

Montana Weather/Precipitation Summary

August 2006 By NOAA's National Weather Service Great Falls Montana

After a hot July, temperatures tempered a bit in August, but continued above normal in many areas. Temperatures averaged from 3.5°F above normal in the east, to 2°F below normal in the west and south central. Dryness continued most areas through mid-month, with exceptions. Thunderstorms became more common during August, with nearly 2 inches of rain by mid-month at some points in the state. Over 100°F temperatures were reported across the state from the 7th-10th, with the warmest 104°F at Libby on the 7th. Temperatures were not as consistently warm in August as in July. More variability was accompanied by more rainfall. A strong cold front on the 11th brought the first major cool period during the summer from the 12th-13th, with high temperatures in the 70s and lower 80s. This change brought severe weather to the state. Weak disturbances also brought thunderstorms with little rain, which sparked fires in western Montana. The cooler air during this period produced the coldest reading of the month, 20°F at Clover Meadow. An unsettled period through mid-month brought even cooler air with widespread rain on the 17th. Maximum temperatures on the 17th were in the 60s and lower 70s. Mid-month, Benchmark (west of Augusta) received more than two inches of rain over a 3 day period. The heat returned during the third week. Some records highs were set, with temperatures over 100°F in the southeast on the 22nd-23rd.

Heat returned the last few days of the month, before a strong cold front brought much cooler air for the last day. This cold front produced the strongest wind gusts for the month. Fallon, in Prairie County, recorded a gust to 69 mph on the morning of the 31st. Record low temperatures were set at many locations in western Montana on the 31st. Clover Meadow dropped to 14°F, for the month's low, and tying the state record low for the date. This was the coolest August temperature in the state since 1992. Snow fell at the higher elevations of the island ranges as precipitation accompanied this front. Some areas in the Little Belts recorded up to 3 inches of snow.

Severe weather occurred on 13 days. The average for August is 7 days. Severe thunderstorms brought one inch hail to southeast Montana on the 7th and 8th. The strongest wind of the month occurred near Mosby on the 9th (65 mph). A strong cold front brought hail wind strong winds across most of the state on the 11th and 12th. A major weather change on the 16th and 17th produced hail, heavy rain and strong winds over much of Montana. Accompanying the strong cold front on the 30th and 31st, isolated thunderstorms produced severe weather in western and extreme northeast Montana.

Figure 1 shows the average flow pattern during August as contrasted with July. In August, an upper level trough has dominated western Montana, with a low pressure trough over eastern Montana, which has brought more variability to the weather pattern. Hot days were interspersed with cool periods. Thunderstorms that developed also brought more rain than those of July. Figure 2 illustrates the precipitation departures from normal for August. In general, it was a dry month for the state. Butte, Livingston and Miles City ranked among the 10 driest Augusts of record.

For the water year, there are still areas that remain dry. Large portions of eastern Montana are around 80% or less of normal precipitation for the water year. Many of these areas have experienced a very dry and warm summer, too.

Month's summary information (to date):

| | | | |
|---------------------------------|--|-------------------------|--------------------------------------|
| High Temperature | 104°F at Libby (7 th) | Greatest Precip | 2.92" at Benchmark |
| Low Temperature | 14°F at Clover Meadow (31 st) (sw Montana) | | 1.70" at Waldron (WC Montana) |
| Warmest Ave Temp | 75.2°F at Glendive | Peak Wind Gust | 69 mph at Fallon (31 st) |
| Coollest Ave Temp | 52.7°F at Cooke City | | |
| Range of Temp Departures | -2.0°F at Cooke City to +3.5°F at Glendive | Highest Ave Wind | 12.1 mph at Deep Creek |

Summer (June-August) Temperature and Precipitation ranking of note:

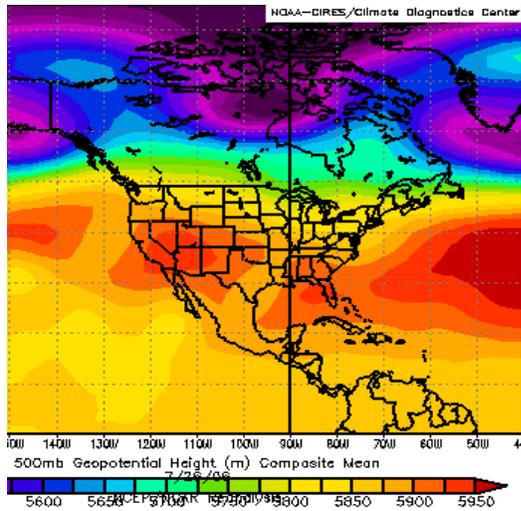
| Temperature Ranking | | Precipitation Ranking | |
|-------------------------|----------------------------|------------------------|--------------------|
| 3 rd warmest | Helena | Driest | Glasgow |
| 4 th warmest | Bozeman | 2 nd driest | Billings, Cut Bank |
| 5 th warmest | Dillon, Glasgow, Missoula | 4 th driest | Miles City |
| 6 th warmest | Miles City | | |
| 7 th warmest | Billings, Havre, Lewistown | | |

