Colorado Climate Update –
A look at WY2021 and October 2021

Dr. Becky Bolinger
Assistant State Climatologist

Water Availability Task Force
November 4, 2021
A look back at Water Year 2021
Water Year 2021 ranked as the 36th driest on record for Colorado. Precipitation 16.21”, which is 1.89” below the long-term average.
Statewide Precipitation Ranks
October 2020 – September 2021
Period: 1896–2021

<table>
<thead>
<tr>
<th>Month</th>
<th>P Rank (of 127 years)</th>
<th>Above, below, or near 20th century avg?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct</td>
<td>16th driest</td>
<td>below</td>
</tr>
<tr>
<td>Nov</td>
<td>44th driest</td>
<td>near avg</td>
</tr>
<tr>
<td>Dec</td>
<td>59th driest</td>
<td>near avg</td>
</tr>
<tr>
<td>Jan</td>
<td>38th driest</td>
<td>below</td>
</tr>
<tr>
<td>Feb</td>
<td>71st driest</td>
<td>near avg</td>
</tr>
<tr>
<td>Mar</td>
<td>20th wettest</td>
<td>above</td>
</tr>
<tr>
<td>Apr</td>
<td>18th driest</td>
<td>below</td>
</tr>
<tr>
<td>May</td>
<td>11th wettest</td>
<td>much above</td>
</tr>
<tr>
<td>Jun</td>
<td>50th driest</td>
<td>near avg</td>
</tr>
<tr>
<td>Jul</td>
<td>64th driest</td>
<td>near avg</td>
</tr>
<tr>
<td>Aug</td>
<td>19th driest</td>
<td>below</td>
</tr>
<tr>
<td>Sep</td>
<td>53rd driest</td>
<td>near avg</td>
</tr>
</tbody>
</table>

Water Year 2021 ranked as the 11th warmest on record for Colorado. Average temperature was 46.7°F, which is 2.1° above the long-term average.
Colorado Average Temperature
October–September

1901-2000 Mean: 44.6°F
1981-2010 Mean: 45.6°F
1991-2020 Mean: 46.2°F
### Statewide Average Temperature Ranks

**October 2020 – September 2021**  
**Period: 1895–2021**

<table>
<thead>
<tr>
<th>Month</th>
<th>T Rank (of 127 years)</th>
<th>Above, below, or near 20th century avg?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct</td>
<td>52nd warmest</td>
<td>near avg</td>
</tr>
<tr>
<td>Nov</td>
<td>7th warmest</td>
<td>much above</td>
</tr>
<tr>
<td>Dec</td>
<td>46th warmest</td>
<td>near avg</td>
</tr>
<tr>
<td>Jan</td>
<td>33rd warmest</td>
<td>above</td>
</tr>
<tr>
<td>Feb</td>
<td>26th coolest</td>
<td>below</td>
</tr>
<tr>
<td>Mar</td>
<td>46th warmest</td>
<td>near avg</td>
</tr>
<tr>
<td>Apr</td>
<td>69th warmest</td>
<td>near avg</td>
</tr>
<tr>
<td>May</td>
<td>50th warmest</td>
<td>near avg</td>
</tr>
<tr>
<td>Jun</td>
<td>6th warmest</td>
<td>much above</td>
</tr>
<tr>
<td>Jul</td>
<td>11th warmest</td>
<td>much above</td>
</tr>
<tr>
<td>Aug</td>
<td>15th warmest</td>
<td>above</td>
</tr>
<tr>
<td>Sep</td>
<td>3rd warmest</td>
<td>much above</td>
</tr>
</tbody>
</table>

