

# CBRFC February 2017 CUWCD Briefing

1pm February 6, 2017

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Senior Hydrologist

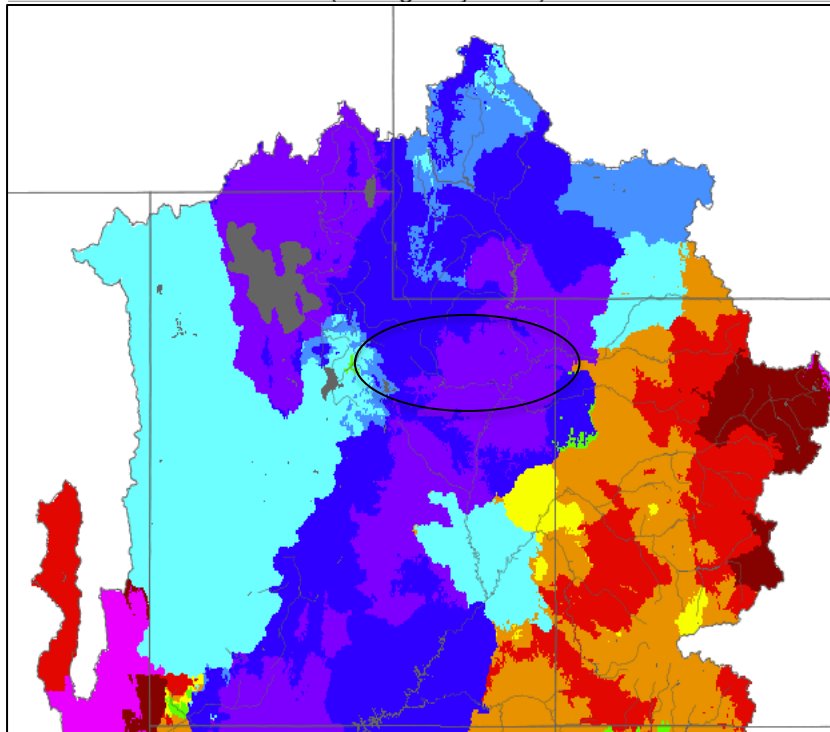
# Today's Presentation

- Fall weather impacts to water supply forecasts
- December-January weather/critical pattern change
- Current snowpack situation
- 2017 Water Supply Forecasts
- February forecasts-How good are they?
- Upcoming weather

# Fall Weather Impacts

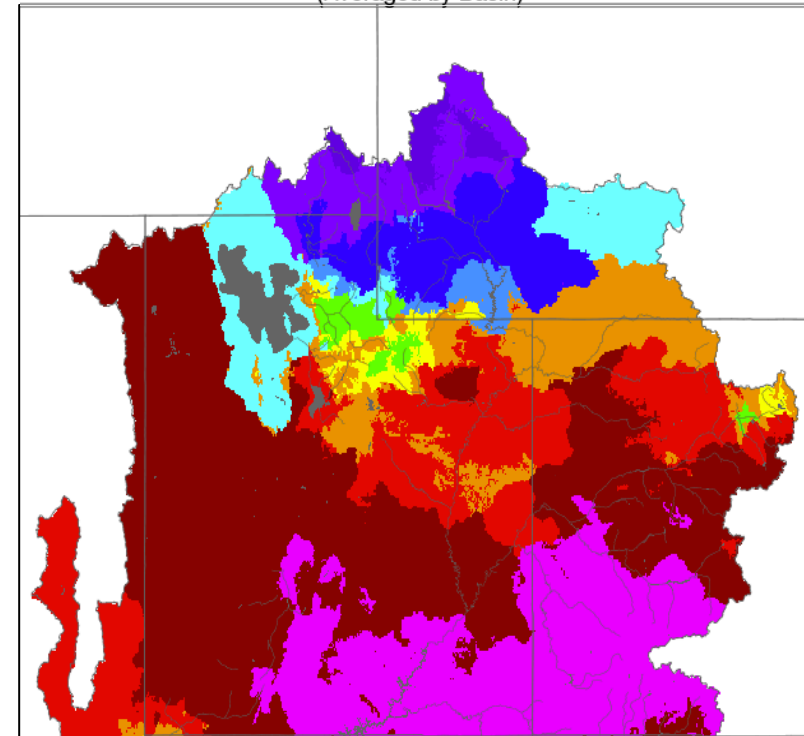
## September and October Monthly Precipitation

Monthly Precipitation - September 2016  
(Averaged by Basin)



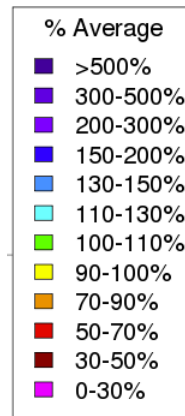
Duchesne: 200%  
Provo: 140%

Monthly Precipitation - October 2016  
(Averaged by Basin)



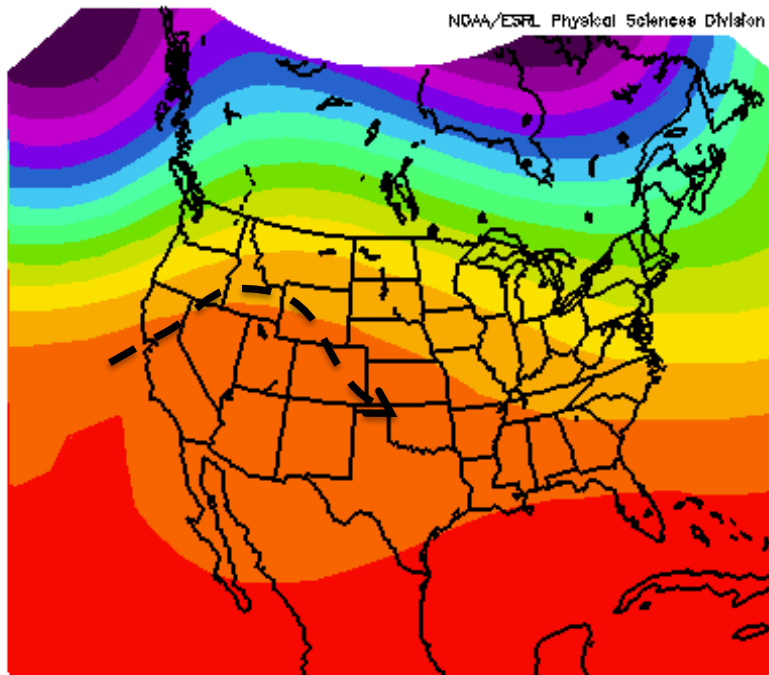
Duchesne: 85%  
Provo: 90%

*Provo and Duchesne headwaters and Upper Stillwater average or above average*



# Fall Weather Impacts

*November: Where precipitation did fall- it was rain*

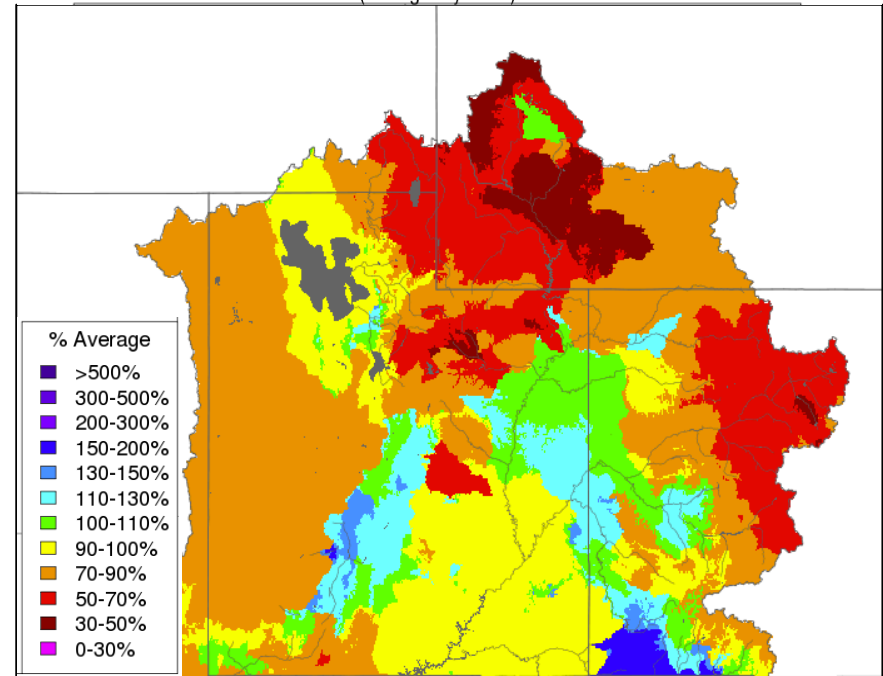


500mb Geopotential Heights (m) Composite Mean  
11/1/16 12z to 11/15/16 12z  
NCEP/NCAR Reanalysis

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



Monthly Precipitation - November 2016  
(Averaged by Basin)



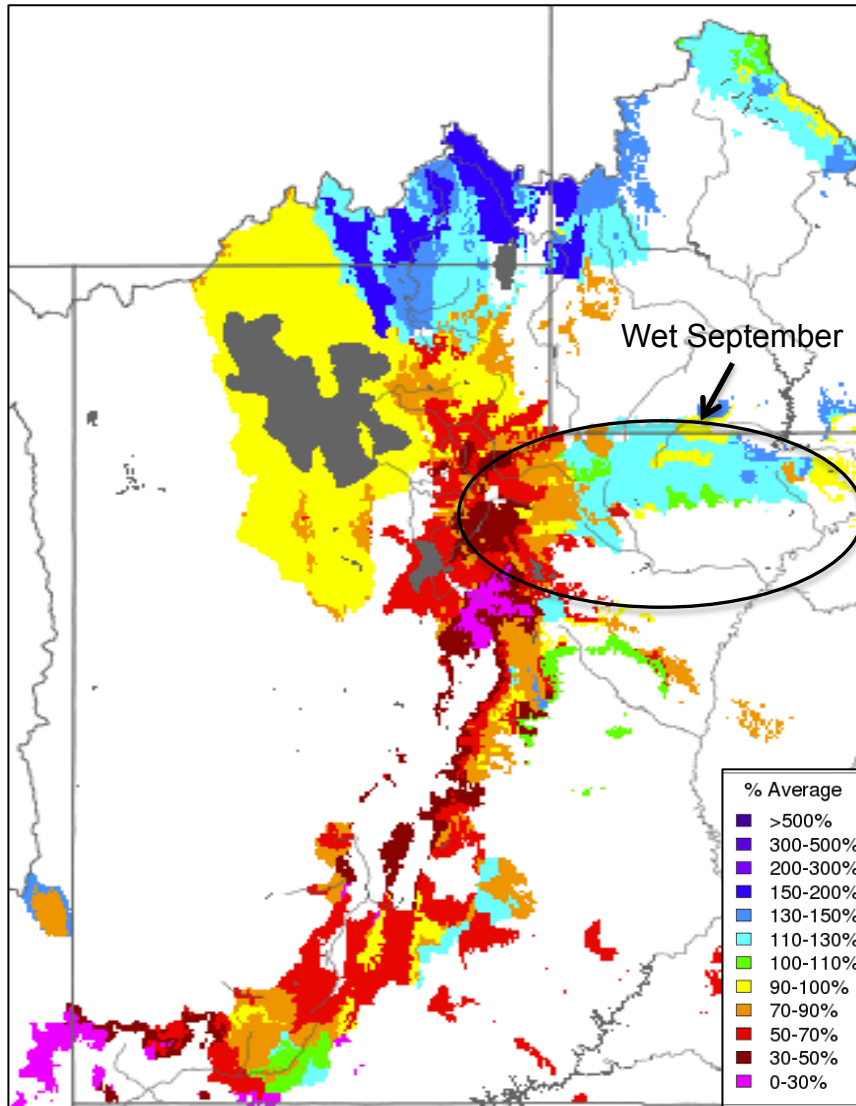
Duchesne: 55%  
Provo: 70%



# Fall Weather Impacts

## *Impacts to Soil Moisture Entering Winter*

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

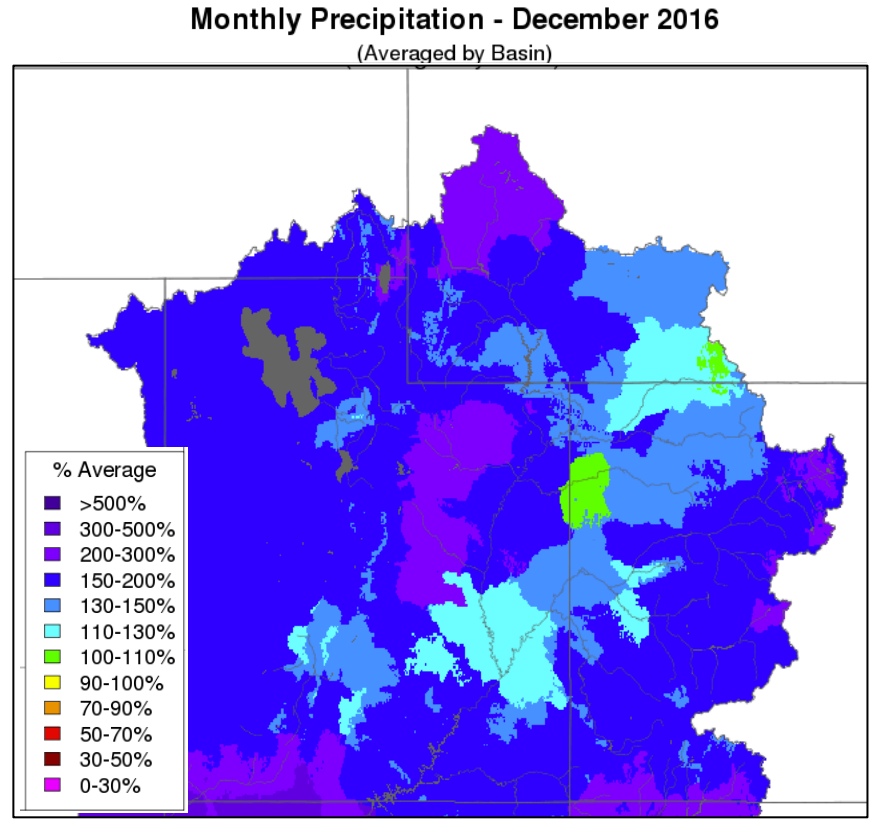
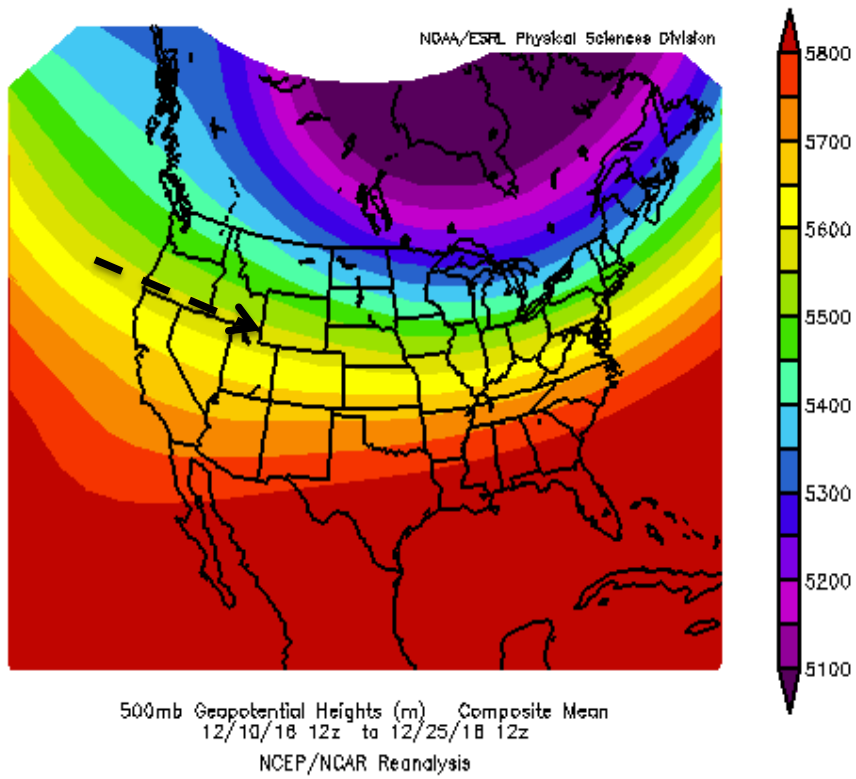


