Colorado Basin
Water Supply Briefing

April 4th 2019

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Phone: 1-877-929-0660
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Please mute your phone until the question period
Thank You!
Today’s Presentation

Very wet start to March
   Record precipitation in the first 15 days

Snowpack well above the seasonal peak in many areas
   Update on current snowpack conditions

2019 Water Supply Forecasts – Widespread increases since early March
   Select forecast site review
   Flows in similar snowpack years (analog years)

Peak Flows
   Information about magnitude of streamflow peaks – flood potential

Upcoming Weather
   Likely impacts to the forecasts going forward

Contacts & Questions

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   * Please mute your phone until the question period *
Early March weather pattern

500mb Height Anomaly – first two weeks of March

Negative values (cool colors) indicate an anomalous trough over the western US. This pattern persisted since early February.
March Precipitation – Very wet first half of the month
Early March storms contained significant moisture

March 2nd 2019

March 12th 2019
Upper San Juan March precipitation

March Precipitation ~14.1 inches
Period of record average: 6.12 inches
Record: 17.3 inches in 1979

Provisional data

~ 6 inches
~ 7 inches

Additional precip.
Gridded precipitation field for March 2019 (Upper Colorado / Great Basin)
March Temperature – Mean monthly maximum deviation from normal
Cooler temperatures preserved some lower elevation snow
Early April snowpack conditions
River Basin SNOTEL group plots
River Basin SNOTEL group plots
**Upper Colorado Basin:** Dry soil conditions are still expected to have some impact on the runoff volumes. However in areas of significant snowpack and where melt is delayed these impacts will likely be less.

**Lower Colorado Basin:** Recent rainfall and snowmelt has increased soil moisture in many Lower Colorado Basin areas. More efficient runoff is likely due to additional rainfall. However we are entering a time of year where large rainfall events are less likely.
Forecasts as of Apr 1 2019

Volume 1000’s acre feet / % of 1981-2010 average

Minimal to no change in upper Green. Increases everywhere else (+5-15% of average).

Largest increases in the western Duchesne River Basin
Upper Colorado: Colorado River Mainstem

Forecasts as of Apr 1 2019
Volume in 1000’s acre-feet / % of 1981-2010 average

Forecast range: ~ 100% to 135% average

Forecasts generally increased between 5% to 18% of average throughout the Basin. Largest increase in southern headwaters (Eagle, Blue, Williams Fork)
General forecast range: ~ 115% to 145% average

Large increases between March 1st and April 1st. Very similar in magnitude to increases between Feb and Mar.

- McPhee Increase: 100 KAF (34% of average increase)
- Blue Mesa Increase: 185 KAF (27% of average increase)
- Taylor Park Res increase: 20 KAF (20% of average increase)
Upper Colorado: San Juan Basin

Forecasts as of Apr 1 2019
Volume in 1000’s acre-feet / % of 1981-2010 average

- San Juan-Bluff: 1380 / 125%
- San Juan-Farmington: 1370 / 125%
- Animas-Durango: 515 / 124%
- Mancos-Mancos: 36 / 116%
- Lemon Res: 65 / 118%
- Vallecito Res: 240 / 124%
- San Juan-Carracas: 450 / 118%
- Navajo Res: 920 / 125%

Forecast range: ~ 115% to 130 % average

Basin wide volume increases of 15% to 30% of average between March 1st and April 1st.

- Vallecito increase: 35 KAF (18% of average increase)
- Lemon increase: 9 KAF (16% of average increase)
- Navajo increase: 230 KAF (31% of average increase)
Lake Powell summarizes the impacts of the very wet February through early March period in the upper Colorado River Basin.

The Lake Powell inflow forecast increased 1.9 million acre-feet from early March (26% of average increase)
Above average flow occurred in February/March due to potent storm systems that brought rain and lower elevation snowmelt. Virgin River headwater observed February volume was exceed 140% of average and March over 250% of average.

Forecast range:
~ 110% to 120% average
~165% to 205% median
Increase of 5-12 % of average over March Forecasts
Lower Colorado Apr-May & Seasonal (Jan-May) forecast streamflow volumes (1000’s acre-feet / % of 1981-2010 median)

Forecast range: ~ 60% to 300% of median

Nearly all of seasonal flow has already been observed.

Climatologically entering a drier period of the season.

* Apr-June forecast period
Increased due to above average Feb precipitation. Fairly flat since.

Daily model guidance 50% forecast and range (track the trend)

50% exceedance forecast (the "official" forecast)

www.cbrfc.noaa.gov select “Water Supply” from dropdown menu
Forecast Evolution Plot: Dillon Reservoir Inflow (Colorado Headwaters)

Water Supply Forecast

Blue - Dillon Res (DIRC2)
ESP is Unregulated and No Precipitation Forecast Included

2019/04/01:
Max 1984: 275.99
Min 2002: 54.07
Average: 163
Median: 159
Observed Total: 0.2
Normal Accumulation: 0.33
ESP: 202
Official 10: 245
Official 30: 225
Official 50: 205
Official 70: 185
Official 90: 165

Colorado Basin River Forecast Center
DIRC2 Blue River abv Dillon Group

2019: 205 KAF
1993: 195 KAF
1983: 209 KAF
Guidance / Forecasts assume average climate conditions in the future.

