

2017 Hydrologic Conditions: Green River Basin

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Wyoming Water Update: Green River Basin

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NOAA/National Weather Service



Presentation Overview

- Colorado Basin River Forecast Center Background
- Overview of Forecast Products
 - Long range \longrightarrow short range
- How we make the forecasts
- Review of 2017 forecasts
- Questions

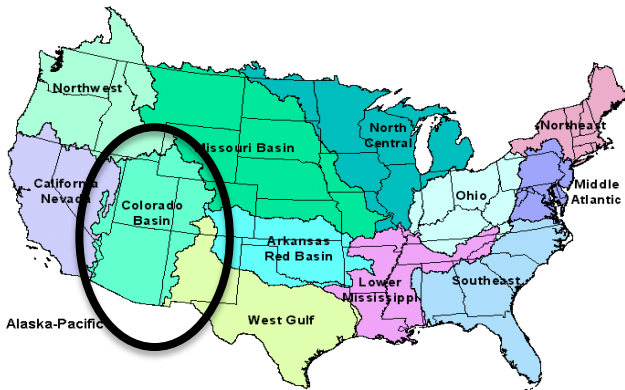
The Hierarchy and Mission – Colorado Basin River Forecast Center



Emphasis on understanding and predicting the Earth's environment.



Emphasis on protection of lives & property, decision support services associated with weather, water, and climate.



13 NWS River Forecast Centers

Emphasis on river basin hydrology

Flood forecasting & Flash flood guidance

Water supply forecasting

River stage & stream flow forecasts

Long range probabilistic forecasts

Rainfall & drought information

In Support of:

Flood warnings, reservoir flood control, water resource management, power generation, recreation, agriculture, river navigation/transportation, fisheries management, etc.

Colorado Basin River Forecast Center: Background



Our areas of Responsibility Include:
Eastern Great Basin
Colorado River Basin

This includes the
Green River Basin of Wyoming
Bear River Basin of Wyoming

Primary Emphasis:
Flood Forecasting
Water Supply
Daily River Stage / Flow forecasts
Flash Flood Guidance

Overview of Forecast Products

Long Range
(months to years)

Seasonal Water Supply Forecasts

April-July Unregulated Streamflow Volumes
Generated January-July
Provide a range of possibilities
Snowpack driven: Upper Colorado

Peak Flow Forecasts

Mean daily maximum flow from snowmelt
Indicator of flood potential
Generated March-May
Provide a range of possibilities

Daily River/Flood Forecasts

Generated everyday for ~400 river/reservoir locations
Forecasts of flow you expect to see in the river
Includes future weather forecasts:
5 days of precipitation
10 days of temperature

