NOAA's Colorado Basin River Forecast Center

Decision Support in the Upper Gila River: Making the Most of Local Resources for National Benefit

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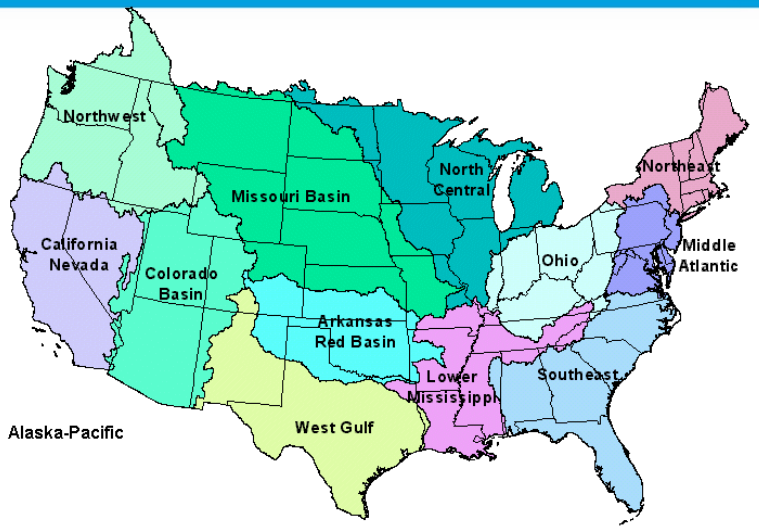
Upper Gila River State of the Watershed

September 22, 2017

Eastern Arizona College – Thatcher, AZ

Who Are We?



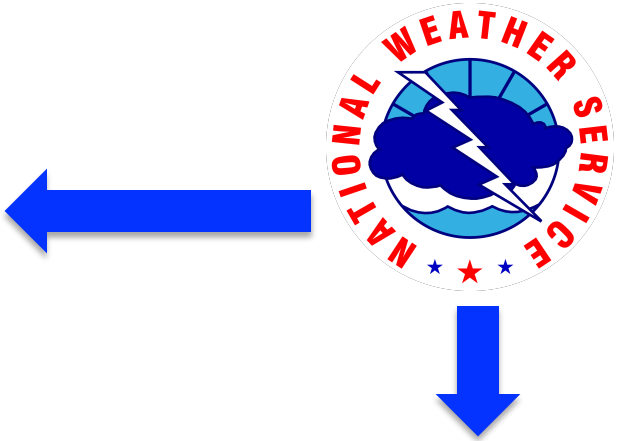
- Part of NOAA - NWS, one of 13 RFCs nationwide
- An operational field office located in Salt Lake City, UT
- Highly collaborative, reliant on partners and data
- All about decision-support!

Who We Are

- Work with a broad and diverse set of stakeholders
  - Weather Forecast Offices and Reclamation
  - Municipal and Agricultural Water Users
  - USGS, NRCS, and many other federal agencies
  - State agencies, Academics, NGOs, Tribes
- Receive data from many of these sources

Colorado Basin River Forecast Center

- River Forecast Centers (RFCs)
  - –Support for WFOs
  - –River levels and flows
  - –Reservoir inflows
  - –Each RFC is unique
- CBRFC
  - –Seasonal Water Supply forecasts, in addition to many other products
    - Most advanced, involved
    - Reclamation is a key stakeholder
    - www.cbrfc.noaa.gov



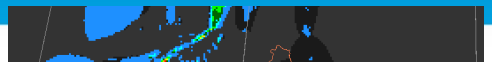
Weather Forecast Offices (WFOs)

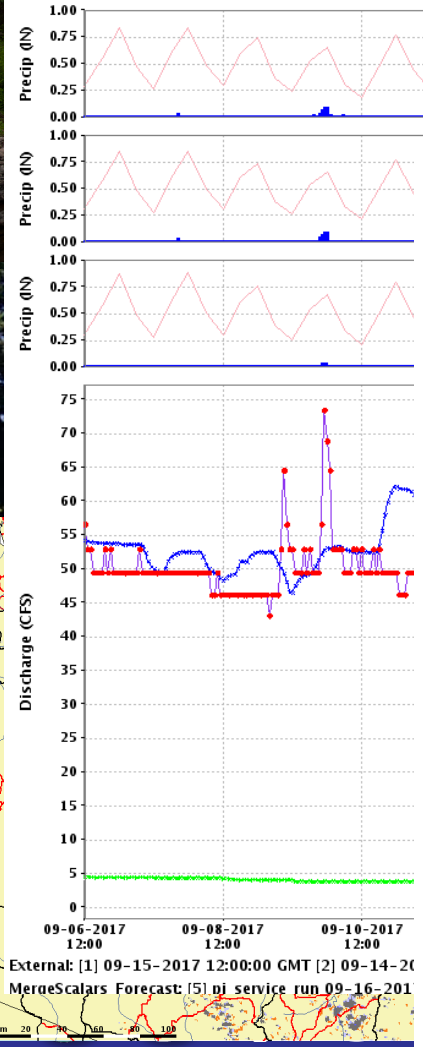
- **Everyday weather**
- **Extreme weather**
- **Warnings, watches, and advisories**
- **Floods, tornadoes, heat, etc…**

