

# April 2017 Great Basin Water Supply Briefing

April 6, 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

## March weather impacts:

- Warm month

- Melting snow, record runoff volumes, & saturated soils

## Snowpack conditions:

- Low and mid elevation (<8000) snowmelt

- Significant snow remains at higher elevation areas

## April 2017 water supply forecasts overview

- Some runoff was pushed into March

- Forecast trends over the last month

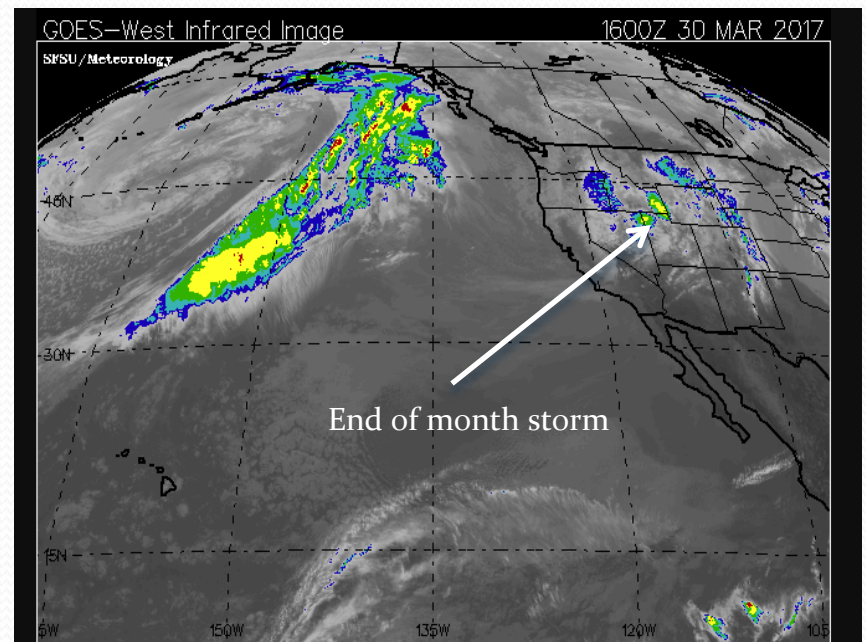
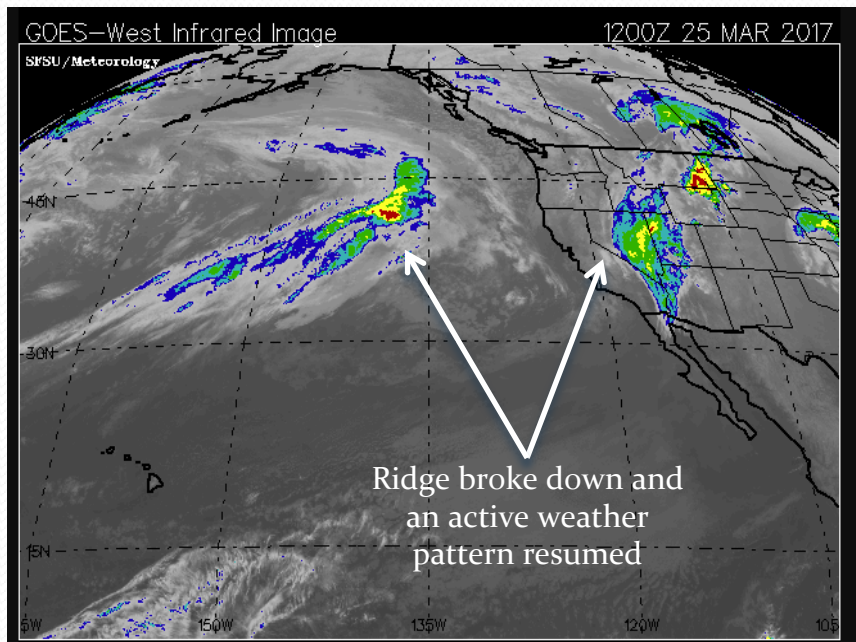
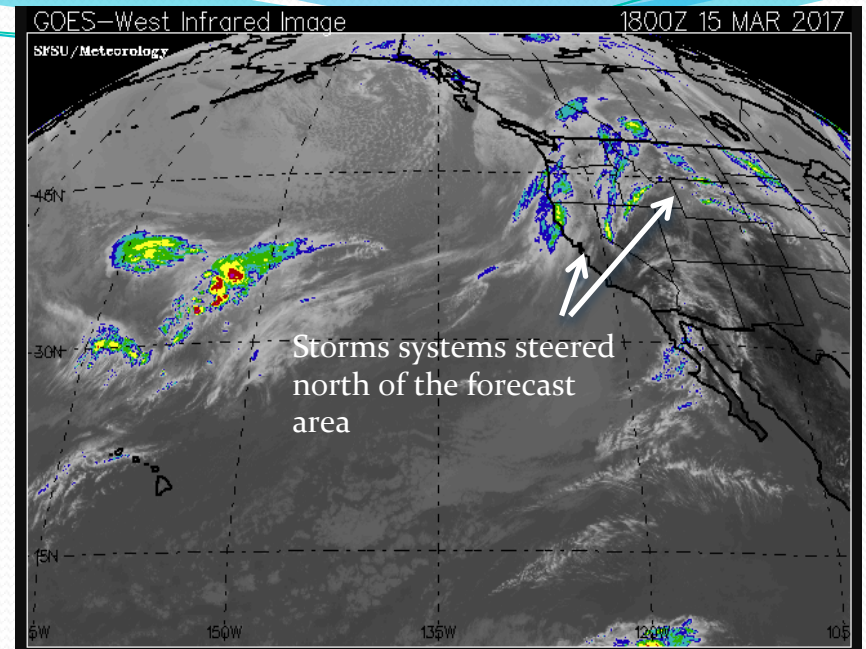
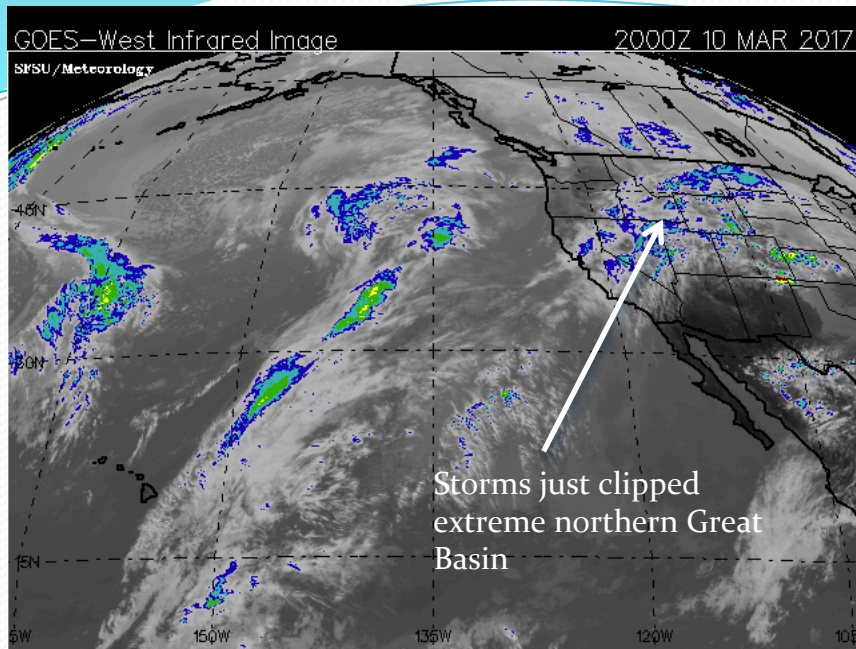
April forecast error – Better than March?

Upcoming weather – Potential impacts to water supply forecasts

Contacts & Questions

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

# March Weather





# March Weather

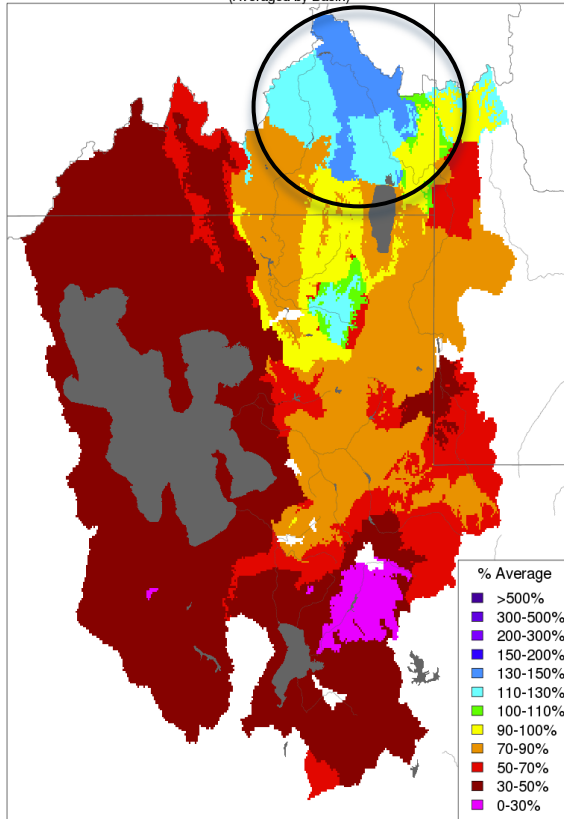
## Precipitation distribution over the month of March

Storms clipped only the extreme northern part of the area during early March (Bear River Basin).

Extended period of dry conditions throughout the area during the middle part of the month.

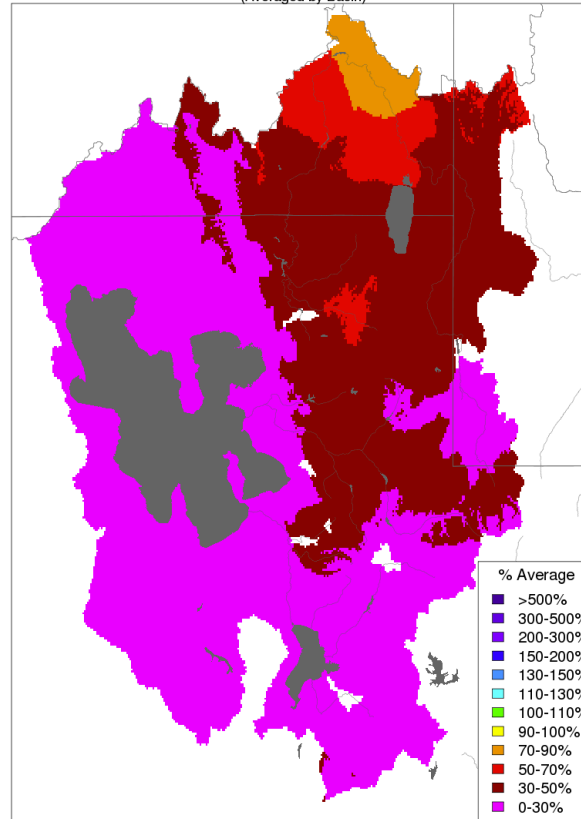
Significant precipitation the final 7-10 days of March. Widespread precipitation over most of the basin.

Month to Date Precipitation - March 10 2017  
(Averaged by Basin)



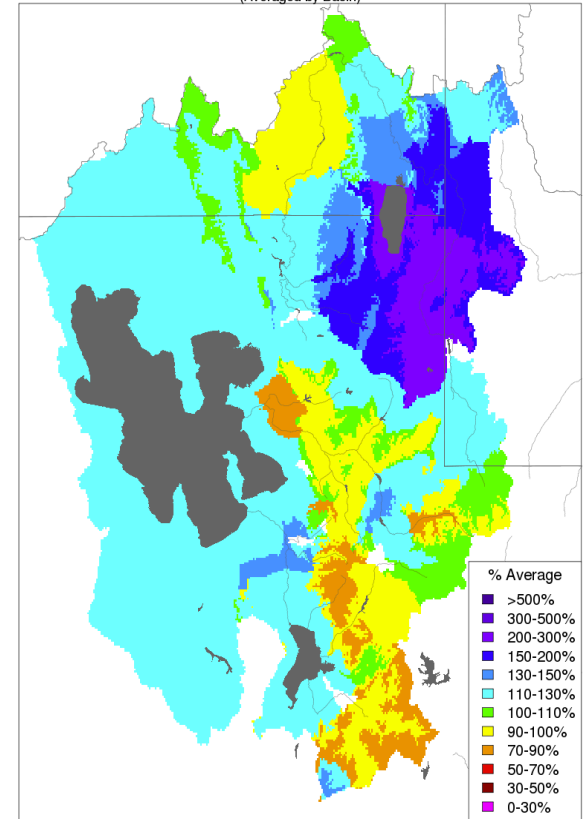
Prepared by NOAA, Colorado Basin River Forecast Center  
Salt Lake City, Utah, [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)

Month to Date Precipitation - March 20 2017  
(Averaged by Basin)



Prepared by NOAA, Colorado Basin River Forecast Center  
Salt Lake City, Utah, [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)

Monthly Precipitation - March 2017  
(Averaged by Basin)



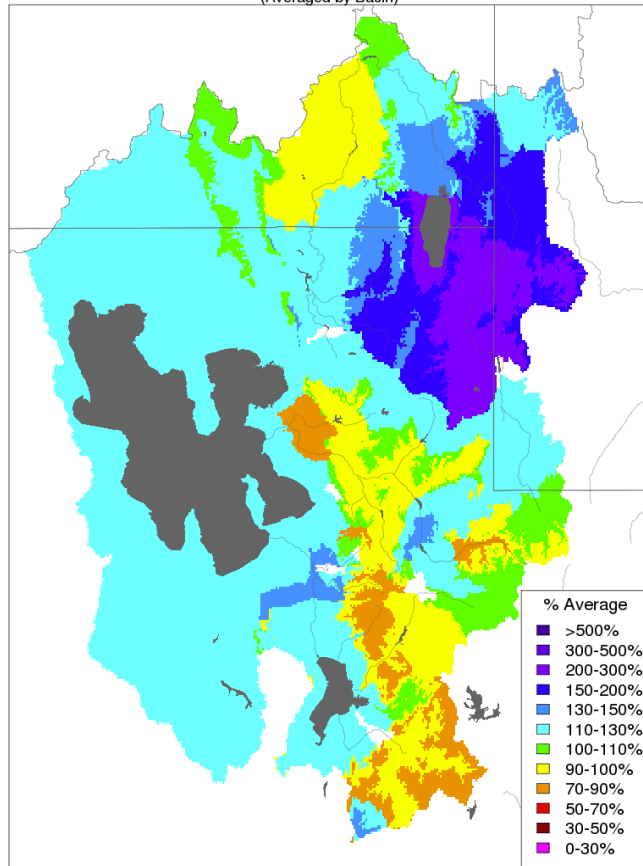
Prepared by NOAA, Colorado Basin River Forecast Center  
Salt Lake City, Utah, [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)



# March Weather

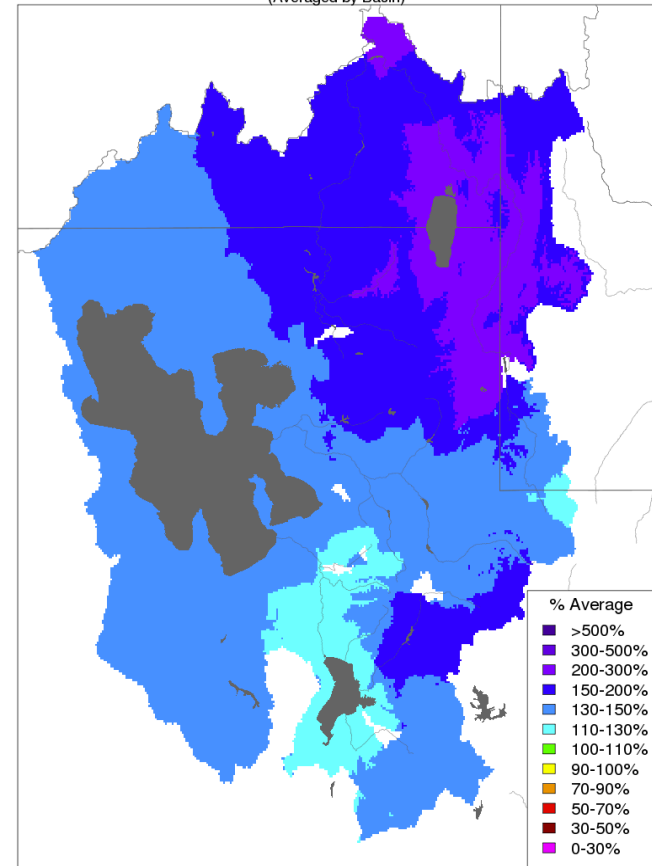
## Precipitation

Monthly Precipitation - March 2017  
(Averaged by Basin)



Prepared by NOAA, Colorado Basin River Forecast Center  
Salt Lake City, Utah, [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)

Water Year Precipitation, October 2016 - March 2017  
(Averaged by Basin)



Prepared by NOAA, Colorado Basin River Forecast Center  
Salt Lake City, Utah, [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)

### March Precipitation (% average):

Bear:	125%
Weber:	100%
Six Creeks:	90%
Provo/UT Lake:	90%

### Seasonal Precipitation (% average):

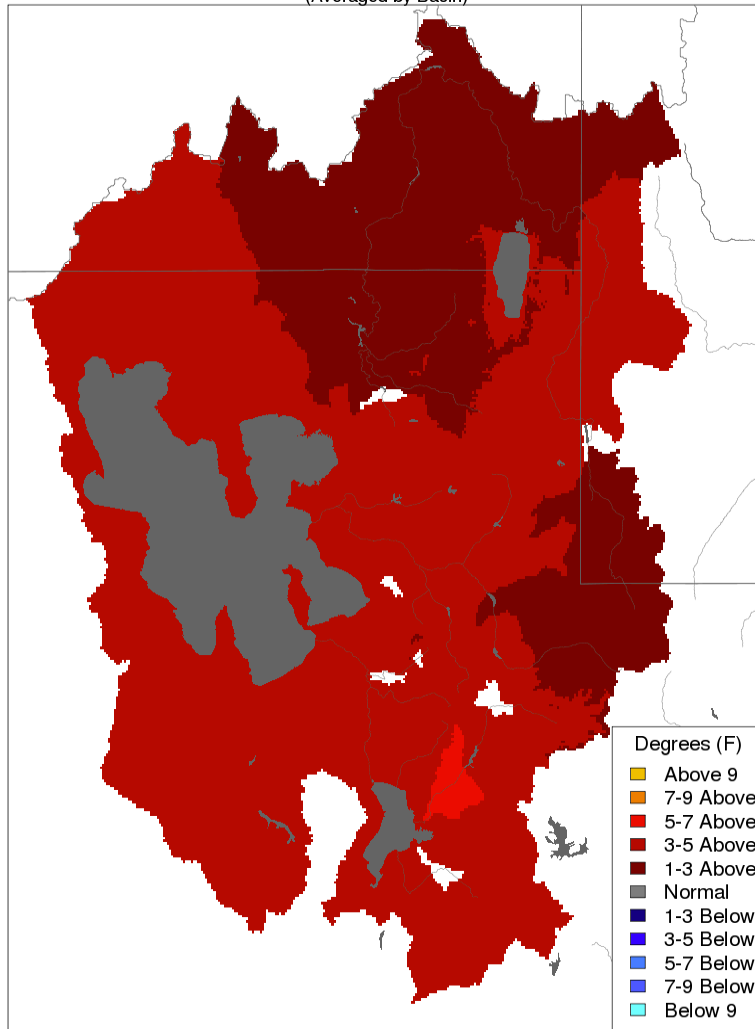
Bear:	170%
Weber:	150%
Six Creeks:	130%
Provo/UT Lake:	150%