### Water Supply Impacts:

- Early season forecasts higher/lower by 3-10% of average
- Significant snowpack, like this year, lessens the impacts of dry soils on spring runoff
- Significant snowpack + wet soils could see more enhanced spring runoff

# December Weather

*A pattern change from dry/warm to cool/wet*

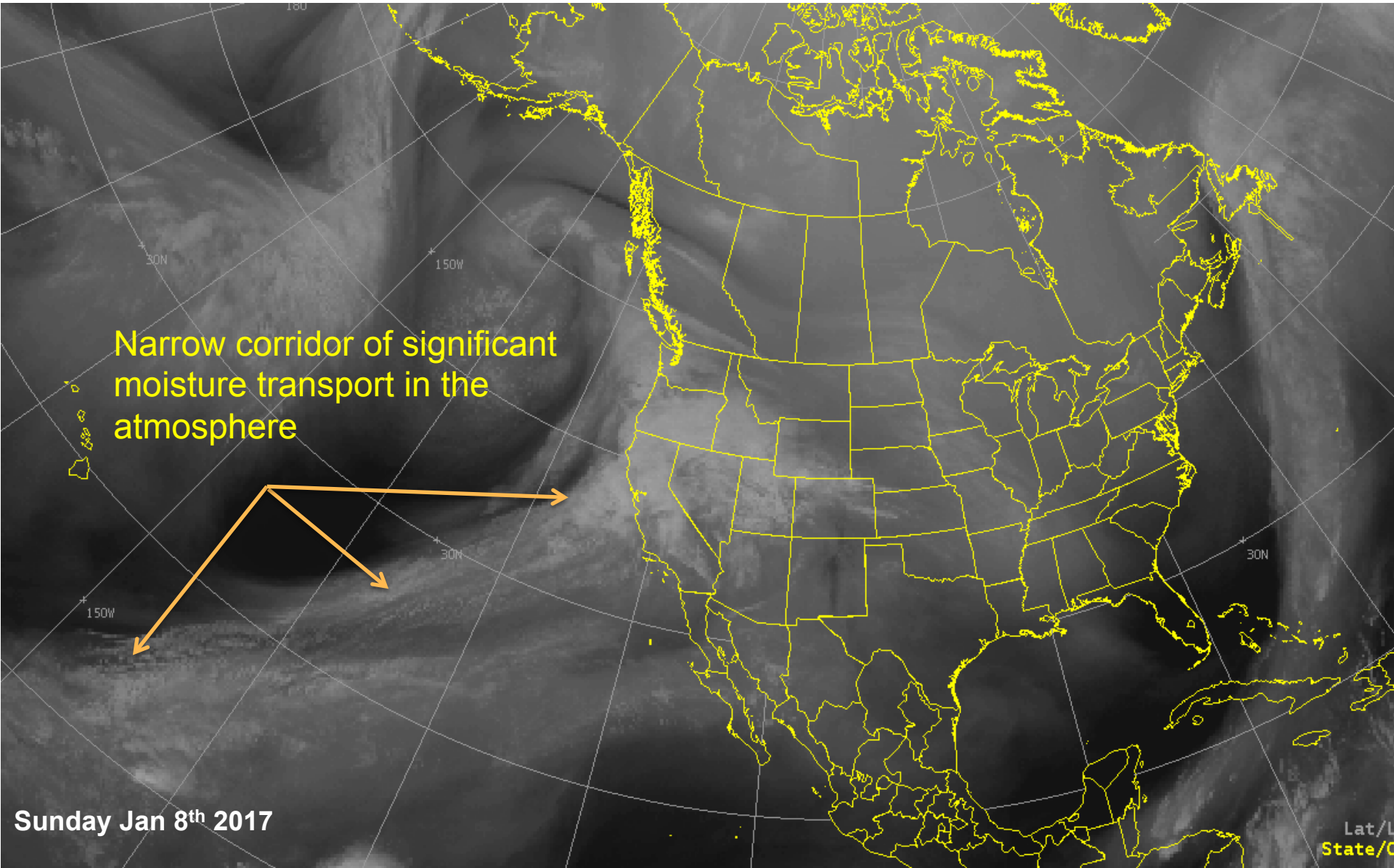


December Atmospheric Pattern:  
Strong onshore flow transported significant moisture into the western U.S

Duchesne: 205%  
Provo: 170%

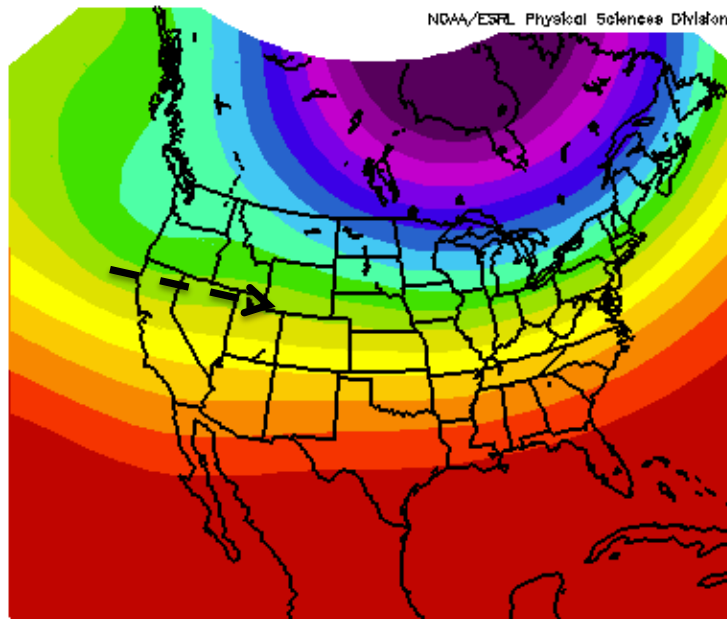
**Very beneficial month!**

# The weather term of the season: "Atmospheric River"



# January Weather

*Active and wet pattern continued for most of the month  
Drier conditions prevailed the last week of the month*

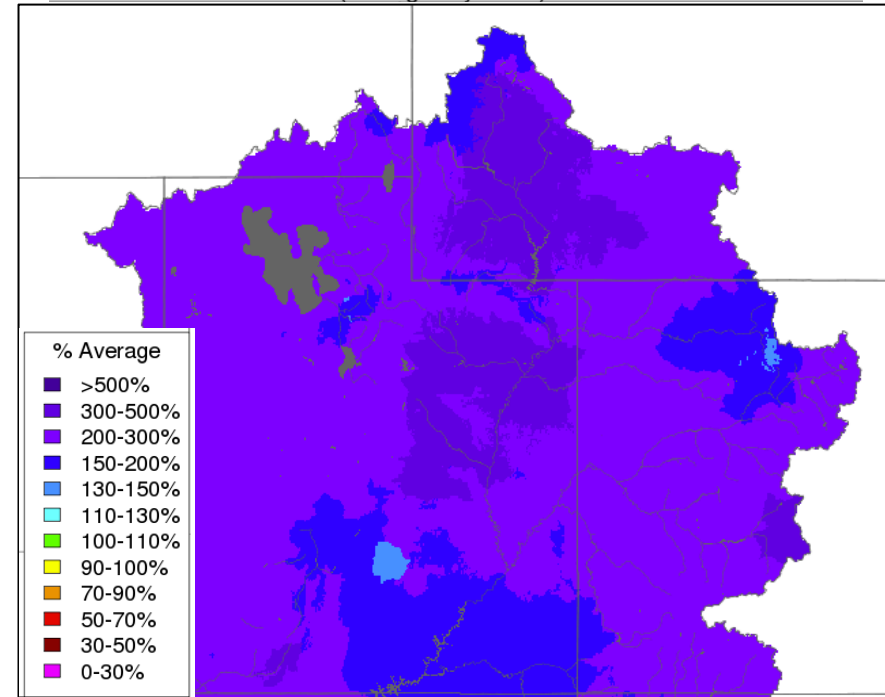


500mb Geopotential Heights (m) Composite Mean  
1/1/17 12z to 1/15/17 12z  
NCEP/NCAR Reanalysis

January Atmospheric Pattern:

Strong onshore flow continued to transported significant moisture into the western U.S

Monthly Precipitation - January 2017  
(Averaged by Basin)



Duchesne: 290%!

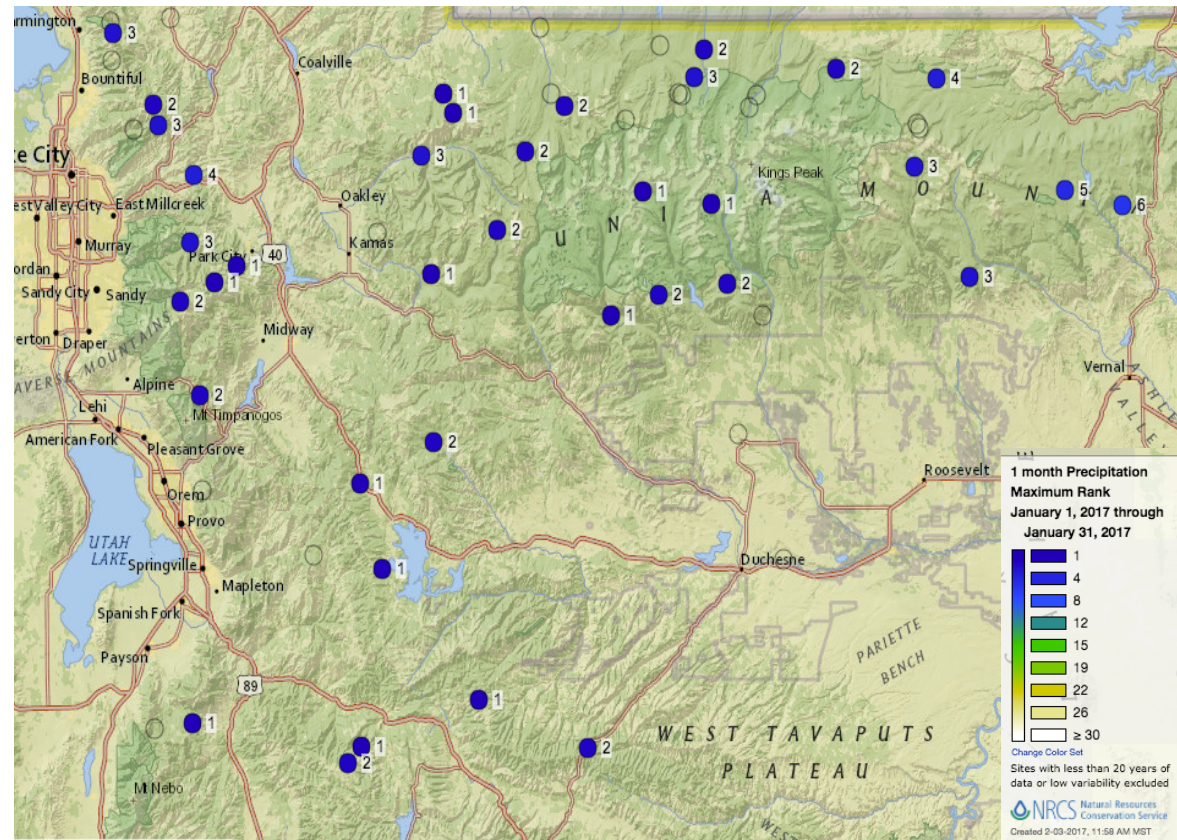
Provo: 265%!

