Utah Water Supply Briefing

April 7\textsuperscript{th}, 2022

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 Review
2. Current Snowpack
3. 2022 Water Supply Forecasts
4. Typical Forecast Error
5. Upcoming Weather
6. CBRFC Snow Operations
7. Contacts & Questions
March was the 3rd month in a row of below normal precipitation.

Water year precipitation is btw 87-98 percent of normal.

<table>
<thead>
<tr>
<th>Forecast Group</th>
<th>Percent of WY normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bear</td>
<td>90</td>
</tr>
<tr>
<td>Weber</td>
<td>87</td>
</tr>
<tr>
<td>Six Creeks</td>
<td>90</td>
</tr>
<tr>
<td>Provo</td>
<td>91</td>
</tr>
<tr>
<td>Sevier</td>
<td>91</td>
</tr>
<tr>
<td>Duchesne</td>
<td>98</td>
</tr>
<tr>
<td>Virgin</td>
<td>90</td>
</tr>
</tbody>
</table>
Utah Weather Review - Precipitation

January 1 - March 31
Minimum Rank

March 2022
Monthly Precipitation - March 2022
Averaged by Basin, Major Contributing Areas

Water Year Precipitation
Water Year Precipitation, October 2021 - March 2022
Averaged by Basin, Major Contributing Areas

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

Prepared by NWS, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrf.noaa.gov
Utah Current Snowpack - Early April

SNOTEL (Observed)

CBRFC Model Snow, Significant Areas - Apr 4, 2022

<table>
<thead>
<tr>
<th>SNOTEL (Observed)</th>
<th>CBRFC Model Snow, Significant Areas - Apr 4, 2022</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% Median (% Median - Averaged by Basin)</td>
</tr>
<tr>
<td></td>
<td>No Data</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bear</td>
</tr>
<tr>
<td></td>
<td>Weber</td>
</tr>
<tr>
<td></td>
<td>Six Creeks</td>
</tr>
<tr>
<td></td>
<td>Provo</td>
</tr>
<tr>
<td></td>
<td>Duchesne</td>
</tr>
<tr>
<td></td>
<td>Sevier</td>
</tr>
<tr>
<td></td>
<td>Virgin</td>
</tr>
</tbody>
</table>

As of April 1, 2022

CBRFC Snow Groups (SNOTEL Stations)
Current snowpack is below last year’s snowpack in Six Creeks. Other groups are similar at this point.
Utah Water Supply Forecasts - Overview

- April 1 Forecast for April-July Volume
- April-July Forecast Streamflow Volumes are in percent of 1991-2020 average
- 10% declines in forecasts from Mar. 1

Median value of the...
...individual forecasts (in % of average)...
...by Forecast Group.

<table>
<thead>
<tr>
<th>Forecast Group</th>
<th>Median Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weber</td>
<td>55%</td>
</tr>
<tr>
<td>Bear</td>
<td>50%</td>
</tr>
<tr>
<td>Six Creeks</td>
<td>65%</td>
</tr>
<tr>
<td>Provo / Utah Lake</td>
<td>60%</td>
</tr>
<tr>
<td>Sevier</td>
<td>65%</td>
</tr>
<tr>
<td>Duchesne</td>
<td>75%</td>
</tr>
<tr>
<td>Virgin</td>
<td>50%</td>
</tr>
</tbody>
</table>
Utah Water Supply Forecasts - Weber

Weber River Basin Forecasts

January: 110% of Normal
February: 85% of Normal
March: 65% of Normal
April: 55% of Normal

- Forecasts range from 30-70% of normal
Utah Water Supply Forecasts - Bear

Bear River Basin Forecasts

January: 95% of Normal
February: 80% of Normal
March: 60% of Normal
April: 50% of Normal

- Forecasts range from 25-80% of normal
Utah Water Supply Forecasts - Bear

Little Bear - Paradise (PRZU1)
Period: Apr-jul, Official 50% Forecast (2022-04-01) 10.7 kaf (27% Average, 38% Median)
ESP is Unregulated and Includes 7 Day Precipitation Forecast

2022/04/01:
Min 2021: 5.83
Average: 39
Median: 28
Observed Total: 0.65
Normal Accumulation: 0.43
ESP: 10.7
Official 10: 20
Official 30: 14.4
Official 50: 10.7
Official 70: 9.1
Official 90: 7

Volume (kaf)
Utah Water Supply Forecasts - Six Creeks

Six Creeks Basin Forecasts

January: 115% of Normal
February: 100% of Normal
March: 75% of Normal
April: 65% of Normal

- Forecasts range from 50-75% of normal
Utah Water Supply Forecasts - Utah Lake Basin

