

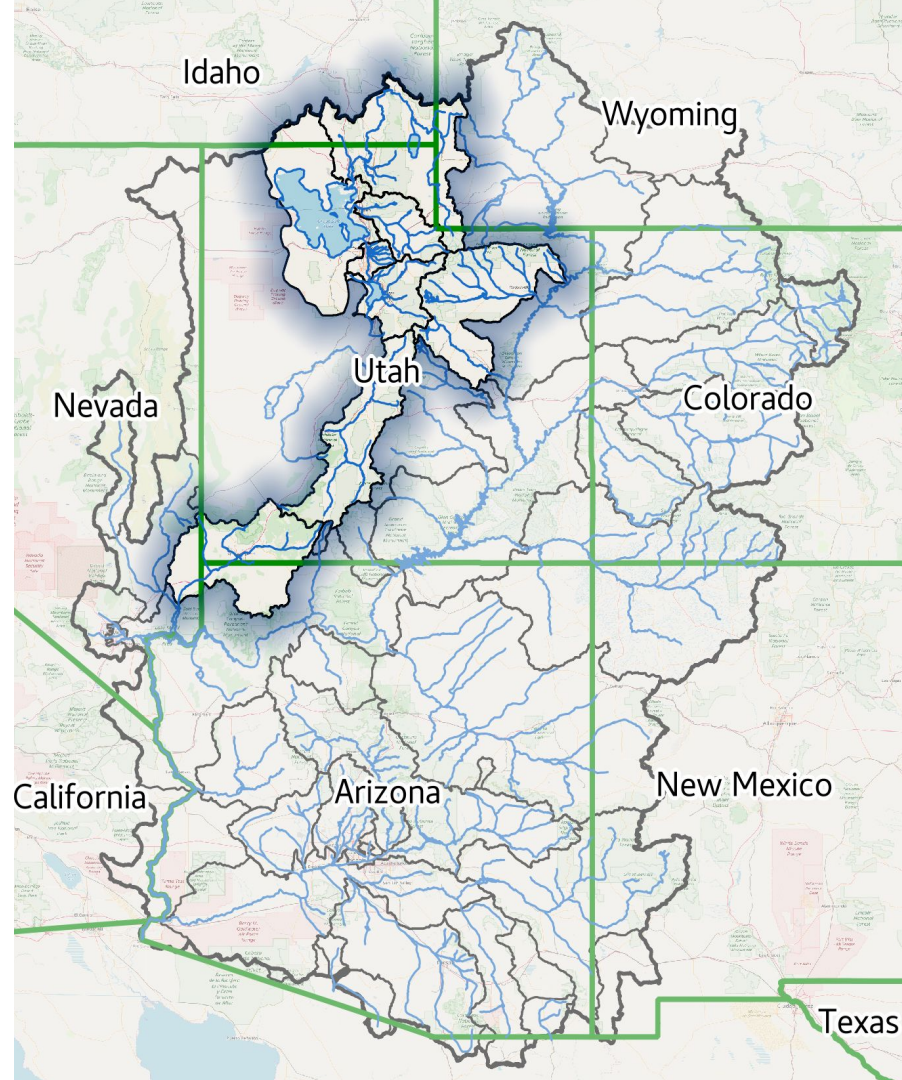
Utah Water Supply Briefing

Colorado Basin River Forecast Center

May 7, 2024

Presenter: Trevor Grout

Utah Forecasters: Brenda Alcorn
Trevor Grout
Wolfgang Hanft
Nanette Hosenfeld
Cody Moser



Presentation Overview

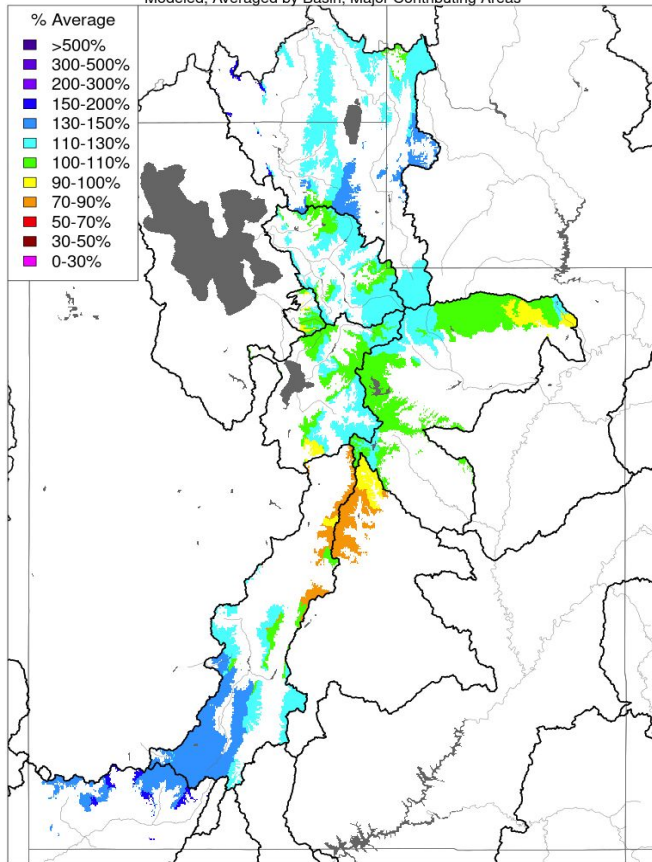
- Model Soil Moisture Conditions
- Precipitation Review
- Model Snow Conditions
- 2024 Water Supply Forecasts
- Forecast Error
- Upcoming Weather
- Peak Flows
- Contacts & Questions

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

Fall 2023 Hydrologic Model Soil Moisture Conditions

Soil Moisture - Fall - 2023 (November 15)

Modeled, Averaged by Basin, Major Contributing Areas



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

The map shows the model soil moisture conditions from the lower soil zone in CBRFC's hydrologic model, and is a result of past hydrologic conditions including but not limited to:

- previous year(s) runoff
- summer/fall precipitation

CBRFC hydrologic model soil moisture is adjusted (if necessary) every fall after irrigation season has ended and before winter.

Data used to make adjustments:

- Early November streamflow observations (baseflow)
- Reservoir inflows
- July-October precipitation
- Past season(s) runoff conditions

Soil Moisture Impacts on Water Supply / Runoff

Above normal soil moisture conditions → positive impact (increased runoff efficiency)

Below normal soil moisture conditions → negative impact (decreased runoff efficiency)

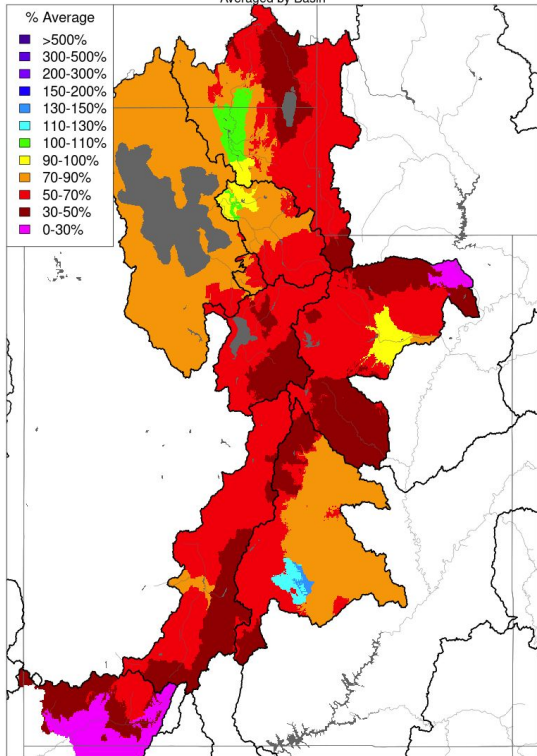
Great Basin / Utah: near to above normal

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

April 2024 Precipitation Summary

Monthly Precipitation - April 2024

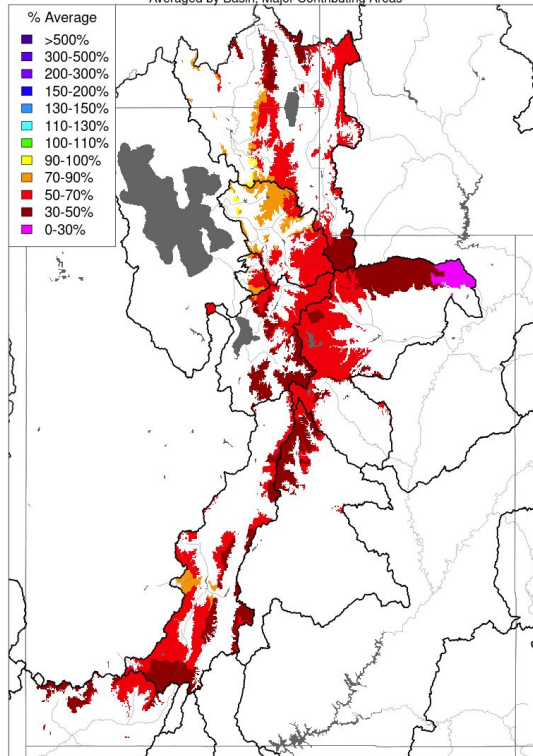
Averaged by Basin



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

Monthly Precipitation - April 2024

Averaged by Basin, Major Contributing Areas



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

April precipitation was generally below normal across the region.

