

## April 1, 2023 Water Supply Forecast Discussion

The [Colorado Basin River Forecast Center \(CBRFC\)](#) geographic forecast area includes the Upper Colorado River Basin (UCRB), Lower Colorado River Basin (LCRB), and Eastern Great Basin (GB).

### Water Supply Forecast Summary

The cold and wet weather pattern that began around mid-February continued through March across the region. Precipitation continued to favor UT, central AZ, and northwest/southwest CO, with many SNOTEL stations across the CRB and GB receiving March precipitation amounts ranking in the wettest three on record. March 15-23 was a very active weather/hydrologic period, especially across the LCRB, with two storm systems leading to high water impacts across AZ and southwest UT.

Above average March precipitation led to increases in percent of normal snow water equivalent (SWE) conditions over the past month. Colder than normal March temperatures across the region led to additional snow accumulation across lower elevations, with minimal snowmelt occurring during the month. April 1 SWE across much of the UCRB is ranked in the wettest five in the 35+ year SNOTEL record, which is at or above the 85<sup>th</sup> percentile. Around twenty SNOTEL stations across the UCRB have record April 1 SWE. April 1 SWE across portions of the LCRB including southwest UT (Virgin River Basin) and central AZ (Little Colorado, Verde, Salt) is ranked in the wettest three on record and above the 95<sup>th</sup> percentile. April 1 SWE at nearly all SNOTEL stations in the GB is also ranked in the wettest three and above the 95<sup>th</sup> percentile.

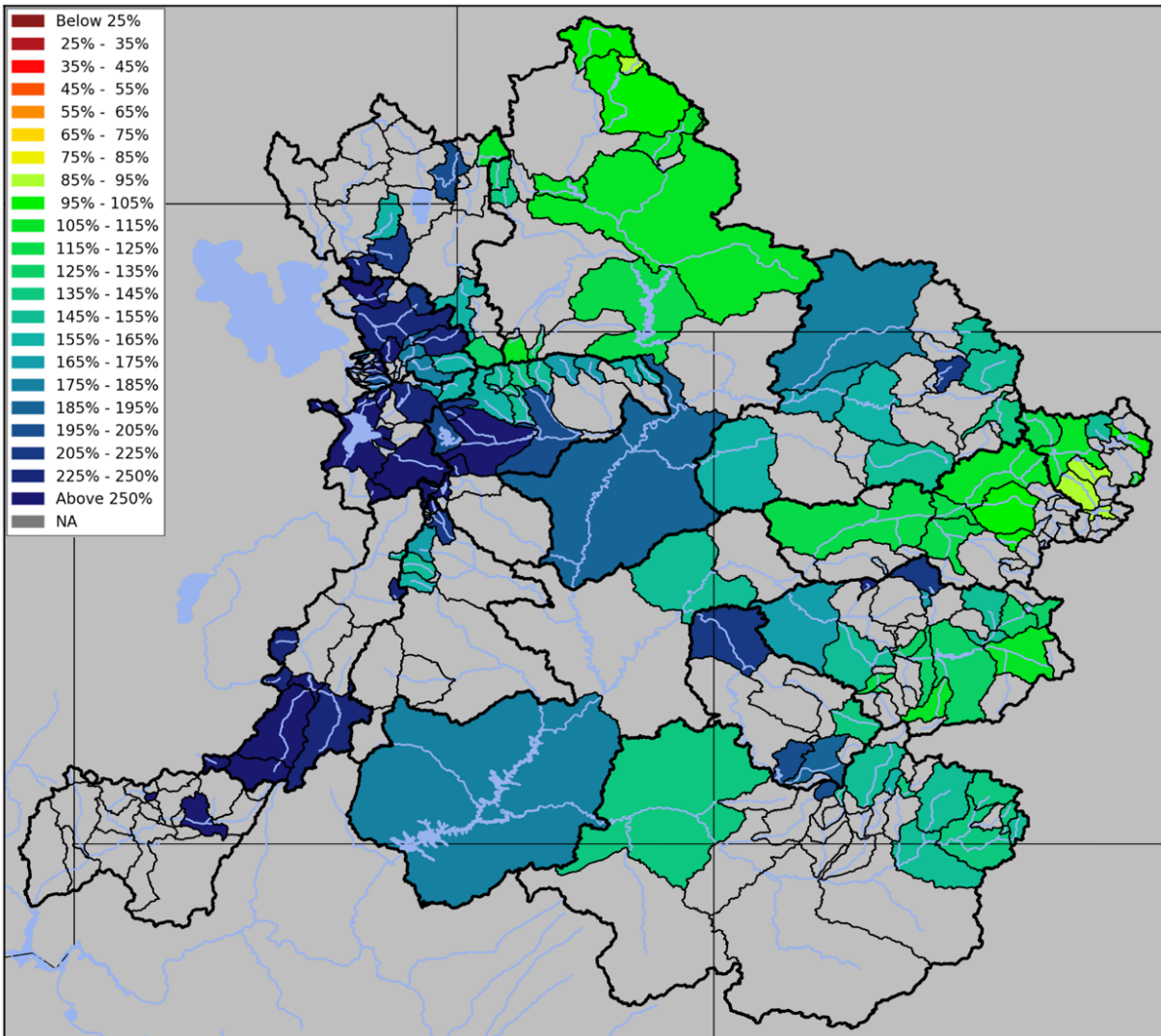
Basins that had a very wet March saw substantial increases in water supply forecasts. Water supply volume forecasts rank in the top three in portions of the UCRB, LCRB, and GB. April-July unregulated inflow forecasts for some of the major reservoirs in the UCRB include Fontenelle 800 KAF (109% of average), Flaming Gorge 1200 KAF (124%), Green Mountain 260 KAF (93%), Blue Mesa 850 KAF (134%), McPhee 515 KAF (202%), and Navajo 945 KAF (150%). The Lake Powell inflow forecast is 11.3 MAF (177% of average), which is a 3.3 MAF increase from March.