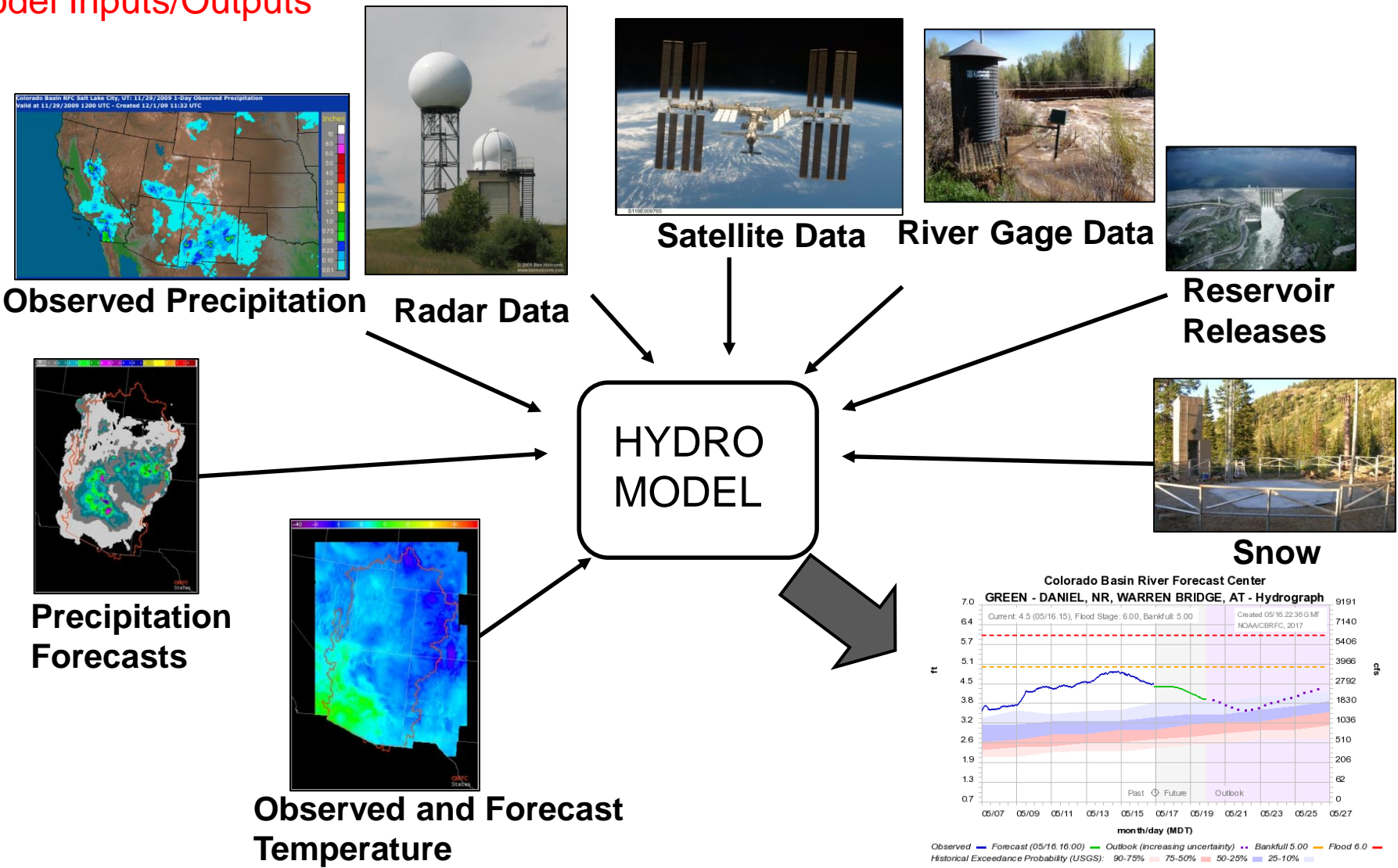
Flash Flood Guidance

Gridded guidance based on watershed characteristics
Supports National Weather Service WFO's

Short Range
(days to hours)

How do we make the forecasts?

Model Inputs/Outputs

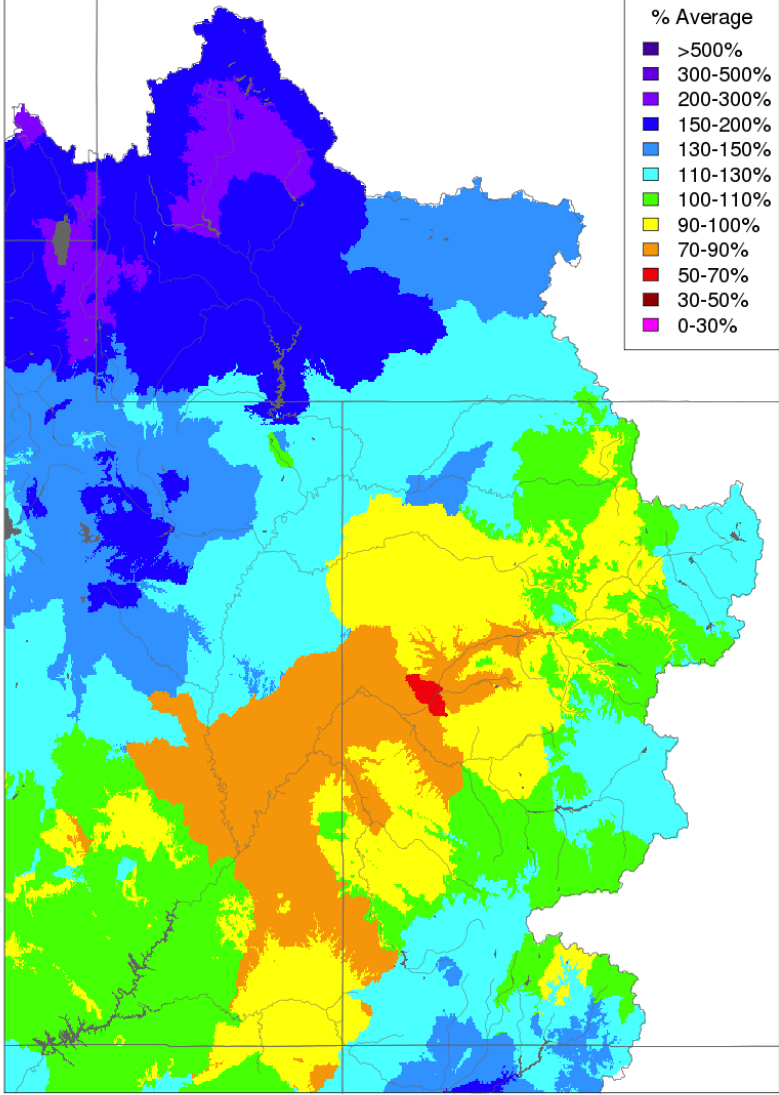


Quality of forecast depends on inputs !!

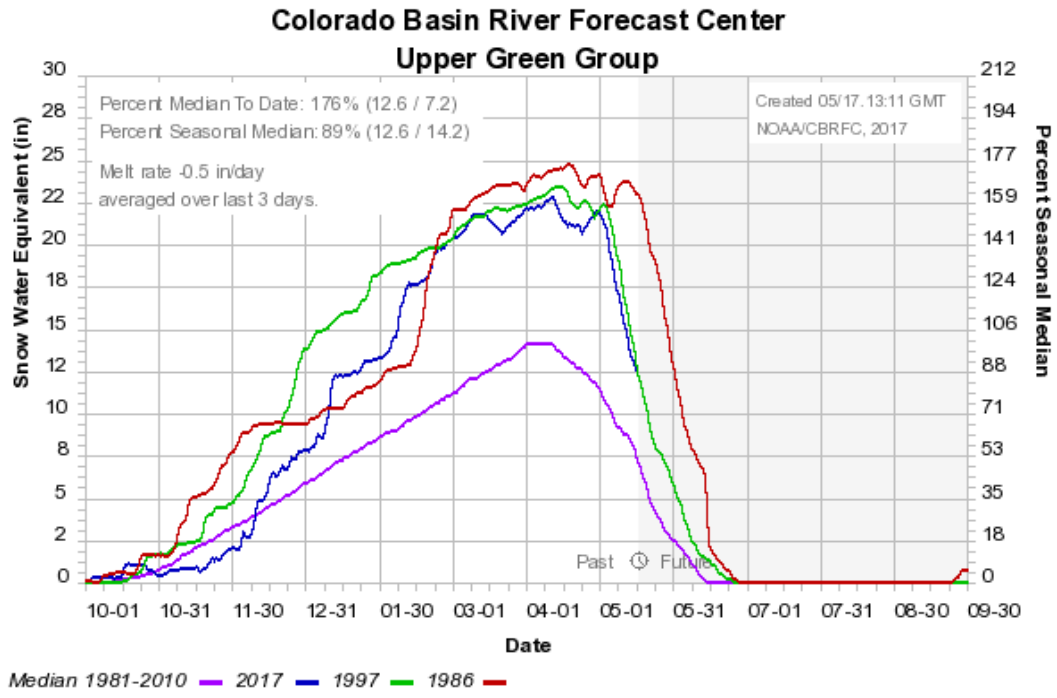
**Deterministic / Probabilistic
River Forecasts**

