January 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

Following below normal Spring 2022 runoff, an active Southwest monsoon season brought near to above average precipitation to much of the region during June-September. The favorable monsoon season helped improve soil moisture conditions, especially across southwest CO (San Juan, Dolores basins) and the southeast LCRB (Salt, Upper Gila basins). However, CBRFC modeled 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).

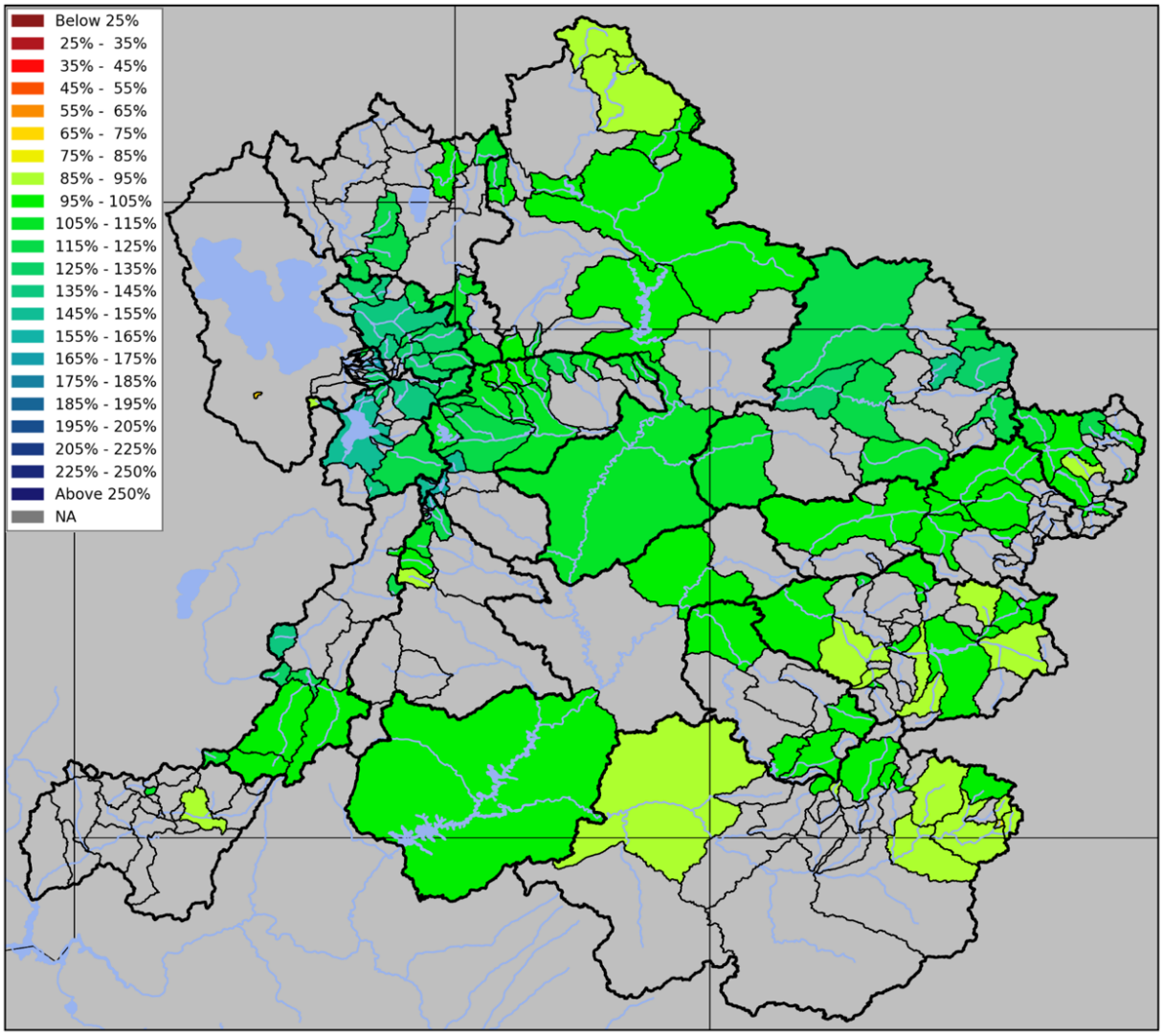
Precipitation continued into October, with snow accumulating during the last 10 days of the month. Widespread above normal December/early January precipitation improved snow water equivalent (SWE) conditions, particularly across UT. January 1 SWE conditions generally range between 110-180% of normal across the UCRB, 30-120% of normal across the LCRB, and 160-190% of normal across the GB.

April-July unregulated inflow forecasts for some of the major reservoirs in the UCRB include Fontenelle 700 KAF (95% average), Flaming Gorge 950 KAF (98%), Green Mountain 270 KAF (96%), Blue Mesa 605 KAF (95%), McPhee 260 KAF (102%), and Navajo 570 KAF (90%). The Lake Powell inflow forecast is 6.7 MAF (105% of average).

