

Montana Weather/Precipitation Summary

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

July temperatures averaged mostly above normal. Areas of warmest anomalies were across portions of the eastern one-half of the state (Fig. 3). For July, statewide composite temperatures were 4.0°F above normal, ranking at the 94th percentile (1=coldest) and seventh warmest of record. This was the warmest July to-date since 2007. There were only five days on which high temperatures averaged below normal (Fig. 1). Precipitation has been below normal over much of the state, with exceptional pockets of wetter than normal (Fig. 4). The composite precipitation for July ranked at the 46th percentile for the state (1=driest). This is the driest water-year-to-date since 2008. The strongest winds in the state came on the third (Fig. 1). Gusts to 86 mph were recorded at Logan Pass. Otherwise, thunderstorm gusts to 75 mph were recorded at Baker (Fallon County) on the 24th and 74 mph at Great Falls on the 30th. Gusts reached 75 mph at Livingston on the 31st. Soil moisture continued its climatological drying out. Statewide, soil moisture conditions are the driest since 2007, with some areas having the driest soil conditions since their records began in 2006. Montana has been under a broad ridge of high pressure during July (Fig. 2). Upper level heights were above normal, with general southwesterly flow aloft.

July 1-5

With near seasonal temperatures, thunderstorms were widely scattered across the state during this period. On the first, thunderstorms produced gusts to 69 mph along Fort Peck Reservoir in northern Garfield County. On the third, scattered thunderstorms brought gusty winds and hail up to one-inch over portions of northeast Montana. Very warm air over eastern Montana produced temperatures of 106°F at Jordan and Forsyth on the third. Billings set a new record high for the date. Windy conditions along the east slopes of the continental divide on the third caused gusts in the mid-60 mph range on the adjacent plains, with a gust to 86 mph at Logan Pass. A few more thunderstorms broke out across southeast Montana on the fifth. Cooler air on the fourth and fifth caused low temperatures to fall into the 30s across north central Montana, with Cut Bank tying their record low on the fifth, falling to 37 degrees, which was first set in 1911. Gates Park was the coolest in the state with lows of 27° on the fourth and sixth.

July 6-13

The warmest period of the month was during this period. Many areas remained dry, but scattered thunderstorms did occur. Bozeman and Great Falls set new record high temperatures on the ninth. Great Falls reached 98F, the old record was 97F set in 1939. On the 11th, high-based thunderstorms produced gusts to 66 mph near Lake View (Beaverhead). On the 13th, thunderstorms in northwest Montana produced heavy rain. Near Yaak (Lincoln), over two-inches of rain fell, and a downburst caused a tree blow down south of Kootenai Falls.

July 14-17

Very humid conditions over the weekend contributed to thunderstorms with heavy rainfall. Cut Bank reached a dew-point temperature of 65F on the 14th, which was their highest since July 2002, and their second highest of record. Great Falls' dew-point was 64°F on the 14th, which tied the highest value for 2012, and is the highest dew-point reading since July 2002. Also at Great Falls, the upper air sounding showed a very moist profile on the morning of the 14th. This was one of the wettest atmospheric profiles of record at Great Falls (since 1948) (Fig. 5). Lightning injured three persons attending a rodeo at Darby (Ravalli) on the 14th. Heavy rain produced localized flooding in central and southwest Montana. Up to 2.20-inches of rain fell in a short period near Sand Coulee (Cascade) on the 15th. Havre set a daily precipitation record on the 15th, measuring 0.98-inches. The old record was 0.75-inches in 1923. On the 17th, thunderstorms across the state produced heavy rain at Ekalaka (1.10-inches), 2.50" at Somers in just over one hour, and 2.10-inches at Gibson Dam. The heavy rain along the Rocky Mountains caused a debris flow and injuries in Glacier National Park.

July 18-31

Very warm conditions prevailed for the rest of the month. Though temperature readings did not reach extreme values, a value near 100F was recorded on nearly every day. Severe thunderstorms were seen in some section of the state on all but three of the days during this period. Gusts to 75 mph were recorded at Baker on the 24th. A downburst caused tree blowdown in the Kootenai Falls area on the 22nd. Golf-ball size hail was observed in the Kevin and Whitlash areas on the 29th, while northeast Glacier County saw golf-ball to softball sized hail on the 26th. High-based thunderstorms produced a wind gust of 74 mph at the Great Falls airport on the 30th. This was the strongest July wind gust at Great Falls since 1990. Storms in the northeast corner of the state also produced 74 mph in Richland County early in the morning of the 31st.

