

Green and Yampa Rivers: Current Conditions and Forecasts

March 16, 2017

Flaming Gorge Working Group Meeting

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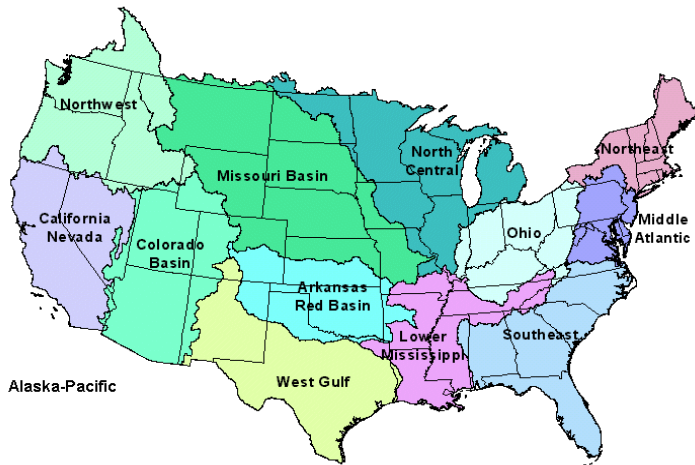
Who is the Colorado Basin River Forecast Center?



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

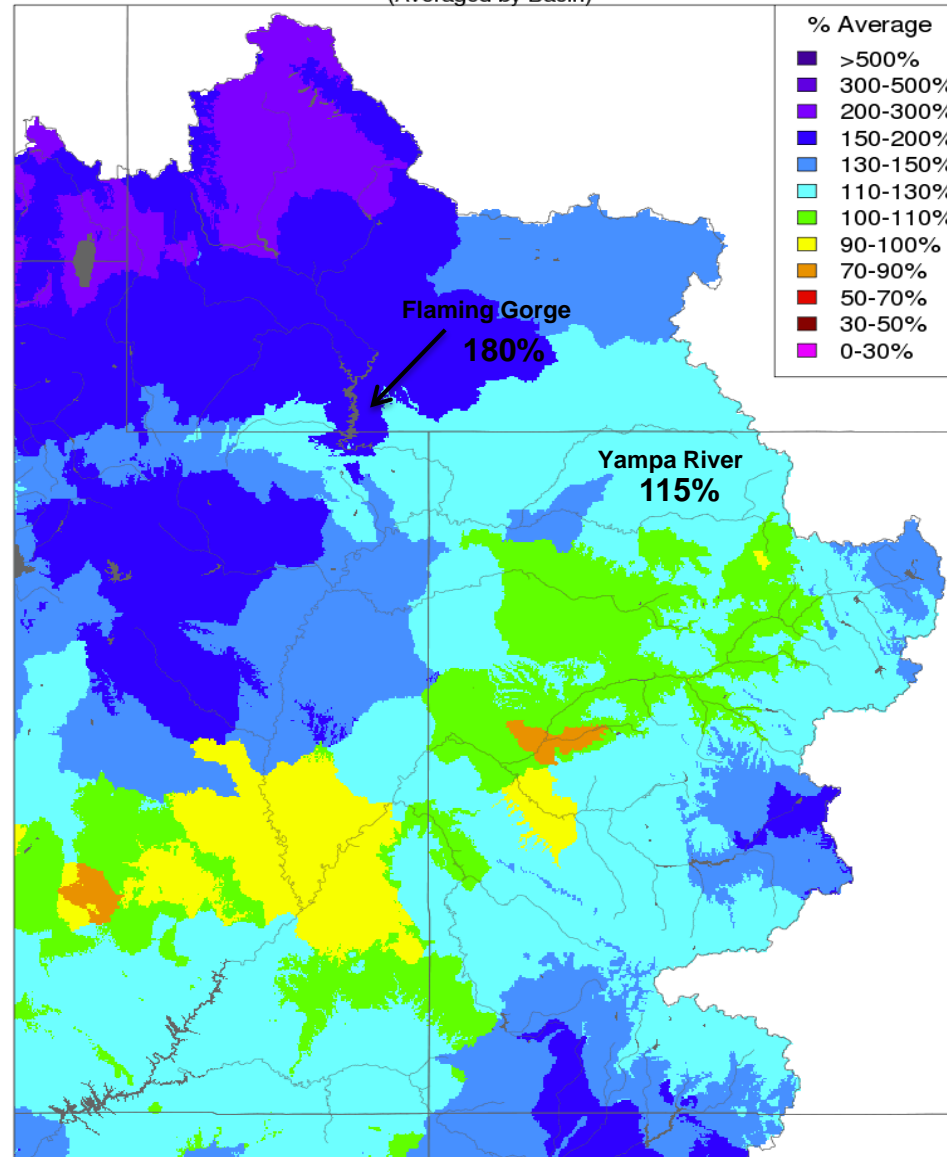
Fall soil moisture

Water Supply Forecast Overview

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

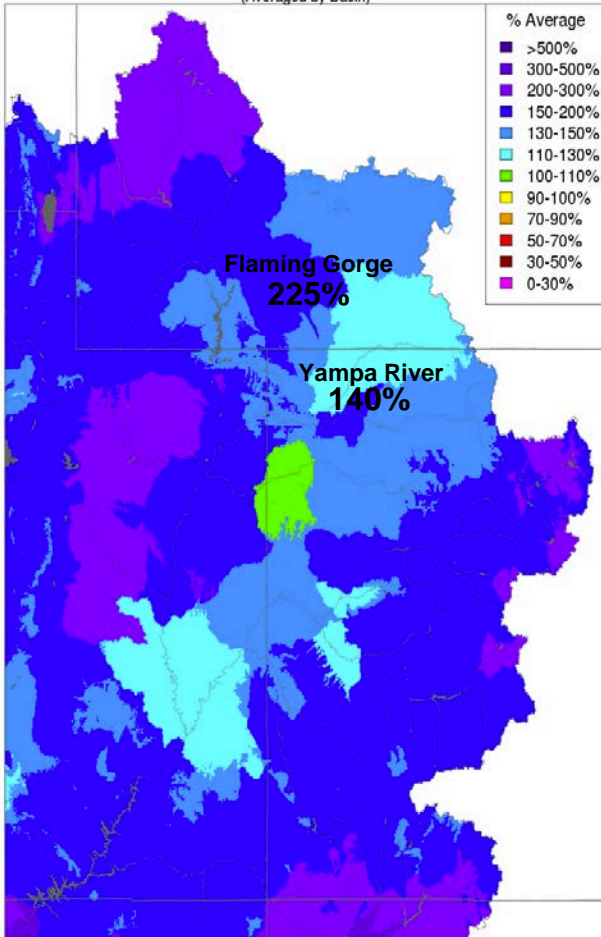
Weather Review: Water Year Precipitation (Oct-Feb)

