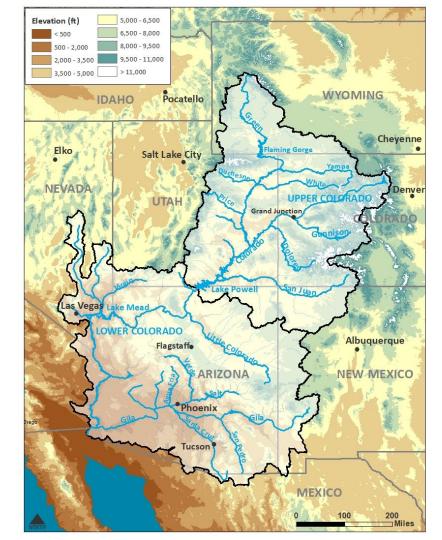
Colorado River Basin Water Supply Briefing

May 7, 2024



Colorado Basin River Forecast Center National Weather Service



Presentation Overview

Soil Moisture / April Streamflow

Precipitation Review

Snowpack Conditions

Water Supply Forecasts

Upcoming Weather

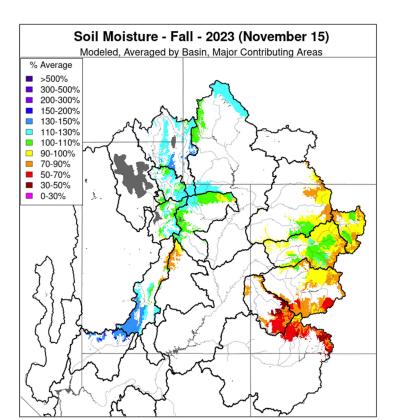
Peak Flow Forecasts

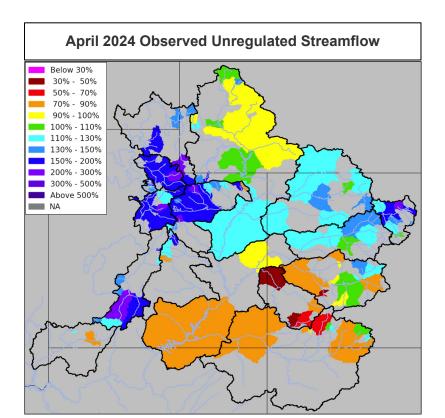
Contacts & Questions

Webinar recording & slides will be available on CBRFC webpage.

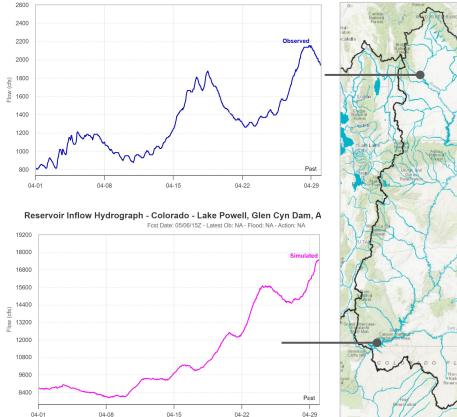
Antecedent Soil Moisture Conditions / April Observed Flow

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





April Hydrographs



04-29

04-01

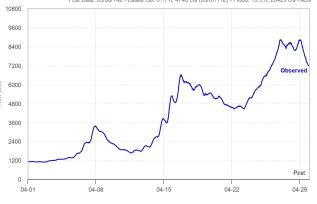
04-08

Forecast Hydrograph - Green - La Barge, Nr (LABW4) - NC

Fcst Date: 05/06/14Z - Latest Ob: 5.63 ft, 1468 cfs (05/07/12Z) - Flood: 9.0 ft, 11023 cfs - Act

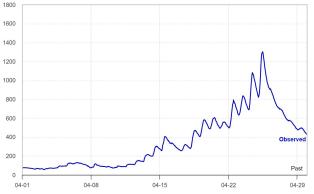


Forecast Hydrograph - Yampa - Deerlodge Park (YDLC2) - N Fcst Date: 05/06/14Z - Latest Ob: 6.11 ft, 4740 cfs (05/07/11Z) - Flood: 13.5 ft, 20429 cfs - Activ



Forecast Hydrograph - Dolores - Dolores (DOLC2) - NOA

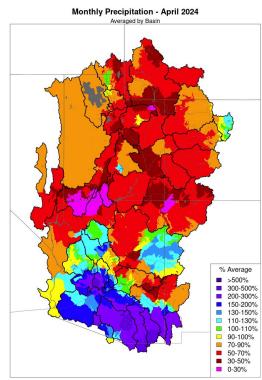
Fcst Date: 05/06/15Z - Latest Ob: 3.81 ft, 602 cfs (05/07/12Z) - Flood: 8.0 ft, 6719 cfs - Actic

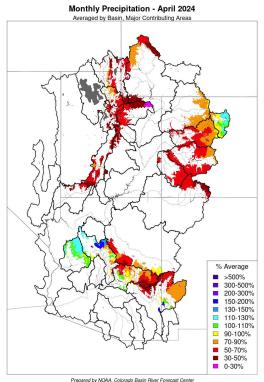


6

April 2024 Precipitation Summary

April precipitation was generally below average across the region. Exceptions: Colorado River headwaters above Kremmling and the Verde basins.





