2019 Snowpack Status and Streamflow Outlook
Humboldt Basin

February 8, 2019
Humboldt River Basin Water Authority Meeting

Jeff Anderson
Nevada NRCS Snow Survey
(775) 857-8500 x152
jeff.anderson@nv.usda.gov
2018 Fire Season was kind to Nevada SNOTEL Sites

Lamoille #1 Snow Course

Range 2 Fire Perimeter

Lamoille #3 SNOTEL
Subscribe to Nevada Water Supply Outlook Email List

Google “NRCS Nevada Snow Survey” for the Snow Survey Homepage.

Follow links to subscribe
Key Points:

• February 1 conditions and forecast were all near normal

• February 7 conditions are slightly above normal,

• Snowpack is very healthy, well distributed across key elevation bands, including below SNOTEL network.

• Dry soils are a wildcard this year, how much snowmelt will they soak up?

• Is 2016 a decent comparison year - maybe?

• Spring moisture is another wildcard.
Water Year Precipitation
Feb 1 to Feb 7
SWE Increase ~8-12%
Snowpack
Feb 1 to Feb 7
Increase ~10-18%
Snowpack is very healthy well distributed across key elevation bands.
## Upper Humboldt River Basin
### Water Supply Forecasts
#### February 1, 2019

<table>
<thead>
<tr>
<th>Forecast Point</th>
<th>Forecast Period</th>
<th>Percent of Average (30 Yr Period)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marys River near Deeth</td>
<td>Mar-Jul</td>
<td>14, 29, 39, 49, 64</td>
</tr>
<tr>
<td>Lamoille Creek near Lamoille</td>
<td>Mar-Jul</td>
<td>16, 24, 29, 34, 42</td>
</tr>
<tr>
<td>NF Humboldt River at Devils Gate</td>
<td>Mar-Jul</td>
<td>15, 29, 38, 47, 61</td>
</tr>
<tr>
<td>Humboldt River near Elko</td>
<td>Mar-Jul</td>
<td>48, 108, 149, 190, 250</td>
</tr>
<tr>
<td>SF Humboldt River above Dixie Creek</td>
<td>Mar-Jul</td>
<td>29, 59, 79, 100, 130</td>
</tr>
<tr>
<td>Humboldt River near Carlin</td>
<td>Mar-Jul</td>
<td>126, 185, 225, 265, 325</td>
</tr>
<tr>
<td>Humboldt River at Palisade</td>
<td>Mar-Jul</td>
<td>159, 220, 260, 300, 360</td>
</tr>
</tbody>
</table>

### Forecast Exceedance Probabilities

Labels on chart represent volumes of water expressed in thousand acre-feet.

### Legend

- **95% or 90% Exceedance:** There is a 95% or 90% chance that flows will exceed this volume.
- **70% Exceedance:** There is a 70% chance that flows will exceed this volume.
- **50% Exceedance:** There is a 50% chance that flows will exceed this volume.
- **30% Exceedance:** There is a 30% chance that flows will exceed this volume.
- **10% or 5% Exceedance:** There is a 10% or 5% chance that flows will exceed this volume.

#### When selected, the following historic streamflow values and statistics will be shown:
- **Period of Record Minimum Streamflow KAF (Year)**
- **1981-2010 Normal Streamflow KAF**
- **Observed Streamflow KAF**
- **Period of Record Maximum Streamflow KAF (Year)**

Some forecasts may be for volumes that are regulated or influenced by diversions and water management.
# Lower Humboldt River Basin

## Water Supply Forecasts

**February 1, 2019**

<table>
<thead>
<tr>
<th>Forecast Point</th>
<th>Forecast Period</th>
<th>Forecast Exceedance Probabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rock Ck nr Battle Mountain</td>
<td>Mar-Jul</td>
<td>19, 24, 27, 30, 35</td>
</tr>
<tr>
<td>Humboldt R at Comus</td>
<td>Mar-Jul</td>
<td>105, 180, 230, 280, 355</td>
</tr>
<tr>
<td>L Humboldt R nr Paradise Valley</td>
<td>Mar-Jul</td>
<td>1.7, 7.2, 11, 15, 20</td>
</tr>
<tr>
<td>Martin Ck nr Paradise Valley</td>
<td>Mar-Jul</td>
<td>3.3, 13, 20, 27, 37</td>
</tr>
<tr>
<td>Humboldt R nr Imlay</td>
<td>Mar-Jul</td>
<td>52, 134, 190, 245, 330</td>
</tr>
</tbody>
</table>

**Legend**

- **95% or 90% Exceedance**: There is a 95%/90% chance that flows will exceed this volume.
- **70% Exceedance**: There is a 70% chance that flows will exceed this volume.
- **50% Exceedance**: There is a 50% chance that flows will exceed this volume.
- **30% Exceedance**: There is a 30% chance that flows will exceed this volume.
- **10% or 5% Exceedance**: There is a 10%/5% chance that flows will exceed this volume.