A ridge of high pressure is building over the Western US, which will bring a period of dry and warming conditions to the region. Temperatures will approach seasonal normals by this weekend, and should be 5-10 degrees above normal for the start of next week. Little to no precipitation is expected through the middle of next week. Around the middle of next week, the ridge will begin to break down as a trough moves into the Western US. There are discrepancies between the depth and timing of this trough, which translates to uncertainties in precipitation totals and placement. Current weather model ensemble guidance favors precipitation over the GB and UCRB, with lower chances of precipitation in the LCRB. Despite uncertainties in the forecast, this upper-level weather pattern would result in a return to above normal precipitation and near to below normal temperatures across the area.

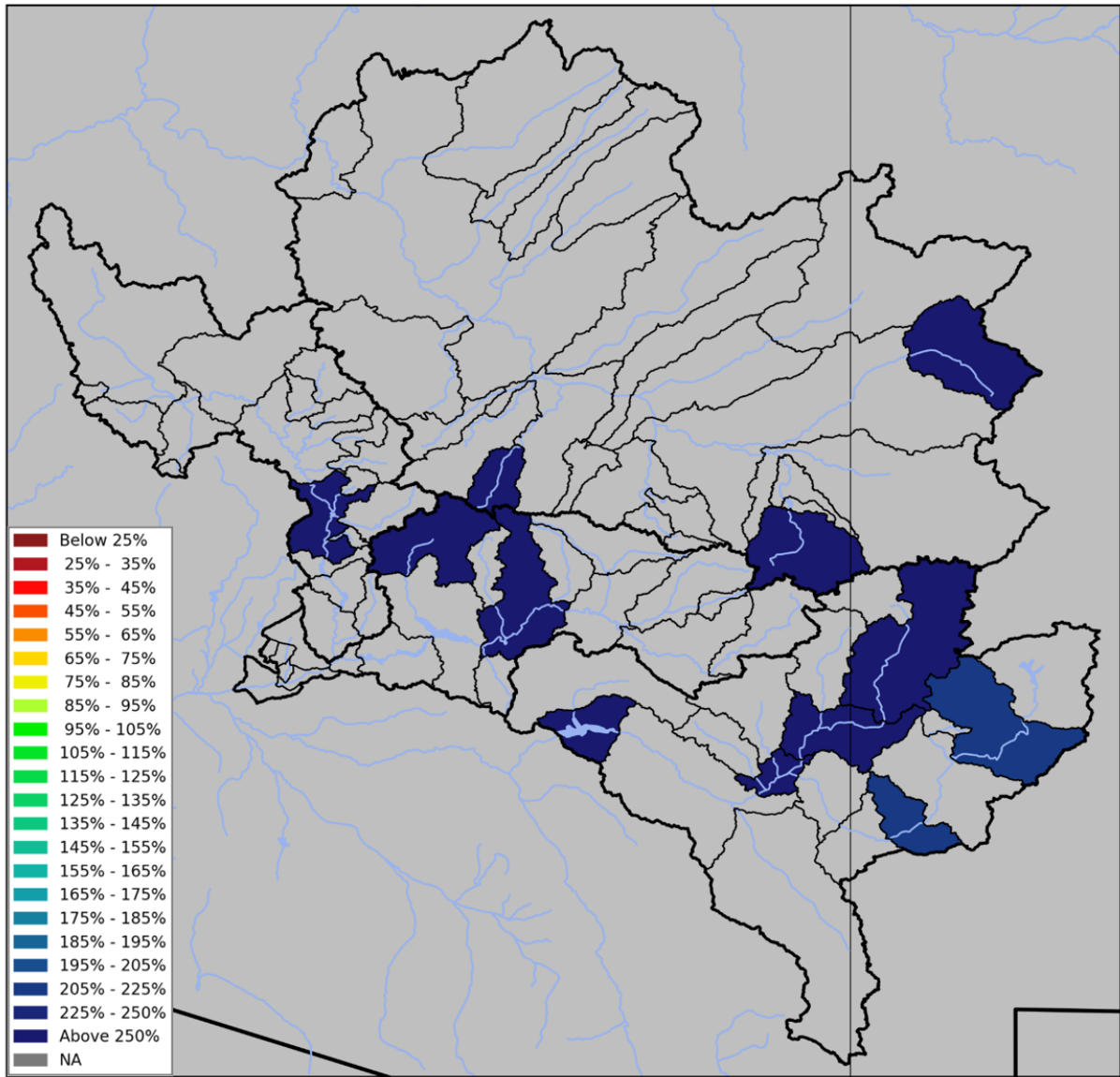
## Seasonal Water Supply Forecasts

April 1 water supply forecast ranges (percent of normal) by basin:

<b>April-July Water Supply Forecast Ranges (%Average)</b> <i>*January-May Forecast Period (%Median)</i>	
<b>UPPER COLORADO RIVER BASIN</b>	
<b>Basin</b>	<b>Forecast Range</b>
Lake Powell	177
<b>Green River Basin</b>	
Upper Green	95-145
Duchesne	140-260
Yampa/White	135-210
Price/San Rafael/Dirty Devil	150-305
<b>Colorado River Headwaters</b>	
Above Kremmling	90-150
Kremmling to Cameo	95-120
<b>Southwest Colorado</b>	
Gunnison	110-225
Dolores	140-210
San Juan	135-200
<b>LOWER COLORADO RIVER BASIN</b>	
Virgin	260-350
<i>*Little Colorado</i>	340-710
<i>*Verde</i>	575
<i>*Salt</i>	335-635
<i>*Upper Gila</i>	210-475
<b>GREAT BASIN</b>	
Bear	115-240
Weber	160-310
Six Creeks	180-325
Provo/Utah Lake	165-325
Sevier	155-475



Upper Colorado, Great Basin, and Virgin River Basins  
 2023 April-July forecast volumes as a percent of 1991-2020 average  
 (50% exceedance probability forecast).



