

Montana Weather/Precipitation Summary

May 2011 by NOAA's National Weather Service Great Falls Montana

Cool and wet were two words that described May's weather in Montana. The wet conditions eventually led to major flooding over most of the state at some point during the month. A split westerly flow, with trough of low pressure aloft (Fig. 2) produced regular disturbances with moisture to provide large amounts of rainfall, mainly to eastern Montana. During May, temperatures averaged from near normal around Anaconda, to much below normal across the eastern one-half of the state. Precipitation totals varied widely, with highest amounts in the central and east.

Temperatures across the state (Fig. 1) in May averaged 48.7F, over four degrees below average. This produced the 12th coolest May. May 2010 was one degree cooler than May 2011. Temperatures averaged coolest across southeastern Montana (Fig. 3). This was the fourth consecutive month of below normal temperatures.

Seventy degree temperatures were scarce during the month. Glasgow reached only 70F on the 16th. The last time the temperature at Glasgow did not warm above 70F in May was in 1902. They did reach the 70s in April 1902, however. This was the first time that Lewistown has not been 70F or warmer in May since records began in 1896. The old record was May 29, 1995.

Precipitation was above average most areas (Fig. 1), especially across the eastern one-half of the state. Below normal areas were primarily west of the divide. The statewide average of 4.65 inches was a 2.00-inch surplus or 181 percent of average for the month. This was the wettest of record, and the seventh consecutive month of above normal precipitation. The precipitation excess over the average in the past 12 months is 5.99 inches. Precipitation anomalies were greatest over the eastern one-half of the state (Fig. 4). Over the Rockies, deep snowpack remained at some locations. Some areas actually added to their snowpack during the month, with Placer Basin picking up 21 inches on the 20th and 13 inches on the 29th. Albro Lake, in the Tobacco Roots, measured 21 inches of new snow on the 29th. Snow-on-ground totals were 110-140 inches at a few higher locations in the Mission, Swan, Gallatin and Beartooth Ranges.

Wind speeds were slightly above the monthly normal in May. Besides the normally windy areas, the windiest region was along the North Dakota border and northeast Montana. The May average of 10.1 mph was 0.3 mph above the normal for May; the 28th windiest May of record.

Soil moisture conditions were above average in May. At Havre and Great Falls, some the coldest and wettest soil conditions since records began in 1997 persisted through the end of May.

May 1-7

The first week of May began cold, with below normal temperatures. West Yellowstone fell to 7F on the morning of May 2. Warming winds blew along the Rocky Mountain Front on the 3rd, with

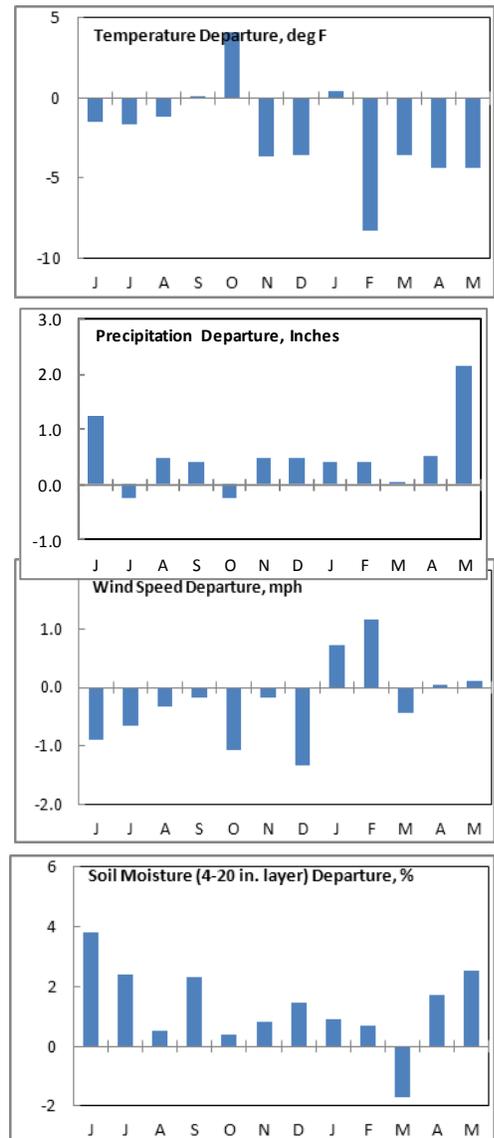


Figure 1. Statewide departures from normal for 18 locations.

gusts reaching 61 mph west of Bynum. Billings also warmed to 75F ahead of a cold front. For the rest of the period, temperatures were close to seasonal normals.

