

Montana Weather/Precipitation Summary

April 2008 by NOAA's National Weather Service Great Falls Montana

April 2008 was somewhat typical for a spring month, but it had its share of extremes. From a tornado, to record snowfall, to record cold, April in Montana was a month of extremes. Overall, temperatures were below normal (Fig. 1), with precipitation totals quite variable (Fig. 2). The colder temperatures and periods of precipitation kept snowpack at high levels in the mountains. The coldest area of the state was the southwest, with temperatures averaging over eight degrees below normal. The upper flow pattern for the month averaged a weak low-pressure trough along the west coast (Fig. 3). This contributed to the colder temperatures across the state.

As is typical, a series of storms passed through the state during the month. Cold early in the month set a few record low temperatures were set in the southwest. Whiskey Creek SNOTEL dropped to -18F on the morning of the 2nd for the lowest temperature in April. Wisdom fell below zero for several nights through the 6th. A storm passed through Wyoming on the 5th and brought several inches of snow to extreme southeast Montana. Amounts of six to seven inches were common across Carter and Powder River Counties. With another weak storm moving through on the 7th, up to 5 inches of snow fell in the Bozeman area. Temperatures warmed slightly by the ninth, when a cold front produced thunderstorms in northwest Montana. A weak tornado (Fig. 4) was reported near Kalispell on the 9th. The strongest wind gust for the month occurred at Snowslip on the 9th, gusting to 78 mph.

By the 11th, a period of above normal temperatures finally came to the state. On the other extreme, record high temperatures were set at several locations on the 13th and 14th. Temperatures pushed into the lower to middle 80s over much of the state. Hardin reached 85F and Chain Buttes (in northern Petroleum County) topped out at 87F. With the warm temperatures came wind. A gust to 67 mph was reported at Choteau on the 14th. The weather roller-coaster continued with a strong cold front and storm pushing through the state on the 15th. Affecting mostly southwest and south central Montana, snowfall amounts of up to 8 inches were reported in the Bozeman and Livingston areas. Temperatures fell sharply (Fig. 5) after another strong storm visited the state on the 19th and 20th. This was a storm of note for heavy snow and cold temperatures that followed. As the storm pushed in on the 19th, blizzard conditions were reported over portions of central and western Montana. Snowfall amounts of 16 inches were reported near the Canadian border in the Sweet Grass Hills, and over 15 inches at Great Falls (Fig. 6). Record high daily snowfall values occurred at Great Falls, Hardin and Glasgow. The 15.1 inch total snowfall at Great Falls was the 5th highest 2-day total of record at Great Falls. The cold was the other big story. Temperatures bottomed out at -9F at Rogers Pass and -8 at Great Falls. The -8F low was by far the coldest so last in the season (Fig. 7). This was the latest that the temperature has been below zero at Great Falls by a full two weeks, and it broke the previous record low for the date by an incredible 19 degrees. Many other areas set new record lows for the 21st.

After this period with temperatures of 35 degrees below normal, temperatures slowly warmed. With warmer temperatures came another storm system. Again, the southwest was hardest hit, with 5 to 6 inches in the Bozeman and Livingston areas on the 24th. Again, after this system passed, another record low was set. This time Choteau dropped to 13 on the 24th. Temperatures finally warmed to above normal, with highs in the lower 70s on the 27th and 28th. Thunderstorms visited the state on the 29th, accompanied by a strong cold front that sharply dropped temperatures for the last day of the month. These thunderstorms brought another bout of severe weather.

In the mountains, the cold temperatures and series of storm systems maintained a good snow pack. Again, at month's end several SNOTEL sites in the northern Rockies, northwest Montana and the southwest reported over 100 inches of snow on the ground. Soil moisture conditions showed most areas improving. The eastern-most portions of the state, with less precipitation during the month, continued to show the dryer values.

Severe weather occurred on 2 days. The average for all of April is 1 day. Thunderstorms brought strong winds with gusts to 65 mph at Loma on the 29th. Also, a microburst produced local damage in the Fort Shaw area. Though there were variations in temperature, precipitation

and wind speeds across the state, the mean statewide average temperature at 18 cities 3.5F below average. Winds averaged a bit below the long-term average at 9.6 mph. Precipitation was 56 percent of the average at 0.67 inches.