WY2021 extremes around the state

-50°F
ANTERO RSVR
12/30/2020

108°F
FRUITA
7/10/2021

28.5 inches
Bellvue 5.9W (CoCoRaHS)
3/14/2021

7.87 inches
Holyoke (CoAgMET)
8/19/2021

108°F
LAS ANIMAS
WALSH 1 W
6/24/2021
## Daily records broken in Water Year 2021

<table>
<thead>
<tr>
<th>Month</th>
<th>High max T</th>
<th>High min T</th>
<th>Low max T</th>
<th>Low min T</th>
<th>Precipitation</th>
<th>Snowfall</th>
</tr>
</thead>
<tbody>
<tr>
<td>October</td>
<td>437</td>
<td>365</td>
<td>233</td>
<td>374</td>
<td>35</td>
<td>42</td>
</tr>
<tr>
<td>November</td>
<td>352</td>
<td>388</td>
<td>31</td>
<td>13</td>
<td>64</td>
<td>9</td>
</tr>
<tr>
<td>December</td>
<td>216</td>
<td>70</td>
<td>33</td>
<td>22</td>
<td>60</td>
<td>27</td>
</tr>
<tr>
<td>January</td>
<td>35</td>
<td>69</td>
<td>20</td>
<td>14</td>
<td>72</td>
<td>31</td>
</tr>
<tr>
<td>February</td>
<td>34</td>
<td>64</td>
<td>241</td>
<td>175</td>
<td>101</td>
<td>64</td>
</tr>
<tr>
<td>March</td>
<td>63</td>
<td>85</td>
<td>24</td>
<td>20</td>
<td>140</td>
<td>64</td>
</tr>
<tr>
<td>April</td>
<td>293</td>
<td>158</td>
<td>106</td>
<td>131</td>
<td>38</td>
<td>39</td>
</tr>
<tr>
<td>May</td>
<td>86</td>
<td>139</td>
<td>83</td>
<td>29</td>
<td>127</td>
<td>26</td>
</tr>
<tr>
<td>June</td>
<td>679</td>
<td>450</td>
<td>131</td>
<td>15</td>
<td>85</td>
<td>0</td>
</tr>
<tr>
<td>July</td>
<td>110</td>
<td>320</td>
<td>16</td>
<td>12</td>
<td>133</td>
<td>0</td>
</tr>
<tr>
<td>August</td>
<td>63</td>
<td>149</td>
<td>4</td>
<td>85</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>September</td>
<td>447</td>
<td>249</td>
<td>30</td>
<td>2</td>
<td>55</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td><strong>2815</strong></td>
<td><strong>2506</strong></td>
<td><strong>952</strong></td>
<td><strong>892</strong></td>
<td><strong>919</strong></td>
<td><strong>302</strong></td>
</tr>
</tbody>
</table>

- **warm records: 5321**
- **cold records: 1844**
Evolution of drought in WY2021

<table>
<thead>
<tr>
<th>Week</th>
<th>None</th>
<th>D0-D4</th>
<th>D1-D4</th>
<th>D2-D4</th>
<th>D3-D4</th>
<th>D4</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020-10-06</td>
<td>0.00</td>
<td>100.00</td>
<td>99.30</td>
<td>90.39</td>
<td>59.23</td>
<td>16.72</td>
</tr>
<tr>
<td>2021-09-28</td>
<td>12.72</td>
<td>87.28</td>
<td>46.42</td>
<td>26.30</td>
<td>15.05</td>
<td>3.91</td>
</tr>
<tr>
<td>Change</td>
<td>12.72</td>
<td>-12.72</td>
<td>-52.88</td>
<td>-64.09</td>
<td>-44.18</td>
<td>-12.81</td>
</tr>
</tbody>
</table>
Evolution of drought in WY2021

U.S. Drought Monitor Class Change - Colorado
52 Week

September 28, 2021
compared to
September 29, 2020
droughtmonitor.unl.edu

Colorado Percent Area in U.S. Drought Monitor Categories

D0 (Abnormally Dry)  D1 (Moderate Drought)  D2 (Severe Drought)  D3 (Extreme Drought)  D4 (Exceptional Drought)
Significant events of WY2021

February cold outbreak

Pi Day Blizzard

Mean Temperature Departures from Average
February 7-21 2021
Average Period: 1981-2010

National Centers for Environmental Information

Created: Tue Mar 09 2021
Sourced data

Data Source: Skim Gridded (nClimGrid-Daily) Beta

COLORADO CLIMATE CENTER
Check out the summary and extended summary!

tinyurl.com/wy2021-climate
Water Year 2022

Temperature
Precipitation
Evaporative Demand
Soil Moisture
Vegetation
30-day SPI: 2021/10/03 - 2021/11/01

Data from High Plains Regional Climate Center and ACIS

https://climate.colostate.edu/drought/
6-month SPI: 2021/05/02 - 2021/11/01

Data from High Plains Regional Climate Center and ACIS

https://climate.colostate.edu/drought/
Year-to-date SPI: 2021/01/01 - 2021/11/01

Data from High Plains Regional Climate Center and ACIS

https://climate.colostate.edu/drought/
Drought

National Drought
Colorado Drought
Some Drought Facts
U.S. Drought Monitor
Colorado

