Montana Weather/Precipitation Summary

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

December 2009 was generally cold and dry. A persistent northwest flow aloft (Fig. 1) produced the coldest December since 1983 across Montana, and the fifth coldest December of record. This month's pattern was remarkable similar to December 1983 (Fig. 2), but 1983 produced a string of much colder temperatures. Temperatures ranged from 1F to 15 F below normal (Fig. 3). The statewide average was 9F below normal. Precipitation was variable, with the highest amounts across the hi-line and eastern tier counties of the state (Fig. 4). December is normally a dry month across the east, where precipitation was up to eight times the normal. The statewide average was only 61% of normal. Snowfall was variable, too. Fifteen to 20 inches of snow fell at Billings, Havre and Kalispell. Fifty-one inches fell at Millegan, their 2nd snowiest December of record.

Dec 1-4
Relatively mild temperatures prevailed across the state, with some precipitation west of the divide. Up to 9 inches of snow fell over higher elevations in the Butte area. Cold air trapped in southwest valleys produced record low temperatures on the morning of the 2nd and 3rd

Dec 5-15
A very cold period was ushered in by a cold front on the 4th. This period also brought heavy snow to many areas as the cold air was overrun by warmer air at times. From the 4th-6th, nearly 2.5 feet of snow fell at Millegan (northern Meagher County) and 1.5 feet fell in the Babb area. This snow drifted into 10-foot drifts. Heavy snow also fell in the Sweet Grass Hills (9 inches) and over the higher mountains of the south central portion of the state (8" at Placer Basin SNOTEL). The first push of cold air produced temperatures as low as -37F. A slight warming brought another round of heavy snow to portions of central and western Montana. From the 12th-15th, 2.5 feet of snow fell at Fisher Creek SNOTEL (Park County), 1.5 feet at Ovando and Swan Lake, 1 foot at Clinton, Lincoln and West Glacier, and 10 inches at Absarokee (Stillwater County) and Bigfork. After this snow, the coldest temperatures of the month pushed into the state. By the morning of the 15th, temperatures as low as -40F were recorded at Jordan.

Dec 16-20
A warm-up across the state prevailed during this time. Some areas started a little earlier, but during this period, some windy conditions returned to the Rocky Mountain Front, and temperatures rebounded to as much as 10-15 degrees above normal. Much of the snow that fell during the previous period melted over the central plains.

Dec 21-31
A persistent cold pattern prevailed which brought widespread fog and some freezing rain and snow to portions of the state. Great Falls area experienced one of the most severe ice accumulations in nearly 25 years as around 0.10" of rain fell and froze on surfaces on the 20th. Snow accumulated to 6 inches in some mountain locations. By the 23rd, another storm brought scattered snow to the state. Amounts ranged as high as 9 inches at Many Glacier, to 4-6 inches from Livingston northward to Malta. The last big storm of the year occurred on Christmas Day. The eastern tier counties experienced blizzard conditions with blocked roads in snow and blowing snow. From Wibaux to Ekalaka, 12 to 20 inches of snow fell, with drifts as high as seven feet. I-94 was closed on Christmas Day, and reopened the next afternoon. The storm brought severe blizzard conditions to the Dakotas, so roads were closed across the Dakotas, too. Though temperatures were mild along the Rocky Mountain Front, very cold air remained over the eastern half of Montana. Temperatures were 20 to 30 degrees below normal from the 24th through 27th.

New Temperature Records for Dec 2009

Station	Record Type	New Record	Date	Previous Record	Year of Previous Record
Wisdom	Low Daily Min	-29	2	-26	1931
Dillon	Low Daily Min	-7	3	-7	1972
Cut Bank	Low Daily Min	-34	8	-34	1972
Dunkirk	Low Daily Min	-35	9	-35	1977
Lewistown	Low Daily Max	-6	13	-4	1922
Havre	Low Daily Min	-30	15	-30	2008

Precipitation

Severe weather occurred on zero days in December.
Precipitation was generally below normal across the state. The heaviest precipitation fell along the hi-line and eastern portions of the state.

New Precipitation Records for Dec 2009

Station	Record Type	New Record	Date	Previous Record	Year of Prev Record
Stanford	Daily Max Snowfall	9.0	13	5.5	1946

Other Information

At Butte, December was the driest of record with only 0.01 inches recorded At Bozeman/Belgrade, only 0.11 inches were recorded, for the fourth driest of record.