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



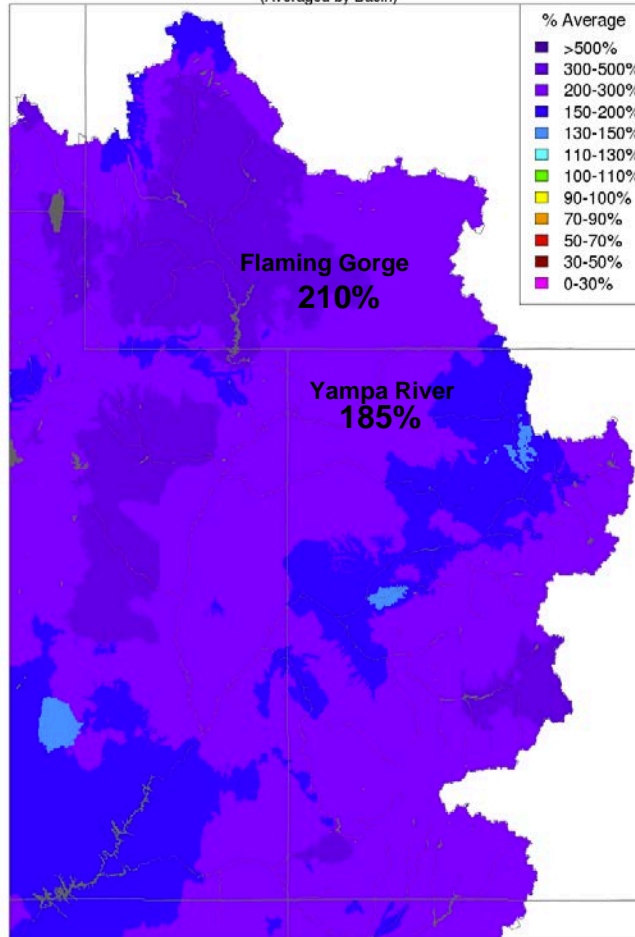
Weather Review: Winter Precipitation (Dec-Feb)

Monthly Precipitation - December 2016
(Averaged by Basin)



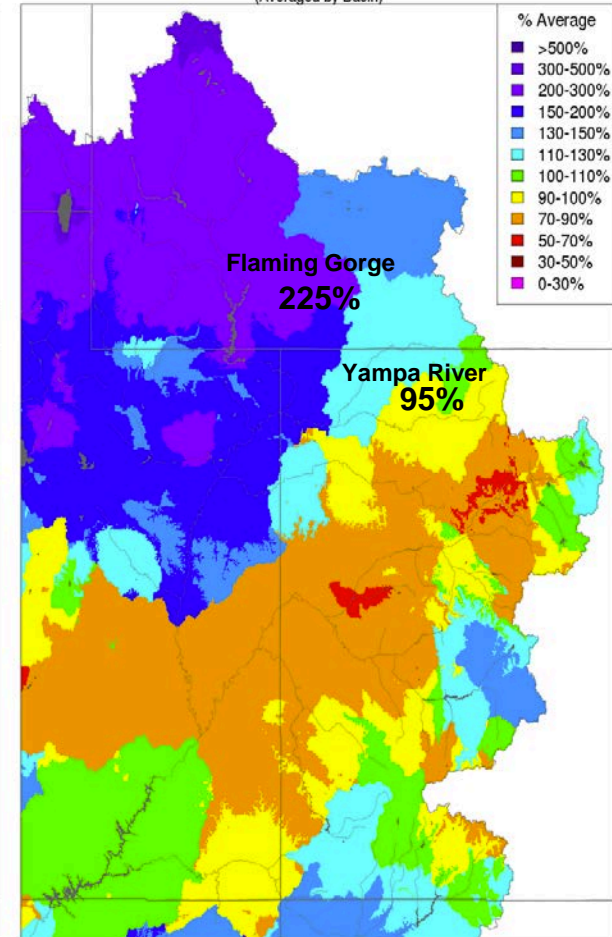
Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

Monthly Precipitation - January 2017
(Averaged by Basin)