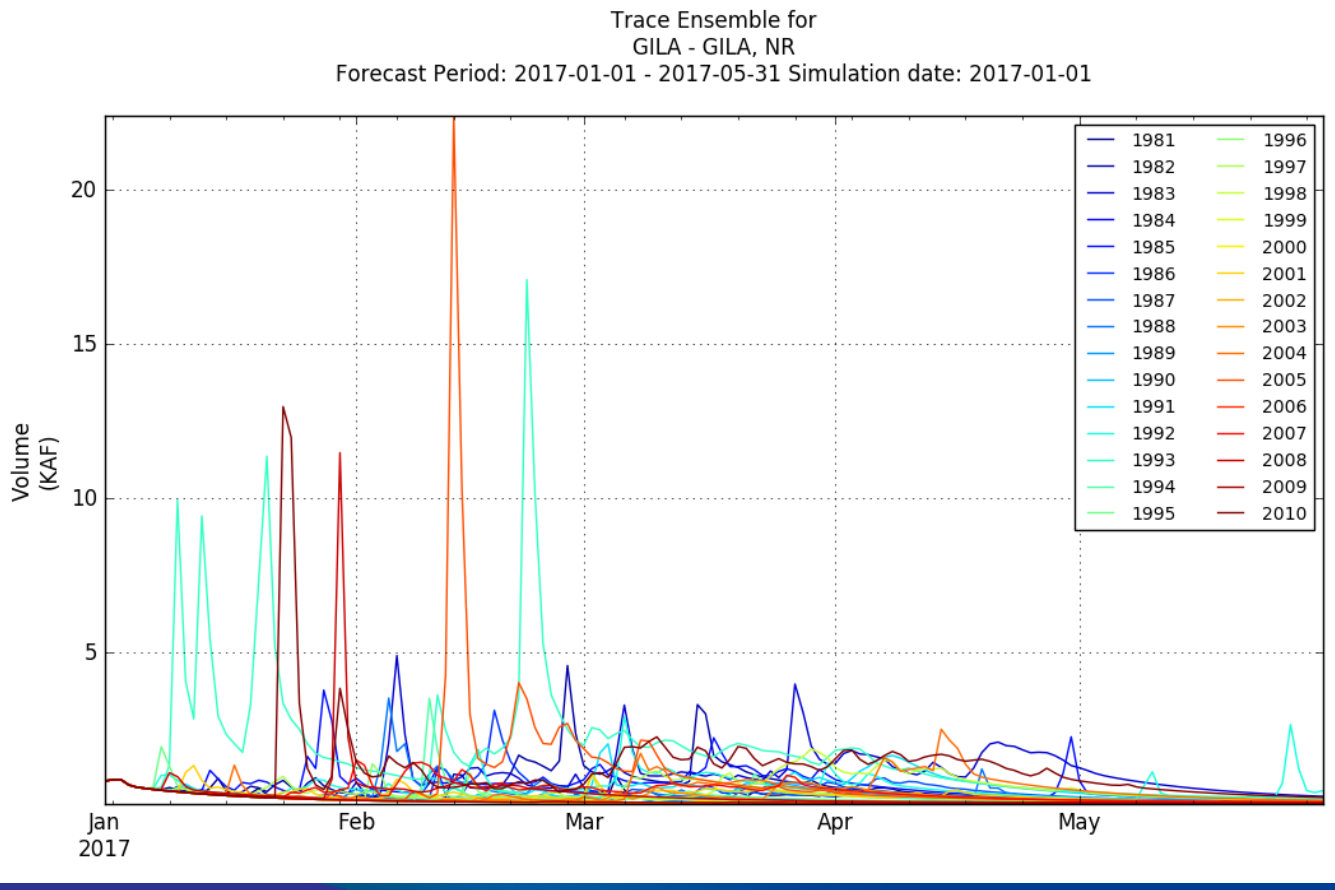
Forecasting in the Upper Gila Watershed

- Short term forecasts at 19 locations
  - Updated at least daily
  - More frequently if needed
- Seasonal water supply forecasts at 5 locations
  - Forecast Jan – May runoff
  - Official forecast issued each month, but guidance issued every day

Developing a Forecast







Developing a Forecast

- Consume as much observed data as we can
  - Temperature
  - Precipitation
  - Streamflow
  - Reservoir Operations
  - Measured Depletions
- Strong ENSO events

