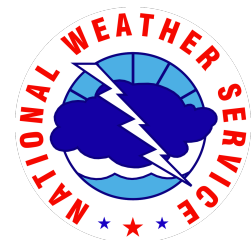


# Green and Yampa Rivers: Current Conditions and Forecasts

March 16, 2017  
Flaming Gorge Working Group Meeting

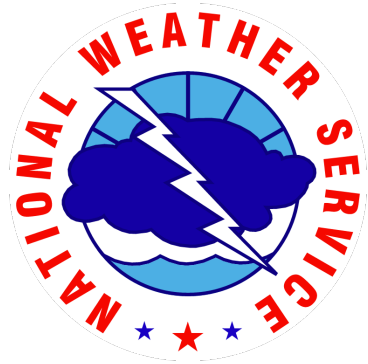
Ashley Nielson-Senior Hydrologist  
Colorado Basin River Forecast Center  
National Weather Service/NOAA



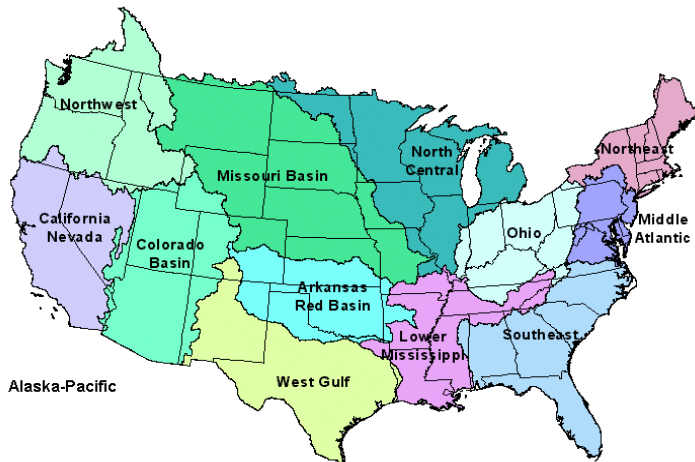
# Who is the Colorado Basin River Forecast Center?



Mission: To understand and predict changes in the Earth's environment...to meet our Nation's economic, social and environmental needs



Mission: The NWS provides, weather, hydrologic, and climate forecasts and warnings....for the protection of life and property and the enhancement of the national economy



The NWS has 13 river forecast centers defined by major river basins across the country that produce timely and accurate water forecasts to support the NWS/NOAA missions

# CBRFC: Who are we?

- Forecast Areas:
  - Colorado River Basin
  - Eastern Great Basin
- Major Programs Include
  - Flood and daily river forecasts
  - Water Supply Forecasts
- Staff includes meteorologists and hydrologists



# Today's Presentation

Weather Review (Fall + Winter)

