

Montana Weather/Precipitation Summary

November 2010 by NOAA's National Weather Service Great Falls Montana

November 2010 was a month with warm temperatures in the first half, and very cold temperatures in the last half. Some of the coldest temperatures of the year occurred during the latter half. In addition, heavy snow fell during the cold period. Some areas had their snowiest November since 1978. Further, precipitation was above normal. Many areas ranked among the ten wettest November's of record. This was due to a series of weather systems moving through a generally westerly flow while cold air was in place across the state. The warmer and moist air overran the cold air and deposited large amounts of snow and precipitation over much of the state (Fig. 3). Some mountain locations in the southwest recorded their highest November precipitation since records began in the 1980s. Over 70 inches of snow were on the ground at the end of the month in the Mission Mountains and Swan Range.

Though the month had very warm temperatures in the first half and cold in the latter half, the mean flow averaged near normal, with generally westerly flow (Fig. 1). The warmth of the first part of the month, added to the cold of the latter half produced a month with near or below normal temperatures (Fig. 2).

November 1-7

Above normal temperatures prevailed during the first week of November. Record high temperatures occurred at scattered locations on the second, fifth, sixth and seventh. Ryegate reached 79°F on the 5th, for the warmest temperature of the month. In addition, winds were generally on the higher side. Logan Pass recorded a gust of 90 mph on the 1st. Even at Great Falls, a gust to 58 mph occurred.

November 8-17

Though temperatures cooled during this period, it was generally unsettled. A series of storms moved across the state dropping large amounts of snow and rainfall. Record high daily precipitation amounts occurred on the 8th and 16th. On the 8th, a storm system brought heavy rains to northern Montana, and snow to southern portions. In Stillwater County, a foot of snow fell at Fishtail SNOTEL, with generally six or more inches at higher elevations in south central Montana. As the storm exited the state, six inches also fell in the southeast at Mill Iron (Carter). Baker (Fallon), Carlyle (Wibaux) received a foot of snow from the 8th through 10th. Red Lodge picked up 10 inches. Even back in the Little Belts, Showdown Ski Area measured a foot of new snow.

A brief warm-up on the 15th and 16th brought windy conditions. Logan Pass recorded a gust to 62 mph, Judith Gap 61 mph and Billings 59 mph. In the meantime, heavy snow fell across western Montana. Higher elevations in Missoula and Flathead Counties recorded 12 to 18 inches of snow. Another storm moving across the state brought up to five inches of snow to southeast Montana (five inches at Ryegate and Broadus). During this period, heavy precipitation (snowfall) broke daily precipitation records at locations throughout the state (on the 16th). Showdown again recorded 21 inches of snow. A strong Canadian cold front pushed onto the plains of north central Montana on the 16th. Wind gusts to 78 mph occurred at Choteau and to 61 mph as this front passed through Great Falls. Temperatures cooled to near zero behind the front. Warming on the 17th produced rapid short-term temperature fluctuations along the northern Rocky Mountain Front. A location west of Bynum recorded a 20F temperature rise in 30 minutes, with an 18F temperature drop in 30 minutes, a few hours later.

November 18-24

Windy and mild conditions on the 18th produced wind gusts to 71 mph near Red Lodge and 68 mph at Logan Pass. A strong cold front moved through the state on the 18th, causing cold air to slide over the state. Heavy snow fell over portions of the state. Up to 19 inches of snow fell in the Babb and Many Glacier areas, with 10 to 14 inches west of the divide. As the cold air settled across the state, a storm system moving south of the state caused moisture to overflow the cold air. This combination produced high snow amounts across much of the southern tier. From the 18th-22nd, Fishtail reported 33 inches of snow, Fisher Creek (Park) measured 32.5 inches,

Monument Peak (Park) had 26 inches, Placer Basin (Sweet Grass) had 22 inches, the Livingston area had 19 inches and Billings a foot. Across other areas, Flat Willow had 7 inches. While the cold persisted, another batch of moisture moved across the state on the 22nd. Condon and Ronan picked up 7 inches of snow, with whiteout conditions in the Hellgate Canyon. With snow and strong winds over eastern Montana, Zortman picked up five inches of snow. The snow was blown into three-foot drifts near Jordan and Wibaux. Blizzard conditions prevailed in the Monida, Reynolds Pass and West Yellowstone areas on the 23rd.

