

Colorado River Basin Water Supply Briefing

March 7, 2022

Cody Moser - Hydrologist
Colorado Basin River Forecast Center



Today's Presentation

Precipitation Review

Soil Moisture Conditions

Current Snowpack

2022 Water Supply Forecasts

March Forecast Error

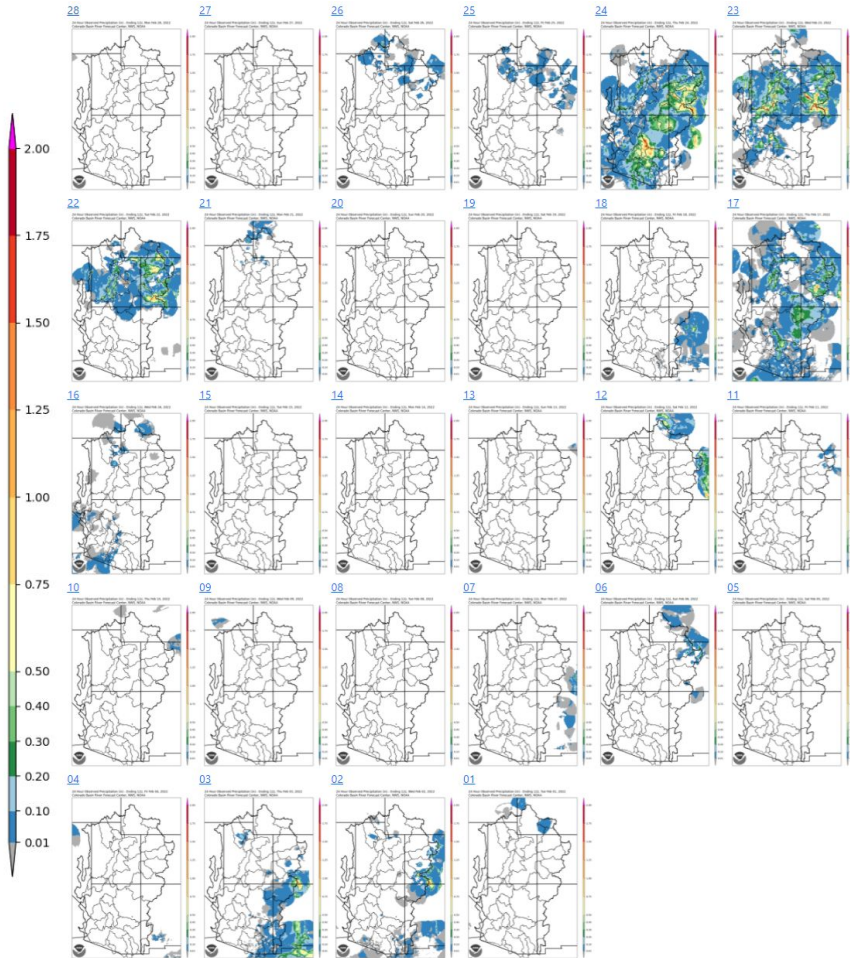
Recent/Upcoming Weather

Contacts & Questions

CBRFC Water Supply Web Demo

**Webinar recording & slides will be
made available on CBRFC webpage**

February 2022 Precipitation



Feb 21-23

2-3+ inches higher elevations across SW CO (San Juan/Dolores/Gunnison)

0.5-2.0" SW UT, central AZ

0.5-1.0" NW CO, central UT

Little to no precip in northern basins (Upper Green)

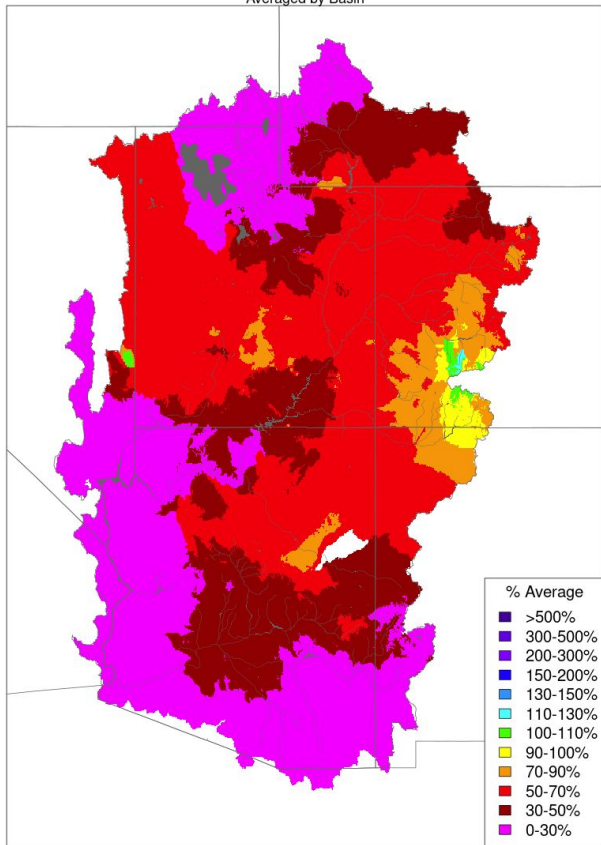
The weather pattern shifted to favor a more active pattern around mid-February with a series of weather disturbances impacting Utah, western Colorado, and Arizona the last half of the month.

Very dry weather persisted over the region during the last three weeks of January through mid-February. Record/near record dry precipitation during this period.

February Precipitation Summary

Monthly Precipitation - February 2022

Averaged by Basin

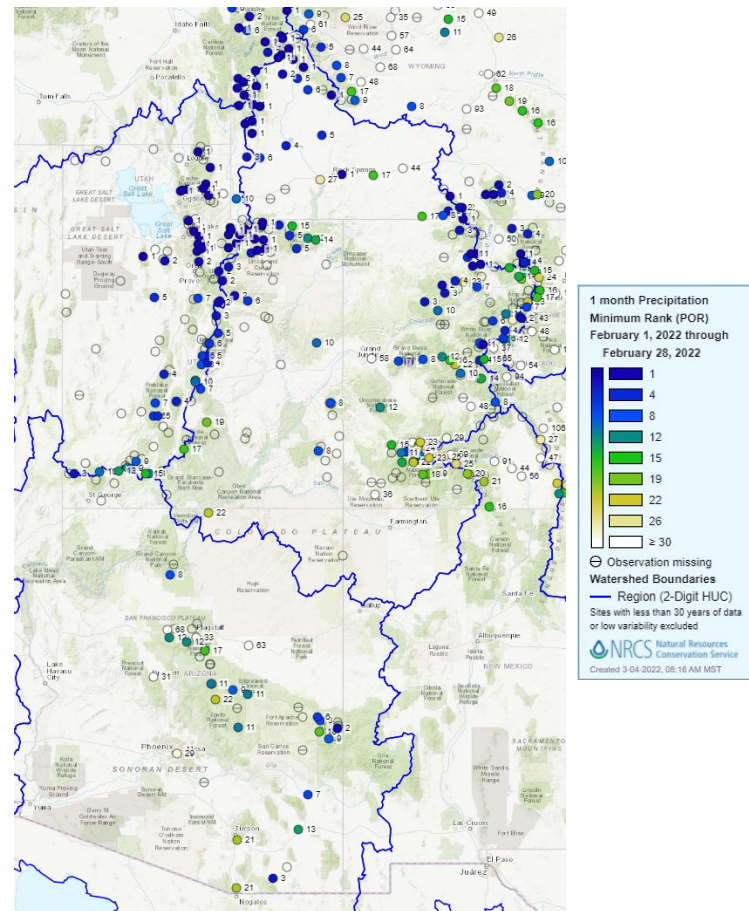


Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbafc.noaa.gov

February precipitation was much below normal across the majority of the region.

Northern areas including the Green River Basin had a very dry February with monthly precipitation values at many SNOTEL sites ranked as the driest in the past 40 years.

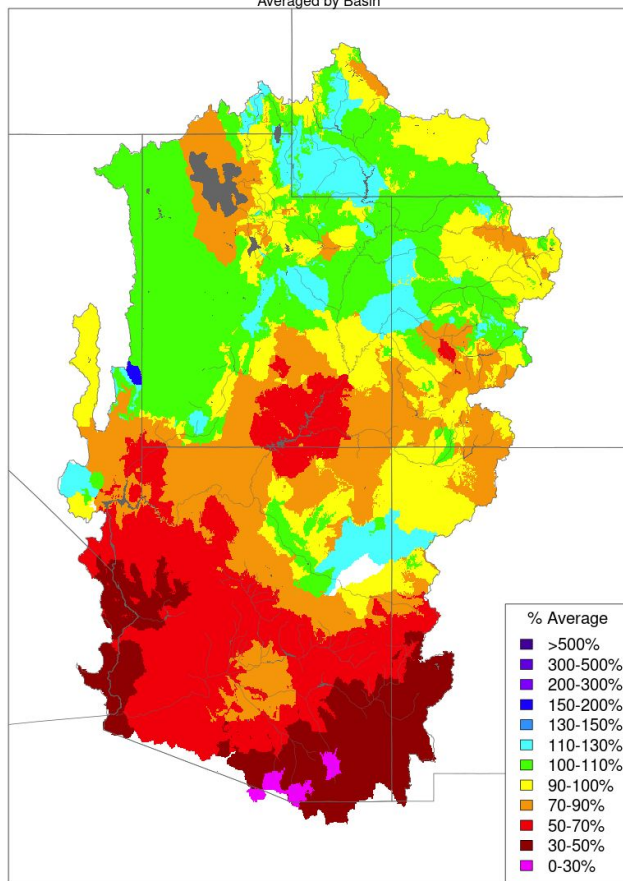
Only a small portion of southwest Colorado ended February with near normal precipitation.



Water Year 2022 (October-February) Precipitation

Water Year Precipitation, October 2021 - February 2022

Averaged by Basin



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

Water year precipitation can be used as a good indicator of early season water supply conditions.

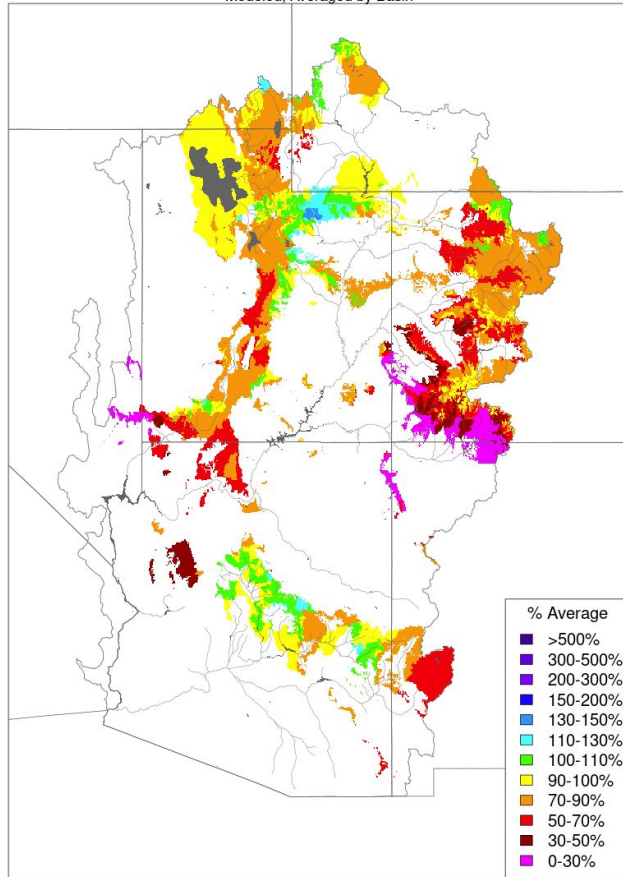
Water Year 2022 Oct-Feb Precip Summary

<u>Basin</u>	<u>Precip (% Avg)</u>
Upper Green	95%
Duchesne	100%
Price/San Rafael	105%
Yampa/White	100%
Upper CO Mainstem	100%
Gunnison	100%
Dolores	95%
San Juan	90%
Lake Powell	100%
Virgin	100%
Little Colorado	75%
Verde	70%
Salt	65%
Upper Gila	45%

