

Utah Water Supply Briefing

March 7th, 2023

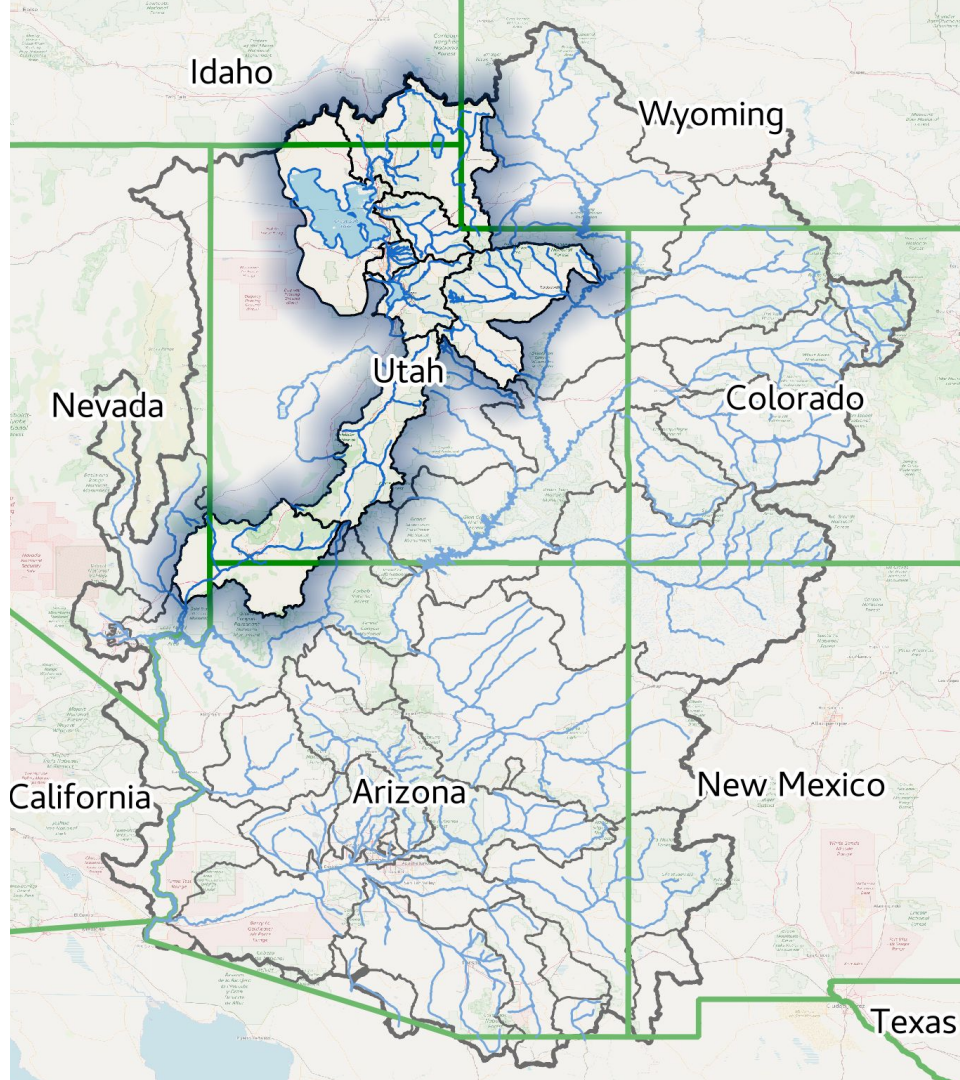
Colorado Basin River Forecast Center

Presenter: - Patrick Kormos

Utah Forecasters: Trevor Grout
Brenda Alcorn
Patrick Kormos

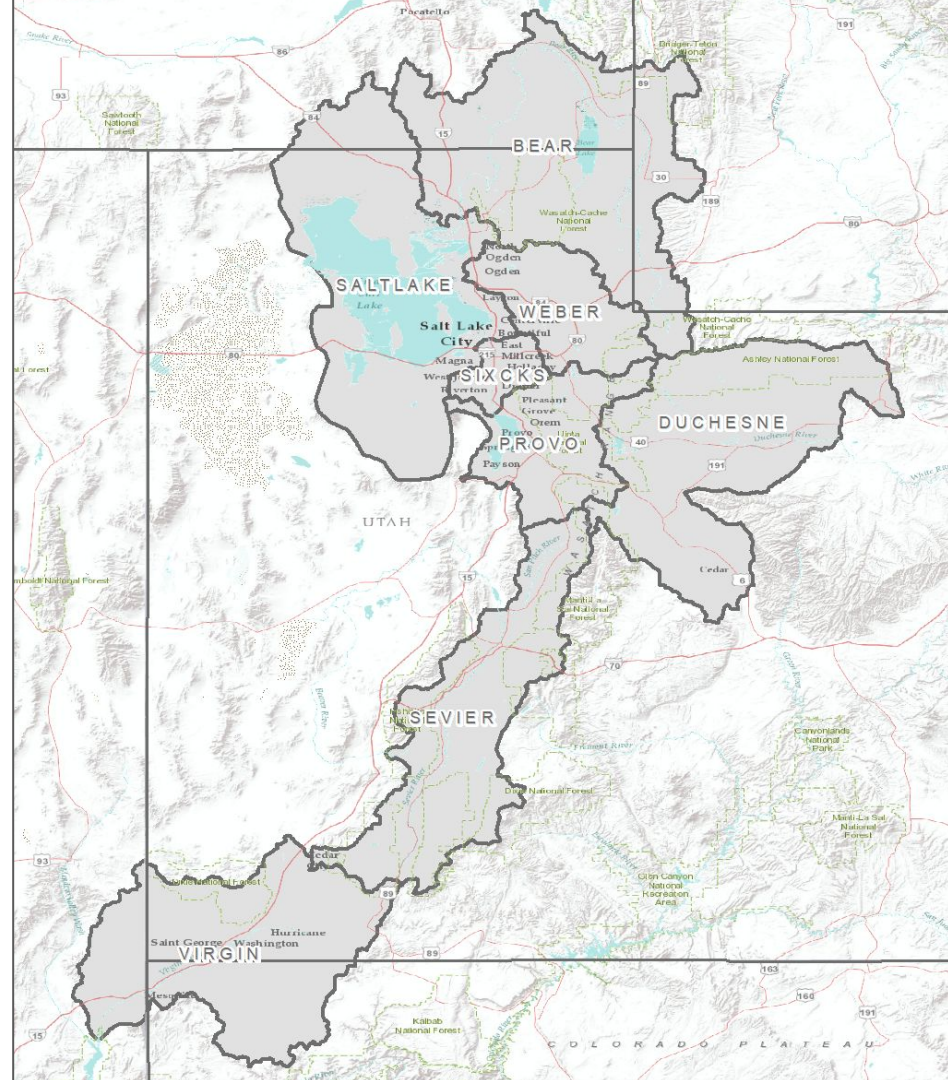
Questions: Type questions into the 'Questions'
Box or Raise Hand

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



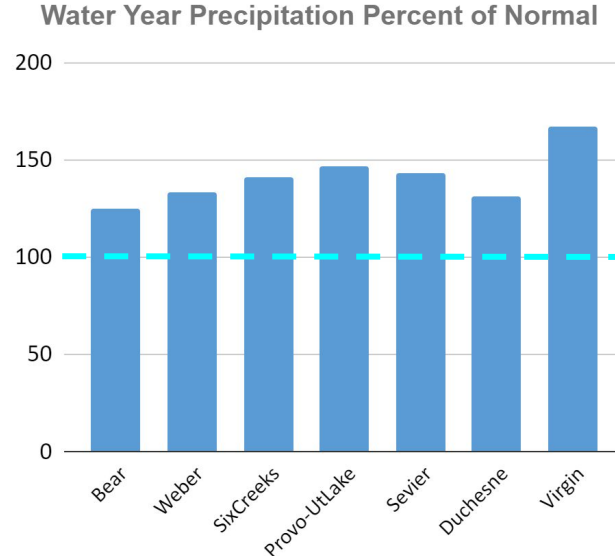
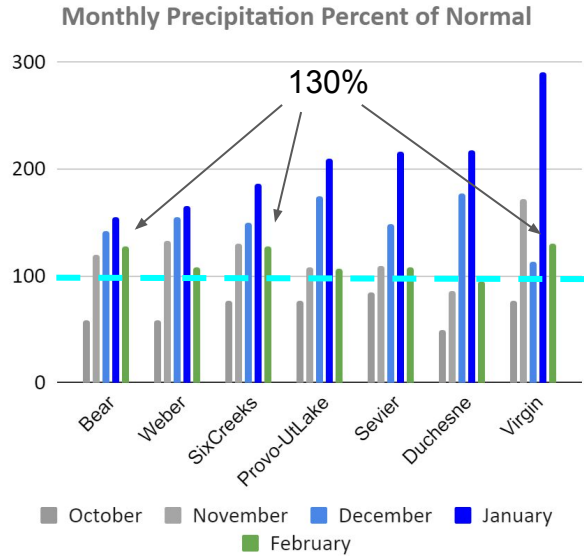
Utah Water Supply Briefing

1. Weather and Snowpack
2. Water Supply Forecasts
3. Upcoming Weather
4. Contacts & Questions



February and Water Year Precipitation

- All forecast groups have seen above normal WY precipitation

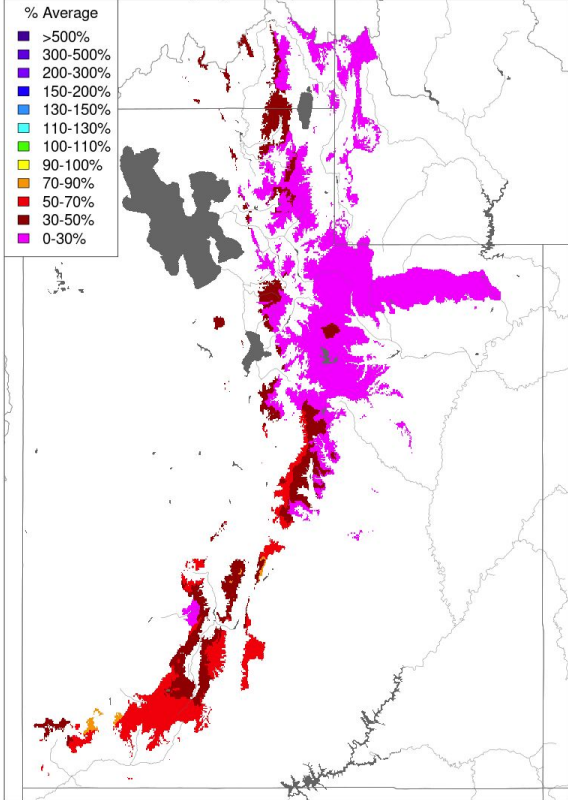


Water Year 2023 CBRFC Precipitation Percent of 1991-2020 Average		
	<u>Feb</u>	<u>Oct-Feb</u>
Duchesne	95	124
Virgin	129	157
Bear	128	124
Weber	108	130
Six Creeks	128	140
Provo/Utah Lake	107	140
Sevier	108	137

Utah Weather Review - February Precipitation

Month to Date Precipitation - February 15 2023

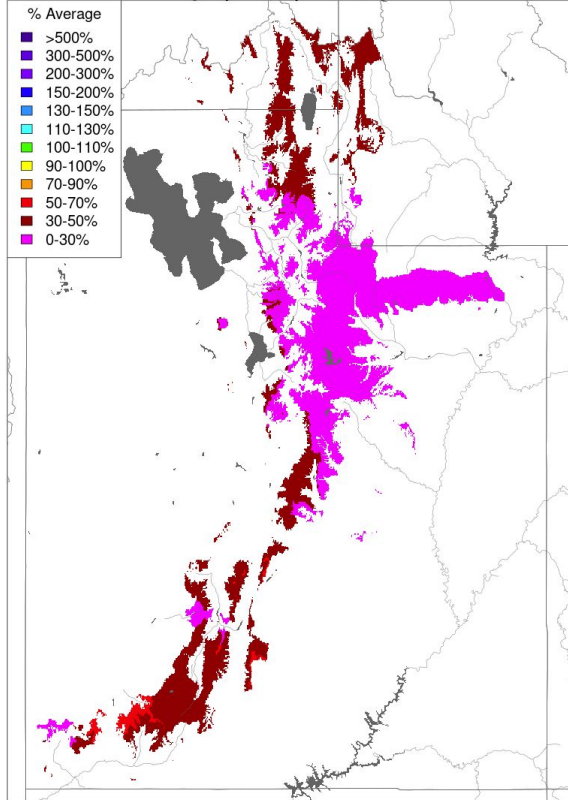
Averaged by Basin, Major Contributing Areas



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

Month to Date Precipitation - February 21 2023

Averaged by Basin, Major Contributing Areas

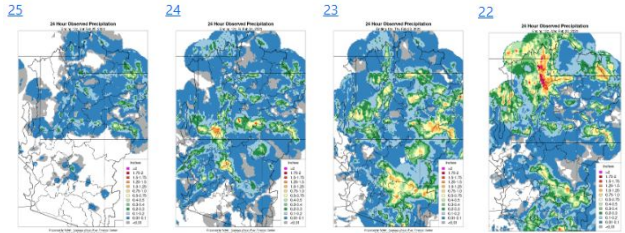


Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

February started off below normal

Water Year 2023		
CBRFC Precipitation (Significant Runoff Areas)		
Percent of 1991-2020 Average		
	Oct-Jan	Feb1-Feb15
GREAT BASIN		
Bear	125	26
Weber	134	23
Six Creeks	142	29
Provo/Utah Lake	148	23
Sevier	143	51

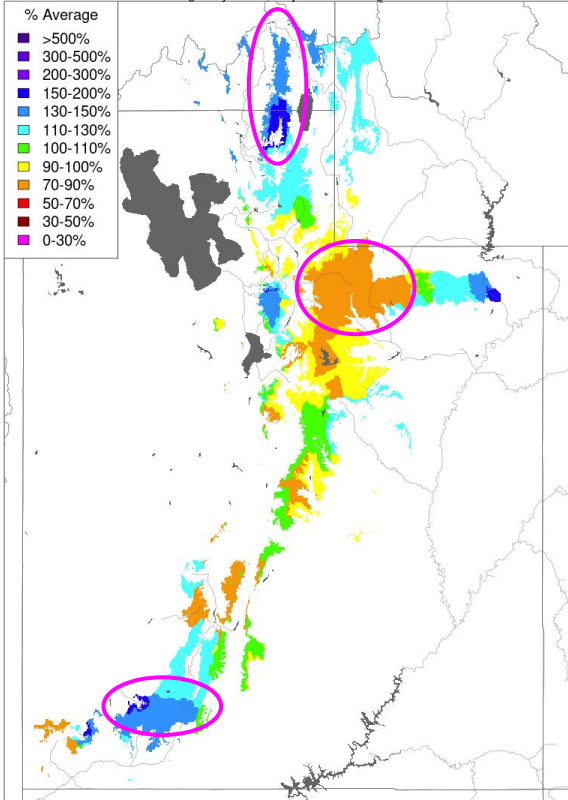
February 22 storm



Utah Weather Review - Monthly and Seasonal Precipitation

Monthly Precipitation - February 2023

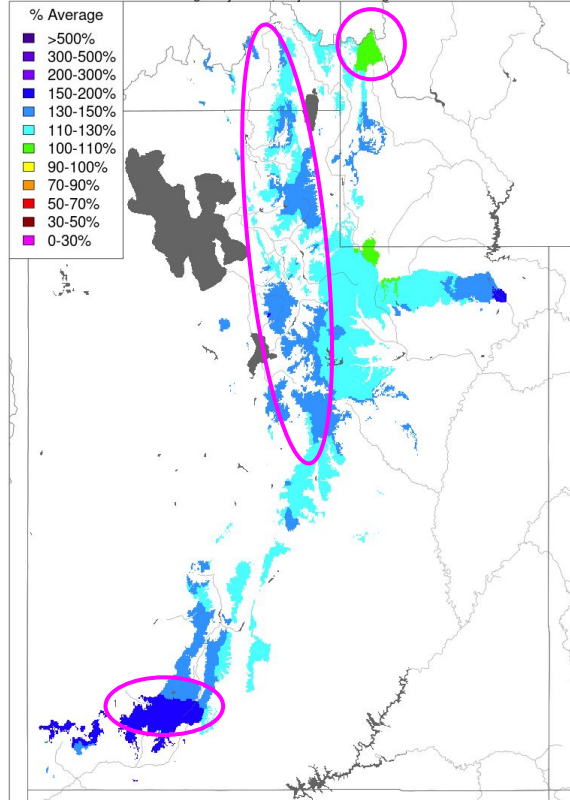
Averaged by Basin, Major Contributing Areas



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

Water Year Precipitation, October 2022 - February 2023

Averaged by Basin, Major Contributing Areas



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

February precipitation was near to above average across Utah.