Precipitation/convection

Severe convective weather occurred on 18 days in July, this is seven days more than normal. The severe thunderstorms have produced up to 69 mph winds (Garfield County), one-inch hail (scattered throughout northeast Montana), a severe downburst (near Kootenai Falls), funnel clouds and heavy rainfall. On the 30th, a thunderstorm produced 74 mph winds at Great Falls, and early in the morning of the 31st, thunderstorms again produced a gust to 74 mph in Richland County

July summary information:

High Temperature	110°F near Wibaux (19 th)	Greatest Precip	3.32" at Troy (Lincoln) 6.10" at Stahl Peak SNOTEL (Lincoln)
Low Temperature	27°F at Gates Park (4 th and 6 th) (Lewis and Clark)		
Warmest Ave Temp	81.2°F at Miles City	Peak Wind Gust	75 mph at Baker (Fallon) (24 th) 86 mph at Logan Pass (3 rd)
Coollest Ave Temp	59.0°F at Cooke City		
Range of Temp departures	-0.1°F at West Yellowstone to +7.2°F at Miles City	Highest Ave Wind	10.7 mph at Fort Belknap 11.4 mph at Deep Creek RAWS
21 city mean monthly Temperature/Normal	72.1/68.1F; 7 th warmest of record (since 1880) 94 th percentile, warmest since 2007	20 city mean monthly wind speed/Normal	7.7 mph/8.4 mph; 9 th calmest of record. (since 1936) 13 th percentile
22 city mean monthly precipitation/Normal	1.23/1.53" – 81% of normal; 61 st driest of record. (since 1880) 46 th percentile	30 locations mean soil moisture/normal	19.0/18.5%; 7 th wettest of record (since 1995). 62 nd percentile

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

Location	Jul	% of Norm	Rank	Pcntl	Oct 1 – Jul 2	% of norm	Rank	Pcntl	Years
Baker	2.30	162%			8.74	92%			14
Billings	0.39	30%	29	25	7.11	57%	24	21	111
Belgrade	0.38	34%	14	17	8.15	68%	5	5	75
Butte	2.20	163%	103	86	8.41	81%	31	26	118
Cut Bank	1.16	91%	56	52	9.17	108%	53	50	104
Dillon	0.85	68%	35	47	5.57	65%	5	6	72
Glasgow	2.00	112%	79	68	11.86	125%	80	71	112
Great Falls	2.02	135%	95	78	12.22	104%	67	55	120
Havre	1.26	77%	69	52	10.63	119%	83	63	132
Helena	0.61	51%	47	35	7.20	81%	19	14	134
Jordan	0.87	47%			7.33	71%			14
Kalispell	0.74	51%	46	38	16.85	115%	102	86	118
Lewistown	1.71	89%	61	52	15.82	115%	81	70	116
Livingston	0.42	29%	14	12	8.78	70%	18	16	106
Miles City	0.79	48%	47	34	4.97	48%	3	1	135
Missoula	1.14	111%	100	76	14.20	119%	107	84	127
Mullan Pass	1.64	138%	53	72	45.13	129%	64	91	70
Wolf Point	2.19	111%			9.68	98%			14
Glendive	4.43	236%	112	97	11.58	106%	60	55	109
Sidney	2.75	109%	56	77	6.93	58%	10	13	71
BZN-MSU	1.13	77%	63	47	14.38	85%	42	32	129

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>

Billings recorded their fifth driest water year, through July, since 1996. Dillon has also had their fifth driest water year of record, and the driest since 1979. They have recorded only 5.57-inches of precipitation. Miles City has had their third driest water year (4.97-inches) and the driest since 1988. Meanwhile, Glendive recorded their eighth wettest July of record, and the wettest July since 1997.

Miles City had 13 days of 100F or warmer. This ties record for the most days of 100F or warmer also set in July 2007 and 1936. At Great Falls, there were 19 days of 90F or warmer. This was ten days more than normal, but in 2007 there were 22 days. Great Falls reached only 98F on three days in July.