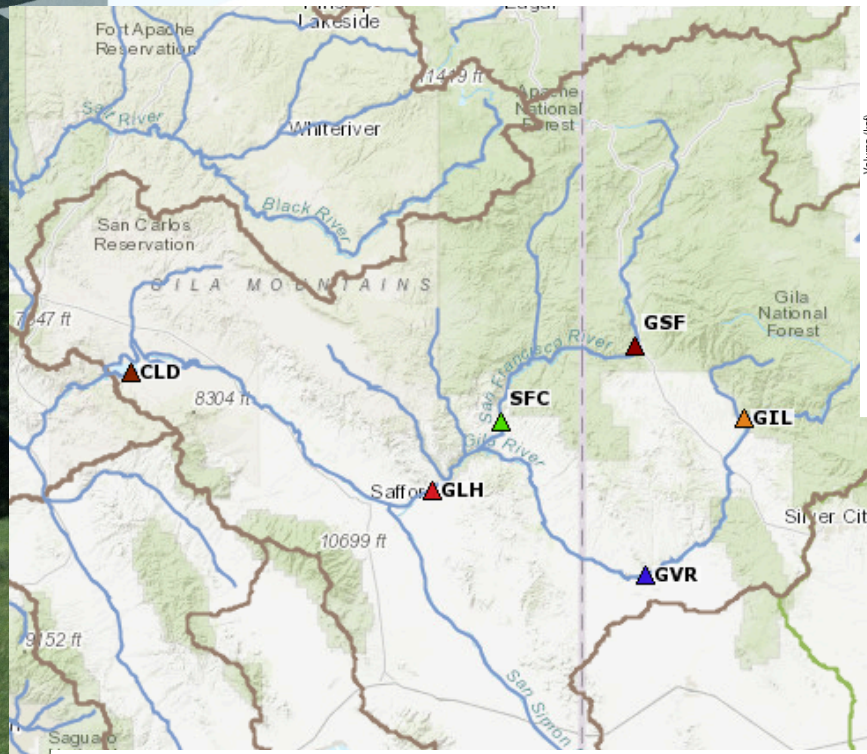
- Modeled Data
  - Soil Moisture
  - Freezing Levels
  - Develop a snowpack from observed precipitation data
  - Unmeasured Depletions
- Remote Sensing
  - Snow Coverage (qualitatively)
  - Dust (quantitatively)

Forecasting in the Upper Gila River Basin

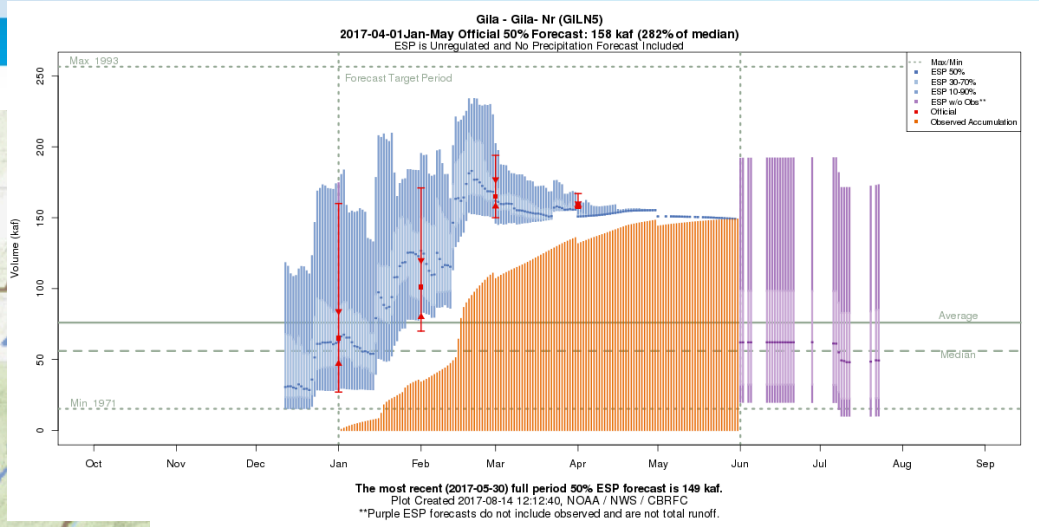
- We do really well…
  - Wintertime storm events
  - Routing upstream observed flows
  - Supporting flash flood events
- Updating calibrations in the Lower Colorado River Basin