- Western Uintas were low
- Bear River Range was high
- Sevier above Kingston, N.F. Virgin and Santa Clara were high

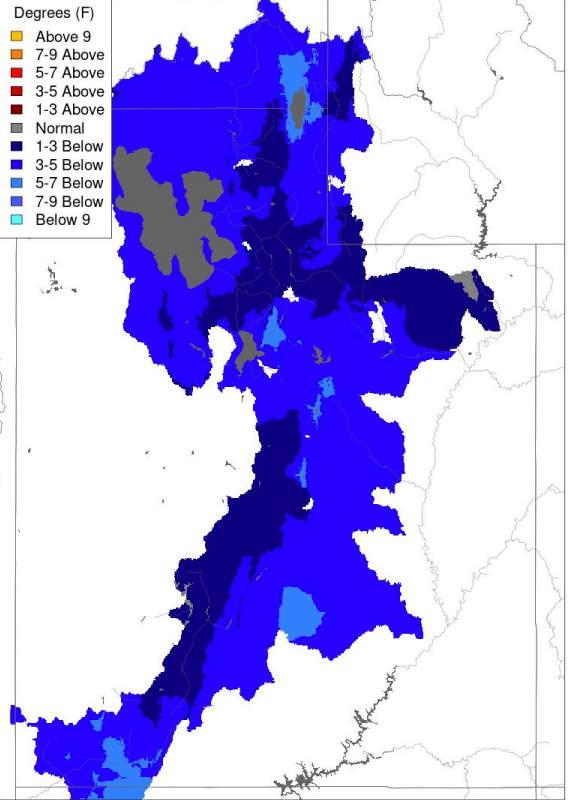
Water year precipitation is above average across Utah.

- Smith's Fork and W. Uintas vs.
- Bear River through Wasatch front

Utah Weather Review - February Temperatures

Max Temp - Monthly Deviation - February 2023

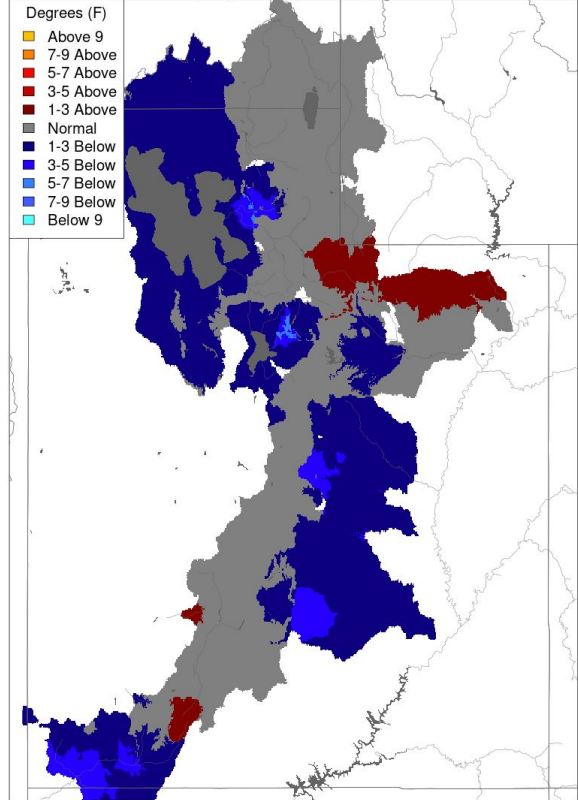
Averaged by Basin, Major Contributing Areas



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

Min Temp - Monthly Deviation - February 2023

Averaged by Basin, Major Contributing Areas



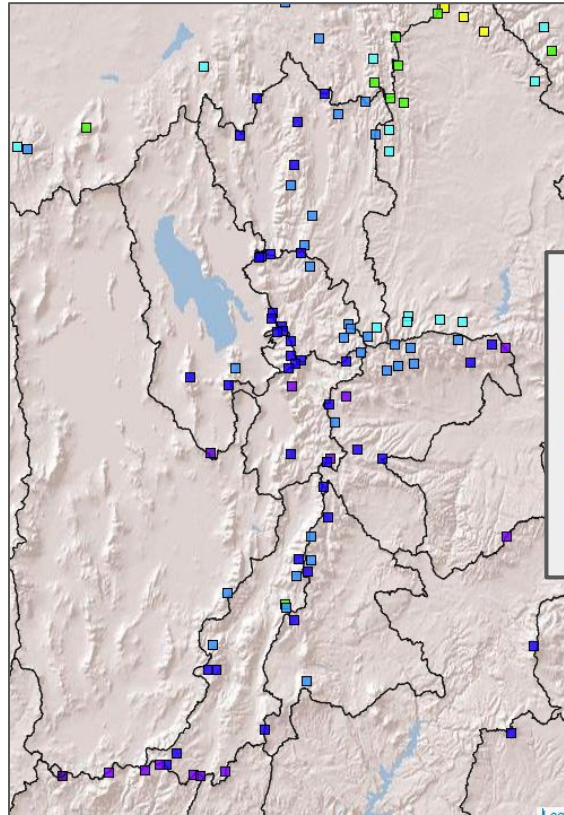
Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

February maximum temperature was below average across Utah.

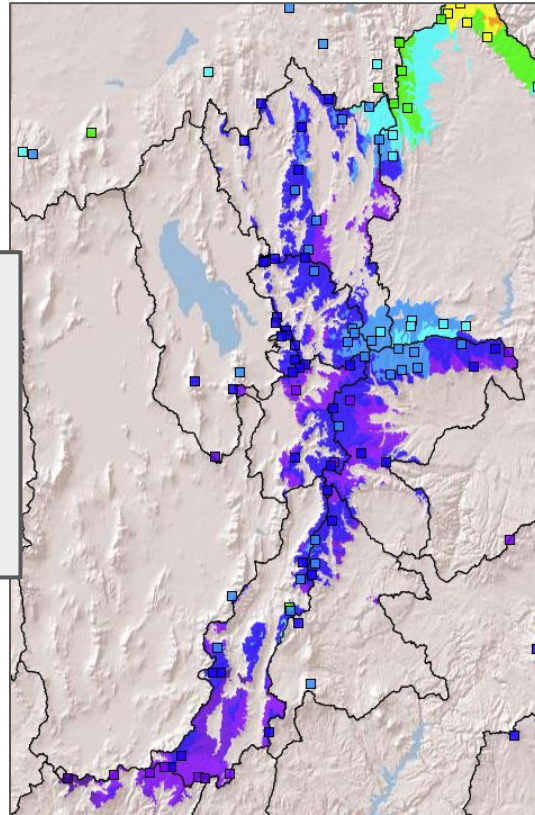
February minimum temperature was average to below average for the majority of areas across Utah.

Utah Current Snowpack: March 5th

SNOTEL SWE % Median



CBRFC Model SWE %Median

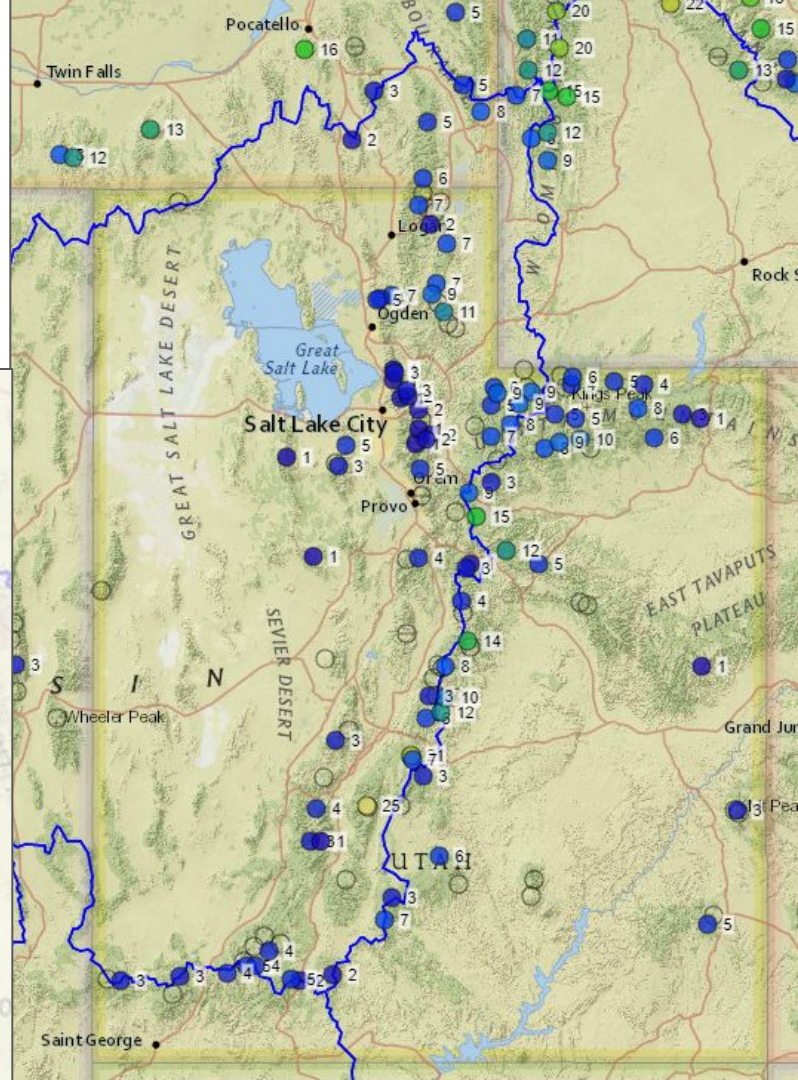
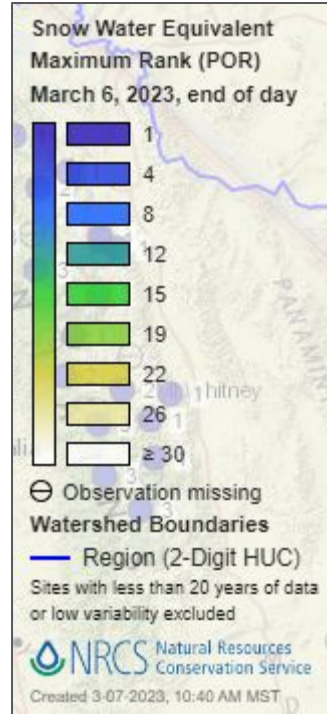


CBRFC Model Snow by Forecast Group % median

Bear	151%
Weber	170%
Six Creeks	175%
Provo	200%
Duchesne	164%
Sevier	181%
Virgin	244%

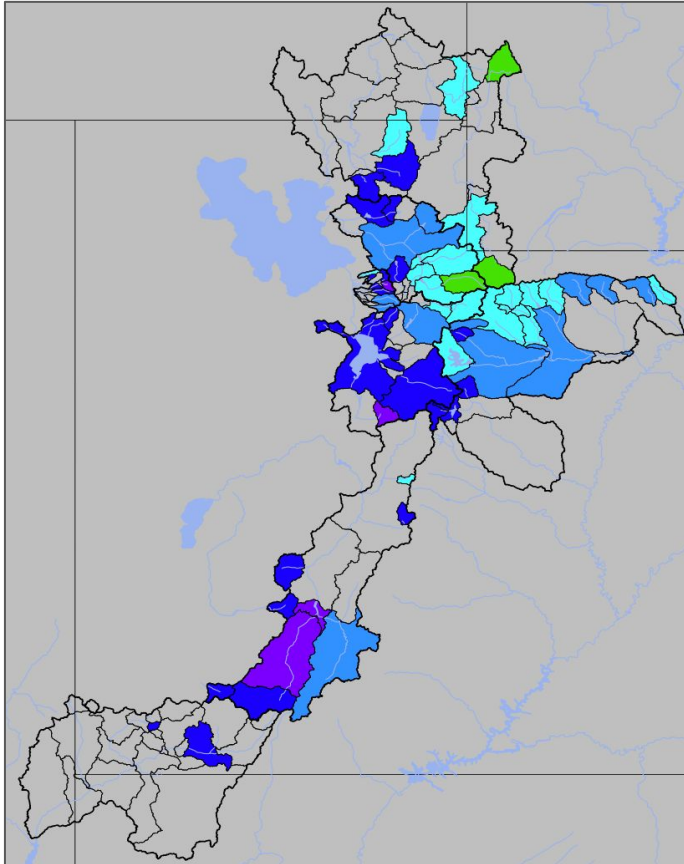
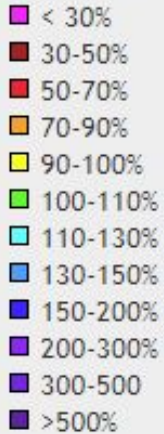
Utah Current Snowpack: March 6th

Many SNOTEL stations are reporting SWE values in the top 5 years on record.



Utah Water Supply Forecasts

Percent of Average

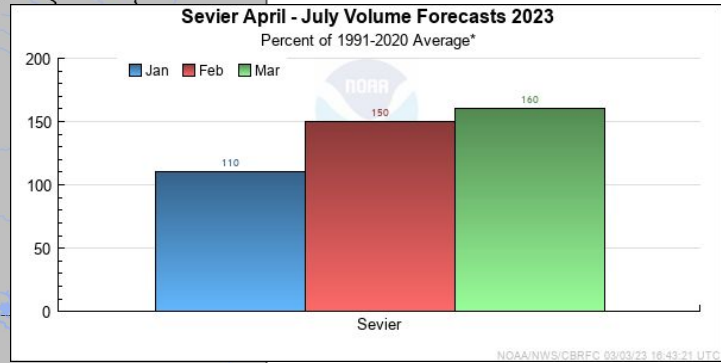
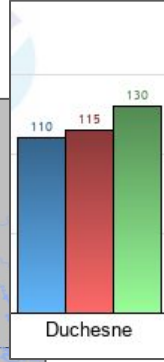
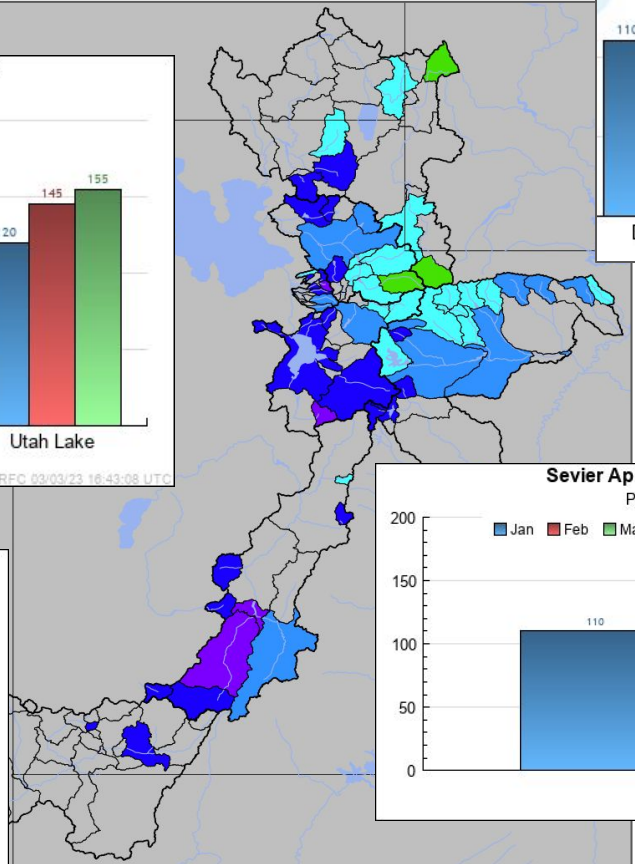
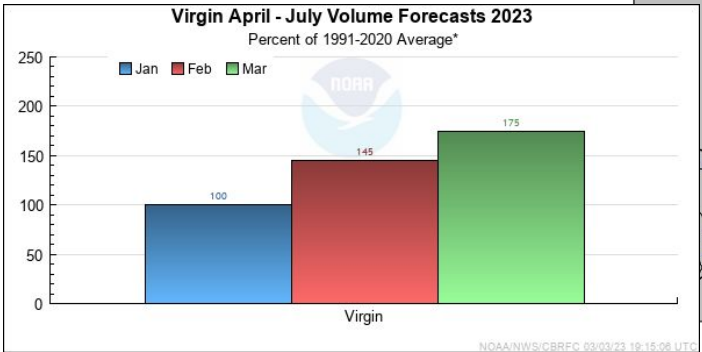
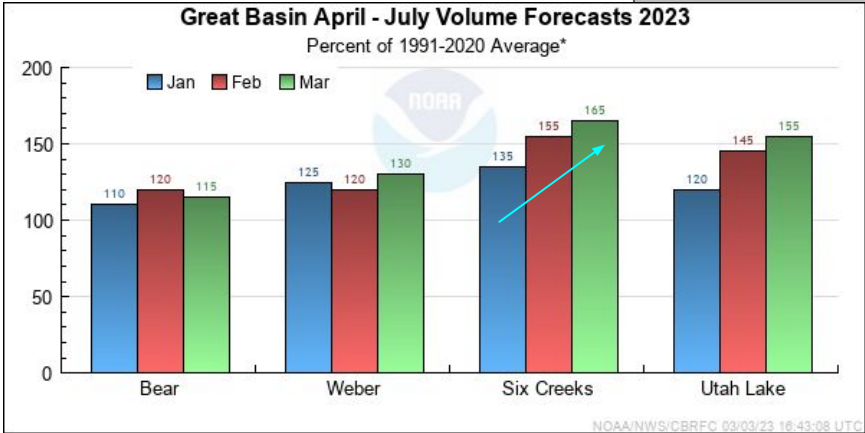


- March 1 forecast for April-July volume
- April-July forecast streamflow volumes are in percent of 1991-2020 average.

Median forecasts by forecast group.

