Montana Weather/Precipitation Summary

August 2010 by NOAA's National Weather Service Great Falls Montana

August 2010 recorded widely variable temperatures, with record warm and record cold high temperatures. Overall, statewide temperatures averaged below normal, with a few exceptions. Temperature averages ranged from three degrees below normal to two degrees above normal (Fig. 2). Precipitation was variable with scattered thunderstorms the normal for August. Many areas recorded above average precipitation, with the heaviest precipitation over central and eastern Montana (Fig. 3). An anomalous upper level ridge dominated the North Pacific region during the months of July and August. This contributed to the pattern of below normal temperatures over Montana (Fig. 1).

August 1-4

Below normal temperatures and severe weather occurred during the first four days of August. A cold front brought cooler air to the region on the first. Havre recorded gusts to 67 mph on the first as thunderstorms moved through. Golf-ball size hail fell near Froid in Roosevelt County. On the second, heavy rain caused flooding of 25 homes as 3.25 inches of rain fell near Hot Springs (Sanders County).

August 5-12

Temperatures warmed with generally above normal temperatures during this period. Flat Willow reached 96F on the 6th and Baker reached 97F on the 11th. Again, thunderstorms and severe weather were a daily feature during this period. On the sixth, a tornado briefly touched down in northern McCone County, while another briefly touched down near Richey (Dawson). Meanwhile, thunderstorms produced wind gusts to 69 mph at Great Falls. On the ninth, 1.5-inch hail fell near Richey (Dawson). A thunderstorm dumped heavy rainfall in the Helena area on the tenth, causing a new daily rainfall record to be established at Helena. On the 11th, severe weather again raked northeast Montana. Baseball-size hail fell near Peerless (Daniels) and a rope-like tornado was observed near Scobey. Thunderstorm wind gusts to 74 mph occurred at Armells Creek (Fergus).

August 13-16

A cold front brought significantly cooler air to the state. Widespread rains fell across western and central Montana. Up to 1.5 inches of rain fell in the Mission Mountains in Lake County. Record cool maximum temperatures occurred in north central and southwest Montana. Millegan reached only 62F on the 14th, while Wisdom's morning low temperature was 28F. Traces of snow fell over the highest peaks in Glacier National Park.

August 17-26

A period of benign weather occurred during this period. Temperatures warmed and generally dry conditions accompanied the warmer temperatures. A thunderstorm moving through Great Falls on the 18th produced 68 mph winds in north Great Falls. On the 21st, isolated thunderstorms accompanying a cold front produced gusts to 60 mph at Jordan. Ahead of the cold front, temperatures reached 104F at Jordan, and 105F at Little Bighorn and Forsyth. The month's warmest temperature occurred on the 21st. Record high temperatures were set at Billings, Livingston, Miles City and Bozeman. An isolated thunderstorm produced heavy rain in the Great Falls area on the 22nd. Nearly one inch of rain fell in one hour, which caused some back up of storm drains in Great Falls. As these thunderstorms moved from the southwest, a gust to 62 mph occurred at Elk Park. Clearing skies and a slight cool-down on the 23rd and 24th produced the coolest temperature of the month. On the morning of the 24th, Wisdom recorded a low of 24F. A quick rebound to warmer air caused record high temperatures to fall over central and western Montana on the 26th. At many of these locations, this was the warmest day of the year. Havre reached 103F.

August 27-31

A strong cold front moved across the state on the 26th and brought cooler air for the rest of the month. A collapsing thunderstorm moved across the city of West Yellowstone on the 28th and produced a microburst that damaged several structures in the city. A severe thunderstorm caused golf ball-size hail in Billings on the 29th. Meanwhile snow fell at the higher elevations in western Montana. Up to three inches of snow fell at Big Mountain Resort, and around two inches at Big Sky Resort. Heavy rains fell over many portions of the state. Up to two inches fell at Billings, and 3.25 inches at Crystal Lake (Fergus). Temperatures were so cool that many locations in central Montana failed to climb out of the 40s on the 29th and 30th. Many daily cool maximum temperatures were set these days.