Fall Model Soil Moisture Conditions: 2020 vs. 2021

Soil Moisture - Fall - 2021 (November 15)

Modeled, Averaged by Basin



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

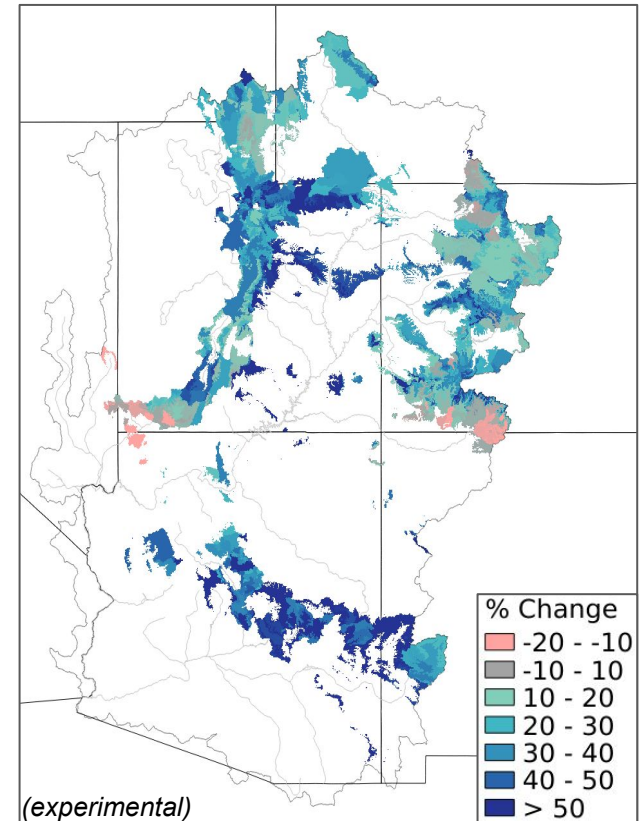
The timing and magnitude of spring runoff is ultimately a result of SWE conditions, spring weather, and antecedent soil moisture conditions.

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, notably western Colorado.

Basins with above average soil moisture conditions can be expected to experience more efficient runoff from rainfall or snowmelt while basins with below average soil moisture conditions can be expected to have lower runoff efficiency until soil moisture deficits are fulfilled.

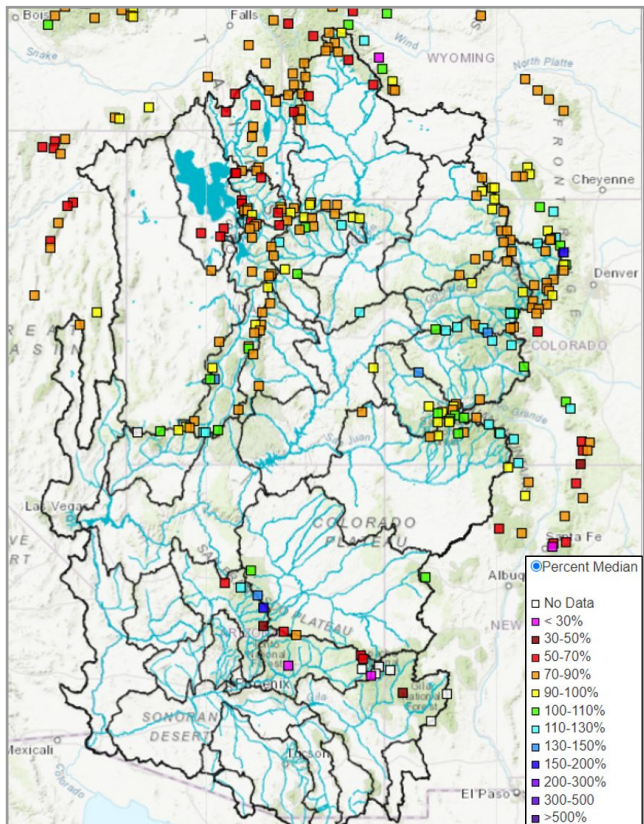
Soil Moisture - Fall (November 15)

Modeled, %Change
(2021-2020)

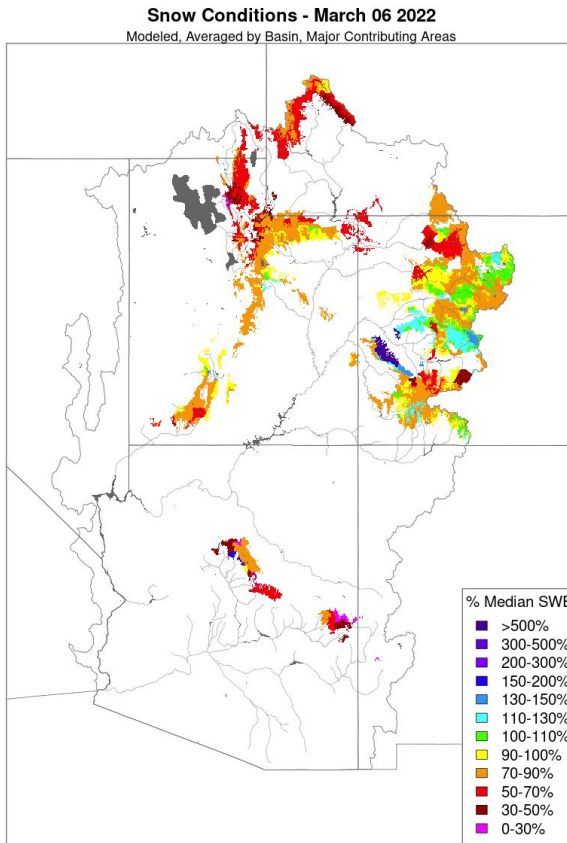


Early March Snow Conditions

SNOTEL (Observed)



CBRFC (Model)

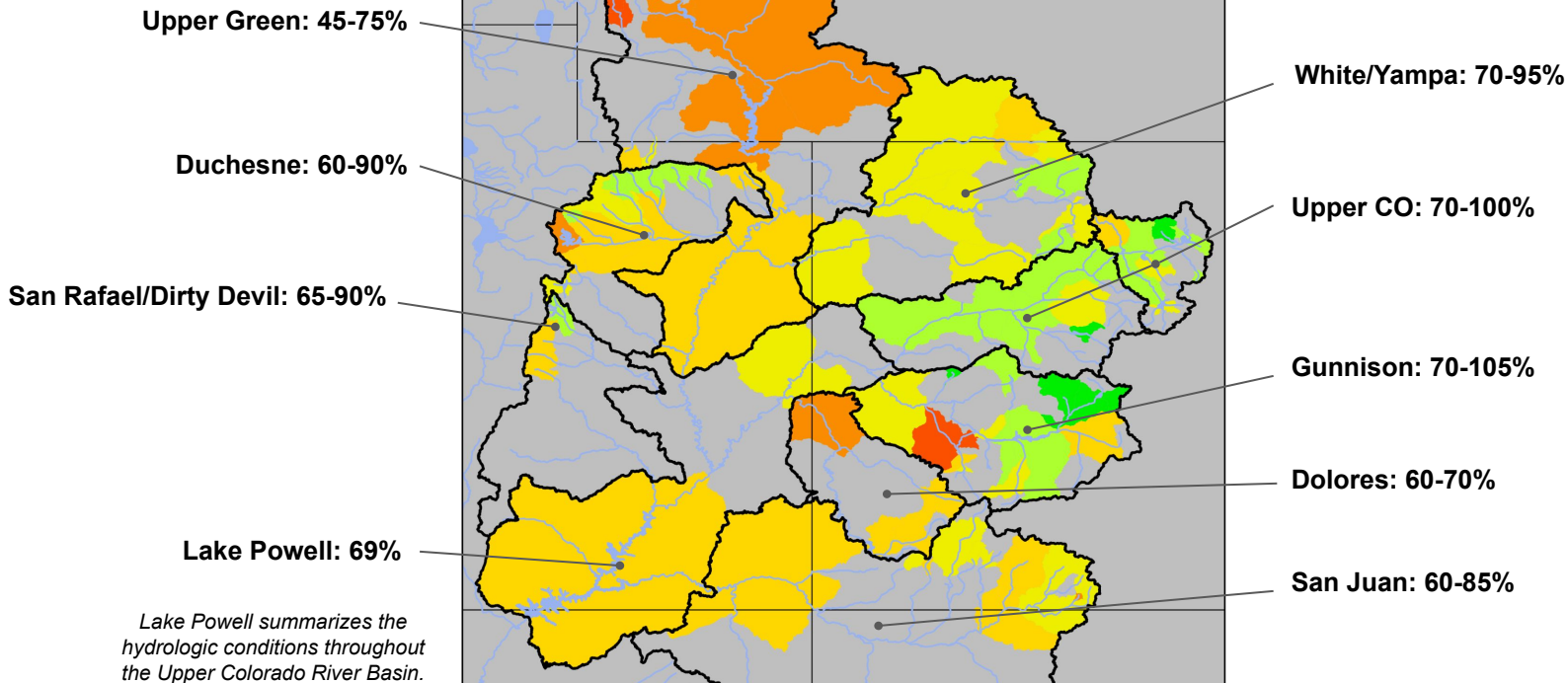
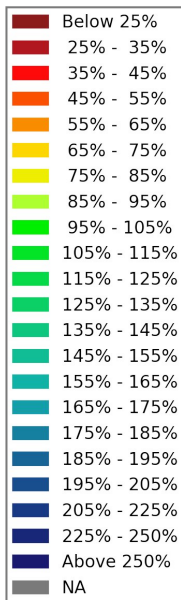


Mar 7 SWE Summary (SNOTEL)

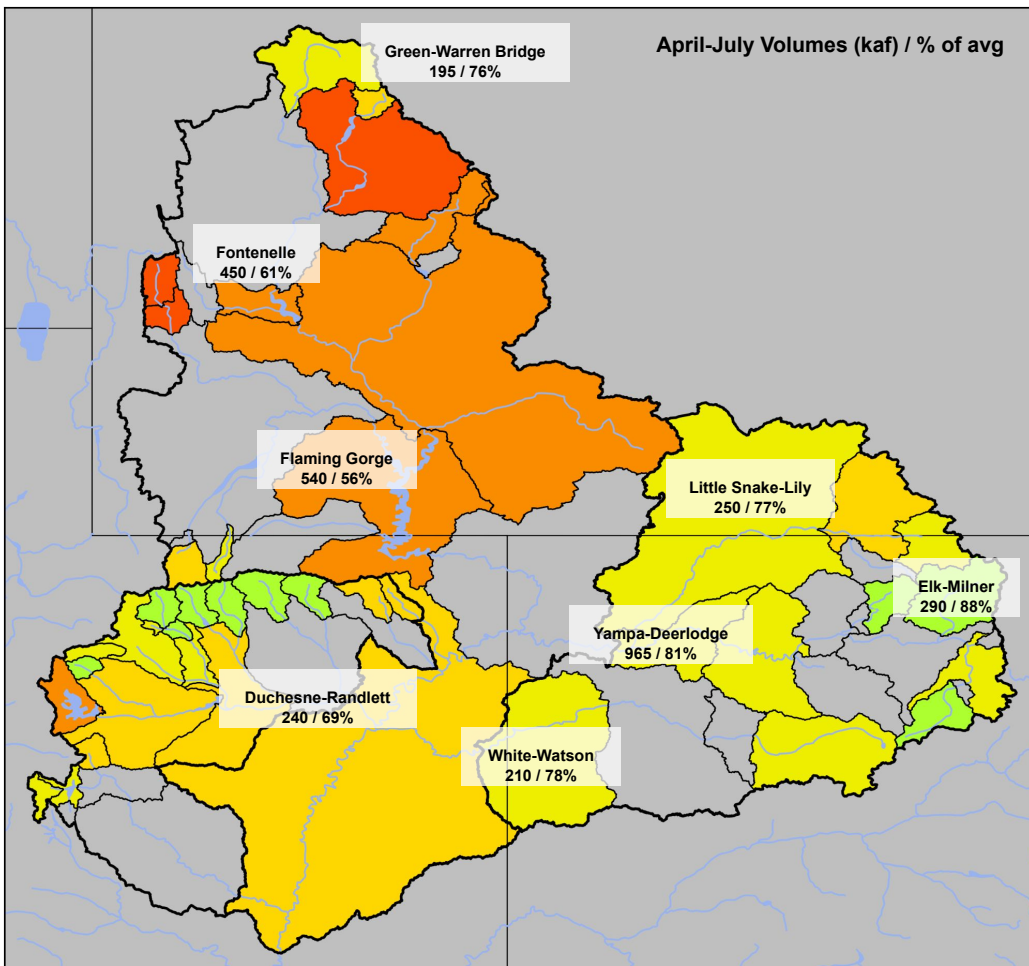
<u>Basin</u>	<u>SWE (% Median)</u>
Upper Green	75%
Duchesne	95%
Price/San Rafael	85%
Yampa/White	85%
Upper CO Mainstem	95%
Gunnison	110%
Dolores	95%
San Juan	105%
Virgin	95%
Little Colorado	60%
Verde	100%
Salt	45%
Upper Gila	45%

Mar 1st Water Supply Forecasts: Upper Colorado

Water supply forecast volumes decreased over the past month across most of the Colorado River Basin as a result of below normal February precipitation.