**Game changer for water supply!**



# January Weather

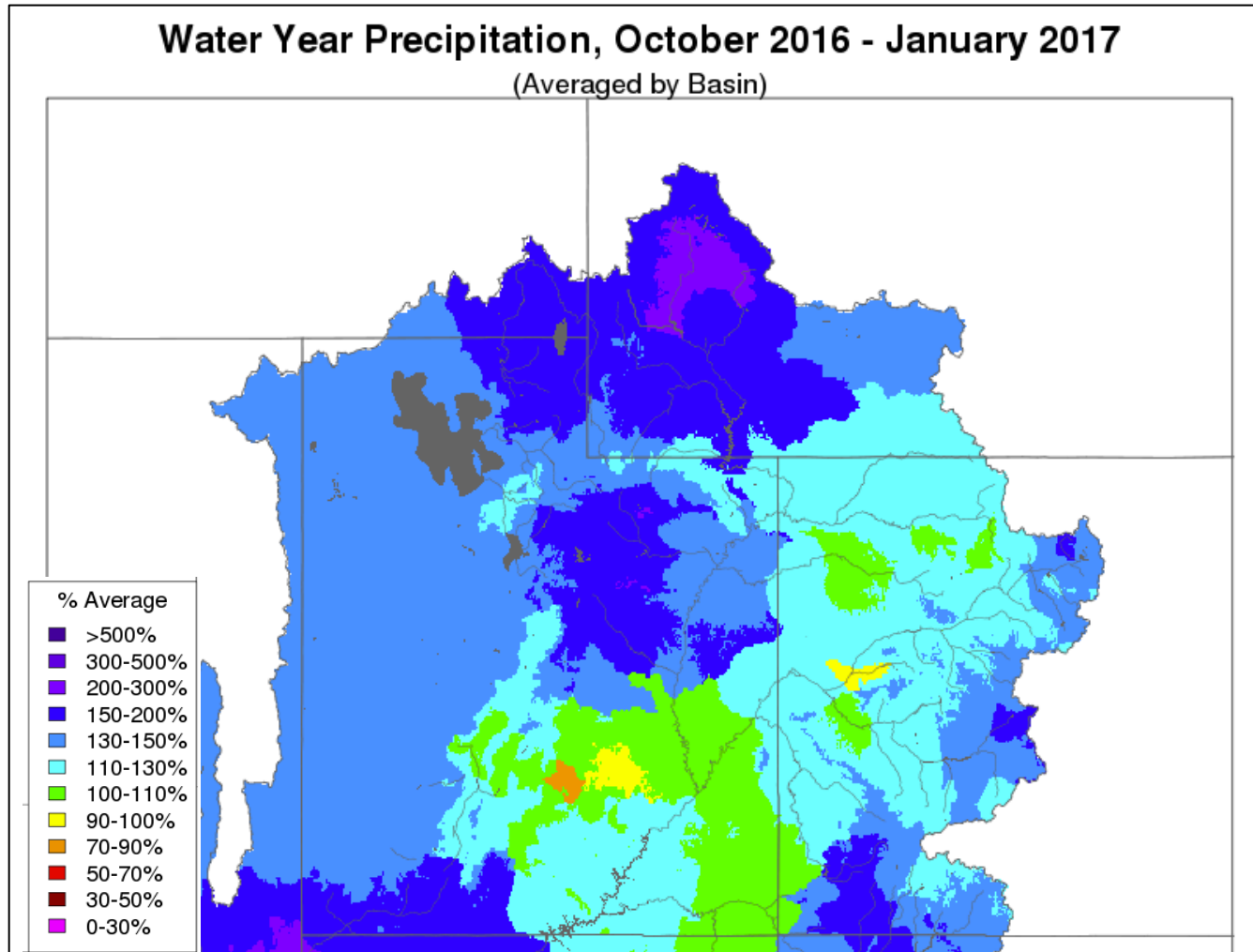
## January SNOTEL Precipitation Rankings



Location	January Observed (in)	% of Average	Anomaly (in)
Lakefork	9.5	275%	6.6
Daniels-Strawberry	11.1	302%	8.3
Rock Creek	6.8	358%	5.5
Trial Lake	11.1	250%	7.6

Many SNOTEL locations had record or near record precipitation for the month of January.

# Water Year Precipitation



Duchesne: 160%

Provo: 155%

*Conditions are looking great!*

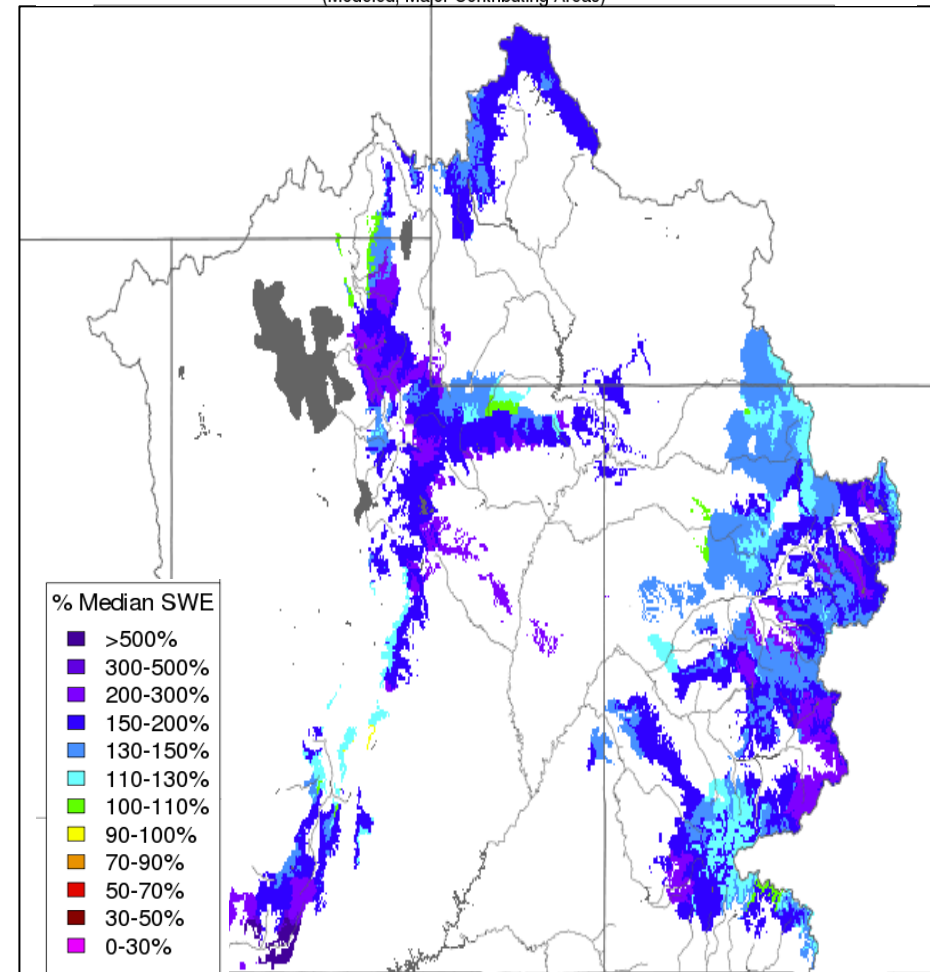
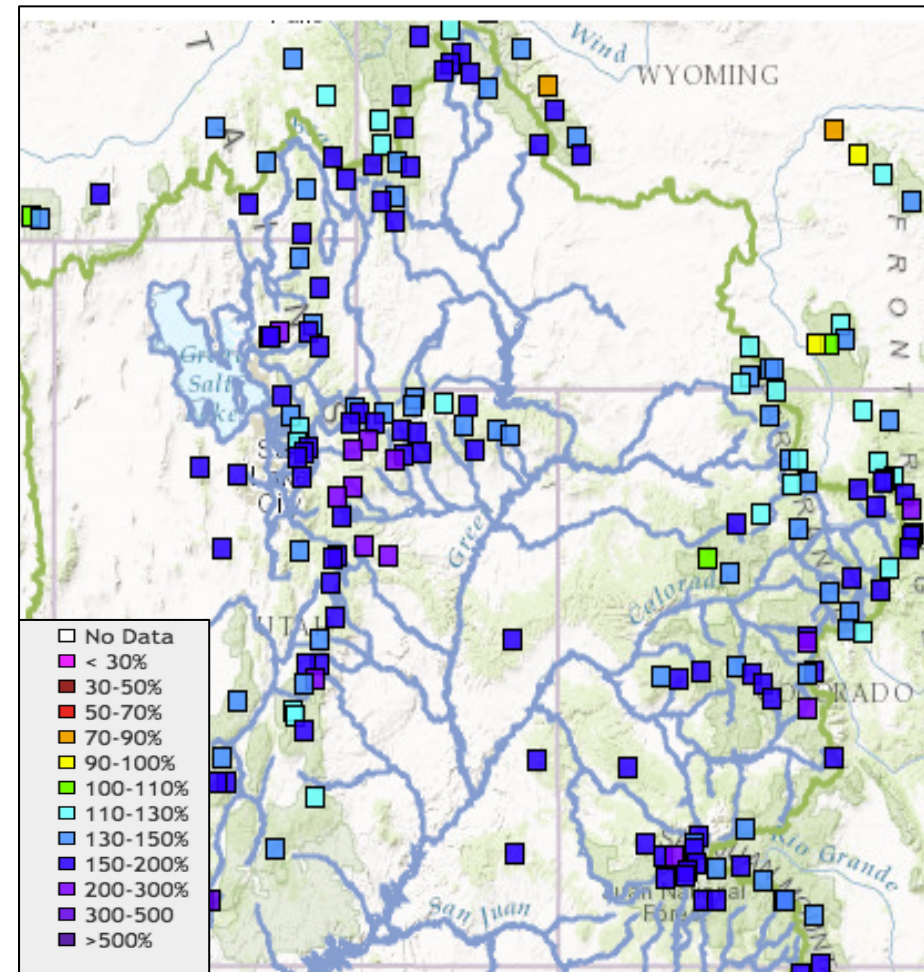
# Snow Conditions

SNOTEL (% median): February 3, 2017

CBRFC MODEL SNOW (% median):

Snow Conditions - February 03 2017

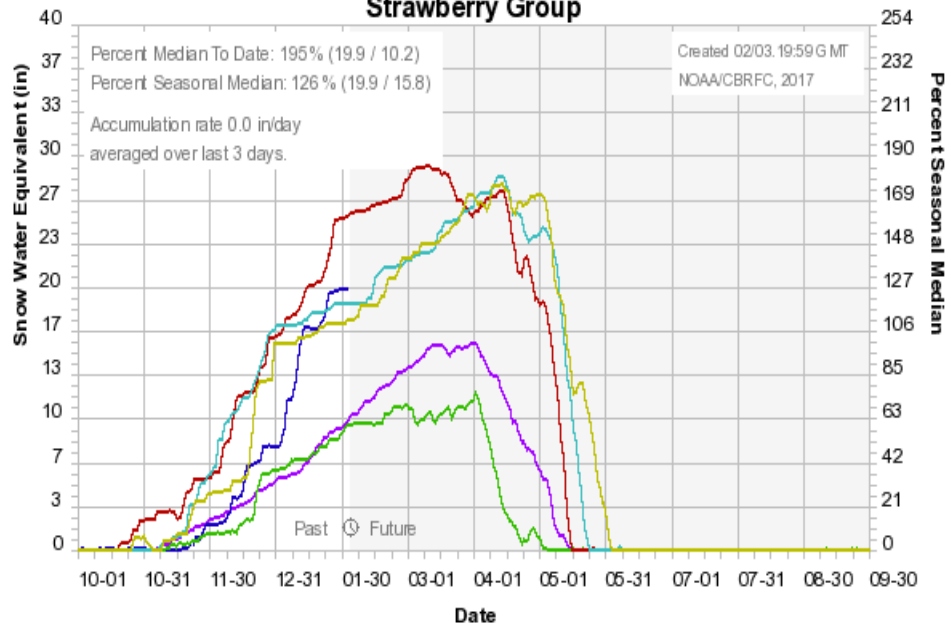
(Modeled, Major Contributing Areas)





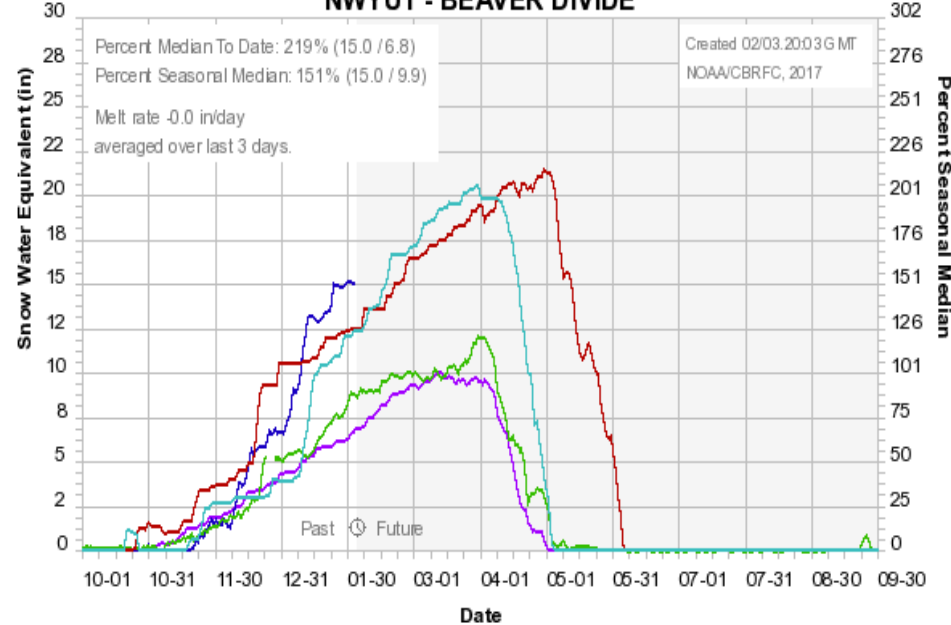
### Colorado Basin River Forecast Center

#### Strawberry Group



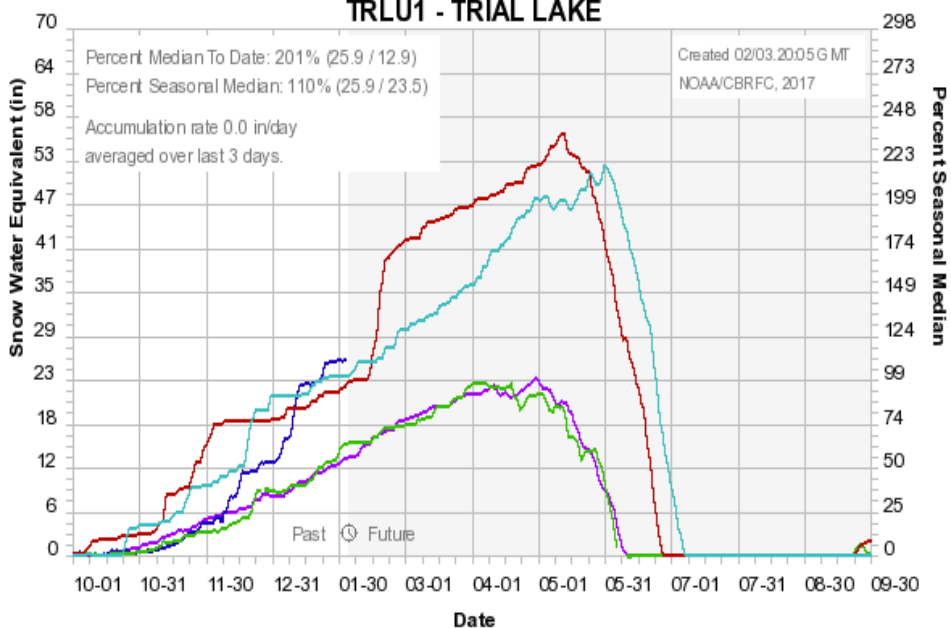
### Colorado Basin River Forecast Center

