Water year 2022 to date: temperature, precipitation, evaporative demand

January 25, 2022
https://twitter.com/EricPurvis8/status/1486061549269786631
Statewide: tied for 2nd warmest October-January (tied with WY1934, only WY2018 warmer)
4.5°F above 20th century average
3.2°F above 1991-2020 average
<table>
<thead>
<tr>
<th>Period</th>
<th>Value</th>
<th>1901-2000 Mean</th>
<th>Anomaly</th>
<th>Rank (1895-2022)</th>
<th>Warmest/Coolest Since</th>
<th>Record</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 2022 1-Month</td>
<td>26.1°F (−3.3°C)</td>
<td>23.7°F (−4.6°C)</td>
<td>2.4°F (1.3°C)</td>
<td>90th Coolest</td>
<td>Coolest since: 2019</td>
<td>1937</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>39th Warmest</td>
<td>Warmest since: 2021</td>
<td>1986</td>
</tr>
<tr>
<td>Dec 2021–Jan 2022 2-Month</td>
<td>29.2°F (−1.6°C)</td>
<td>24.4°F (−4.2°C)</td>
<td>4.8°F (2.6°C)</td>
<td>120th Coolest</td>
<td>Coolest since: 2021</td>
<td>1979</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8th Warmest</td>
<td>Warmest since: 2018</td>
<td>1981</td>
</tr>
<tr>
<td>Nov 2021–Jan 2022 3-Month</td>
<td>33.1°F (0.6°C)</td>
<td>27.5°F (−2.5°C)</td>
<td>5.6°F (3.1°C)</td>
<td>125th Coolest</td>
<td>Coolest since: 2021</td>
<td>1973</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3rd Warmest</td>
<td>Warmest since: 2018</td>
<td>2018</td>
</tr>
<tr>
<td>Oct 2021–Jan 2022 4-Month</td>
<td>36.8°F (2.7°C)</td>
<td>32.3°F (0.2°C)</td>
<td>4.5°F (2.5°C)</td>
<td>126th Coolest</td>
<td>Coolest since: 2021</td>
<td>1899</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>2nd Warmest</td>
<td>Warmest since: 2018</td>
<td>2018</td>
</tr>
<tr>
<td>Sep 2022 5-Month</td>
<td>41.9°F (5.5°C)</td>
<td>37.3°F (2.9°C)</td>
<td>4.6°F (2.6°C)</td>
<td>177th Coolest</td>
<td>Coolest since: 2021</td>
<td>1900</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1st Warmest</td>
<td>Warmest to Date</td>
<td>2022</td>
</tr>
<tr>
<td>Aug 2022 6-Month</td>
<td>46.2°F (7.9°C)</td>
<td>42.0°F (5.6°C)</td>
<td>4.2°F (2.3°C)</td>
<td>127th Coolest</td>
<td>Coolest since: 2021</td>
<td>1899</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1st Warmest</td>
<td>Warmest to Date</td>
<td>2022</td>
</tr>
<tr>
<td>Jul 2022 7-Month</td>
<td>49.6°F (9.8°C)</td>
<td>45.5°F (7.5°C)</td>
<td>4.1°F (2.3°C)</td>
<td>127th Coolest</td>
<td>Coolest since: 2021</td>
<td>1913</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1st Warmest</td>
<td>Warmest to Date</td>
<td>2022</td>
</tr>
<tr>
<td>Jun 2022 8-Month</td>
<td>51.6°F (10.9°C)</td>
<td>47.5°F (8.6°C)</td>
<td>4.1°F (2.3°C)</td>
<td>127th Coolest</td>
<td>Coolest since: 2021</td>
<td>1913</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1st Warmest</td>
<td>Warmest to Date</td>
<td>2022</td>
</tr>
<tr>
<td>May 2022 9-Month</td>
<td>51.7°F (10.9°C)</td>
<td>47.9°F (8.8°C)</td>
<td>3.8°F (2.1°C)</td>
<td>127th Coolest</td>
<td>Coolest since: 2021</td>
<td>1913</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1st Warmest</td>
<td>Warmest to Date</td>
<td>2022</td>
</tr>
<tr>
<td>Apr 2022 10-Month</td>
<td>50.8°F (10.4°C)</td>
<td>47.4°F (8.6°C)</td>
<td>3.4°F (1.8°C)</td>
<td>127th Coolest</td>
<td>Coolest since: 2021</td>
<td>1913</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1st Warmest</td>
<td>Warmest to Date</td>
<td>2022</td>
</tr>
</tbody>
</table>
Globally, 6th warmest January on record
### Statewide Precipitation Ranks

