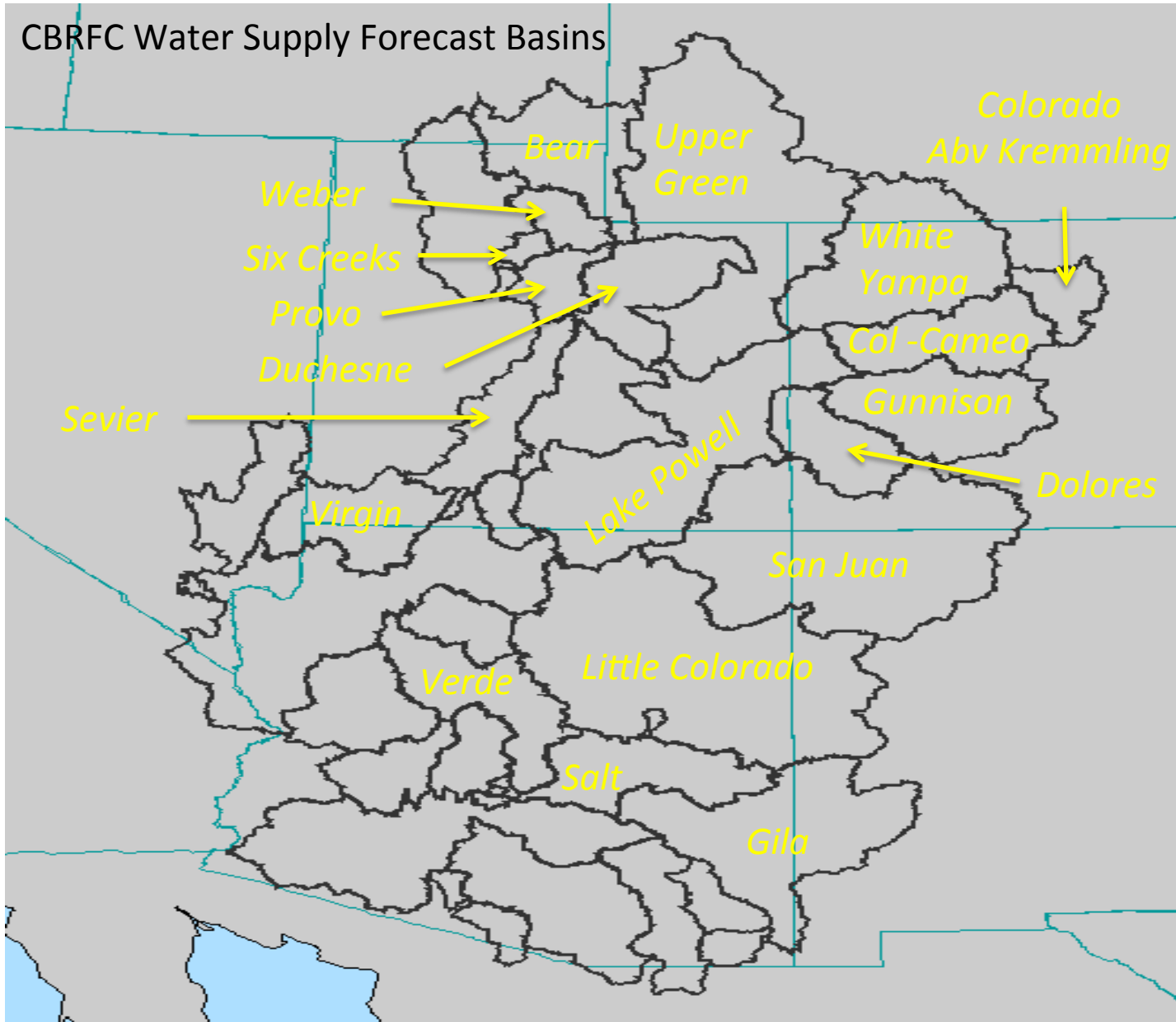


# CBRFC WATER SUPPLY WEBINAR - March 5<sup>th</sup> 1 pm MST

Presented By: Greg Smith – Sr. Hydrologist



# **CBRFC WATER SUPPLY WEBINAR – March 5<sup>th</sup> 1 pm MST**

Presented By: Greg Smith – Sr. Hydrologist

## Today's Presentation

February Weather Review

Current Conditions (driving the forecasts)

March 1<sup>st</sup> Water Supply Forecast Summary

Future Weather Outlook

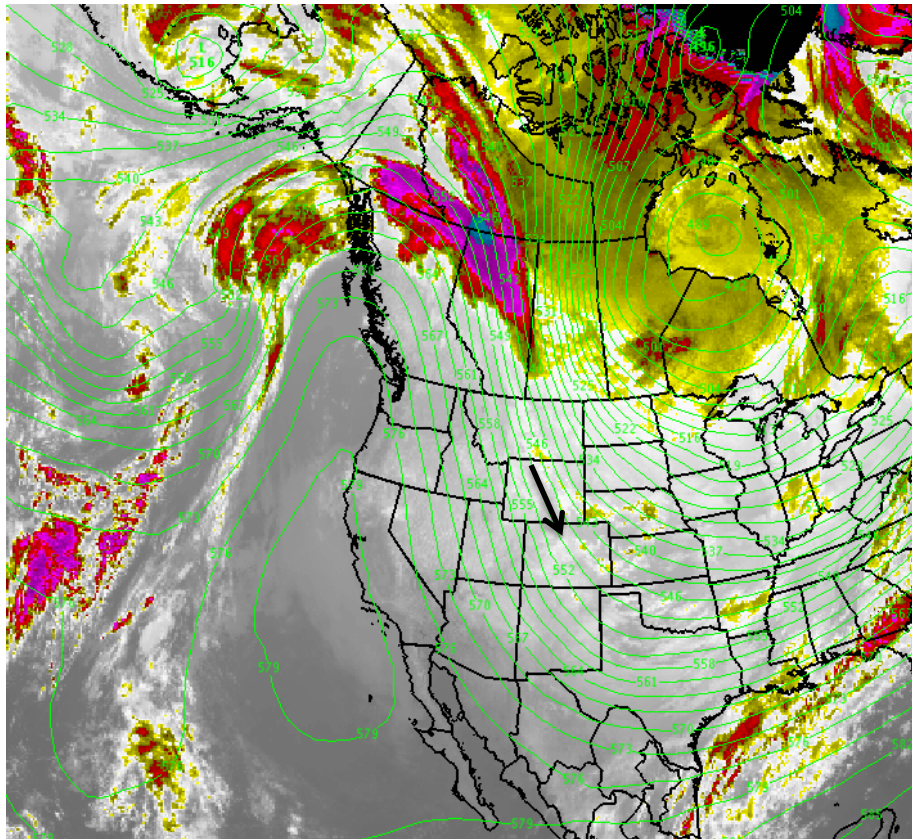
Area Extent of Snow Cover

This presentation available at: [www.cbrfc.noaa.gov/present/present2015.cgi](http://www.cbrfc.noaa.gov/present/present2015.cgi)

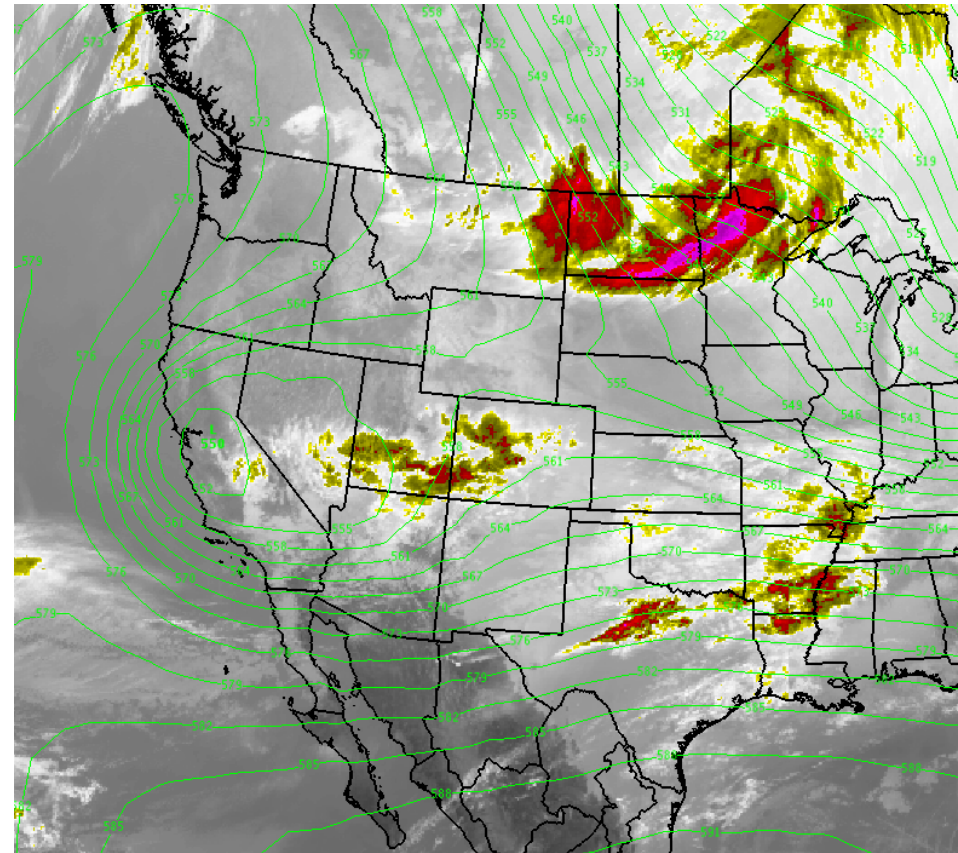
Recording available at: <http://www.cbrfc.noaa.gov/podcasts/podcasts.php>

# FEBRUARY WEATHER

Feb 17 2015 – High Pressure Ridge



Feb 23 2015 – Pattern Change !!

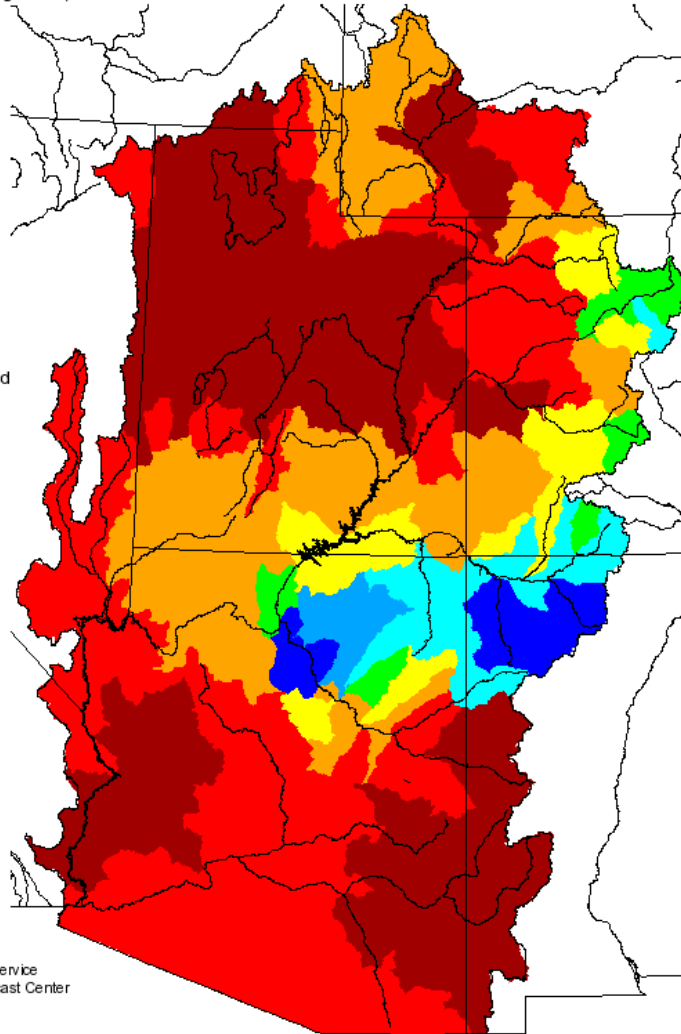
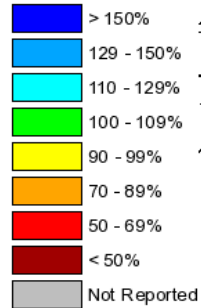


# February and Seasonal Precipitation

## Monthly Precipitation for February 2015

(Averaged by Hydrologic Unit)

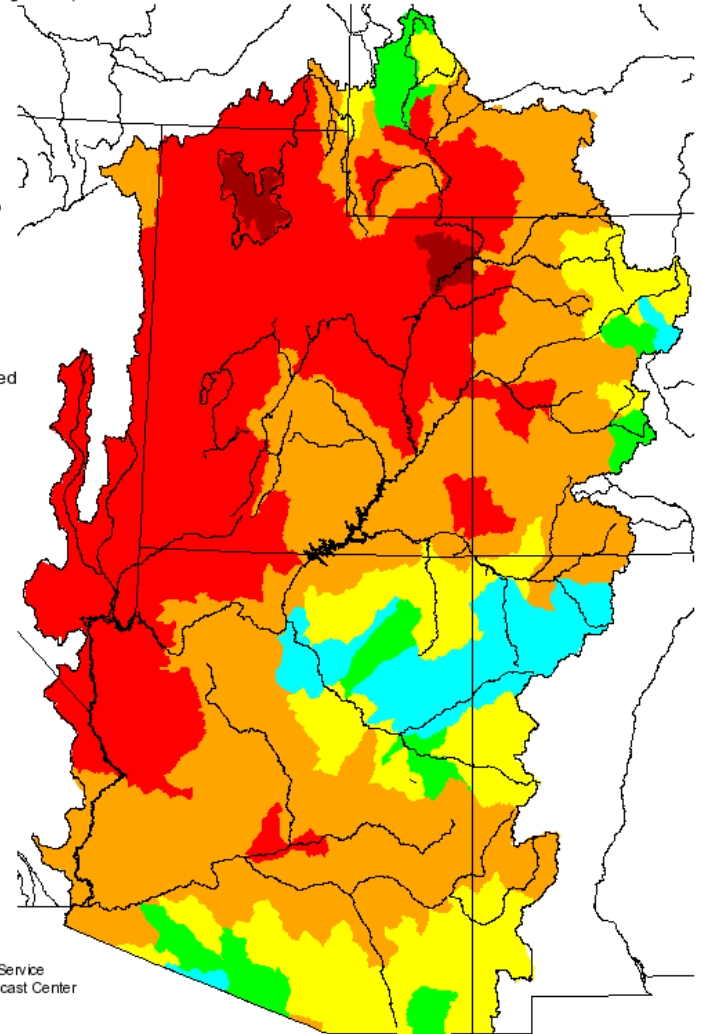
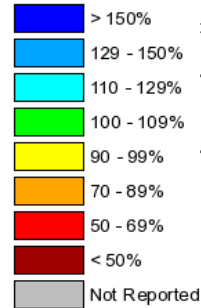
### % Average



## Seasonal Precipitation, October 2014 - February 2015

(Averaged by Hydrologic Unit)