Mar 1st Water Supply Forecasts: Green, Yampa, White, Duchesne



March 1st 2022 Forecasts

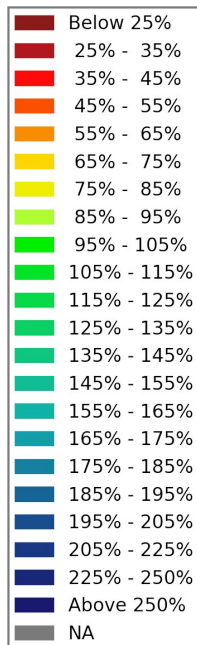
Volume (kaf) / % of 1991-2020 avg

Forecast Ranges & (1-month Trend)

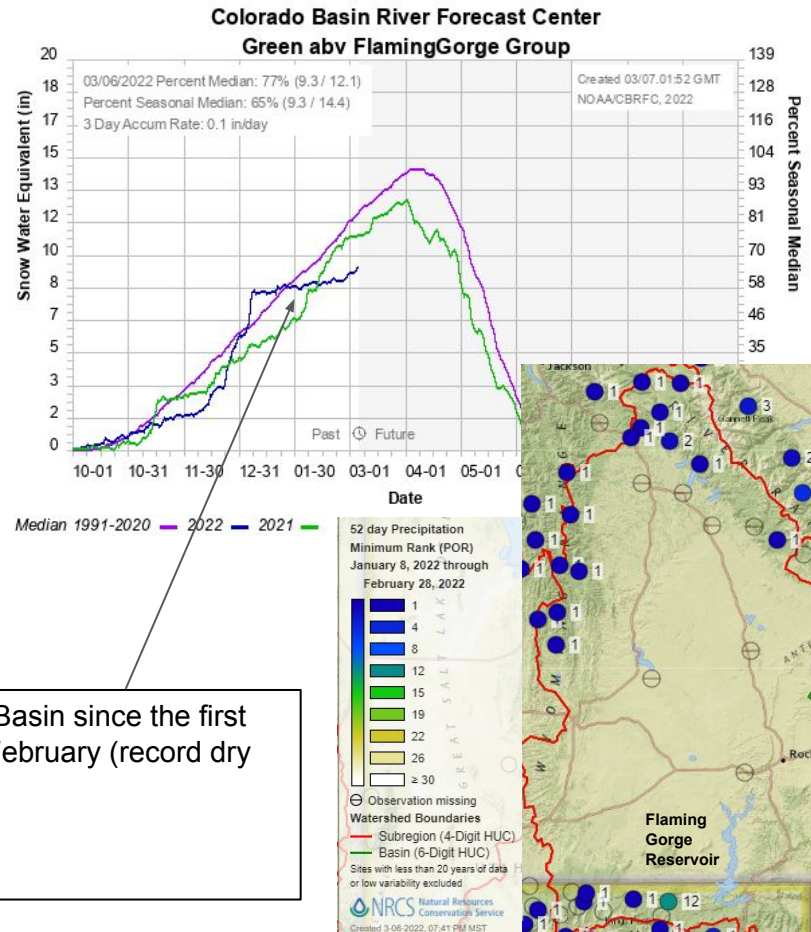
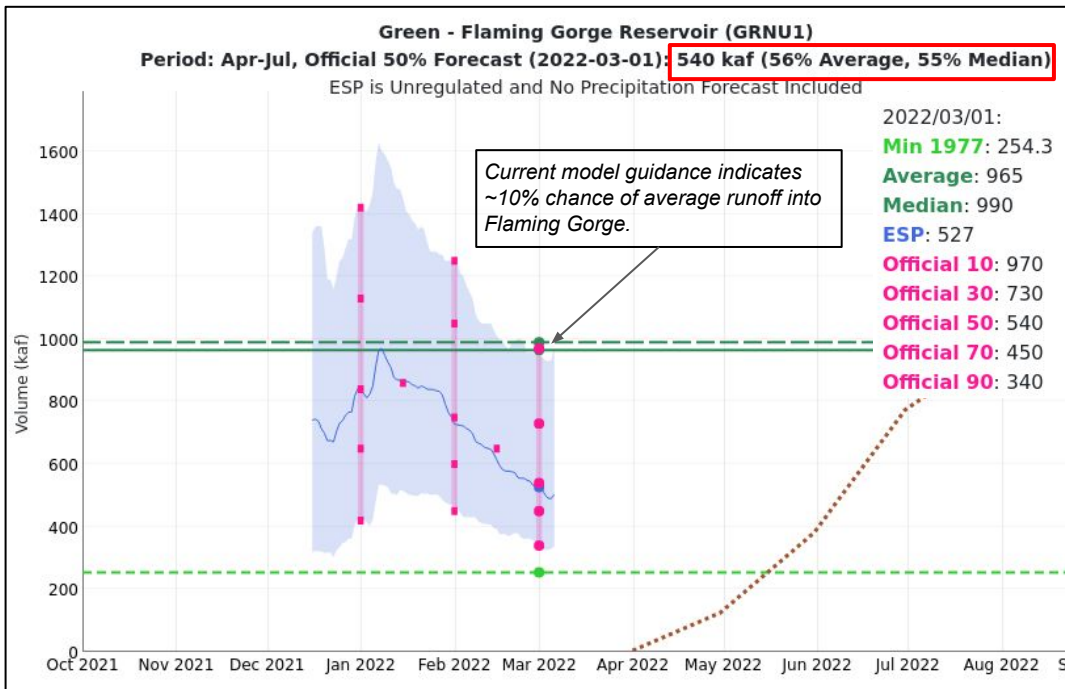
Upper Green: 45 - 75%
(10-20% decrease)

Yampa/White: 70 - 95%
(5-20% decrease)

Duchesne: 60 - 90%
(5-15% decrease)



Upper Green Water Supply Forecasts & Snow Conditions



There has been a steady decline in model guidance in the Upper Green River Basin since the first week of January due to little to no snow accumulation from then to the end of February (record dry period at SNOTEL stations).

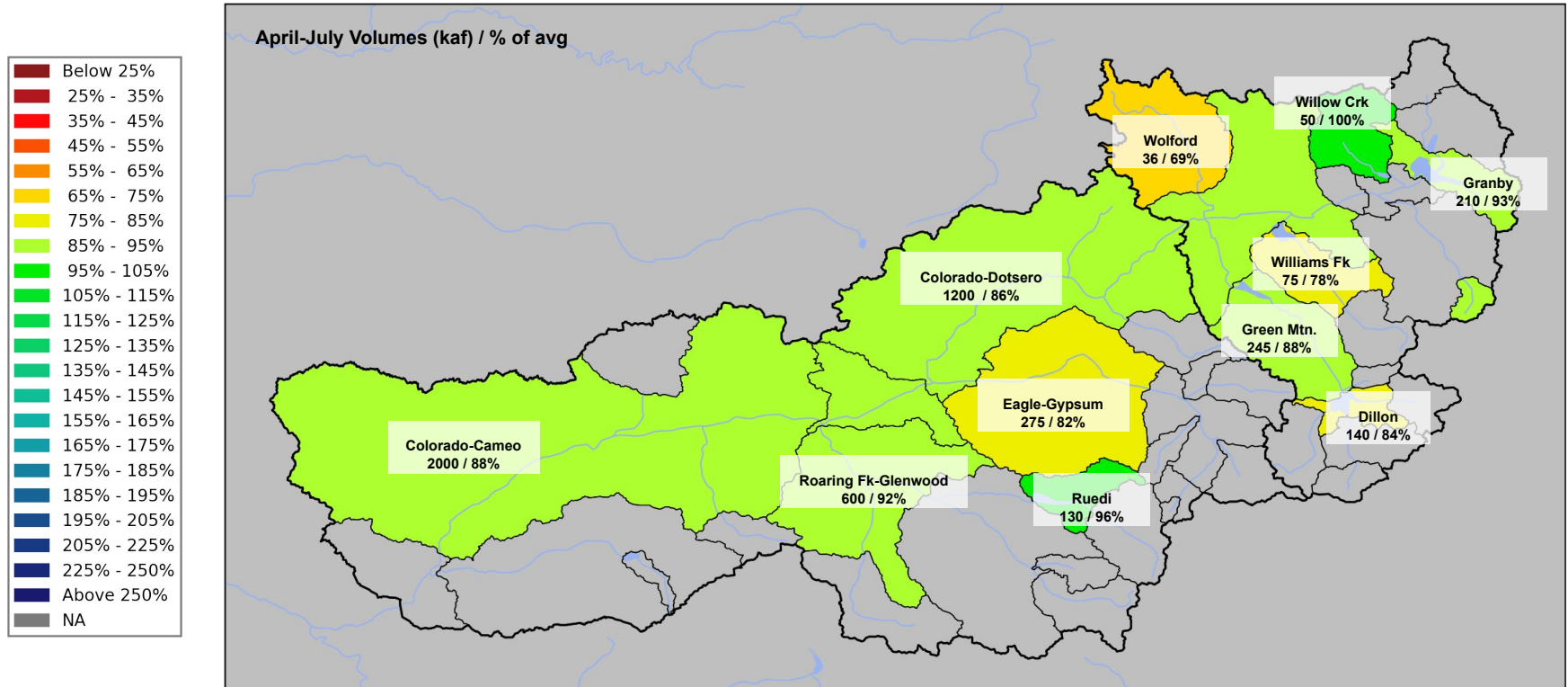
Storms the first weekend of March have at least slowed this fall.