May 8-11

A changeable period with areas of heavy precipitation highlighted May 8-11. A strong spring storm dumped heavy precipitation across much of eastern Montana. The heaviest rain fell across southeast Montana, with up to five inches south of Miles City. Runoff from this rainfall caused the Tongue River near Miles City to rise nearly 7 feet in one day. Many streams across southeast Montana flooded a result of this rainfall. Meanwhile, this storm caused heavy snowfall over the higher western mountains. Up to 21 inches fell in higher mountains around Butte.

May 12-18

The warmest period of the month occurred on the 12th. Warmest air across western Montana caused temperatures to rise to 80F at Thompson Falls. For May, this tied the lowest-warmest temperature recorded in the state. That record was set at Troy in May 1995. Further, some areas of the state experienced their first 70F day of the year. Over the weekend of May 14-16, very strong easterly winds blew across central and western Montana. Montana was caught between a strong high-pressure area over Saskatchewan, and a strengthening low over Idaho. Strong east winds are rare in these areas, as such some damage did occur as trees blew over. East winds gusted to 75 mph at Big Sandy on the evening of the 15th. This was also one of the dryer periods of the month, with little precipitation falling across the state.

May 19-31

A very wet pattern dominated the last part of May. A series of storm systems brought regular doses of precipitation, sometimes heavy to the state. From May 19-23, Wolf Mountain (Big Horn County) and Crystal Lake (Fergus) recorded nearly 11 inches of rain. The Zortman area received nearly nine inches of rain. In 24-hour period on the 20th and 21st, Zortman received nearly five inches of rain. The heavy rain that fell over most of eastern Montana caused most rivers to rise out of their banks. Widespread damage was reported to roads, bridges and other infrastructure. I-90 from near Billings into Wyoming was closed for a period over the weekend of May 21-23 due to flood waters. The communities of Lodge Grass and Roundup were cut-off from road transportation for a few days. On the 24th, Billings recorded over 3 inches of rain. This set an all-time daily 24-hour precipitation record at Billings. Several locations in southeast and central Montana recorded their wettest May, and month of record.

New Temperature Records for the current month

Station	Record Type	New Record	Date	Previous Record	Year of Previous Record
Dillon	Low Daily Max	40	29	45	1979
Billings	Low Daily Max	47	30	47	1971
Lewistown	Did not reach 70			May 29	1995

Precipitation/convection

Severe convective weather occurred on one day in May. Near Terry, a tornado was reported during the afternoon of the 20th.

New Precipitation Records for the current month

Station	Record Type	New Record	Date	Previous Record	Year of Previous Record
Billings	High Daily Precip	1.08	9	0.80	1986
Billings	High Daily Precip	1.51	10	0.90	1967
Glasgow	High Daily Precip	0.91	10	0.80	1914
Miles City	High Daily Precip	2.22	10	0.90	1904
Miles City	High Daily Precip	0.51	18	0.43	1896
Miles City	High Daily Precip	1.04	21	0.70	1957
Billings	High Daily Precip	3.12*	24	1.14	1939
	Highest 24-hr pcpn	3.12	24	2.91	June 8, 1997
Dillon	High Daily Precip	0.85	24	0.63	1953
Livingston	High Daily Precip	2.08	24	1.12	2009
Billings	High month prec	9.54		7.71	May 1981
Powderville	High month prec	10.40		7.72	July 1993
Billings	High May precip	9.54		7.71	May 1981
Ekalaka	High May precip	11.71		9.03	July 1993
Glasgow	High May precip	6.97		6.61	2007
Hysham	High May precip	7.66		6.73	1977
Miles City	High May precip	8.84		6.81	1978

* The 24-hour total of 3.12 inches at Billings on May 24 was the highest amount recorded in 24 hours on record. The previous record amount was 2.91 inches on June 8, 1997. Billings recorded their wettest May and month of record. The previously wettest month was May 1981 when 7.71 inches of rain fell.