Latest snowpack conditions

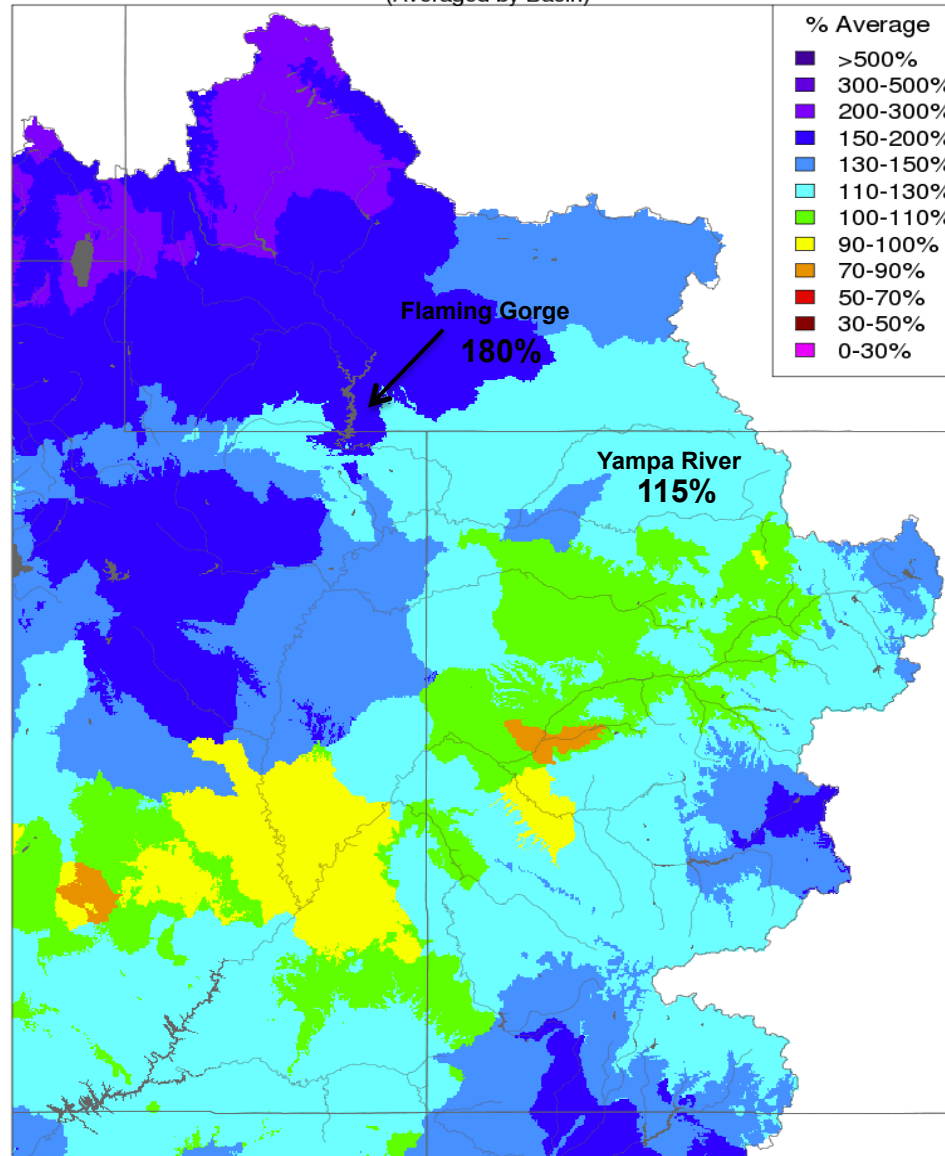
Fall soil moisture

Water Supply Forecast Overview

- April-July Water Supply Volumes
  - Flaming Gorge Reservoir
  - Yampa River

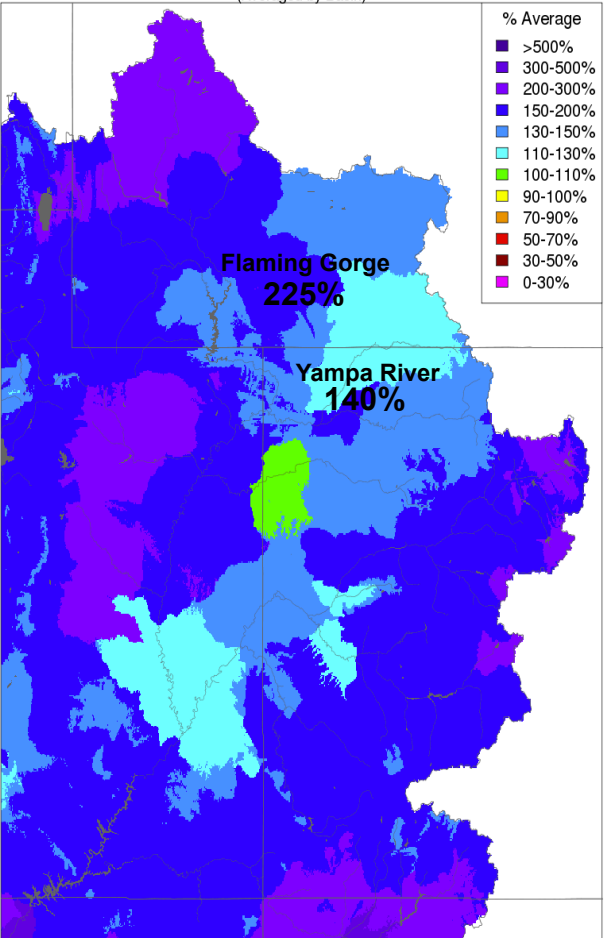
# Weather Review: Water Year Precipitation (Oct-Feb)

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



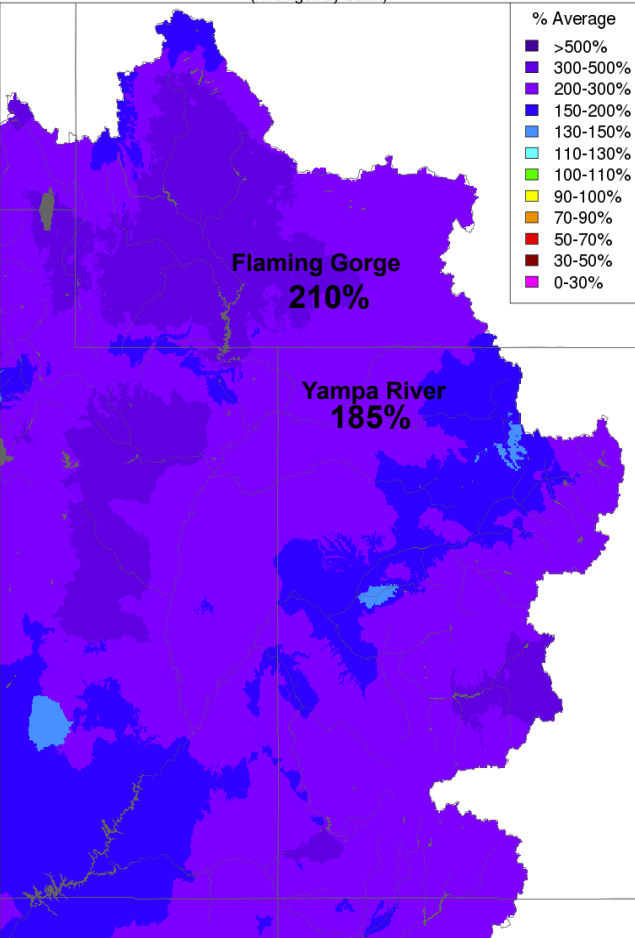
# Weather Review: Winter Precipitation (Dec-Feb)

Monthly Precipitation - December 2016  
(Averaged by Basin)



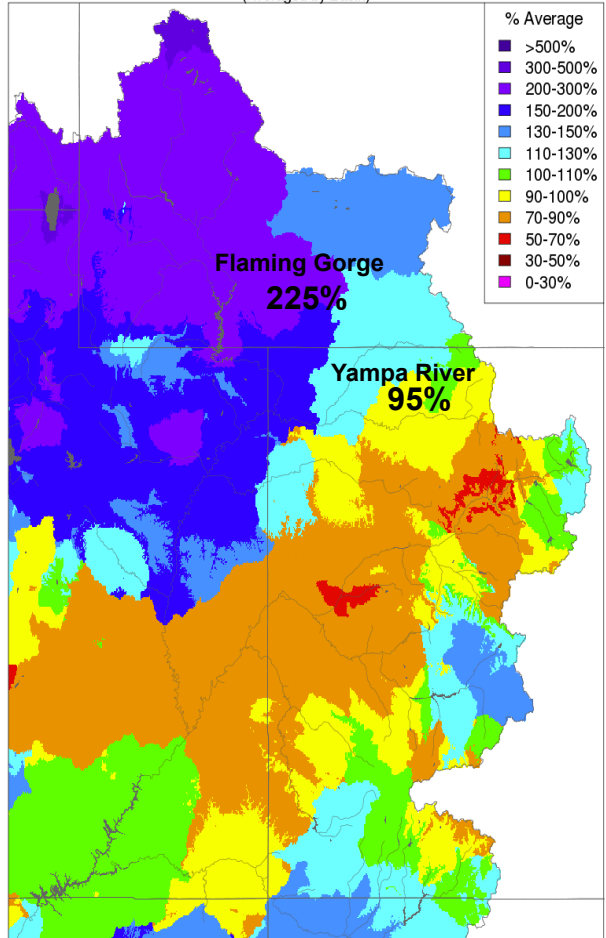
Prepared by NOAA, Colorado Basin River Forecast Center  
Salt Lake City, Utah, [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)

Monthly Precipitation - January 2017  
(Averaged by Basin)