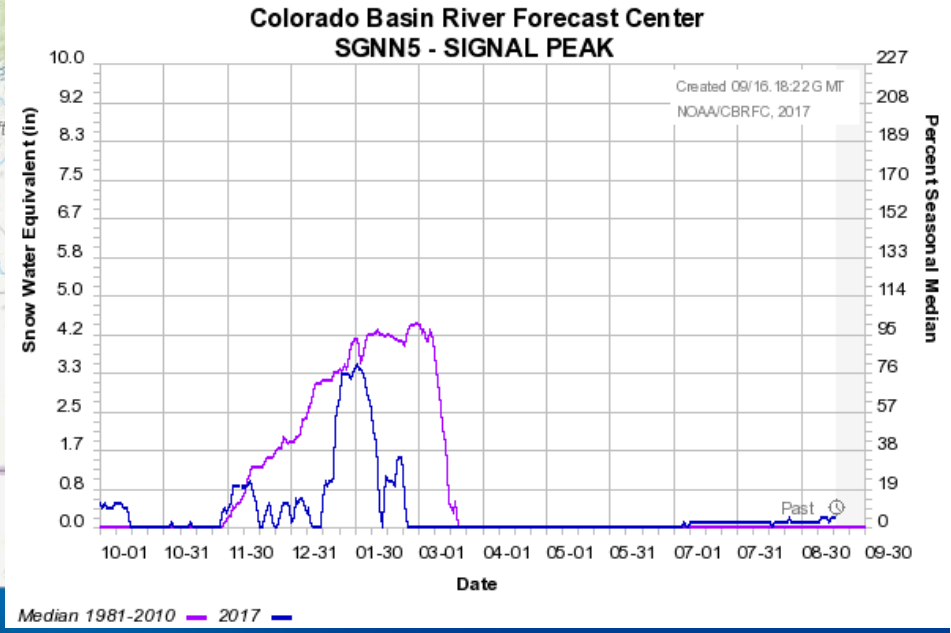
- We are challenged by…
  - Summertime storm events, monsoon events
  - Freezing level accuracy
  - Lack of observations in some areas
  - Changes in channel geometry during and after storm events
  - Flash flood events

Reaching our Stakeholders



100% Snow does not mean 100% Runoff!