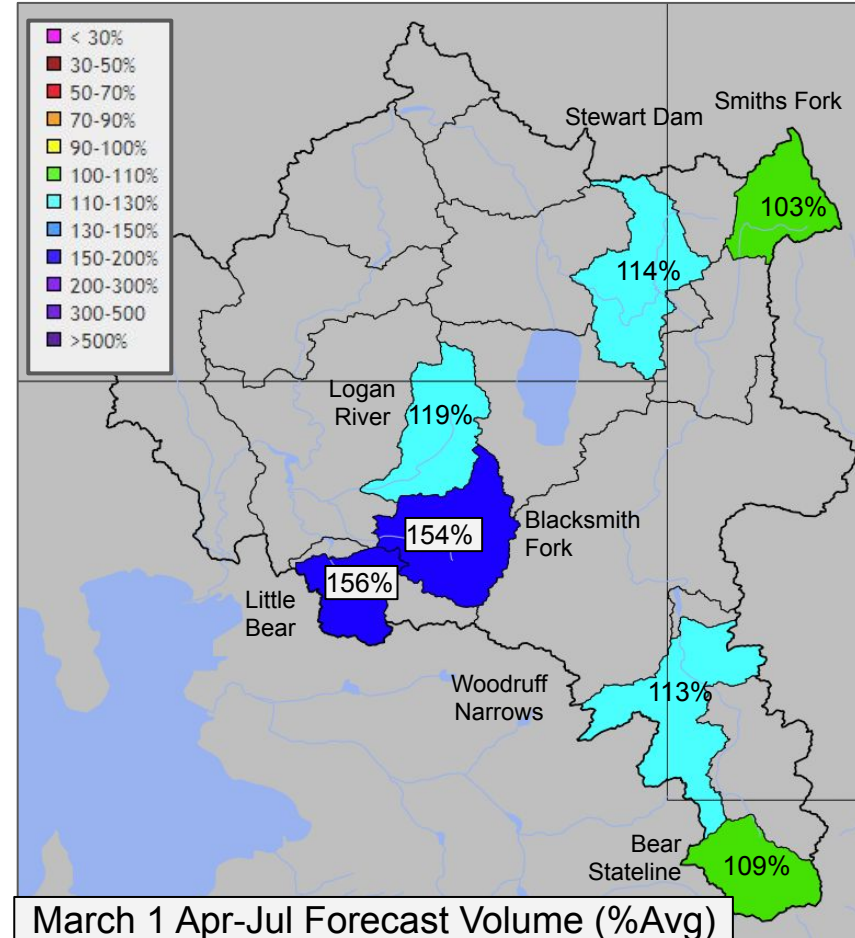
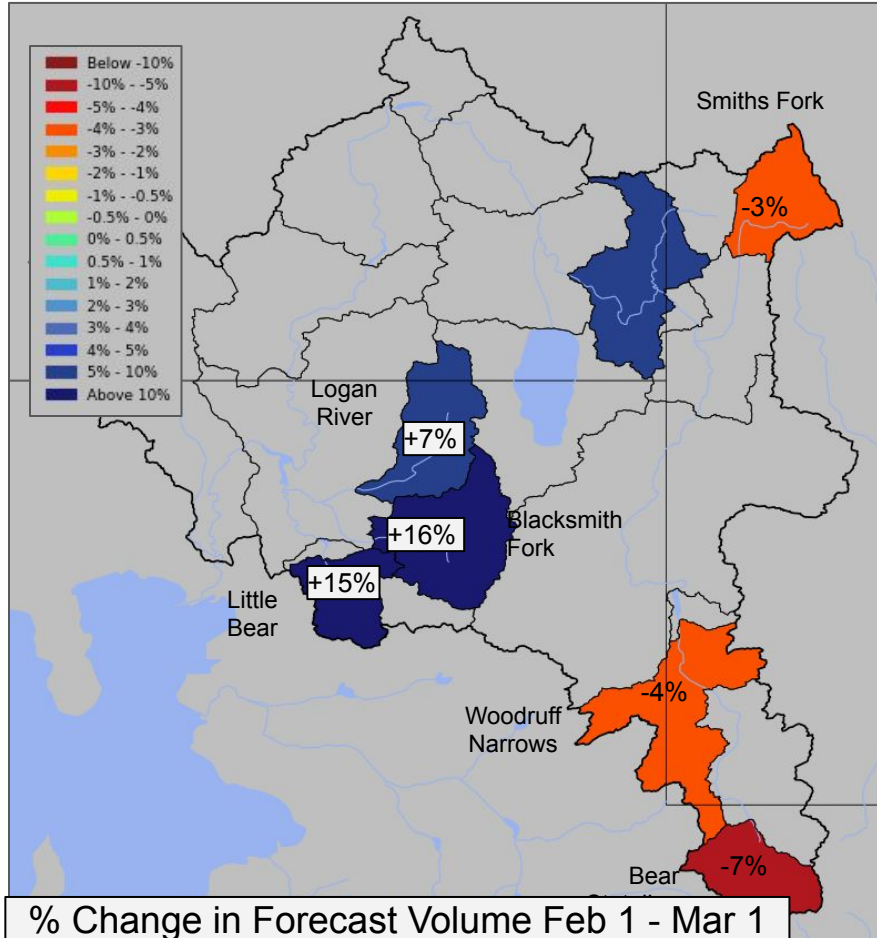
Bear	115%
Weber	130%
Six Creeks	165%
Provo / Utah Lake	155%
Sevier	160%
Duchesne	130%
Virgin	175%

Utah Water Supply Forecasts since January 1

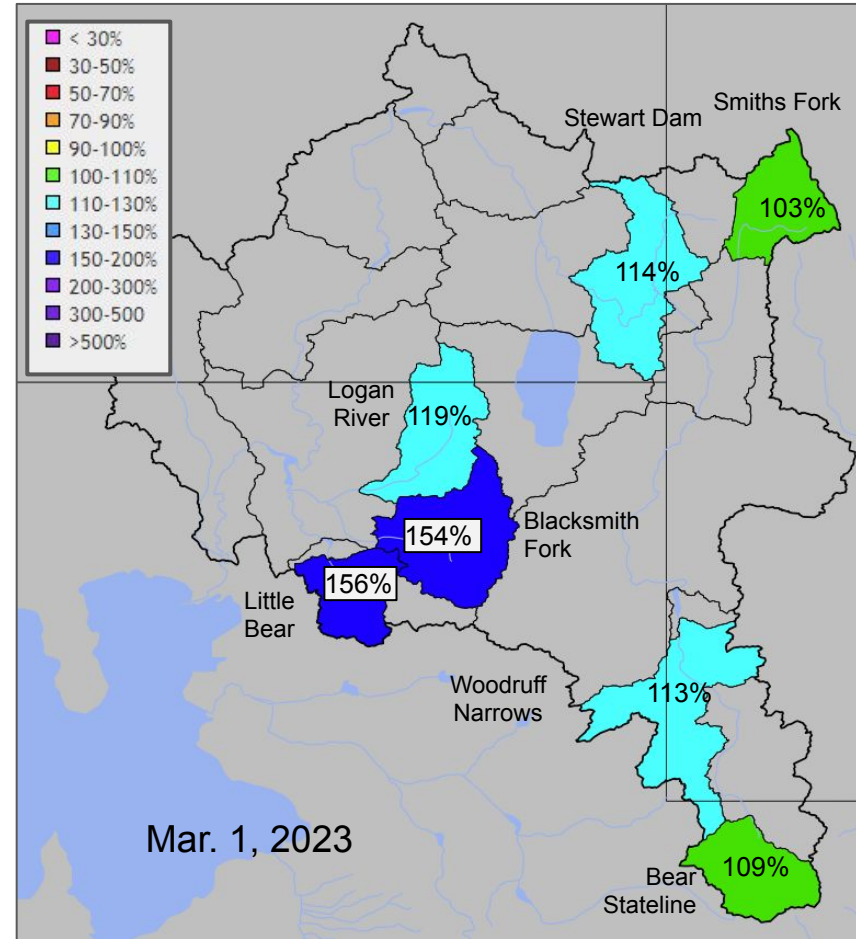
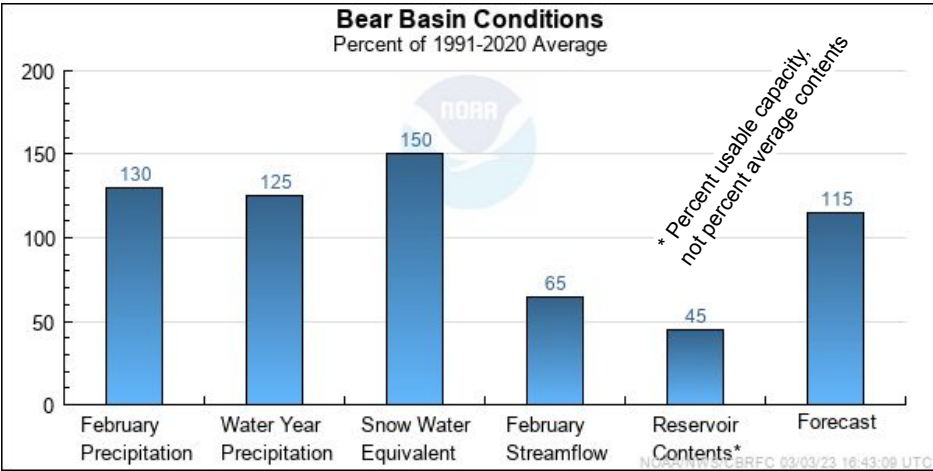
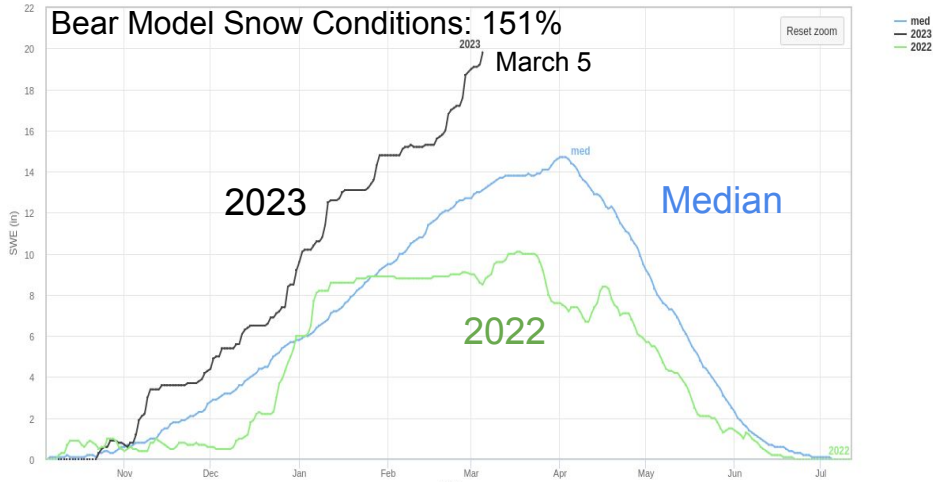


Forecasts have generally increased in response to above average precipitation and snowpack accumulation.

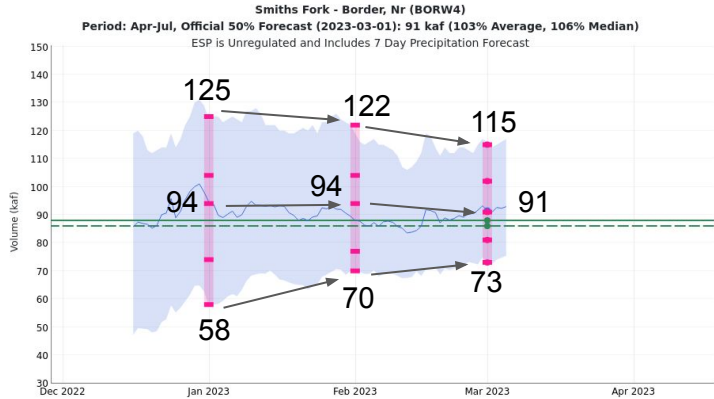
Utah Water Supply Forecasts - Bear



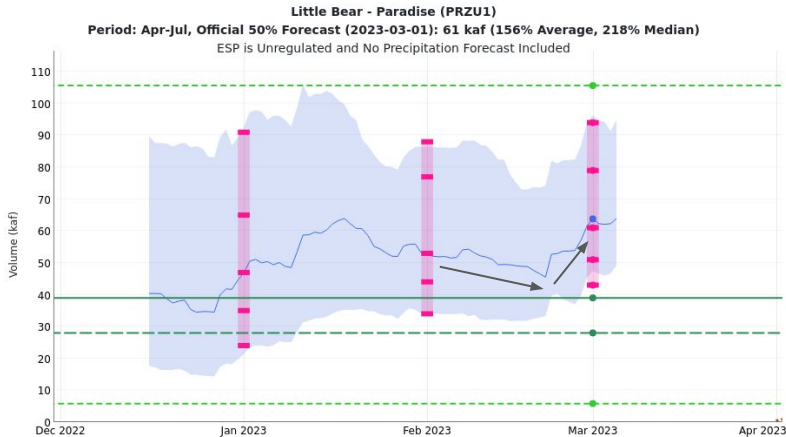
Utah Water Supply Forecasts - Bear



Utah Water Supply Forecasts - Bear



2023/03/01:
Max 1986: 180.79
Min 1977: 20.27
Average: 88
Median: 86
ESP: 91.5
Official 10: 115
Official 30: 102
Official 50: 91
Official 70: 81
Official 90: 73

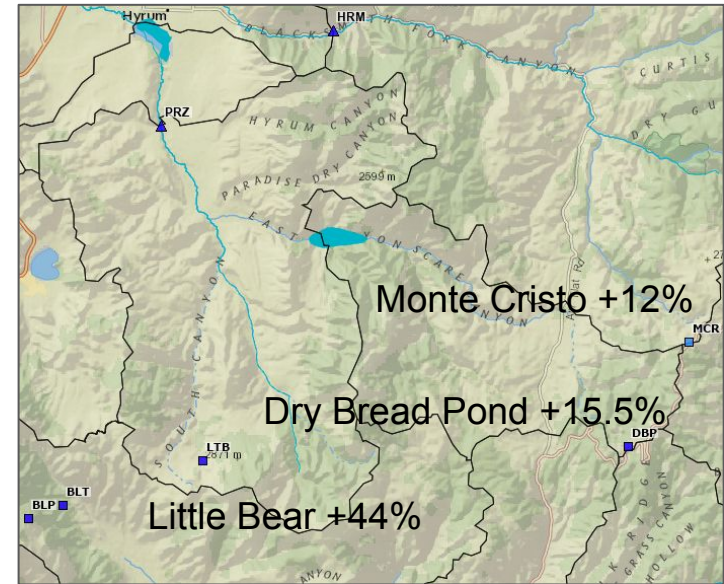


2023/03/01:
Max 2011: 105.64
Min 2021: 5.83
Average: 39
Median: 28
ESP: 63.8
Official 10: 94
Official 30: 79
Official 50: 61
Official 70: 51
Official 90: 43

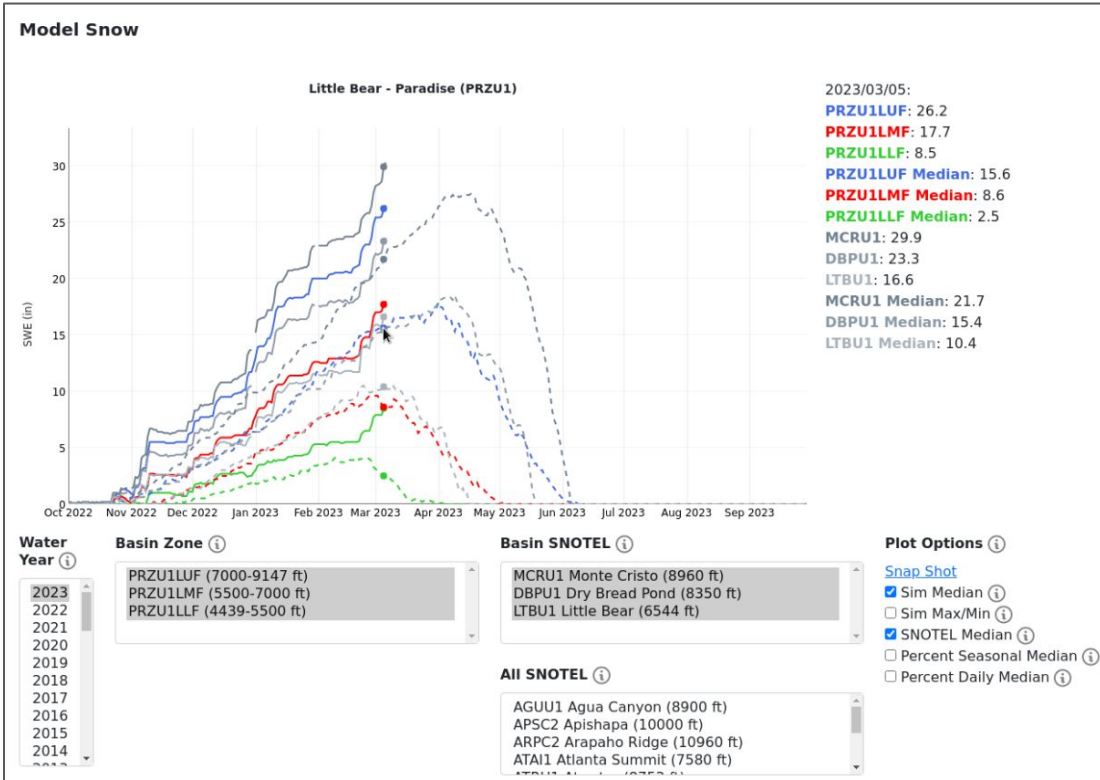
Evolution Plots

- “Evolve” with model states over time
 - Above average precipitation should move forecasts up.
 - Future weather variability decreases with time.

