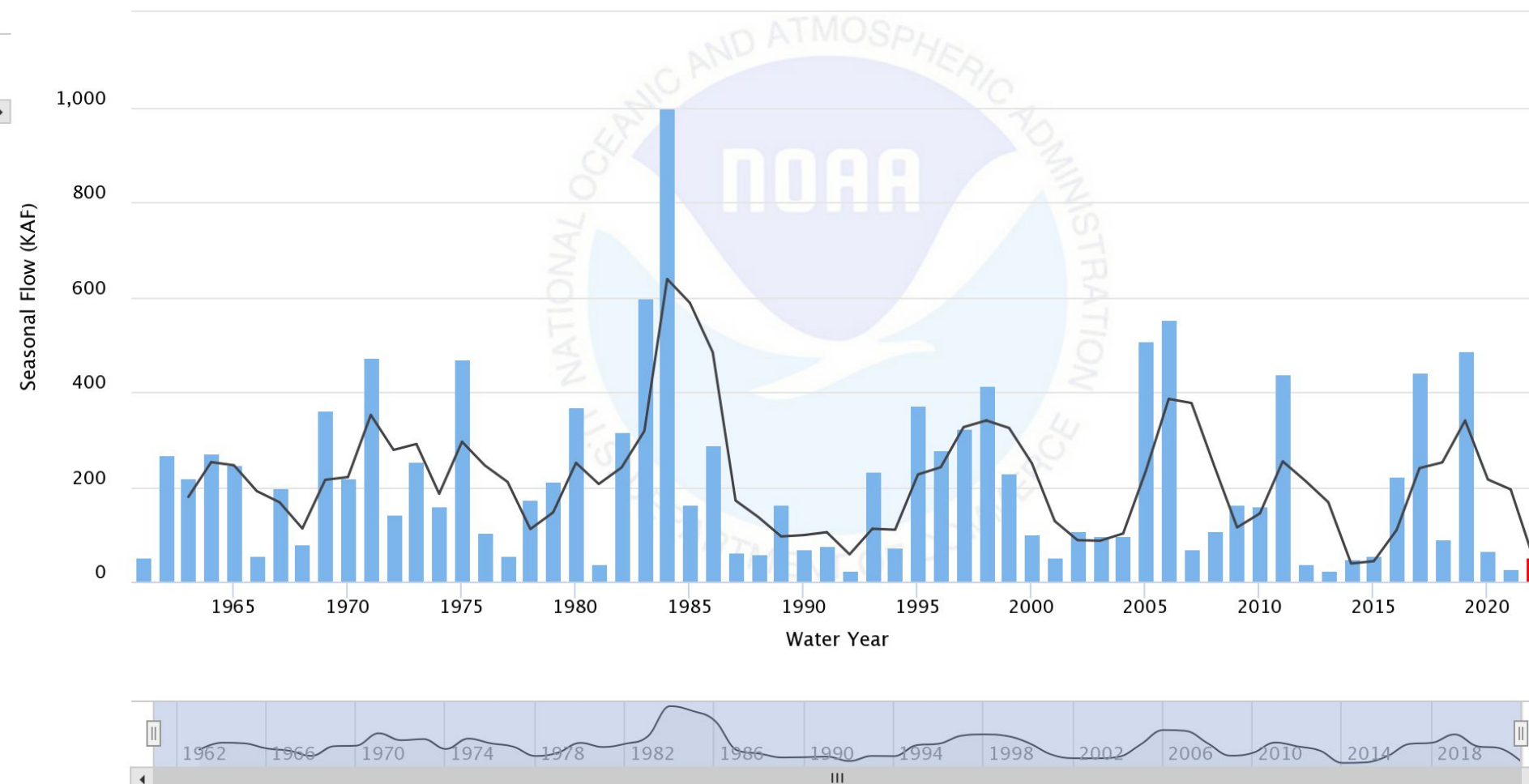
Carson nr Carson City

Seasonal (Apr-Jul) Historical Flow for STWN2



Humboldt nr Palisade

Seasonal (Apr-Jul) Historical Flow for PALN2



If median forecast verify, Carson Carson would be the 4th driest 3 year period on record, and Palisade would be the 3rd.