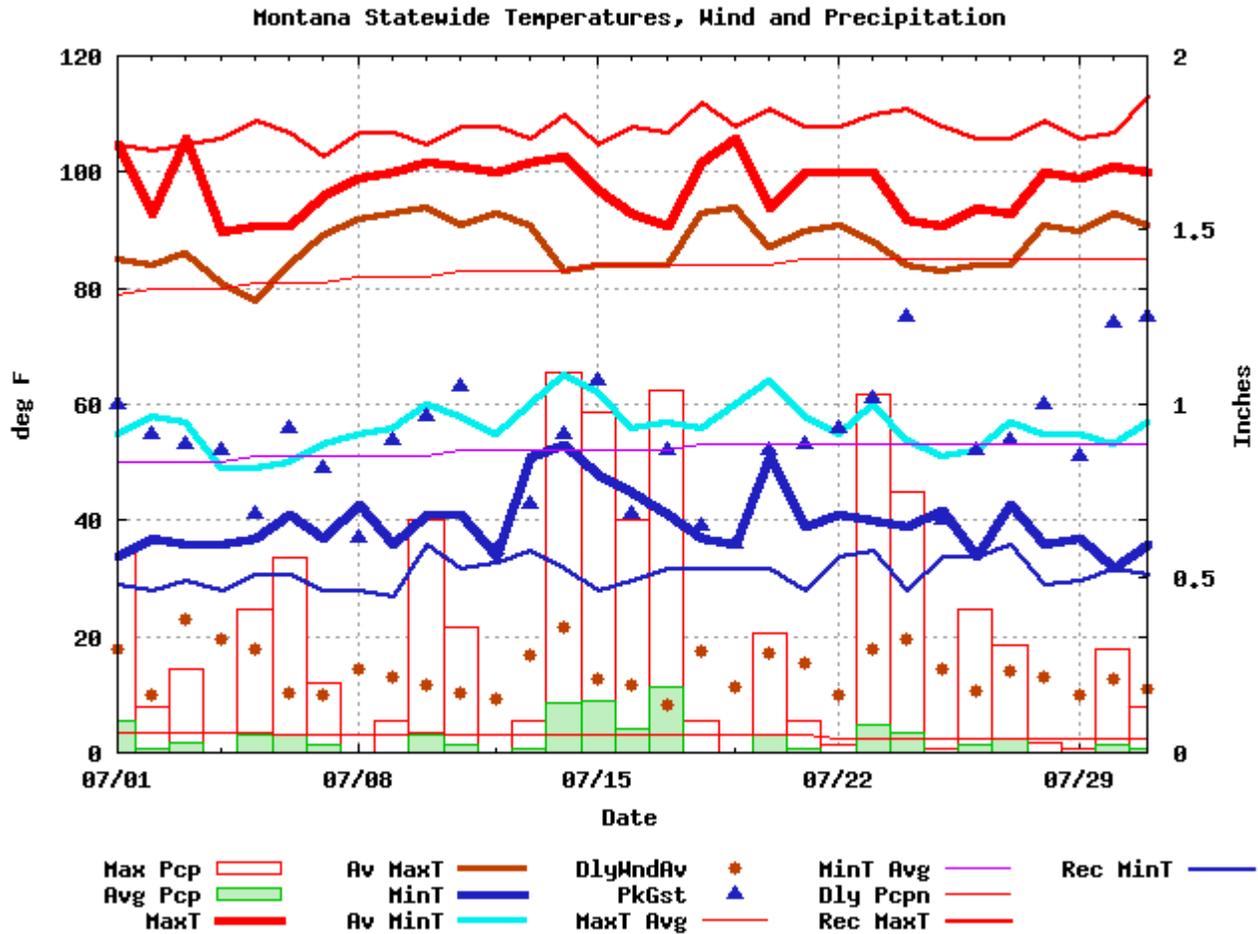
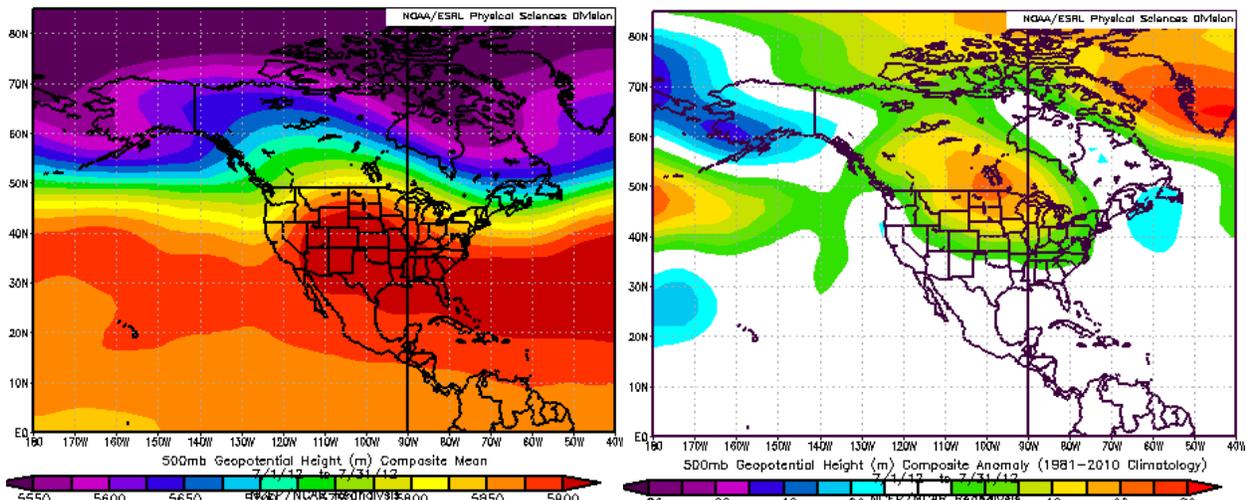