# March Weather

## Another Warm Month

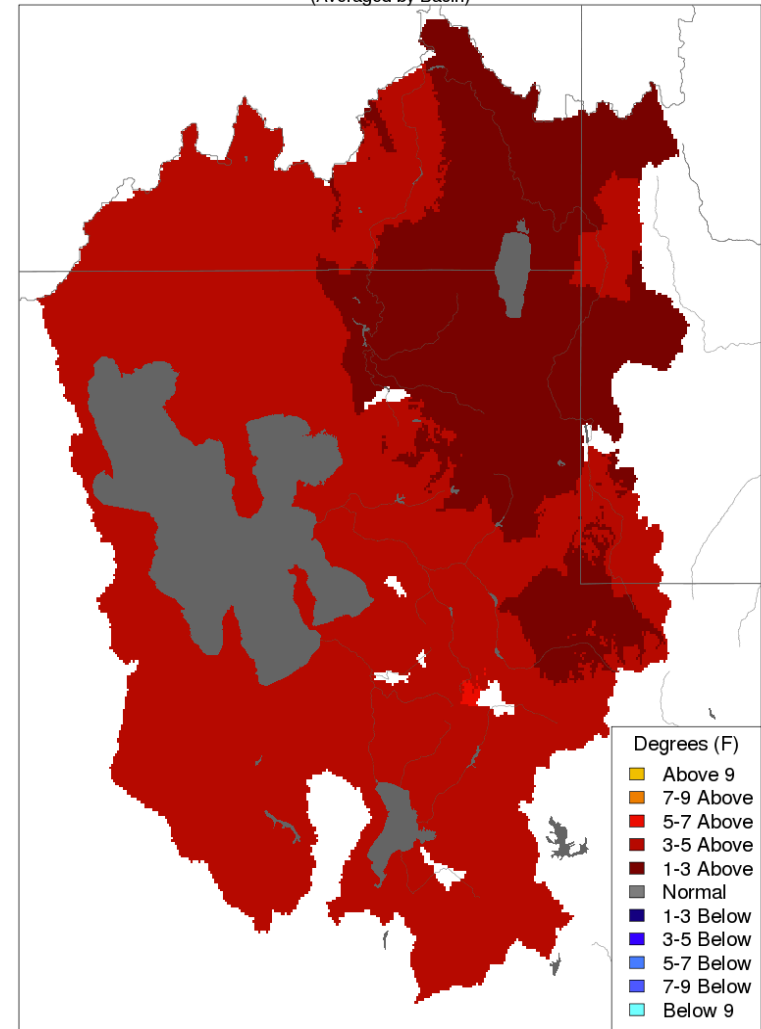
Some mean daily temperatures reached 15-25 degrees above average

Max Temp - Monthly Deviation - February 2017  
(Averaged by Basin)



Prepared by NOAA, Colorado Basin River Forecast Center  
Salt Lake City, Utah, [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)

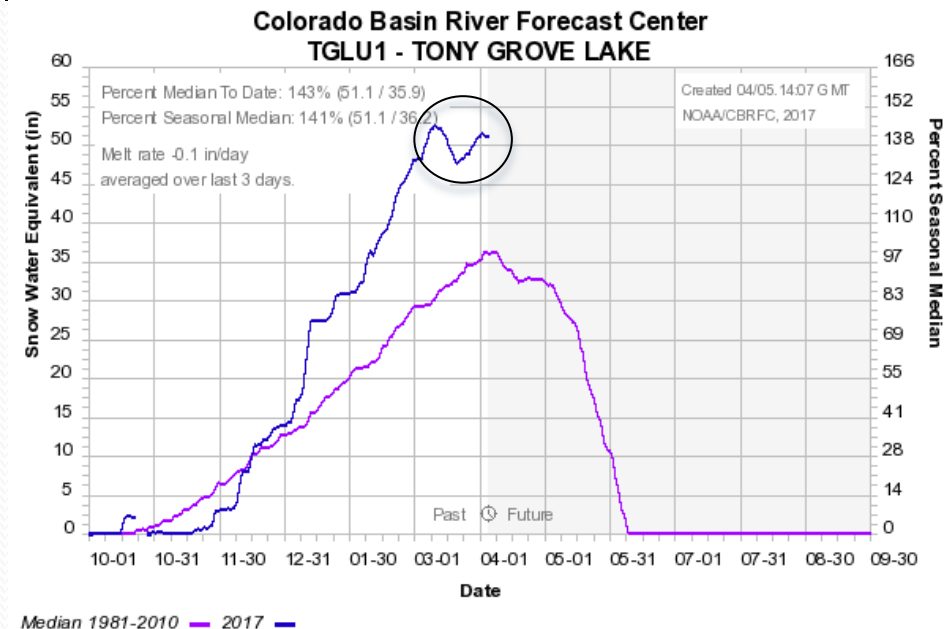
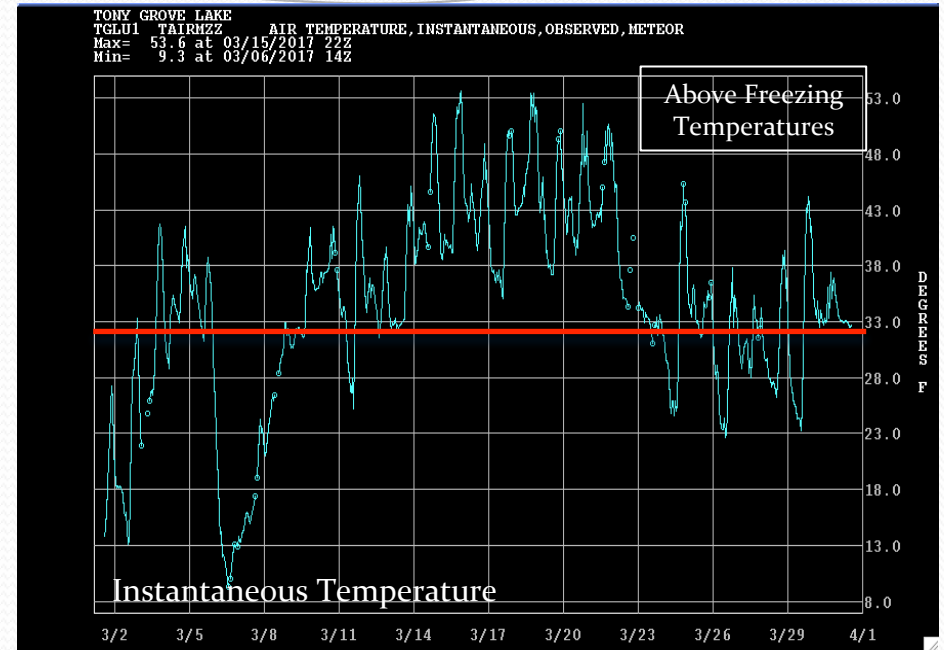
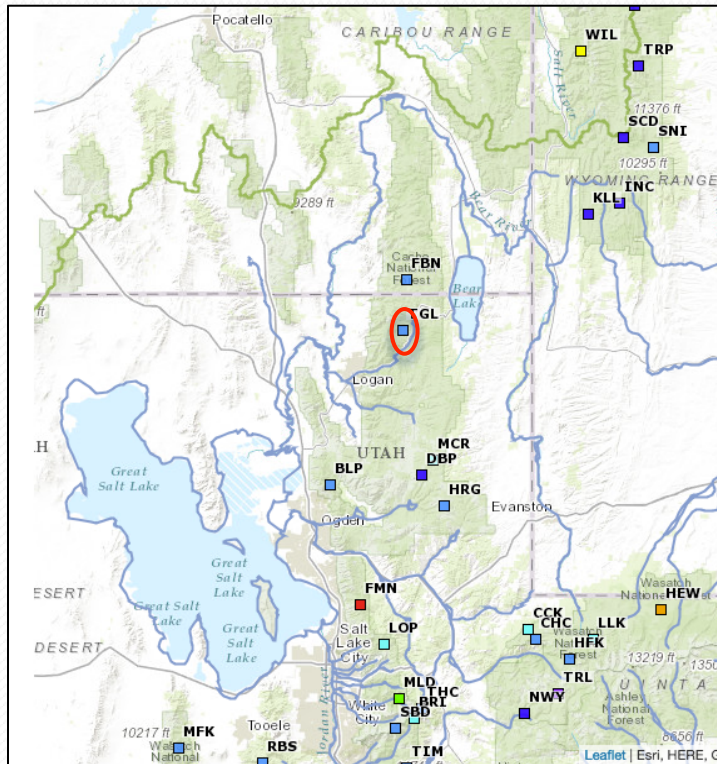
Max Temp - Monthly Deviation - March 2017  
(Averaged by Basin)



Prepared by NOAA, Colorado Basin River Forecast Center  
Salt Lake City, Utah, [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)

# March Weather Temperature

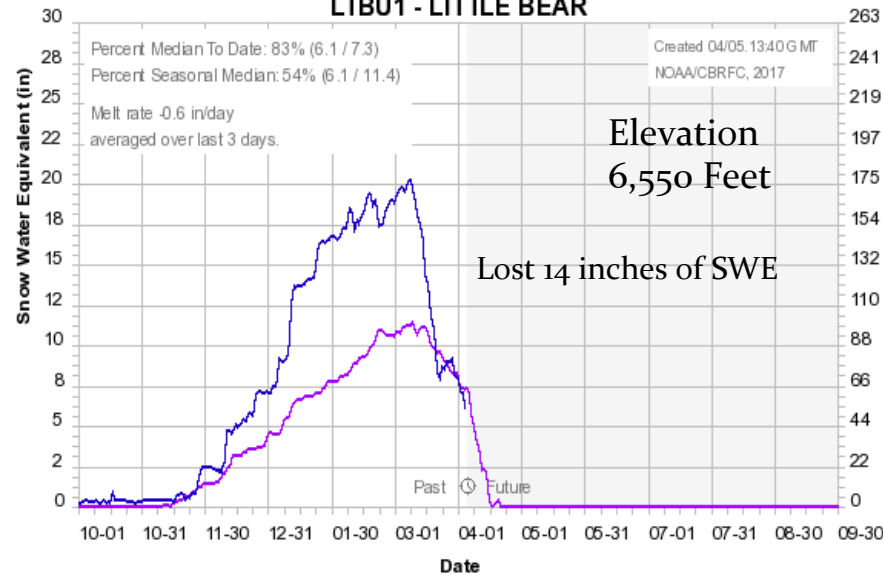
Tony Grove Lake SNOTEL  
Elevation: 8,400 Feet  
Logan River Basin



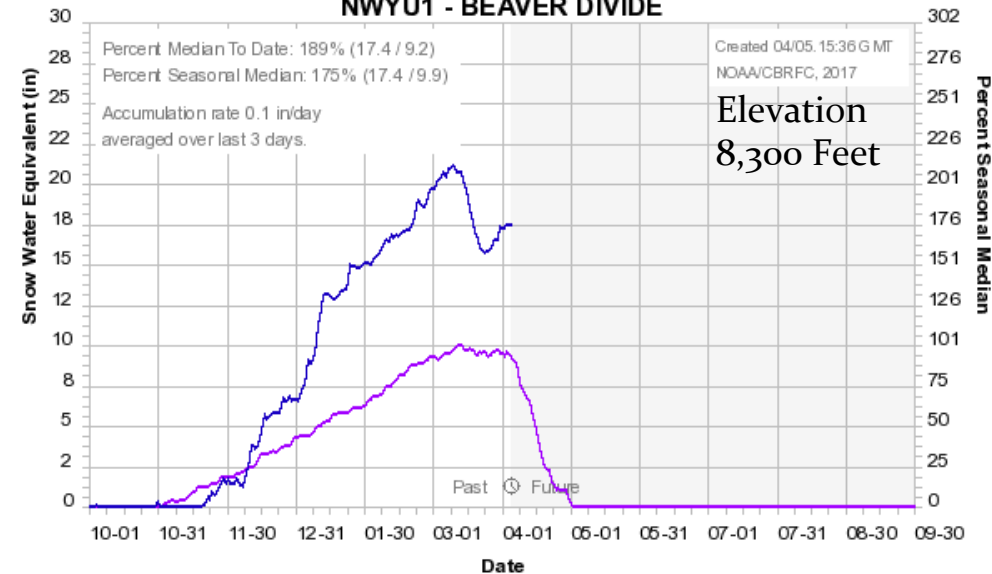


# March Weather: Temperature Impacts to the snowpack

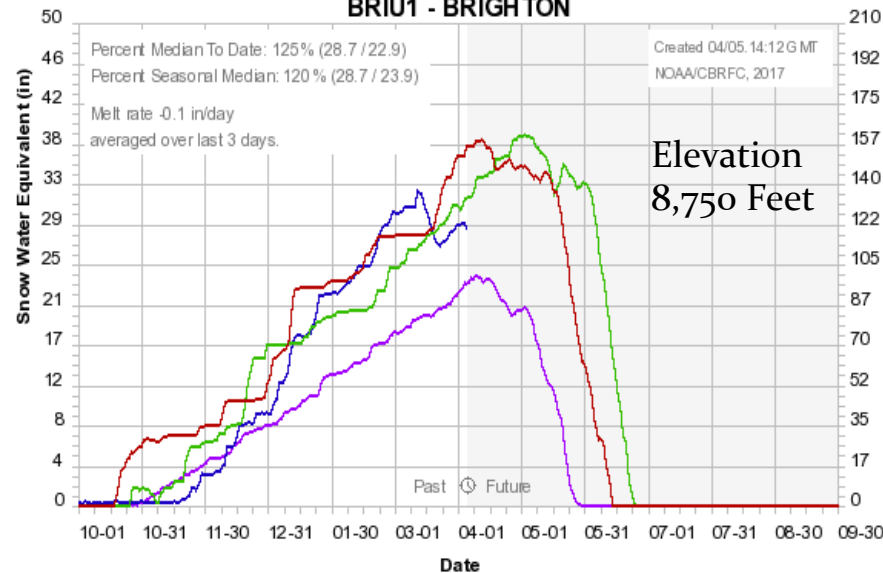
Colorado Basin River Forecast Center  
LTBU1 - LITTLE BEAR



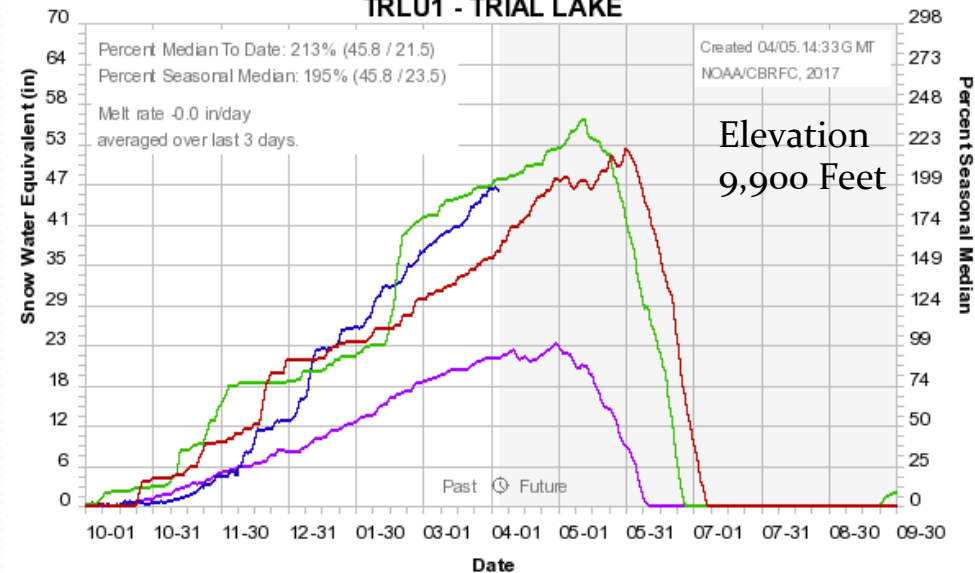
Colorado Basin River Forecast Center  
NWYU1 - BEAVER DIVIDE



Colorado Basin River Forecast Center  
BRIU1 - BRIGHTON



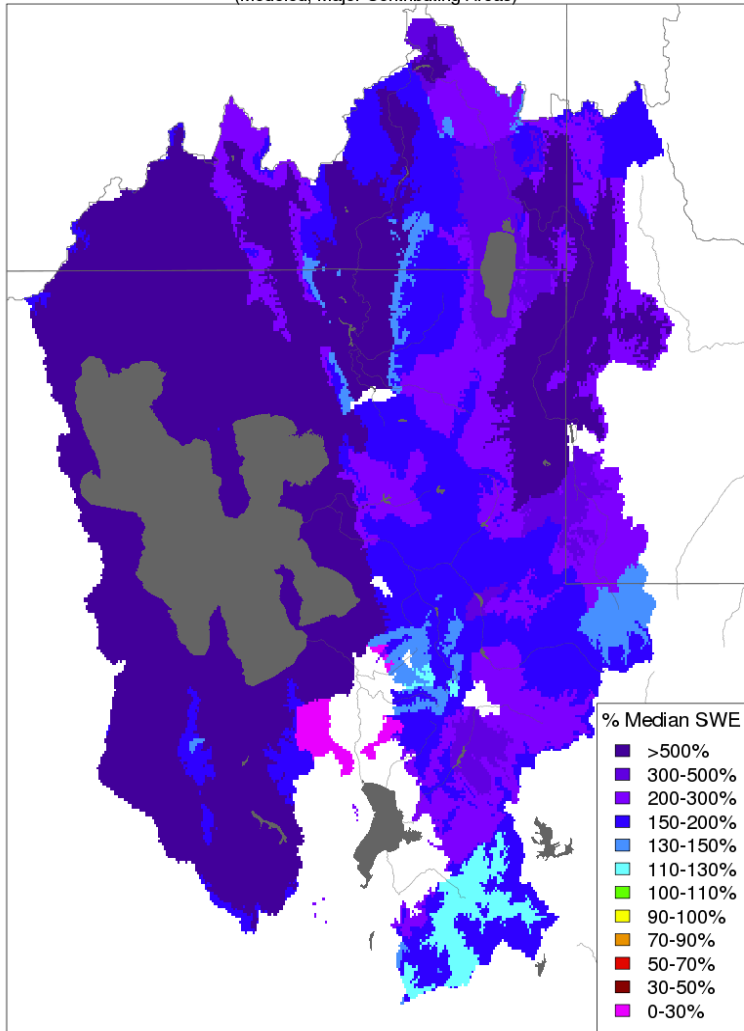
Colorado Basin River Forecast Center  
TRLU1 - TRIAL LAKE