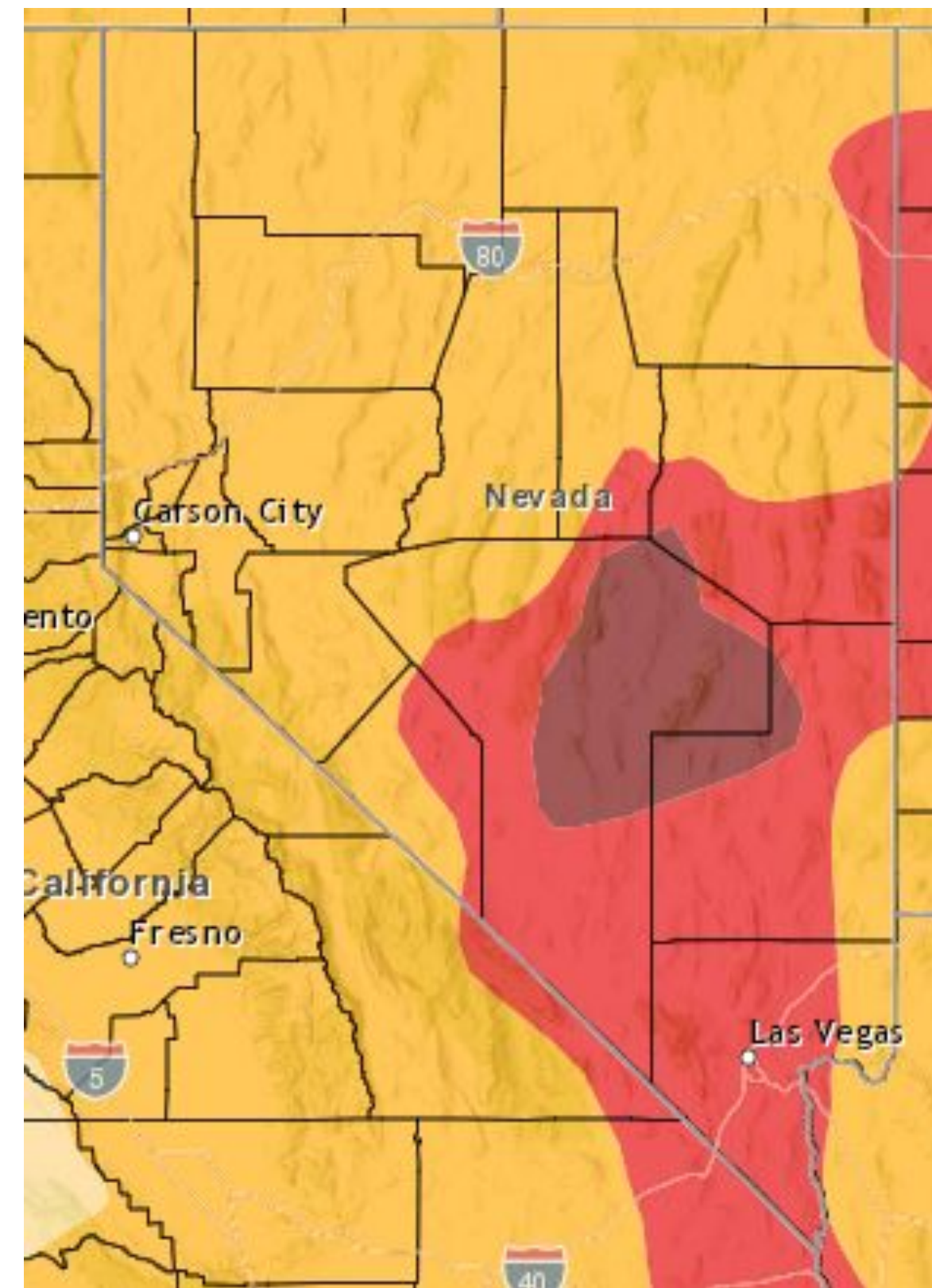
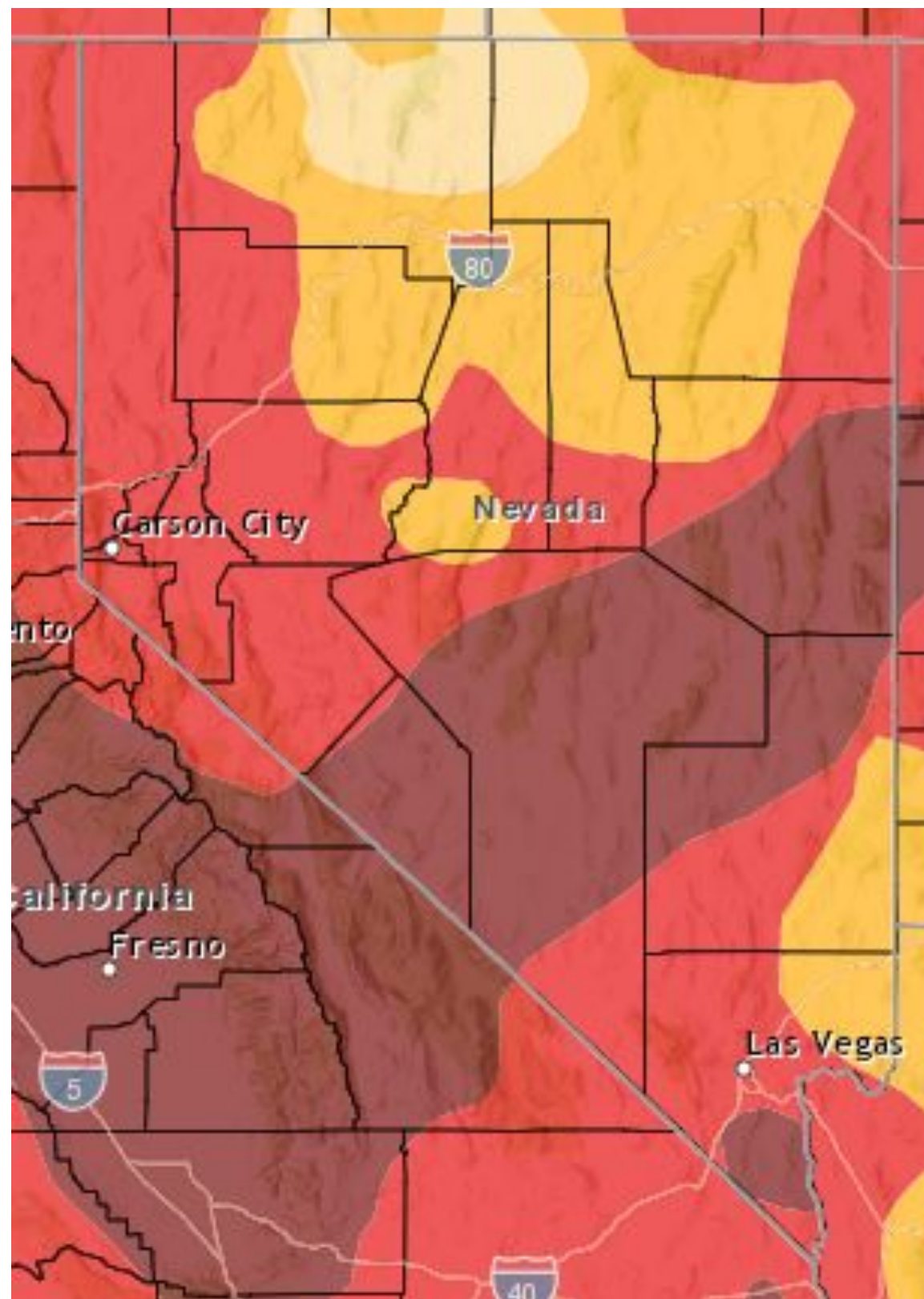
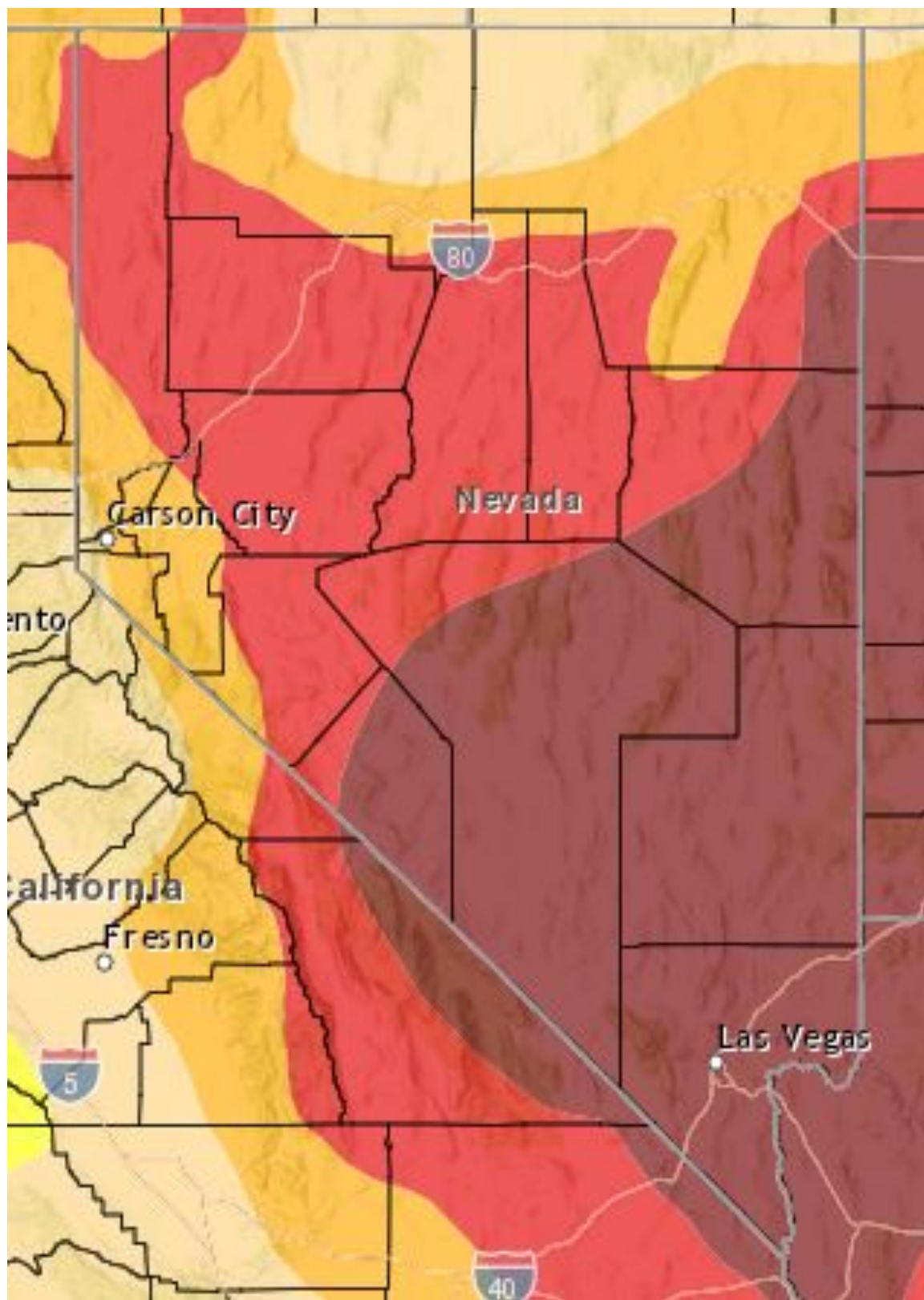
Drought Status