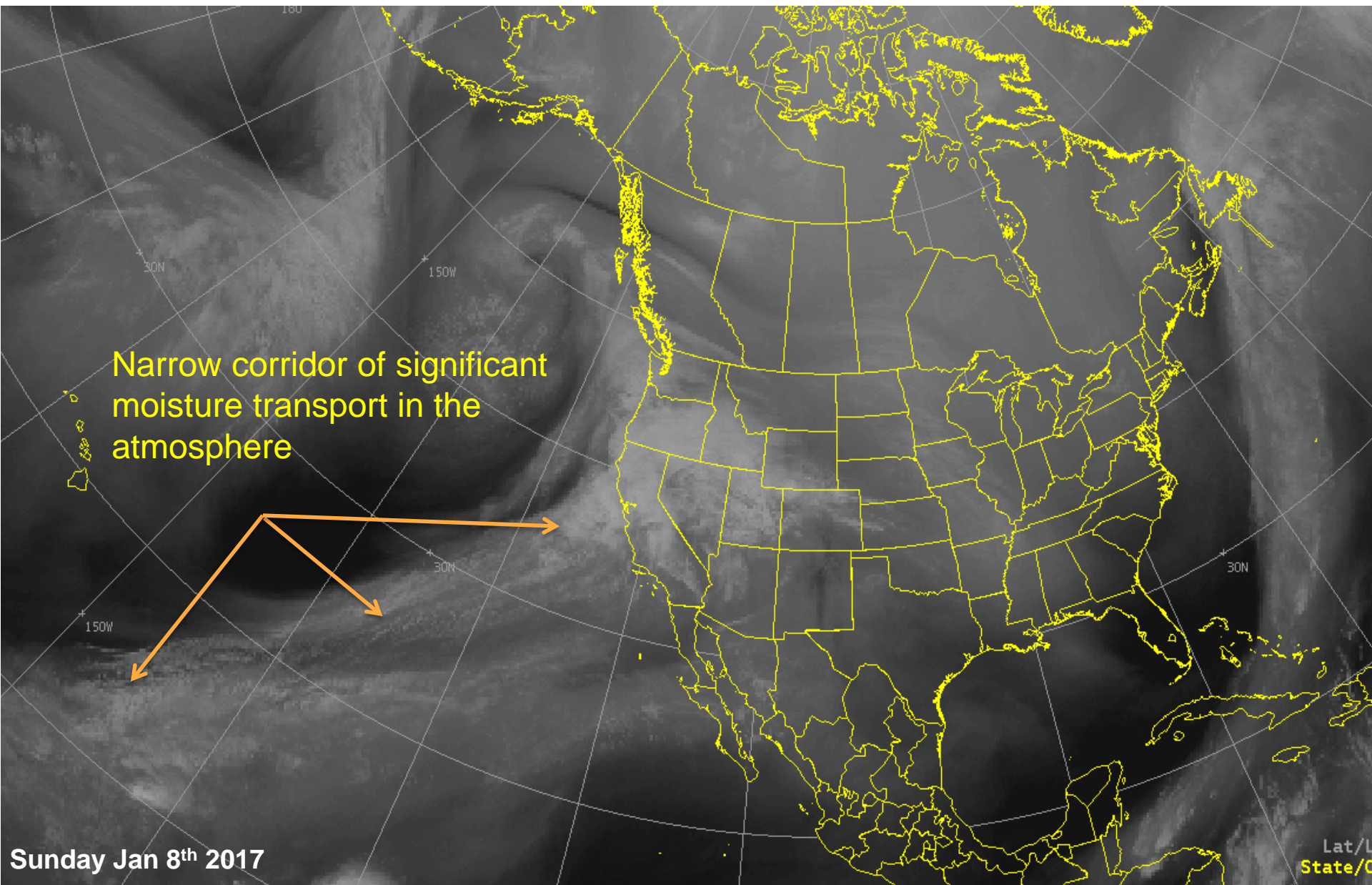
Prepared by NOAA, Colorado Basin River Forecast Center
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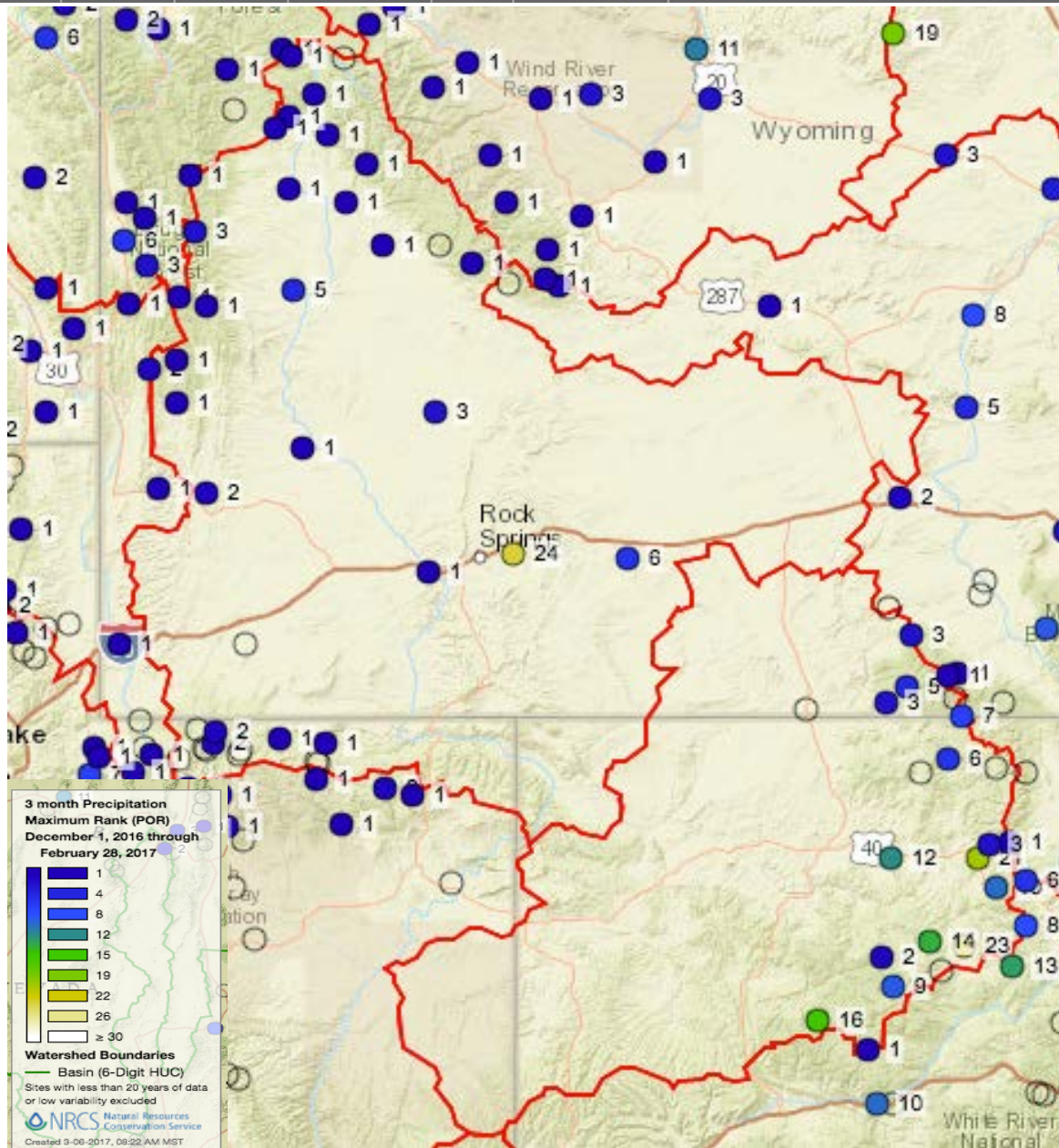
Monthly Precipitation - February 2017
(Averaged by Basin)



Prepared by NOAA, Colorado Basin River Forecast Center
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Mid December through February: “Atmospheric Rivers”