Seasonal Water Supply Forecasts: Upper Green

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



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

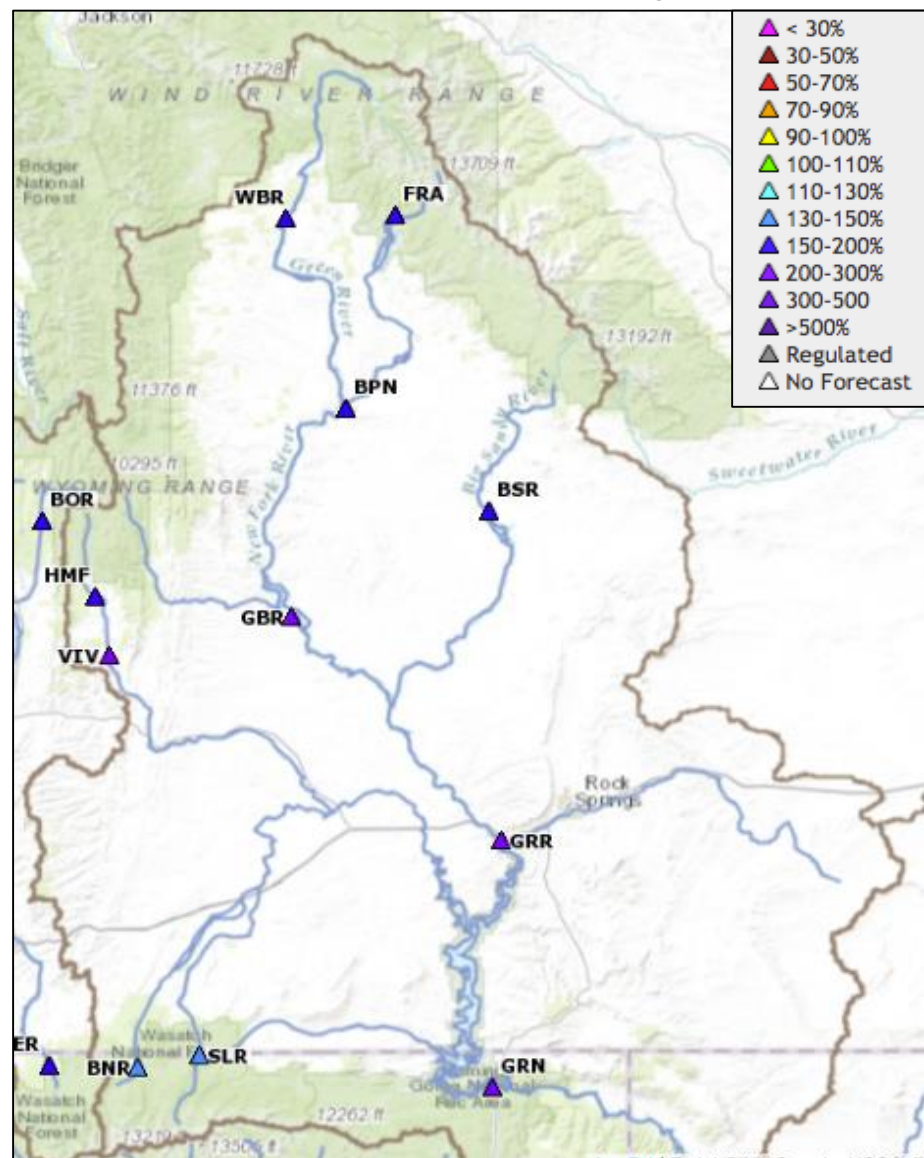


Snowpack similar to 1997 and 1986 which are the two largest years on record (30-35 years)

Record December-February Precipitation

Seasonal Water Supply Forecasts: Upper Green

May 1st April-July Forecast Streamflow Volumes
(% of 1981-2010 Average)



Expecting significant runoff volumes as a result of an extremely wet water year and an above normal snowpack.

