

January 2017 Colorado River Basin Water Supply Briefing

Jan 9, 2017

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Colorado Basin River Forecast Center
National Weather Service
NOAA

Please mute your phone
until ready to ask questions



Today's Presentation

Fall weather impacts to water supply forecasts

December – January weather / critical pattern change

Current snowpack situation

2017 water supply forecasts overview and current trends

January forecast – How good are they?

Upcoming weather – potential impacts to water supply forecasts

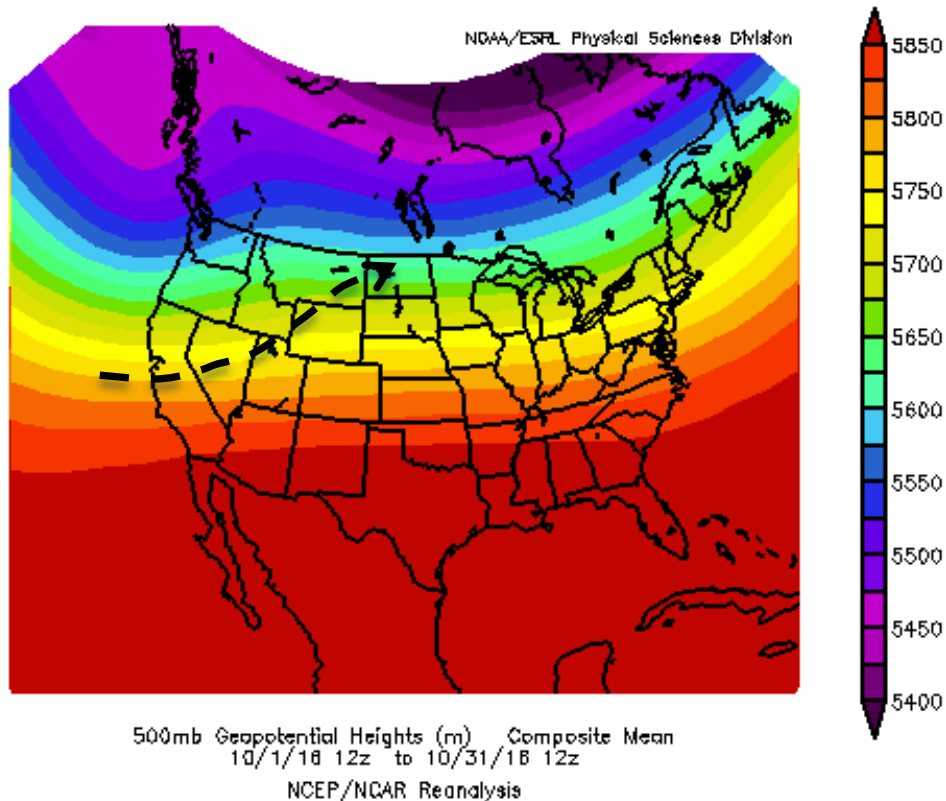
Contacts & Questions

*** Please mute your phone until ready to ask questions ***

Fall Weather Impacts

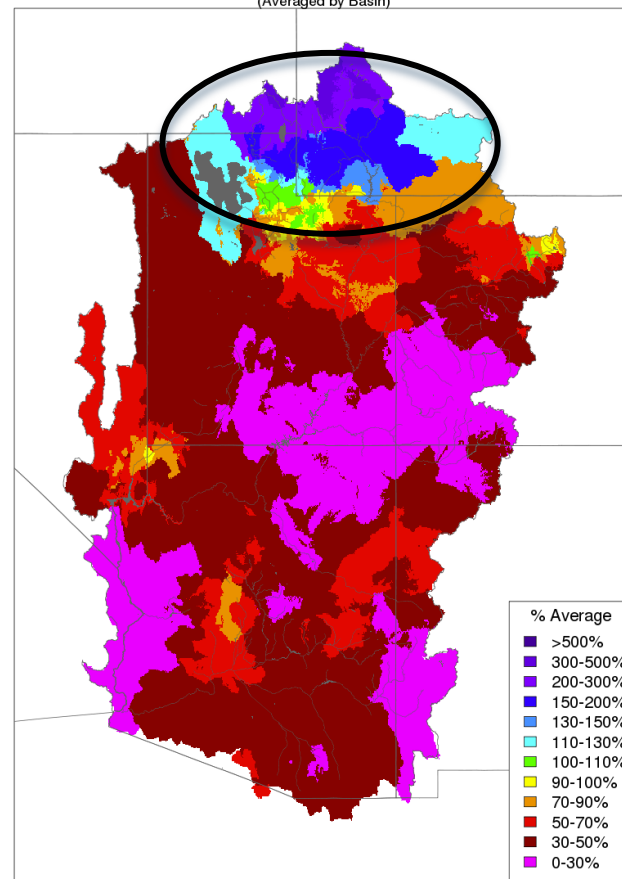
Started the 2017 water year very dry most areas

October Atmospheric Pattern



Storm track clipped the northern part of the Green River and Great Basins

Monthly Precipitation - October 2016
(Averaged by Basin)



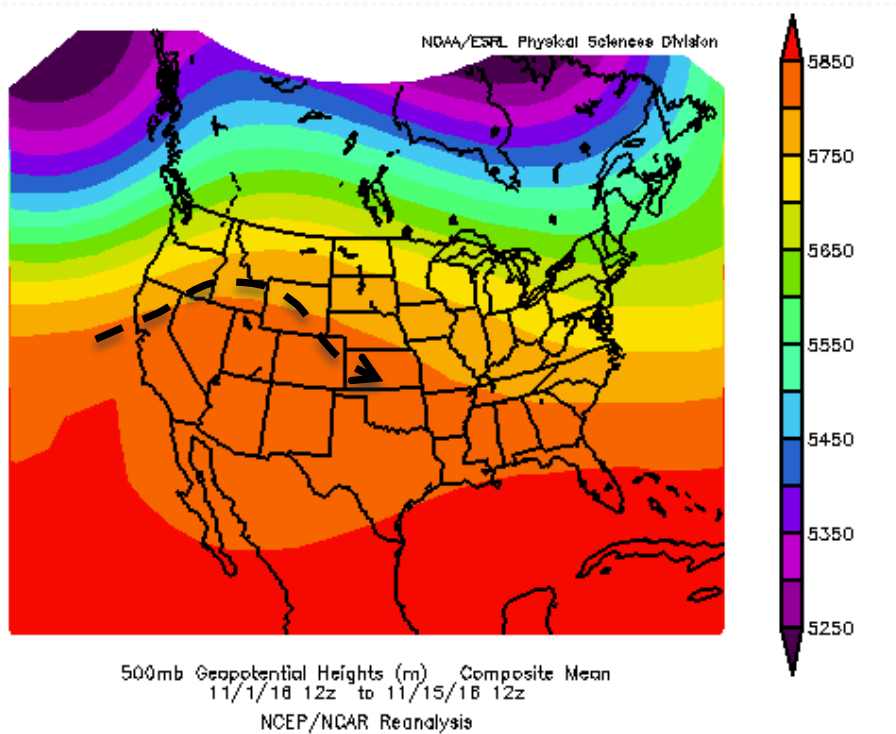
Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

Near or Above Average Precipitation

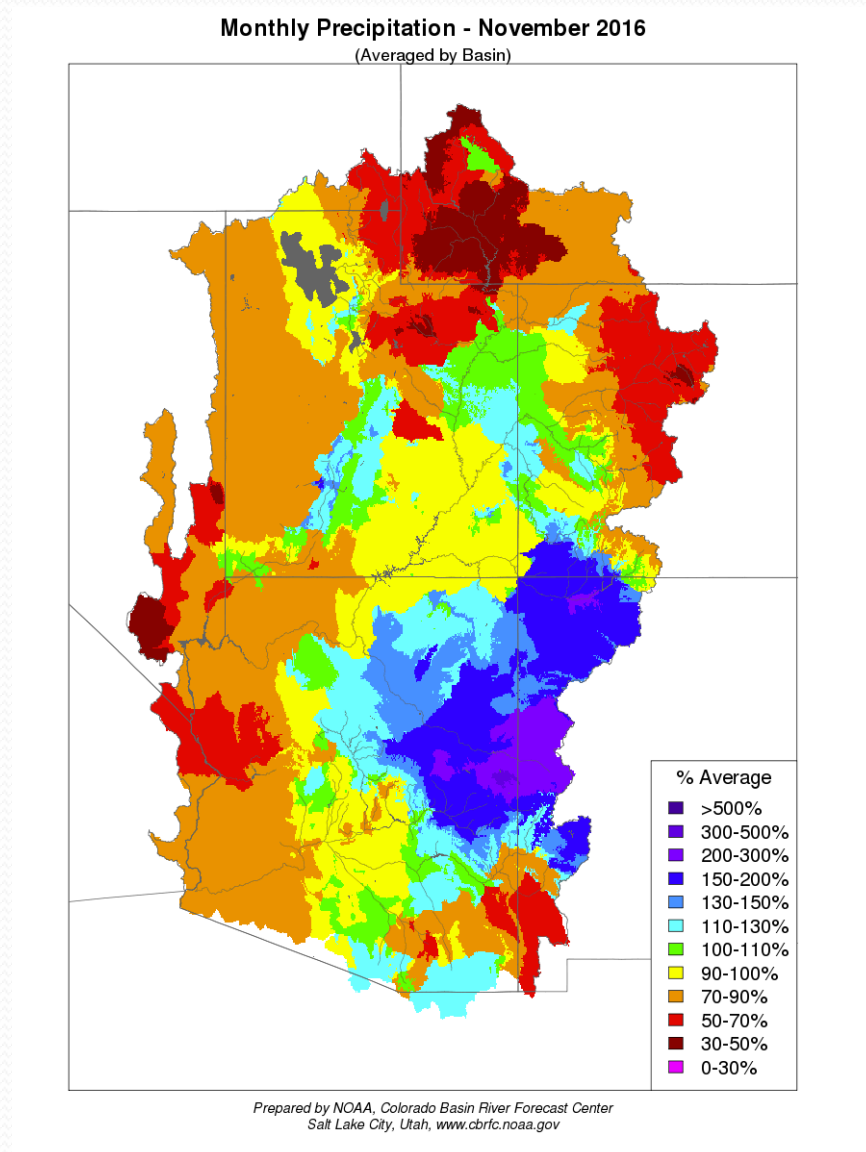
- Green River Basin above Flaming Gorge
- Northern Great Basin
- Parts of Duchesne River Basin

Fall Weather Impacts

November - Where precipitation did fall - It was rain



First 20 days of November:
Dry with temperatures as much as
20 degrees above normal

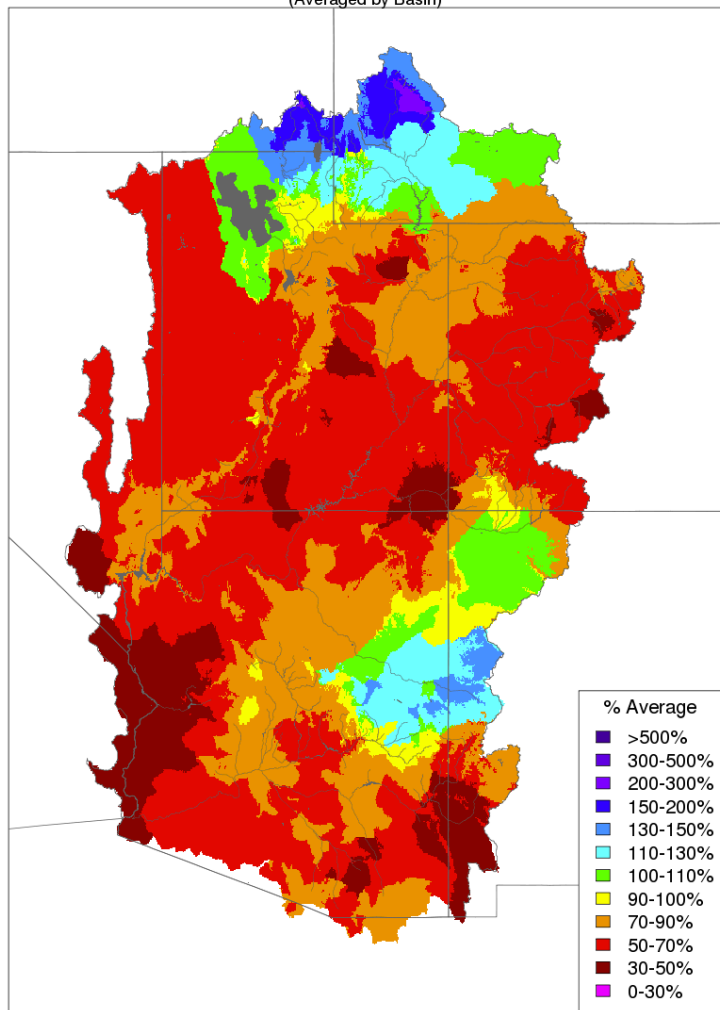


Fall Weather Impacts

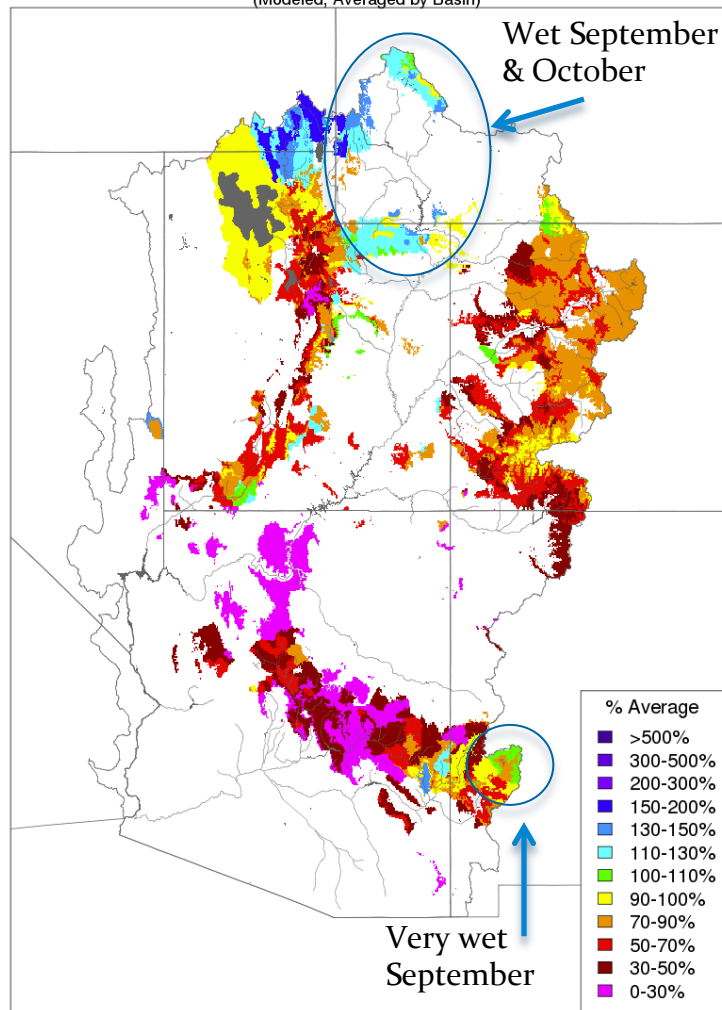
Impacts to soil moisture entering winter

Water Supply Forecast Impacts: Forecasts higher/lower by 3-10% of average

Water Year Precipitation, October 2016 - November 2016
(Averaged by Basin)



Soil Moisture - Fall - 2016 (November 16)
(Modeled, Averaged by Basin)

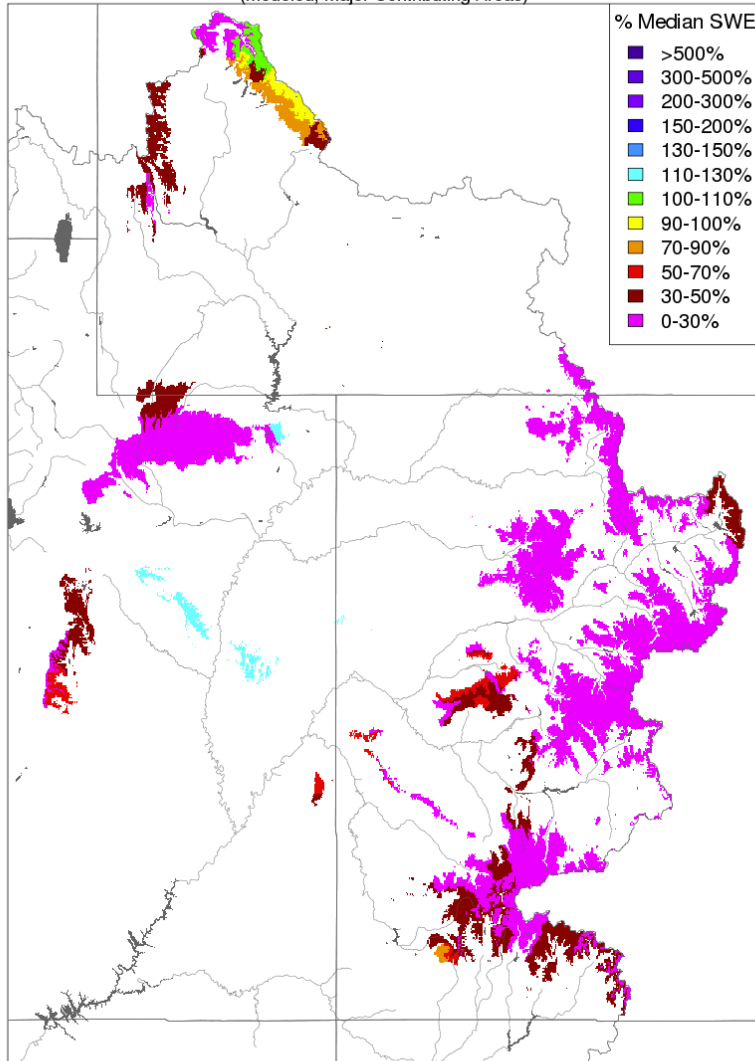


Fall Weather Impacts

Impacts to high elevation snowpack entering winter

Snow Conditions - November 22 2016

(Modeled, Major Contributing Areas)



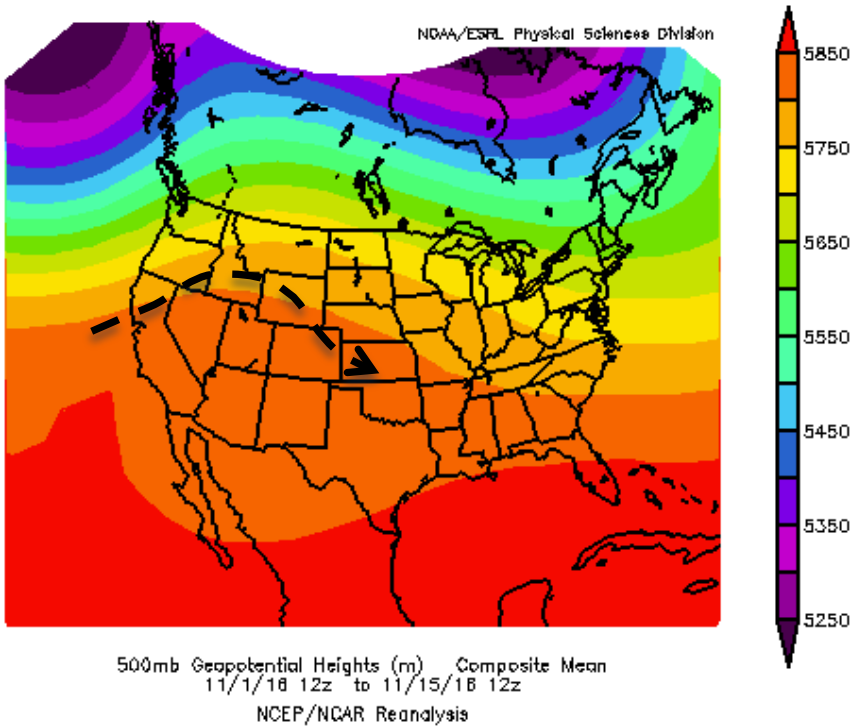
Typically high elevation (> 10,000 feet) snow accumulation occurs in November. This was not the case in parts of the Upper Colorado River Basin.

SNOTEL groups do not show this representation. They are below the high elevation zones in the CBRFC hydrologic model.

Water Supply Forecast Impacts:
Forecasts lower as a percent of average in these areas.

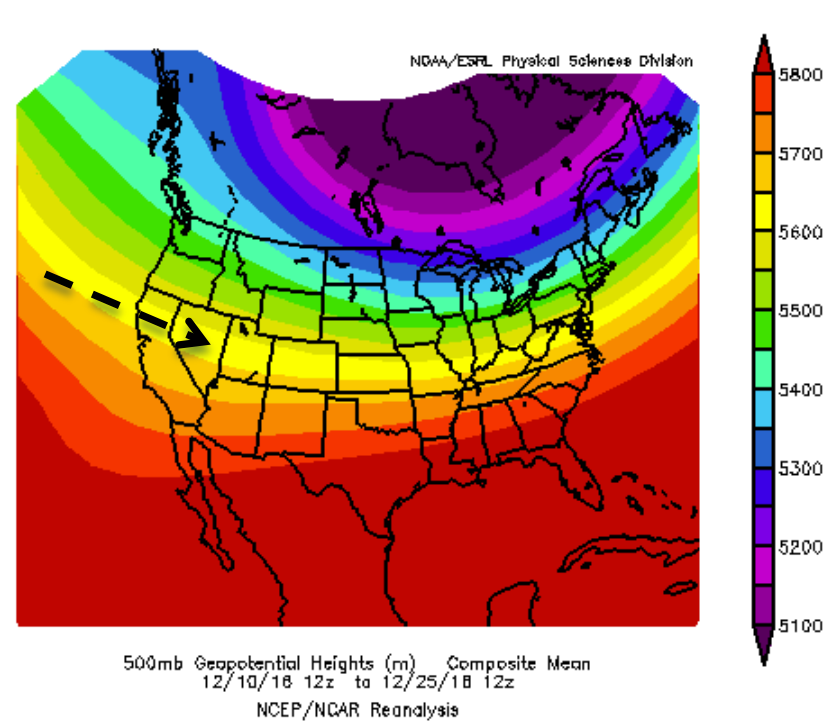
December Weather

A Big Transition...from dry/warm to cooler and very wet



Early November Atmospheric Pattern:

Extended period with very warm and dry conditions in the runoff producing areas.



