CBRFC
2018 Early Outlook

December 7, 2017

Greg Smith, Brenda Alcorn
Senior Hydrologists
Today’s Topics

- Late summer / fall weather
- Soil moisture conditions entering the winter season
- Current snow conditions
- Early season water supply model guidance
- Weather outlook for the remainder of December
- New forecast evolution plot features
- Forecast timeline and upcoming water supply briefings
Late Summer/Fall Precipitation

Monthly Precipitation - August 2017
(Averaged by Basin)

% Average
- >500%
- 300-500%
- 200-300%
- 150-200%
- 130-150%
- 110-130%
- 100-110%
- 90-100%
- 70-90%
- 50-70%
- 30-50%
- 0-30%

Monthly Precipitation - September 2017
(Averaged by Basin)

% Average
- >500%
- 300-500%
- 200-300%
- 150-200%
- 130-150%
- 110-130%
- 100-110%
- 90-100%
- 70-90%
- 50-70%
- 30-50%
- 0-30%

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

Soil Moisture - November 16 2017
(Modeled, Averaged by Basin)

Great Basin

Upper Colorado Basin

% Average
- >500%
- 300-500%
- 200-300%
- 150-200%
- 130-150%
- 110-130%
- 100-110%
- 90-100%
- 70-90%
- 50-70%
- 30-50%
- 0-30%

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Salt Lake City, Utah, www.cbrfc.noaa.gov
Modeled soil moisture, averaged by Basin – Nov 16th 2017
Current Snow Conditions - SNOTEL

Dec 7th 2017

Current
4.9 inches
12/7 median 3.7 inches
4/1 median 14.5 inches

Current
2.6 inches
12/7 median 6.3 inches
4/1 median 22.6 inches
Current Snow Represented in the Hydrologic Model

Snow Conditions - December 06 2017
(Modeled, Major Contributing Areas)

Great Basin

Upper Colorado Basin

% Median SWE
- >500%
- 300-500%
- 200-300%
- 150-200%
- 130-150%
- 110-130%
- 100-110%
- 90-100%
- 70-90%
- 50-70%
- 30-50%
- 0-30%

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Early Outlook: 2018 April-July Model Guidance

April-July volumes in 1000’s acre-feet and % of 1981-2010 average

- Flaming Gorge: 105%
- Fontenelle: 114%
- Yampa-Maybell: 84%
- Duchesne-Randlett: 62%
Early Outlook: Comparing 2016 & 2017 Dec Guidance for Following Apr-Jul Period

April-July volumes in 1000’s acre-feet and % of 1981-2010 average

This Dec Forecast

Last Dec Forecast

1000’s Acre-Feet

Flaming Gorge: 105%, 86%
Fontenelle: 114%, 92%
Yampa-Maybell: 84%, 84%
Duchesne-Randlett: 62%, 64%
Early Outlook: 2017 Observed Volumes – Significant Snow Accumulation Season Remains

April-July volumes in 1000’s acre-feet and % of 1981-2010 average

<table>
<thead>
<tr>
<th>River Location</th>
<th>This Dec Forecast</th>
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April-July volumes in 1000’s acre-feet and % of 1981-2010 average

Early Outlook: 2017 Observed Volumes – Significant Snow Accumulation Season Remains

April-July volumes in 1000’s acre-feet and % of 1981-2010 average

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Early Outlook: 2018 April-July Model Guidance

April-July volumes in 1000’s acre-feet and % of 1981-2010 average

- Colorado-Kremmling: 86%
- Gunnison-Blue Mesa: 73%
- Dolores-McPhee: 52%
- San Juan-Navajo: 58%
- Animas-Durango: 58%
Early Outlook: Comparing 2016 & 2017 Dec Guidance for Following Apr-Jul Period