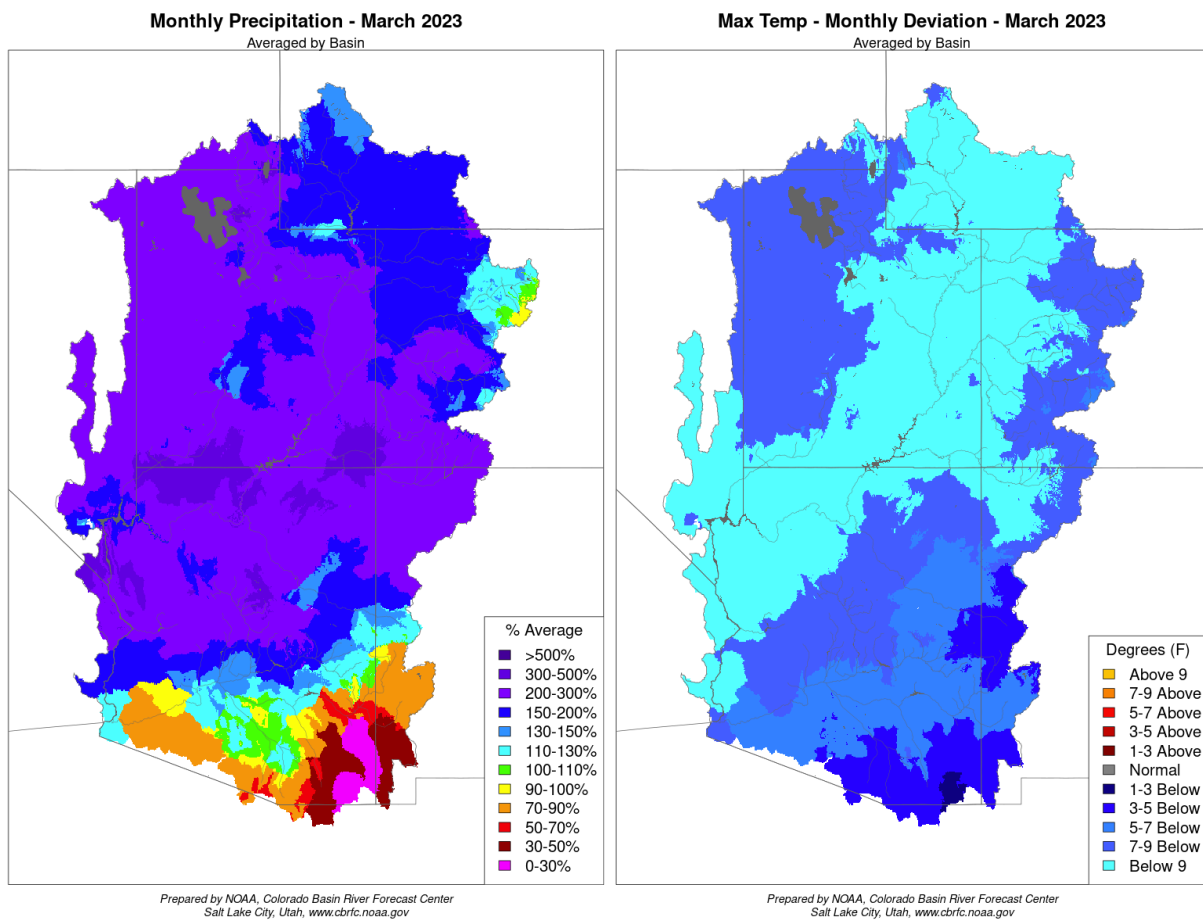
Lower Colorado River Basin (AZ/NM)  
 2023 January-May forecast volumes as a percent of 1991-2020 median  
 (50% exceedance probability forecast).

For specific site water supply forecasts click [here](#).

## Water Supply Discussion

### March Weather

The cold and wet weather pattern that began around mid-February continued through March across the region. Precipitation continued to favor UT, central AZ, and northwest/southwest CO, with many SNOTEL stations across the CRB and GB receiving March precipitation amounts ranking in the wettest three on record and above the 90<sup>th</sup> percentile. The active weather pattern brought much colder than normal temperatures to the region with a lot of the precipitation falling as snow, even across LCRB higher elevations. March 15-23 was a very active weather/hydrologic period, especially across the LCRB, with two storm systems leading to high water impacts across AZ and southwest UT.

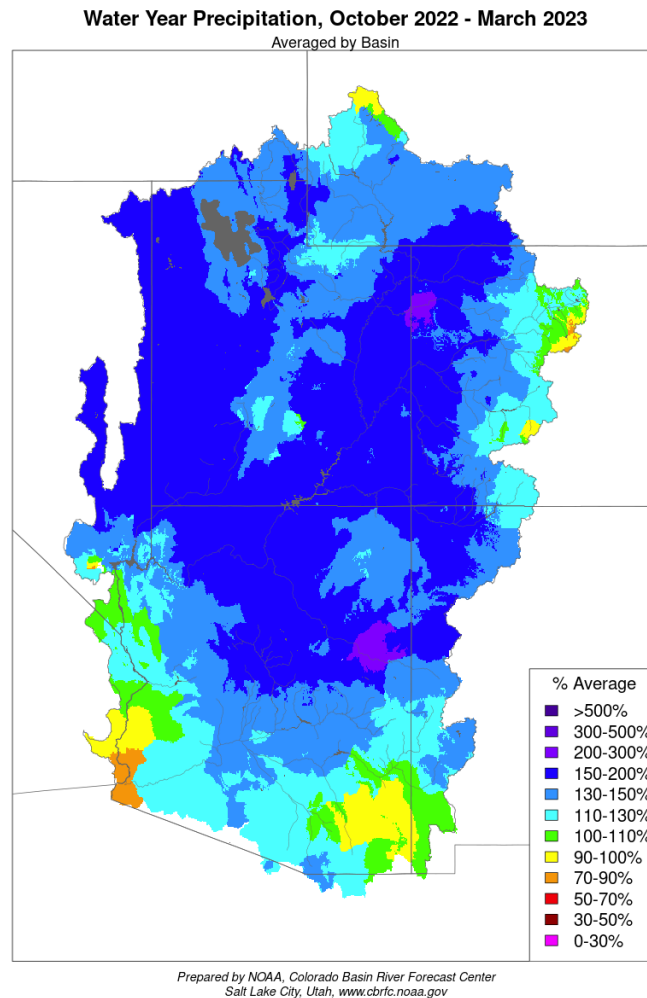


March 2023 percent of normal precipitation (left) and maximum temperature departure (right).  
(Averaged by basins defined in the CBRFC hydrologic model)

For CBRFC monthly precipitation maps click [here](#).