**January 2022**

**Period:** 1895–2022

<table>
<thead>
<tr>
<th>Month</th>
<th>P Rank (of 127 years)</th>
<th>Above, below, or near avg?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct</td>
<td>62&lt;sup&gt;nd&lt;/sup&gt; driest</td>
<td>near avg</td>
</tr>
<tr>
<td>Nov</td>
<td>10&lt;sup&gt;th&lt;/sup&gt; driest</td>
<td>much below</td>
</tr>
<tr>
<td>Dec</td>
<td>14&lt;sup&gt;th&lt;/sup&gt; wettest</td>
<td>above</td>
</tr>
<tr>
<td>Jan</td>
<td>39&lt;sup&gt;th&lt;/sup&gt; driest</td>
<td>below</td>
</tr>
</tbody>
</table>

Statewide: 38<sup>th</sup> driest October-January

0.59” below 20<sup>th</sup> century average
Statewide: 39th warmest January
Statewide: tied for 2nd warmest October-January (tied with WY1934, only WY2018 warmer)

http://climate.colostate.edu/ranks_monthly_maps.html
Colorado January 2022 Precipitation as a Percentage of Normal

Data from PRISM Climate Group
Statewide: 39th driest January
Colorado Water Year 2022 Precipitation as a Percentage of Normal
Oct 2021 - Jan 2022

awy_jan22_pn
Precip % norm

Data from PRISM Climate Group
Statewide: 39th driest October-January

http://climate.colostate.edu/ranks_monthly_maps.html
Colorado statewide average temperature and precipitation, October - January

Water year 2022 through January

1991-2020 avg temp

1901-2000 avg temp

Warm & dry

Cool & dry

Warm & wet

https://climate.colostate.edu/co_cag/quadrant.html
Departure from Normal Temperature (F)
2/1/2022 – 2/15/2022

Generated 2/16/2022 at HPRCC using provisional data.
NOAA Regional Climate Centers
Colorado Month to Date Precipitation
1 - 14 February 2022
Ending 5AM MST

01_14feb22
Precip (inches)

Data from PRISM Climate Group
Standardized Precipitation Index

30-day Standardized Precipitation Index: 2022/01/16 - 2022/02/14

COLORADO CLIMATE CENTER
24-month Standardized Precipitation Index: 2020/02/15 - 2022/02/14
Note: data only through January 31, but nearby stations have remained dry with only ~0.1” in Feb. so far
ALAMOSA-BERGMAN FIELD WY2022 Precipitation Projections

- 2022-02-15: 1.06" (Average: 1.84", 58% Ave)
- Long-Term Average (7.31")
- Average Projection (89% Ave)
- Above Average Projection (97% Ave)
- Below Average Projection (73% Ave)
- 69-Year Historical Accumulations
PUEBLO MEMORIAL AIRPORT WY2022 Precipitation Projections

- 2022-02-15: 1.27" (Average: 2.05", 62% Ave)
- Long-Term Average (12.57")
- Average Projection (94% Ave)
- Above Average Projection (99% Ave)
- Below Average Projection (78% Ave)
- 65-Year Historical Accumulations

Accumulated Precip (in.)

Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Walsh
AKRON 4 E WY2022 Precipitation Projections

- 2022-02-16: 1.34" (Average: 2.64", 51% Ave)
- Long-Term Average (16.52")
- Average Projection (92% Ave)
- Above Average Projection (100% Ave)
- Below Average Projection (83% Ave)
- 49-Year Historical Accumulations
Snowpack evolution over the season

SWE percentile by elevation, dots are colored by the basin

December 7
Snowpack evolution over the season

SWE percentile by elevation, dots are colored by the basin

December 26
Snowpack evolution over the season

SWE percentile by elevation, dots are colored by the basin

January 9
Snowpack evolution over the season

SWE percentile by elevation, dots are colored by the basin

January 26
Snowpack evolution over the season

SWE percentile by elevation, dots are colored by the basin

February 15

http://climate.colostate.edu/snotel.html
Band of snow that fell January 25

Image from the afternoon of February 9

Drought Conditions
COLORADO CLIMATE CENTER
One year ago

February 16, 2021
(Released Thursday, Feb. 18, 2021)
Valid 7 a.m. EST

Drought Conditions (Percent Area)

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>D2-D3</th>
<th>D1-D2</th>
<th>D0-D1</th>
<th>D3-D4</th>
<th>D4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>0.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>58.91</td>
<td>17.78</td>
</tr>
<tr>
<td>Last Week</td>
<td>0.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>90.24</td>
<td>70.11</td>
</tr>
<tr>
<td>3 Months Ago</td>
<td>0.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>93.71</td>
<td>74.08</td>
</tr>
<tr>
<td>Start of Calendar Year</td>
<td>0.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>93.73</td>
<td>76.17</td>
</tr>
<tr>
<td>Start of Water Year</td>
<td>0.00</td>
<td>100.00</td>
<td>99.29</td>
<td>99.35</td>
<td>52.88</td>
<td>2.64</td>
</tr>
<tr>
<td>One Year Ago</td>
<td>28.75</td>
<td>71.25</td>
<td>43.82</td>
<td>3.30</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Intensity:
- None
- D2 Severe Drought
- D0 Abnormally Dry
- D3 Extreme Drought
- D1 Moderate 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:
David Misulis
NOAA/NWS/NCEP/CPC

droughtmonitor.unl.edu
Change over two months
February 15, 2022
(Released Thursday, Feb. 17, 2022)
Valid 7 a.m. EST

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>0.00</td>
<td>100.00</td>
<td>90.41</td>
<td>90.81</td>
<td>8.65</td>
<td>0.00</td>
</tr>
<tr>
<td>Last Week</td>
<td>0.00</td>
<td>100.00</td>
<td>88.17</td>
<td>82.00</td>
<td>8.65</td>
<td>0.00</td>
</tr>
<tr>
<td>3 Months Ago</td>
<td>2.51</td>
<td>97.49</td>
<td>77.70</td>
<td>79.35</td>
<td>5.10</td>
<td>0.00</td>
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<tr>
<td>Start of Calendar Year</td>
<td>0.00</td>
<td>100.00</td>
<td>95.49</td>
<td>77.08</td>
<td>22.25</td>
<td>0.00</td>
</tr>
<tr>
<td>Start of Winter Year</td>
<td>12.72</td>
<td>87.28</td>
<td>46.42</td>
<td>26.30</td>
<td>15.06</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>90.24</td>
<td>58.91</td>
<td>17.78</td>
</tr>
</tbody>
</table>

Intensity:
- None
- D0 Severe Drought
- D1 Abnormally Dry
- D2 Moderate 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:
Brad Pugh
CPC/NOAA

droughtmonitor.unl.edu

COLORADO CLIMATE CENTER
Percent of Colorado in drought (since 2000)

**Intensity:**
- Yellow: D0 Abnormally Dry
- Light Orange: D1 Moderate Drought
- Orange: D2 Severe Drought
- Red: D3 Extreme Drought
- Maroon: D4 Exceptional Drought
Usually we look at evaporative demand in the warm season, but the last few months have had above normal (for winter) ET on the eastern plains, with drought continuing.
USDA outlooks point to increased potential for grass fires in the spring on the plains.
Shallow soil moisture looking better in most places; deficits remain in deep soil moisture especially on the eastern plains and parts of the San Luis Valley.
GRACE-Based Root Zone Soil Moisture Drought Indicator

August 16, 2021

Wetness percentiles are relative to the period 1948-2012
The rootzone is defined as the top 1 meter of soil
Cell Resolution 0.125 degrees
Projection of this document is Lambert Azimuthal Equal Area

https://nasagrace.unl.edu
VegDRI: longer-term vegetation condition

Vegetation Drought Response Index
Complete: Colorado

August 22, 2021

QuickDRI: shorter-term vegetation response

Quick Drought Response Index
Colorado

August 15, 2021
(Week 33)