In the year 2009, temperatures averaged close to normal across Montana. Precipitation averaged about two inches below normal. Winds continued to average below normal. The average wind speed was nearly one mile-per-hour below average. Some areas had high precipitation amounts. Millegan 14SE had their snowiest year of record. They recorded nearly 230 inches of snow. Neihart recorded 152 inches of snow, their 5th snowiest year of record.

December summary information:

High Temperature	53°F at Rapelje (21st)	**Greatest Precip**	3.80" at Bull Lake 9.20" at North Fork Jocko SNOTEL
Low Temperature	-40°F at Jordan (15th)		
Warmest Ave Temp	25.8°F at Superior	**Peak Wind Gust**	74 mph Deep Creek (11th) 71 mph Logan Pass (19th)
Coolest Ave Temp	1.7°F at Chinook		
Range of Temp departures	-0.8°F at Divide to -15.1F at Chinook	**Highest Ave Wind**	17.6 mph at Livingston (Park)
18 city mean monthly Temperature/Normal	11.4/20.5 – 5th coldest CY: 40.4/40.9 – 54th warmest		
18 city mean monthly precipitation/Normal	0.43"/0.71" – 61% of normal - 22nd driest CY: 12.31/14.81 – 28th driest	**18 city mean monthly wind speed/Normal**	7.5 mph/9.6 mph - calmest CY: 8.4/9.3 – 3rd calmest

CY = Calendar-year-to-date.

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	0.26	110%	11	91	1.58	80%			12
Billings	0.65	97%	68	67	2.27	85%	60	60	100
Belgrade	0.11	19%	4	4	2.21	89%	36	49	72
Butte	0.01	2%	1	1	1.38	72%	34	29	115
Cut Bank	0.07	21%	20	19	0.36	30%	11	10	103
Dillon	0.07	30%	8	10	1.62	132%	52	74	70
Glasgow	0.34	92%	55	48	1.17	80%	37	32	112
Great Falls	0.76	113%	81	68	2.27	104%	71	60	118
Havre	0.65	127%	94	72	1.44	91%	58	44	130
Helena	0.31	67%	37	27	1.33	83%	34	25	132
Jordan	0.73	679%	14	108	2.45	162%			13
Kalispell	1.35	82%	51	43	3.01	74%	44	37	116
Lewistown	0.31	37%	24	20	2.72	103%	68	59	114
Livingston	0.00	0%	2	1	1.85	61%	31	28	107
Miles City	0.06	13%	13	9	1.15	55%	37	27	133
Missoula	0.59	51%	35	26	1.50	51%	14	10	130
Mullan Pass	0.95	22%	2	1	6.46	54%	4	4	69
Wolf Point	0.06	33%	3	18	1.02	78%			12
Glendive	0.93	238%	106	91	2.59	139%	92	83	111
Sidney	0.42	86%	37	52	2.63	123%	55	79	69
BZN-MSU	0.64	81%	47	36	4.06	116%	94	72	131

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

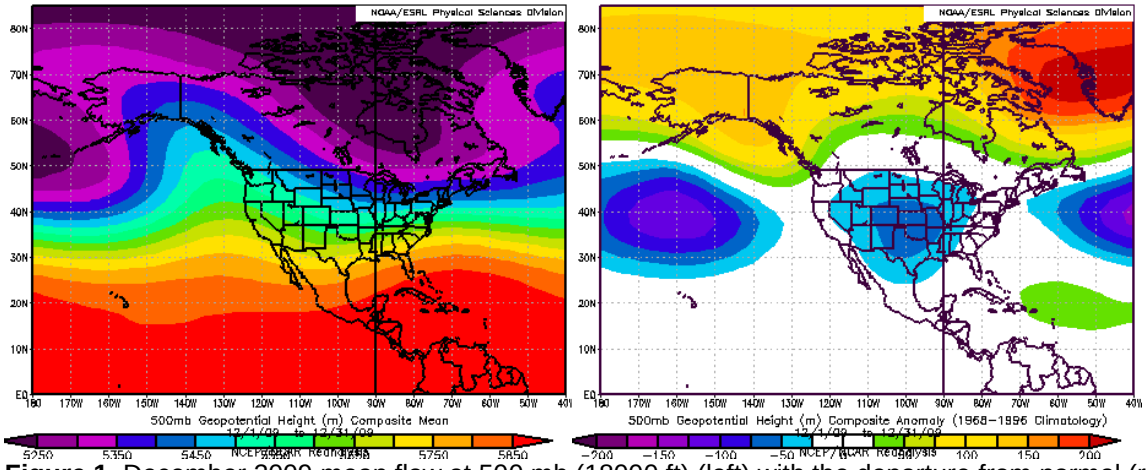

Figure 1. December 2009 mean flow at 500 mb (18000 ft) (left) with the departure from normal (right).

