

Montana Weather/Precipitation Summary

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

Except for a band from the southwest through central portion of Montana, precipitation was below normal for the state. The statewide average precipitation was only 32% of normal. The notable exception was the southwest, where Dillon recorded 125% of their normal November precipitation, and Bozeman MSU collected twice their normal 1.10" of November precipitation. Heavy snow fell in these areas near Veterans Day, which largely contributed to the heavy totals. Temperatures were above to much above normal for November (Fig. 1). The northeast was almost 10 degrees above normal. Low temperatures averaged a bit below average in the snow covered areas of southwest and central Montana.

A trough of low pressure dominated the eastern Pacific during November, with a weak ridge of high pressure over western North America (Fig. 3). This created a large negative anomaly in the pressure pattern over the northern Pacific and a positive anomaly over central North America. Typically, a ridge of high pressure dominates western North America in November. This pattern contributed to the warmer than normal temperatures across the state.

The lack of precipitation over much of the state is clearly shown in Figure 2. Scattered light precipitation fell over the west on the 5th and 21st, but the primary storm of the month occurred across the southwest and central on the 12th and 13th. The most reported with this storm was 30 inches in the mid-elevations south and southeast of Bozeman. Even with the dryness, some impressive November totals were reported. Over two inches fell at Bozeman and Fisher Creek (Lincoln Co), while Flattop Mountain recorded nearly 9 inches, and Poorman Creek SNOTEL reported over 11 inches.

Nov 1-10

Above normal temperatures prevailed. Record high temperatures were set on the 5th (Bozeman) and 6th (Glasgow), while windy conditions also prevailed. The warmest temperatures of the month occurred during this period. On the 5th, Huntley reached 78F, while Little Bighorn and Dry Blood Creek reached 79F. Temperatures were up to 20 degrees above normal on the 5th. Winds gusted to 63 mph at Two Medicine on the 5th, and 66 mph at Heart Butte on the 6th. Logan Pass reported one of the highest gusts of the month on the 7th, peaking at 79 mph. Some precipitation fell west of the divide on the 6th and 8th, with up to nine inches of snow at Poorman Creek and Flattop Mountain on the 8th.

Nov 11-15

The largest storm of the month occurred during this period. From the 12th through 13th, up to 30 inches of snow fell in the Bozeman area, with 20 inches at Clyde Park (Park Co), 15" at Melville (Sweet Grass Co), and 10 inches at Roundup (Musselshell Co). The heaviest snow fell from northern Madison through northern Park Counties (Fig. 4). This also ushered in a period of below normal temperatures, especially over these snow covered areas. Temperatures were 12-19 degrees below normal in the Bozeman area on the 18th and 19th. The coldest temperatures of the month were during this period. Wisdom dropped to -14F on the 13th. Warmer conditions began a return on the 15th, with gusty winds along the Rocky Mountain Front. Winds peaked at 82 mph at Deep Creek and 66 mph at Two Medicine on the 15th.

Nov 16-18

Windy conditions prevailed during this warm period. Temperatures warmed to 72F at Chinook on the 17th while winds gusted to 70 mph at Babb. Temperatures were 22 degrees above normal at Great Falls on the 17th.

Nov 19 - 30

A cold front on the 19th brought a brief period of below normal temperatures, but warming returned on the 20th. Winds gusted to 57 mph at the Port of Piegan on the 20th. The strong west winds brought precipitation to western Montana. Lolo Pass picked up 7 inches on the 21st, while

Warm Springs recorded 5 inches. Winds continued east of the divide, with a gust to 58 mph at Heart Butte. Windy and warm conditions continued through the end of the month. Fort Benton reached 68F on the 26th, while winds again gusted to 69 mph at Babb on the 29th. The 30th produced one of the windiest days of the month, when Cut Bank gusted to 59 mph. Some below zero lows returned to the southwest. West Yellowstone dropped to -8F on the 29th.

New Temperature Records for Nov 2009

Station	Record Type	New Record	Date	Previous Record	Year of Previous Record
Bozeman	High Daily Max	70	5	68	2001
Glasgow	High Daily Max	71	6	71	1931
Glasgow	High Daily Max	68	17	64	1943
Great Falls	High Daily Max	68	17	66	1908
Havre	High Daily Max	71	17	65	1976
Kalispell	High Daily Max	59	17	59	1976
Missoula	High Daily Max	65	17	58	1895
Havre	High Daily Max	65	20	65	2002, 1968

Precipitation

Severe weather occurred on no days in November.

Precipitation was generally below normal across the state. There was a band of above normal precipitation from Beaverhead through Musselshell Counties.