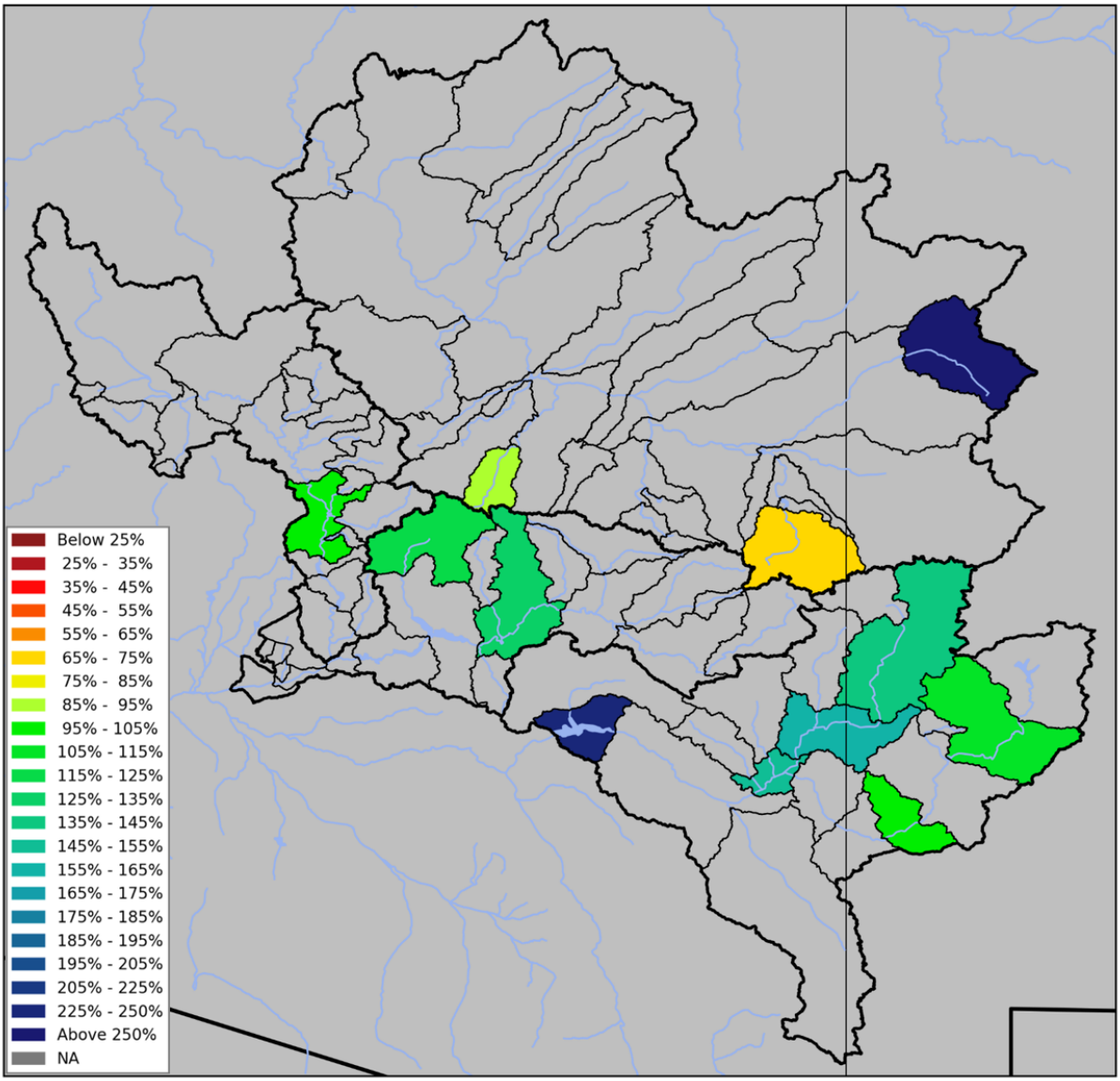
January 1 CBRFC water supply forecast ranges by basin:

April-July Water Supply Forecast Ranges (%Average) **January-May Forecast Period (%Median)*	
UPPER COLORADO RIVER BASIN	
Basin	**Forecast Range**
Lake Powell	105
Green River Basin	
Upper Green	90-105
Duchesne	95-125
Yampa/White	110-140
Price/San Rafael/Dirty Devil	95-150
Colorado River Headwaters	
Above Kremmling	90-120
Kremmling to Cameo	95-100
Southwest Colorado	
Gunnison	90-110
Dolores	100-105
San Juan	85-100
LOWER COLORADO RIVER BASIN	
Virgin	90-110
**Little Colorado*	70-95
**Verde*	105
**Salt*	120-130
**Upper Gila*	100-235
GREAT BASIN	
Bear	105-120
Weber	120-145
Six Creeks	115-175
Provo/Utah Lake	95-155
Sevier	95-135