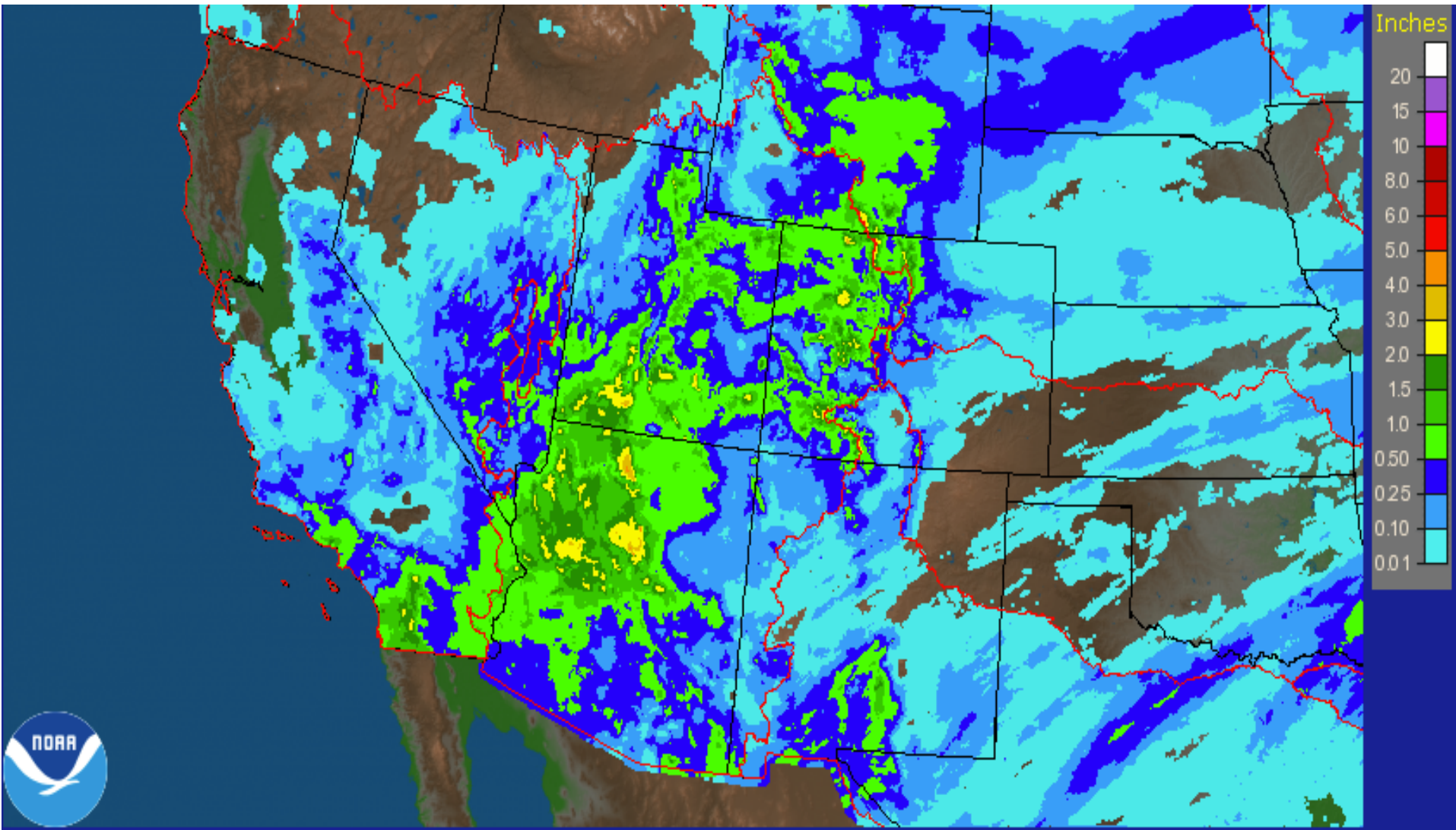
### % Average





# Precipitation

March 1<sup>st</sup> – 4<sup>th</sup> 2015



# February Temperatures

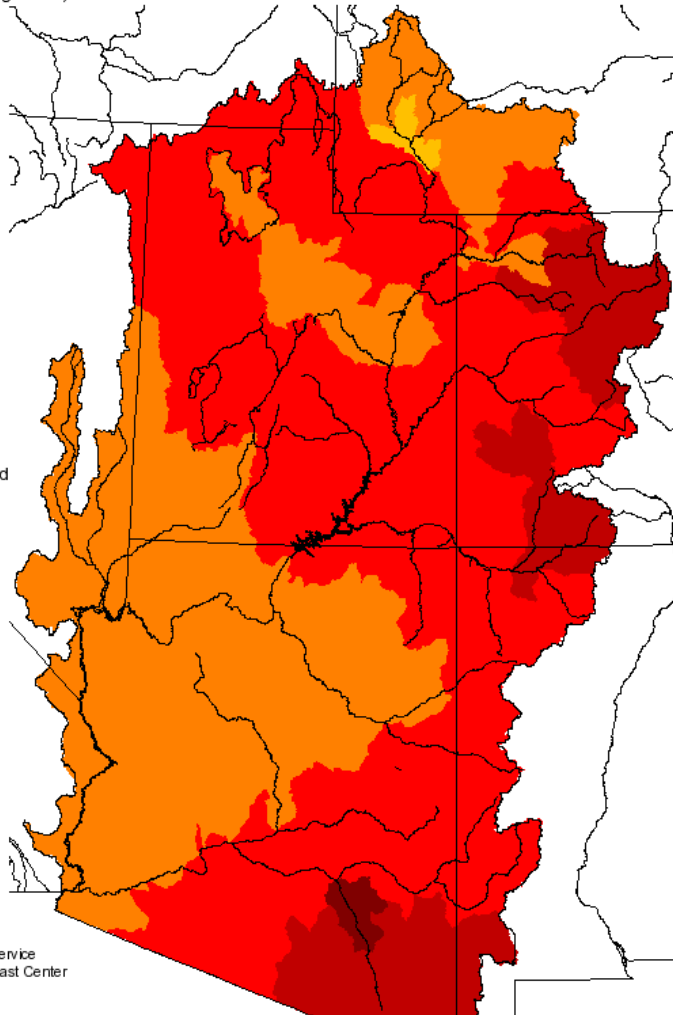
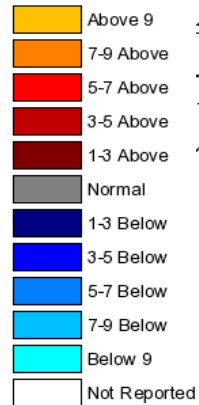
\* Warmest February on Record – Several Locations \*

\* Snowmelt and Increased Streamflow in February \*

## Monthly Max Temp Deviation for February 2015

(Averaged by Hydrologic Unit)

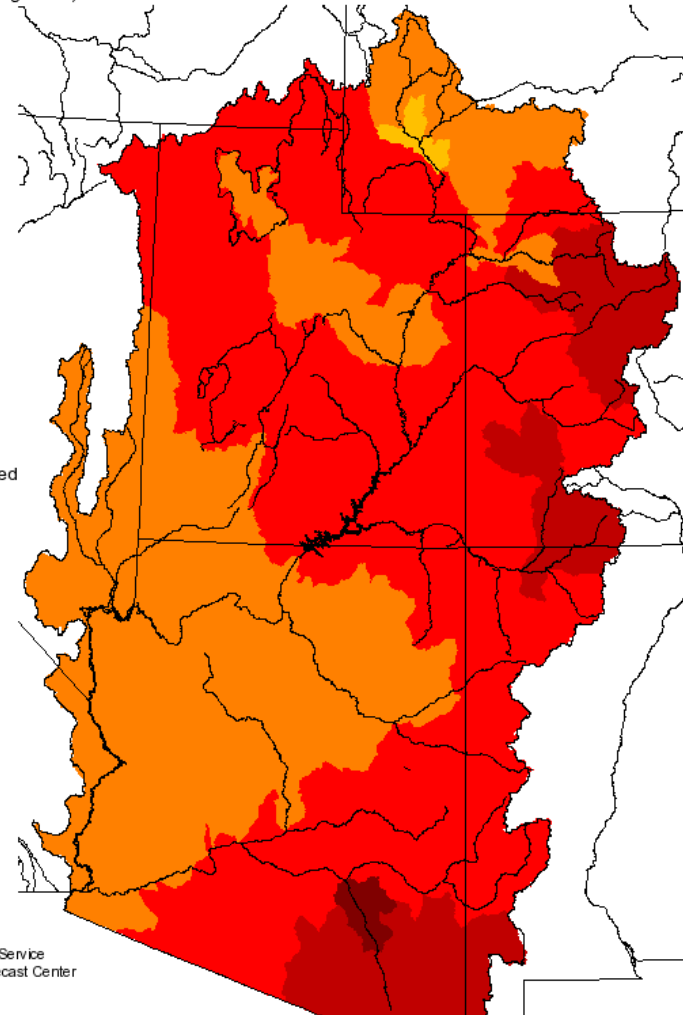
Degrees (F)



## Monthly Max Temp Deviation for February 2015

(Averaged by Hydrologic Unit)

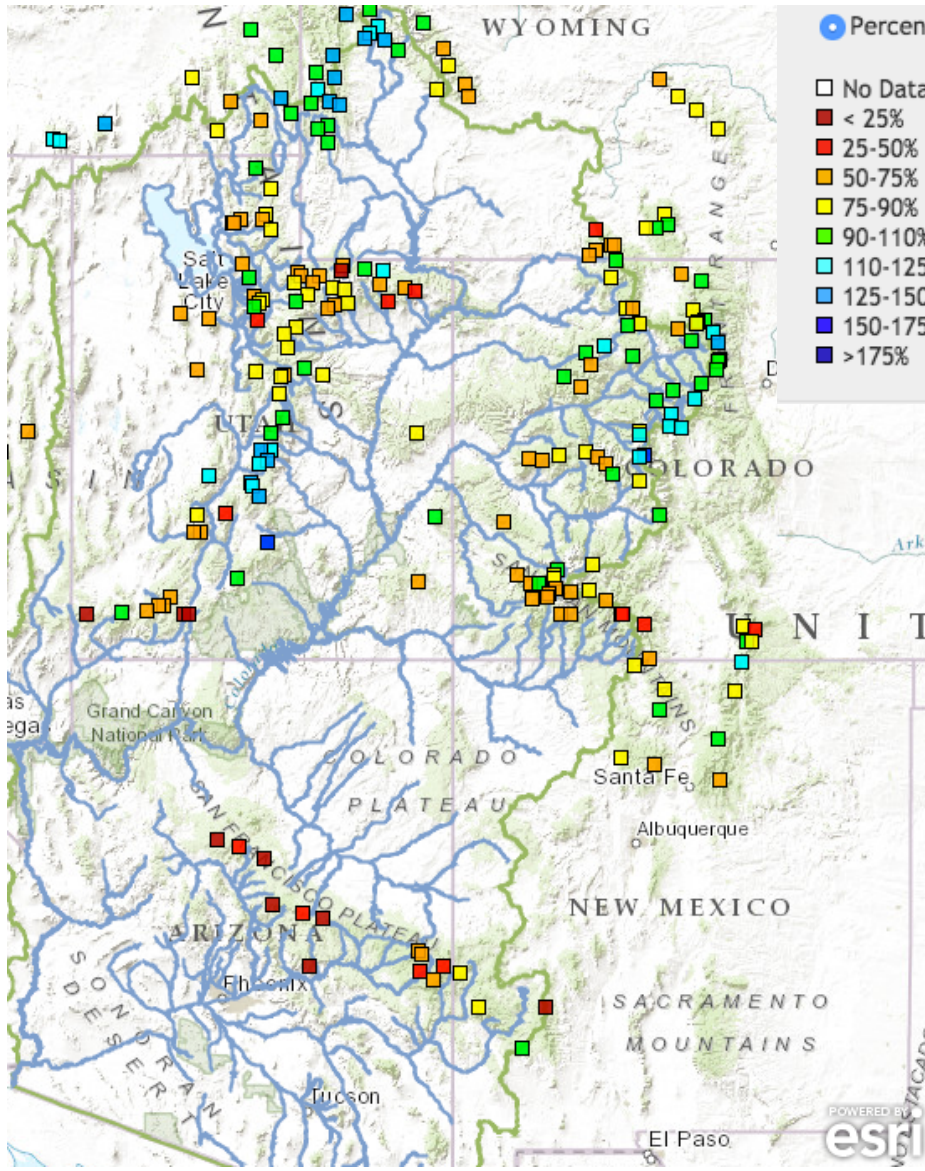
Degrees (F)



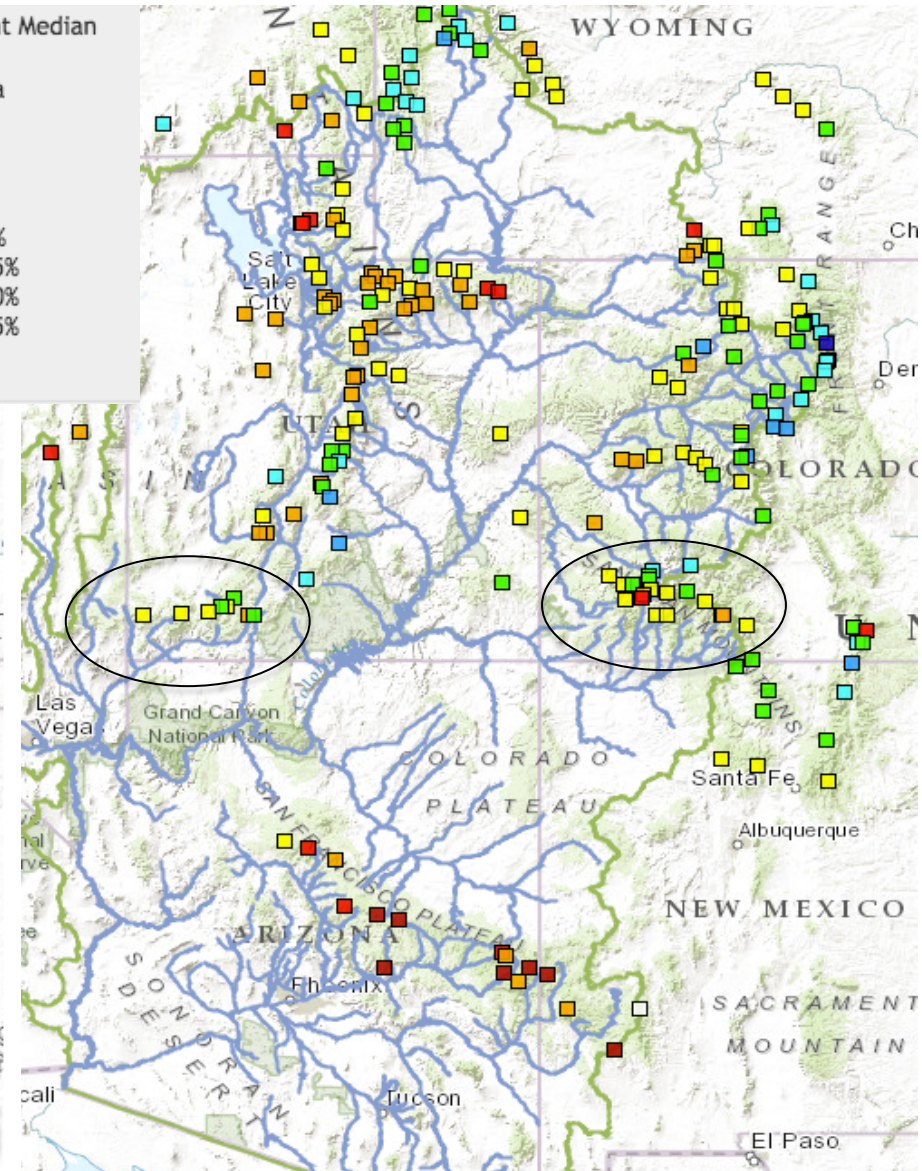


# SNOW CONDITIONS

## SNOTEL SWE – FEB 3 2015



## SNOTEL SWE – MAR 4 2015



- Percent Median
- No Data
  - < 25%
  - 25-50%
  - 50-75%
  - 75-90%
  - 90-110%
  - 110-125%
  - 125-150%
  - 150-175%
  - >175%