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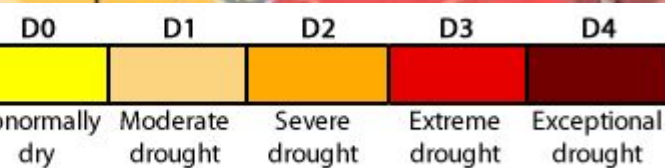
3/11/2021

9/30/2021

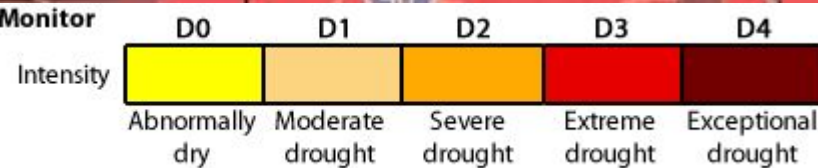
3/10/2022



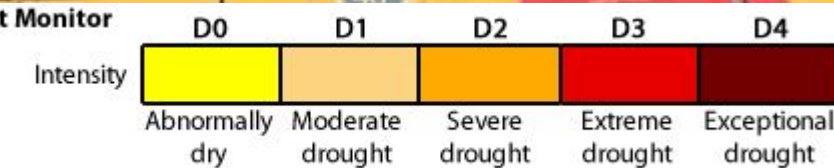
U.S. Drought Monitor

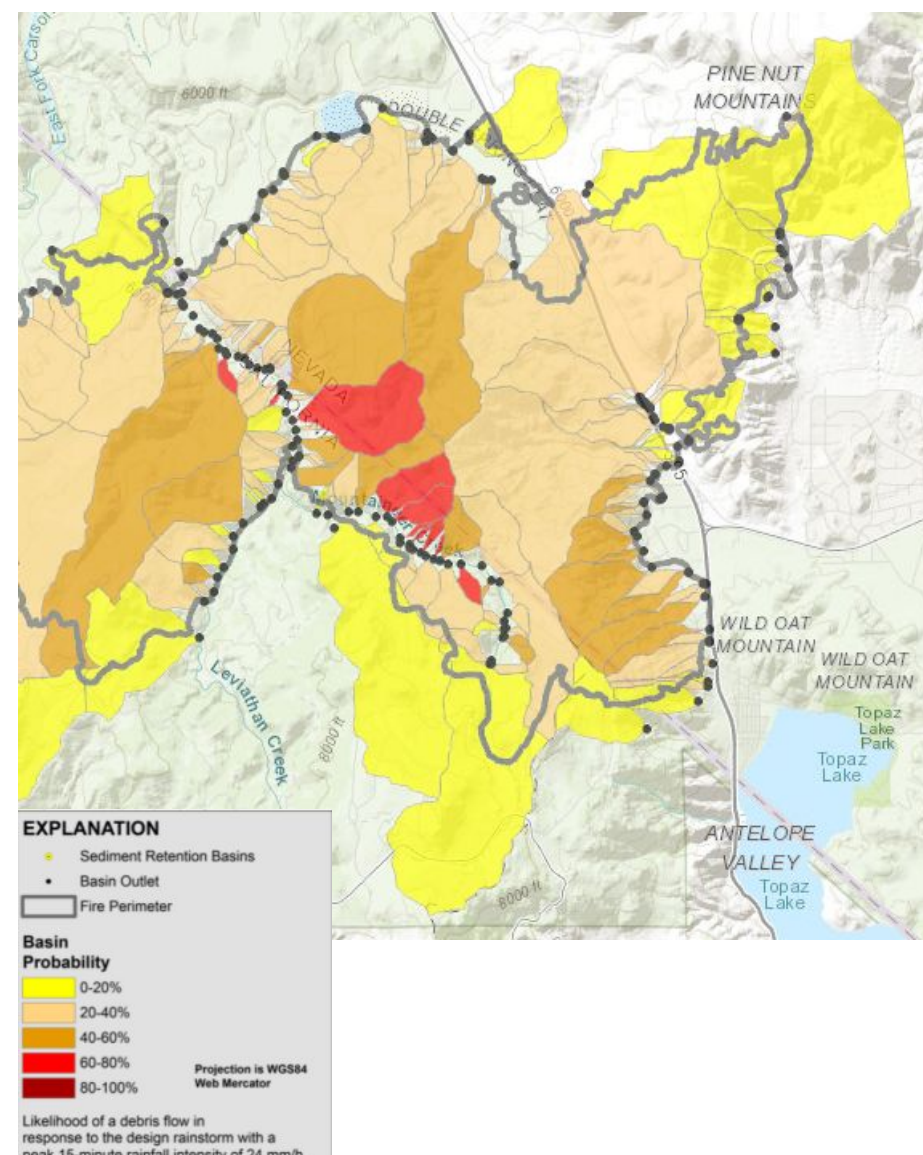
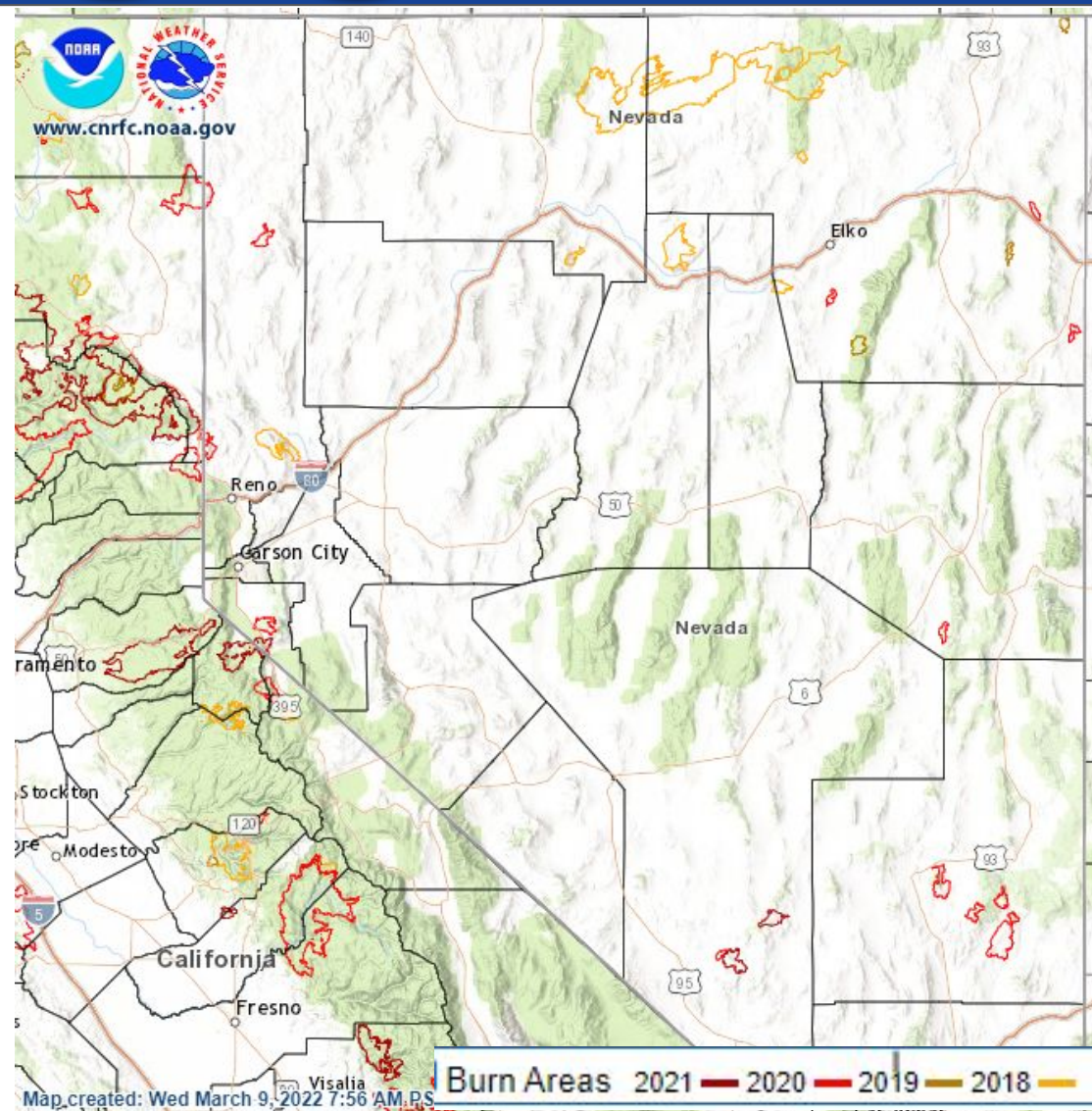


U.S. Drought Monitor



U.S. Drought Monitor





Moderate to high burn severity areas will be a serious issue for several years after the fire is out!

- Little to no warning should be expected. - take action on watch. Messaging challenges
- ~ 0.25" in 15 minutes is enough to trigger debris flows.
- Interagency analysis to figure areas most prone to flooding.





Summary and Key Points

Weather Forecast Office
Reno, NV
Wednesday, March 16

- Regional snowpack is near to much below normal.