Other record or notable information for April:

- Bozeman recorded their 4th calmest April of record at 6.4 mph. The normal for the month is 7.1 mph.
- Butte recorded their 3rd calmest April of record at 6.2 mph – normal is 7.3 mph. They also have had the 5th calmest water-year period of record. April also has been the 5th coldest of record. The average temperature was 32.9F, or 6.2 degrees below normal.
- Havre has seen their 3rd driest water year of record-to-date. Only 1.69 inches has been recorded. The driest water year of record to date was in 1987-88, when 1.07 inches were recorded.
- Lewistown has had their 2nd driest January through April period of record. 1.55 inches has been recorded. The driest same period occurred in 1983 when 1.31 inches fell.
- Miles City has had their driest water-year-to-date of record. They have recorded 0.67 inches of moisture. The normal for the period is 4.92 inches. They have also recorded their 2nd driest April of record, collecting 0.05 inches. The January through April precipitation of 0.16 inches is also the record driest for the period. The old record was 0.33 inches in 2004.
- Missoula recorded their 4th calmest April of record at 5.7 mph. The normal April wind speed is 7.5 mph. The calmest April of record is 5.2 mph recorded in 1997.
- Sidney has had their 4th driest water-year-to-date of record. Since October, 2.02 inches of precipitation has fallen. The driest same period has been 1.26 inches in 1914-15. They have also seen their 3rd driest January through April period of record, collecting only 0.70 inches. The driest same period was in 1915, when only 0.25 inches fell.

April summary information:

High Temperature	87°F at Chain Buttes and 85° at Hardin (14 th)	Greatest Precip	2.03" at Ennis 2.49" Gird Point
Low Temperature	-14°F at Wisdom & -18°F Whiskey Ck (2 nd)		7.5" at Moss Peak SNOTEL
Warmest Ave Temp	44.8°F at Glendive	Peak Wind Gust	78 mph Snowslip (9 th) & 70 mph near East Glacier (17 th) & 67 mph at Choteau (14 th)
Coollest Ave Temp	27.5°F at Wisdom		
Range of Temp departures	-8.1°F at Wisdom to -0.1°F at Glendive	Highest Ave Wind	20.4 mph near East Glacier and 14.6 mph in Sweet Grass Hills
18 city mean monthly Temperature/Normal	39.4/42.9	18 city mean monthly wind speed/Normal	9.6mph/10.0mph
18 city mean monthly precipitation/Normal	0.67"/1.20" – 56% of normal		

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

Location	Apr	% of Norm	Rank	Pcntl	Oct 1 – Apr 30	% of norm	Rank	Pcntl	Years
Baker	0.63	70%			1.94	49%			9
Billings	0.20	11%	7	6	4.19	60%	31	31	99
Belgrade	2.14	153%	64	90	6.34	105%	43	64	67
Butte	0.63	62%	31	26	3.28	69%	27	23	114
Cut Bank	0.13	14%	11	10	M	M			101
Dillon	0.37	39%	9	12	3.40	107%	40	58	68
Glasgow	0.85	113%	63	57	3.62	110%	57	52	108
Great Falls	1.51	108%	83	73	4.69	81%	40	35	114
Havre	0.23	26%	13	9	1.69	42%	3	2	128
Helena	0.49	54%	17	13	3.01	75%	21	16	130
Jordan	0.72	73%			5.02	145%			9
Kalispell	0.50	41%	18	15	5.55	62%	16	13	114
Lewistown	0.55	40%	20	17	3.64	55%	8	6	112
Livingston	1.60	112%	73	67	5.48	82%	48	46	104
Miles City	0.05	4%	2	1	0.67	14%	1	0	131
Missoula	0.40	37%	19	14	4.75	70%	15	11	127
Mullan Pass	1.19	44%	7	9	30.67	123%	42	62	67
Wolf Point	0.26	30%			1.62	59%			10
Glendive	0.29	24%	18	15	2.10	47%	6	5	107
Sidney	0.28	26%	14	19	2.02	44%	4	5	66
BZN-MSU	0.91	44%	18	13	8.93	105%	84	65	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>