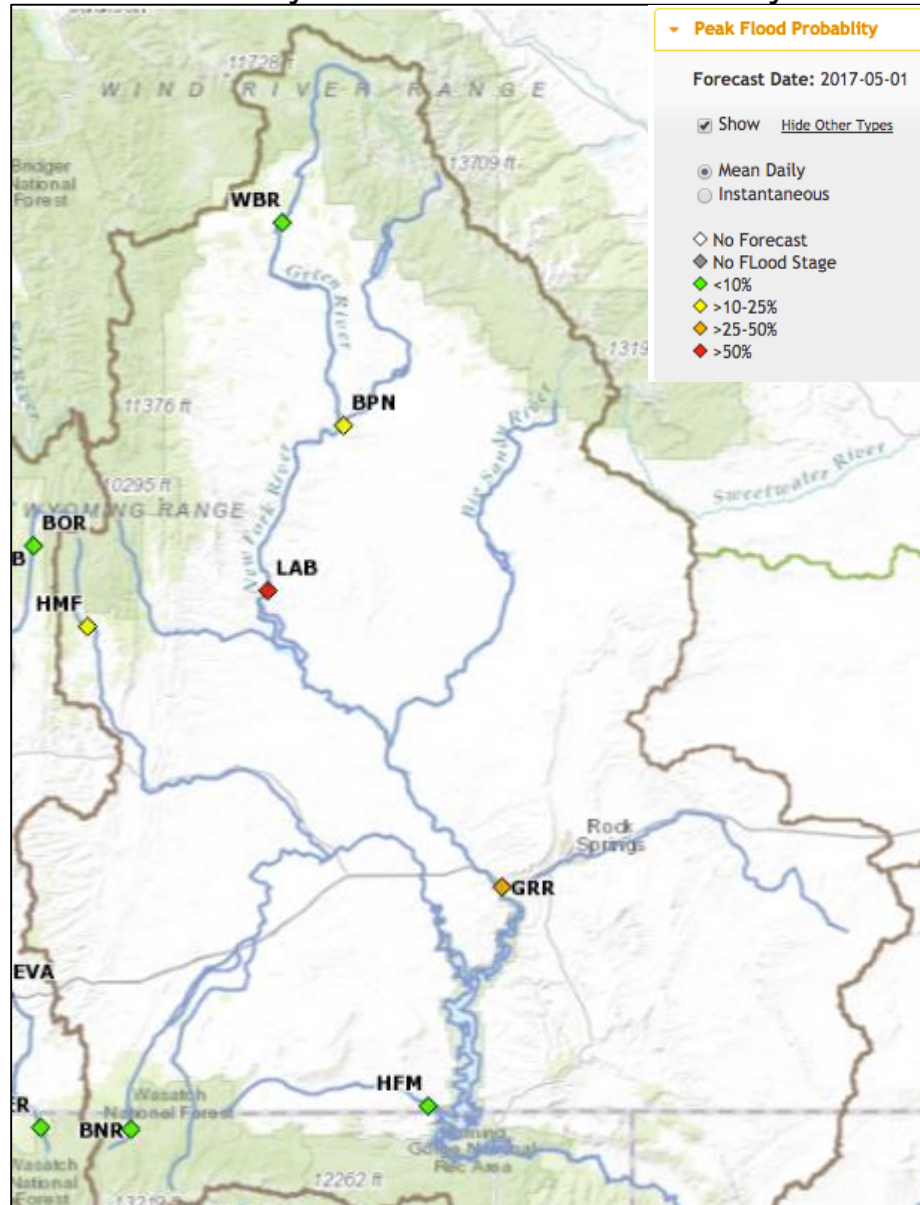
Specific Forecast Locations

Location	Volume (KAF)	% Average
Green River-Warren Bridge	430*	176%
New Fork – Big Piney	690	194%
Fontenelle Inflow	1680*	232%
Ham's Fork	113	209%
Big Sandy River	86	165%
Flaming Gorge Inflow	2260*	231%

*Indicates forecast is for record or near record volumes

Peak Flow Outlooks: Upper Green

May 1st Peak Flow Probability



Map indicates probability of reaching National Weather Service defined flood flow

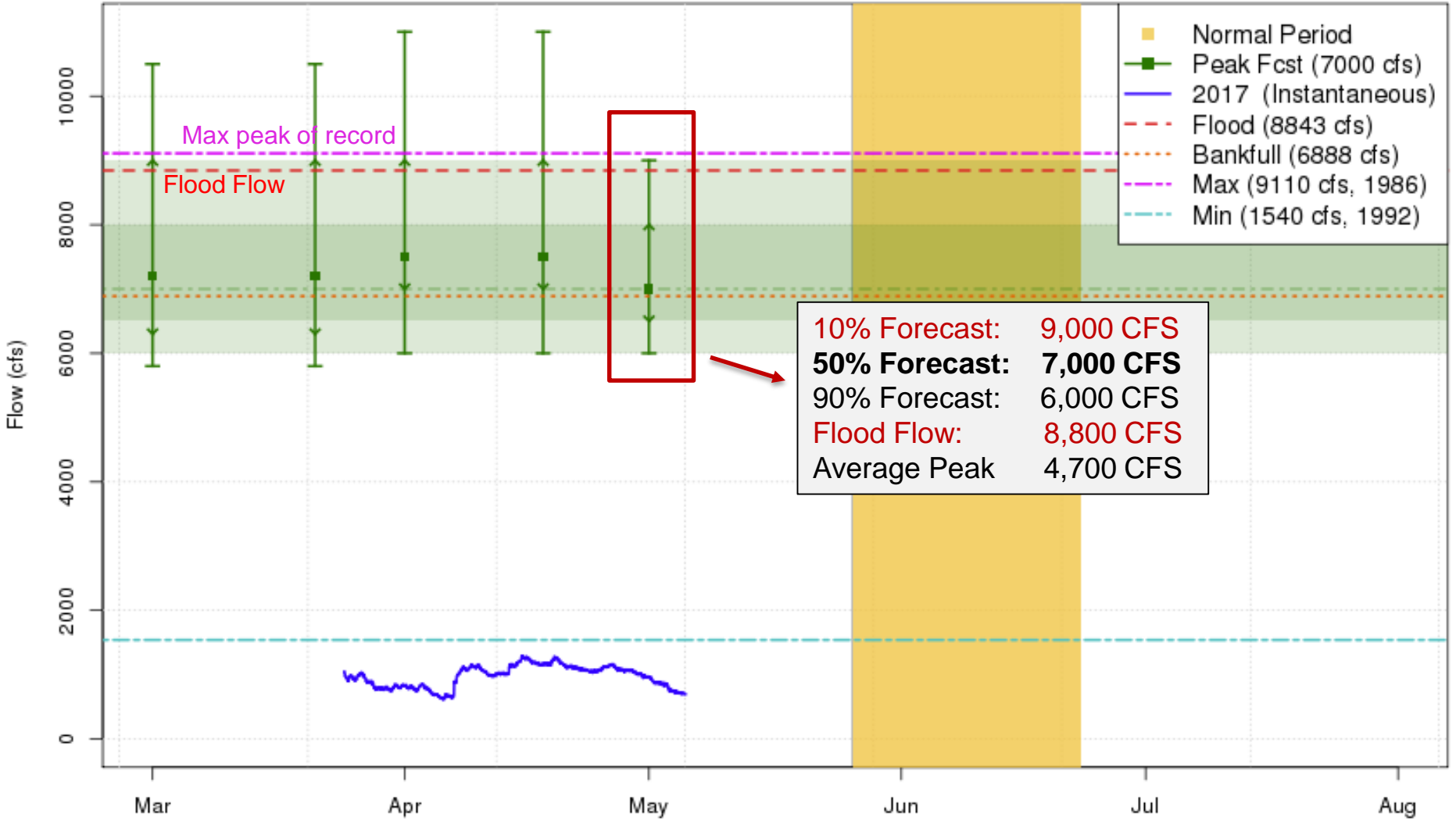
High Chance of Reaching Flood Flows
-Green River-LaBarge
-New Fork-Big Piney