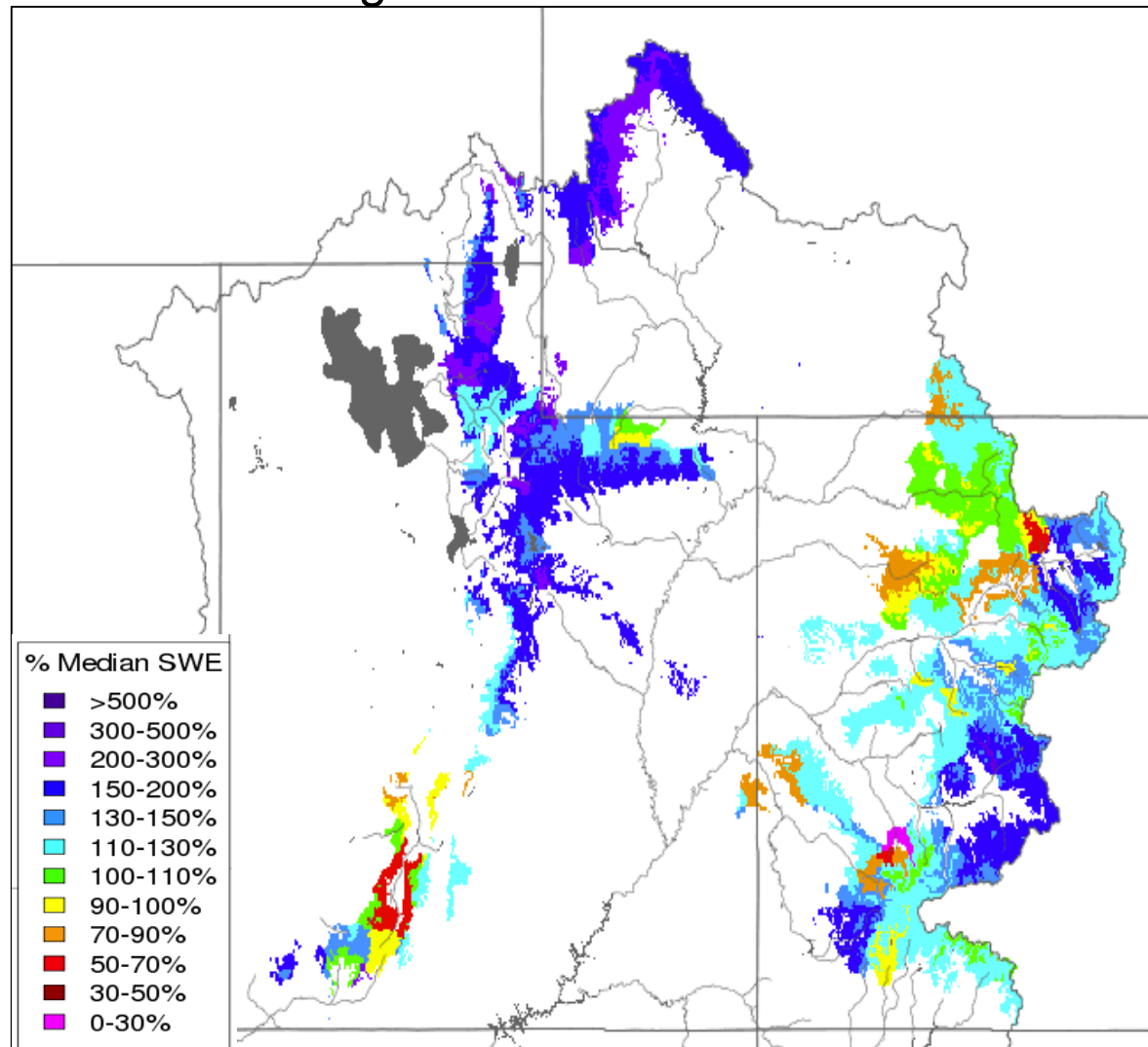




Upper Green had record
 precipitation for the 3
 month period of
 December-February

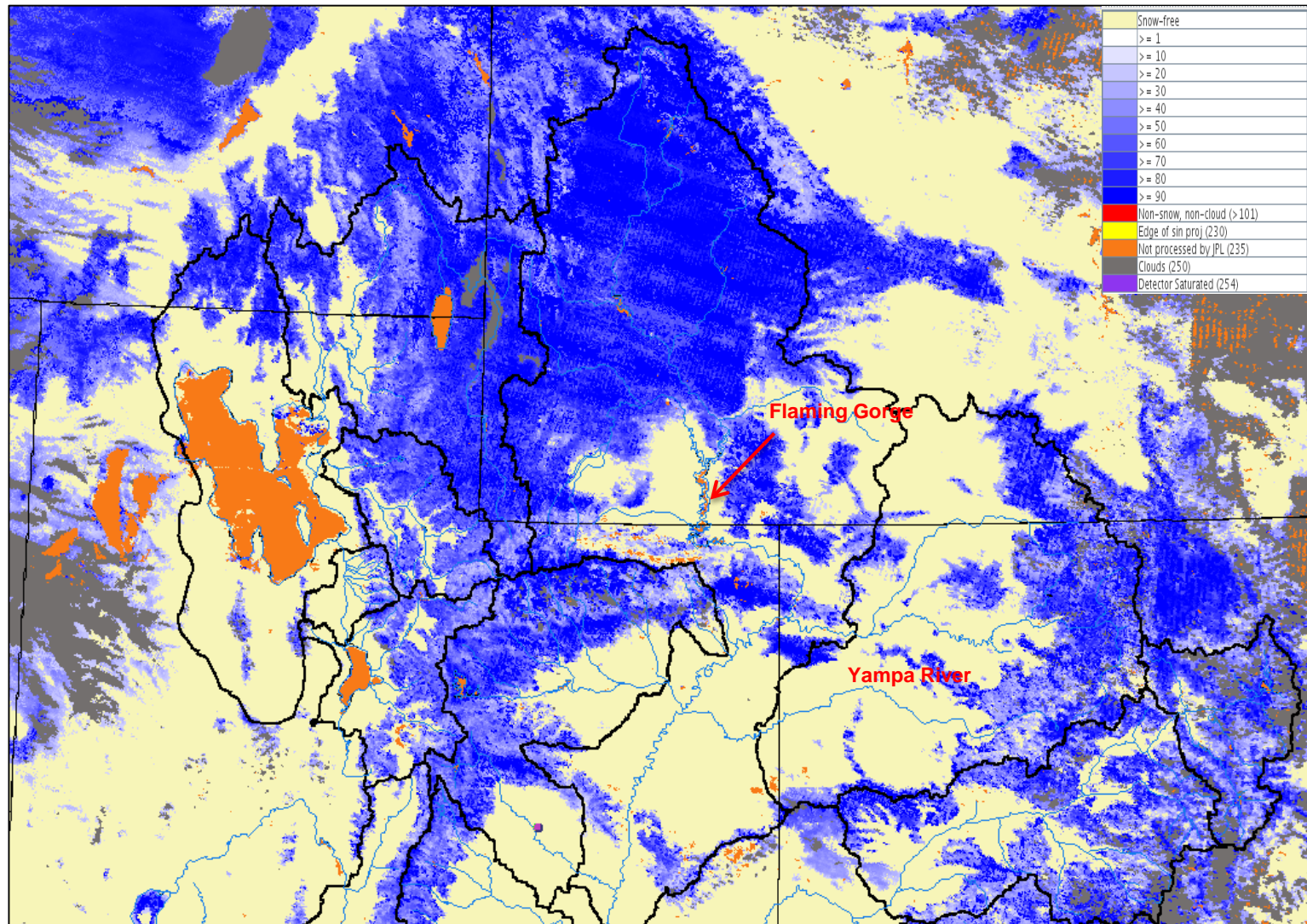
Snow (CBRFC Hydrologic Model)