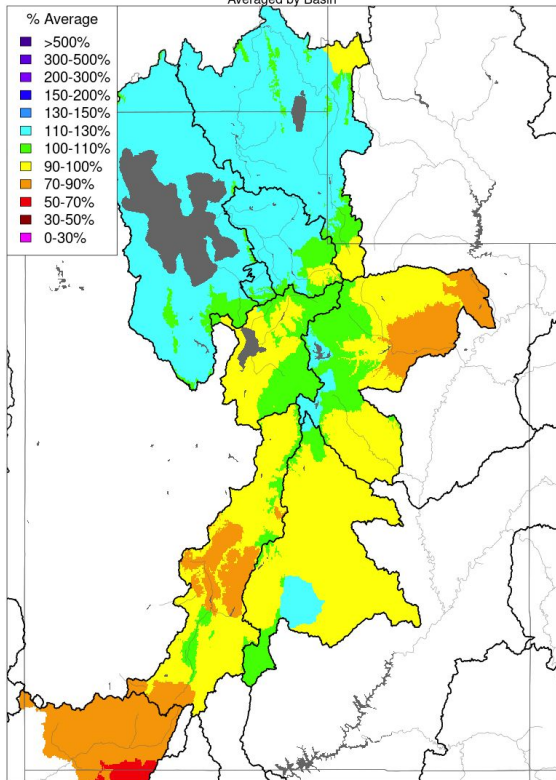
Water Year 2024
CBRFC Precipitation (Major Contributing Areas)
Percent of 1991-2020 Average

	UTAH	
	Apr	Oct-Apr
Bear	59	109
Weber	67	109
Six Creeks	70	111
Provo/Utah Lake	57	104
Duchesne	45	98
Price/San Rafael	54	105
Sevier	56	92
Virgin	45	81

Water Year 2024 Precipitation Summary

Water Year Precipitation, October 2023 - April 2024

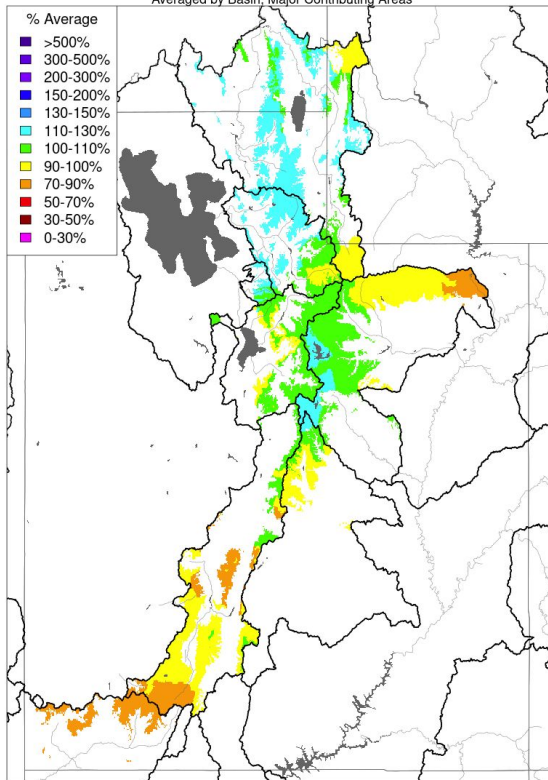
Averaged by Basin



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

Water Year Precipitation, October 2023 - April 2024

Averaged by Basin, Major Contributing Areas



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

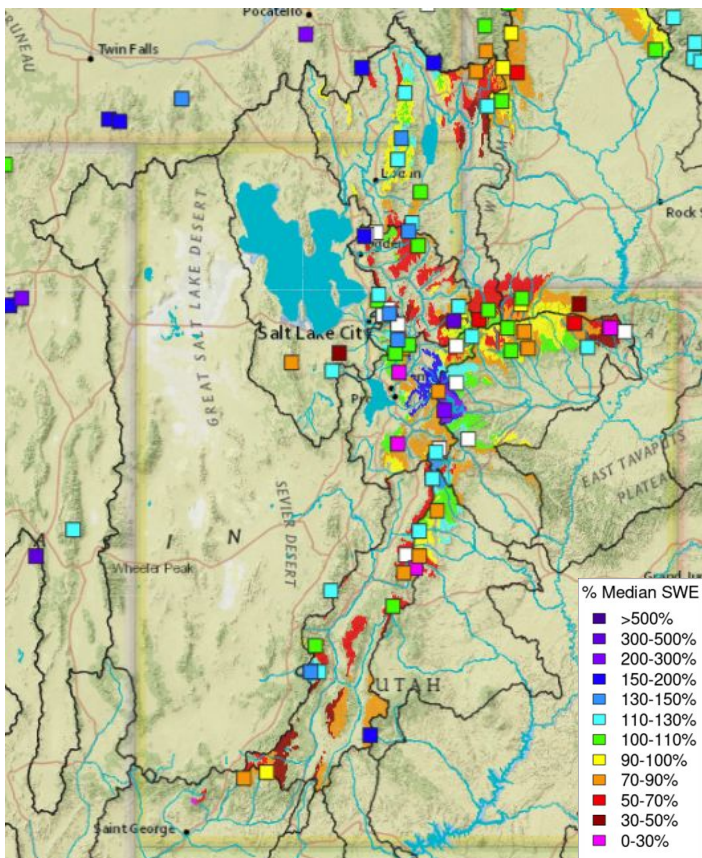
Water year 2024 precipitation (October-April) ranges from below normal to slightly above normal.

Water Year 2024 CBRFC Precipitation (Major Contributing Areas) Percent of 1991-2020 Average		
	UTAH	
	Apr	Oct-Apr
Bear	59	109
Weber	67	109
Six Creeks	70	111
Provo/Utah Lake	57	104
Duchesne	45	98
Price/San Rafael	54	105
Sevier	56	92
Virgin	45	81

Snowpack Conditions

May 1 SWE Conditions

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



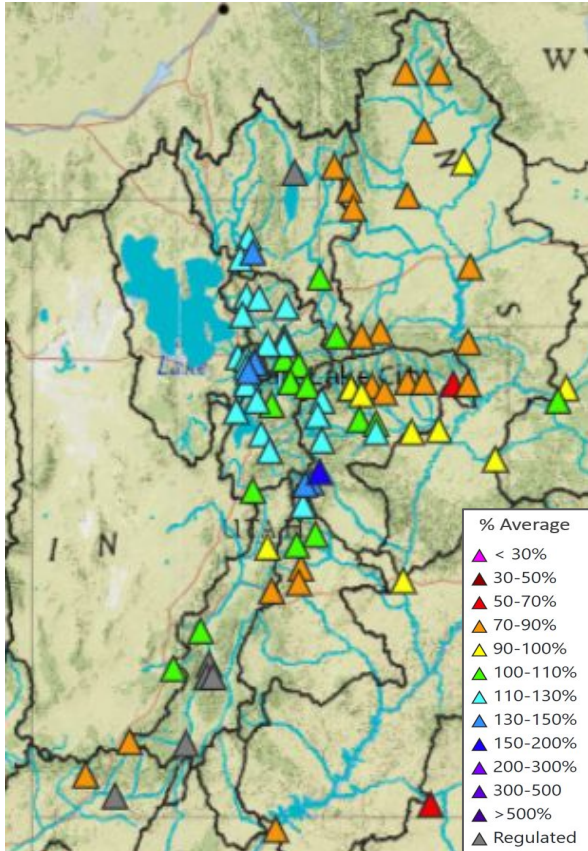
SWE conditions declined in April. Most areas are still near normal except southern Utah.