- Dry January and February may lead to unusual snow distribution, not fully represented by ground stations.
- No hope for a miracle March.
- Water supply forecasts are near to well below average, Consider using the 75 or 90% exceedance forecasts for guidance rather than 50th.
- Warm mid to late March weather will initiate snowmelt (again), and lead to additional declines in April-July Forecasts.
- Reservoirs are generally below average levels.
- Drought conditions expected to persist or worsen.

- Based on current conditions, risk for snowmelt flooding is low.

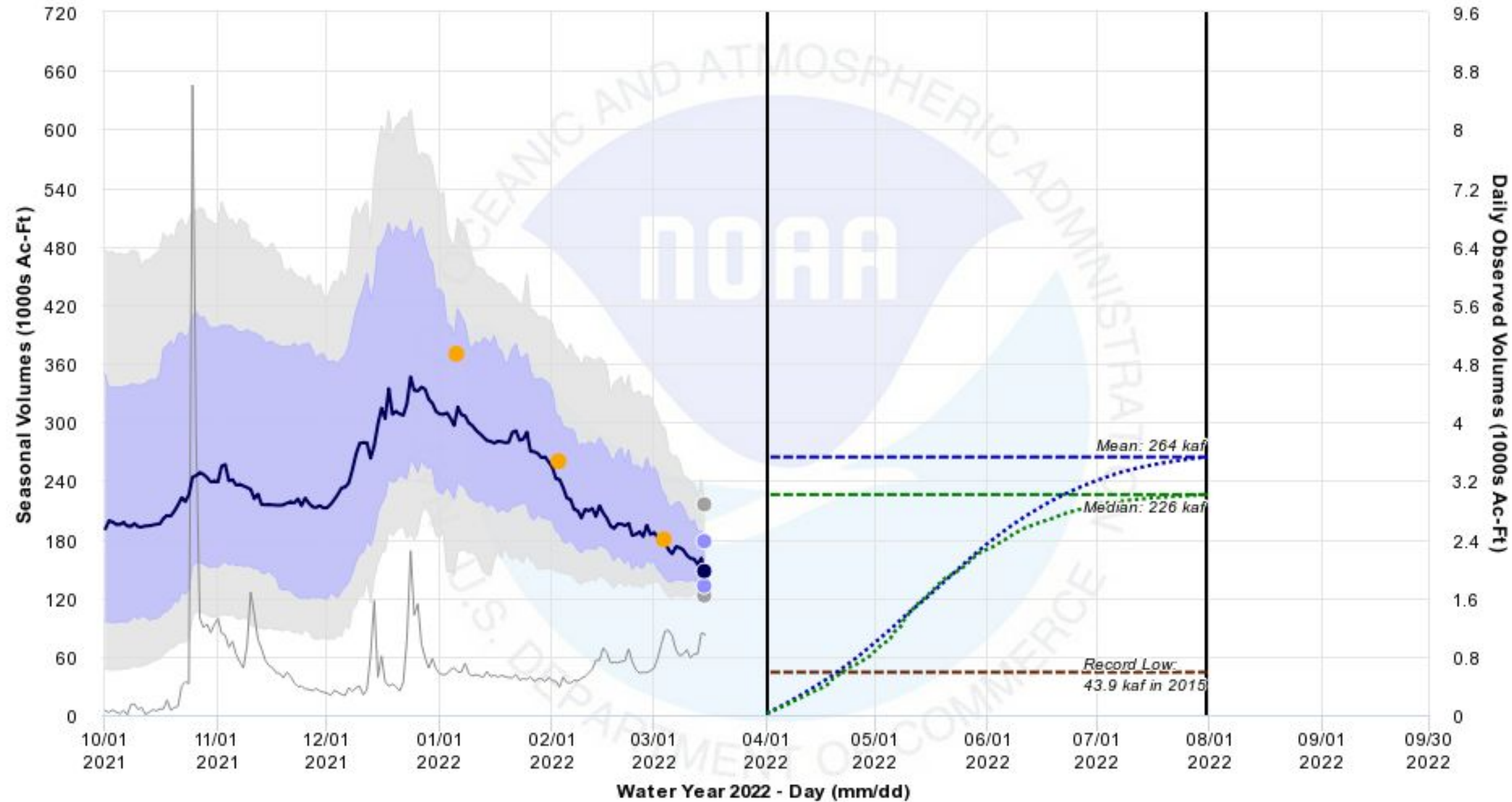
- Beyond the forecast window:
 - Keep in mind a major late season snows impacting all aspects and elevations followed by rapid warmup can result in flooding.
 - Watch for late-spring and summer convective storms especially over sensitive recent burn areas.