March 14th 2017
Significant Runoff Areas




Snow (Satellite Image of Snow Covered Area)

March 11th 2017

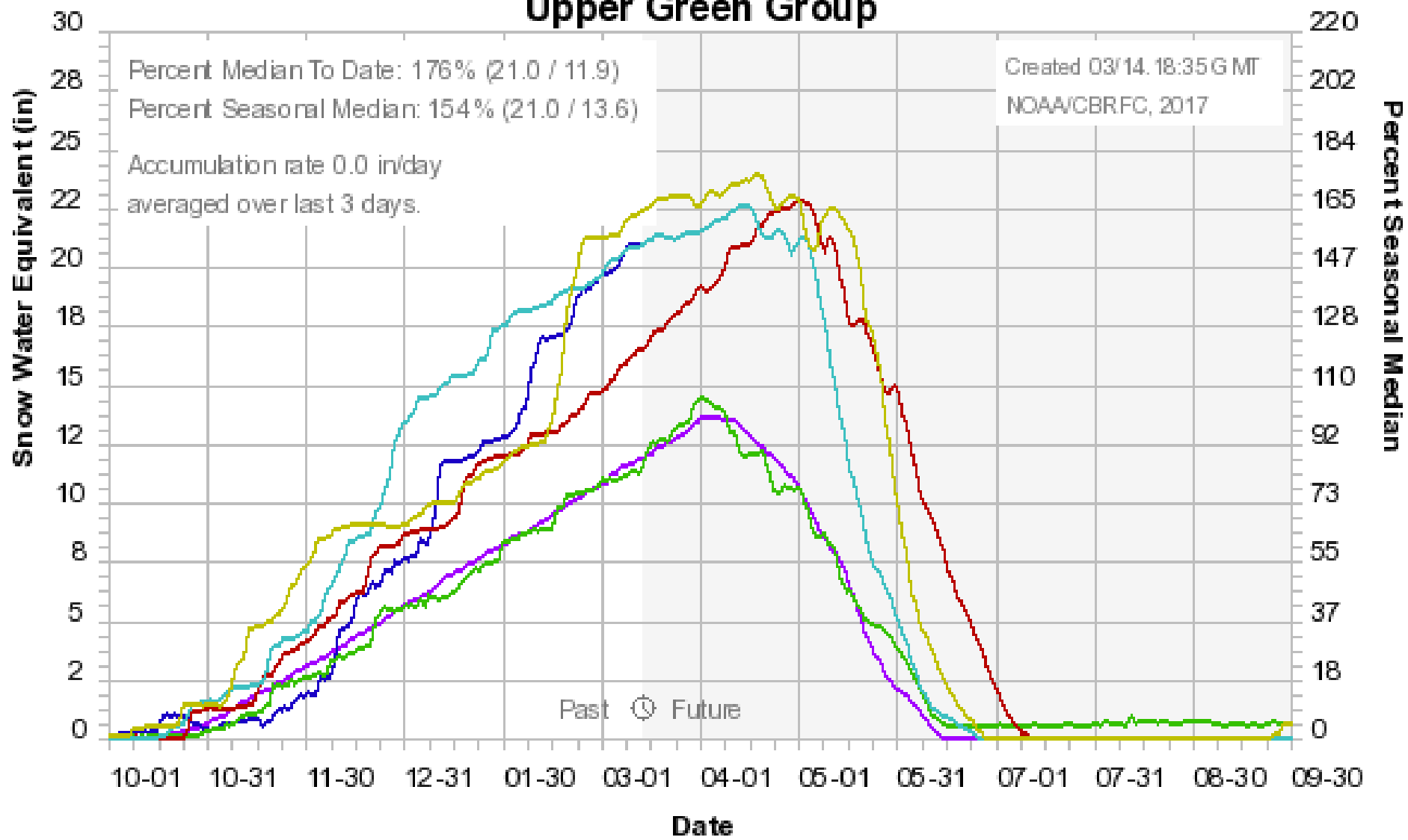


 = Snow Free

 = > 90% Snow Covered

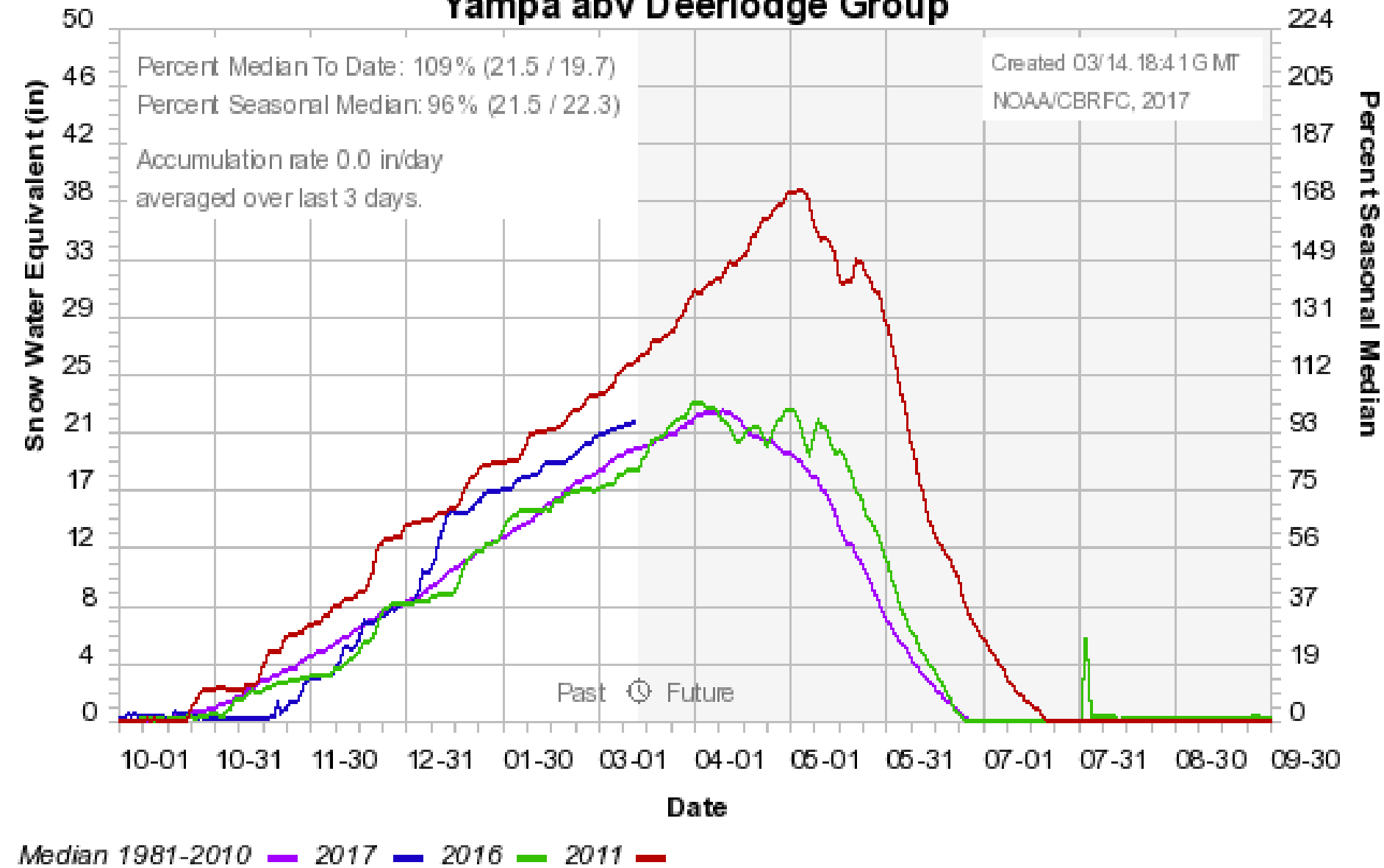
Snow (Upper Green SNOTELS)

Colorado Basin River Forecast Center Upper Green Group