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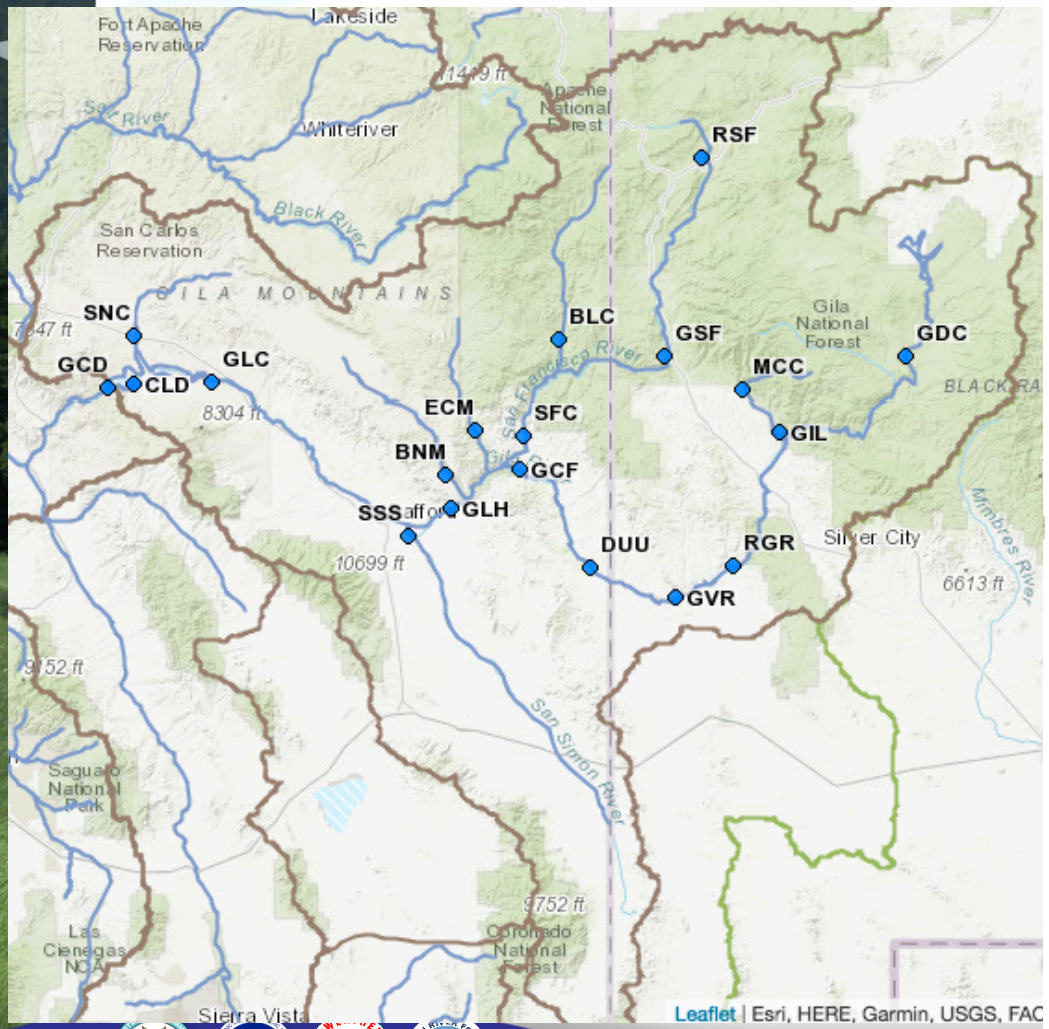