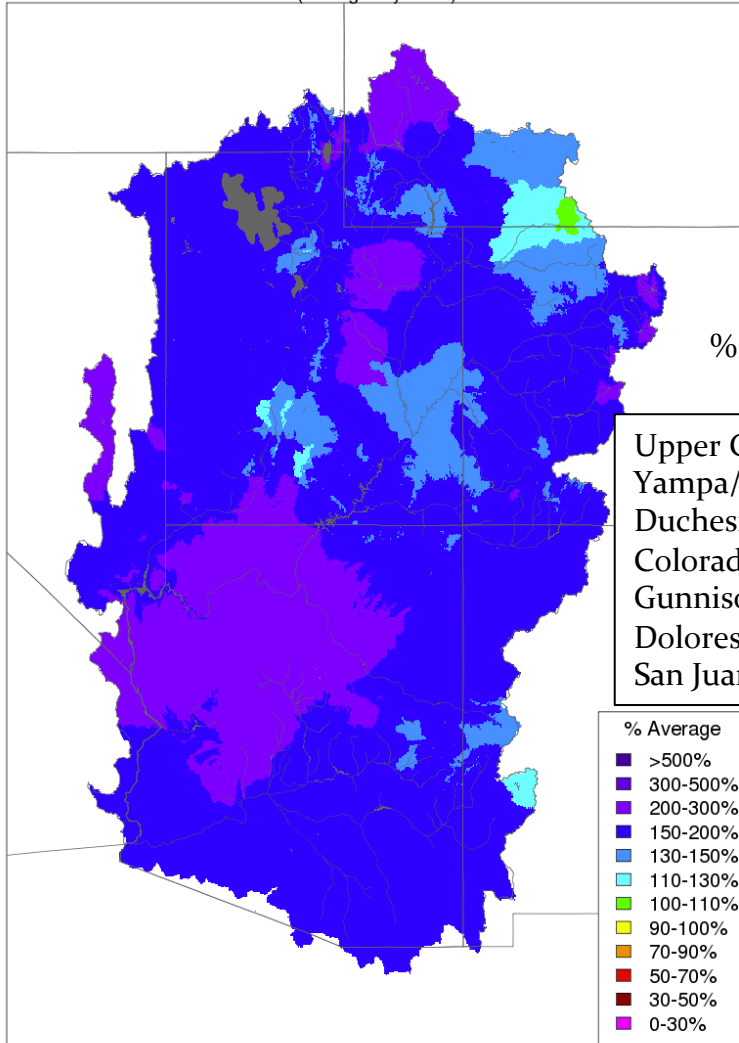
December Atmospheric Pattern:

Onslaught! Strong onshore flow transported significant moisture into the western U.S.

December Weather: Monthly and Seasonal precipitation

Very beneficial Month !

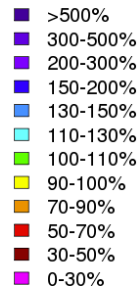
Monthly Precipitation - December 2016
(Averaged by Basin)



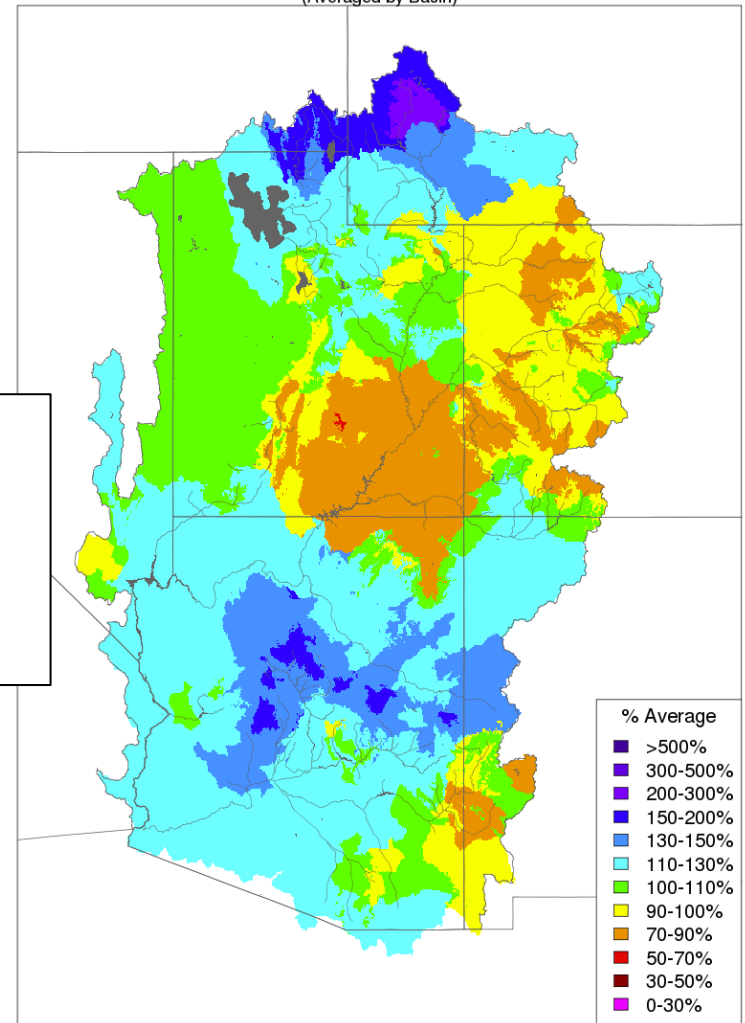
% Avg December precipitation

Upper Green	225%
Yampa/White	140%
Duchesne	200%
Colorado Mainstem	180%
Gunnison	180%
Dolores	165%
San Juan	175%

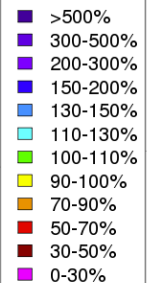
% Average



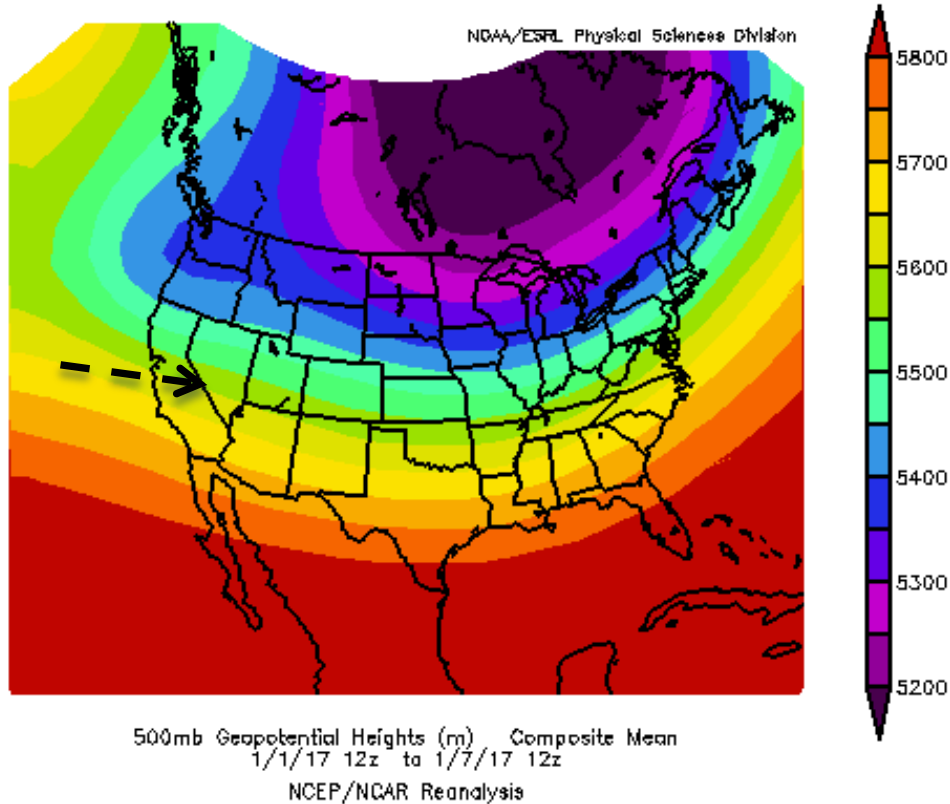
Water Year Precipitation, October 2016 - December 2016
(Averaged by Basin)



% Average

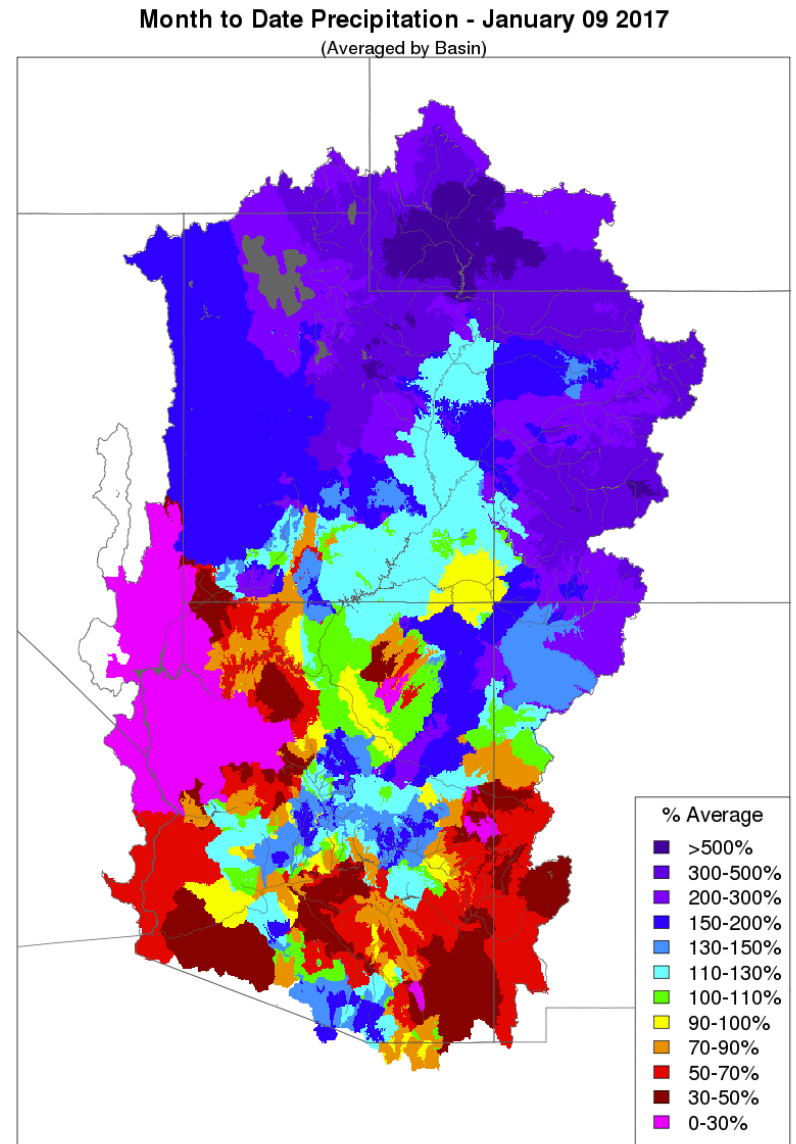


Early January Weather: Continued active and wet



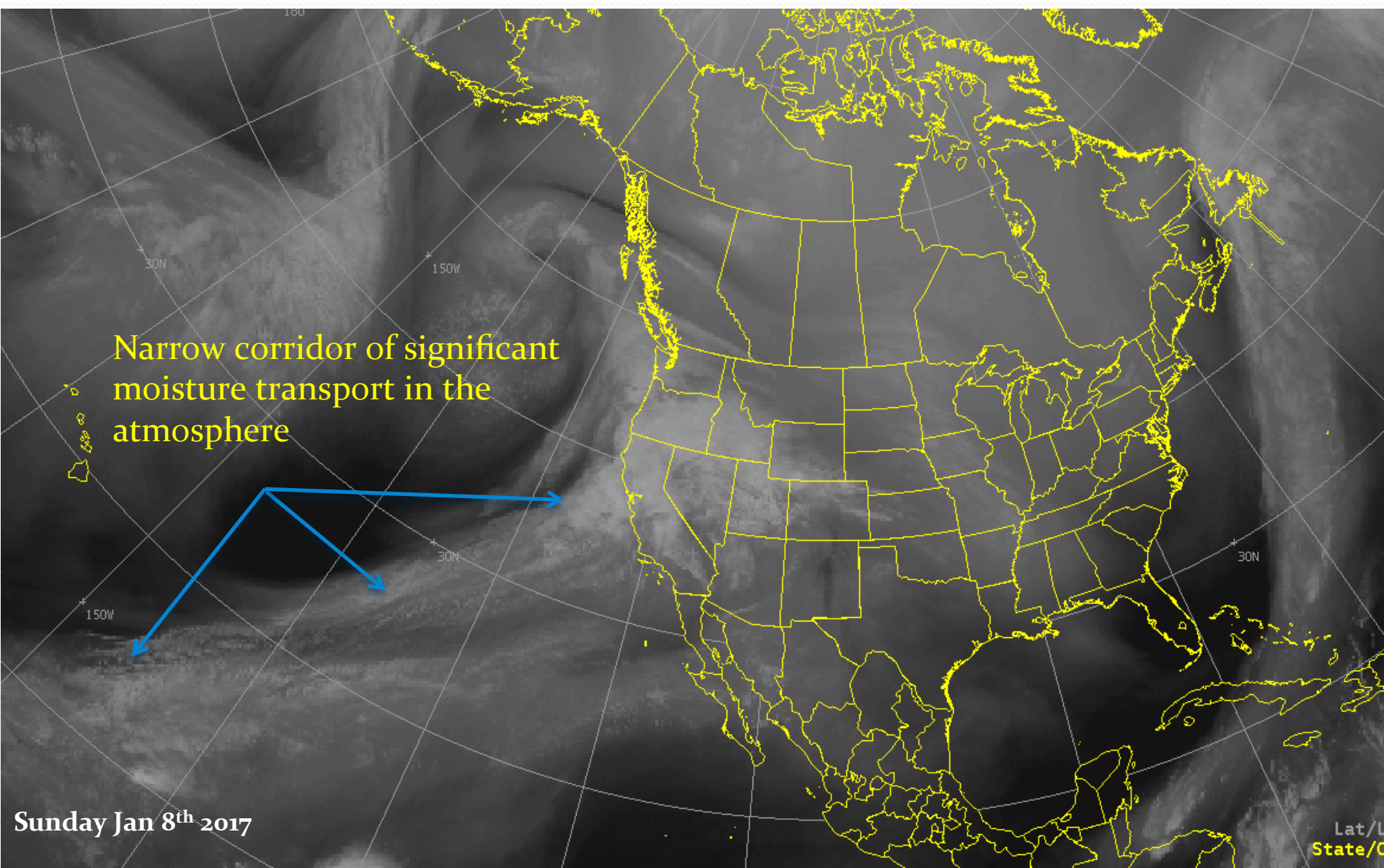
January Atmospheric Pattern:

Onslaught continues. Very moist air masses continue to impact the western U.S.

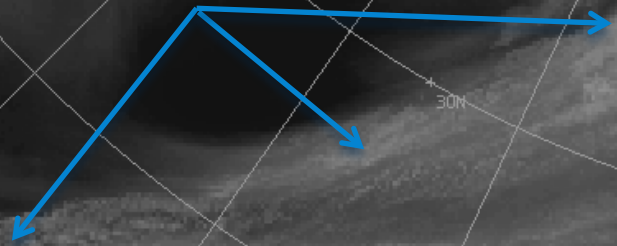


Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrcf.noaa.gov

The weather term of the season: "Atmospheric River"