New Temperature Records for August 2010

Station	Record Type	New Record	Date	Previous Record	Year of Previous Record
Livingston	Low Daily Min	38	15	38	2005
Cut Bank	High Daily Min	59	19	59	1979
Billings	High Daily Max	101	21	97	1969
Bozeman Apt	High Daily Max	98	21	97	2009
Livingston	High Daily Max	98	21	97	1995
Miles City	High Daily Max	102	21	102	1995
Billings	High Daily Max	99	26	98	1994
Bozeman Apt	High Daily Max	101	26	96	2003
Cut Bank	High Daily Max	93	26	91	2003
Great Falls	High Daily Max	96	26	96	1894
Havre	High Daily Max	102	26	98	2003
Helena	High Daily Max	96	26	95	2003
Livingston	High Daily Max	99	26	95	1999
Missoula	High Daily Max	99	26	99	1981
Billings	Low Daily Min	57	29	58	1994
Cut Bank	Low Daily Max	53	29	57	1951
Dillon	Low Daily Max	58	29	58	1948
Great Falls	Low Daily Max	51	29	53	1993
Missoula	Low Daily Max	55	29	57	1965
Butte	Low Daily Max	49	30	50	1932
Glasgow	Low Daily Max	55	30	57	1965
Lewistown	Low Daily Max	48	30	49	1952
Miles City	Low Daily Max	58	31	58	1956

Precipitation

Severe convective weather occurred on 17 days in August. The average for August is 8 days. This is the highest number of days of severe weather in an August since reliable records have been kept. The highest reported thunderstorm gust was 74 mph near Armells Creek (Fergus County) on the 11th.

Areas of below normal precipitation were over northwest and north central Montana (Fig. 3). A large area of above normal precipitation occurred across central and eastern Montana.

New Precipitation Records for August 2010

Station	Record Type	New Record	Date	Previous Record	Year of Previous Record
Butte	High Daily Rain	0.51	10	0.40	1907
Helena	High Daily Rain	0.88	10	0.54	1985
Glasgow	High Daily Rain	0.49	11	0.14	1932
Billings	High Daily Rain	0.93	30	0.37	1977

Other Information

August's statewide average temperature of 64.4F was 1.1F below normal. This has been the coolest water year average (40.5F) since 1995-96 and the coolest calendar-year-to-date average (45.0F) since 2002. For the summer period (June through August), the average temperature was 63.4F, the 26th coolest of record, and the coolest since 2004. The normal temperature for this period is 64.8F.

For precipitation statewide, this was the wettest August since 1993. The composite total for the summer was 6.88 inches, or the 14th wettest summer of record. This has been the wettest summer period since 1993. For the calendar year, the statewide average precipitation is the wettest since 1995, and this has been the wettest water-year since 1996-97.

For August winds, this was the 13th calmest August of record and has been the fourth calmest water-year of record. So far, this is the calmest water-year period since 1996-97. For the calendar year, it is the fourth calmest of record and the lowest average since 1998. For the summer-period, the average was 7.9 mph (normal 8.8 mph) and the fourth calmest of record.

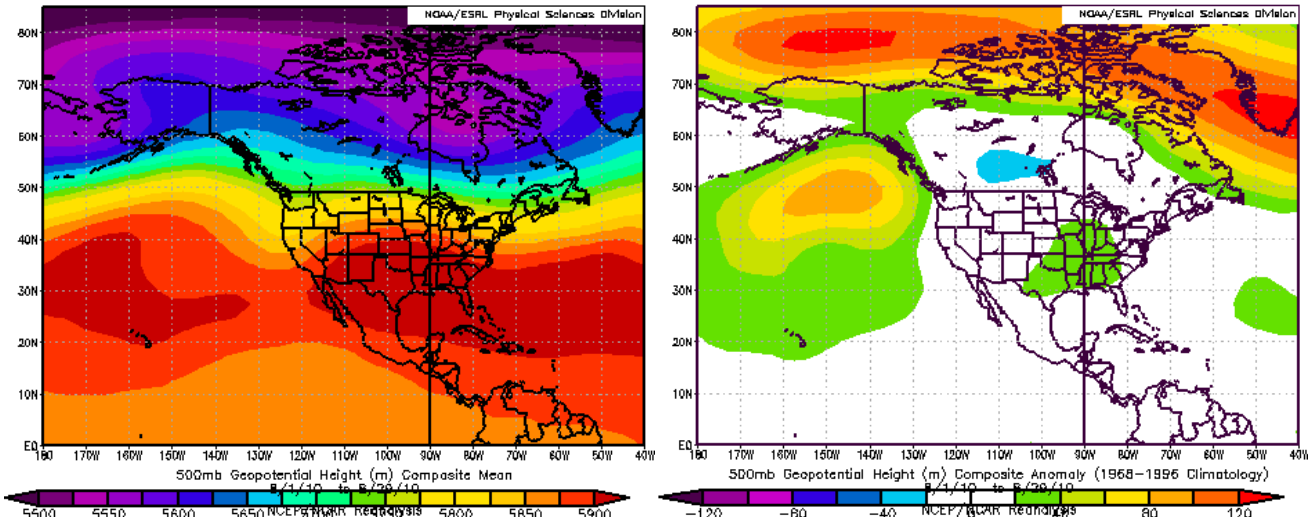
August summary information:

High Temperature	105°F at Little Bighorn and Forsyth (21st)	**Greatest Precip**	5.02" at Shenango (Gallatin)
Low Temperature	24°F at Wisdom (24th)		5.10" at South Fork Shields SNOTEL (Park)
Warmest Ave Temp	72.0°F at Miles City	**Peak Wind Gust**	74 mph at Garden Wall (2nd) and Armells Creek (Fergus) (11th)
Coolest Ave Temp	52.2°F at Gates Park		
Range of Temp departures	-3.2°F at Wibaux and Polson to +2.0°F at Malta	**Highest Ave Wind**	12.1 mph at McDonalds and 18.5 mph at Logan Pass
18 city mean monthly Temperature/Normal	65.4/66.5; 49th coolest of record (since 1880)	**18 city mean monthly wind speed/Normal**	7.9 mph/8.5 mph; 13th calmest of record (since 1936)
18 city mean monthly precipitation/Normal	1.92"/1.43" – 134% of normal; 16th wettest of record (since 1880) Water year 100% of normal		

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	1.05	108%			14.39	137%			12
Billings	2.78	327%	101	99	16.92	126%	90	89	101
Belgrade	1.91	168%	65	88	13.38	101%	52	71	73
Butte	2.05	151%	100	85	13.96	119%	89	77	116
Cut Bank	0.25	15%	16	15	6.80	60%	16	15	102
Dillon	1.28	119%	53	74	10.79	120%	52	74	70
Glasgow	2.99	239%	102	89	15.36	150%	98	89	110
Great Falls	2.05	124%	94	79	15.63	114%	88	74	118
Havre	1.34	112%	84	64	12.10	116%	83	64	130
Helena	2.59	201%	124	95	10.92	106%	75	56	132
Jordan	2.46	165%			15.29	144%			12
Kalispell	1.39	111%	87	74	16.52	103%	54	46	116
Lewistown	3.69	195%	105	91	19.33	117%	92	81	114
Livingston	1.91	141%	89	83	13.36	94%	55	52	104
Miles City	1.54	133%	97	73	16.30	133%	120	90	133
Missoula	1.22	106%	93	71	12.20	96%	54	43	124
Mullan Pass	0.94	62%	37	51	28.25	84%	10	13	68
Wolf Point	3.15	227%			12.27	114%			12
Glendive	0.65	46%	38	32	17.05	139%	95	89	107
Sidney	1.39	106%	42	59	16.92	132%	63	91	69
BZN-MSU	2.09	141%	114	86	20.03	115%	105	84	125

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



Figures 1a (left) and 1b (right). Mean flow at 500 millibars (~18,000 ft) for August (left). A trough of low pressure dominated western North America. This contributed to the below average temperatures in Montana.

