CBRFC
January 2015
Water Supply Webinar

January 8, 2015

Greg Smith

These slides: www.cbrfc.noaa.gov/present/present.php
Water Supply Webinars

• Focus on the forecast drivers
  – Basin conditions, model states, future weather
• Provide the big picture view of runoff expectations
• Highlight the unique and out of the ordinary
• Opportunity to provide insight into our forecast process
  – Data interpretation, climate issues, new technology, etc.
• Continue to modify webinars to meet needs and be informative
  – UC webinar and Great Basin webinar?

5 brief webinar survey questions at the end
January Water Supply Webinar

• Fall / winter weather
• Current conditions driving the forecasts
  – Soil Moisture, Snow Conditions
• Water supply forecasts
• Insight: SNOTEL Elevation vs Flow Contribution
• Upcoming weather (short and long term)
Late Summer / Fall Precipitation

Monthly Precipitation for August 2014
(Averaged by Hydrologic Unit)

% Average
- > 150%
- 129 - 150%
- 110 - 129%
- 100 - 110%
- 90 - 99%
- 70 - 89%
- 50 - 69%
- < 50%
- Not Reported

Monthly Precipitation for September 2014
(Averaged by Hydrologic Unit)

% Average
- > 150%
- 129 - 150%
- 110 - 129%
- 100 - 110%
- 90 - 99%
- 70 - 89%
- 50 - 69%
- < 50%
- Not Reported

Prepared by
NOAA National Weather Service
Colorado River Forecast Center
Salt Lake City, UT
www.crfc.noaa.gov

Prepared by
NOAA National Weather Service
Oklahoma Basin River Forecast Center
Salt Lake City, UT
www.bfsc.noaa.gov
Model Soil Moisture Entering Winter

How will this affect water supply forecasts?

Positive:
- Green above Fontenelle
- Colorado above Kremmling
- Uinta Range (Bear, Provo, Duchesne)
- Parts of Yampa, White, Gunnison

Negative:
- Northern Great Basin (Weber, Provo)
- Sevier
- San Juan
- Virgin
- Lower Colorado Basins
December 2014 Weather

Mild temperatures – December ended up warmer than average
Moist and mild air mass – Pacific/Sub-Tropical source
Precipitation varied but generally near to above average
Arctic air arrived to end the month – Low elevation snow
January 6th Snow
Soil Moisture & Snow - Initial Conditions Driving the Forecasts

Model Soil Moisture

Model Snow
Soil Moisture and Snow – Where are the signals the same?

Model Soil Moisture

Model Snow

Above Average

Below Average

Above Average

Below Average
January 1st Water Supply Forecasts
Apr-Jul Volumes / % Average – (50% exceedance forecasts)

Flaming Gorge: 1000 KAF / 102%
Yampa-Deerlodge: 1200 KAF / 97%
Colorado-Cameo: 2500 KAF / 106%
Blue Mesa: 690 KAF / 102%
McPhee Res: 255 KAF / 86%
Navajo Res: 450 KAF / 61%

Lake Powell: 6500 KAF / 91%

Virgin-Virgin: 28 KAF / 43%
Provo-Woodland: 97 KAF / 97%
Weber-Oakley: 107 KAF / 91%
Bear-UT/WY Stateline: 117 KAF / 105%
January 1\textsuperscript{st} Water Supply Forecasts
Jan-May Volumes / % Median

- Salt - Roosevelt: 250 KAF / 81%
- Verde-Horseshoe: 150 KAF / 96%
- Gila-Gila: 48 KAF / 86%
- Little Colorado-Lyman: 6.5 KAF / 92%
Daily Ensemble Streamflow Prediction (ESP) Model Run & Official Forecast

Available at: www.cbrfc.noaa.gov Select: Water Supply  Click: Point of Interest

Colorado - Lake Powell- Glen Cyn Dam- At (GLDA3)
2015-01-01 Apr-Jul Official 50% Forecast: 6500 kaf (91% of average)
ESP is Unregulated and No Precipitation Forecast Included

The latest (2015-01-05) 50% ESP forecast is 6445 kaf.
Plot Created 2015-01-05 16:12:29, NOAA / NWS / CBRFC
SNOTEL Elevations vs. Flow Contribution