Glasgow recorded their second highest monthly total precipitation. The highest recorded in any month was 10.29 inches in June 1923. Miles City also recorded their second highest monthly precipitation amount. The highest recorded in any month was 9.78 inches in June 1944.

The monthly precipitation total at Zortman (16.44 inches), ranks as the greatest amount recorded at any one location in May. The old record was 12.63 inches at Red Lodge in 1989, and 15.90 inches at Noisy Basin Snotel in 1990. The most ever recorded in one month was 18.17 inches near Warrick in June 1906, and at Flattop Mountain, where they recorded 28.3 inches in December 1996.

May summary information:

High Temperature	80°F at Thompson Falls (12 th) (Sanders)	Greatest Precip	16.44" at Zortman (Phillips)
Low Temperature	7°F at West Yellowstone (2 nd)		16.30" at Crystal Lake SNOTEL (Fergus)
Warmest Ave Temp	53.4°F at Superior	Peak Wind Gust	75 mph at Big Sandy (15 th) (Chouteau)
Coollest Ave Temp	36.4°F at Cooke City		
Range of Temp departures	0.0°F at Anaconda to -6.4°F at Ekalaka	Highest Ave Wind	14.9 mph at Deep Creek and 14.4 mph at Comerstown
18 city mean monthly Temperature/Normal	44.7/52.1; 12 th coolest of record (since 1880)	18 city mean monthly wind speed/Normal	10.1 mph/9.8 mph; 28 th windiest of record (since 1936)
18 city mean monthly precipitation/Normal	4.65/2.14" – 181% normal; wettest of record (since 1880)	19 city mean monthly snow/Normal	0.4/1.5"

To this point in the water-year, this is the 14th coolest of record, with a statewide average temperature of 30.8F. This is the coolest October through May period since 1978. The water-year

total precipitation is 12.85 inches, or the wettest of record. The previously wettest water-year through May was in 1972-73, when 11.67 inches fell through May 31.

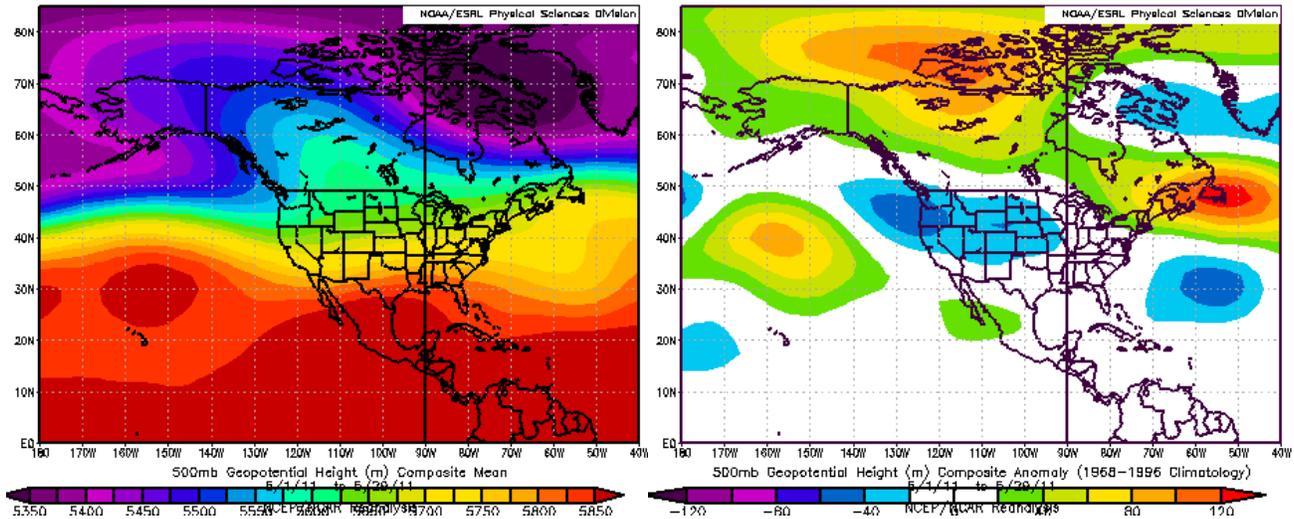
Historical Rank of Precipitation (inches) for the Current Month and Water Year to Date