# SNOW CONDITIONS

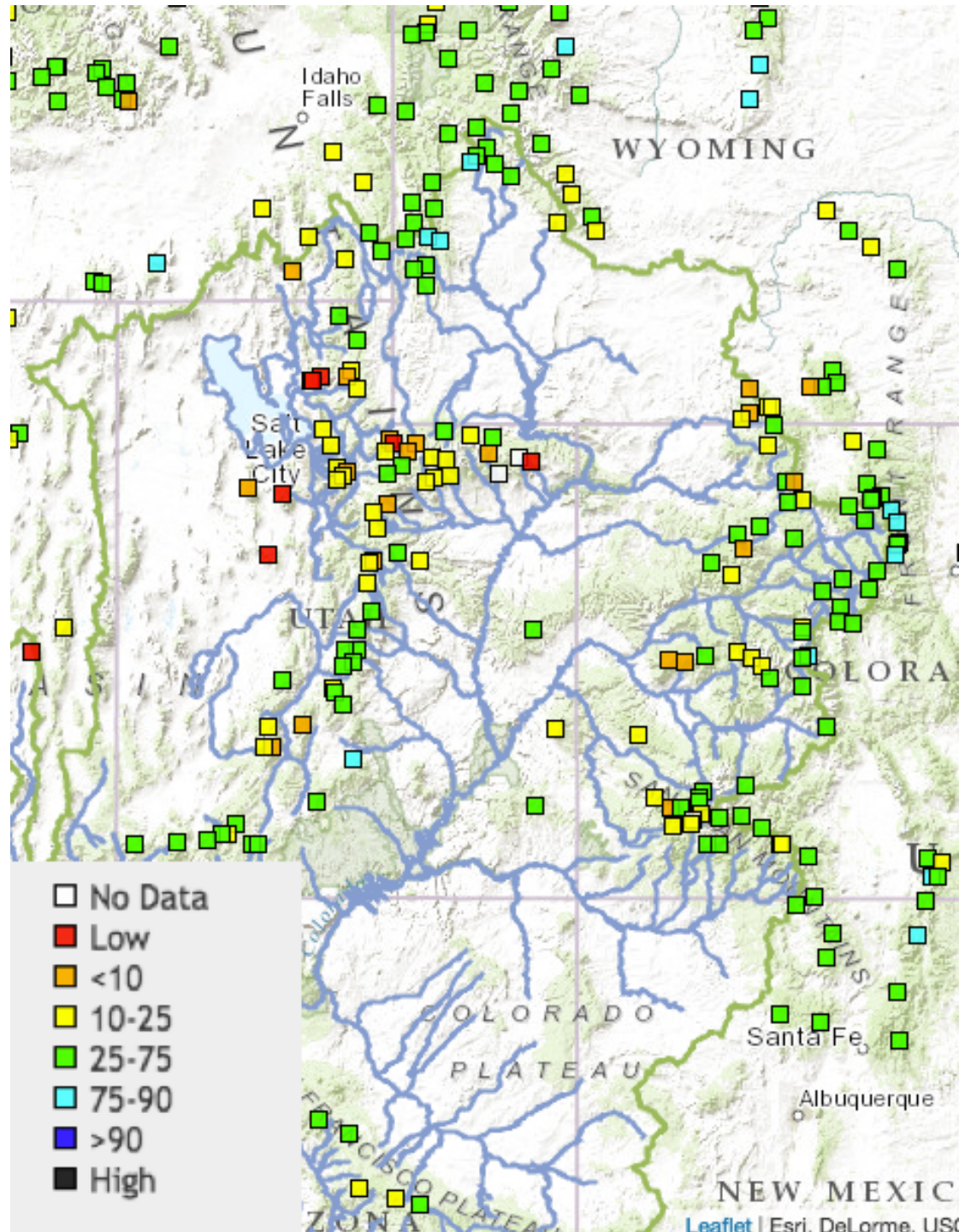
Snow Rankings as of March 3rd

Red – Lowest on Record

Orange – Lowest 2<sup>nd</sup>-5<sup>th</sup> on record

Period of Record

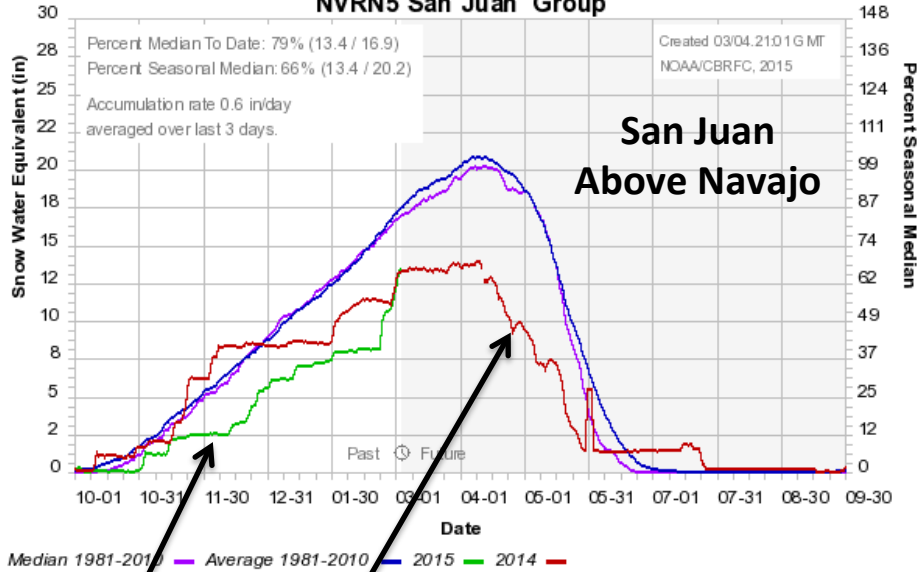
Most around 30-36 years





# SNOTEL SAMPLE

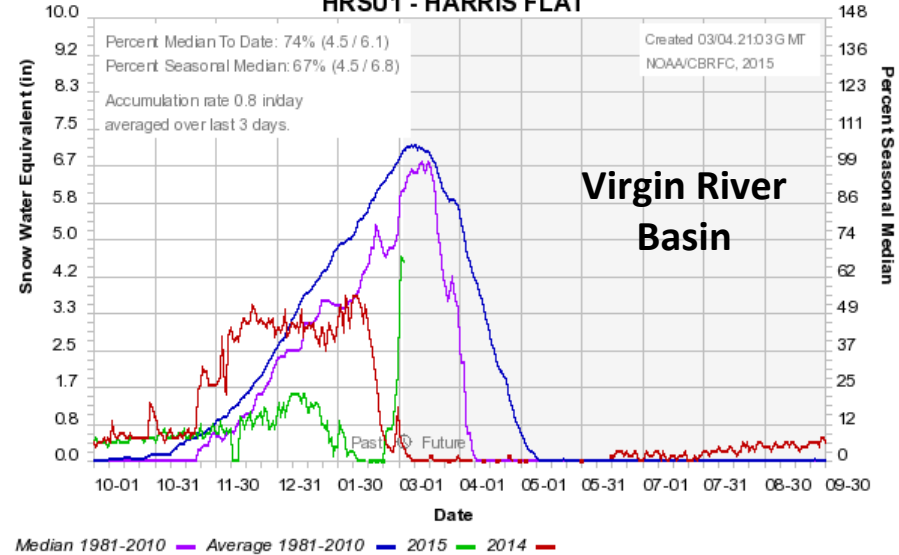
Colorado Basin River Forecast Center  
NVRN5 San Juan Group



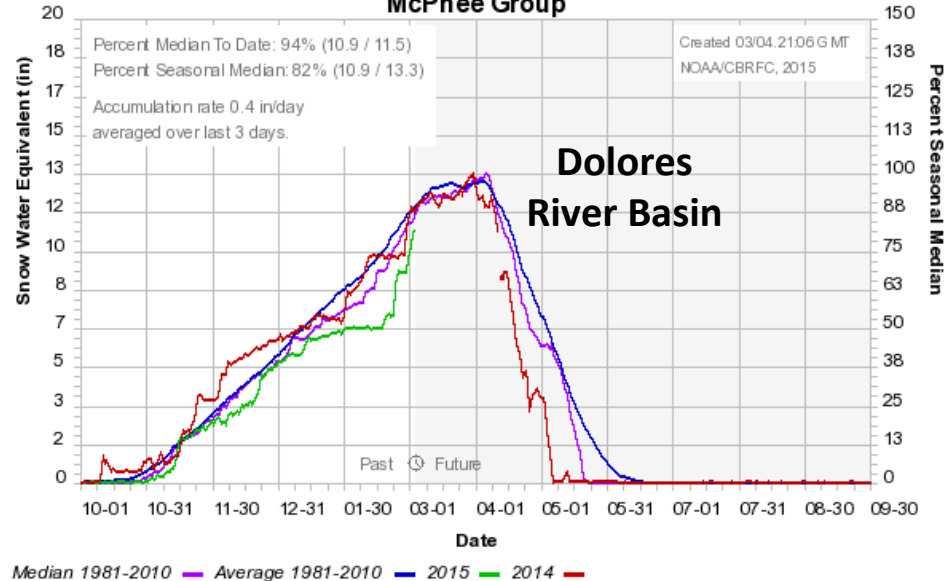
This Year Last Year

Average = Blue Line  
Median = Purple Line

Colorado Basin River Forecast Center  
HRSU1 - HARRIS FLAT

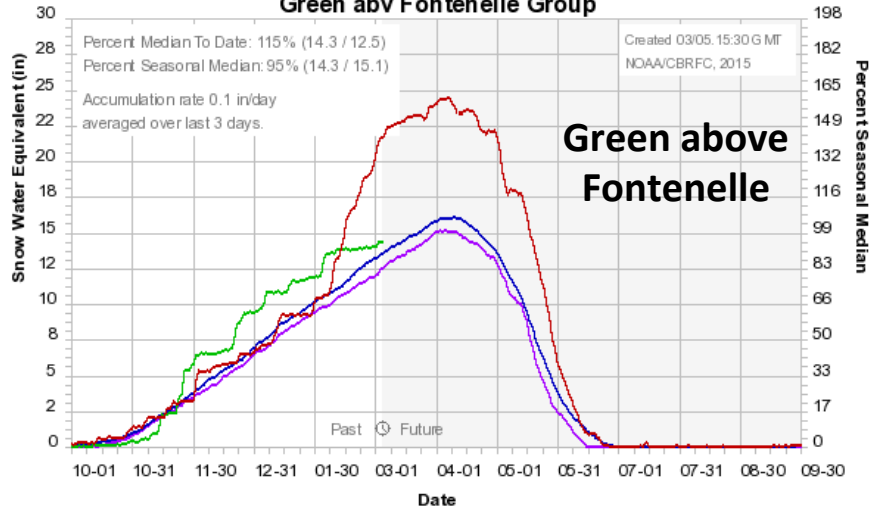


Colorado Basin River Forecast Center  
McPhee Group

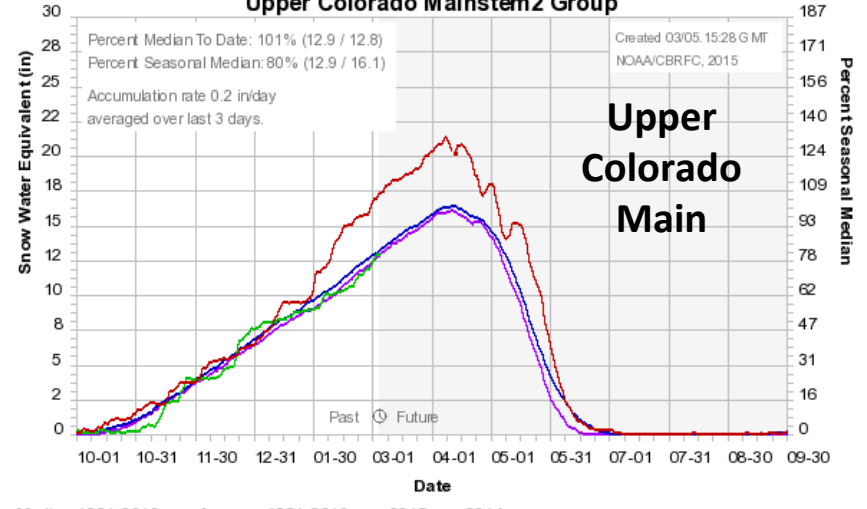


# SNOTEL SAMPLE

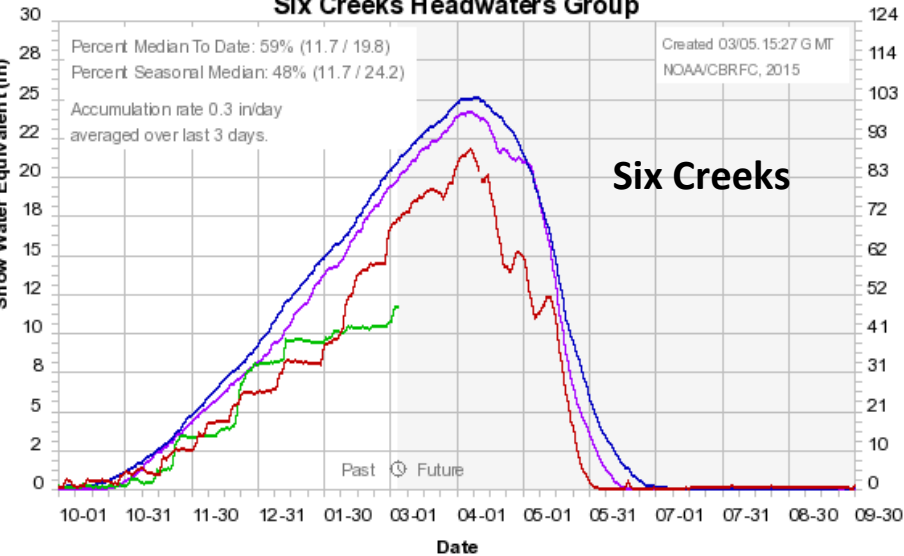
Colorado Basin River Forecast Center  
Green abv Fontenelle Group



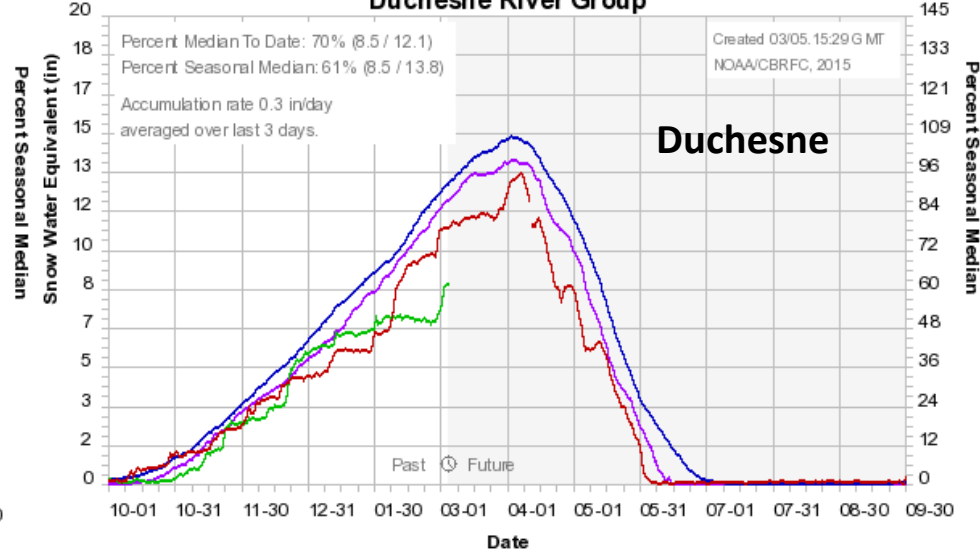
Colorado Basin River Forecast Center  
Upper Colorado Mainstem2 Group