Seasonal Water Supply Forecasts



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



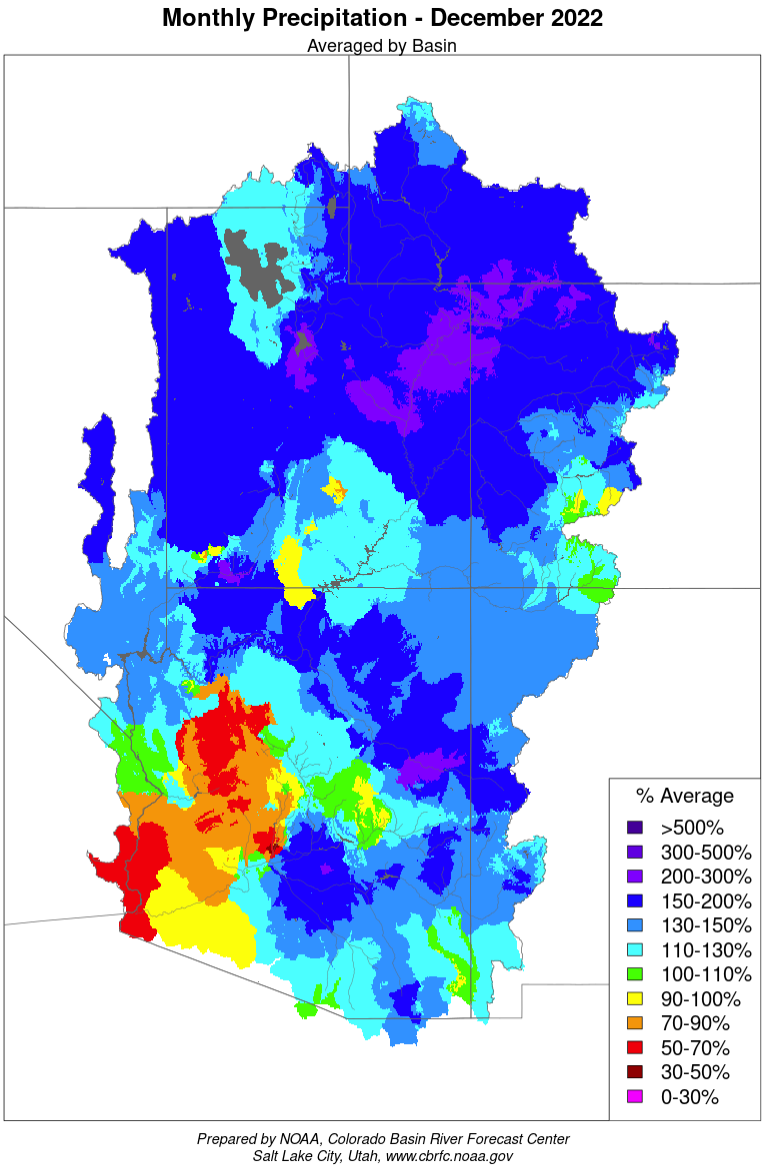
Lower Colorado River Basin (AZ/NM)
2023 January-May forecast volumes as a percent of 1991-2020 median
(50% exceedance probability forecast).

For specific site water supply forecasts click here.

Water Supply Discussion

December Precipitation

Active weather occurred during much of December across the CRB and GB, with only a handful of days during the month seeing no precipitation. December precipitation (image below) was much above average across the majority of the CRB and GB, with the northern/central Wasatch Range in UT and the Sierra Madre and Park Ranges in northwest CO receiving the most precipitation during December. A number of SNOTEL stations in these areas reported December precipitation values above the 90th percentile and ranking in the wettest five on record. December 27 - January 3 was a very active weather period that delivered 5+ inches of precipitation to parts of UT, western CO, and central AZ.