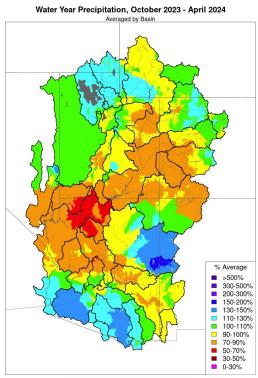
Water Year 2024 CBRFC Precipitation (Major Contributing Areas)				
Percent of 1991-2020 Average				
UPPER COLORADO	RIVER	BASIN		
	Apr	Oct-Apr		
Above Lake Powell	69	97		
Green River	Basin			
Above Fontenelle	55	94		
Above Flaming Gorge	50	97		
Yampa/White	82	108		
Duchesne	45	98		
Price/San Rafael/Dirty Devil	54	105		
Colorado River H	eadwate	ers		
Above Kremmling	108	103		
Eagle	86	105		
Roaring Fork	72	100		
Above Cameo	89	102		
Southwest C	olorado			
Gunnison	63	94		
Dolores	60	86		
San Juan	52	85		
LOWER COLORADO RIVER BASIN				
Virgin	45	81		
Little Colorado	74	95		
Verde	95	90		
Salt	71	94		
Upper Gila	70	98		

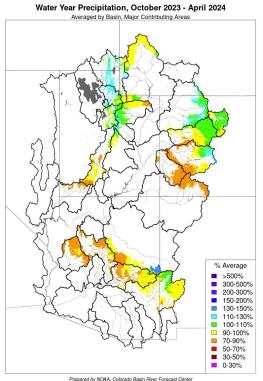
Prepared by NOAA, Colorado Basin River Forecast Center Salt Lake City, Utah, www.cbrfc.noaa.gov

Salt Lake City, Utah, www.cbrfc.noaa.gov

Water Year 2024 Precipitation Summary

Colorado River Basin water year 2024 precipitation is generally near to below normal across significant runoff producing areas.





Water Ye	ar 2024			
CBRFC Precipitation (Ma Percent of 1991	jor Contribut			
UPPER COLORAD	O RIVER BA	SIN		
	Apr	Oct-Apr		
Above Lake Powell	69	97		
Green Riv				
Above Fontenelle	55	94		
Above Flaming Gorge	50	97		
Yampa/White	82	108		
Duchesne	45	98		
Price/San Rafael/Dirty Devil	54	105		
Colorado Rive				
Above Kremmling	108	103		
Eagle	86	105		
Roaring Fork	72	100		
Above Cameo	89	102		
Southwest	Colorado			
Gunnison	63	94		
Dolores	60	86		
San Juan	52	85		
LOWER COLORADO RIVER BASIN				
Virgin	45	81		
Little Colorado	74	95		
Verde	95	90		
Salt	71	94		
Upper Gila	70	98		

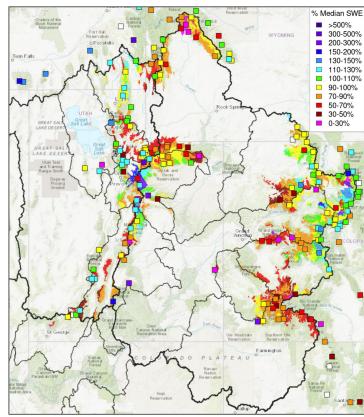
Prepared by NOAA, Colorado Basin River Forecast Center Salt Lake City, Utah, www.cbrfc.noaa.gov

Salt Lake City, Utah, www.cbrfc.noaa.gov

Snowpack Conditions

May 1 SWE Conditions

NRCS SNOTEL Observed (Squares) CBRFC Model (Significant Areas)



Water Year 2024 CBRFC Model SWE (Major Contributing Areas) Percent of 1991-2020 Median					
	DO RIVER	BASIN			
	Apr1	<u>May1</u>	Change		
Above Lake Powell	113	89	-24		
Green R	iver Basin				
Above Fontenelle	95	84	-11		
Above Flaming Gorge	106	84	-22		
Yampa/White	121	96	-25		
Duchesne	128	93	-35		
Price/San Rafael/Dirty Devil	150	100 -			
Colorado River Headwaters					
Above Kremmling	112	102	-10		
Eagle	109	98	-11		
Roaring Fork	108	93	-15		
Above Cameo	109 96 -13		-13		
Southwes					
Gunnison	105	82	-23		
Dolores	109	79	-30		
San Juan	104	71	-33		

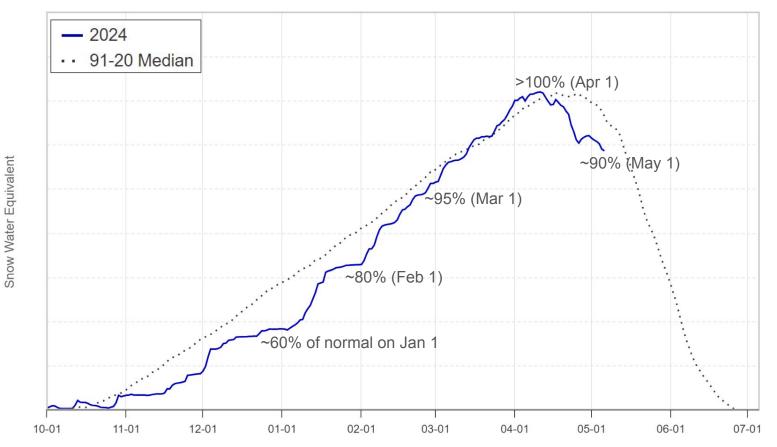
SWE = Snow Water Equivalent The amount of water in snow.

UCRB SWE conditions declined during April and are near to below normal, ranging from 70-100%.