Change in % daily median Feb. 22-28



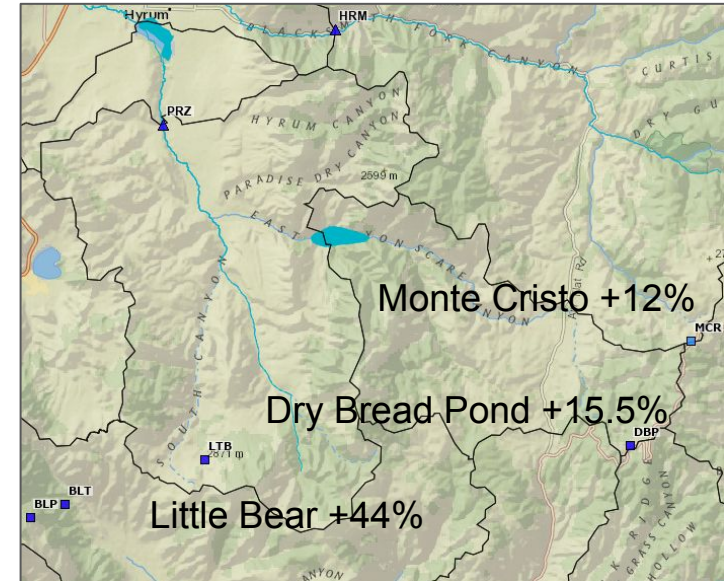
Utah Water Supply Forecasts - Bear



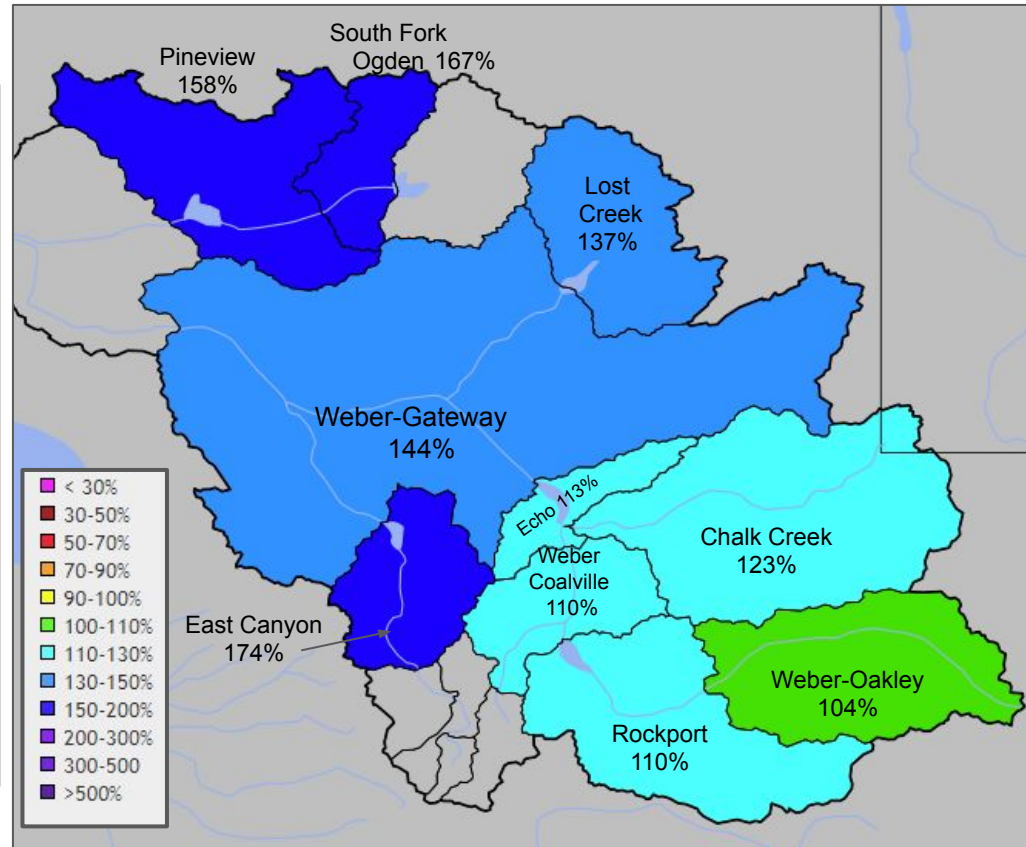
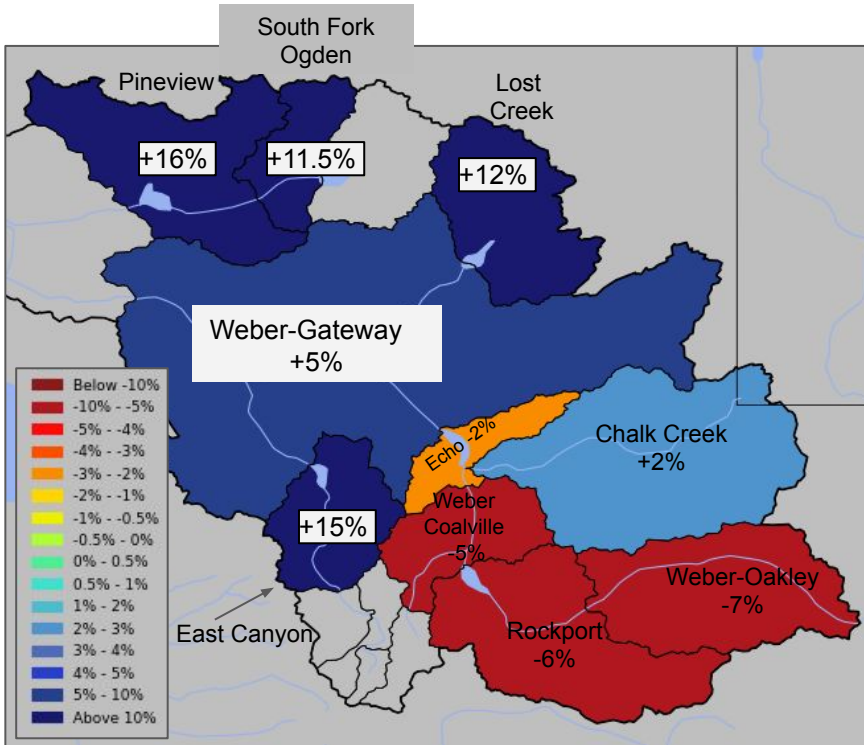
Model snow plots available.

- Different Year
- Snotels
- Units (inches or % median)

Change in % daily median Feb. 22-28



Utah Water Supply Forecasts - Weber

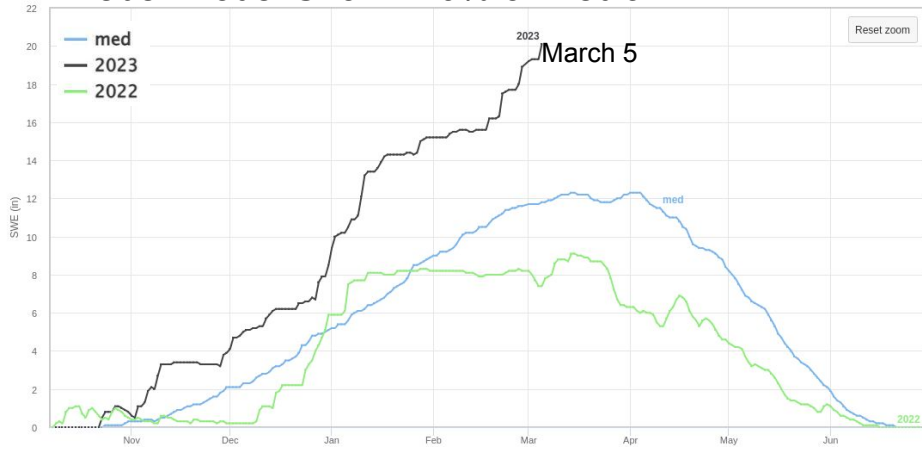


% Change in Forecast Volume Feb 1 - Mar 1

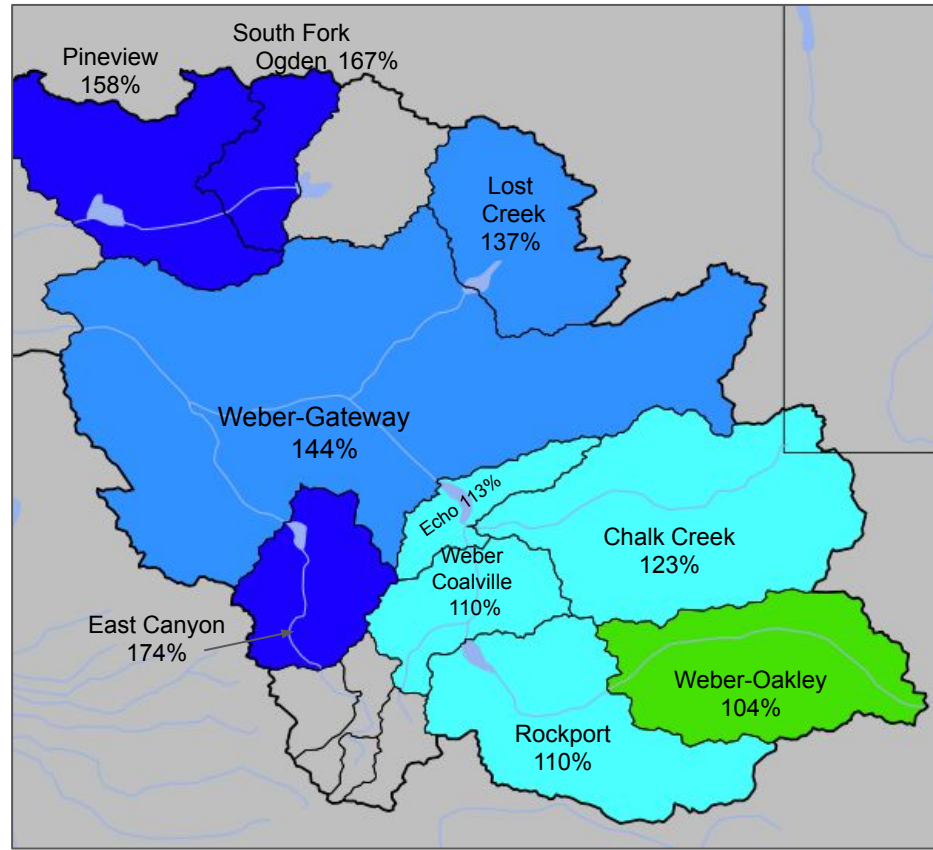
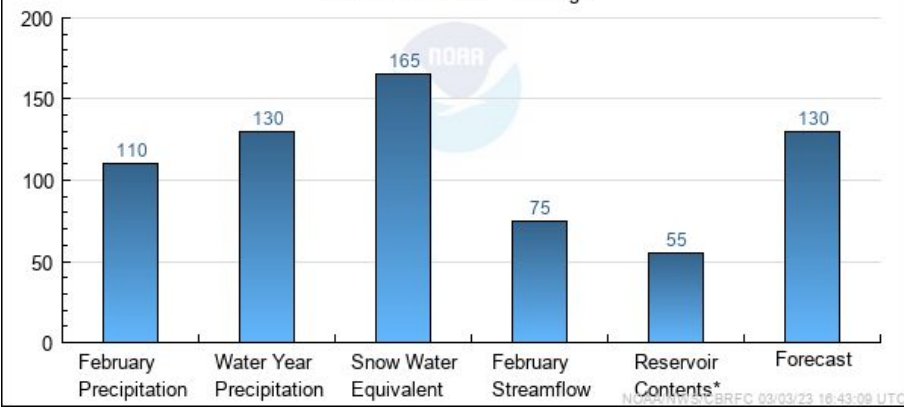
March 1 Apr-Jul Forecast Volume (%Avg)

Utah Water Supply Forecasts - Weber

Weber Model Snow 170% of median



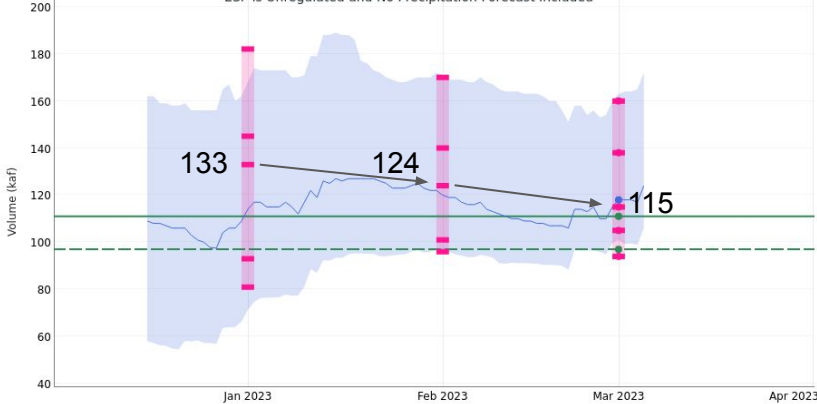
Weber Basin Conditions
Percent of 1991-2020 Average



Utah Water Supply Forecasts - Weber

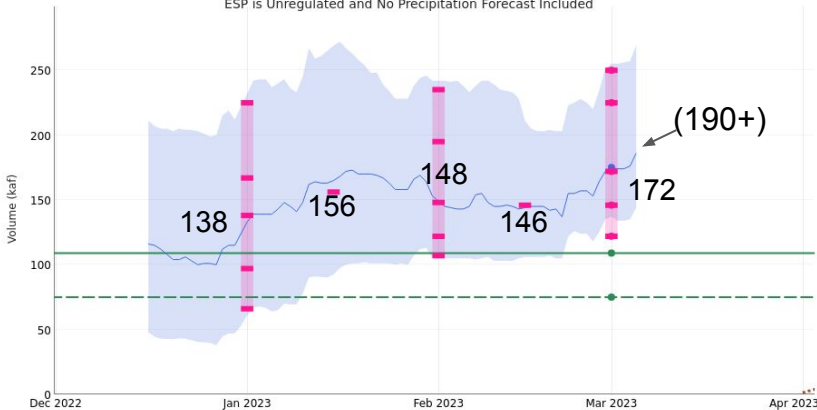
Weber - Oakley, Nr (OAWU1)
 Period: Apr-Jul, Official 50% Forecast (2023-03-01): 115 kaf (104% Average, 119% Median)
 ESP is Unregulated and No Precipitation Forecast Included

2023/03/01:
Average: 111
Median: 97
ESP: 118
Official 10: 160
Official 30: 138
Official 50: 115
Official 70: 105
Official 90: 94



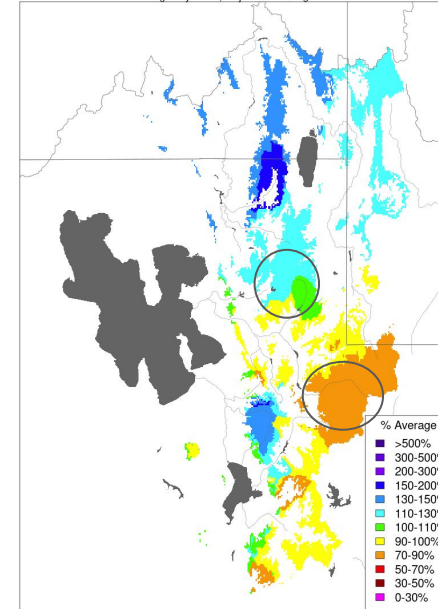
Ogden - Pineview Reservoir, Ogden, Nr (PINU1)
 Period: Apr-Jul, Official 50% Forecast (2023-03-01): 172 kaf (158% Average, 229% Median)
 ESP is Unregulated and No Precipitation Forecast Included

2023/03/01:
Average: 109
Median: 75
ESP: 175
Official 10: 250
Official 30: 225
Official 50: 172
Official 70: 146
Official 90: 122

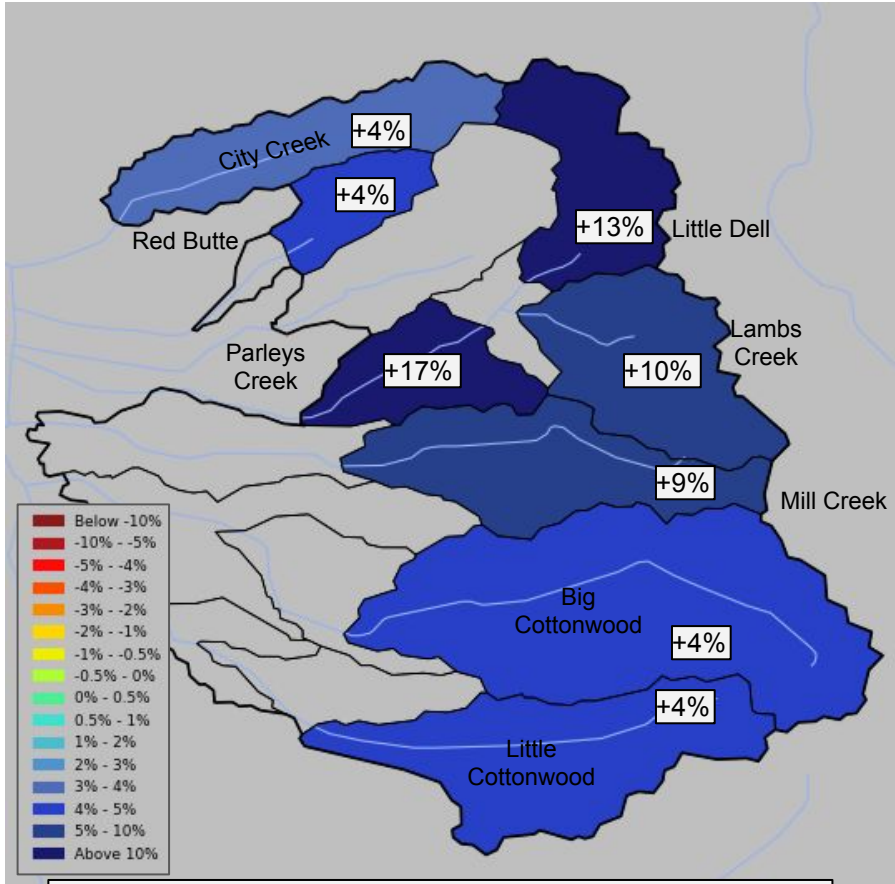


- Uinta Headwaters have received below normal precipitation for February
- Ogden, Lost Creek have received above normal precipitation for February

