

Montana Weather/Precipitation Summary

May 2009 by NOAA's National Weather Service Great Falls Montana

Temperature

For a state-wide average, temperatures averaged near normal during the month of May. The warmest anomalies were in the Bozeman area, with the coolest anomalies in the northeast. Average monthly mean temperatures ranged from 3.9F below normal at Opheim to 4.0F above normal at Bozeman (Fig. 1).

The upper air pattern showed general westerly flow with a weak ridge of high pressure over the western United States during the month (Fig. 2). The coolest period of the month was during the first two weeks. Cold air continuing from the last part of April produced new record low temperatures over portions of central Montana on the 1st. As the sky cleared on the morning of the 1st, Great Falls fell to 12 degrees. This set a new all-time low temperature record for May at Great Falls. The temperature also fell to -3F at Placer Basin and to 8F at Mystic Lake. During another cool period later in the month, Cascade 20SSE fell to 18F on the 21st. The warmest periods of the month were just prior to the last cool period, from the 17th-19th. Several record high temperatures were set across the state during this period. Broadus peaked at 97F on the 19th, the warmest temperature of the month. Another warm period occurred during the last week, as temperatures again pushed into the mid 80s over many areas.

New Temperature Records for May

Station	Record Type	New Record	Date	Previous Record	Year of Previous Record
Great Falls	Low Daily Minimum ** All-time monthly low	12	1	15	1954
Bozeman	High Daily Maximum	91	18	86	1986
Bozeman MSU	High Daily Maximum	85	18	85	1948
Butte	High Daily Maximum	84	18	83	1954
Dillon	High Daily Maximum	89	18	87	1954
Missoula	High Daily Maximum	88	18	88	2006
Great Falls	Low Daily Minimum	30	21	30	2001
Missoula	Low Daily Minimum	28	21	28	1960

Precipitation

Severe weather was reported on 4 days in May, which is the normal for May. Precipitation was highly variable across the state. Most areas came in below normal, with the driest areas along the North Dakota border, and an area along the Rocky Mountain Front (Fig. 3). Thunderstorms occurred throughout the month, with the most organized activity on the 5th and 12th. Snow fell at the higher elevations of the southwest on the 7th, with more widespread snow falling across much of the state on the 13th. The Sapphire and Bitterroot Ranges picked up nearly a foot of snow, with amounts of up to three inches falling in the Zortman area.

In the driest areas was along the Rocky Mountain Front, some locations received less than 10% of the normal monthly amount. Several locations recorded their driest Mays of record. The

following table summaries those sites. Other locations had their 3rd, 4th, or 5th driest of record. These include – 3rd – Shelby and Stanford; 4th – Billings and Chinook; 5th – Dillon. Mullan Pass recorded 4.23 inches, or 141% of normal, while Baker recorded 2.89" and Plevna recorded 2.09 inches, or 95% of normal. A small area in northwest Montana recorded from 100 to 125% of normal for the month.

New Precipitation Records for May 2009

Station	Record Type	New Record	Previous Record	Year of Previous Record
Cascade 20SSE	Lowest Monthly Precipitation **All-time May record	0.18 inches	0.27 inches	1958
Millegan	Lowest Monthly Precipitation **All-time May record	0.71 inches	1.20 inches	2006

Significant Storms

May 5

A cold front moved across the state and produced a line of thunderstorms that produced strong, gusty winds to 68 mph at Sidney and 63 mph at Lewistown. Hail up to ¾ inch in diameter also fell at Lewistown. Winds behind this cold front gusted to 87 mph at Snowslip.

May 12-13

Another cold front moved across the state, ushering in colder air and snow. Severe weather across southeast Montana produced one inch hail at Alzada and Pompeys Pillar. As the severe thunderstorms cleared the state, heavy snow fell over portions of the western mountains, with up to a foot in the Bitterroot and Sapphire ranges, and up to 3 inches in the vicinity of the Little Rockies. A quick warm-up on the 14th, along with another rapidly moving weather system brought thunderstorms with gusty winds and small hail to portions of northern Montana. Great Falls recorded a gust to 59 mph, with pea size hail in the Frazer area.

May 19

A cold front that ended the warmest period of the month caused thunderstorms again. Golf ball size hail fell in the Frazer area.

May 24

Widely scattered showers and thunderstorms occurred over the Memorial Day weekend. Some areas recorded as much as ¾ inch of precipitation, with gust winds accompanying many of the thunderstorms. The highest gust of 69 mph occurred at the Duck Creek Fishing area.