Mar 1st Water Supply Forecasts: Upper Colorado River Mainstem

Forecast Ranges & (1-month Trend):

Granby to Kremmling: 70 - 100% of average (0-10% decrease)

Kremmling to Cameo: 80 - 95% of average (0-5% decrease)

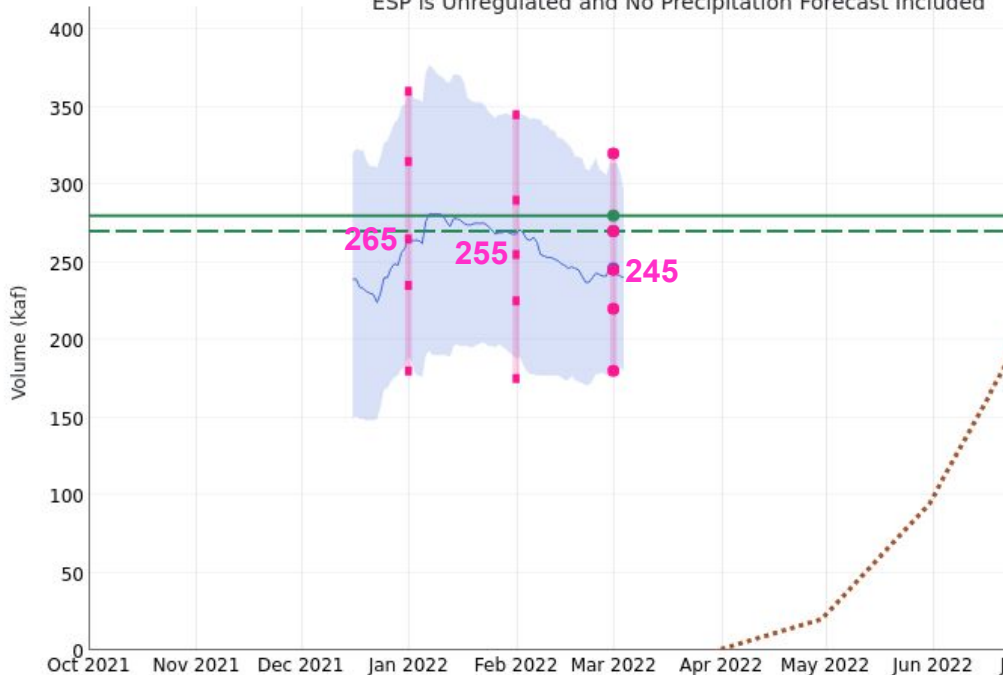


Upper Colorado Mainstem Water Supply Forecasts & Snow Conditions

Blue - Green Mtn Reservoir (GMRC2)

Period: Apr-Jul, Official 50% Forecast (2022-03-01): **245 kaf (88% Average, 91% Median)**

ESP is Unregulated and No Precipitation Forecast Included



2022/03/01:

Average: 280

Median: 270

ESP: 246

Official 10: 320

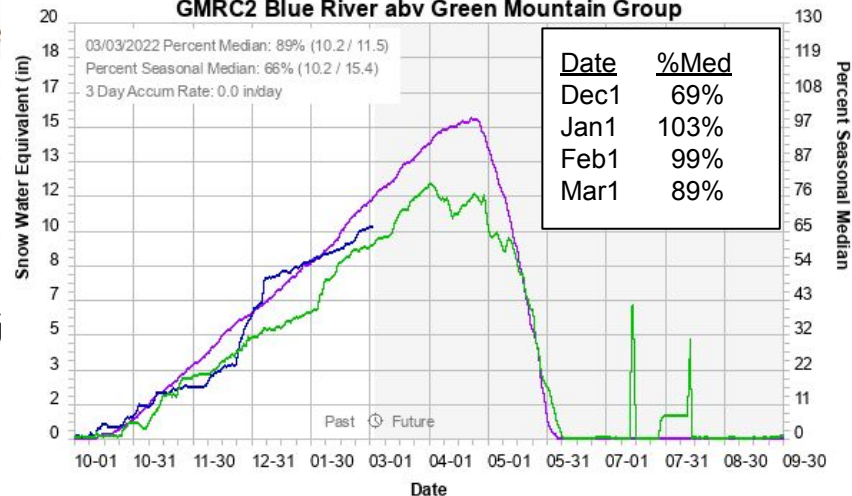
Official 30: 270

Official 50: 245

Official 70: 220

Official 90: 180

Colorado Basin River Forecast Center GMRC2 Blue River abv Green Mountain Group



Water Year	AMJJ (kaf)
2020 obs	244
2021 obs	162
2022 fcst	245

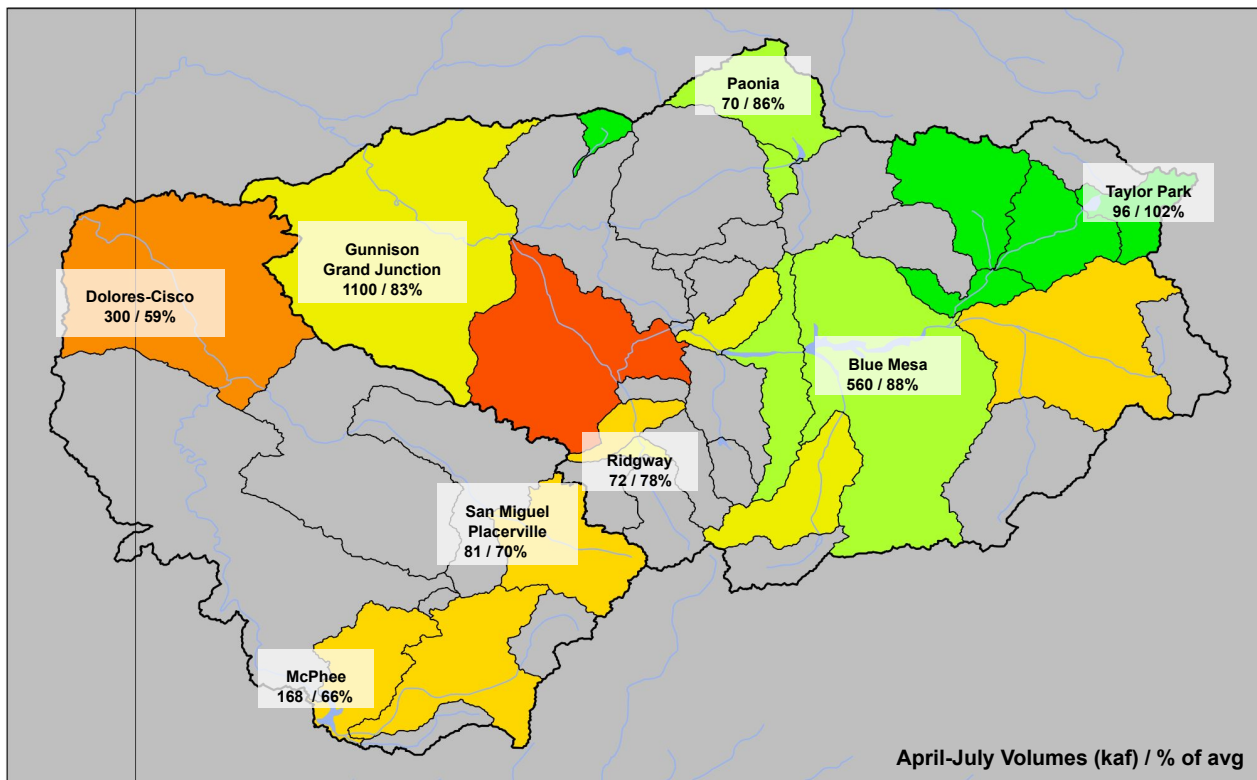
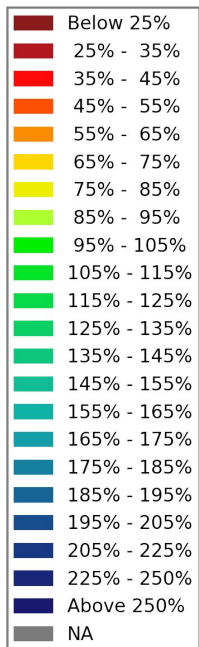
Median 1991-2020 — 2022 — 2021 —

Mar 1st Water Supply Forecasts: Gunnison, Dolores

Forecast Ranges & (1-month Trend):

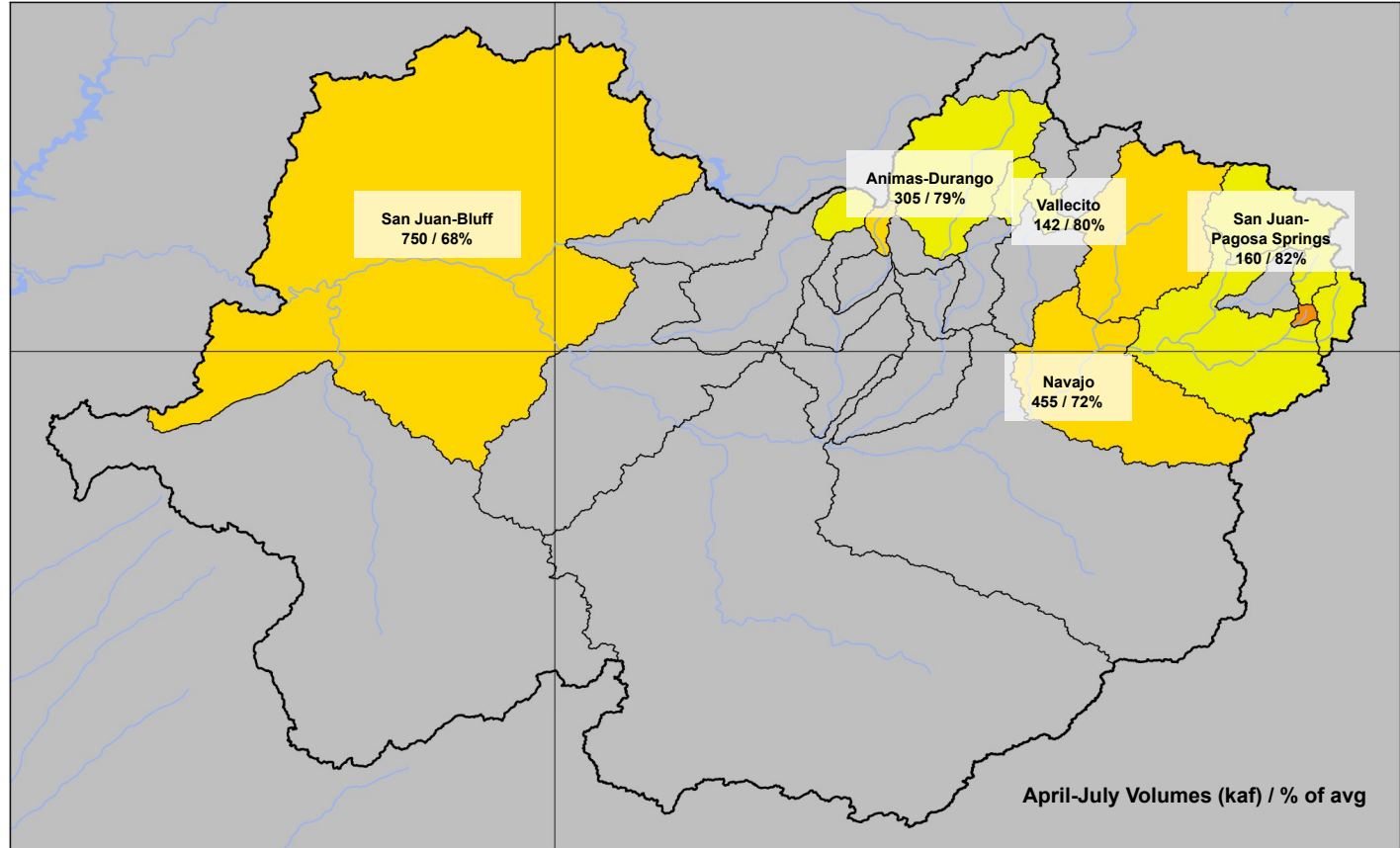
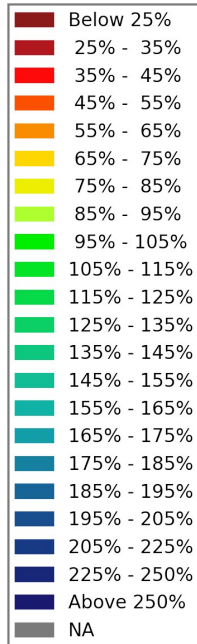
Gunnison: 70 - 105% of average (0-10% decrease)

Dolores: 60 - 70% of average (5-10% decrease)



