

Montana Weather/Precipitation Summary

(with summary for the year 2011)

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

December temperatures averaged above normal across most of the state. Some areas were as much as eleven degrees above normal. The warmest departures were over the north central and northeastern portions of the state. A couple of areas over the southwest and extreme south central were below normal (Fig. 3). Record warm temperatures were recorded during the last week of the month, during a very windy period. Precipitation was generally below average, with a few pockets of above normal (Fig. 4). Winds were again a big factor during December. Gusts to 119 mph were recorded at Logan Pass, with several locations having their highest December gust in several years. Upper air flow averaged northwesterly across Montana, with a ridge of high pressure along the west coast (Fig. 2). Usually, a weak ridge of high pressure dominates Montana. Because of the westerly flow, winds averaged stronger.

Temperatures across the state averaged 25.7F; 5.7 degrees above normal (Fig. 1). This was the 34th warmest December, and the sixth consecutive month with above normal temperatures. Temperatures averaged warmest over north central and eastern Montana (Fig. 3). For the period October through December, temperatures averaged 34.3F, or 2.1F above normal (the 38th warmest of record). This was the warmest October through December period since 2004. The statewide average temperature for the past 12 months is 0.5F below normal.

Precipitation averaged below normal most areas in December (Fig. 1). December averaged 0.14-inches below normal, or 0.56-inches. This was 80% of normal, and the 29th driest December of record. The precipitation excess over the average in the past 12 months is 2.19 inches. Small areas scattered throughout the state recorded above average precipitation (Fig. 4). For the period October through December, precipitation averaged 2.62 inches, or 0.02-inches above normal. December snowfall averaged 5.2 inches across the state, or 5.0 inches below normal. This was the 25th lowest December total of record. This was also the lowest average December snowfall since 1986. For the October through December period, an average of 14.8 inches of snow has fallen. This is the 41st lowest of record, and the lowest since 2004.

Wind speeds were again above normal in December. The average of 9.5 mph was 0.6 mph above average, and the 33rd calmest of record. This was the second consecutive month to record above normal wind speeds. For period from October through December, an average of 9.1 mph was 0.2 mph above normal, and the 27th calmest of record.

December 1-13

Temperatures oscillated from below to above normal during the first two weeks of December. The coolest temperatures of the month occurred, with the coldest readings in the snow-covered high southwest valleys. West Yellowstone dropped to -35F on the 5th. Winds were a big factor during

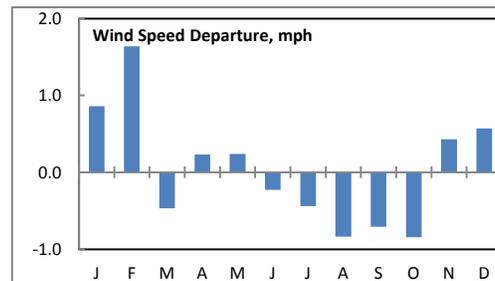
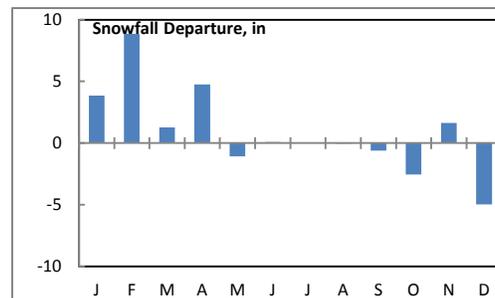
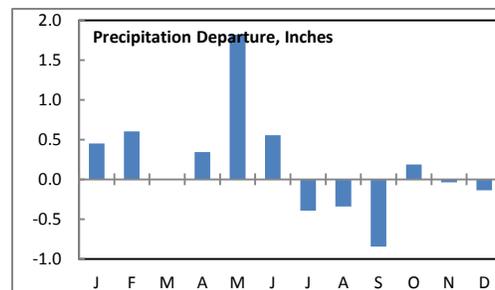
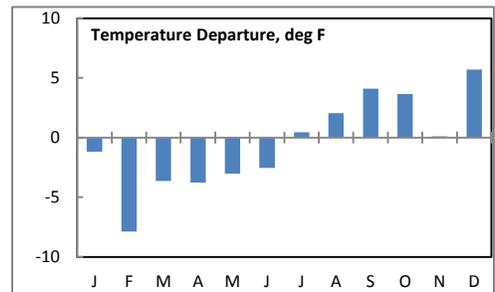


Figure 1. Statewide departures from normal for 18 locations.

this period, and during the whole month. With a minor warm-up on the second, wind gusts reached 62 mph at Sweet Grass. A weak weather system passed through the state on the third and fourth, with up to 1.5 feet of snow falling in the Little Belts and Elkhorns. Much warmer temperatures on the tenth brought a high of 57F to Forsyth.

