STATE OF THE UPPER YAMPA
MOFFAT COUNTY, APRIL 2018

THOSE WHO KNOW, KNOW THEY DON’T

BUT WE HAVE TO MAKE SOME BETS!

Kevin McBride, P.E.
General Manager UYWCD
WHO’S AT THE TABLE?

THE WHOLE WATERSHED AND THEN SOME
LET’S TALK ABOUT HOW IMPORTANT WE ARE. WE GET THE PRECIPITATION!!!!!!

… IN THE FORM OF SNOW…
LETS TALK MORE ABOUT HOW IMPORTANT WE ARE!

- YAMPA RIVER WATERSHED IS ABOUT 3.1% OF THE COLORADO RIVER'S LAND AREA
  YET

- YAMPA FLOWS MAKE UP ABOUT 10% OF THE COLORADO RIVER AT LEE'S FERRY

At The 5th Street Gage in Steamboat Springs
- The Watershed is about 0.2% of the Colorado
- The flow is a little more that 2%
What is the Upper Yampa Water Conservancy District?

Conserving some of that runoff for later use

- The Upper Yampa Water Conservancy District (UYWCD) serves most of Routt County and some of Moffat County with Storage.
- We operate Stagecoach and Yamcolo Reservoirs
- Stagecoach Reservoir can hold about 36,460 acre-feet of water. Yamcolo can hold 9,621 AF.
- We store water under contracts (for example)
  - Agricultural Use
    - Yamcolo Irrigators Association
  - Municipal Use
    - City of Steamboat Springs
    - Town of Hayden
    - Mt. Werner Water
  - Industrial Use
  - Tri-State Generation & Transmission
  - Environmental Flows
  - Colorado Water Trust
WHEN YOU GAMBLE, IT’S BEST TO HAVE A BIG PILE OF CHIPS
RESERVOIR OPERATIONS IN DROUGHT AND FLOOD

Sometimes you play the hand
Sometimes you get played
March 18, 2018 Current Deal
Ladies and Gentlemen Please Place your bets.
Water Supply Forecast

Yampa - Stagecoach Rsvr, Abv (YASC2)
Period: Apr-Jul, Official 50% Forecast (2018-03-01): 14.5 kaf (63% Average, 69% Median)
ESP is Unregulated and No Precipitation Forecast Included

2018/01/01:
Max 2011: 72.79
Min 2002: 1.46
Average: 23
Median: 21
ESP: 16.6
Official 10: 19.9
Official 30: 17
Official 50: 16.5
Official 70: 15.1
Official 90: 12.5
### What’s on the Table

#### Stagecoach Inflow Volume Forecast

<table>
<thead>
<tr>
<th>Forecast Period</th>
<th>Total Inflow</th>
<th>Demand</th>
<th>Surplus</th>
<th>Deficit</th>
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<tbody>
<tr>
<td>2021</td>
<td>123</td>
<td>45</td>
<td>67</td>
<td>89</td>
</tr>
<tr>
<td>2022</td>
<td>145</td>
<td>67</td>
<td>89</td>
<td>123</td>
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</table>

#### Current Year Data

<table>
<thead>
<tr>
<th>Year</th>
<th>Inflow (cfs)</th>
<th>Volume (AF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>150</td>
<td>230</td>
</tr>
<tr>
<td>2021</td>
<td>160</td>
<td>240</td>
</tr>
</tbody>
</table>

#### Observed Inflow

- Below 10% Forecast: 15 cfs
- Above 10% Forecast: 20 cfs

#### Notes

- Forecast Inflow Volume does not account for time distribution of inflow hydrograph.
## Stagecoach Inflow Volume Forecast

### Forecast Period:
3/1/2018 - 7/1/2018

**Last Update:** 3/18/2018

* CRBFC D

### Coefficient
\[
y = a_{R}C + b_{LP} + c
\]

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Ripple Creek</th>
<th>Lynx Pass</th>
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<tbody>
<tr>
<td>cont</td>
<td>-15.232497</td>
<td>0.71191734</td>
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<tr>
<td>Ripple</td>
<td>0.71191734</td>
<td></td>
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<tr>
<td>Lynx Pass</td>
<td>1.31600285</td>
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</table>