# March Weather: Temperature Impacts to Snowpack

## CBRFC Model

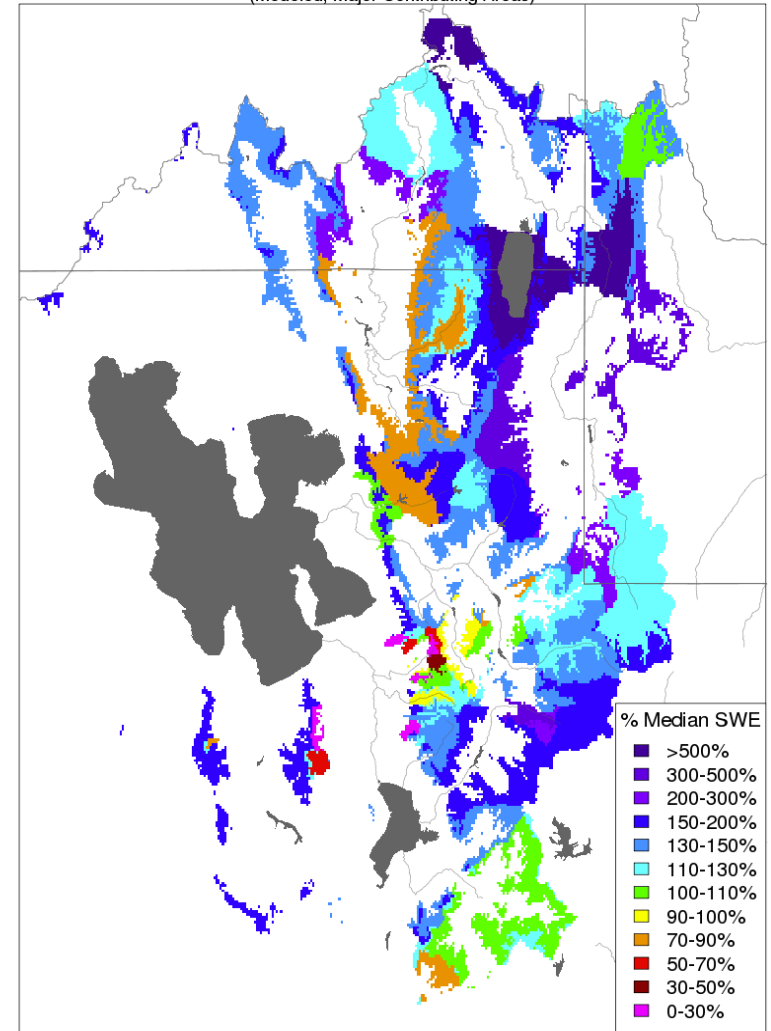
**Snow Conditions - March 01 2017**  
(Modeled, Major Contributing Areas)



Prepared by NOAA, Colorado Basin River Forecast Center  
Salt Lake City, Utah, [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)

## CBRFC Model

**Snow Conditions - April 05 2017**  
(Modeled, Major Contributing Areas)



Prepared by NOAA, Colorado Basin River Forecast Center  
Salt Lake City, Utah, [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)

# March Weather: Impacts to Soil Moisture

## EXPLANATION

Model representation of where areas are becoming saturated.

Primary use (dark green):

- Indicates where efficient runoff is likely in the near future due to snowmelt and/or rainfall (dark green areas).

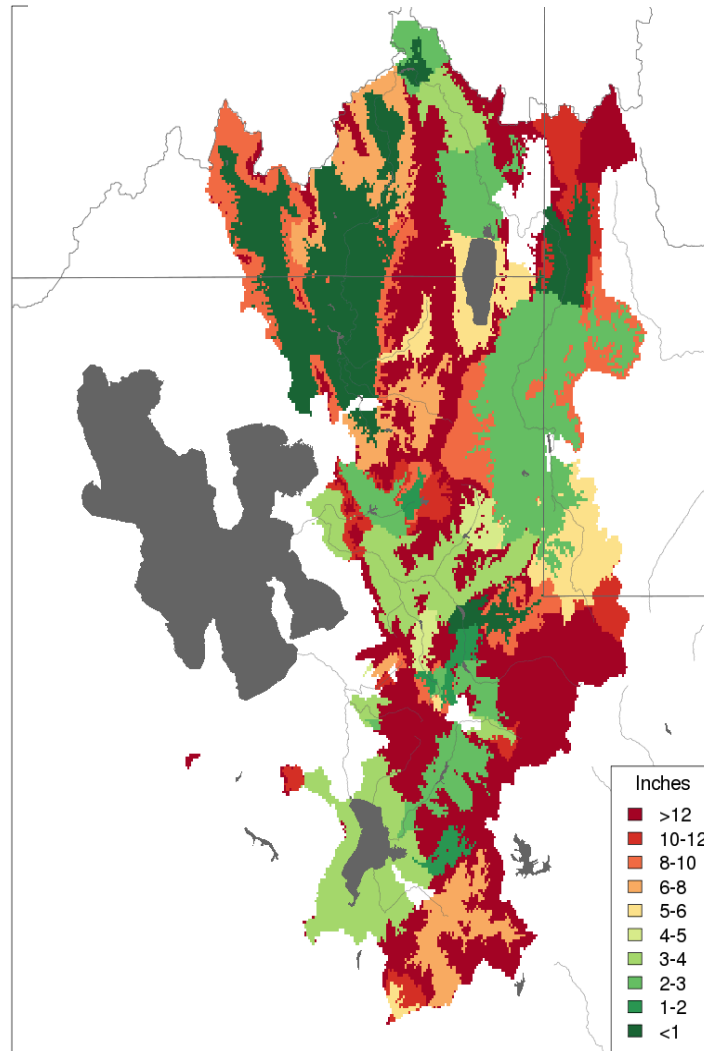
Large deficits (red/orange):

- Areas under snowpack where significant melt has not begun. Red is normal this time of year.

**\*\*Not a representation of above / below average soil moisture conditions**

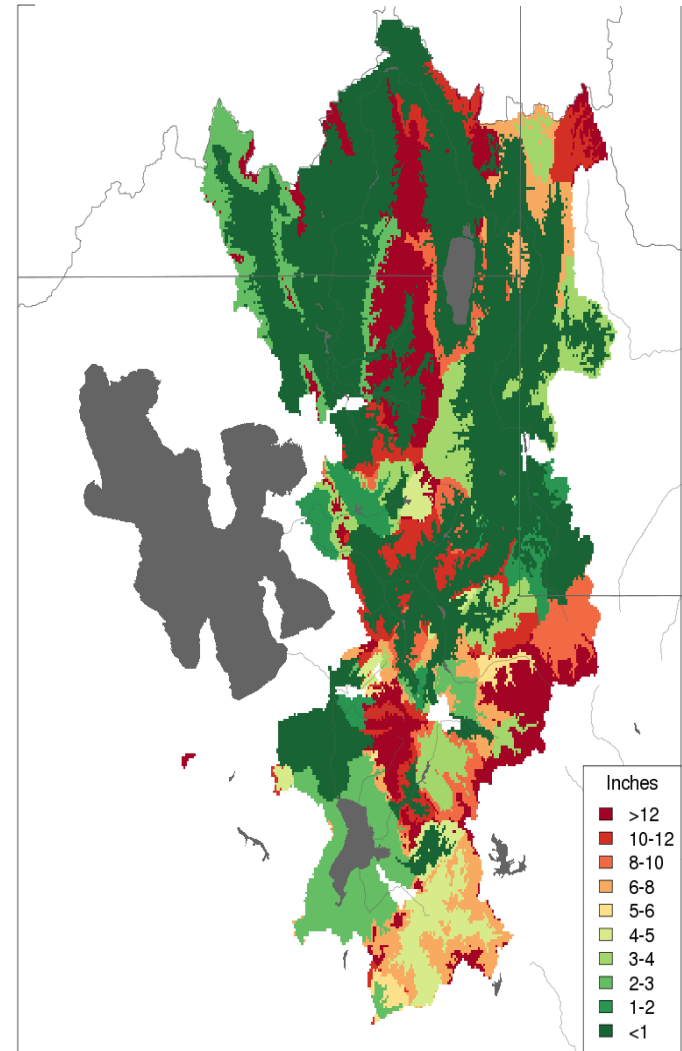
## Model Soil Moisture-Inches to Saturation

March 1, 2017



Prepared by NOAA, Colorado Basin River Forecast Center  
Salt Lake City, Utah, [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)

April 1, 2017

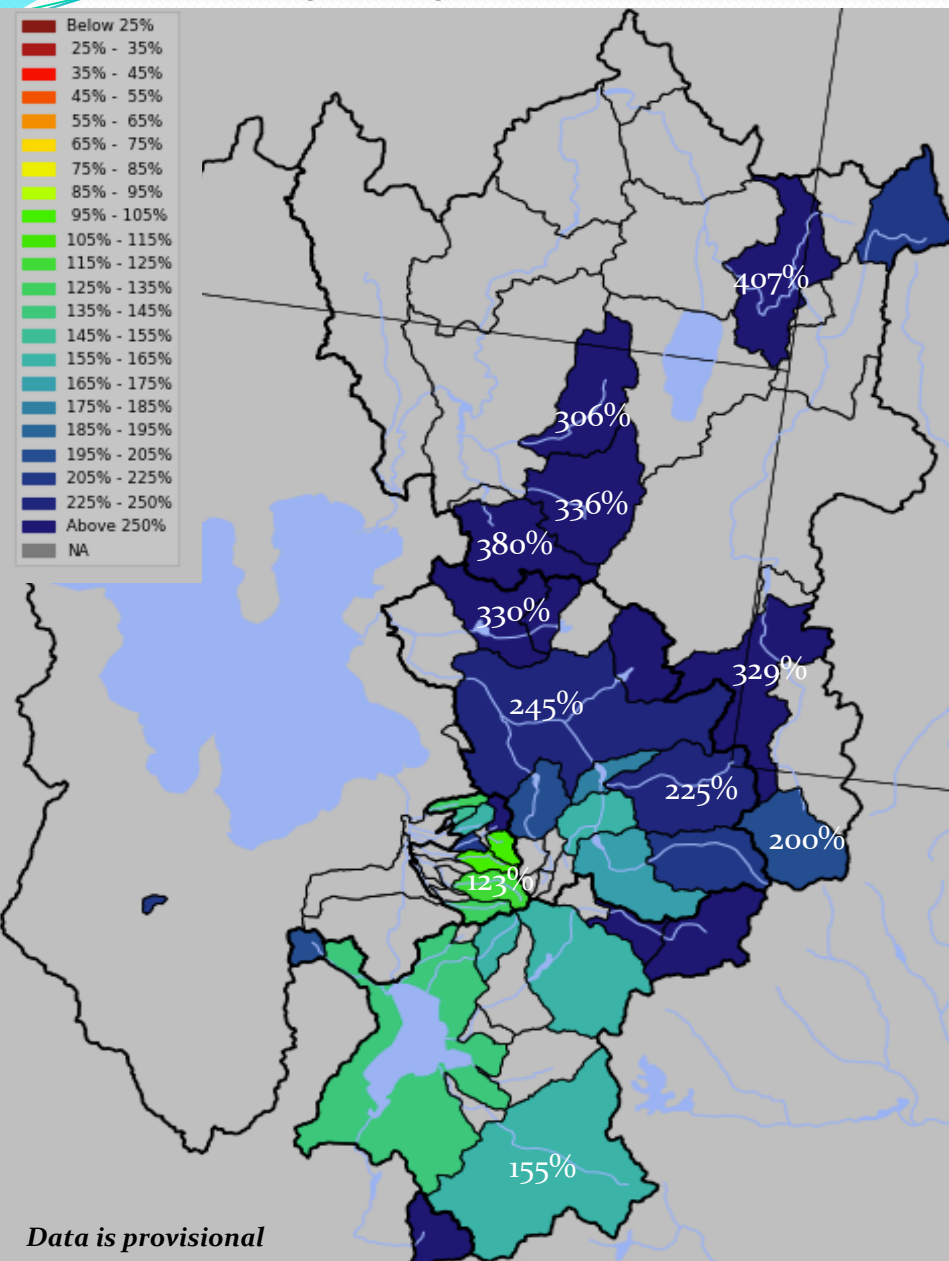


Prepared by NOAA, Colorado Basin River Forecast Center  
Salt Lake City, Utah, [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)



# March Weather: Impacts on March Streamflow

March % of Average Unregulated Streamflow for March



Data is provisional

## Notable March Volumes

Site (Rank/POR) - Mar Vol KAF / % Avg - old record (year)

Bear-UT/WY (1/75)*	5.8 /200%	4.8 (2015)
Smiths Fork (1/75)*	8.8/224%	6.2 (2015)
Stewart Dam (1/89)*	98/407%	82 (1986)
Logan River (1/52)*	25/306%	23 (1986)
Blacksmith Fork (1/99)*	23/336%	22 (1986)
Little Bear River(1/73)*	29/380%	24 (1986)
South Fork Ogden (1/94)*	29/400%	25 (1986)
Pineview Inflow (1/79)*	80/330%	72 (1986)
Provo-Woodland(1/52)*	11.6/265%	11.4 (1986)
Provo-Hailstone(1/62)*	18.3/319%	16.5 (1986)

Saturated conditions, warm temperatures, low elevation snowmelt and precipitation resulted in record flows at many locations.

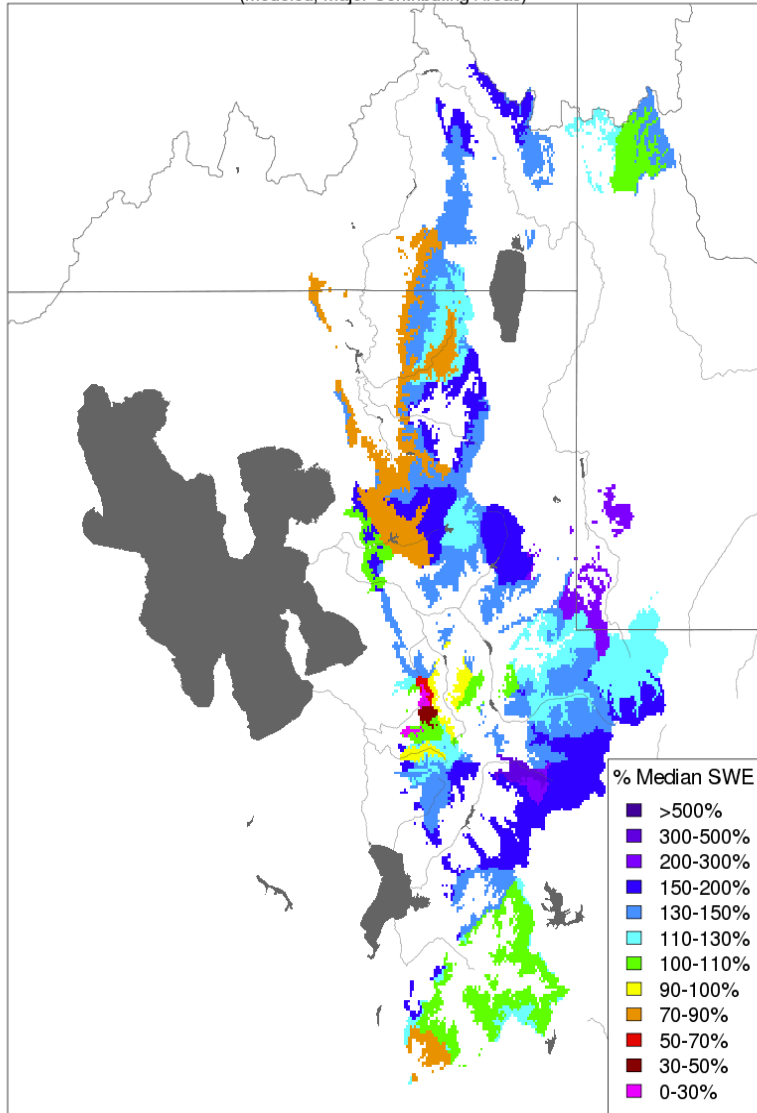
Many more sites in top 2 or 3 of record

# March Weather Impacts

Current snow conditions (CBRFC model)

Snow Conditions - April 05 2017

(Modeled, Major Contributing Areas)



Prepared by NOAA, Colorado Basin River Forecast Center  
Salt Lake City, Utah, [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)

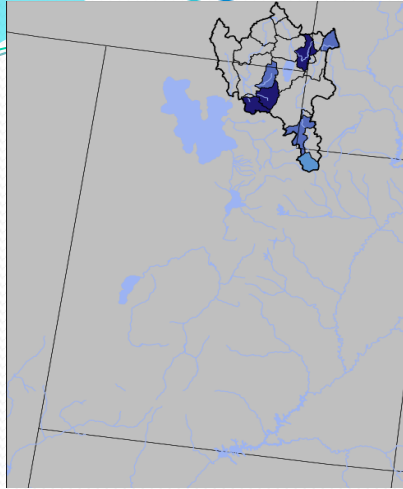
Melted significant amount of lower elevation snow  
Benefits to reducing flood threats

Lower elevation areas saturated (model)  
Could result in efficient runoff response to rain  
Bear River Basin  
Weber/Ogden River Basin