## Water Year Precipitation

October precipitation was above average across much of AZ as well as lower elevation areas along the UT/CO border, while the majority of the GB and Upper Green River Basin received below normal precipitation during the month. A few storm systems moved through the region during November, with precipitation primarily targeting western UT, southwest WY, and northwest CO. December and January precipitation was well above average across the region, with near/record precipitation amounts across central UT and northwest WY. February precipitation was much below normal during the first half of the month and generally much above normal during the last of the month, with most basins ending the month with near to slightly above normal precipitation. Precipitation in March continued to favor UT, central AZ, and northwest/southwest CO, with many SNOTEL stations across the CRB and GB receiving monthly precipitation amounts ranking in the wettest three on record and above the 90<sup>th</sup> percentile. Water year precipitation-to-date (October-March) is much above average across the majority of the region, and is summarized in the figure and table below.



Water Year 2023 percent of normal precipitation.  
(Averaged by basins defined in the CBRFC hydrologic model)

For CBRFC seasonal precipitation maps click [here](#).

<b>Water Year 2023 CBRFC Precipitation (Significant Runoff Areas) Percent of 1991-2020 Average</b>		
<b>UPPER COLORADO RIVER BASIN</b>		
	<b>Mar</b>	<b>Oct-Mar</b>
Above Lake Powell	180	130
<b>Green River Basin</b>		
Above Fontenelle	145	105
Above Flaming Gorge	147	114
Yampa/White	167	135
Duchesne	210	139
Price/San Rafael/Dirty Devil	219	148
<b>Colorado River Headwaters</b>		
Above Kremmling	107	100
Eagle	114	106
Roaring Fork	170	124
Above Cameo	134	113
<b>Southwest Colorado</b>		
Gunnison	189	130
Dolores	222	148
San Juan	233	141
<b>LOWER COLORADO RIVER BASIN</b>		
Virgin	211	169
Little Colorado	216	156
Verde	271	169
Salt	165	137
Upper Gila	88	125
<b>GREAT BASIN</b>		
Bear	203	137
Weber	231	148
Six Creeks	255	161
Provo/Utah Lake	244	158
Sevier	194	149

## **Snowpack**

Above average March precipitation led to increases in percent of normal snow water equivalent (SWE) conditions over the past month. Brief periods of snowmelt occurred during March, but for the most part snow continued to accumulate, even across lower elevations, as a result of below normal temperatures during the month. Early April snow water equivalent (SWE) conditions are generally above the 85<sup>th</sup> percentile across the GB, central AZ, and much of the UCRB, with record April 1 SWE in many areas.

April 1 SWE across much of the UCRB is ranked in the wettest five in the 35+ year SNOTEL record, which is at or above the 85<sup>th</sup> percentile. Around twenty SNOTEL stations across the UCRB have record April 1 SWE - this includes the Sierra Madre Range (White/Yampa River Basins), the Gunnison River Basin and the San Juan Mountain Range in southwest CO (Dolores, San Juan River Basins), as well as portions of the UCRB within UT (Duchesne, Price, San Rafael River Basins). April 1 SWE is less favorable, although still near normal, in the Upper Green River Basin above Fontenelle Reservoir and along Colorado's Western Slope extending from the Fraser River Basin to the headwaters of the Roaring Fork.

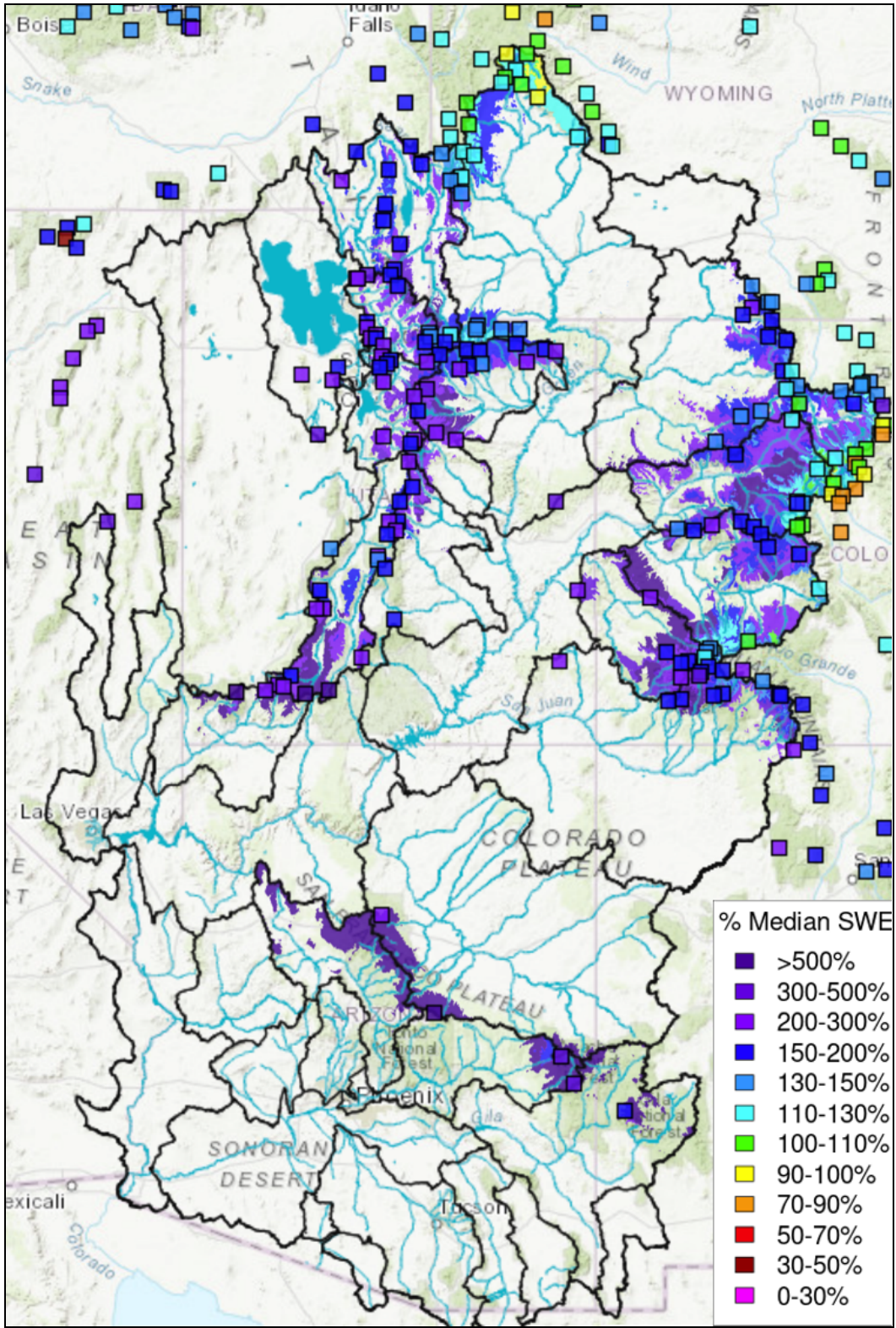
La Niña conditions usually result in drier than average winter weather across the southwest US, and SWE at central AZ SNOTEL stations is usually close to melt out (zero) by April 1. Neither are true this year. During March, the LCRB experienced periods of heavy rain, snowmelt, and additional snow accumulation. April 1 SWE across much of the LCRB including southwest UT (Virgin River Basin) and central AZ (Little Colorado, Verde, Salt) is generally ranked in the wettest three on record and above the 95<sup>th</sup> percentile. Snowpack conditions further east in the Salt and Upper Gila River Basins near the AZ/NM border are less favorable, although still well above normal and generally around the 75<sup>th</sup> percentile.

