

Montana Weather/Precipitation Summary

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

December was a very active and stormy month. It delivered a share of snow, cold temperatures and strong winds. Temperatures averaged the coldest in 12 years across the state. Some areas also had their snowiest December of record. Other than wind, the first half of the month was mild, with temperature as much as 20 degrees above normal on the 1st and 6th. Even so, a series of storm deposited precipitation across the state. The bottom fell out of the temperature starting on the 13th. On the 14th and 15th, temperatures were more than 40 degrees below normal. Temperatures did warm around Christmas and stayed mild through the end of the month.

Very warm air and windy conditions started out the month. Helena reached 60F, with record high temperatures set from the Canadian border to Wisdom. Hardin had the highest temperature for the month, reaching 64F. Gusty winds along the Rocky Mountain Front produced speeds over 80 mph. A strong cold front passed through the state on the 2nd, bringing snow and colder air to much of the state. Highest snowfalls were over southern Montana, with up to 9" reported in the Beartooth Mountains, and 8.5" at Helena. Temperatures warmed back above normal over western areas on the 4th, with accompanying winds through the 5th. A gust to 91 mph was recorded in the East Glacier area on the 5th. As the warmer air spread across the state, a bout of freezing rain plagued an area from Glasgow to Richey on the 7th. This was ahead of yet another storm and colder air to overspread the state. Again, the highest amounts of snow fell over the south (7") and western mountains (10"). Four to six inches were common across the northeast. With warmer air again spreading into the state winds picked up. Very windy conditions were common from the Canadian line to Big Timber. Gusts reached 105 mph near East Glacier on the 10th. Strong westerly flow aloft brought large amounts of moisture to the state. Eight inches of snow fell in the Troy area on the 12th.

The strong winds and heavy snows were a prelude to one of the strongest weather systems to push across the state in a long time. Blizzard conditions were reported in nearly every part of the state on the 13th. A strong arctic cold front blasted across the state on the 13th, accompanied by winds to 62 mph at Loma. Heavy snows fell along with the winds, piling snow into drifts as much as 5 feet deep. At Noxon 14 inches fell. Glasgow set a daily snowfall record with 10 inches falling. Blizzard conditions lasted throughout the day on the 13th. Temperatures fell rapidly, with record lows across much of central Montana on the morning of the 14th. Gold Butte dropped to -33F. The cold persisted, with even colder temperatures by the morning of the 16th. Simpson fell to as low as -39F for the state's lowest temperature for the month. High temperatures remained well below zero on the 14th and 15th.

Even though it was cold, snow continued to fall. On the 18th, Noxon accumulated 26", with a foot in the Kalispell area. This snow spread to eastern Montana, with up to 4" falling in the Red Lodge area. After another snot of cold air around the 20th, with temperatures as low as -30F again, temperatures began a slow recovery. During this slow warm-up, heavy snow again fell. This time the southwest was mostly affected. A foot of snow fell at Big Sky, with 6-10 inches common in the mountains around Big Sky. A break in the cold temperatures came to western portions of the state on Christmas day. Temperatures rose above freezing for the first time in nearly two weeks. With the warmer temperatures, strong winds again blew along the Rocky Mountain Front. Gusts reached 93 mph at Babb and 104 mph at Logan Pass. As happened with past warm-ups, snow again fell over the state as another cold front moved through. Great Falls set a record collecting 10.4 inches of snow. Snow fell across much of eastern Montana. Judith Gap measured 8" and Livingston had 7".

The snow did not last long as strong winds again pushed across the area. After creating severe blowing snow, the temperature warmed and crusted the snow in many areas. While warm temperatures were flowing over eastern Montana, Polebridge collected another 13 inches of snow. The strong winds were producing severe blizzard conditions in the Livingston area. Nye reported a gust to 82 mph on the 27th. The rapid succession of storm systems continued into the 28th. The Piegan area northwest of Cut Bank reported a foot of new snow on the 28th and 14 inches at Libby. At the same time, very warm air spread to southwest Montana, with temperatures reaching 52 at Helena. On the 29th, yet another storm system brought the now

usual, mix of strong winds and snow. Winds gusted across the area, with speeds reaching 80 mph near East Glacier. Even Billings recorded winds to 61 mph as a cold front spread across the state. At Helena, the front was accompanied by thunder snow showers. The strongest winds of the month occurred on the last day, when 130 mph wind gusts were recorded at Logan Pass.