#### NWYU1 - BEAVER DIVIDE



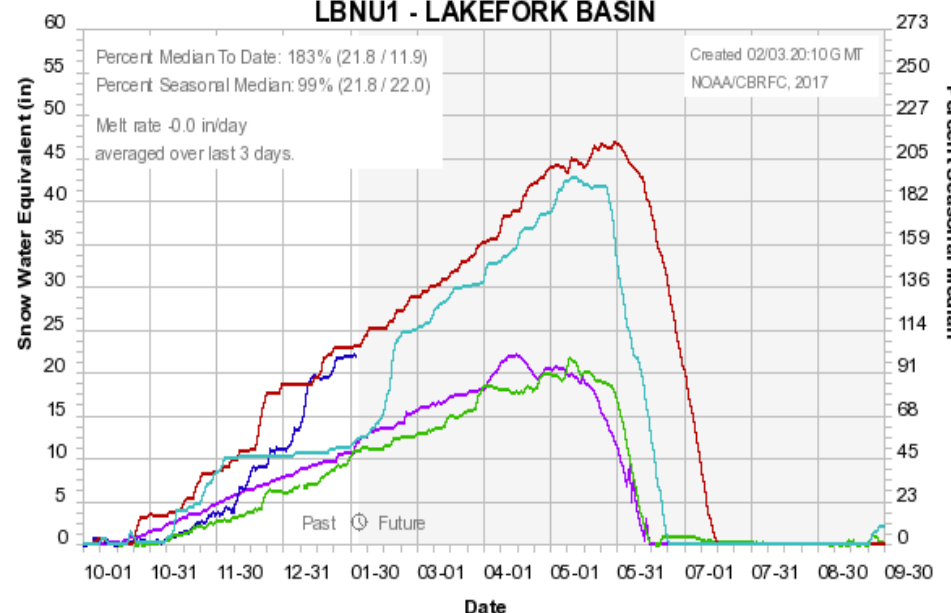
### Colorado Basin River Forecast Center

#### TRLU1 - TRIAL LAKE



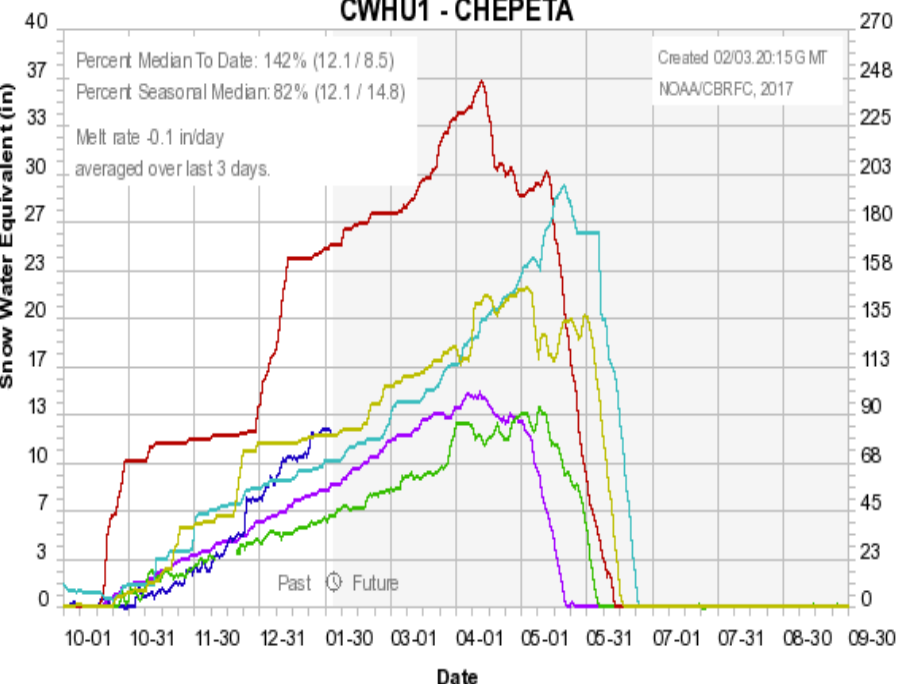
### Colorado Basin River Forecast Center

#### LBNU1 - LAKEFORK BASIN

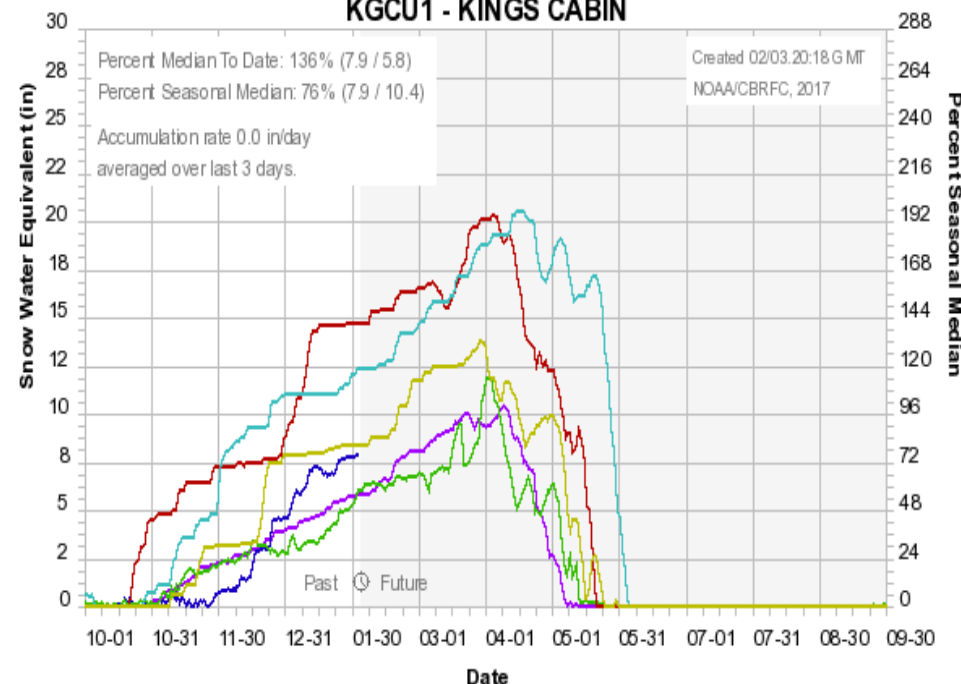




### Colorado Basin River Forecast Center CWHU1 - CHEPETA

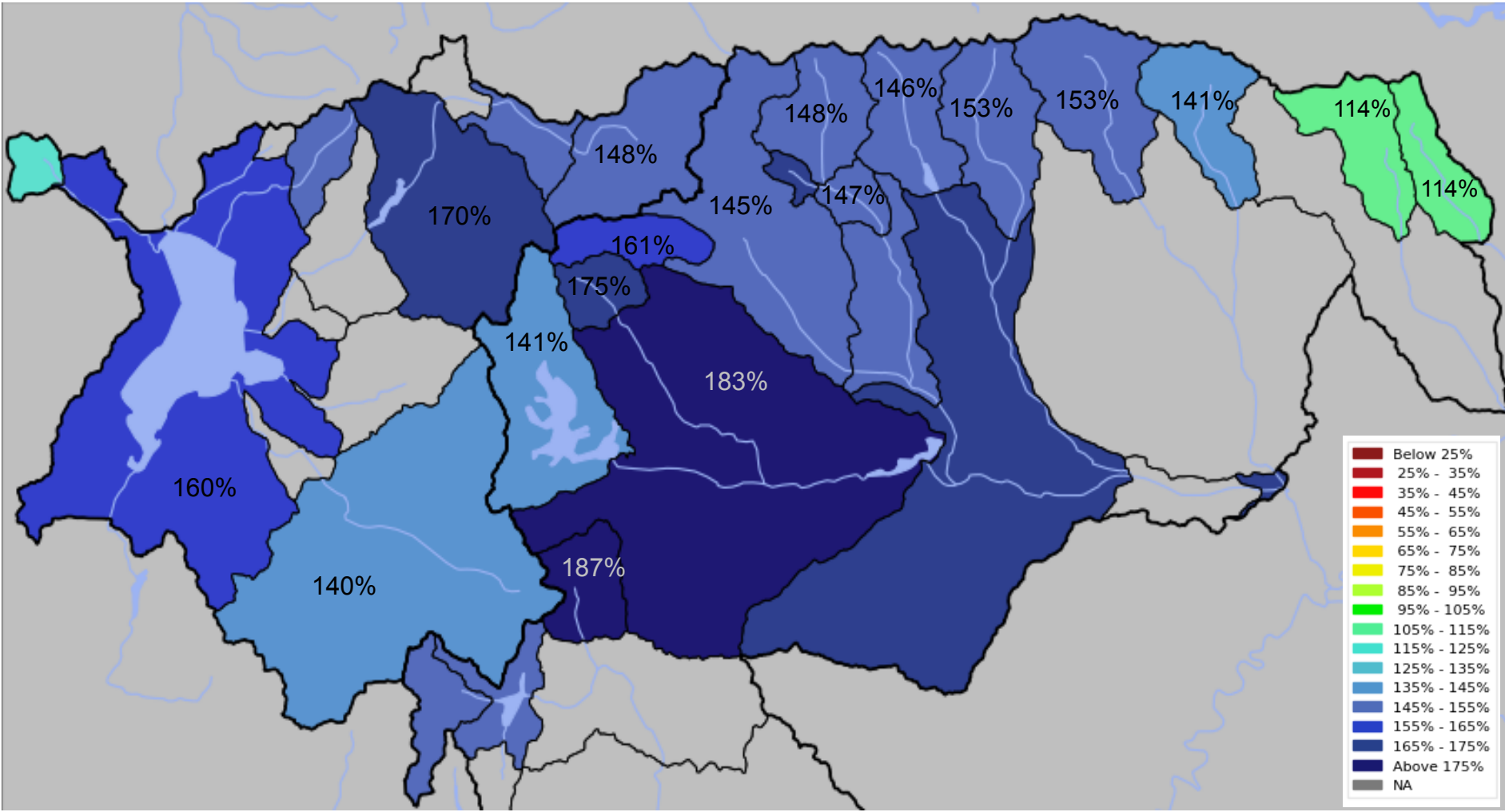


### Colorado Basin River Forecast Center KGPU1 - KINGS CABIN



# February 1<sup>st</sup> Water Supply Forecasts

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

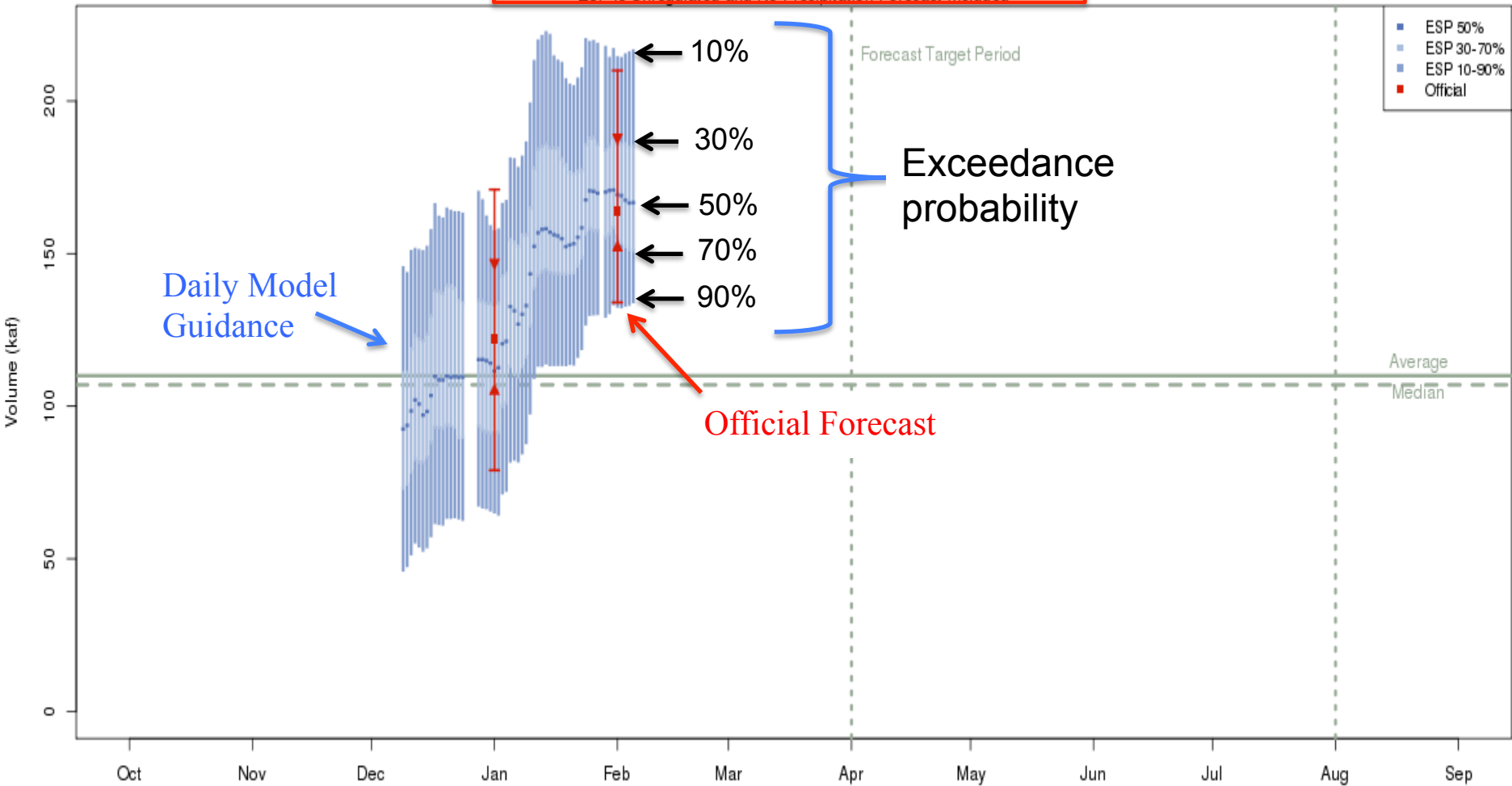


# Forecast Evolution Plot

## Daily Ensemble Streamflow Prediction (ESP) Model Run & Official

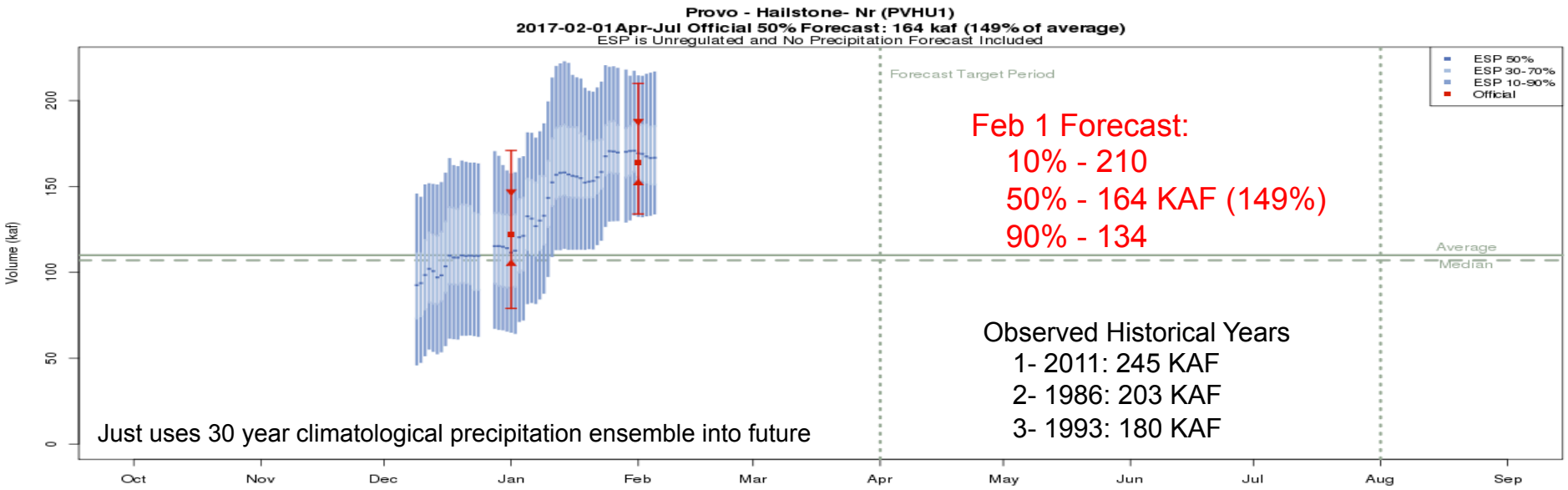
Available at: [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov) Select: Water Supply Click: Point of Interest