April-July volumes in 1000’s acre-feet and % of 1981-2010 average

- **Colorado-Kremmling**: 86% (This Dec Forecast), 77% (Last Dec Forecast)
- **Gunnison-Blue Mesa**: 73% (This Dec Forecast), 65% (Last Dec Forecast)
- **Dolores-McPhee**: 52% (This Dec Forecast), 79% (Last Dec Forecast)
- **San Juan-Navajo**: 58% (This Dec Forecast), 67% (Last Dec Forecast)
- **Animas-Durango**: 77% (This Dec Forecast)
Early Outlook: 2017 Observed Volumes – Significant Snow Accumulation Season Remains

April-July volumes in 1000’s acre-feet and % of 1981-2010 average

- Colorado-Kremmling: 86% (This Dec Forecast), 77% (Last Dec Forecast), 109% (Last Spring Observed)
- Gunnison-Blue Mesa: 73% (This Dec Forecast), 65% (Last Dec Forecast), 136% (Last Spring Observed)
- Dolores-McPhee: 52% (This Dec Forecast), 79% (Last Dec Forecast), 117% (Last Spring Observed)
- San Juan-Navajo: 58% (This Dec Forecast), 67% (Last Dec Forecast), 105% (Last Spring Observed)
- Animas-Durango: 58% (This Dec Forecast), 77% (Last Dec Forecast), 109% (Last Spring Observed)
April-July volumes in 1000’s acre-feet and % of 1981-2010 average

Lake Powell

1000’s Acre-Feet

This Dec Forecast: 64%
Last Dec Forecast: 69%
Last Spring Observed: 114%
Early Outlook: 2017 observed volumes – A lot of snow accumulation season remains

April-July volumes in 1000’s acre-feet and % of 1981-2010 average

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<tr>
<td>Bear-Stateline</td>
<td>135%</td>
<td>103%</td>
<td>95%</td>
</tr>
<tr>
<td>Weber-Oakley</td>
<td>138%</td>
<td>83%</td>
<td>86%</td>
</tr>
<tr>
<td>Provo-Woodland</td>
<td>151%</td>
<td>97%</td>
<td>83%</td>
</tr>
<tr>
<td>Sevier - Hatch</td>
<td>121%</td>
<td>48%</td>
<td>46%</td>
</tr>
<tr>
<td>Virgin - Virgin</td>
<td>112%</td>
<td>59%</td>
<td>55%</td>
</tr>
</tbody>
</table>
What Happened Last Season?

A big pattern change around the 3\textsuperscript{rd} week of December
Extreme wet conditions ensued into February

December 1-15 2016

December 1-25 2016

December 2016

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

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Early Outlook 2018 Model Guidance: April-July volumes (percent of 1981-2010 average)
Early Outlook 2018 Model Guidance: Jan-May volumes (percent of 1981-2010 median)
So what about this year? The outlook for December
The Outlook for December – Meteorological Guidance for Fri Dec 8th
The Outlook for December – Meteorological Guidance for Tue Dec 12th
The Outlook for December – Meteorological Guidance for Sat Dec 16th
The Outlook for December – Long Range Guidance for Sat Dec 23rd
The Outlook for December – 7 day precipitation outlook (Dec 7th – Dec 14th)
The Outlook for December – Precipitation Probability (Dec 13th-19th)
Soil moisture conditions:

**Above average**: Upper Green (WY), northern Great, and Duchesne Basins.

**Near or above average**: Headwaters Colorado, Yampa, Gunnison, eastern San Juan Basins.

**Below average**: Lower Colorado, Dolores, southwest Utah, remainder of San Juan Basins.

Generally better than last year at this time most areas except Lower Colorado and parts of Dolores and San Juan Basins.

Weather Outlook:

Dry conditions experienced this fall are likely to continue through most if not all of December. Northern areas, such as the upper Green may be more susceptible to storm systems rounding the ridge of high pressure.

Weather models continue to keep a mean ridge over the area into the last week of the month.

Snow:

Snow conditions are likely to worsen over the next 2-3 weeks, particularly for areas farther south. However, sufficient snow accumulation season remains and there is time to make up ground if we get the right weather pattern change.