Water Year 2024 CBRFC Model SWE (Major Contributing Areas) Percent of 1991-2020 Median			
UTAH			
	Apr1	May1	Change
Bear	118	91	-27
Weber	132	85	-47
Six Creeks	134	106	-28
Provo/Utah Lake	136	98	-38
Duchesne	128	93	-35
Price/San Rafael	150	100	-50
Sevier	123	78	-45
Virgin	113	56	-57

SWE = Snow Water Equivalent. The amount of water in snow.
* Peak SWE normally in March for many locations

Utah Water Supply Forecasts: Overview

May 1 Forecast
April-July Volume (%avg)



Utah April-July volume forecasts range from below normal to above normal

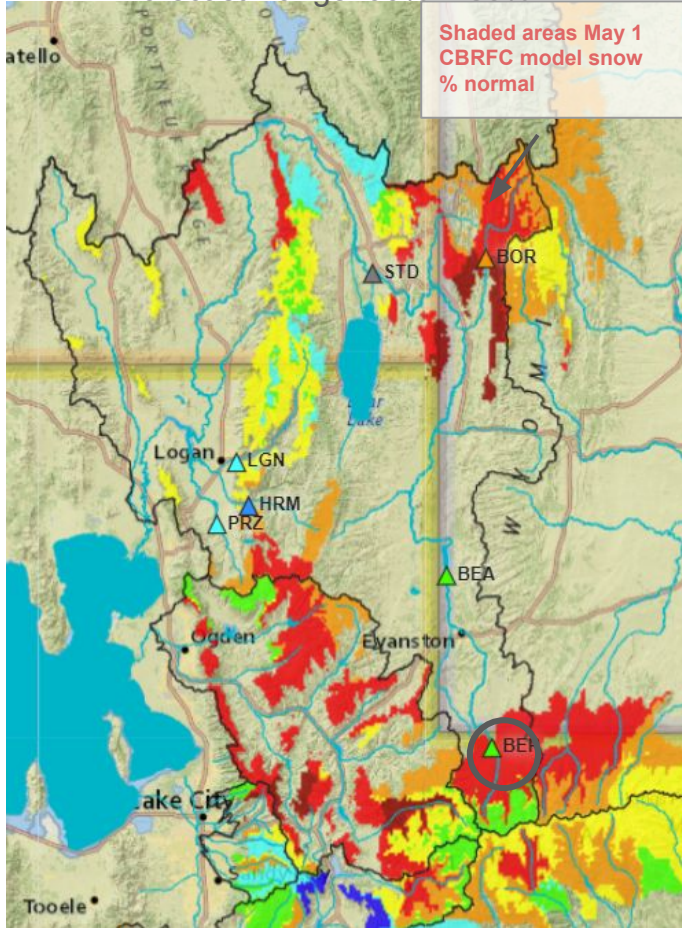
Colorado Basin River Forecast Center Water Supply Forecasts
May 1, 2024

UTAH			
Basin	Volume (KAF)	%Normal (1991-2020)	Period
Bear-UT/WY State Line	111	102	Apr-Jul
Weber-Oakley	117	105	Apr-Jul
Big Cottonwood Creek	39	115	Apr-Jul
Provo-Woodland	105	109	Apr-Jul
Duchesne-Tabiona	108	105	Apr-Jul
Sevier-Hatch (*Regulated)	41	85	Apr-Jul
Virgin-Virgin (*Regulated)	45	80	Apr-Jul

KAF = thousand acre-feet

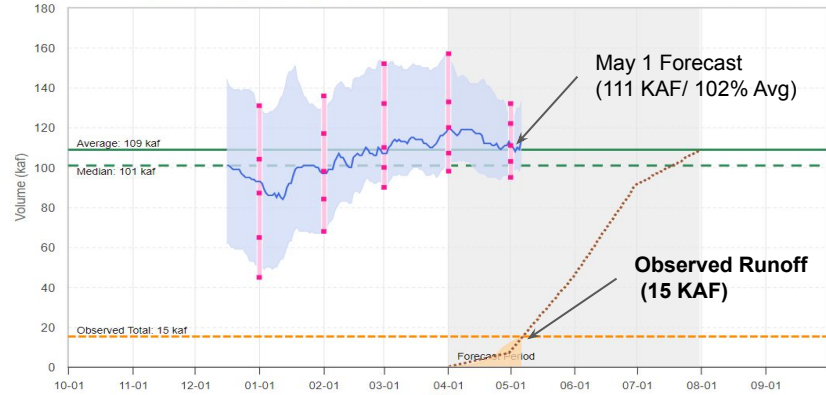
Bear River Basin

Forecast Range: 90% -150%



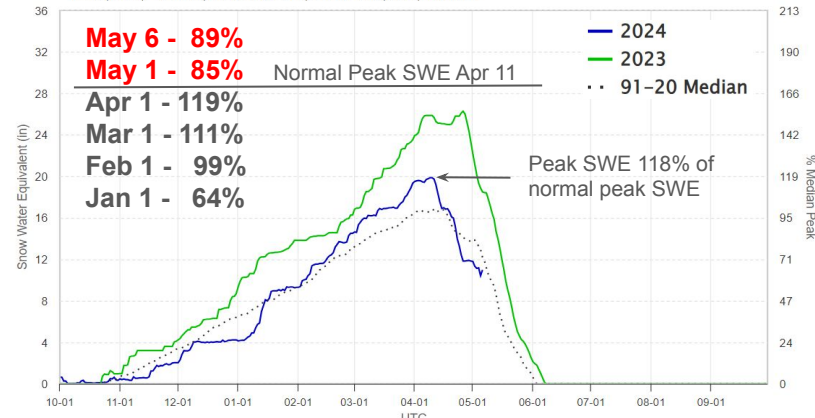
2024 Water Supply Forecast - Bear - Utah-Wyoming State Line, Nr (BERU1)

ESP is Unregulated and No Precipitation Forecast Included
 Official 50% Fcst (2024-05-01): 111 kaf (102% Avg, 110% Med)
 ESP 50% Fcst (2024-05-06): 114 kaf (105% Avg, 113% Med)
 Observed Volume: 15.4 kaf (14% Average, 15% Median)



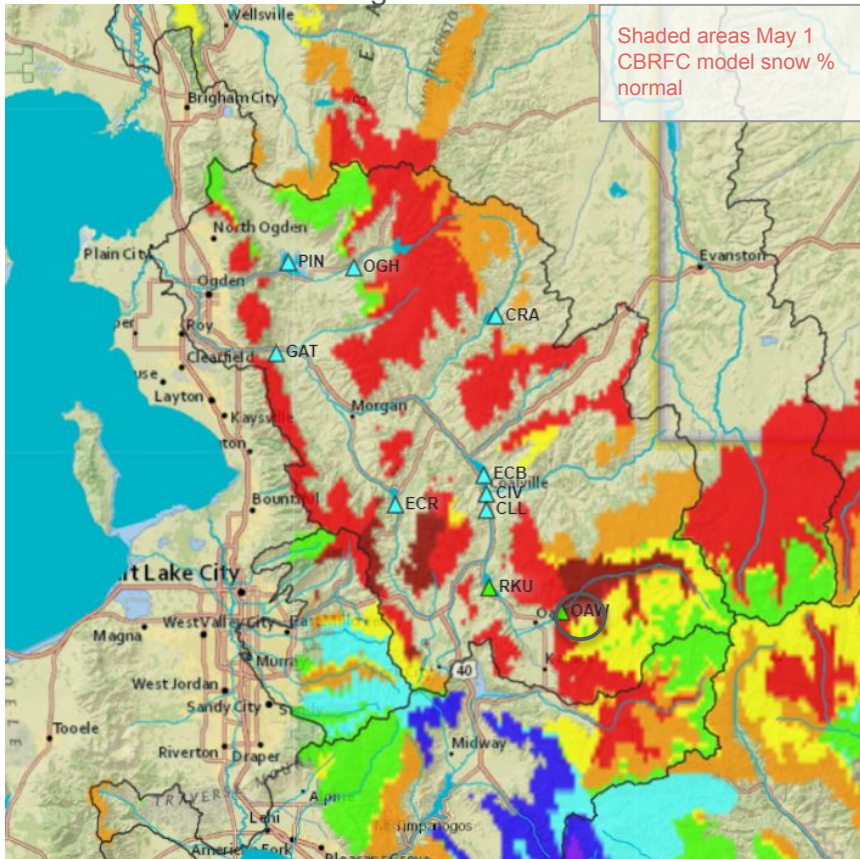
Bear River Headwaters - Group SNOTEL Plot

CHCU1,HFKU1,LLKU1
 Ob (05-06): 10.97 in, 89% Med - Rate (in/dy): -0.05 (3-day), -0.13 (week)
 Peak (04-09): 19.87 in (118.00 % Med Peak) - Med Peak (04-11): 16.87 in



Weber River Basin

Forecast Range: 105% - 130%



- % Average
- ▲ < 30%
- ▲ 30-50%
- ▲ 50-70%
- ▲ 70-90%
- ▲ 90-100%
- ▲ 100-110%
- ▲ 110-130%
- ▲ 130-150%
- ▲ 150-200%
- ▲ 200-300%
- ▲ 300-500%
- ▲ >500%
- ▲ Regulated