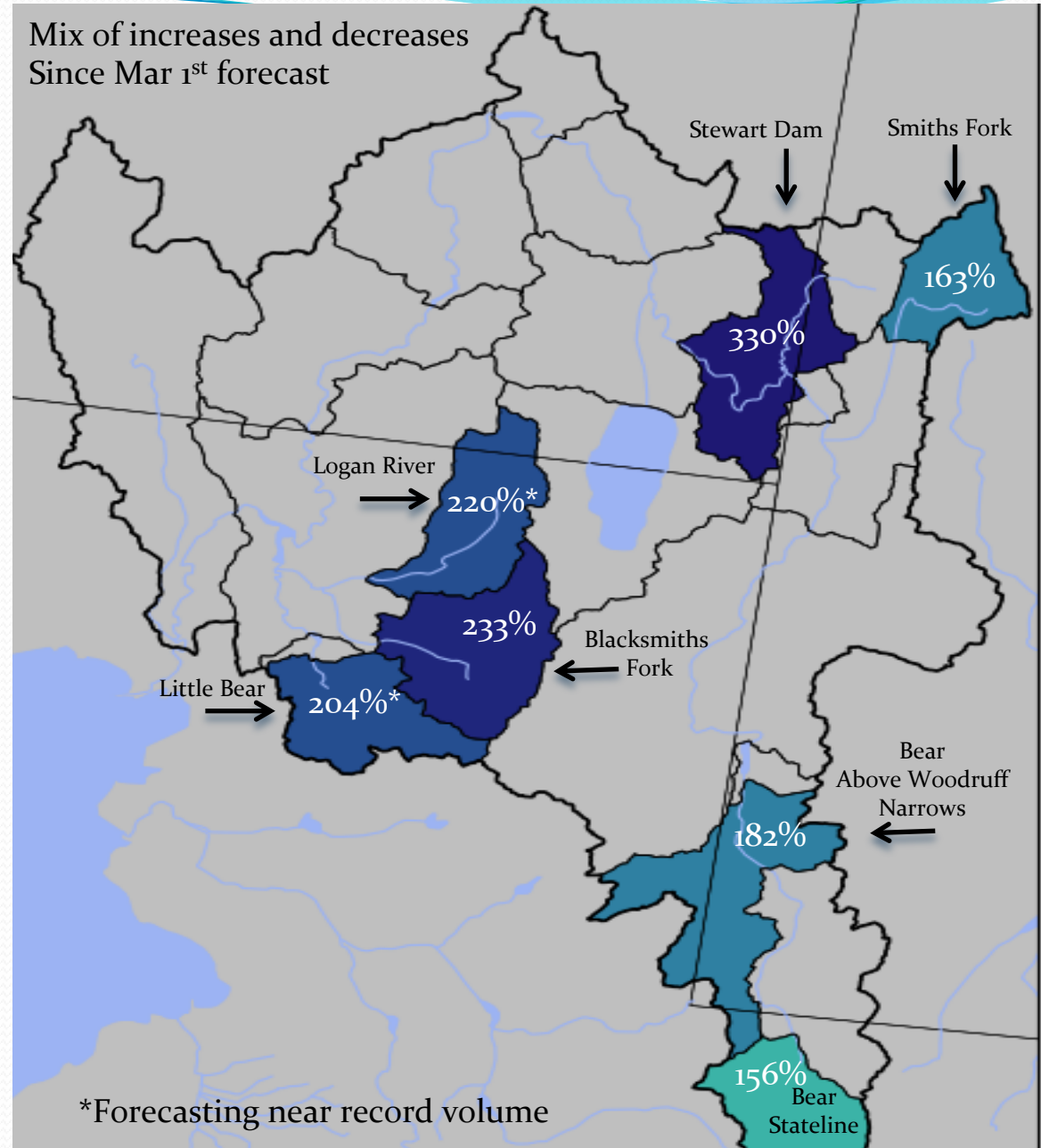
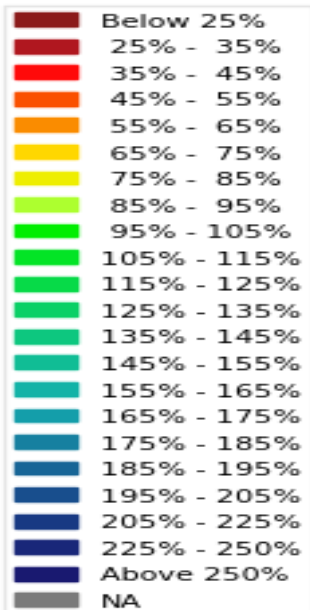
Previous April-July forecast volumes  
Some of that volume ended up in March  
Some April-July volumes decreased especially at  
lower elevation basins

Significant snow still remains in higher elevations  
Bear River Basin  
Weber River Basin  
Provo River Basin  
Little and Big Cottonwood Creek Basins

# April 1<sup>st</sup> Water Supply Forecasts – Bear River Basin

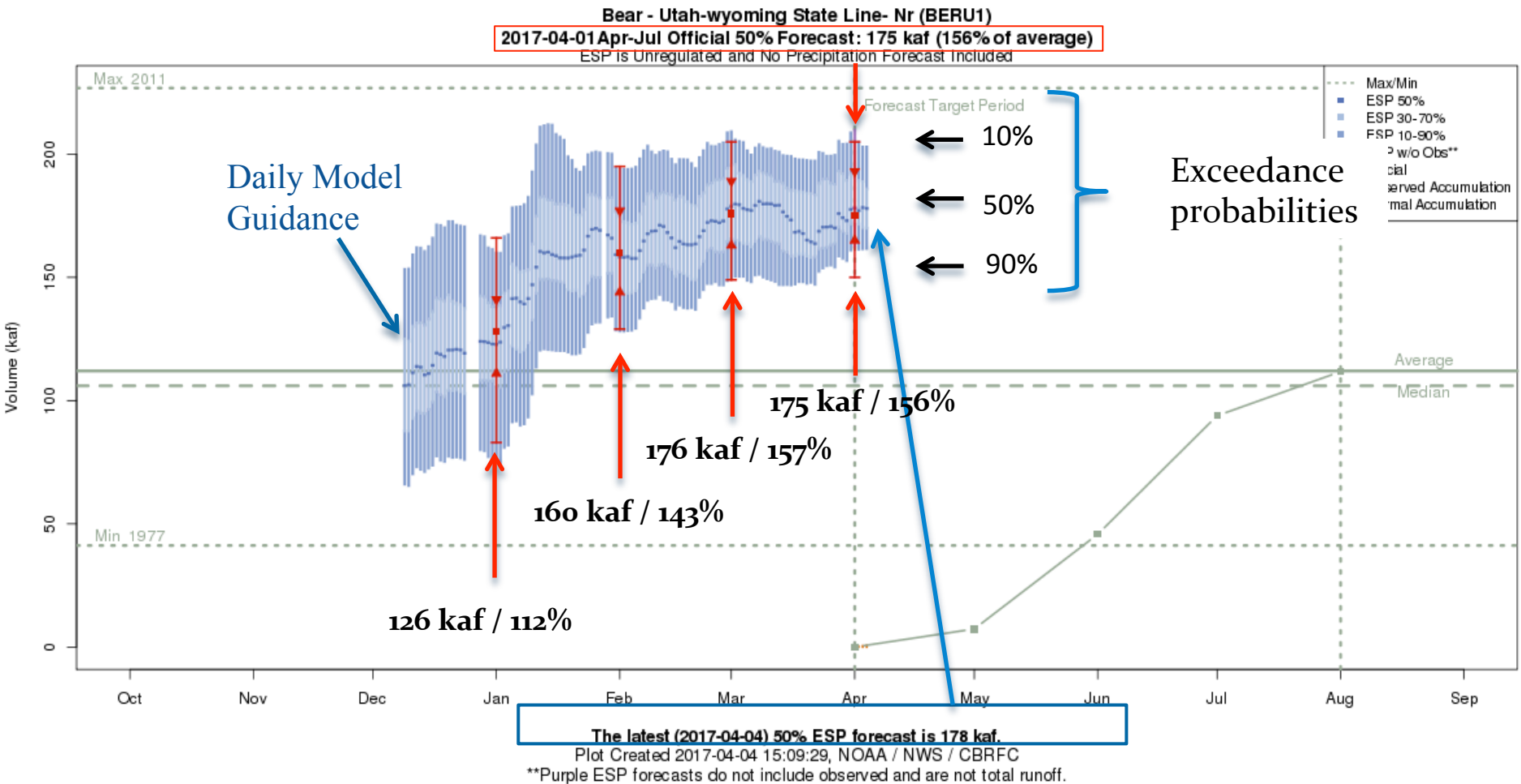


April-July  
Forecast  
Streamflow Volumes  
(% of 1981-2010 average)



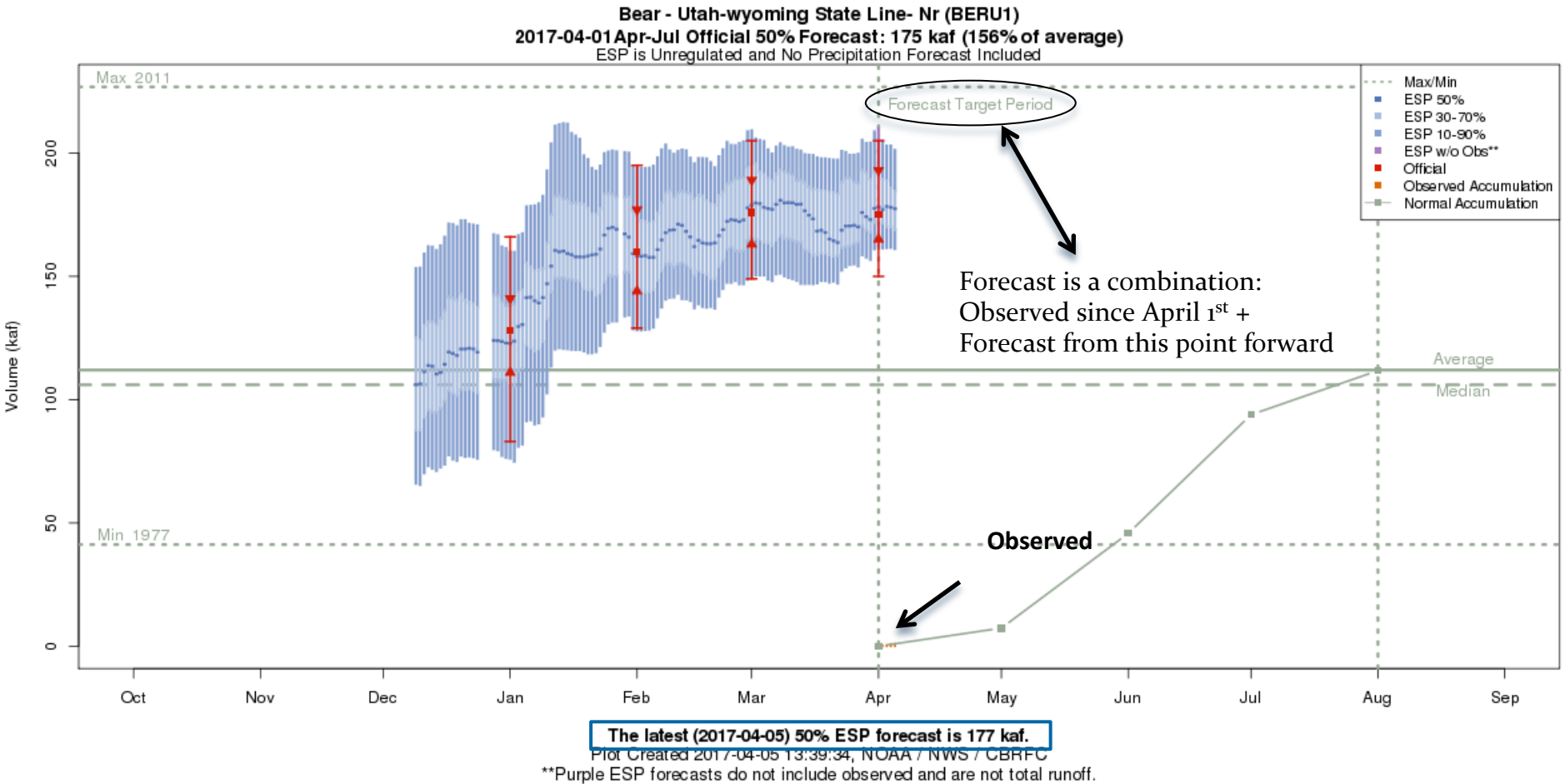


# Forecast Evolution Plot – Bear River @ Utah/Wyoming Stateline

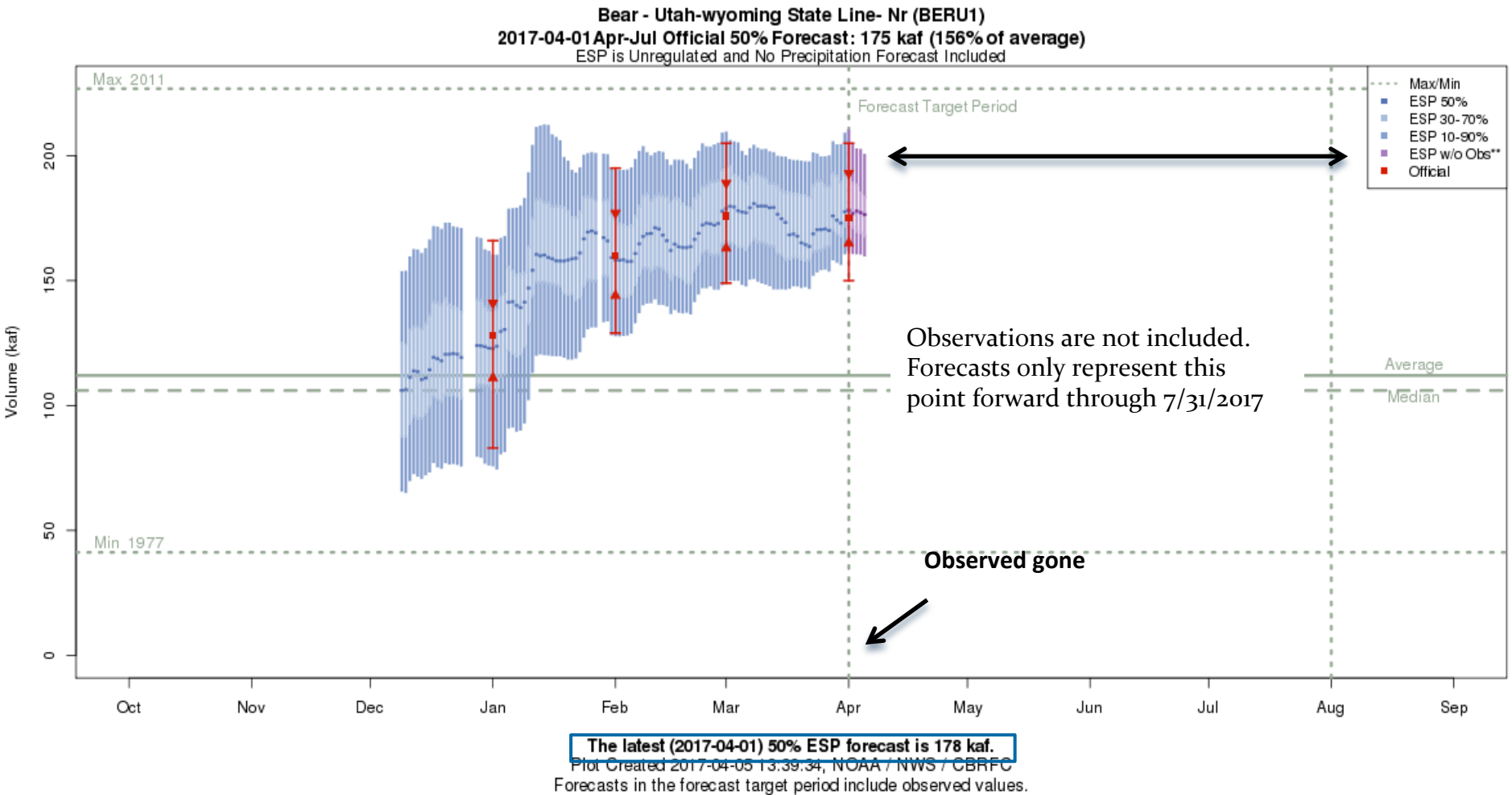


Plots are available at: <https://www.cbrfc.noaa.gov>  
Select WATER SUPPLY from the top menu  
Click on desired location for pop-up, click again for full screen