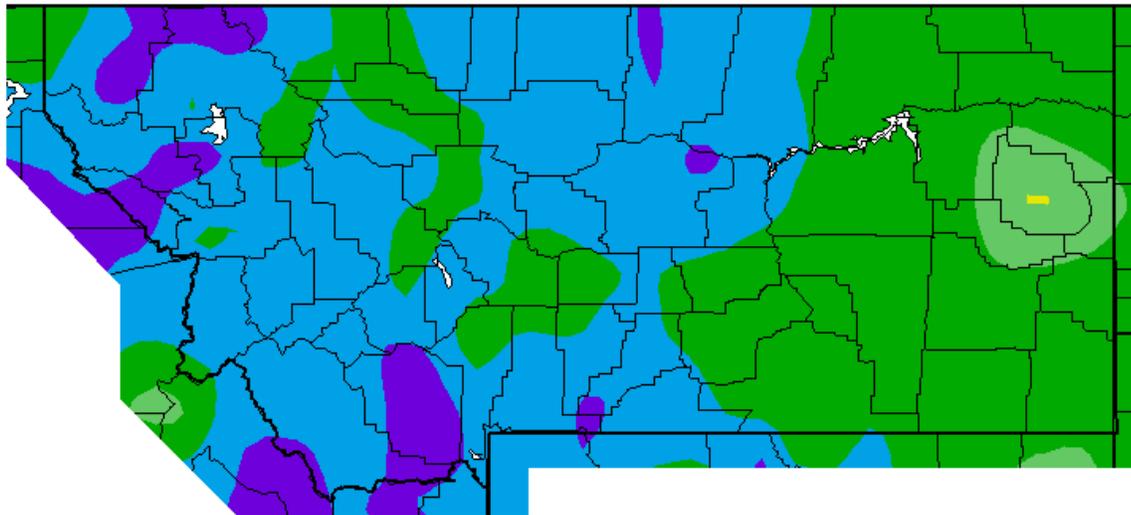


Figure 1. Temperature anomaly for April. Montana experienced temperatures below normal across most of the state. (Western Regional Climate Center).

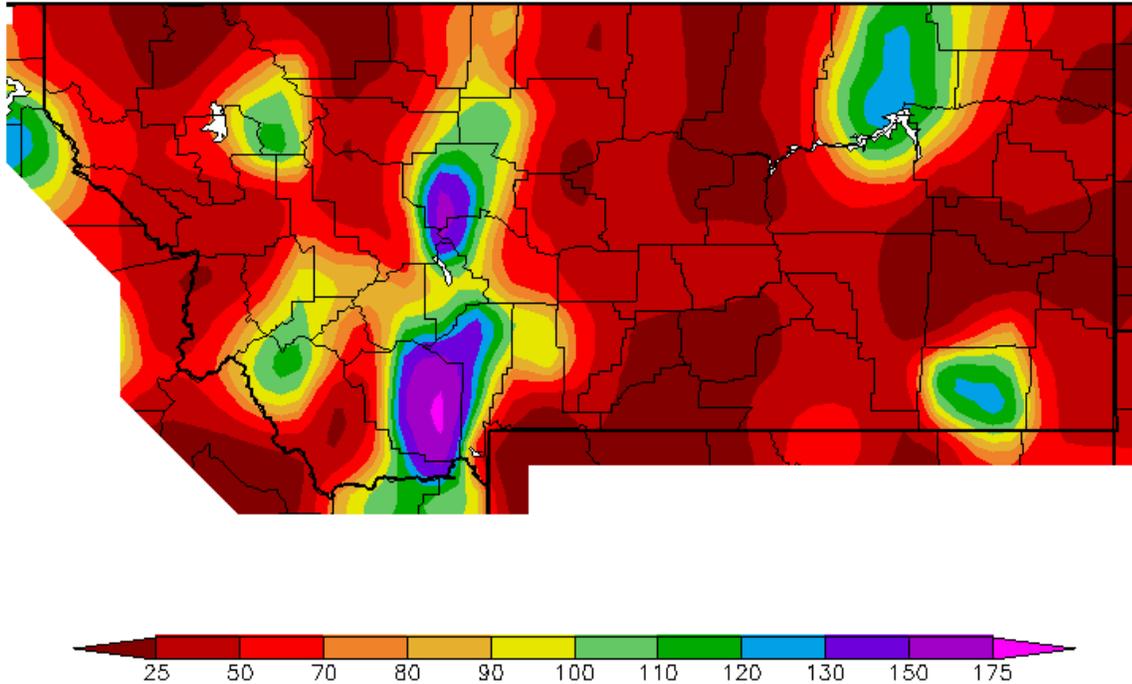


Figure 2. Precipitation anomaly (% of normal) for April. Only pockets of above normal precipitation were measured in April (Western Regional Climate Center).