Roaring Fork River Basin

Crystal – Redstone

Modeled basin is broken into three elevation zones with stats as follows:

<table>
<thead>
<tr>
<th>Elevation Band</th>
<th>% Total Area</th>
<th>% Flow Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>11,000’ – 13,000’</td>
<td>33.5%</td>
<td>56%</td>
</tr>
<tr>
<td>9500’ – 11,000’</td>
<td>33.5%</td>
<td>33%</td>
</tr>
<tr>
<td>7100’ – 9500’</td>
<td>33%</td>
<td>11%</td>
</tr>
</tbody>
</table>

→ More than half of the flow comes from elevations above the highest SNOTEL station.
There are no SNOTELS above 11,600’, so the highest area is poorly represented.
Future Weather:
Strong ridge of high pressure over the area keeping conditions dry
Weak quick hitting storm system possible early next week

Long Range Meteorological Model Ensembles: (Lower Confidence)
Suggest a brief return to ridge conditions / dry later next week
Possibly more active weather by around the 20th of January
Quantitative Precipitation Forecast

Weather Prediction Center

5 Day Total
January 8-13

7 Day Total
January 8-15

www.wpc.ncep.noaa.gov
The prospect for El Nino: A 50-60% chance for next 2 months then neutral conditions thereafter.

Figure 6. Forecasts of sea surface temperature (SST) anomalies for the Niño 3.4 region (5°N-5°S, 120°W-170°W). Figure updated 16 December 2014.
Spring Temperature Outlook
Climate Prediction Center

January 2015

January-March 2015

www.cpc.ncep.noaa.gov
A mass of information – Where to find it?
### Water Supply Official Forecast List

Download Data | Requery | Rebuild Plots

#### Water Supply Volume Percent Average/Median Condition

- **<70**
- **70-90**
- **90-110**
- **110-130**
- **>130**
- **Regulated**

#### Options (on/off):

- **Plot**
- **Area**: CBRFC, Green, Colorado, San Juan, Great, Sevier, Virginia, Low, Colorado, WGRFC, ABRFC

#### Columns (on/off):

- **Area**
- **Sub Area**
- **NWS ID**
- **River**
- **Location**
- **Forecast Date**
- **Avg Cond**
- **Med Cond**
- **Forecast Period**
- **Min 90**
- **MP 90**
- **Max 10**
- **Avg**
- **Med**
- **Pct Avg**
- **Pct Med**

Click column heading to sort by that data. Click ID to view point info. Click Area, Sub Area, or Forecast Period to show only those points.