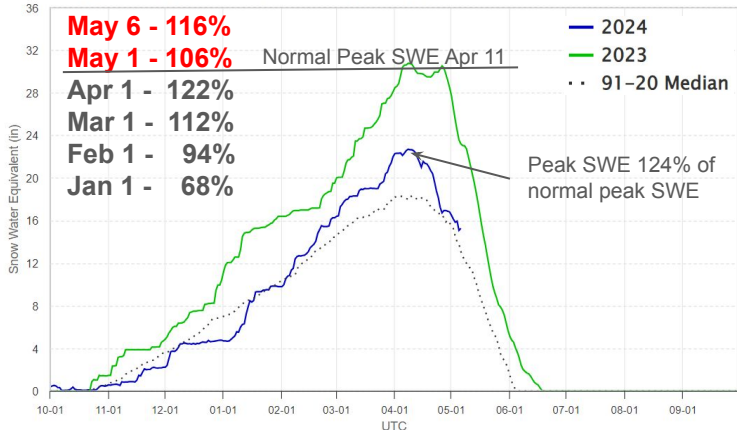
2024 Water Supply Forecast - Weber - Oakley, Nr (OAWU1)

ESP is Unregulated and No Precipitation Forecast Included
 Official 50% Fcst (2024-05-01): 117 kaf (105% Avg, 121% Med)
 ESP 50% Fcst (2024-05-06): 121 kaf (109% Avg, 124% Med)
 Observed Volume: 21 kaf (19% Average, 22% Median)



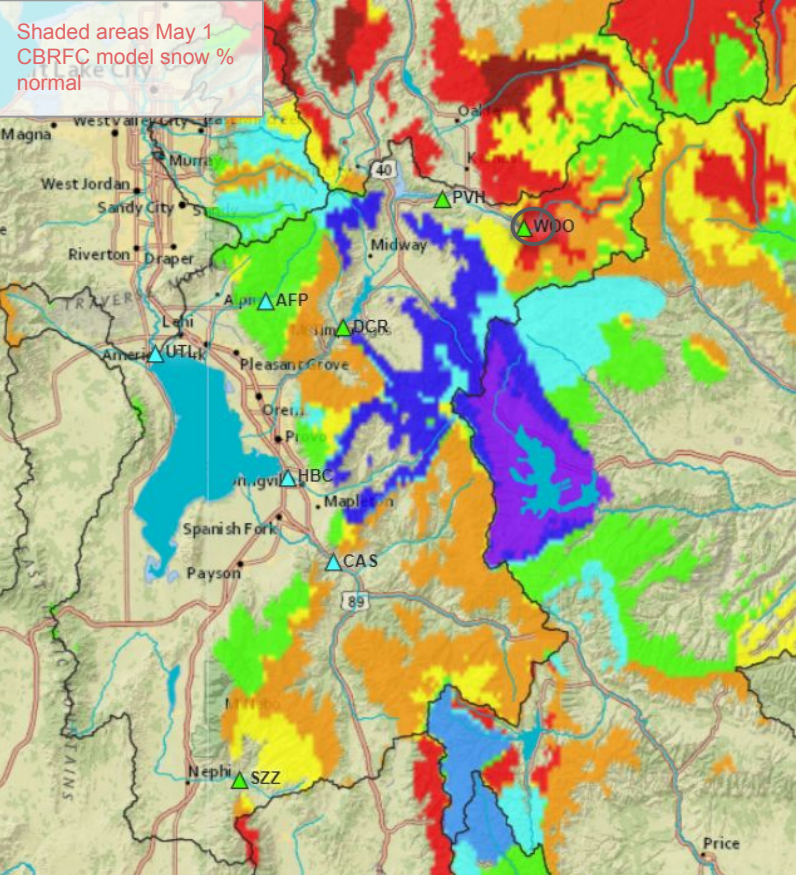
Weber Basin Headwaters - Group SNOTEL Plot

CCKU1,CHCU1,SMMU1,TRLU1
 Ob (05-06): 15.28 in, 116% Med - Rate (in/dy): -0.19 (3-day), -0.23 (week)
 Peak (04-08): 22.70 in (124.00% Med Pk) - Med Peak (04-11): 18.31 in



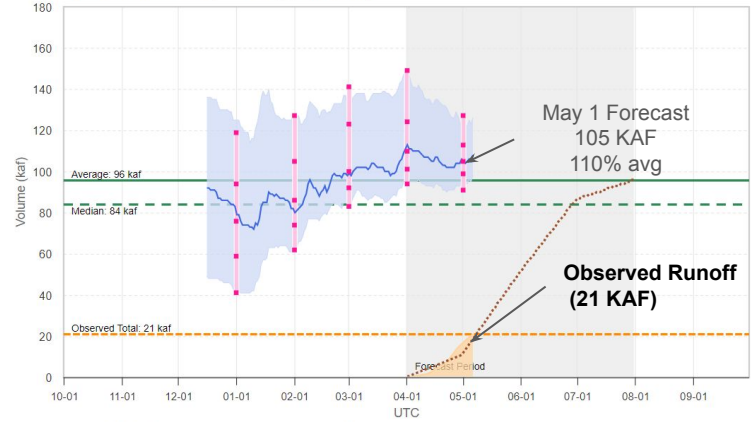
Provo River Basin

Forecast Range: 105% - 130%



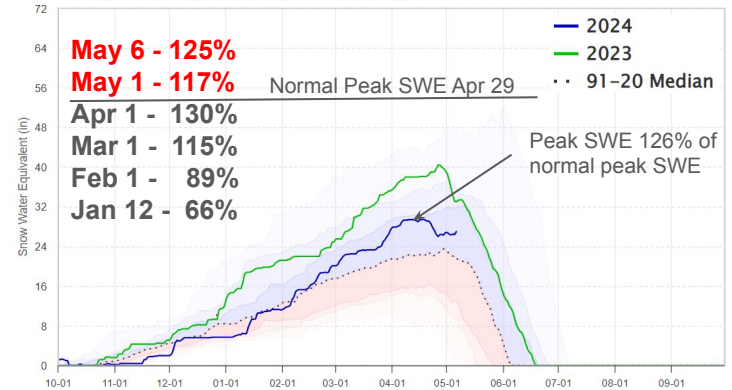
2024 Water Supply Forecast - Provo - Woodland, Nr (WOOU1)

ESP is Unregulated and No Precipitation Forecast Included
 Official 50% Fcst (2024-05-01): 105 kaf (109% Avg, 125% Med)
 ESP 50% Fcst (2024-05-06): 108 kaf (113% Avg, 129% Med)
 Observed Volume: 21 kaf (22% Average, 25% Median)



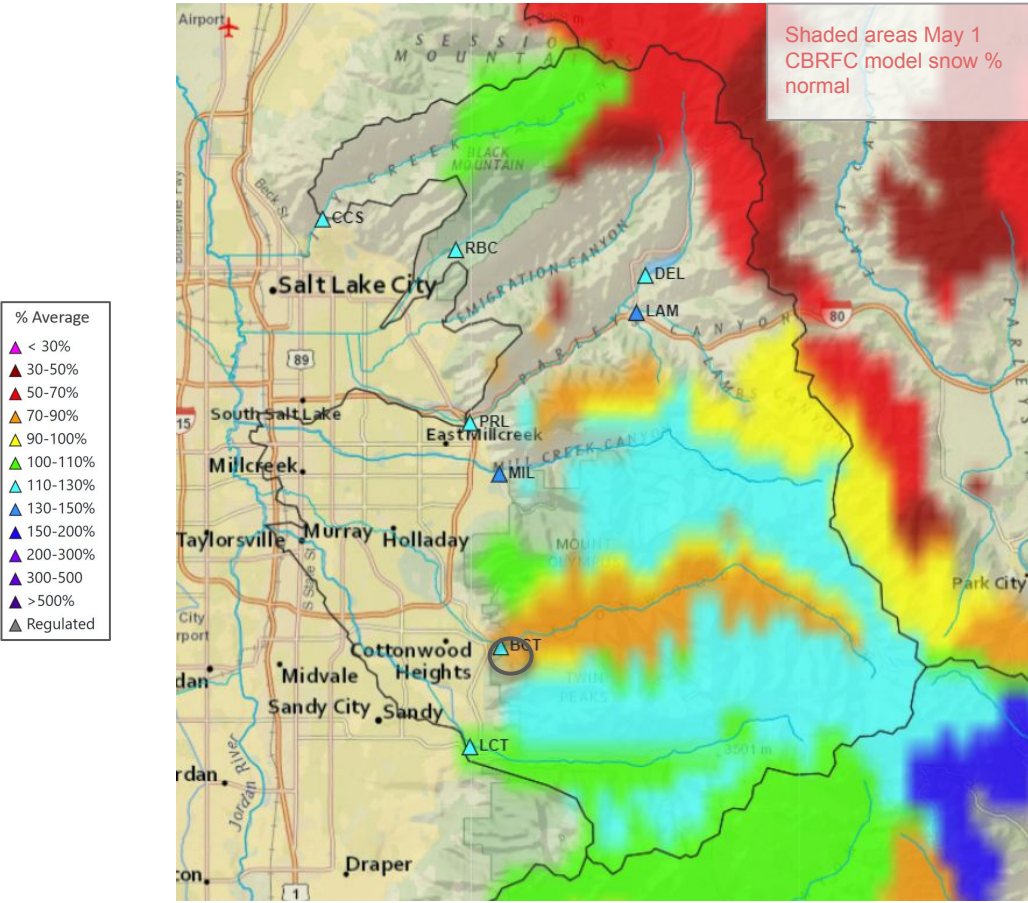
SNOTEL Plot - Trial Lake (TRLU1) - 9992 ft