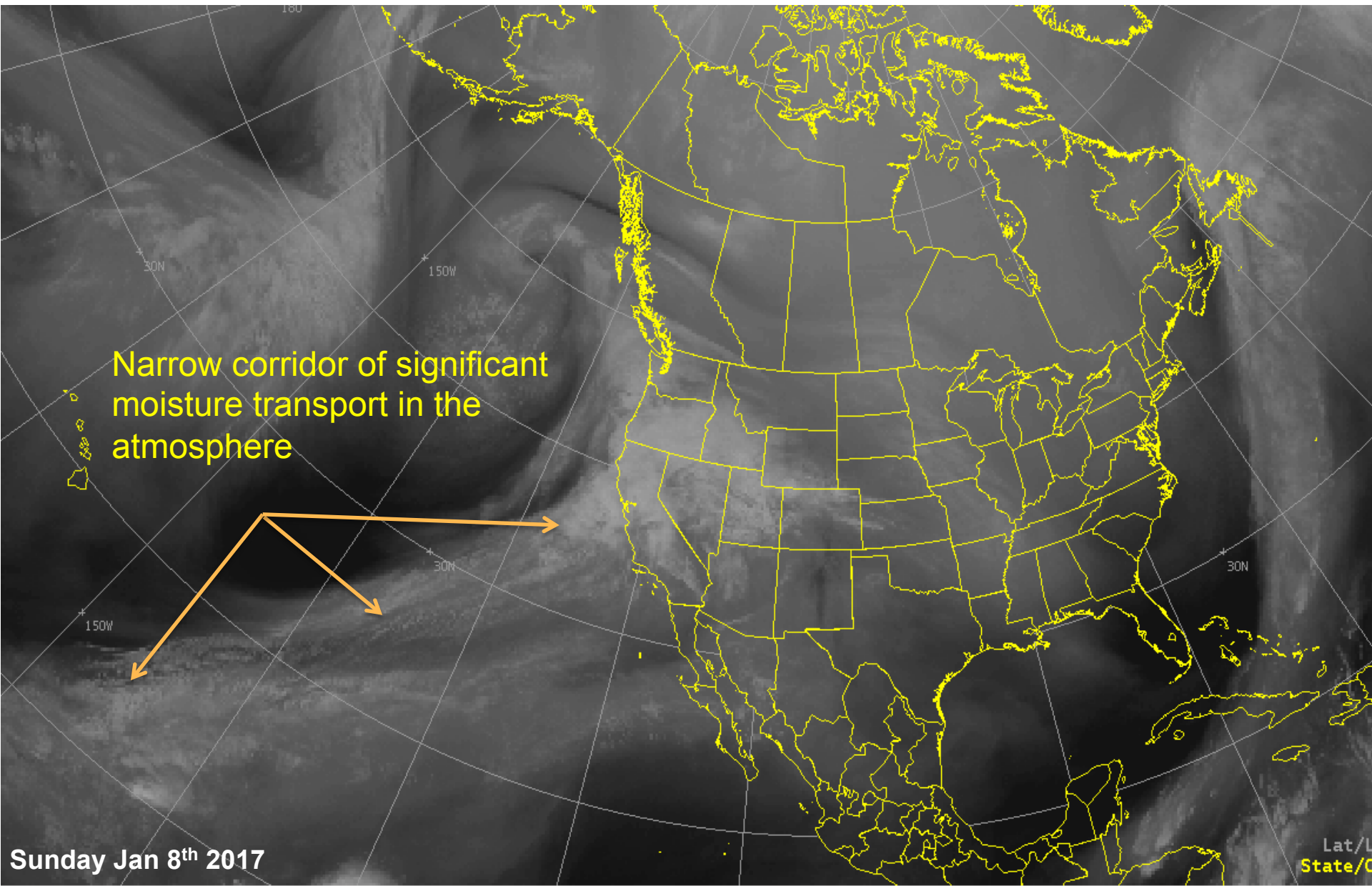
Prepared by NOAA, Colorado Basin River Forecast Center  
Salt Lake City, Utah, [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)

Monthly Precipitation - February 2017  
(Averaged by Basin)

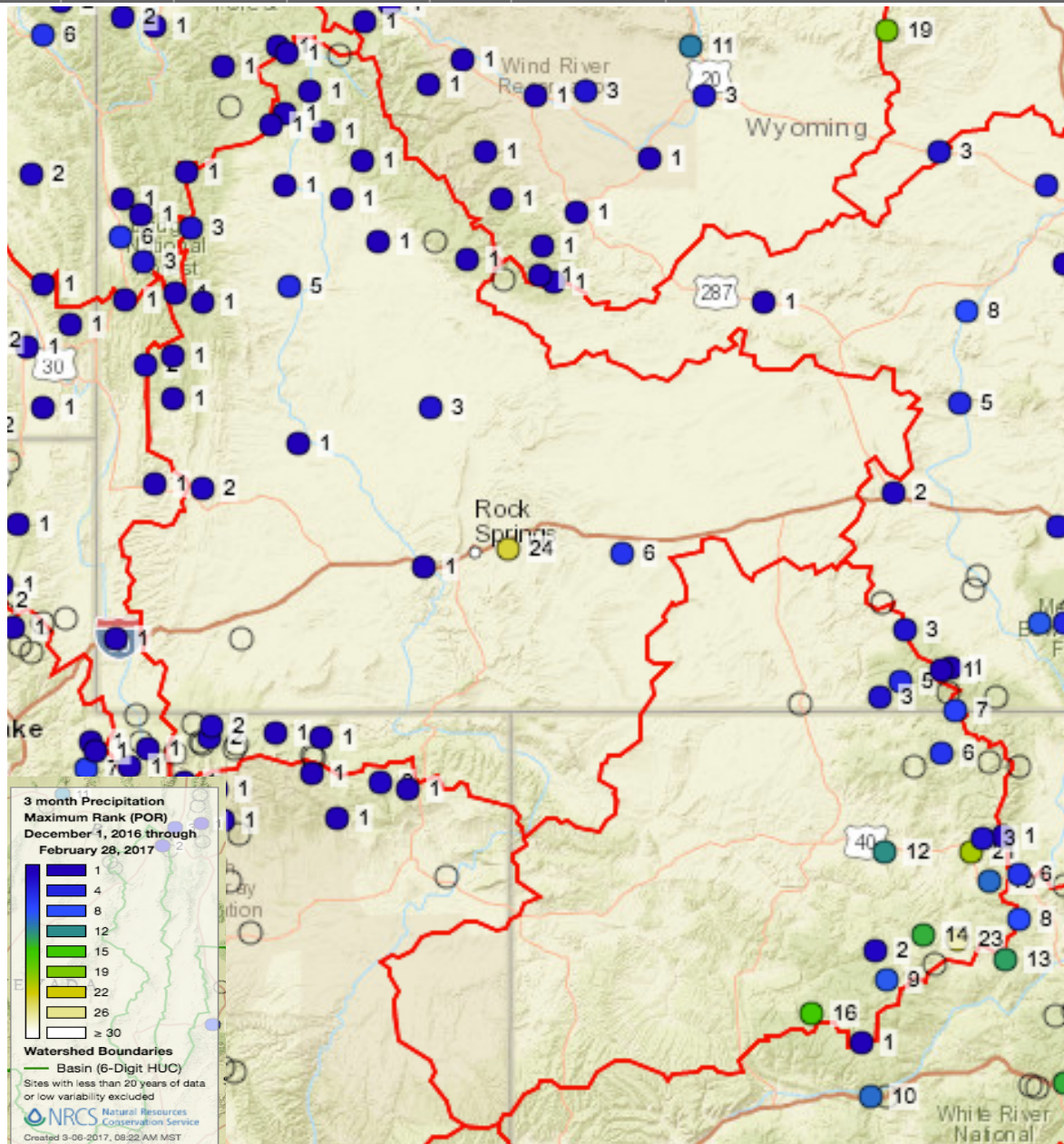


Prepared by NOAA, Colorado Basin River Forecast Center  
Salt Lake City, Utah, [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)

