

CBRFC

2019 Early Outlook

December 18, 2018

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Please mute your phone until it is time for questions

2019 Early Water Supply Outlook

Late summer / fall precipitation

Soil moisture situation entering winter

Weather pattern & current snow conditions
Comparison to last year at this time

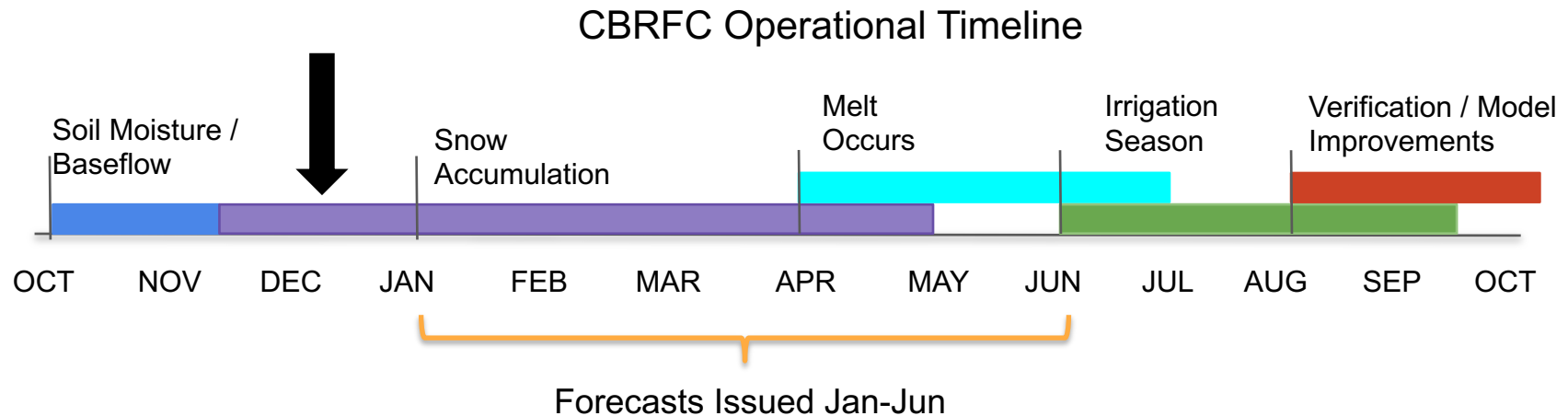
2019 Water Supply – Early season model guidance

Daily trend in model guidance – Forecast Evolution Plots

Weather outlook

Forecaster points of contact / water supply webinar schedule

2019 Early Outlook



Forecasts are issued starting in January, however we begin posting model guidance on our website in mid December (forecast evolution plots)

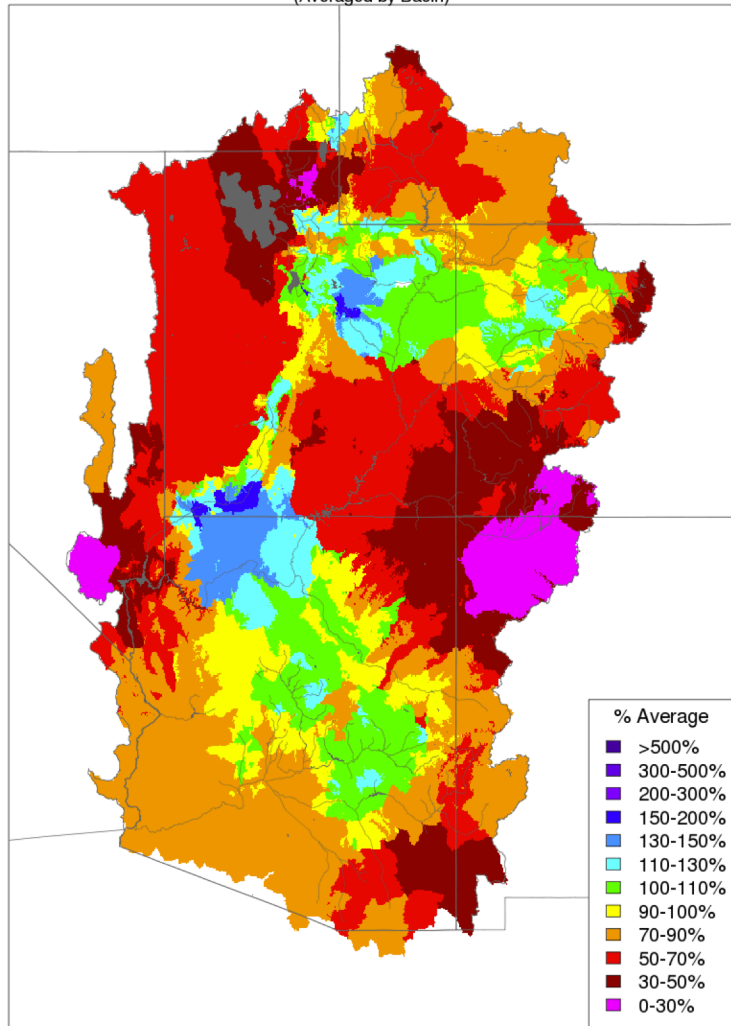
At this early date in the winter season soil moisture states (also represented by baseflow) in the model are having a large influence on hydrologic guidance.

As we progress into the winter snowpack conditions will have a larger impact on forecasts in the upper Colorado and Great Basins.

Winter rain events will have largest impacts on Lower Colorado River Basin forecasts.

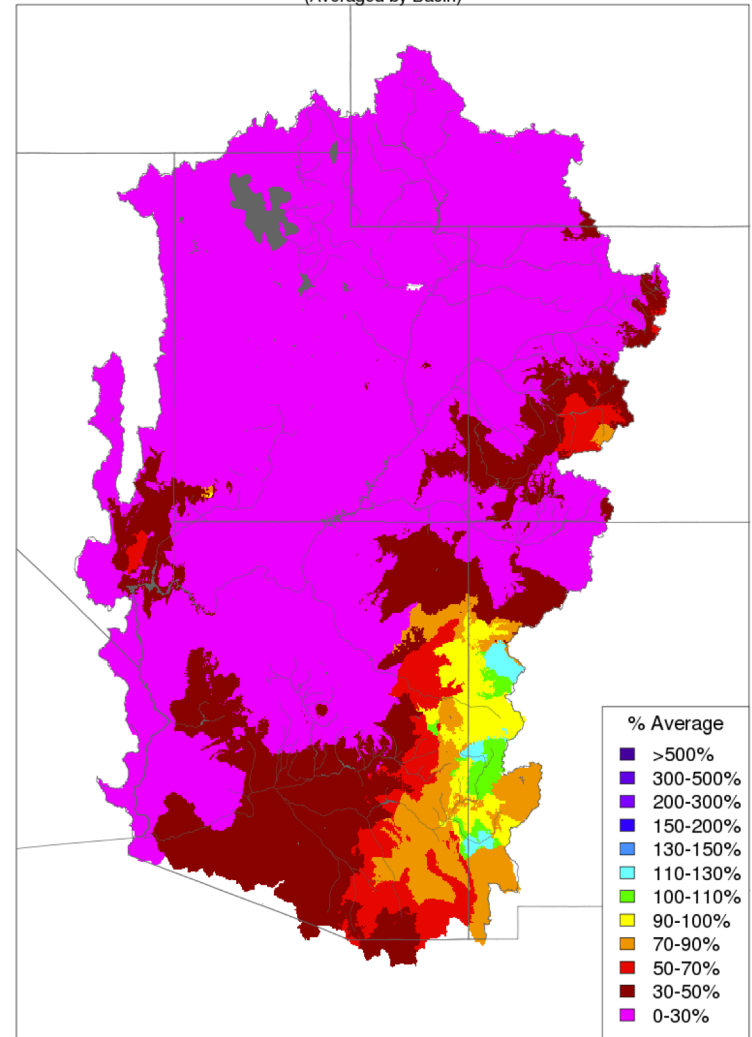
Late Summer/Fall Precipitation

Monthly Precipitation - August 2018
(Averaged by Basin)



Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

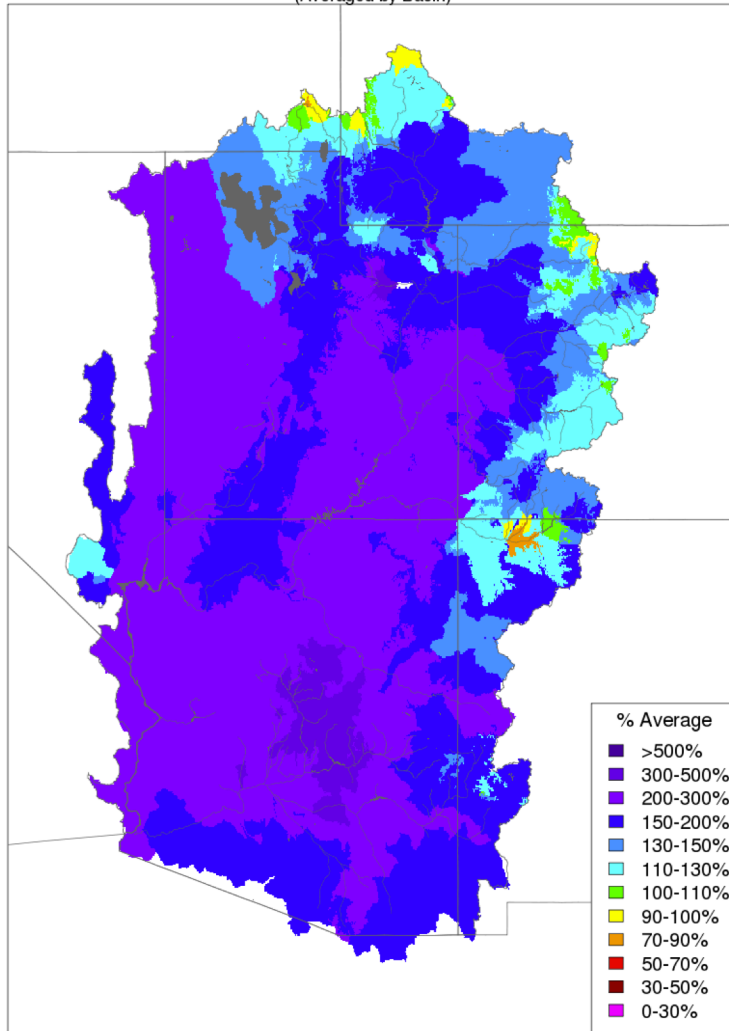
Monthly Precipitation - September 2018
(Averaged by Basin)



Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

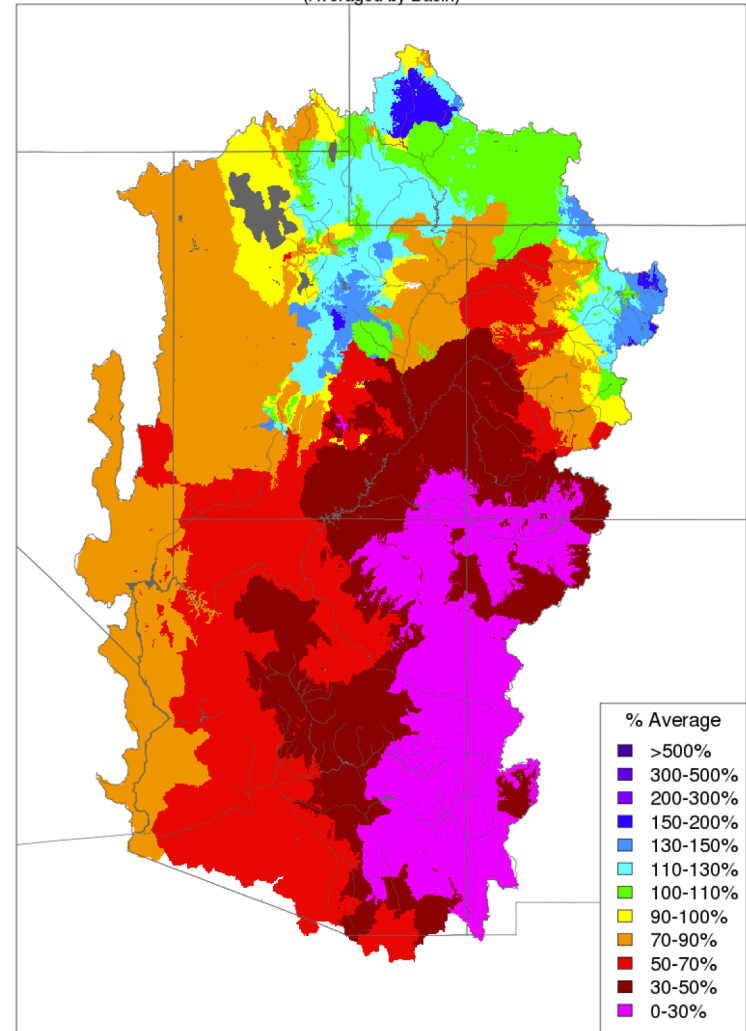
Late Summer/Fall Precipitation

Monthly Precipitation - October 2018
(Averaged by Basin)



Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

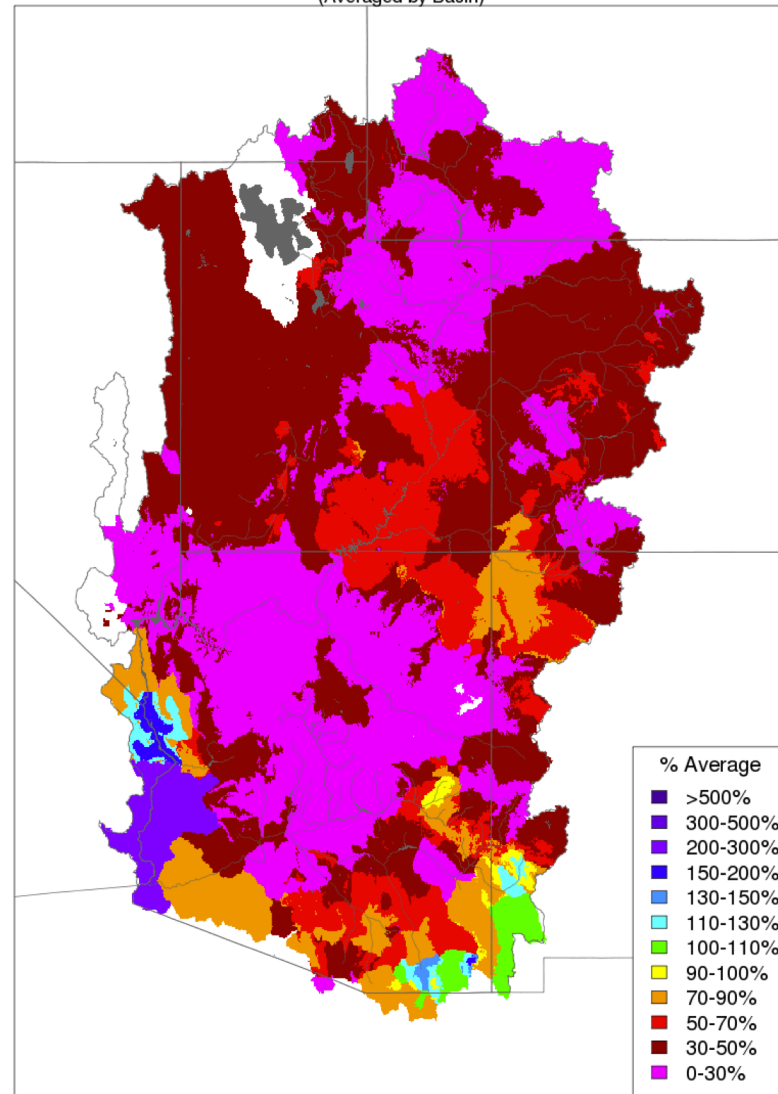
Monthly Precipitation - November 2018
(Averaged by Basin)



Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

December Precipitation

Month to Date Precipitation - December 18 2018
(Averaged by Basin)



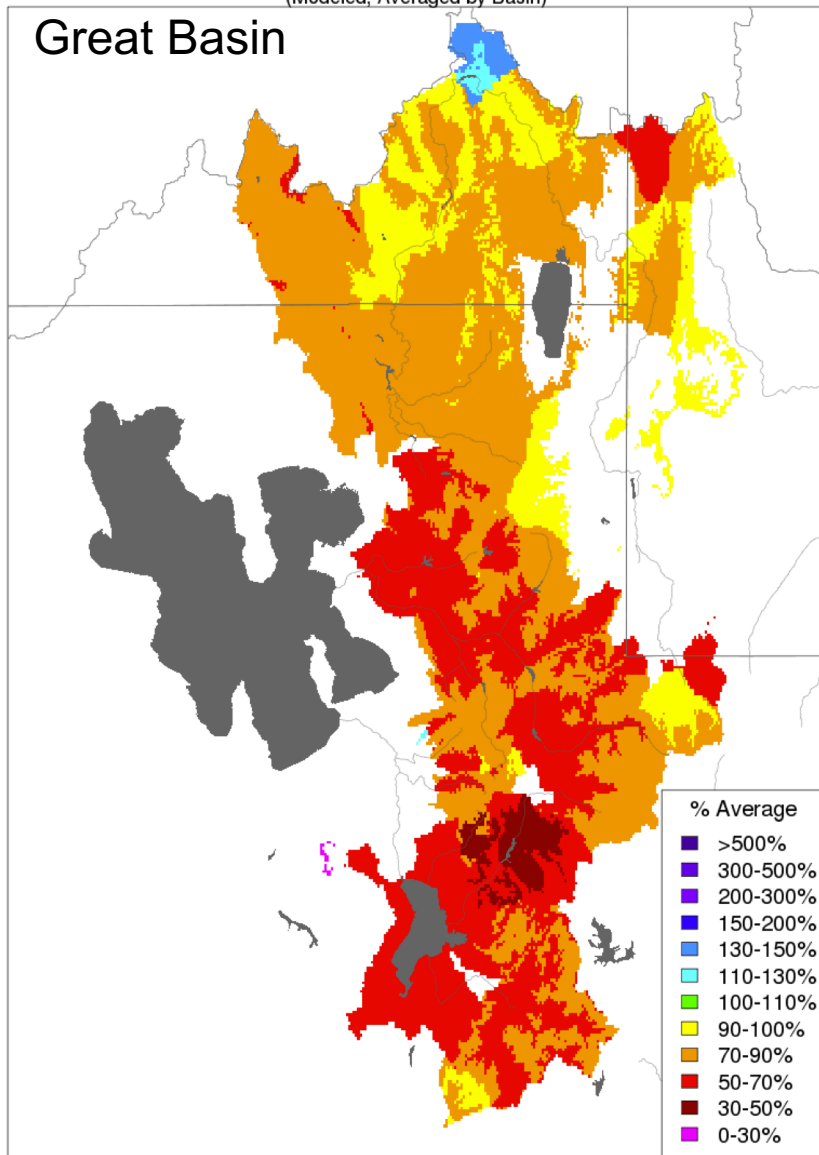
Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