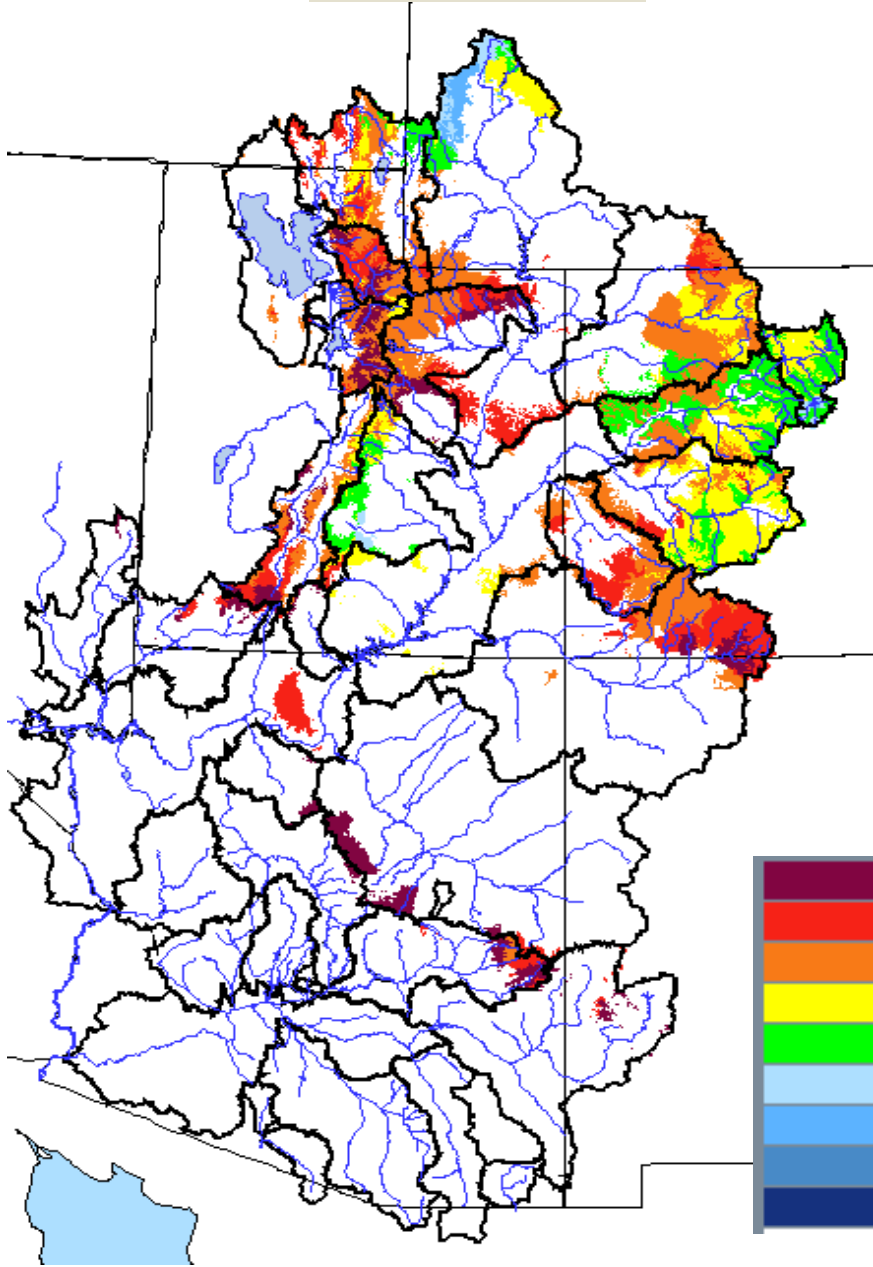
Colorado Basin River Forecast Center  
Six Creeks Headwaters Group



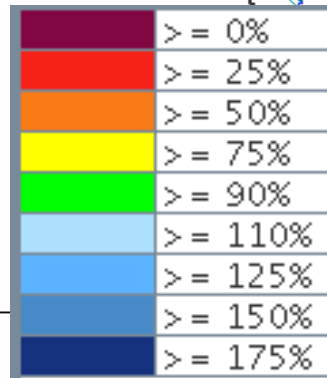
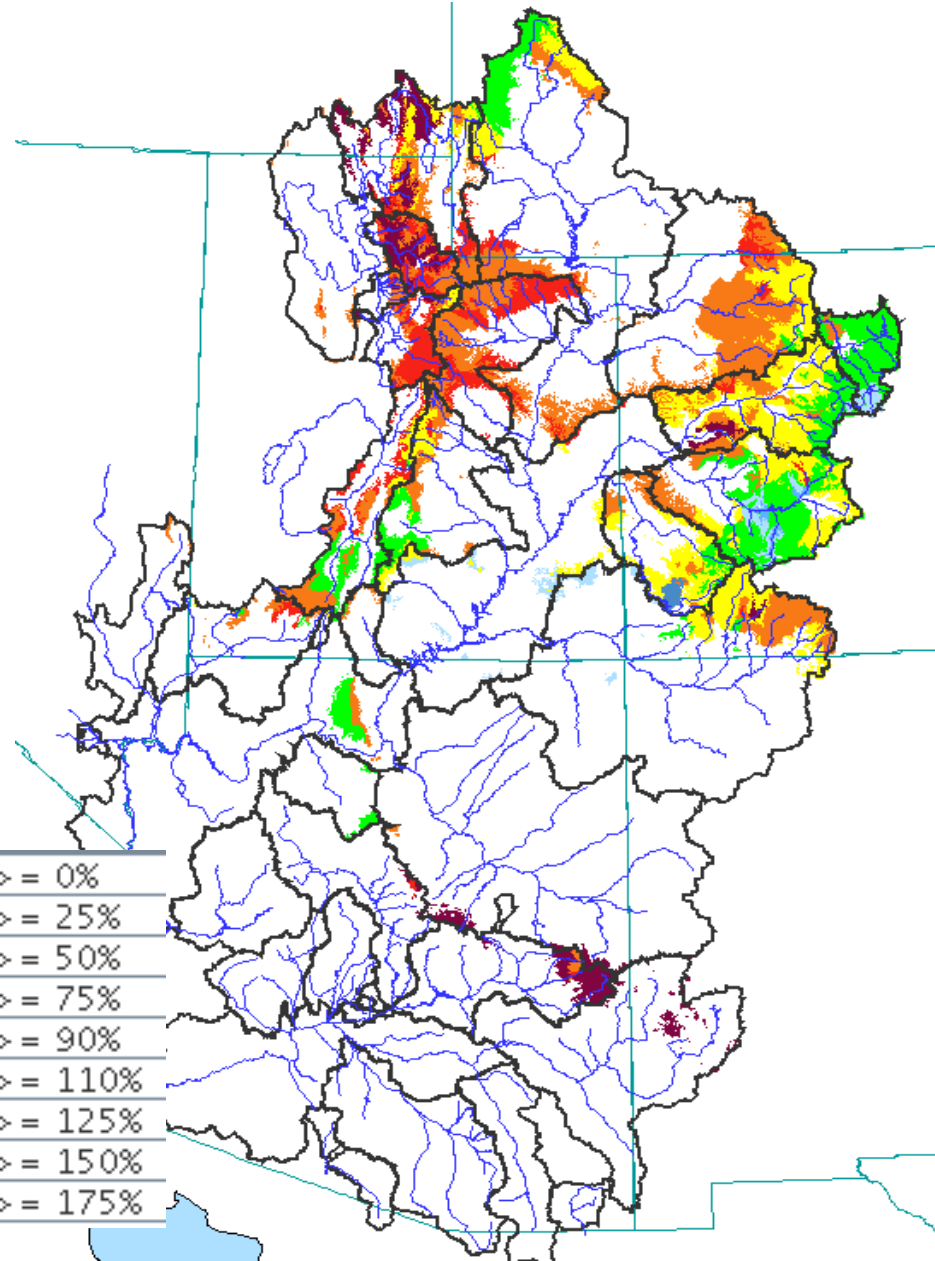
Colorado Basin River Forecast Center  
Duchesne River Group



Model Snow  
2/4/2015



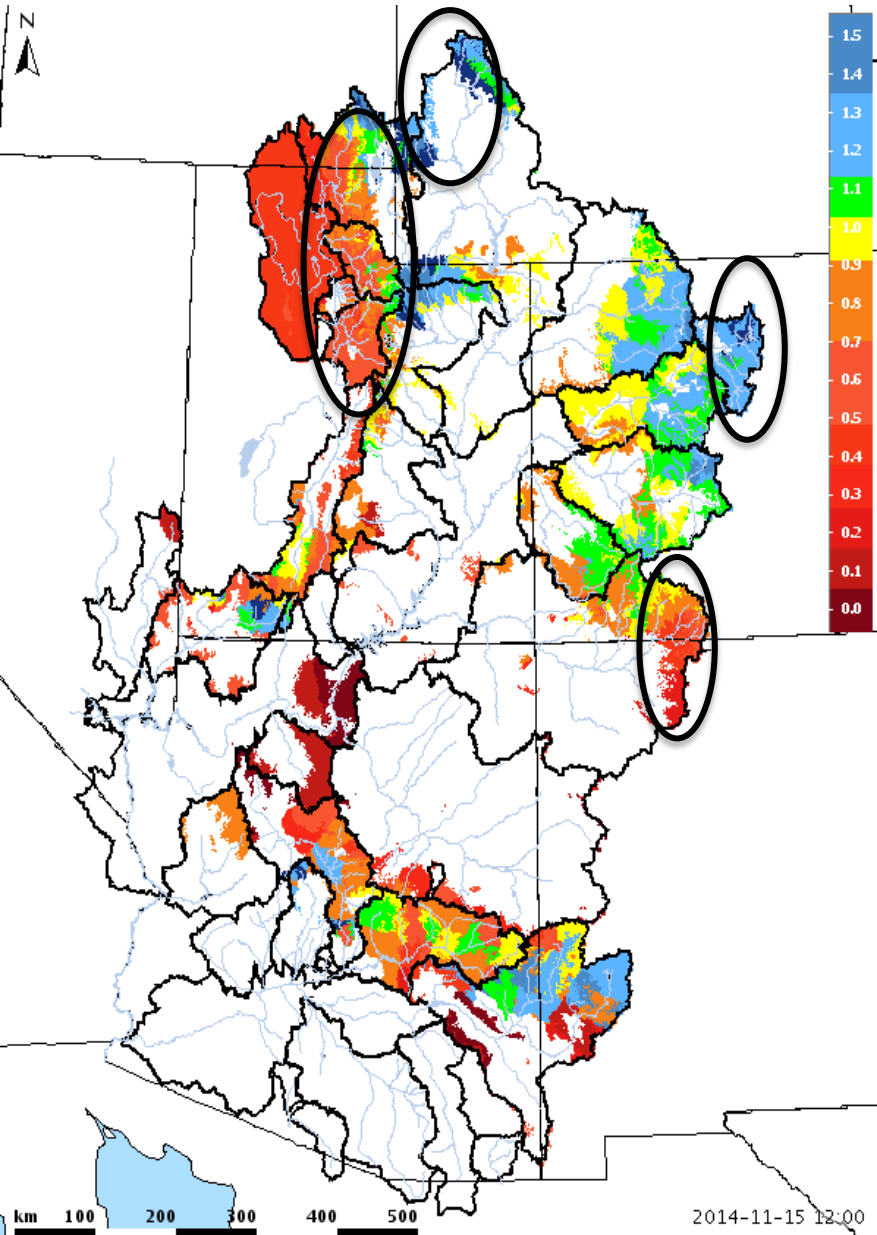
Model Snow  
3/4/2015



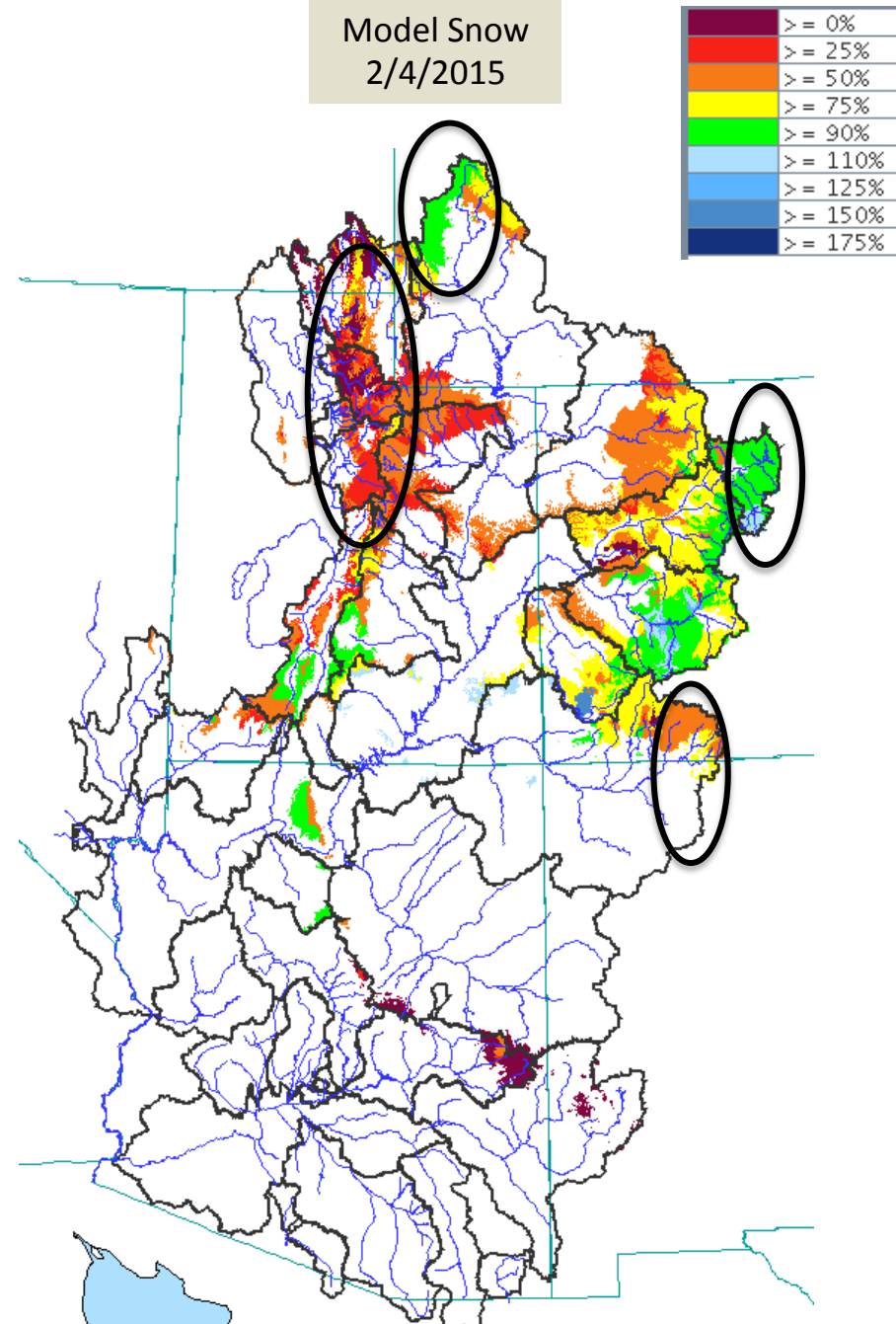


# Model Soil Moisture and Snow – Where are the signals the same ?

Model Soil Moisture  
11/15/2015



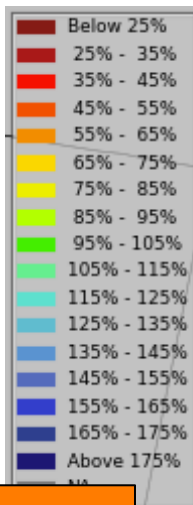
Model Snow  
2/4/2015



>= 0%
>= 25%
>= 50%
>= 75%
>= 90%
>= 110%
>= 125%
>= 150%
>= 175%

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

Apr-Jul Volumes / % Average – (50% exceedance forecasts)