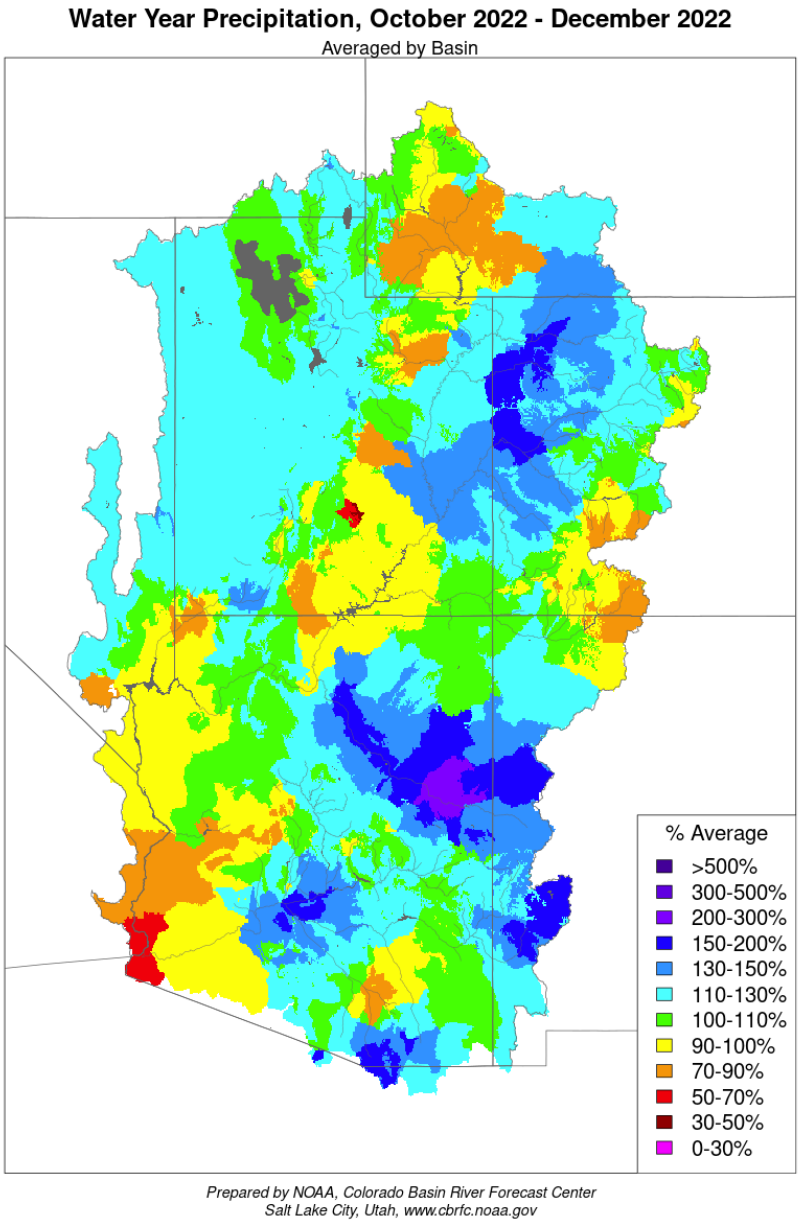


December 2022 percent of average precipitation.

For CBRFC monthly precipitation maps click here.

Water Year Precipitation

Water year precipitation can be used as a good indicator of early season water supply conditions. 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. Following above average December precipitation, water year precipitation-to-date (October-December) is generally near to above average across the region, which is shown in the figure and table below.



Water Year 2023 percent of normal precipitation.

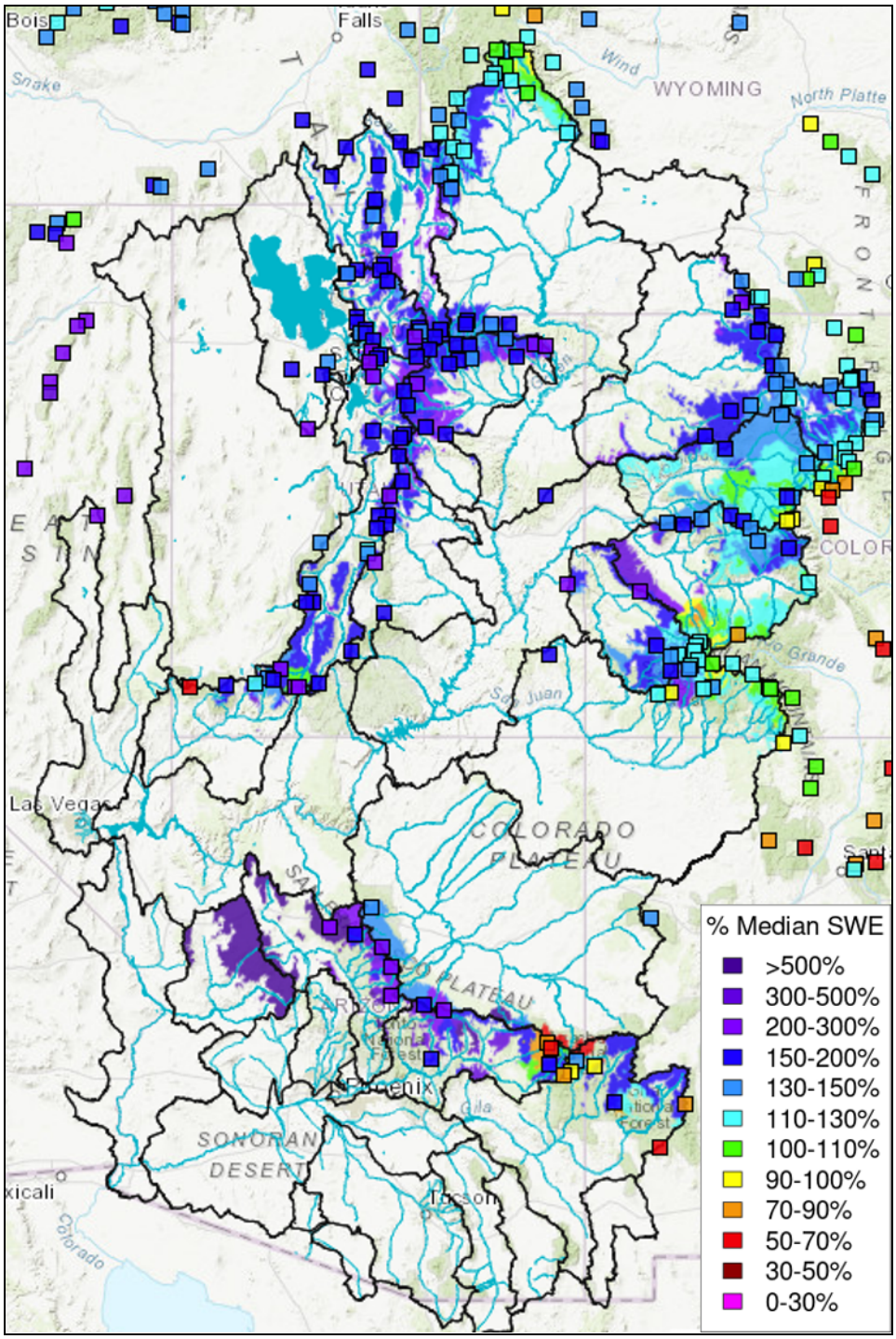
For CBRFC seasonal precipitation maps click here.