Fall Modeled Soil Moisture

Soil Moisture - Fall - 2018 (November 15)

(Modeled, Averaged by Basin)

Great Basin

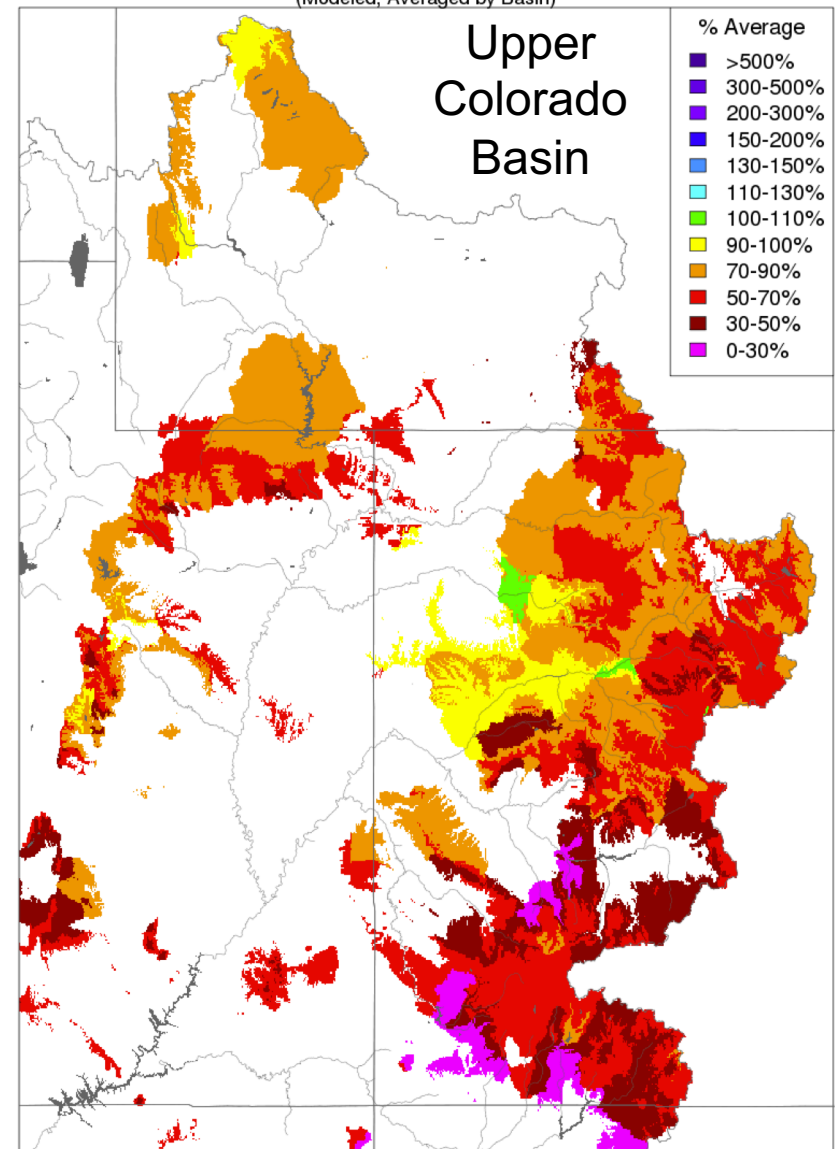


Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

Soil Moisture - Fall - 2018 (November 15)

(Modeled, Averaged by Basin)

Upper Colorado Basin

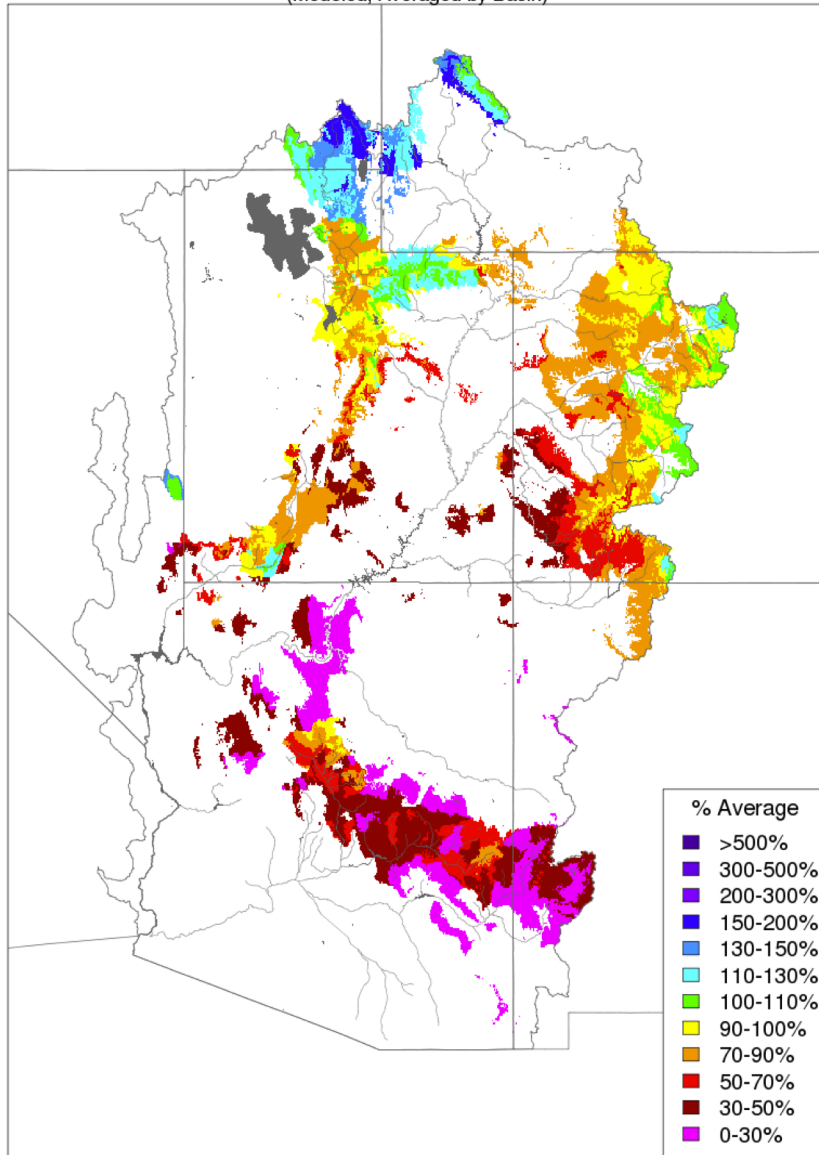


Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

Fall Modeled Soil Moisture – Comparison to last year at this time

Soil Moisture - Fall - 2017 (November 16)

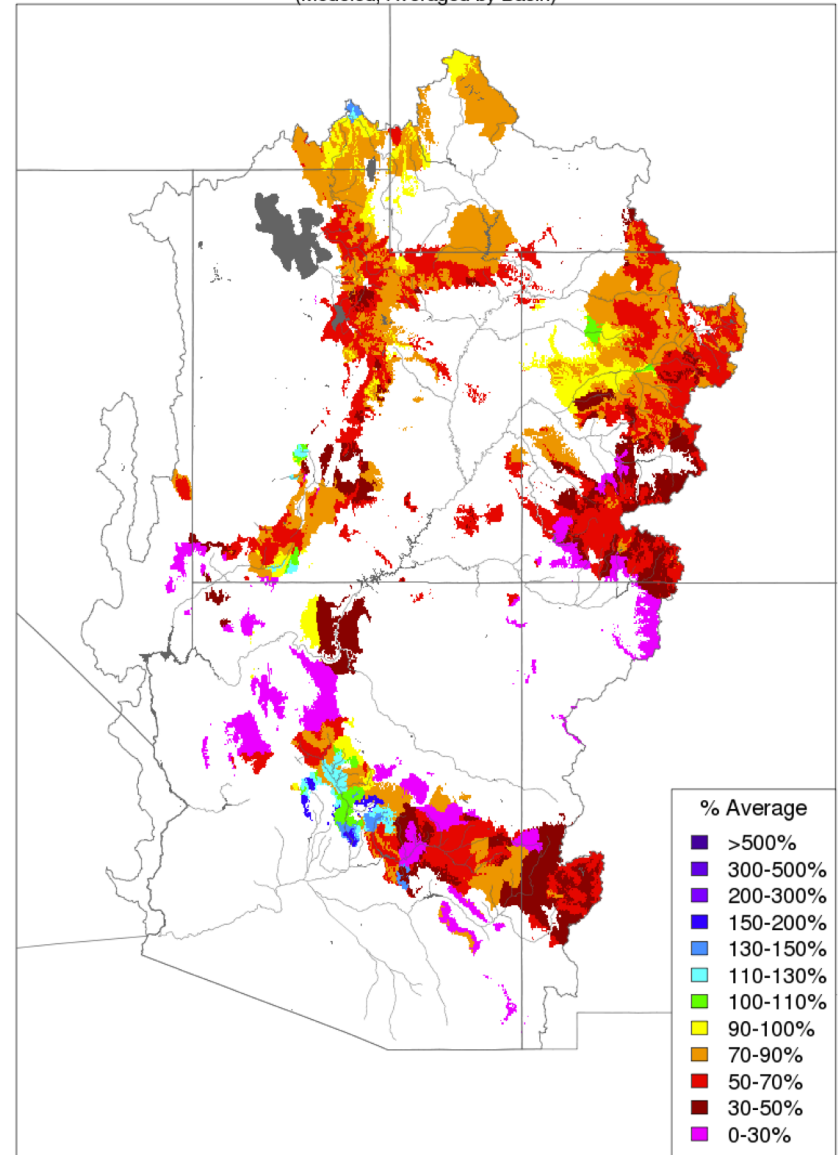
(Modeled, Averaged by Basin)



Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

Soil Moisture - Fall - 2018 (November 15)

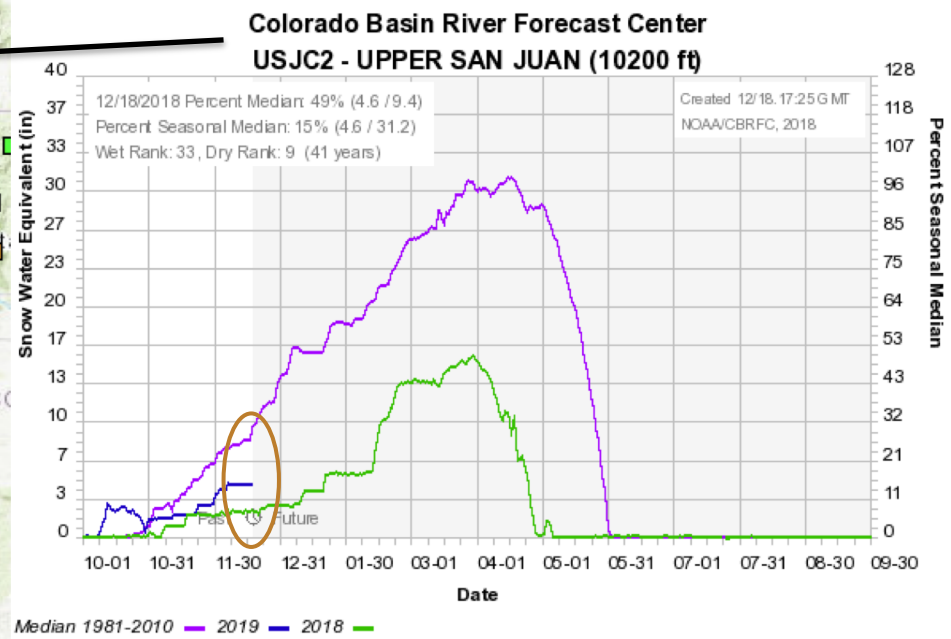
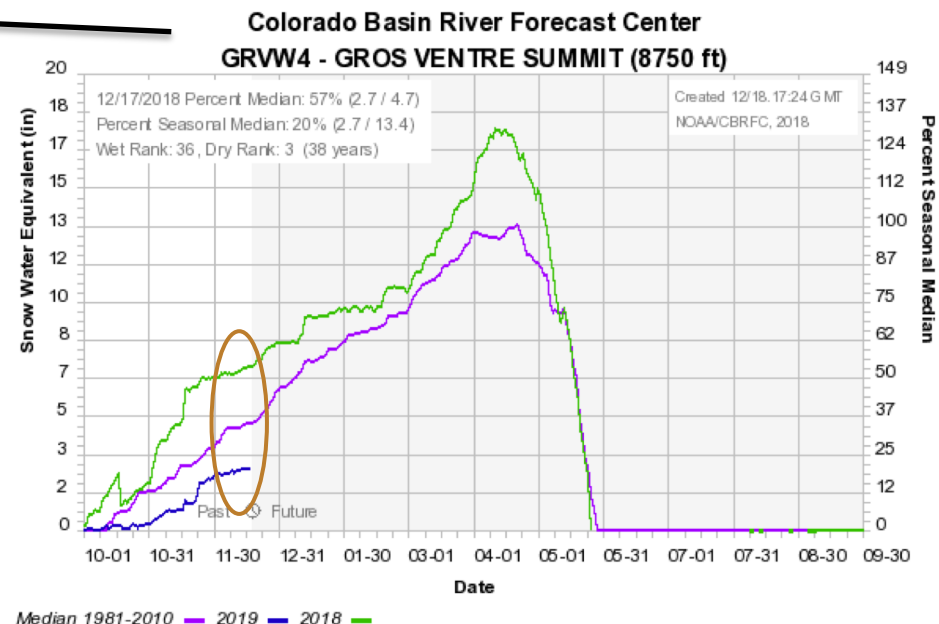
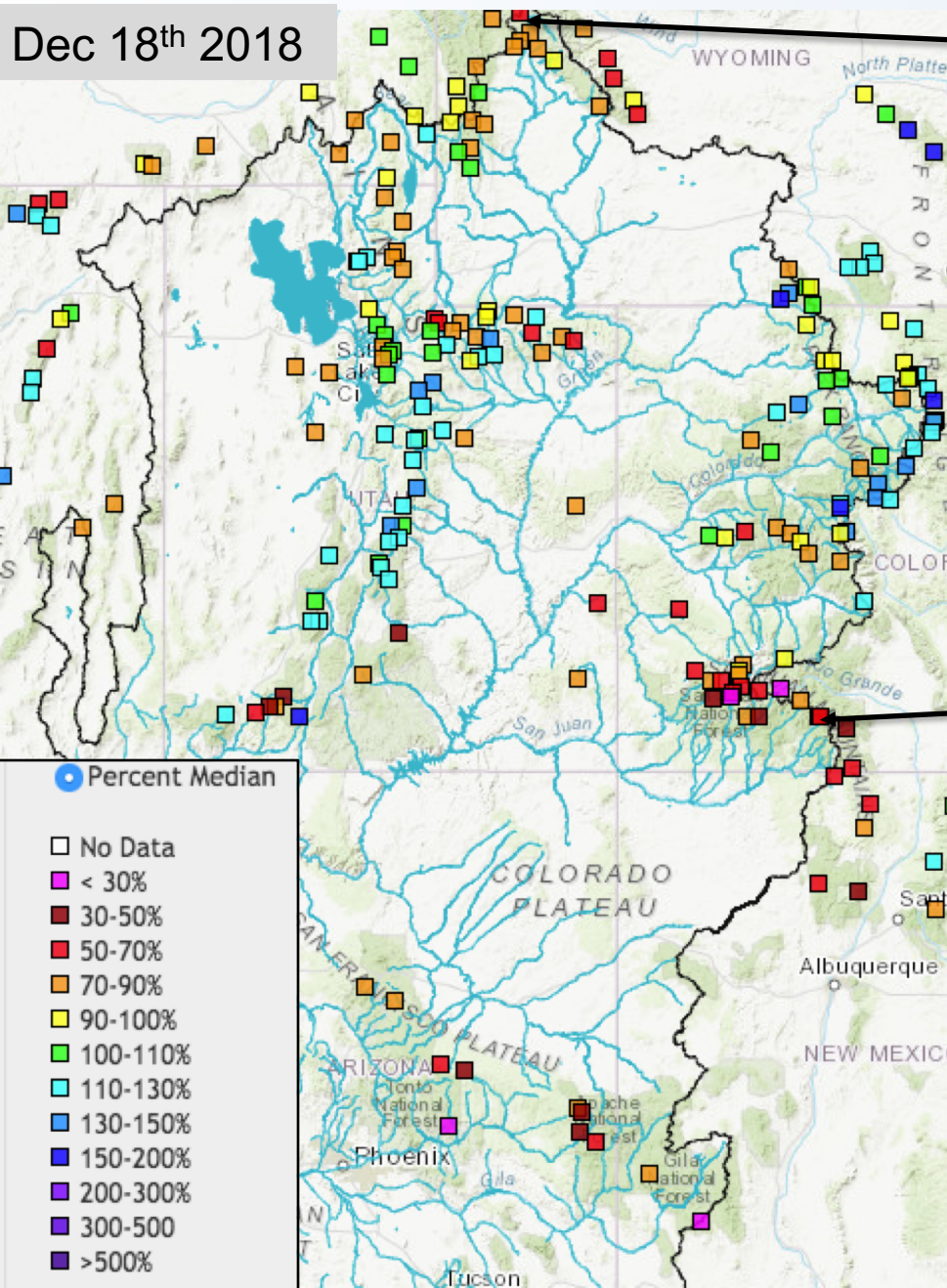
(Modeled, Averaged by Basin)



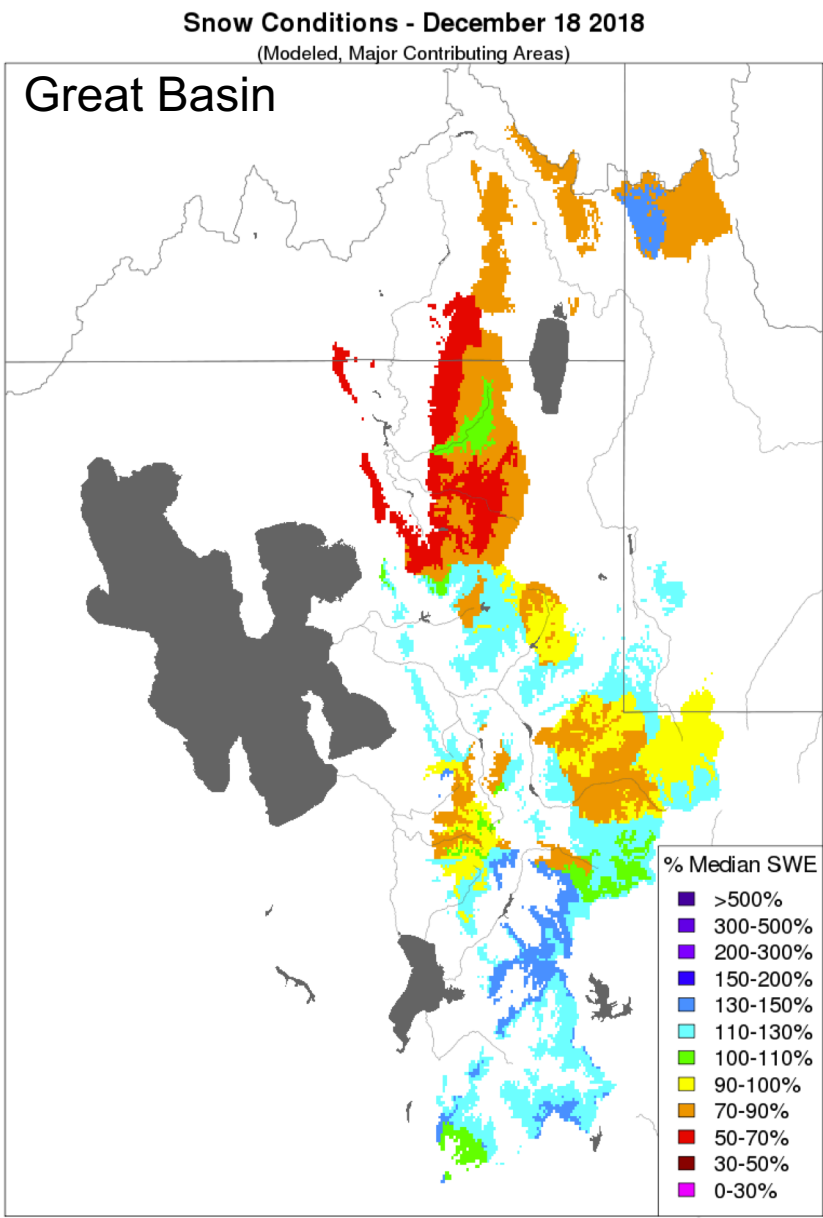
Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