Vegetation Condition:
- Extreme Drought
- Severe Drought
- Moderate Drought
- Pre-drought stress
- Near Normal
- Unusually Moist
- Very Moist
- Fairly Moist
- Out of Season
- Water
See others on our drought page: [https://climate.colostate.edu/drought/](https://climate.colostate.edu/drought/)
**Rapid intensification of the emerging southwestern North American megadrought in 2020–2021**

A. Park Williams, Benjamin I. Cook & Jason E. Smerdon

---

**a**

22-yr running mean

---

**b**

2000–2021 drought rank

---

From Williams et al. (2022, Nature Climate Change)
Wet and dry periods come and go, and droughts have always been a part of our climate…

Standardized Precipitation Index (SPI)
state of Colorado, 48 months

Considers precip only

Standardized precipitation index (48 months, statewide)
...but a warmer atmosphere is “thirstier”, making droughts more intense and more likely
Trends in reference evapotranspiration by season, averaged across multiple datasets

A multi-dataset assessment of climatic drivers and uncertainties of recent trends in evaporative demand across the continental US

Christine M. Albano1, John T. Abatzoglou2, Daniel J. McEvoy3, Justin L. Huntington1, Charles G. Morton4, Michael D. Dettinger2, and Thomas J. Ott1

1* Division of Hydrologic Sciences, Desert Research Institute, Reno, Nevada | 2-3 Management of Complex Systems Department, University of California, Merced, Merced, California | 4 Division of Atmospheric Sciences, Desert Research Institute, Reno, Nevada | 5-6 Division of Earth and Ecosystem Sciences, Desert Research Institute, Reno, Nevada | 7-8 California-Nevada Climate Applications Program, Scripps Institution of Oceanography, La Jolla, California

Published online: 27 Jan 2022
DOI: https://doi.org/10.1175/JHM-D-21-0163.1

From Albano et al. (2022, J. Hydrometeorology)
NOAA 7-day precipitation forecast
NOAA 7-day precipitation forecast (difference from average)
Warming into the weekend, then a big pattern shift early next week, with extended cooler-than-average conditions
Mountain snow pattern becomes much more active next week, though looks more like “normal” winter rather than a blockbuster storm.
Western slope lower elevations should get decent precip (rain?) next week
February 24 – March 2 (after the real cold and snow early next week)
La Niña still in place, but starting to wane

La Niña is likely to continue through the spring (77% chance), and then transition to ENSO-neutral by summer.
Correlation Between ENSO MEI and Seasonal Precipitation Accumulation (1981-2020)
Spring ENSO probably in here
Spring PDO probably in here
MAM Precipitation During La Nina
Increased Risk of Wet or Dry Extremes

COLORADO CLIMATE CENTER
March-April-May outlook

Three Category Temperature Outlook
Normal Maximum Temperature: 59
Normal Minimum Temperature: 25

Three Category Precipitation Outlook
Normal Precipitation: 10.19

Seasonal Outlook
March 2022-May 2022 (Lead 1)
March-April-May outlook

Three Category Temperature Outlook
Normal Maximum Temperature: **59**
Normal Minimum Temperature: **25**

- Above Normal: **52%**
- Below Normal: **15%**
- Near Normal: **33%**

Three Category Precipitation Outlook
Normal Precipitation: **10.19**

- Above Normal: **11%**
- Below Normal: **56%**
- Near Normal: **33%**
Takeaways

• Recent snow along the Front Range has been very welcome, but the mountains have had very little snow since the huge storm cycle of late December/early January

• With snowpack back near/below normal in most basins, less optimism for a good runoff year

• Pattern shift coming next week, with an extended period of cool conditions and potential for mountain snow

• La Niña continues, but is expected to weaken by summer. But in the meantime, outlooks tilt toward a warm, dry spring
Thank you!

http://climate.colostate.edu/
russ.schumacher@colostate.edu

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Join our monthly webinar!
https://climate.colostate.edu/webinar_registration.html