New Precipitation Records for Oct 2009

Station	Record Type	New Record	Date	Previous Record	Year of Prev Record
Bozeman	Daily Max Precip	0.90	12	0.63	1941
Bozeman MSU	Daily Max Snowfall	16.2	12	5.0	1968

Other Information

Cut Bank recorded their second driest November of record. Havre had their 3rd driest, while Great Falls recorded their 4th driest November.

Glasgow had no days that averaged below normal.

At Great Falls and Cut Bank, it was the windiest November since 1989.

November summary information:

High Temperature	79°F at Little Bighorn (Big Horn Co) and Dry Blood Ck (Petroleum Co) (17 th)	Greatest Precip	2.94" at Fisher River (Lincoln) 11.60" at Poorman Ck SNOTEL (Lincoln)
Low Temperature	-14°F at Wisdom (13 th)		
Warmest Ave Temp	41.7°F at Billings	Peak Wind Gust	70 mph Babb (17 th) 82 mph Deep Creek (15 th)
Coollest Ave Temp	24.9°F at West Yellowstone		
Range of Temp departures	+1.4°F at Butte to +9.9F at Westby	Highest Ave Wind	19.6 mph at Two Medicine DOT (Glacier) 27.8 mph at Deep Creek RAWS
18 city mean monthly Temperature/Normal	33.7/29.0 – 21 st warmest CY: 42.9/42.9 – 37 th warmest Sea: 42.9/41.2 – 24 th warmest		
18 city mean monthly precipitation/Normal	0.26"/0.81" – 32% of normal - 6 th driest CY: 11.90/13.60 – 29 th driest Sea: 2.22/2.98 – 30 th driest	18 city mean monthly wind speed/Normal	8.4 mph/8.9 mph - 16 th calmest CY: 8.4/9.2 - 4 th calmest Sea: 7.7/8.5 – 12 th calmest

CY = Calendar-year-to-date; Sea = Season of September through November.

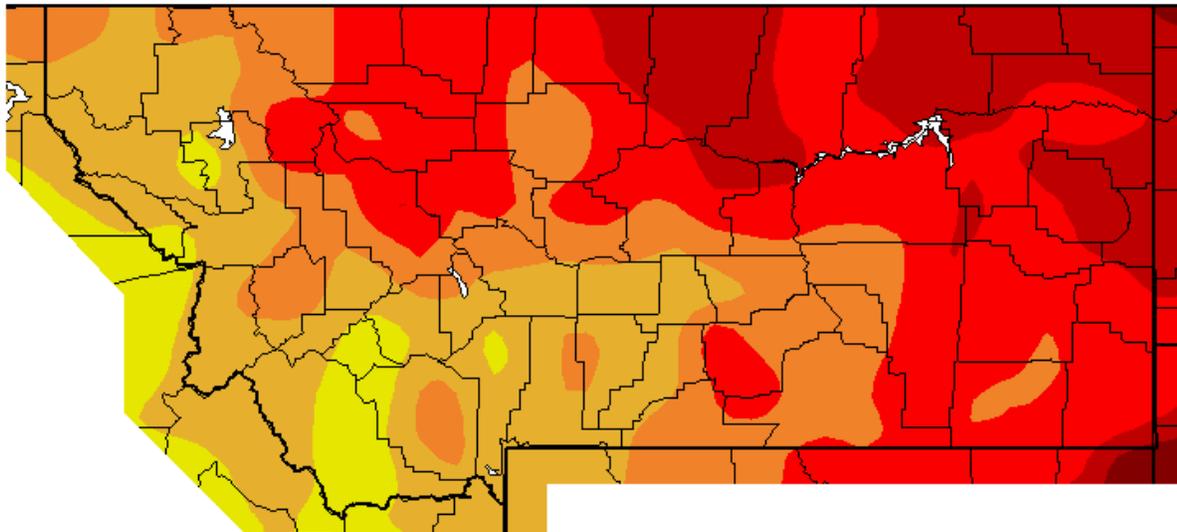


Figure 1. Average temperature departure from normal for November 2009. Temperatures were above normal across the state (Western Region Climate Center).