Current Snow Conditions - SNOTEL

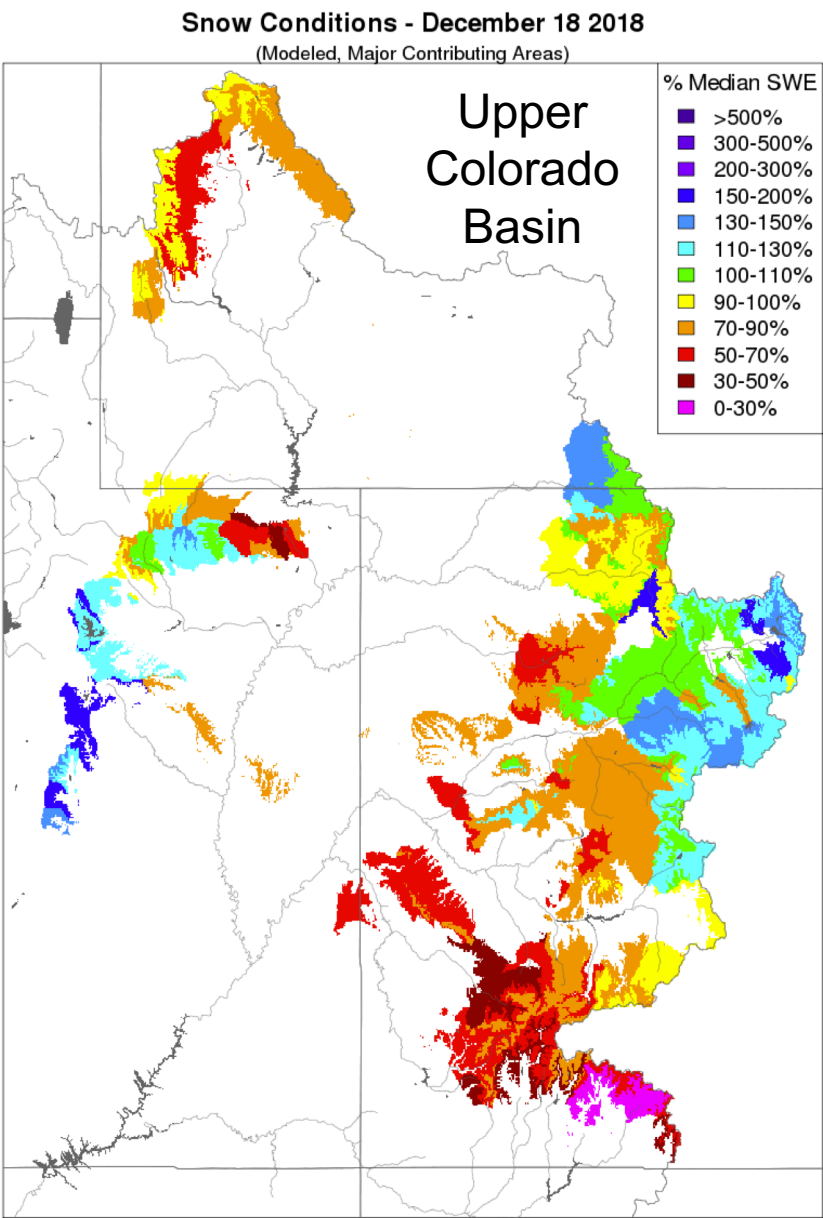
Dec 18th 2018



Current Snow Represented in the Hydrologic Model



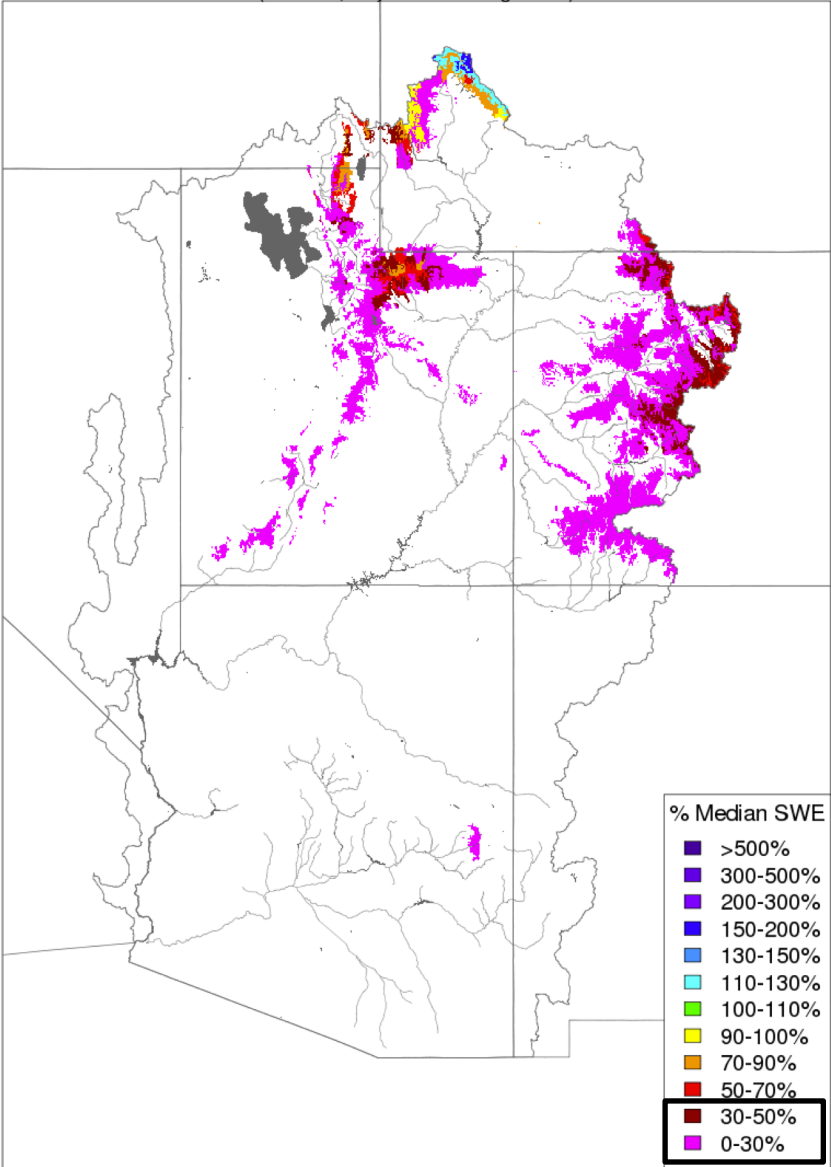
Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov



Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

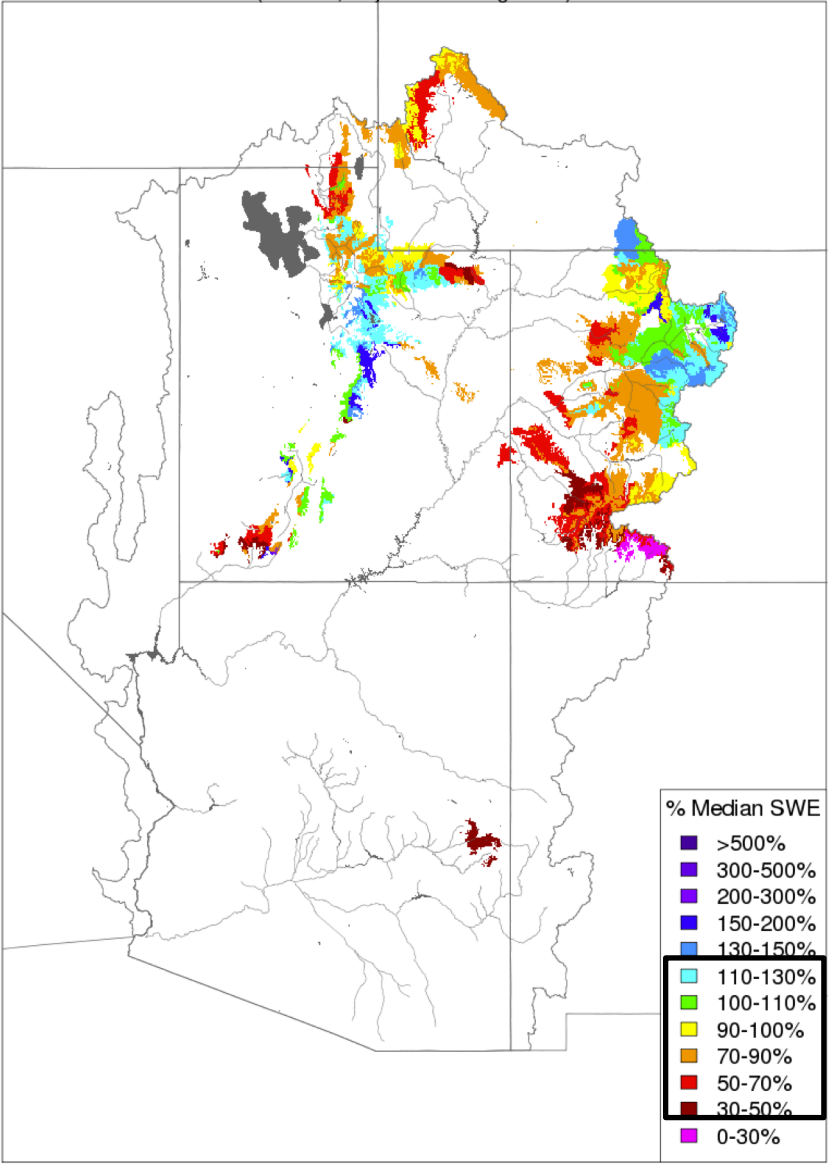
Current Snow Represented in the Hydrologic Model – Comparison to Last Year

Snow Conditions - December 18 2017
(Modeled, Major Contributing Areas)



Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

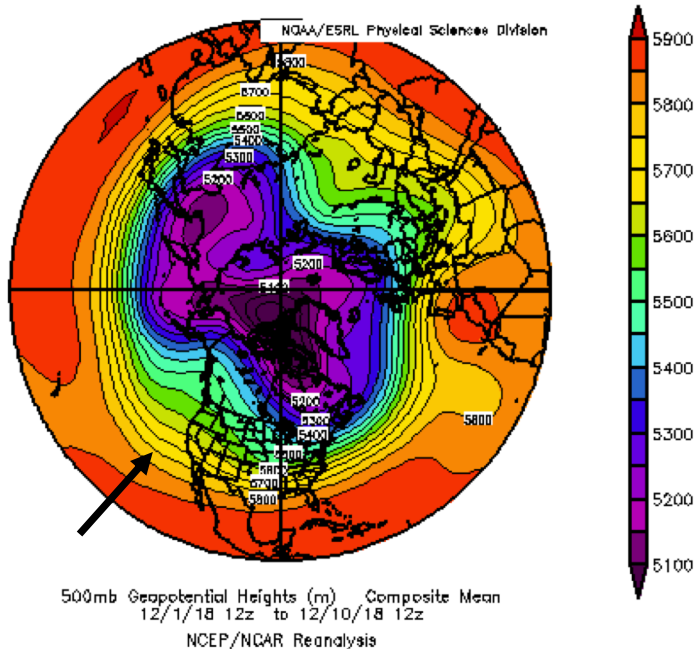
Snow Conditions - December 18 2018
(Modeled, Major Contributing Areas)



Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

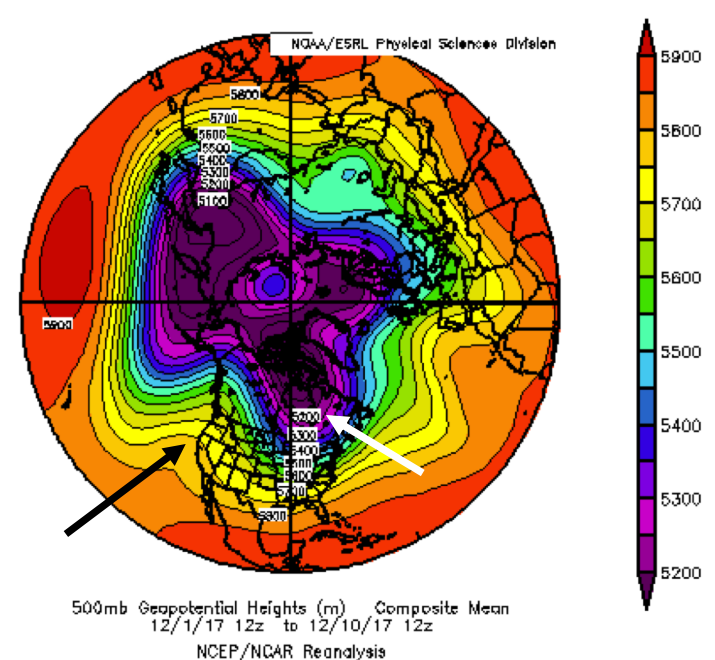
Heading into Winter- How does this year differ from last?

Mean Atmospheric Pattern Dec 1 – Dec 10 2018



So far the pattern is more progressive. The dominant blocking features of 2017 are lacking. Stronger pacific jet stream farther south. The door is open to more frequent storm activity.

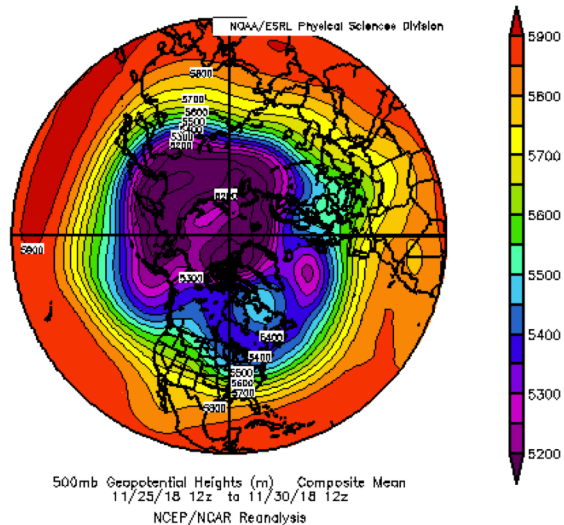
“Mean” Atmospheric Pattern Dec 1 – Dec 10 2017



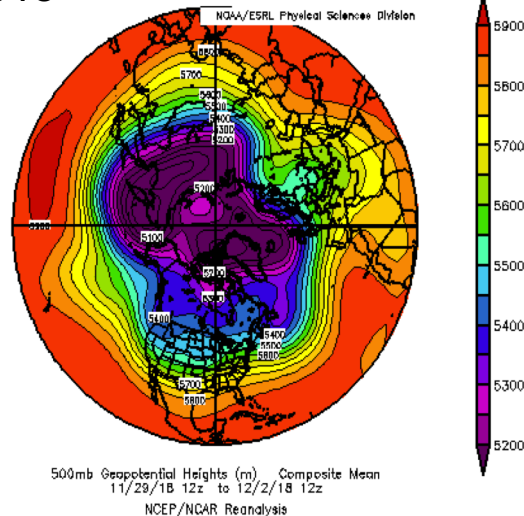
High amplitude atmospheric blocking pattern firmly established by early December. This persisted through the month and beyond.

2018: Pattern is more transitory. Troughs and ridges moving through the area.
 2017: Strong persistent features with an atmospheric blocking pattern developing.

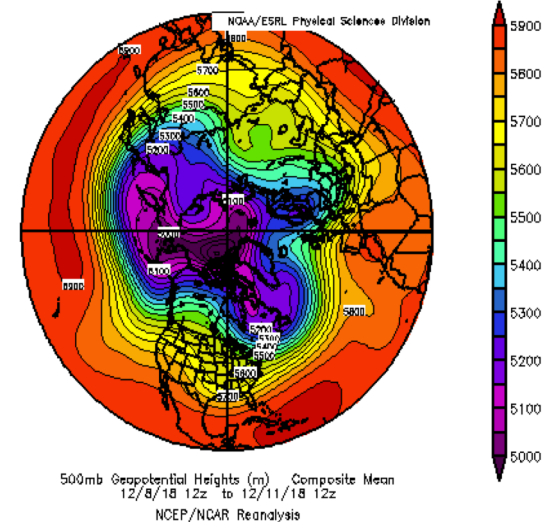
2018



2018



2018

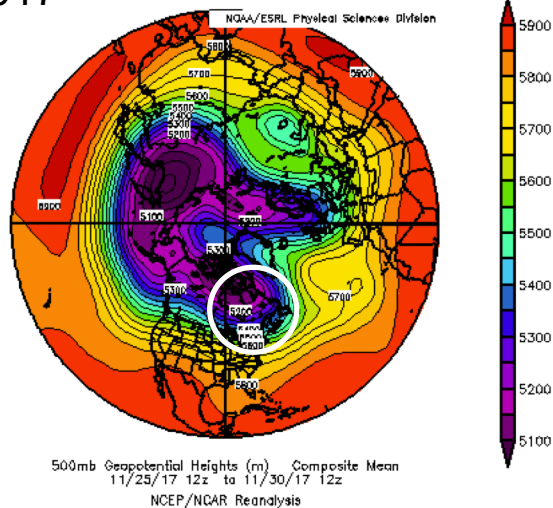


Nov 25-30

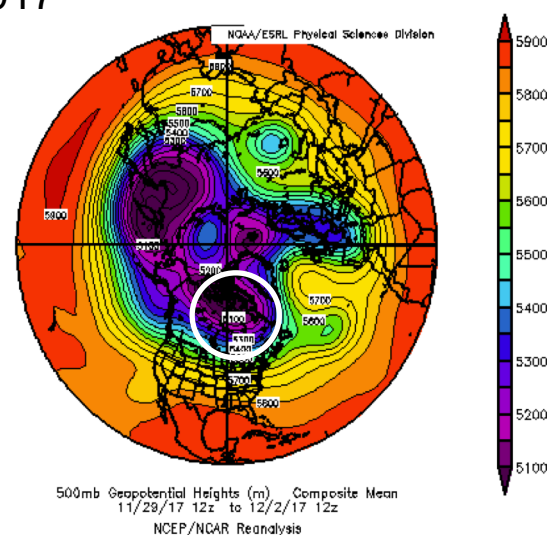
Nov 29-Dec 2

Dec 8-11

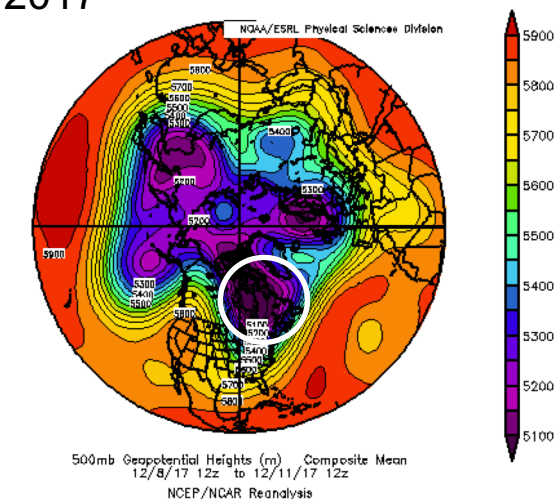
2017



2017



2017



At this point in time....