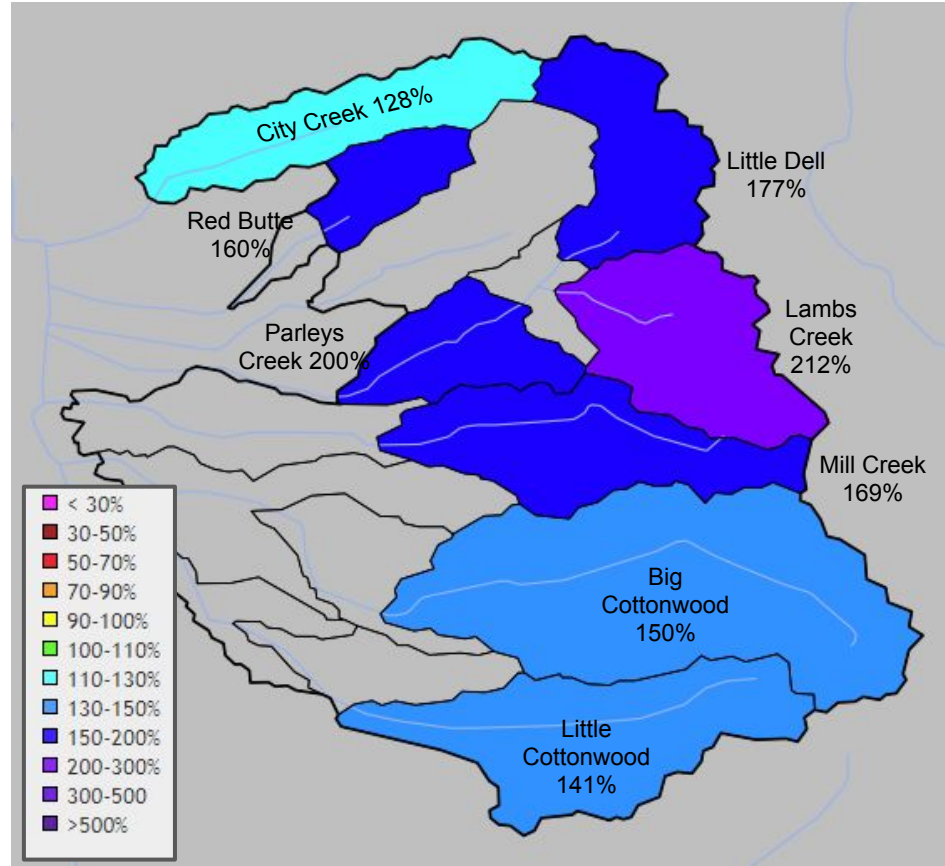
Monthly Precipitation - February 2023
 Averaged by Basin, Major Contributing Areas



Utah Water Supply Forecasts - Six Creeks



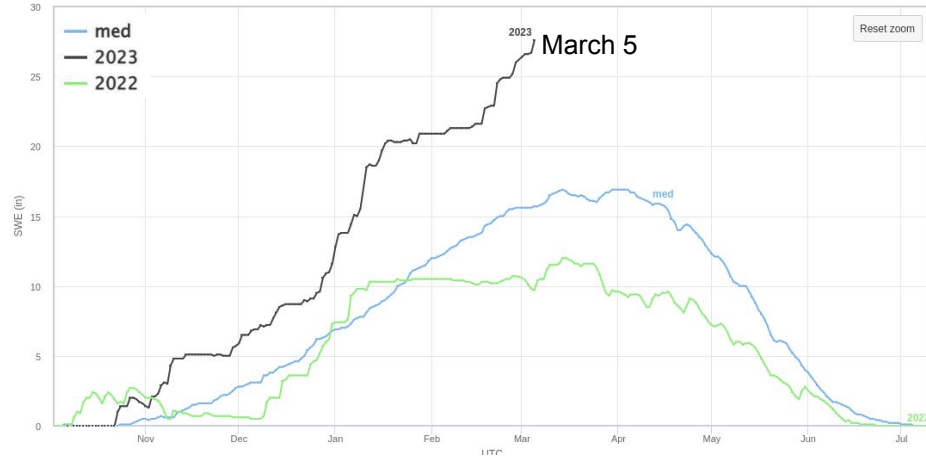
% Change in Forecast Volume Feb 1 - Mar 1



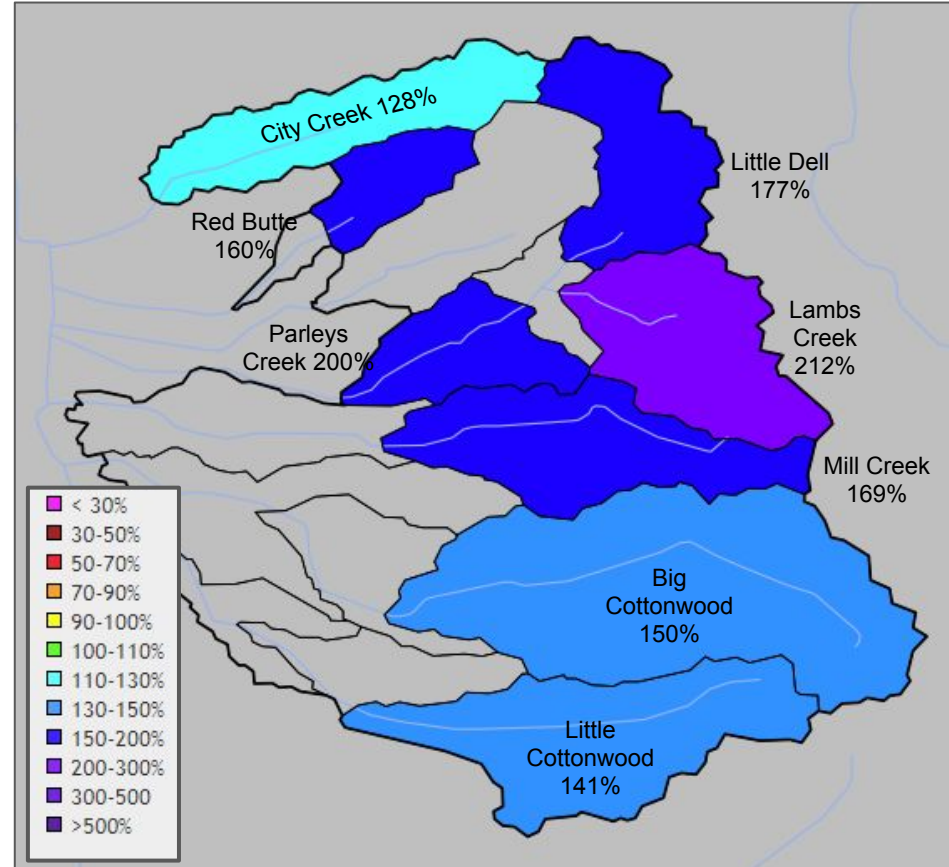
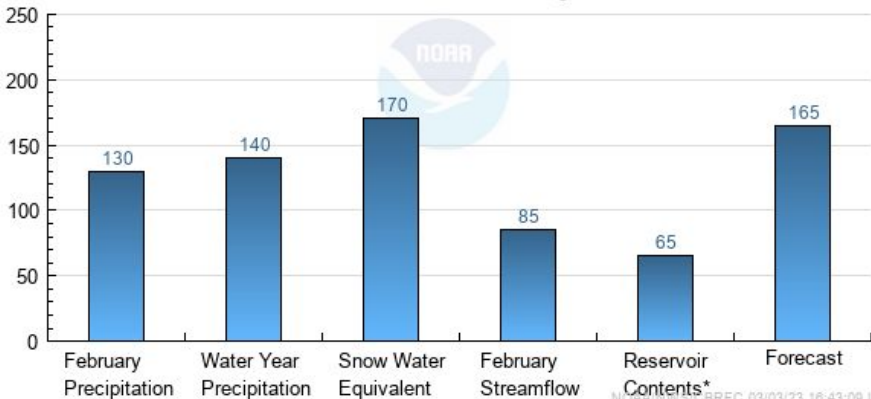
March 1 Apr-Jul Forecast Volume (%Avg)

Utah Water Supply Forecasts - Six Creeks

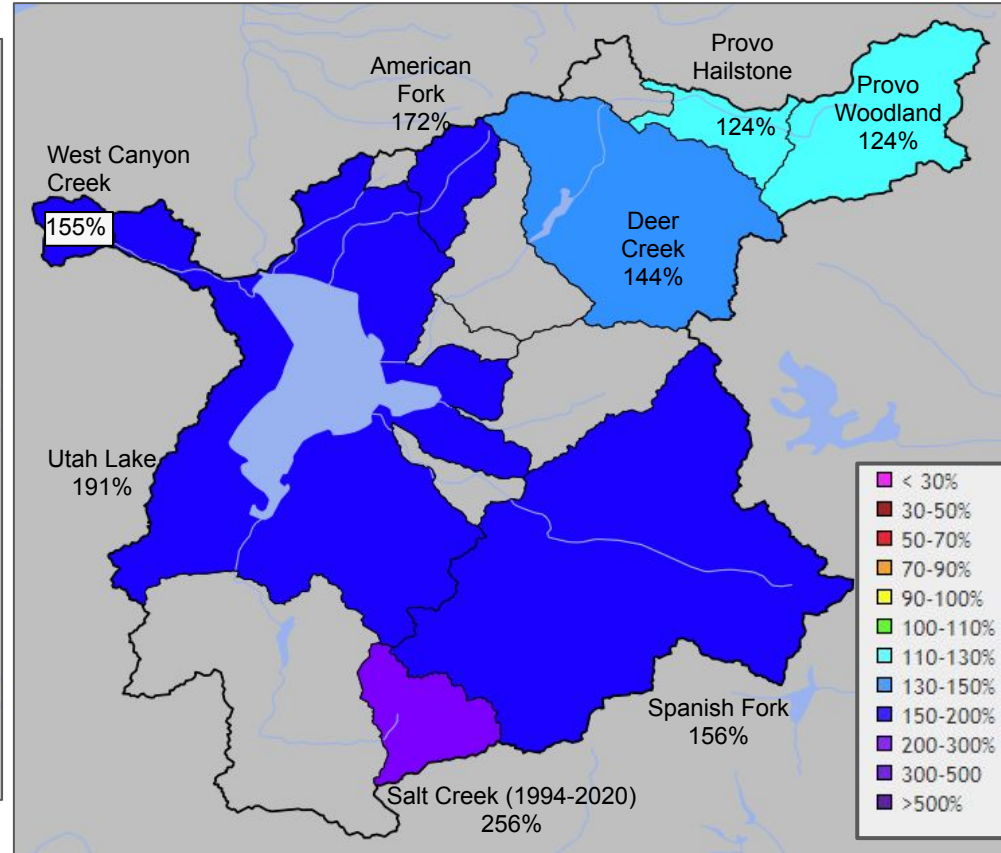
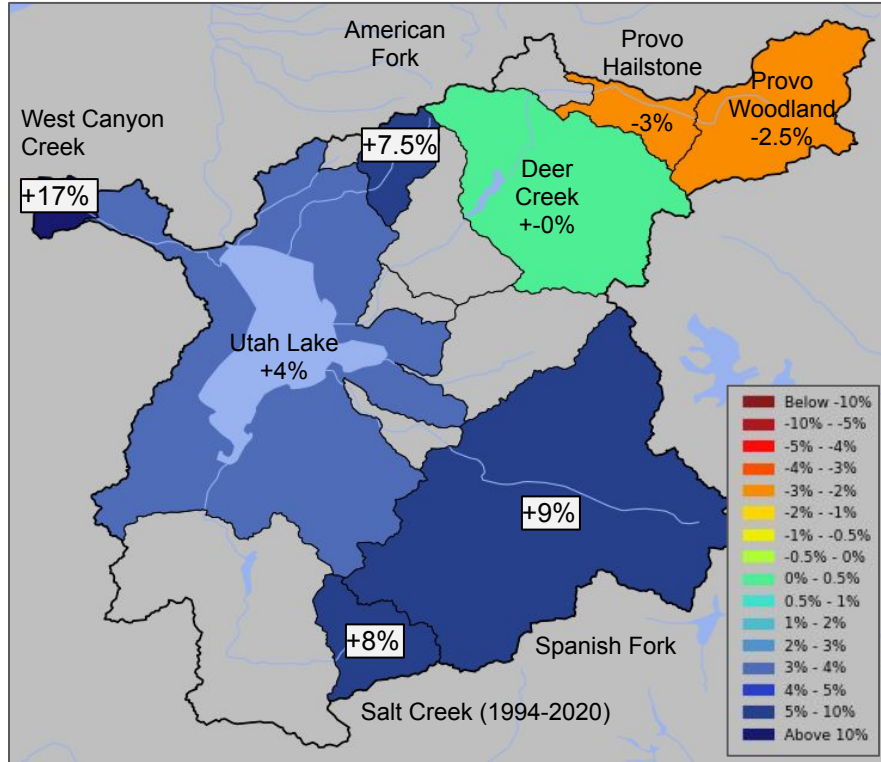
Six Creeks Model Snow 176% of median



Six Creeks Basin Conditions
Percent of 1991-2020 Average



Utah Water Supply Forecasts - Provo - Utah Lake Basin

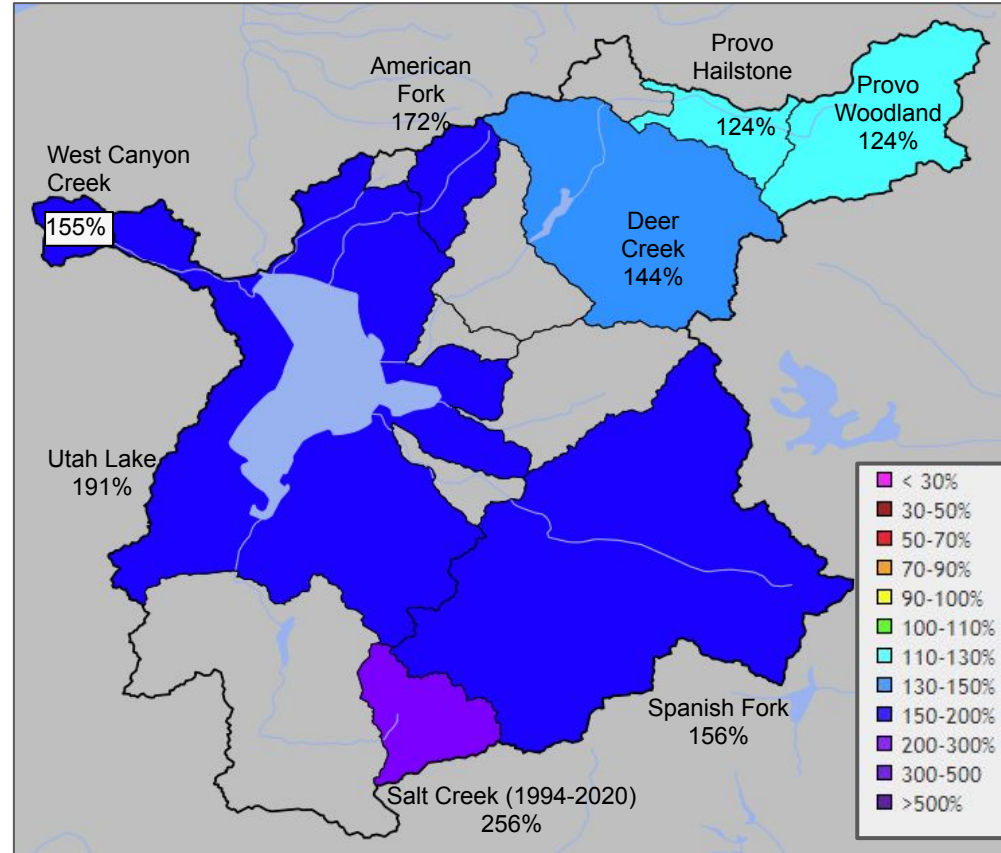
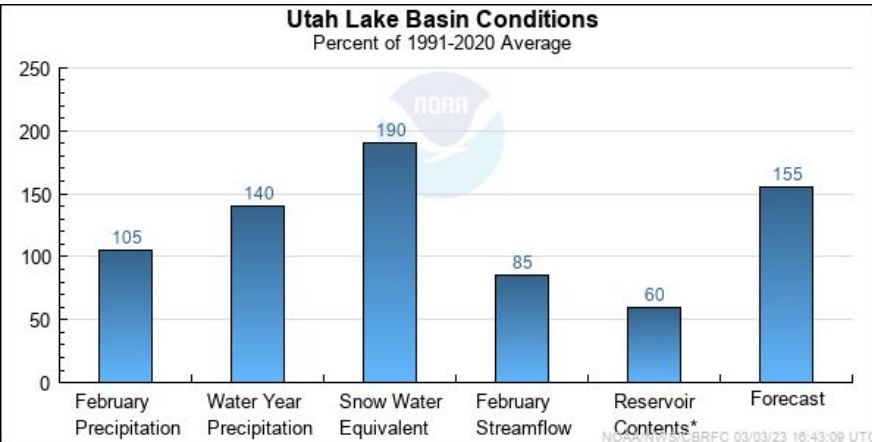
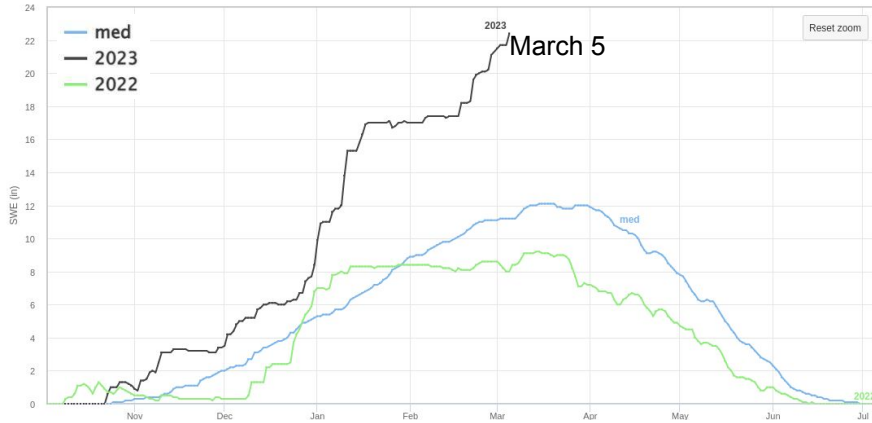