# Mid December through February: "Atmospheric Rivers"





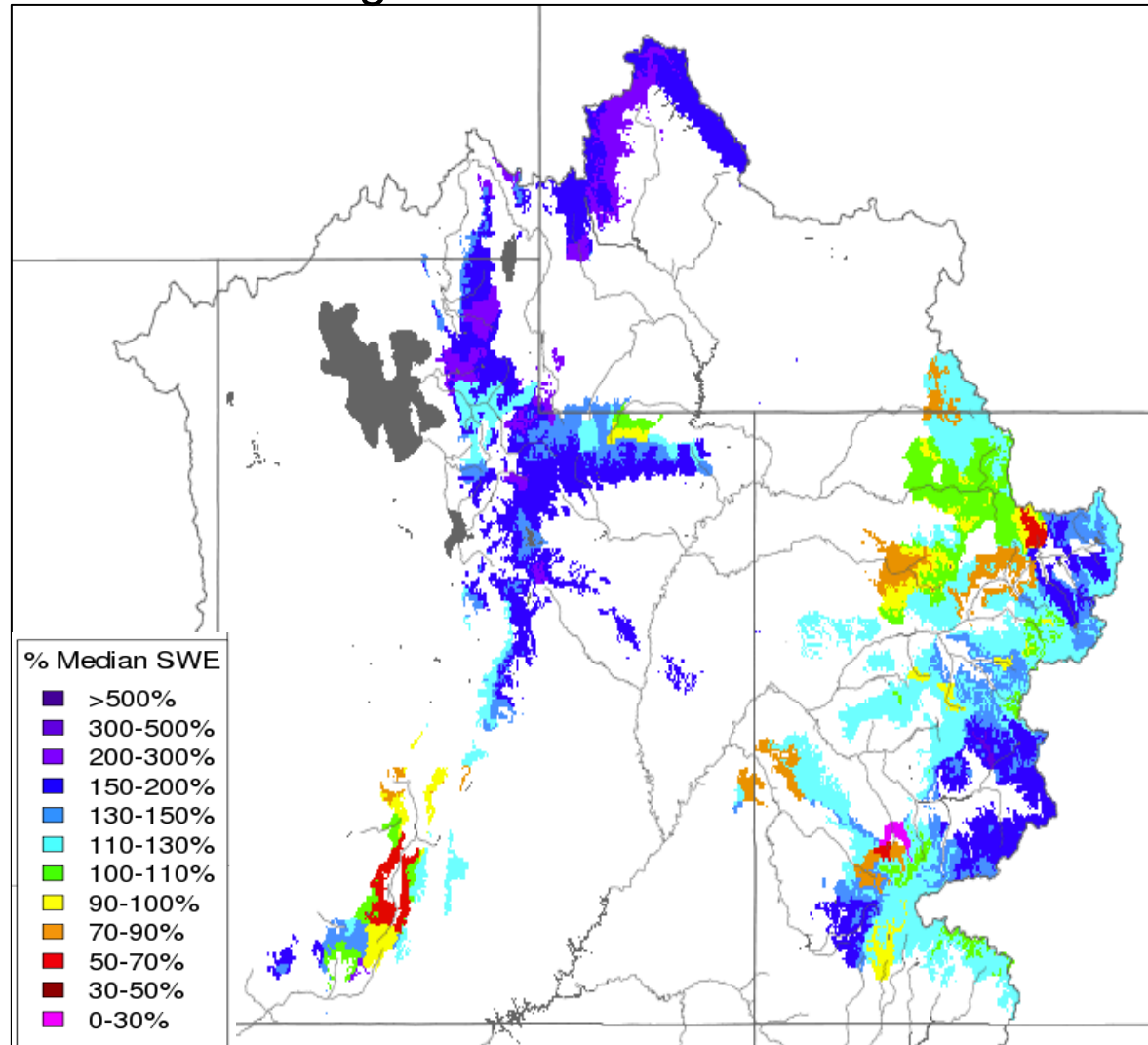


Upper Green had record precipitation for the 3 month period of December-February



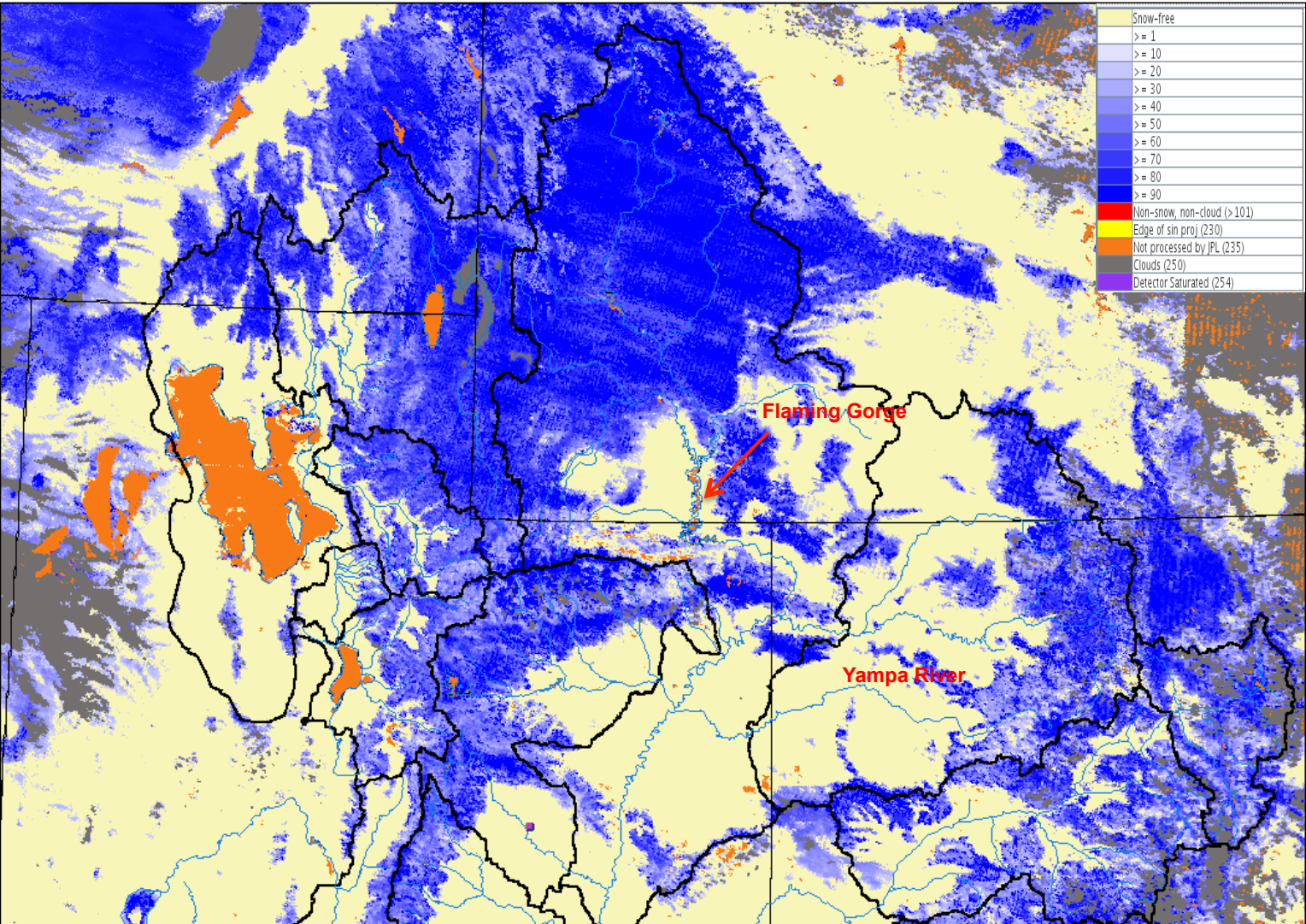
# SNOW (CBRFC Hydrologic Model)

