Great Basin / Utah Water Supply Briefing

May 7, 2018

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Please mute your phone until ready to ask questions
Today’s Presentation

• Quick review of the weather pattern that put us in our current situation

• April weather and water year precipitation summary

• The 2018 snowpack evolution

• Latest water supply forecasts and how several rank historically.

• Current and near term weather impacts
  • Seasonal peaks are very near – They are low and early.

• Wrapping up the 2018 season

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* Please mute your phone until the question period *
We knew we might have a problem late last fall.
We anticipated water supply forecasts would start out low.

Strong low pressure in the east (Hudson Bay) and a strong ridge near the West Coast.
A high amplitude “Blocking Pattern” had become established by December.

Extended periods of dry & warm or cold & wet usually result with such patterns.

Mean Atmospheric Pattern
Nov 15 – Nov 30

Mean Atmospheric Pattern
Dec 1 – Dec 31
This weather pattern persisted into mid February

Mean Atmospheric Pattern
January 2018

Mean Atmospheric Pattern
First half of February 2018

Storm track was around the periphery of the high pressure ridge. Precipitation impacts were limited to far northern portions of the Great Basin.
January 1st Forecasts: Started season below average

April-January streamflow
Volume forecasts
Forecasts as of Jan 1 2018
Not many April storms: A significant amount of April precipitation came from a storm system April 6th – April 8th. Warm system – high freezing levels – minor snowpack improvement

Apr 6th 2018

2-5 inches of precipitation to mountains of northern Utah / Colorado and Wyoming
April 2018 Precipitation: Precipitation through the first week of the month

Observed 24hr Precipitation, Ending 12Z, 04/08/2018

Precipitation (Inches)
- <0.01
- 0.01-0.1
- 0.1-0.2
- 0.2-0.3
- 0.3-0.4
- 0.4-0.5
- 0.5-0.75
- 0.75-1.0
- 1.0-1.25
- 1.25-1.5
- 1.5-1.75
- 1.75-2
- 2-2.5

Creation Time: Thu May 3 13:04:17 MDT 2018
April Weather Pattern

Mean Atmospheric Pattern
April 2018

Mean atmospheric high pressure ridge
Generally below average precipitation and above average temperatures
April Precipitation – full month % of average

April Totals

- Bear: 100%
- Weber: 80%
- Six Creeks: 85%
- Provo: 80%
- Duchesne: 50%
- Sevier: 75%
- Virgin: 70%
April Precipitation – Primary runoff contributing areas
Water Year Precipitation, October 2017 - April 2018
(Averaged by Basin)
Water Year 2018 Precipitation Historical Ranking

October-March

October-April
2018 Temperatures – Mean Monthly Maximum Deviation from Normal

February

March

April
2018 Snowpack Evolution

Peaked at 88% of the normal seasonal max

Peaked at 65% of the normal seasonal max

Peaked at 88% of the normal seasonal max

Peaked at 70% of the normal seasonal max
Snow Conditions: CBRFC hydrologic model – Now and Last year at this time

**Snow Conditions - May 06 2018**
(Modeling, Major Contributing Areas)

**Snow Conditions - May 06 2017**
(Modeling, Major Contributing Areas)
May 1st Water Supply Forecasts – Bear River Basin

April-July Forecast Streamflow Volumes (% of 1981-2010 average)

- Below 25%
- 25% - 35%
- 35% - 45%
- 45% - 55%
- 55% - 65%
- 65% - 75%
- 75% - 85%
- 85% - 95%
- 95% - 105%
- 105% - 115%
- 115% - 125%
- 125% - 135%
- 135% - 145%
- 145% - 155%
- 155% - 165%
- 165% - 175%
- Above 175%
- NA

Forecast range: ~35%-95% of average

Forecasts changed from -10% to +12% of average

Median Basin Forecast:
- Jan – 85%
- Feb – 75%
- Mar – 75%
- Apr – 70%
- May – 70%
Forecast Evolution Plot
Bear – UT/WY Stateline: 87 kaf / 78% average

Forecast is a combination of observed from April 1st until current date and model guidance from current date through July 31st
Forecast Evolution Plot
Logan River – Logan – 104 kaf / 94% average

Impact of early April storm
Greater than 10% chance of average runoff
May 1st Water Supply Forecasts – Weber River Basin

Median Basin Forecast:
- Jan – 65%
- Feb – 50%
- Mar – 50%
- Apr – 45%
- May – 40%

Forecast range:
- ~35%-60% of average
- Decreases between 1-15% of average
Forecast Evolution Plot
Weber – Oakley: 61 kaf / 52% average
May 1st Water Supply Forecasts – Six Creeks

Median Basin Forecast:
- Jan – 55%
- Feb – 45%
- Mar – 50%
- Apr – 45%
- May – 35%

April-July Forecast Streamflow Volumes (% of 1981-2010 average)

Forecast range: ~20-60%
Decreases between 4-12% of average

Red Butte Creek: 4th Lowest
Big Cottonwood Creek: 19 kaf / 52% average

Decrease in forecast; no chance for average runoff
May 1st Water Supply Forecasts – Provo River/Utah Lake

April-July Forecast Streamflow Volumes (% of 1981-2010 average)

Forecast range: ~13%-50%
Minor changes to most forecasts

- West Canyon: 2nd Lowest
- Spanish Fork: 5th Lowest
- American Fork: 5th Lowest

Median Basin Forecast:
- Jan – 50%
- Feb – 45%
- Mar – 45%
- Apr – 40%
- May – 40%
Forecast Evolution Plot
Provo – Hailstone (Jordanelle Inflow) – 66 kaf / 60% average