Snow (Yampa River SNOTELS)

Colorado Basin River Forecast Center Yampa abv Deerlodge Group

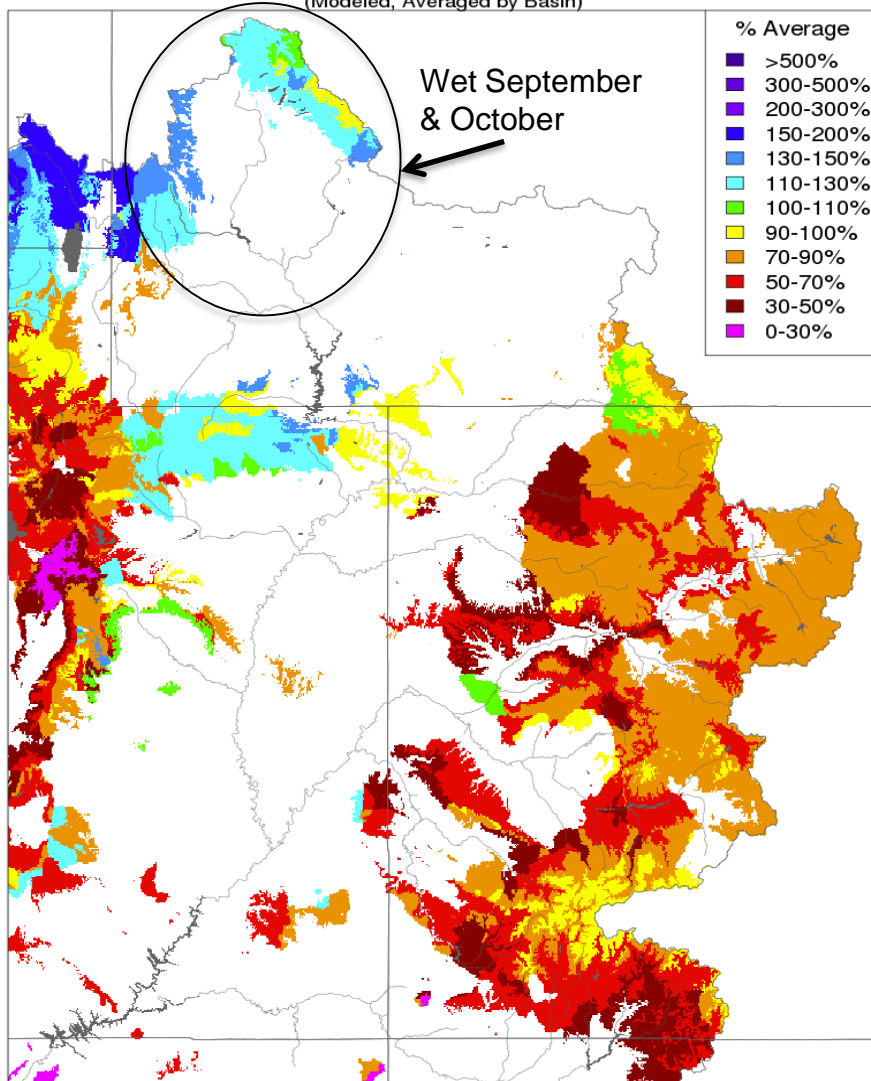


Fall Soil Moisture

Model Soil Moisture entering winter

Soil Moisture - November 16 2016

(Modeled, Averaged by Basin)



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2017 Water Supply Impacts :