March 14<sup>th</sup> 2017  
Significant Runoff Areas




# Snow (Satellite Image of Snow Covered Area)

March 11<sup>th</sup> 2017

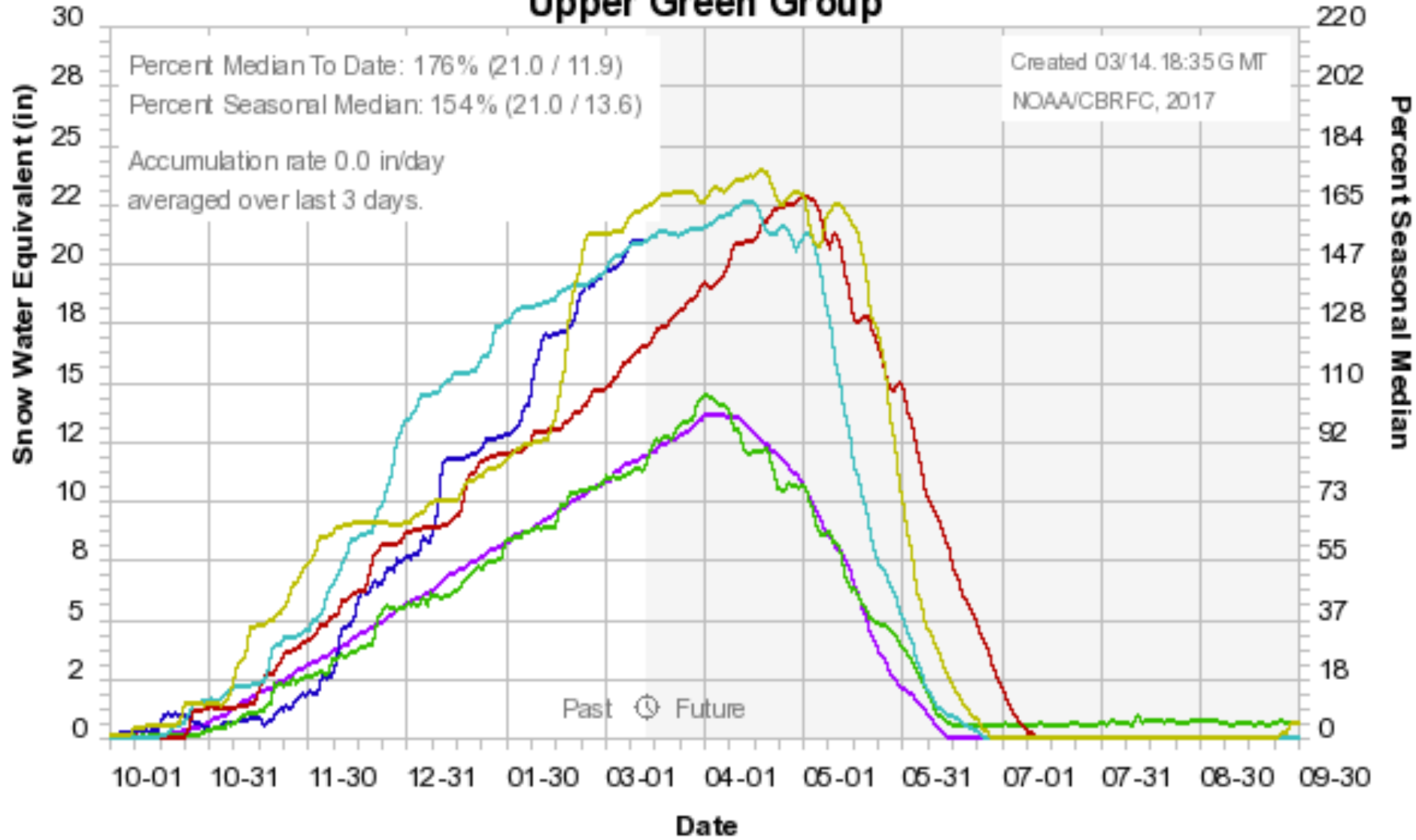


 = Snow Free

 = > 90% Snow Covered

# Snow (Upper Green SNOTELS)

## Colorado Basin River Forecast Center Upper Green Group

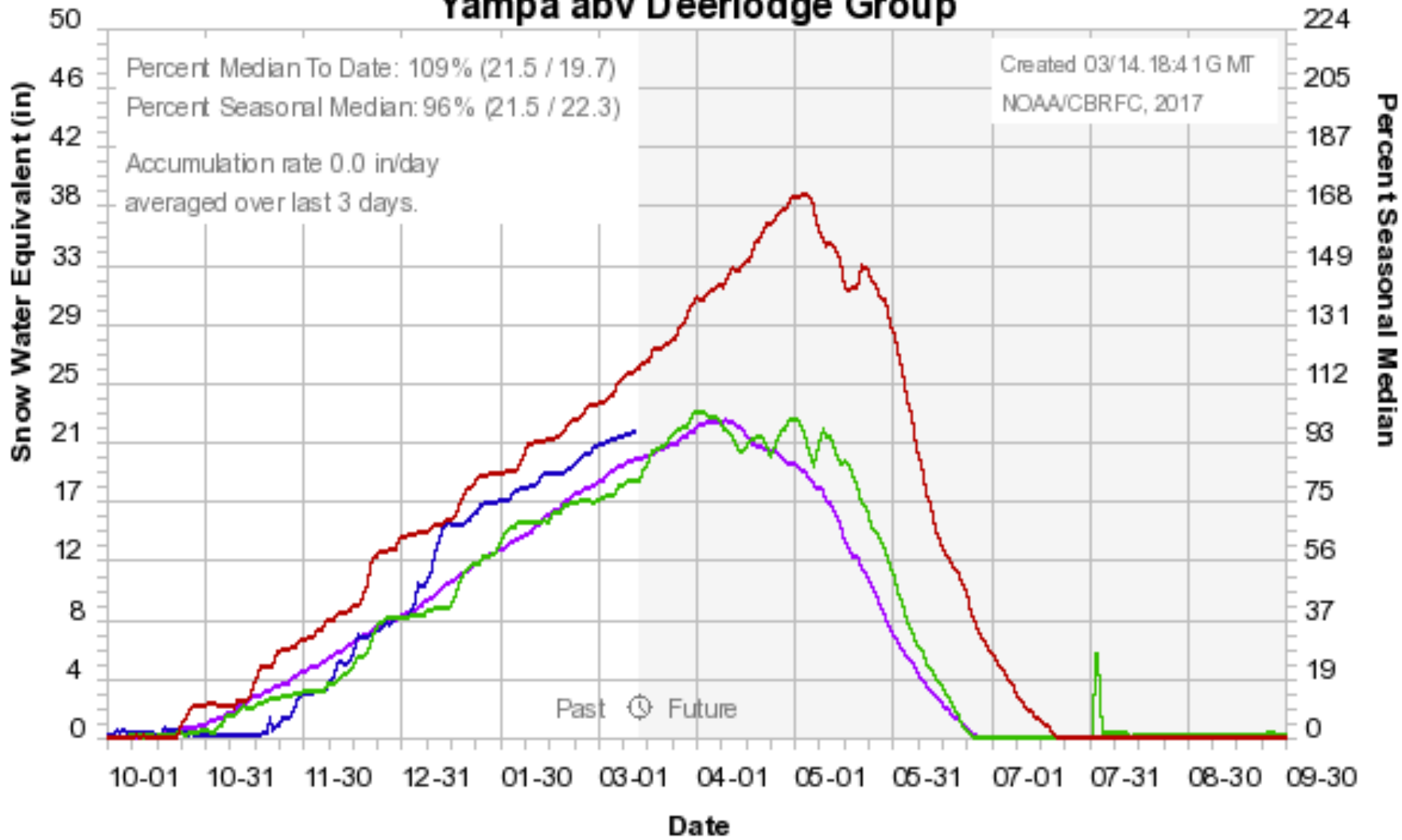