**Fontenelle:**  
710 KAF / 98%

**Flaming Gorge:**  
825 KAF / 84%

**Yampa-Deerlodge:**  
925 KAF / 75%

**Colorado-Cameo:**  
2110 KAF / 89%

**Blue Mesa:**  
600 KAF / 89%

**McPhee Res:**  
230 KAF / 78%

**Navajo Res:**  
415 KAF / 57%

**Bear-UT/WY Stateline:**  
91 KAF / 81 %

**Little Cottonwood-SLC:**  
25 KAF / 66 %

**Weber-Oakley:**  
79 KAF / 67%

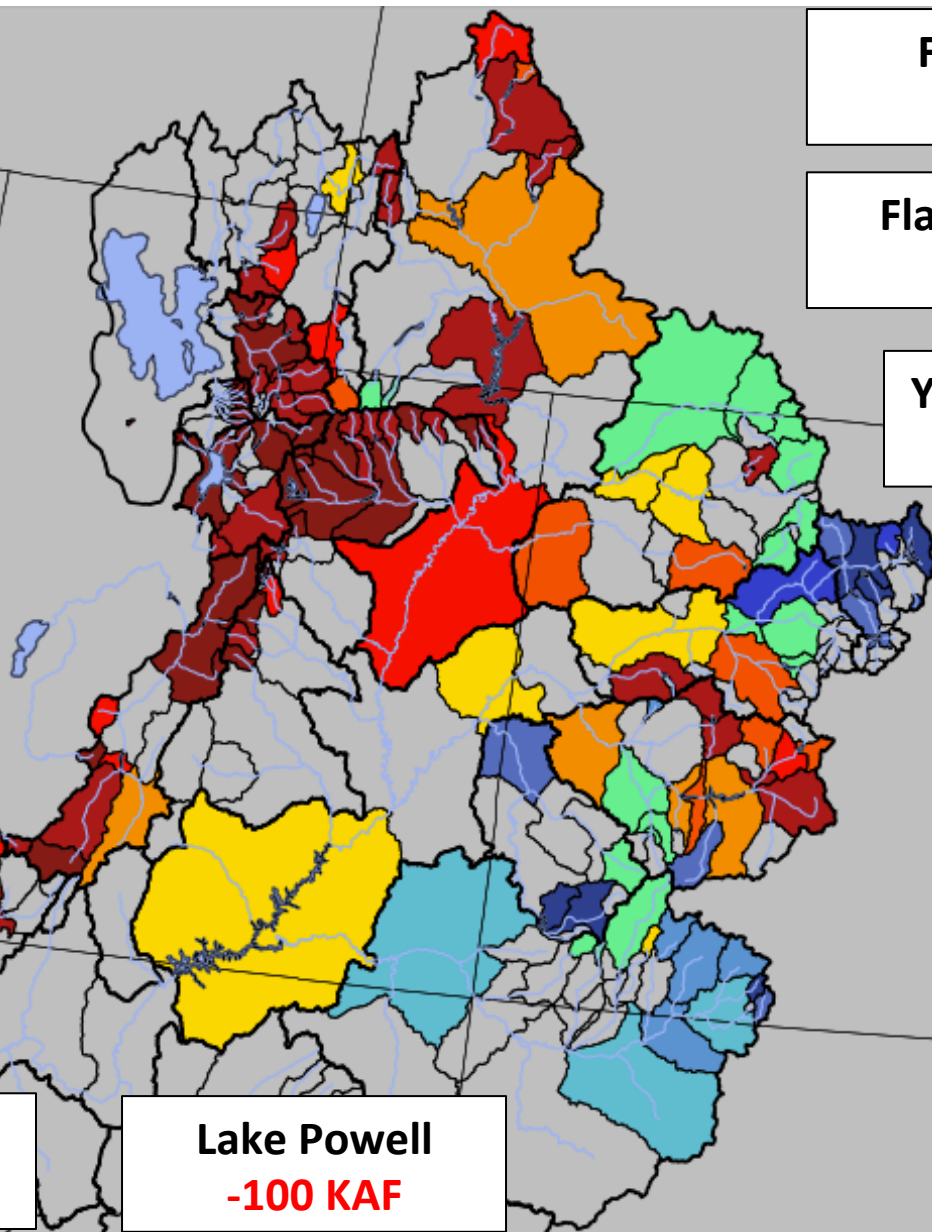
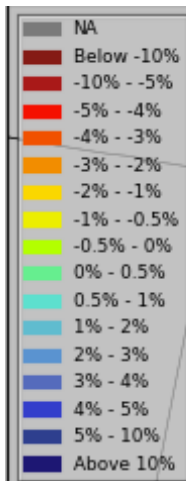
**Provo-Woodland:**  
71 KAF / 71%