<table>
<thead>
<tr>
<th>Area</th>
<th>Sub Area</th>
<th>NWS ID</th>
<th>River</th>
<th>Location</th>
<th>Forecast Date</th>
<th>Avg Cond</th>
<th>Med Cond</th>
<th>Forecast Period</th>
<th>Min 90</th>
<th>MP 90</th>
<th>Max 10</th>
<th>Avg</th>
<th>Med</th>
<th>Pct Avg</th>
<th>Pct Med</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>Upper</td>
<td>WBRW4</td>
<td>Green</td>
<td>Daniel</td>
<td>2015-1-1</td>
<td>△△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>176</td>
<td>275</td>
<td>375</td>
<td>245</td>
<td>230</td>
<td>112</td>
<td>125</td>
</tr>
<tr>
<td>Green</td>
<td>Upper</td>
<td>FRW4</td>
<td>Pine Gk</td>
<td>Fremont Lk</td>
<td>2015-1-1</td>
<td>△△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>70</td>
<td>100</td>
<td>130</td>
<td>98</td>
<td>94</td>
<td>102</td>
<td>106</td>
</tr>
<tr>
<td>Green</td>
<td>Upper</td>
<td>PFW4</td>
<td>New Fork</td>
<td>Big Piney</td>
<td>2015-1-1</td>
<td>△△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>230</td>
<td>345</td>
<td>535</td>
<td>355</td>
<td>315</td>
<td>57</td>
<td>110</td>
</tr>
<tr>
<td>Green</td>
<td>Upper</td>
<td>GBRW4</td>
<td>Green</td>
<td>Fontenelle Res</td>
<td>2015-1-1</td>
<td>△△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>475</td>
<td>600</td>
<td>1220</td>
<td>725</td>
<td>650</td>
<td>110</td>
<td>123</td>
</tr>
<tr>
<td>Green</td>
<td>Upper</td>
<td>BRW4</td>
<td>Big Sandy</td>
<td>Fanson</td>
<td>2015-1-1</td>
<td>△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>29</td>
<td>48</td>
<td>72</td>
<td>52</td>
<td>47</td>
<td>92</td>
<td>102</td>
</tr>
<tr>
<td>Green</td>
<td>Upper</td>
<td>GHRW4</td>
<td>Green</td>
<td>Green River</td>
<td>2015-1-1</td>
<td>△△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>475</td>
<td>600</td>
<td>1270</td>
<td>730</td>
<td>630</td>
<td>110</td>
<td>126</td>
</tr>
<tr>
<td>Green</td>
<td>Upper</td>
<td>SLW4</td>
<td>Elkhorn Fork</td>
<td>Starlina Res</td>
<td>2015-1-1</td>
<td>△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>15</td>
<td>24</td>
<td>32</td>
<td>26</td>
<td>23</td>
<td>52</td>
<td>104</td>
</tr>
<tr>
<td>Green</td>
<td>Upper</td>
<td>BRN1R1</td>
<td>Backs Fork</td>
<td>Robertson</td>
<td>2015-1-1</td>
<td>△△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>50</td>
<td>82</td>
<td>115</td>
<td>89</td>
<td>93</td>
<td>92</td>
<td>88</td>
</tr>
<tr>
<td>Green</td>
<td>Upper</td>
<td>HMFW4</td>
<td>Hame Fork</td>
<td>Fornier</td>
<td>2015-1-1</td>
<td>△△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>30</td>
<td>55</td>
<td>86</td>
<td>84</td>
<td>47</td>
<td>102</td>
<td>117</td>
</tr>
<tr>
<td>Green</td>
<td>Upper</td>
<td>VIVW4</td>
<td>Hams Fork</td>
<td>Viva Neaughon Res</td>
<td>2015-1-1</td>
<td>△△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>44</td>
<td>76</td>
<td>126</td>
<td>74</td>
<td>63</td>
<td>102</td>
<td>121</td>
</tr>
<tr>
<td>Green</td>
<td>Upper</td>
<td>GRNW1</td>
<td>Green</td>
<td>Fleming Gorge Res</td>
<td>2015-1-1</td>
<td>△△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>600</td>
<td>1000</td>
<td>1890</td>
<td>980</td>
<td>630</td>
<td>102</td>
<td>120</td>
</tr>
<tr>
<td>Green</td>
<td>Upper/White</td>
<td>YAMC2</td>
<td>Yampa</td>
<td>Stagecoach Reservoir</td>
<td>2015-1-1</td>
<td>△△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>16</td>
<td>26</td>
<td>36</td>
<td>23</td>
<td>21</td>
<td>113</td>
<td>124</td>
</tr>
<tr>
<td>Green</td>
<td>Upper/White</td>
<td>STMC2</td>
<td>Yampa</td>
<td>Steamboat Springs</td>
<td>2015-1-1</td>
<td>△△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>180</td>
<td>280</td>
<td>370</td>
<td>260</td>
<td>250</td>
<td>108</td>
<td>112</td>
</tr>
<tr>