Median 1981-2010 2017 2016 2011 1997 1986

# Snow (Yampa River SNOTELS)

Colorado Basin River Forecast Center

Yampa abv Deerlodge Group



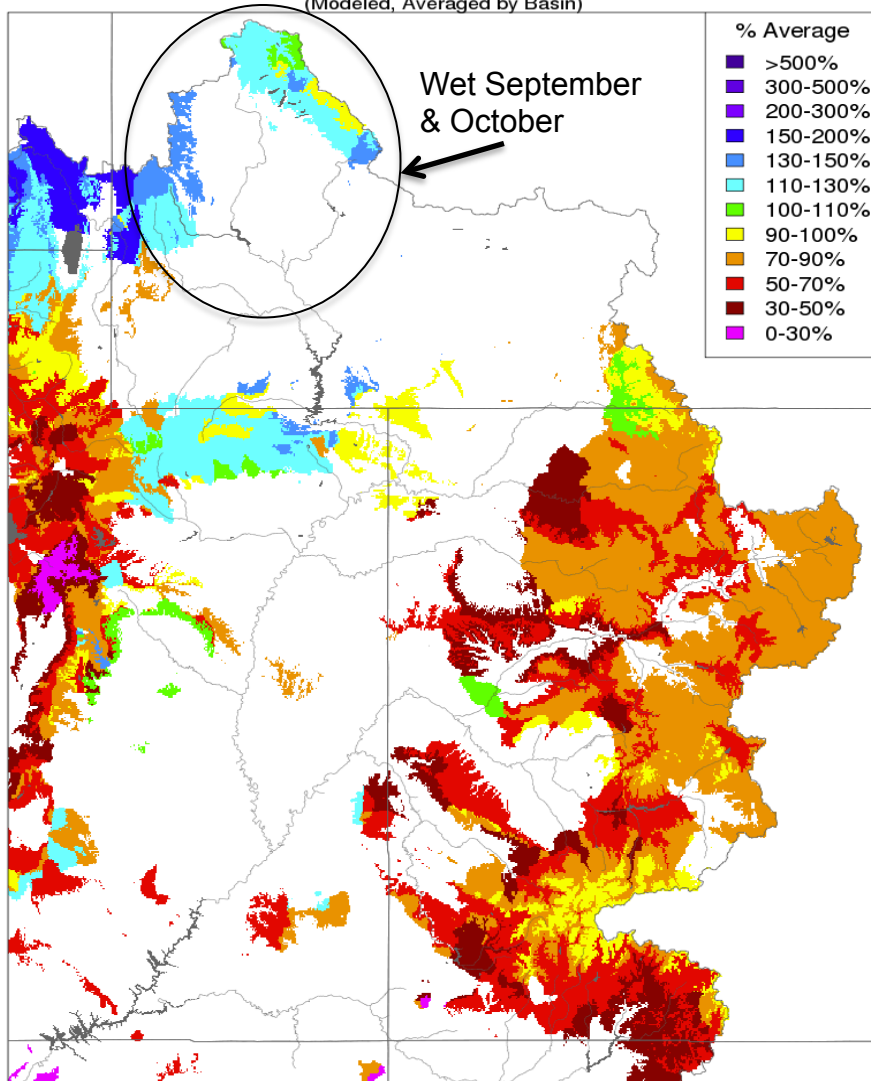
Median 1981-2010 2017 2016 2011

# Fall Soil Moisture

## Model Soil Moisture entering winter

Soil Moisture - November 16 2016

(Modeled, Averaged by Basin)