Also of note was the cold. Chester dropped to -32F on the 24th, with many cold maximum and minimum temperature records set from the 21st through 24th. The low temperature of -21°F on the 24th was the coldest temperature of the year at Great Falls. This snowy period produced one of the snowiest November's of record at Mystic Lake and Red Lodge. During this week, Fisher Creek measured 62 inches of snow, Fishtail had 49 inches, White Mill (Park) had 45 inches, and Billings recorded 12 inches.

November 25-30

Warmer temperatures returned to the state, with above freezing temperatures at many locations on the 26th and 27th. With warmer air comes the wind. Livingston recorded a gust to 72 mph on the 25th, while Babb saw a gust to 81 mph. Raging blizzard conditions accompanied the strong winds over the northern Rocky Mountain Front and the Livingston area. Roads closed in these areas for the day on the 25th. A cold front moved across the state on the 27th and 28th, with a storm brushing southern Montana on the 28th. This system brought another foot of snow to Billings and Red Lodge, and 10 inches in the Columbia Falls and Ronan areas. Windy and warmer conditions returned on the last day. This produced heavy drifting snow along the northern Rocky Mountain Front and adjacent plains and the Livingston area. Winds gusted to 78 mph at Deep Creek RAWs, 61 mph at Two Medicine and 70 mph near Nye (Stillwater).

New Temperature Records for November 2010

Station	Record Type	New Record	Date	Previous Record	Year of Previous Record
Billings	High Daily Max	71	2	69	1981
Miles City	High Daily Max	72	2	71	1959
Cut Bank	High Daily Max	75	5	71	1975
Livingston	High Daily Max	72	5	72	2009
Great Falls	High Daily Max	72	6	69	1997
Havre	High Daily Max	73	6	70	1999
Havre	High Daily Max	75	7	71	2006
Livingston	Low Daily Min	-12	21	-12	1977
Bozeman Apt	Low Daily Max	4	21	7	1985
Billings	Low Daily Max	0	23	5	1993
Cut Bank	Low Daily Max	-10	23	-7	1993
Dillon	Low Daily Max	-2	23	11	1985
Great Falls	Low Daily Max	-7	23	-6	1993
Havre	Low Daily Max	-2	23	-2	1993
Helena	Low Daily Max	-3	23	-2	1993
Kalispell	Low Daily Max	4	23	4	1993
Lewistown	Low Daily Max	-7	23	-6	1993
Livingston	Low Daily Max	-3	23	1	1993
Billings	Low Daily Min	-14	24	-11	1993
Bozeman Apt	Low Daily Min	-21	24	-20	1985
Butte	Low Daily Min	-22	24	-20	1985
Cut Bank	Low Daily Min	-14	24	-12	1996
Dillon	Low Daily Min	-22	24	-12	1985
Great Falls	Low Daily Min	-21	24	-13	1993
Livingston	Low Daily Min	-13	24	-7	1993
Missoula	Low Daily Min	-11	24	-8	1931

Butte	Low Daily Max	3	24	4	1993
Dillon	Low Daily Max	7	24	10	1985
Kalispell	Low Daily Max	6	24	8	1993
Livingston	Low Daily Max	7	24	7	1993
Miles City	Low Daily Max	0	24	0	1993
Missoula	Low Daily Max	10	24	15	1985

Precipitation

Severe convective weather occurred on zero days in November.

Precipitation was largely above normal for the month. Small pockets of below normal precipitation were over the northwest and eastern portions (Fig. 3).