Ideally model soil moisture/snow states are accurate and representative of current conditions

Model guidance is still heavily influenced by soil moisture

Early season forecast errors are generally 20-40% and typically improve through the spring; the primary source of forecast uncertainty is future weather.

Snowpack – Don't put too much weight into mid December conditions.

Typically around 30-35 percent of the seasonal snow has occurred by mid December

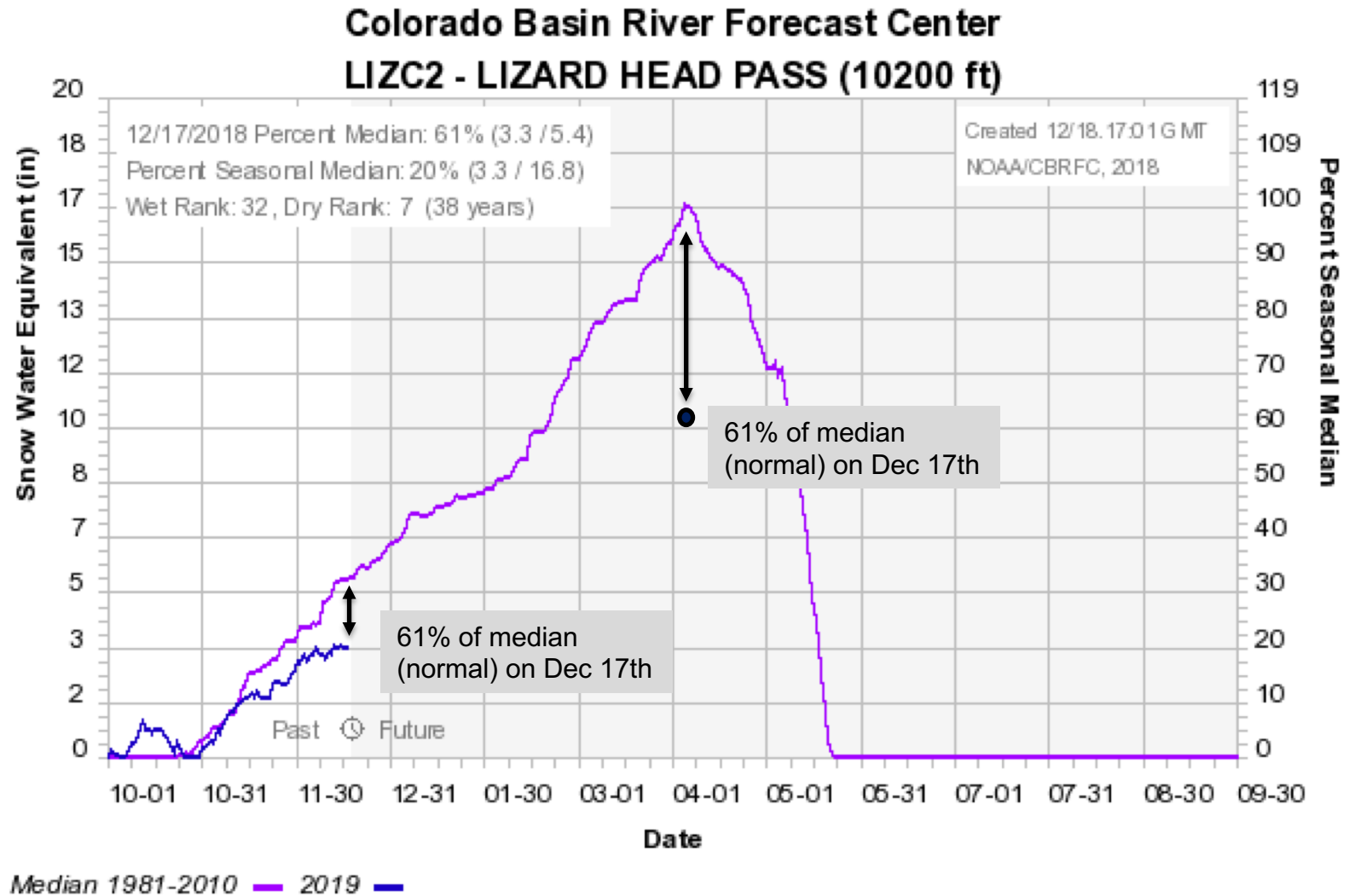
Historical median (or normal) snowpack values are still small compared to later in the season.

Even now, one good storm could push many areas back to near normal snowpack.

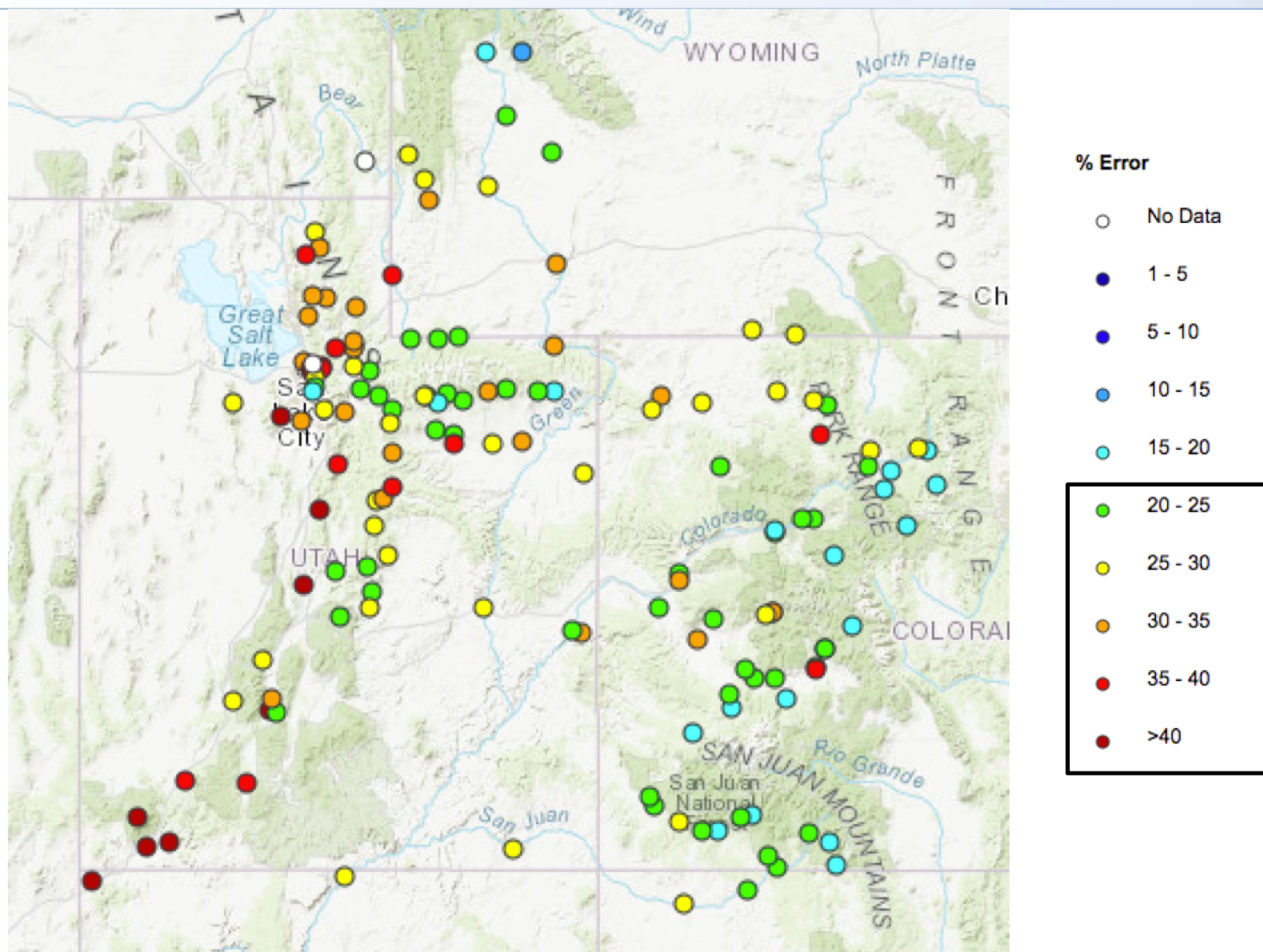
Example (Lizard Head SNOTEL –Dolores Basin):

Date	historical median	61% of median	
Dec 17th	5.4	3.3	2.1 inches to get back to normal
Apr 5th	16.8	10.2	6.6 inches to get back to normal

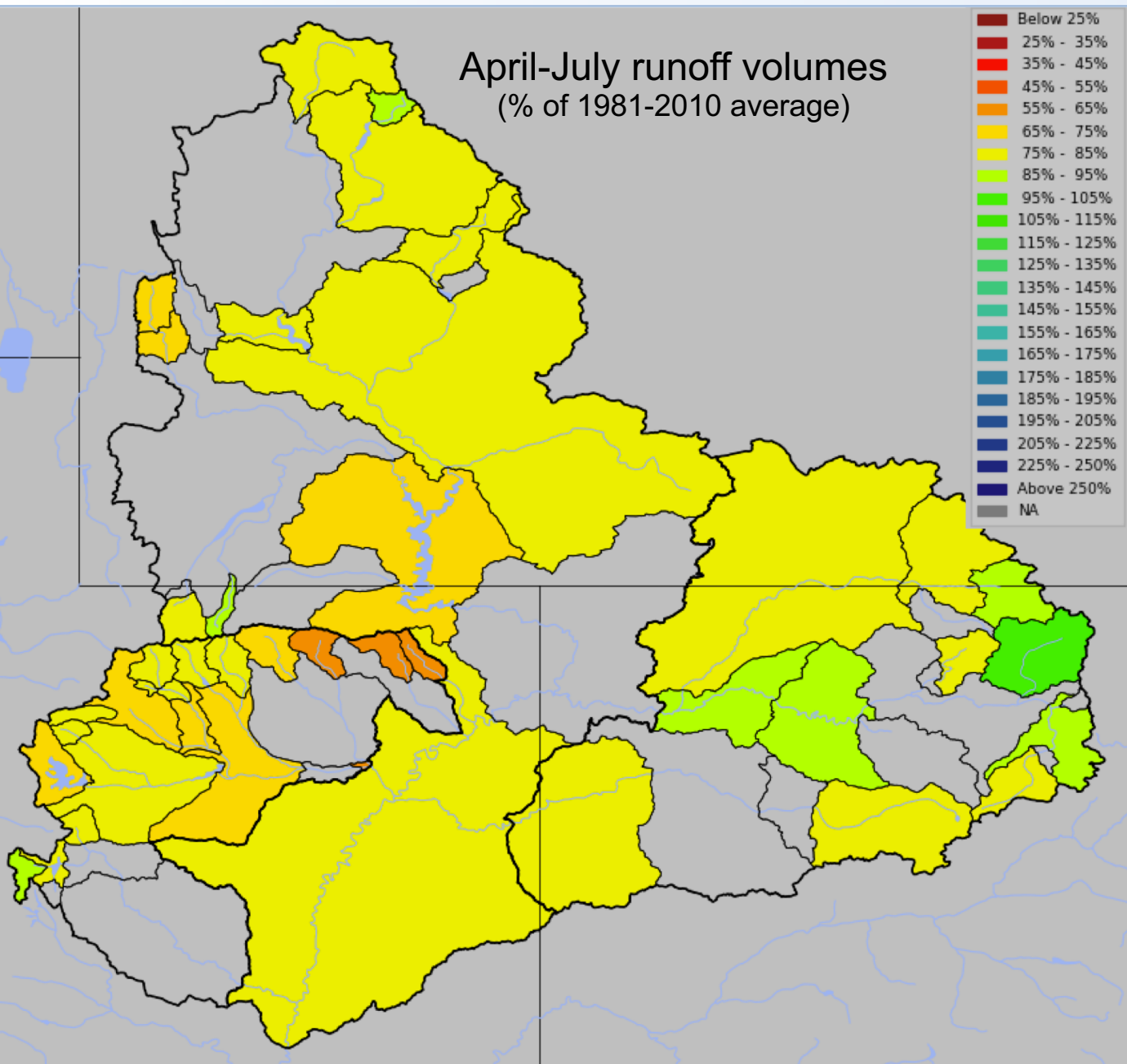
Water Supply Early Season Model Guidance – Early season snowpack numbers



Historical January Model Forecast Error (for the April-July period)



Early Season April-July 2019 Model Guidance – Green, White/Yampa, Duchesne Basins



Upper Green
Below Average
(70-90% of average)

Fontenelle ~75%
Flaming Gorge ~70%

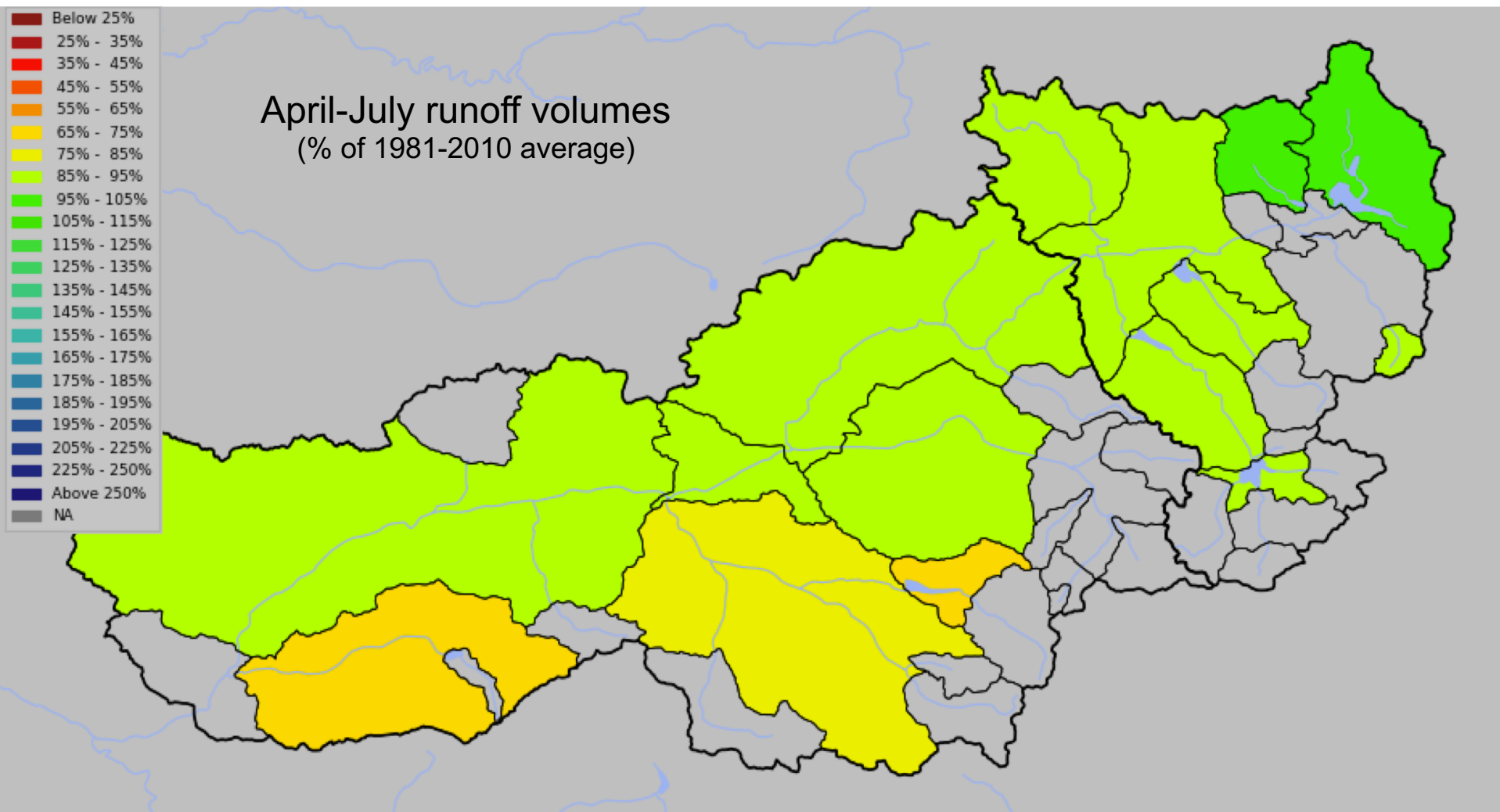
White/Yampa
Below to Near Average
(80-100% of average)

Duchesne
Below Average
(60-90% of average)

Early Season April-July 2019 Model Guidance – Colorado Mainstem

Colorado
Kremmling to Cameo
Below Average
(70-90% of average)

Colorado above Kremmling
Near Average
(90-100 % of average)



Early Season April-July 2019 Model Guidance – Gunnison and Dolores Basins

Dolores Basin
Below Average
(55-70 % of average)