<td>Green</td>
<td>Upper/White</td>
<td>ENMCG2</td>
<td>Elk</td>
<td>Minor</td>
<td>2015-1-1</td>
<td>△△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>225</td>
<td>350</td>
<td>430</td>
<td>320</td>
<td>325</td>
<td>109</td>
<td>109</td>
</tr>
<tr>
<td>Green</td>
<td>Upper/White</td>
<td>LLHCG2</td>
<td>Elkhead Creek</td>
<td>Long Gulch</td>
<td>2015-1-1</td>
<td>△△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>32</td>
<td>63</td>
<td>86</td>
<td>73</td>
<td>75</td>
<td>69</td>
<td>86</td>
</tr>
<tr>
<td>Green</td>
<td>Upper/White</td>
<td>YMLC2</td>
<td>Yampa</td>
<td>Maybeil</td>
<td>2015-1-1</td>
<td>△△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>545</td>
<td>950</td>
<td>1200</td>
<td>935</td>
<td>895</td>
<td>102</td>
<td>106</td>
</tr>
<tr>
<td>Green</td>
<td>Upper/White</td>
<td>LSCMG2</td>
<td>Little Snake Creek</td>
<td>Slator</td>
<td>2015-1-1</td>
<td>△△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>82</td>
<td>145</td>
<td>196</td>
<td>168</td>
<td>154</td>
<td>92</td>
<td>94</td>
</tr>
<tr>
<td>Green</td>
<td>Upper/White</td>
<td>LDLW4</td>
<td>Little Snake</td>
<td>Dixon</td>
<td>2015-1-1</td>
<td>△△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>144</td>
<td>275</td>
<td>435</td>
<td>345</td>
<td>390</td>
<td>60</td>
<td>76</td>
</tr>
<tr>
<td>Green</td>
<td>Upper/White</td>
<td>LMG2</td>
<td>Little Snake</td>
<td>Lily</td>
<td>2015-1-1</td>
<td>△△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>140</td>
<td>285</td>
<td>480</td>
<td>345</td>
<td>300</td>
<td>83</td>
<td>95</td>
</tr>
<tr>
<td>Green</td>
<td>Upper/White</td>
<td>YDLW4</td>
<td>Yampa</td>
<td>Deerlodge Park</td>
<td>2015-1-1</td>
<td>△△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>665</td>
<td>1200</td>
<td>1800</td>
<td>1240</td>
<td>1170</td>
<td>97</td>
<td>103</td>
</tr>
<tr>
<td>Green</td>
<td>Upper/White</td>
<td>WMCG2</td>
<td>White</td>
<td>Meeker</td>
<td>2015-1-1</td>
<td>△△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>200</td>
<td>295</td>
<td>360</td>
<td>280</td>
<td>285</td>
<td>106</td>
<td>111</td>
</tr>
<tr>
<td>Green</td>
<td>Upper/White</td>
<td>WATU1</td>
<td>White</td>
<td>Watson</td>
<td>2015-1-1</td>
<td>△△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>215</td>
<td>310</td>
<td>360</td>
<td>280</td>
<td>285</td>
<td>111</td>
<td>109</td>
</tr>
<tr>
<td>Green</td>
<td>Upper/White</td>
<td>RUU1R1</td>
<td>Big Brush Creek</td>
<td>Vernal</td>
<td>2015-1-1</td>
<td>△△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>10.7</td>
<td>15</td>
<td>24</td>
<td>21</td>
<td>19.9</td>
<td>71</td>
<td>75</td>
</tr>
<tr>
<td>Green</td>
<td>Upper/White</td>
<td>ASHU1</td>
<td>Ashley Creek</td>
<td>Vernal</td>
<td>2015-1-1</td>
<td>△△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>20</td>
<td>36</td>
<td>52</td>
<td>44</td>
<td>42</td>
<td>72</td>
<td>82</td>
</tr>
<tr>
<td>Green</td>
<td>Upper/White</td>
<td>WTRU1</td>
<td>White Rock Creek</td>
<td>White Rock</td>
<td>2015-1-1</td>
<td>△△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>25</td>
<td>39</td>
<td>55</td>
<td>54</td>
<td>47</td>
<td>72</td>
<td>83</td>
</tr>
<tr>
<td>Green</td>
<td>Upper/White</td>
<td>NEU1U1</td>
<td>Uinta</td>
<td>Neola</td>
<td>2015-1-1</td>
<td>△△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>40</td>
<td>65</td>
<td>97</td>
<td>84</td>
<td>62</td>
<td>66</td>
<td>105</td>
</tr>
<tr>
<td>Green</td>
<td>Upper/White</td>
<td>YLLU1</td>
<td>Yellowstone</td>
<td>Altona</td>
<td>2015-1-1</td>
<td>△△</td>
<td>△△</td>
<td>Apr 01-Jul 31</td>
<td>36</td>
<td>57</td>
<td>75</td>
<td>61</td>
<td>58</td>
<td>93</td>
<td>98</td>
</tr>
</tbody>
</table>
Carbon Basin River Forecast Center