**Provo - Hailstone- Nr (PVHU1)**  
**2017-02-01 Apr-Jul Official 50% Forecast: 164 kaf (149% of average)**  
ESP is Unregulated and No Precipitation Forecast Included

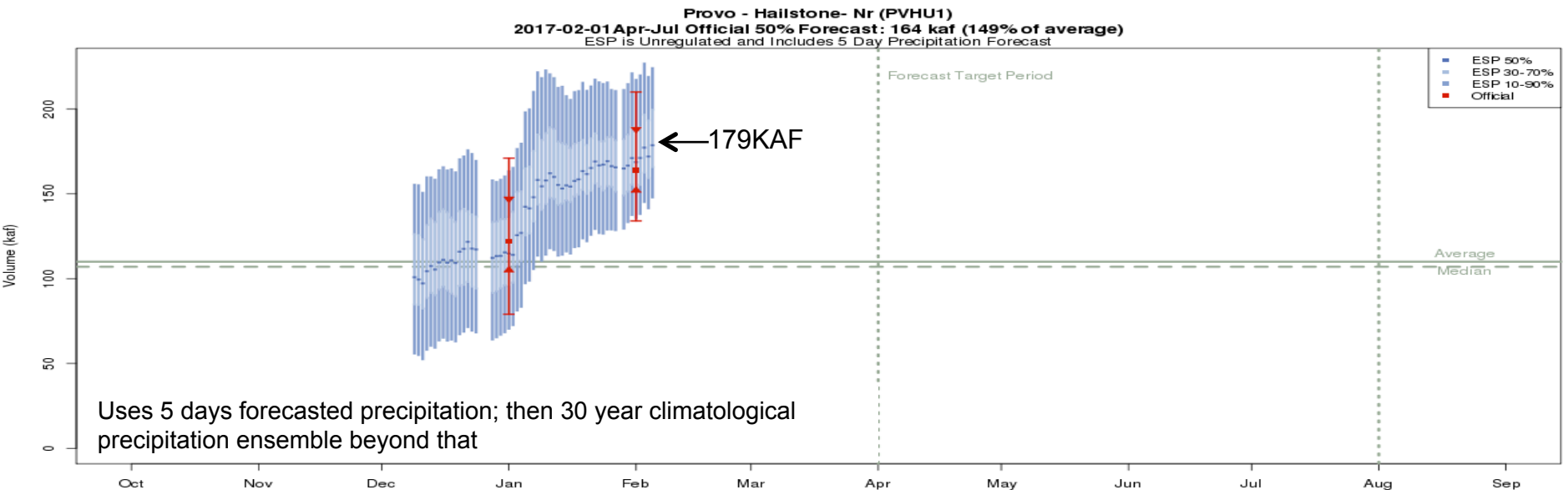


**The latest (2017-02-05) 50% ESP forecast is 167 kaf.**  
Plot Created 2017-02-05 13:29:34, NOAA / NWS / CBRFC  
Forecasts in the forecast target period include observed values.

# Forecasts: Provo nr Hailstone



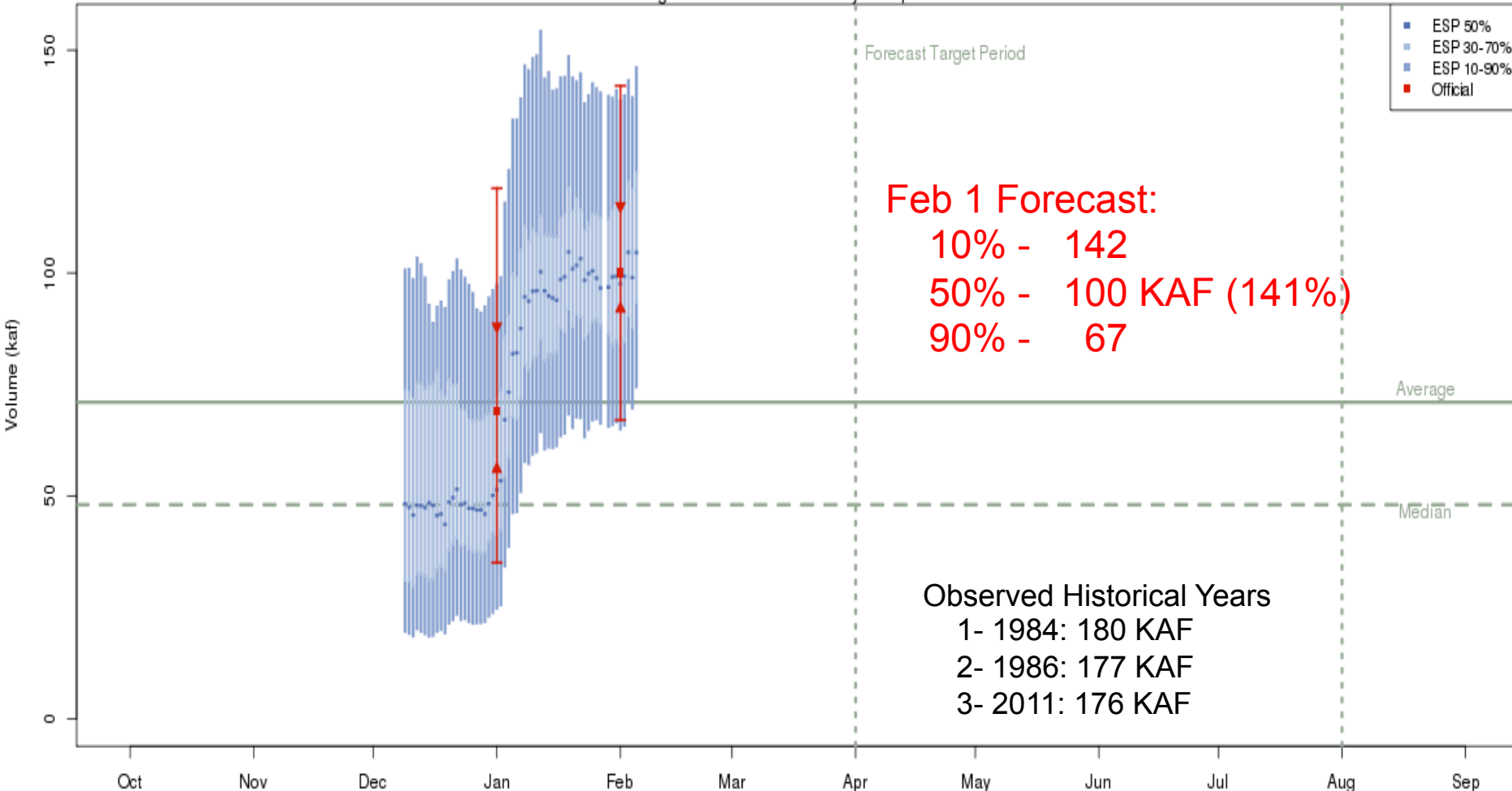
The latest (2017-02-05) 50% ESP forecast is 167 kaf.  
 Plot Created 2017-02-05 13:29:34, NOAA / NWS / CBRFC  
 Forecasts in the forecast target period include observed values.



The latest (2017-02-05) 50% ESP forecast is 179 kaf.  
 Plot Created 2017-02-05 13:29:41, NOAA / NWS / CBRFC  
 Forecasts in the forecast target period include observed values.

# Forecasts: Strawberry nr Solider Springs

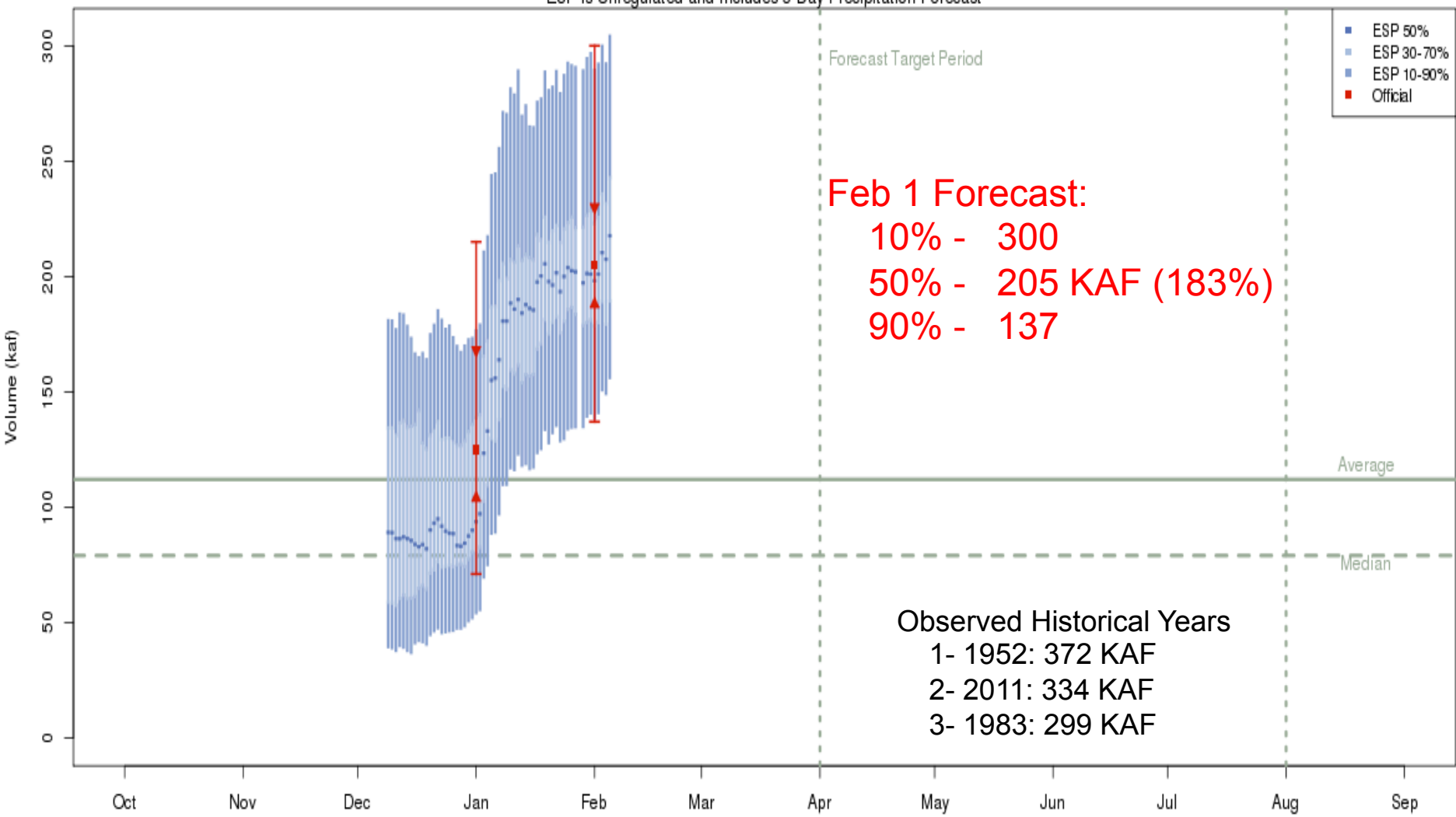
Strawberry - Solider Springs-nr - Strawberry Res (STIU1)  
2017-02-01 Apr-Jul Official 50% Forecast: 100 kaf (141% of average)  
ESP is Unregulated and Includes 5 Day Precipitation Forecast



The latest (2017-02-05) 50% ESP forecast is 105 kaf.  
Plot Created 2017-02-05 13:35:02, NOAA / NWS / CBRFC  
Forecasts in the forecast target period include observed values.