**Virgin-Virgin:**  
28 KAF / 43%

**Lake Powell:**  
5100 KAF / 71%

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

Apr-Jul Volumes / % Of Average Change from February 1<sup>st</sup> Forecasts



**Fontenelle**  
**-15 KAF**

**Flaming Gorge**  
**-50 KAF**

**Yampa - Deerlodge**  
**-20 KAF**

**Bear-UT/WY Stateline**  
**-4 KAF**

**Little Cottonwood-SLC:**  
**-5 KAF**

**Weber-Oakley**  
**-8 KAF**

**Provo-Woodland**  
**-11 KAF**

**Colorado-Cameo**  
**-40 KAF**

**Blue Mesa**  
**-20 KAF**

**McPhee Res**  
**+ 25 KAF**

**Virgin-Virgin**  
**-4 KAF**

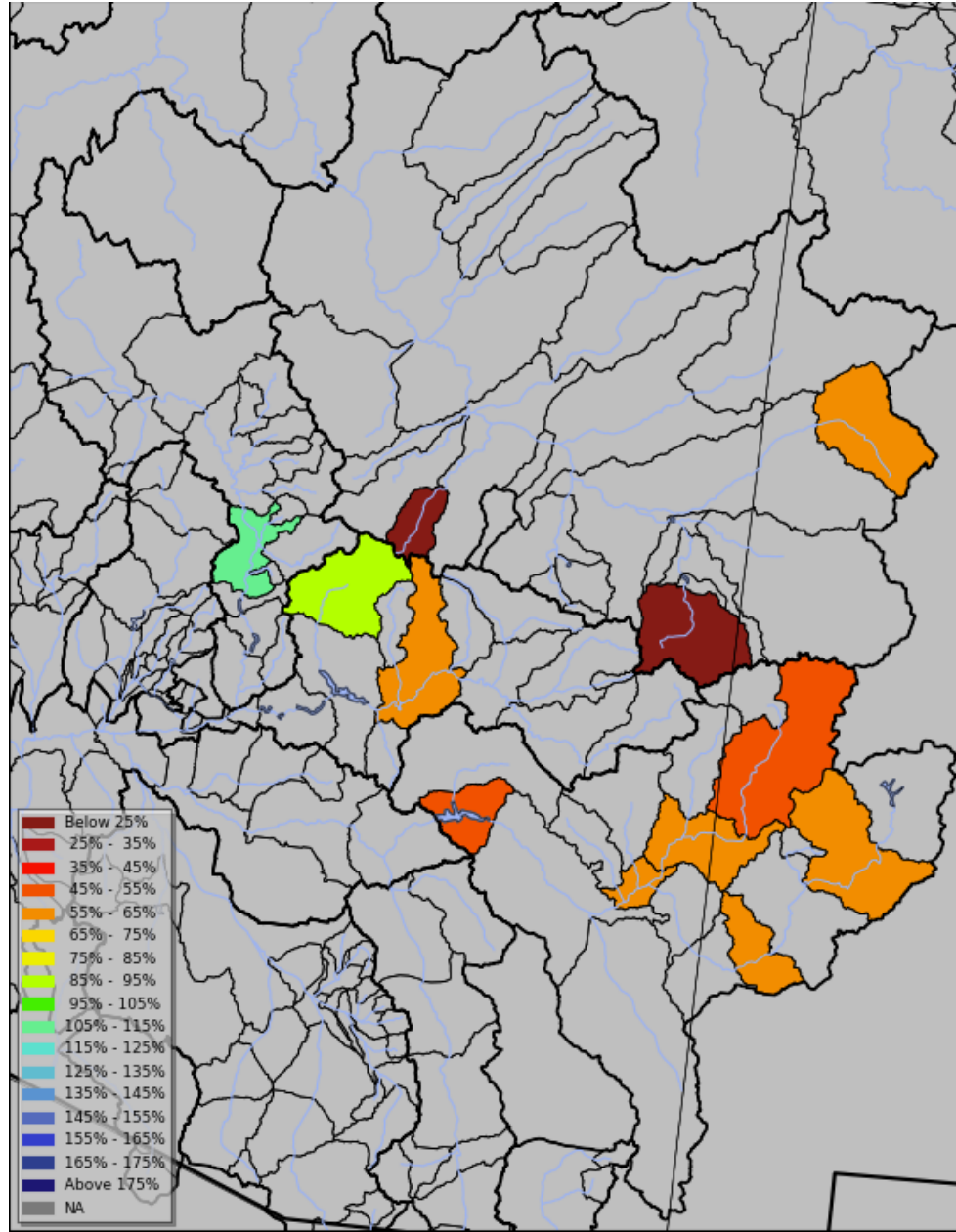
**Lake Powell**  
**-100 KAF**

**Navajo Res**  
**+ 15 KAF**



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

Mar-May Volumes / % Median



**Little Colorado-Lyman:**  
1.2 KAF / 21%

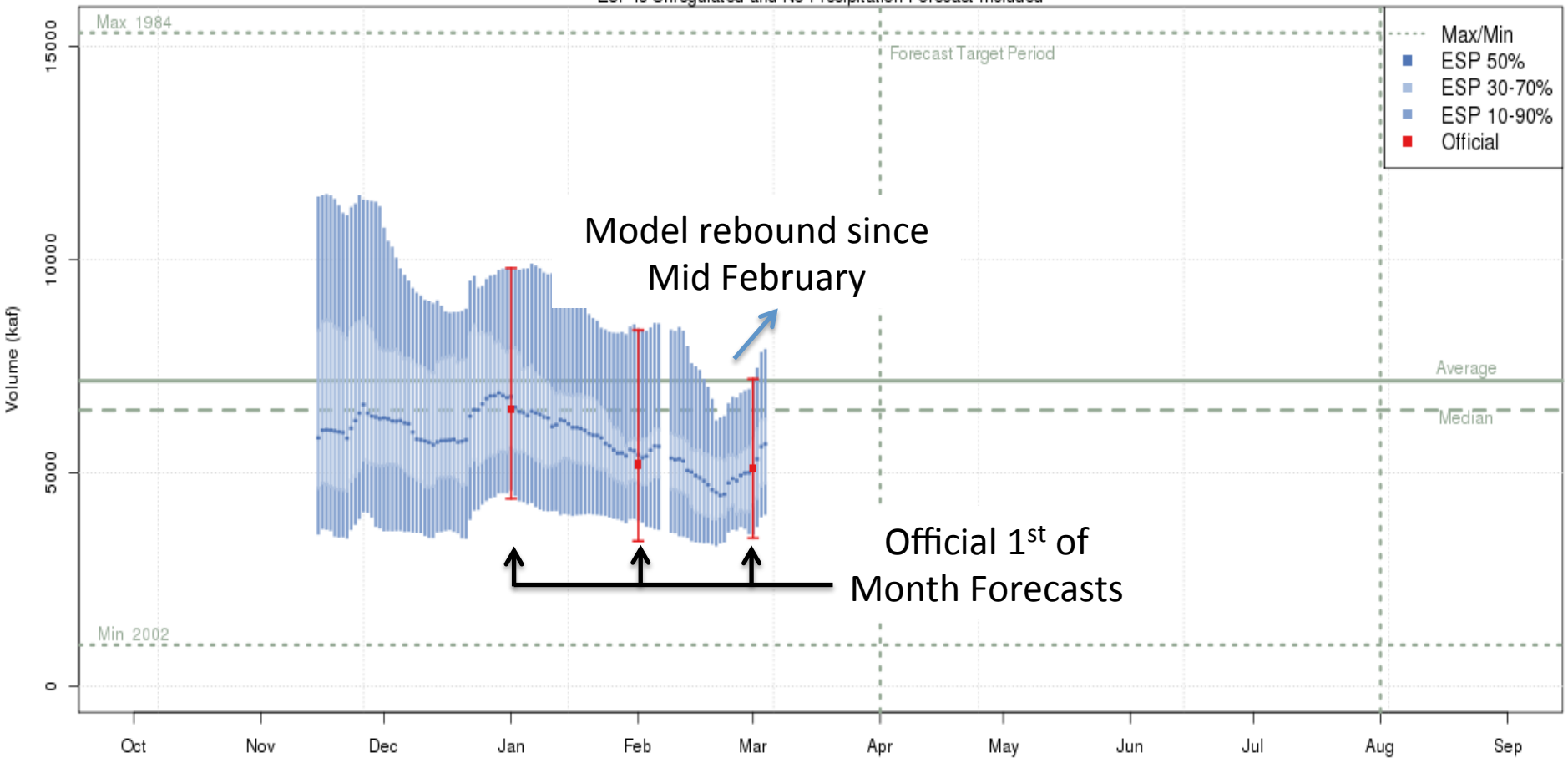
**Verde-Horseshoe:**  
117 KAF / 109%

**Salt - Roosevelt:**  
135 KAF / 56%

**Gila-Gila:**  
50 KAF / 56%

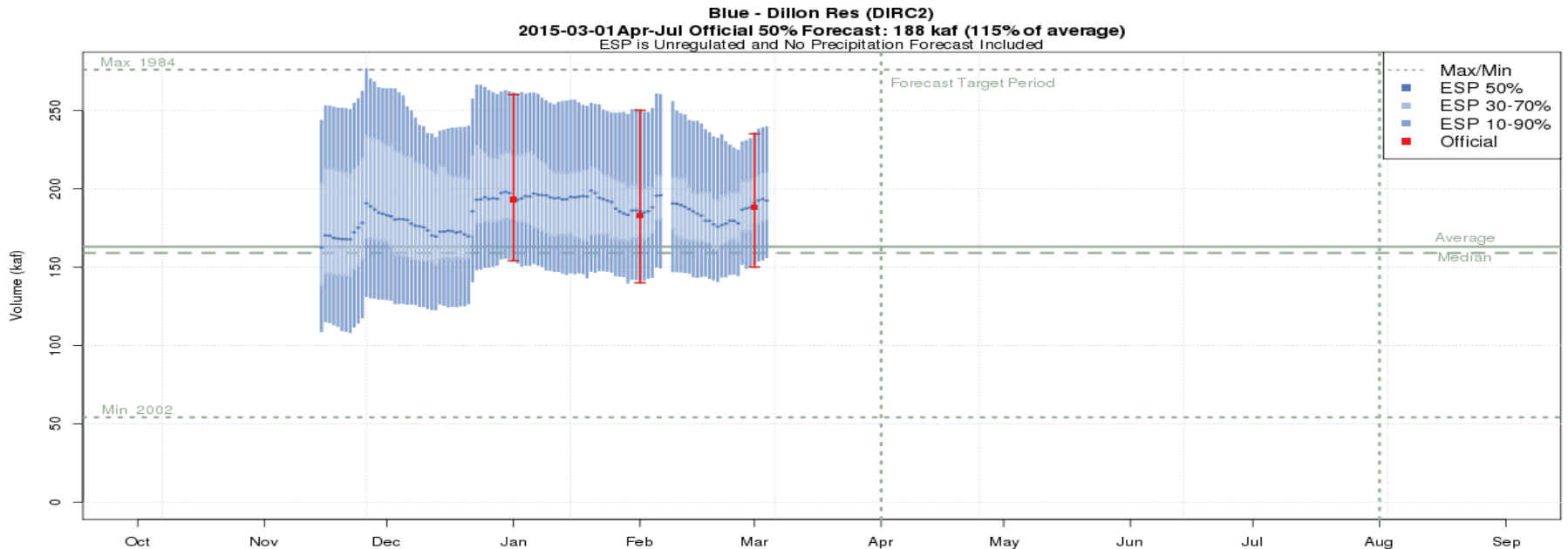
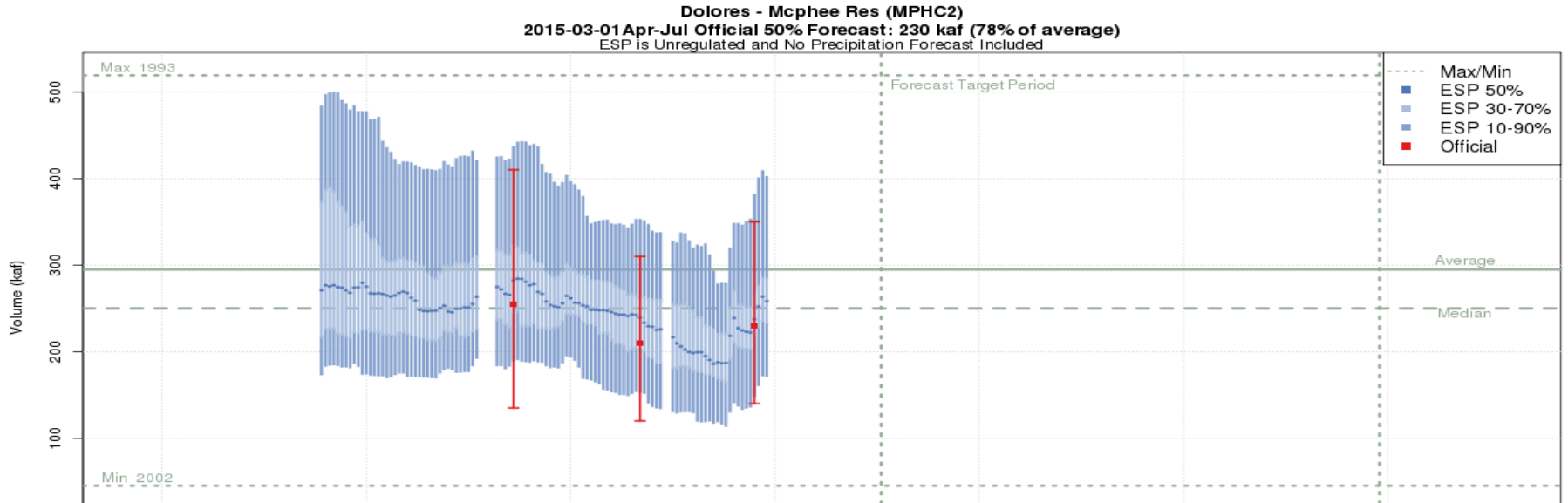
# Lake Powell – Model Forecast Evolution Plot

Colorado - Lake Powell- Glen Cyn Dam- At (GLDA3)  
2015-03-01 Apr-Jul Official 50% Forecast: 5100 kaf (71% of average)  
ESP is Unregulated and No Precipitation Forecast Included



The latest (2015-03-04) 50% ESP forecast is 5678 kaf.  
Plot Created 2015-03-04 14:15:17, NOAA / NWS / CBRFC

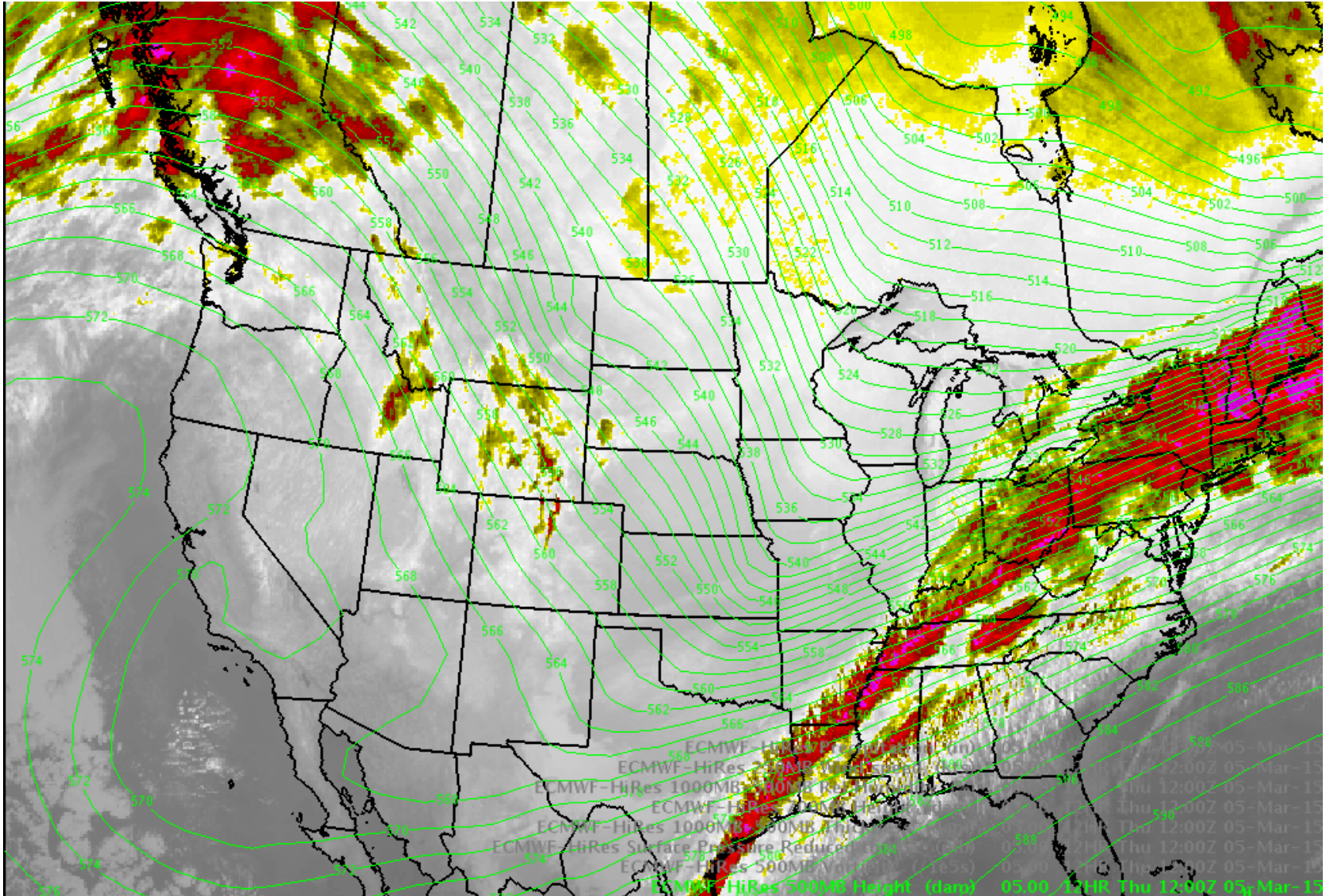
# Forecast Guidance Evolution Plot





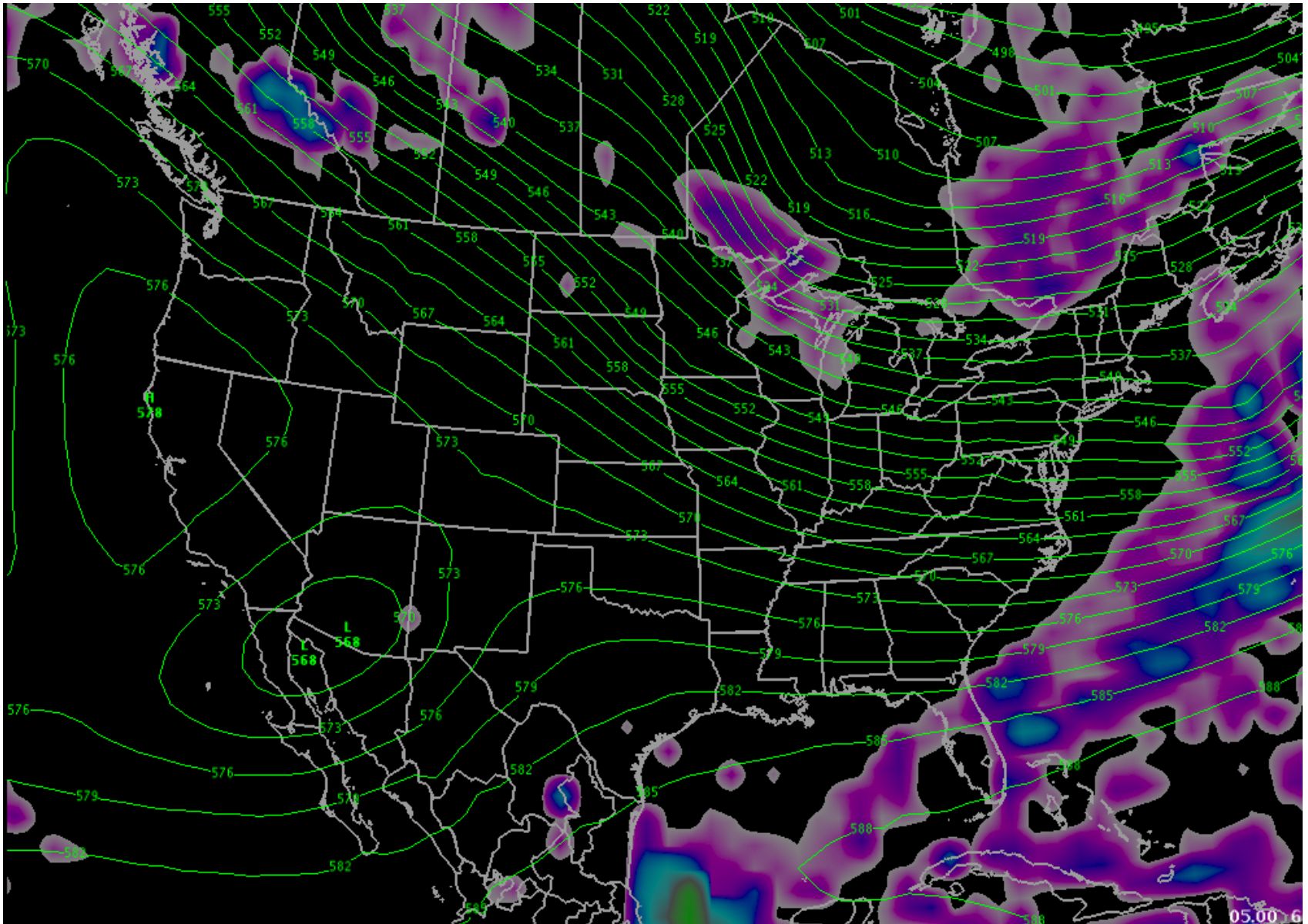
# FUTURE WEATHER

There it is – Ridge of high pressure building into the area over the next few days  
- Satellite image as of 3/5/2015 -



# FUTURE WEATHER

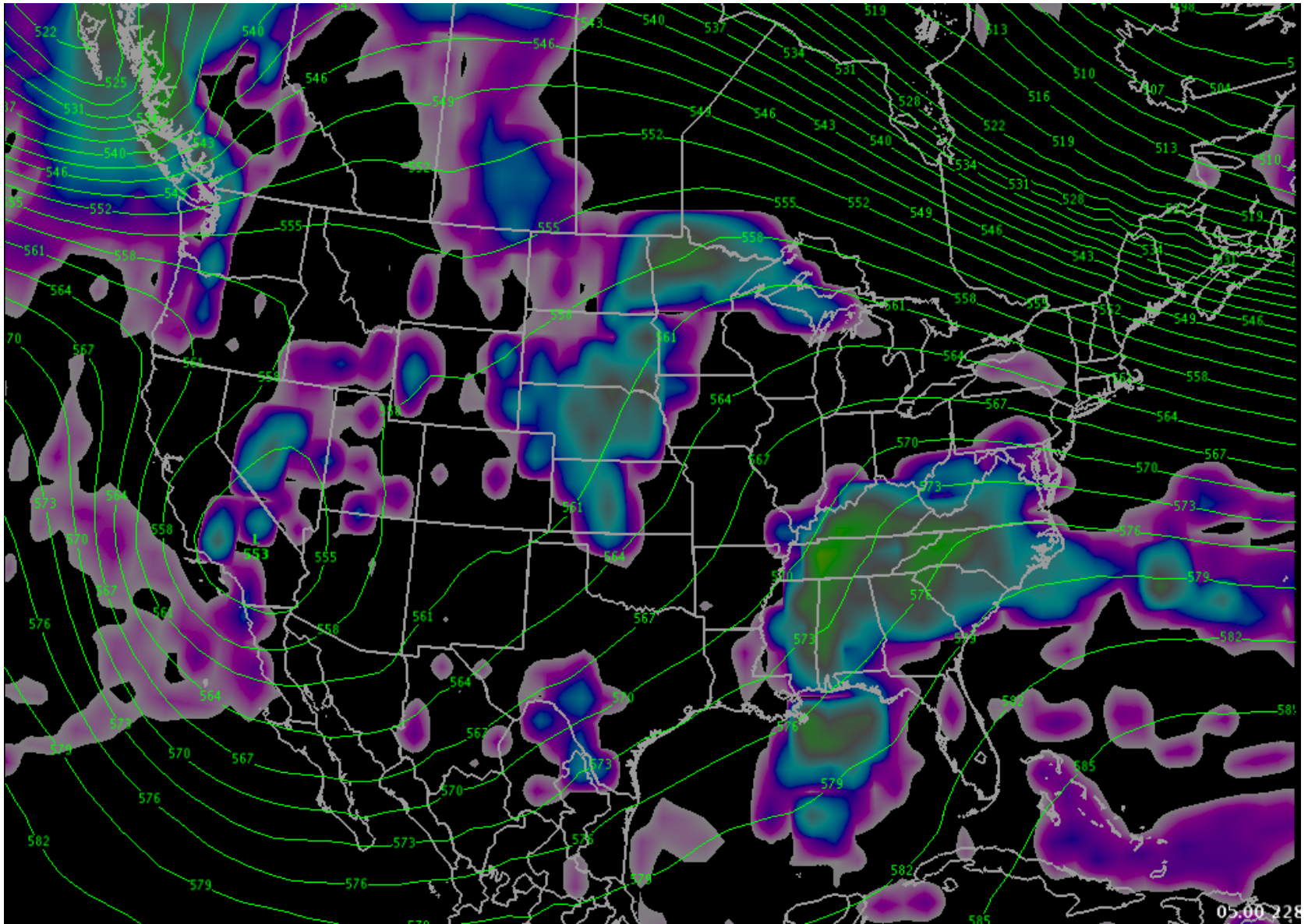
Dry weather through late next week  
- Model Guidance For Saturday March 7th-