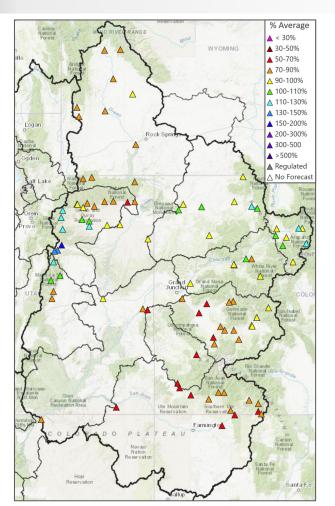
Dust-on-Snow severity is around average this year, except for the Roaring Fork, where dust-on-snow conditions are severe (CODOS).

UCRB Snowpack Evolution

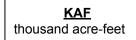
SWE Above Lake Powell



UCRB Water Supply Forecasts: Overview



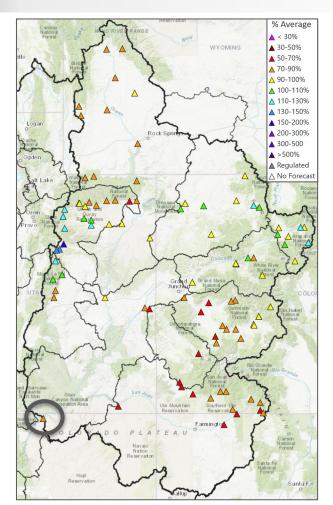
The water supply outlook has generally declined due to below average April precipitation. Central areas: near to above normal Northern/southern areas: near to below normal **Colorado Basin River Forecast Center Water Supply Forecasts** May 1, 2024 **UPPER COLORADO RIVER BASIN** Volume %Average Basin (KAF) (1991 - 2020)Period Lake Powell 5100 80 Apr-Jul Green River Basin Green-Flaming Gorge Reservoir 83 800 Apr-Jul Yampa-Deerlodge 1270 107 Apr-Jul Duchesne-Tabiona 108 105 Apr-Jul Colorado River Headwaters Colorado-Kremmling 925 106 Apr-Jul Eagle-Gypsum 300 90 Apr-Jul Roaring Fork-Glenwood Springs 575 88 Apr-Jul Colorado-Cameo 2180 96 Apr-Jul Southwest Colorado Gunnison-Blue Mesa Reservoir 570 90 Apr-Jul **Dolores-McPhee Reservoir** 142 56 Apr-Jul San Juan-Navajo Reservoir 420 67 Apr-Jul Animas-Durango 285 74 Apr-Jul

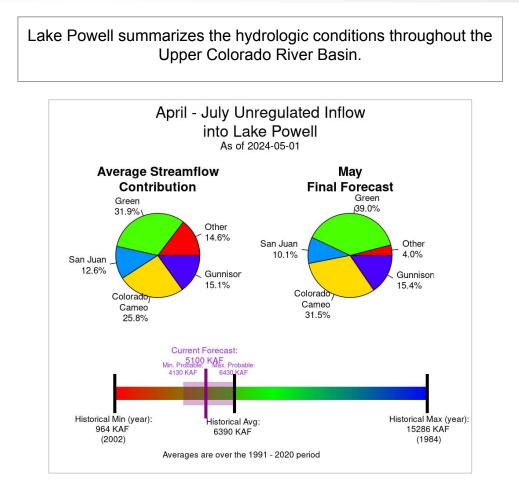


Best conditions

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Worse conditions
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Lake Powell Water Supply Forecast



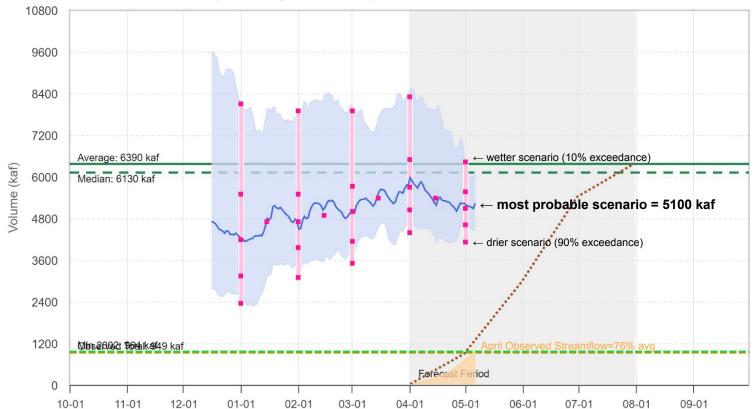


Lake Powell Water Supply Forecast

2024 Water Supply Forecast - Colorado - Lake Powell, Glen Cyn Dam, At (GLDA3)

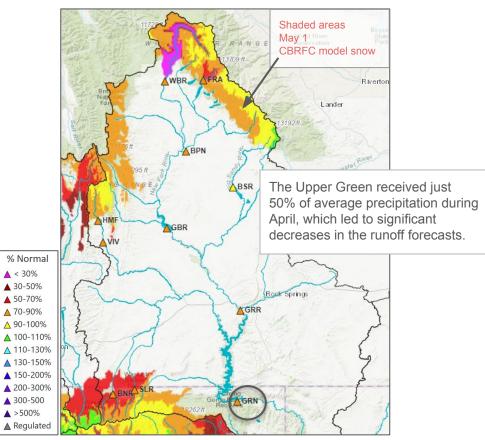
ESP is Unregulated and No Precipitation Forecast Included

Official 50% Fcst (2024-05-01): 5100 kaf (80% Avg, 83% Med), (33% of Yrs Below Fcst, 41 Highest Flow / 60 Tot Yrs) ESP 50% Fcst (2024-05-06): 5239 kaf (82% Avg, 85% Med), (35% of Yrs Below Fcst, 40 Highest Flow / 60 Tot Yrs) Observed Volume: 949 kaf (15% Average, 15% Median)