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

Location	Nov	% of Norm	Rank	Pcntl	Oct 1 – Nov 30	% of norm	Rank	Pcntl	Years
Baker	0.01	2%			1.32	76%			12
Billings	0.17	23%	21	20	1.62	81%	60	59	101
Belgrade	1.12	138%	60	82	2.10	109%	48	65	73
Butte	0.09	15%	7	5	1.37	99%	62	53	116
Cut Bank	T	0%	6	5	0.29	33%	20	19	103
Dillon	0.45	125%	46	65	1.55	155%	57	81	70
Glasgow	T	0%	4	3	0.83	76%	47	41	112
Great Falls	0.02	3%	4	3	1.51	99%	63	53	118
Havre	T	0%	3	2	0.79	74%	50	38	130
Helena	0.13	27%	10	7	1.02	89%	51	38	131
Jordan	0.05	11%			1.72	123%			13
Kalispell	0.37	26%	27	23	1.66	69%	51	43	116
Lewistown	0.29	39%	27	23	2.41	134%	86	75	114
Livingston	0.45	45%	43	39	1.85	75%	52	48	107
Miles City	0.00	0%	1	1	1.09	66%	56	42	133
Missoula	0.29	30%	17	12	0.91	51%	18	13	130
Mullan Pass	1.38	29%	4	4	5.51	71%	16	22	70
Wolf Point	0.01	4%			0.96	85%			12
Glendive	T	0%	1	1	1.66	112%	77	68	112
Sidney	0.02	3%	2	1	2.21	134%	56	81	69
BZN-MSU	2.21	201%	124	95	3.42	126%	107	82	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>

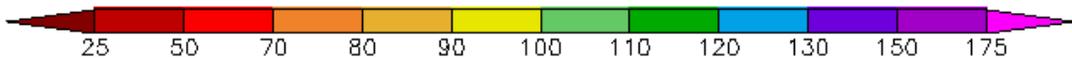
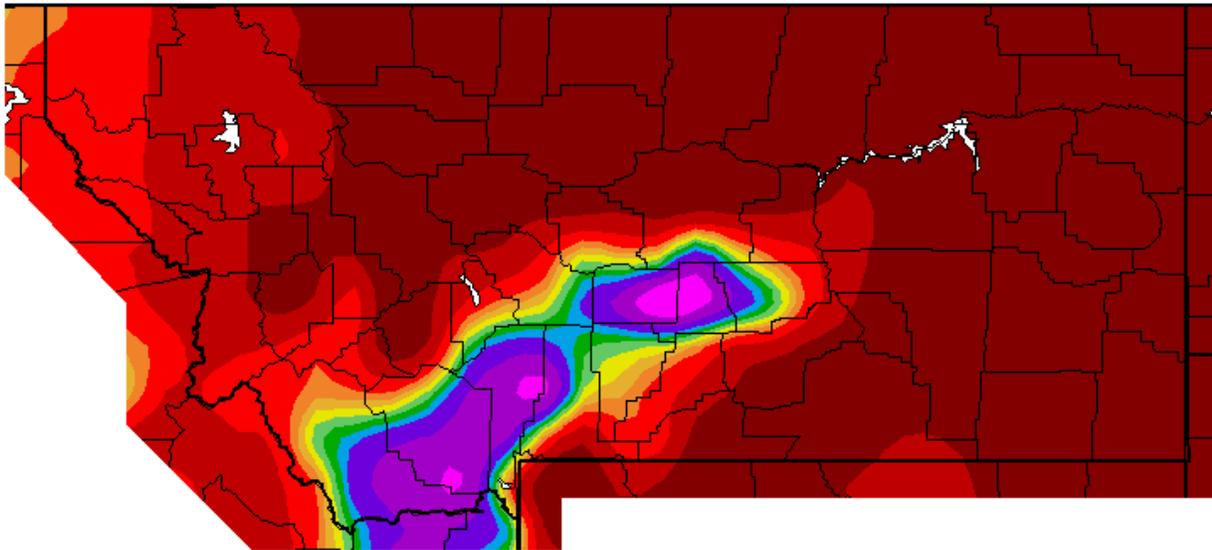


Figure 2. Precipitation anomaly (% of normal) for November. (Western Regional Climate Center).

