● CBRFC Background
● Looking Back: Water Year 2021
● Looking Forward: Water Year 2022
● Water Supply Forecasts
Background: River Forecast Centers

- **Weather Forecast Offices**
  - Flood Watches and Warnings
  - Determine flood stages
  - “Eyes on the ground” -- document impacts, notify communities
  - Work closely with Emergency Managers
  - Flash flood experts for the area
13 RFCs nationwide
  ○ Support role to WFOs
  ○ Streamflow forecasts from hourly to seasonal timescales
Hydrologic models run locally on a daily basis
Western RFCs are particularly adept at water supply services
In a First, U.S. Declares Shortage on Colorado River, Forcing Water Cuts

Arizona farmers will take the initial brunt, but wider reductions loom as climate change continues to affect flows into the river.
Below normal snowpack observed as evidenced by Snow Water Equivalent (SWE) through winter-spring 2021
Poor spring runoff was followed by a wet monsoon season.
Tucson, AZ recorded its 3rd wettest monsoon.

Monsoon season precipitation brought multiple high water events across southern Arizona.
Review: Water Year 2021 (Oct 2020 - Sep 2021)

Exceptional Drought ~15%
Exceptional Drought ~57%
Exceptional Drought ~55%
Exceptional Drought ~7%
Looking Forward: Water Year 2022

Oct 2021 - Sep 2022
La Niña is favored to continue through the Northern Hemisphere winter 2021-22 (~95% chance)

- Very similar conditions to last year
- Increased chances of drier winter weather in Arizona/LCRB
CBRFC model soil moisture conditions are improved from their record/near record dry levels a year ago but remain below to well below normal across many of the major runoff producing areas.

Above normal winter/spring precipitation will be needed to improve soil moisture deficits.
Precipitation Event Jan 1st and 2nd in Arizona.

Much above normal flows and even approaching flood conditions.
Water Supply Forecasts

- Probabilistic, volumetric forecasts
- Updated daily, with monthly “official” forecasts
- Used by Reclamation in reservoir operations models, and other water managers
Lake Powell Water Forecast

Colorado - Lake Powell, Glen Cyn Dam, At (GLDA3)
Period: Apr-Jul, Official 50% Forecast (2022-01-01): 6300 kaf (99% Average, 103% Median)
ESP is Unregulated and Includes 7 Day Precipitation Forecast

- 2022/01/01:
  - Max 1984: 15285.64
  - Min 2002: 963.96
  - Average: 6390
  - Median: 6130
  - ESP: 6390
  - Official 10: 11000
  - Official 30: 7600
  - Official 50: 6300
  - Official 70: 4900
  - Official 90: 4000
Gila River Water Forecast

Gila - Gila, Nr (GILN5)
Period: Jan-May, Official 50% Forecast (2022-01-01): 19.5 kaf (27% Average, 38% Median)
ESP is Unregulated and Includes 7 Day Precipitation Forecast

- Forecast suppressed due to La Nina weighting

2022/01/01:
- Max 1993: 256.52
- Min 1971: 15.18
- Average: 71
- Median: 51
- Observed Total: 1.82
- ESP: 25.3
- Official 10: 47
- Official 30: 24
- Official 50: 19.5
- Official 70: 14.9
- Official 90: 13.4
Jan 1 Water Supply Forecasts: Lower Colorado

January - May Forecast Period
% of 1991-2020 Median

Forecast Ranges
Little Colorado: 50 - 155%
Upper Gila: 40 - 65%
Salt: 75 - 80%
Verde: 70%
Contact us!

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801-524-5130 Press “1” to speak with a hydrologist
www.cbrfc.noaa.gov
Ensembles
Trace Ensemble for
DRRC2M_F

Initial conditions known for January 1st

A lot of unknown between Jan 1st and start of the forecast period of April 1st
Current hydrologic model states:
- River / Res. Levels
- Soil Moisture
- Snowpack

Past <-> Future

- Start with current conditions of streamflow, soil moisture, snowpack
- Apply precipitation and temperature from each historical year used in model calibration (1990 - 2020)
- A forecast hydrograph is generated for each of those years
  - This creates an ensemble of possible future streamflow patterns
  - Each year is given an equal chance of occurring
Flash floods

- Flooding in Arizona is most often caused by local, intense convective storms that lead to flash flooding
  - Too rapid for RFC to model
  - Weather Forecast Office issues warnings based on precipitation rate and location
  - RFC provides tools to help locate areas where flash floods are most likely (GIS based)
Snowtel snow accumulation is between 90 and 115% of normal.
### Water Year 2022
#### Oct-Dec Precip Summary

<table>
<thead>
<tr>
<th>Basin</th>
<th>Precip (% Avg)</th>
</tr>
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<tbody>
<tr>
<td>Upper Green</td>
<td>125%</td>
</tr>
<tr>
<td>Duchesne</td>
<td>145%</td>
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<tr>
<td>Price/San Rafael</td>
<td>155%</td>
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<tr>
<td>Yampa/White</td>
<td>125%</td>
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<tr>
<td>Upper CO Mainstem</td>
<td>120%</td>
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<tr>
<td>Gunnison</td>
<td>125%</td>
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<tr>
<td>Dolores</td>
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<tr>
<td>San Juan</td>
<td>115%</td>
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<tr>
<td>Lake Powell</td>
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<tr>
<td>Virgin</td>
<td>165%</td>
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<tr>
<td>Verde</td>
<td>105%</td>
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<tr>
<td>Salt</td>
<td>90%</td>
</tr>
<tr>
<td>Little Colorado</td>
<td>100%</td>
</tr>
<tr>
<td>Upper Gila</td>
<td>50%</td>
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</table>
Water Year 2020 was dry throughout the Colorado River Basin, including most of Arizona.

Dry conditions, combined with continued dry conditions in the Fall of 2020 led to historically dry soil moisture conditions throughout the basin.
Resource managers, like Reclamation, utilize our forecasts to make key operational decisions, particularly with regards to reservoir operations.