Figure 1. Composite Daily Highest and Lowest Temperature, Averages, Daily Maximum Precipitation and Averages, Daily average wind speed and gusts from 43 Airport stations from across Montana.



Figures 2a (left); 2b (right). Mean flow at 500 millibars (~18,000 ft) for July 2012 (left) and anomaly (right). Heights across Montana were above normal. This has contributed to the warmer than normal conditions across the state.

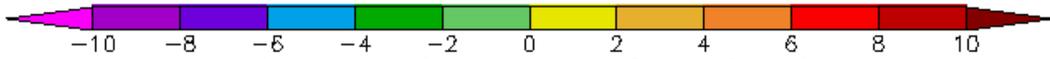
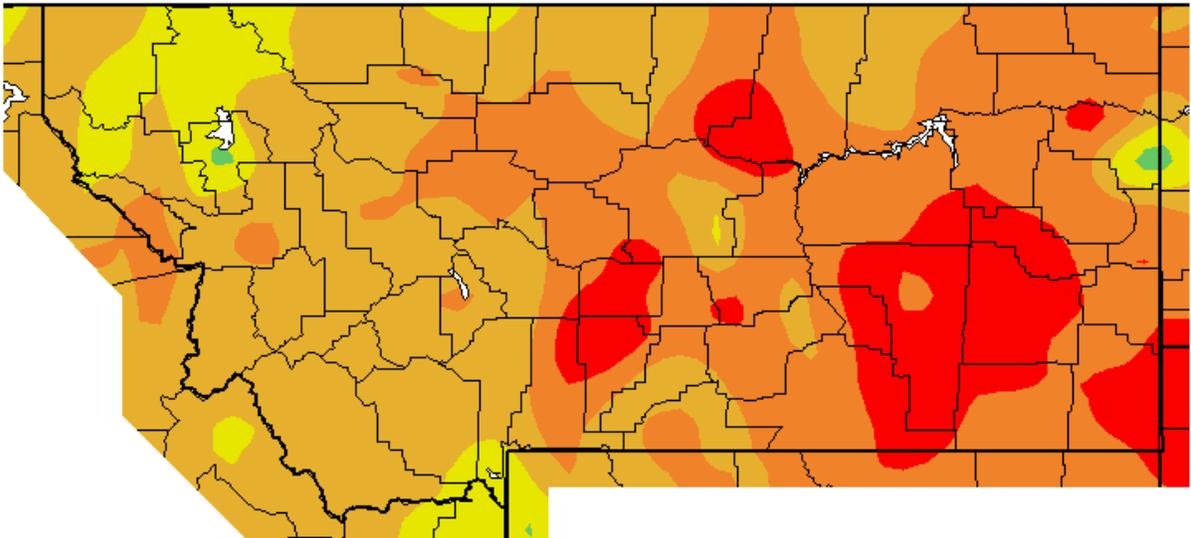


Figure 3. Temperature anomaly for July 2012 (Western Region Climate Center).