Location	May	% of Norm	Rank	Pcntl	Oct 1 – May 31	% of norm	Rank	Pcntl	Years
Baker	7.34	467%			11.52	207%			13
Billings	9.54	385%	103	100	16.47	175%	101	99	102
Belgrade	1.92	77%	33	43	7.18	84%	30	40	74
Butte	2.60	129%	94	79	6.60	97%	60	51	117
Cut Bank	2.40	108%	75	72	5.40	97%	66	63	104
Dillon	2.75	152%	60	83	5.89	118%	53	74	71
Glasgow	6.97	405%	114	100	12.55	250%	111	100	111
Great Falls	4.12	163%	110	92	13.36	161%	117	98	119
Havre	3.53	192%	121	92	9.10	156%	125	95	131
Helena	2.81	158%	112	84	7.69	132%	98	73	133
Jordan	6.95	496%			12.33	249%			13
Kalispell	1.85	91%	80	68	13.64	123%	109	93	117
Lewistown	6.63	227%	112	97	15.67	164%	113	98	115
Livingston	5.19	200%	102	94	8.87	96%	62	58	106
Miles City	8.84	404%	134	100	12.94	182%	132	98	134
Missoula	1.63	84%	70	52	10.79	123%	106	81	130
Mullan Pass	3.47	121%	54	75	49.18	177%	69	99	70
Wolf Point	5.74	303%			8.16	177%			13
Glendive	8.10	395%	118	102	15.45	233%	110	100	110
Sidney	5.97	296%	72	100	14.91	227%	70	100	70
BZN-MSU	3.58	111%	96	71	13.96	119%	116	88	132

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 2a (left); 2b (right). Mean flow at 500 millibars (~18,000 ft) for May (left). A ridge of high pressure was over southern Canada, with a mean trough of low pressure over the Pacific Northwest (left). Climatologically, a weak trough does dominate the northwest in May, but this year the trough was much stronger, as denoted by the below normal heights (blue) (right).