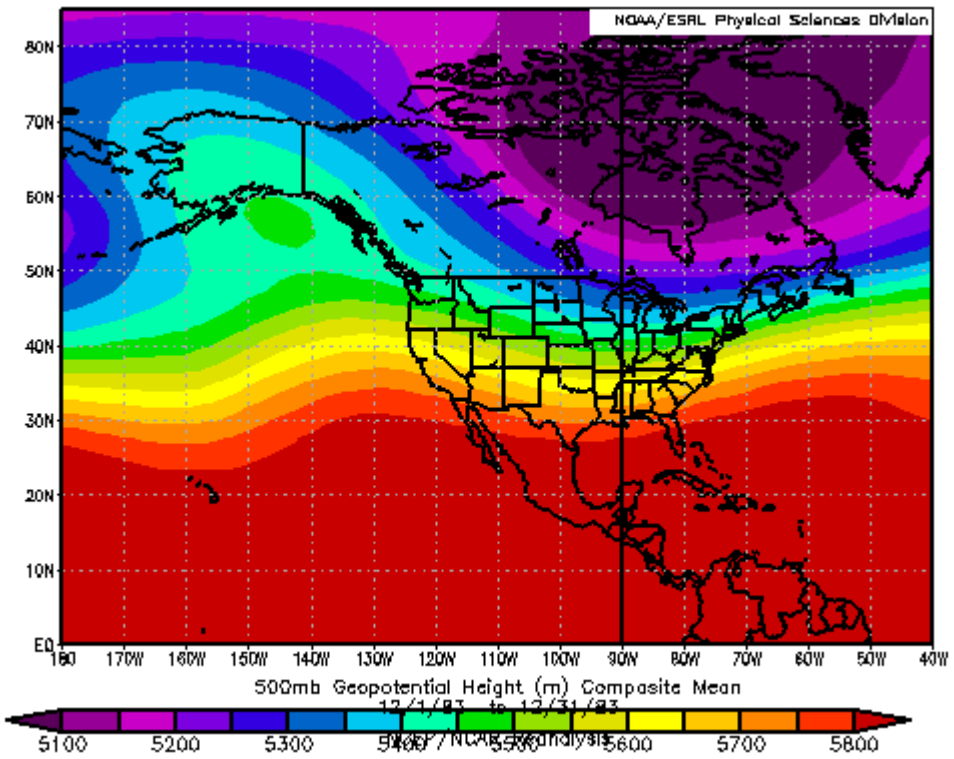

Figure 2. December 1983 mean flow at 500 mb.