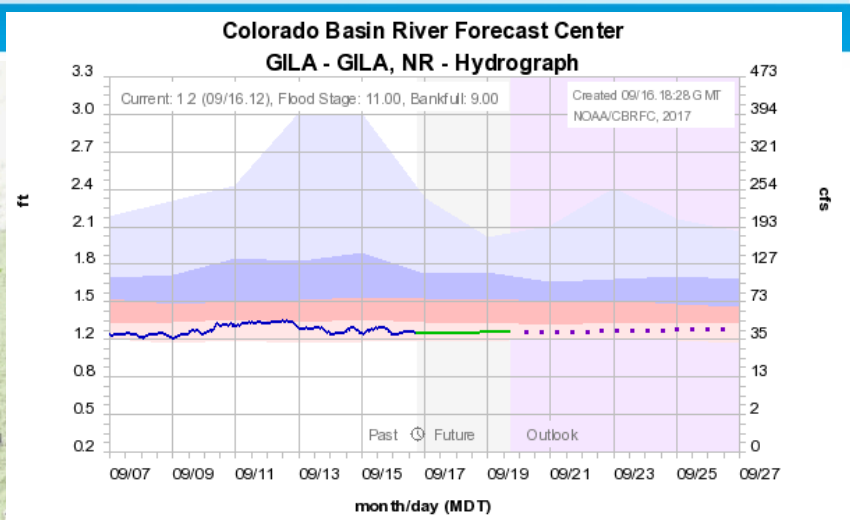
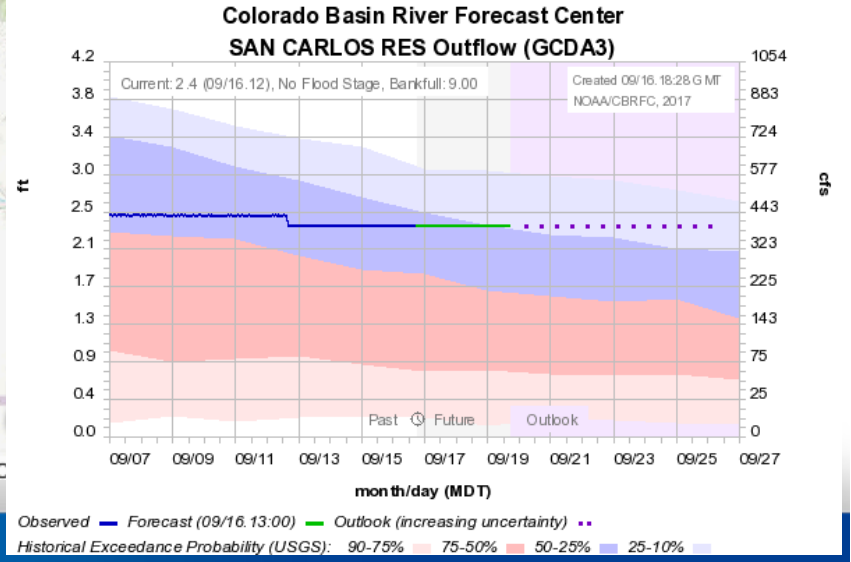
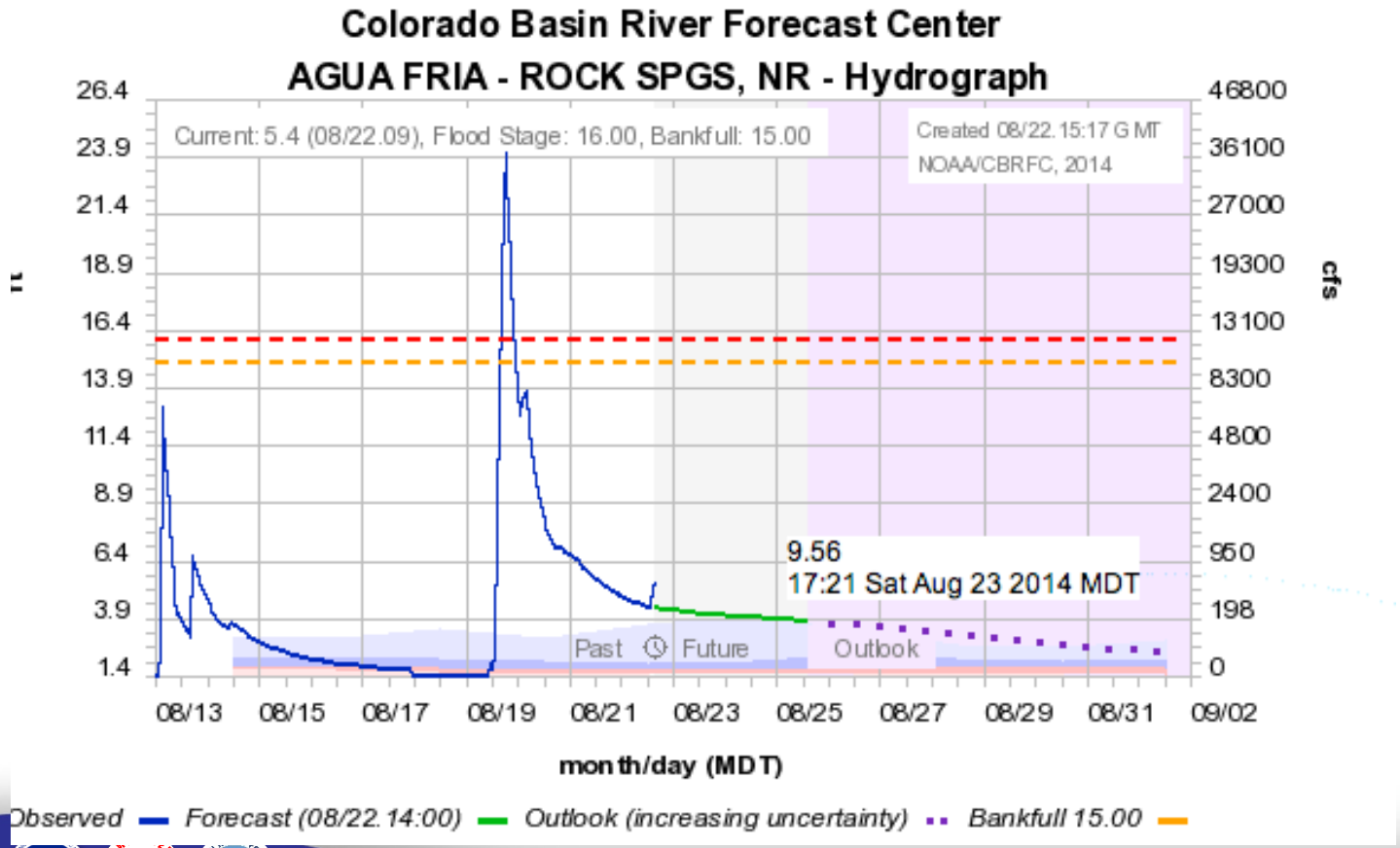