% Change in Forecast Volume Feb 1 - Mar 1

March 1 Apr-Jul Forecast Volume (%Avg)

Utah Water Supply Forecasts - Provo - Utah Lake Basin

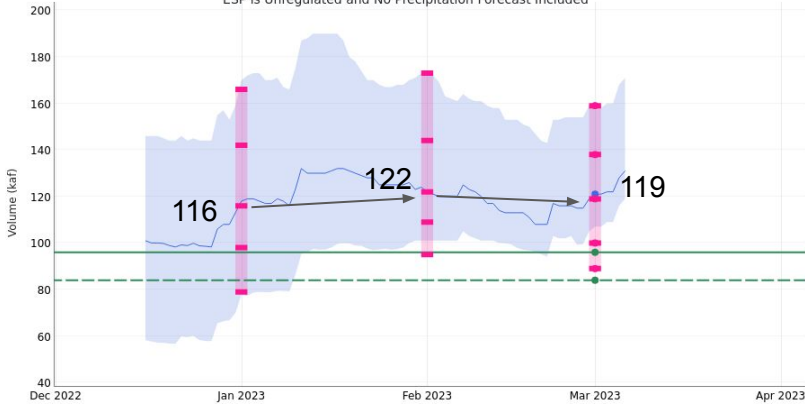
Provo - Utah Lake Model Snow 200% of median



Utah Water Supply Forecasts - Provo - Utah Lake Basin

Provo - Woodland, Nr (W00U1)
Period: Apr-Jul, Official 50% Forecast (2023-03-01): 119 kaf (124% Average, 142% Median)
 ESP is Unregulated and No Precipitation Forecast Included

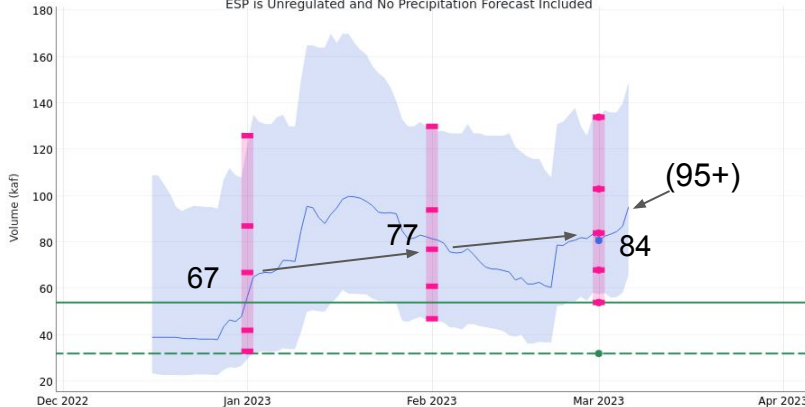
2023/03/01:
Average: 96
Median: 84
ESP: 121
Official 10: 159
Official 30: 138
Official 50: 119
Official 70: 100
Official 90: 89



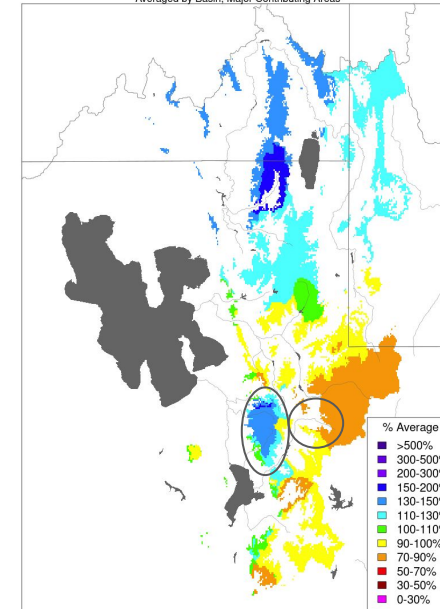
- Uinta Headwaters have received below normal precipitation for February
- Spanish Fork and American Fork have received above normal precipitation

Spanish Fork - Castilla, Nr (CASU1)
Period: Apr-Jul, Official 50% Forecast (2023-03-01): 84 kaf (156% Average, 263% Median)
 ESP is Unregulated and No Precipitation Forecast Included

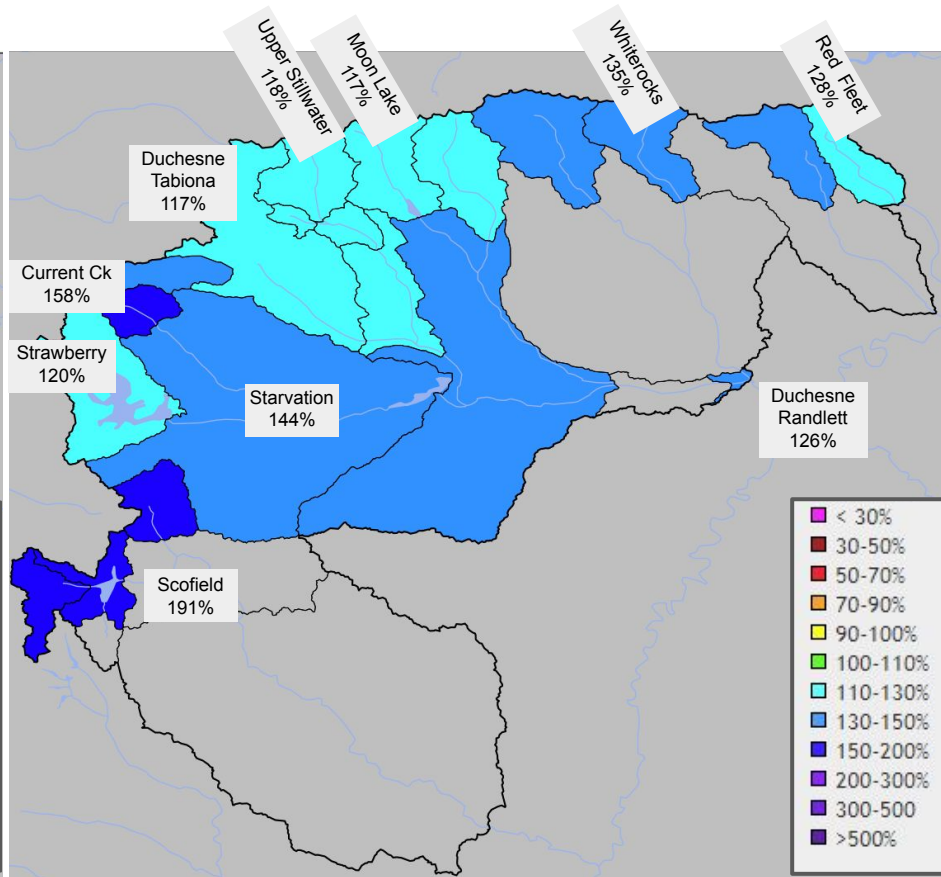
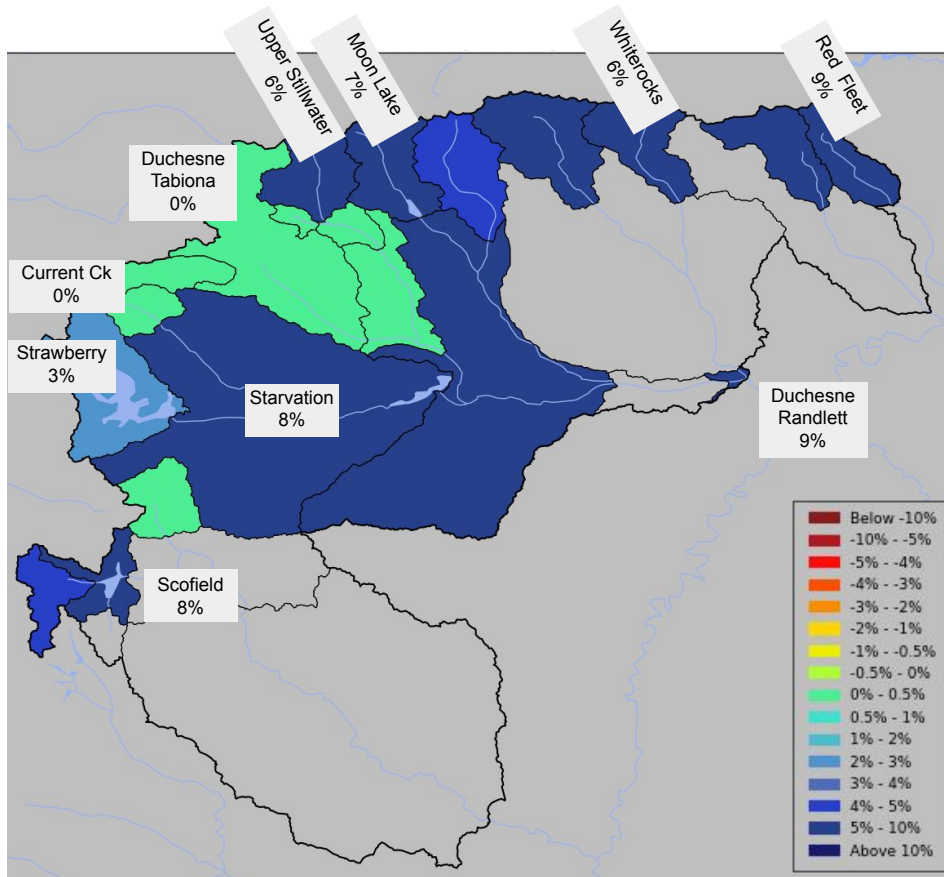
2023/03/01:
Average: 54
Median: 32
ESP: 80.8
Official 10: 134
Official 30: 103
Official 50: 84
Official 70: 68
Official 90: 54



Monthly Precipitation - February 2023
 Averaged by Basin, Major Contributing Areas



Utah Water Supply Forecasts - Duchesne

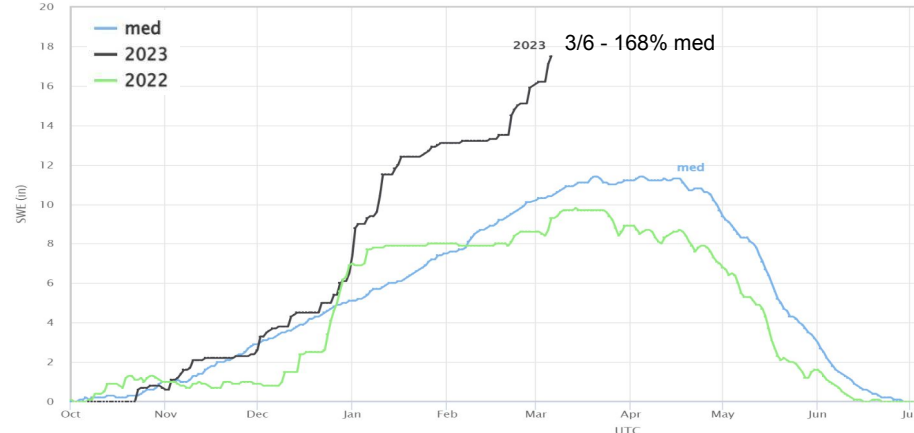


% Change in Forecast Volume Feb 1 - Mar 1

March 1 Apr-Jul Forecast Volume (%Avg)

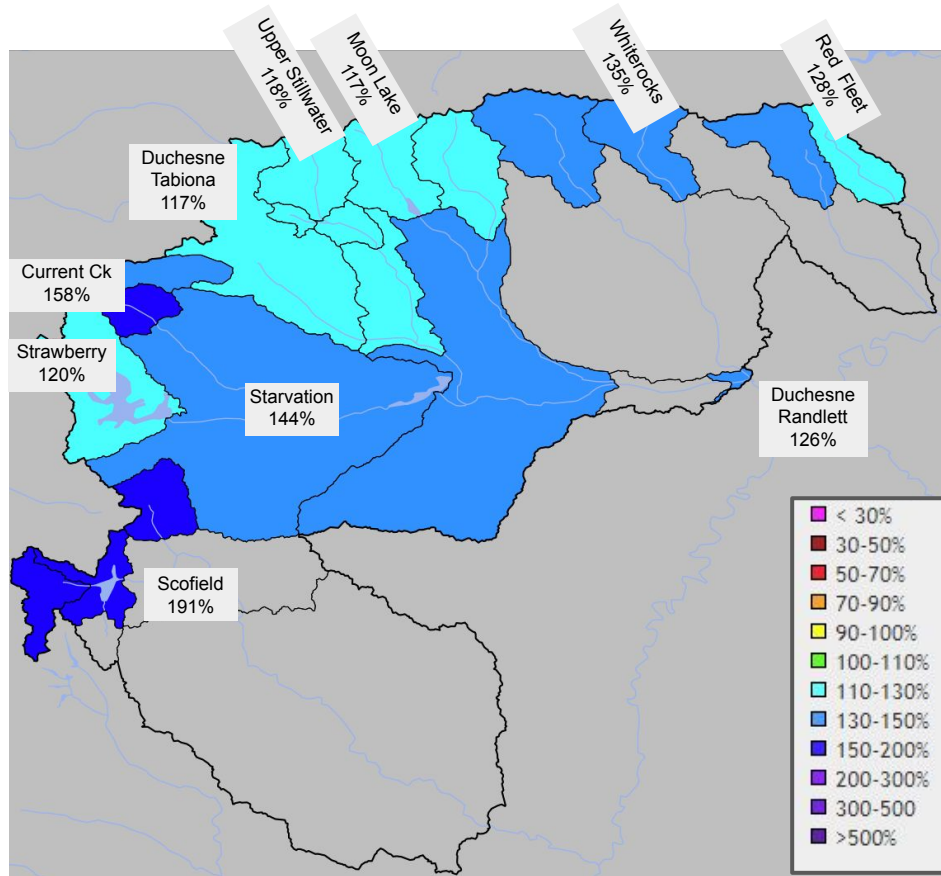
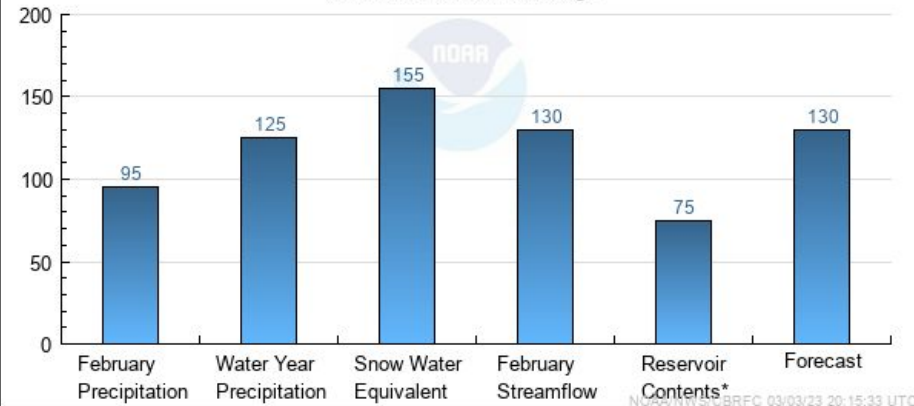
Utah Water Supply Forecasts - Duchesne