Mar 1st Water Supply Forecasts: San Juan

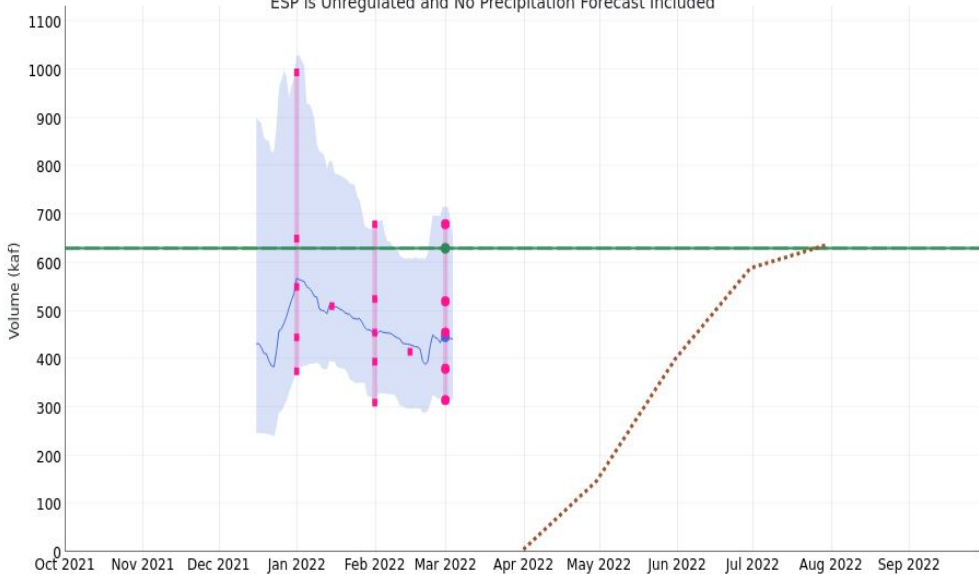
Forecast Range & (1-month Trend):
60 - 85% of average (0-5% decrease)



Southwest Colorado Water Supply Forecasts & Snow Conditions

San Juan - Navajo Reservoir, Archuleta, Nr (NVRN5)
 Period: Apr-Jul, Official 50% Forecast (2022-03-01): **455 kaf (72% Average, 72% Median)**

ESP is Unregulated and No Precipitation Forecast Included



2022/03/01:

Average: 630

Median: 630

ESP: 446

Official 10: 680

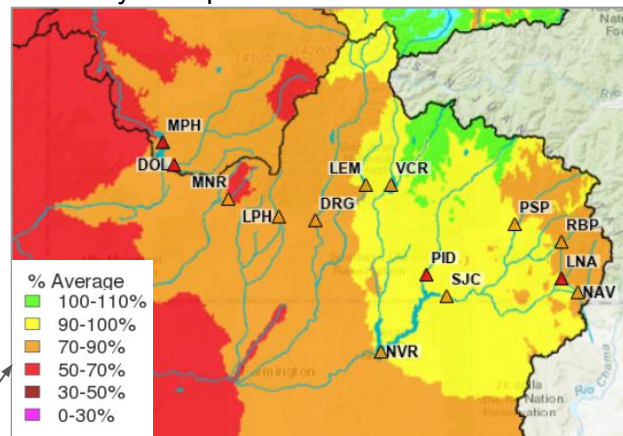
Official 30: 520

Official 50: 455

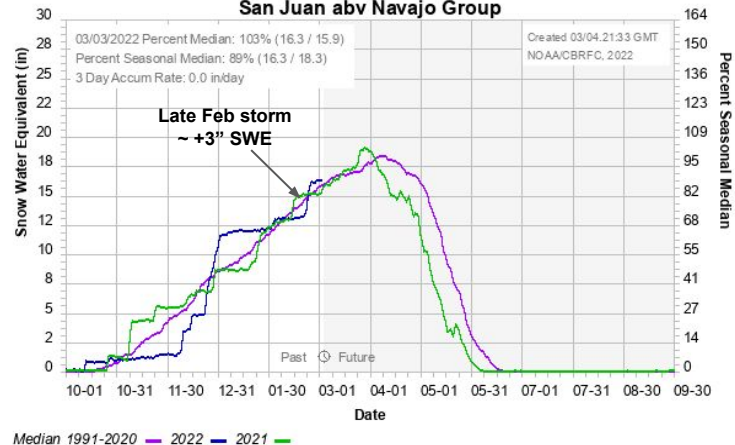
Official 70: 380

Official 90: 315

February Precipitation



Colorado Basin River Forecast Center San Juan abv Navajo Group



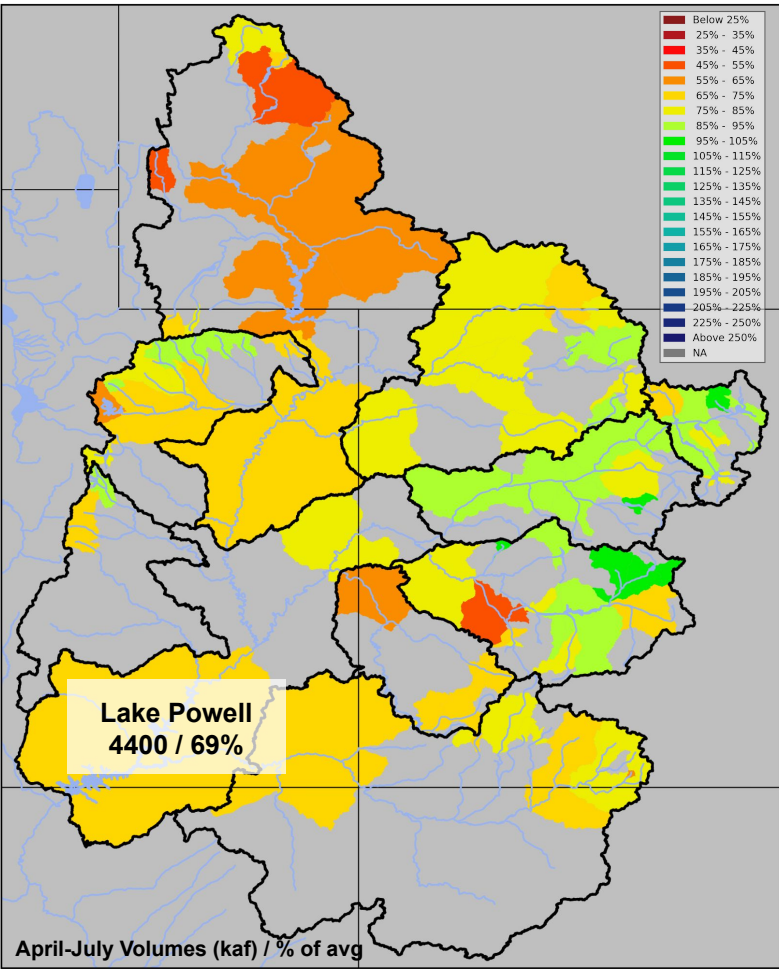
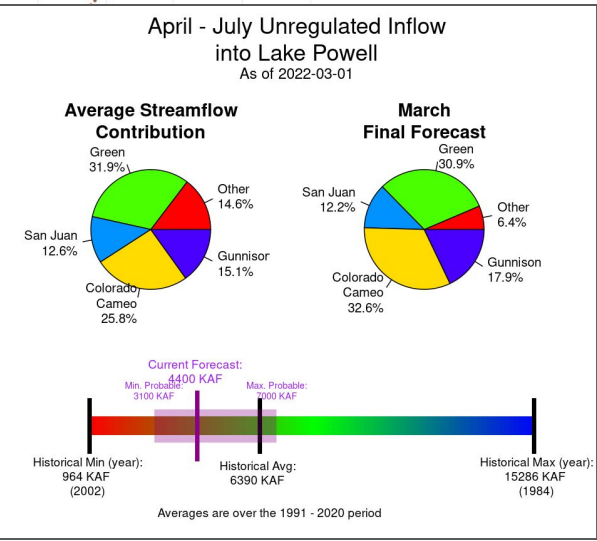
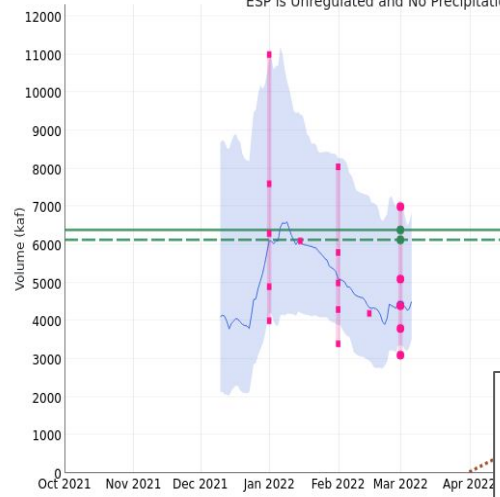
Navajo Res Inflow
 Mar Fcst: 455 kaf / 72%
 No change from early Feb forecast

The San Juan river basin had near average February precipitation. The 50% exceedance forecast is assuming normal precipitation into the future.

Mar 1st Water Supply Forecasts: Upper Colorado (Lake Powell)

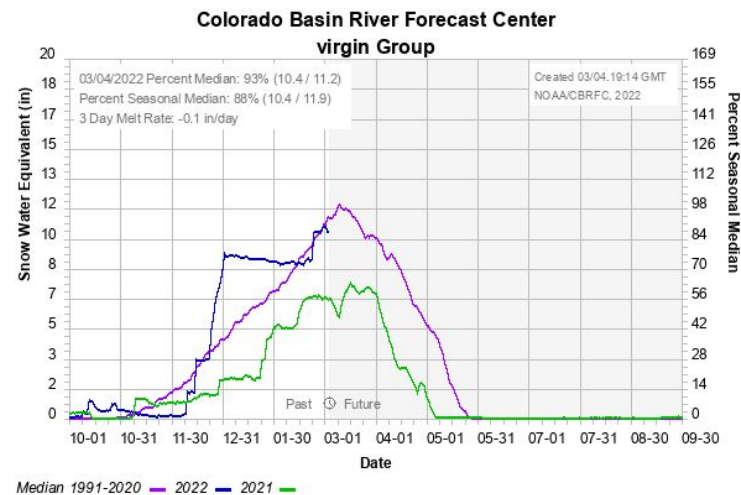
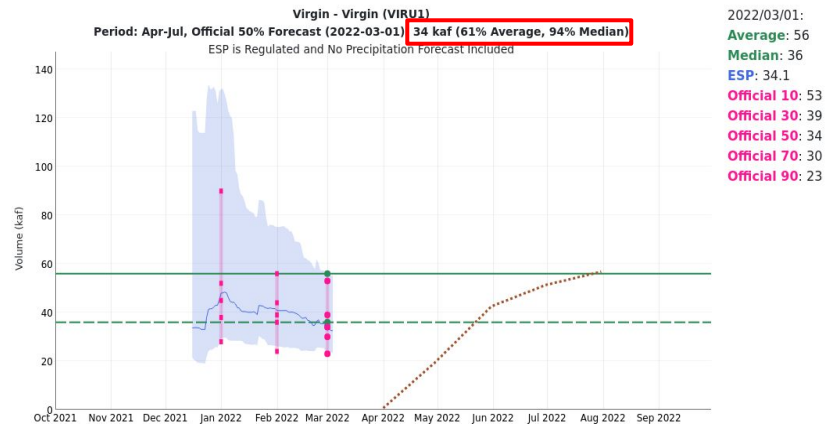
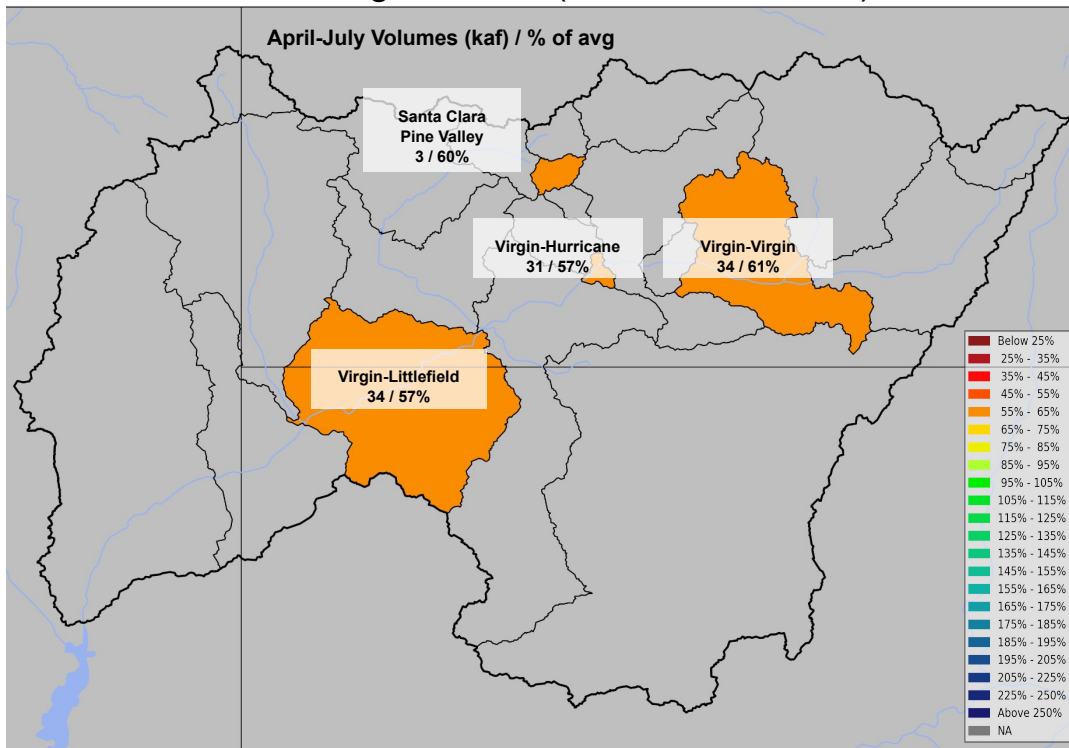
2022/03/01:
Average: 6390
Median: 6130
ESP: 4420
Official 10: 7000
Official 30: 5100
Official 50: 4400
Official 70: 3800
Official 90: 3100