# Forecast Evolution Plot – Bear River @ Utah/Wyoming Stateline

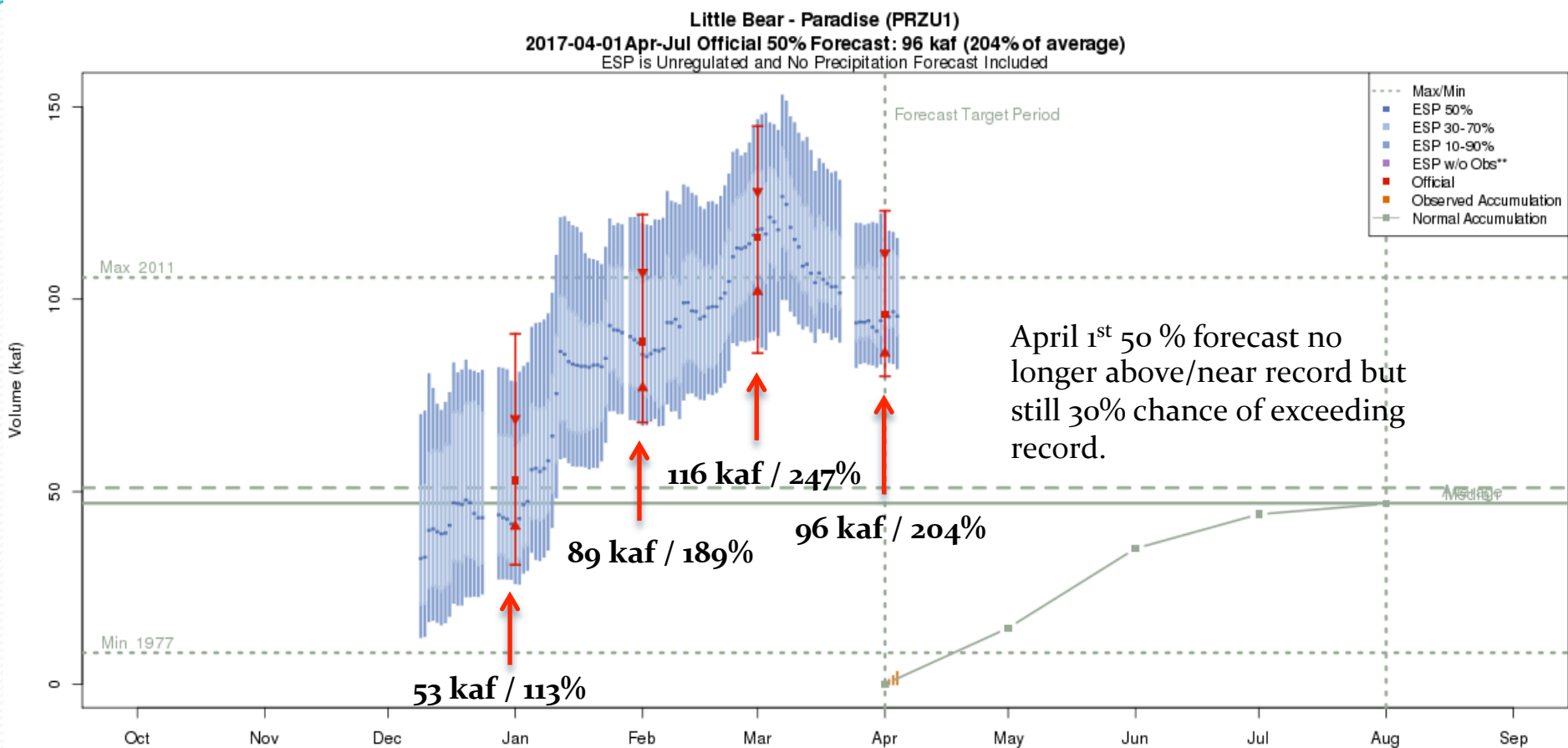


# Forecast Evolution Plot – Bear River @ Utah/Wyoming Stateline



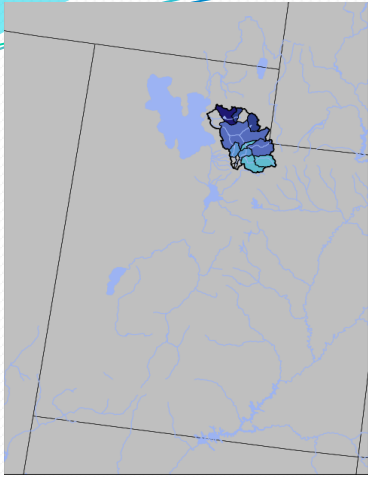


# Forecast Evolution Plot – Little Bear at Paradise

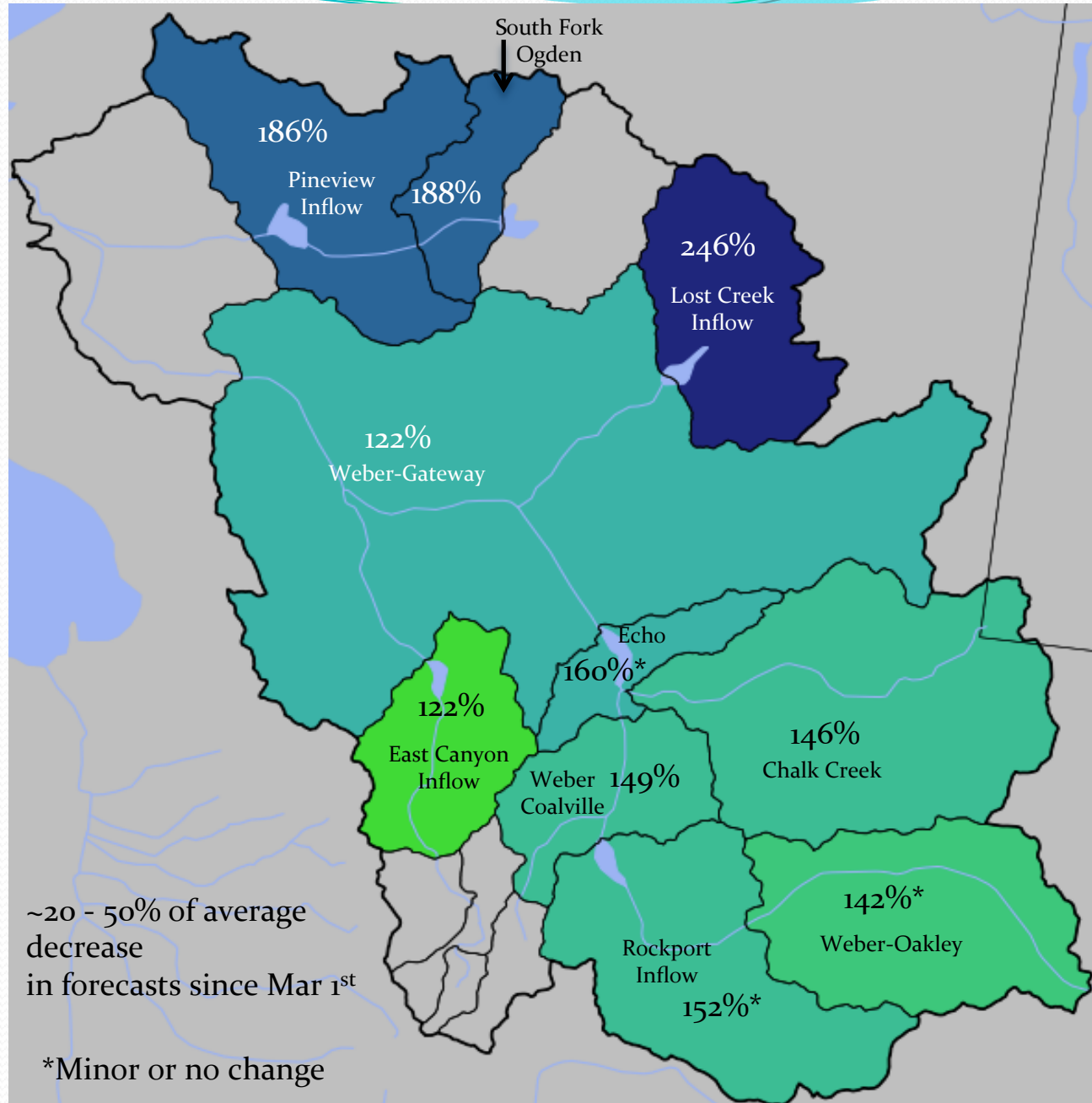
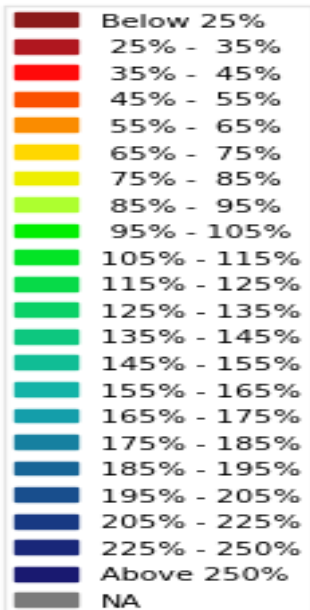


The latest (2017-04-04) 50% ESP forecast is 96 kaf.  
Plot Created 2017-04-04 15:10:39, NOAA / NWS / CBRFC  
\*\*Purple ESP forecasts do not include observed and are not total runoff.

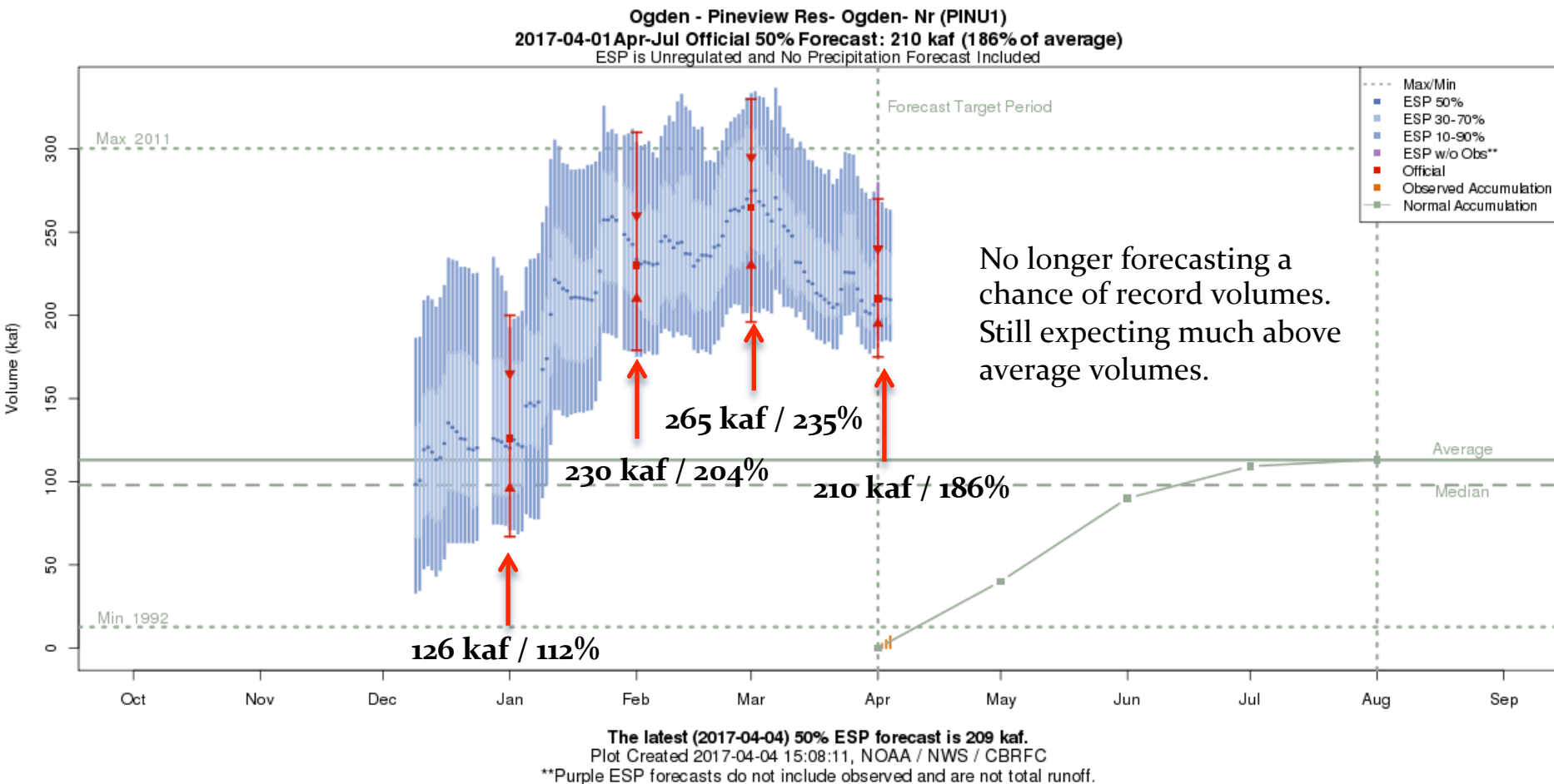
# April 1<sup>st</sup> Water Supply Forecasts – Weber River Basin



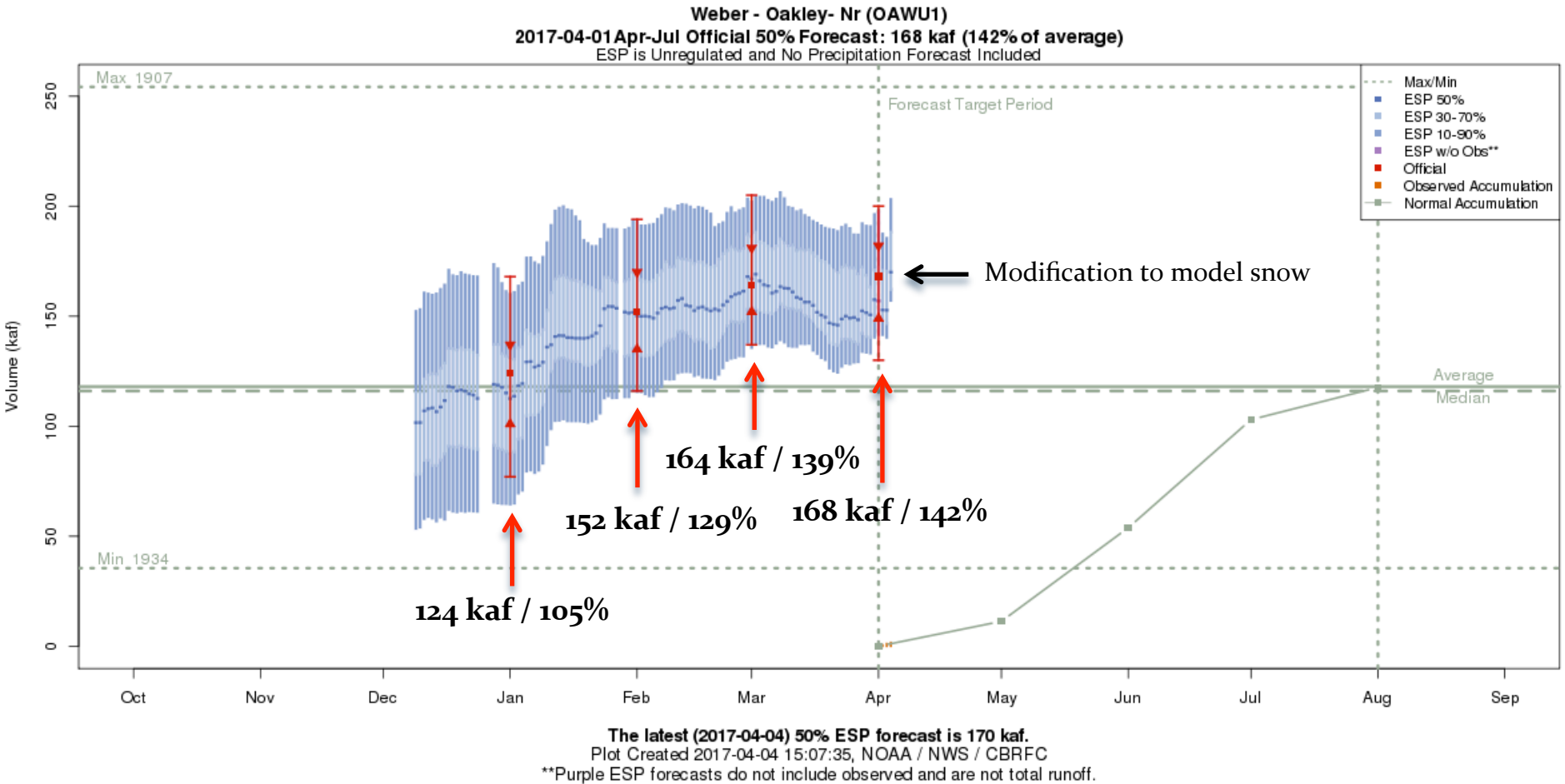
April-July Forecast  
Streamflow Volumes  
(% of 1981-2010 average)



# Forecast Evolution Plot – Ogden near Pineview Reservoir

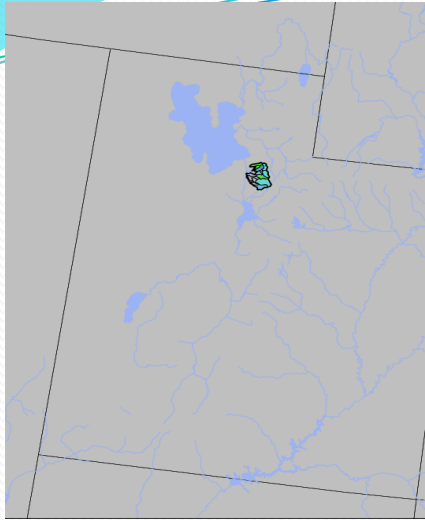


# Forecast Evolution Plot – Weber River near Oakley

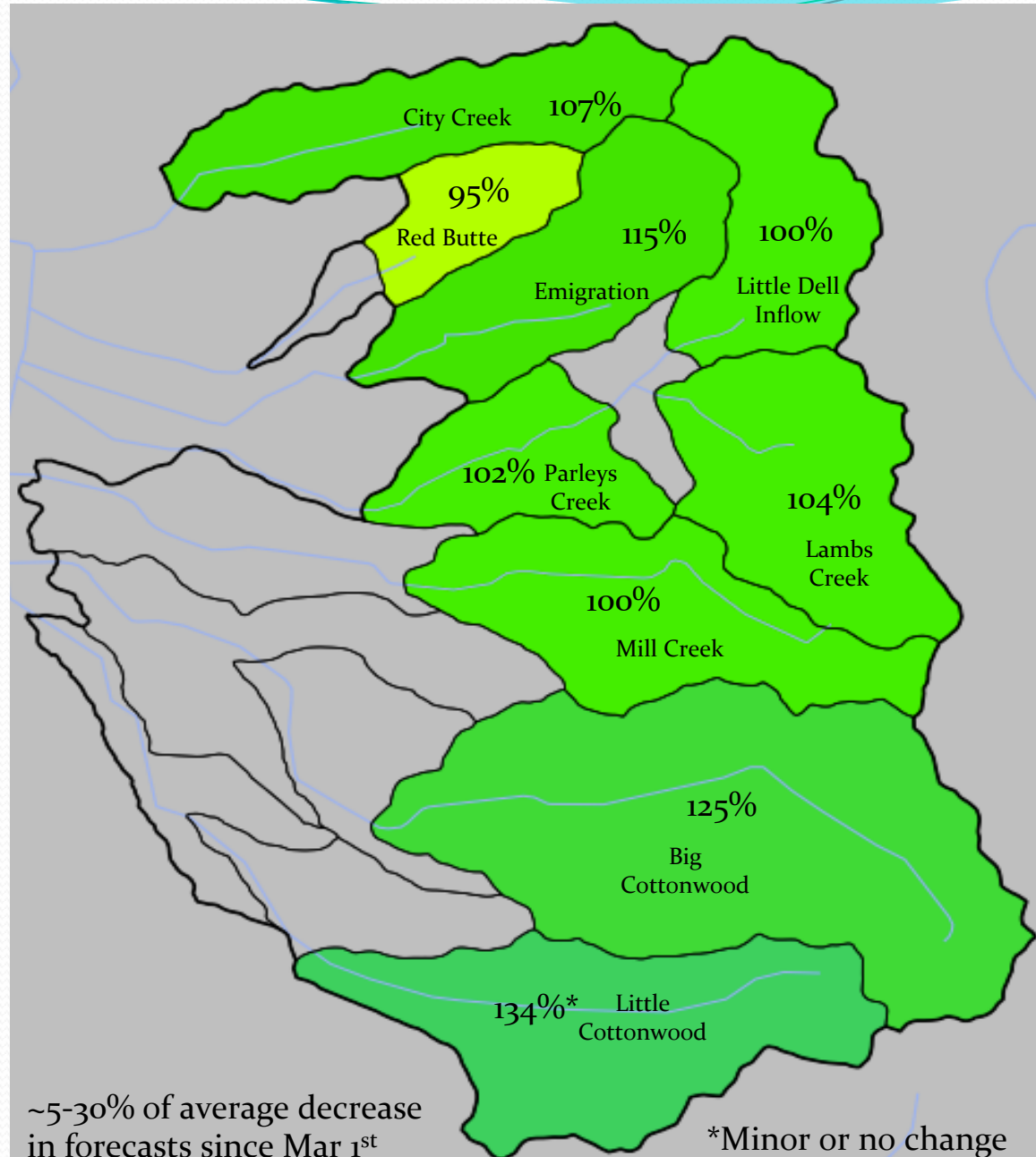
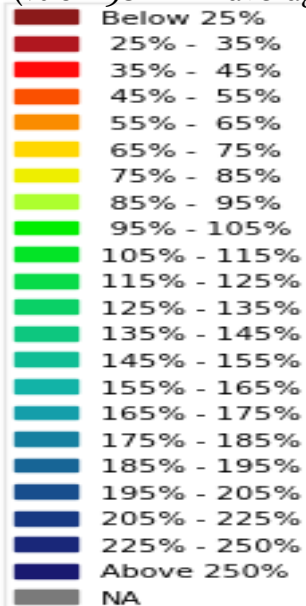