Narrow corridor of significant moisture transport in the atmosphere



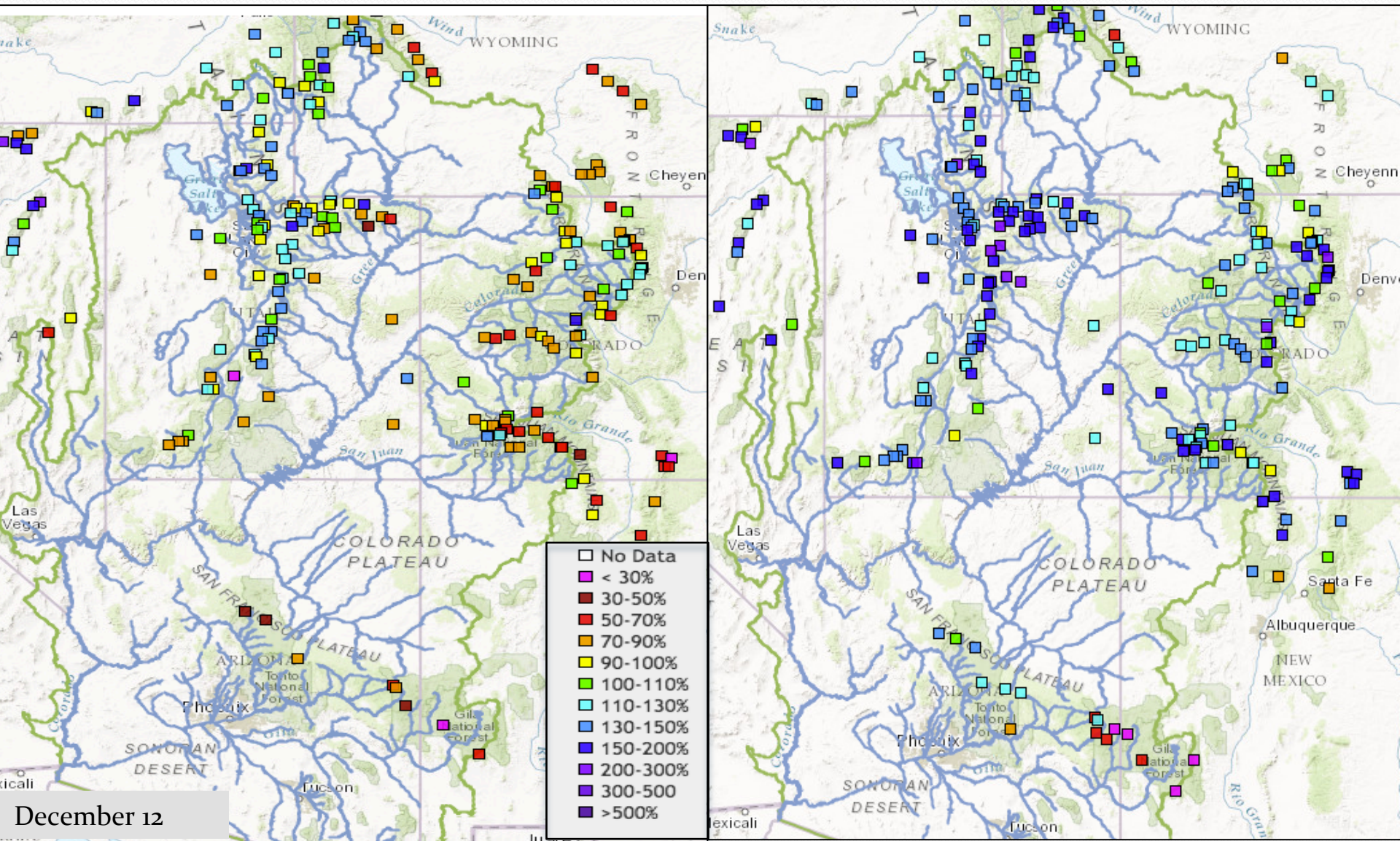
Sunday Jan 8th 2017

Lat/L
State/C

December Weather: Impact to the snowpack

December 12 2016

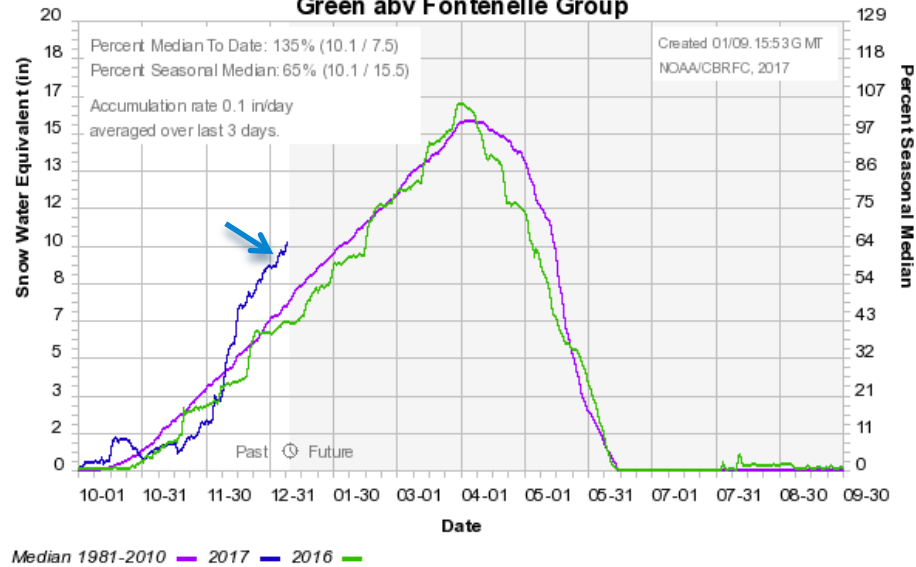
January 5 2017



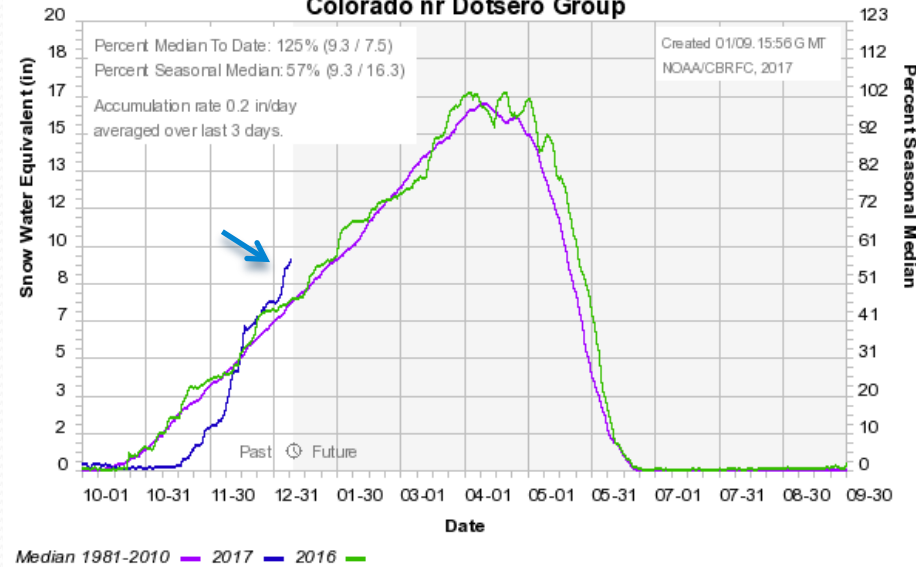
December 12

January Weather: Impact to the snowpack

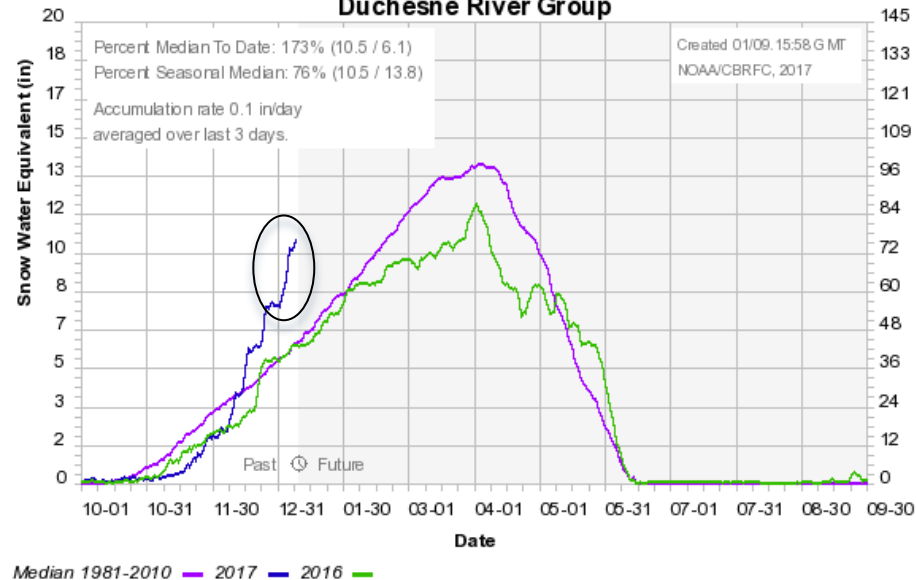
Colorado Basin River Forecast Center
Green abv Fontenelle Group



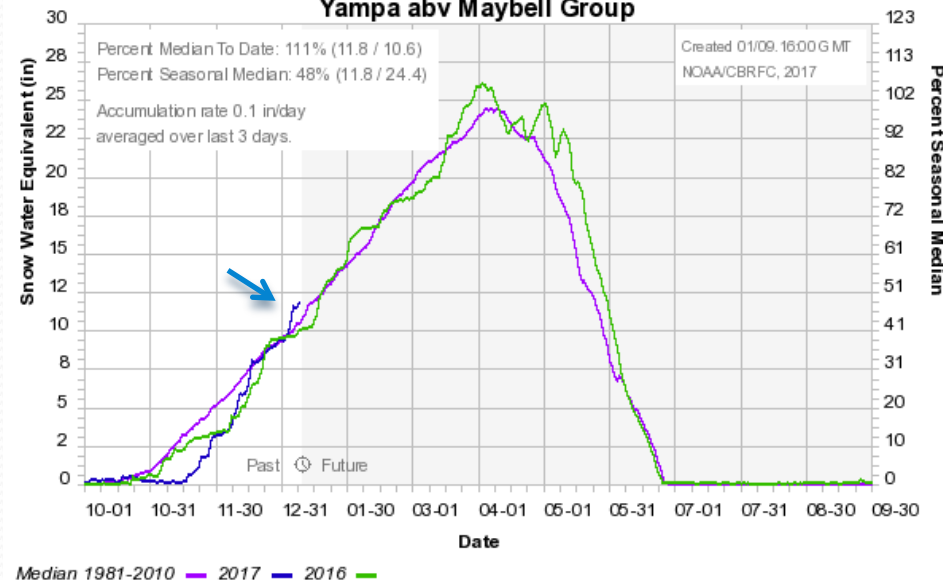
Colorado Basin River Forecast Center
Colorado nr Dotsero Group



Colorado Basin River Forecast Center
Duchesne River Group

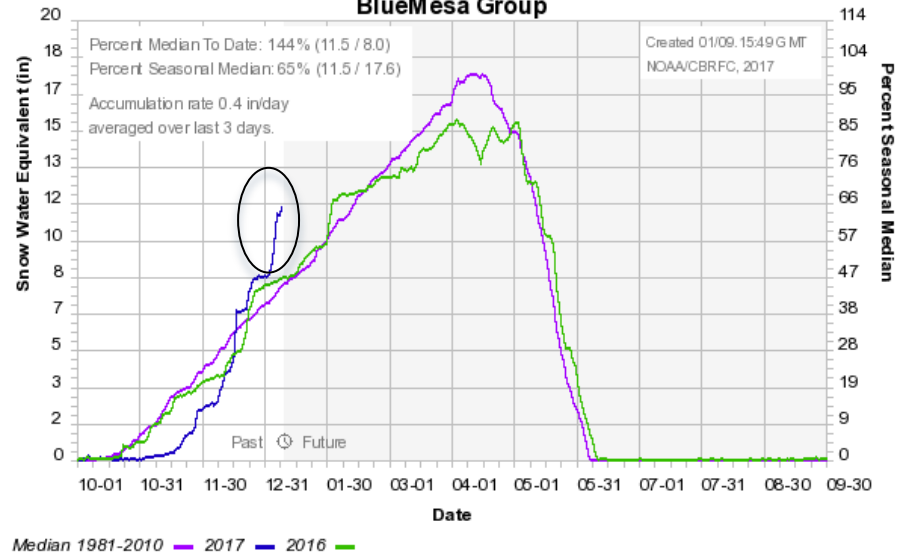


Colorado Basin River Forecast Center
Yampa abv Maybell Group

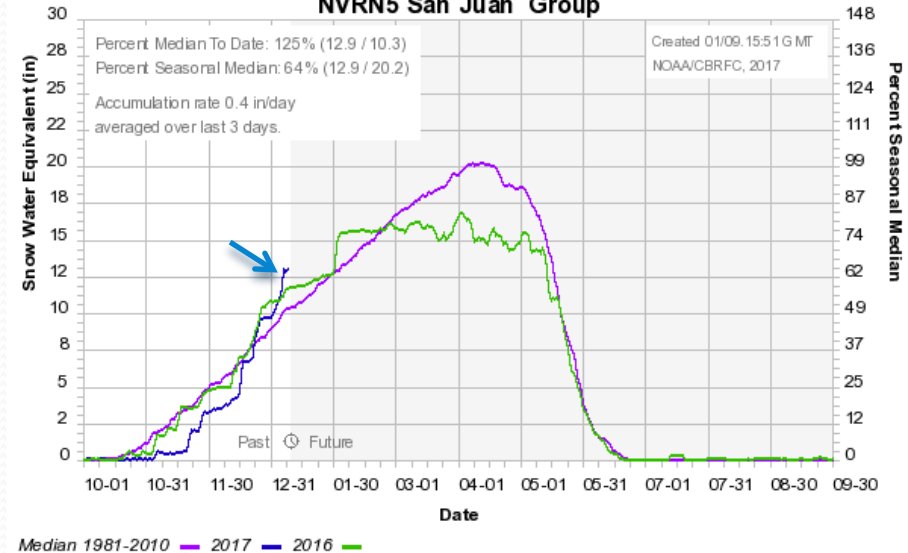


January Weather: Impact to the snowpack

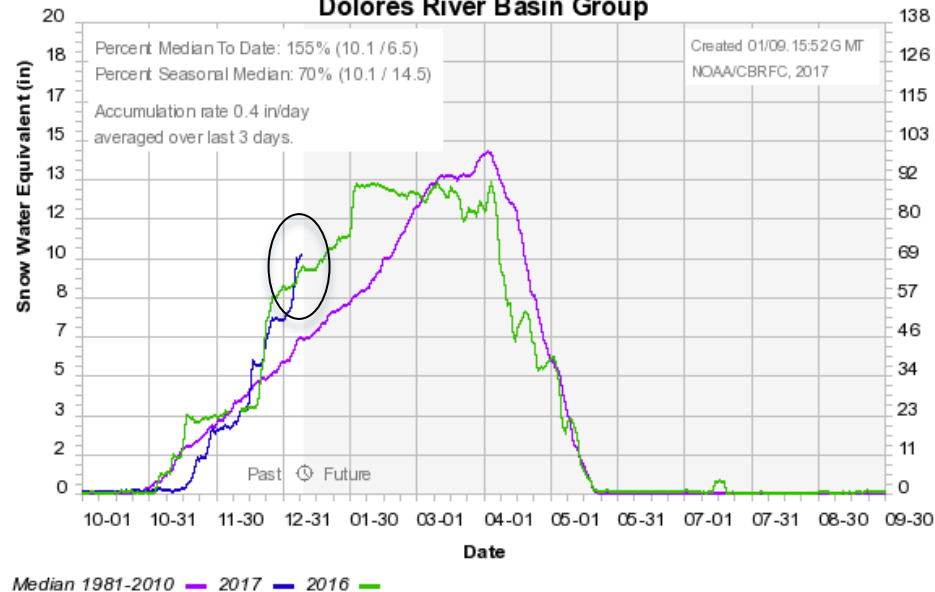
Colorado Basin River Forecast Center
BlueMesa Group



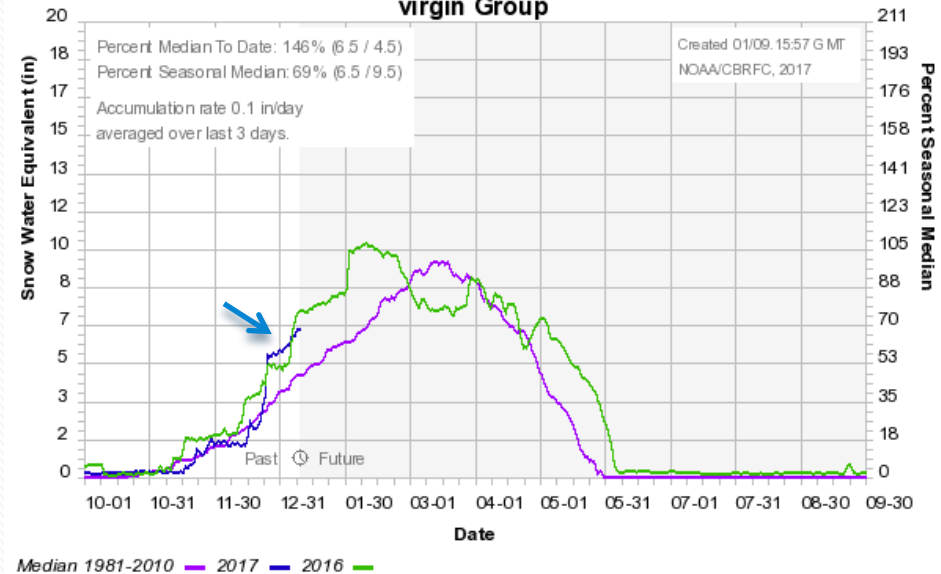
Colorado Basin River Forecast Center
NVRN5 San Juan Group



Colorado Basin River Forecast Center
Dolores River Basin Group



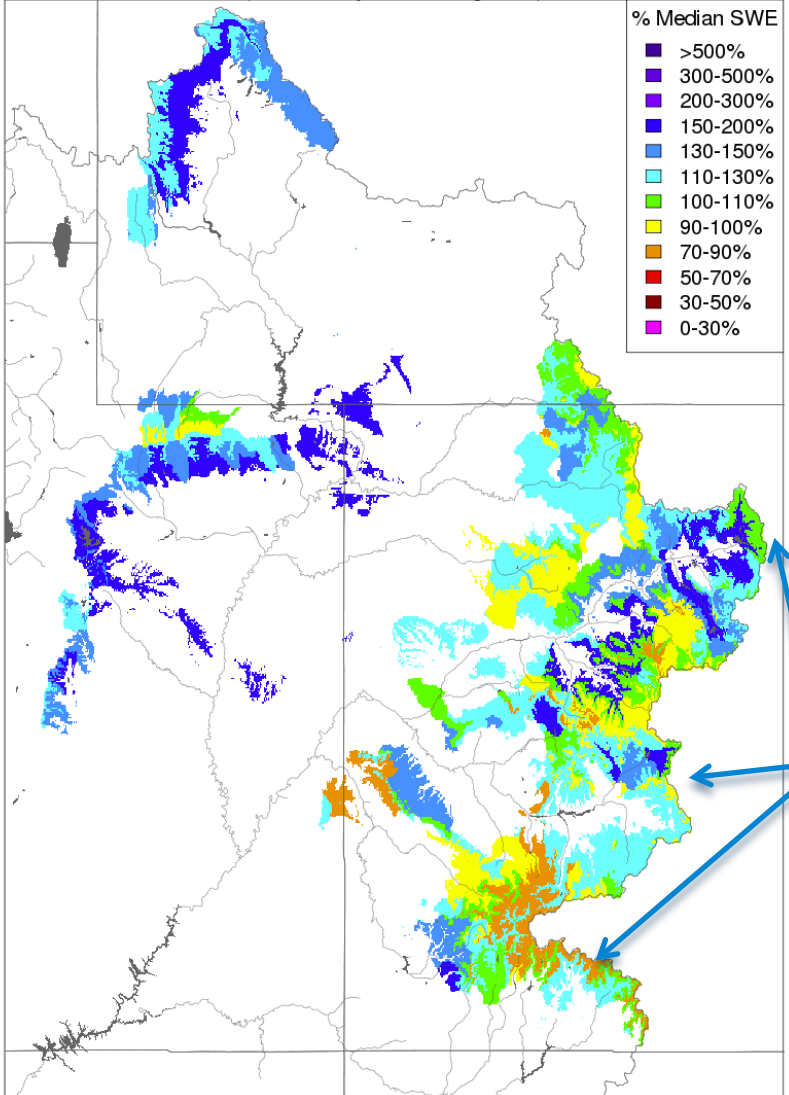
Colorado Basin River Forecast Center
virgin Group



Current Snowpack: Evolving Snowpack with additional storms

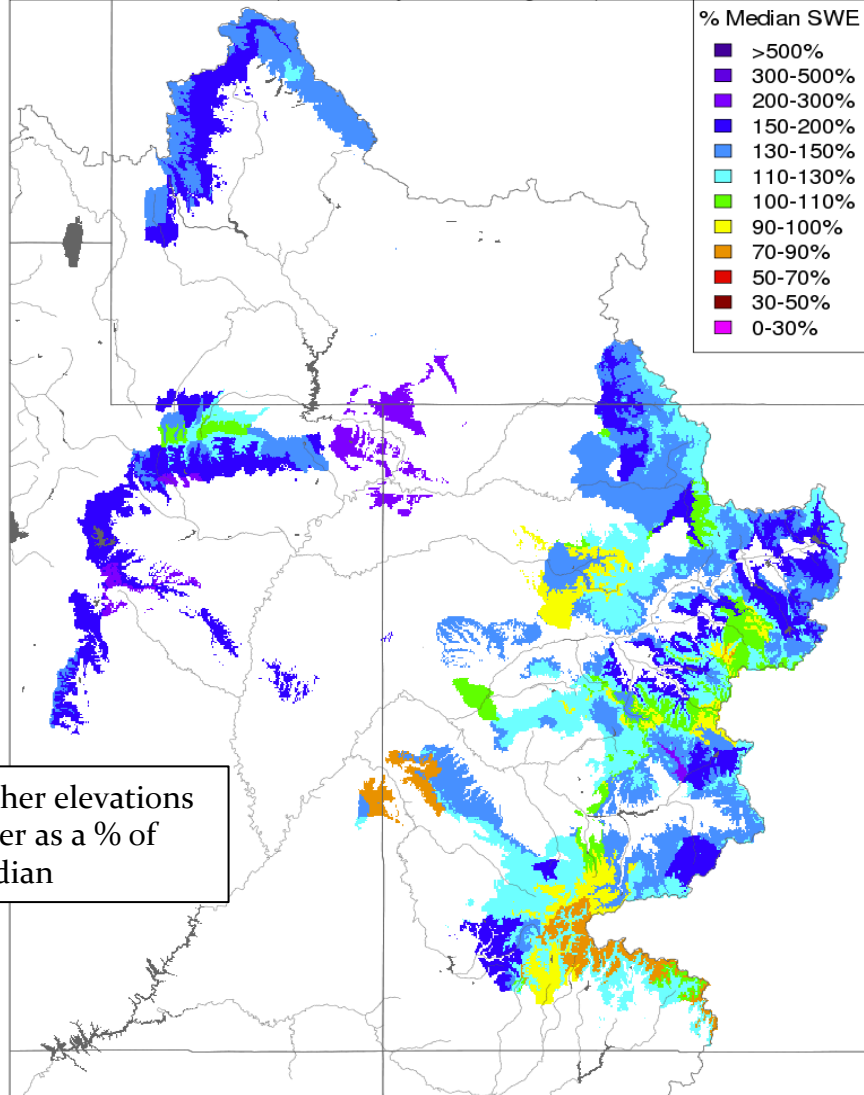
Snow Conditions - January 03 2017

(Modeled, Major Contributing Areas)



Snow Conditions - January 05 2017

(Modeled, Major Contributing Areas)

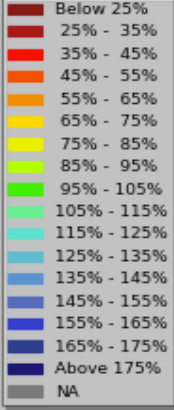


Higher elevations lower as a % of median

Upper Colorado April-July Streamflow

Volume Forecasts (% of 1981-2010 average)