Water Supply:

Anticipate most areas with below average forecasts to start off the season.
Communicating Forecast Information

Existing Forecast Evolution Plot

Colorado - Kremmling- Nr (KRMC2)
Apr-Jul Observed Volume: 940 kaf (109% of average)
ESP is Unregulated and No Precipitation Forecast Included

Max/Min
- ESP 50%
- ESP 20-70%
- ESP 10-90%
- ESP w/o Obs
- Official
- Observed Accumulation
- Period Total
- Normal Accumulation

Observed Flow (When in the forecast target period)

Red: Official Forecast
Blue: Daily raw model guidance

Range of forecast probabilities
- 10%
- 30%
- 50%
- 70%
- 90%

Voluntary
Min 2002
Max 2011

Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep

Plot Created 2017-09-06 07:26:43, NOAA / NWS / CBRFC
Forecasts in the forecast target period include observed values.
Communicating Forecast Information

New Forecast Evolution Plot (many more interactive features)

Colorado - Kremmling, Nr (KRMC2)
Period: Apr-Jul, Observed Volume: 939.63 kaf (109% Average, 115% Median)
ESP is Unregulated and No Precipitation Forecast Included

- Range of forecast probabilities
- 10%
- 50%
- 90%

A dot on the plot corresponds to a value in the list

Red: Official Forecast
Blue: Daily raw model guidance

Evolution Plot: 10/90 bounds (the default)

2017/03/01:
- Max 2011: 1780
- Min 2002: 246
- Average: 860
- Median: 820
- Observed Total: 940
- ESP 10/90: 1090
- Official 10: 1490
- Official 30: 1000
- Official 50: 1060
- Official 70: 1180
- Official 90: 825
Communicating Forecast Information

New Forecast Evolution Plot (many more interactive features)

Colorado - Kremmling, Nr (KRMC2)
Period: Apr-Jul, Observed Volume: 939.63 kaf (109% Average, 115% Median)
ESP is Unregulated and No Precipitation Forecast Included

2017/05/16:
- Max 2011: 1780
- Min 2002: 246
- Average: 860
- Median: 820
- Observed Accumulation: 216
- Observed Total: 940
- Normal Accumulation: 211
- ESP 10/90: 857
Communicating Forecast Information

New Forecast Evolution Plot (many more interactive features)

Colorado - Kremmling, Nr (KRMC2)
Period: Apr-Jul, Observed Volume: 939.63 kaf (109% Average, 115% Median)
ESP is Unregulated and No Precipitation Forecast Included

2017/03/01:
- Max 2011: 1780
- Min 2002: 246
- Average: 860
- Median: 820
- Observed Total: 940
- ESP max: 1730
- ESP 10: 1490
- ESP 30: 1170
- ESP 50: 1090
- ESP 70: 1020
- ESP 90: 842
- ESP min: 655
- Official 10: 1490
- Official 30: 1180
- Official 50: 1060
- Official 70: 1000
- Official 90: 825
Communicating Forecast Information: Forecast Evolution Plot Options

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**Plot Options**

- QPF
- ESP
- Official Forecasts
- Average
- Median
- Observations
- Unapproved
- Max/Min

**ESP Display Mode**

- 30/70 Probability Bounds
- 10/90 Probability Bounds
- Max/Min Trace Bounds
- Probability Traces

**Plot Help**

Hover for values.
Click and drag to zoom.
Double click to zoom out.
Shift-click and drag to pan.

- Product Description
- ESP Model Description
- Download Data

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Tabular data will still be available
Forecast Evolution Plots: [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)  select: Water Supply  Click: Forecast Point
Concluding…

Forecast evolution plots for the 2018 season on CBRFC web site mid December

Official forecasts are usually ready by the 4\textsuperscript{th} working day of the month (Jan-Jun)

Notifications of new forecast / forecast discussion distributed to email distribution list

Water supply briefings (webinars) will be held early each month (Jan-May, etc.)

Monday Jan 8\textsuperscript{th} @ 11 am MT – Colorado River Basin Briefing
Monday Jan 8\textsuperscript{th} @ 1:30 pm MT Great Basin Briefing

Register for the briefings and see the full schedule by going to the CBRFC web page: www.cbrfc.noaa.gov

Feel free to contact us with any questions or concerns.

Thank You