

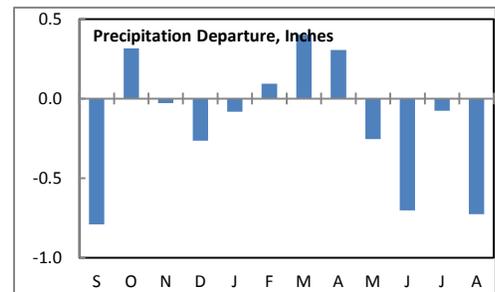
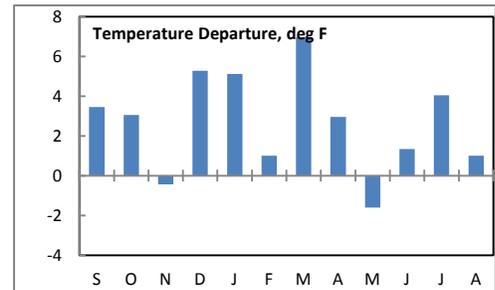
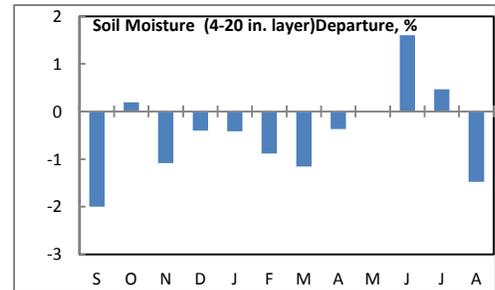
Montana Weather/Precipitation Summary

August 2012 by NOAA's National Weather Service Great Falls Montana

August produced a mix of temperature anomalies. The state was under the influence of a broad ridge of high-pressure for most of the month (Fig. 1). There were pockets of below normal averages scattered across the state, with the largest contiguous area along the eastern border. Some locations near Sidney were as much as 3°F below normal (Fig. 2). The warmest anomalies were over portions of the central and southwest. Pockets of 2-4°F positive anomalies stretched from Havre to Livingston, and westward through Missoula and Dillon. Most of the state recorded less than one-half the normal August precipitation (Fig. 3). Some locations saw near to above normal rainfall, but the area was confined to along the eastern border. Soil moisture conditions for the month were a sharp turn-

around from earlier in the summer. A statewide August composite now shows that soil moisture is the driest since 2007 (right-top). Besides below normal precipitation, the state has had a prolonged period of above normal temperatures. In the past 12-months, only two months have had below average temperatures, giving a composite departure of 2.7°F over these 12 months (right-middle). Long-term precipitation has been a little more jumbled, but the past five-months have had below normal precipitation.

The 12-month departure is 1.81-inches below normal (right-bottom).



August 1-4

Near seasonal temperatures occurred on the first and second, with thunderstorms scattered throughout the state. Some severe convective weather occurred across eastern Montana, with golf-ball size hail reported in Daniels, Roosevelt and Powder River Counties. Up to three-quarters of an inch of rain fell at Zortman and Opheim. A cold front passed through the state on the third, producing below normal temperatures on the third. Some locations did not reach 70F for daytime highs on the third. Bozeman started the day with a record low temperature on the fourth. They dropped to 37F. The lowest in the state on the fourth was 28F at West Yellowstone.

August 5-13

Temperatures rebounded back into the above-normal range over most of the state. The far eastern counties were did have periods of above normal temperatures from the fifth through tenth, but cooler air on the 11th through 14th produced near to slightly below normal temperatures. The warmest temperature in the state occurred on the sixth, when Moorhead reached 104F. The warmer air retreated westward, and on the eighth, Great Falls, Missoula and Bozeman all recorded record high temperatures. Great Falls reached 102F, for the warmest in the state on the eighth. Afternoon thunderstorms across central Montana produced many reports of wind gusts between 60 and 65 mph. A cold front moved through eastern Montana on the thirteenth. Some golf-ball size hail was reported near Miles City and Brusett (Garfield), and just before the storms moved into North Dakota, a wind gust to 72 mph was recorded at Glendive.