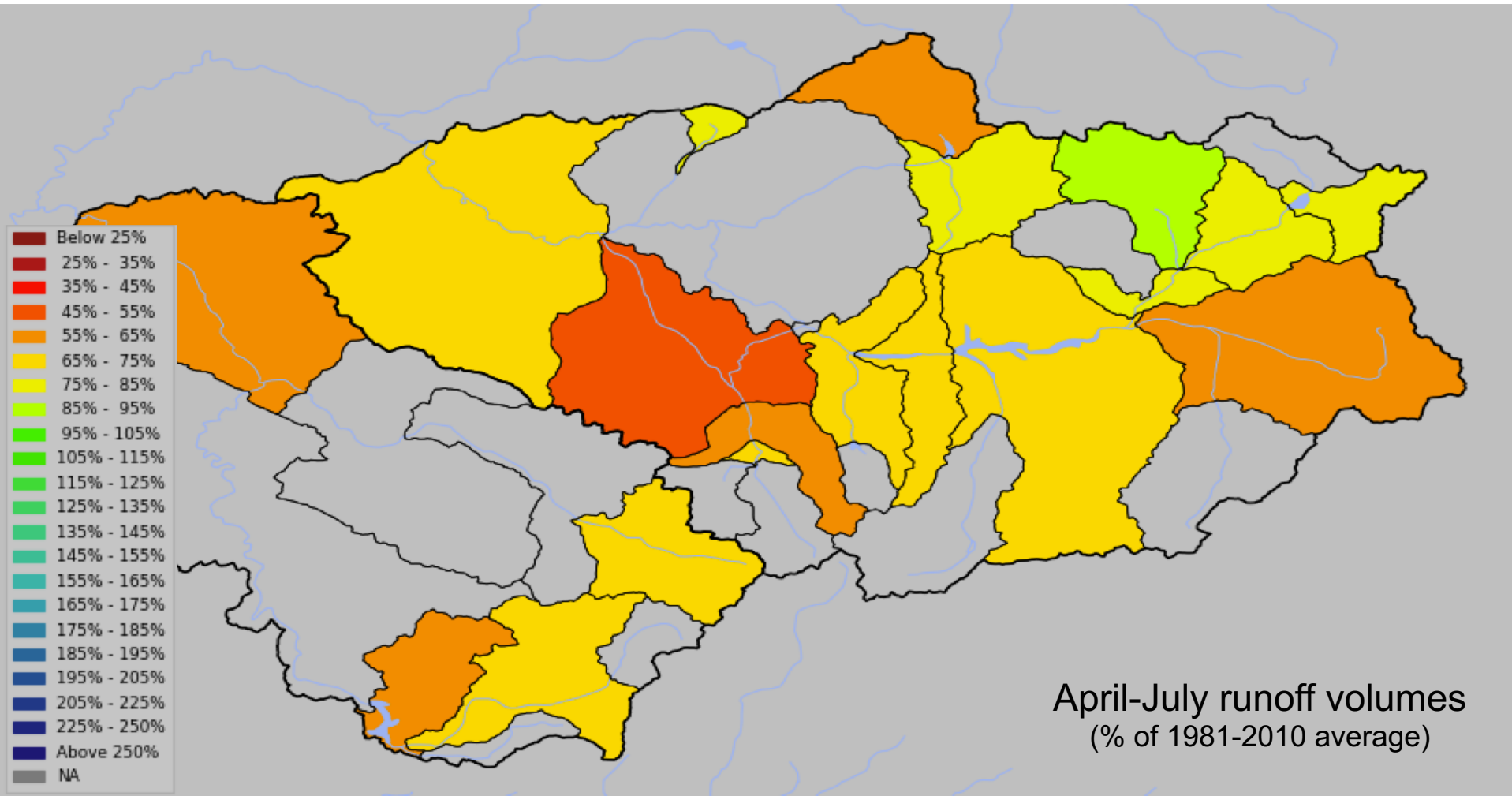
McPhee ~65%

Lower Gunnison
Below Average
(50-75 % of average)

Paonia ~65%
Ridgeway ~70%

Gunnison Above Blue Mesa
Below Average
(60-85% of average)

Taylor Park ~80%
Blue Mesa ~75%

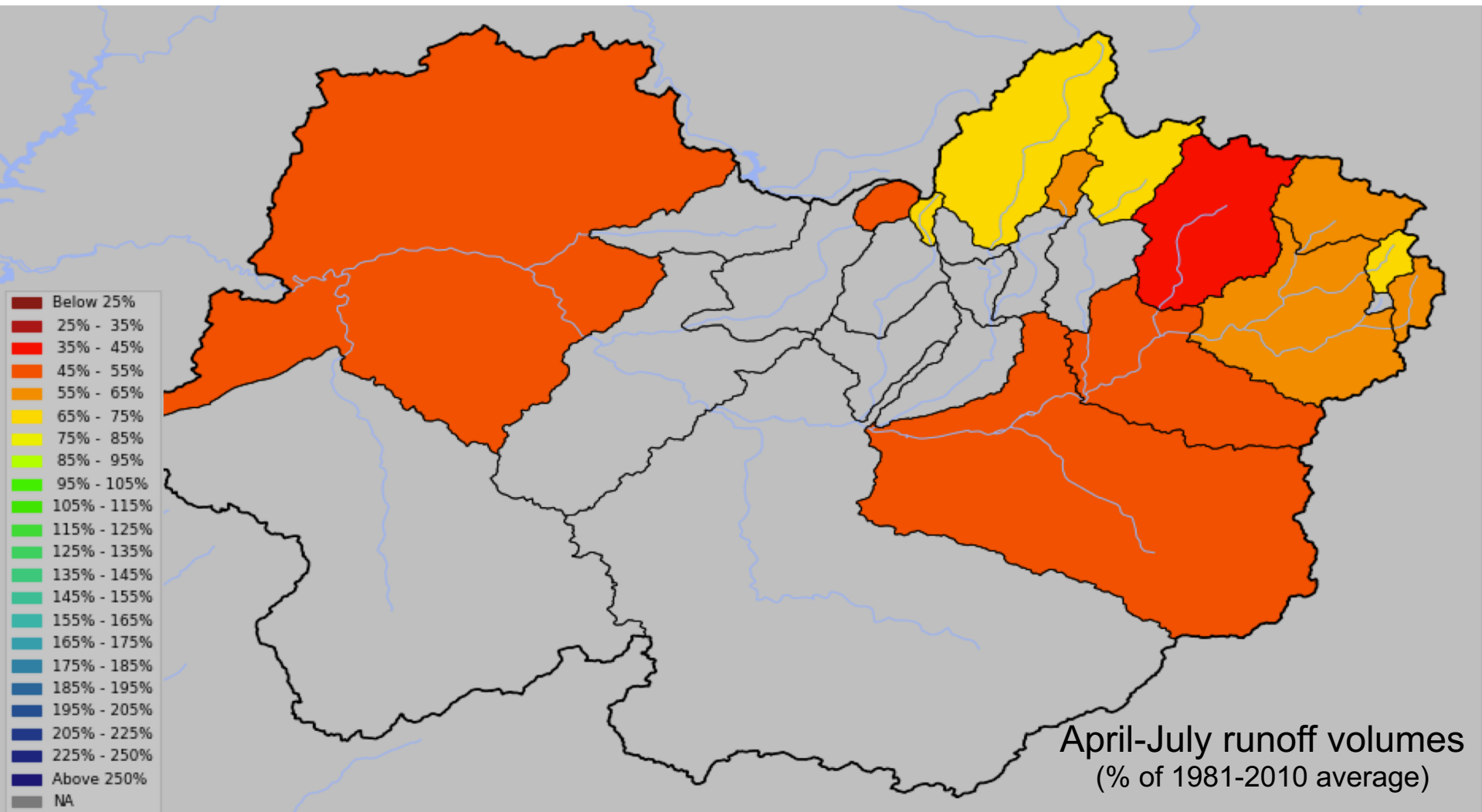


Early Season April-July 2019 Model Guidance – San Juan Basin

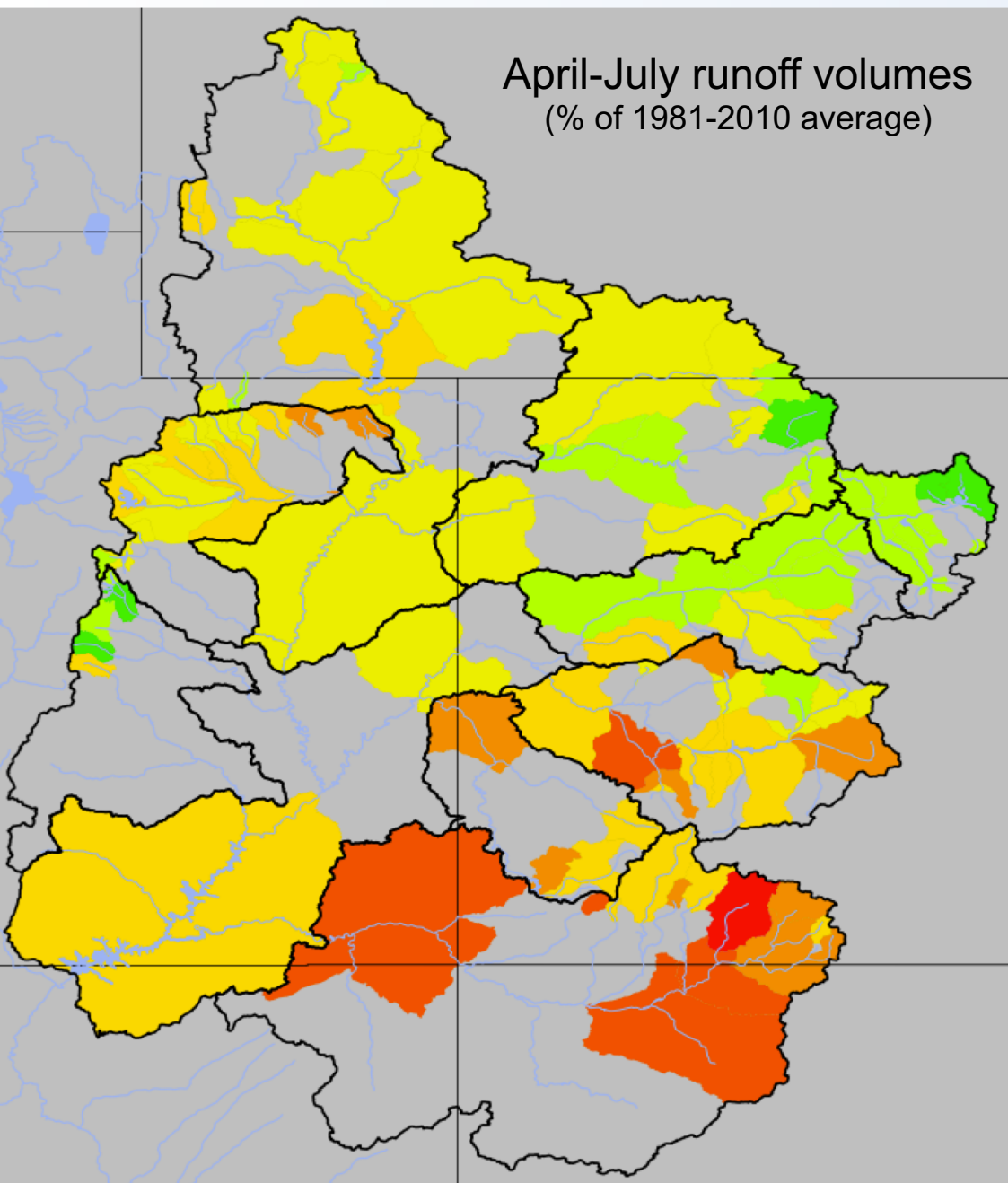
San Juan Basin

Below Average
(45-70 % of average)

<i>Vallecito</i>	~70%
<i>Lemon</i>	~55%
<i>Navajo</i>	~55%

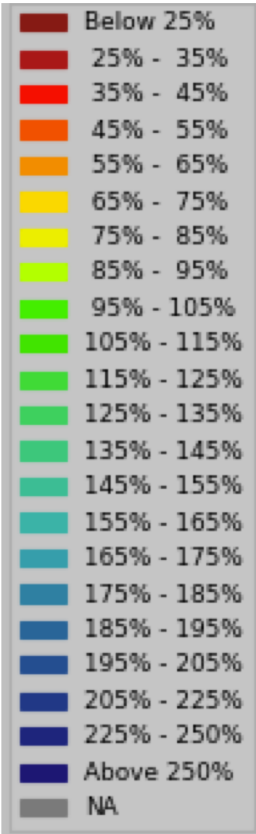


Early Season April-July 2019 Model Guidance – Lake Powell Inflow

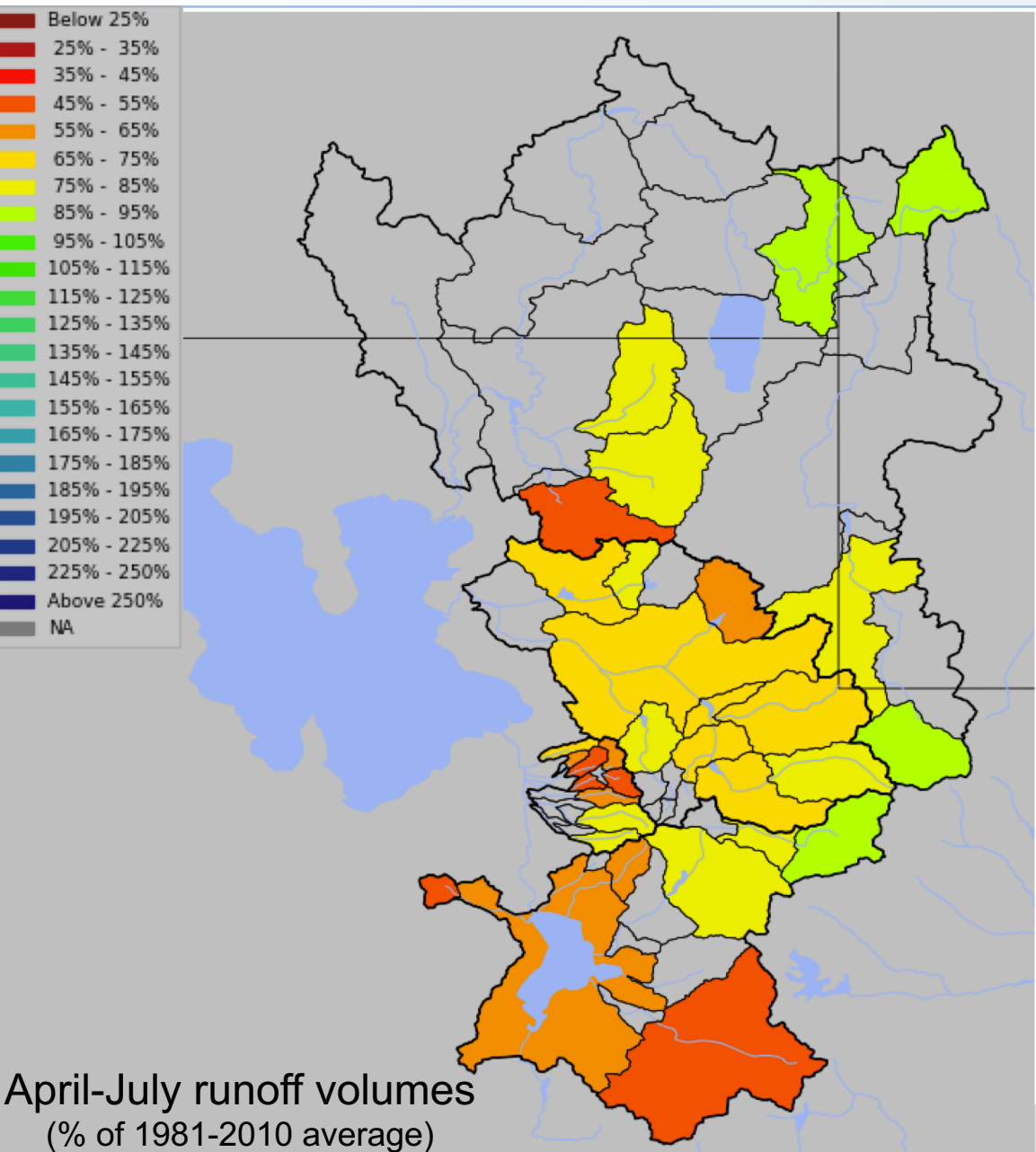


Upper Colorado River Basin

Lake Powell ~65%



Early Season April-July 2019 Model Guidance – Great Basin



Bear

Below to Near Average
(50-85% of average)

Hyrum Res ~75%

Weber

Below Average
(65-80% of average)

Pineview ~70%

Rockport ~70%

East Canyon ~80%

Six Creeks

Below Average
(50-80% of average)

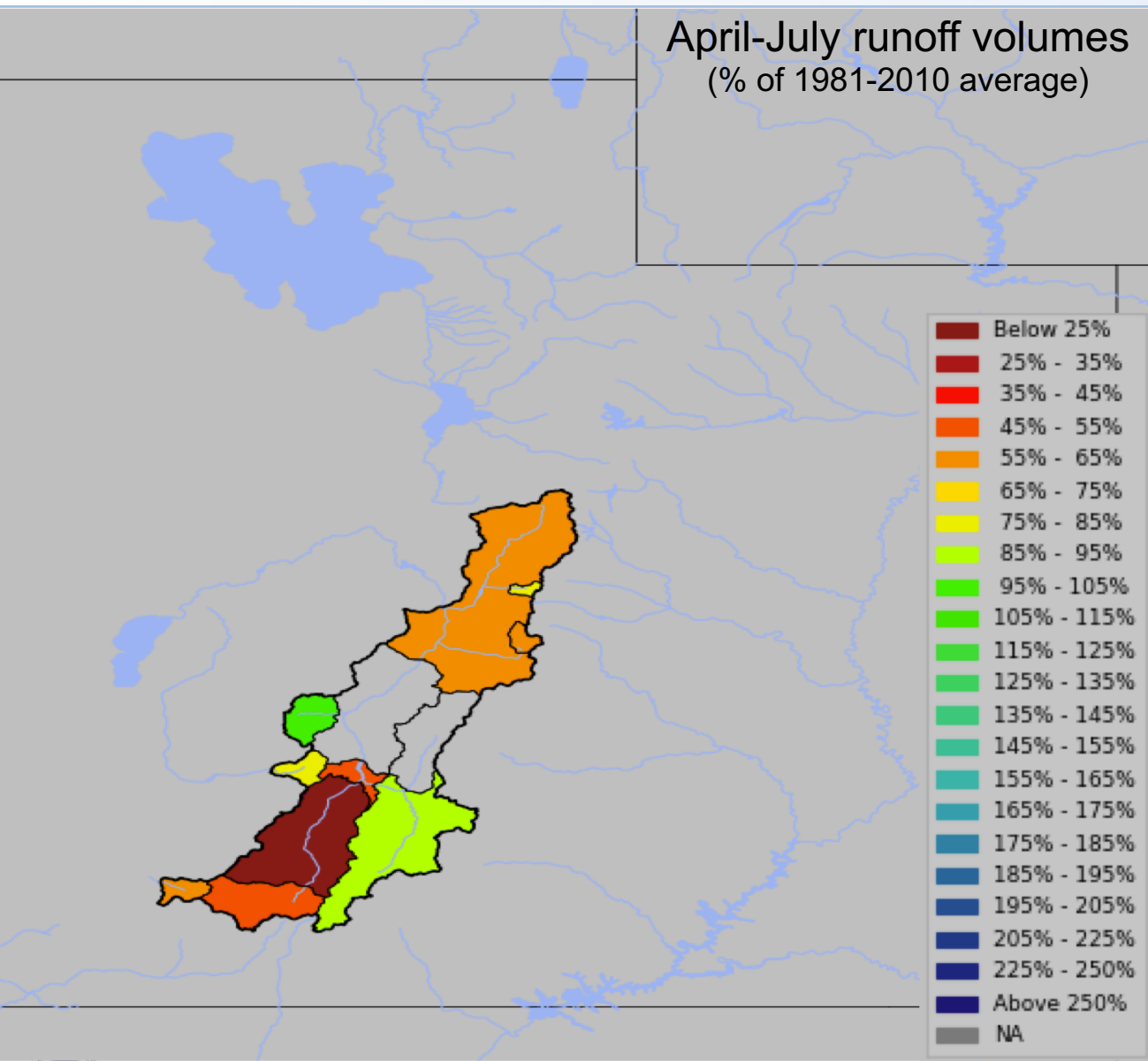
Provo / Utah Lake

Below Average
(50-85% of average)