Water Year 2023 CBRFC Precipitation (Significant Runoff Areas) Percent of 1991-2020 Average				
UPPER COLORADO RIVER BASIN				
	Oct	**Nov**	**Dec**	**Oct-Dec**
Above Lake Powell	84	82	152	107
Green River Basin				
Above Fontenelle	48	92	140	98
Above Flaming Gorge	51	101	156	105
Yampa/White	82	102	179	124
Duchesne	49	86	178	103
Price/San Rafael/Dirty Devil	82	83	181	118
Colorado River Headwaters				
Above Kremmling	58	90	150	101
Eagle	101	86	146	111
Roaring Fork	103	81	142	108
Above Cameo	87	86	148	107
Southwest Colorado				
Gunnison	97	74	136	103
Dolores	113	64	152	109
San Juan	97	62	119	92
LOWER COLORADO RIVER BASIN				
Virgin	77	172	113	121
Little Colorado	166	81	121	123
Verde	158	79	114	115
Salt	143	50	126	109
Upper Gila	196	26	140	130
GREAT BASIN				
Bear	58	120	143	114
Weber	58	133	157	121
Six Creeks	77	130	157	125
Provo/Utah Lake	77	108	177	124
Sevier	85	109	149	116

Snowpack

An October 22-27 storm system delivered the first snow of water year 2023 across higher elevations of the UCRB and GB. During November, snowpack conditions as a percent of normal generally improved across northern basins and declined across southern basins, with brief periods of low and mid-elevation snowmelt occurring during the month. Above normal December/early January precipitation across most of the region improved SWE conditions, particularly across UT. Water year 2023 CBRFC model SWE conditions are summarized in the table below.

Water Year 2023 CBRFC Model SWE (Significant Runoff Areas) Percent of 1991-2020 Median			
UPPER COLORADO RIVER BASIN			
	Dec1	**Jan1**	**Change**
Above Lake Powell	91	126	35
Green River Basin			
Above Fontenelle	97	112	15
Above Flaming Gorge	104	127	23
Yampa/White	115	160	45
Duchesne	91	146	55
Price/San Rafael/Dirty Devil	123	164	41
Colorado River Headwaters			
Above Kremmling	84	122	38
Eagle	95	118	23
Roaring Fork	91	114	23
Above Cameo	89	122	33
Southwest Colorado			
Gunnison	85	117	32
Dolores	67	122	55
San Juan	64	87	23
LOWER COLORADO RIVER BASIN			
Virgin	141	121	-20
Little Colorado	2	49	47
Verde	0	108	108
Salt	38	52	14
Upper Gila	0	28	28
GREAT BASIN			
Bear	160	165	5
Weber	197	180	-17
Six Creeks	210	188	-22
Provo/Utah Lake	177	187	10
Sevier	148	159	11



January 3, 2023 percent median SWE -
NRCS SNOTEL Observed (squares) and CBRFC hydrologic model significant runoff areas.