Duchesne Basin Model SWE



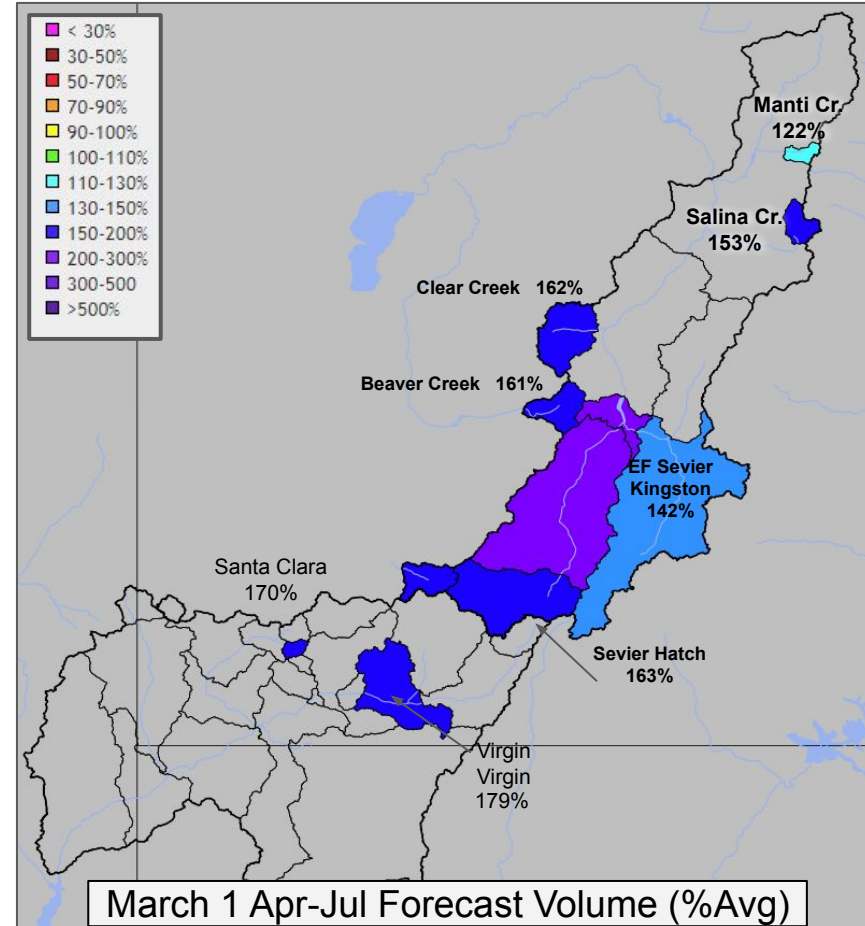
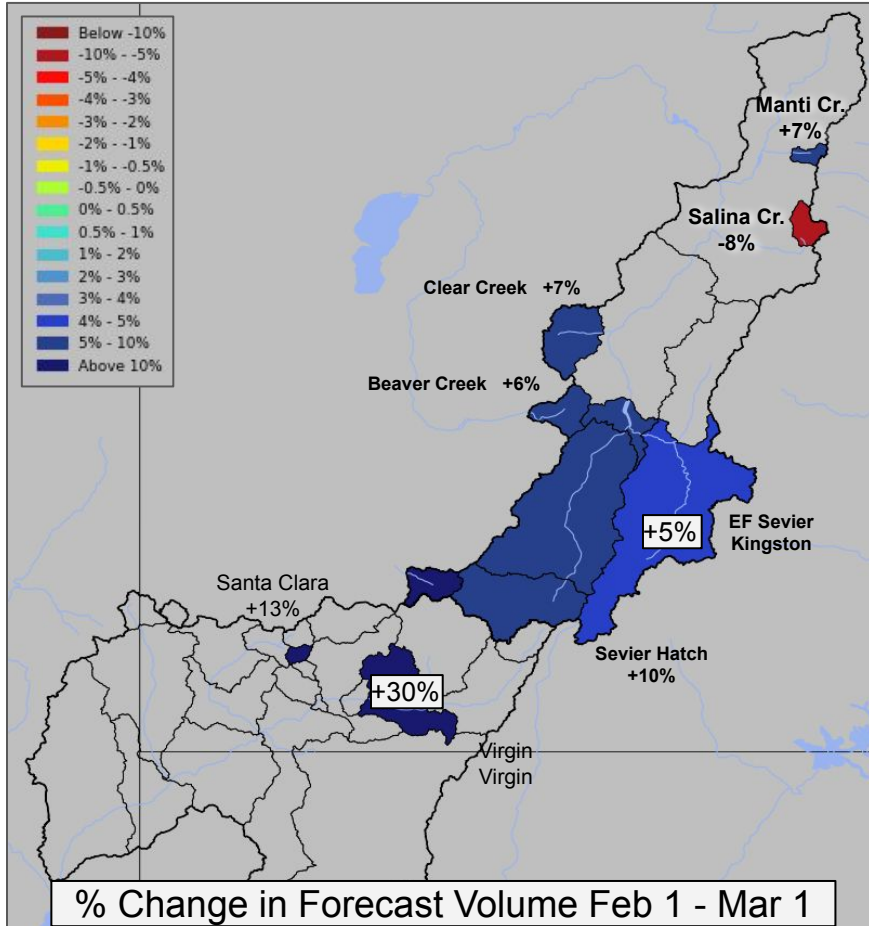
Duchesne Basin Conditions

Percent of 1991-2020 Average



March 1 Apr-Jul Forecast Volume (%Avg)

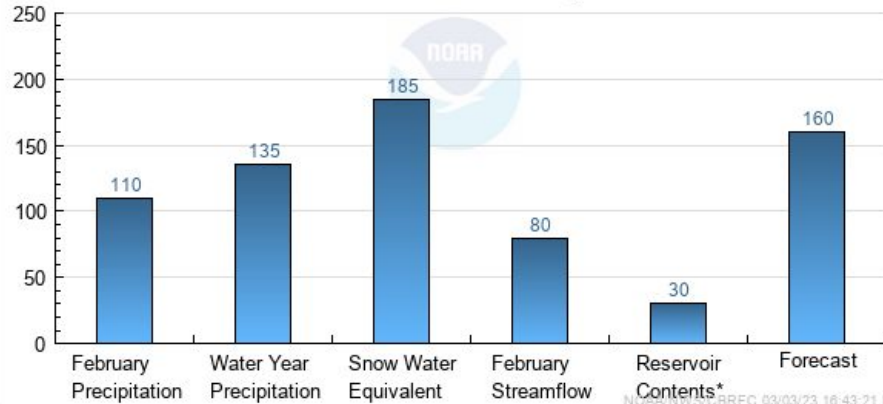
Utah Water Supply Forecasts - Sevier and Virgin



Utah Water Supply Forecasts - Sevier and Virgin

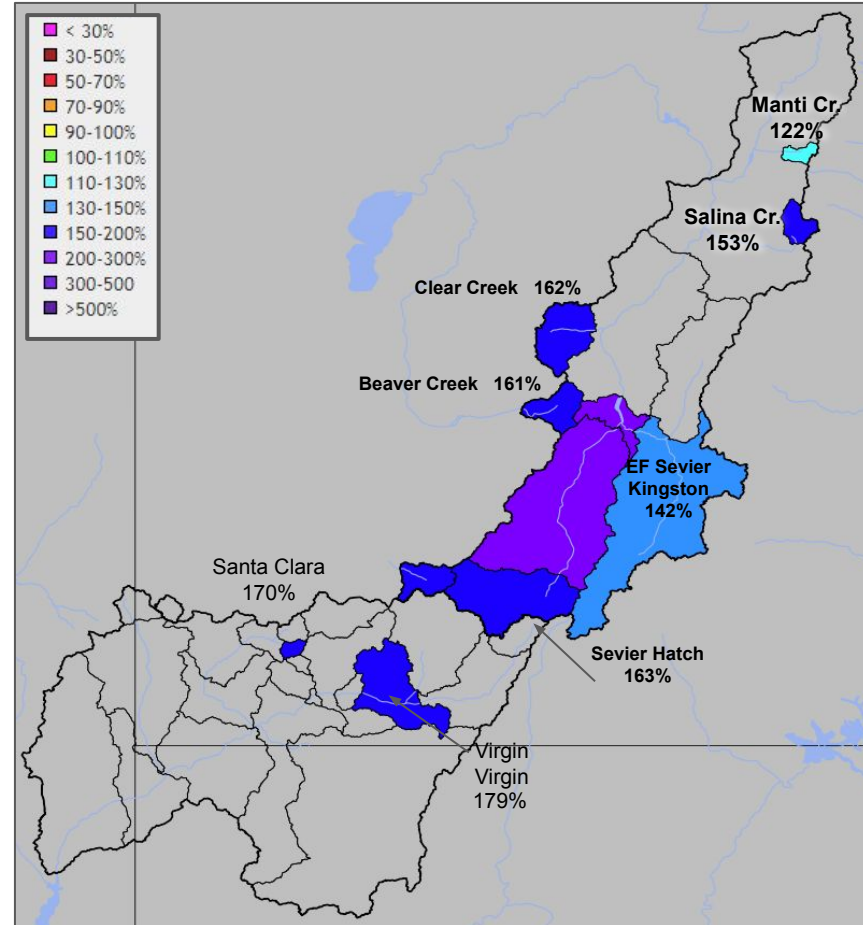
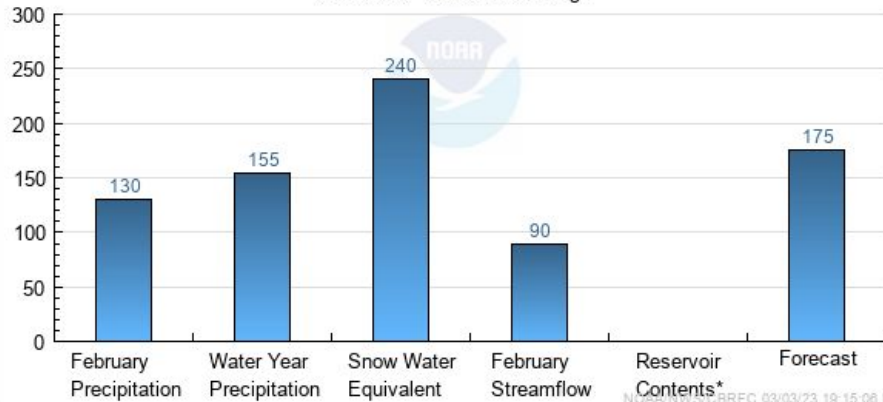
Sevier Basin Conditions

Percent of 1991-2020 Average

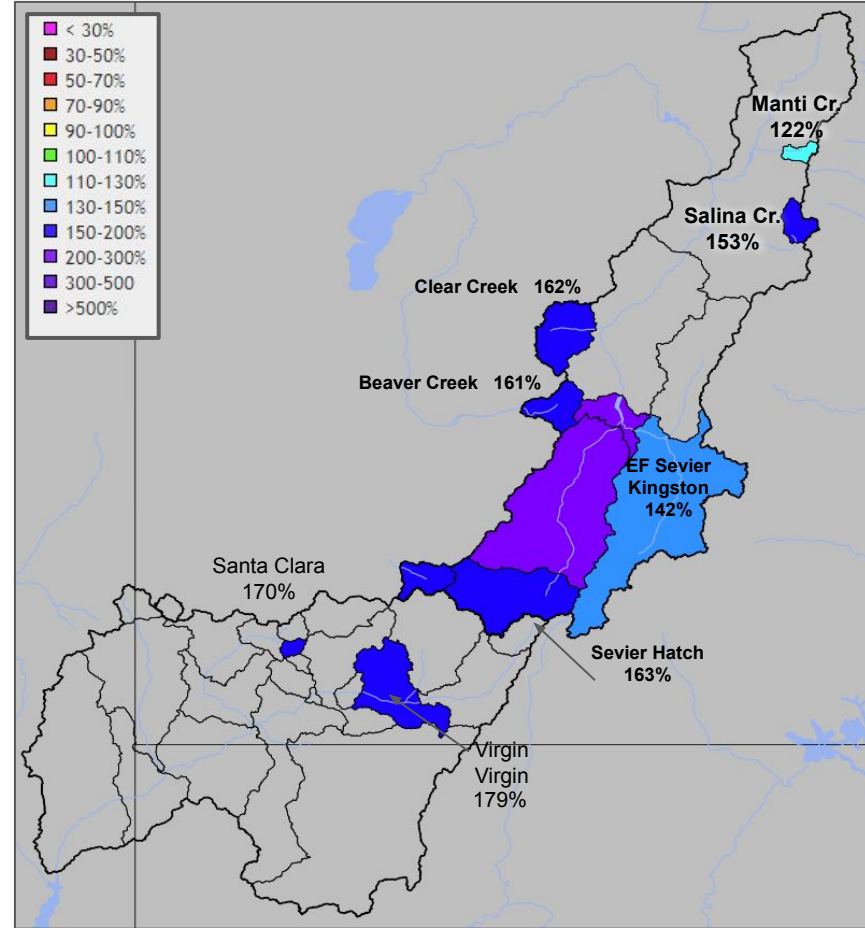
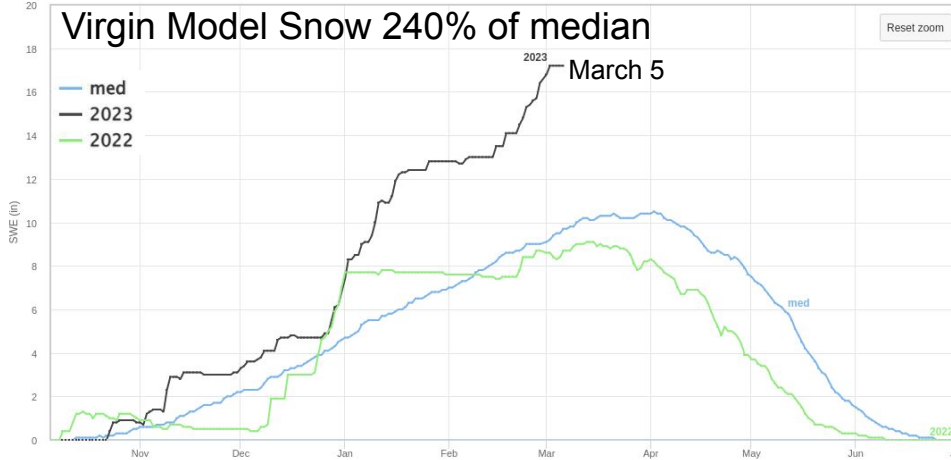
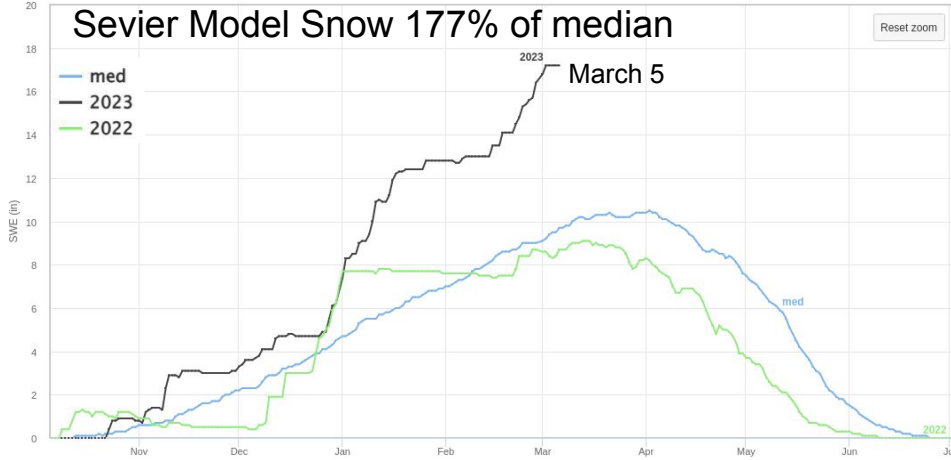


Virgin Basin Conditions

Percent of 1991-2020 Average

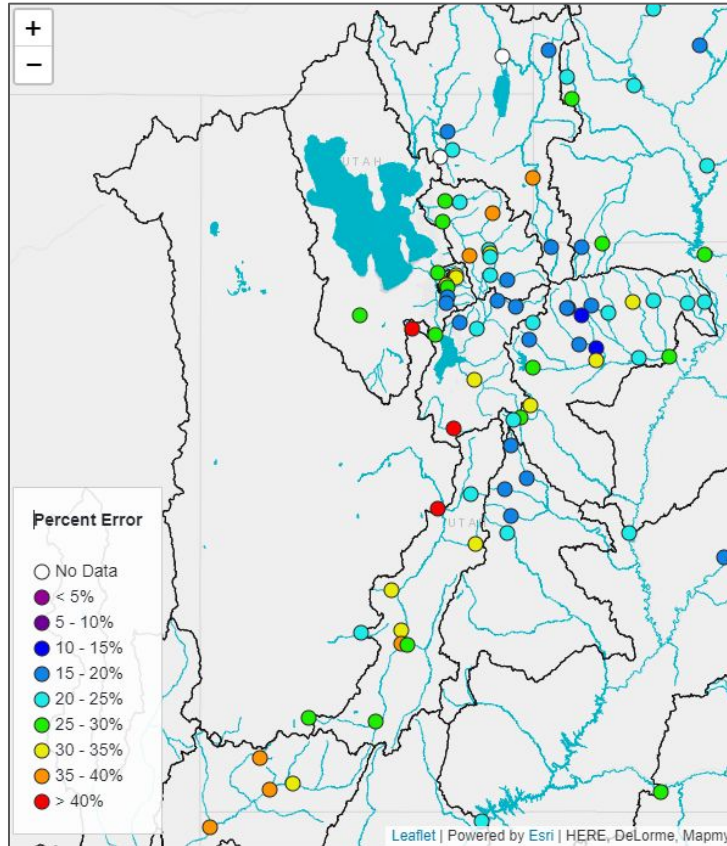


Utah Water Supply Forecasts - Sevier and Virgin



Historical Forecast Verification

March Forecast Error: April-July Volume



Location

BEAR - UTAH-WYOMING STATE
 BEAR - WOODRUFF NARROWS
 LOGAN - LOGAN- NR
 WEBER - OAKLEY- NR
 WEBER - ROCKPORT RES
 BIG COTTONWOOD CK
 PROVO - WOODLAND- NR
 PROVO - DEER CK RES
 VIRGIN - VIRGIN

Mar 1 Forecast Error

18%
 36%
 19%
 17%
 24%
 19%
 16%
 23%
 31%

Mar 2022

14% low
 33% low
 19% low
 12% low
 25% low
 7% low
 14% low
 19% low
 21% high

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:

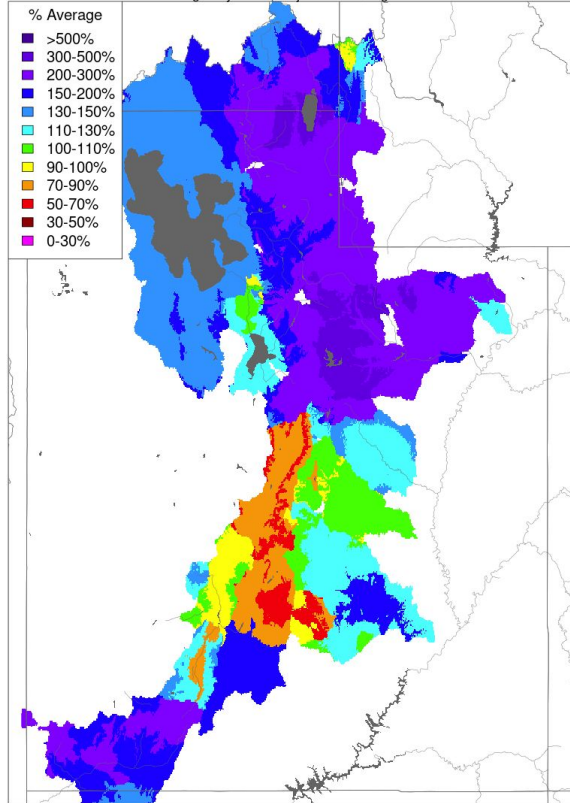
- Lower elevations (rain or early melt)
- Downstream of diversions / irrigation
- Little is known about diversions / demands

Future weather is the primary source of early season water supply forecast error/uncertainty.