December 14 – 20

The third week of December was mild, windy and generally dry. Strong winds gusted along the Rocky Mountain Front and adjacent plains on the 16th through 20th. Gusts reached 82 mph south of East Glacier on the 17th and 90 mph on the 20th. A weak weather system brought snowfall to portions of southern and central Montana on the 18th. Up to 5.5 inches of snow fell south of Livingston, with 2-3 inches common most other areas of central and south central Montana.

December 21-31

Temperatures were mild again during this period, as much as 20 degrees above normal on the 25th. The most significant storm of the month moved across the state from the 20th to 22nd. Up to a foot of snow fell over the higher mountains of south central Montana, with 2-4 inch amounts common from west of the divide, through central and northeast Montana. Snowfall was very light over the north central portions. Wind was the big news during this period. Wind gusts reached 78 mph at Babb on the 23rd, 113 mph at Logan Pass on the 25th, and 75 mph west of Pendroy on the 26th. As a cold front moved across the state, gusts to 62 mph were recorded at Scobey and 66 mph at Opheim. Windy conditions persisted through the rest of the month. Wind gusts reached 119 mph at Logan Pass on the 29th. Havre had a gust of 56 mph on the 28th, which was their highest December gust since 1994. Bozeman recorded a gust of 60 mph on the 29th, which was their highest December gust since 1974.

New Temperature Records for the current month

Station	Record Type	New Record	Date	Previous Record	Year of Previous Record
Billings	High Daily Min	40	28	40	1956
Bozeman	High Daily Min	36	28	33	2005
Havre	High Daily Max	57	28	56	1918
Miles City	High Daily Max	60	28	57	1999
Glasgow	High Daily Min	30	29	28	2005
Bozeman	High Daily Max	56	30	54	1962
Havre	High Daily Max	54	30	54	1980

Precipitation/convection

Severe convective weather occurred on zero days in December.

New Precipitation Records for the current month...

Station	Record Type	New Record	Date	Previous Record	Year of Previous Record
Miles City	High Daily Precip	0.23	30	0.23	1977

December summary information:

High Temperature	60°F at Fort Benton (17 th) and Hardin (18 th) and Miles City (30 th)	Greatest Precip	2.71" at Marias Pass 6.90" at Twin Lakes (Ravalli)
Low Temperature	-35°F at West Yellowstone (5 th)		
Warmest Ave Temp	32.5°F at Yellowtail Dam	Peak Wind Gust	78 mph at Babb (23 rd) 119 mph at Logan Pass (29 th)
Coollest Ave Temp	11.9°F at Cooke City		
Range of Temp departures	-1.2°F at Lake View to +10.8°F at Westby	Highest Ave Wind	29.1 mph at Logan Pass; 20.5 mph at Livingston
21 city mean monthly Temperature/Normal	27.5/20.0; 34 th warmest of record 2011: 42.5/42.8; 45 th coolest of record. (since 1880)	20 city mean monthly wind speed/Normal	9.5 mph/8.9 mph; 33 rd calmest of record. 2011: 8.9/8.9; 20 th calmest of record. (since 1936)
22 city mean monthly precipitation/Normal	0.56/0.70" – 80% normal; 29 th driest of record. 2011: 17.58/15.21; 10 th wettest of record. (since 1880)	19 city mean monthly snow/Normal	5.2/10.2 – 5.0 inches below normal; 25 th lowest of record. 2011: 72.9/61.6; 19 th highest of record. (since 1880)