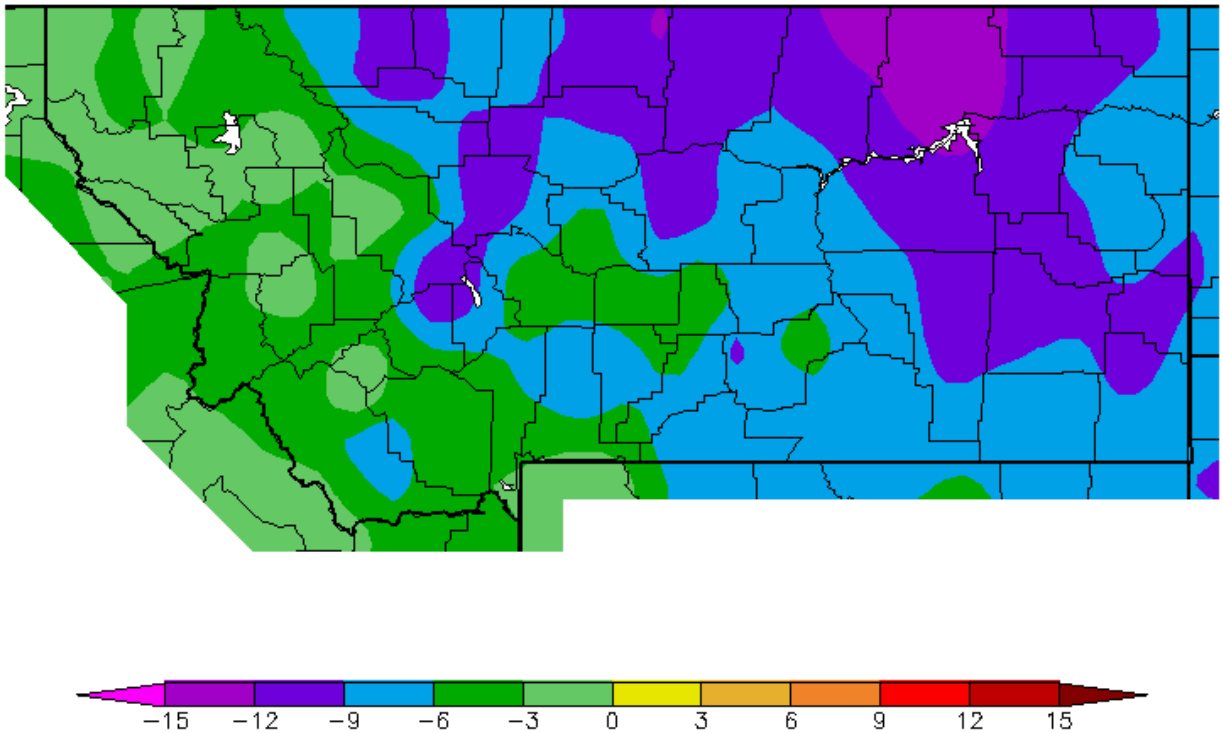

Figure 3. Average temperature departure from normal for December 2009. Temperatures were above normal across the state (Western Region Climate Center).

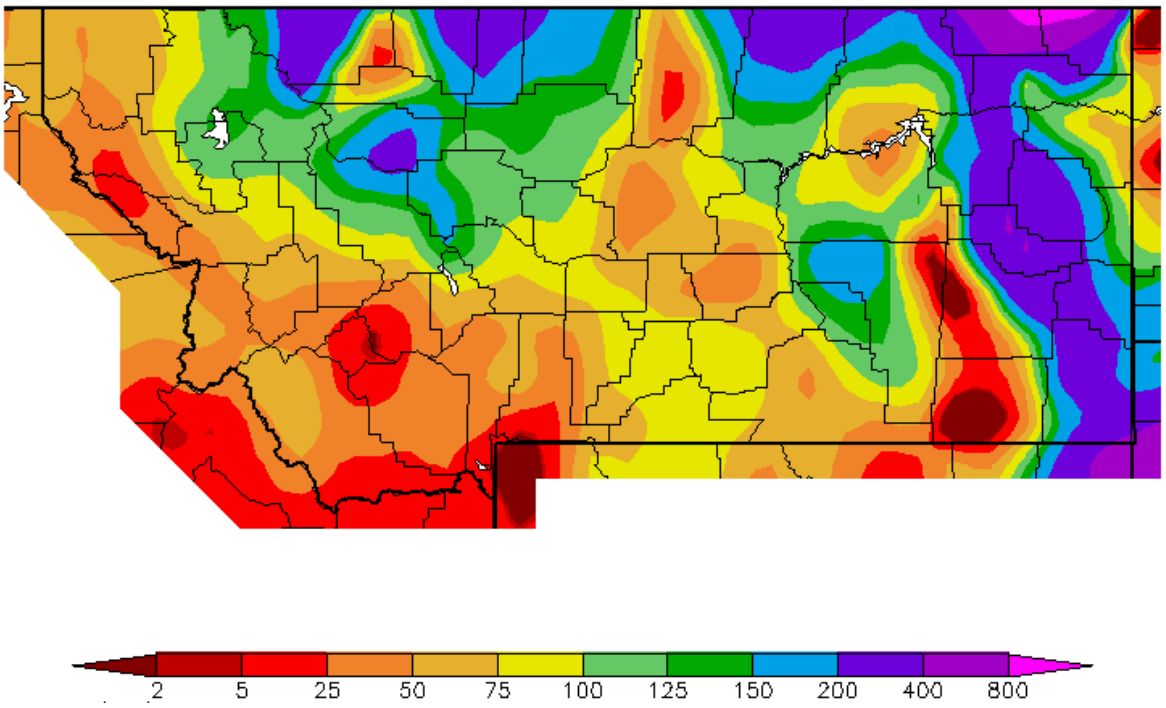

Figure 4. Precipitation anomaly (% of normal) for December. (Western Regional Climate Center).

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 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=tfx