New Precipitation Records for November 2010

Station	Record Type	New Record	Date	Previous Record	Year of Previous Record
Billings	High Daily Precip	0.31	8	0.30	1947
Bozeman Apt	High Daily Precip	0.92	8	0.42	1938
Dillon	High Daily Precip	0.54	8	0.27	2005
Helena	High Daily Precip	0.31	8	0.25	1906
Lewistown	High Daily Precip	0.59	8	0.35	1940
Livingston	High Daily Precip	0.60	8	0.25	1973
Lewistown	High Daily Snow	4.0	8	3.5	1940
Great Falls	High Daily Precip	0.35	16	0.24	1906
Havre	High Daily Precip	0.29	16	0.22	1896
Helena	High Daily Precip	0.35	16	0.21	1906
Kalispell	High Daily Precip	0.43	16	0.42	1953
Lewistown	High Daily Precip	0.59	16	0.20	1906
Miles City	High Daily Precip	0.40	16	0.30	1958
Missoula	High Daily Precip	0.49	16	0.34	1981
Great Falls	High Daily Snow	3.8	16	2.6	1958
Havre	High Daily Snow	12	16	4.4	1958
Billings	High Daily Precip	0.40	20	0.16	2007
Billings	High Daily Snow	8.8	20	2.5	2007

Other Information

November's statewide average temperature of 26.9F was 3.7F below normal. This was the 16th coolest November of record, and the coolest since 2003. For precipitation, this was the wettest November since 1986. The statewide average was 1.37 inches, and the 13th wettest of record.

This was one of the wettest and snowiest November's of record at many locations. Several SNOTEL stations reported their highest November precipitation since records commenced at the respective SNOTEL. Following are new November precipitation records: at Beaver Creek (Gallatin), 5.50 inches of precipitation fell. At Lone Mountain (Madison), 4.90 inches were recorded. At Daisy Peak (Meagher), 3.90 inches fell. At Divide 4.30 inches fell. At Lakeview Ridge (Beaverhead), 5.10 inches were recorded. At Rocky Boy (Hill) 4.20 inches fell. Black Bear has collected 49 inches of snow, while Copper Camp (Lewis and Clark) has picked up 56 inches of snow in November. Gold Butte (Toole) measured 29.3 inches of snow. Their old record was 26.1 inches in 1996. Millegan (Meagher) exceeded their November snowfall record of 51 inches set in 2005, they received 52 inches. West Yellowstone has measured 37.2 inches of snow, the most in November since 1994. Billings had their third wettest and snowiest November of record. It was the wettest since 1978. At Great Falls, the third wettest and snowiest November occurred. It was the wettest since 1955. Havre saw their fourth snowiest November of record. Sidney had their second wettest November. Mystic Lake also had their snowiest November of record, 69.5 inches. This is the fourth highest monthly amount. The highest is 96 inches in April 1958 and 1991.

For the fall season (September through November), the statewide average temperature was 43.6°, or 0.1°F above normal. The statewide average precipitation was 3.64 inches, 0.56 inches above normal (28th wettest period of record). The average wind speed was 8.3 mph, or 0.6 mph below average. This was the seventh calmest fall period of record.

November summary information:

High Temperature	79°F near Ryegate (5 th)	Greatest Precip	5.96" at Fisher River RAWS (Lincoln)
Low Temperature	-32°F at Chester (24 th)		13.3" at Noisy Basin SNOTEL (Flathead)
Warmest Ave Temp	35.5°F at Thompson Falls	Peak Wind Gust	90 mph at Logan Pass (1 st) 81 mph at Babb (5 th)
Coollest Ave Temp	21.4°F at Dunkirk		
Range of Temp departures	-6.4°F at Shelby to -0.1 °F at Troy	Highest Ave Wind	17.0 mph at Livingston and 19.9 mph at Logan Pass
18 city mean monthly Temperature/Normal	26.9/30.6; 16 th coolest of record (since 1880)	18 city mean monthly wind speed/Normal	9.0 mph/9.2 mph; 23 rd calmest of record (since 1936)
18 city mean monthly precipitation/Normal	1.37"/0.91" – 1.5 times normal; 13 th wettest of record (since 1880)		