Jordanelle ~80%

Utah Lake ~60%

Early Season April-July 2019 Model Guidance – Great Basin



Sevier
Below to Near Average
(45-85% of average)

Forecast Evolution Plots: www.cbrfc.noaa.gov select: Water Supply Click: Forecast Point



COLORADO BASIN RIVER FORECAST CENTER

NATIONAL WEATHER SERVICE / NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

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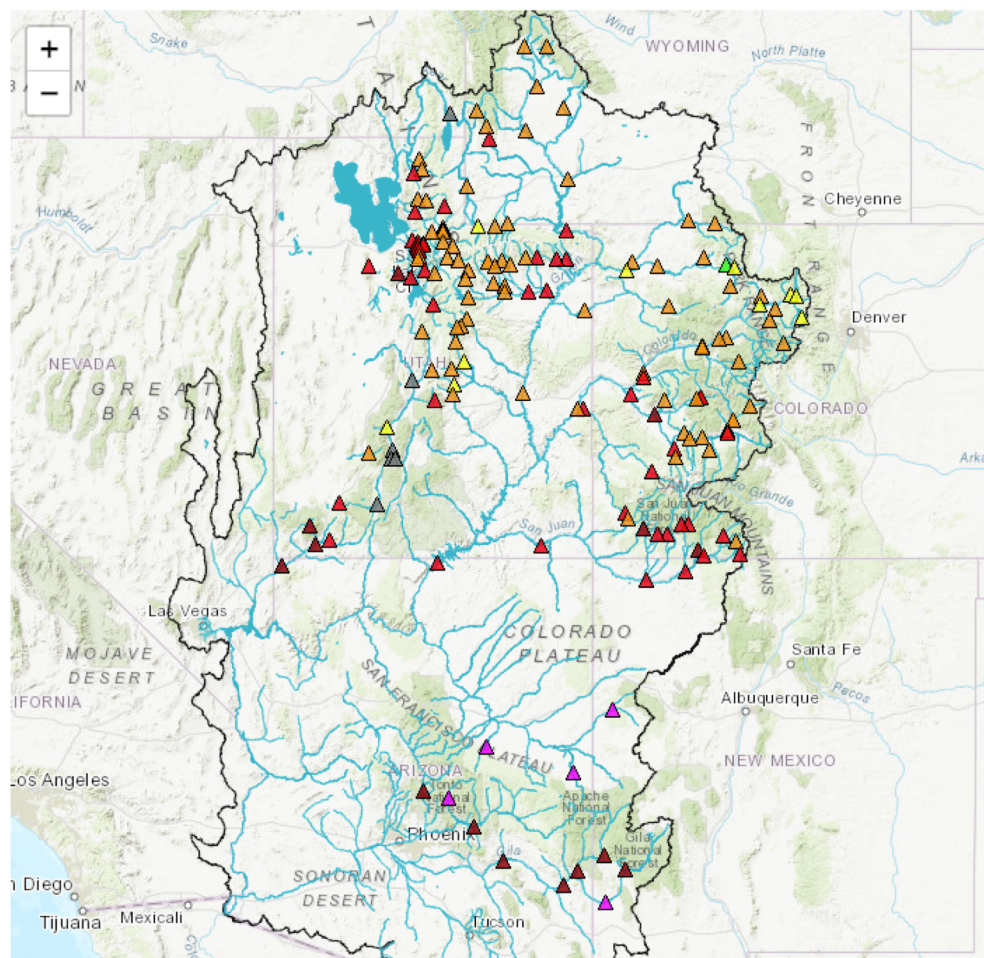
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Conditions Map

[Help](#)



▶ River Conditions

▶ Snow Conditions

▼ Water Supply Forecasts

First of Month Forecast Date: 2018-6-15

[Help](#)

Latest Model Run Date: 2018-12-17

☒ Show [Hide Other Types](#)

☐ First of Month Forecast Percent Average

☐ First of Month Forecast Percent Median

☒ Latest Model Guidance Percent Average

☐ Latest Model Guidance Percent Median

▲ < 30%

▲ 30-50%

▲ 50-70%

▲ 70-90%

▲ 90-100%

▲ 100-110%

▲ 110-130%

▲ 130-150%

▲ 150-200%

▲ 200-300%

▲ 300-500%

▲ >500%

▲ Regulated

△ No Forecast

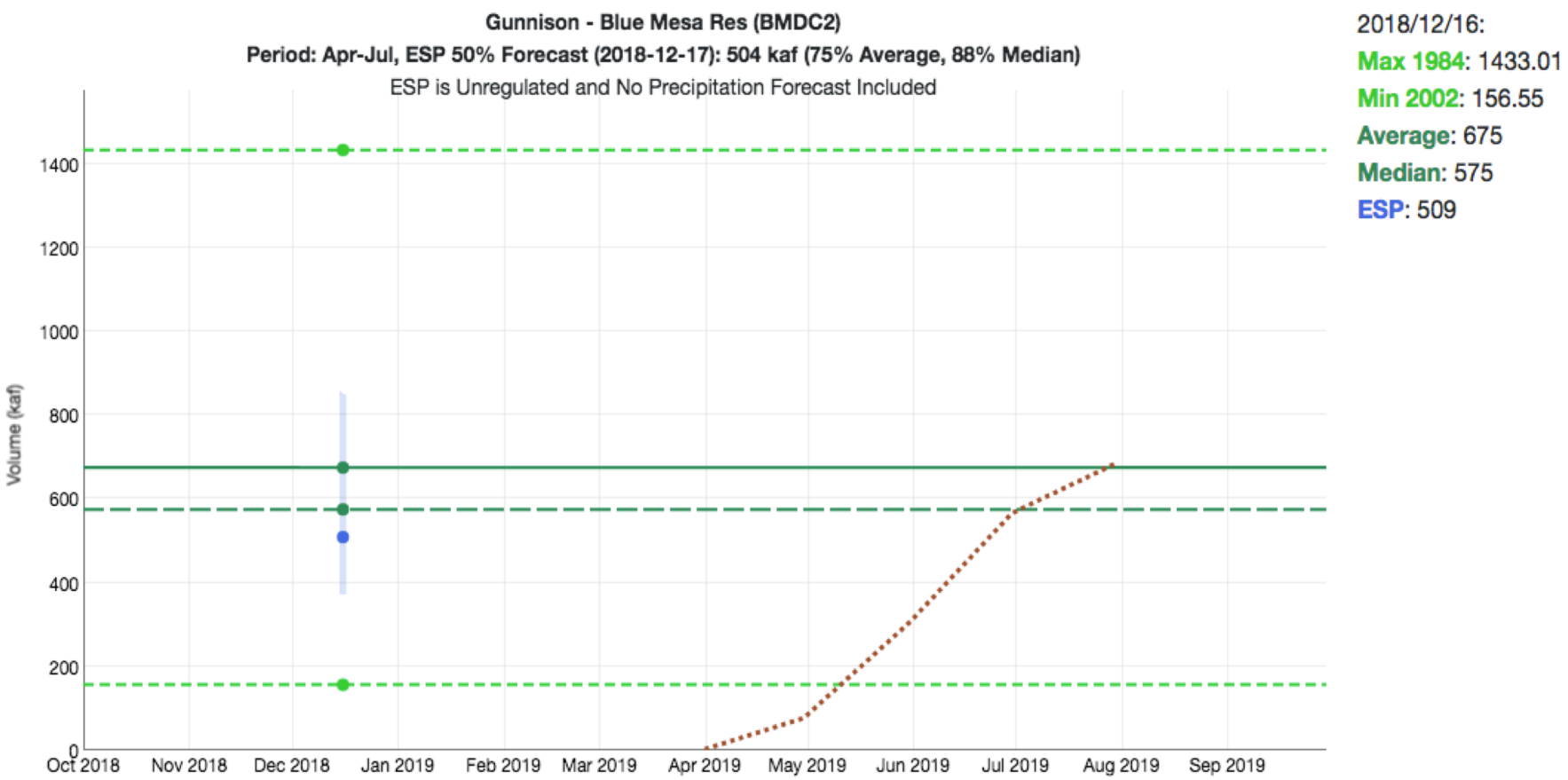
▶ Peak Flood Probability

▶ Reservoir Conditions

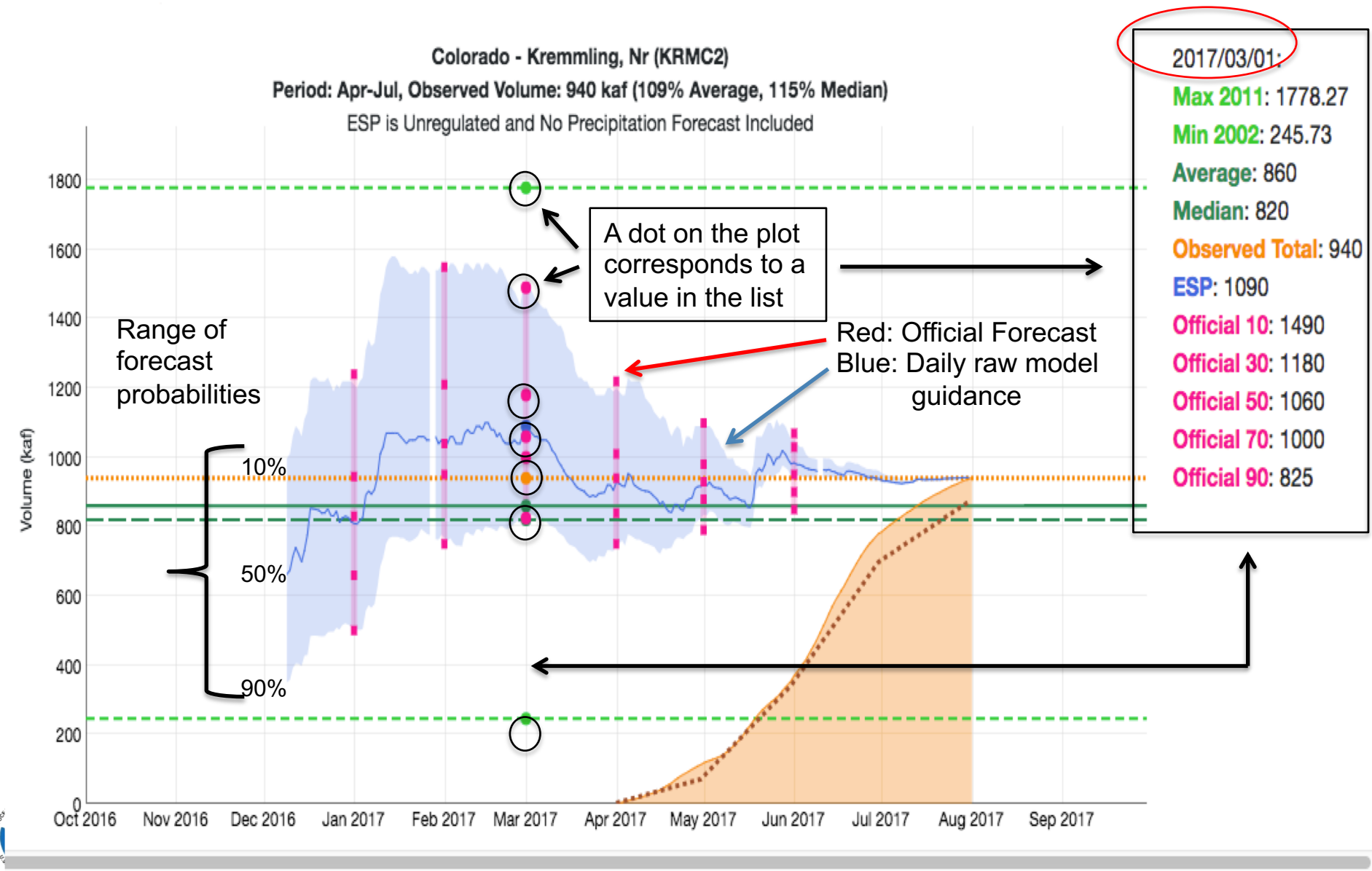
▶ Daily Precipitation



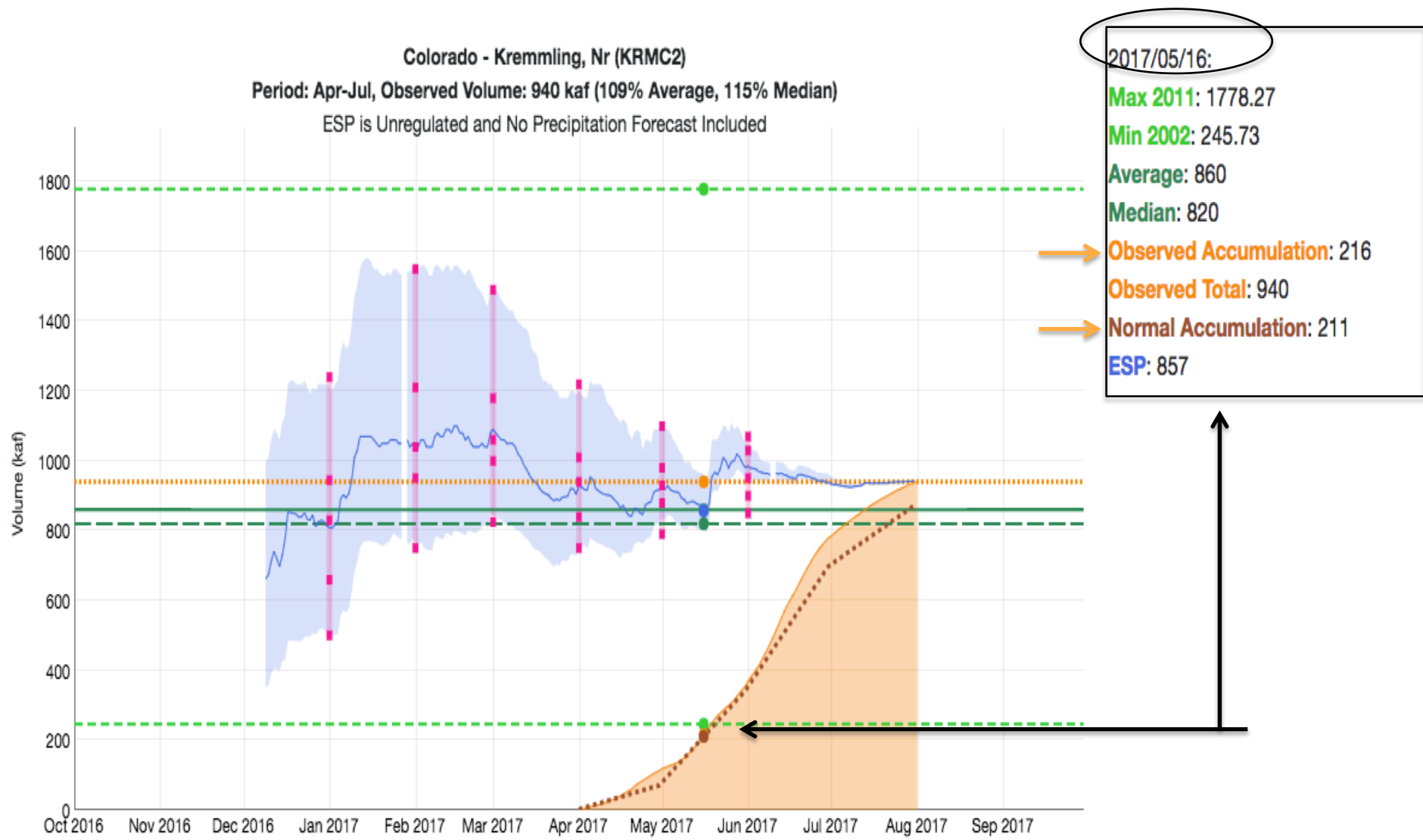
Water Supply Forecast



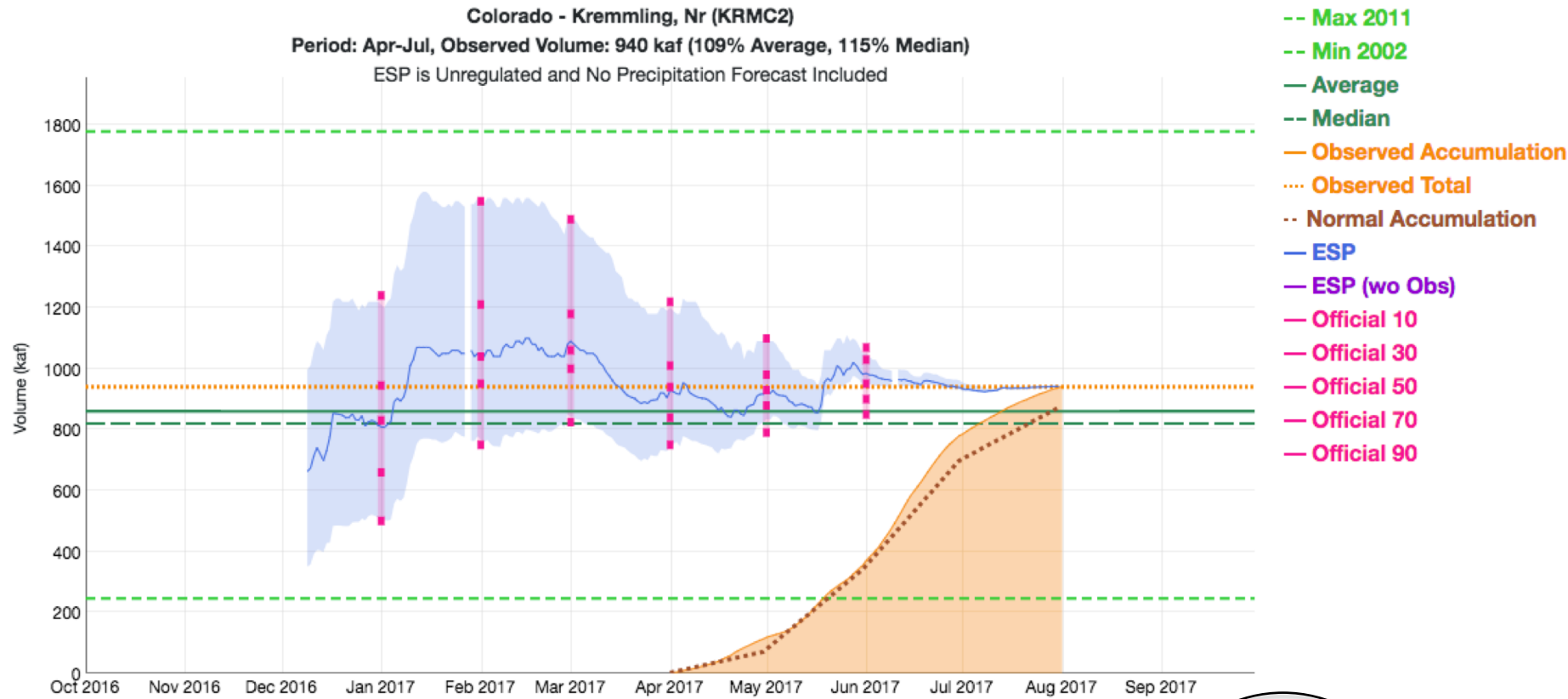
Forecast Evolution Plots (interactive features)



Forecast Evolution Plot (interactive features)



Communicating Forecast Information: Forecast Evolution Plot Options



Water Year

- 2019
- 2018
- 2017**
- 2016
- 2015
- 2014
- 2013
- 2012
- 2011

Plot Options

- ☐ QPF
- ☒ ESP
- ☒ Official Forecasts
- ☒ Average
- ☒ Median
- ☒ Observations
- ☒ Max/Min
- ☐ Probability Traces

Plot Help

Hover for values.
Click and drag to zoom.
Double click to zoom out.
Shift-click and drag to pan.