Bonus Material

TRUCKEE - FARAD (FARC1) 03/15/2022
Median Forecast: 147 kaf | 56% of Mean | 65% of Median

Created: 03/15/2022 at 09:15 AM PDT



Observed Season to Date Percent of Mean: N/A% (M kaf) Season to Date Mean: kaf
 Historical Apr-Jul Vol Max: 713 kaf in 1952 Historical Apr-Jul Vol Min: 43.9 kaf in 2015

This product only considers meteorological uncertainty and does not account for hydrologic uncertainty.
 Means/medians are based on the period of Water Years 1980 through 2020.

Legend entries below can be toggled on/off.

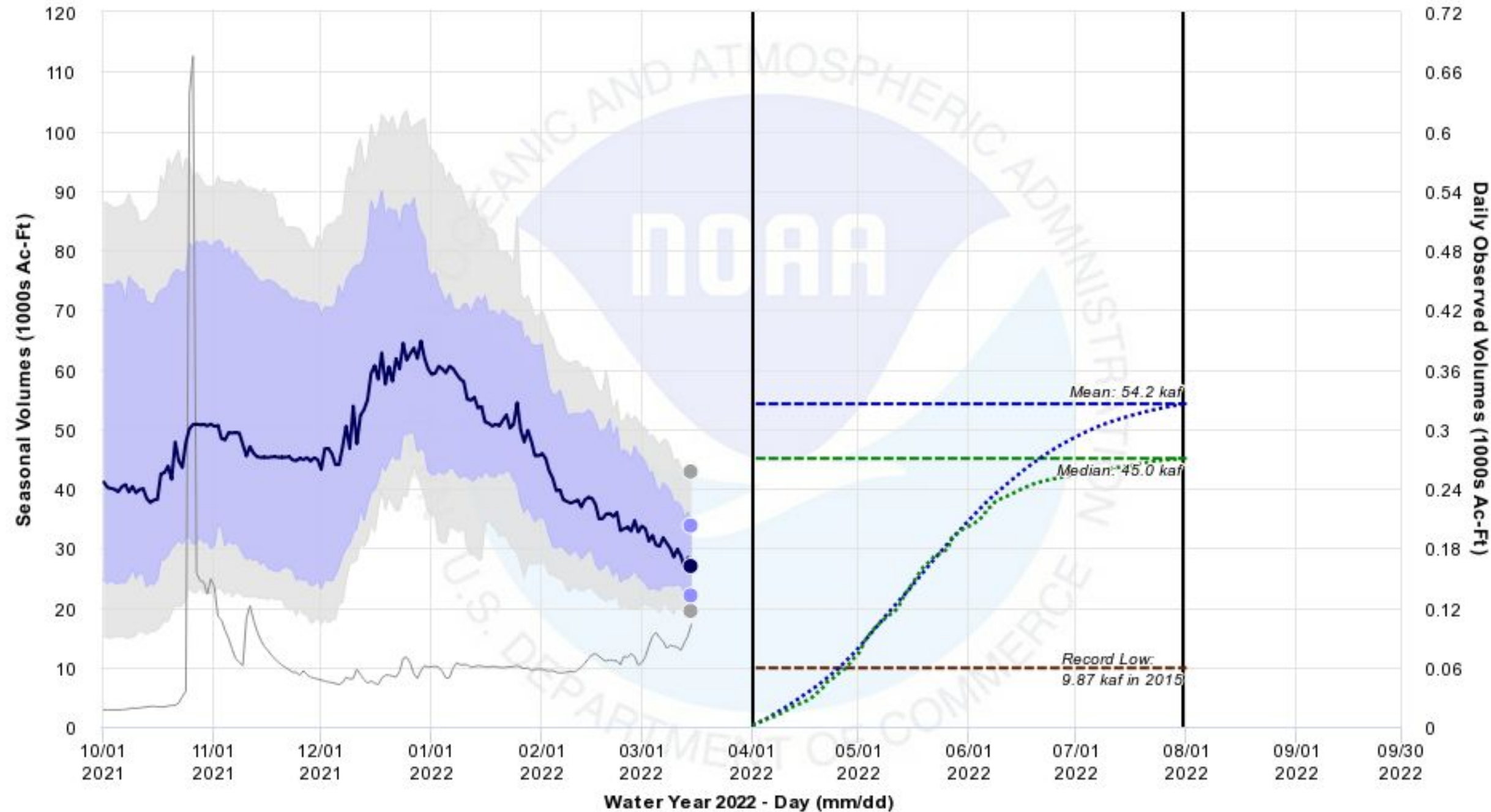
- Apr-Jul Vol Mean
- Apr-Jul Vol Median
- Season to Date Mean
- ◆ Season to Date Median
- NWS/NRCS Coord. Apr-Jul Fcs
- Season to Date Obs
- Daily Obs
- ESP Apr-Jul Fcst 50%
- ESP Apr-Jul Fcst 25/75%
- ESP Apr-Jul Fcst 10/90%
- ESP Apr-Jul Fcst Max/Min
- Record Low
- ▼ Snow Model Updates



Bonus Material

WF CARSON - WOODFORDS (WOOC1) 03/15/2022
Median Forecast: 27.0 kaf | 50% of Mean | 60% of Median

Created: 03/15/2022 at 09:15 AM PDT



Observed Season to Date Percent of Mean: N/A% (M kaf) Season to Date Mean: kaf
Historical Apr-Jul Vol Max: 134 kaf in 2017 Historical Apr-Jul Vol Min: 9.87 kaf in 2015

This product only considers meteorological uncertainty and does not account for hydrologic uncertainty.