August 14-16

One of the strongest Canadian cold fronts in a decade passed through central and western Montana during the late afternoon and evening of the 14th. After some severe convective winds were reported over the hi-line east of Cut Bank, the front passed through Cut Bank producing a wind gust of 72 mph. This was the highest gust of record in August at Cut Bank. Gusts reached

62 mph at Great Falls and 86 mph at Millegan (Cascade). Severe tree damage occurred around Great Falls. Downed power lines also caused a few fires in the area. The strong winds brought two to three hours of blowing dust and reduced visibilities due to the dust and smoke over portions of central Montana. As the front moved through the Flathead Lake area, northeast winds to 43 mph caused damage to several boats on the west and southwest shores of the lake. Precipitation behind the front amounted to nearly one-half inch over portions of northwest and central Montana. Even a little snow fell at 8400 feet (Swiftcurrent Lookout) in Glacier National Park. Many locations did not warm above 60F on the 15th, as the cool air and cloudy conditions prevailed over central Montana. Havre saw a record low on the morning of the 16th, falling to 38F. The coolest location in the state on the 16th was 29F at St Mary.

August 17-23

The weather turned warmer during this period. Isolated thunderstorms produced gusty winds along the Rocky Mountains on the 20th. Areas of Glacier National Park had thunderstorm wind gusts to 65 mph. Very warm air over the adjacent plains produced a record high temperature at Cut Bank, when they reached 92°F. Thunderstorms moving across the northern plains on the 21st produced wind gusts to 61 mph at Fort Benton.

August 24-31

A strong cold front brought much cooler conditions statewide on the 24th. Winds behind the front gusted to 57 mph near Galata (Toole). Wisdom fell to 17°F on the 25th, while a record low temperature was set at Dillon, when they reached 35°F. A sharp warm-up and some afternoon stability caused record highs and thunderstorms on the 27th. Dillon tied their record high temperature, reaching 90F, while winds gusted to 73 mph near Millegan (southern Cascade County). In very hazy conditions due to fires scattered across the state, the heat continued on the 28th. Several new high temperature records were set. By the time cooler air reached all across the state on the 29th, Moorhead (Powder River) had topped out at 105°F, the warmest for the month. The record high temperature was also tied at Glasgow, when they reached 100°F. Somewhat cooler air was across the state through the end-of-the-month, but little rainfall. Smoky conditions from fires in Idaho and Montana reduced visibilities below 4 miles in some of the southwest valleys.

Precipitation/convection

Severe convective weather occurred on eight days in August. The normal for the month is also eight days. Severe thunderstorms produced up to 72 mph winds (Dawson County) and golf-ball size hail. Gusts to 73 mph occurred southeast of Cascade, near Millegan, on the 27th.

August summary information:

High Temperature	105°F near Moorhead (Powder River) (29 th)	Greatest Precip	1.66" near Savage (Richland)
Low Temperature	17°F at Wisdom (25 th)		2.30" at Dupuyer Creek SNOTEL
Warmest Ave Temp	74.5°F at Roundup (1.3F above normal)	Peak Wind Gust	86 mph at Millegan (Cascade) (14 th)
Coolest Ave Temp	57.3°F at Wisdom (1.2F above normal)		
Range of Temp departures	-2.4°F at Belgrade to +3.1°F at Missoula	Highest Ave Wind	11.2 mph at Fort Belknap 12.7 mph at Point Six RAWS
21 city mean monthly Temperature/Normal	67.9/66.9F 1F above normal. 43 rd warmest of record (since 1880) 68 th percentile.	20 city mean monthly wind speed/Normal	7.1 mph/8.3 mph; 3 rd calmest of record. (since 1936) 4 th percentile
22 city mean monthly precipitation/Normal	0.52/1.19" – 44% of normal; 23 rd driest of record. (since 1880) 17 th percentile		

August precipitation average of 0.52-inches was the driest since 2001.

Summer June through August mean temperature was 67.3°F (normal is 65.1F). This was the 16th warmest of record, and the warmest since 2007. So far this year, Miles City has had 18 days of 100F or warmer. This is the highest amount since 2003.

The summer mean precipitation was 3.57-inches, the 23rd driest of record and the driest since 2001. Over a period for the calendar-year-to-date, the statewide mean precipitation is 9.80-inches, which is the 38th driest of record, and the driest since 2001. The mean summer wind speed of 8.2-mph is 0.4-mph below normal, and the 12th calmest of record. Even so, this was the windiest summer period since 2005.