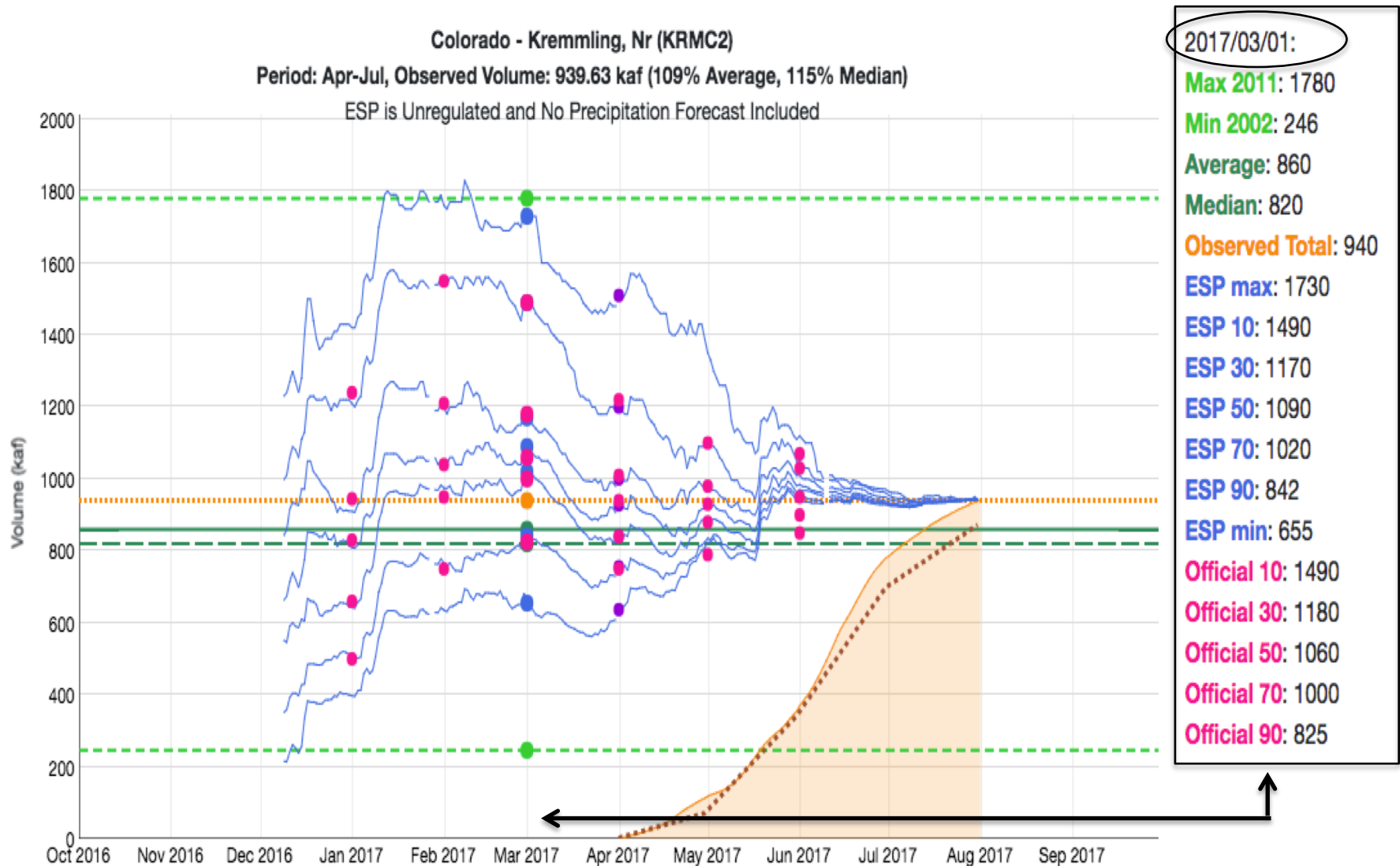
[Product Description](#)
[ESP Model Description](#)

Data

- [Graph Data](#)
- [Forecasts](#)
- [Observations](#)
- [Historical Volumes](#)
- [Verification](#)
- [Old Graph](#)
- [Snow](#)



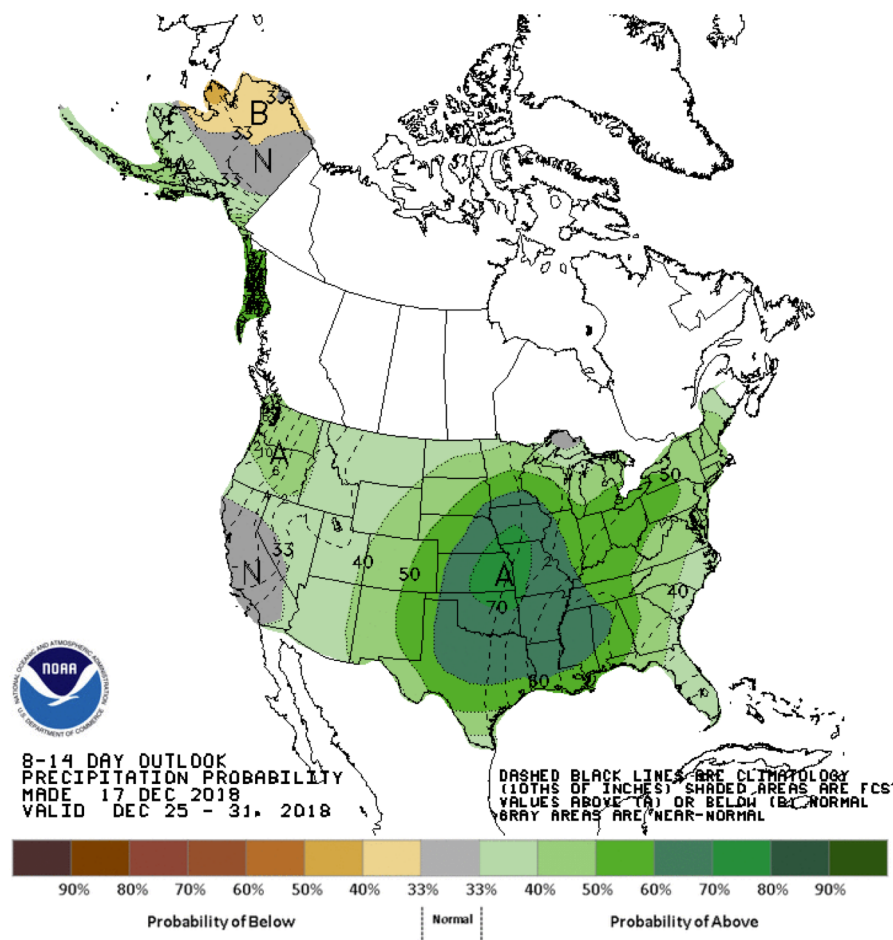
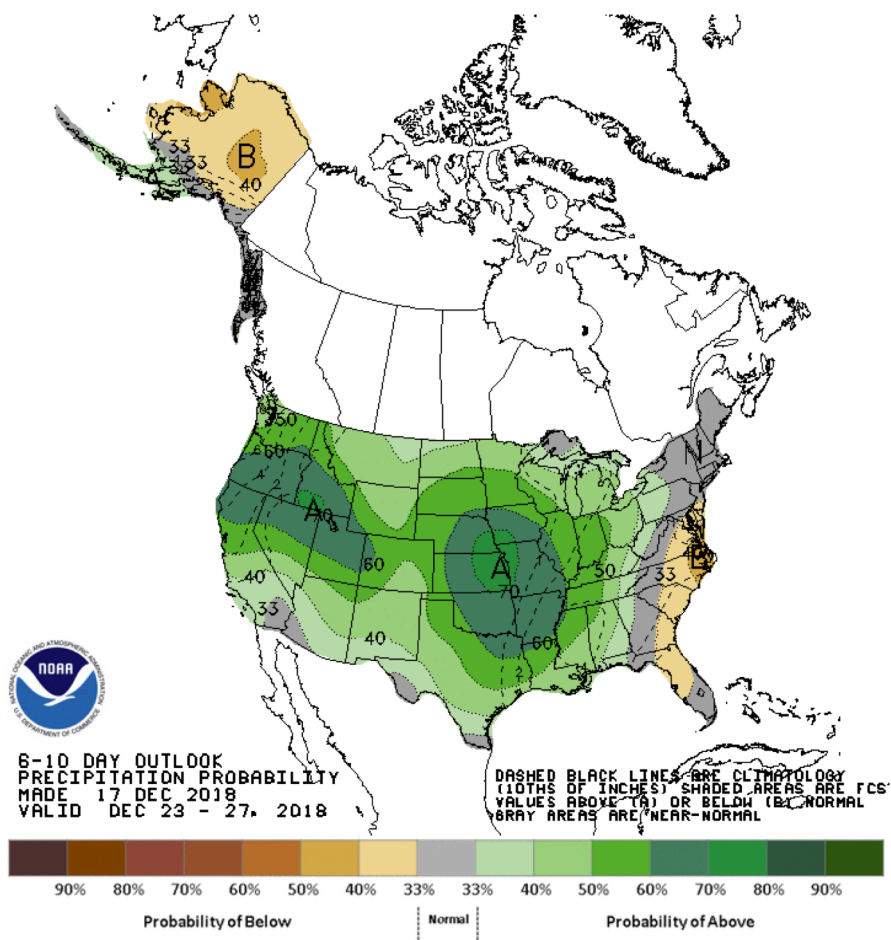
Forecast Evolution Plot Options