Forecasts as of Jan 1 2017



Fontenelle:
930 KAF / 128 %

Flaming Gorge:
1230 KAF / 126 %

Yampa-Deerlodge:
1180 KAF / 95%

Duchesne-Randlett:
440 KAF / 114%

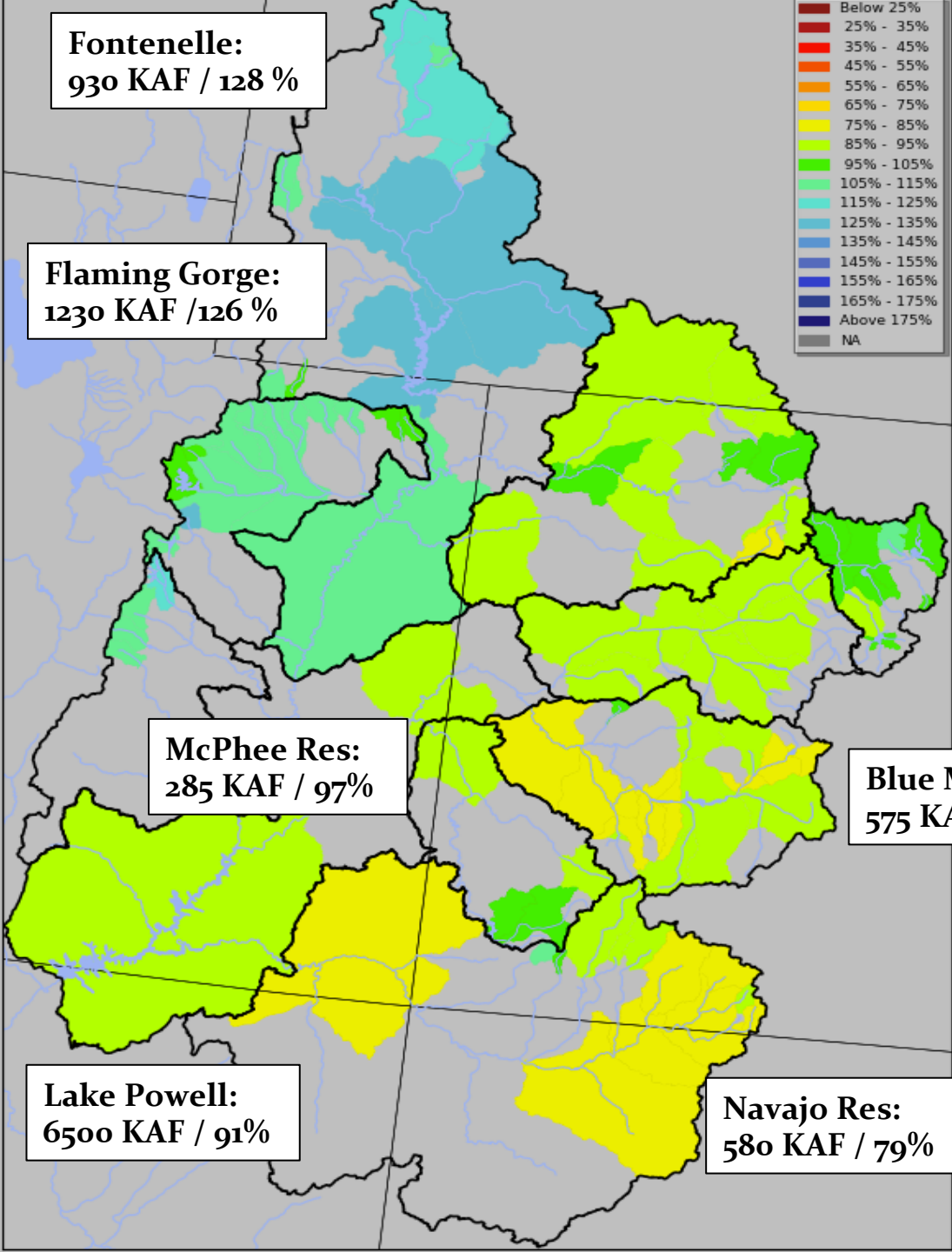
Colorado-Cameo:
2120 KAF / 90%

McPhee Res:
285 KAF / 97%

Blue Mesa:
575 KAF / 85%

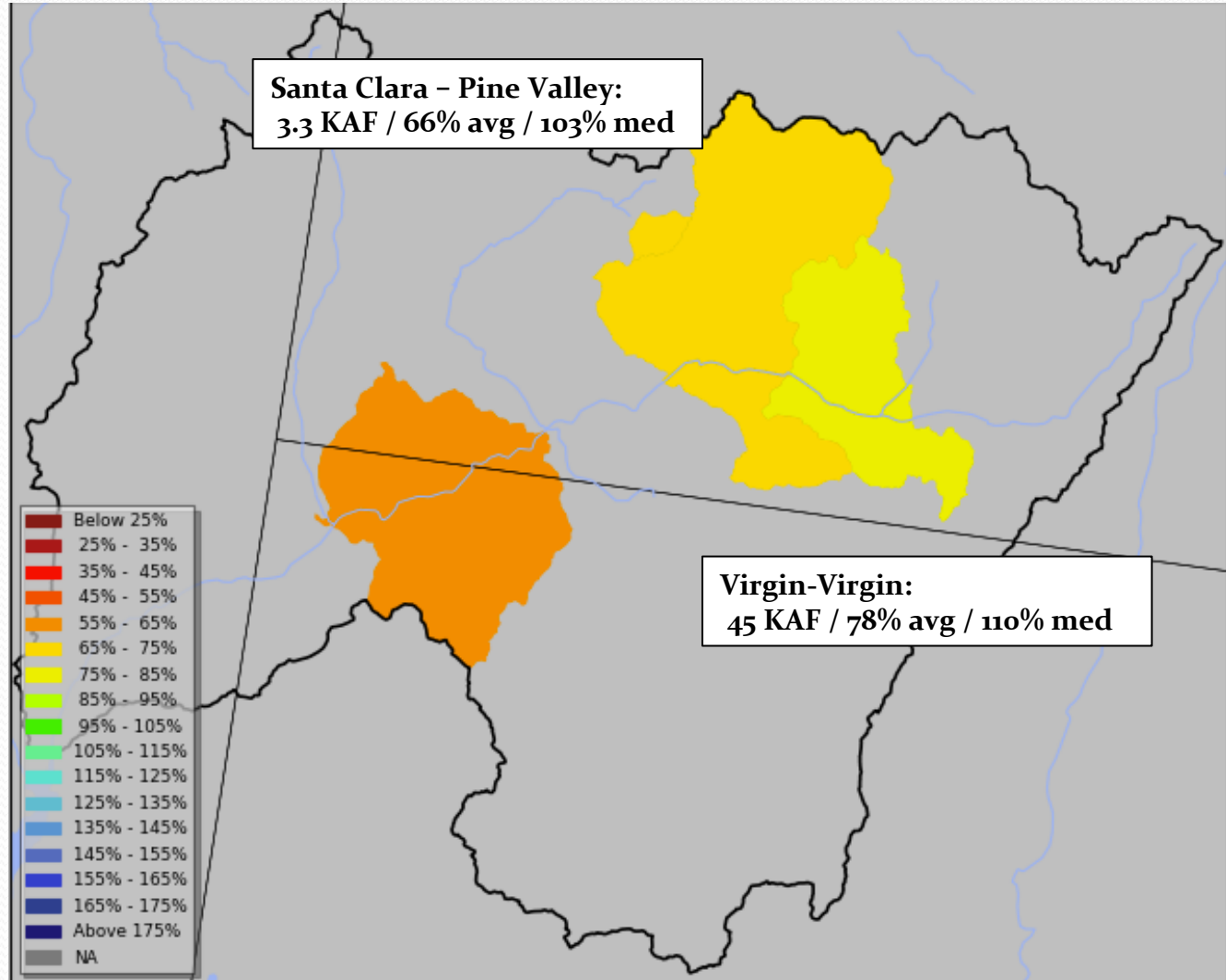
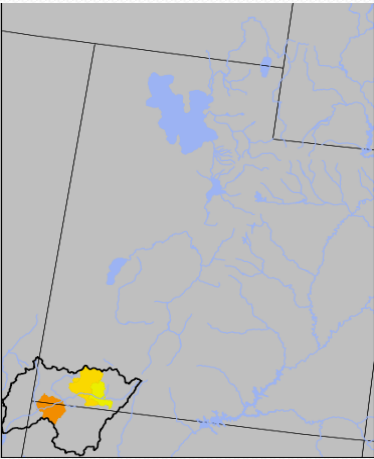
Lake Powell:
6500 KAF / 91%

Navajo Res:
580 KAF / 79%



Lower Colorado (Virgin River) April-July Streamflow Volume Forecasts

(% of 1981-2010 average / median)

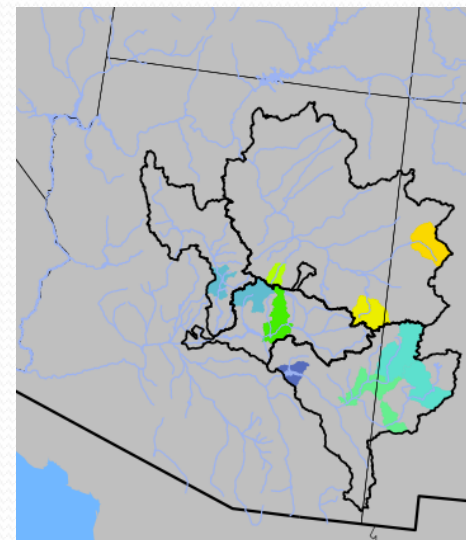
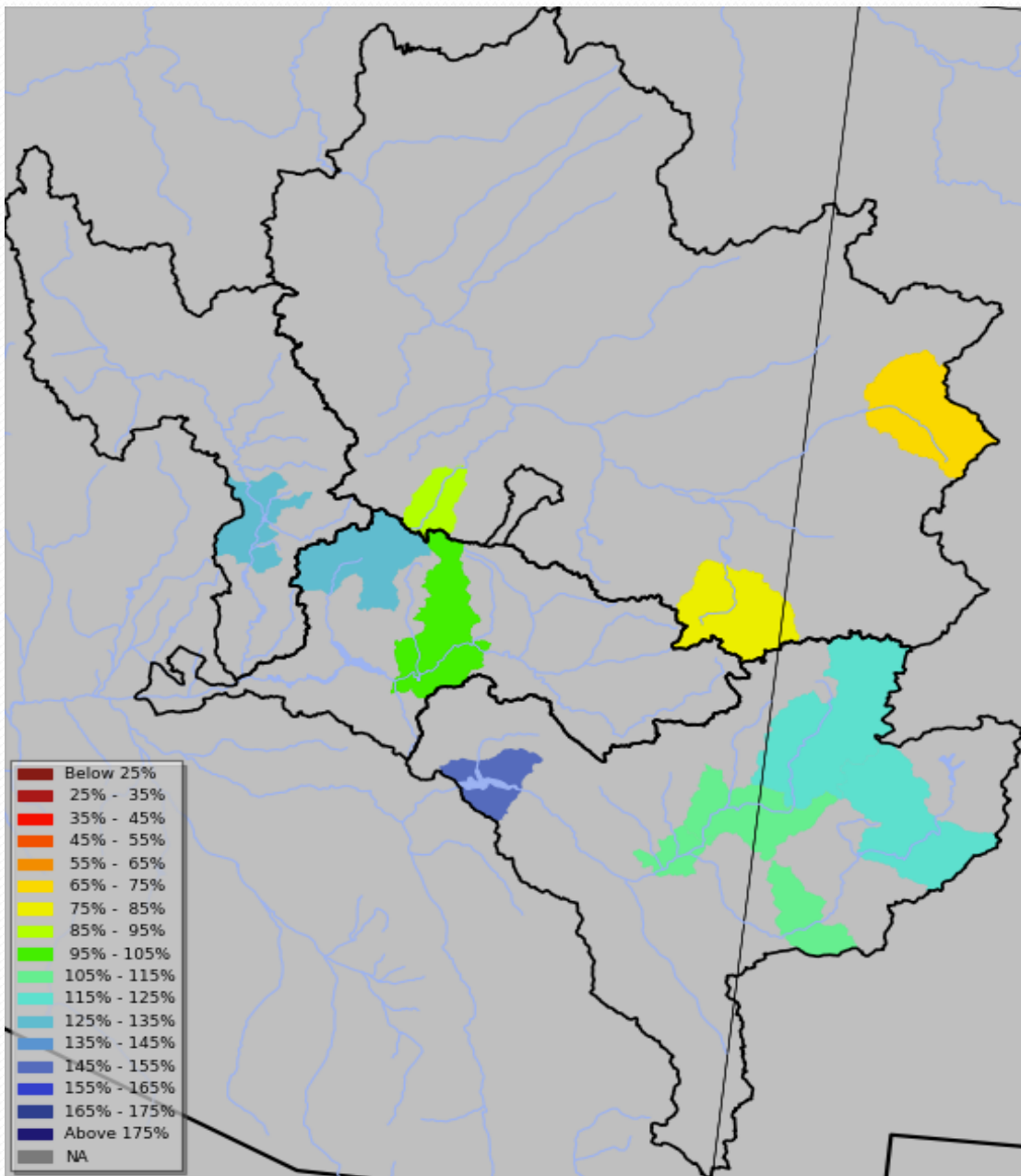


Forecasts as of Jan 1 2017

Lower Colorado Jan-May forecast streamflow volumes

(% of 1981-2010 median)

Forecasts as of Jan 1 2017



Little Colorado-Lyman:
5.7 KAF / 80%

Verde-Horseshoe:
200 KAF / 127%

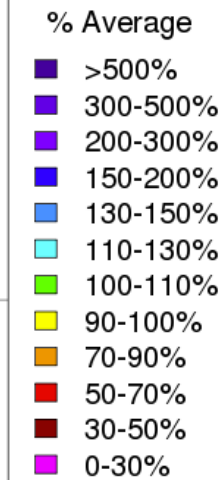
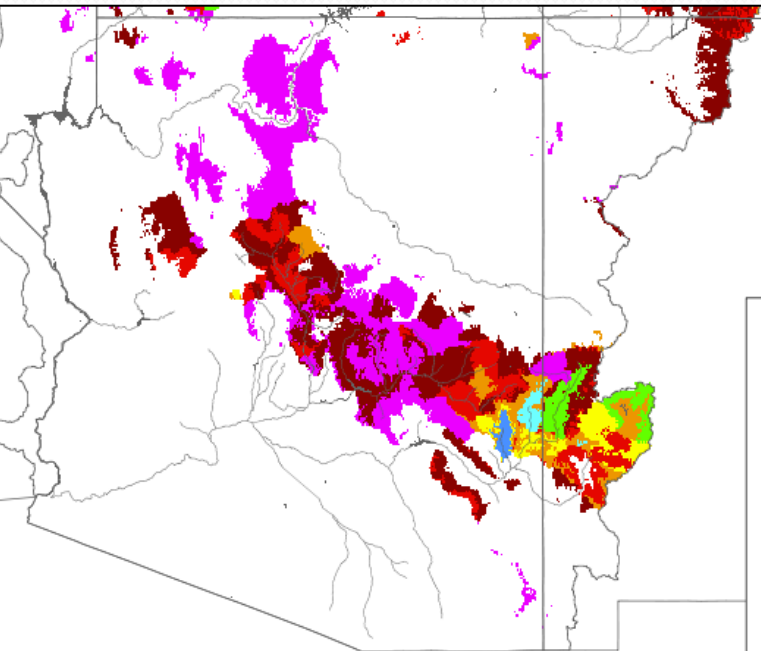
Salt - Roosevelt:
300 KAF / 97%

Gila-Gila:
65 KAF / 116%

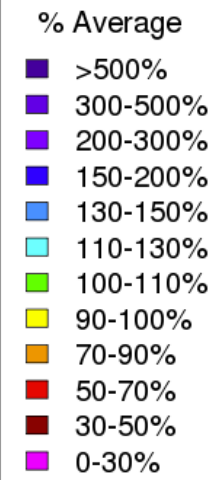
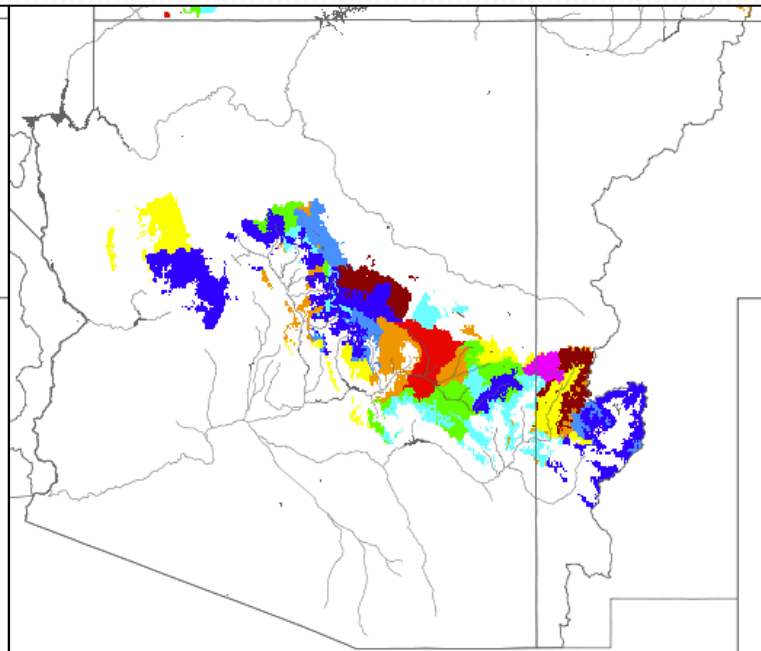
CBRFC Model Soil Moisture

Precipitation impacts to soil moisture
in the Lower Colorado River Basin

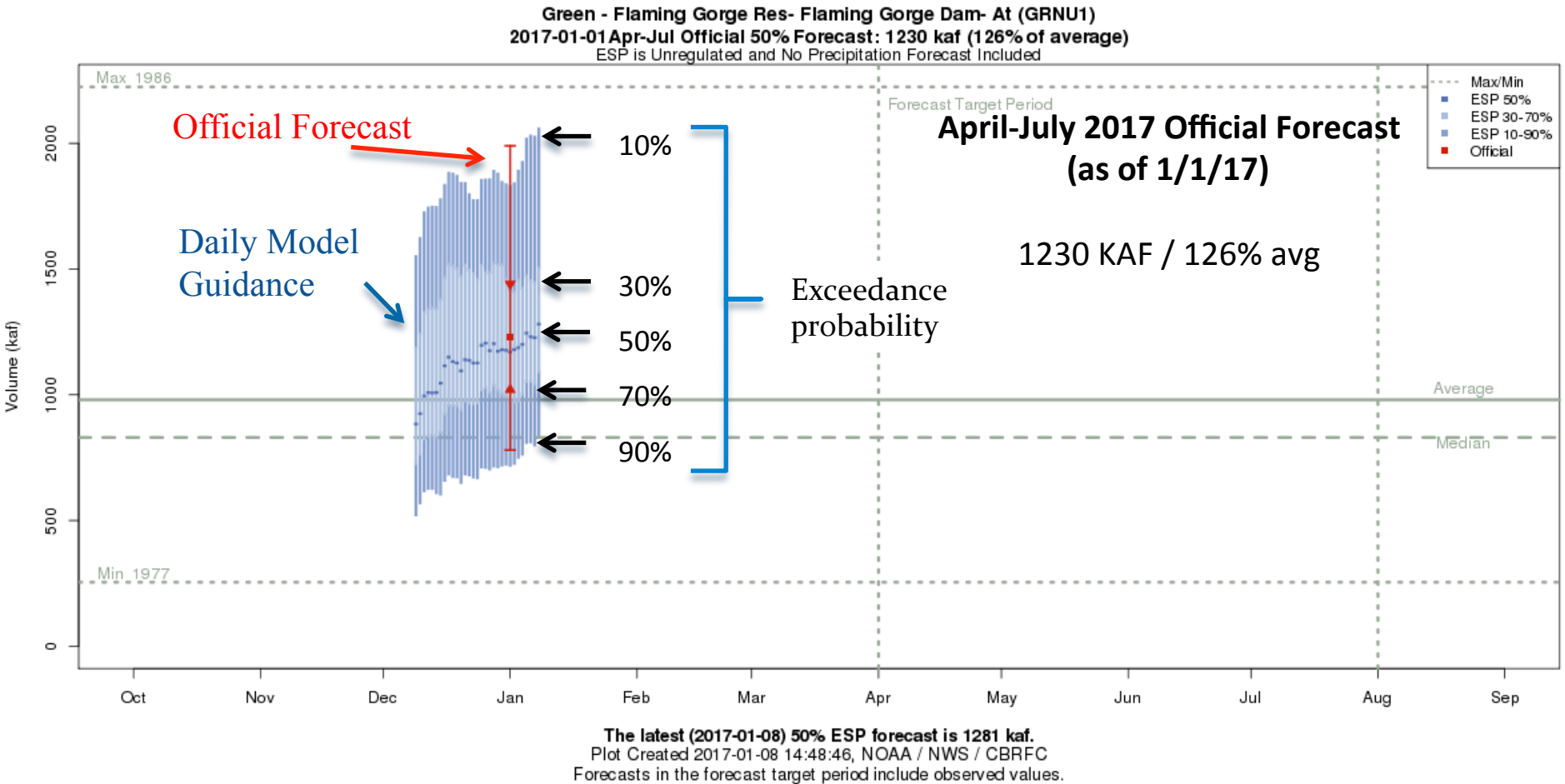
Nov 15 2016



Jan 3 2017



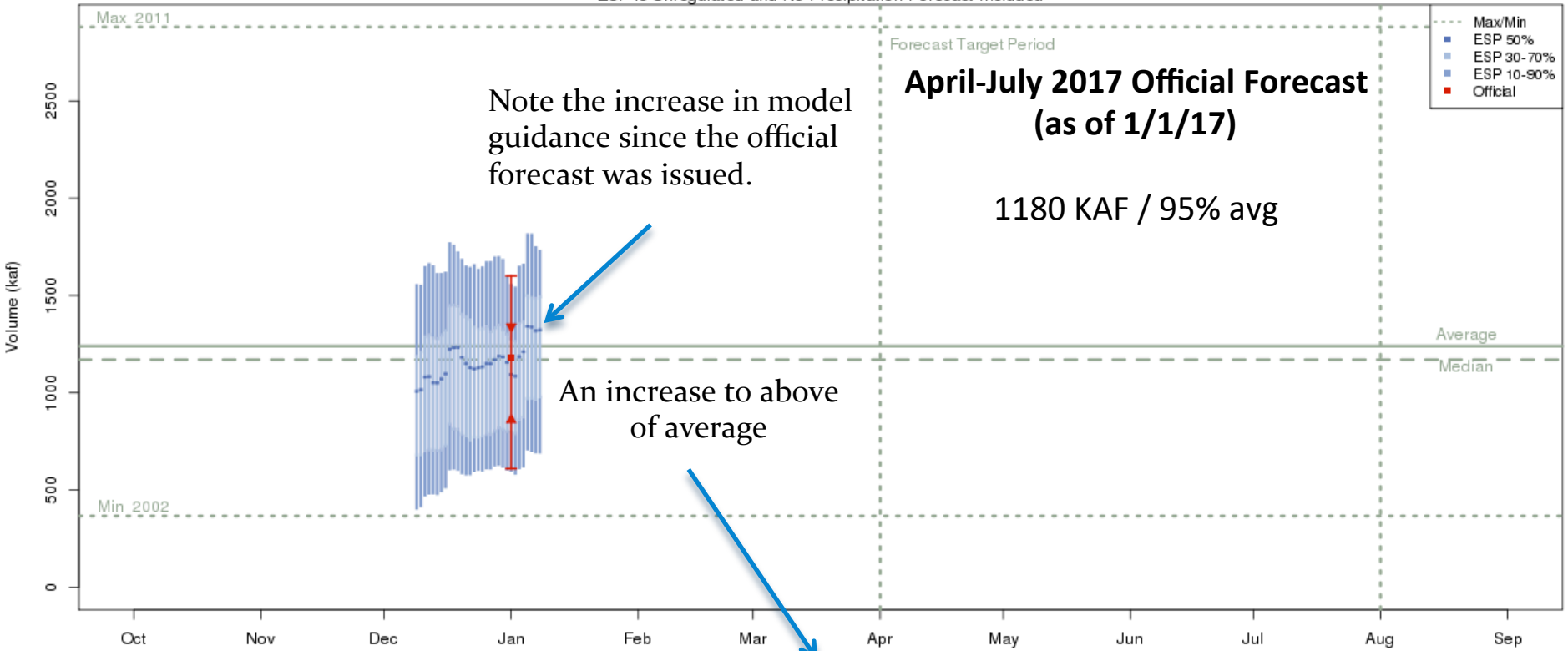
Forecast Evolution Plot: Flaming Gorge Inflow