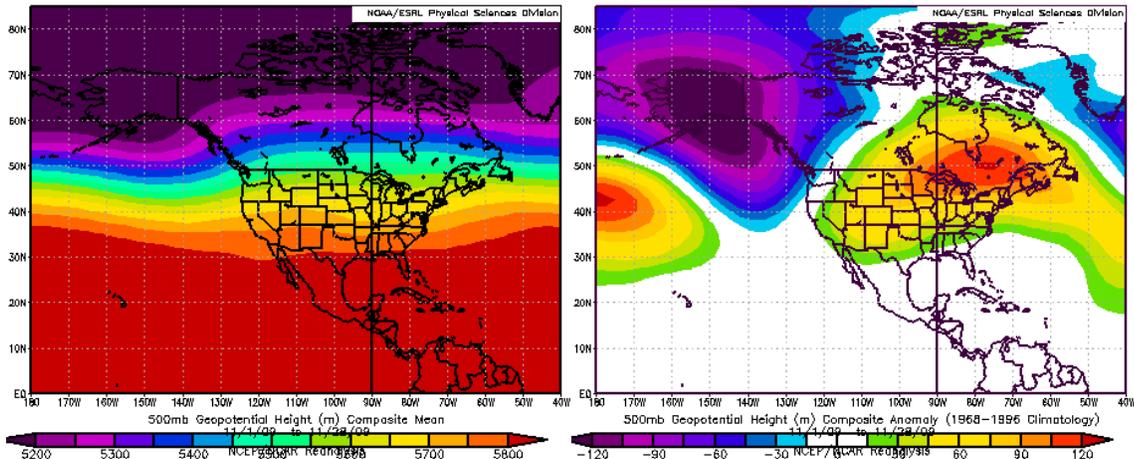


Figure 3. November 2009 mean flow at 500 mb (18000 ft) (left) with the departure from normal (right).

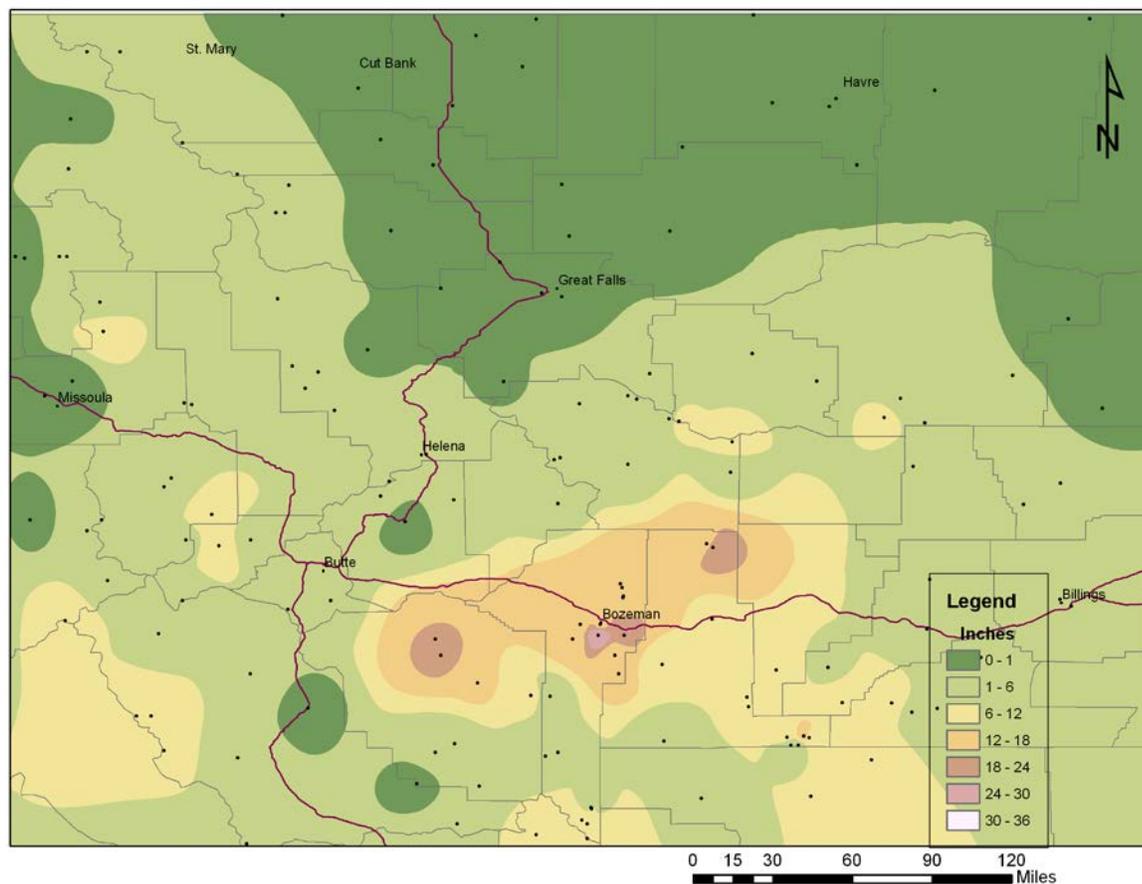


Figure 4. Snowfall of 11-13 November 2009.

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_pctnorm.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>