Means/medians are based on the period of Water Years 1980 through 2020.

Legend entries below can be toggled on/off.

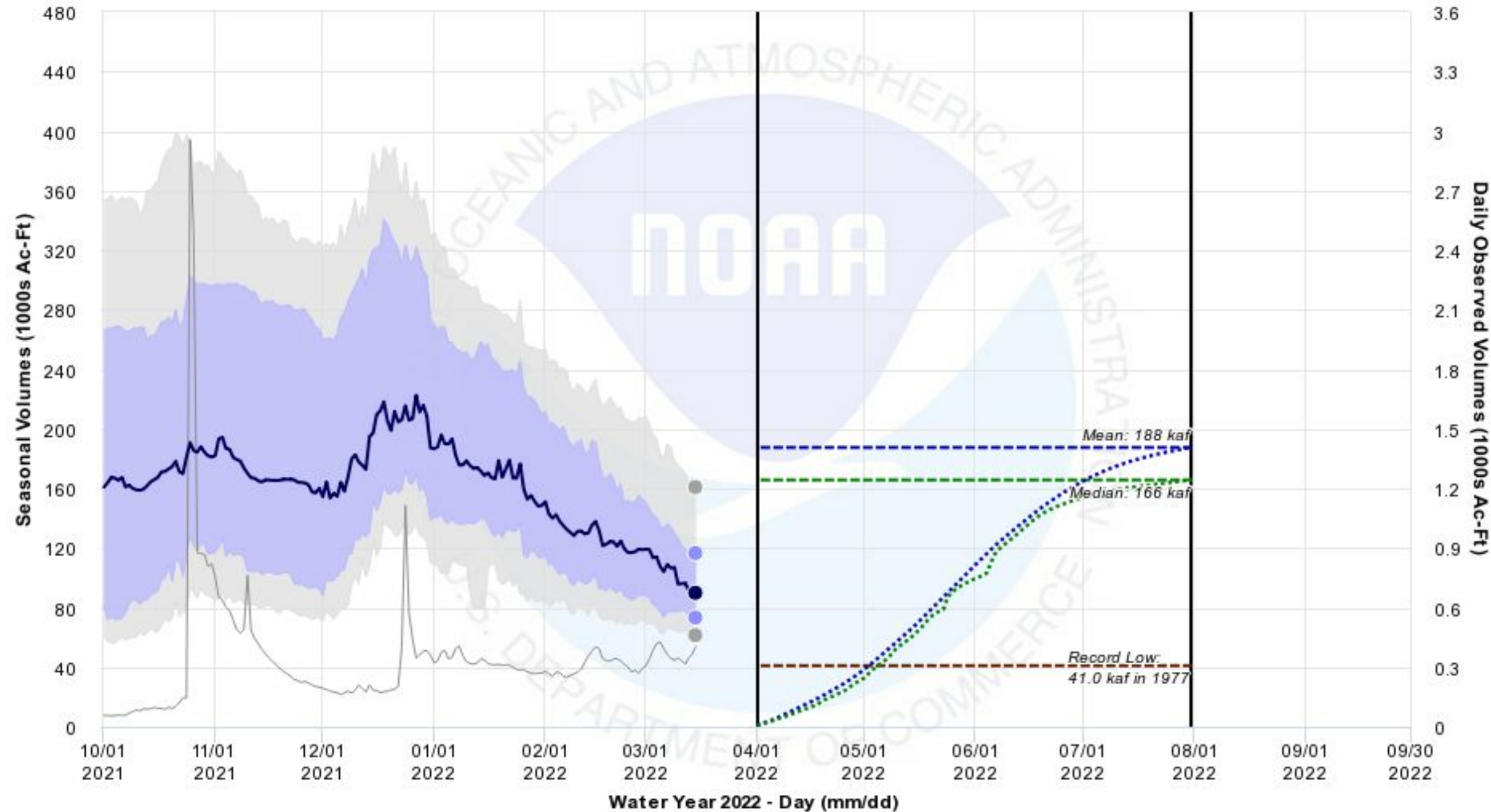
- Apr-Jul Vol Mean
- Apr-Jul Vol Median
- Season to Date Mean
- ◆ Season to Date Median
- Season to Date Obs
- Daily Obs
- ESP Apr-Jul Fcst 50%
- ESP Apr-Jul Fcst 25/75%
- ESP Apr-Jul Fcst 10/90%
- ESP Apr-Jul Fcst Max/Min
- Record Low
- Record High
- ▼ Snow Model Updates



Bonus Material

EF CARSON - MARKLEEVILLE, NR (CEMC1) 03/15/2022
Median Forecast: 90.0 kaf | 48% of Mean | 54% of Median

Created: 03/15/2022 at 09:15 AM PDT



Observed Season to Date Percent of Mean: N/A% (M kaf) Season to Date Mean: kaf
Historical Apr-Jul Vol Max: 471 kaf in 2017 Historical Apr-Jul Vol Min: 41.0 kaf in 1977

This product only considers meteorological uncertainty and does not account for hydrologic uncertainty.

Means/medians are based on the period of Water Years 1980 through 2020.

Legend entries below can be toggled on/off.