Colorado - Lake Powell, Glen Cyn Dam, At (GLDA3)
 Period: Apr-Jul, Official 50% Forecast (2022-03-01) **4400 kaf (69% Average, 72% Median)**
 ESP is Unregulated and No Precipitation Forecast Included

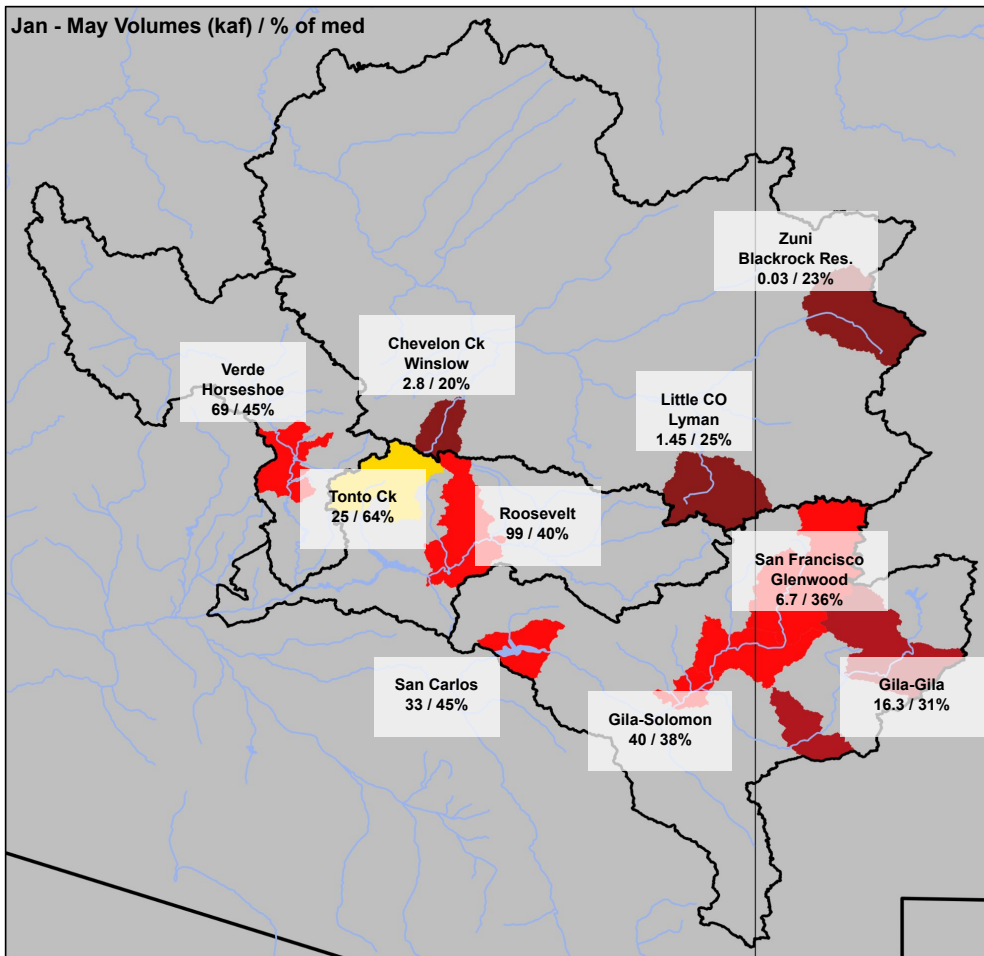


Mar 1st Water Supply Forecasts: Virgin River Basin

Forecast Range & (1-month Trend):
 55 - 60% avg (10-15% decrease)



Mar 1st Water Supply Forecasts: Lower Colorado River Basin



January - May Forecast Period
% of 1991-2020 Median

Forecast Ranges

Little Colorado: 20% - 25%

Upper Gila: 30% - 45%

Salt: 40% - 65%

Verde: 45%

La Niña conditions generally result in warmer/drier than normal conditions across the LCRB

Lower Colorado Water Supply Forecasts & Snow Conditions

Gila - Solomon, Nr, Head Of Safford Vly (GLHA3)

Period: Jan-May, Official 50% Forecast (2022-03-01): 40 kaf (18% Average, 38% Median)

ESP is Unregulated and No Precipitation Forecast Included

2022/03/01:

Max 1993: 1463.61

Min 1956: 25.62

Average: 220

Median: 106

Observed Accumulation: 23.8

Observed Total: 24.7

ESP: 42.1

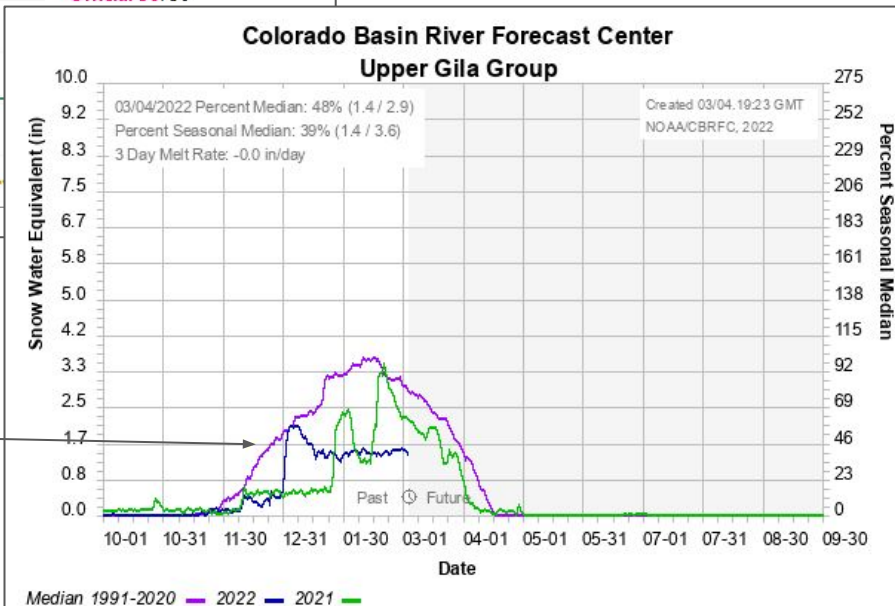
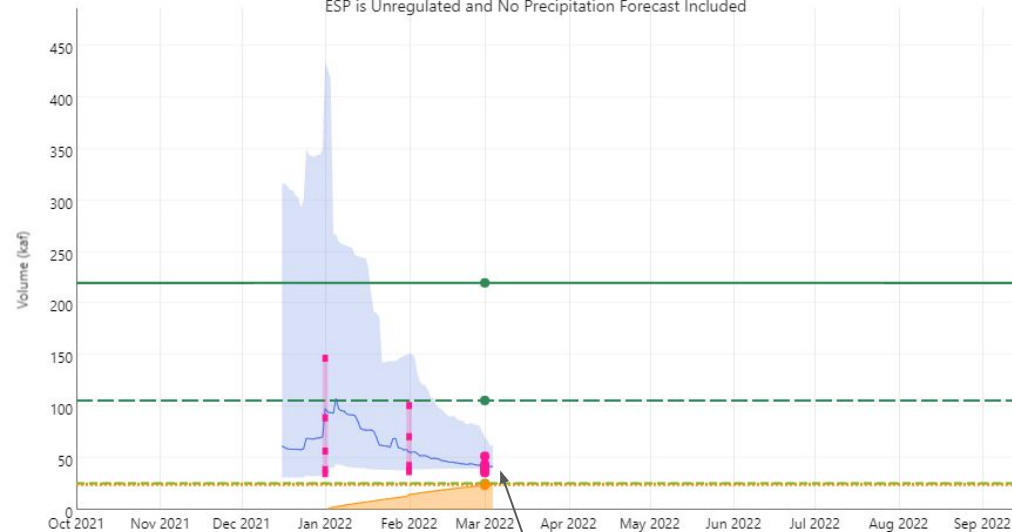
Official 10: 52

Official 30: 44

Official 50: 40

Official 70: 38

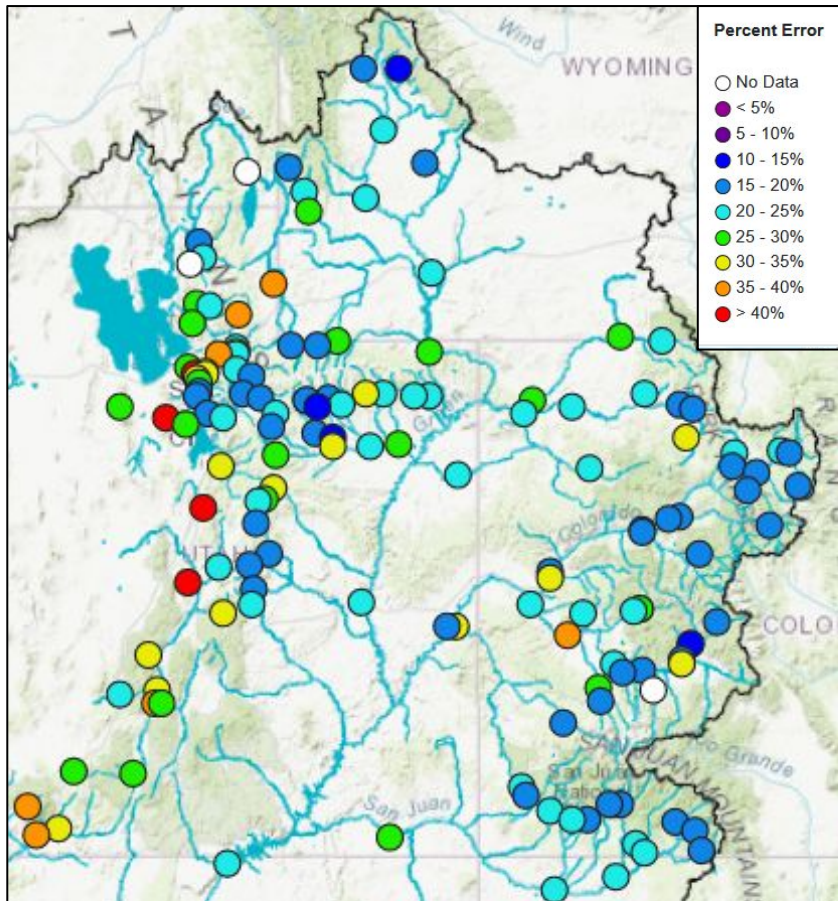
Official 90: 36



Mostly dry weather across the Upper Gila this water year.