**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	1.24	128%			9.98	95%			14
Billings	0.30	35%	27	24	7.41	55%	21	19	108
Belgrade	0.23	21%	6	7	8.38	64%	4	4	75
Butte	0.25	18%	13	10	8.66	74%	21	17	118
Cut Bank	0.45	39%	24	22	9.62	100%	42	40	104
Dillon	0.67	63%	31	42	6.24	65%	4	4	72
Glasgow	0.76	61%	45	38	12.62	118%	70	62	112
Great Falls	0.36	23%	22	18	12.58	94%	52	43	120
Havre	0.31	28%	26	19	10.94	109%	70	53	132
Helena	0.66	55%	62	46	7.86	78%	18	13	134
Jordan	0.10	8%			7.43	65%			14
Kalispell	0.30	30%	23	19	17.15	110%	94	79	118
Lewistown	0.43	25%	18	15	16.25	105%	66	57	116
Livingston	0.15	14%	4	3	8.93	66%	11	10	106
Miles City	0.83	91%	70	51	5.80	51%	4	2	135
Missoula	0.16	13%	17	12	14.36	110%	95	75	126
Mullan Pass	0.07	5%	4	4	45.20	124%	59	84	70
Wolf Point	0.78	61%			10.46	94%			14
Glendive	1.23	89%	68	58	12.81	104%	59	54	109
Sidney	0.86	74%	28	38	7.79	60%	7	9	71
BZN-MSU	0.48	34%	21	15	14.86	81%	28	21	127

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=tx&type=&loc=products&fx=PCPNTOTALS>

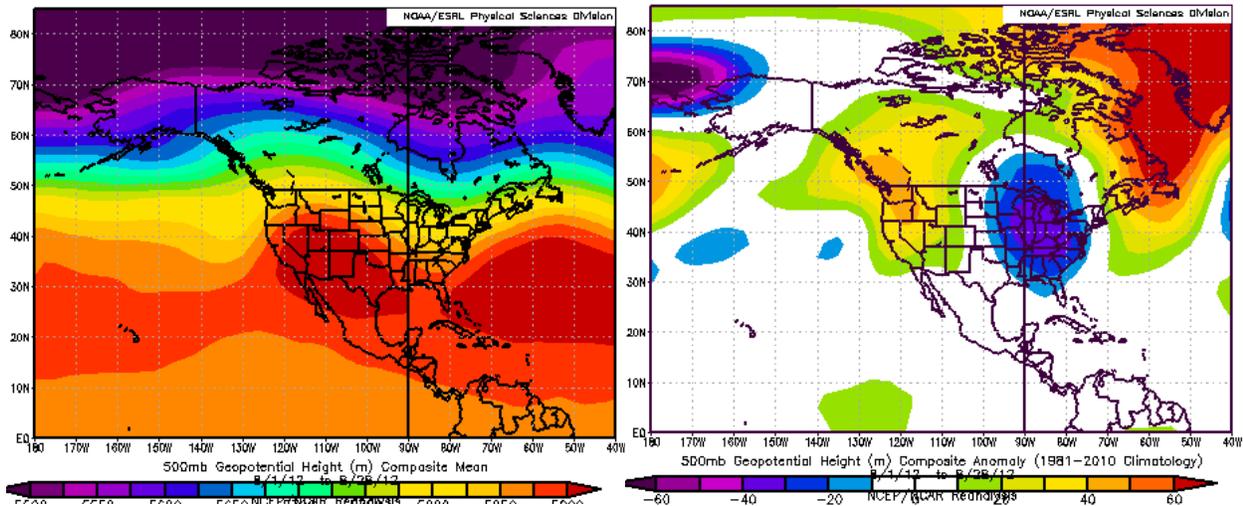


Figure 1a (left); 1b (right). Mean flow at 500 millibars (~18,000 ft) for August 2012 (left) and anomaly (right). Heights across Montana were above normal, especially west. This contributed to the generally warmer than normal conditions across the west. The trough over the great lakes contributed to below normal temperatures and somewhat above normal precipitation in the far east.