Plots are available at: <https://www.cbrfc.noaa.gov>
 Select: water supply from the menu

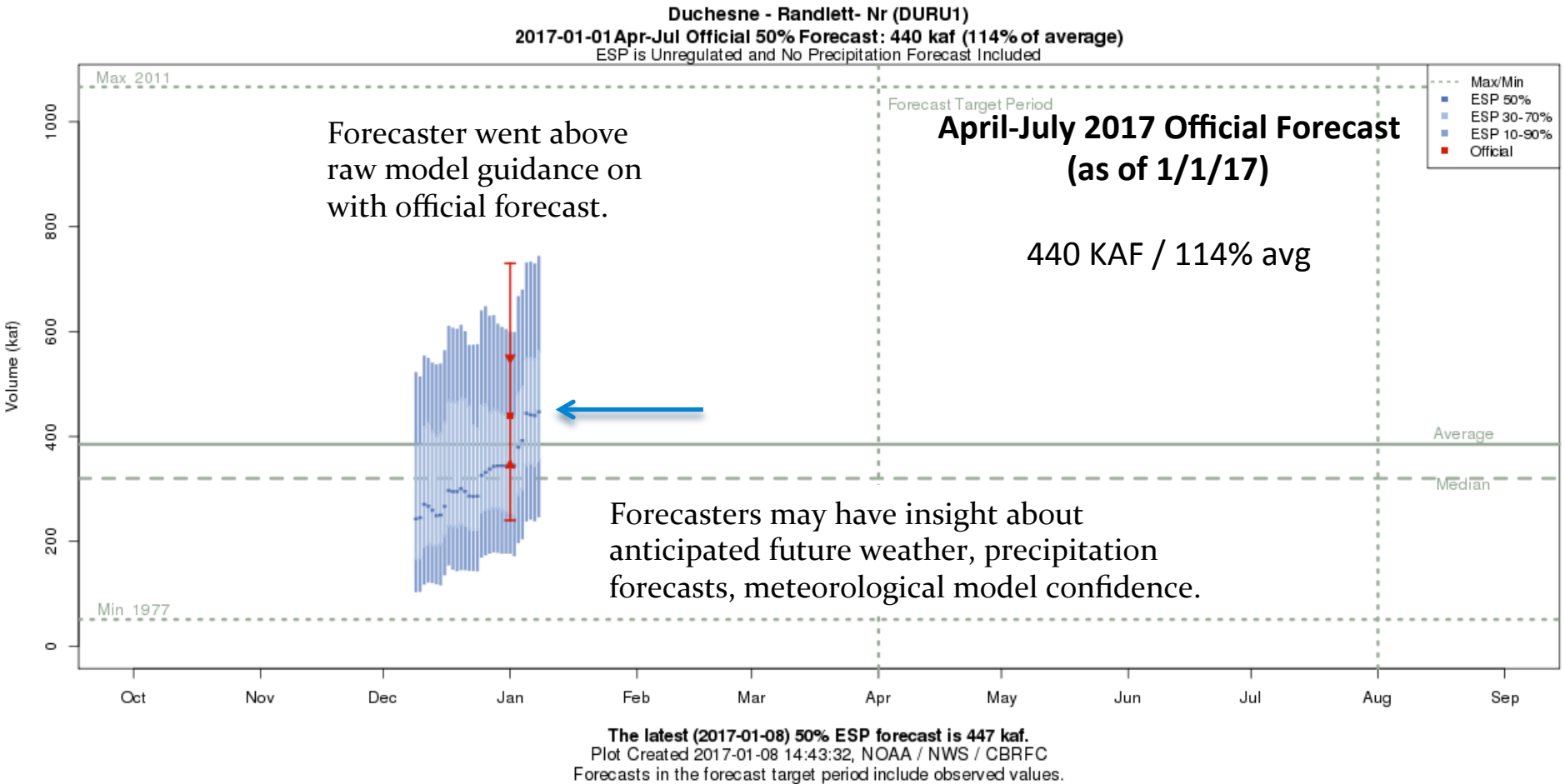
Forecast Evolution Plot: Yampa - Deerlodge Park

Yampa - Deerlodge Park (YDLC2)
2017-01-01 Apr-Jul Official 50% Forecast: 1180 kaf (95% of average)
ESP is Unregulated and No Precipitation Forecast Included

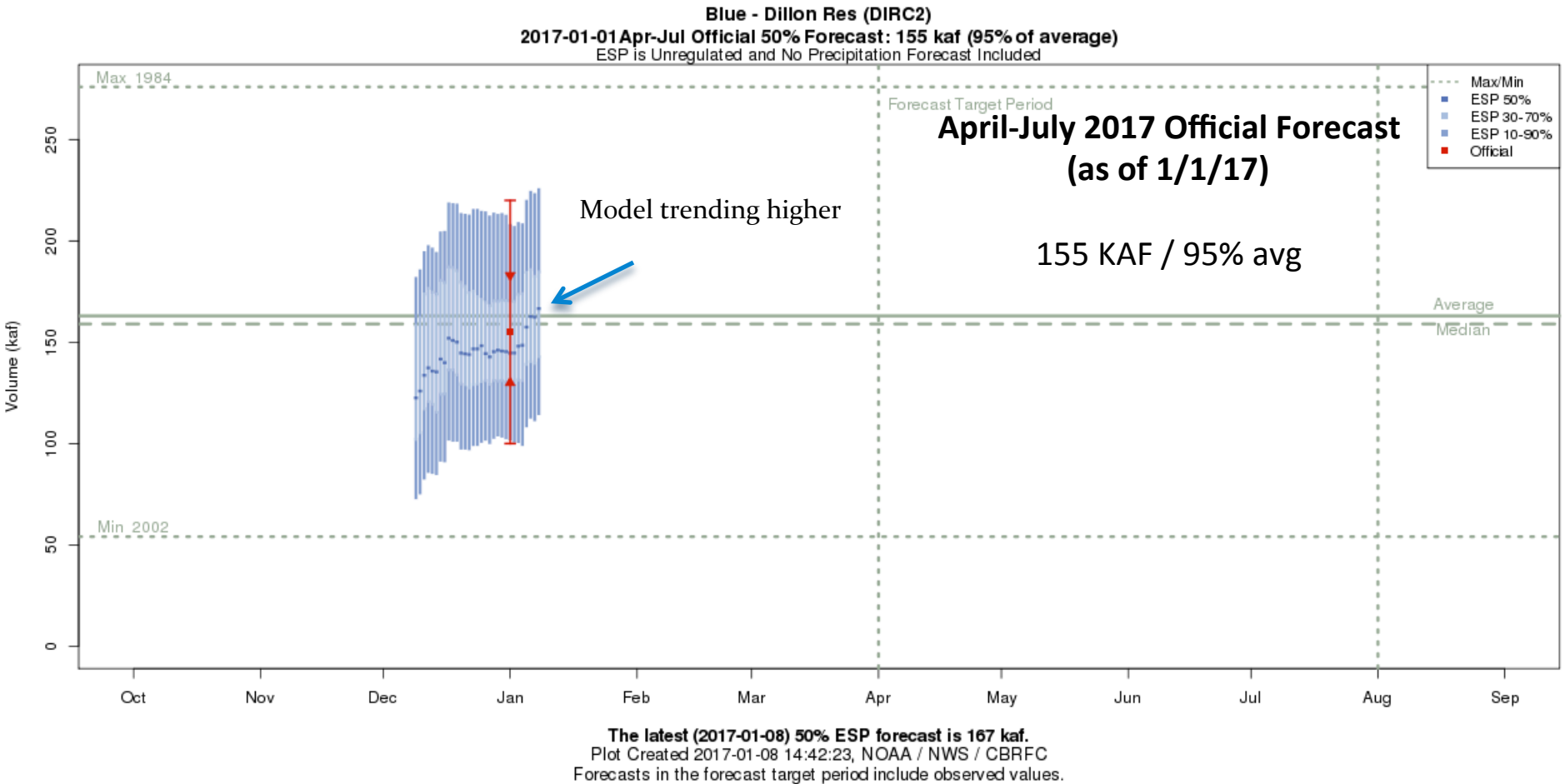


The latest (2017-01-08) 50% ESP forecast is 1323 kaf.
Plot Created 2017-01-08 15:10:57, NOAA / NWS / CBRFC
Forecasts in the forecast target period include observed values.

Forecast Evolution Plot: Duchesne-Randlett

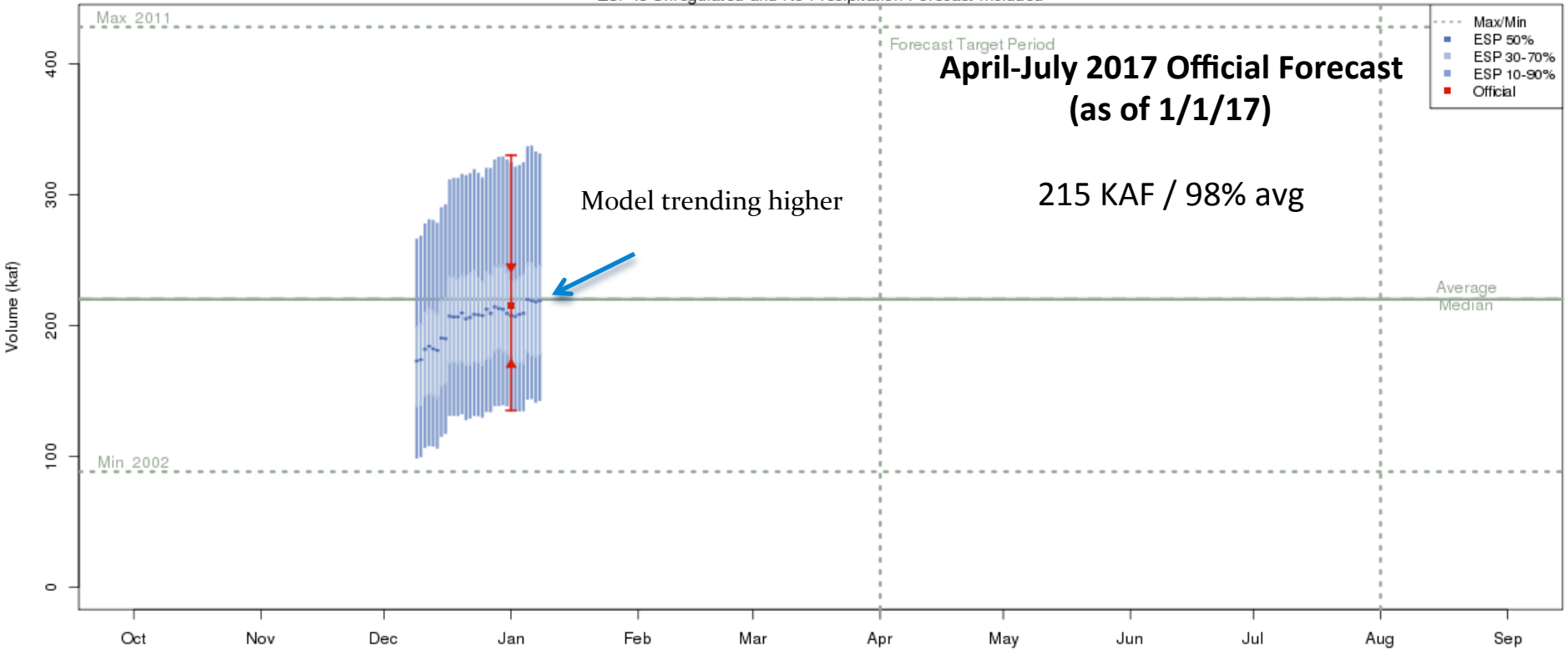


Forecast Evolution Plot: Blue - Dillon Inflow



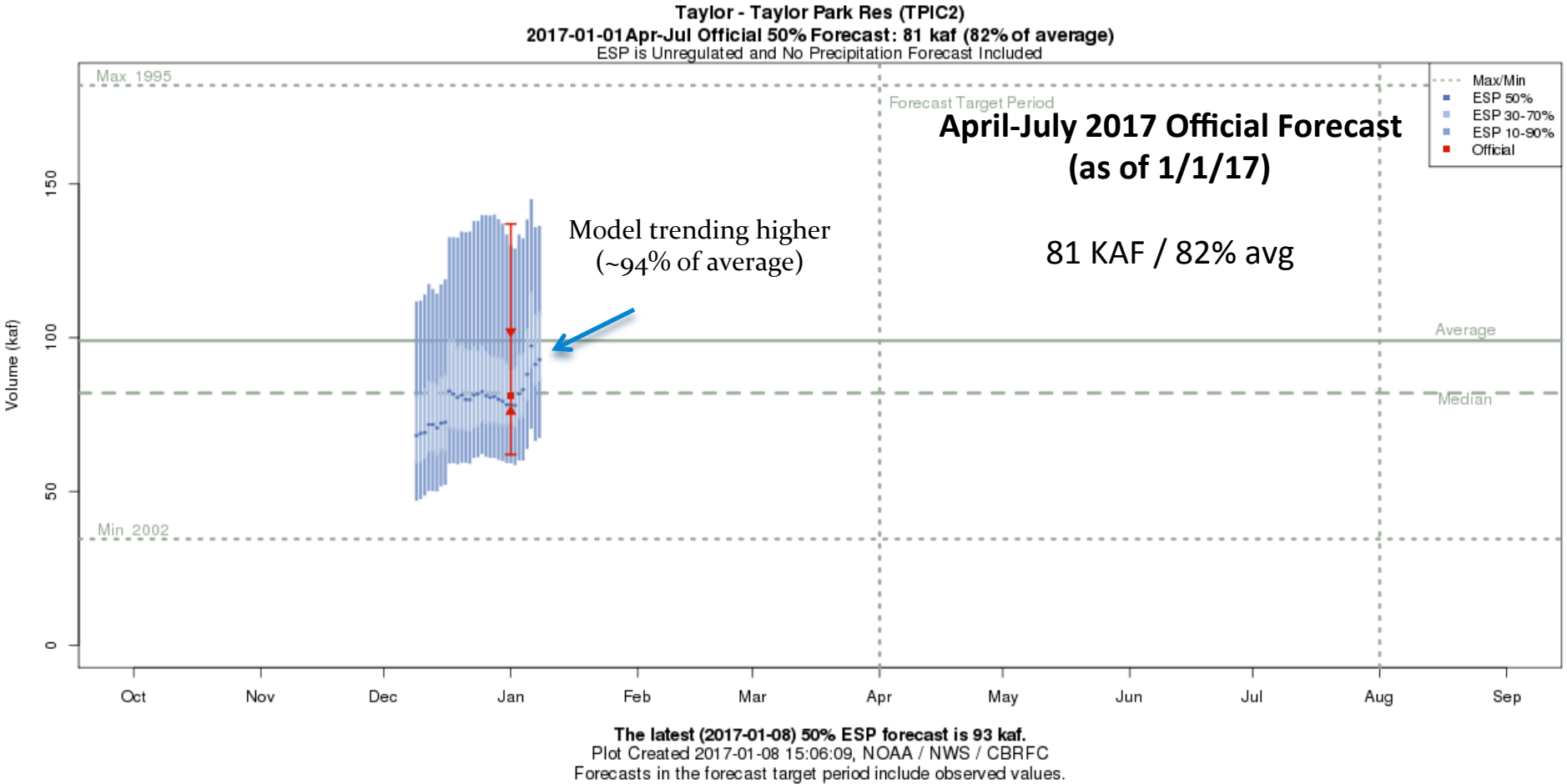
Forecast Evolution Plot: Lake Granby Inflow

Colorado - Lake Granby- Granby- Nr (GBYC2)
2017-01-01 Apr-Jul Official 50% Forecast: 215 kaf (98% of average)
ESP is Unregulated and No Precipitation Forecast Included

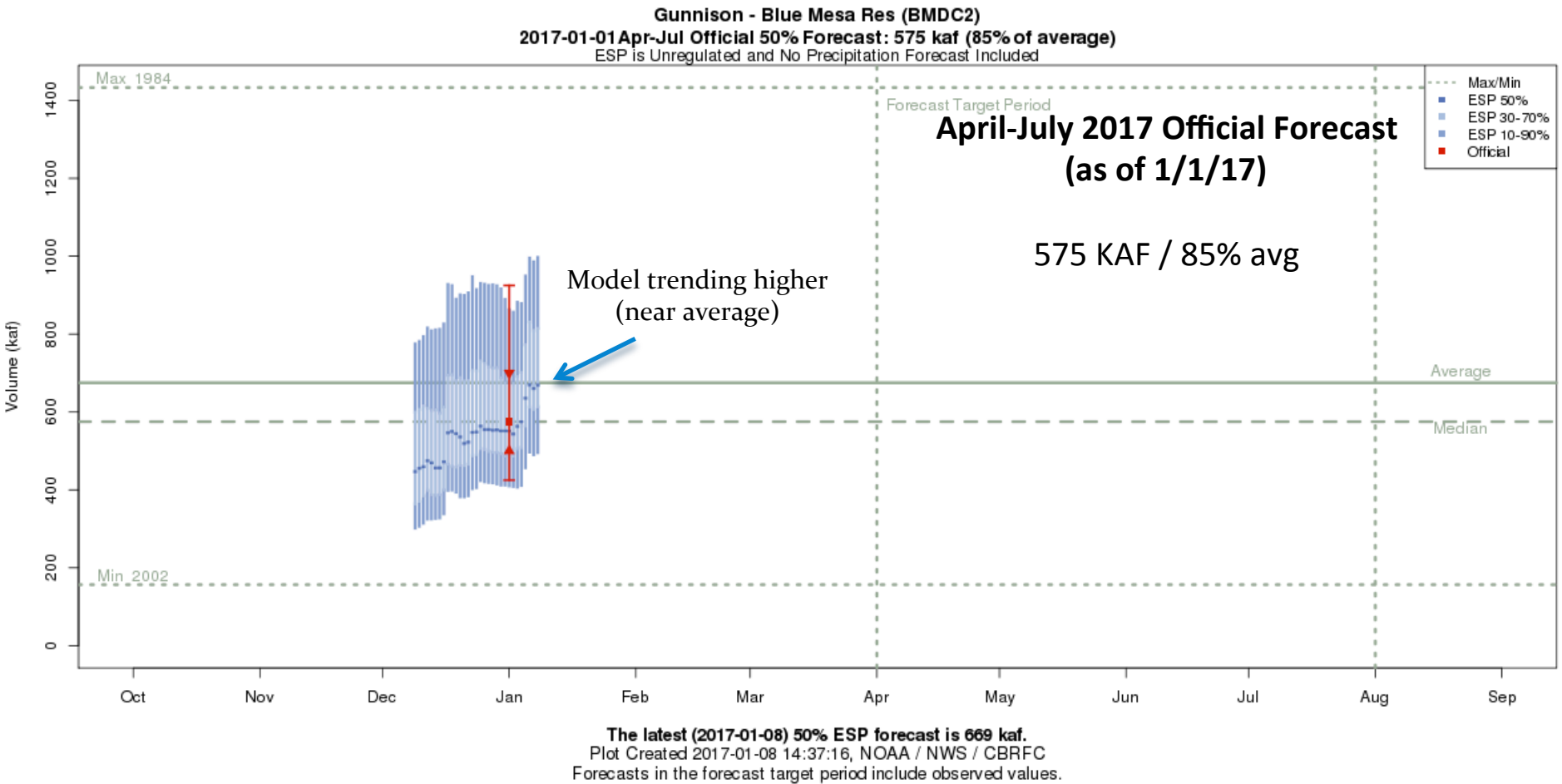


The latest (2017-01-08) 50% ESP forecast is 219 kaf.
Plot Created 2017-01-08 14:46:57, NOAA / NWS / CBRFC
Forecasts in the forecast target period include observed values.