Upper Green River Basin

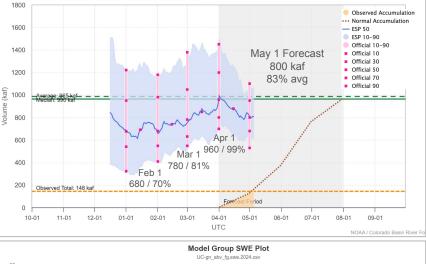
Forecast Range: 75-90%

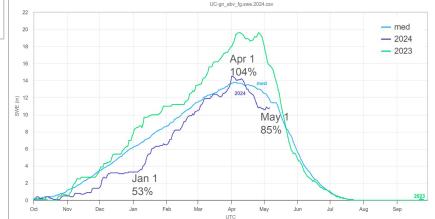


2024 Water Supply Forecast - Green - Flaming Gorge Reservoir (GRNU1)

ESP is Unregulated and No Precipitation Forecast Included Official 50% Fcst (2024-05-01): 800 kaf (83% Avg, 81% Med), (37% of Yrs Below Fcst, 39 Highest Flow / 61 Tot Yrs)

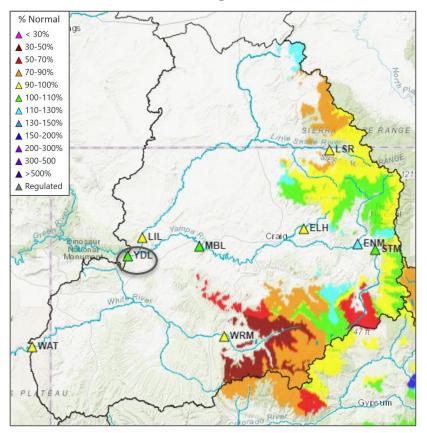
ESP 50% Fcst (2024-05-05): 807 kaf (84% Avg, 81% Med), (37% of Yrs Below Fcst, 39 Highest Flow / 61 Tot Yrs) Observed Volume: 148 kaf (15% Average, 15% Median)





White/Yampa River Basin

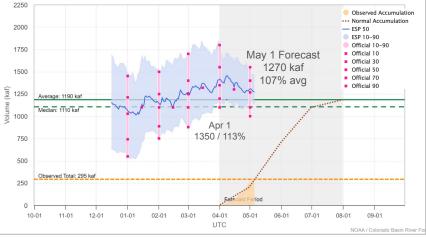
Forecast Range: 95-110%

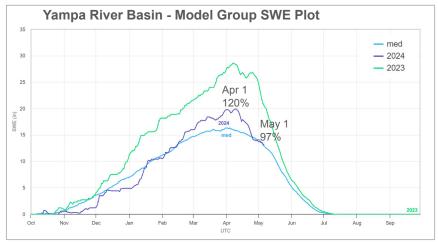


2024 Water Supply Forecast - Yampa - Deerlodge Park (YDLC2)

ESP is Unregulated and No Precipitation Forecast Included

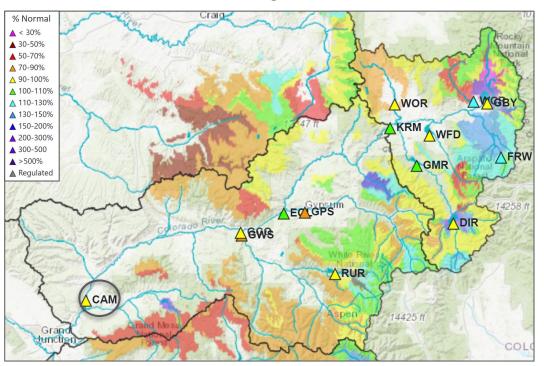
Official 50% Fcst (2024-05-01): 1270 kaf (107% Avg, 114% Med), (56% of Yrs Below Fcst, 18 Highest Flow / 39 Tot Yrs) ESP 50% Fcst (2024-05-05): 1271 kaf (107% Avg, 114% Med), (56% of Yrs Below Fcst, 18 Highest Flow / 39 Tot Yrs) Observed Volume: 295 kaf (25% Average, 27% Median)





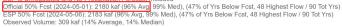
Colorado River Headwaters

Forecast Range: 90-130%



2024 Water Supply Forecast - Colorado - Cameo, Nr (CAMC2)

ESP is Unregulated and No Precipitation Forecast Included

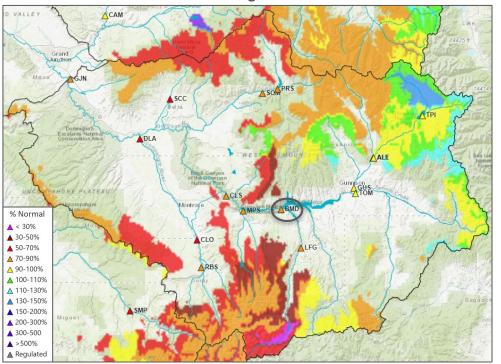




CAMC2 Colorado River abv Cameo LONG - Group SNOTEL Plot 21 sites Ob (05-07): 12.02 in, 94% Med - Rate (in/dy): -0.15 (3-day), -0.18 (week) Peak (04-09): 17.10 in (106.00 % Med Pk) - Med Peak (04-09): 16.12 in 22.5 - 2024 - 2023 20 · · 91-20 Median 105% 17.5 lent (in) 15 12.5 Equ 94% Water 10 Snow 7.5 5 70% 2.5 0 10-01 12-01 01-01 02-01 03-01 04-01 05-01 06-01 07-01 11-01