Utah Lake Basin Forecasts

January: 110% of Normal
February: 85% of Normal
March: 70% of Normal
April: 60% of Normal

- Forecasts range from 40-75% of normal
Utah Water Supply Forecasts - Provo

Provo - Woodland, Nr (WOUU1)

Period: Apr-Jul, Official 50% Forecast (2022-04-01) 72 kaf (75% Average, 86% Median)

ESP is Unregulated and No Precipitation Forecast Included

2022/04/01:
Min 1977: 26.99
Average: 96
Median: 84
Observed Total: 1.34
Normal Accumulation: 0.36
ESP: 73.6
Official 10: 101
Official 30: 81
Official 50: 72
Official 70: 66
Official 90: 61

Model Snow

Provo - Woodland, Nr (WOUU1)
Utah Water Supply Forecasts - Duchesne

Duchesne River Basin

- January: 110% of Normal
- February: 90% of Normal
- March: 75% of Normal
- April: 75% of Normal
  - Forecasts range from 50-85% of normal

Price River Basin

- January: 125% of Normal
- February: 85% of Normal
- March: 80% of Normal
- April: 80% of Normal
Utah Water Supply Forecasts - Duchesne

Rock Ck - Upper Stillwater Reservoir (USTU1)
Period: Apr-Jul, Official 50% Forecast (2022-04-01): 60 kaf (83% Average, 94% Median)
ESP is Unregulated and No Precipitation Forecast Included

2022/04/01:
Min 1977: 29.9
Average: 72
Median: 64
Observed Total: 0.61
Normal Accumulation: 0.11
ESP: 61.3
Official 10: 85
Official 30: 70
Official 50: 60
Official 70: 52
Official 90: 48
# Utah Water Supply Forecasts - Sevier and Virgin

## Sevier River Basin Forecasts (regulated)

<table>
<thead>
<tr>
<th>Month</th>
<th>Percentage of Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>105%</td>
</tr>
<tr>
<td>February</td>
<td>90%</td>
</tr>
<tr>
<td>March</td>
<td>75%</td>
</tr>
<tr>
<td>April</td>
<td>65%</td>
</tr>
</tbody>
</table>

- Forecasts range from 25-80% of normal

## Virgin River Basin Forecasts

<table>
<thead>
<tr>
<th>Month</th>
<th>Percentage of Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>90%</td>
</tr>
<tr>
<td>February</td>
<td>75%</td>
</tr>
<tr>
<td>March</td>
<td>60%</td>
</tr>
<tr>
<td>April</td>
<td>50%</td>
</tr>
</tbody>
</table>

- Forecasts range from 35-55% of normal
Historical (1981-2010) Forecast Verification

Forecasts are better than just going with average
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

April Forecast Error: April-July Volume

<table>
<thead>
<tr>
<th>Location</th>
<th>April 1 Forecast Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEAR - UTAH-WYOMING STATE</td>
<td>15%</td>
</tr>
<tr>
<td>BEAR - WOODRUFF NARROWS</td>
<td>31%</td>
</tr>
<tr>
<td>LOGAN - LOGAN- NR</td>
<td>14%</td>
</tr>
<tr>
<td>WEBER - OAKLEY- NR</td>
<td>14%</td>
</tr>
<tr>
<td>WEBER - ROCKPORT RES</td>
<td>19%</td>
</tr>
<tr>
<td>BIG COTTONWOOD CK</td>
<td>16%</td>
</tr>
<tr>
<td>PROVO - WOODLAND- NR</td>
<td>13%</td>
</tr>
<tr>
<td>PROVO - DEER CK RES</td>
<td>19%</td>
</tr>
<tr>
<td>VIRGIN - VIRGIN</td>
<td>17%</td>
</tr>
</tbody>
</table>
Early April has had some precipitation in the northern half of the basin.
Upcoming Weather: WPC April 7-14 Precipitation Outlook

- Dry and warm conditions to start the forecast period
- A pattern change starting this weekend will bring precipitation and below average temperatures next week
  - Around 1” expected for the high terrain
  - Generally around 0.10” - 0.50” elsewhere
- Best chances of precipitation are Monday through Wednesday, with another round possible at the end of the week
Upcoming Weather: April 14-20

- Chances of precipitation will come to an end by next weekend
- Ridging will likely occur over the Eastern Pacific, and remain in place for the rest of the forecast period
Upcoming Weather: 8-14 Day Outlook (April 14-20)

Elevated odds of below average precipitation across all basins. Near average temperatures likely in western regions, to below average temperatures in eastern regions.
CBRFC Winter/Spring Snow Operations Overview