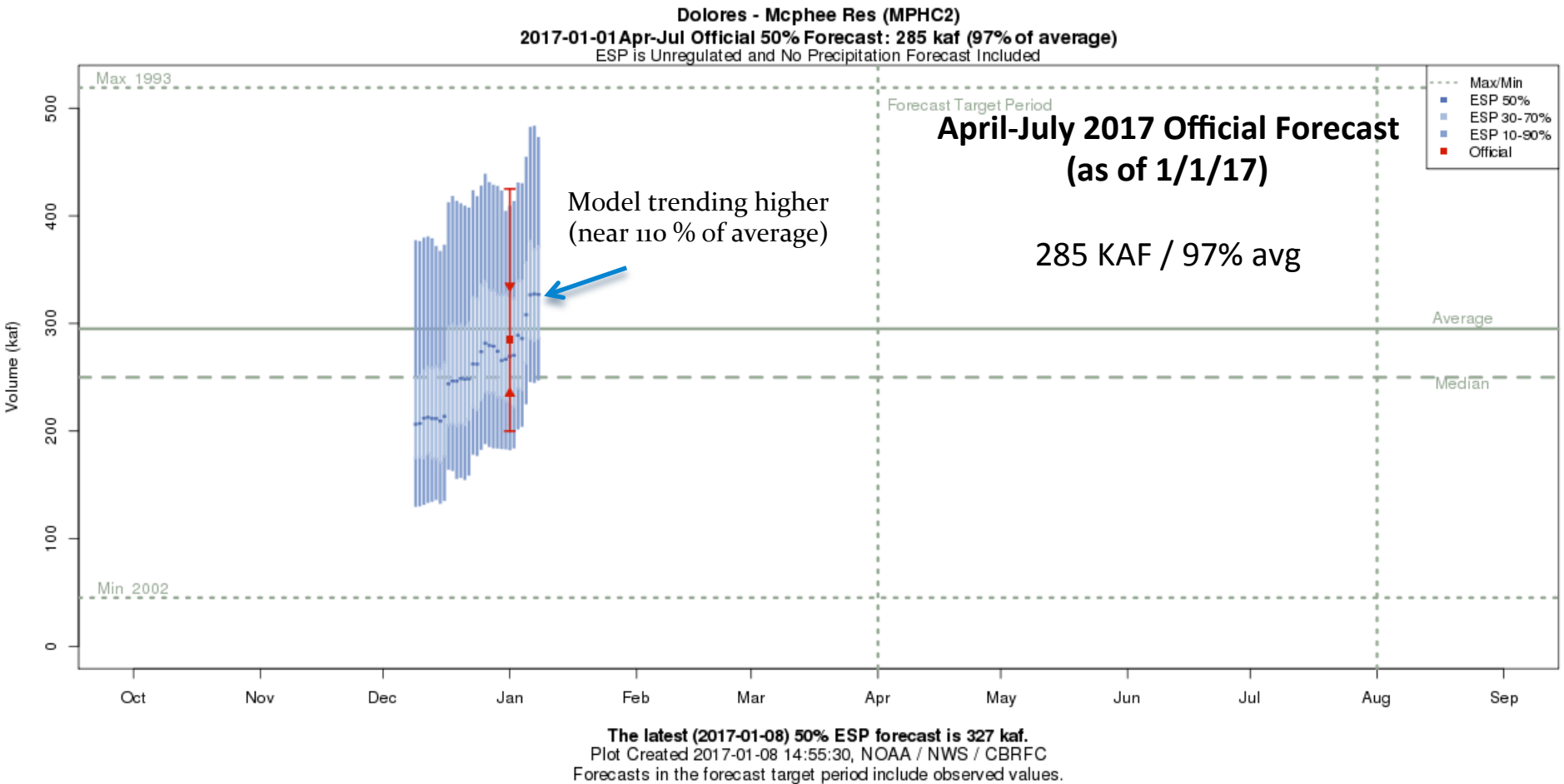
Forecast Evolution Plot: Taylor - Taylor Park Inflow



Forecast Evolution Plot: Gunnison - Blue Mesa Inflow

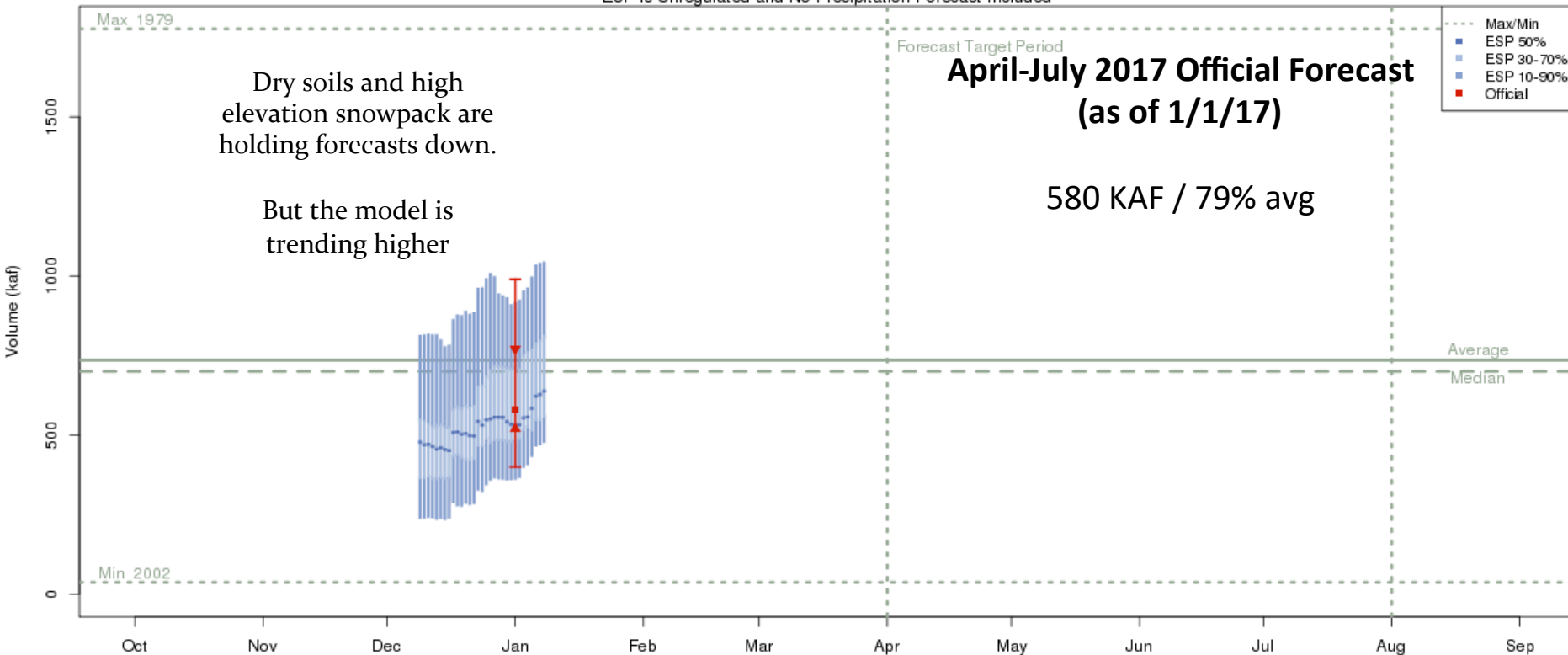


Forecast Evolution Plot: Dolores - McPhee Reservoir Inflow



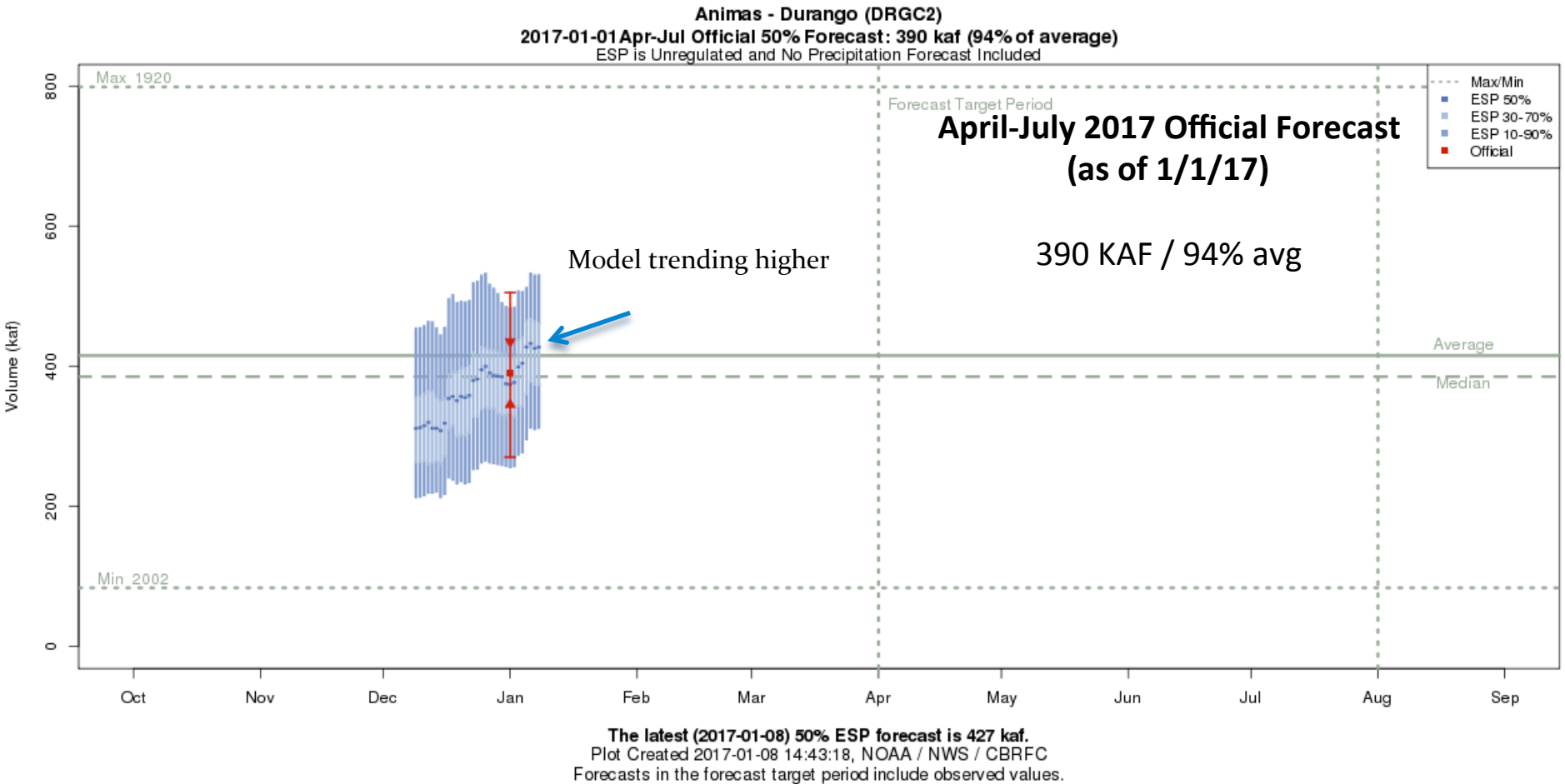
Forecast Evolution Plot: San Juan - Navajo Reservoir Inflow

San Juan - Navajo Res- Archuleta- Nr (NVRN5)
2017-01-01 Apr-Jul Official 50% Forecast: 580 kaf (79% of average)
ESP is Unregulated and No Precipitation Forecast Included



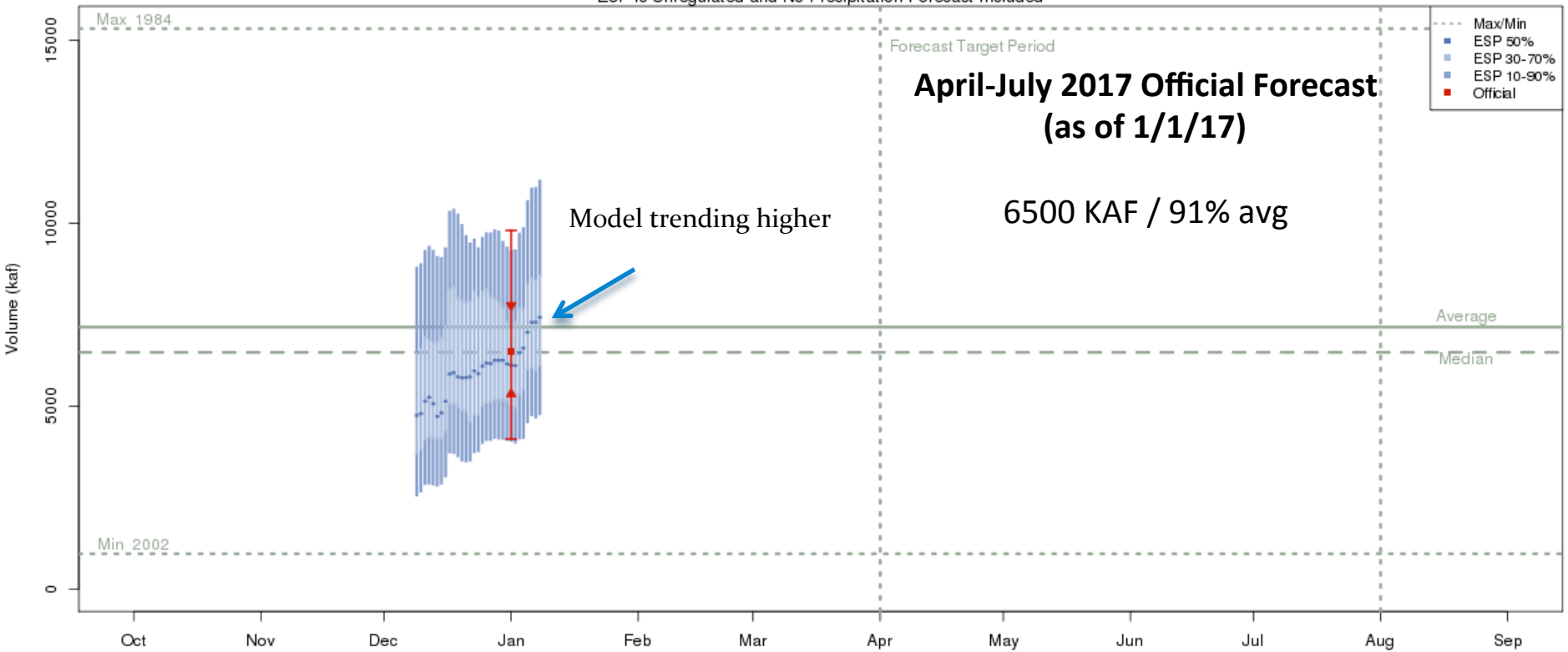
The latest (2017-01-08) 50% ESP forecast is 638 kaf.
Plot Created 2017-01-08 14:56:38, NOAA / NWS / CBRFC
Forecasts in the forecast target period include observed values.

Forecast Evolution Plot: Animas - Durango



Forecast Evolution Plot: Lake Powell Inflow

Colorado - Lake Powell- Glen Cyn Dam- At (GLDA3)
2017-01-01 Apr-Jul Official 50% Forecast: 6500 kaf (91% of average)
ESP is Unregulated and No Precipitation Forecast Included



The latest (2017-01-08) 50% ESP forecast is 7424 kaf.
Plot Created 2017-01-08 14:47:51, NOAA / NWS / CBRFC
Forecasts in the forecast target period include observed values.

Forecast Validation: How good are forecasts in January ?

Historical Model Error 1981-2010

January has the highest model/forecast errors
significant snow accumulation period remains

Forecasts are better than just going with average

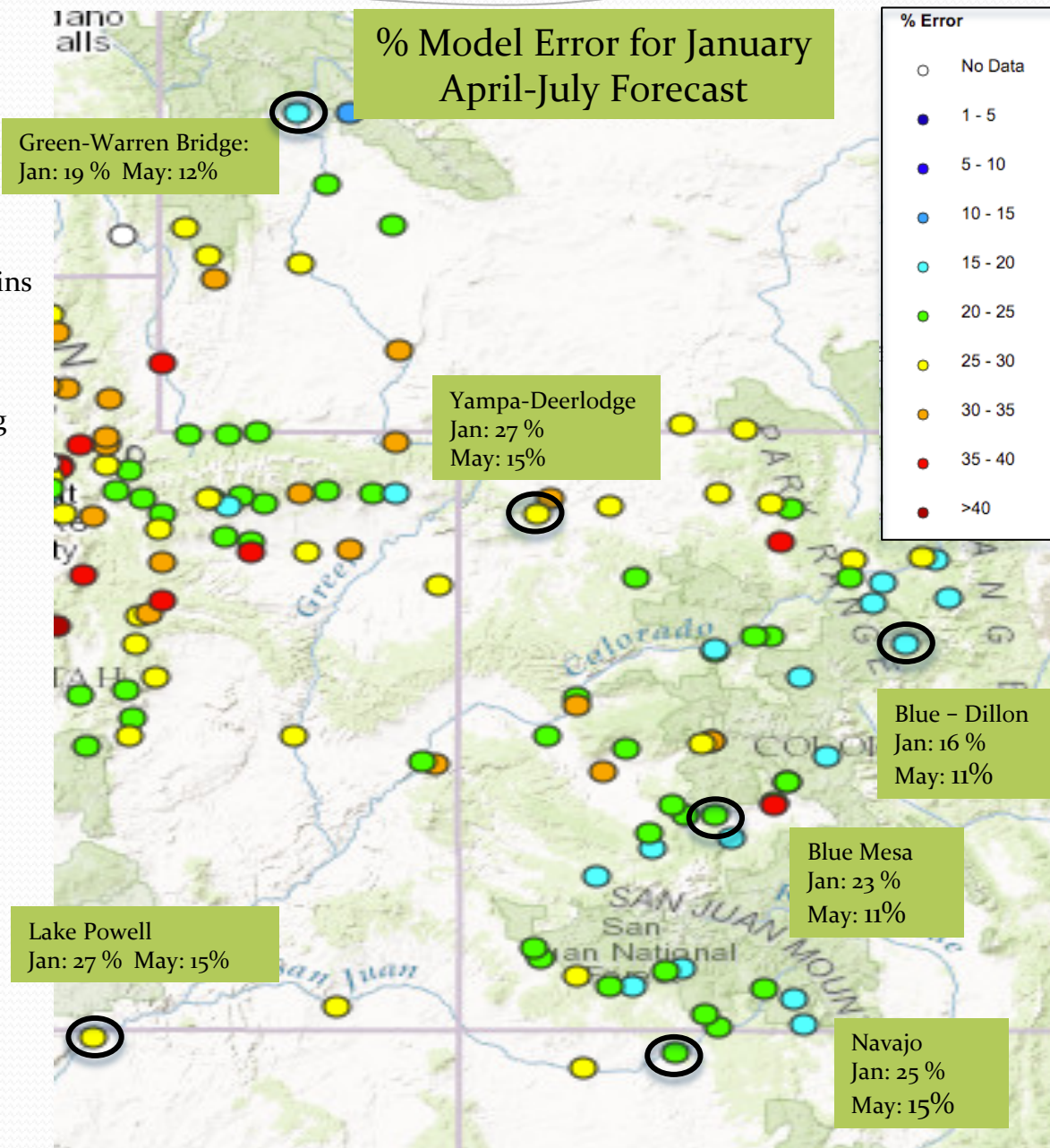
Error tends to decrease each month into the spring

Where We Do Better:

- Headwaters
- Primarily snow melt basins
- Known diversions / demands

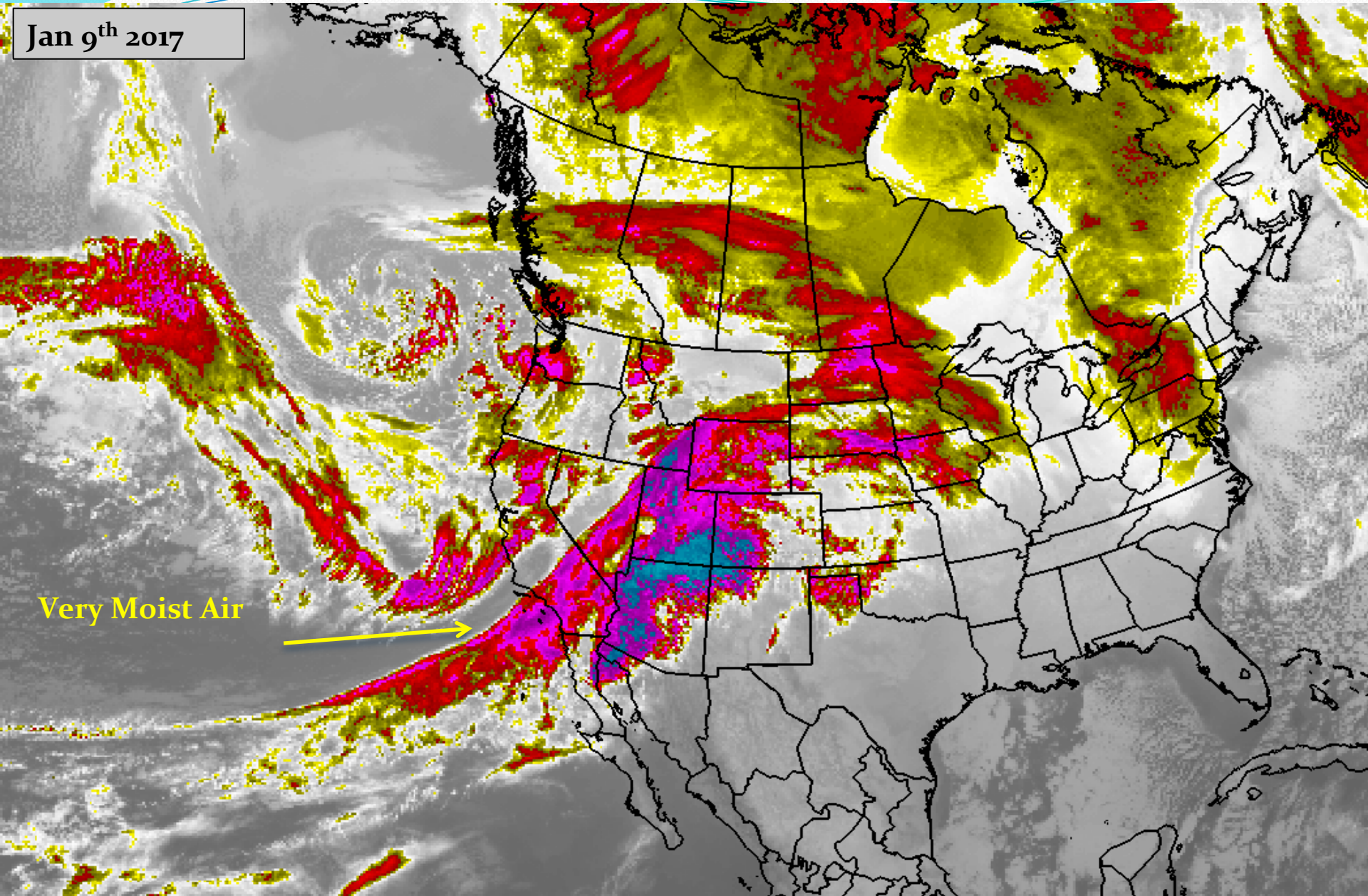
Where We Do Worse:

- Lower elevations (rain or early melt)
- Downstream of diversions / irrigation
- Little is known about diversions / demands



Upcoming Weather and Impacts to Water Supply Forecasts

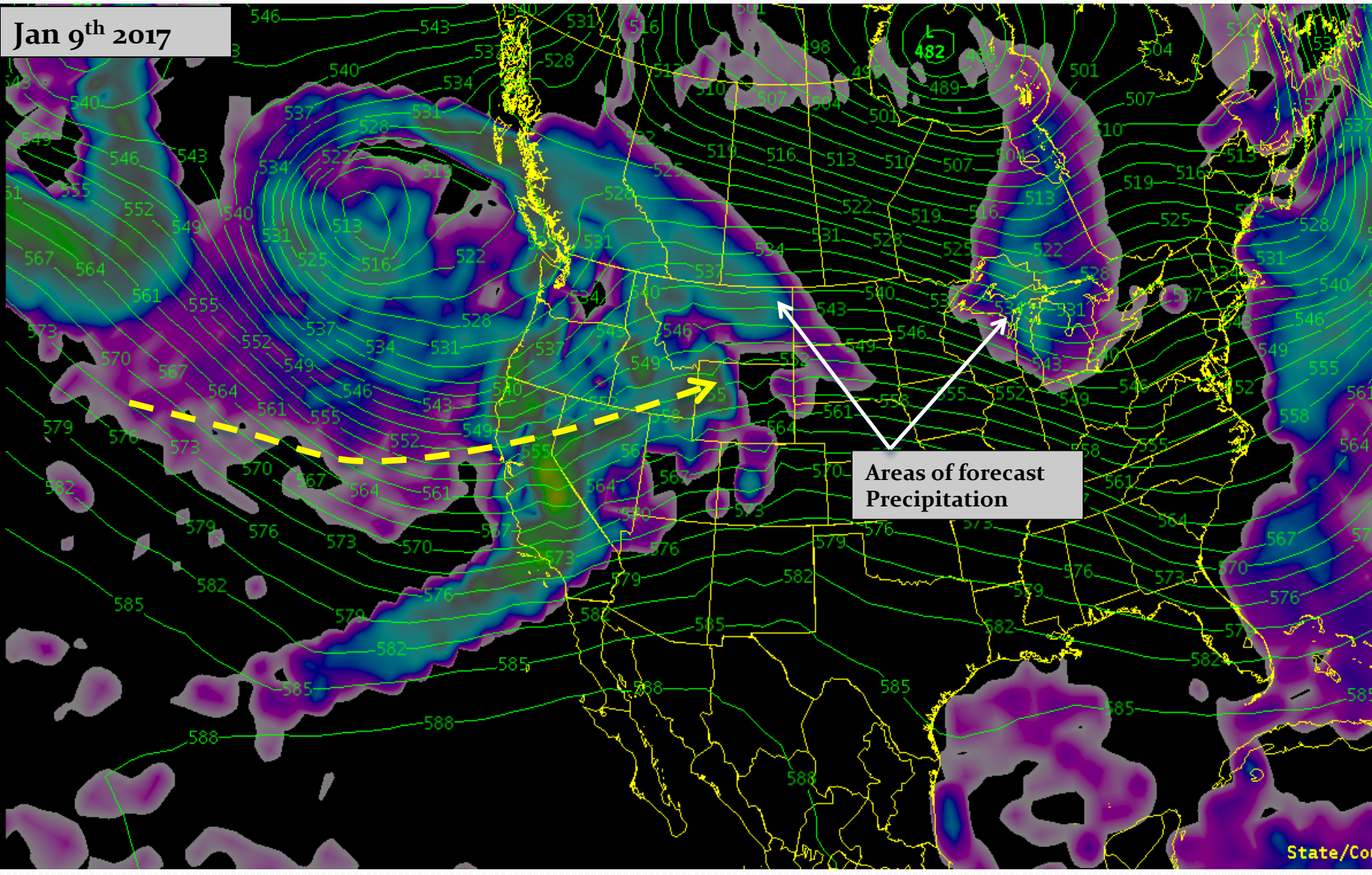
Jan 9th 2017



Very Moist Air

Upcoming Weather and Impacts to Water Supply Forecasts

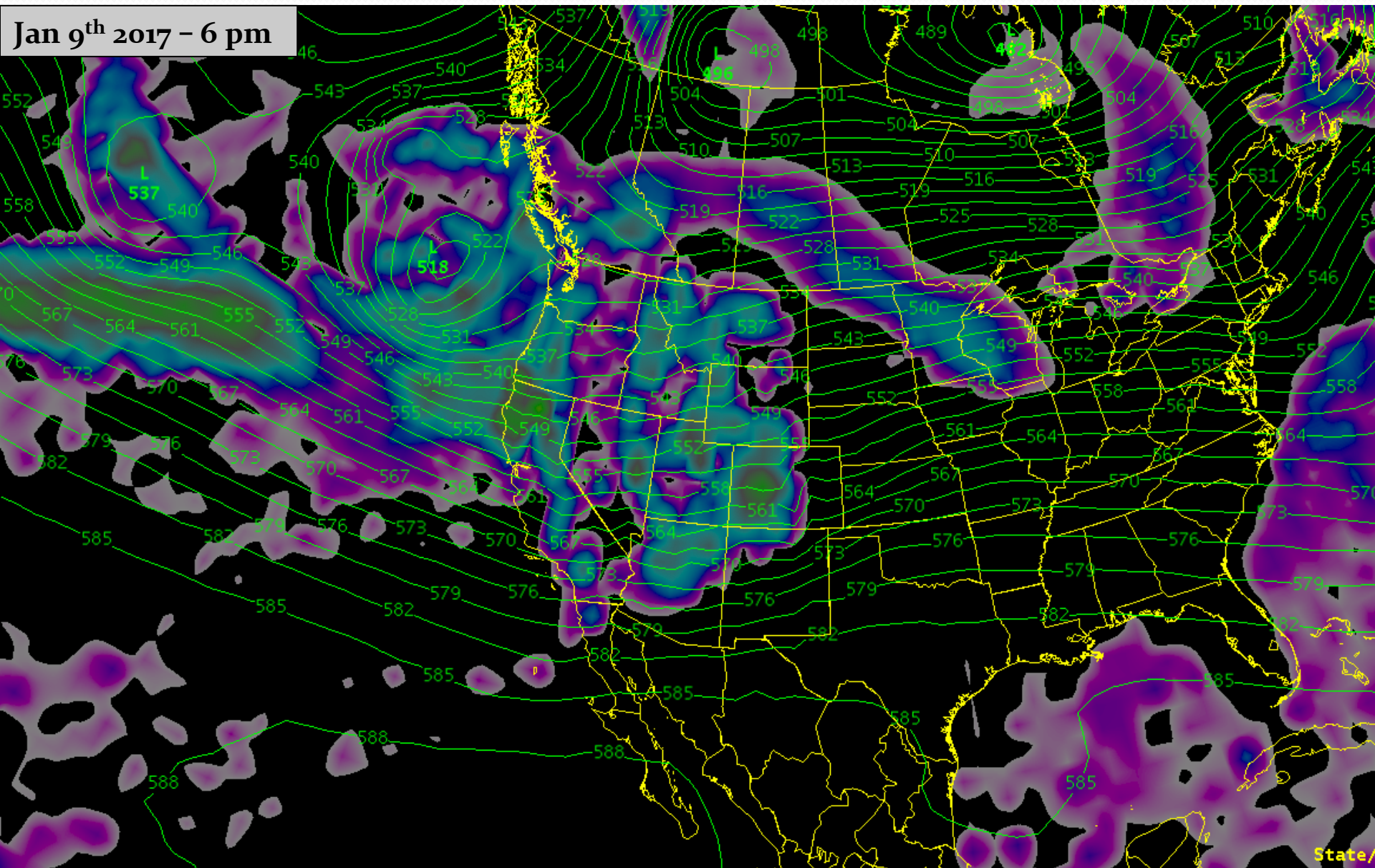
Meteorological Model Guidance: Very moist air mass entering region



Upcoming Weather and Impacts to Water Supply Forecasts

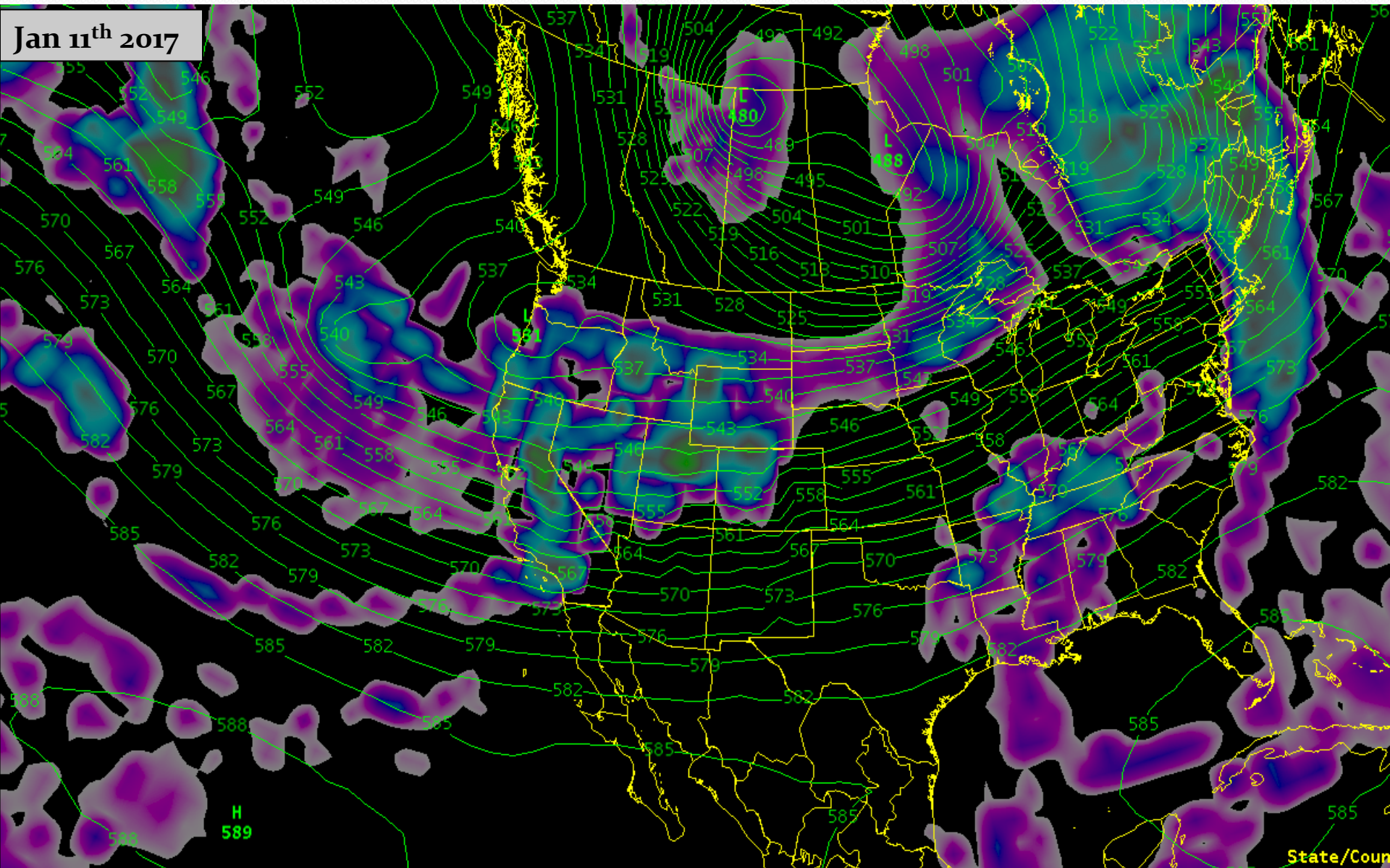
Meteorological Model Guidance: Moist air mass impacting northern Great Basin, northern Green River Basin.

Jan 9th 2017 - 6 pm



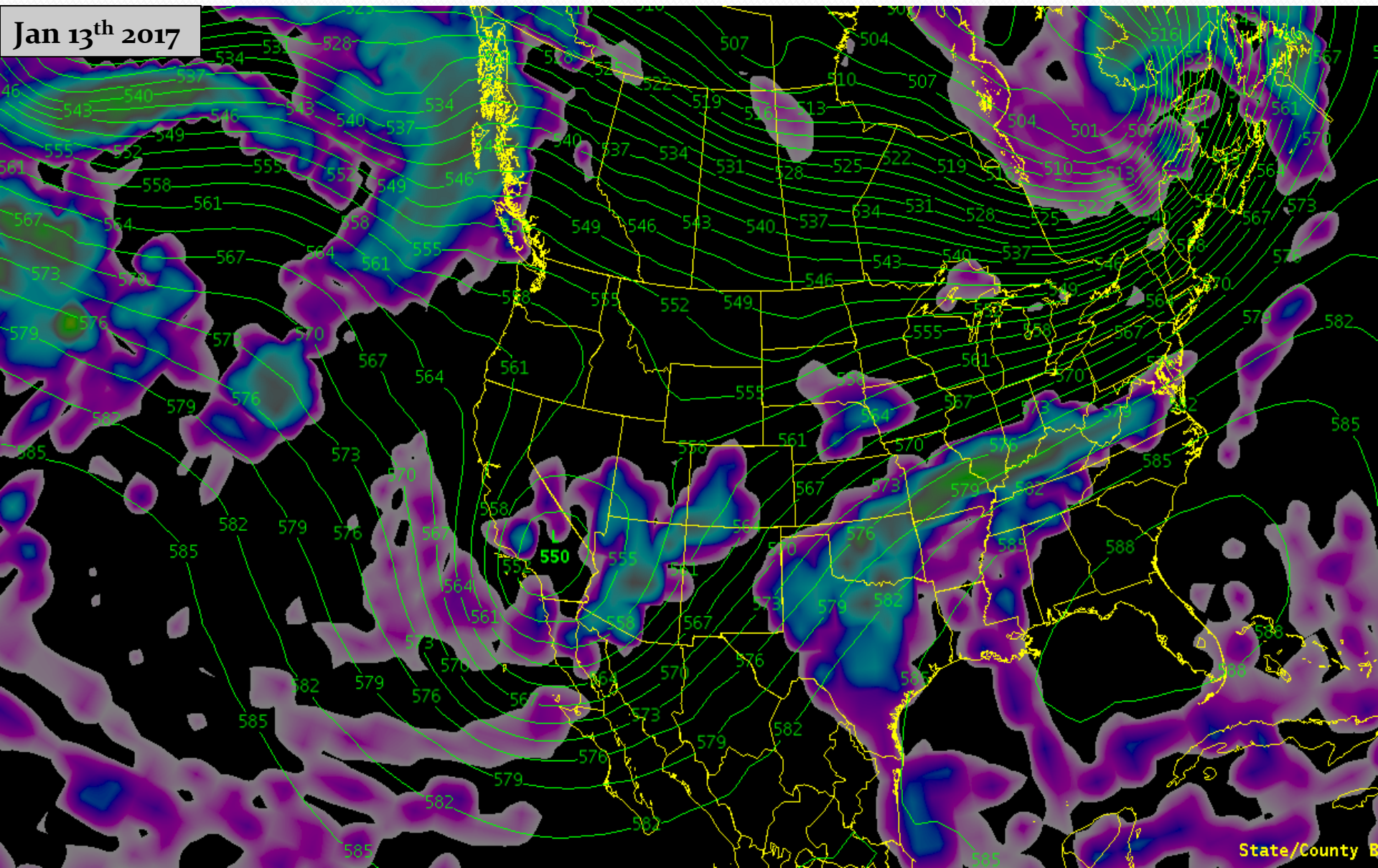
Upcoming Weather and Impacts to Water Supply Forecasts

Meteorological Model Guidance: Colder air and additional precipitation northern half of forecast area



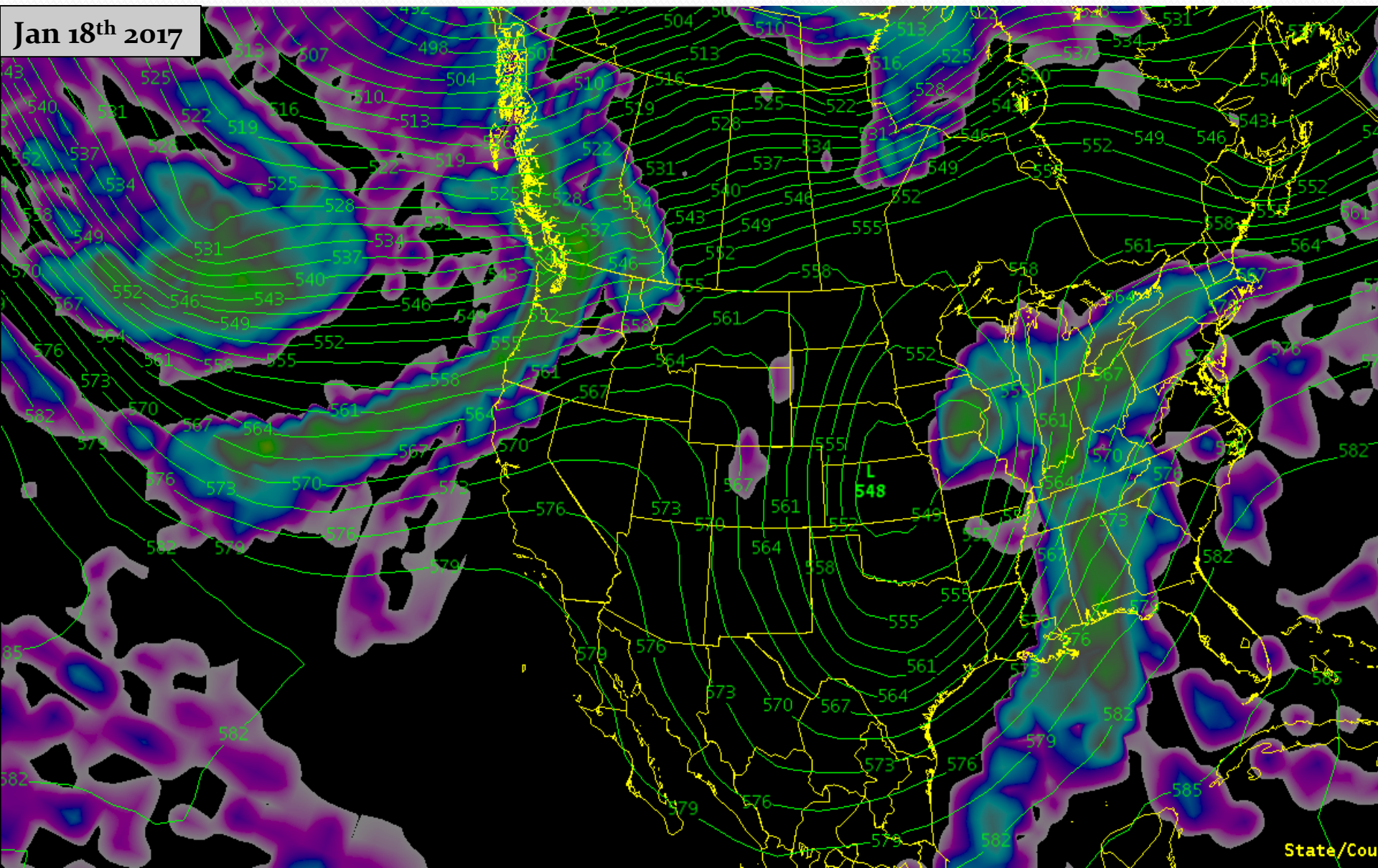
Upcoming Weather and Impacts to Water Supply Forecasts

Meteorological Model Guidance: Precipitation over the Lower Colorado River Region and SW Colorado