SWE conditions in the GB are generally better when compared to the UCRB, as more storms and precipitation events have targeted UT this winter compared to southwest WY, and western CO. April 1 SWE at nearly all SNOTEL stations in the GB is ranked in the wettest three on record and above the 95<sup>th</sup> percentile.

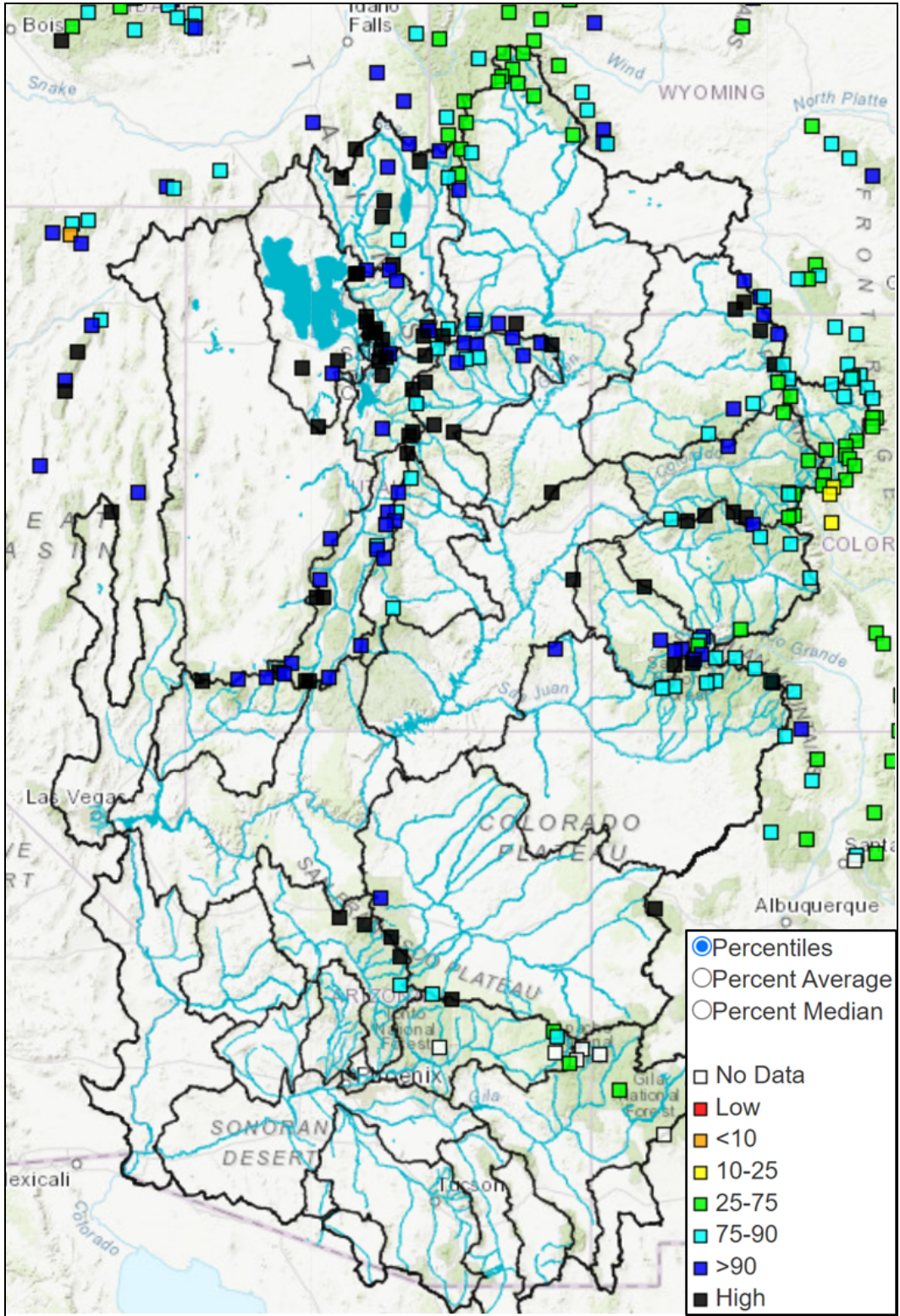
SWE conditions are summarized in the table and figures below.



<b>Water Year 2023</b>			
<b>CBRFC Model SWE (Significant Runoff Areas)</b>			
<b>Percent of 1991-2020 Median</b>			
<b>UPPER COLORADO RIVER BASIN</b>			
	<b>Mar1</b>	<b>Apr1</b>	<b>Change</b>
Above Lake Powell	135	169	34
<b>Green River Basin</b>			
Above Fontenelle	99	114	15
Above Flaming Gorge	116	131	15
Yampa/White	148	175	27
Duchesne	157	199	42
Price/San Rafael/Dirty Devil	183	247	64
<b>Colorado River Headwaters</b>			
Above Kremmling	111	124	13
Eagle	109	119	10
Roaring Fork	119	142	23
Above Cameo	117	136	19
<b>Southwest Colorado</b>			
Gunnison	133	167	34
Dolores	157	238	81
San Juan	129	186	57
<b>LOWER COLORADO RIVER BASIN</b>			
Virgin	239	401	162
Little Colorado	342	500	158
Verde	486	500	14
Salt	175	305	130
Upper Gila	206	500	294
<b>GREAT BASIN</b>			
Bear	149	175	26
Weber	165	221	56
Six Creeks	168	229	61
Provo/Utah Lake	191	252	61
Sevier	184	223	39



April 1, 2023 percent median SWE -  
 NRCS SNOTEL observed (squares) and CBRFC hydrologic model significant runoff areas.