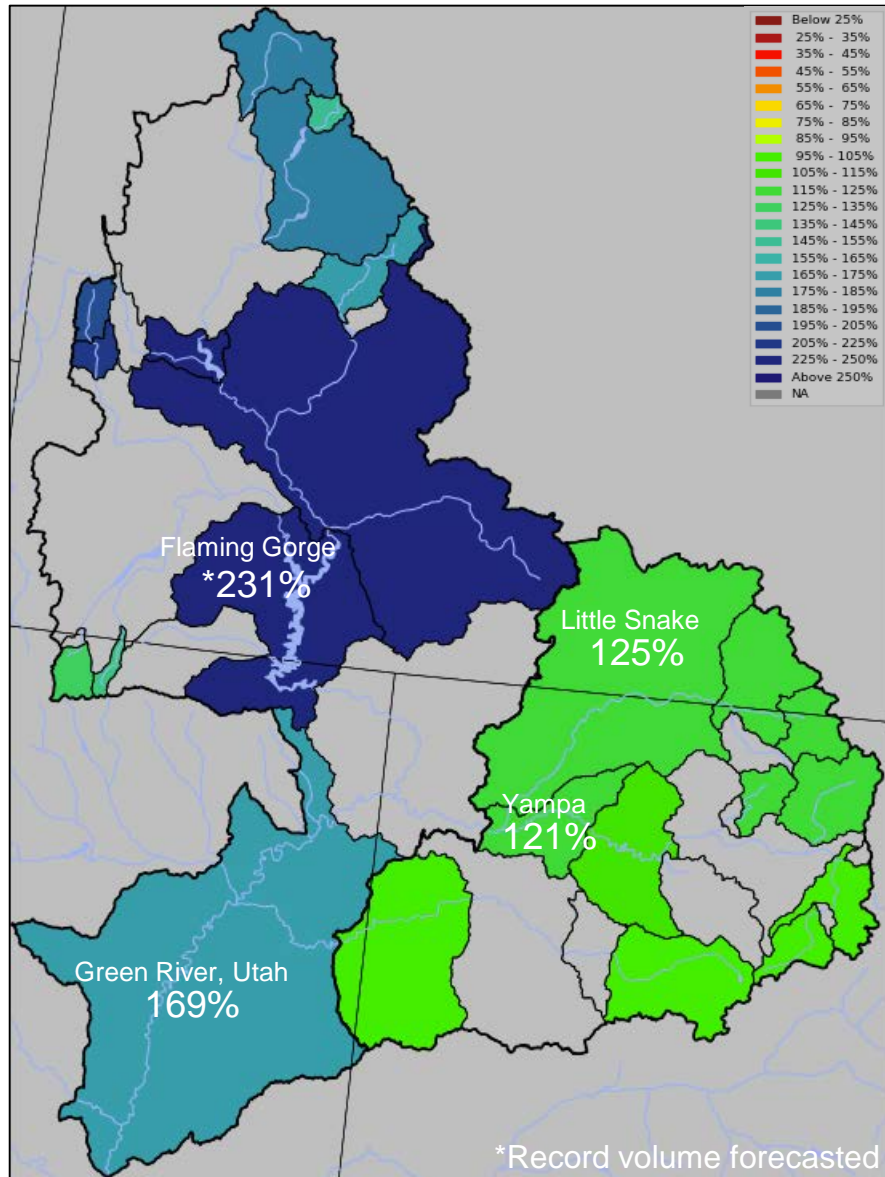
- In significant snowpack areas below average soil moisture less likely to have a large impact.
- Significant snowpack + wet soils could see more enhanced spring runoff
 - Upper Green river basins

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 1st Flaming Gorge Forecasts:

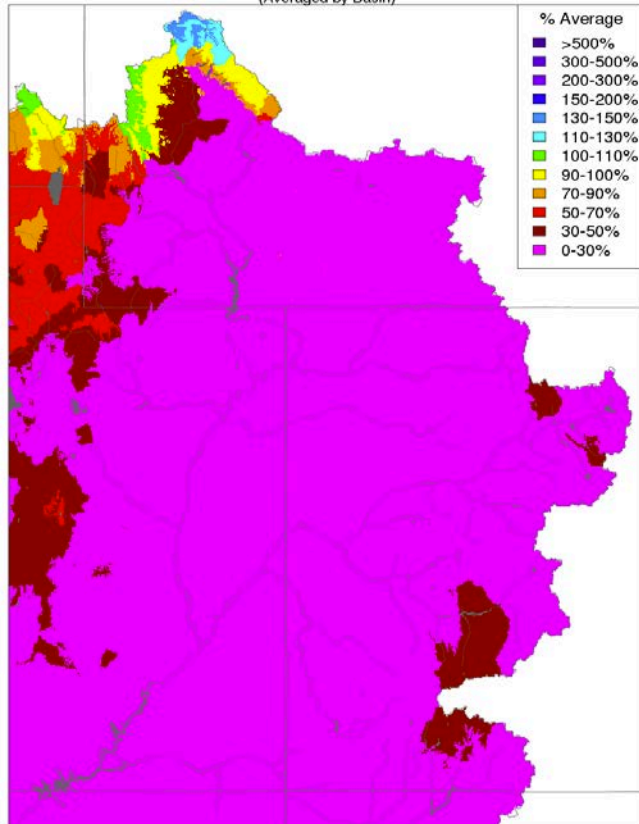
Dry	→	1840 KAF (187% average)
Average	→	2260 KAF (231% average)
Wet	→	2850 KAF (290% average)

March 1st 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)



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Flaming Gorge Forecasts:

March 1st: 2260 KAF (231%)