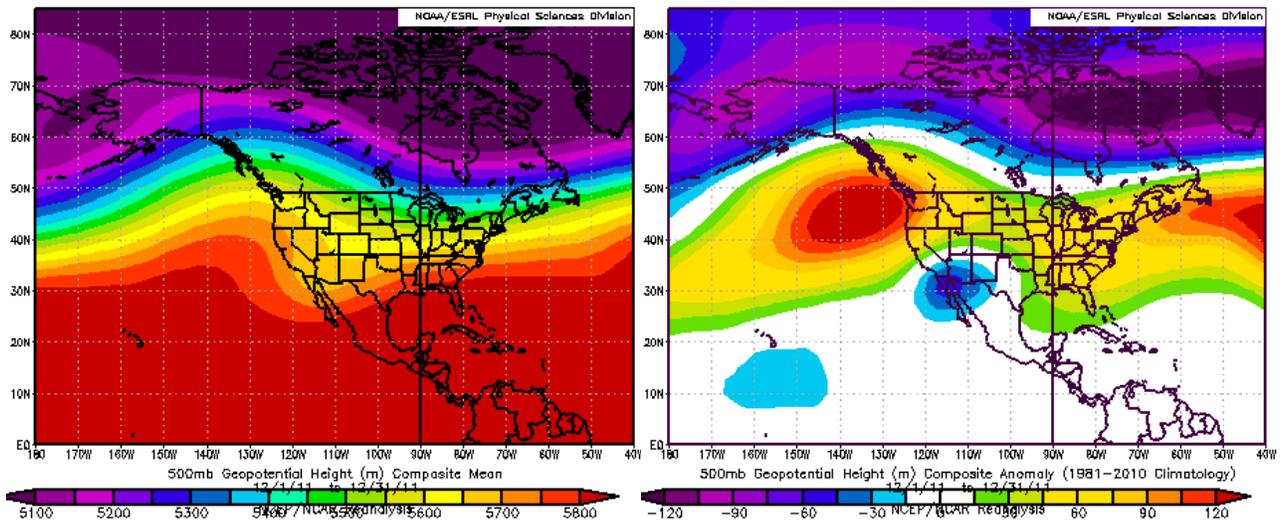
**Historical Rank of Precipitation (inches)
for the Current Month and Water Year to Date**

Location	Dec	% of Norm	Rank	Pcntl	Oct 1 – Dec 31	% of norm	Rank	Pcntl	Years
Baker	0.49	207%			1.36	69%			14
Billings	0.21	31%	27	23	2.33	87%	66	59	111
Belgrade	0.40	78%	31	41	1.55	65%	16	20	75
Butte	0.29	57%	33	27	1.26	67%	30	25	118
Cut Bank	0.23	115%	48	45	1.72	172%	82	78	105
Dillon	0.20	77%	33	45	1.23	92%	41	56	72
Glasgow	0.35	88%	58	50	1.79	115%	71	62	114
Great Falls	0.20	36%	21	17	2.79	140%	95	79	120
Havre	0.12	30%	22	16	0.80	57%	16	11	132
Helena	0.07	18%	8	5	1.39	89%	39	29	134
Jordan	0.20	69%			1.80	115%			15
Kalispell	0.74	47%	23	19	3.02	76%	36	30	118
Lewistown	0.16	24%	10	8	3.42	137%	90	77	116
Livingston	0.46	88%	55	49	2.14	90%	44	40	109
Miles City	0.31	107%	59	43	1.19	74%	40	29	135
Missoula	0.57	56%	35	25	3.82	128%	94	71	132
Mullan Pass	3.31	74%	18	24	14.10	114%	42	58	72
Wolf Point	0.11	37%			1.34	89%			14
Glendive	0.27	71%	38	32	1.31	69%	45	39	113
Sidney	0.10	19%	9	11	0.79	36%	8	10	71
BZN-MSU	0.75	81%	65	49	3.46	90%	69	52	133

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 December (left). The ridge along the west coast (left) was much stronger than normal (right).

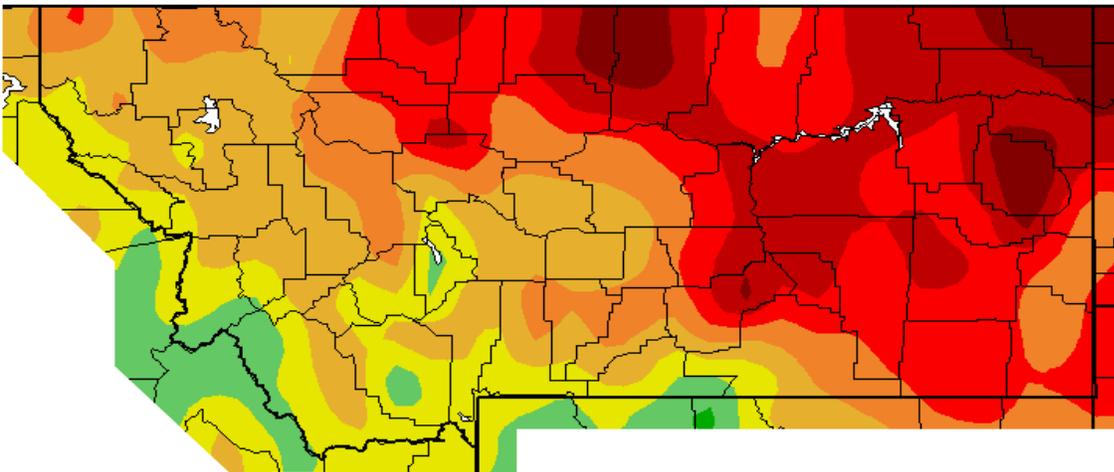


Figure 3. Temperature anomaly for December. Temperatures averages were mostly above normal, with areas of the southwest and extreme south central recording below normal conditions. (Western Region Climate Center).