Historical (1981-2010) Forecast Verification

March Forecast Error: April-July Volume



Location

Green River - Warren Bridge	15%
Fontenelle Reservoir	22%
Yampa River - Deerlodge	23%
Blue River - Dillon Reservoir	16%
Colorado River - Cameo	17%
Blue Mesa Reservoir (Gunnison)	18%
McPhee Reservoir (Dolores)	22%
Navajo Reservoir (San Juan)	22%
Lake Powell	24%
Virgin River at Virgin	31%

Avg Mar Forecast Error

Error tends to decrease each month into the spring

Where Forecasts are Better:

- Headwaters
- Primarily snow melt basins
- Known diversions / demands

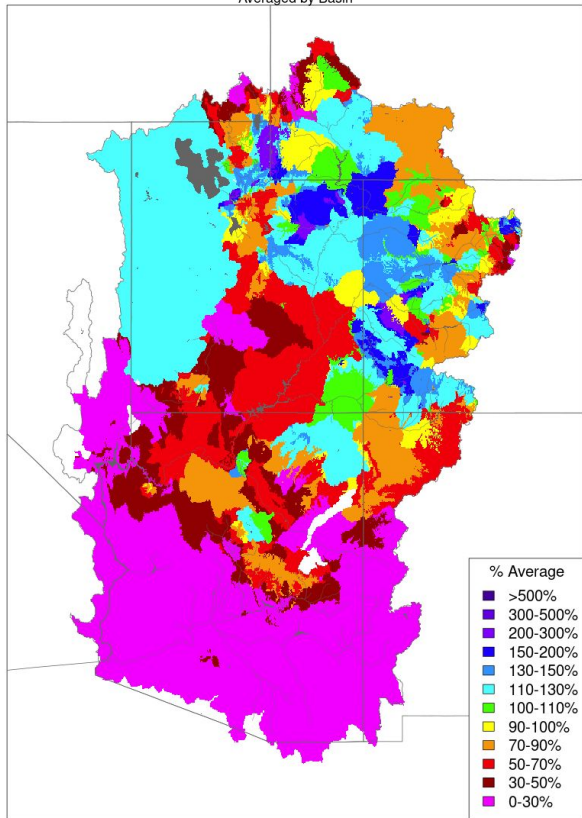
Where Forecasts are Worse:

- Lower elevations (rain or early melt)
- Downstream of diversions / irrigation
- Little is known about diversions / demands

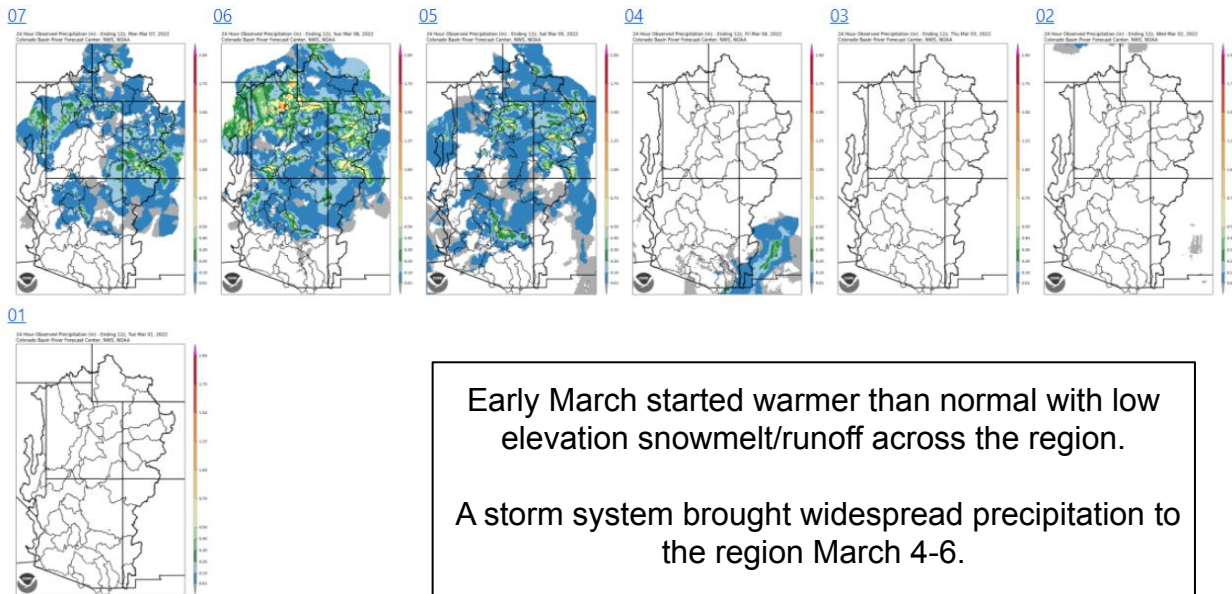
March 2022 Month-To-Date Precipitation

Month to Date Precipitation - March 07 2022

Averaged by Basin



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



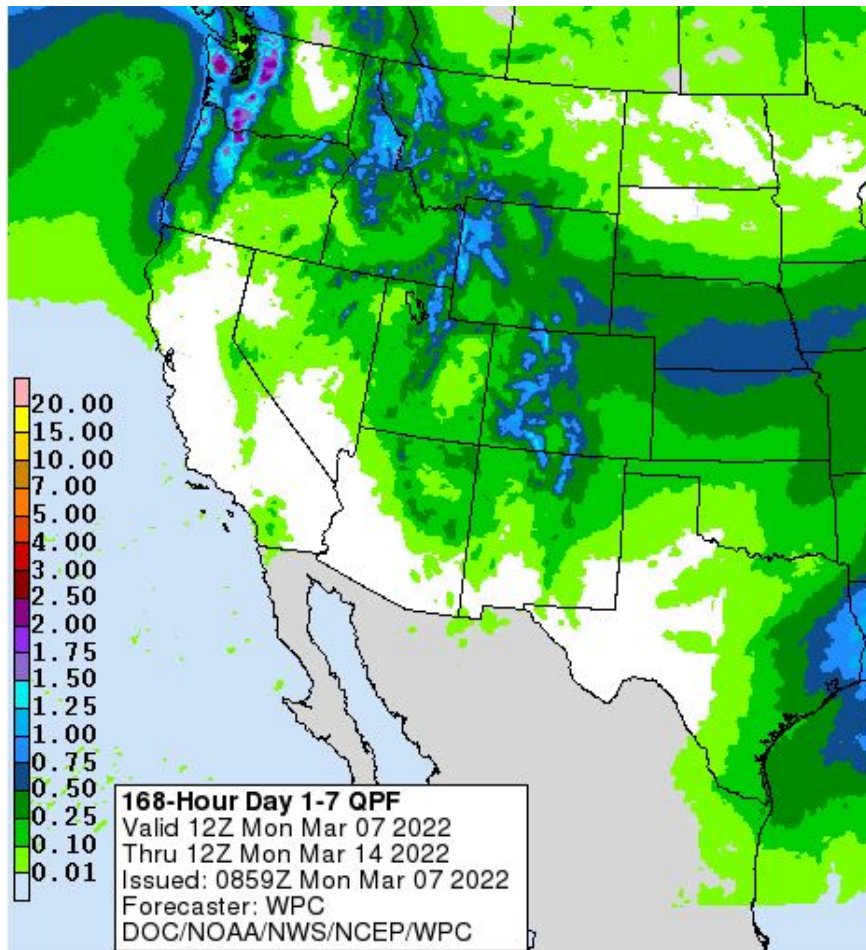
Early March started warmer than normal with low elevation snowmelt/runoff across the region.

A storm system brought widespread precipitation to the region March 4-6.

March 4-6 Precipitation Totals

Upper Green:	0.00 - 0.50"
Duchesne:	0.50 - 1.50"
NW CO:	0.25 - 1.00"
SW CO:	0.50 - 1.50"
Central AZ:	0.00 - 1.00"

Upcoming Weather: WPC March 7-14 Precipitation Outlook



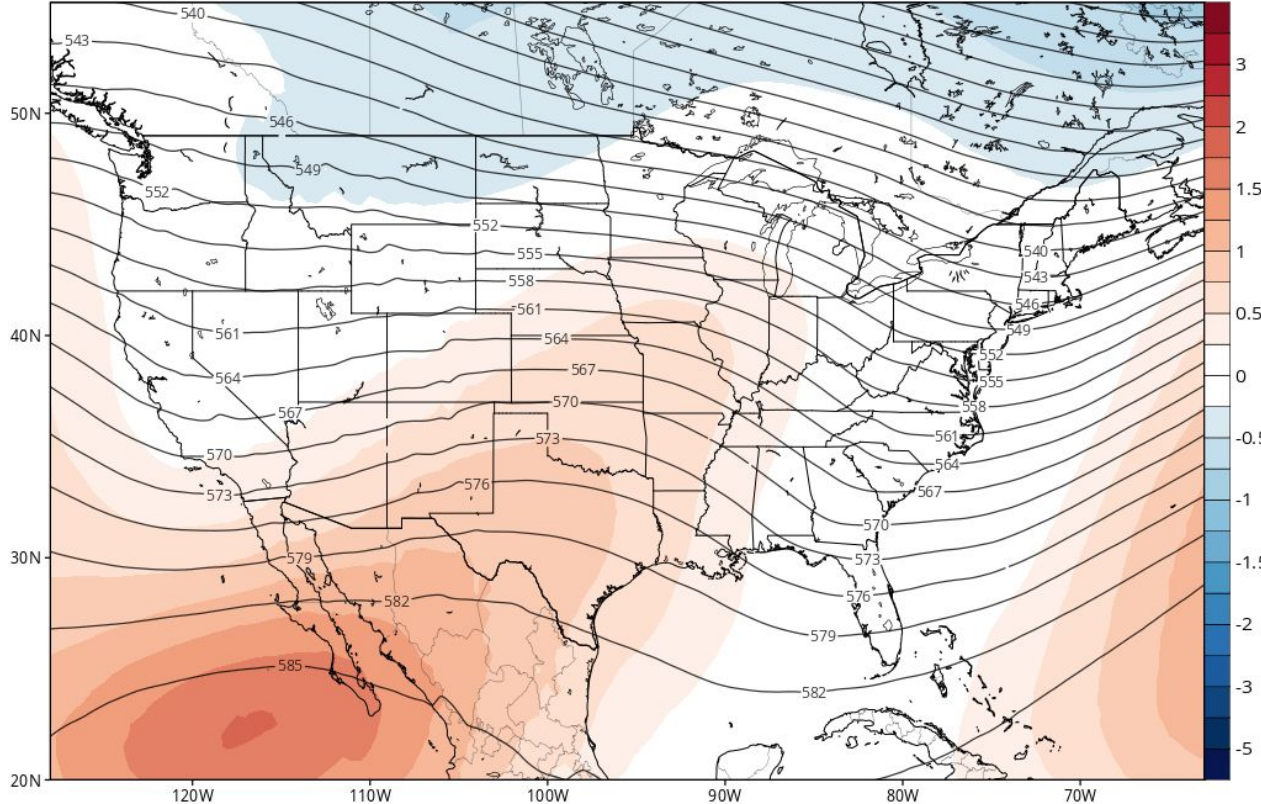
- A southward moving trough will bring precipitation mid-week
 - Highest totals around 1" expected for the high terrain, less elsewhere
- An upper-level ridge will move over the Western US during the latter half of the week, bringing quiet weather through the weekend

Upcoming Weather: March 14-21

GEFS 500mb Geopotential Height & Normalized Anomaly (based on CFSR 1981-2010 Climatology)

Init: 06z Mar 07 2022 Forecast Hour: [222] valid at 12z Wed, Mar 16 2022

TROPICALTIDBITS.COM



- Possibility of a long-wave trough forming over the Western US
 - Current projections would favor precipitation in UT and CO
- High uncertainty in precipitation amounts and placement

Upcoming Weather: 8-14 Day Outlook (March 14-20)

Slightly elevated odds of above average precip and below average temperatures across far northern basins.
Slightly elevated odds of below average precip and above average temperatures across southern basins.