Gunnison River Basin

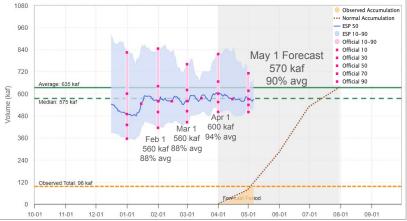
Forecast Range: 50-100%



2024 Water Supply Forecast - Gunnison - Blue Mesa Reservoir (BMDC2)

ESP is Unregulated and No Precipitation Forecast Included

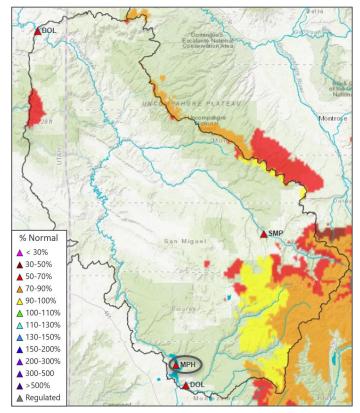
Official 50% Fcst (2024-05-01): 570 kaf (90% Avg, 99% Med), (45% of Yrs Below Fcst, 31 Highest Flow / 55 Tot Yrs) ESP 50% Fcst (2024-05-06): 571 kaf (90% Avg, 99% Med), (45% of Yrs Below Fcst, 31 Highest Flow / 55 Tot Yrs) Observed Volume: 98 kaf (15% Average, 17% Median)



BlueMesa - Group SNOTEL Plot BUTC2.PKCC2.PRPC2.SLMC2.SOSC2 Ob (05-06): 10.68 in, 80% Med - Rate (in/dy): -0.55 (3-day), -0.40 (week) Peak (04-10): 19.14 in (111.00 % Med Pk) - Med Peak (04-16): 17.19 in 27 - 2024 24 - 2023 · · 91-20 Median Apr ' 21 115% E 18 15 Eg ater 12 Snow May 86% 3 0 10-01 11-01 12-01 01-01 02-01 03-01 04-01 05-01 06-01 07-01 08-01 09-01

Dolores River Basin

Forecast Range: 50-70%

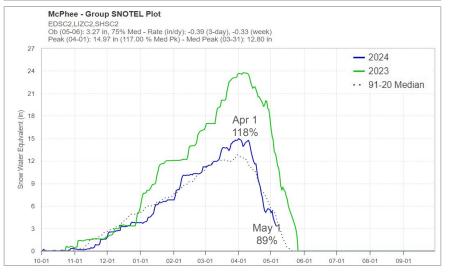


2024 Water Supply Forecast - Dolores - Mcphee Reservoir (MPHC2)

ESP is Unregulated and No Precipitation Forecast Included

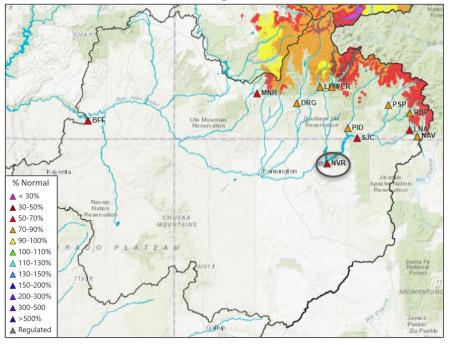
Official 50% Fcst (2024-05-01): 142 kaf (56% Avg, 60% Med), (18% of Yrs Below Fcst, 36 Highest Flow / 43 Tot Yrs) ESP 50% Fcst (2024-05-06): 146 kaf (57% Avg, 62% Med), (20% of Yrs Below Fcst, 35 Highest Flow / 43 Tot Yrs) Observed Volume: 30 kaf (12% Average, 13% Median)





San Juan River Basin

Forecast Range: 65-80%

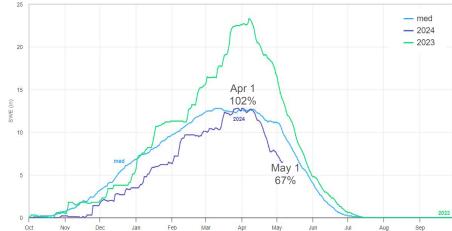


2024 Water Supply Forecast - San Juan - Navajo Reservoir, Archuleta, Nr (NVRN5)

ESP is Unregulated and No Precipitation Forecast Included Official 50% Fcst (2024-05-01): 420 kaf (67% Avg, 67% Med), (30% of Yrs Below Fcst, 38 Highest Flow / 53 Tot Yrs) ESP 50% Fcst (2024-05-06): 430 kaf (68% Avg, 68% Med), (32% of Yrs Below Fcst, 37 Highest Flow / 53 Tot Yrs) Observed Volume: 146 kaf (23% Average, 23% Median)

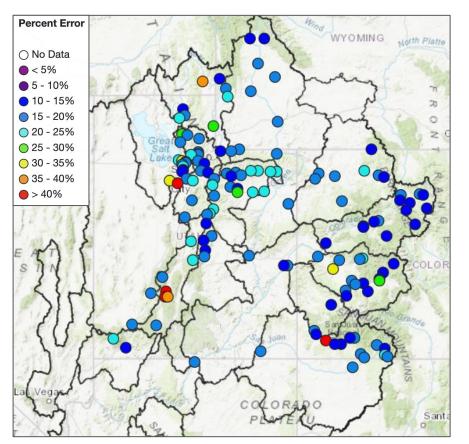


San Juan River Basin abv Navajo - Model Group SWE Plot



Historical Forecast Verification

May Forecast Error: April-July Volume



Location	<u>Avg May Forecast Error</u>
Green River - Warren Bridge	10%
Fontenelle Reservoir	16%
Yampa River - Deerlodge	16%
Blue River - Dillon Reservoir	12%
Colorado River - Cameo	13%
Blue Mesa Reservoir (Gunnison)	14%
McPhee Reservoir (Dolores)	16%
Navajo Reservoir (San Juan)	19%
Lake Powell	16%
Virgin River at Virgin	12%