November 2, 2021
(Released Thursday, Nov. 4, 2021)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>D0-D4</th>
<th>D1-D4</th>
<th>D2-D4</th>
<th>D3-D4</th>
<th>D4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>4.44</td>
<td>95.56</td>
<td>76.77</td>
<td>30.46</td>
<td>6.93</td>
<td>0.00</td>
</tr>
<tr>
<td>Last Week</td>
<td>4.44</td>
<td>95.56</td>
<td>74.99</td>
<td>29.73</td>
<td>11.13</td>
<td>1.95</td>
</tr>
<tr>
<td>3 Months Ago</td>
<td>56.64</td>
<td>43.36</td>
<td>34.52</td>
<td>29.61</td>
<td>20.96</td>
<td>5.38</td>
</tr>
<tr>
<td>Start of Calendar Year</td>
<td>0.00</td>
<td>100.00</td>
<td>100.00</td>
<td>93.73</td>
<td>76.17</td>
<td>27.60</td>
</tr>
<tr>
<td>Start of Water Year</td>
<td>12.72</td>
<td>87.28</td>
<td>45.42</td>
<td>26.30</td>
<td>15.05</td>
<td>3.91</td>
</tr>
<tr>
<td>One Year Ago</td>
<td>0.00</td>
<td>100.00</td>
<td>100.00</td>
<td>93.71</td>
<td>74.08</td>
<td>24.39</td>
</tr>
</tbody>
</table>

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

Author:
Adam Hartman
NOAA/NWS/NCEP/CPC

droughtmonitor.unl.edu
The last time we had 0% D4 drought in Colorado was August 18, 2020.
The duration of D4 drought lasted over a year for Moffat County! How does that compare to other counties in the state?

<table>
<thead>
<tr>
<th>Rank</th>
<th>FIPS</th>
<th>Start Date</th>
<th>End Date</th>
<th>Consecutive Weeks</th>
<th>State</th>
<th>County</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>8011</td>
<td>7/5/12</td>
<td>8/7/14</td>
<td>108</td>
<td>CO</td>
<td>Bent County</td>
</tr>
<tr>
<td>2</td>
<td>8025</td>
<td>7/5/12</td>
<td>8/7/14</td>
<td>108</td>
<td>CO</td>
<td>Crowley County</td>
</tr>
<tr>
<td>3</td>
<td>8061</td>
<td>7/5/12</td>
<td>8/7/14</td>
<td>108</td>
<td>CO</td>
<td>Kiowa County</td>
</tr>
<tr>
<td>4</td>
<td>8089</td>
<td>7/5/12</td>
<td>8/7/14</td>
<td>108</td>
<td>CO</td>
<td>Otero County</td>
</tr>
<tr>
<td>5</td>
<td>8071</td>
<td>8/16/12</td>
<td>7/3/14</td>
<td>97</td>
<td>CO</td>
<td>Las Animas County</td>
</tr>
<tr>
<td>6</td>
<td>8073</td>
<td>7/5/12</td>
<td>9/12/13</td>
<td>62</td>
<td>CO</td>
<td>Lincoln County</td>
</tr>
<tr>
<td>7</td>
<td>8101</td>
<td>7/19/12</td>
<td>9/12/13</td>
<td>60</td>
<td>CO</td>
<td>Pueblo County</td>
</tr>
<tr>
<td>8</td>
<td>8081</td>
<td>10/8/20</td>
<td>10/28/21</td>
<td>56</td>
<td>CO</td>
<td>Moffat County</td>
</tr>
<tr>
<td>9</td>
<td>8099</td>
<td>7/19/12</td>
<td>8/15/13</td>
<td>56</td>
<td>CO</td>
<td>Prowers County</td>
</tr>
<tr>
<td>10</td>
<td>8009</td>
<td>8/9/12</td>
<td>8/15/13</td>
<td>53</td>
<td>CO</td>
<td>Baca County</td>
</tr>
<tr>
<td>11</td>
<td>8017</td>
<td>7/26/12</td>
<td>8/1/13</td>
<td>53</td>
<td>CO</td>
<td>Cheyenne County</td>
</tr>
<tr>
<td>12</td>
<td>8103</td>
<td>10/8/20</td>
<td>9/30/21</td>
<td>52</td>
<td>CO</td>
<td>Rio Blanco County</td>
</tr>
<tr>
<td>13</td>
<td>8107</td>
<td>10/8/20</td>
<td>9/30/21</td>
<td>52</td>
<td>CO</td>
<td>Routt County</td>
</tr>
<tr>
<td>14</td>
<td>8041</td>
<td>8/16/12</td>
<td>8/1/13</td>
<td>50</td>
<td>CO</td>
<td>El Paso County</td>
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<tr>
<td>15</td>
<td>8055</td>
<td>8/30/12</td>
<td>8/1/13</td>
<td>48</td>
<td>CO</td>
<td>Huerfano County</td>
</tr>
<tr>
<td>16</td>
<td>8029</td>
<td>10/1/20</td>
<td>8/19/21</td>
<td>47</td>
<td>CO</td>
<td>Delta County</td>
</tr>
<tr>
<td>17</td>
<td>8045</td>
<td>10/1/20</td>
<td>8/19/21</td>
<td>47</td>
<td>CO</td>
<td>Garfield County</td>
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<tr>
<td>18</td>
<td>8077</td>
<td>10/1/20</td>
<td>8/19/21</td>
<td>47</td>
<td>CO</td>
<td>Mesa County</td>
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<tr>
<td>19</td>
<td>8067</td>
<td>10/8/20</td>
<td>8/19/21</td>
<td>46</td>
<td>CO</td>
<td>La Plata County</td>
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<tr>
<td>20</td>
<td>8083</td>
<td>10/8/20</td>
<td>8/19/21</td>
<td>46</td>
<td>CO</td>
<td>Montezuma County</td>
</tr>
</tbody>
</table>
Outlook