The statewide mean temperature at 18 cities in December was 14.1F, much colder than the normal of 20.5F (Fig. 2), and the coldest monthly average since January 1996. At Billings, it was the 8th coldest December of record. At Lewistown, it was the 10th coldest of record. The precipitation average was 0.98 inches or 132 percent of normal. The normal value is 0.74 inches. Precipitation was above normal across most of the state. At Billings, it was the 9th wettest and 4th snowiest; at Glasgow, it was the 4th wettest and snowiest of record (24.8"); and at Great Falls it was the snowiest of record (30.5") (Fig. 3). This was also the wettest December since 1996 for the state. Though it seemed like a very windy month east of the divide, the state-wide wind average was the normal speed of 9.6 mph.

December summary information:

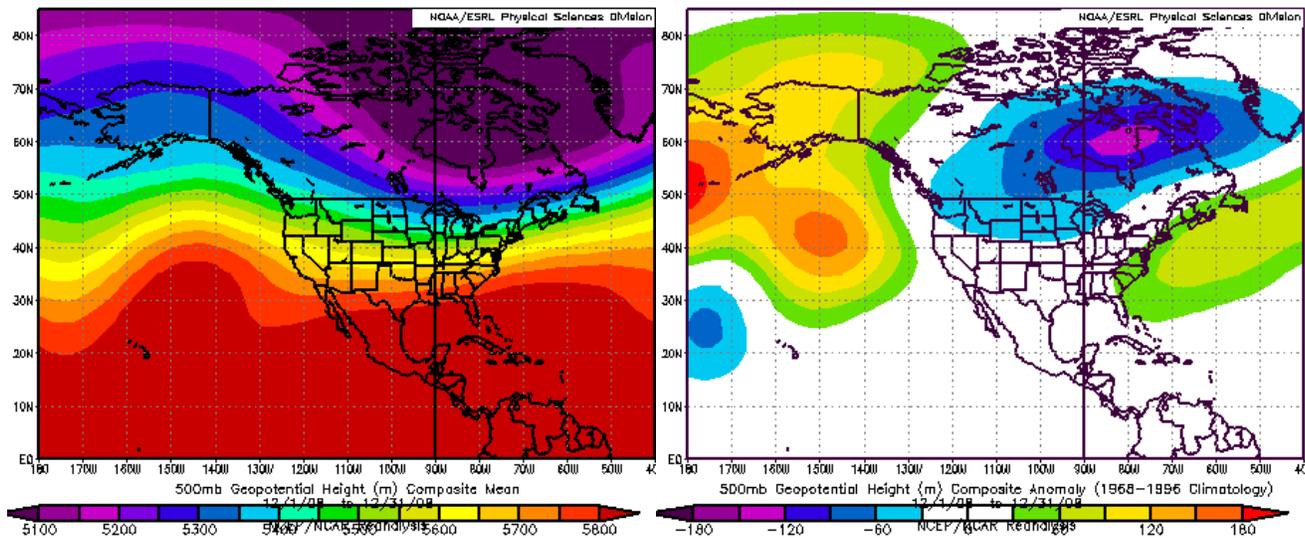
High Temperature	64°F at Hardin (1 st); Libby Dam (5 th)	Greatest Precip	3.76" at Mullan Pass
Low Temperature	-39F at Simpson (21 st)		12.0" at Twin Lakes SNOTEL
Warmest Ave Temp	24.3°F at Thompson Falls	Peak Wind Gust	130 mph at Logan Pass (31 st) and 82 mph at Nye (27 th)
Coollest Ave Temp	2.9°F at Westby		
Range of Temp departures	-10.4°F at Valier to -1.9°F at Bozeman	Highest Ave Wind	20.1 at Livingston
18 city mean monthly Temperature/Normal	14.1/20.5	18 city mean monthly wind speed/Normal	9.6 mph/9.6 mph
18 city mean monthly precipitation/Normal	0.98"/0.74" – 132% of normal		