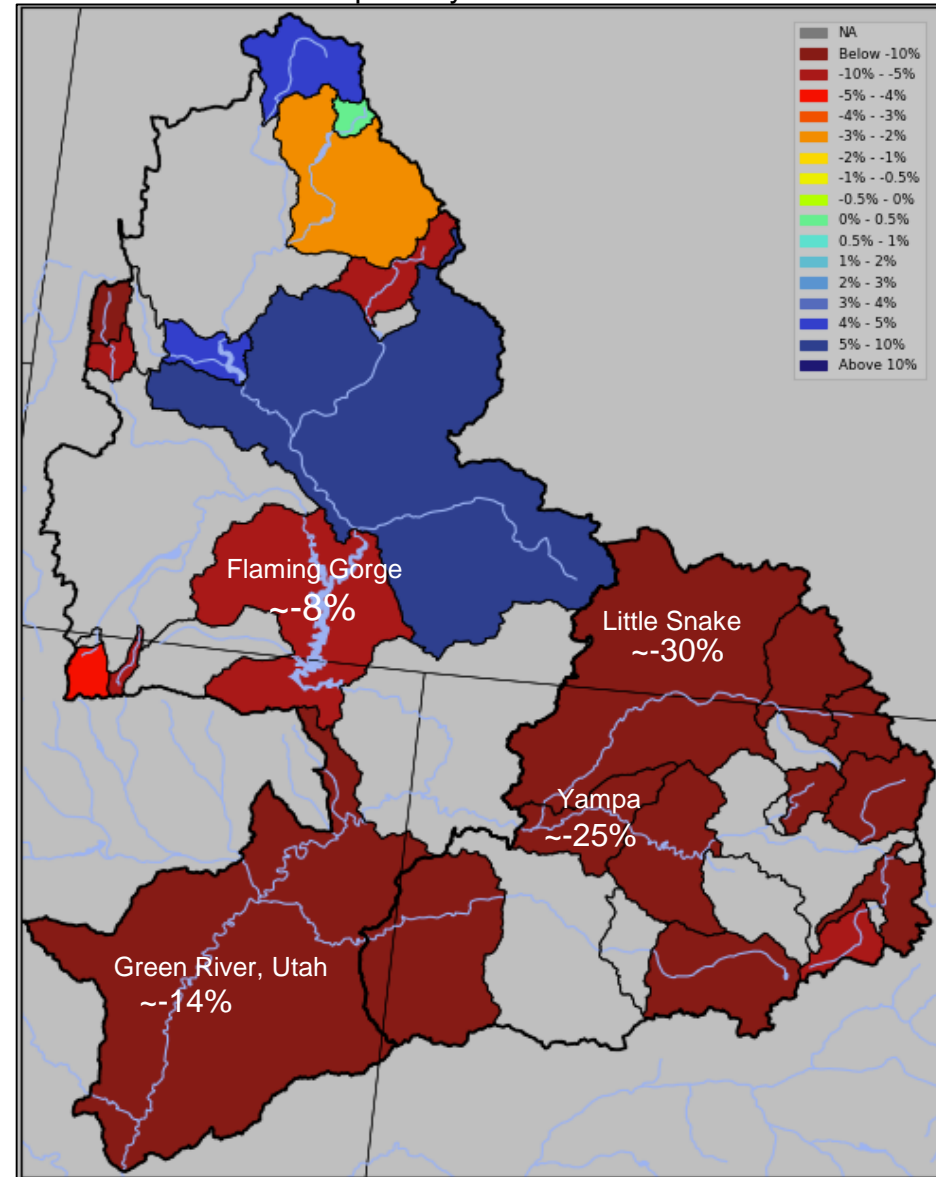
March 15th: 2180 KAF (222%)

Yampa River Forecasts:

March 1st: 1500 KAF (121%)

March 15th: 1250 KAF (100%)

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





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 $\pm \sim 5-8\%$

1. 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 1st 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

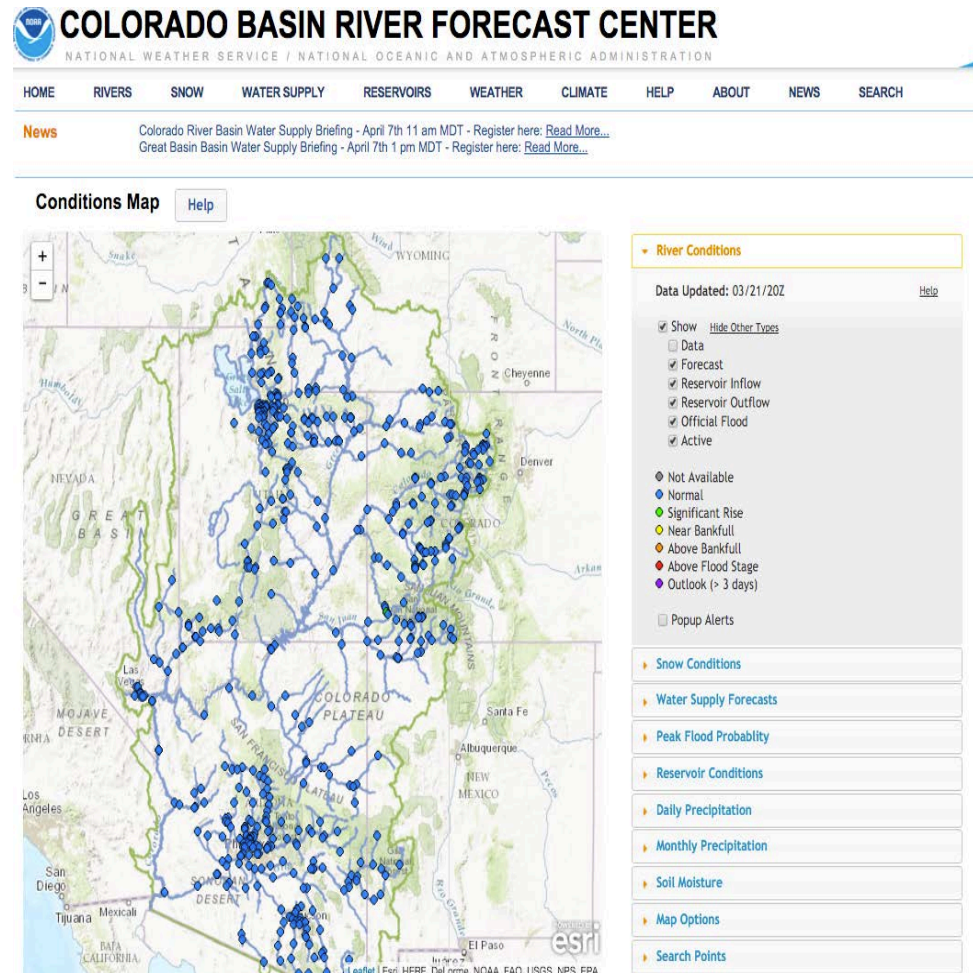
- Dry and warm conditions expected through early next
- Temperatures much above average through early next week
- Chance for more active weather period beginning the middle part of next week

Questions?



Contact Us!

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