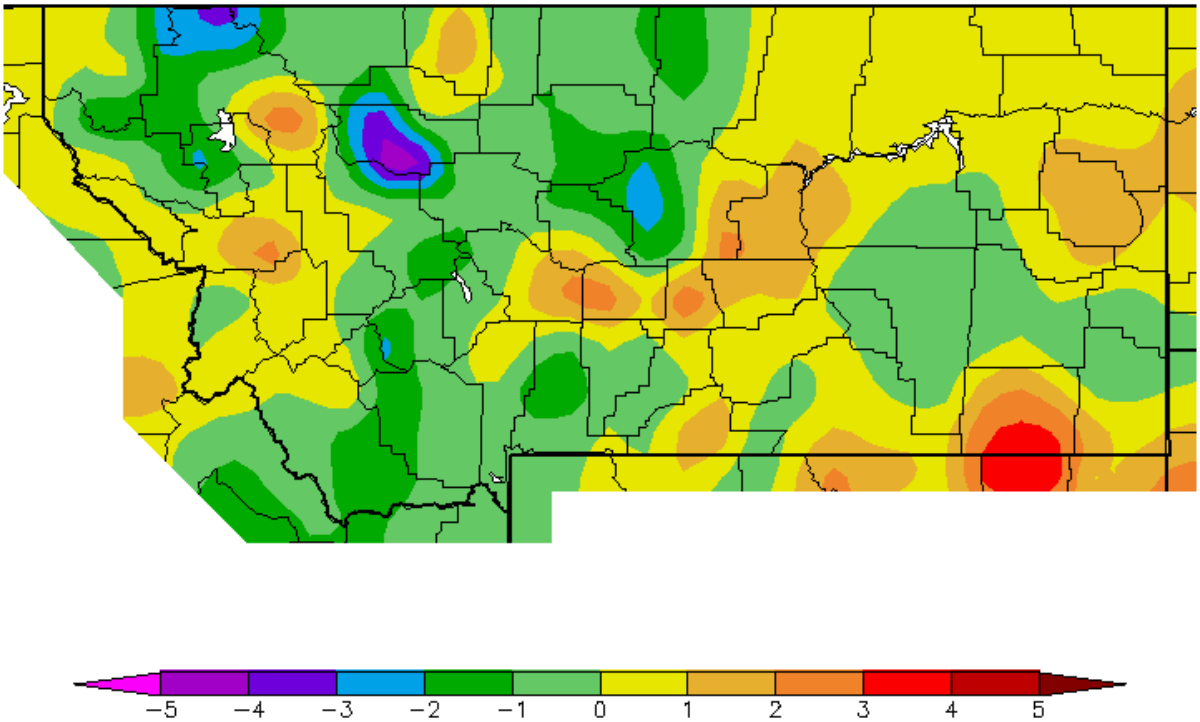


Figure 2. Temperature anomaly for August. Temperatures were below normal across most of the state. (Western Region Climate Center).

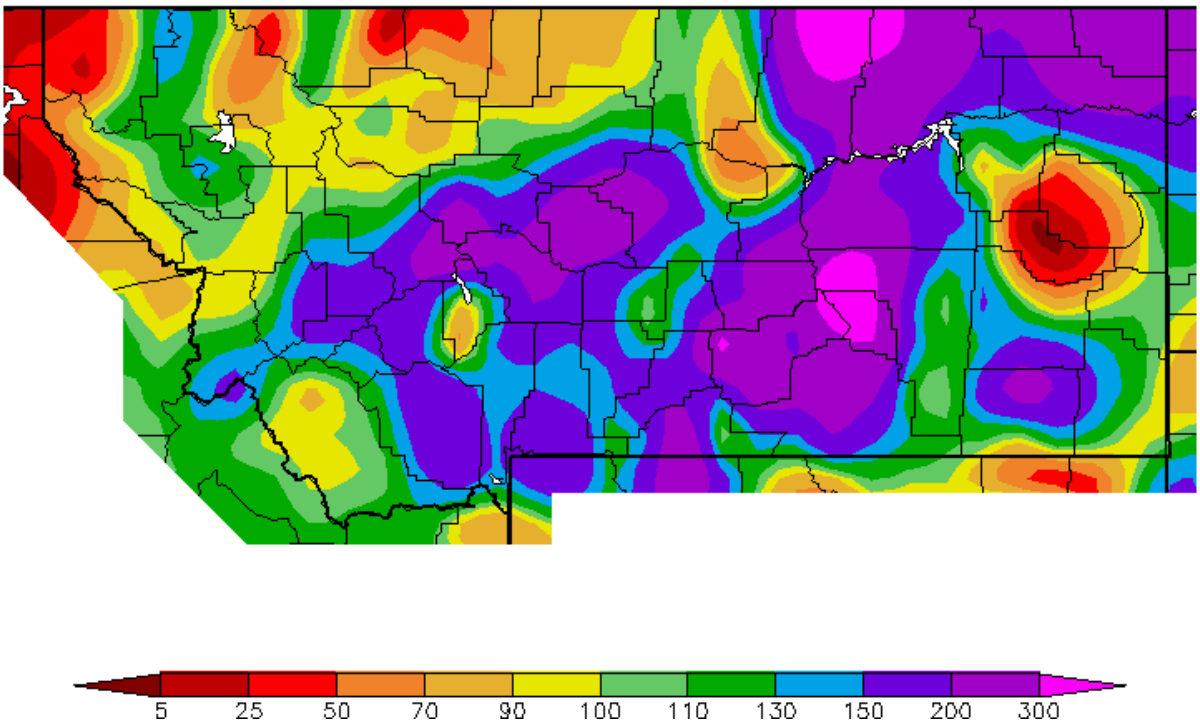


Figure 3. Precipitation anomaly (% of normal) for August. (Western Region Climate Center)

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=tfx&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