April 3, 2023 SNOTEL station SWE percentiles.

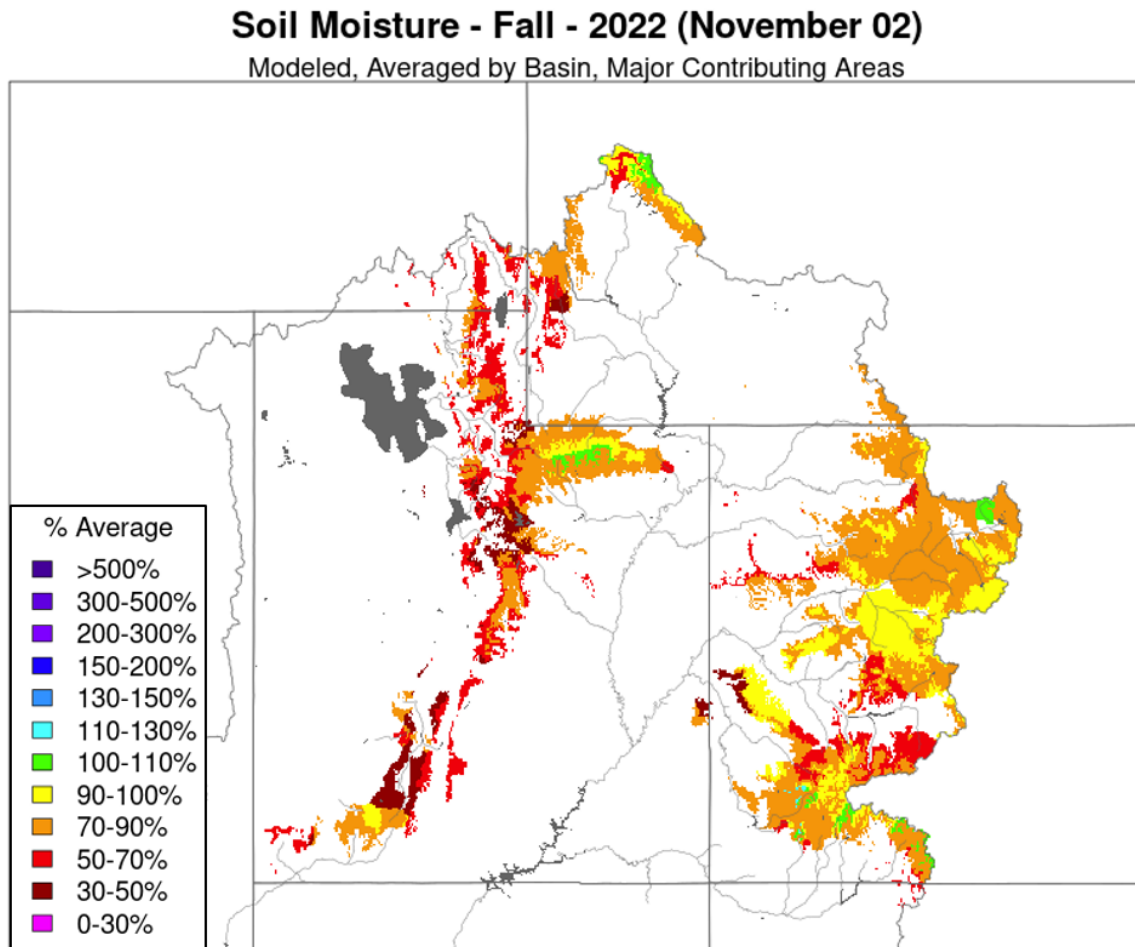
For updated SNOTEL information click [here](#).

For CBRFC hydrologic model snow click [here](#).

## Soil Moisture

CBRFC model soil moisture conditions impact water supply forecasts and the efficiency of spring runoff. Above average Fall (antecedent) soil moisture conditions have a positive impact (increased runoff efficiency) on water supply forecasts while below average conditions have a negative impact (decreased runoff efficiency). The timing and magnitude of spring runoff is ultimately a result of SWE conditions, spring weather, and antecedent soil moisture conditions.