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

## 2017 Water Supply Impacts :

- In significant snowpack areas below average soil moisture less likely to have a large impact.
- Significant snowpack + wet soils could see more enhanced spring runoff
  - Upper Green river basins

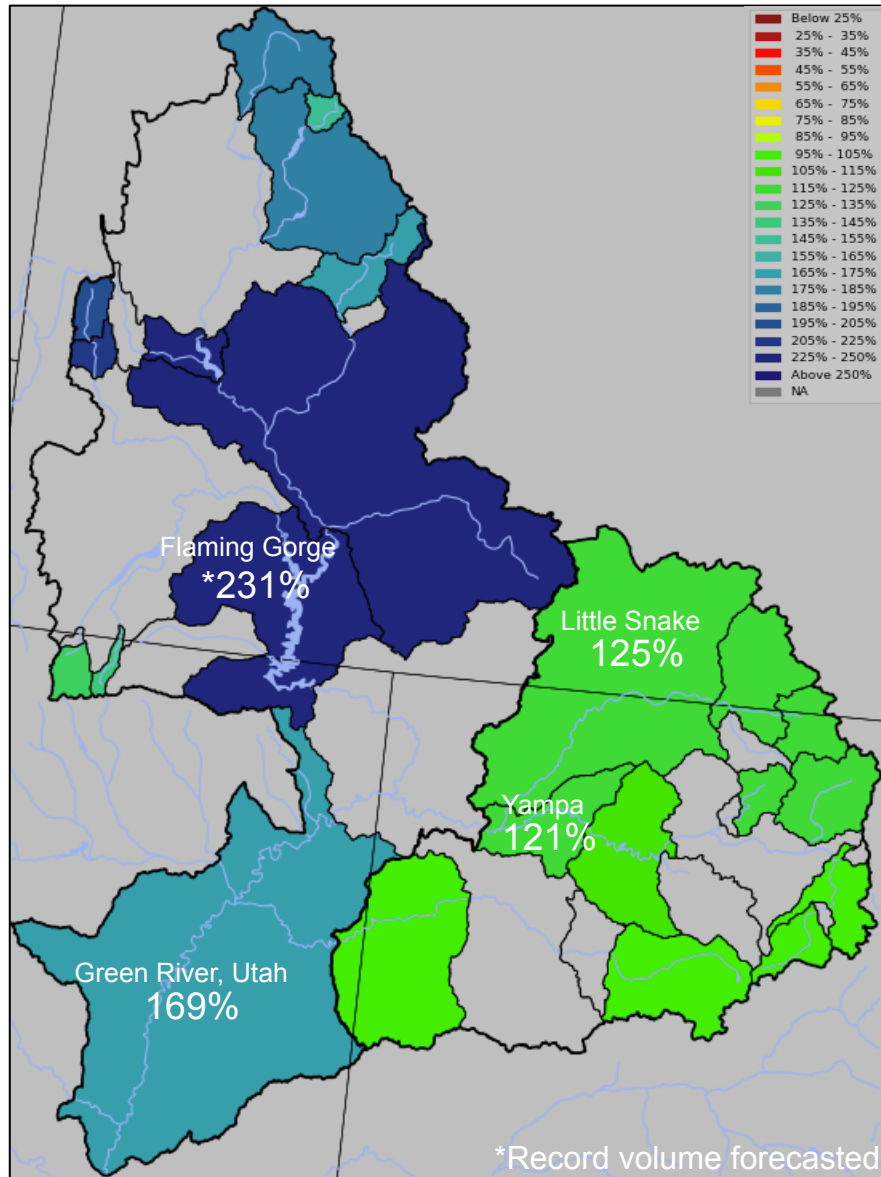
**This is representation of above / below average soil moisture conditions prior to snowmelt (valid at higher elevations)**



# March 1st Water Supply Forecasts

## Water Supply Forecasts: April – July Volumes

Most Probable Scenario (% of 1981-2010 average)



- CBRFC model makes assumptions about long range future weather
- Official forecasts provide a range of possible outcomes based on “dry”, “average”, and “wet” weather scenarios
- “Average” scenario is most commonly used forecast

### March 1<sup>st</sup> Flaming Gorge Forecasts:

Dry	→	1840 KAF (187% average)
Average	→	2260 KAF (231% average)
Wet	→	2850 KAF (290% average)

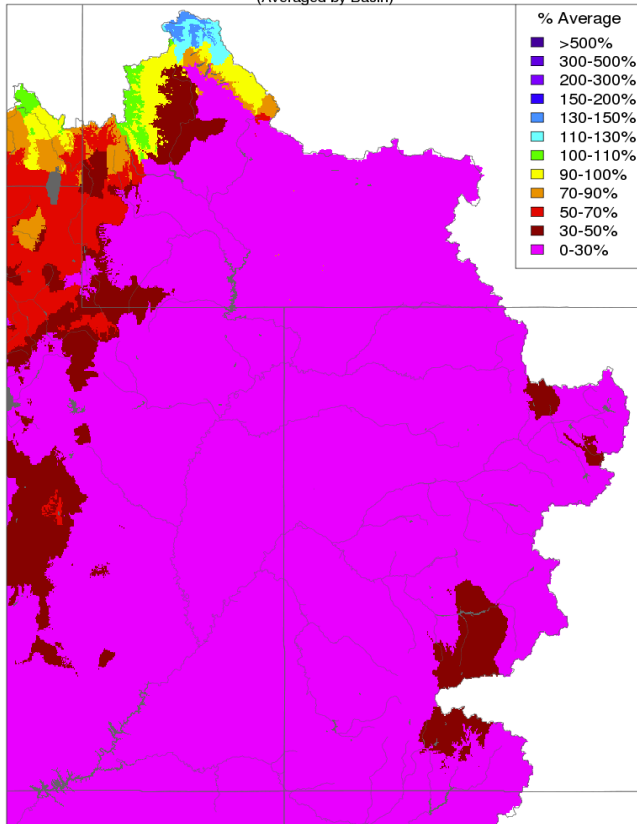
### March 1<sup>st</sup> Yampa River Forecasts:

Dry	→	1030 KAF (83% average)
Average	→	1500 KAF (121% average)
Wet	→	1980 KAF (160% average)