March 2023 Precipitation (Month-To-Date)

Month to Date Precipitation - March 06 2023

Averaged by Basin, Major Contributing Areas

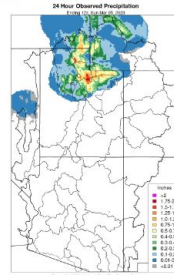


Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

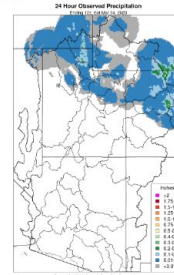
06



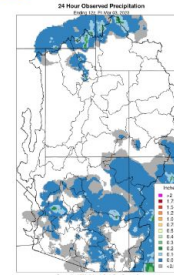
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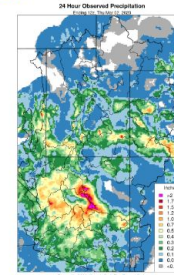
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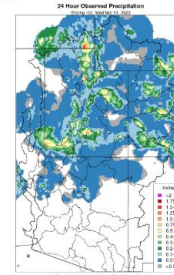
03



02



01



Water Year 2023 CBRFC Model SWE (Significant Runoff Areas) Percent of 1991-2020 Median

UPPER COLORADO RIVER BASIN

	<u>Mar1</u>	<u>Mar6</u>	<u>Change</u>
Duchesne	157	168	11
Price/San Rafael/Dirty Devil	183	184	1

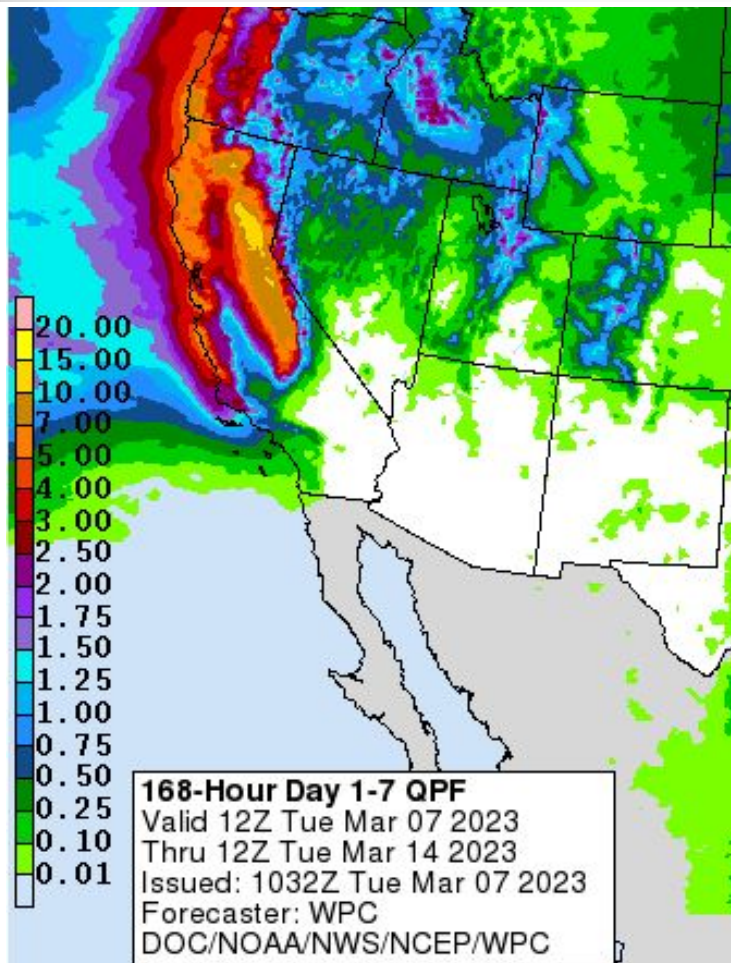
LOWER COLORADO RIVER BASIN

Virgin	239	242	3
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GREAT BASIN

Bear	149	152	3
Weber	165	173	8
Six Creeks	168	177	9
Provo/Utah Lake	191	204	13
Sevier	184	178	-6

Upcoming Weather: WPC March 7-14 Precipitation Outlook



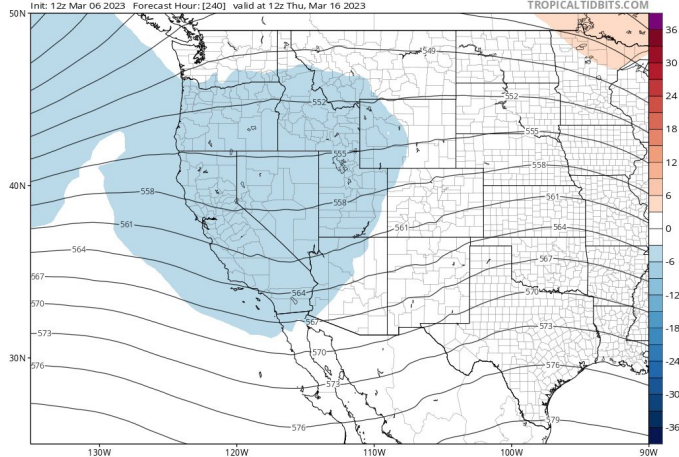
- Two shortwave troughs will move across Utah this week
 - Timing: Wednesday/Thursday, and Friday/Saturday
 - Potential for an inland penetrating atmospheric river with the Friday/Saturday trough
 - Highest 7-day precipitation totals across Utah
 - 1-2" of precipitation across higher terrain
- Ridging will take place to start next week
 - A break in precipitation
 - Warming temperatures

Upcoming Weather: March 14-21

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

INI: 12z Mar 06 2023 Forecast Hour: [240] valid at 12z Thu, Mar 16 2023

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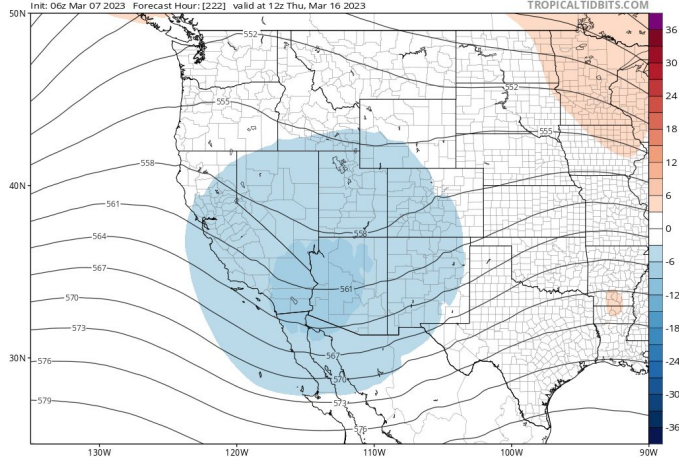


- Another period of troughing over the Western US is likely
 - Westerly flow will allow for troughs that move across the region to have higher moisture content
- High uncertainty in precipitation amounts and locations, as ensembles vary with trough depths and timing

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

INI: 06z Mar 07 2023 Forecast Hour: [222] valid at 12z Thu, Mar 16 2023

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Model run yesterday for Thursday, March 16

Model run this morning for Thursday, March 16

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

Elevated odds of above average precipitation across Utah.

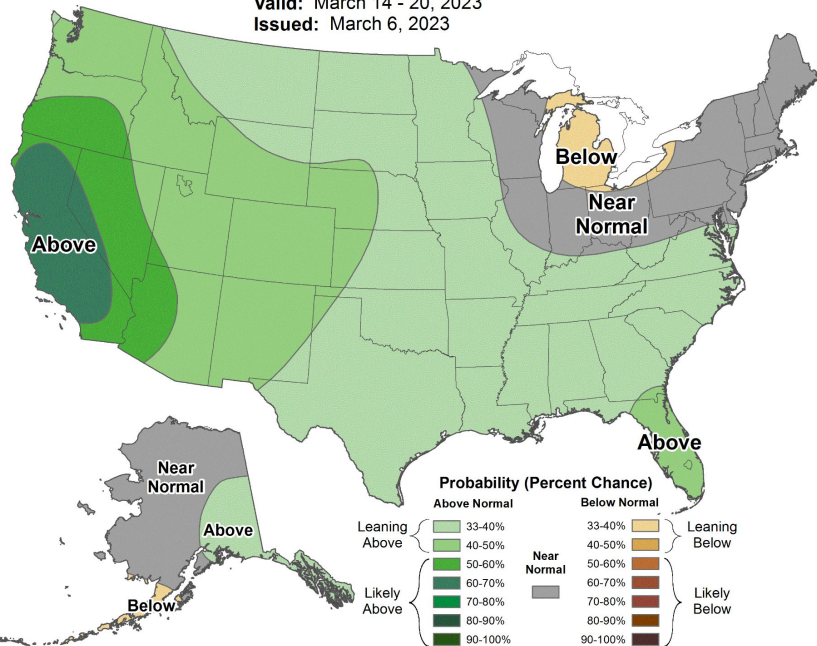
Slightly elevated odds of below average temperatures across Utah.



8-14 Day Precipitation Outlook



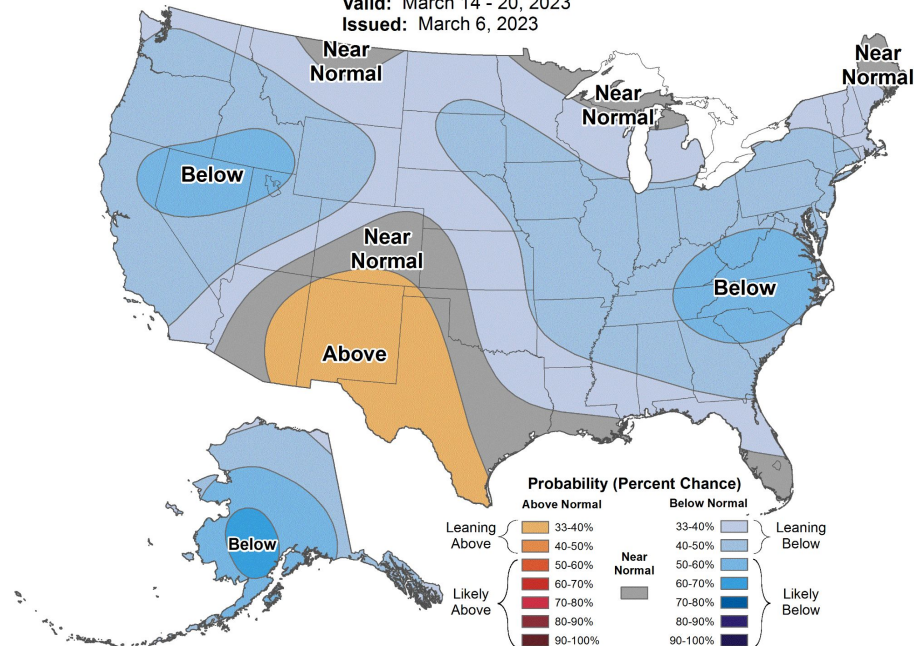
Valid: March 14 - 20, 2023
Issued: March 6, 2023



8-14 Day Temperature Outlook

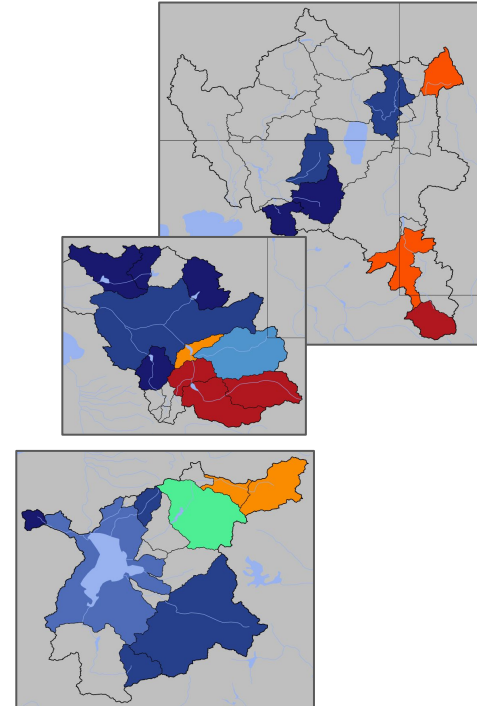
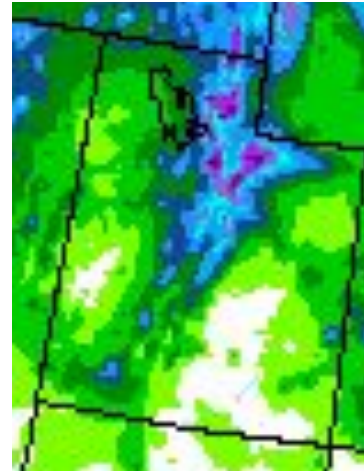
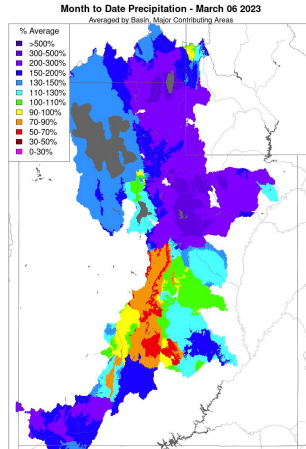
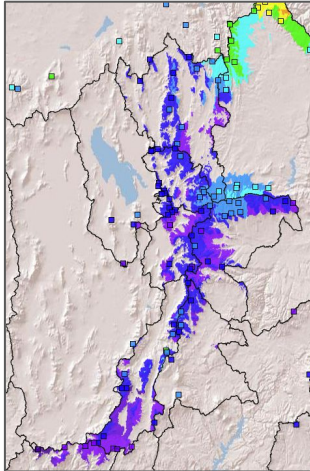
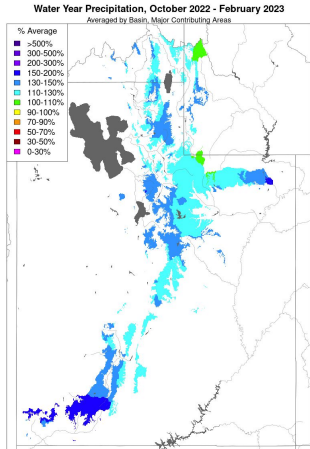


Valid: March 14 - 20, 2023
Issued: March 6, 2023



Summary

- Water year precipitation is much above average across Utah.
- Current snowpack is much above average across Utah.
- Water supply forecasts are above to much above average across Utah.
 - Slight declines in Uinta headwaters water supply forecasts
- Early March precipitation is above average.
- March weather forecasts (through the 21st) are active.



2023 Water Supply Webinar Schedule

**All Times Mountain Time (MT)*

Colorado River Basin

Monday	Jan 9 th	10 am
Tuesday	Feb 7 th	10 am
Tuesday	Mar 7 th	10 am
Friday	Apr 7 th	10 am
Friday	May 5 th	10 am

Utah/Great Basin

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

Peak flow forecast webinar Monday, March 20th, 10 am MT

Additional briefings scheduled as needed

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

CBRFC Contacts & WY23 Basin Focal Points

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CBRFC Water Supply Presentations
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