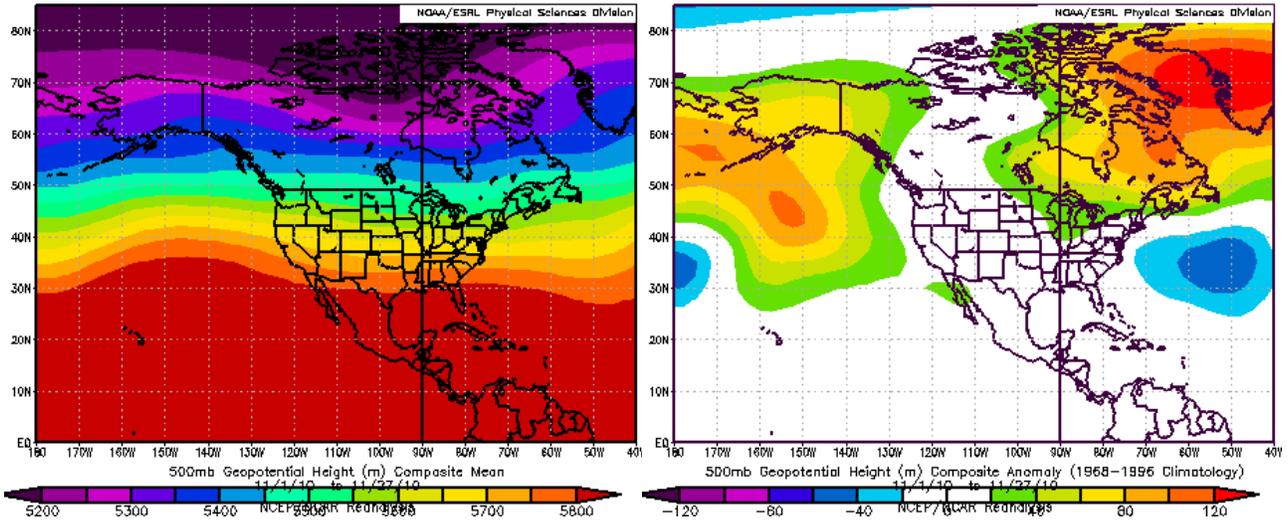
**Historical Rank of Precipitation (inches)
for the Current Month and Water Year to Date**

Location	Nov	% of Norm	Rank	Pcntl	Oct 1 – Nov 30	% of norm	Rank	Pcntl	Years
Baker	0.48	92%			1.00	58%			13
Billings	1.89	252%	100	98	2.52	125%	81	79	102
Belgrade	1.55	191%	69	93	2.22	116%	54	73	74
Butte	0.50	83%	64	54	1.16	83%	49	41	117
Cut Bank	0.03	7%	11	10	0.11	12%	4	3	104
Dillon	0.82	228%	66	93	1.33	133%	52	73	71
Glasgow	0.34	87%	58	50	0.70	64%	36	31	113
Great Falls	1.74	295%	116	97	2.20	145%	97	81	119
Havre	1.20	267%	123	94	1.40	131%	97	74	131
Helena	1.33	277%	120	91	1.79	157%	100	76	132
Jordan	1.09	240%			1.68	120%			14
Kalispell	2.53	174%	27	22	3.06	127%	51	43	117
Lewistown	1.81	245%	112	97	2.57	143%	94	82	115
Livingston	0.68	69%	62	56	1.41	57%	31	28	108
Miles City	0.49	94%	84	62	0.94	57%	43	32	134
Missoula	1.50	156%	103	77	2.58	144%	95	72	131
Mullan Pass	5.79	120%	50	69	9.52	122%	45	63	71
Wolf Point	0.12	53%			0.87	77%			13
Glendive	0.79	161%	93	79	1.27	86%	61	54	113
Sidney	1.40	222%	70	97	1.87	113%	53	75	70
BZN-MSU	2.24	204%	124	94	3.07	113%	94	71	132

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 1a (left) and 1b (right). Mean flow at 500 millibars (~18,000 ft) for November (left). Ridging in early November and a trough over the west coast in late November averaged to westerly flow for the month. This appeared to be a “normal” pattern, but this was not the case for the month.