# FUTURE WEATHER

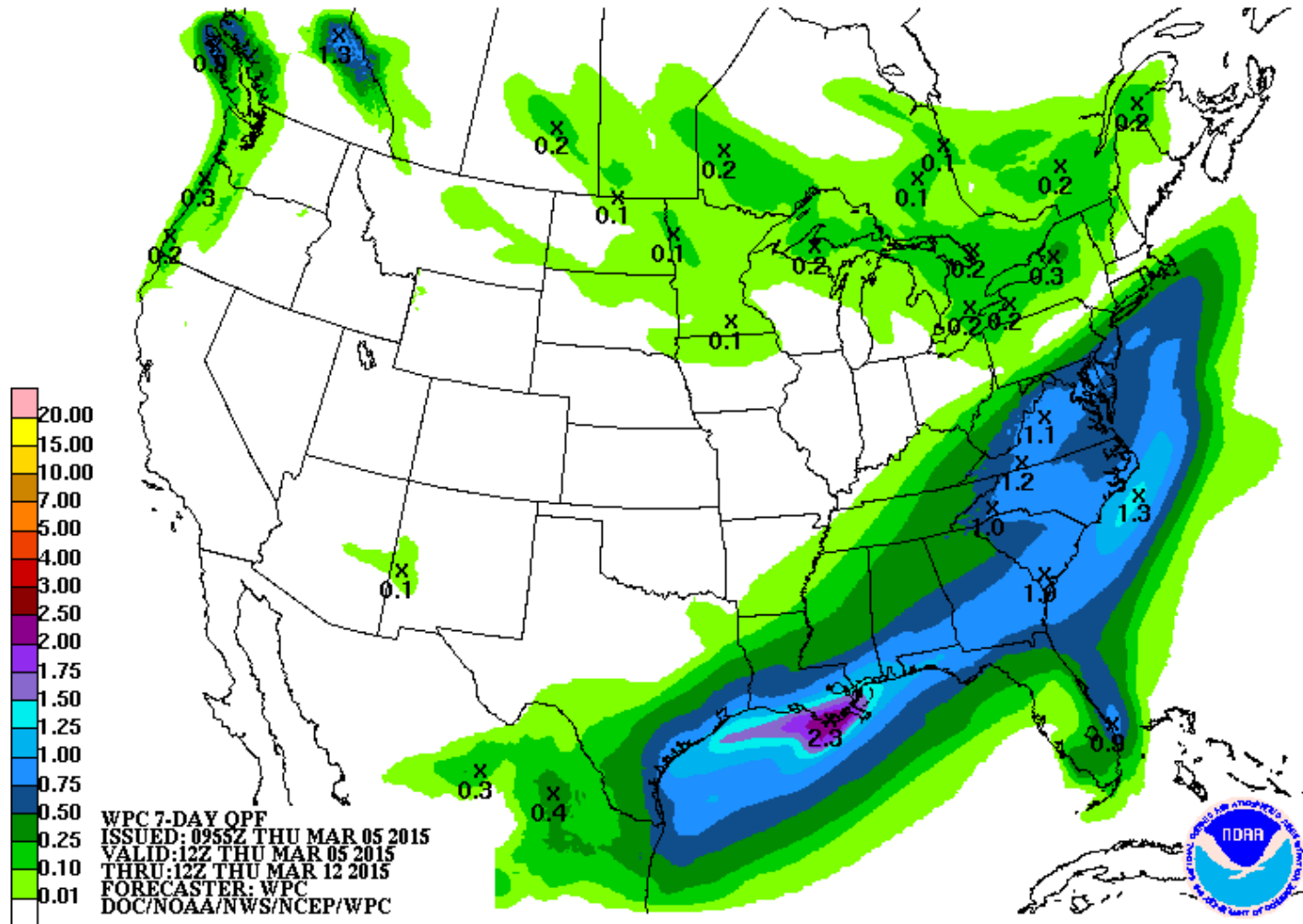
Precipitation returns next weekend  
- Model Guidance For Saturday March 14th-



# Quantitative Precipitation Forecast

Weather Prediction Center

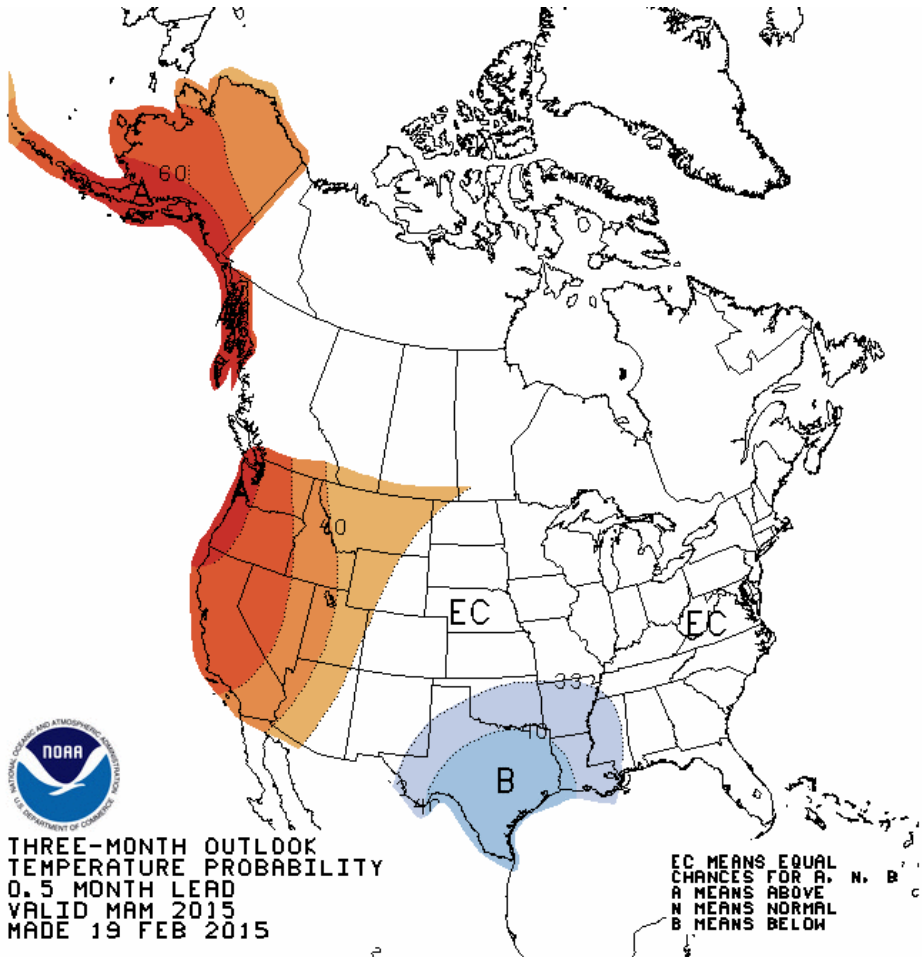
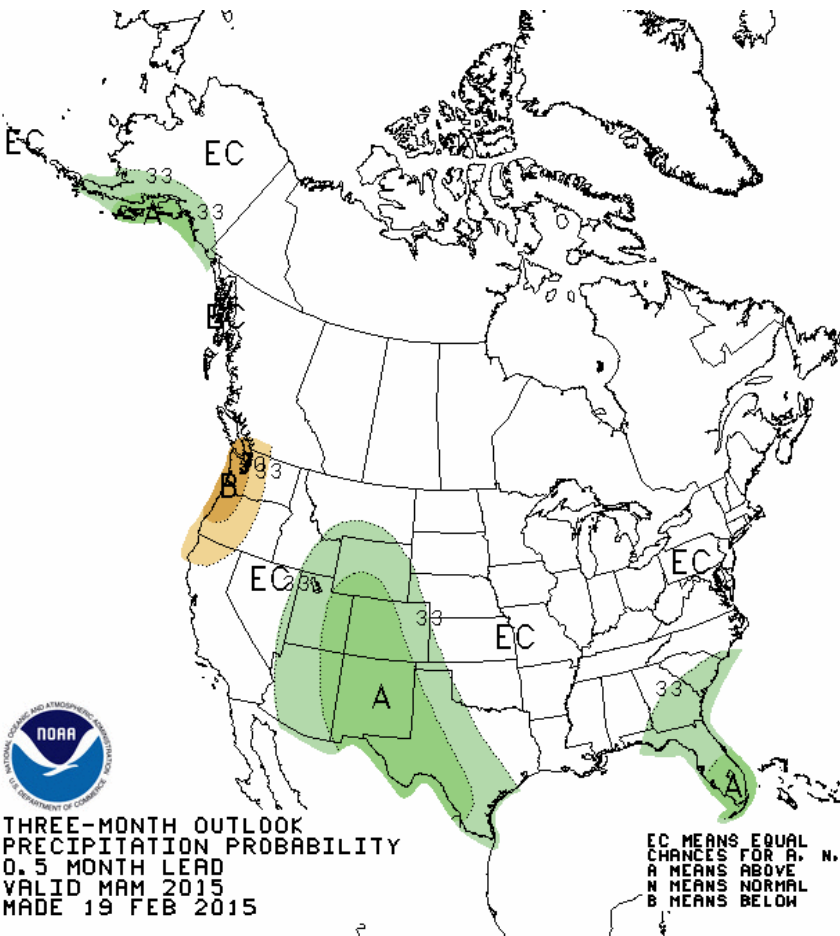
7 Day Total March 5-12





# LONG RANGE OUTLOOK

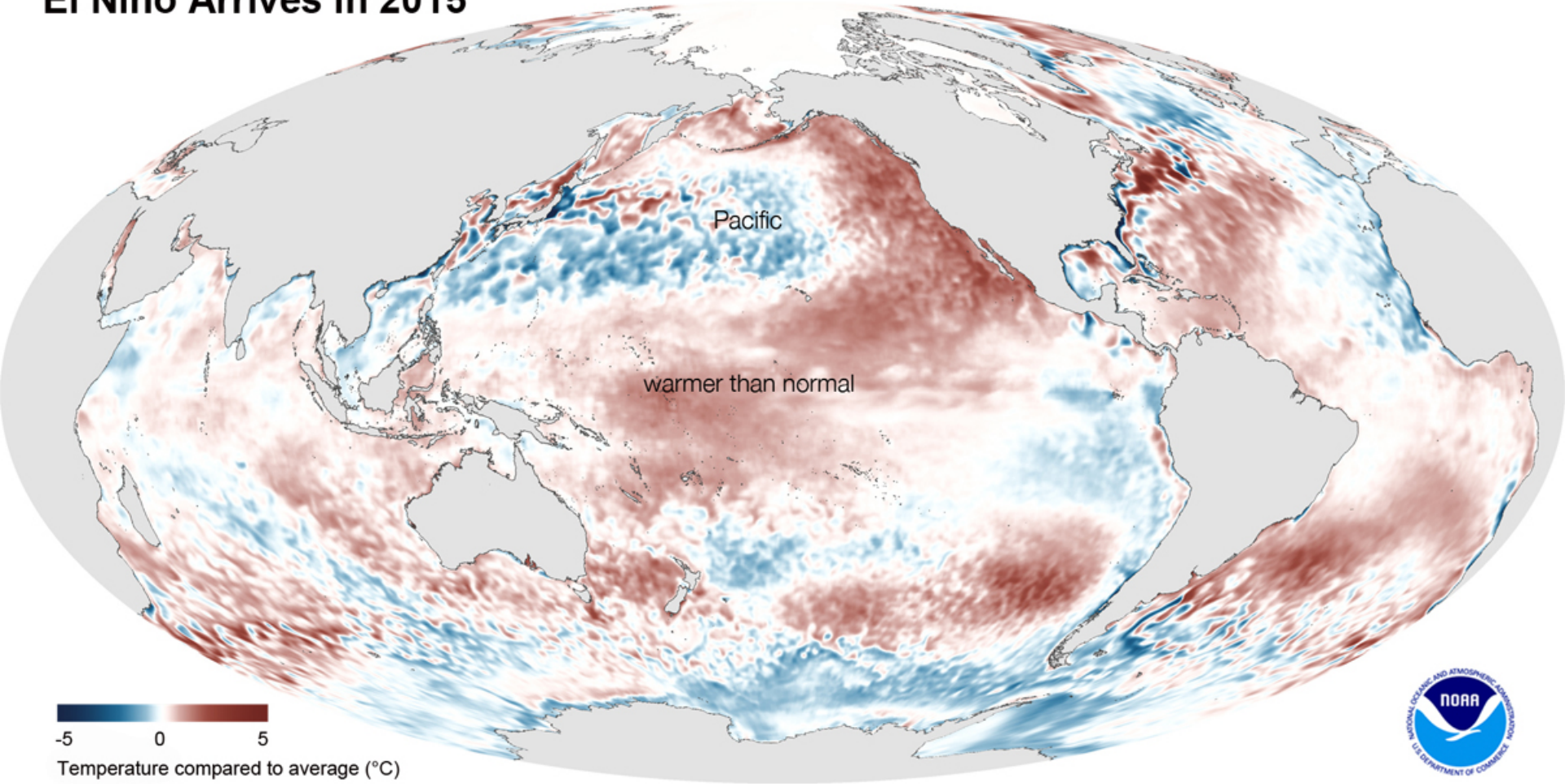
## Climate Prediction Center 90 day outlooks



# LONG RANGE OUTLOOK

Weak El Nino Exists

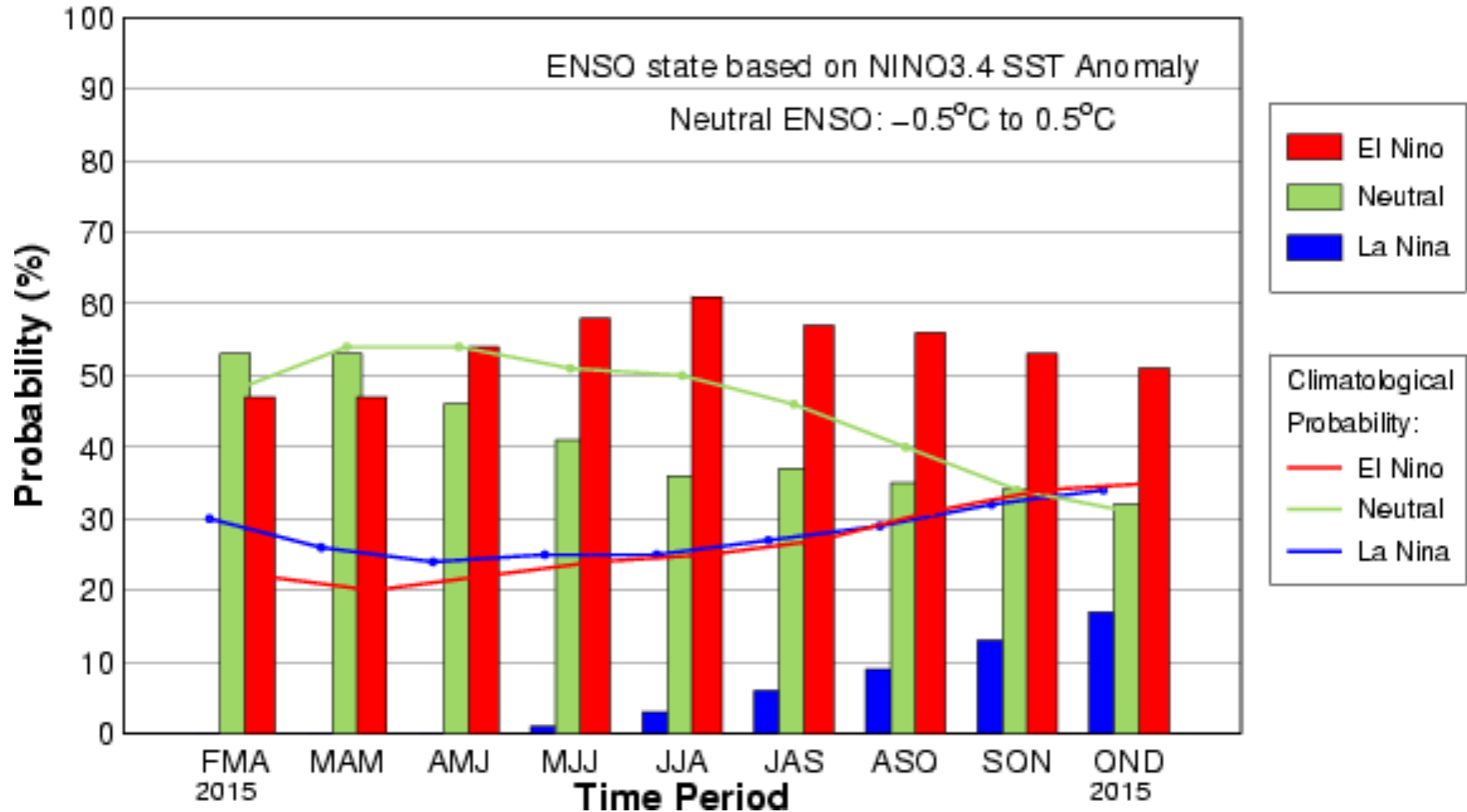
## El Niño Arrives in 2015



# LONG RANGE WEATHER – CLIMATE SIGNAL

Currently weak El Nino conditions. Neutral late spring.  
Raw model shows tendency toward El Nino remainder of 2015