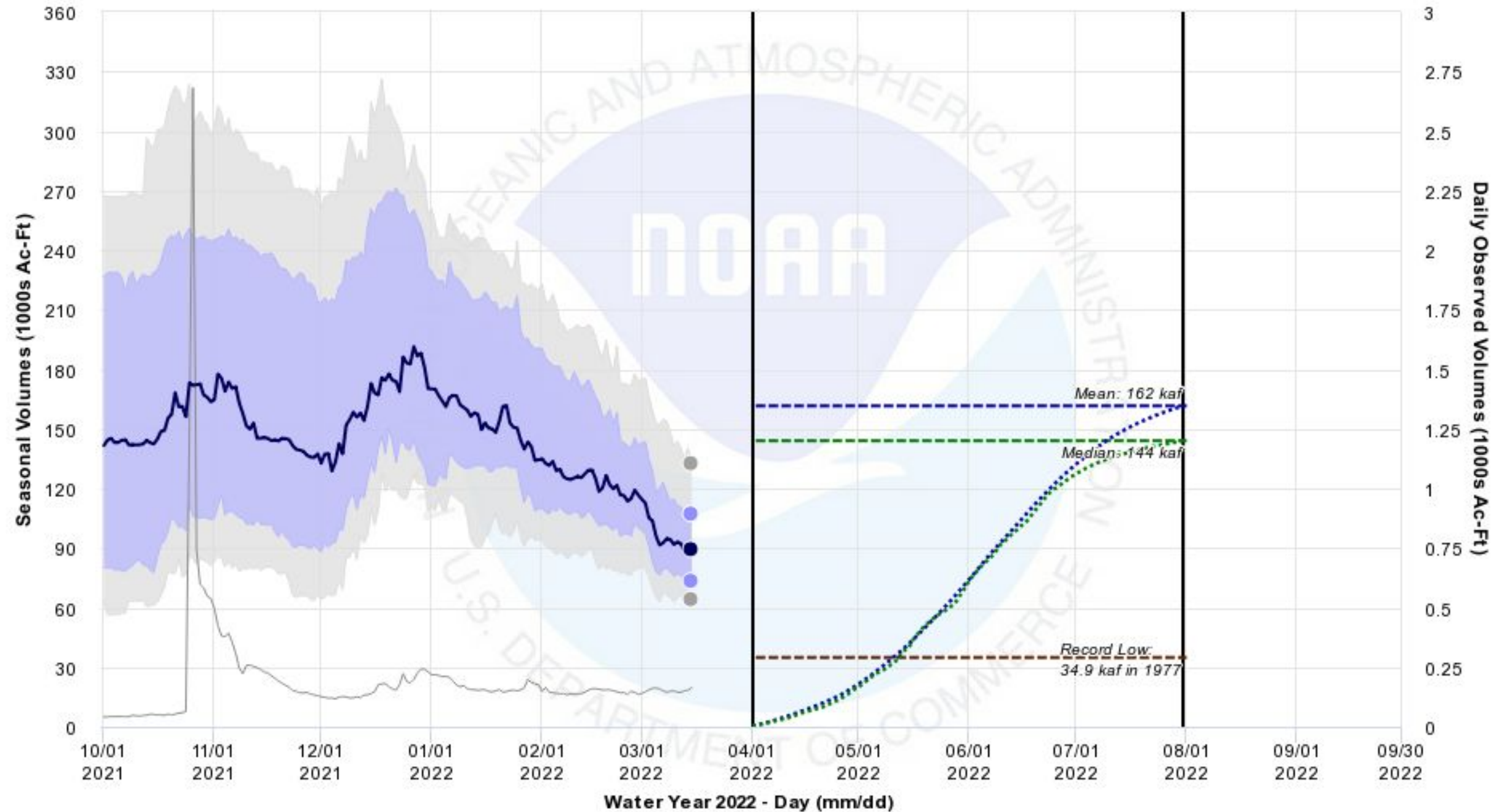
- Apr-Jul Vol Mean
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- Season to Date Mean
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- Season to Date Obs
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- ESP Apr-Jul Fcst 25/75%
- ESP Apr-Jul Fcst 10/90%
- ESP Apr-Jul Fcst Max/Min
- Record Low
- Record High
- ▼ Snow Model Updates



Bonus Material

WEST WALKER - LTL WALKER, BLO, COLEVILLE, NR (WWBC1) 03/15/2022
Median Forecast: 89.5 kaf | 55% of Mean | 62% of Median

Created: 03/15/2022 at 09:15 AM PDT



Observed Season to Date Percent of Mean: N/A% (M kaf) Season to Date Mean: kaf
Historical Apr-Jul Vol Max: 406 kaf in 2017 Historical Apr-Jul Vol Min: 34.9 kaf in 1977

This product only considers meteorological uncertainty and does not account for hydrologic uncertainty.

Means/medians are based on the period of Water Years 1980 through 2020.

Legend entries below can be toggled on/off.

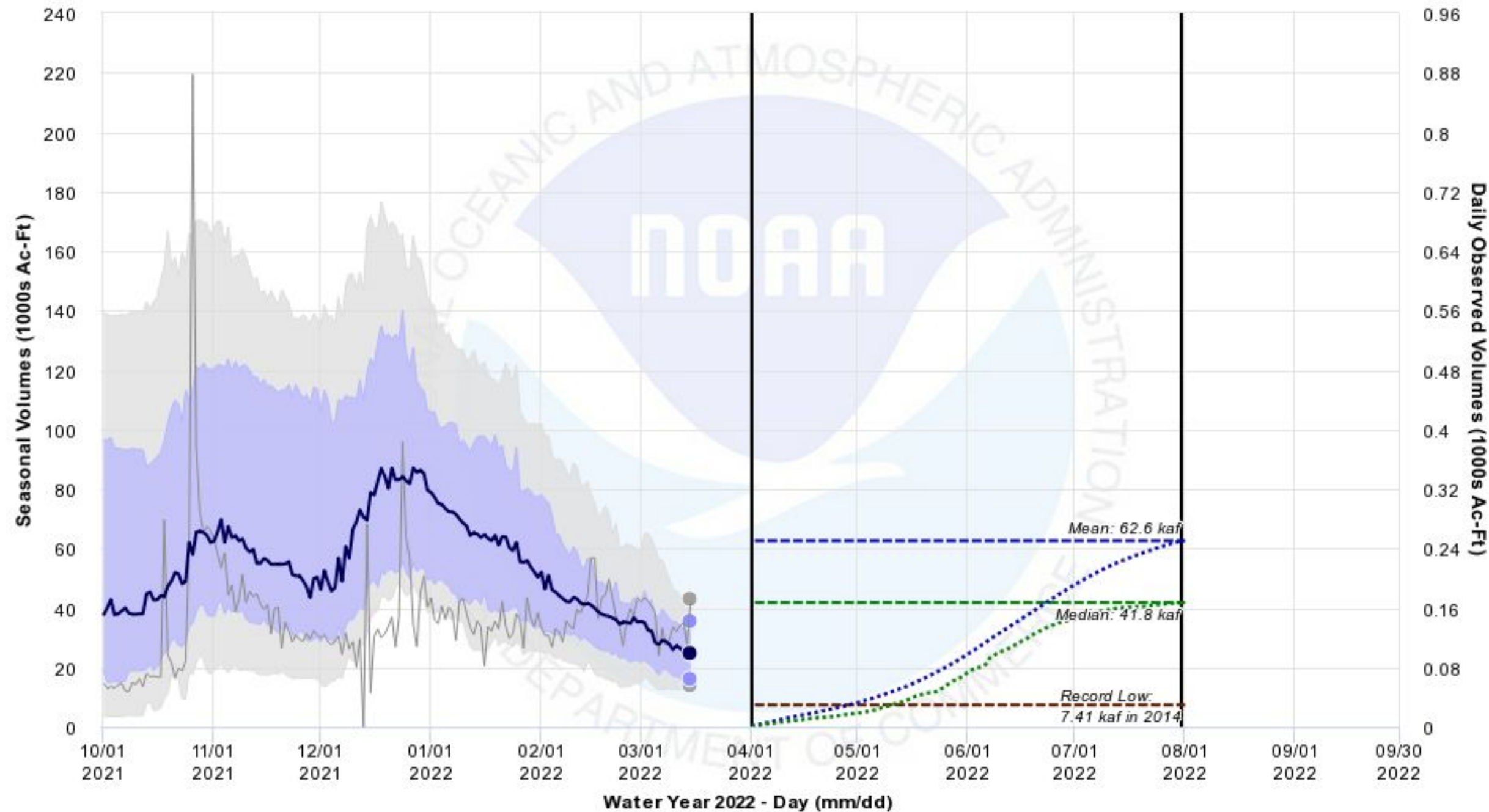
- Apr-Jul Vol Mean
- Apr-Jul Vol Median
- Season to Date Mean
- ◆ Season to Date Median
- Season to Date Obs
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- ESP Apr-Jul Fcst 50%
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- ESP Apr-Jul Fcst 10/90%
- ESP Apr-Jul Fcst Max/Min
- Record Low
- Record High
- ▼ Snow Model Updates