Long Range Guidance – An increase in storm activity / precipitation potential

Dec 23-27

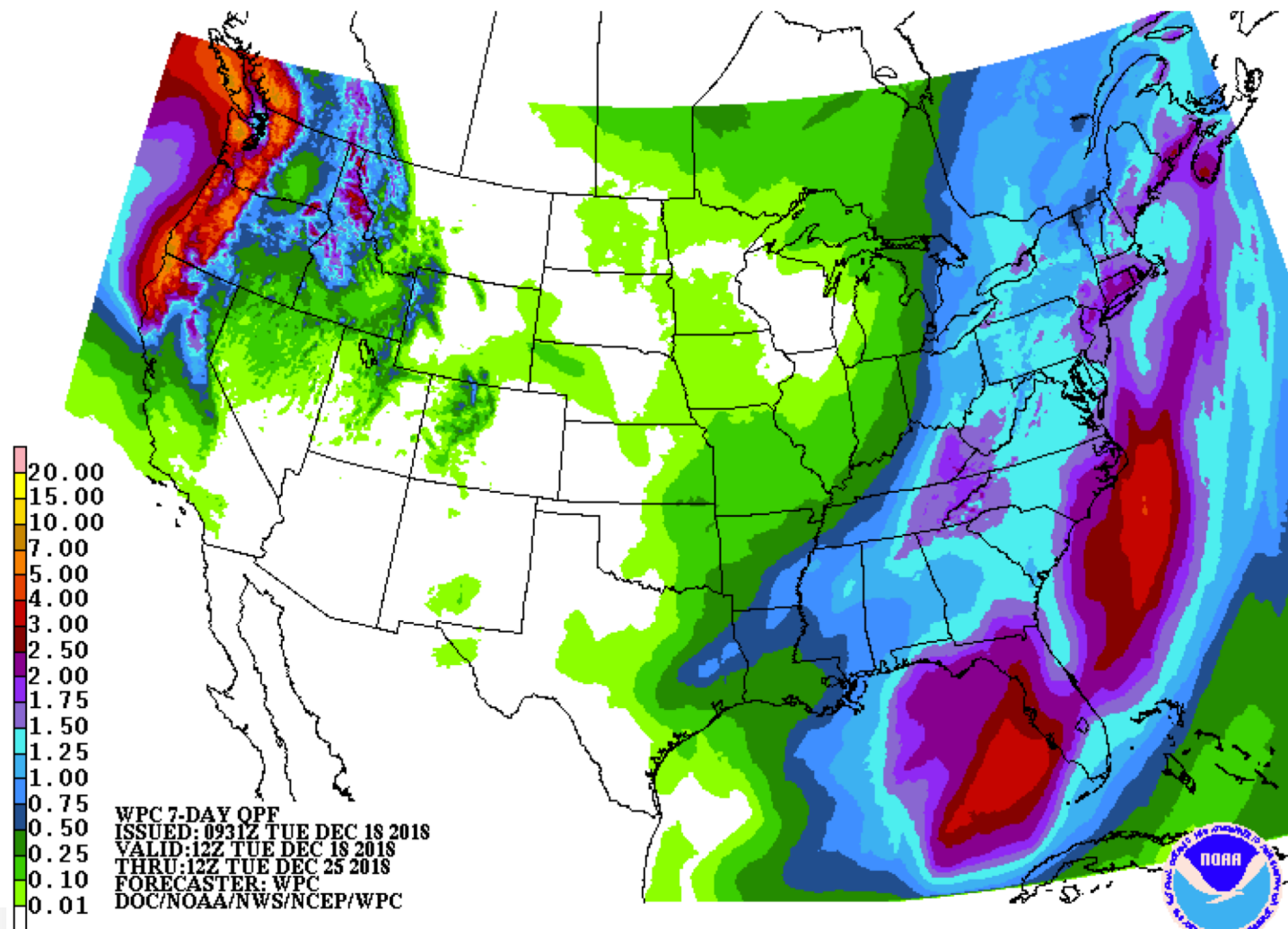
Dec 25-31



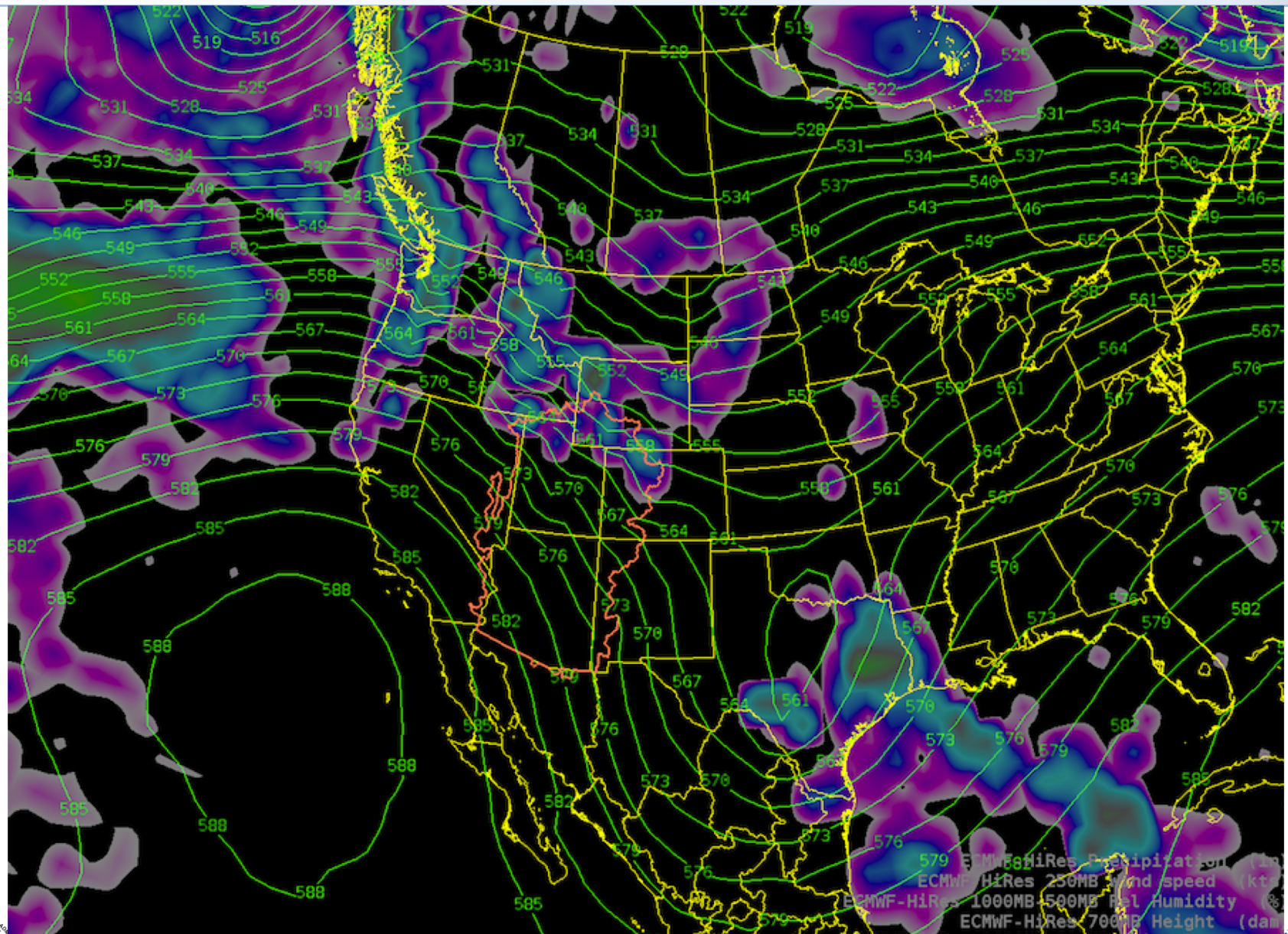
NOAA – Climate Prediction Center

The Outlook for December – 7 day precipitation outlook

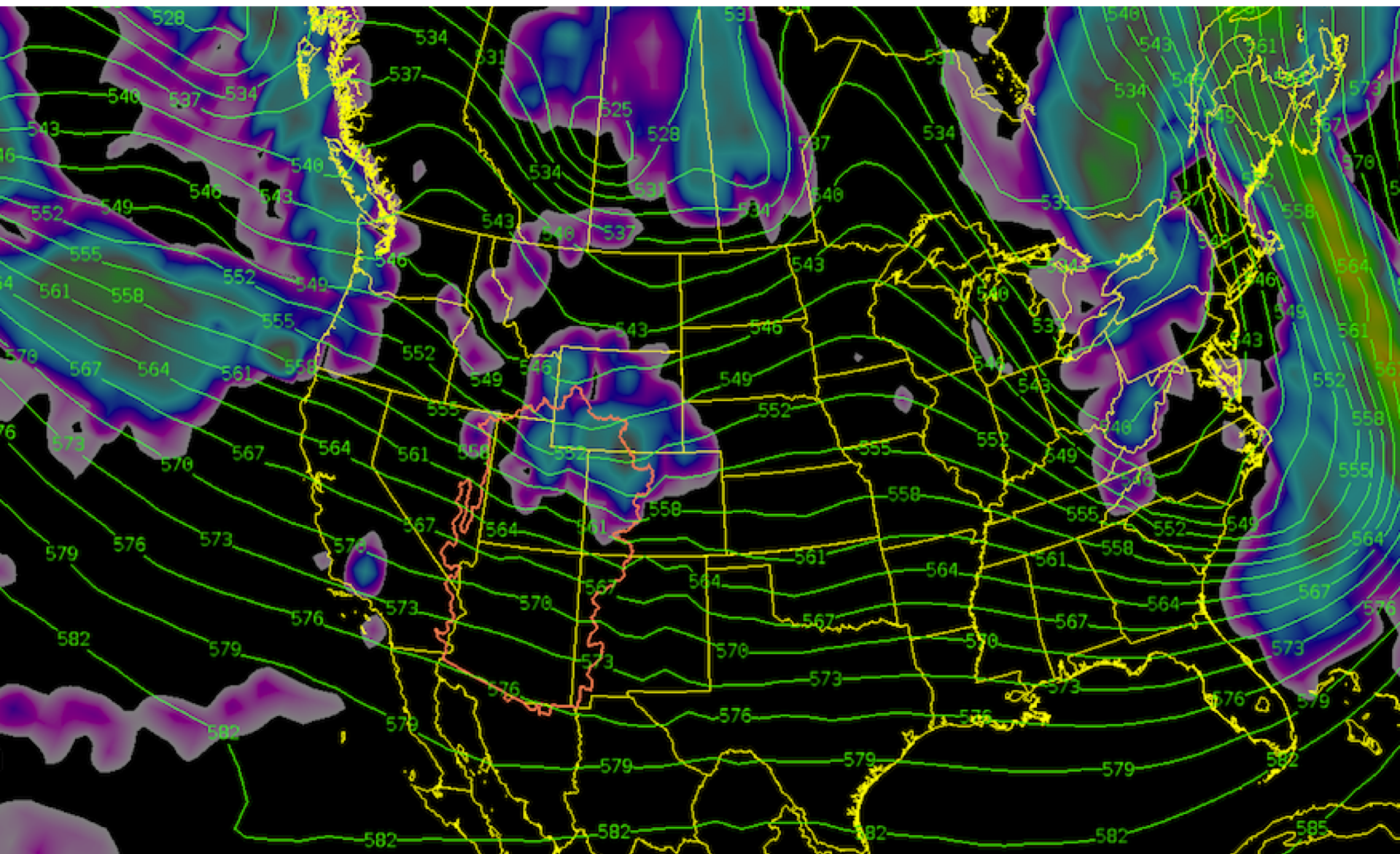
NOAA Weather Prediction Center Precipitation Dec 18 – Dec 25



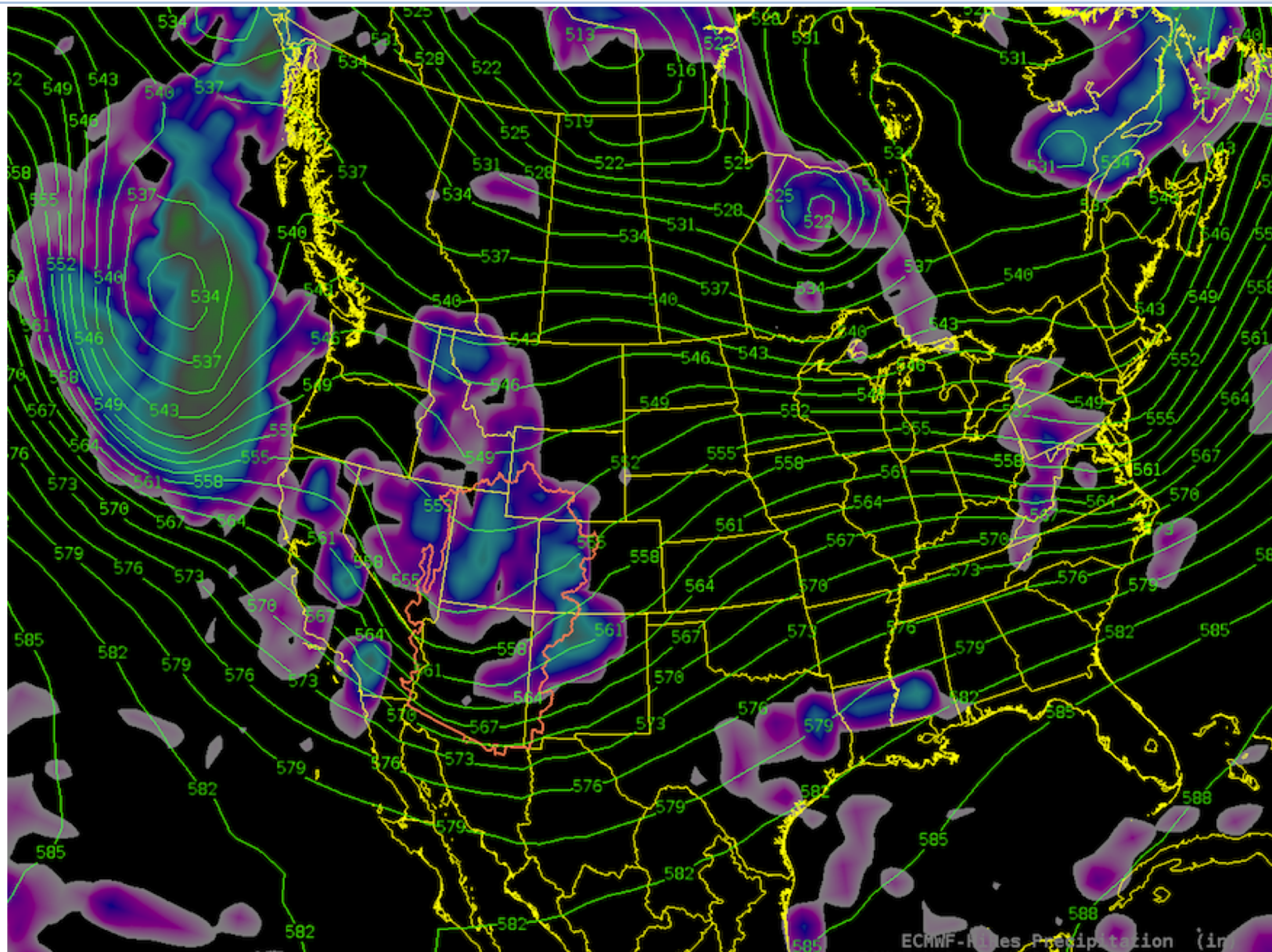
The Outlook for December – Wednesday December 19th



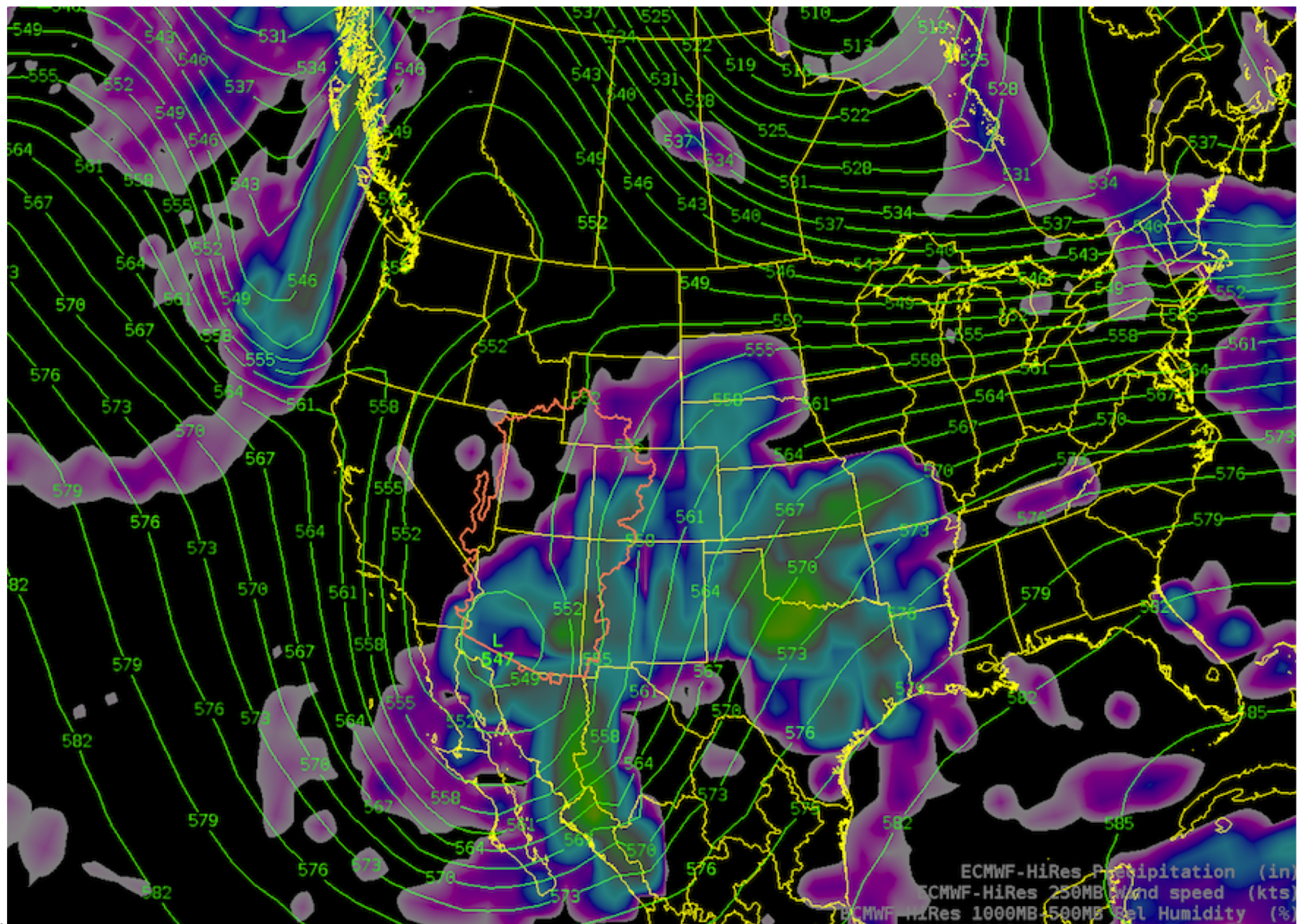
The Outlook for December – Saturday December 22nd



The Outlook for December – Monday December 24th



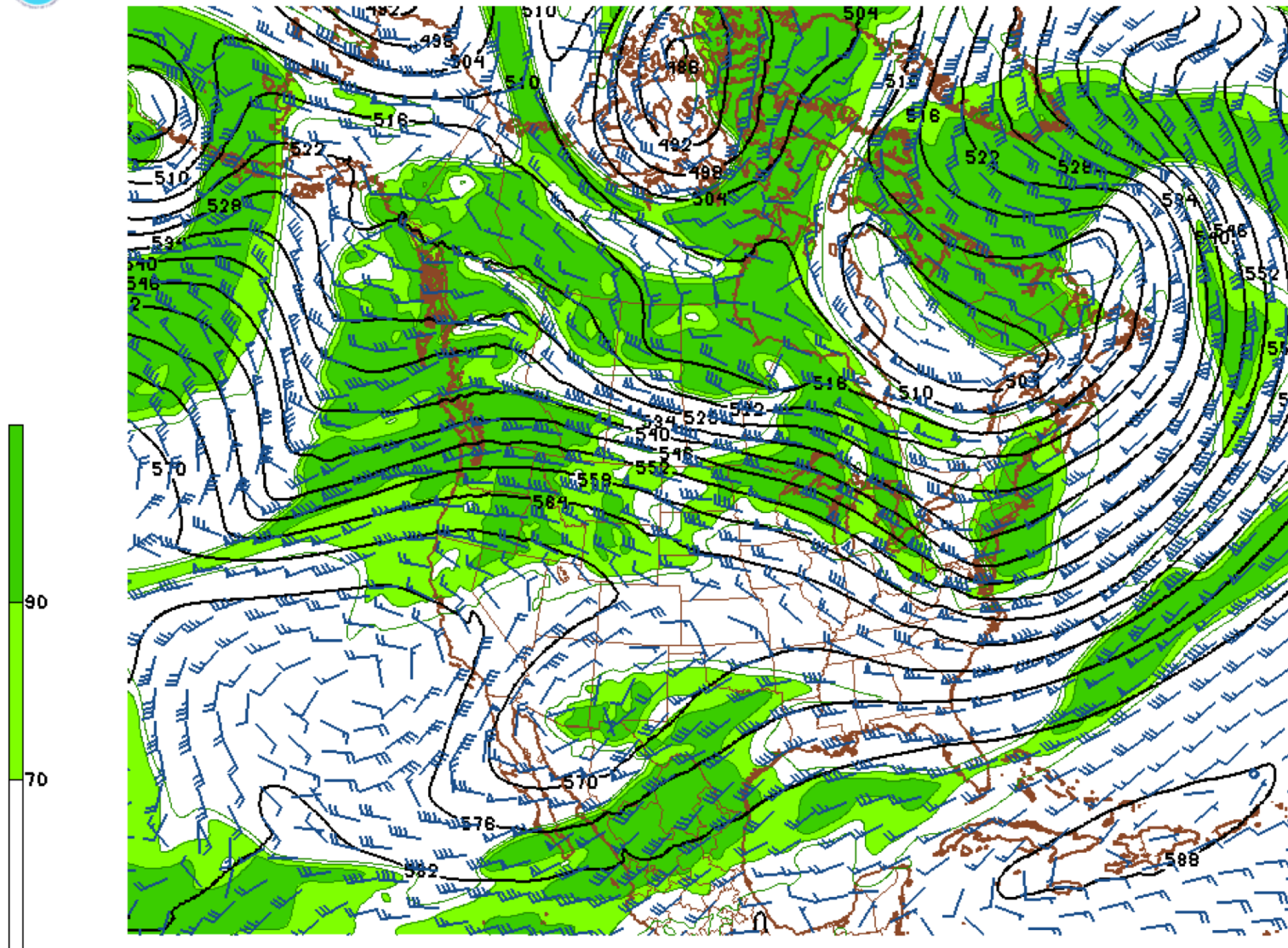
The Outlook for December – Wednesday December 26th



Long Range Guidance – First week of January (lower confidence)



12/18/18 06UTC 384HR FCST VALID THU 01/03/19 06UTC NOAA/NWS/NCEP



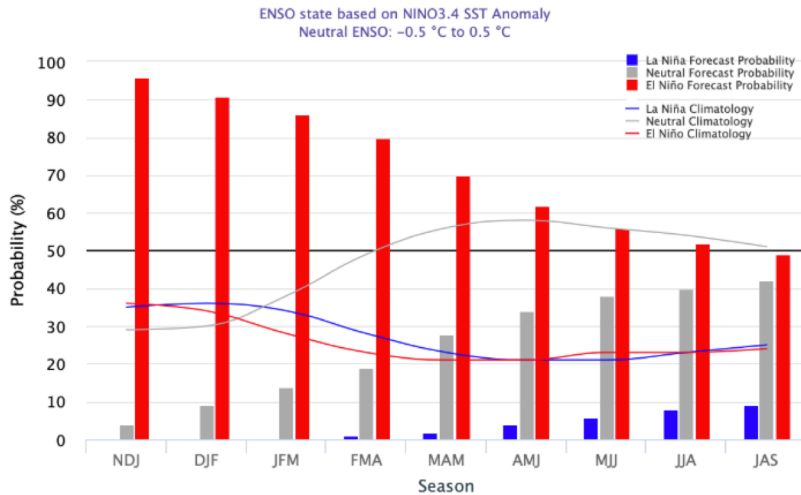
El Niño Southern Oscillation (ENSO)

Conditions as of December 17th 2018: ENSO Neutral

Above average sea surface temperatures exist across the equatorial pacific ocean however coupling to atmospheric circulation has yet to occur.

The outlook remains for a better than 90% chance of a weak El Niño through the winter of 2018/2019 and 70% chance into spring of 2019.

Early-December 2018 CPC/IRI Official Probabilistic ENSO Forecasts



CPC/IRI Early-Month Official ENSO Forecast Probabilities

Season	La Niña	Neutral	El Niño
NDJ 2018	0%	4%	96%
DJF 2018	0%	9%	91%
JFM 2018	0%	14%	86%
FMA 2018	1%	19%	80%
MAM 2018	2%	28%	70%
AMJ 2018	4%	34%	62%
MJJ 2019	6%	38%	56%
JJA 2019	8%	40%	52%
JAS 2019	9%	42%	49%

Primary impacts: Correlate with wetter conditions in the Lower Colorado River Basin (possibly extending into the Virgin & San Juan Basins) and drier conditions in Green River Headwaters (WY). Little correlation elsewhere.

Staff and Basin Assignments 2019 Water Year

Ashley Nielson - Green River Basin and Lake Powell

Greg Smith - San Juan, Gunnison and Dolores

Cody Moser - Upper Colorado Mainstem

Zach Finch - Lower Colorado Basin (Virgin, LML)

Tracy Cox - Lower Colorado Basin (Salt, Gila)

Patrick Kormos - Bear and Weber

Brent Bernard - Six Creeks, Provo, Sevier

Brenda Alcorn – Support and Backup

Concluding...

Forecast evolution plots for the 2019 season now on CBRFC web site

Official forecasts are usually published by the 4th working day of the month (Jan-Jun)

Notifications of new forecast / forecast discussion distributed to email distribution list.

Contact us to get on the list: greg.smith@noaa.gov or paul.miller@noaa.gov

Water supply briefings (webinars) will be held early each month (Jan-May, etc.)

Tuesday Jan 8th @ 11 am MT – Colorado River Basin Briefing

Tuesday Jan 8th @ 1:30 pm MT Great Basin Briefing

Register for the briefings and see the full schedule by going to the CBRFC web page:
www.cbrfc.noaa.gov

Feel free to contact us with any questions or concerns.

Thank You