**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	0.07	30%			2.07	105%			10
Billings	1.23	184%	92	92	3.32	124%	84	84	100
Belgrade	0.63	111%	45	62	1.92	77%	24	34	68
Butte	1.12	211%	98	85	2.53	132%	86	75	115
Cut Bank	0.09	27%	25	24	0.39	32%	11	10	102
Dillon	0.31	135%	48	69	0.84	68%	20	28	69
Glasgow	1.30	351%	109	97	2.91	198%	106	95	111
Great Falls	1.43	213%	108	91	2.70	123%	84	73	114
Havre	0.48	94%	72	56	1.79	113%	80	62	128
Helena	0.77	167%	94	72	2.01	126%	76	58	130
Jordan	0.35	326%			2.77	183%			10
Kalispell	2.30	139%	51	44	4.02	99%	43	37	115
Lewistown	0.39	47%	30	26	2.37	90%	47	41	112
Livingston	0.12	21%	9	7	1.16	38%	10	9	104
Miles City	0.16	36%	30	22	2.45	117%	100	76	131
Missoula	1.43	124%	96	73	4.01	136%	96	74	129
Mullan Pass	4.26	100%	30	43	8.59	71%	9	12	69
Wolf Point	0.39	216%			1.56	119%			10
Glendive	0.54	138%	79	68	2.43	130%	87	80	108
Sidney	0.75	153%	62	92	2.21	103%	51	77	66
BZN-MSU	1.60	203%	113	88	3.63	104%	78	60	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/tx/dx.php?wfo=tx&type=&loc=products&fx=PCPNTOTALS>



Figures 1a (left) and 1b (right). Mean flow at 500 millibars (~18,000 ft) for December (left). Though a weak ridge prevailed off the west coast, a strong trough dominated most of the northeast portion of the continent. This produced well below average heights (right) over the region. This also contributed to the below normal temperatures across the state.

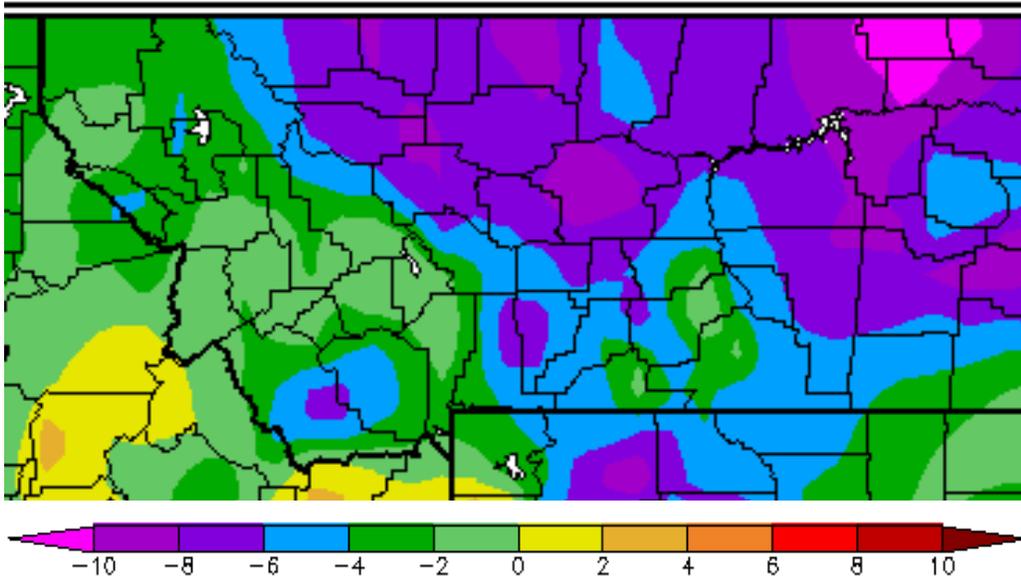


Figure 2. Temperature anomaly for December. Temperatures more than 10 degrees below average in the pinkish areas. (High Plains Regional Climate Center).

Figure 3. Precipitation anomaly (% of normal) for December. (High Plains Regional Climate Center).

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>