# Forecasts: Starvation Reservoir

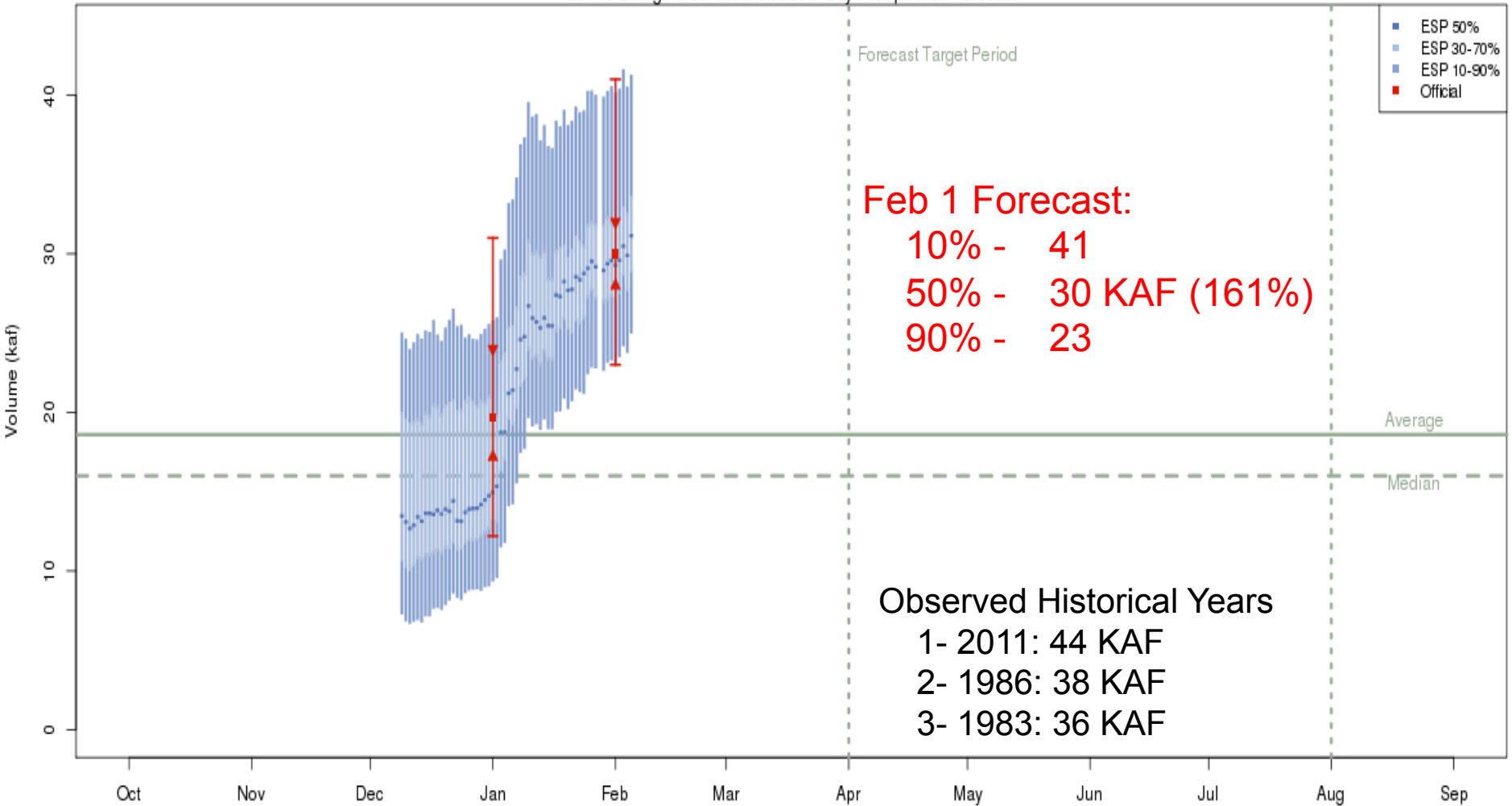
Strawberry - Starvation Res- Duchesne- Nr (STAU1)  
2017-02-01 Apr-Jul Official 50% Forecast: 205 kaf (183% of average)  
ESP is Unregulated and Includes 5 Day Precipitation Forecast



The latest (2017-02-05) 50% ESP forecast is 218 kaf.  
Plot Created 2017-02-05 13:34:20, NOAA / NWS / CBRFC  
Forecasts in the forecast target period include observed values.

# Forecasts: West Fork below Vat

West Fork Duchesne - Vat Diversion- Blo (WFDU1)  
 2017-02-01 Apr-Jul Official 50% Forecast: 30 kaf (161% of average)  
 ESP is Unregulated and Includes 5 Day Precipitation Forecast

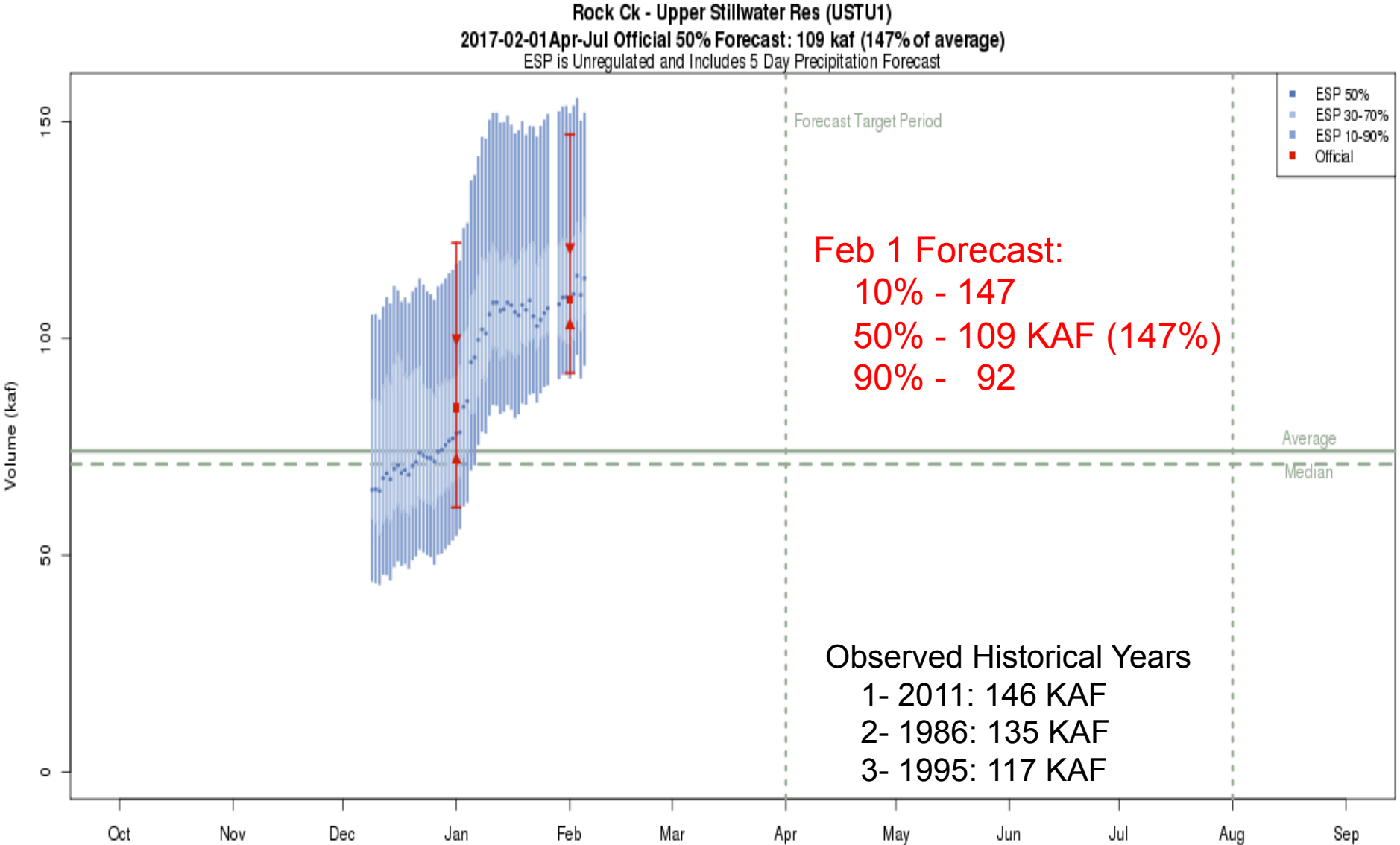


**Feb 1 Forecast:**  
 10% - 41  
 50% - 30 KAF (161%)  
 90% - 23

**Observed Historical Years**  
 1- 2011: 44 KAF  
 2- 1986: 38 KAF  
 3- 1983: 36 KAF

**The latest (2017-02-05) 50% ESP forecast is 31 kaf.**  
 Plot Created 2017-02-05 13:39:46, NOAA / NWS / CBRFC  
 Forecasts in the forecast target period include observed values.

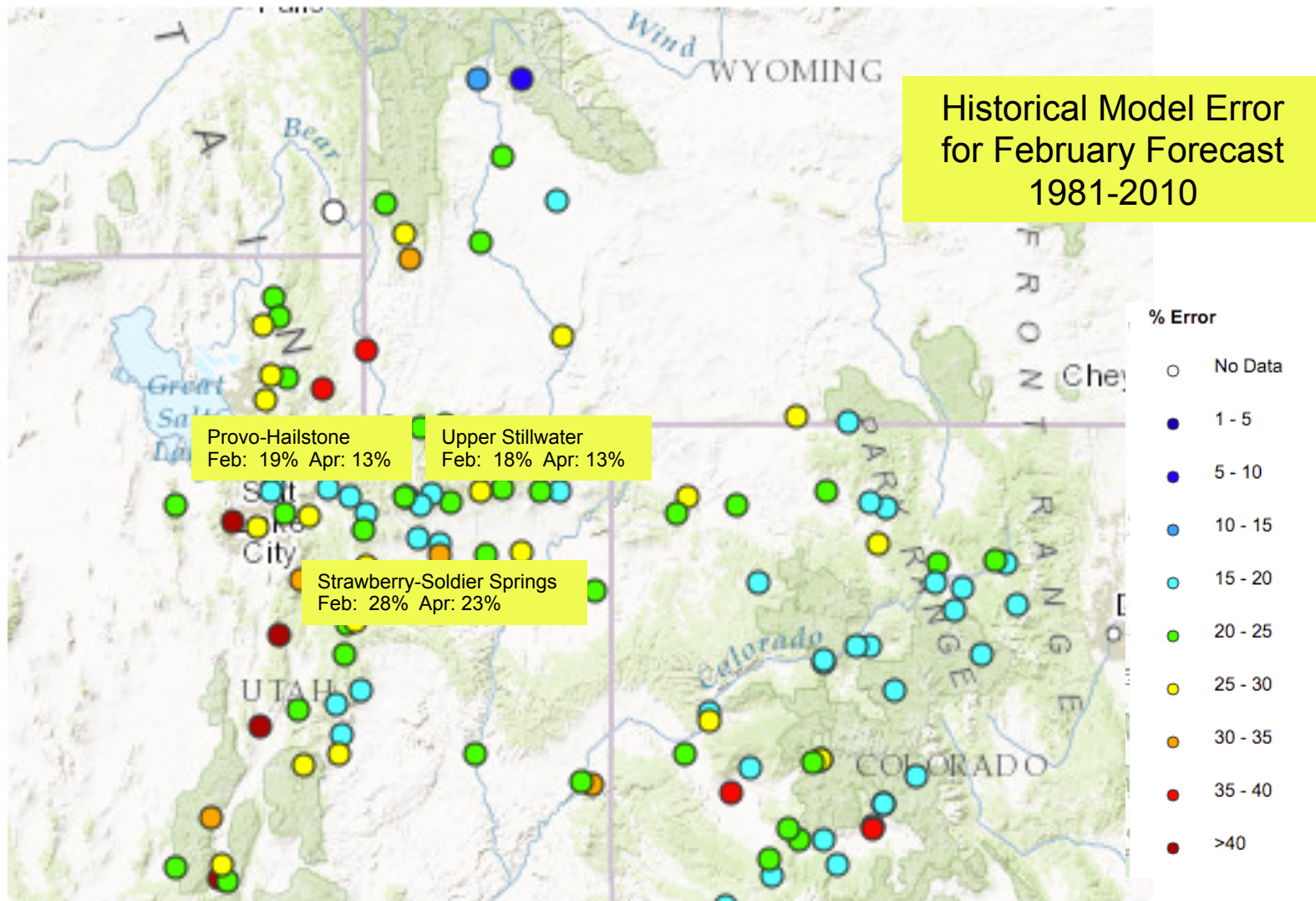
# Forecasts: Upper Stillwater Reservoir



The latest (2017-02-05) 50% ESP forecast is 114 kaf.  
Plot Created 2017-02-05 13:36:43, NOAA / NWS / CBRFC  
Forecasts in the forecast target period include observed values.



# Forecast Accuracy? How good are the forecasts in February?



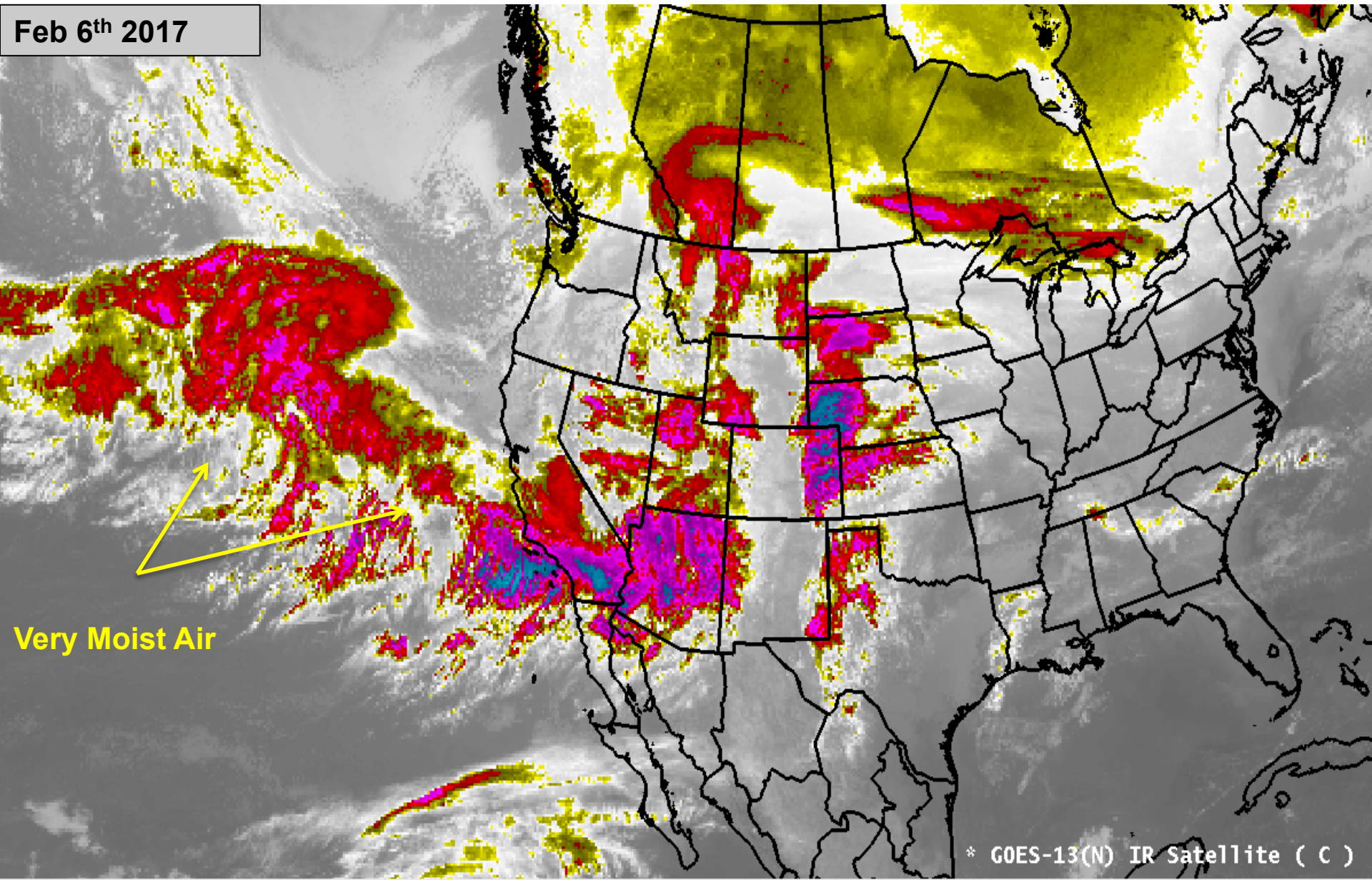
We Do Better:  
Headwaters  
Primarily snow melt basins  
Known diversions / demands