Trended down slightly due to a dry 2nd half of March.

However significant increase since early February.

Average

2008: 999 KAF
1993: 985 KAF
2017: 915 KAF
Mid March update was higher than guidance based on anticipated wet storm system that did not verify.

Since early February guidance / forecasts have increased 200 KAF

Last years runoff was 2\textsuperscript{nd} lowest (49.7 KAF)
Forecast Evolution Plot: Navajo Inflow (San Juan Basin)

San Juan - Navajo Res, Archuleta, N (NVRN5)
Period: Apr-Jul, Official 50% Forecast (2019-04-01): 920 kaf (125% Average, 131% Median)
ESP is Unregulated and No Precipitation Forecast Included

2019/04/01:
Max 1979: 1776.84
Min 2002: 36.74
Average: 735
Median: 700
Observed Total: 4.13
Normal Accumulation: 5.68
ESP: 911
Official 10: 1170
Official 30: 1000
Official 50: 920
Official 70: 815
Official 90: 780

2019: 920 KAF
1997: 1022 KAF
2008: 973 KAF
Since early February Lake Powell inflow forecast increased 3.9 million acre-feet (about a 54% of average increase)

If the forecast verifies it would be the 2nd highest observed volume in the last 22 years

(2011 12.5 MAF & 1997 11.6 MAF)
Peak Flow/Flood Potential Updates

Percentile Ranking of Peak Flows

- Additional piece of information regarding flooding potential
- Not all locations have a defined flood stage
- Provides historical context
- Will eventually be available on the webpage

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Currently no forecast points in the model are forecast to reach flood stage. However many streamflow peaks will are forecast to be in the top 30% of their historical record.

The next 6 weeks will determine how the high water / flood potential threat will really play out.

Given the current snowpack levels a delayed melt / increase in snowpack into mid May could significantly increase flood potential in certain areas.
Upper Colorado Headwaters:
- Blue River – Top 15%
- Tenmile Creek – Top 30%
- Crystal River – Top 30%

Gunnison Headwaters:
- Surface Creek – Top 20%

Dolores Headwaters:
- Above Rico - Top 20%

San Juan Headwaters:
- Upper San Juan - Top 25%
- Animas – Top 30%

25% chance instantaneous peaks will reach NWS defined flood stage

- Currently no forecast points reach flood stage at the 50% exceedance forecast.
- Several sites have a 10% chance for the mean daily flow to reach flood stage
- A subset of those sites have a 25% chance of the instantaneous peaks to reach flood stage

How high might streams be running compared to historical record?
This morning – Satellite image from this morning

In between storm systems today and Friday
Upcoming Weather – Weak storm system Saturday

Splitting storm system moving through the northern Great and Colorado River Basins. Precipitation amounts should be generally light, upwards to .50 to .75 northern mountains. Ridge and warmer temperatures early next week should enhance snowmelt in certain areas.
Upcoming Weather – Early next week (Tue-Thu)

Models suggest a more robust storm system for the middle of next week. Primary impacts look to be from central Utah / Colorado north. This system is colder and would bring several inches of snow to the mountains and possibly snow to lower elevations.

Wednesday April 10
Upcoming Weather – 2nd weekend of April (12th-13th)

Models are becoming more consistent with the idea of a large closed low pressure system moving through the southern part of the forecast area. Confidence is low considering the long lead time. Potentially a good precipitation producer for those areas that already have a significant snowpack (SW Colorado).
Precipitation Outlook – Next 7 Days

Weather Prediction Center
Precipitation Outlook April 4th – April 11th
The 8-14 day outlook – Very April like with a progressive storm pattern

Pattern is trending wetter/cooler for the first half of April. Not as wet as the previous couple of months.

Periodic warming between storms will slowly increase snowmelt in middle elevations and areas south.

Next 2 weeks: Precipitation should be near to above average and temperatures below average Upper Colorado / Great Basins. Some increase to high elevation snowpack is probable.

Impacts to Water Supply Volume Forecasts – Less dramatic changes in the trends between now and mid April. Northern / High elevation basins might experience some increase if additional snow / melt is delayed into May.
2019 monthly water supply briefings for the Colorado Basin

Tuesday May 7\textsuperscript{th} @ 11 am MT

Great Basin webinars are same dates at 1:30 pm MT (there is one today)

Additional webinar will be scheduled in early June if needed

Date/Times are subject to change. All registration information has been posted to the CBRFC web page.
CBRFC Water Supply Contacts

Please contact us with any questions

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