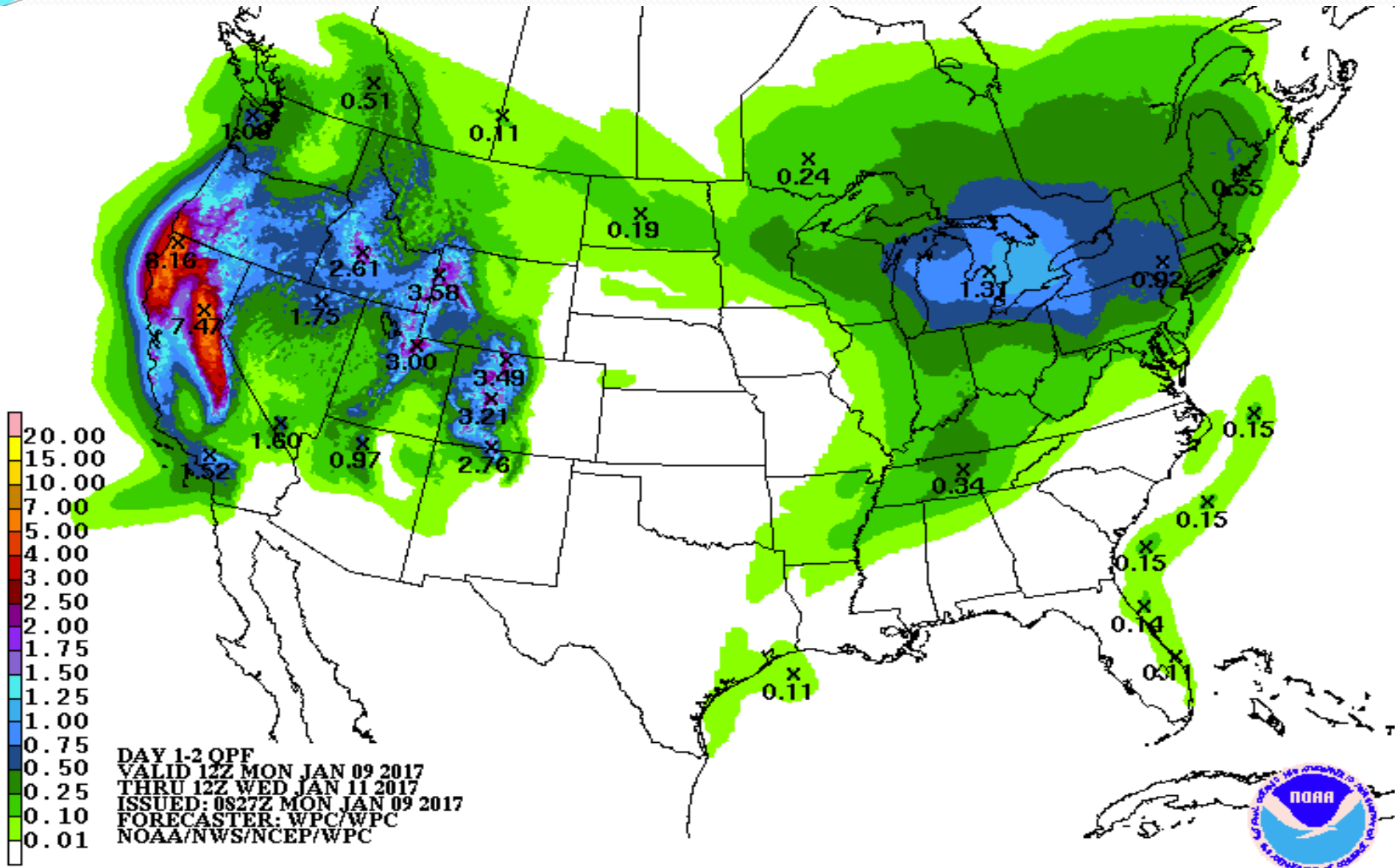
Upcoming Weather and Impacts to Water Supply Forecasts

Meteorological Model Guidance: Dry period from the weekend into the middle of next week



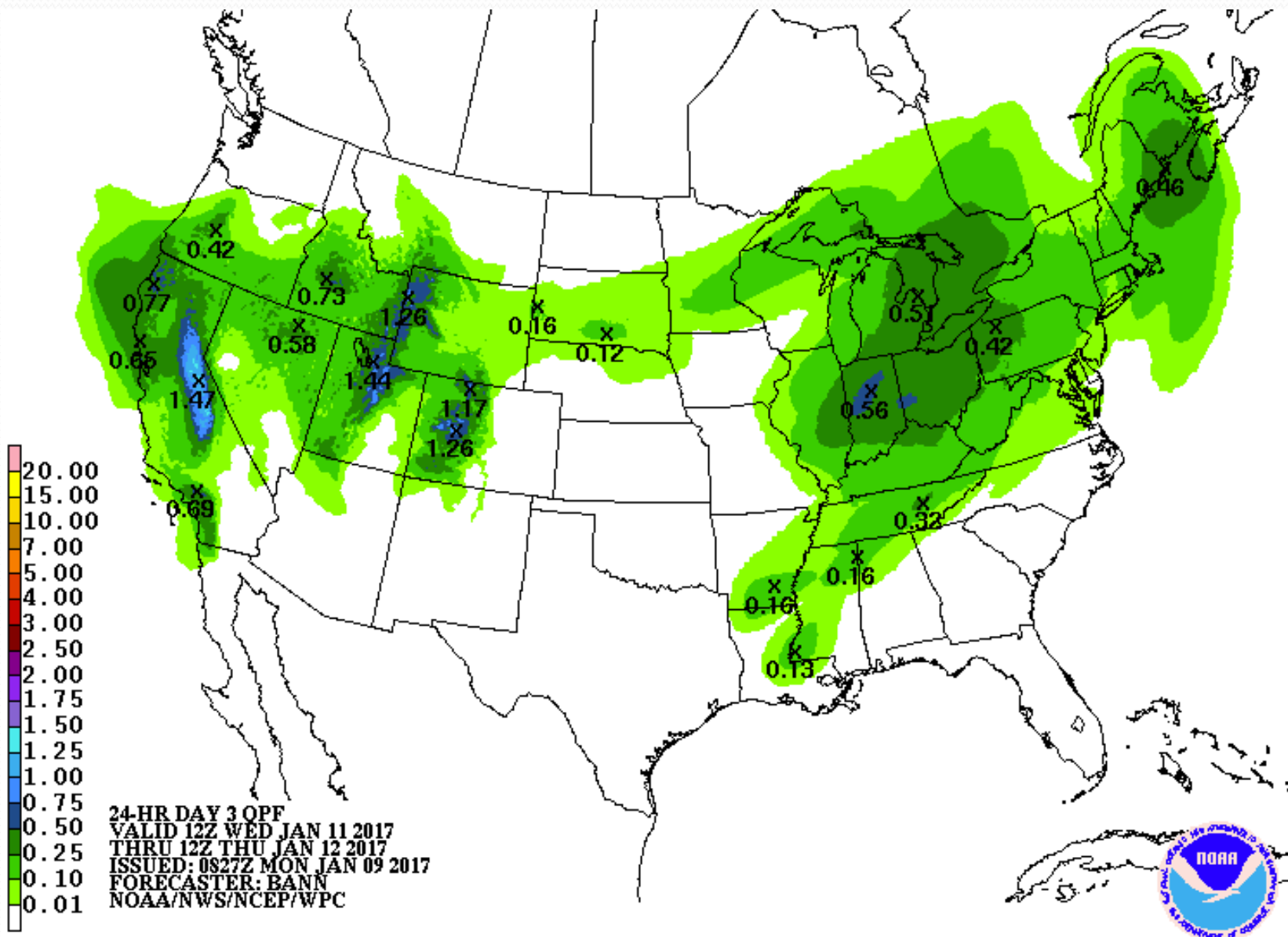
Upcoming Weather and Impacts to Water Supply Forecasts

Precipitation Forecasts the next 48 hours



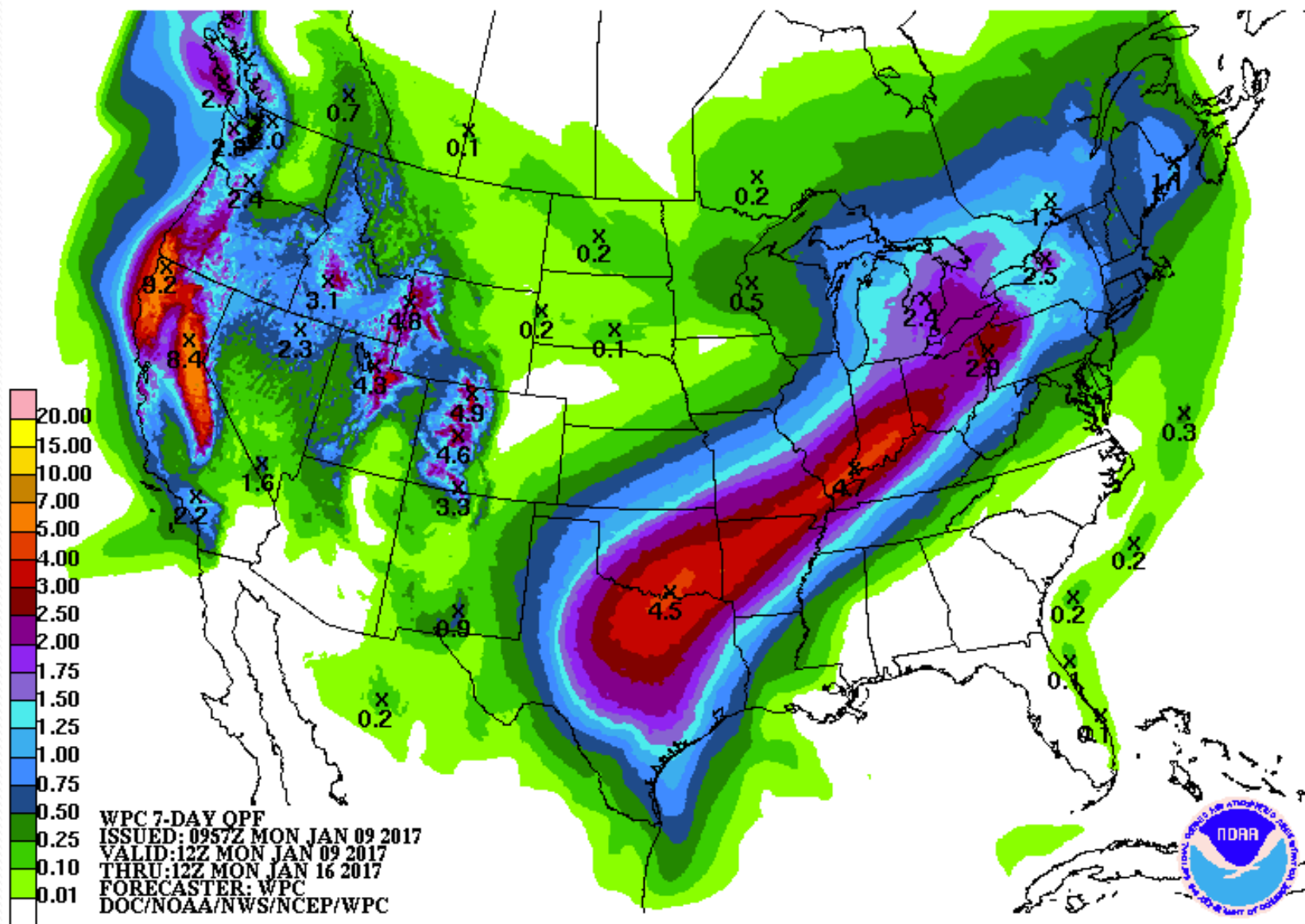
Upcoming Weather and Impacts to Water Supply Forecasts

Precipitation Forecasts the Wednesday-Thursday



Upcoming Weather and Impacts to Water Supply Forecasts

Precipitation Forecast: 7 day total (Jan 9th-Jan 16th)

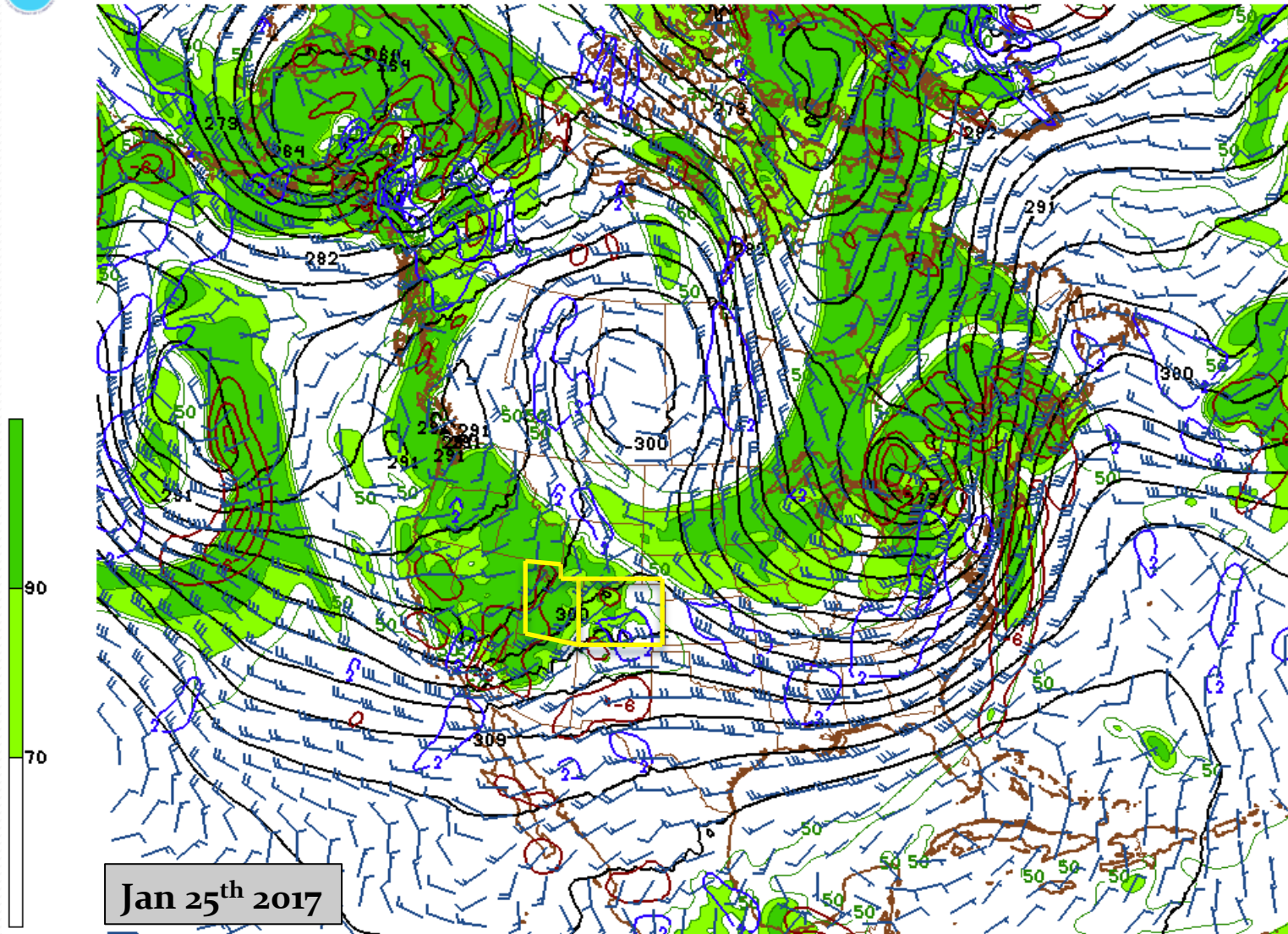


Upcoming Weather and Impacts to Water Supply Forecasts

Meteorological Model : Active pattern continues toward the end of the month



01/09/17 06UTC 384HR FCST VALID MED 01/25/17 06UTC NCEP/NWS/NOAA



170125/0600V384 GFS 700MB H6T (DM) RH(X) WIND(KTS) AND OMEGA

Key Points

Off to a great start due to the active Dec-Jan weather pattern

Dry soil moisture still impacting areas outside of the upper Green Basin with positive impacts in upper Green, Duchesne, parts of Lower Colorado.

Model guidance has trended forecasts above the Jan 1st official forecasts

There is still a large range of forecast probabilities. We could be impacted negatively if we were to turn dry like last year.

So far meteorological models suggest active weather will continue through the end of January.

Water Supply Forecasts are most likely to trend higher in the near term.

Long term our model uses average conditions.

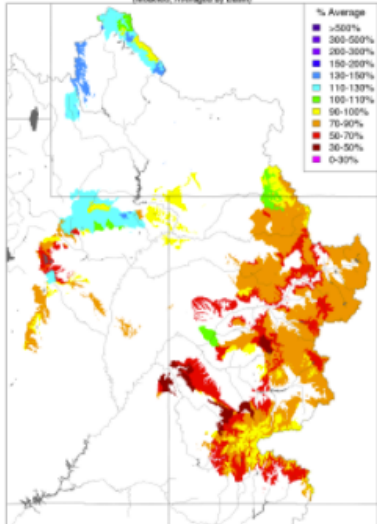
Quick look at conditions that affect the water supply forecasts for Lake Powell unregulated inflow:

<https://www.cbrfc.noaa.gov>

Under 'Water Supply' menu then select 'Upper Colorado Situational Awareness'

Soil Moisture

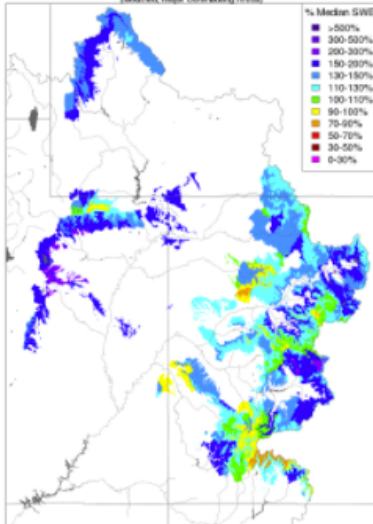
Soil Moisture - Fall - 2016 (November 16)
(Modeled, Averaged by Basin)



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

Snow Conditions

Snow Conditions - January 06 2017
(Modeled, Major Contributing Areas)



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

Lake Powell Unregulated Inflow (kaf) Water Year 2017 Forecasts as of 2017-01-01

Period	Obs to Date	Full Fcst	%Avg
Apr-Jul	0	6500	91%
Water Year	1064	9514	88%

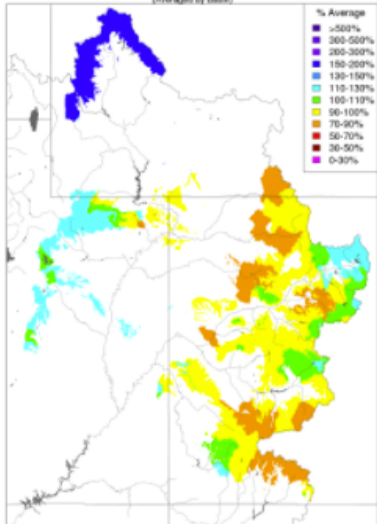
Lake Powell %Average Precipitation Water Year 2017

Area	Oct	Nov	Dec	Water Year
UC-Powell	60	75	177	106



Water Year Precipitation

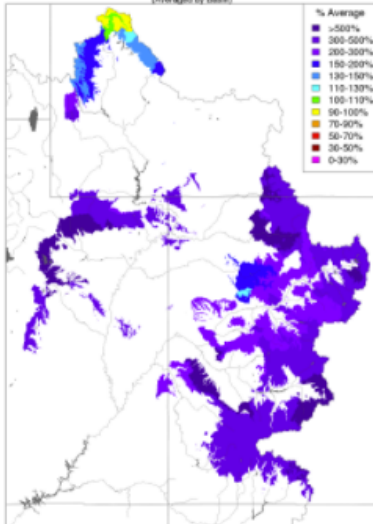
Water Year Precipitation, October 2016 - December 2016
(Averaged by Basin)



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

Month to Date Precipitation

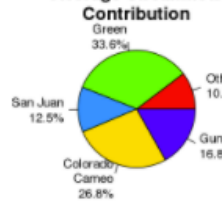
Month to Date Precipitation - January 06 2017
(Averaged by Basin)



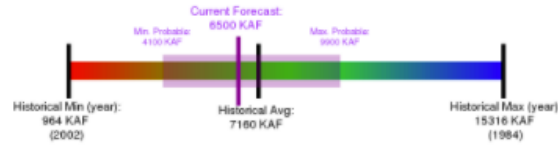
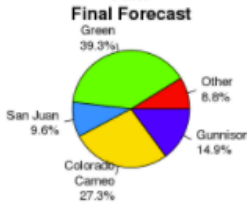
Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

April - July Unregulated Inflow into Lake Powell As of 2016-06-01

Average Streamflow Contribution



June Final Forecast



2017 water supply briefing schedule

- 2017 monthly water supply briefings for the Colorado River Basin
 - Tuesday Feb 7th @ 11 am MT
 - Tuesday Mar 7th @ 11 am MT
 - Thursday Apr 5th @ 11 am MT
 - Friday May 5th @ 11 am MT

 - Great Basin webinars are same dates at 1:30 pm MT
- Peak flow briefing early March. Additional briefings scheduled as needed.
- Date/Times are subject to change. All registration information has been posted to the CBRFC web page.

CBRFC Water Supply Contacts

Please contact us with any questions

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