Error tends to decrease each month into the spring

Where Forecasts are Better:

-Headwaters

-Primarily snow melt basins

-Known diversions / demands

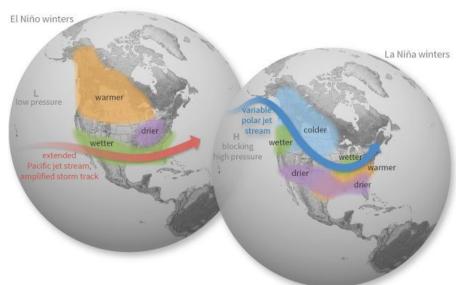
Where Forecasts are Worse: -Lower elevations (rain or early melt) -Downstream of diversions / irrigation -Little is known about diversions / demands

El Niño Southern Oscillation (ENSO) Status

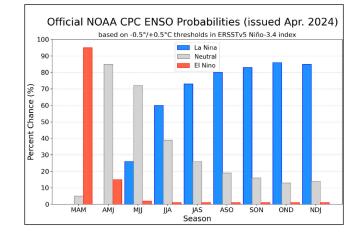
EL NIÑO/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC DISCUSSION

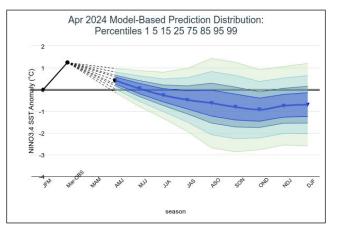
issued by CLIMATE PREDICTION CENTER/NCEP/NWS 11 April 2024

• A transition from El Niño to ENSO-neutral is likely by April-June 2024 (85% chance)





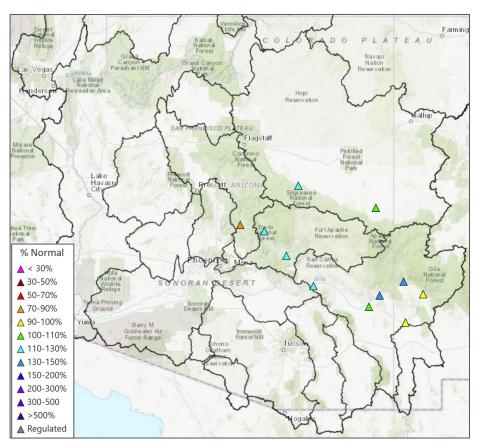




Sources: NOAA, IRI

LCRB: Jan-May ESP Model Guidance (May 1)

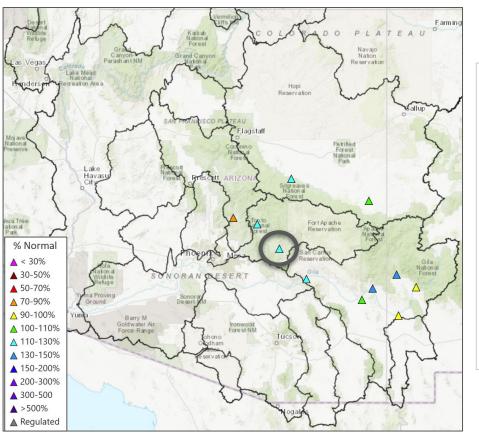
Volume Range: 80-150%



LCRB January-May runoff volume guidance is generally near normal (median).

	ID	Vol	%Avg	%Med	%ile	Description
	CHWA3	16.6	88	119	47	Chevelon Ck - Winslow Nr Wildcat Cyn Blo
	CLDA3	82	42	113	52	Gila - San Carlos Reservoir Coolidge Dam At
Δ	<u>GILN5</u>	51	72	98	56	Gila - Gila Nr
	GLHA3	116	53	110	54	Gila - Solomon Nr Head Of Safford Vly
	<u>GSFN5</u>	27	72	149	64	San Francisco - Glenwood Nr
Δ	<u>GVRN5</u>	60	57	94	54	Gila - Virden Nr Blue Ck Blo
	LCLA3	6.2	76	105	51	Little Colorado - Lyman Lk Abv St. Johns Nr
	SFCA3	58	62	132	56	San Francisco - Clifton
	<u>SLRA3</u>	285	74	114	50	Salt - Roosevelt Nr
	TNRA3	48	60	122	55	Tonto Ck - Roosevelt Nr Gun Ck Abv
	VDTA3	124	45	80	44	Verde - Tangle Ck Blo Horseshoe Dam Abv

Salt River Basin



Jan and Feb forecasts assumed wetter than normal winter weather due to El Niño. March forecast declined due to drier than normal observed winter weather Wet March pushed volume forecast higher (near median)

2024 Water Supply Forecast - Salt - Roosevelt, Nr (SLRA3)

ESP is Unregulated and No Precipitation Forecast Included Official 50% Fcst (2024-04-01): 270 kaf (70% Avg, 108% Med), (49% of Yrs Below Fcst, 57 Highest Flow / 110 Tot Yrs) ESP 50% Fcst (2024-05-06): 285 kaf (74% Avg, 114% Med), (50% of Yrs Below Fcst, 56 Highest Flow / 110 Tot Yrs) Observed Volume: 256 kaf (67% Average, 102% Median)



A strong spring storm system has moved through the area, bringing precipitation and below average temperatures.