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

Satellite Image This Morning - A wet week ahead for northern Utah / SW Wyoming

Feb 6<sup>th</sup> 2017



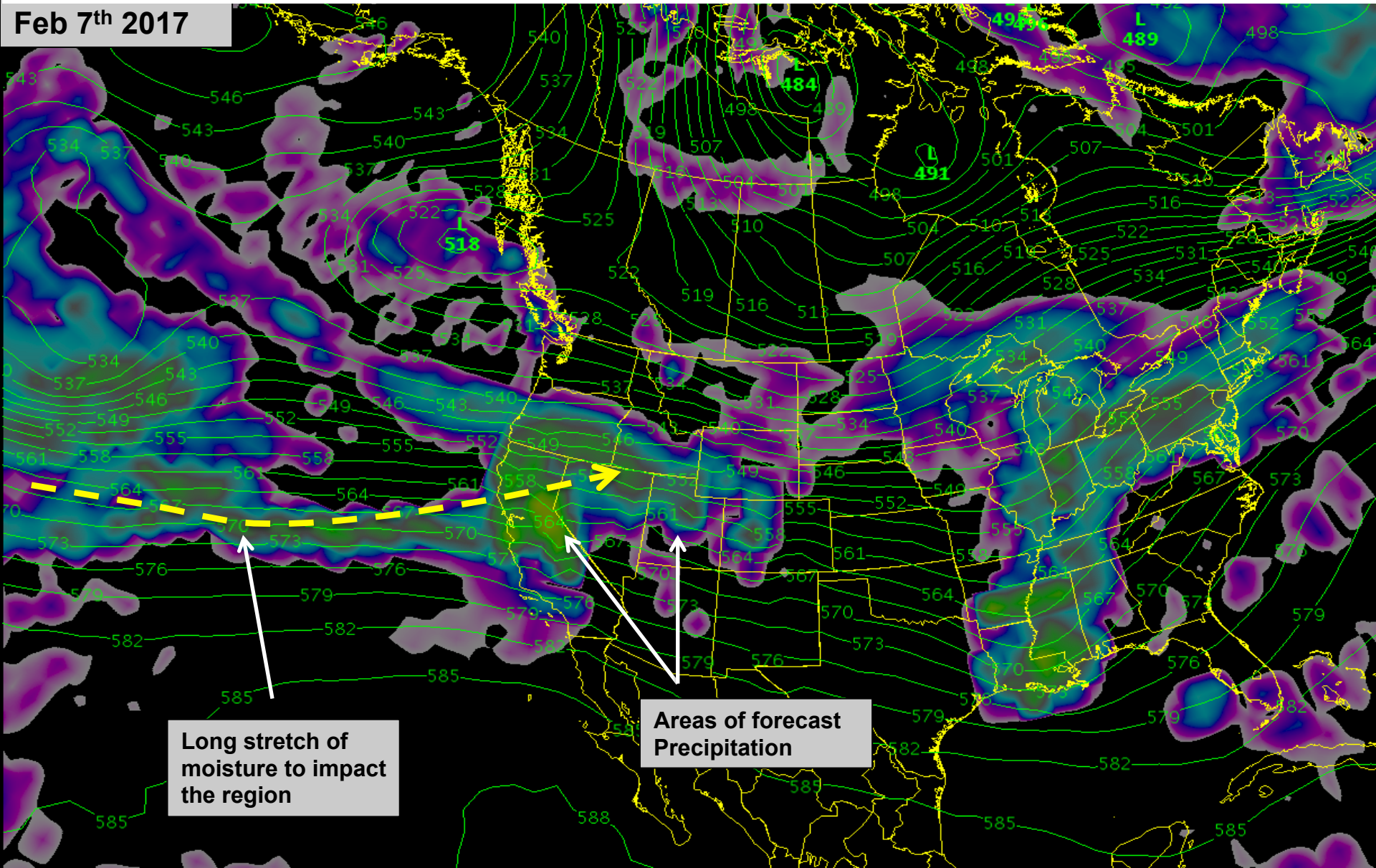
\* GOES-13(N) IR Satellite ( C )



# Upcoming Weather and Impacts to Water Supply Forecasts

Meteorological Model Guidance: Tonight through early Wednesday rain valleys / snow mountains (~6500 feet)  
Fairly potent system with some 3-4 inch precipitation amounts possible in northern Utah

Feb 7<sup>th</sup> 2017



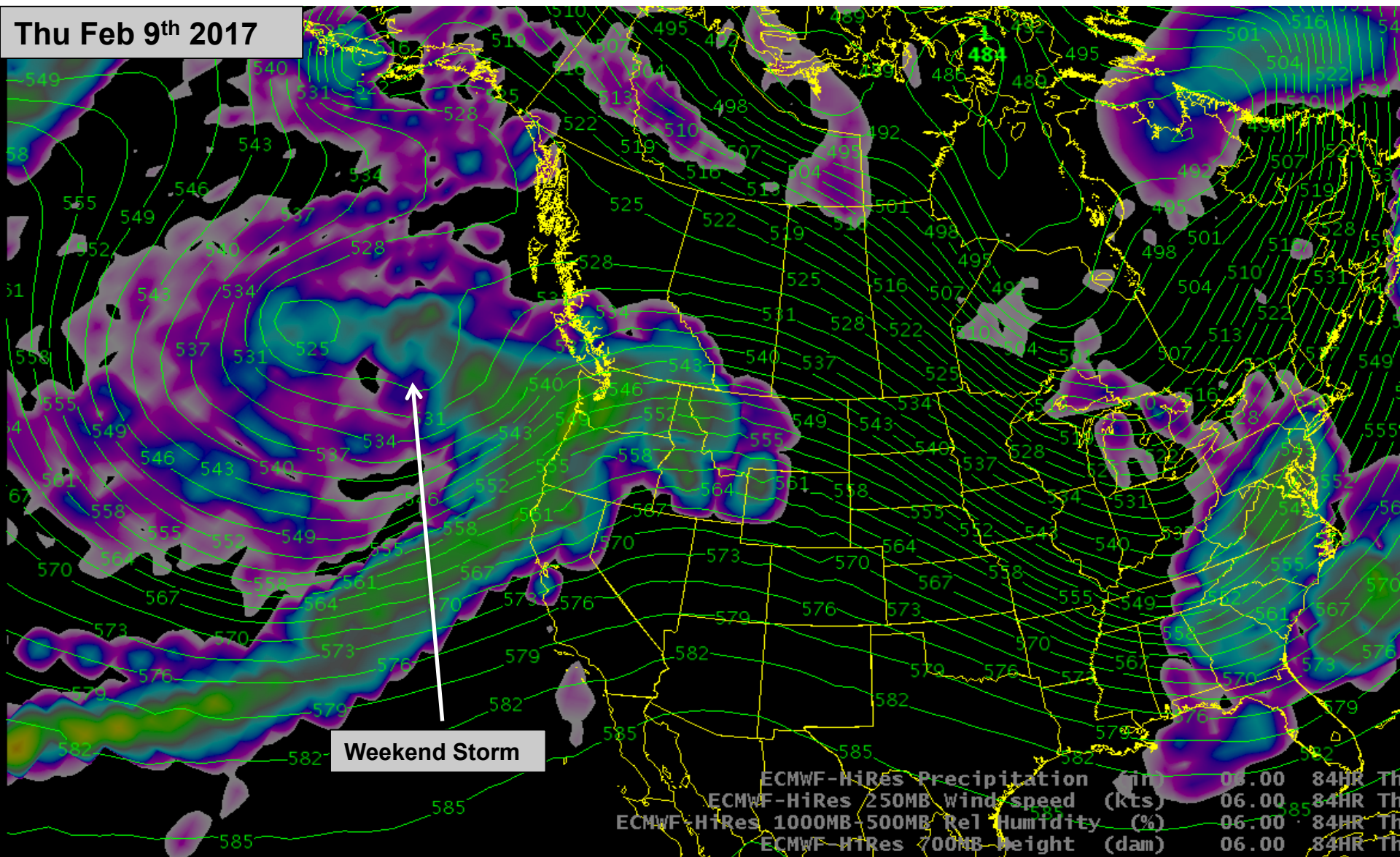
Long stretch of moisture to impact the region

Areas of forecast Precipitation

# Upcoming Weather and Impacts to Water Supply Forecasts

Meteorological Model Guidance: A lull in precipitation later Wednesday into late Thursday / early Friday.

Thu Feb 9<sup>th</sup> 2017



Weekend Storm

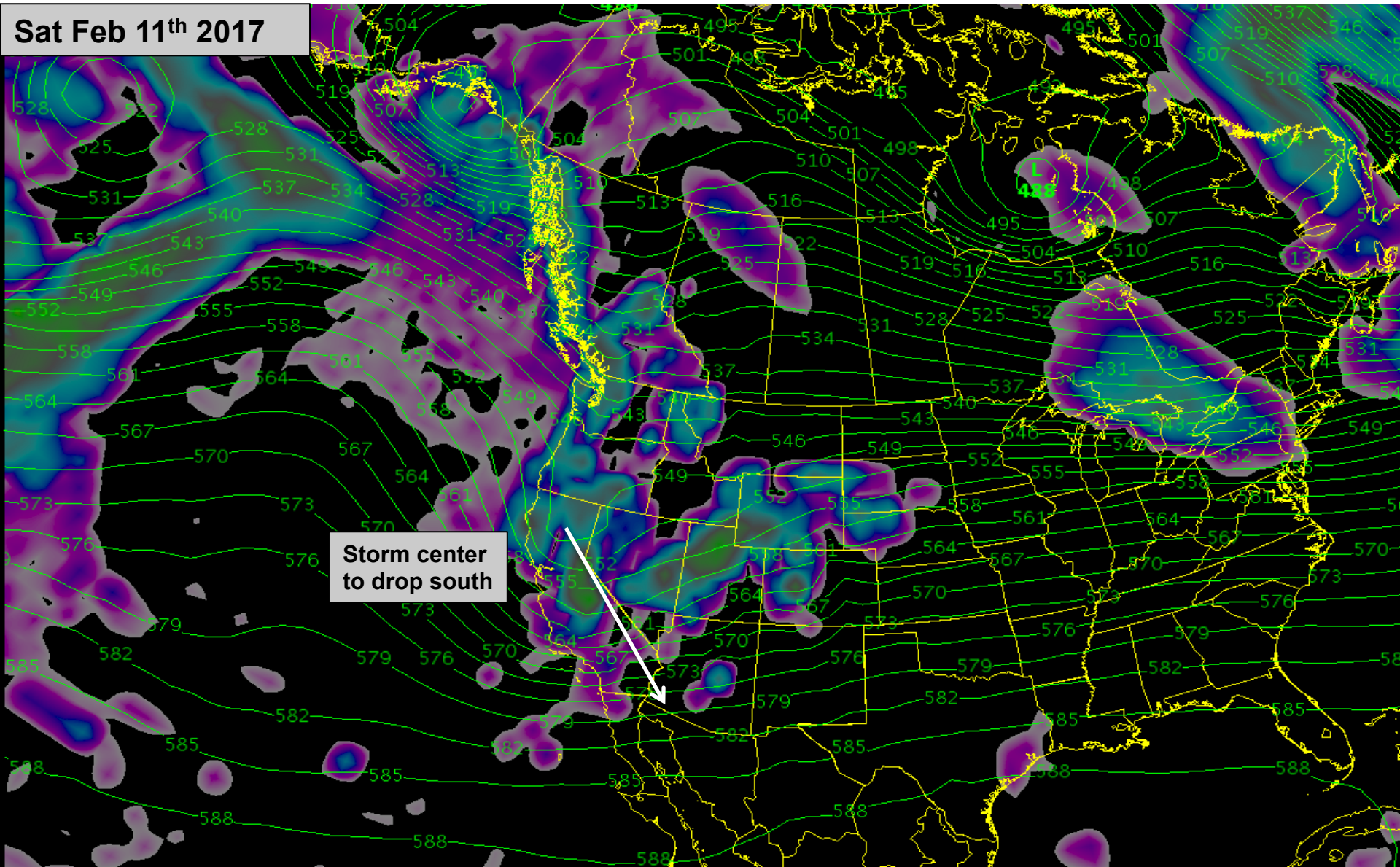
ECMWF-HiRes Precipitation	(in)	06.00	84HR	Th
ECMWF-HiRes 250MB Wind speed	(kts)	06.00	84HR	Th
ECMWF-HiRes 1000MB-500MB Rel Humidity	(%)	06.00	84HR	Th
ECMWF-HiRes 700MB Height	(dam)	06.00	84HR	Th
ECMWF-HiRes 1000MB-500MB Thickness	(dam)	06.00	84HR	Th
ECMWF-HiRes Sfc Pressure Reduced to MSI	(mb)	06.00	84HR	Th



# Upcoming Weather and Impacts to Water Supply Forecasts

Meteorological Model Guidance: Increasing precipitation Friday into the weekend, colder air, lowering snow levels