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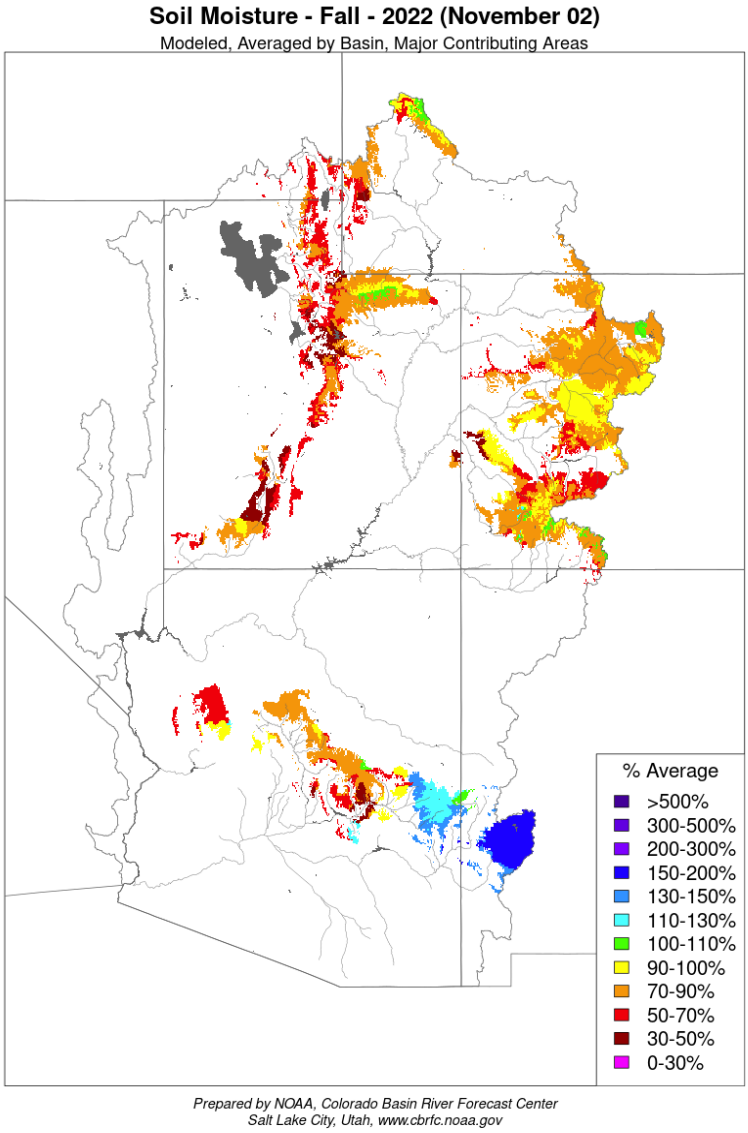
For updated SNOTEL information click here.
For CBRFC hydrologic model snow conditions click here.

Soil Moisture

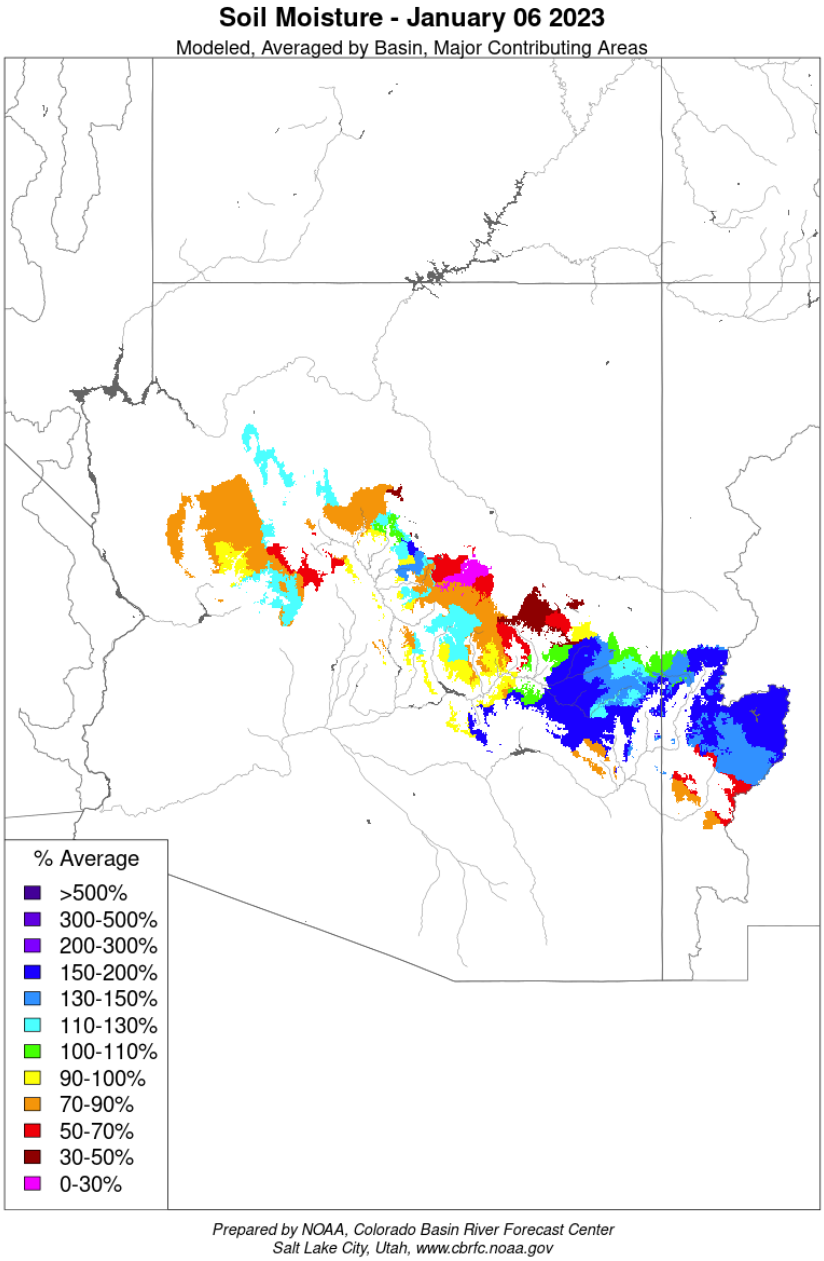
CBRFC hydrologic model soil moisture states are adjusted in the fall after the irrigation season and prior to the winter snowpack accumulation to accurately reflect observed baseflow conditions. CBRFC model fall soil moisture conditions impact early season water supply forecasts and the efficiency of spring runoff. Above average fall soil moisture conditions have a positive impact (increased runoff efficiency) on early season 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 (antecedent) 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).