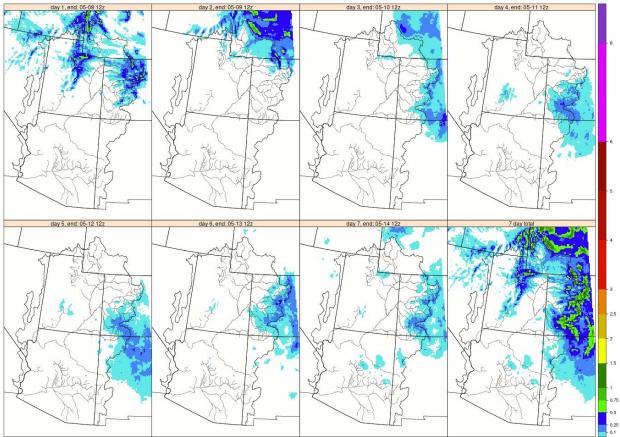
The weather pattern remains active through this weekend, with chances of precipitation for northern and eastern basins.

Temperatures will slowly warm, returning to near normal by this weekend.

7-Day Forecast Precipitation Totals

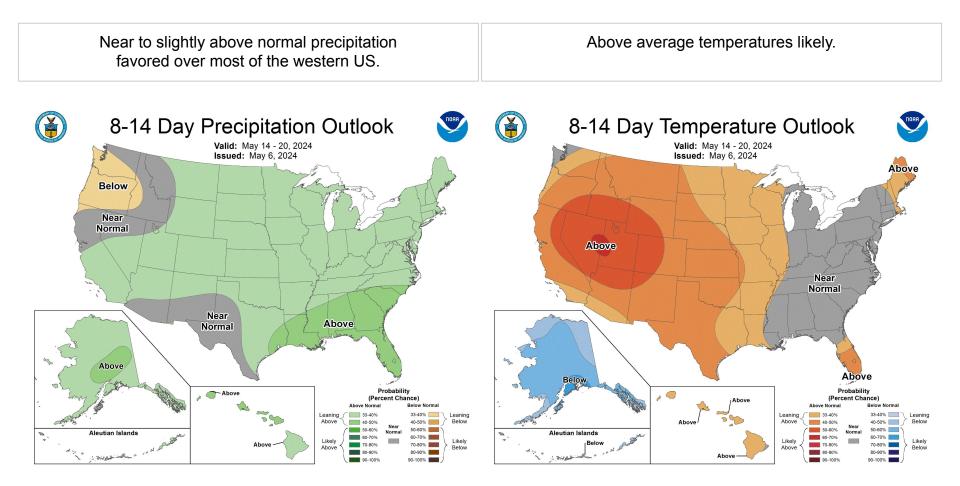
UCRB: 0.5" - 1.5"

LCRB: 0" - 0.1"

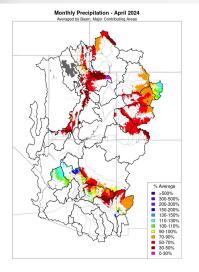


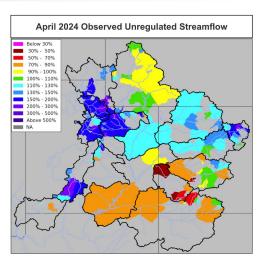
QPF Daily Totals (inches), issued: 05-07-2024 12z

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

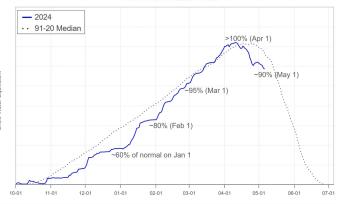


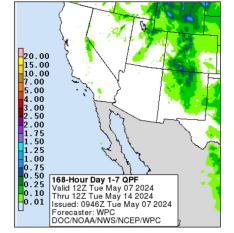
Summary



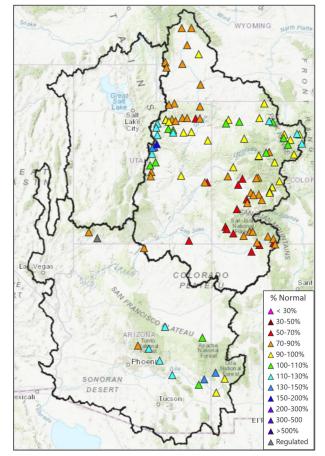


SWE Above Lake Powell

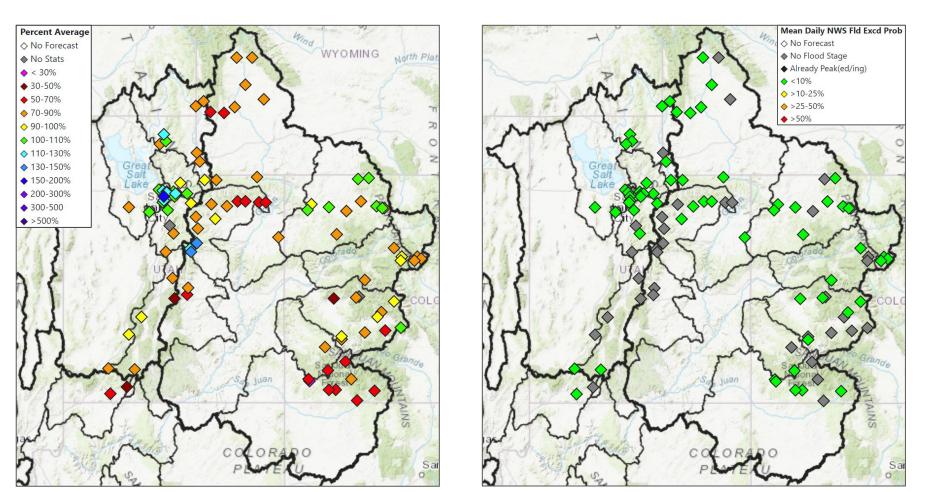




May 1 Water Supply Outlook Percent of 1991-2020 Normal Seasonal Volume



Current Peak Flow Forecasts



Peak Flow Forecast Information

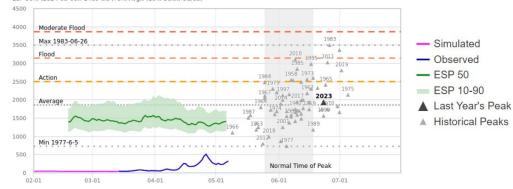
Daily Peak Flow Forecast - RCYC2 - Crystal - Redstone Nr Avalanche Ck Abv