Precipitation Outlook

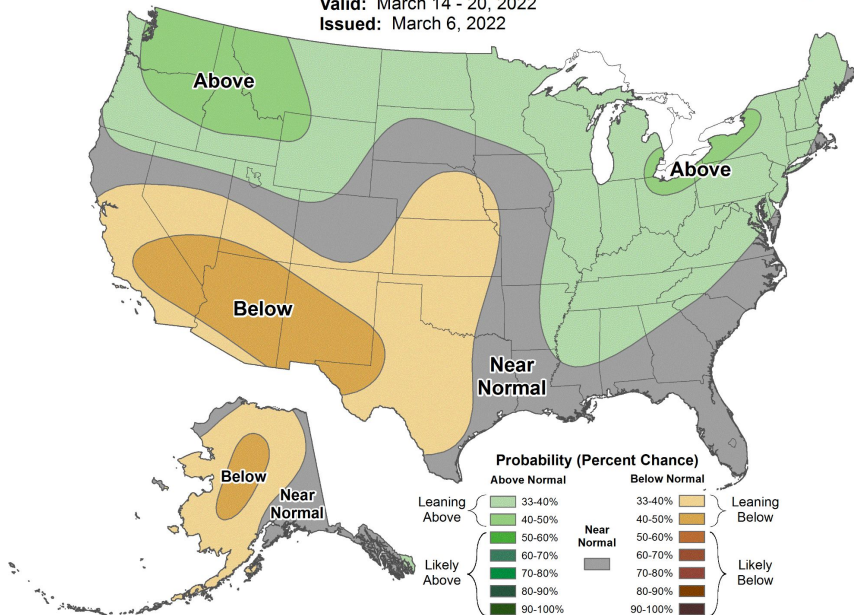
Temperature Outlook



8-14 Day Precipitation Outlook



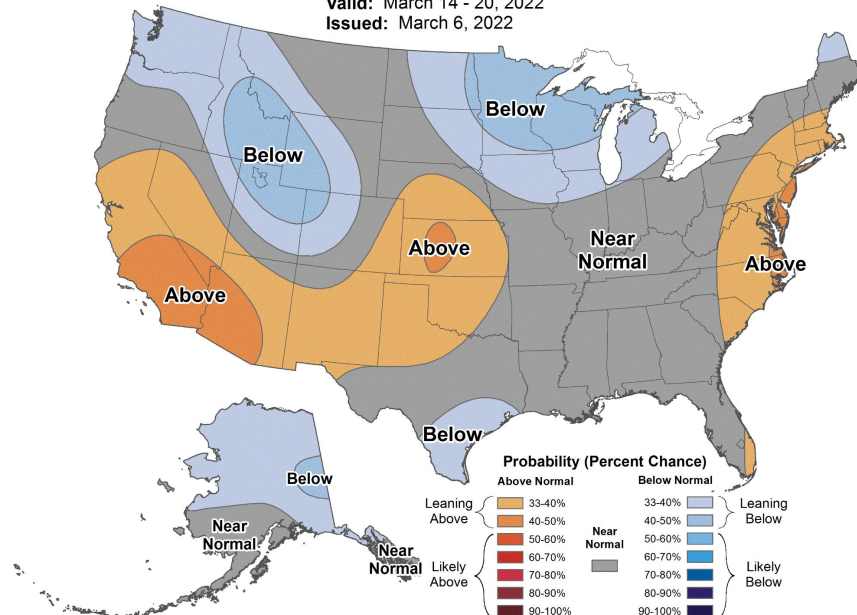
Valid: March 14 - 20, 2022
Issued: March 6, 2022



8-14 Day Temperature Outlook



Valid: March 14 - 20, 2022
Issued: March 6, 2022



Summary

- A wet monsoon season helped soil moisture conditions, which are improved from a year ago but soil moisture deficits are still out there, notably across much of western Colorado
- February precipitation:
 - Below normal across majority of region
 - Near normal across parts of southwest CO (San Juan benefited most from Feb precip)
 - Near/record dry across the Upper Green & White/Yampa basins
- Current (March 7) SWE Conditions:
 - Upper Colorado: 75-110% worst conditions Upper Green; best conditions SW CO
 - Lower Colorado: 45-100% worst conditions western AZ; best conditions SW UT, central AZ
- March water supply forecasts (% of normal):
 - Upper Colorado: 45-105%
 - Lower Colorado: 20-65%
- Weather outlook
 - Mid-week storm:
 - 0.50-1.00" precipitation forecast for UCRB high elevations
 - <0.25" LCRB
 - Additional precipitation possible across northern basins next week

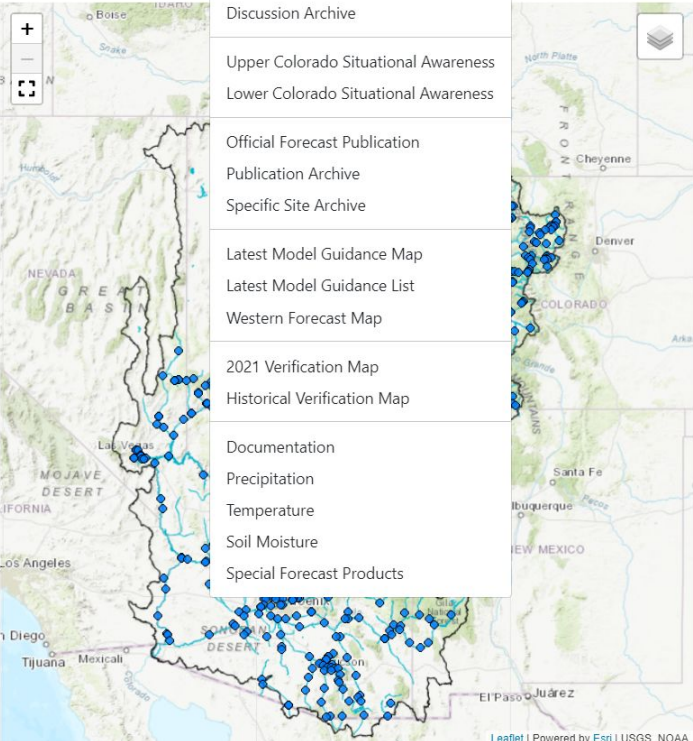
CBRFC Web Water Supply Live Demo

Home Rivers ▾ Snow ▾ Water Supply ▾ Reservoirs ▾ Weather ▾ Climate ▾ Help ▾ About ▾ News ▾

Monday, March 7, 2022: CBRFC [Info](#)

Conditions Map Home

- Official Forecast Map
- Official Forecast List
- Official Forecast Discussion
- Discussion Archive
- Upper Colorado Situational Awareness
- Lower Colorado Situational Awareness
- Official Forecast Publication
- Publication Archive
- Specific Site Archive
- Latest Model Guidance Map
- Latest Model Guidance List
- Western Forecast Map
- 2021 Verification Map
- Historical Verification Map
- Documentation
- Precipitation
- Temperature
- Soil Moisture
- Special Forecast Products



River Conditions

Data Updated: 03/04/18Z Help

Show Hide Other Types

- Data
- Forecast
- Reservoir Inflow
- Reservoir Outflow
- Official Flood
- Active

- ◆ Not Available
- ◆ Normal
- ◆ Significant Rise
- ◆ Near Action
- ◆ Above Action
- ◆ Above Flood Stage
- ◆ Outlook (> 3 days)

Popup Alerts

Old Hydrographs

- Snow Conditions
- Water Supply Forecasts
- Peak Flow Forecasts
- Reservoir Conditions
- Daily Precipitation
- Monthly Precipitation
- Soil Moisture

Leaflet | Powered by Esri | USGS, NOAA

You can access most of the graphics and maps that we use in our webinars through the Water Supply drop down menu on our web page (www.cbrfc.noaa.gov).

There is also a lot of additional information and documentation available here.

Please see the webinar recording for more information and a live web demo.

We encourage you to explore and let us know if you have any questions.

2022 Water Supply Webinar Schedule

**All Times Mountain Time (MT)*

Colorado River Basin

Friday	Jan 7th	10 am
Monday	Feb 7th	10 am
Monday	Mar 7 th	10 am
Thursday	Apr 7 th	10 am
Friday	May 6 th	10 am

Great Basin

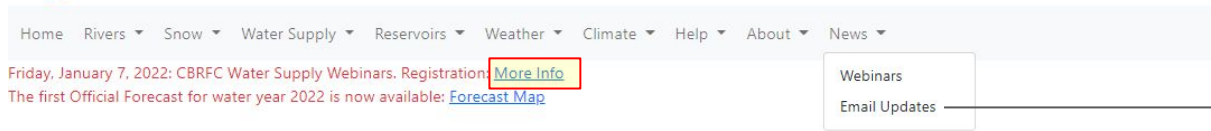
Friday	Jan 7th	11:30 am
Monday	Feb 7th	11:30 am
Monday	Mar 7 th	11:30 am
Thursday	Apr 7 th	11:30 am
Friday	May 6 th	11:30 am

*Peak flow forecast webinar **rescheduled** to Monday, March 21, 1:00 pm MT

Additional briefings scheduled as needed

Webinar schedule & registration information has been posted to the CBRFC web page

CBRFC Webinar Registration & Email List



email **cbrfc.webmasters@noaa.gov**
subject line: **email notification list**

This list is used to provide notification when webinars are scheduled, water supply forecasts are updated, and for other news of interest to our stakeholders regarding CBRFC operations.

CBRFC Water Supply Forecast Webinar Schedule & Registration - Water Year 2022

The Colorado Basin River Forecast Center (CBRFC) produces water supply forecasts for the Colorado River Basin and the eastern Great Basin. CBRFC conducts December through May webinars explaining the forecasts and current conditions.

Follow the links below to register for a webinar.

Early Season Water Supply Outlook Webinar

Wednesday December 15 @ 10 am MT

Colorado River Basin Water Supply Webinars

- [Friday January 7 @ 10 am MT](#)
- [Monday February 7 @ 10 am MT](#)
- [Monday March 7 @ 10 am MT](#)
- [Thursday April 7 @ 10 am MT](#)
- [Friday May 6 @ 10 am MT](#)

Utah Water Supply Webinars

- [Friday January 7 @ 11:30 am MT](#)
- [Monday February 7 @ 11:30 am MT](#)
- [Monday March 7 @ 11:30 am MT](#)
- [Thursday April 7 @ 11:30 am MT](#)
- [Friday May 6 @ 11:30 am MT](#)

Peak Flow Webinar

- [Thursday March 17 @ 10 am MT](#)

2022 Presentations

Overview of the 1991-2020 Normal Period and Model Impacts Presentation during Reclamation's October 24-Month Study Rollout
Slides (.pdf)

2022 Early Season Water Supply Outlook
Slides (.pdf)
Recording (.mp4)

A notification email will be sent if a date or time change occurs. Additional webinars are scheduled as needed.

The webinar slides will be available on the [CBRFC presentations page](#) soon after each briefing.

CBRFC Contacts & WY22 Basin Focal Points

Basin Focal Points (Forecasters)

Brenda Alcorn - Green, Duchesne, White/Yampa
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Ashley Nielson – Gunnison, San Juan, Dolores, Lake Powell
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Cody Moser – Upper Colorado Mainstem
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Patrick Kormos – Great Basin/Sevier
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Trevor Grout - Virgin, Lower Colorado
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Brent Bernard – Hydrologist
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