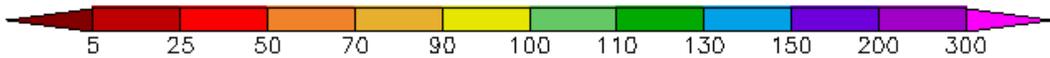
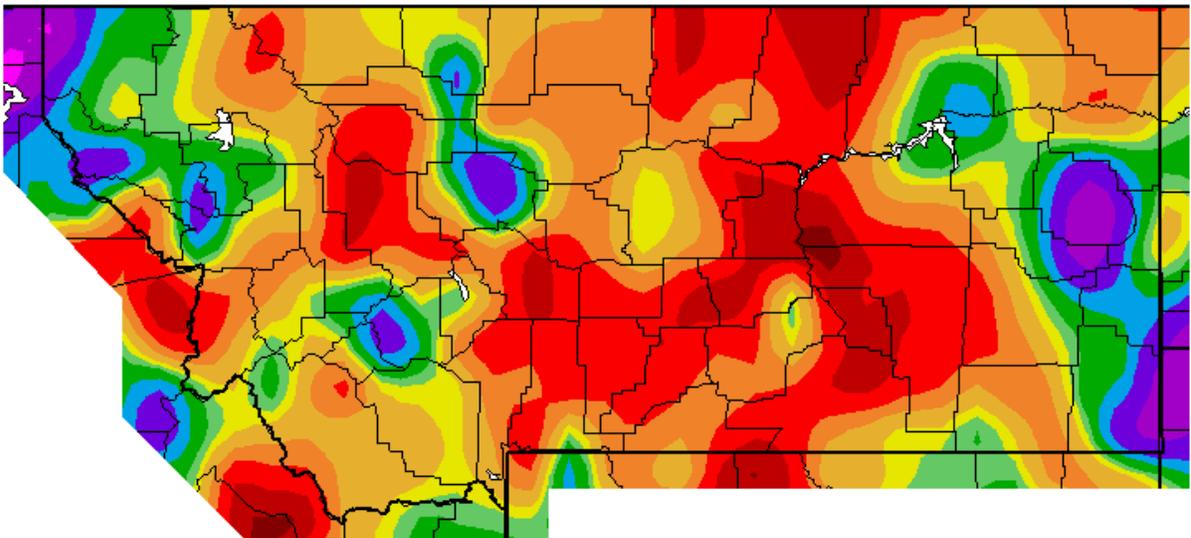


Figure 4. Precipitation anomaly (% of normal) for July 2012.

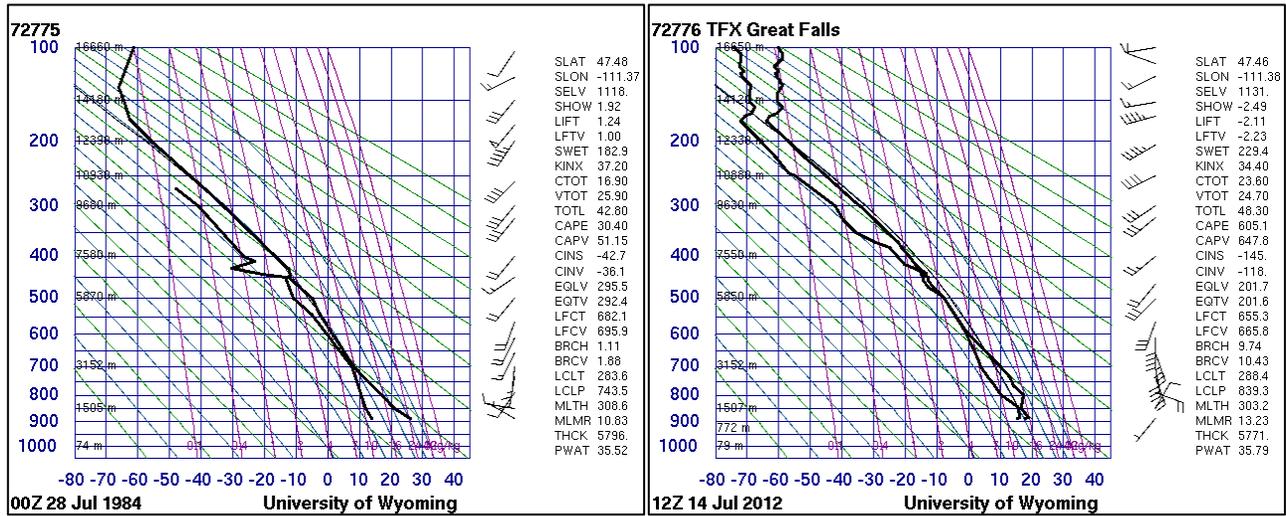


Figure 5. Upper air soundings at Great Falls from July 28 1984 (left) and July 14 2012 (right). The sounding on the right has one of the highest moisture values of record measured at Great Falls.

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=txf&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=txf>. 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.