- Twice monthly CBRFC model snow update based on NRCS SNOTEL precipitation during snow accumulation season
  - Long (~30-40 years), reliable observed precipitation dataset at mid/high elevation points across western US
  - Crucial component of CBRFC hydrologic model calibration process

- CBRFC model SWE vs. ASO Inc. SWE analysis (select basins in Colorado)
  - High resolution snapshot of estimated SWE
  - Newer dataset (<5 years) with limited and inconsistent coverage
  - Ongoing evaluation

- CBRFC model snow vs. satellite snow: areal extent/snow covered area analysis
  - Data collection/reliability requires days with no/few clouds
  - CBRFC used historical (2000-2020) satellite snow covered area data during latest snow model calibration
  - Used qualitatively in real time model to help validate model snow states

- Awareness of current dust on snow conditions
  - Dust on snow conditions impact snowmelt rate/timing/magnitude

- Awareness of ice/backwater impacts, field measurements of flow post river ice, rating curve adjustments
  - Observed streamflow rises and fluctuations due to snowmelt help validate model snow states

- Quality control of event precipitation type (rain vs. snow) and amount across various elevation bands
  - Hydrologic model review to ensure high quality forecasts of both daily streamflow and seasonal volumes
  - Validation of CBRFC hydrologic model states (snow and soil moisture)
January-March precipitation amounts have been below normal. Water year precipitation is now below normal.

- Snowpack conditions have continued to decline since the end of January (percent of median).
  - Below average March precipitation
  - Mid-late March snowmelt

- Water Supply Forecasts have declined from March 1

- Mean forecast errors are generally below 20% (see Historical Verification for site specific info)

- We’ve had some precipitation in April. We will get more April precipitation, longer term forecasts suggest below normal April precipitation (through April 20).

- We use many data sources to keep the model on track / provide the best 10 day and seasonal water supply forecasts.
# 2022 Water Supply Webinar Schedule

*All Times Mountain Time (MT)*

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Colorado River Basin</strong></td>
<td></td>
<td><strong>Great Basin</strong></td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td>Jan 7th</td>
<td>Friday</td>
<td>Jan 7th</td>
</tr>
<tr>
<td></td>
<td>10 am</td>
<td></td>
<td>11:30 am</td>
</tr>
<tr>
<td>Monday</td>
<td>Feb 7th</td>
<td>Monday</td>
<td>Feb 7th</td>
</tr>
<tr>
<td></td>
<td>10 am</td>
<td></td>
<td>11:30 am</td>
</tr>
<tr>
<td>Monday</td>
<td>Mar 7th</td>
<td>Monday</td>
<td>Mar 7th</td>
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<tr>
<td></td>
<td>10 am</td>
<td></td>
<td>11:30 am</td>
</tr>
<tr>
<td>Thursday</td>
<td>Apr 7th</td>
<td>Thursday</td>
<td>Apr 7th</td>
</tr>
<tr>
<td></td>
<td>10 am</td>
<td></td>
<td>11:30 am</td>
</tr>
<tr>
<td>Friday</td>
<td>May 6th</td>
<td>Friday</td>
<td>May 6th</td>
</tr>
<tr>
<td></td>
<td>10 am</td>
<td></td>
<td>11:30 am</td>
</tr>
</tbody>
</table>

Additional briefings scheduled as needed

Webinar schedule & registration information has been posted to the CBRFC web page
CBRFC Contacts & WY22 Basin Focal Points

**Basin Focal Points (Forecasters)**

- Brenda Alcorn - Green, Duchesne, White/Yampa
  brenda.alcorn@noaa.gov

- Ashley Nielson – Gunnison, San Juan, Dolores, Lake Powell
  ashley.nielson@noaa.gov

- Cody Moser – Upper Colorado Mainstem
  cody.moser@noaa.gov

- Patrick Kormos – Great Basin/Sevier
  patrick.kormos@noaa.gov

- Trevor Grout - Virgin, Lower Colorado
  trevor.grout@noaa.gov

- Tracy Cox - Hydrometeorologist
  tracy.cox@noaa.gov

- Nanette Hosenfeld - Senior Hydrometeorologist
  nanette.hosenfeld@noaa.gov

- Wolfgang Hanft - Hydrometeorologist
  wolfgang.hanft@noaa.gov

- Michelle Stokes – Hydrologist In Charge
  michelle.stokes@noaa.gov

- Paul Miller – Service Coordination Hydrologist
  paul.miller@noaa.gov

- John Lhotak – Development and Operations Hydrologist
  john.lhotak@noaa.gov

CBRFC Webpage
https://www.cbrfc.noaa.gov/

CBRFC Operations
cbrc.operations@noaa.gov
801-524-4004

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