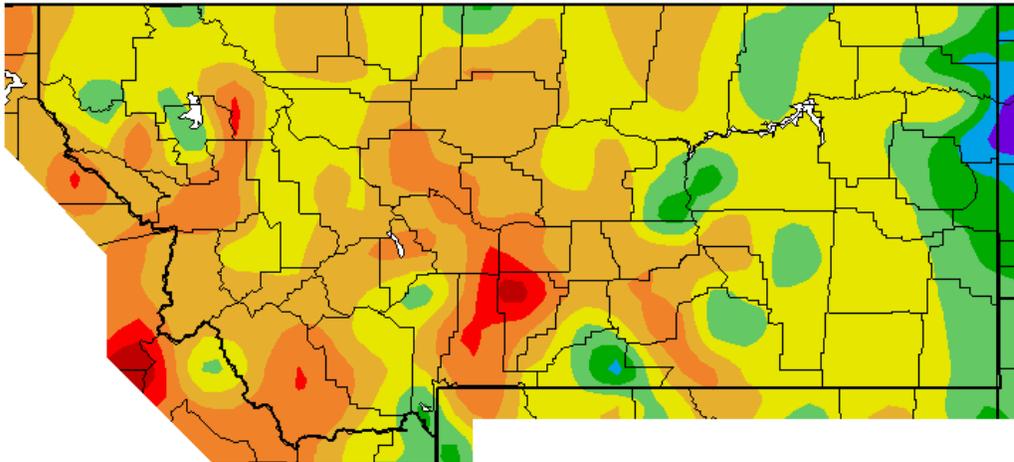


Figure 2. August 2012 Temperature anomalies (Western Region Climate Center)

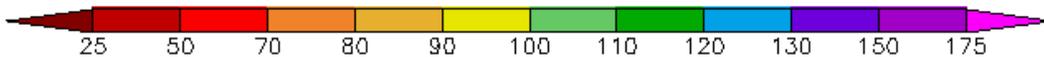
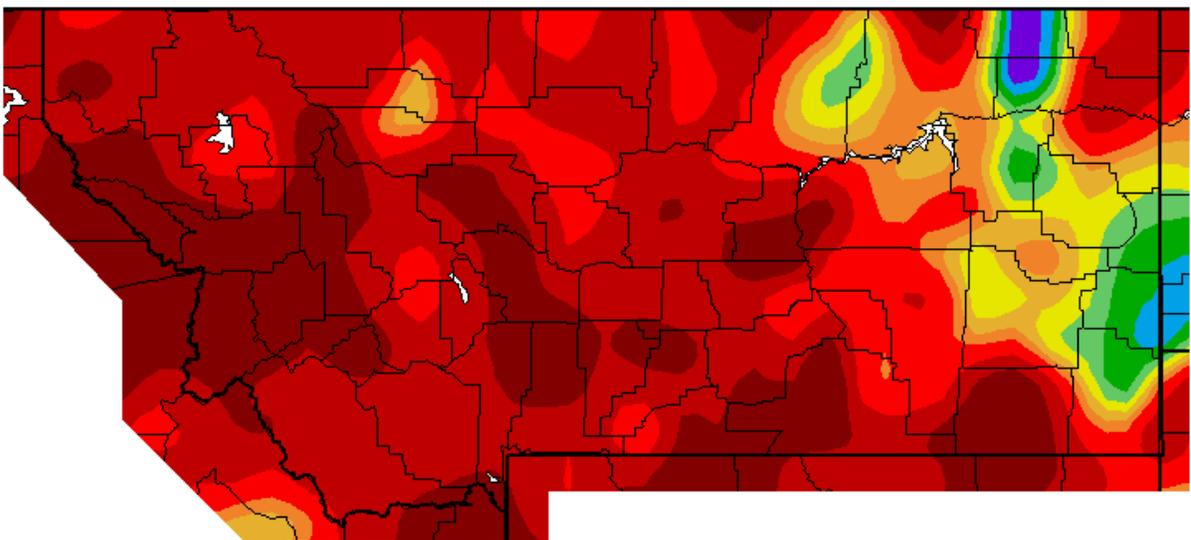


Figure 3. August 2012 Precipitation anomalies (Western Region Climate Center).

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_pcntnorm.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>

These data are preliminary and have not undergone final QC by NCDC. Therefore, these data are subject to revision. Final and certified climate data can be access at the National Climatic Data Center (NCDC) <http://www.ncdc.noaa.gov>. 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=tfx>. The climatological record for normals is 1981-2010. The ranking period for temperature, precipitation and snowfall is since 1880. The ranking period for wind speeds is since 1936. The ranking period for soil moisture is since 1995.