### Year | Lynx Pass | Ripple Creek | SWE Index Volume (KAF) | Vol. (% Avg) | ω(0.50) (% Avg)

<table>
<thead>
<tr>
<th>Year</th>
<th>Lynx Pass</th>
<th>Ripple Creek</th>
<th>SWE Index Volume (KAF)</th>
<th>Vol. (% Avg)</th>
<th>ω(0.50) (% Avg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>9.1</td>
<td>18.5</td>
<td>9.91</td>
<td>59.6</td>
<td>60.4</td>
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<tr>
<td>2012</td>
<td>8.4</td>
<td>18.0</td>
<td>8.64</td>
<td>52.0</td>
<td>52.8</td>
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<td>1990</td>
<td>11.0</td>
<td>20.3</td>
<td>13.70</td>
<td>82.4</td>
<td>82.7</td>
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<td>1994</td>
<td>11.7</td>
<td>24.5</td>
<td>17.61</td>
<td>105.9</td>
<td>105.8</td>
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<td>2004</td>
<td>8.6</td>
<td>24.9</td>
<td>13.81</td>
<td>83.1</td>
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<td>1992</td>
<td>11.3</td>
<td>21.2</td>
<td>14.73</td>
<td>88.6</td>
<td>88.8</td>
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<td>2005</td>
<td>10.9</td>
<td>23.7</td>
<td>15.98</td>
<td>96.2</td>
<td>96.2</td>
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<tr>
<td>2013</td>
<td>11.2</td>
<td>27.5</td>
<td>19.08</td>
<td>114.8</td>
<td>114.5</td>
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<td>2007</td>
<td>11.1</td>
<td>23.5</td>
<td>16.11</td>
<td>96.9</td>
<td>96.9</td>
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<td>2010</td>
<td>10.2</td>
<td>24.5</td>
<td>15.63</td>
<td>94.0</td>
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<td>2001</td>
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<td>30.3</td>
<td>20.68</td>
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<td>124.0</td>
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<td>1991</td>
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<td>28.0</td>
<td>20.89</td>
<td>125.7</td>
<td>125.2</td>
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<td>1989</td>
<td>13.6</td>
<td>24.6</td>
<td>20.18</td>
<td>121.4</td>
<td>121.0</td>
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<td>35.7</td>
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<td>27.4</td>
<td>19.01</td>
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**Current Year Data**

<table>
<thead>
<tr>
<th>Date</th>
<th>Lynx Pass</th>
<th>Ripple Creek</th>
<th>Peak SWE (in)</th>
<th>Date of Peak SWE</th>
<th>Mean Peak SWE Date</th>
<th>Latest Peak Inflow Date</th>
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</thead>
<tbody>
<tr>
<td>1/1/2018</td>
<td>3.4</td>
<td>8.5</td>
<td>-4.71</td>
<td>-28.3</td>
<td>-26.0</td>
<td>3/17 2007</td>
</tr>
<tr>
<td>1/8/2018</td>
<td>3.8</td>
<td>9.5</td>
<td>-3.47</td>
<td>-20.9</td>
<td>-18.7</td>
<td>5/12 2012</td>
</tr>
<tr>
<td>2/1/2018</td>
<td>5.5</td>
<td>12.5</td>
<td>0.90</td>
<td>3.4</td>
<td>7.2</td>
<td>7/25 2012 rain</td>
</tr>
<tr>
<td>3/1/2018</td>
<td>8.0</td>
<td>17.4</td>
<td>7.68</td>
<td>46.2</td>
<td>47.2</td>
<td>3/1/16</td>
</tr>
<tr>
<td>3/13/2018</td>
<td>8.6</td>
<td>18.2</td>
<td>9.04</td>
<td>54.4</td>
<td>55.2</td>
<td>3/1/16</td>
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<tr>
<td>3/18/2018</td>
<td>9.5</td>
<td>19.3</td>
<td>10.09</td>
<td>60.7</td>
<td>61.4</td>
<td>3/1/16</td>
</tr>
</tbody>
</table>

### Peak SWE (in)

- **2018 Peak SWE:** 8.8
- **Date of 2018 Peak SWE:** 3/18/2018
- **Earliest Peak SWE Date:** 3/4
- **Mean Peak SWE Date:** 4/2
- **Latest Peak SWE Date:** 5/1

### Current Tracking

**Drought Years**

- 2018 Peak SWE: **8.8 in.**
- Date of 2018 Peak SWE: **3/18/2018**
- Earliest Peak SWE Date: **3/4**
- Mean Peak SWE Date: **4/2**
- Latest Peak SWE Date: **5/1**

**Remaining Forecast**

**Earliest Peak Inflow Date:** 3/17 2007
- **Mean Peak Inflow Date:** 5/12
- **Latest Peak Inflow Date:** 7/25 2012 **rain**
ITS NOT JUST ONE HAND (YEAR)
IT'S A LONG GAME

Stagecoach Reservoir Operations
Total Monthly Volume (AF)

<table>
<thead>
<tr>
<th>INFLOW</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical</td>
<td>4,516</td>
<td>4,010</td>
<td>3,546</td>
<td>2,764</td>
<td>4,528</td>
<td>3,555</td>
<td>2,183</td>
<td>3,680</td>
<td>2,910</td>
<td>2,200</td>
<td>2,591</td>
<td>2,194</td>
<td>37,459</td>
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<tr>
<td>Storage</td>
<td>2,014</td>
<td>1,630</td>
<td>1,462</td>
<td>239</td>
<td>2,058</td>
<td>1,066</td>
<td>220</td>
<td>641</td>
<td>575</td>
<td>196</td>
<td>299</td>
<td>166</td>
<td>10,475</td>
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<tr>
<td>Stored</td>
<td>215</td>
<td>1,170</td>
<td>1,388</td>
<td>233</td>
<td>1,364</td>
<td>277</td>
<td>220</td>
<td>627</td>
<td>269</td>
<td>156</td>
<td>195</td>
<td>148</td>
<td>6,261</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OUTFLOW</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spill</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Reservoir Volume (AF)
- Full Reservoir Volume
- Operational Drawdown 1 (-1,500 AF)
- Operational Drawdown 2 (-3,000 AF)

Inflow/Outflow Volume (AF)
- Bear River Administration
- Contract Release

Accounting Year 2017

UPPER YAMPA WATER CONSERVANCY DISTRICT
Playing the Hand...

Agricultural – Contracts

Industrial – Contracts

Municipal – Contracts

Environmental and Recreational Contracts -
Lots of regulations, water law, and…
2012
This Year may be quite similar to 2012!
Those who know, know they don’t
But we’re ready to play