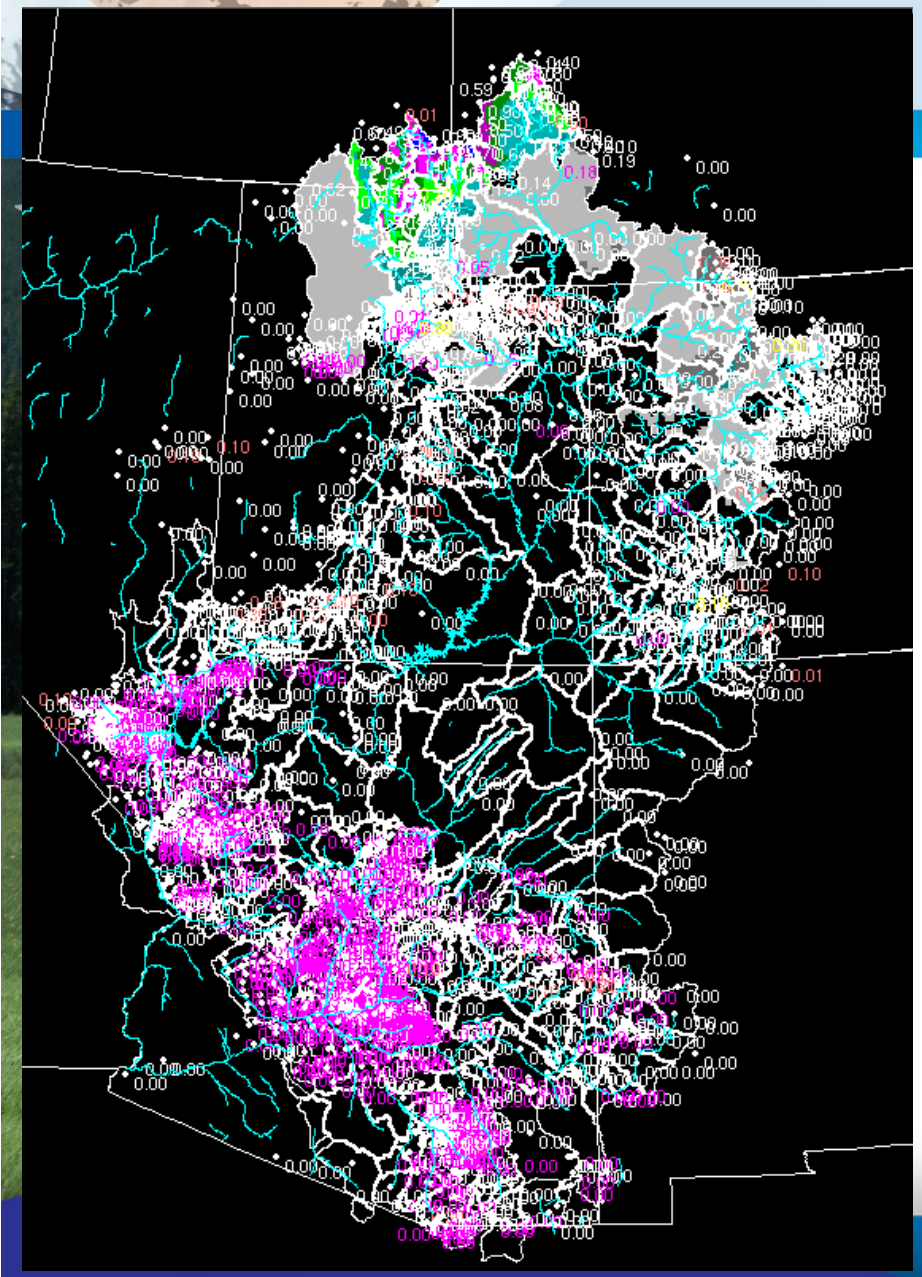


Reaching our Stakeholders

Support flood warning efforts by weather forecast offices

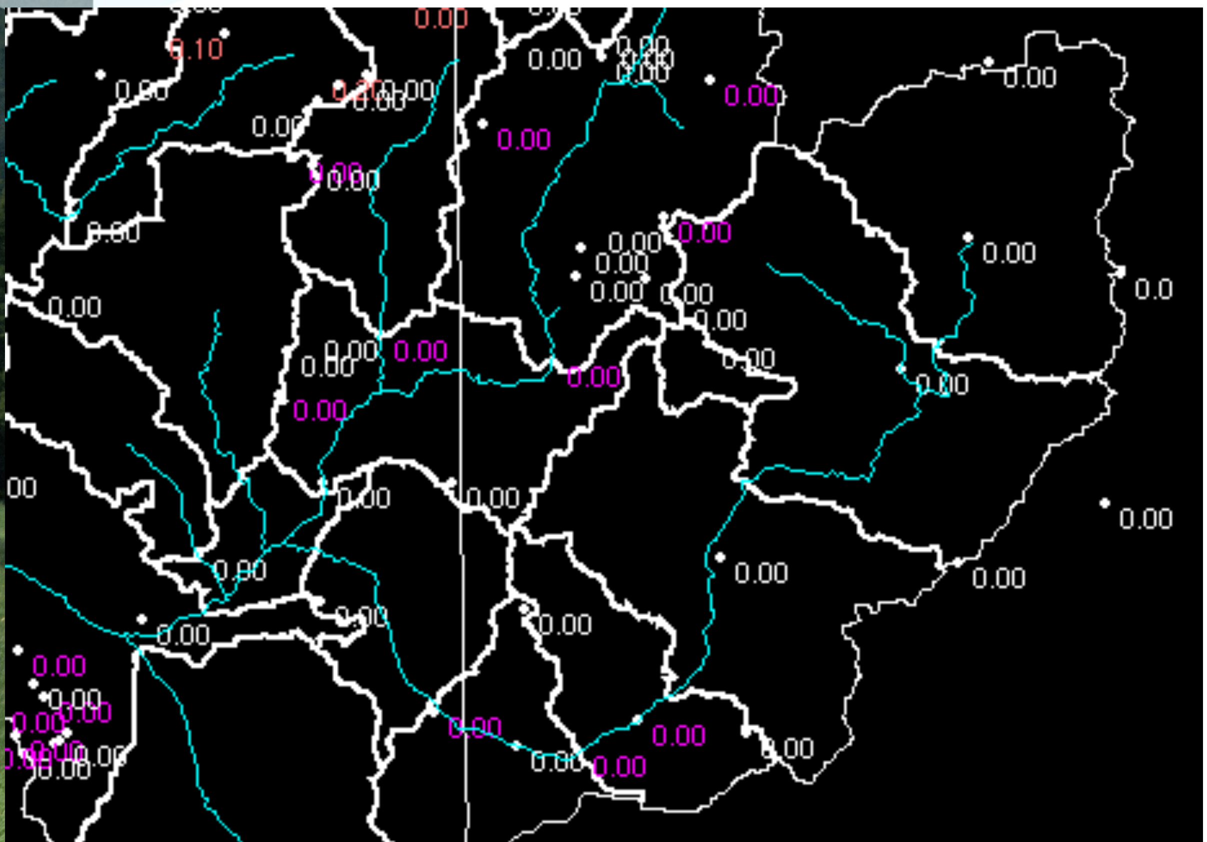


Opportunities in the Upper Gila River Basin



- Upper Gila River Basin is relatively data sparse
- We could improve precipitation gage density by partnering with USGS
  - About $1,000
  - Gage at streamflow sites
  - Very helpful for forecasting in the area

Opportunities in the Upper Gila River Basin



We can incorporate and use new data, especially if it's projected to be long-term and dependable

Could also use more data regarding use in the basin

Future calibration will incorporate any new streamflow stations in the Upper Gila River Basin

Coordination Efforts

- Annual Stakeholder Open House
  - Broad range of stakeholders
  - Introduce new products and services
  - Reinforce traditional products and services
  - Important for us to get feedback
- Frequent webinars
  - Water supply, peak flows
  - Custom Webinars for your group
  - WFO Coordination