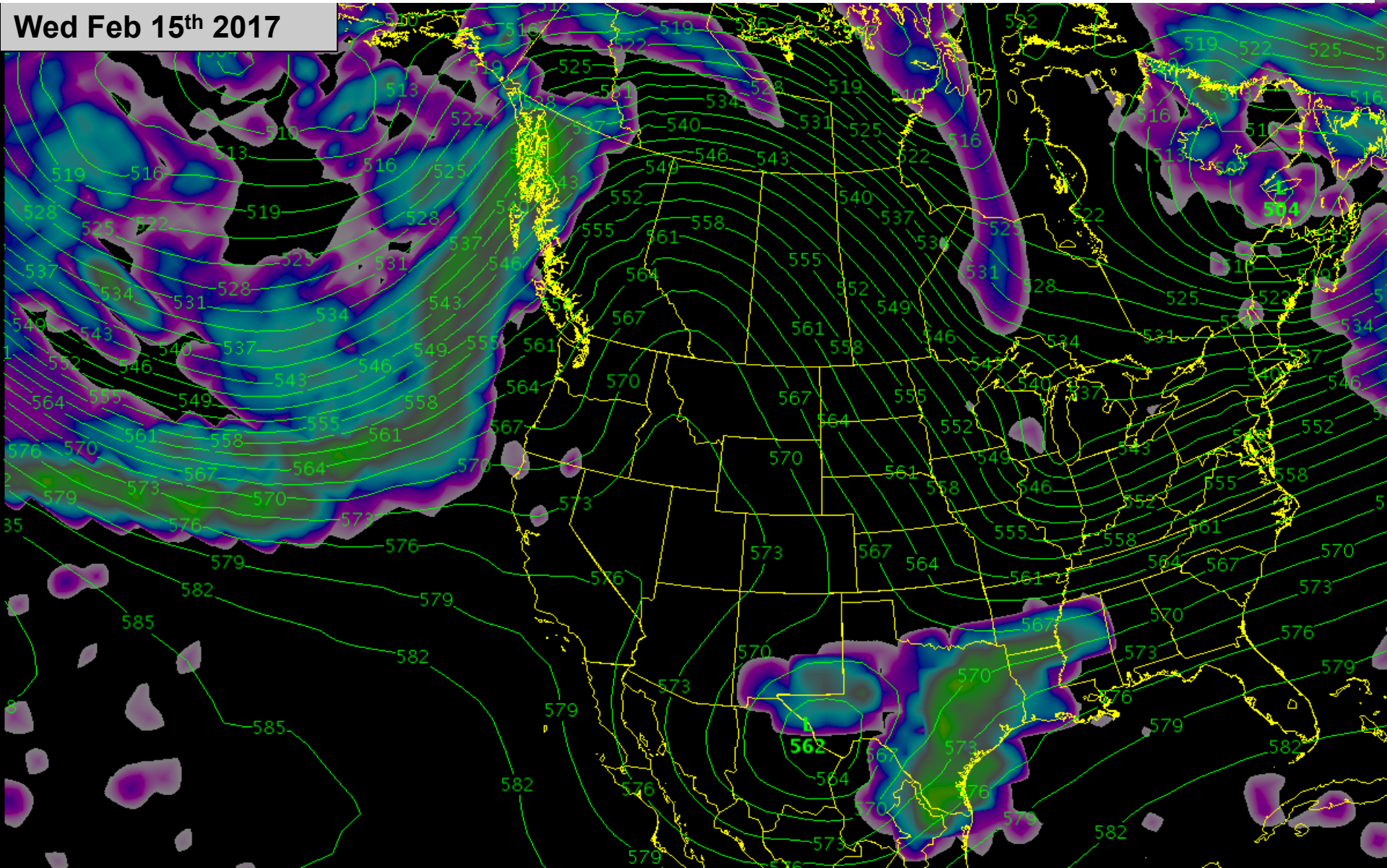
Sat Feb 11<sup>th</sup> 2017



# Upcoming Weather and Impacts to Water Supply Forecasts

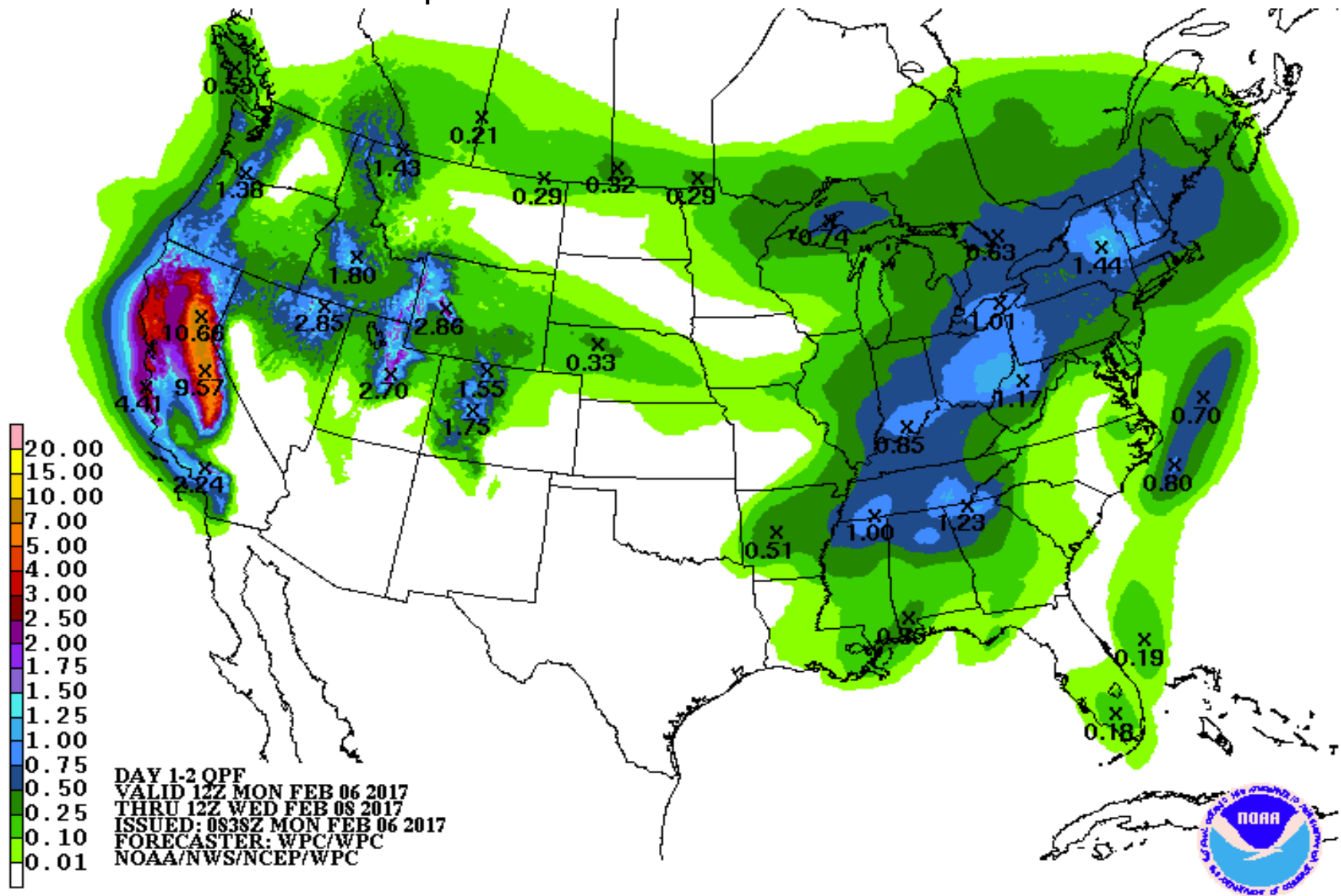
Meteorological Model Guidance: Next week appears to be on the dry side.  
Long range guidance suggest the pattern could become active again by the weekend of the 18<sup>th</sup>.

**Wed Feb 15<sup>th</sup> 2017**



# Upcoming Weather and Impacts to Water Supply Forecasts

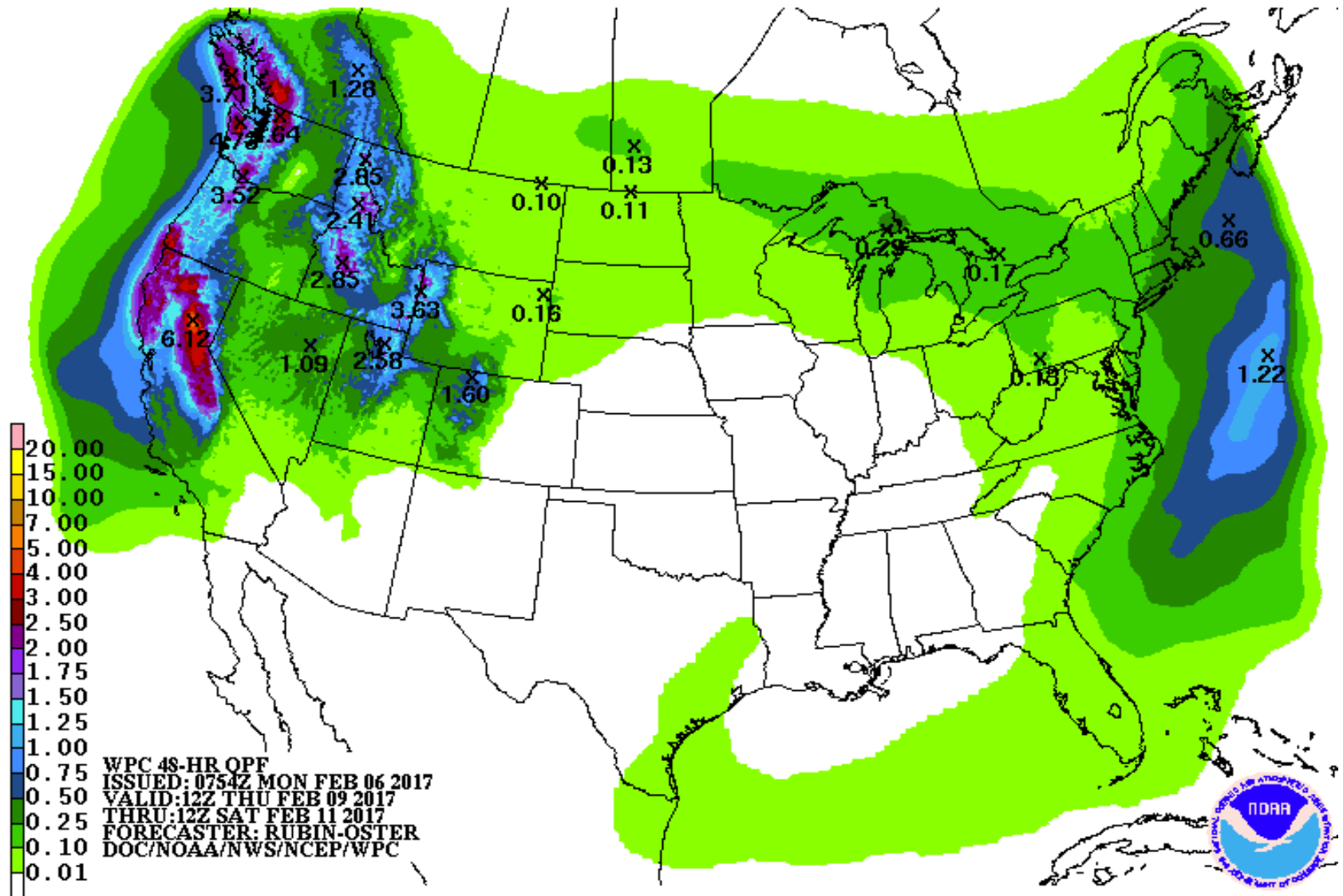
## Precipitation Forecasts the next 48 hours





# Upcoming Weather and Impacts to Water Supply Forecasts

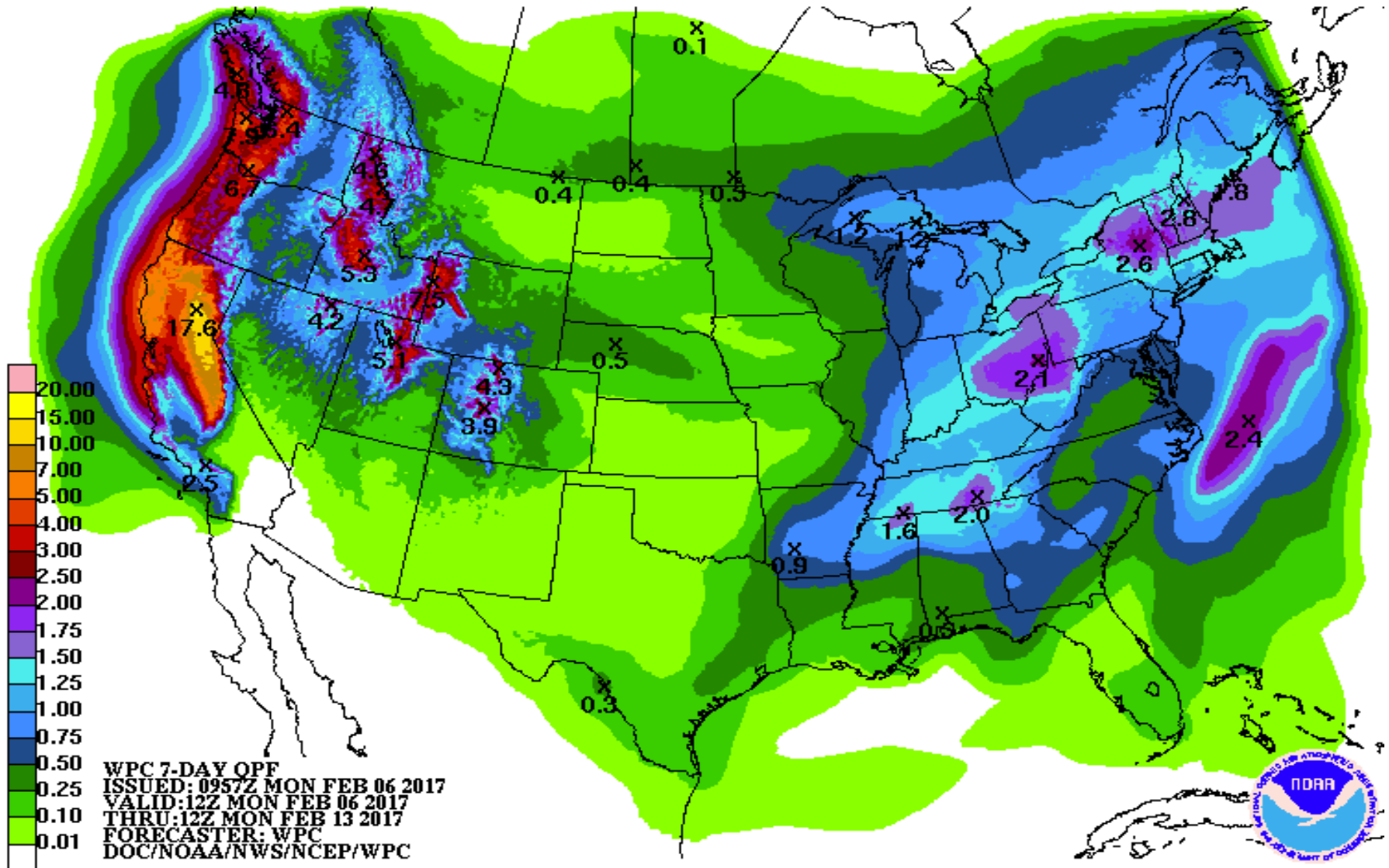
## Precipitation Forecasts the Friday-Saturday storm





# Upcoming Weather and Impacts to Water Supply Forecasts

Precipitation Forecast: 7 day total (Feb 6<sup>th</sup>-Feb 13<sup>th</sup>)



# Discussion

## Today's summary:

- Above normal snow conditions
  - Above average water supply forecasts
  - Active wet weather pattern over the next week
  - Water supply forecasts will likely trend higher by mid-month
- 
- Forecast Discussion
    - Peak Flow Forecasts start in March
  - Operations Discussion
  - Next briefing date?
    - **March 8-10<sup>th</sup>?**

## Other webinars:

**-2/7 @1:30 pm Great Basin Webinar**

**-2/7 @11:00 am Upper Colorado Webinar**