Bonus Material

EAST WALKER - BRIDGEPORT, NR (BPRC1) 03/15/2022
Median Forecast: 24.8 kaf | 40% of Mean | 59% of Median

Created: 03/15/2022 at 09:15 AM PDT



Observed Season to Date Percent of Mean: N/A% (M kaf) Season to Date Mean: kaf
Historical Apr-Jul Vol Max: 208 kaf in 2017 Historical Apr-Jul Vol Min: 7.41 kaf in 2014

This product only considers meteorological uncertainty and does not account for hydrologic uncertainty.

Means/medians are based on the period of Water Years 1980 through 2020.

Legend entries below can be toggled on/off.

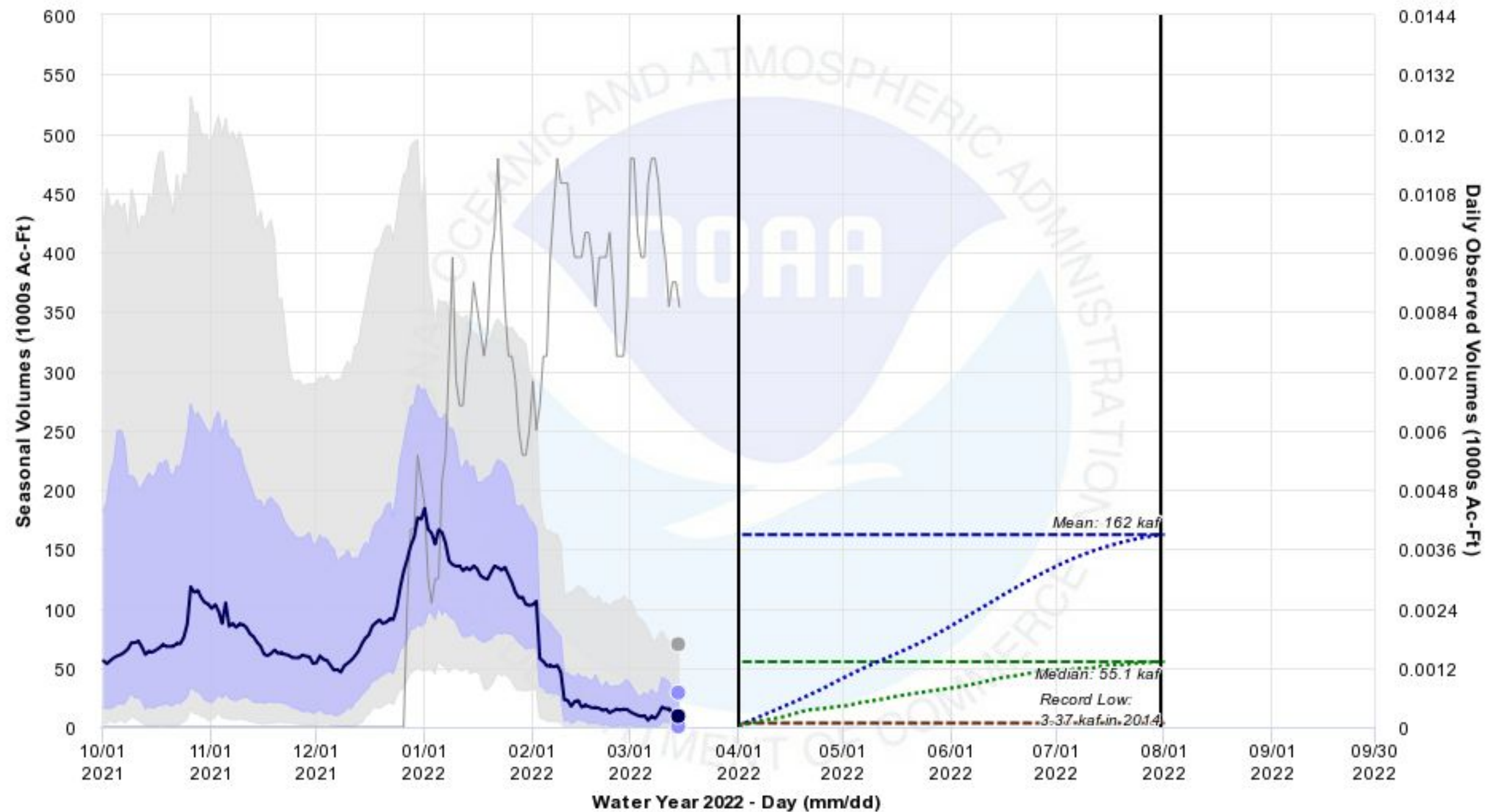
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- ESP Apr-Jul Fcst 25/75%
- Season to Date Median
- ESP Apr-Jul Fcst 10/90%
- Season to Date Obs
- ESP Apr-Jul Fcst Max/Min
- ▼ Snow Model Updates



Bonus Material

HUMBOLDT - IMLAY, NR (HRIN2) 03/15/2022
Median Forecast: 9.27 kaf | **6% of Mean** | **17% of Median**

Created: 03/15/2022 at 09:29 AM PDT



Observed Season to Date Percent of Mean: N/A% (M kaf) **Season to Date Mean: kaf**
Historical Apr-Jul Vol Max: 1110 kaf in 1984 **Historical Apr-Jul Vol Min: 3.37 kaf in 2014**

This product only considers meteorological uncertainty and does not account for hydrologic uncertainty.

Means/medians are based on the period of Water Years 1980 through 2020.

Legend entries below can be toggled on/off.

- Apr-Jul Vol Mean
- Apr-Jul Vol Median
- Season to Date Mean
- ◆ Season to Date Median
- Season to Date Obs
- Daily Obs
- ESP Apr-Jul Fcst 50%
- ESP Apr-Jul Fcst 25/75%
- ESP Apr-Jul Fcst 10/90%
- ESP Apr-Jul Fcst Max/Min
- Record Low
- Record High
- ▼ Snow Model Updates