Water Supply Forecast

Provo - Hailstone, Nr (PVHU1)
Period: Apr-Jul, Official 50% Forecast (2018-05-01): 66 kaf (60% Average, 62% Median)
ESP is Unregulated and No Precipitation Forecast Included

2018/05/01:
Max 2011: 244.76
Min 1977: 23.99
Average: 110
Median: 107
Observed Accumulation: 11.5
Observed Total: 12.7
Normal Accumulation: 14.6
ESP: 65.4
Official 10: 84
Official 30: 71
Official 50: 66
Official 70: 61
Official 90: 54
May 1st Water Supply Forecasts – Duchesne

Forecast range: 20%-60%

Decreased 5–15% of average

Median Basin Forecast:
- Jan – 60%
- Feb – 60%
- Mar – 55%
- Apr - 60%
- May - 50%

April-July Forecast Streamflow Volumes (% of 1981-2010 average)

- Duchesne
  - Tabiona: 56%
  - Myton: 31%
- Strawberry Res: 27%
- Starvation: 23%
- Upper Lake: 63%
- Stillwater: 49%
- Moon: 58%
- Whiterocks: 50%
- Uinta: 54%
- Neola: 50%
- Ashley Creek: 43%
- Red Fleet: 50%
- White-Tabbyune: 2nd Lowest
- Strawberry Res: 3rd Lowest
- West Fork-Duchesne: 5th Lowest
- Moon Lake Res: 5th Lowest
- Duchesne-Randlett: 5th Lowest

White-Tabbyune: 2nd Lowest
Strawberry Res: 3rd Lowest
West Fork-Duchesne: 5th Lowest
Moon Lake Res: 5th Lowest
Duchesne-Randlett: 5th Lowest
Forecast Evolution Plot
Duchesne – Tabiona – 60 kaf / 56% average

Water Supply Forecast

Duchesne - Tabiona, Nr (TADU1)
Period: Apr-Jul, Official 50% Forecast (2018-05-01): 60 kaf (56% Average, 64% Median)
ESP is Unregulated and No Precipitation Forecast Included

2018/05/01:
Max 2011: 227.52
Min 1934: 21.48
Average: 108
Median: 94
Observed Accumulation: 8.1
Observed Total: 9.16
Normal Accumulation: 11.1
ESP: 60.4
Official 10: 73
Official 30: 65
Official 50: 60
Official 70: 53
Official 90: 47
Upper Colorado: San Rafael – Dirty Devil
(Southern Utah – smaller tributaries to the Green and Colorado River)

Forecasts as of May 1 2018
Volume in 1000’s acre-feet / % of 1981-2010 average

Forecast range:
~ 30%-50% average

Change of
0 to -6 % average

Electric Lake
4.4 / 33%

Joes Valley Reservoir
24 / 43%

Ferron Creek
16.5 / 43%

Muddy Creek
6.5 / 33%

Electric Lake Inflow:
4th lowest on record

Ferron Creek:
4th lowest on record

Muddy Creek:
4th lowest on record

Joes Valley Reservoir:
6th lowest on record
Historically, how have we forecast in low volume years (are we too high or too low?)

Could be many reasons we are too high/low & it can be difficult to tease out

Models struggles at extreme ends – Not enough extreme years in the calibration period
Extreme wet or dry in the future – We go with climatology (“normal” conditions) into the future
Model doesn’t have certain “states” correct (high elevation snow, soil moisture)

Bear River-WY/UT Stateline

Weber River- Oakley
Current Conditions – Warmed up significantly with rivers starting to react

Saturday 5/5 observed temperatures

SLC +12
Grand Junction +7
Craig CO +8
Durango +7
Big Piney WY +11

Maximum temperature departure from normal

Sunday 5/6 observed temperatures

SLC +18
Grand Junction +11
Craig CO +12
Durango +11
Big Piney WY +16

Maximum temperature departure from normal
Weak storm system moving through the northern Rockies today. Temperatures a few degrees cooler but still above average. No precipitation threat, primarily a cloud storm.
Strong ridge for midweek. This will bring temperatures 10-15+ degrees above average for many areas – initiating the spring seasonal peak flow for many locations.

Tue May 8th
The ridge flattens but above average temperatures persist into the end of the week.

Thu May 10th
Models suggest many streams will see their seasonal peak within the next 7 days

* Impacted by Duchesne Tunnel operations
Models bring a closed low pressure into the area for the weekend. Below average temperatures and precipitation likely.

Early estimates indicate generally .10 to .25 inches lower elevations with .50 to 1.50+ inches mountains of Utah, Wyoming, Colorado.
Much below average water year precipitation and snow pack with the exception of parts of the Bear River Basin that was closer to average.

Expecting below average runoff volumes for all river basins in Utah.

Seasonal peaks are anticipated in many locations over the next week. Some rebound in streamflow is likely in the May 15-25\textsuperscript{th} time frame but these peaks may be near or less than what is observed this week.

Most streams will likely be in seasonal recession by the last week of May.

At this point we continue to monitor the runoff, analyze and quality control meteorological guidance. A big driver of the near term streamflow are temperature forecasts. We try to get the best forecast information into the model.

Adjustments to model states may be necessary to correct streamflow simulations. This can impact our seasonal recession forecasts and water supply forecast updates. Usually these are minor and in the correct direction.

Feedback is welcome regarding these briefings.

We will be back in the fall with a review of the season and forecast verification.
CBRFC Water Supply Contacts

Please contact us with any questions

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