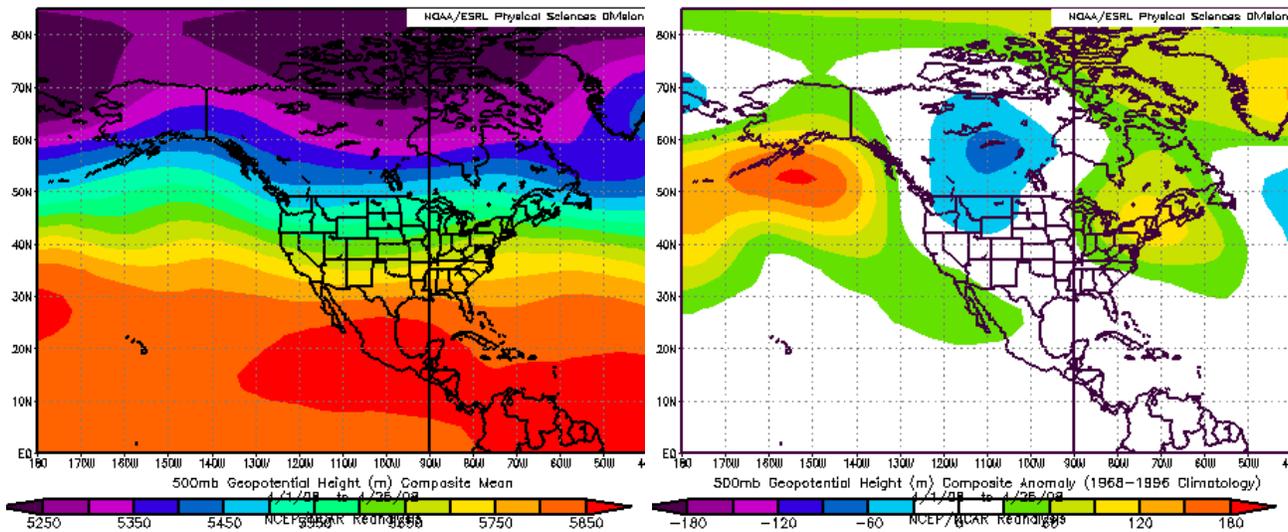
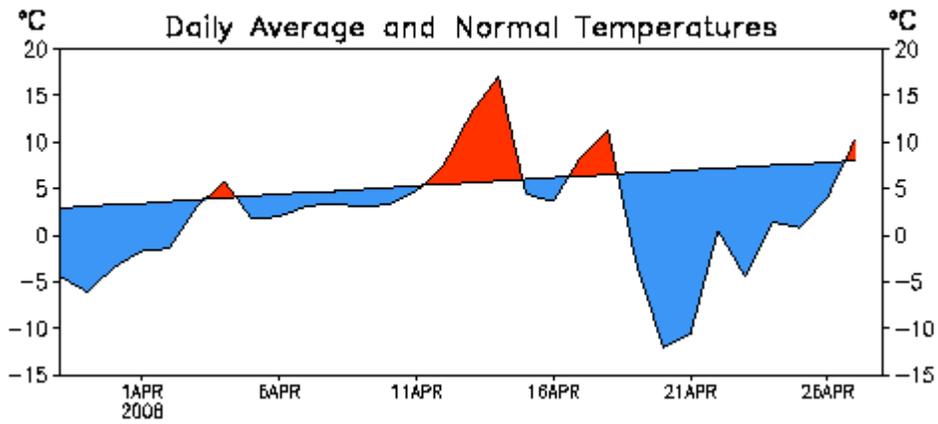


Figure 3. Mean flow at 500 millibars (~18,000 ft) April 2008 (left). The trough of low pressure over western North America was below normal for the month (right). This contributed to the below average temperatures in April.



Figure 4. Tornado near Kalispell 9 April 2008 (courtesy Ken Van Allen).

GREAT FALLS, MONTANA



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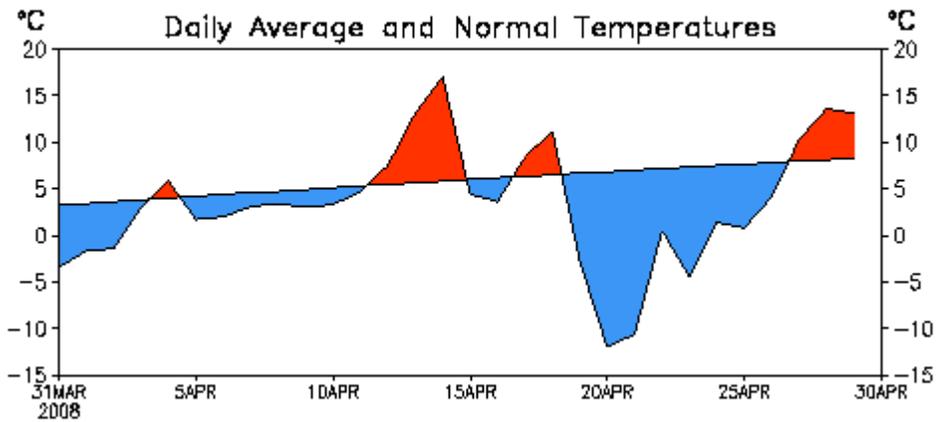


Figure 5. Daily average and normal temperatures at Great Falls from late March through April. This shows the prevalence of below normal temperatures for the month, and the much below normal temperatures around 20 April.