Observed peaks are highly dependent on upcoming weather pattern!

Forecast procedures do not exist for all locations, areas with significant snowpack and a history of flood issues will be at greater risk this year.

Peak Flow Outlooks: New Fork – Big Piney

2017 Mean Daily Peak Flow Forecast
New Fork - Big Piney- Nr (BPNW4)

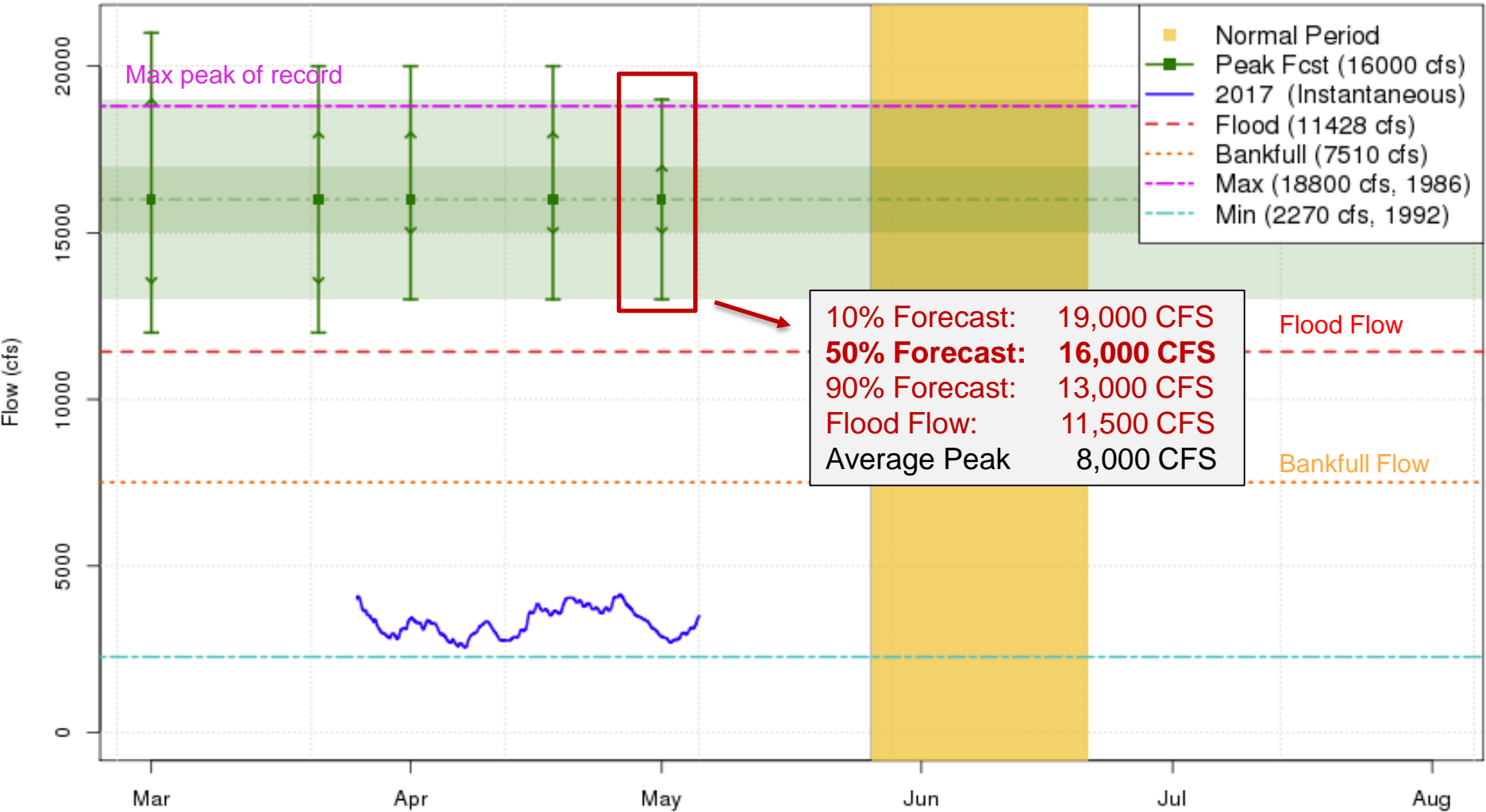


10% Forecast: 9,000 CFS
50% Forecast: 7,000 CFS
90% Forecast: 6,000 CFS
Flood Flow: 8,800 CFS
Average Peak 4,700 CFS