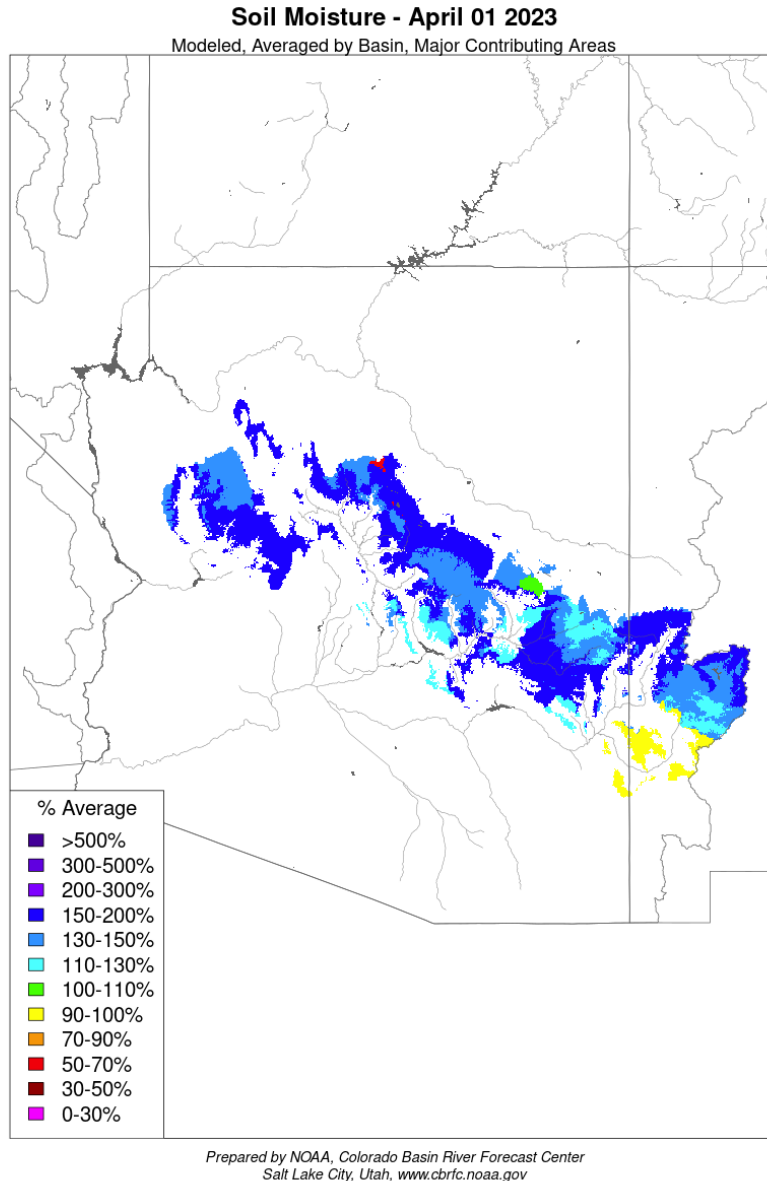
A favorable monsoon season helped to improve soil moisture conditions, especially across southwest CO (San Juan, Dolores basins) and the southeast LCRB (Salt, Upper Gila basins). However, Fall soil moisture conditions remain below average across many of the major runoff producing areas. UCRB model soil moisture conditions are generally better (near to below average) when compared to GB soil moisture conditions (below to much below average).



*Prepared by NOAA, Colorado Basin River Forecast Center  
Salt Lake City, Utah, [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)*

November 2022 CBRFC hydrologic model soil moisture conditions.

Soil moisture conditions tend to fluctuate more in the LCRB of AZ and NM in the winter due to the frequency of rain events and melting snow. Soil conditions in the fall are less informative than they are in the northern basins that remain under snowpack throughout the winter season. 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. LCRB model soil moisture conditions (image below) improved during March as a result of rainfall runoff and snowmelt, and early April model soil moisture is above average in most basins.

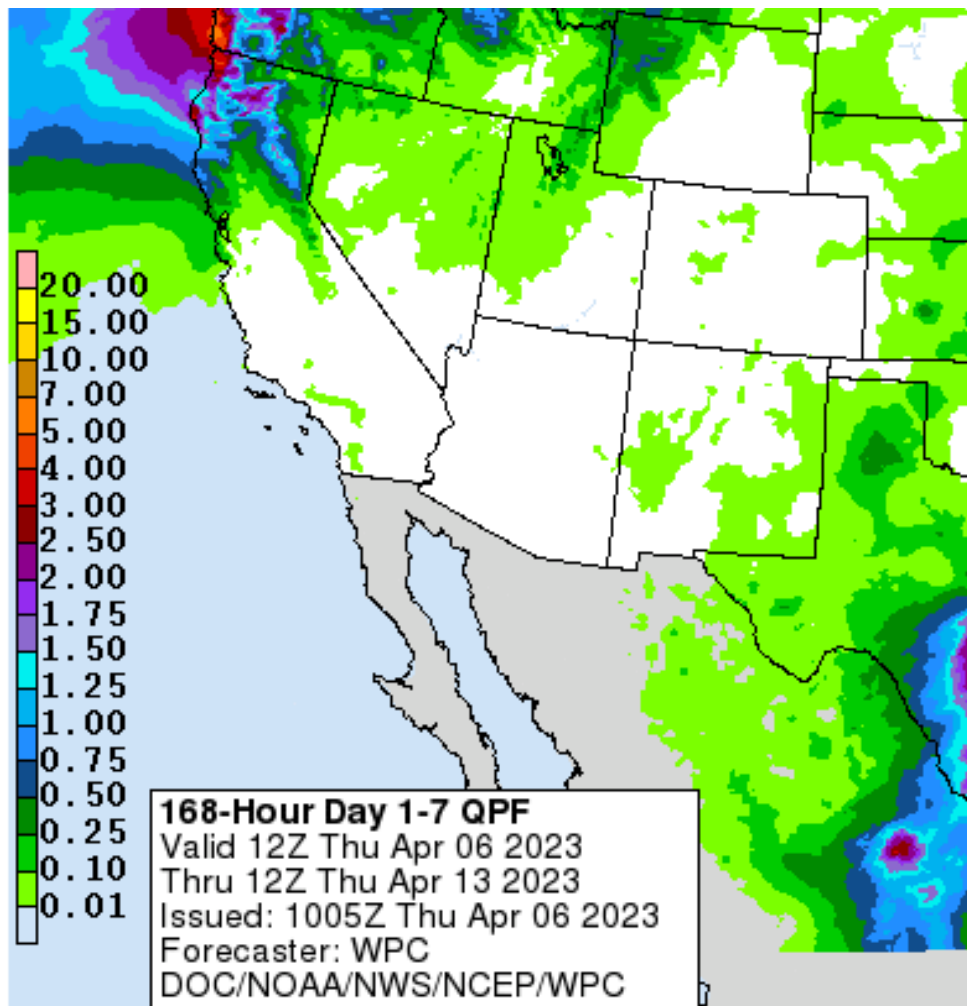


Lower Colorado River Basin (AZ/NM) model soil moisture - April 1, 2023.

For CBRFC hydrologic model soil moisture conditions click [here](#).

## Upcoming Weather

A ridge of high pressure is building over the Western US, which will bring a period of dry and warming conditions to the region. Temperatures will approach seasonal normals by this weekend, and should be 5-10 degrees above normal for the start of next week. Little to no precipitation is expected through the middle of next week. Around the middle of next week, the ridge will begin to break down as a trough moves into the Western US. There are discrepancies between the depth and timing of this trough, which translates to uncertainties in precipitation totals and placement. Current weather model ensemble guidance favors precipitation over the GB and UCRB, with lower chances of precipitation in the LCRB. Despite uncertainties in the forecast, this upper-level weather pattern would result in a return to above normal precipitation and near to below normal temperatures across the area.