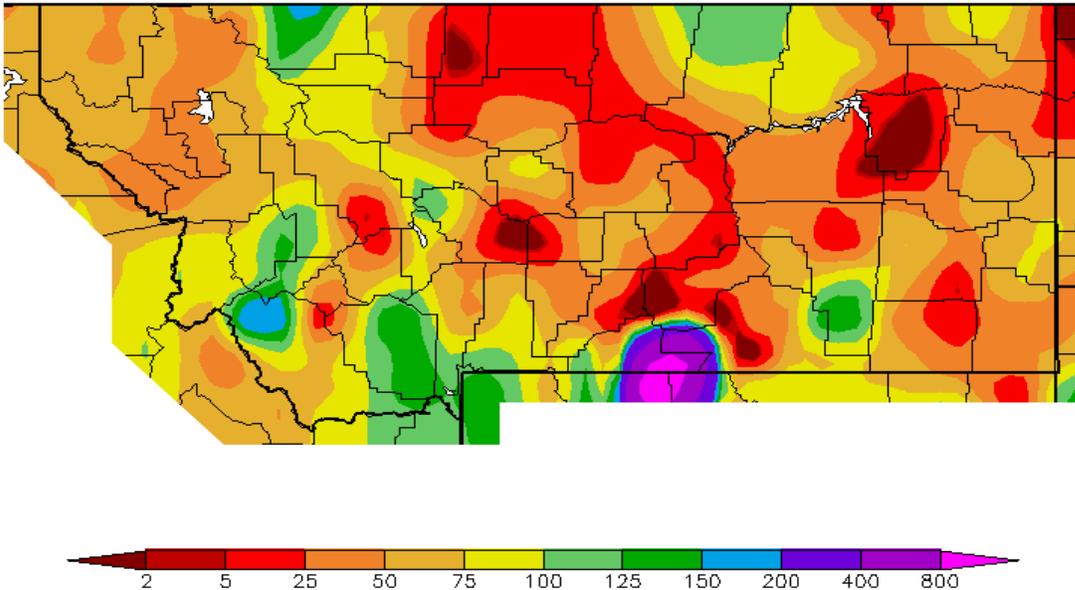


Figure 4. Precipitation anomaly (% of normal) for December. Most areas were below normal.

2011 Summary

A 21-city average temperature of 42.5F was measured across Montana in 2011. This was 0.5F below normal, and the third consecutive year to record below average temperatures. The highest temperature was 103F at Fort Benton and Hardin, while the lowest temperature was -47F at Simpson in February. This was the lowest maximum temperature to be recorded in one year since 1993. The low extreme of -47F was the coldest temperature recorded in the state since 2007.

Precipitation (22-city) averaged 17.58-inches, 2.19-inches above normal. This was the second consecutive year with above normal precipitation. The spring months were particularly wet, with record amounts at many locations in April and May. May was the second wettest May of record. Large amounts of rainfall, and snowmelt caused some of the worst flooding of record this spring. Many lakes also reached their highest levels of record. Tiber Reservoir reached a value of 3011.4-ft on July 15, nearly 5.5-ft higher than the previous record in July 1965. The summer period was one of the driest of record over central Montana. But overall, 2011 was the 10th wettest year of record.

Snowfall was very heavy during the winter of 2010-11. January, February and April all recorded significantly higher than normal snowfall. Though snow was heavy across most of the state, it was especially heavy over northeastern portions. This was easily the snowiest year of record in northeast Montana. Glasgow nearly tripled their annual average, collecting over 83 inches of snow during 2011. During the fall and early winter of 2011-12, snow was scarce across the state. Some mountain areas reported near their normal snowpack near the end of the year, but overall dry conditions prevailed. After the heavy snowfall of the winter of 2010-11, many mountain locations reported one of the latest snowmelts of record. The opening of the Going-to-the-Sun Road in Glacier National Park was the latest of record in 2011, opening on July 13.

Winds were above normal for one-half of the months during 2011. February averaged over 1.5 mph higher than normal, while the summer months averaged below normal. During the fall, winds picked up again, with speeds reaching 89 mph at Cut Bank in November. This was the second highest wind gust of record at Cut Bank. Late December also produced very windy conditions across the state. The highest gust during the year was 119 mph at Logan Pass in December.

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=tx>. 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.