## Mid-Feb IRI/CPC Plume-Based Probabilistic ENSO Forecast

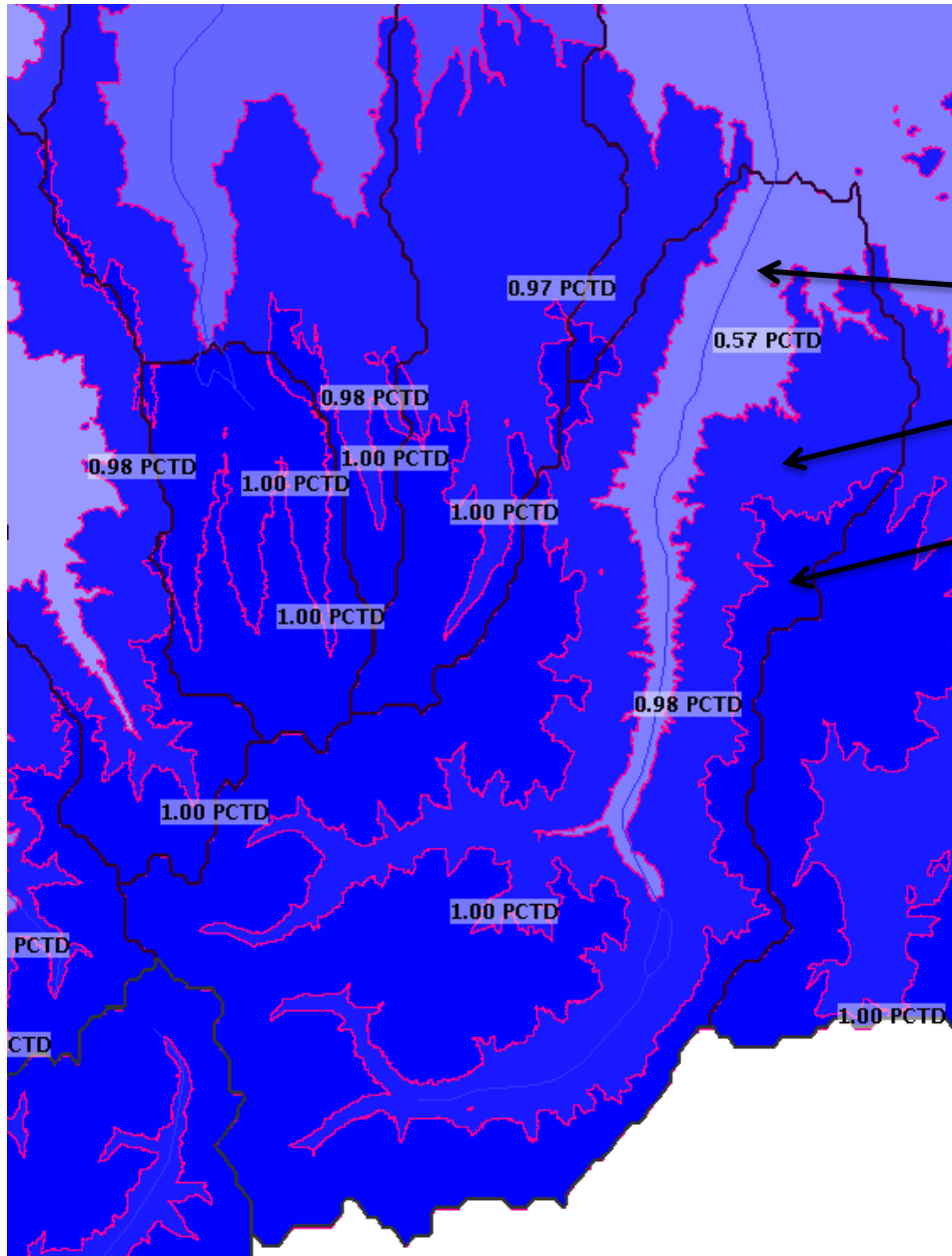


# Area Extent of Snow

- Important model state affects both timing and volume of runoff / seasonal recession
- Larger impact to late season forecasts
- Related to the snow amount within the model
- Wish to “fine tune” model states (late season-melt)



# Snow Cover From the Model - Lake Fork nr Gateway (Gunnison Basin)



Elevation Band (FT)    Snow Cover (%)

Lower (8176-9170 ):                      57%

Middle (9170-11138):                      98%

Upper (11138 – 12874):                      100%

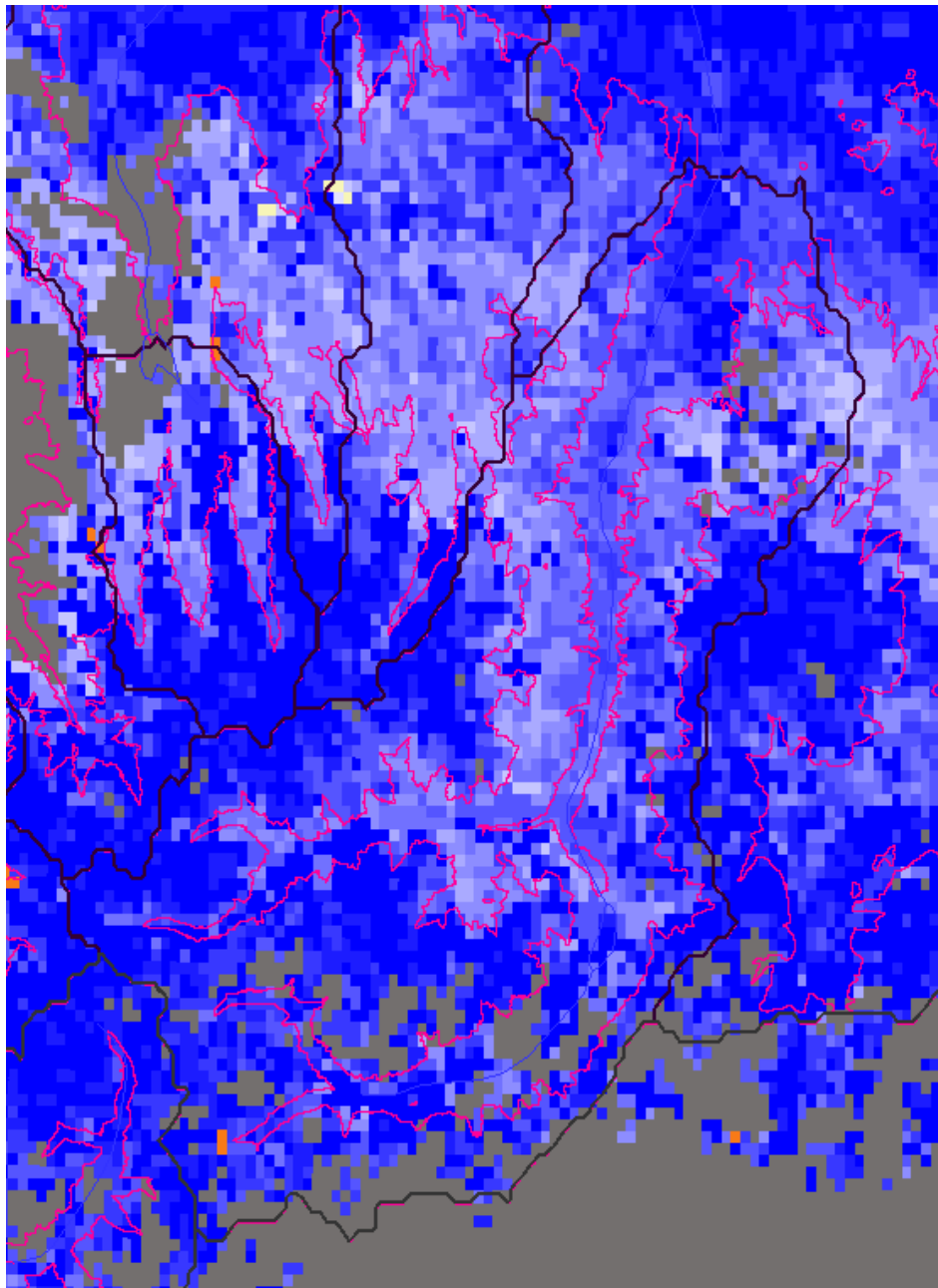
Snow Cover (percent)

	>= 0.01
	>= 0.1
	>= 0.2
	>= 0.3
	>= 0.4
	>= 0.5
	>= 0.6
	>= 0.7
	>= 0.8
	>= 0.9
	>= 1

# Area Extent of Snow

- Gather and process JPL (observed) extent of snow cover data
- Develop relationship between observed (JPL) and Model snow cover
  - Relationship must consider the affect of tree canopy
  - Given the model snow cover we can predict the typical observed extent
- Flag big differences between observed and predicted snow cover extent
- Potentially remove or add snow in the model based on the result
- Testing the process
- Implement operationally (possibly this spring)

# JPL (Observed) Snow Cover Data - Lake Fork nr Gateway (Gunnison Basin)



Snow Cover (percent)

	Snow-free
	$\geq 1$
	$\geq 10$
	$\geq 20$
	$\geq 30$
	$\geq 40$
	$\geq 50$
	$\geq 60$
	$\geq 70$
	$\geq 80$
	$\geq 90$
	Non-snow, non-cloud ( $> 101$ )
	Edge of sin proj (230)
	Not processed by JPL (235)
	Clouds (250)
	Detector Saturated (254)

# Initial Results

We examined Lake Fork at Gateway in the Gunnison basin for 2000-2010 and found that it usually flagged bad years correctly.

- 2000 and 2004 were flagged as not having enough areal extent. The calibration was under predicting these years and adding snow would have helped.
- 2008 was flagged as having too much areal extent late in the melt. Here there was too much snow and removing some snow would have helped.
- 2009 and 2010 it flagged as having too much areal extent late in the melt. These were high dust years and the model melted the snow too late. This indicated a timing (temperature) issue and not necessarily a SWE issue.

Continue to test and work out some issues and possibly implement a process for updating this spring.





# COLORADO BASIN RIVER FORECAST CENTER

NATIONAL WEATHER SERVICE / NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION



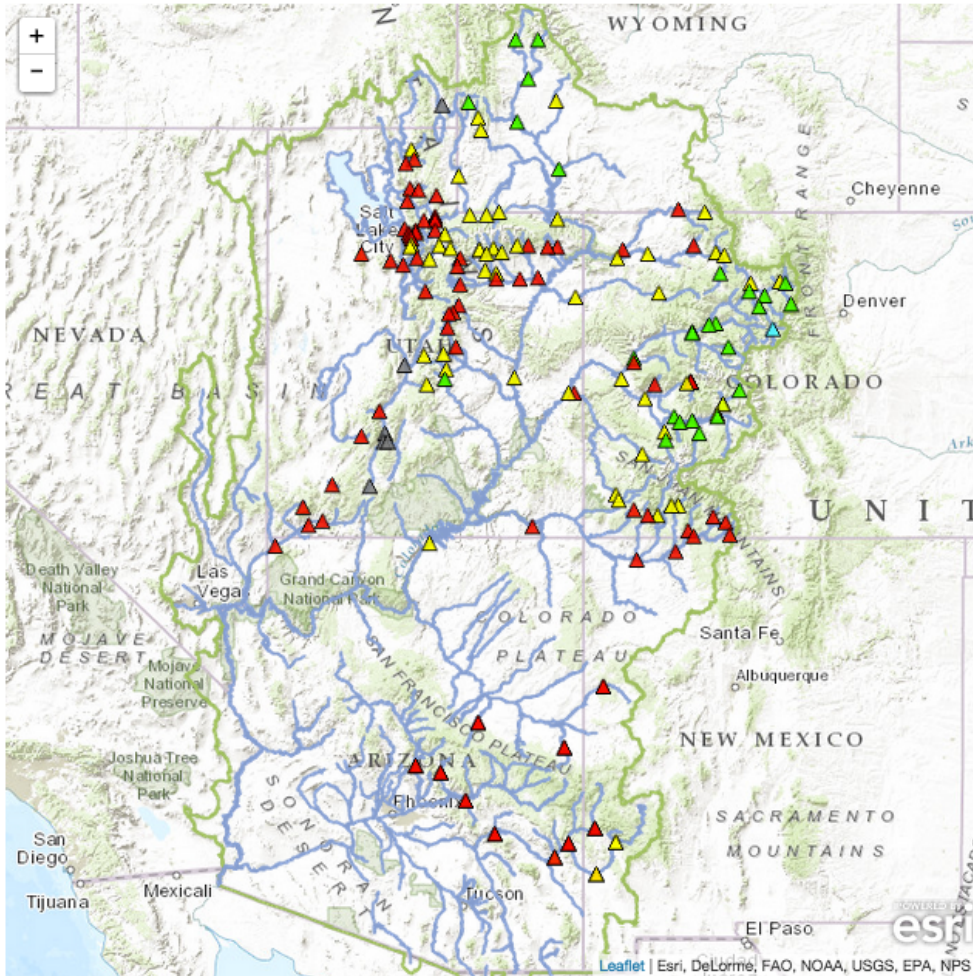
- [HOME](#)
- [RIVERS](#)
- [SNOW](#)
- [WATER SUPPLY](#)
- [RESERVOIRS](#)
- [WEATHER](#)
- [CLIMATE](#)
- [HELP](#)
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- [SEARCH](#)

## News

Water Supply Webinar February 5, 1pm MST. [Read More...](#)  
 CBRFC presentation are posted here. [Read More...](#)  
 CBRFC Webinars are posted here. [Read More...](#)

## Conditions Map

[Help](#)



Lat: 37.6 Lng: -110.5, Zoom: 6

Leaflet | Esri, DeLorme, FAO, NOAA, USGS, EPA, NPS

- [River Conditions](#)
- [Snow Conditions](#)
- [Water Supply Forecasts](#)**
  - Official Forecast Date: 2015-2-1 [Help](#)
  - ESP Run Date: 2015-02-03
  - Show [Hide Other Types](#)
  - Official Percent Average
  - Official Percent Median
  - ESP Percent Average
  - ESP Percent Median
  - < 70%
  - 70-90%
  - 90-110%
  - 110-130%
  - >130%
  - Regulated
  - No Forecast
  - Offices**
  - CBRFC
  - WGRFC
  - ABRFC
- [Peak Flood Probability](#)
- [Reservoir Conditions](#)
- [Base Map Options](#)
- [Boundary Display Options](#)
- [Zoom Areas](#)
- [Search Points](#)

## 2015 Scheduled Webinars

March 10 at 1 pm MT – Peak Flow

April 7 at 11am MT

May 7 at 11am MT

Registration available:

[www.cbrfc.noaa.gov/news/wswebinar2015.html](http://www.cbrfc.noaa.gov/news/wswebinar2015.html)

- 2015 Key Water Supply Contacts:
  - Michelle Stokes (Hydrologist in Charge)
  - Brenda Alcorn (Upper Colorado, Lake Powell)
  - Ashley Nielson (Green + Yampa / White)
  - Greg Smith (San Juan + Gunnison + Dolores)
  - Paul Miller (Great Basin – Bear, Weber, Provo, Six-Creeks/Jordan)
  - Tracy Cox (Lower Colorado + Virgin + Sevier)

**Please contact us with any specific questions**