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. Early January model soil moisture is variable across the LCRB, with conditions generally improving from west to east across AZ, and is shown in the image below.



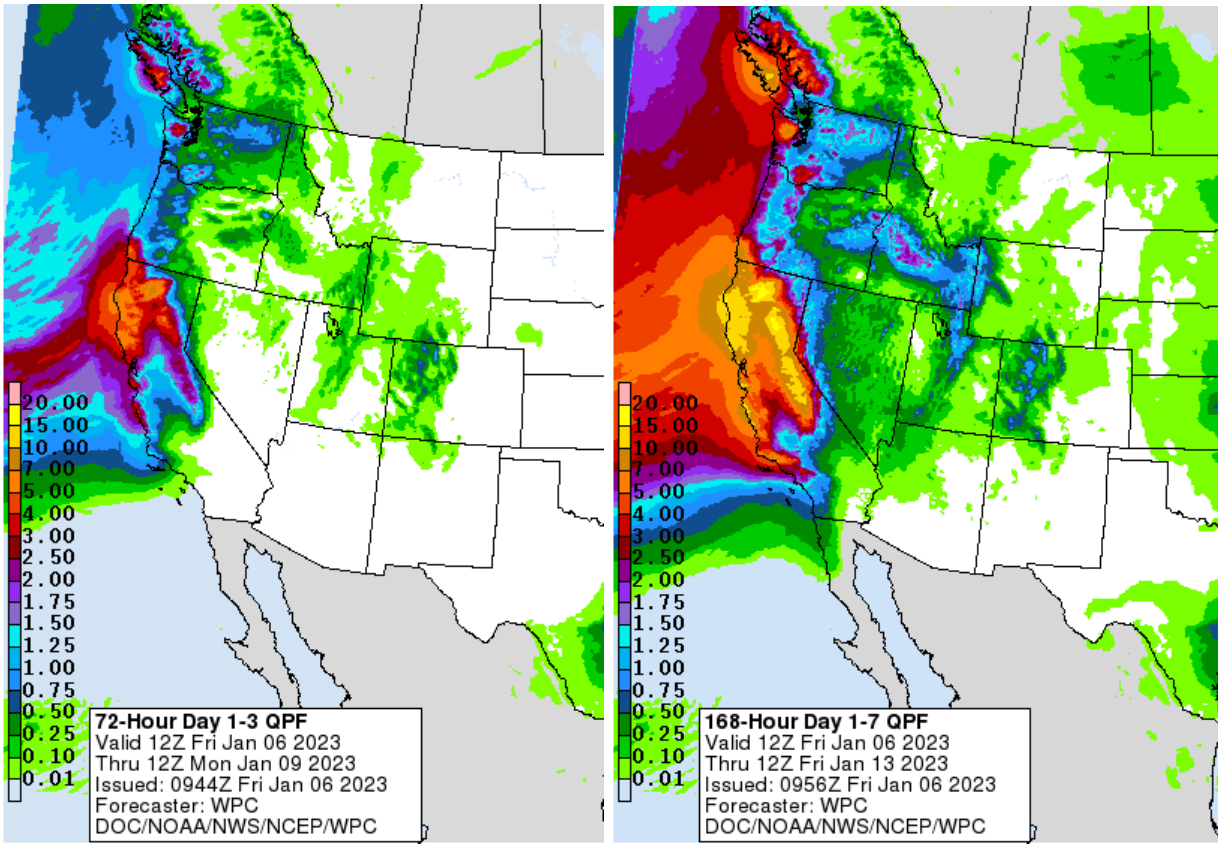
Lower Colorado River Basin (AZ/NM) model soil moisture as of January 6, 2023.

For CBRFC hydrologic model soil moisture conditions click here.