These graphics are updated approximately every two weeks between 3/1 and 5/1

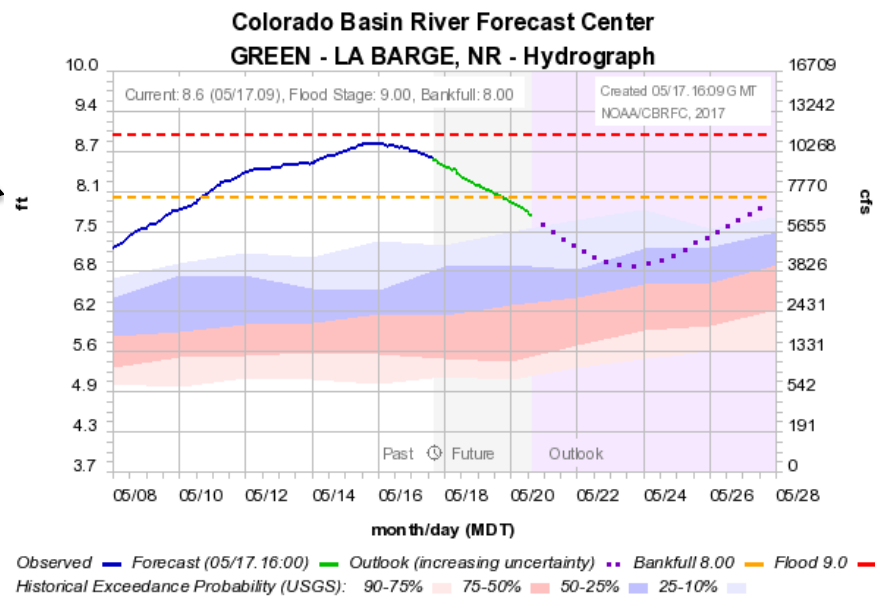
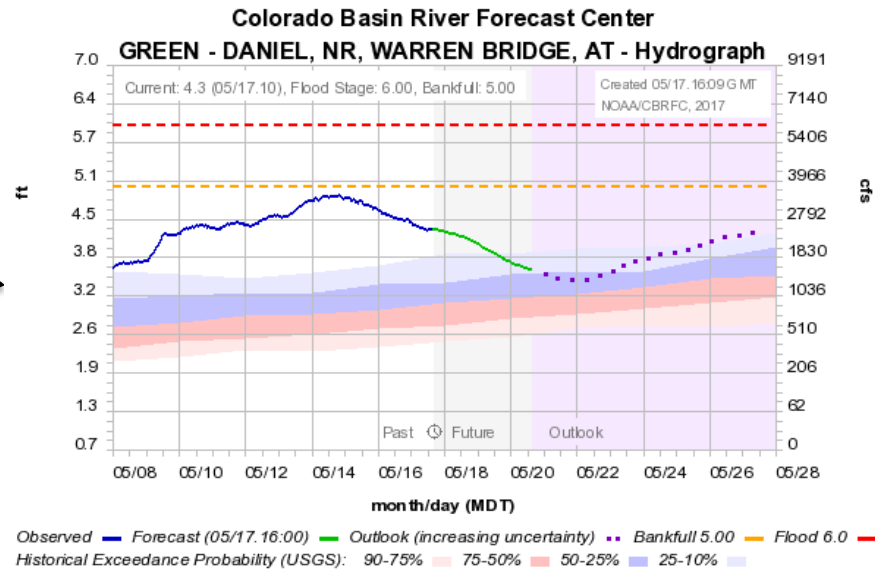
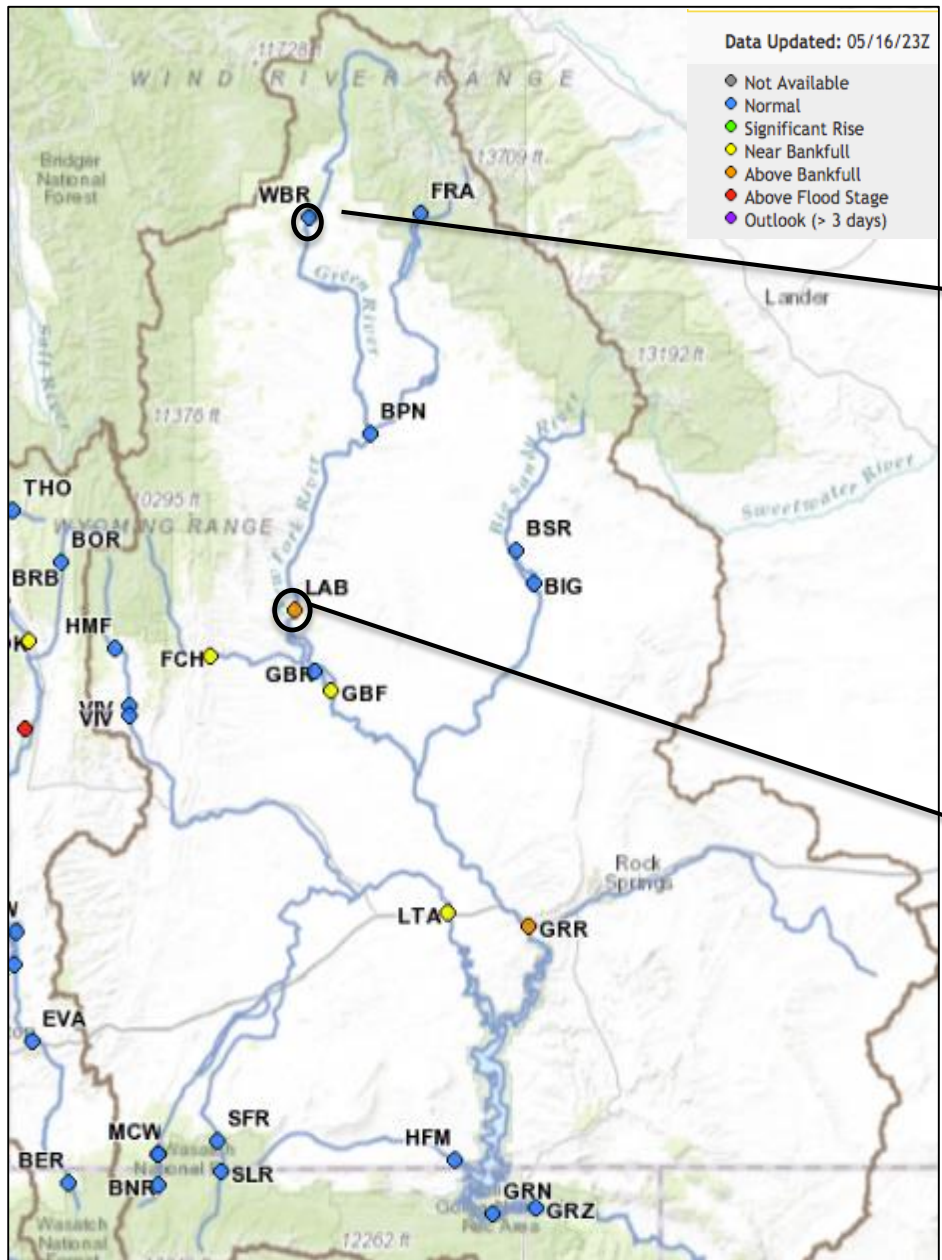
Peak Flow Outlooks: Green River-LaBarge