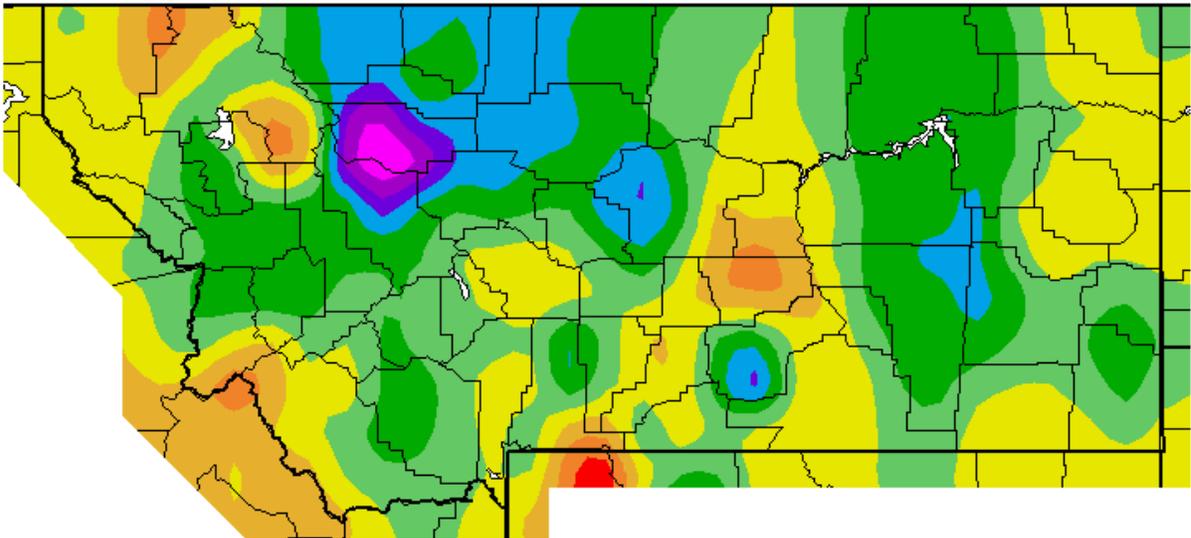


Figure 2. Temperature anomaly for November. Temperatures were below normal across most of the state. (Western Region Climate Center).

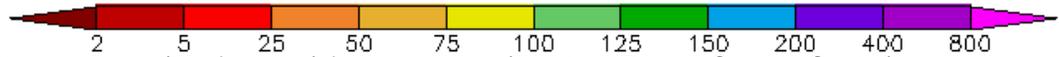
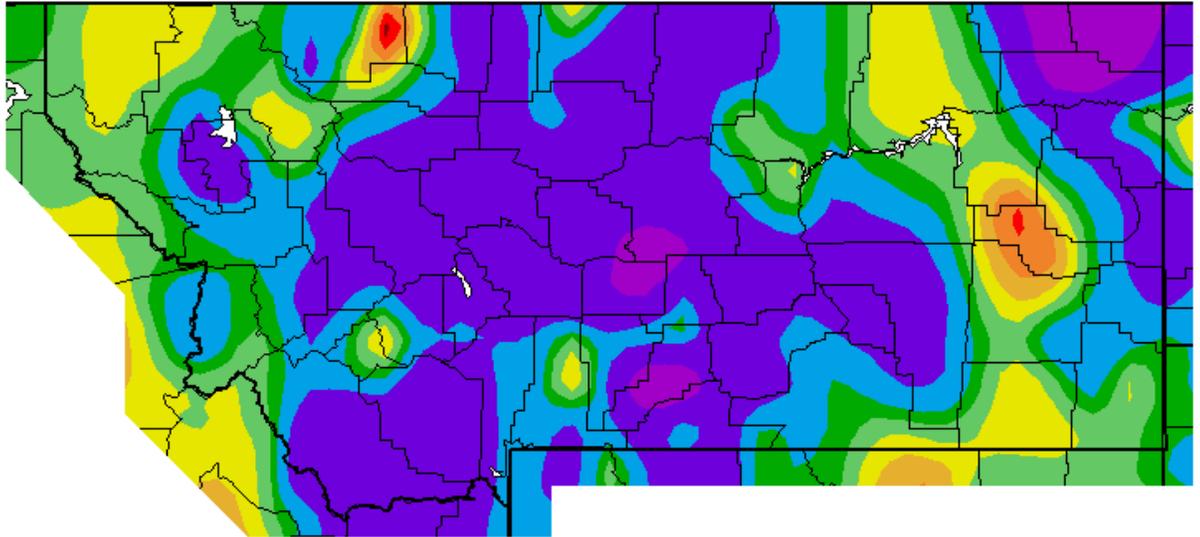


Figure 3. Precipitation anomaly (% of normal) for November. (Western Region Climate Center)

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=tx&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>