Ob (05-06): 27.00 in, 125% Med - Rate (in/dy): 0.23 (3-day), 0.10 (week)
 Percentile: 63, Wet Rank: 17, Dry Rank: 30, Tot Yrs: 46
 Peak (04-18): 29.50 in (126.00 % Med Pk) - Med Peak (04-29): 23.50 in



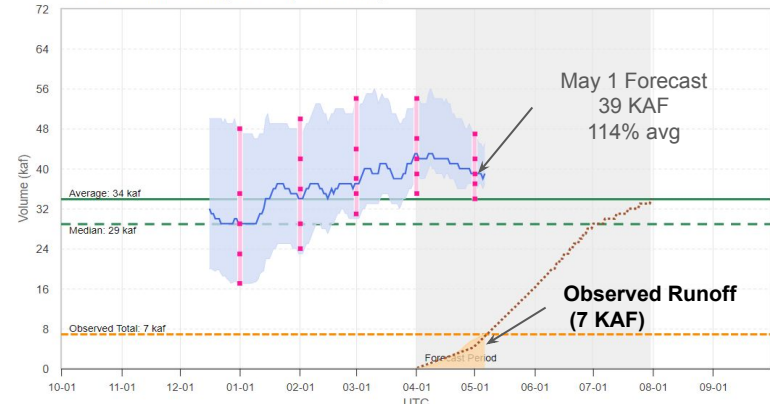
Six Creeks Basin

Forecast Range: 115% - 150%



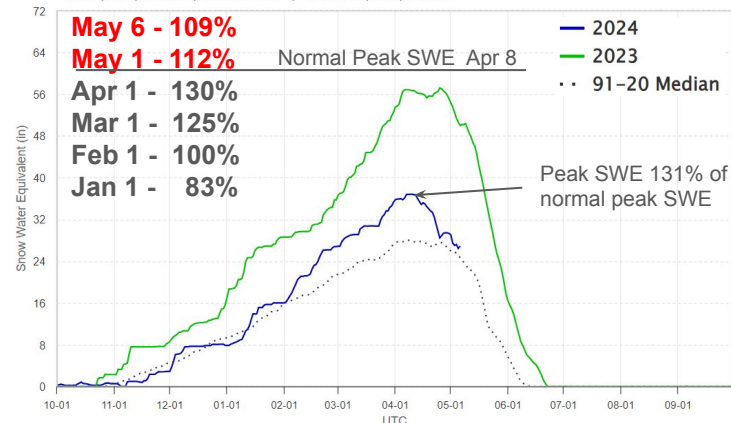
2024 Water Supply Forecast - Big Cottonwood Ck - Salt Lake City, Nr (BCTU1)

ESP is Unregulated and No Precipitation Forecast Included
 Official 50% Fcst (2024-05-01): 39 kaf (115% Avg, 134% Med), (65% of Yrs Below Fcst, 33 Highest Flow / 93 Tot Yrs)
 ESP 50% Fcst (2024-05-06): 39 kaf (115% Avg, 134% Med), (65% of Yrs Below Fcst, 33 Highest Flow / 93 Tot Yrs)
 Observed Volume: 7.0 kaf (20% Average, 24% Median)



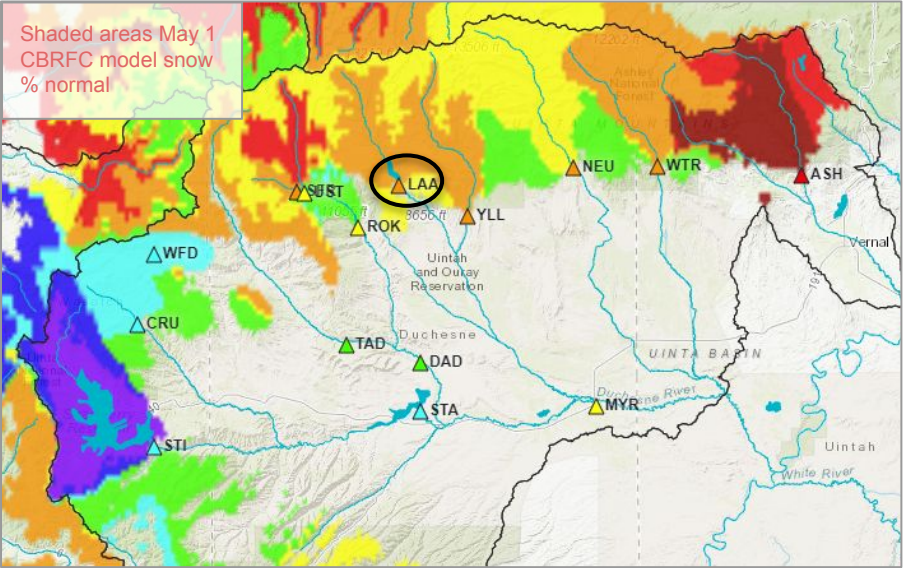
Cottonwood Canyons - Group SNOTEL Plot

BRIU1,MLDU1,SBDU1
 Ob (05-06): 26.90 In, 109% Med - Rate (in/dy): -0.04 (3-day), -0.36 (week)
 Peak (04-09): 36.83 in (131.00% Med Pk) - Med Peak (04-08): 28.03 in



Duchesne River Basin

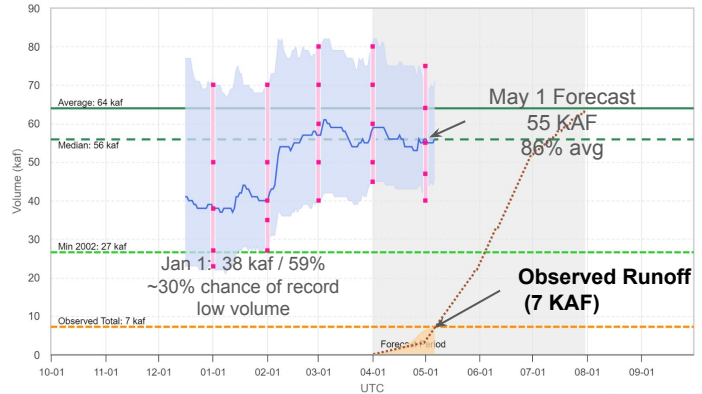
Forecast Range: 70% -120%



Best conditions are in the Strawberry River drainage. Due to a slow start to the snow season, high elevation snow (~11,000+ ft) is lagging behind lower elevations as a percent of normal.

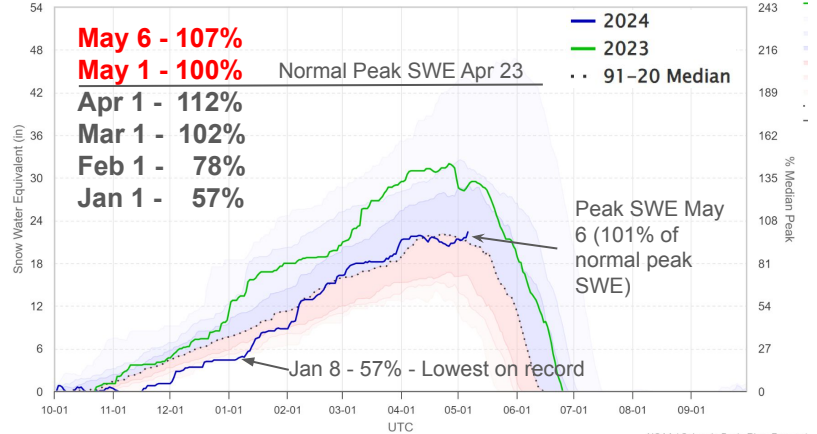
2024 Water Supply Forecast - Lake Fork - Moon Lake Reservoir, Mtn Home, Nr (LAAU1)

ESP is Unregulated and No Precipitation Forecast Included
 Official 50% Fcst (2024-05-01): 55 kaf (86% Avg, 98% Med), (39% of Yrs Below Fcst, 50 Highest Flow / 81 Tot Yrs)
 ESP 50% Fcst (2024-05-06): 56 kaf (87% Avg, 100% Med), (40% of Yrs Below Fcst, 49 Highest Flow / 81 Tot Yrs)
 Observed Volume: 7.3 kaf (11% Average, 13% Median)