Other information

The statewide mean temperature at 18 cities in May was 49.6F, slightly warmer than the normal of 49.3 (Fig. 1). The range was from 4 degrees below average in the northeast, to 4 degrees above normal around Bozeman. The precipitation average was 1.17 inches or 59 percent of normal. This is the 14th driest May of record as a composite for these locations. The normal value is 1.99 inches. Much of the state recorded below average precipitation (Fig. 3). This was also the driest May and Water-year-to-date since 2001. Winds were below average for the month. The state-wide wind average was 9.2 mph, below the normal of 9.9 mph. Soil moisture conditions were dryer than average for the end of May. The extended period of dryness during the month has produced the soil dryness conditions (Fig. 6).

May summary information:

High Temperature	97°F at Broadus (19 th)	Greatest Precip	4.23" at Mullan Pass
Low Temperature	-3F at Placer Basin SNOTEL (1st)		6.50" at Twin Lake SNOTEL
Warmest Ave Temp	56.4°F at Glendive	Peak Wind Gust	87 mph at Snowslip (5 th) 69 mph at Duck Creek Fishing area (24 th)
Coollest Ave Temp	42.4°F at West Yellowstone		
Range of Temp departures	-3.9°F at Opheim to +4.0°F at Bozeman	Highest Ave Wind	14.0 mph at Fort Belknap
18 city mean monthly Temperature/Normal	49.6/49.3	18 city mean monthly wind speed/Normal	9.2 mph/9.9 mph
18 city mean monthly precipitation/Normal	1.17"/1.99" – 59% of normal		

**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	2.89	184%			6.83	123%			11
Billings	0.64	26%	12	11	7.95	84%	59	59	100
Belgrade	1.32	53%	12	15	6.53	76%	17	24	68
Butte	0.99	49%	22	18	6.31	93%	53	46	115
Cut Bank	0.43	19%	10	9	1.91	34%	3	2	102
Dillon	0.49	27%	5	6	4.49	90%	20	28	69
Glasgow	0.87	51%	27	23	5.88	117%	66	60	109
Great Falls	0.95	38%	13	10	7.87	95%	62	54	114
Havre	0.68	37%	21	16	4.31	74%	22	17	128
Helena	0.43	24%	6	4	4.83	83%	23	17	130
Jordan	1.13	81%			6.63	136%			10
Kalispell	1.12	55%	39	33	9.65	87%	17	14	114
Lewistown	1.09	37%	12	10	6.42	67%	16	13	113
Livingston	2.03	78%	38	35	6.93	75%	31	29	104
Miles City	1.04	47%	26	19	5.29	74%	33	24	132
Missoula	0.78	40%	27	20	8.07	92%	50	39	128
Mullan Pass	4.23	147%	62	88	23.68	85%	10	13	68
Wolf Point	0.76	40%			4.16	90%			11
Glendive	0.74	36%	18	15	5.80	90%	47	43	108
Sidney	0.30	15%	4	4	5.02	77%	24	34	68
BZN-MSU	1.45	45%	19	14	12.08	103%	87	67	130