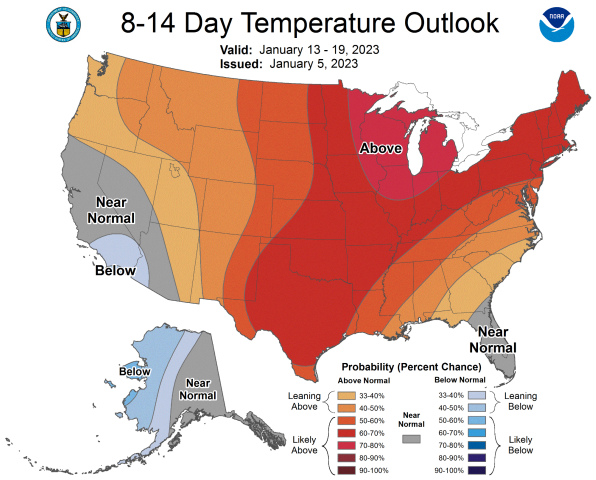
Upcoming Weather

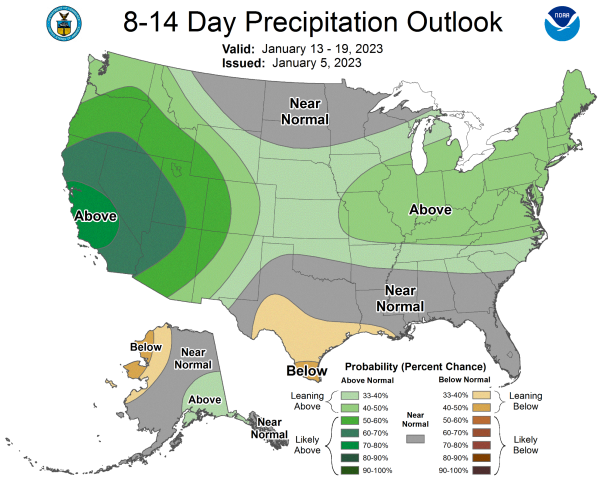
An upper level low is moving across UT and CO today (Friday, January 6), bringing widespread rain and snow showers across the UCRB and GB. Precipitation totals through early Saturday are expected to be in the range of 0.25 to 0.50 inches, with up to an inch for the high elevations of CO. After this low passes, the overall weather pattern will remain progressive, with a large trough of low pressure located over the eastern Pacific and westerly flow over the US. This will allow for the continued quick passage of shortwave troughs and ridges, bringing periods of precipitation and clear weather. The first shortwave trough arrives late this weekend, though precipitation chances look to be minimal at best, and are confined to high terrain. The second arrives mid-week, and will bring more widespread precipitation due to better moisture availability from an atmospheric river event affecting much of the West. Precipitation totals are currently forecast in the range of around 0.25" at lower elevations, to up to an inch for higher terrain. Temperatures throughout the week will be near to slightly above average due to primarily westerly and southerly flow.

Beyond this week, a similar weather pattern looks to remain in place. The 8-10 day period is still characterized by an eastern Pacific/Western US trough that will continue to bring wet and cool weather to the region. The Climate Prediction Center (CPC) places the GB and CRB at elevated odds of wetter than normal precipitation, and near normal to slightly elevated odds of average to above average temperatures for the 8-14 day period. Slight chances for above average precipitation for the northern half of the region extends through the one month outlook provided by the CPC.

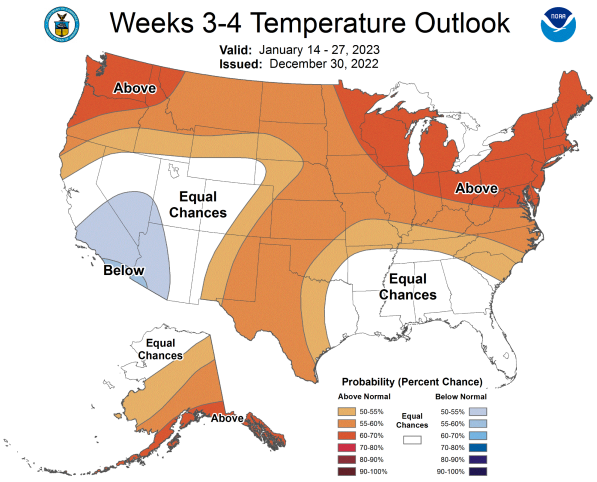


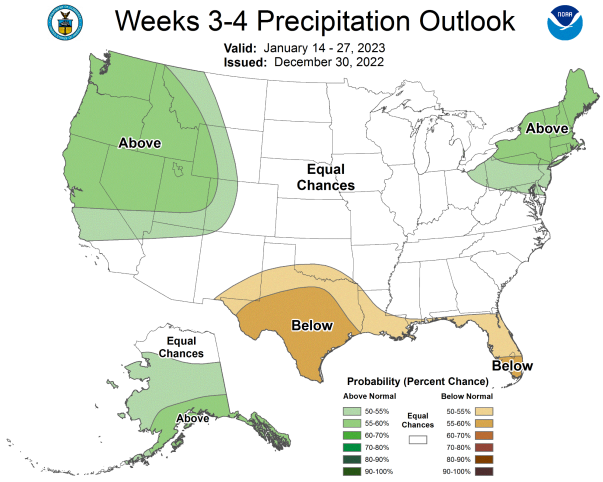
NWS Weather Prediction Center precipitation forecast for January 6-9, 2023 (left), and January 6-13, 2023 (right).





NWS Climate Prediction Center temperature and precipitation probability forecasts for January 13-19, 2023.





NWS Climate Prediction Center temperature and precipitation probability forecasts for January 14-27, 2023.

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

GB - Great Basin

KAF - thousand acre-feet

LCRB - Lower Colorado River Basin

SNOTEL - Snow Telemetry

SWE - snow water equivalent

UCRB - Upper Colorado River Basin