SNOTEL Plot - Lakefork Basin (LBNU1) - 10966 ft

Ob (05-06): 22.40 in, 107% Med - Rate (in/dy): 0.37 (3-day), 0.21 (week)
 Percentile: 55, Wet Rank: 16, Dry Rank: 21, Tot Yrs: 36
 Peak (05-06): 22.40 in (101.00 % Med Pk) - Med Peak (04-23): 22.20 in

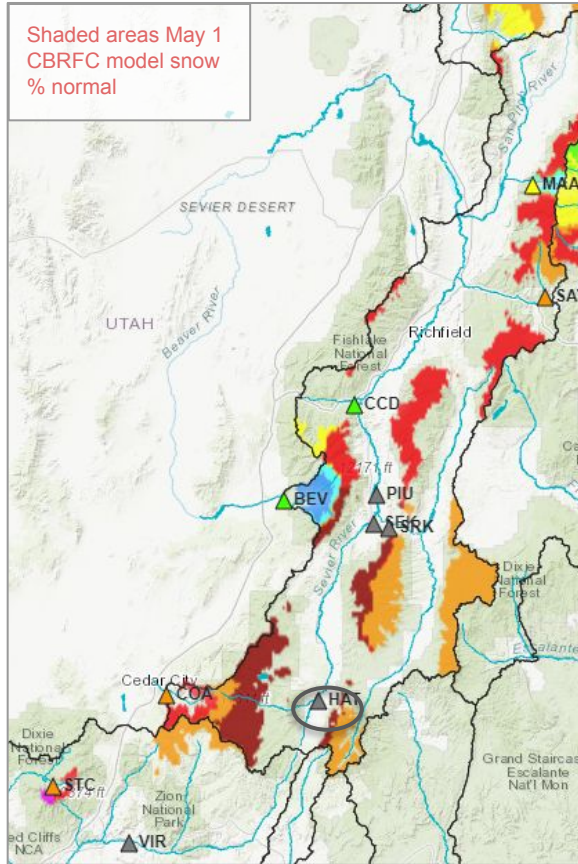


Virgin and Sevier River Basins

Forecast Range: 85% -110%

Shaded areas May 1
CBRFC model snow
% normal

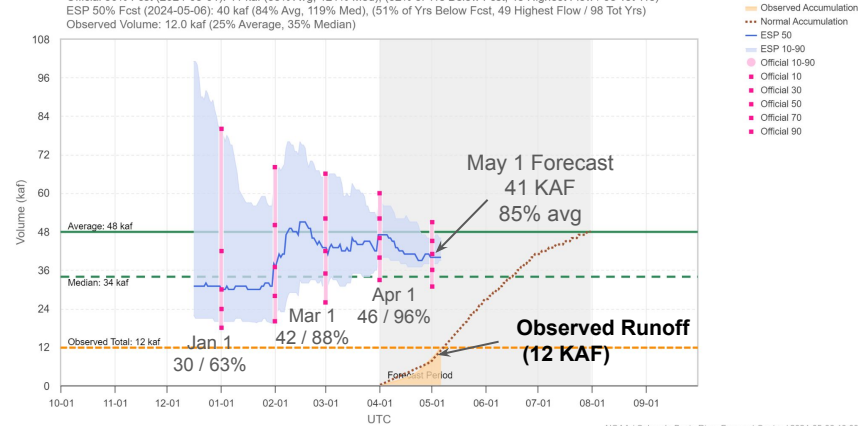
- ▲ % Average
- ▲ < 30%
- ▲ 30-50%
- ▲ 50-70%
- ▲ 70-90%
- ▲ 90-100%
- ▲ 100-110%
- ▲ 110-130%
- ▲ 130-150%
- ▲ 150-200%
- ▲ 200-300%
- ▲ 300-500%
- ▲ >500%
- ▲ Regulated



*Regulated Forecasts

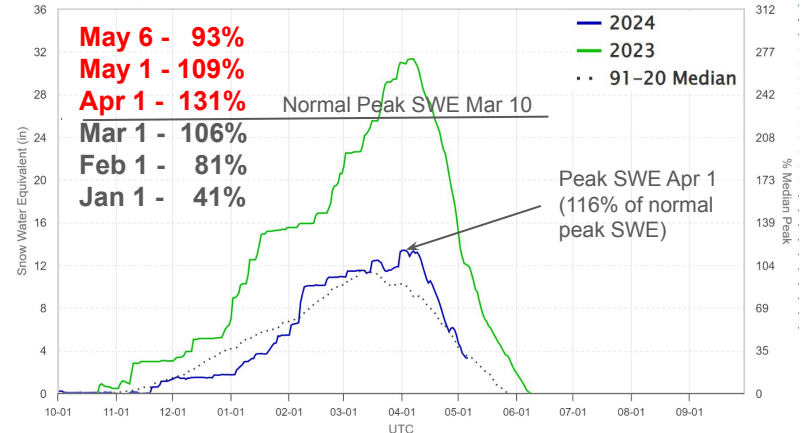
2024 Water Supply Forecast - Sevier - Hatch (HATU1)

ESP is Regulated and No Precipitation Forecast Included
 Official 50% Fcst (2024-05-01): 41 kaf (85% Avg, 121% Med), (52% of Yrs Below Fcst, 48 Highest Flow / 98 Tot Yrs)
 ESP 50% Fcst (2024-05-06): 40 kaf (84% Avg, 119% Med), (51% of Yrs Below Fcst, 49 Highest Flow / 98 Tot Yrs)
 Observed Volume: 12.0 kaf (25% Average, 35% Median)



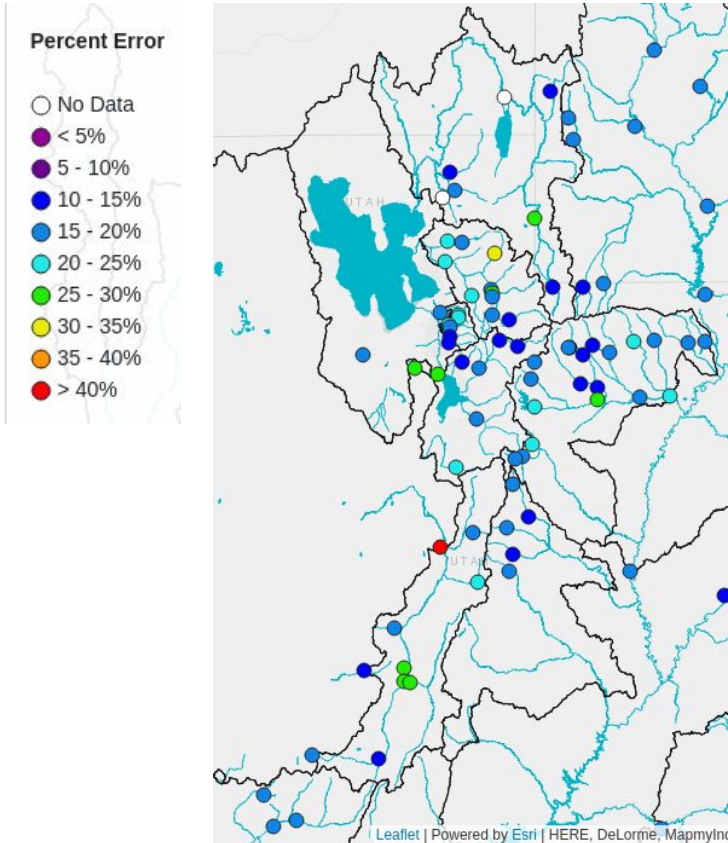
Sevier River Basin Headwaters - Group SNOTEL Plot

CVYU1,HRSU1,LVJU1,MDVU1,WFLU1
 Ob (05-06): 3.32 in, 93% Med - Rate (in/dy): -0.15 (3-day), -0.37 (week)
 Peak (04-01): 13.40 in (116.00 % Med Pk) - Med Peak (03-10): 11.55 in



Historical Forecast Verification

May 1 Forecast Error: April-July Volume



Location

<u>Location</u>	<u>May 1 Forecast Error</u>
BEAR - UTAH-WYOMING STATE	13%
BEAR - WOODRUFF NARROWS	27%
LOGAN - LOGAN- NR	12%
WEBER - OAKLEY- NR	11%
WEBER - ROCKPORT RES	16%
BIG COTTONWOOD CK	13%
PROVO - WOODLAND- NR	14%
PROVO - DEER CK RES	18%
VIRGIN - VIRGIN	15%

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:

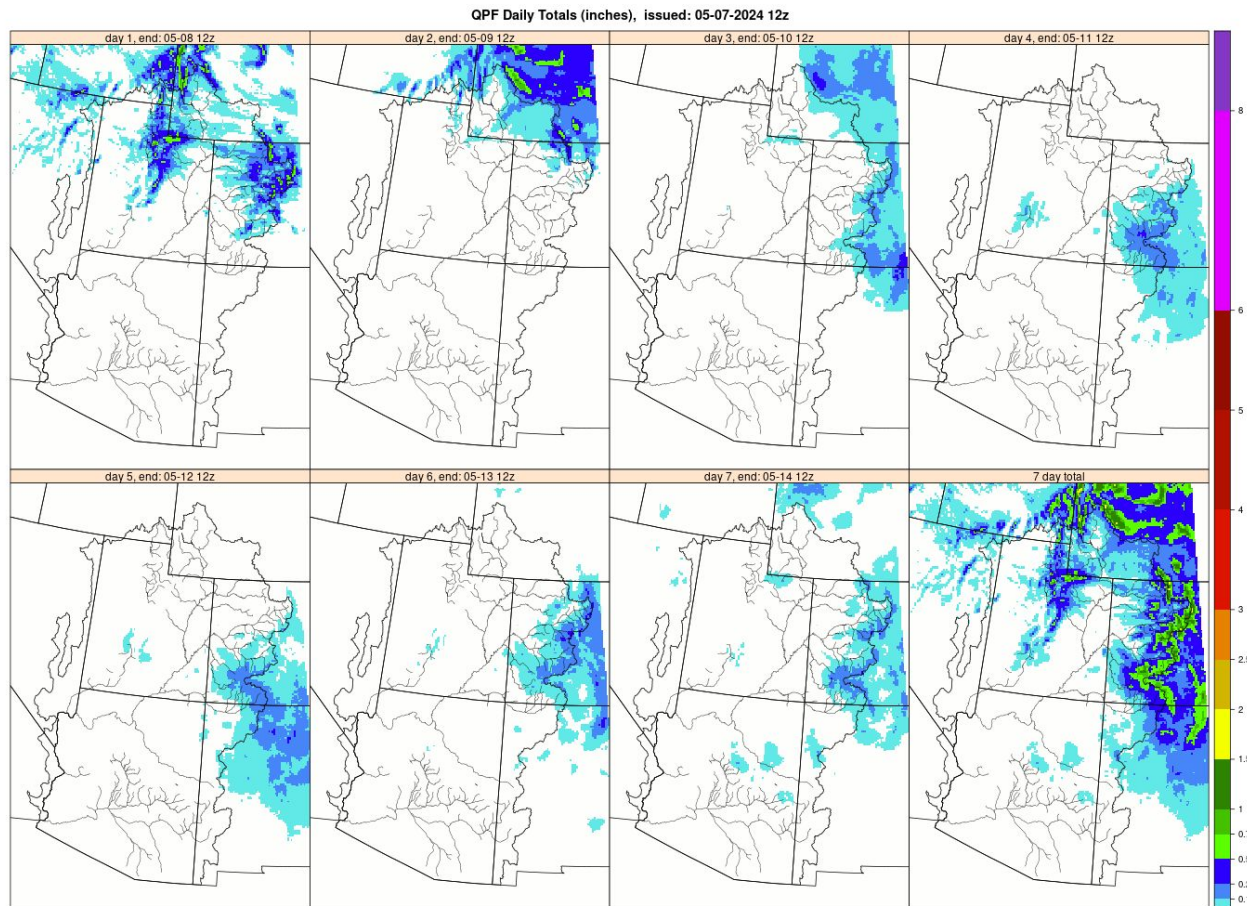
- Lower elevations (rain or early melt)
- Downstream of diversions / irrigation
- Little is known about diversions / demands

Upcoming Weather: 7-Day Precipitation Forecast

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.



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

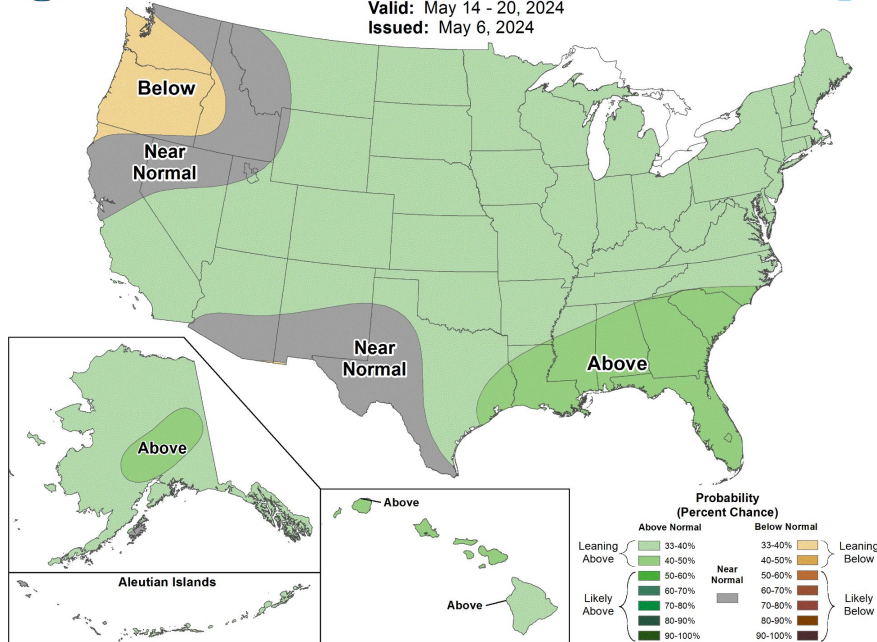
Near to slightly above normal precipitation favored over most of the western US.

Above average temperatures likely.



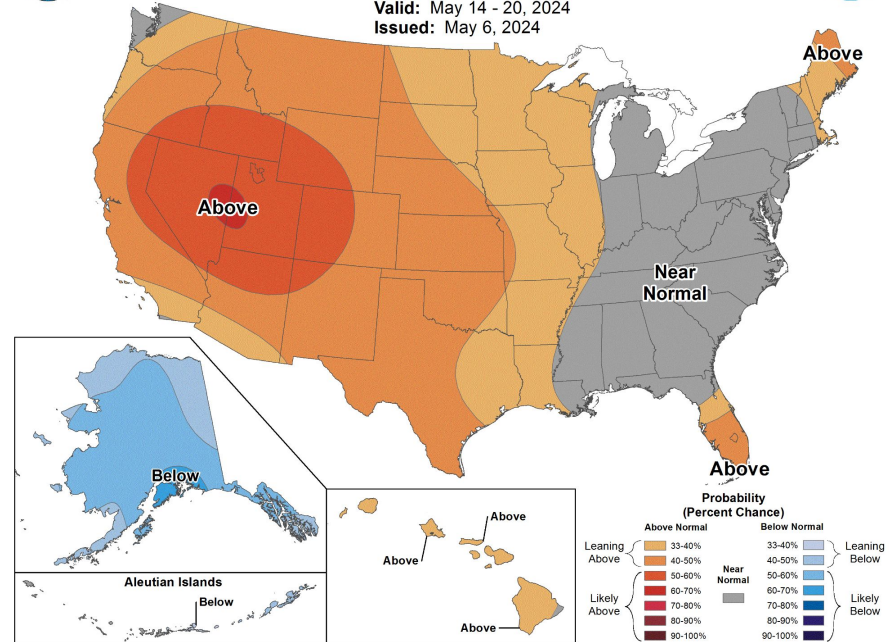
8-14 Day Precipitation Outlook

Valid: May 14 - 20, 2024
Issued: May 6, 2024



8-14 Day Temperature Outlook

Valid: May 14 - 20, 2024
Issued: May 6, 2024



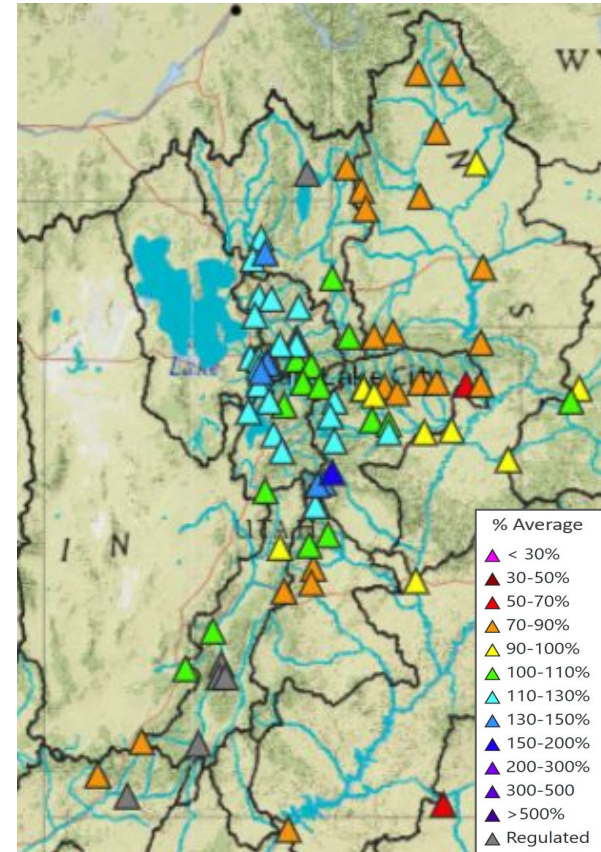
Summary

- Fall Soil Moisture:
 - Near to above normal for most of Utah
- Model SWE (May 1):
 - Ranging from below normal to normal (55% - 105%)
 - Lowest in Southern Utah (Virgin/Sevier basins)
- Water Supply Forecasts (May 1)
 - Near normal to above normal April-July volumes