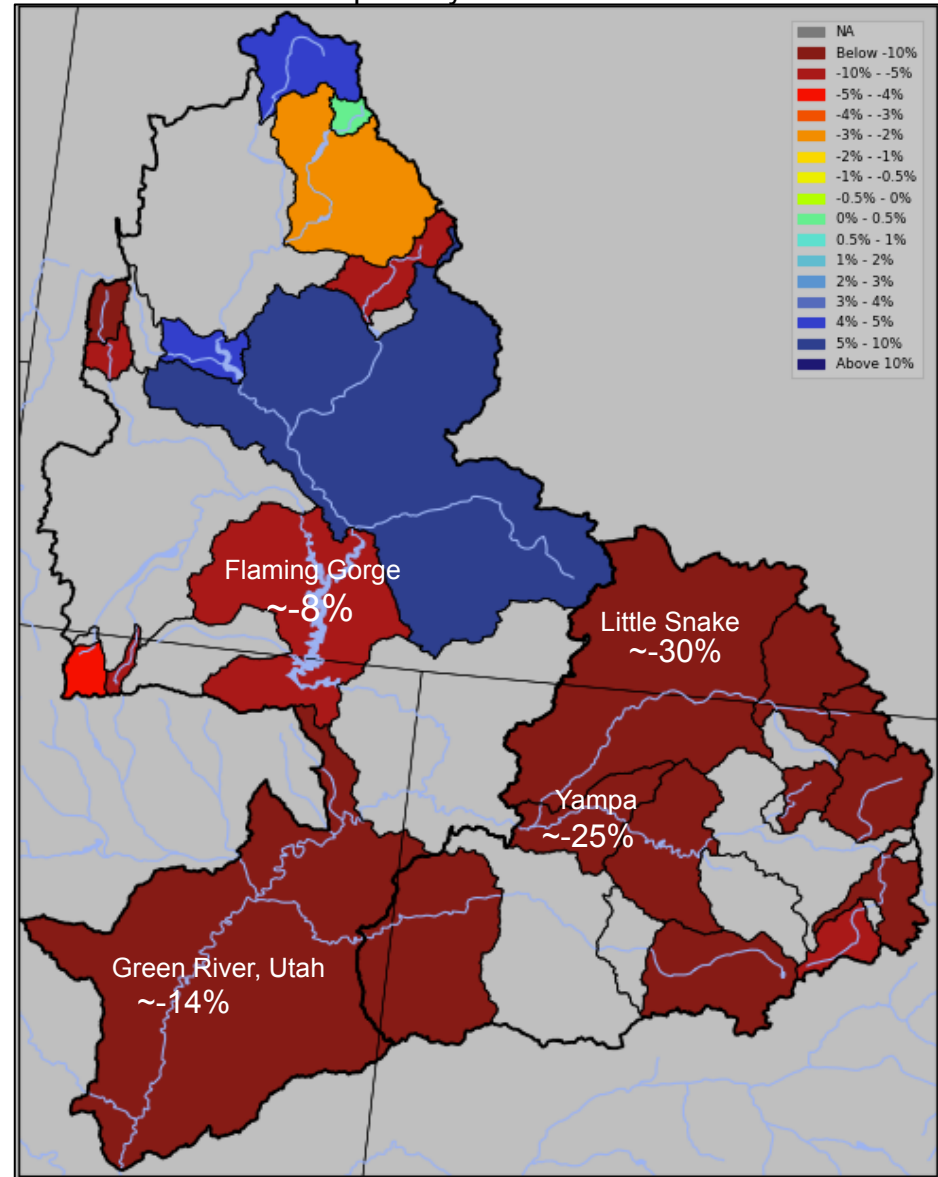
# March 15th Water Supply Forecasts

Month to Date Precipitation - March 14 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)

Change in Percent of Average Forecast 3/1-3/14  
April-July Volumes



## Flaming Gorge Forecasts:

March 1<sup>st</sup>: 2260 KAF (231%)

March 15<sup>th</sup>: 2180 KAF (222%)

## Yampa River Forecasts:

March 1<sup>st</sup>: 1500 KAF (121%)

March 15<sup>th</sup>: 1250 KAF (100%)

# What are the sources of uncertainty in the forecasts?

## 1. Future Weather

- Uncertainty in temperature and precipitation forecasts

## 2. Model Snow States

- Is the model's representation (amount and extent) of the snowpack correct?
- SNOTELS and satellite images used to verify model snow states

## 3. Observed Streamflow

- USGS gage errors  $\pm \sim 5-8\%$

## 4. Demands/Diversions Assumptions

- Model makes assumptions about future diversions/demands
- May be more or less than assumptions depending spring weather

# Key Points

## Overall Key Points

- Still a large range of possible weather and runoff scenarios
- Remainder of March, April and May weather are critical
- Decrease in forecasts from March 1<sup>st</sup> to mid March due to below average precipitation in March so far

## Upper Green River Basin

- Much above average and near record snowpack conditions above Flaming Gorge
- Significant, possible near record, runoff is expected into Flaming Gorge Reservoir
- Even if an abnormally dry spring occurred, we still expect above average runoff
- Extended period of high flows

## Yampa River Basin

- Average runoff expected in the Yampa River Basin
- Current forecasts and snowpack conditions are much lower than in 2011

## Upcoming Weather

- Dry and warm conditions expected through early next
- Temperatures much above average through early next week
- Chance for more active weather period beginning the middle part of next week

# Questions?



# Contact Us!

- Operational Hydrologist
  - 801-524-5130 x340
  - [cbrfc.operations@noaa.gov](mailto:cbrfc.operations@noaa.gov)
- Michelle Stokes - Hydrologist In Charge
  - [michelle.stokes@noaa.gov](mailto:michelle.stokes@noaa.gov)
- Ashley Nielson-Green River Forecaster
  - [ashley.nielson@noaa.gov](mailto:ashley.nielson@noaa.gov)
  - 801-524-5130 x333

**COLORADO BASIN RIVER FORECAST CENTER**  
NATIONAL WEATHER SERVICE / NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

HOME RIVERS SNOW WATER SUPPLY RESERVOIRS WEATHER CLIMATE HELP ABOUT NEWS SEARCH

News Colorado River Basin Water Supply Briefing - April 7th 11 am MDT - Register here: [Read More...](#)  
Great Basin Basin Water Supply Briefing - April 7th 1 pm MDT - Register here: [Read More...](#)

Conditions Map [Help](#)

**River Conditions**  
Data Updated: 03/21/2022 [Help](#)

Show [Hide Other Types](#)

Data

Forecast

Reservoir Inflow

Reservoir Outflow

Official Flood

Active

● Not Available  
● Normal  
● Significant Rise  
● Near Bankfull  
● Above Bankfull  
● Above Flood Stage  
● Outlook (> 3 days)

Pop-up Alerts

- Snow Conditions
- Water Supply Forecasts
- Peak Flood Probability
- Reservoir Conditions
- Daily Precipitation
- Monthly Precipitation
- Soil Moisture
- Map Options
- Search Points

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