2017 Mean Daily Peak Flow Forecast
Green - La Barge- Nr (LABW4)

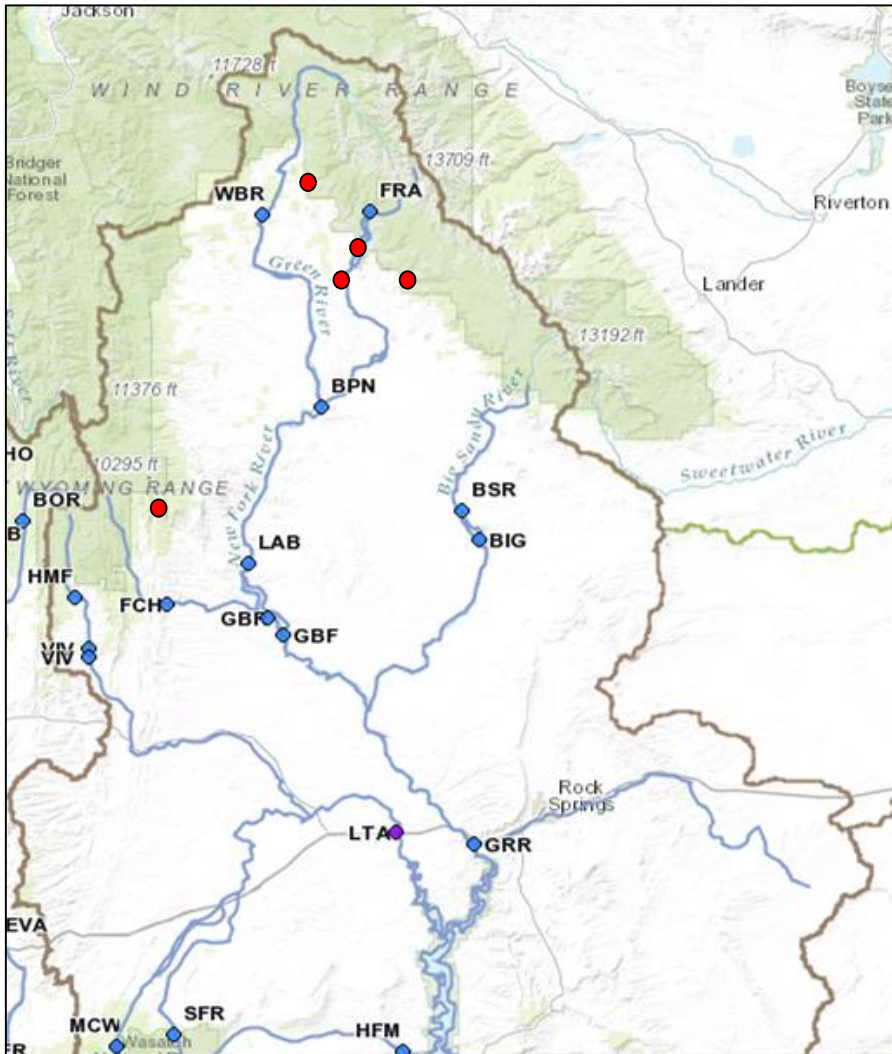


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10-Day Streamflow/Flood Forecasts



Forecast Challenges: Upper Green



Inadequate streamflow resolution

We need to add more model simulation points

Future Improvements:

Pine Creek (Fremont Reservoir, below)