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>

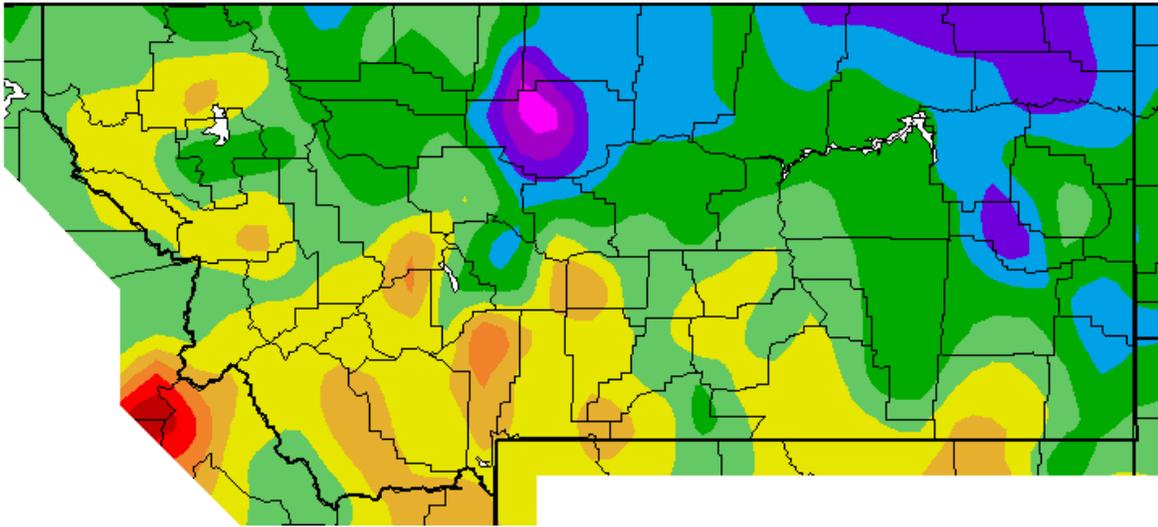
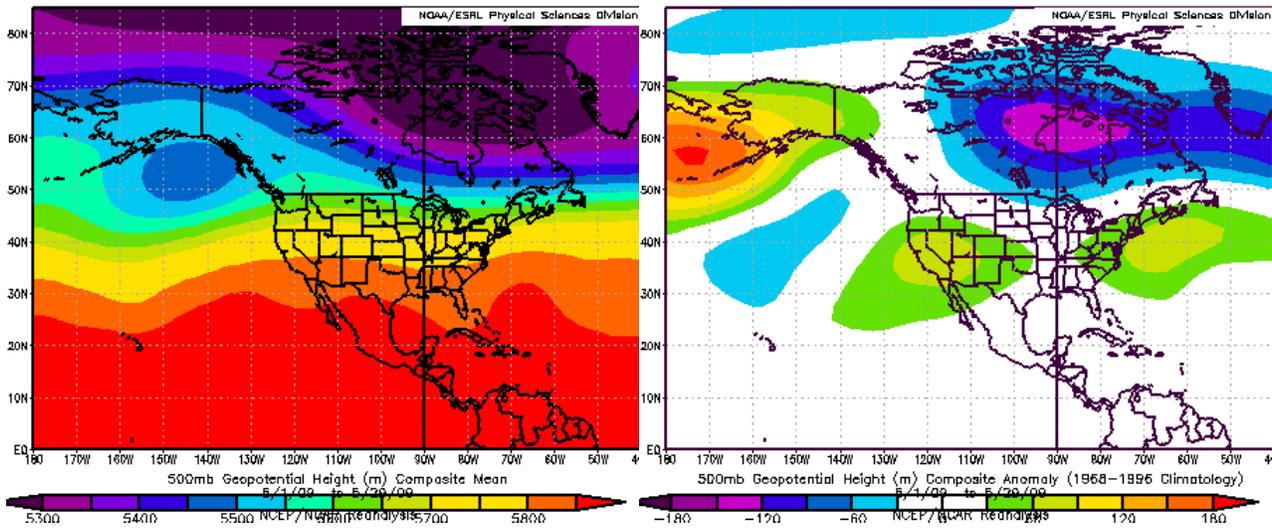


Figure 1. Temperature anomaly for May. Temperatures were above normal southwest and below normal in the northeast (Western Region Climate Center).



Figures 2a (left) and 2b (right). Mean flow at 500 millibars (~18,000 ft) for May (left). A weak ridge of high pressure dominated western Montana. This ridge provided slightly above normal heights for the western US for this time of the year.

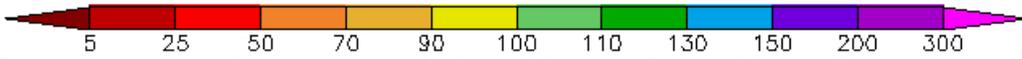
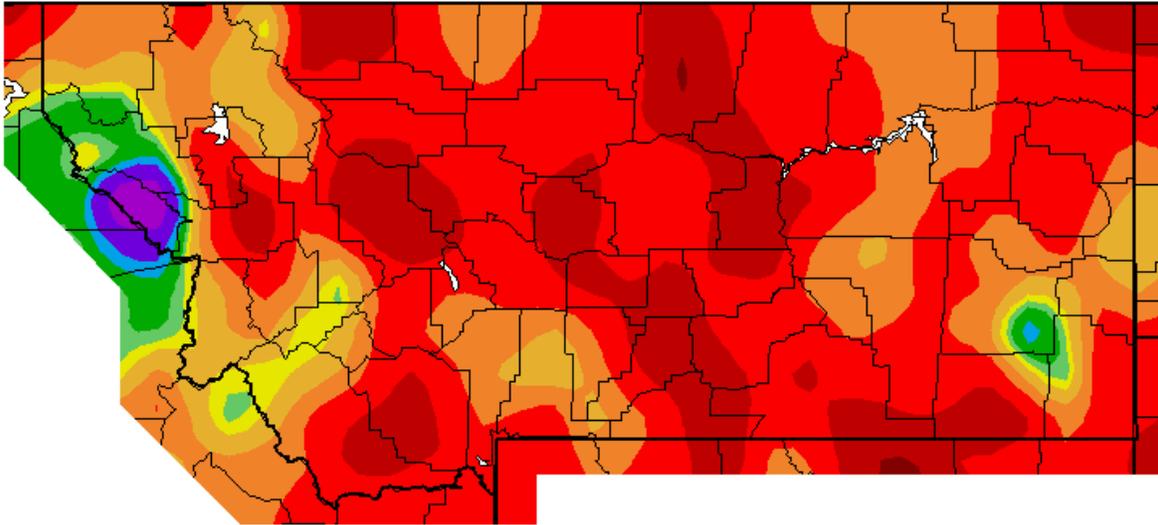


Figure 3. Precipitation anomaly (% of normal) for May. (Western Region Climate Center).