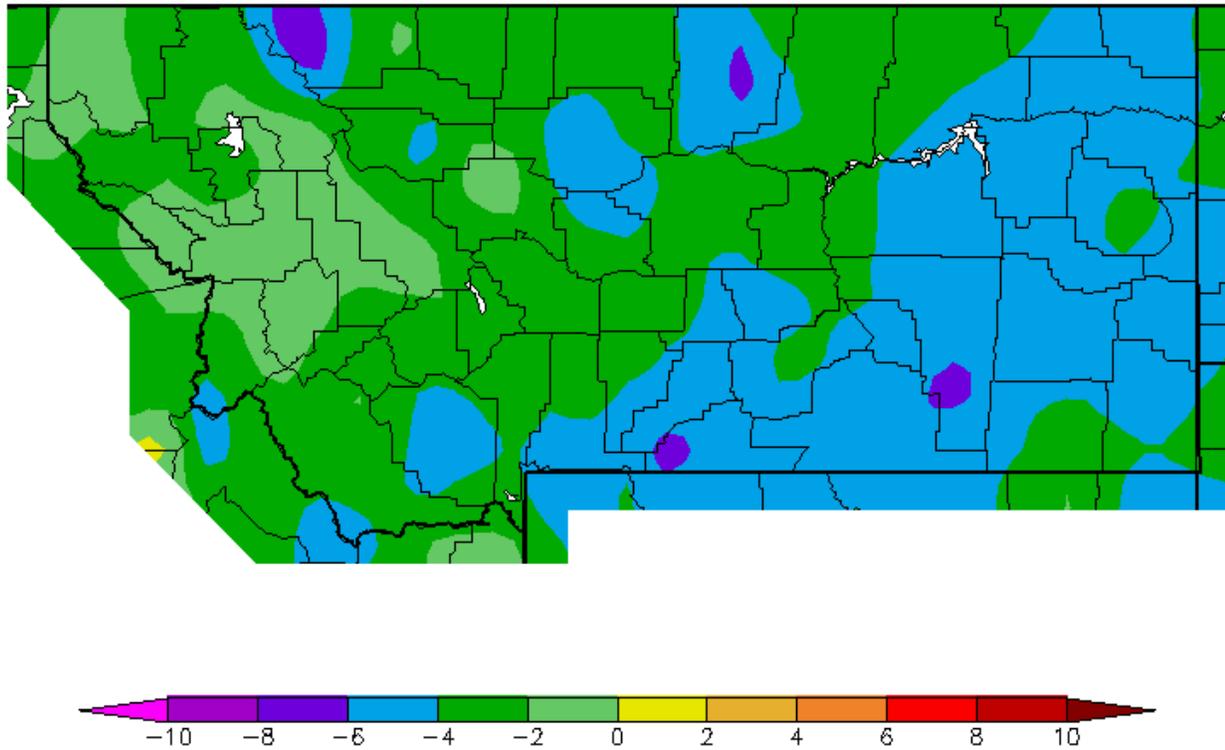


Figure 3. Temperature anomaly for May. Temperatures were below to much below normal across the state (Western Region Climate Center).

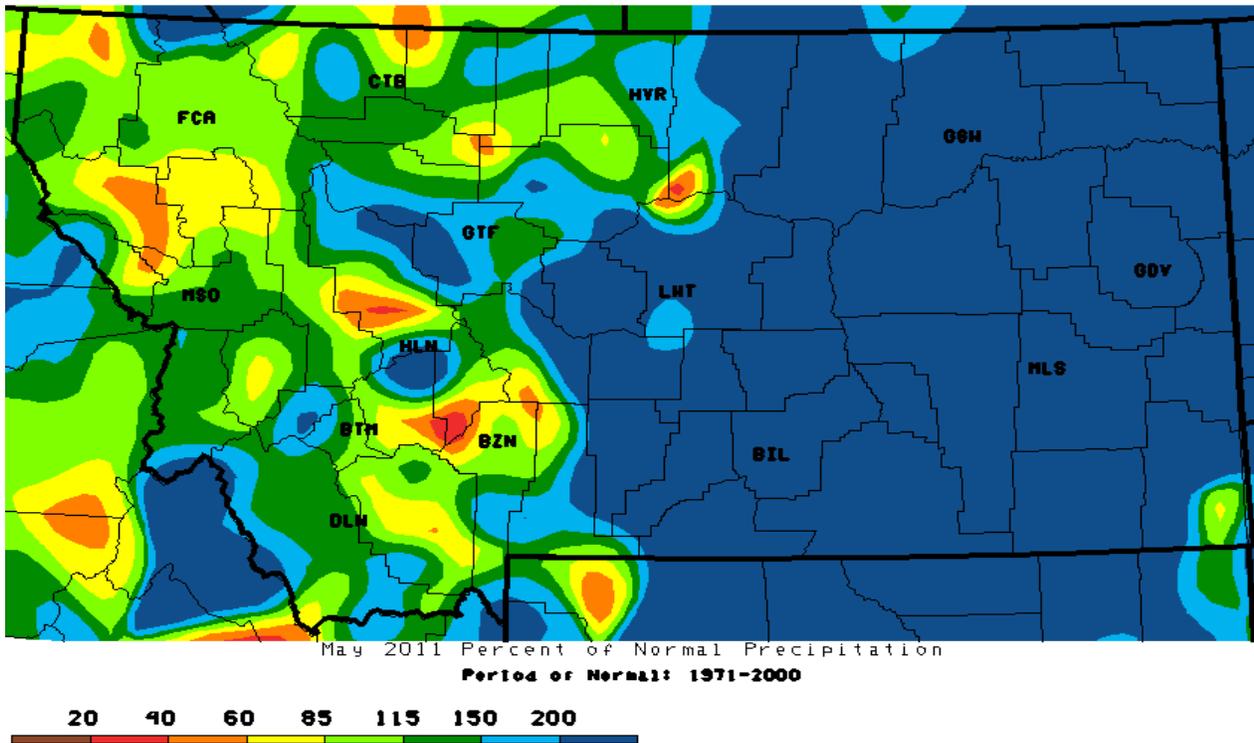


Figure 4. Precipitation anomaly (% of normal) for May.

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>. The climatological record for normals is 1971-2000. 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.