**Historical Rank of Precipitation (inches)
for the Current Month and Water Year to Date**

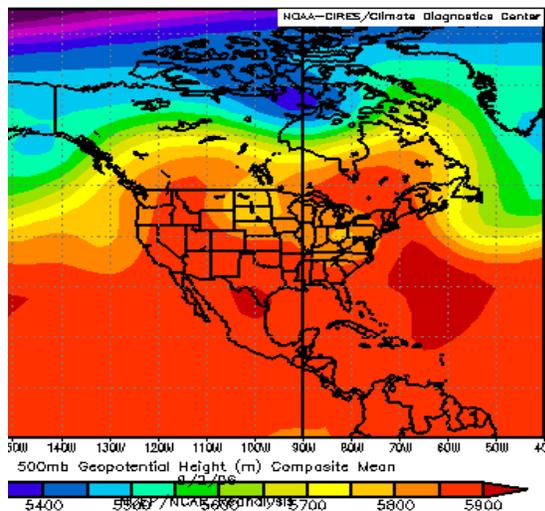
| Location | Aug | % of Norm | Rank | Pcntl | Oct 1 – Aug 31 | % of norm | Rank | Pcntl | Years |
|-------------|------|-----------|------|-------|----------------|-----------|------|-------|-------|
| Baker | 1.56 | 161% | | | 10.10 | 96% | | | 8 |
| Billings | 0.42 | 49% | 34 | 35 | 10.58 | 79% | 49 | 51 | 96 |
| Belgrade | 0.72 | 63% | 26 | 37 | 12.97 | 98% | 41 | 63 | 65 |
| Butte | 0.09 | 7% | 5 | 4 | 12.02 | 103% | 63 | 56 | 112 |
| Cut Bank | 0.30 | 18% | 16 | 16 | 4.07 | 36% | 1 | 1 | 98 |
| Dillon | 0.53 | 49% | 21 | 31 | 8.67 | 97% | 38 | 58 | 66 |
| Glasgow | 0.48 | 38% | 33 | 30 | 7.81 | 76% | 16 | 15 | 106 |
| Great Falls | 1.33 | 81% | 75 | 66 | 16.88 | 124% | 93 | 82 | 114 |
| Havre | 0.80 | 67% | 59 | 46 | 8.18 | 78% | 23 | 18 | 126 |
| Helena | 0.25 | 19% | 18 | 14 | 11.45 | 111% | 78 | 61 | 128 |
| Jordan | 0.98 | 66% | | | 10.07 | 95% | | | 6 |
| Kalispell | 0.62 | 50% | 36 | 32 | 16.47 | 103% | 52 | 46 | 112 |
| Lewistown | 0.63 | 33% | 27 | 24 | 15.64 | 95% | 55 | 50 | 110 |
| Livingston | 0.30 | 22% | 9 | 9 | 11.64 | 82% | 35 | 35 | 100 |
| Miles City | 0.08 | 7% | 10 | 8 | 10.43 | 85% | 44 | 34 | 129 |
| Missoula | 0.74 | 64% | 63 | 50 | 14.94 | 117% | 97 | 81 | 120 |
| Mullan Pass | 0.87 | 57% | 34 | 51 | 44.04 | 131% | 53 | 83 | 64 |
| Wolf Point | 0.95 | 69% | | | 8.29 | 77% | | | 8 |
| Glendive | 0.93 | 66% | 52 | 47 | 11.78 | 96% | 44 | 43 | 103 |
| Sidney | 0.66 | 50% | 19 | 29 | 12.06 | 94% | 29 | 45 | 65 |
| BZN-MSU | 1.84 | 124% | 99 | 77 | 19.42 | 111% | 101 | 83 | 121 |

Rankings and Percentiles are 1=driest, higher numbers=wetter.

For an automated version of this chart, updated daily, go to
<http://www.wrh.noaa.gov/tfx/dx.php?wfo=tfx&type=&loc=products&fx=PCPNTOTALS>



a. July 2006 mean flow



b. August 2006 Mean flow

Figure 1. Mean flow at 500 millibars (~18,000 ft), (a) July 2006. (b) August 2006. Note the difference in the flow pattern over the west between July and August. Also, the scale has changed.

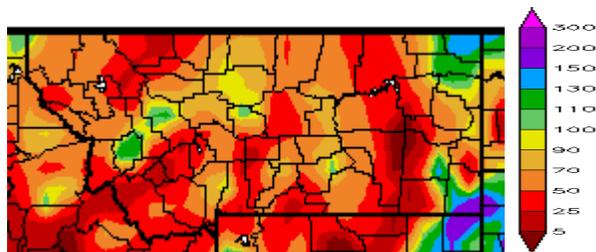


Figure 2. Precipitation anomaly (% of normal) for August. (courtesy High Plains Climate Center).

For a state map of % of normal water year precipitation (updated around the 7th of each month), go to:
http://www.wrh.noaa.gov/tfx/image.php?wfo=tx&type=data&loc=hydro&fx=watyr_pcbtnorm.png

For the latest information on mountain snow pack from the NRCS, go to:
<http://www.mt.nrcs.usda.gov/snow/index.html>

For the latest U.S. Drought Monitor, issued weekly by the Climate Prediction Center (CPC), go to:
<http://www.drought.unl.edu/dm/monitor.html>

All reported data is preliminary. Further inquiries about the moisture conditions can be directed to Dave Bernhardt or Gina Loss at (406) 453-2081. Many more links are on the Drought Information Page of the NWS Great Falls web site at
<http://www.wrh.noaa.gov/tfx/main/drought.php?wfo=tx>