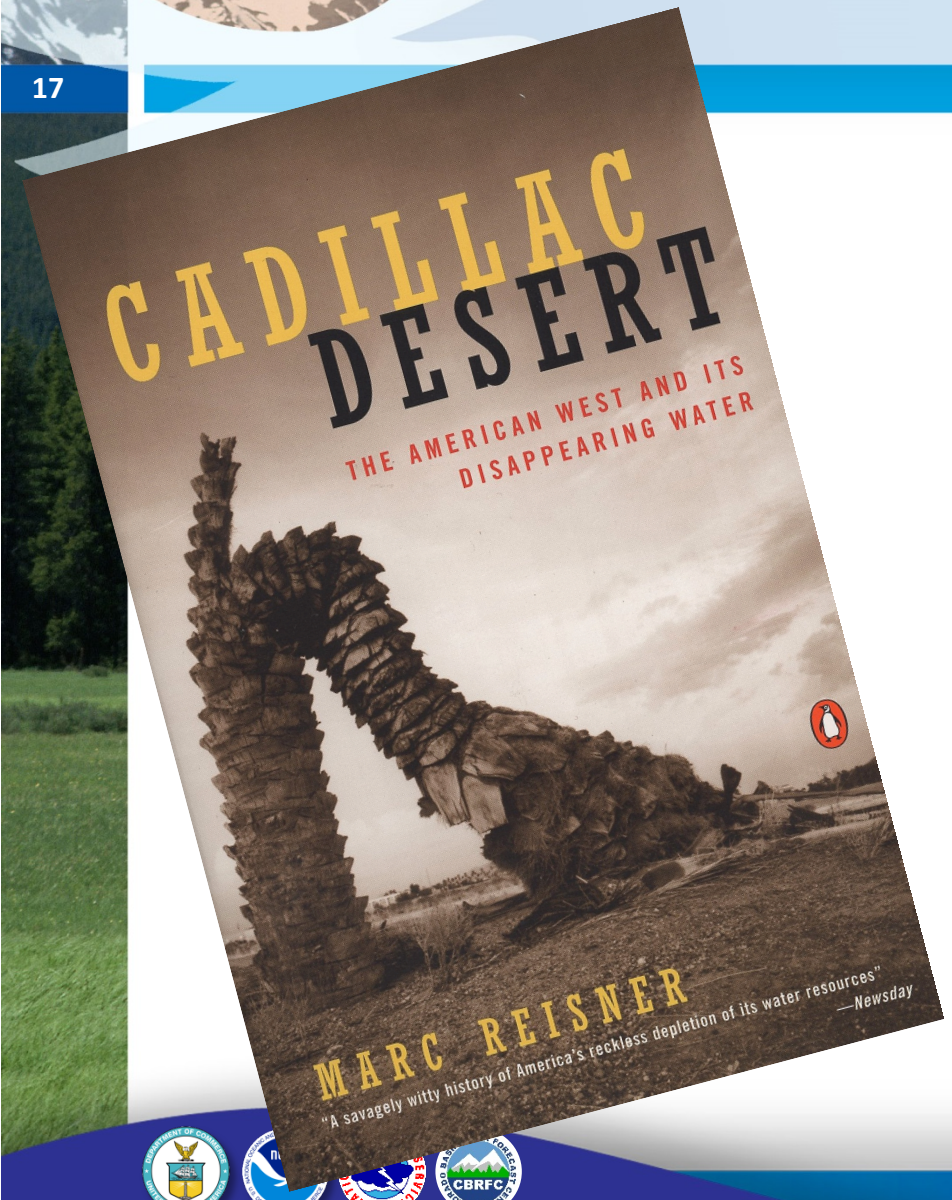
Coordination Efforts

- Participation in stakeholder-run meetings and events
- Participation in multi-agency efforts
  - Landscape Conservation Cooperatives
  - Climate Science Centers
  - NOAA RISAs (like CLIMAS)
  - Others
- Direct contact by phone, e-mail, etc…

Challenges Ahead

- Climate Change and its Impacts
  - Stationarity is in the past – but it's also how we look forward
  - Extreme Events – persistent drought and intense rains can impact our forecasts, and our stakeholder's ability to manage resources effectively
- Infrastructure and Operations
  - How do we continue to bridge the research to operations gap? AND the operations to research gap?
  - Our model from the 1970s was not built for the data we have access to now, so we have to be innovative
- Outreach
  - Facilitating cooperative and continued decision support
  - Reaching those partners we haven't met yet
  - A diverse area with diverse needs! Great Basin, Lower Basin, Upper Basin… and the users within those areas...

Moving Forward



If we want to continue to thrive in a Cadillac Desert, we have to carpool!

We need to encourage the notion of a hydrologic community – we're one basin.

New partnerships, new voices, and new ideas are going to be needed – we can help!

Upcoming Open House

- October 30th and 31st
  - Half day on October 30th covering "CBRFC 101"
  - This year, we'll focus on how stakeholders use our forecast on the 31st
- Free!
- Great way to see what others are doing, exchange information and ideas

Questions?

Contact us!

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cbrfc.operations@noaa.gov

801-524-5130 x335 or press “1” to speak to a hydrologist

www.cbrfc.noaa.gov