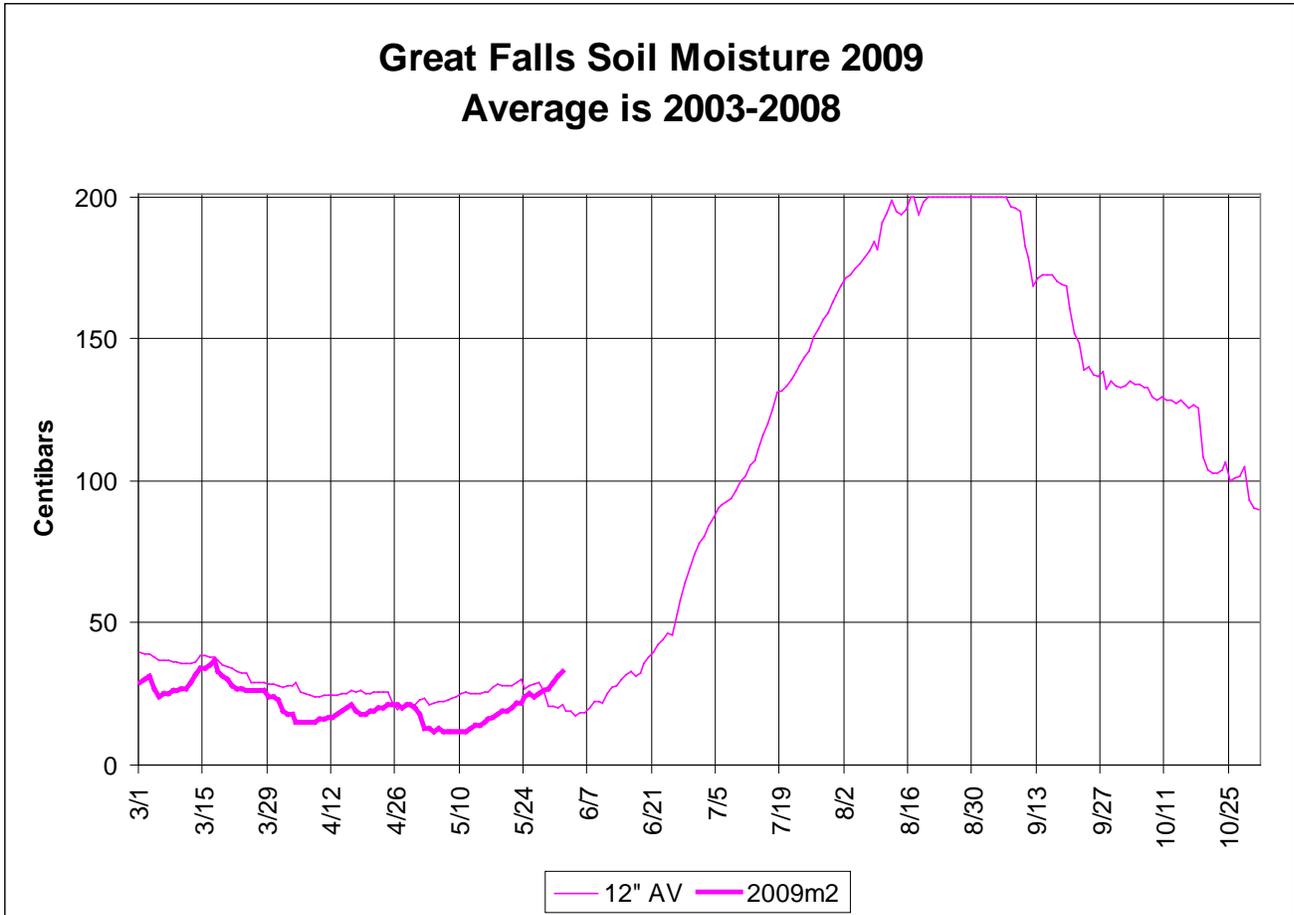


Figure 6. Soil moisture at the 12 inch depth at Great Falls. 2009's values are in the bold line, with the average conditions in the lighter purple line. Values closer to zero centibars reflect wetter conditions. Values nearing 200 are dry.

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_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>

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 accessed 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=tx>