Overview Forecast Tables Forecast Graphic 10-day Streamflow Forecast Historical Peaks Model Snow Help

Model Run Date	2024-05-06 (Incl 7 Day Precip Forecast)
Flood Flow	3149 cfs
50% Forecast	1409 cfs
Rank of 50% Forecast	58th Highest Flow / 68 Total Years
Percentile	16% of Years Below Forecast
Peak to Date	519 cfs, on 2024-04-25
Average Peak	1873 cfs
Percent Average	75%
Normal Time of Peak	05-25 - 06-18
Last Year's Peak	1940 cfs, on 2023-6-23

Crystal - Redstone, Nr, Avalanche Ck, Abv (RCYC2) NOAA

7 Day QPF, Mean Daily ESP ESP 50% (2024-05-06): 1409 cfs (75% Avg), (16% below 58/68)



Daily Peak Flow Forecast Magnitude

Exceedance Probability	Mean Daily Flow (cfs)
Maximum	1729
10%	1691
25%	1533
50%	1409
75%	1280
90%	1160
Minimum	1125

Daily Peak Flow Forecast Timing

Exceedance Probability	Date of Peak
Latest	06-30
10%	06-23
25%	06-19
50%	06-10
75%	06-04
90%	05-30
Earliest	05-25

*NOTE: Forecast peak flow timing generally points to the 'normal time of peak' until the actual time of peak is near.

Peak flow timing is highly dependent on spring weather.

Magnitude and Timing are independent forecasts.

2024 Water Supply Webinar Schedule

*All Times Mountain Time (MT)

Colorado River Basin

Monday	Jan 8th	10 am
Wednesday	Feb 7 th	10 am
Thursday	Mar 7th	10 am
Friday	Apr 5 th	10 am
Tuesday	May 7 th	10 am

Utah/Great Basin

Jan 8th	11:30 am
Feb 7th	11:30 am
Mar 7th	11:30 am
Apr 5 th	11:30 am
May 7 th	11:30 am
	Feb 7th Mar 7th Apr 5th

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

CBRFC Email Lists

Email Updates

Available Email Lists

- General Stakeholders
- Water Supply Forecasts:
 - Green River Basin
 - Upper Colorado Mainstem
 - San Juan, Gunnison and Dolores River Basins
 - Eastern Great Basin (Utah)
 - Virgin River Basin
 - Arizona
- Special Forecast Products:
 - Dolores River Basin
 - San Juan River Basin
 - CUWCD
 - Weber Basin
- Reservoir Forecast Products:
 - Reclamation Upper Colorado Reservoirs
 - Utah Reservoirs

Addition Requests

• Request to be on one of our lists by emailing cbrfc.webmasters@noaa.gov



Water Supply Forecast Discussion May 1, 2024

The <u>Colorado Basin River Forecast Center (CBRFC)</u> geographic forecast area includes the Upper Colorado River Basin (UCRB), Lower Colorado River Basin (LCRB), and Eastern Great Basin (GB).

Water Supply Conditions Summary

April precipitation was generally below average across the region, the exceptions being the Colorado River headwaters above Kremmling and the Verde basins, where monthly precipitation was around average. Water year 2024 precipitation across significant runoff producing areas is generally near to below normal across the CRB and GB. Observed unregulated streamflow volumes during April were generally above average across the GB and central UCRB, near average across the Upper Green, and below normal.

Snow water equivalent (SWE) conditions as a percent of normal (median) declined during April and are near to below normal across the UCRB and GB. May 1 SWE conditions generally range between 70-100% of normal across the UCRB and 80-105% of normal across the GB. SNOTEL peak SWE generally occurred during the first half of April with SWE values near to above normal at most stations.

The water supply outlook has generally declined across the CRB and GB due to below average April precipitation. Forecasted seasonal (April-July) water supply volumes are most favorable in the GB, where water supply forecasts are generally near to above normal. UCRB seasonal volumes are variable, ranging from near normal across central areas to below normal in northern and southern basins.

A strong spring storm on May 5-6 brought widespread precipitation and below normal temperatures across the GB and UCRB. This storm system will stall over the northern Great Plains through mid-week, allowing for a series of quick moving disturbances to move across northern portions of the UCRB. This will continue chances of precipitation and below normal temperatures into Wednesday (May 8). Precipitation totals through the period will range from 0.5 to 1.5 inches, primarily across the northern half of the UCRB and GB. Once this storm system begins to move east, an area of low pressure will break of this main feature, and move southwest over the CRB. This system will be much weaker than the current storm, and will bring a slow warming trend to the region as well as another round of precipitation across CO Friday through Sunday (May 10-12). Precipitation totals will range from 0.1 to 0.75 inches, with the highest totals likely along the Continental Divide.

Basin Focal Points (Forecasters)

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CBRFC Water Supply Presentations https://www.cbrfc.noaa.gov/present/present.html