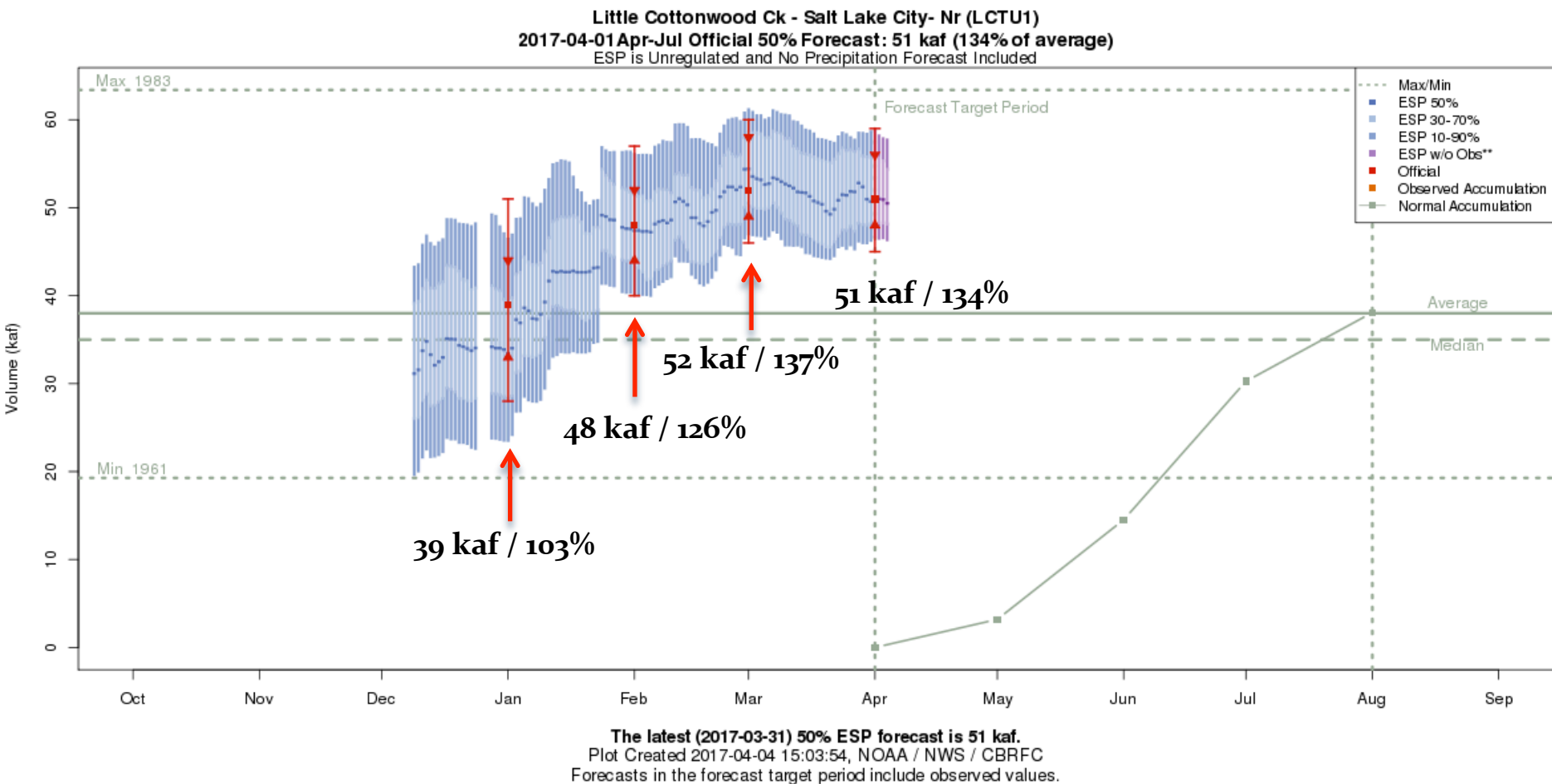
# April 1<sup>st</sup> Water Supply Forecasts – Six Creeks



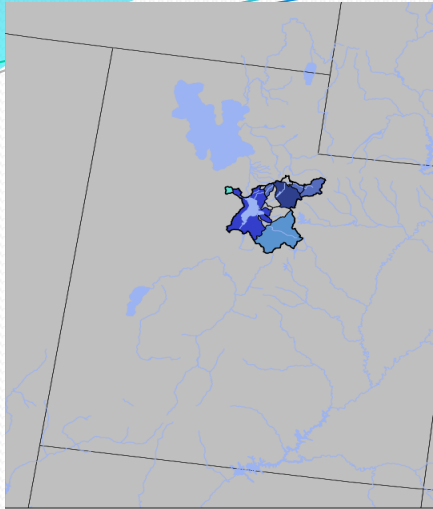
April-July  
Forecast  
Streamflow Volumes  
(% of 1981-2010 average)



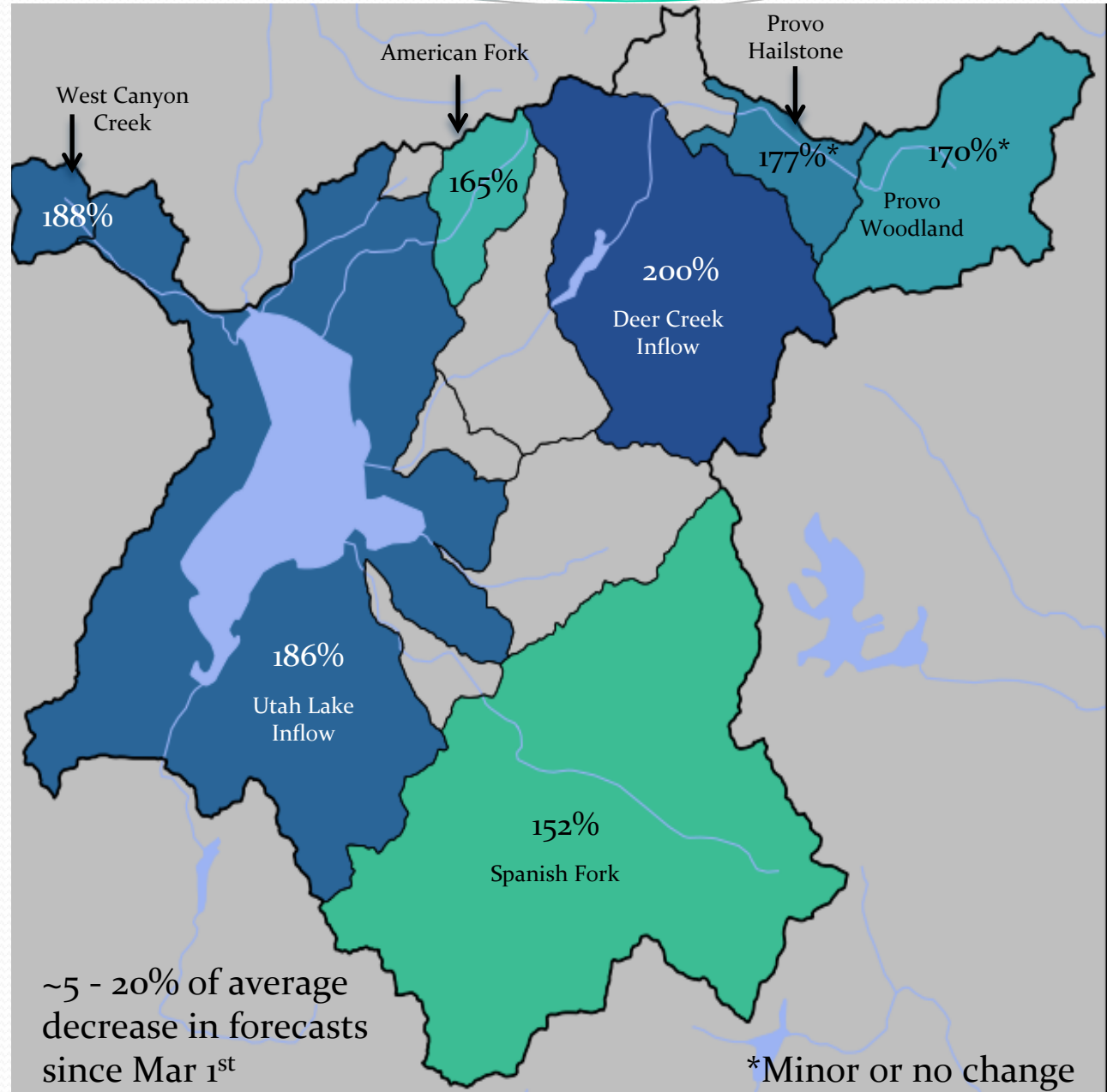
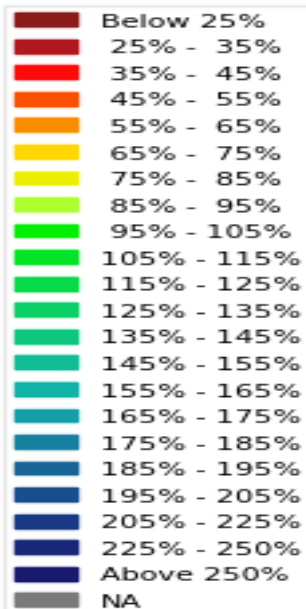
# Forecast Evolution Plot – Little Cottonwood Creek



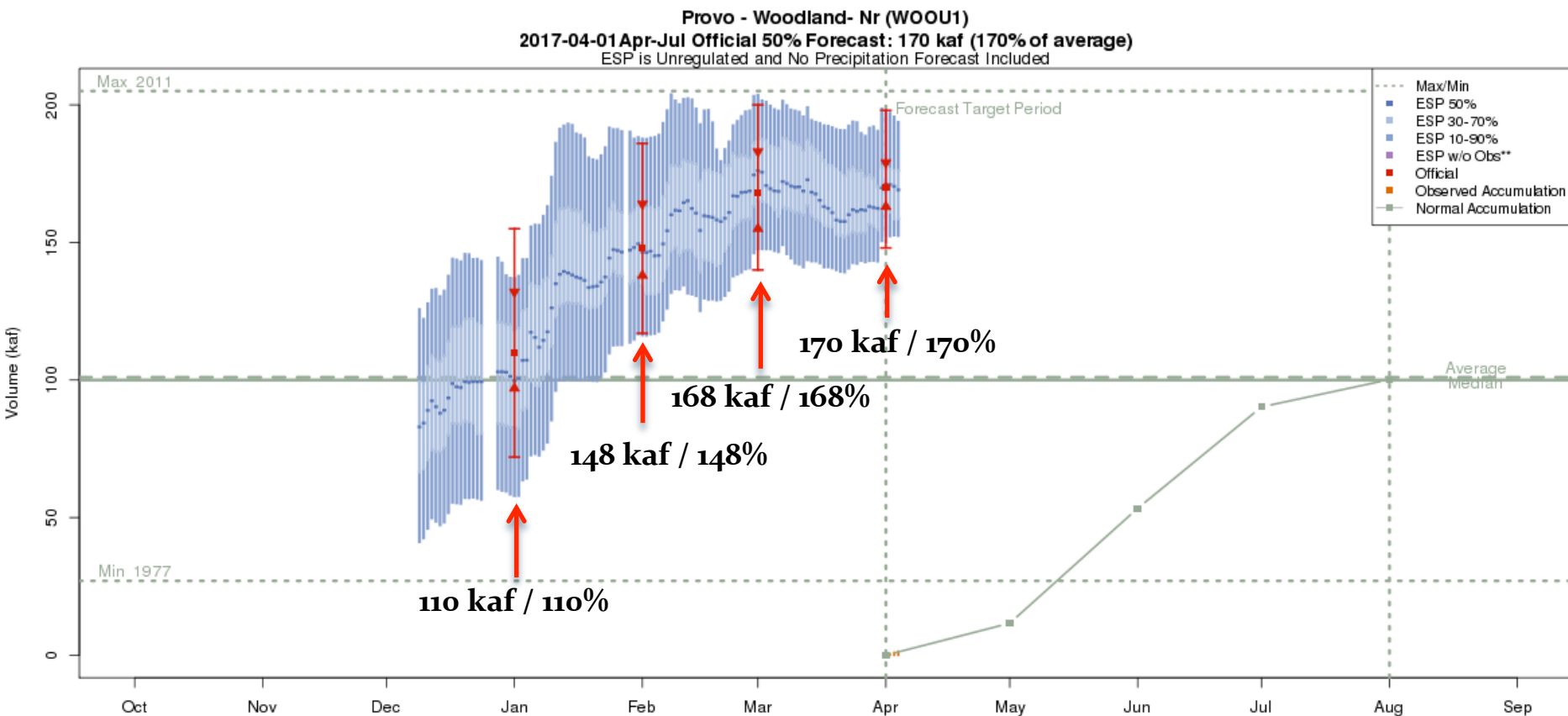
# April 1<sup>st</sup> Water Supply Forecasts – Provo River / Utah Lake



April-July  
Forecast  
Streamflow Volumes  
(% of 1981-2010 average)



# Forecast Evolution Plot – Provo River near Woodland



The latest (2017-04-04) 50% ESP forecast is 169 kaf.  
Plot Created 2017-04-04 15:01:40, NOAA / NWS / CBRFC  
\*\*Purple ESP forecasts do not include observed and are not total runoff.



# Forecast Validation: How good are forecasts in April?

## Historical Model Error 1981-2010

Decrease in model error from March to April forecasts

Forecasts are better than just going with average

Primary sources of error from this point forward:

- Extreme weather (wet or dry)

- Correct model representation of snowpack

- Saturated lower elevations (near model max)

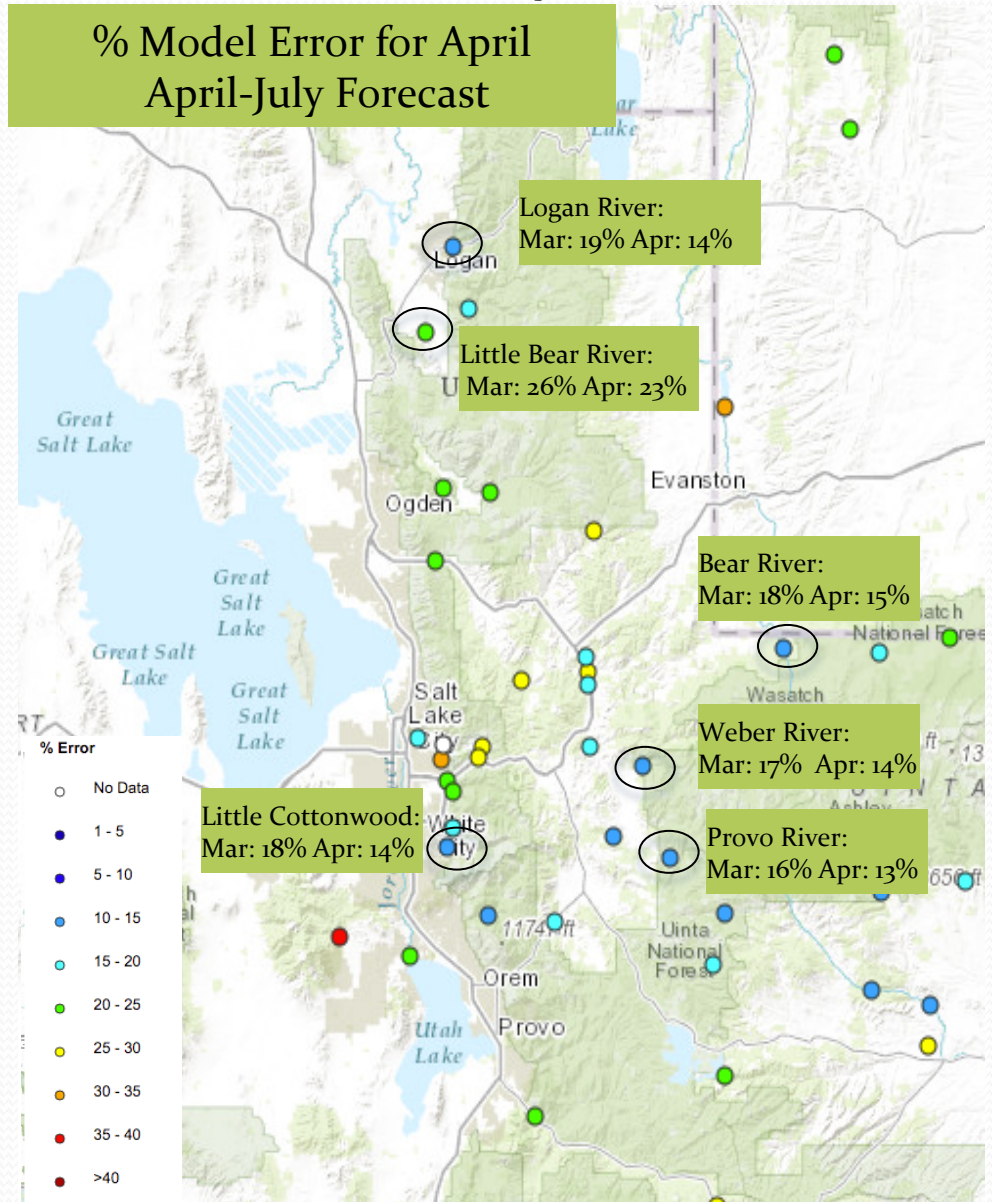
Map is available at:

<https://www.cbrfc.noaa.gov/arc/verif/verif.php>

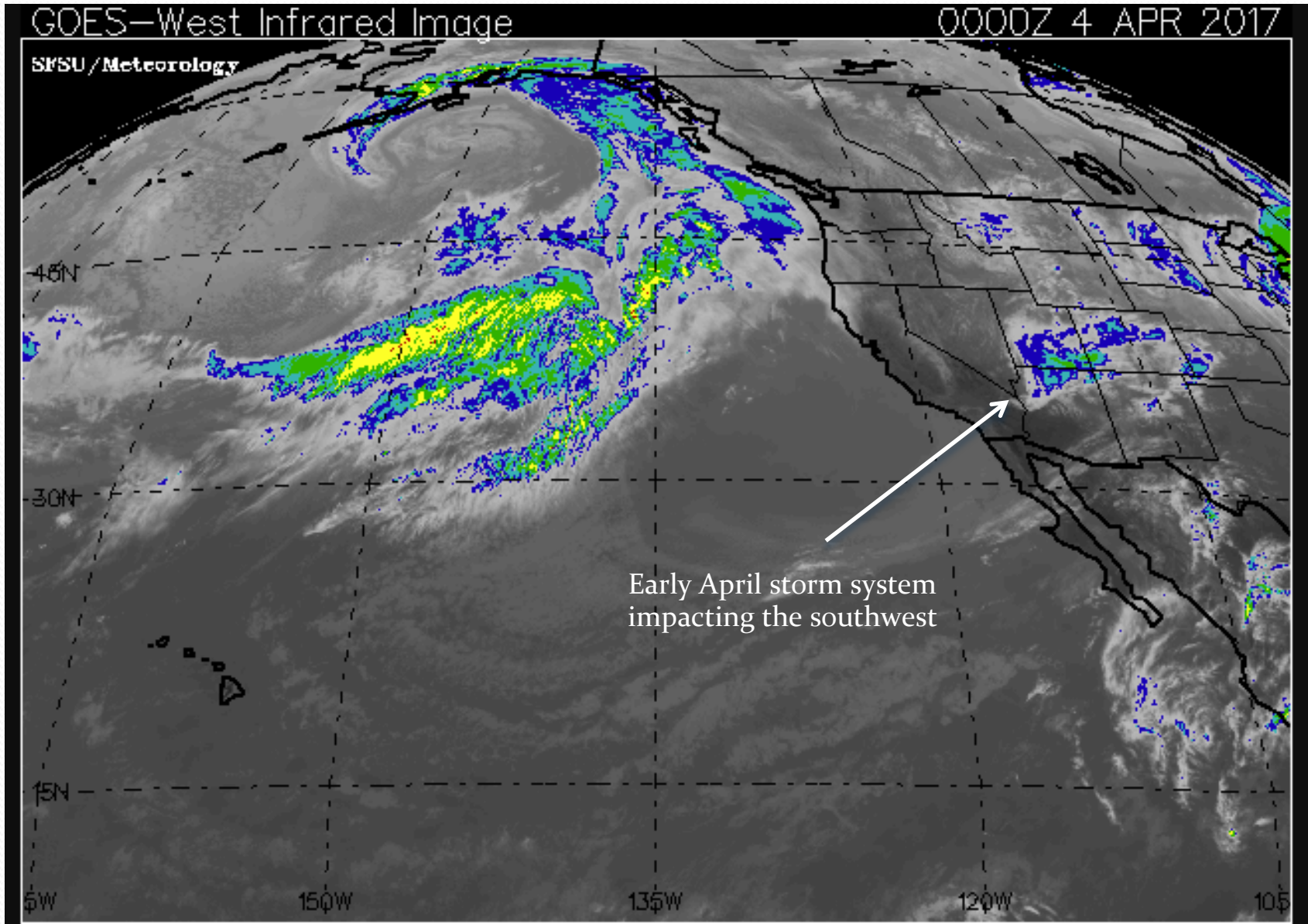
From Water Supply drop down menu  
→ select Historical Verification Map

## Historical Water Supply Verification - April

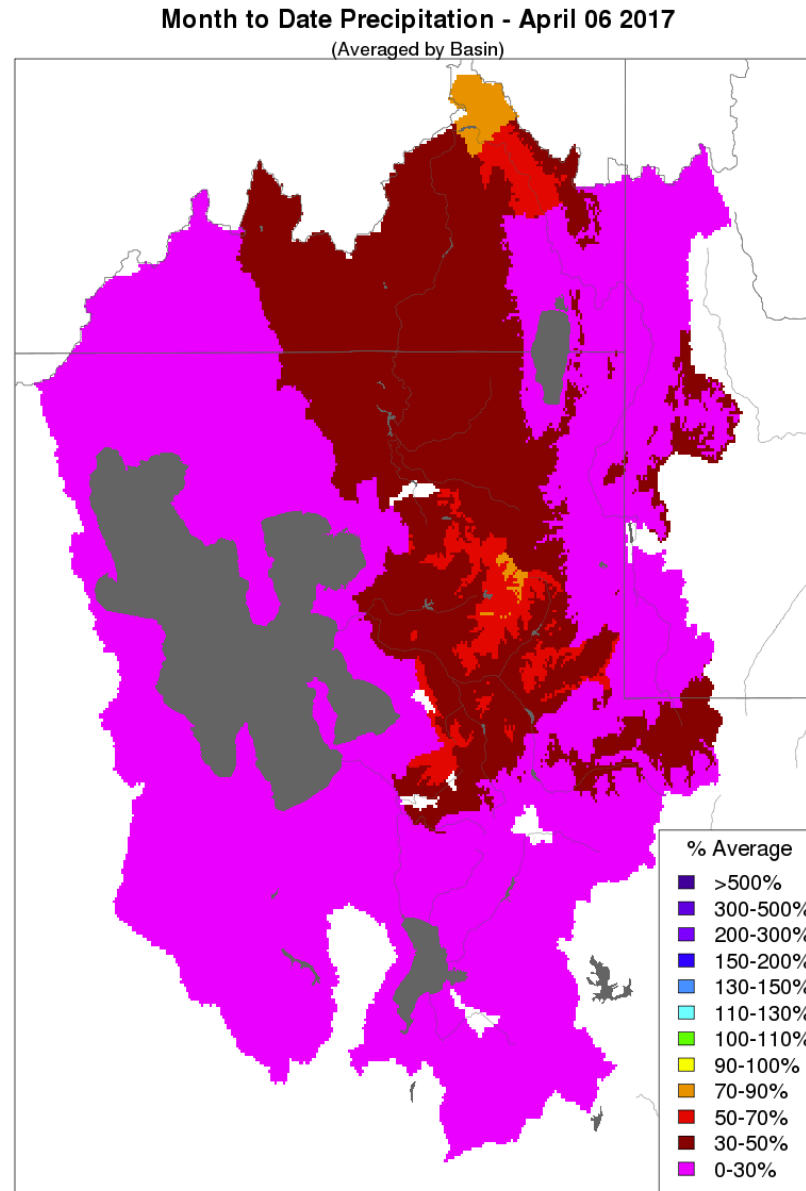
### % Model Error for April April-July Forecast



# April Weather: Precipitation so far....



# April Weather: Precipitation so far....

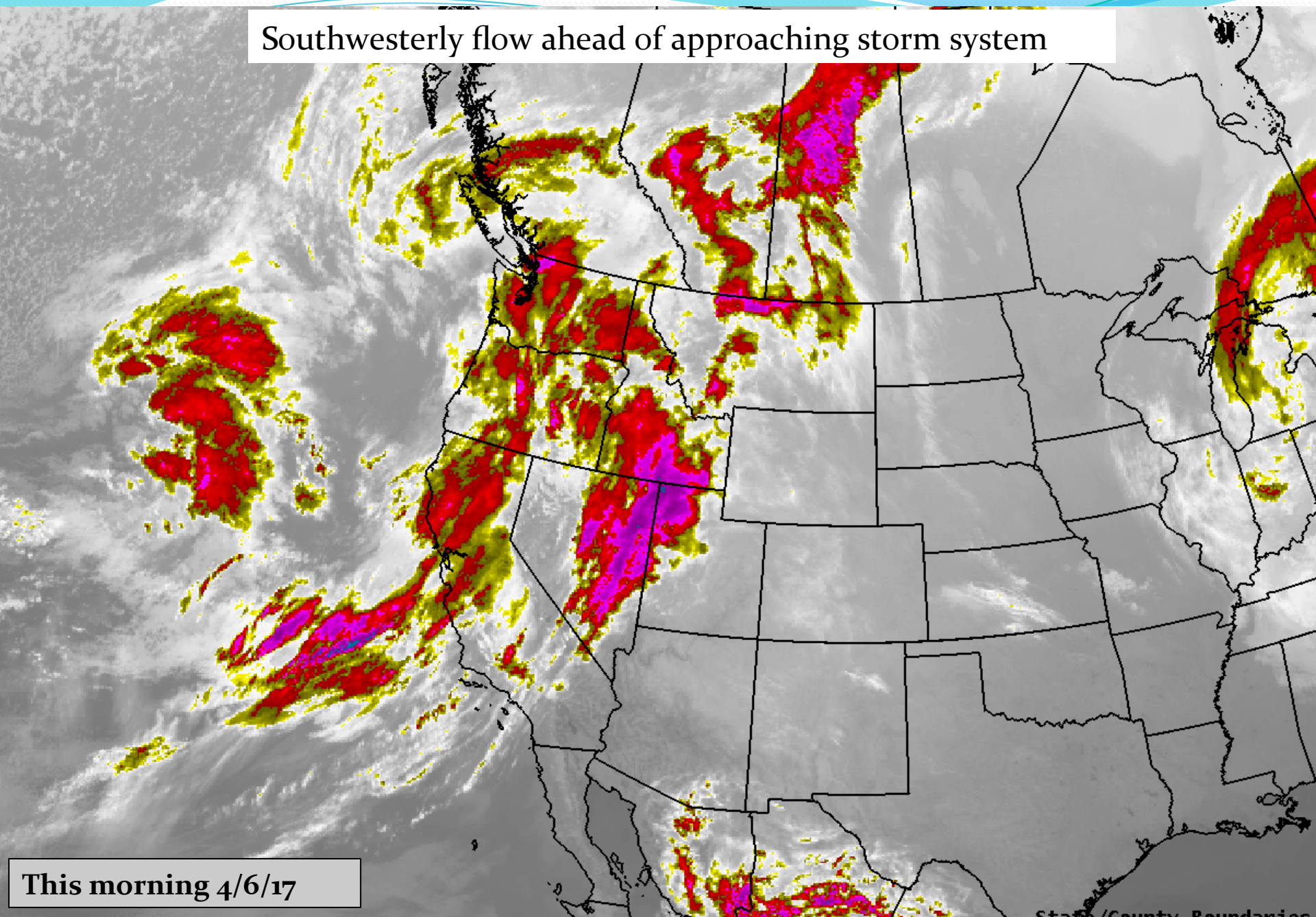


Prepared by NOAA, Colorado Basin River Forecast Center  
Salt Lake City, Utah, [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)



# Upcoming Weather and Impacts to Water Supply Forecasts

Southwesterly flow ahead of approaching storm system



This morning 4/6/17

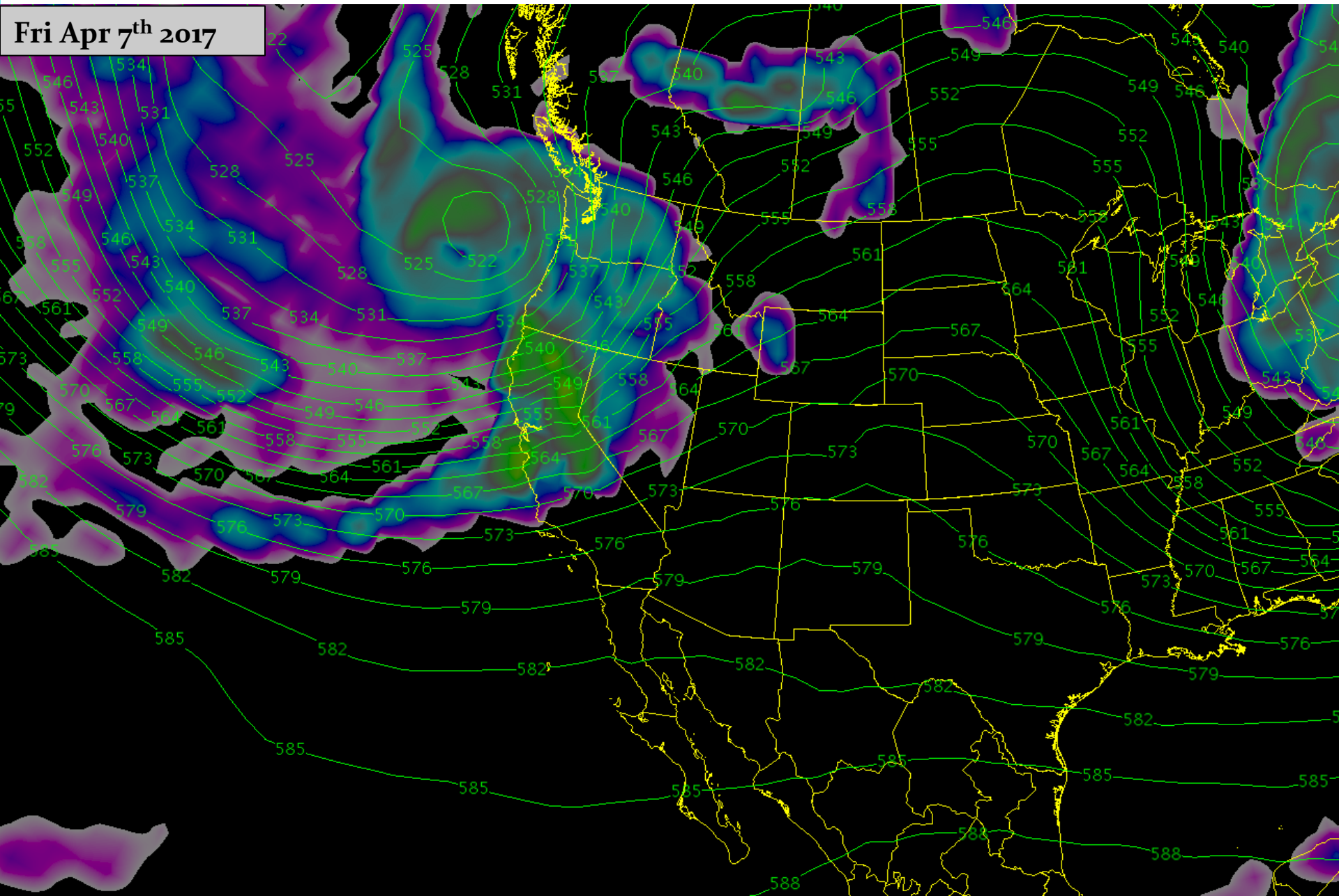
State/County Boundaries



# Upcoming Weather and Impacts to Water Supply Forecasts

Mild southwest flow ahead of weekend storm system. Temperatures 8-10 degrees above average.

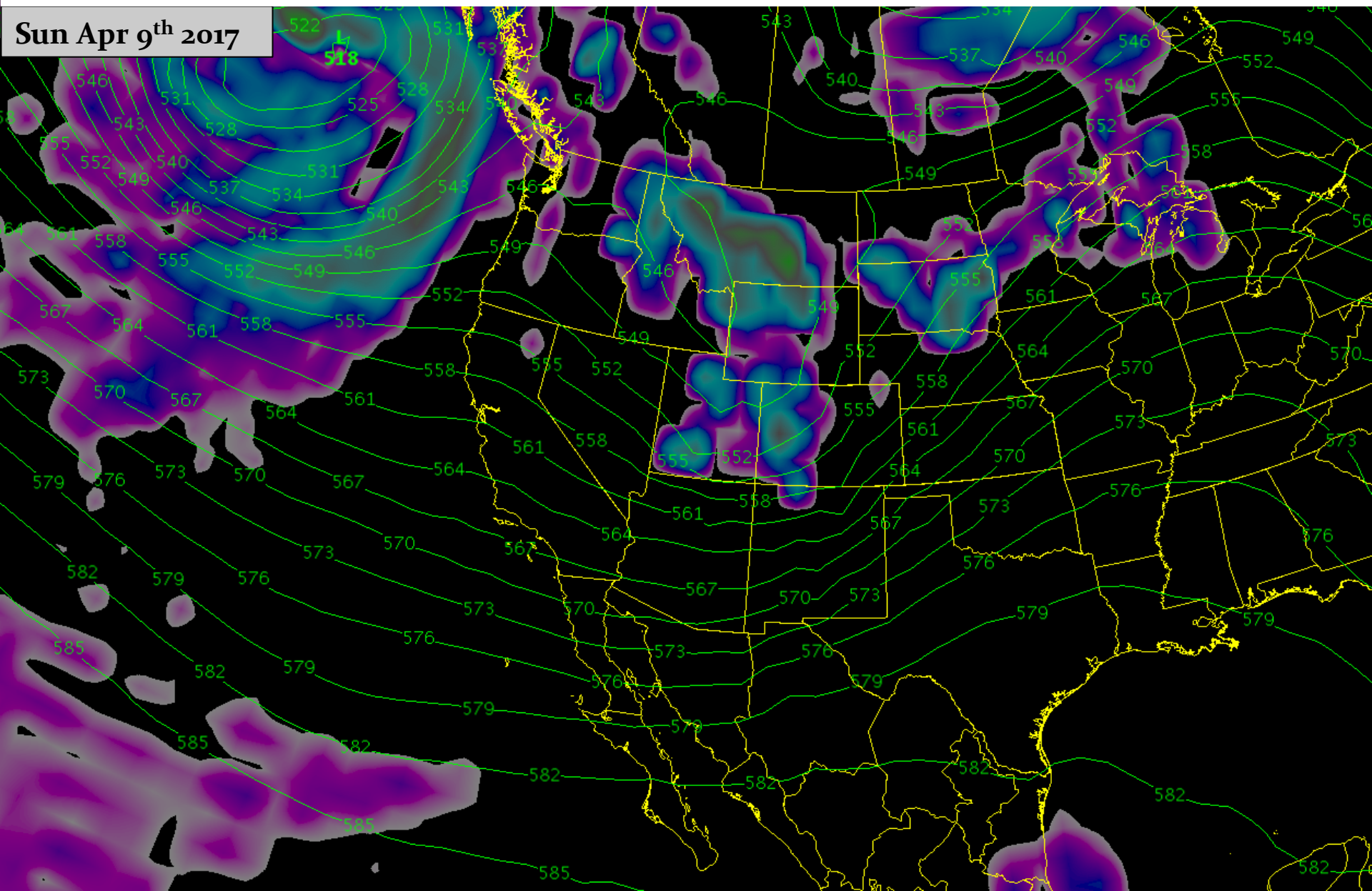
**Fri Apr 7<sup>th</sup> 2017**



# Upcoming Weather and Impacts to Water Supply Forecasts

The first in a series of spring storms moves through the area. Precipitation amounts up to 1 inch in the Colorado River Basin, higher amounts in the 1-3 inch range possible northern Great Basin. Temps 5-15 degrees below avg.