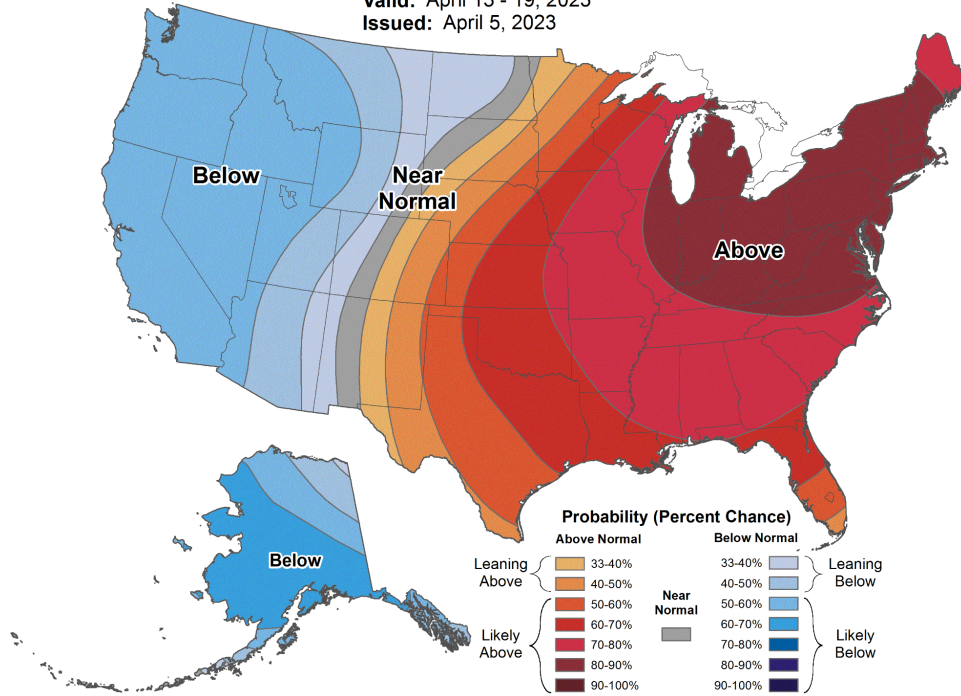
Weather Prediction Center precipitation forecast for April 6-13, 2023.



# 8-14 Day Temperature Outlook



Valid: April 13 - 19, 2023  
Issued: April 5, 2023



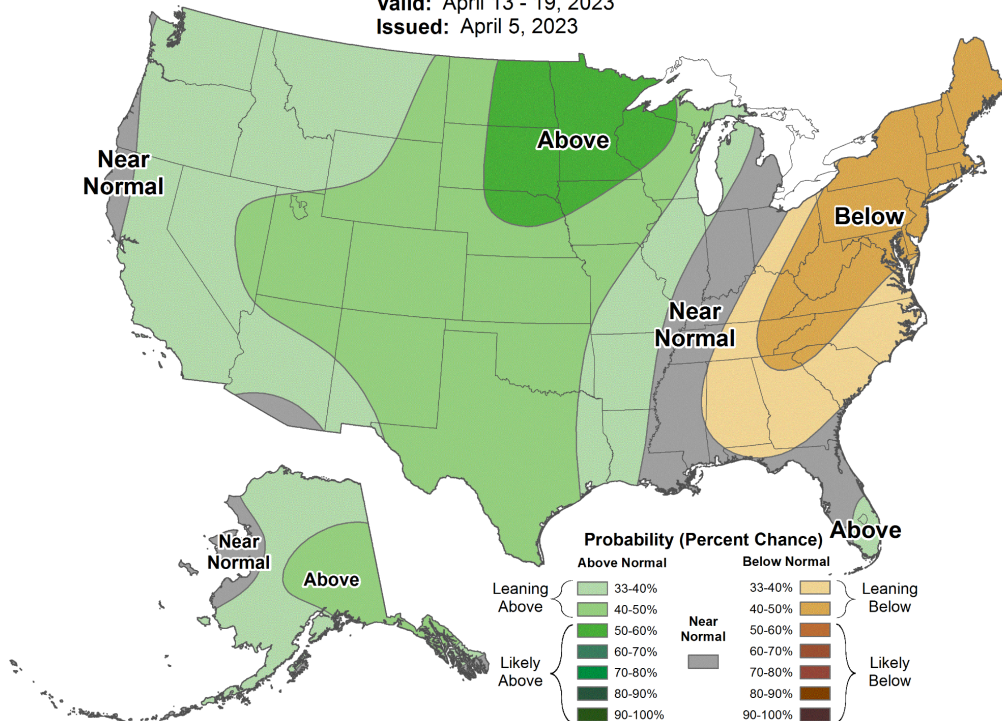
NWS Climate Prediction Center temperature probability forecast for April 13 - 19, 2023.



# 8-14 Day Precipitation Outlook



Valid: April 13 - 19, 2023  
Issued: April 5, 2023



NWS Climate Prediction Center precipitation probability forecast for April 13 - 19, 2023.

For CBRFC's beginning of the month online publication that contains basin conditions, summary graphics, and end of month reservoir content tables, refer to the following links.

### **Basin Conditions and Summary Graphics**

[Green River Basin](#)

[Upper Colorado River Basin](#)

[San Juan River Basin](#)

[Great Salt Lake Basin](#)

[Sevier River Basin](#)

[Virgin River Basin](#)

### **End Of Month Reservoir Content Tables**

[Green River Basin](#)

[Upper Colorado River Basin](#)

[San Juan River Basin](#)

[Great Salt Lake Basin](#)

[Sevier Basin](#)

### **Acronyms & Abbreviations**

CBRFC - Colorado Basin River Forecast Center

CPC - Climate Prediction Center

CRB - Colorado River Basin

ENSO - El Niño/Southern Oscillation

ESP - Ensemble Streamflow Prediction

GB - Great Basin

KAF - Thousand Acre-Feet

LCRB - Lower Colorado River Basin

MAF - Million Acre-Feet

NWS - National Weather Service

QPF - Quantitative Precipitation Forecast

SNOTEL - Snow Telemetry

SWE - Snow Water Equivalent

UCRB - Upper Colorado River Basin

WPC - Weather Prediction Center