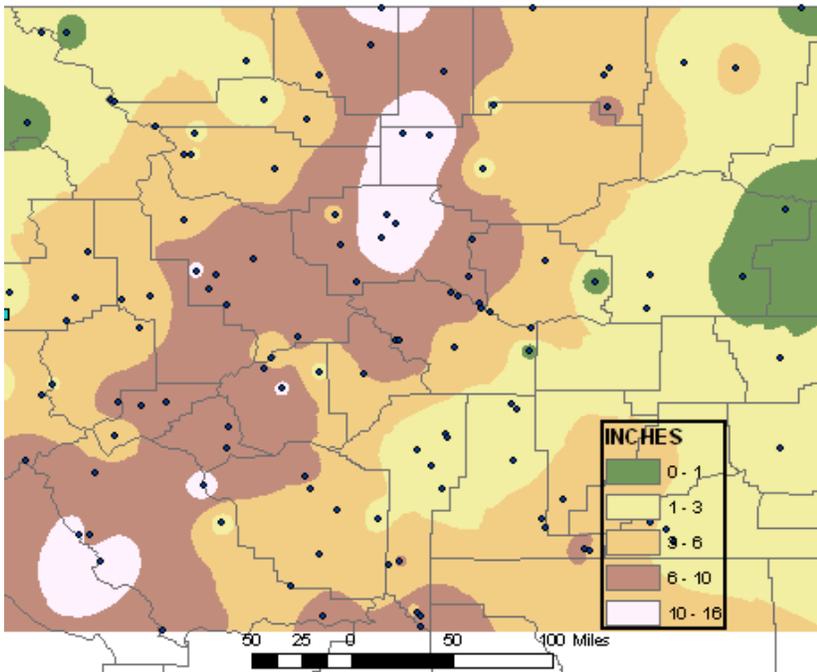


Figure 6. Snowfall totals from weekend storm 19-21 April.

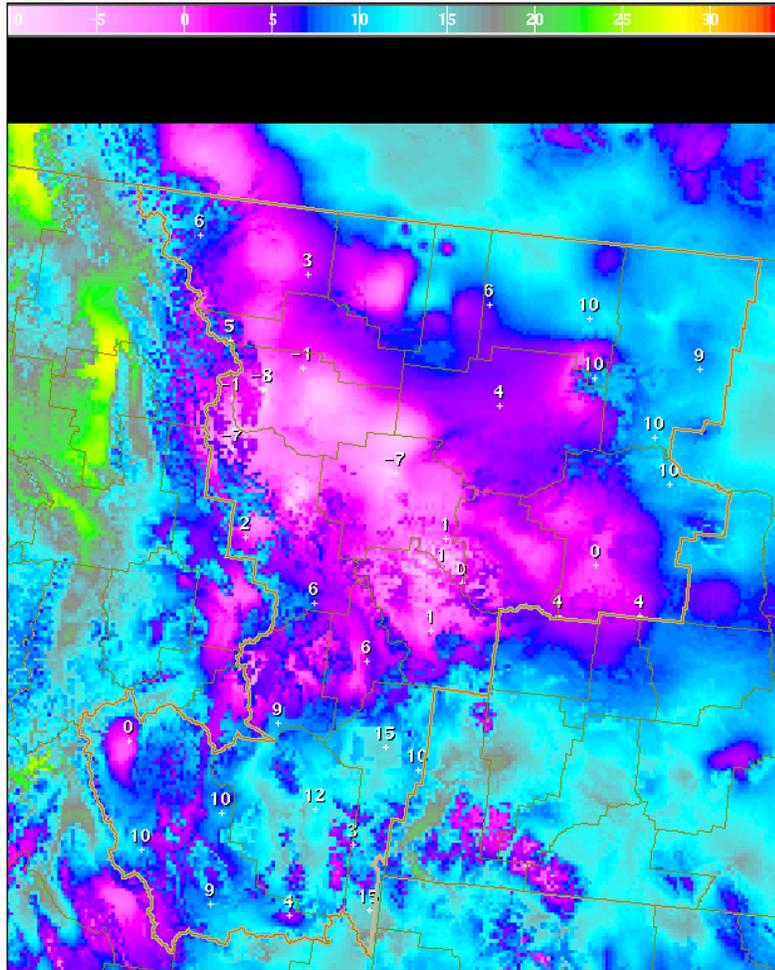


Figure 7. Low temperatures across central and western Montana on the morning of 21 April. Below zero temperatures are in the purple areas.

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_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. 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>