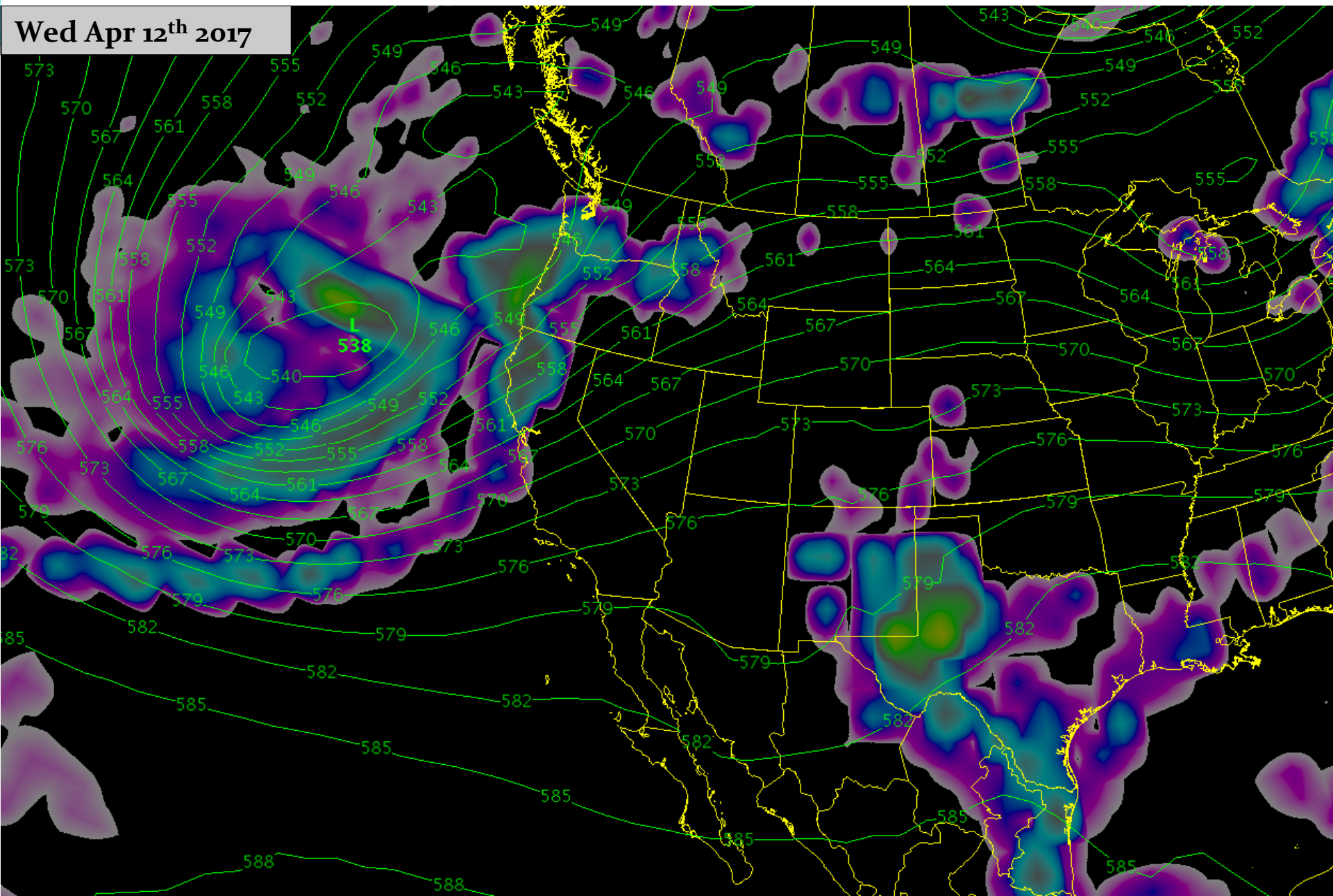
**Sun Apr 9<sup>th</sup> 2017**



# Upcoming Weather and Impacts to Water Supply Forecasts

Dry and mild conditions return midweek ahead of the next storm system. Temperatures 8-10 degrees above average

**Wed Apr 12<sup>th</sup> 2017**

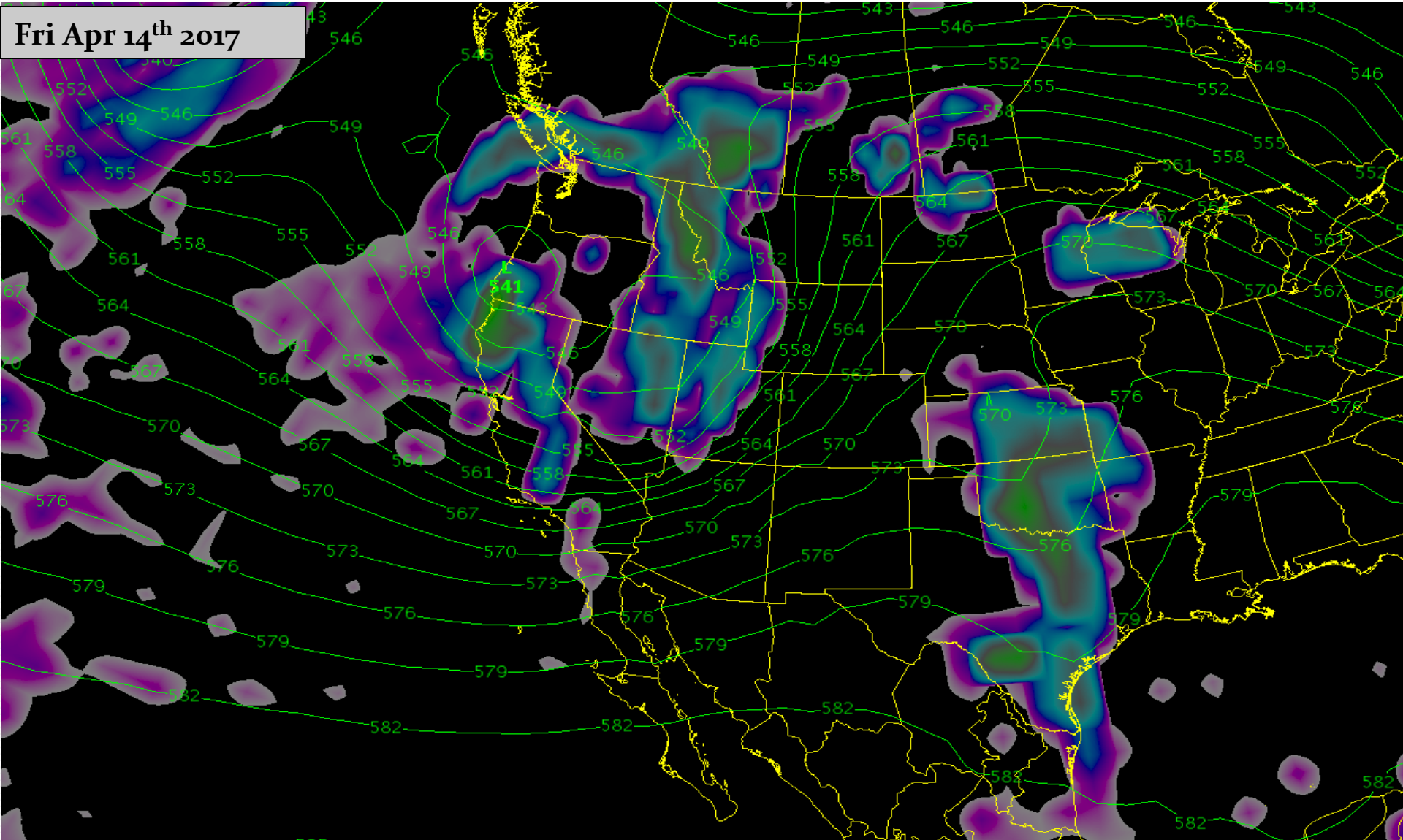




# Upcoming Weather and Impacts to Water Supply Forecasts

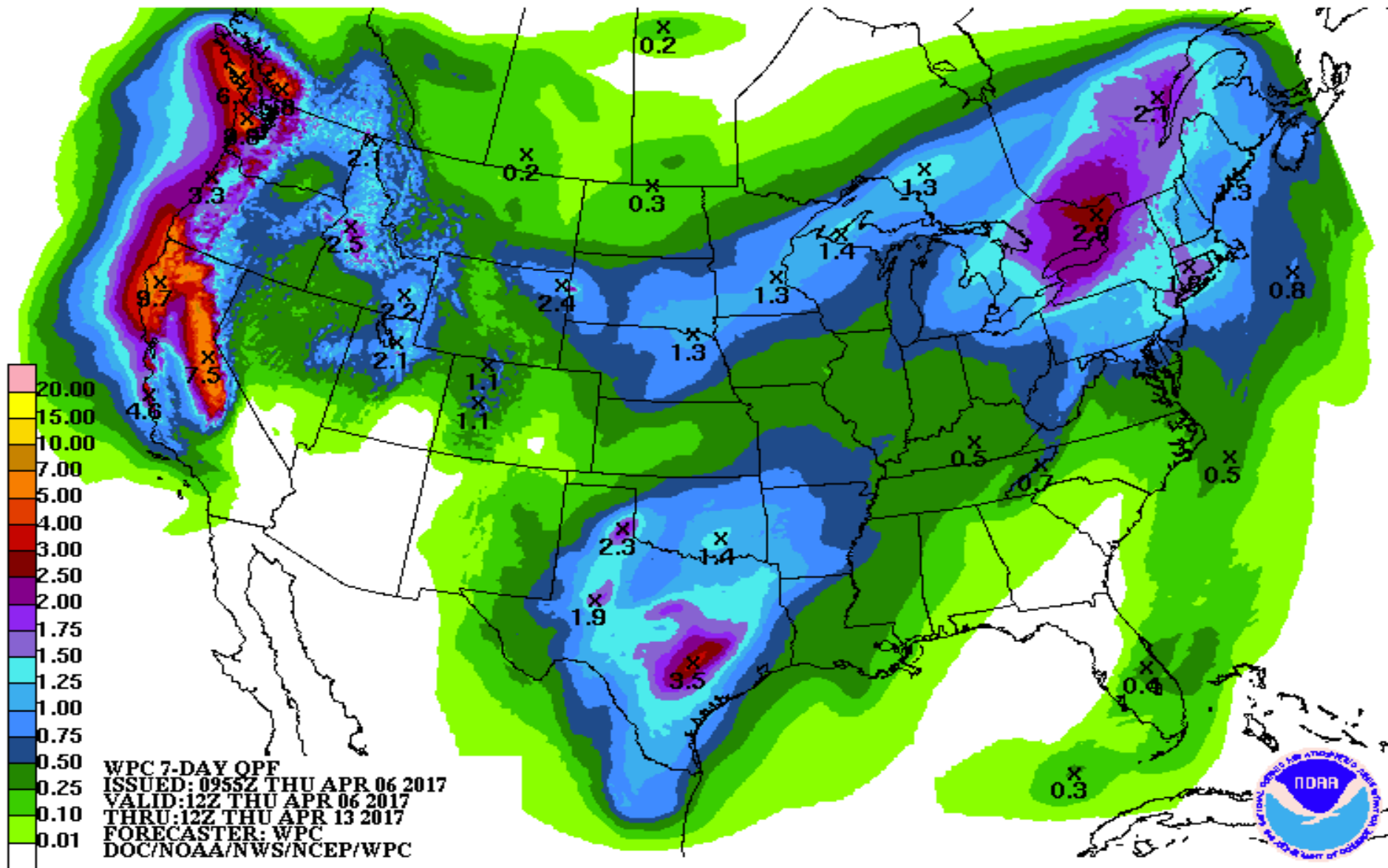
Possibly another ruined weekend as another storm system moves into the area. Models suggest storm center may lift north of us with impacts primarily to the northern Great Basin and Green River Basin (WY).

Long range guidance suggests an active weather pattern & additional storms through at least the 3<sup>rd</sup> week of April.



# Upcoming Weather and Impacts to Water Supply Forecasts

Precipitation Forecast: 7 day total (Apr 6<sup>th</sup>-Apr 13<sup>th</sup>), most associated with this weekends storm





# Key Points

March was another warm month that resulted in significant snowmelt and record runoff in many areas. Some of the April-July volumes from previous forecasts moved into March. As a result, April-July forecast volumes decreased in most locations.

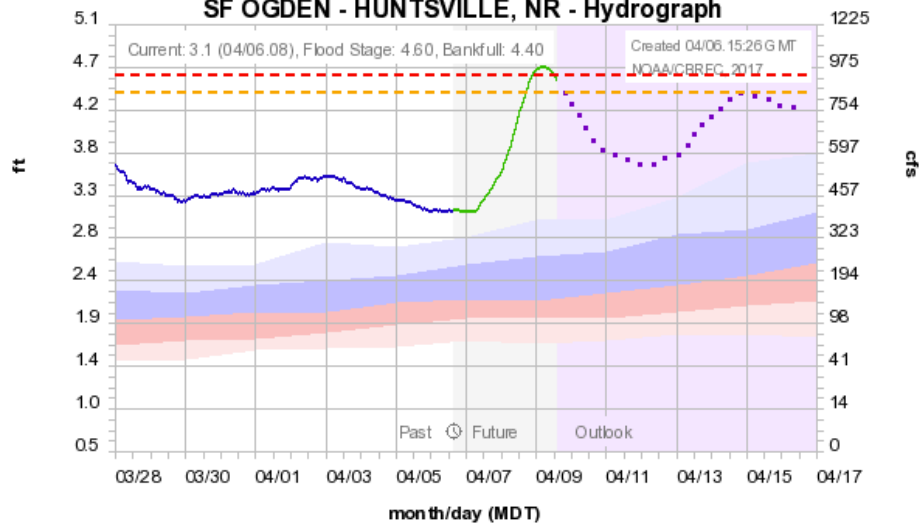
March was beneficial in reducing (not eliminating) flood threats by removing a large low elevation snowpack. However, saturated soil conditions exist in many areas which has and will most likely continue to result in efficient runoff response to rain and additional snowmelt

Significant snow still exists at the higher elevations in the Bear, Weber and Provo River basins. Significant runoff volumes are anticipated in these areas.

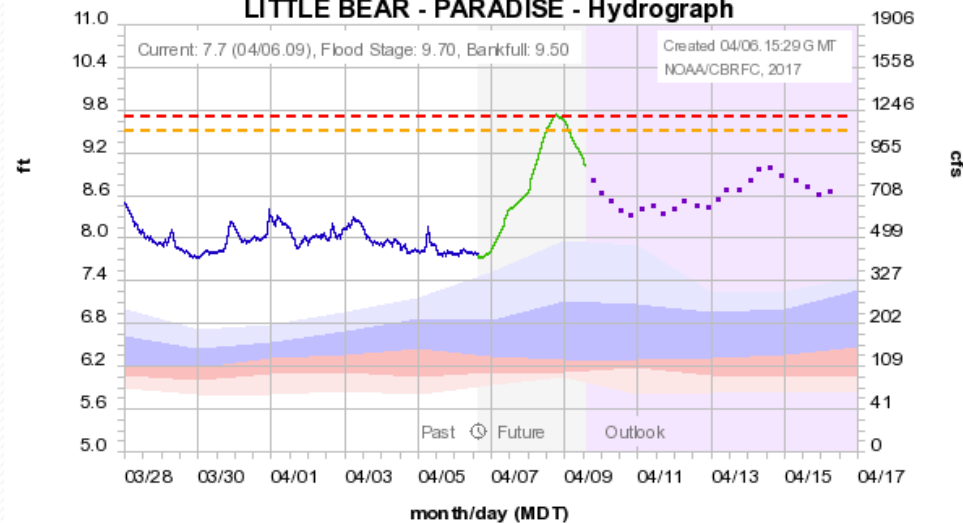
At this time April looks active with a series of storms and dry/warm periods in-between. Short term impacts to existing water supply forecasts will probably be minimal. Rain events may become a concern as streams rise due to snowmelt throughout the month.

# Possible minor flooding at a few locations this weekend...

Colorado Basin River Forecast Center  
SF OGDEN - HUNTSVILLE, NR - Hydrograph

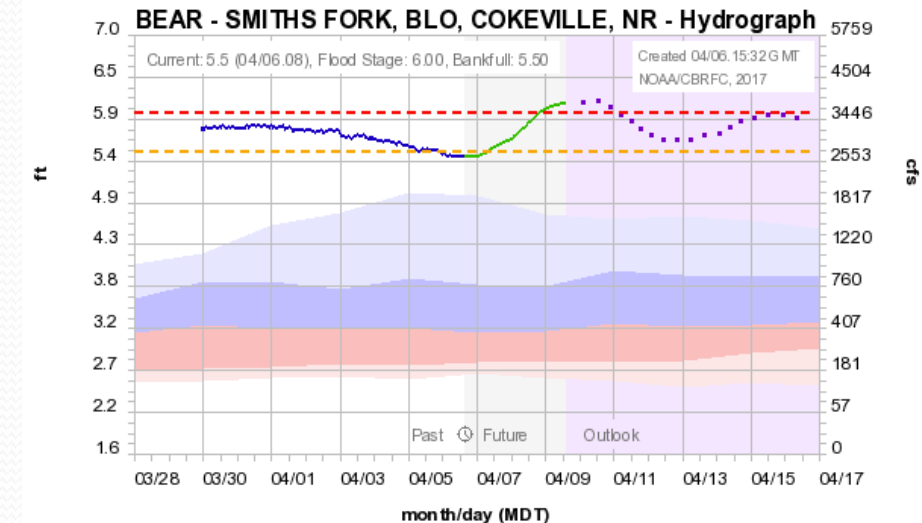


Colorado Basin River Forecast Center  
LITTLE BEAR - PARADISE - Hydrograph



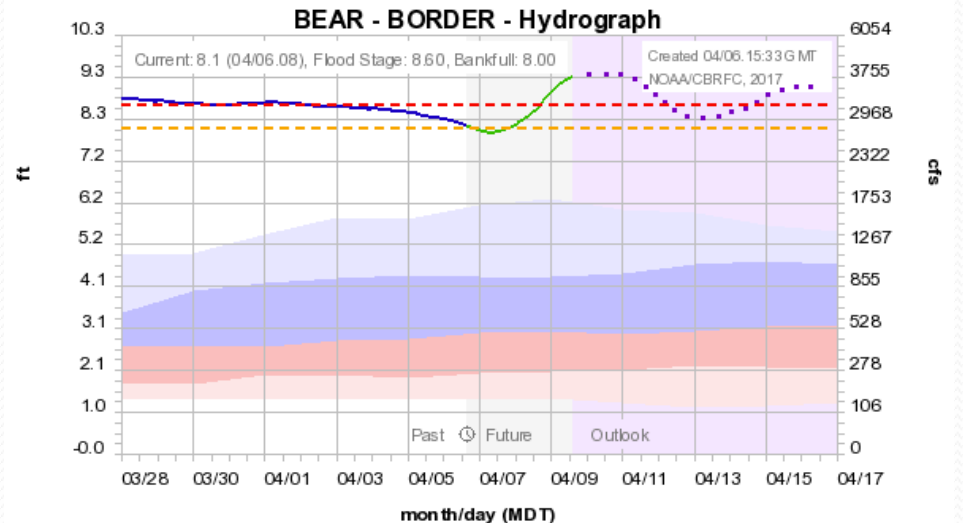
Colorado Basin River Forecast Center

BEAR - SMITHS FORK, BLO, COKEVILLE, NR - Hydrograph



Colorado Basin River Forecast Center

BEAR - BORDER - Hydrograph



Daily deterministic forecasts available on the CBRFC web page: [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)

# 2017 Water Supply Briefing Schedule

- 2017 monthly water supply briefings for the Great Basin
  - Friday May 5<sup>th</sup> @ 1:30 pm MT
  - Colorado River Basin webinars are same dates at 11 am MT
- Peak flow briefing:
  - 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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