Snow Groups

Great Basin
Bear River Drainage (bulu1 finu1 hku1 klw4 liku1 lbnu1 lbu1 mcru1 gju1 osu1 sepi1 dbp4u1)
Bear River Headwaters (hku1 lbu1 chou1)
Bear River below Woodrun (dpbu1 lbnu1 lbu1 klw4 giv1 finu1)
Beaver Meander (gju1 osu1 hou1)
Clear Creek (hku1)
Conifer Woodlands (m4d1u1 b4du1, 1bdu1)
Cottonwood Canyons (mbu2 lbu1 sdu1)
Logan Hot Springs Little Bear Basin (hku1 gju1 finu1)
Logan River Drainage (dpbu1 lbnu1 lbu1 mcru1)
Logan River Drainage (dpbu1 lbnu1 lbu1 mcru1)
Sevier River (mdu1 rnu1 sseu1 b4du1 klw4)
Sevier River Basin (mdu1 rnu1 sseu1 b4du1 klw4)
Sevier River Basin Headwaters (wlu1 mcru1 yu1 yu1 hrtsu4 walu1 b4bu1)
Sevier River Drainage (mdu1 rnu1 sseu1 b4du1 klw4)
Six Creeks Headwaters (dpbu1 lbnu1 lbu1 klw4 giv1 finu1)
Smith Fork Bear Basin (dlu1 db4u1 klw4 inow4)
Spanish Fork Drainage (cl4u1 okru1 pyu1 wru1 tdu1)
Utah Lake Drainage (cl4u1 okru1 pyu1 wru1 tdu1)
Webster Basin (mnu1 truf1 chuc1)
Webster River Drainage (dpbu1 lbnu1 lbu1 klw4 giv1 finu1)

Lower Colorado
Central Mogollon Rim (pro2 b4du3)
Gila River (cnda3 trnd4 scnd4 lkin5 hma3)
LC Southern Headwaters (bda3 b4du3 h4eu3 mva3)
Little Colorado River (dmdu4 b4du3 mva3 mve3 pro3)
Lower Colorado (wha3 fny3 mma3 b4du3 prca3 wka3 mva3 wca3 hma3 cnda3 sgn5 lkin5)
San Francisco Ferry (trnd4 cnda3 xna3)
Upper Gila (scnd4 lkin5 sgn5)
Upper Salt (mva3 cnda3 wca3 xna3)

Green River
Duchesne River (guy1 wru1 smu1 du1 cnu1 truf1 roku1 lbnu1 brnu1 kilu1 fpu1 clw4 mnu1)
Flaming Gorge North Slope (hswu1 hiru1 tsq1 solu1)
Green River Basin (hswu1 hiru1 tsq1 solu1)
Green River Basin (hswu1 hiru1 tsq1 solu1)
Green River (guy1 wru1 smu1 du1 cnu1 truf1 roku1 lbnu1 brnu1 kilu1 fpu1 clw4 mnu1)
Green River (guy1 wru1 smu1 du1 cnu1 truf1 roku1 lbnu1 brnu1 kilu1 fpu1 clw4 mnu1)
Harris Fork (klw4 hiru1 mnu1)
Lone Snake (tb4u1 db4u1 w4d4 wru1 mnu1)
Price-San Rafael (dpbu1 rnu1 sseu1 wru1 cnu1 dp4u1)
Upper Green (nhu1 tsw4 dsw4 mnu1)
White (b4du4 rnu1 tsw4 mnu1)
Wind Rivers (g4eu4 f4eu4 ln4d4 nh4)
Yampa White (db4u1 db4u1 w4d4 wru1 mnu1)
2015 Forecast Webinar Schedule

February 5 at 1 pm MT
March 5 at 11 am MT
April 7 at 11 am MT
May 7 at 11 am MDT

Registration available:

Feedback Is Appreciated
Please contact us with any specific questions

• Key Water Supply Contacts:
  – Michelle Stokes (Hydrologist in Charge)
  – Brenda Alcorn (Upper Colorado)
  – Ashley Nielson (Green + Yampa / White)
  – Greg Smith (San Juan + Gunnison + Dolores)
  – Paul Miller (Great Basin – Bear, Weber, Provo, Six-Creeks/Jordan)
  – Tracy Cox (Lower Colorado + Virgin + Sevier)