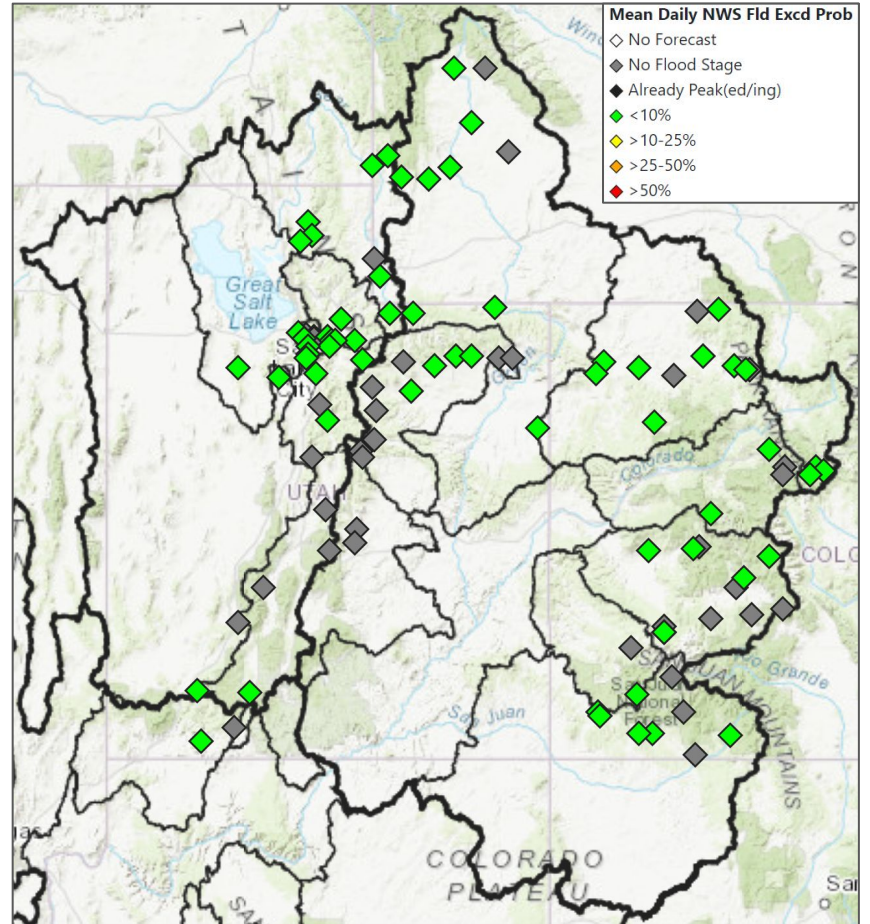
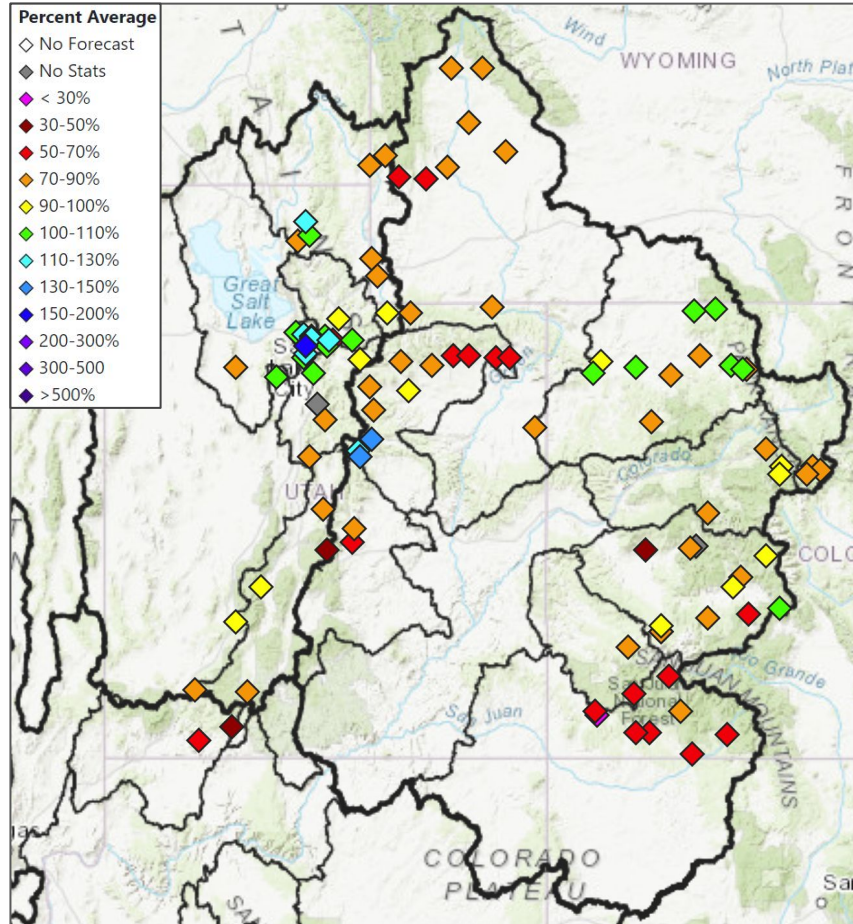
Water Supply Forecasts (April - July) Summary

Watershed	May 2024 Median
Bear River Basin	105%
Weber River Basin	123%
Six Creeks Basin	124%
Provo River Basin	111%
Duchesne River Basin	95%
Virgin and Sevier River Basins	95%

May 1 Forecast
April-July Volume (%avg)



Current Peak Flow Forecasts



Peak Flow Forecast Information

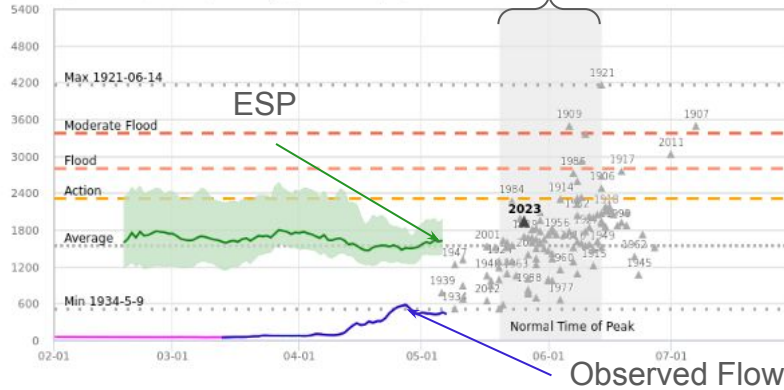
Daily Peak Flow Forecast - OAWU1 - Weber - Oakley Nr

- 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	2822 cfs
50% Forecast	1633 cfs
Rank of 50% Forecast	60th Highest Flow / 119 Total Years
Percentile	50% of Years Below Forecast
Peak to Date	556 cfs, on 2024-04-25
Average Peak	1553 cfs
Percent Average	105%
Normal Time of Peak	05-20 - 06-14
Last Year's Peak	1950 cfs, on 2023-5-26

Weber - Oakley, Nr (OAWU1) NOAA

7 Day QPF, Mean Daily ESP
 ESP 50% (2024-05-06): 1633 cfs (105% Avg), (50% below 60/119)



Normal Time of Peak

- Simulated
- Observed
- ESP 50
- ESP 10-90
- Last Year's Peak
- Historical Peaks

Daily Peak Flow Forecast Magnitude

Exceedance Probability	Mean Daily Flow (cfs)
Maximum	2212
10%	1974
25%	1901
50%	1633
75%	1523
90%	1424
Minimum	1282

Daily Peak Flow Forecast Timing

Exceedance Probability	Date of Peak
Latest	06-21
10%	06-13
25%	06-08
50%	06-02
75%	05-28
90%	05-22
Earliest	05-20

*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 9 th	10 am
Tuesday	Feb 7 th	10 am
Thursday	Mar 7 th	10 am
Friday	Apr 5 th	10 am
Tuesday	May 7 th	10 am

Utah/Great Basin

Monday	Jan 9 th	11:30 am
Tuesday	Feb 7 th	11:30 am
Thursday	Mar 7 th	11:30 am
Friday	Apr 5 th	11:30 am
Tuesday	May 7 th	11:30 am

Additional briefings scheduled as needed

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

CBRFC Contacts & Water Year 2024 Basin Focal Points

Basin Focal Points (Forecasters)

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