Next 7 days
8-14 day Outlook
CPC Outlooks
La Nina
Winter Snow?
NOAA 7-day precip forecast

http://schumacher.atmos.colostate.edu/weather/
8-14 day outlook

8-14 Day Temperature Outlook
Valid: November 11 - 17, 2021
Issued: November 3, 2021

8-14 Day Precipitation Outlook
Valid: November 11 - 17, 2021
Issued: November 3, 2021

https://www.cpc.ncep.noaa.gov
Seasonal outlook

Seasonal Temperature Outlook
Valid: Nov-Dec-Jan 2021-22
Issued: October 21, 2021

Seasonal Precipitation Outlook
Valid: Nov-Dec-Jan 2021-22
Issued: October 21, 2021

https://www.cpc.ncep.noaa.gov
What’s the ENSO forecast?

CPC/IRI October 19, 2021: In mid-October, SSTs in the central-eastern equatorial Pacific are -0.8°C different from average. The evolution of key oceanic and atmospheric variables is consistent with La Niña conditions, and therefore, a La Niña Advisory has been issued for Oct 2021. A large majority of the models predict SSTs to cool further through boreal autumn and winter, and then return to ENSO-neutral levels during spring. Similar to the most-recent official CPC/IRI ENSO Outlook issued on October 14, this objective model-based ENSO outlook also anticipates a La Niña event with high probability during Oct-Dec and persisting until Jan-Mar, with a return to ENSO-neutral conditions with high probabilities for rest of the forecast period.

https://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/
What does La Niña mean for winter?
What about snow during La Niña winters? -
ENSO Climate Blog, November 2017

A wetter pattern in the northwest favors more snowfall over our northern mountains.

The drier southwest extends northward and favors less snowfall over the Four Corners and eastern plains.
Risk of extremes during a La Niña, from https://psl.noaa.gov/enso/climaterisks/
Work on an experimental ski dashboard is underway!

climate.colostate.edu/ski-dashboard
72-hour snowfall forecast – median forecast

NOAA Weather Prediction Center 72-hour 50th-percentile (median) accumulated snow forecast

forecast issued 1200 UTC Sun 10 Oct 2021
snow in 72 hrs ending 1200 UTC Wed 13 Oct 2021

old forecast
72-hour snowfall forecast – low end forecast

NOAA Weather Prediction Center 72-hour 10th-percentile (low-end) accumulated snow forecast

forecast issued 1200 UTC Sun 10 Oct 2021
snow in 72 hrs ending 1200 UTC Wed 13 Oct 2021

old forecast
72-hour snowfall forecast – high end forecast

NOAA Weather Prediction Center 72-hour 90th-percentile (high-end) accumulated snow forecast

forecast issued 1200 UTC Sun 10 Oct 2021
snow in 72 hrs ending 1200 UTC Wed 13 Oct 2021

old forecast
Thank you

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To view this and other presentations:
https://climate.colostate.edu/ccc_archive.html