Boulder Creek below Boulder Lake

LaBarge Creek

New Fork River below New Fork Lake

Irrigation Issues

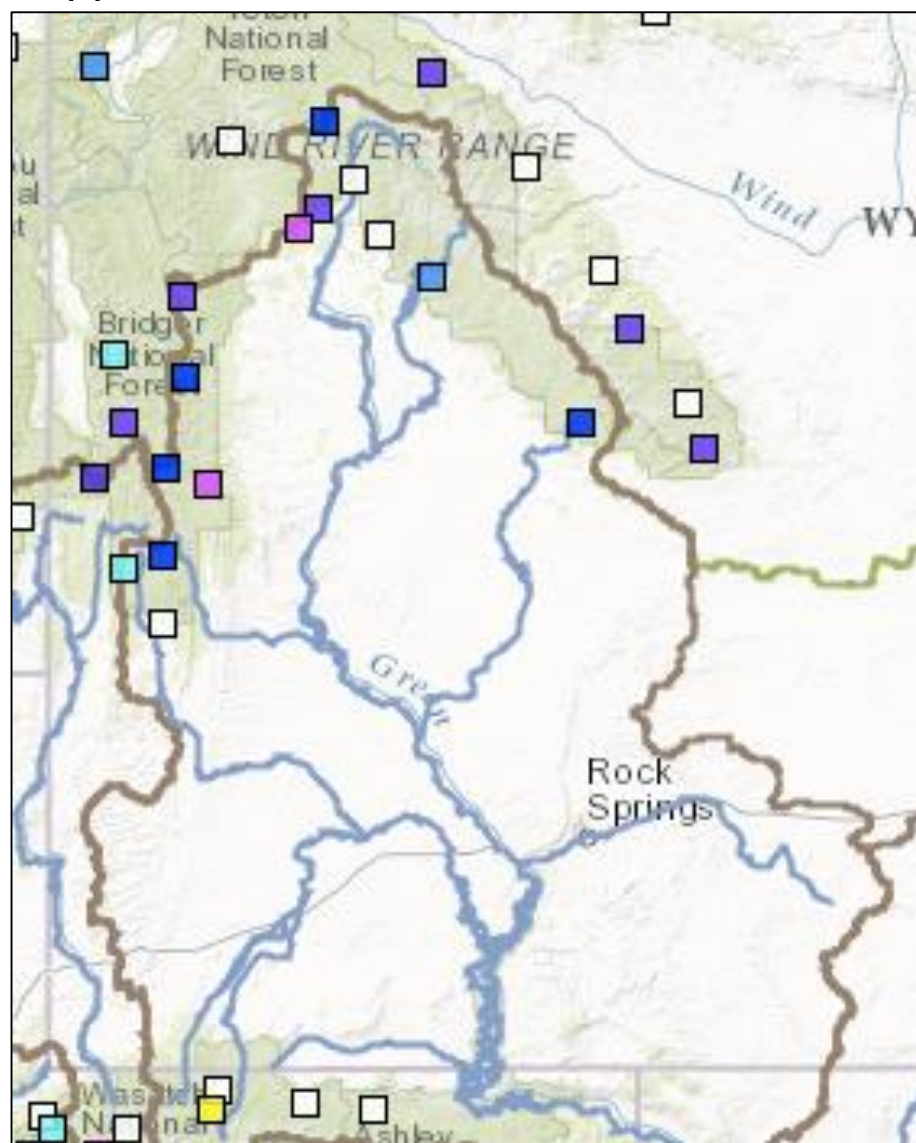
Model makes assumptions about irrigation uses

Future Improvements:

Incorporate additional historical/observed irrigation/diversion data

Forecast Challenges: Upper Green

Upper Green SNOTEL Locations



Density of real-time snow measuring locations (SNOTELS)

Area is approx 4,300 sq miles

Only 9 locations above Fontenelle

All locations < 10,000 ft

Approximately HALF of the Fontenelle April-July inflow volume comes from the area above 10,000 ft

Lack of Precipitation Data

Data sparse area and poor radar coverage

Contact Us!

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The screenshot shows the Colorado Basin River Forecast Center website. At the top, there is a navigation menu with links for HOME, RIVERS, SNOW, WATER SUPPLY, RESERVOIRS, WEATHER, CLIMATE, HELP, ABOUT, NEWS, and SEARCH. Below the menu, there is a 'News' section with two items: 'Colorado River Basin Water Supply Briefing - April 7th 11 am MDT - Register here: [Read More...](#)' and 'Great Basin Basin Water Supply Briefing - April 7th 1 pm MDT - Register here: [Read More...](#)'. The main content area features a 'Conditions Map' with a 'Help' button. The map displays the Colorado River Basin with numerous blue diamond markers indicating river conditions. A legend on the right side of the map provides a key for the markers: Not Available (grey diamond), Normal (blue diamond), Significant Rise (green diamond), Near Bankfull (yellow diamond), Above Bankfull (orange diamond), Above Flood Stage (red diamond), and Outlook (> 3 days) (purple diamond). Below the legend, there is a 'River Conditions' sidebar with a 'Data Updated: 03/21/2022' and a 'Help' link. The sidebar includes a 'Show' button and a 'Hide Other Types' link, followed by a list of checked items: Data, Forecast, Reservoir Inflow, Reservoir Outflow, Official Flood, and Active. There is also an unchecked 'Pop-up Alerts' option. Below the sidebar, there are several expandable sections: Snow Conditions, Water Supply Forecasts, Peak Flood Probability, Reservoir Conditions, Daily Precipitation, Monthly Precipitation, Soil Moisture, Map Options, and Search Points. The map includes a scale bar and a north arrow. The Esri logo is visible in the bottom right corner of the map area.

www.cbrfc.noaa.gov

Questions?