Some forecasts may be for volumes that are regulated or influenced by diversions and water management.
Few sites at low & high elevations

Middle elevational band has the best correlation to seasonal streamflow

Almost 30% of basin area
# Basinwide Summary: February 1, 2019

(Averages/Medians based on 1981-2010 reference period)

<table>
<thead>
<tr>
<th>Upper Humboldt River Basin</th>
<th>Network</th>
<th>Elevation (ft)</th>
<th>Depth (in)</th>
<th>SWE (in)</th>
<th>Median (in)</th>
<th>% Median</th>
<th>Last Year SWE (in)</th>
<th>Last Year % Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robinson Lake - Aerial Marker</td>
<td>SC</td>
<td>9200</td>
<td>44</td>
<td>15.8</td>
<td>17.2</td>
<td>92%</td>
<td>8.6</td>
<td>50%</td>
</tr>
<tr>
<td>Lamoille #5</td>
<td>SC</td>
<td>8814</td>
<td>51</td>
<td>18.2</td>
<td>16.8</td>
<td>108%</td>
<td>12.6</td>
<td>75%</td>
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<tr>
<td>Corral Canyon</td>
<td>SNOTEL</td>
<td>8445</td>
<td>39</td>
<td>10.6</td>
<td>9.1</td>
<td>116%</td>
<td>5.6</td>
<td>62%</td>
</tr>
<tr>
<td>Jacks Peak</td>
<td>SNOTEL</td>
<td>8424</td>
<td>40</td>
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<tr>
<td>Trout Creek, Upper - AM</td>
<td>SC</td>
<td>8415</td>
<td>24</td>
<td>8.6</td>
<td>8.8</td>
<td>98%</td>
<td>3.0</td>
<td>34%</td>
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<td>Tent Mtn., Upper - Aerial Marker</td>
<td>SC</td>
<td>8315</td>
<td>35</td>
<td>9.5</td>
<td>13.0</td>
<td>73%</td>
<td>7.3</td>
<td>56%</td>
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<td>Dorsey Basin</td>
<td>SNOTEL</td>
<td>7903</td>
<td>27</td>
<td>7.9</td>
<td>9.3</td>
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<td>4.7</td>
<td>51%</td>
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<td>Bear Creek</td>
<td>SNOTEL</td>
<td>8040</td>
<td>35</td>
<td>9.4</td>
<td>11.5</td>
<td>82%</td>
<td>7.2</td>
<td>63%</td>
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<td>Green Mountain</td>
<td>SNOTEL</td>
<td>8185</td>
<td>37</td>
<td>11.5</td>
<td>11.5</td>
<td>100%</td>
<td>4.0</td>
<td>35%</td>
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<tr>
<td>American Beauty - Aerial Marker</td>
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<td>7550</td>
<td>27</td>
<td>7.3</td>
<td>7.6</td>
<td>96%</td>
<td>4.3</td>
<td>57%</td>
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<tr>
<td>Stag Mountain</td>
<td>SNOTEL</td>
<td>7628</td>
<td>18</td>
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<tr>
<td>Stag Mountain AM</td>
<td>SC</td>
<td>7640</td>
<td>19</td>
<td>3.8</td>
<td>3.8</td>
<td>100%</td>
<td>0.4</td>
<td>11%</td>
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<tr>
<td>Lamoille #3</td>
<td>SNOTEL</td>
<td>8051</td>
<td>31</td>
<td>8.5</td>
<td>8.8</td>
<td>97%</td>
<td>5.3</td>
<td>60%</td>
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<tr>
<td>Smith Creek</td>
<td>SC</td>
<td>7600</td>
<td>23</td>
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<td>Jakes Creek</td>
<td>SNOTEL</td>
<td>7374</td>
<td>23</td>
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<tr>
<td>Jakes Creek - Aerial Marker</td>
<td>SC</td>
<td>7380</td>
<td>23</td>
<td>4.6</td>
<td>4.3</td>
<td>107%</td>
<td>0.8</td>
<td>19%</td>
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<td>Lamoille #1</td>
<td>SC</td>
<td>7364</td>
<td>24</td>
<td>6.0</td>
<td>6.4</td>
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<td>3.7</td>
<td>58%</td>
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<td>Jack Creek Upper</td>
<td>SNOTEL</td>
<td>7377</td>
<td>32</td>
<td>8.7</td>
<td>9.4</td>
<td>93%</td>
<td>4.9</td>
<td>52%</td>
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<td>Draw Creek</td>
<td>SNOTEL</td>
<td>7285</td>
<td>31</td>
<td>7.8</td>
<td>6.9</td>
<td>113%</td>
<td>2.4</td>
<td>35%</td>
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<tr>
<td>Seventysix Creek</td>
<td>SNOTEL</td>
<td>7350</td>
<td>30</td>
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<td>7.0</td>
<td>103%</td>
<td>2.3</td>
<td>33%</td>
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<tr>
<td>Tent Mtn Lower</td>
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<td>23</td>
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<tr>
<td>Tent Mtn., Lower - Aerial Marker</td>
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<td>7100</td>
<td>23</td>
<td>5.8</td>
<td>5.8</td>
<td>100%</td>
<td>3.5</td>
<td>60%</td>
</tr>
<tr>
<td>Trout Creek, Lower</td>
<td>SC</td>
<td>6900</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Fry Canyon</td>
<td>SNOTEL</td>
<td>6798</td>
<td>12</td>
<td>3.0</td>
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<td></td>
<td>1.7</td>
<td></td>
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<tr>
<td>Fry Canyon</td>
<td>SC</td>
<td>6700</td>
<td>21</td>
<td>5.8</td>
<td>6.2</td>
<td>94%</td>
<td>2.7</td>
<td>44%</td>
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<td>Harrison Pass #1</td>
<td>SC</td>
<td>6600</td>
<td>19</td>
<td>5.0</td>
<td>4.6</td>
<td>109%</td>
<td>0.0</td>
<td>0%</td>
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<tr>
<td>Dry Creek</td>
<td>SNOTEL</td>
<td>6555</td>
<td>14</td>
<td>5.0</td>
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<td></td>
<td>0.9</td>
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<tr>
<td>Dry Creek</td>
<td>SC</td>
<td>6500</td>
<td>13</td>
<td>3.9</td>
<td>4.6</td>
<td>85%</td>
<td>0.6</td>
<td>13%</td>
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<tr>
<td>Taylor Canyon</td>
<td>SNOTEL</td>
<td>6325</td>
<td>17</td>
<td>5.2</td>
<td>4.0</td>
<td>130%</td>
<td>0.2</td>
<td>5%</td>
</tr>
<tr>
<td>Tremewan Ranch</td>
<td>SC</td>
<td>5700</td>
<td>10</td>
<td>3.1</td>
<td>2.3</td>
<td>135%</td>
<td>0.0</td>
<td>0%</td>
</tr>
</tbody>
</table>

# Basin Index

<table>
<thead>
<tr>
<th># of sites</th>
<th>% of sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>97%</td>
</tr>
<tr>
<td>22</td>
<td>47%</td>
</tr>
</tbody>
</table>
Modeled Snow Water Equivalent forecasted for 2019 February 7, 18:00 UTC

Modeled Snow Water Equivalent for 2016 February 7, 18:00 UTC
Humboldt at Comus – 2016 Peak daily cfs 1170cfs
Precipitation in Humboldt River above Imlay

2019
Mostly Snow

2016

2016 1981-2010 Average

Current as of 02/07/2019:
% of Average - 105%
% of WY Average - 46%
Days Until End of WY - 236
Percentile - 58

Monthly Precipitation % of Average

Oct 130%
Nov 91%
Dec 87%
Jan 88%
Early Feb Flows at Comus Currently similar to 2016

Keep in mind 2016 was coming out of prolonged drought
2018 Forecast Review

Actual flows last summer were less than April 1, 2018 50% forecasts in part due to poor spring precipitation.
2018 Nevada Forecast Review

2018 Observed April-July Runoff
Grouped into April 1 Forecast Exceedance Bins

<table>
<thead>
<tr>
<th>Exceedance Probability Bins</th>
<th>Number of Streamflow Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;90%</td>
<td>2</td>
</tr>
<tr>
<td>90%-70%</td>
<td>6</td>
</tr>
<tr>
<td>50%-70%</td>
<td>22</td>
</tr>
<tr>
<td>50%-30%</td>
<td>8</td>
</tr>
<tr>
<td>30%-10%</td>
<td>7</td>
</tr>
<tr>
<td>&gt;10%</td>
<td>0</td>
</tr>
</tbody>
</table>

Forecast Volume
Probability Category in Which Observed Volume Landed
Primary Period
April 1, 2018

- <10% (or <5%)
- 10-30% (or 5-30%)
- 30-50%
- 50-70%
- 70-90% (or 70-95%)
- >90% (or >95%)

Natural Resources Conservation Service
Key Points:

- February 1 conditions and forecast were all near normal
  - Snowpack = 98% of median,
  - WY Precip = 88% of ave,
  - Stream Forecasts = 91-110% of ave

- February 7 conditions are slightly above normal
  - Snowpack = 113% of median,
  - WY Precip = 105% of ave,
  - Stream Forecasts = likely +10-15%

- Snowpack is very healthy, well distributed across key elevation bands, including below SNOTEL network.

- Dry soils are a wildcard this year, how much snowmelt will they soak up?

- Is 2016 a decent comparison year - maybe?

- Spring moisture is another wildcard.
  - 2018 observed flows were less than April 1 50% exceedance forecasts
  - Mainly due to relatively dry spring in Upper Humboldt.