

Montana Weather/Precipitation Summary

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

November temperatures averaged close to normal across the state. Some areas were a little below normal, and other areas a little above normal. Very cold air did not visit the state during the month, but very warm conditions prevailed during the last week, when some record warm temperatures were set. Precipitation was generally below average, with pockets of above normal. Probably the biggest story during the month was the number of days with high winds. There were 13 days during November on which gusts of greater than 60 mph were recorded somewhere in the state. Upper air flow averaged westerly during November (Fig. 2). Usually, a weak ridge of high pressure dominates Montana. Because of the westerly flow, winds averaged stronger.

Temperatures across the state averaged 30.3F; 0.1 degrees above normal (Fig. 1). This was the 51st coolest November, and the fifth consecutive month with above normal temperatures. Temperatures averaged warmest over north central and eastern Montana (Fig. 3). For the fall period (September through November), temperatures averaged 45.7F, or 2.6F above normal (the 34th warmest of record). This was the warmest fall since 2001. The statewide average temperature for the past 12 months is 1.1F below normal.

Precipitation averaged below normal most areas in November (Fig. 1). November averaged 0.05-inches below normal. This was 94% of normal, and the 66th driest November of record. The precipitation excess over the average in the past 12 months is 2.82 inches. Small areas scattered throughout the state recorded above average precipitation (Fig. 4). For the fall period, precipitation averaged 2.32 inches, or 0.71-inches below normal. This was the driest fall since 2002, and the 20th driest of record. November snowfall averaged 9.5 inches across the state, or 1.6 inches above normal. This was the 36th lowest total in November of record, but much less snow was recorded this November than in November 2010. With little snowfall in October, the fall average was 9.6 inches, or 1.6 inches below normal. This was the 64th lowest snowfall average in fall.

Wind speeds were above normal in November. The average of 9.6 mph was 0.4 mph above average. This was the first month since May to record above normal wind speeds, and this November was the windiest November since 2006. It averaged the 38th windiest of record. For the fall period, the average of 8.4 mph was 0.4 mph below normal, and the eighth calmest of record.

Soil moisture conditions suffered a bit with the relatively dry conditions in November (Fig. 1). As we move into the coldest period of the year, the composite of 19 stations across the state show the driest average November conditions since 2002, and 1.5 percentage points below the 1995-2011 average.

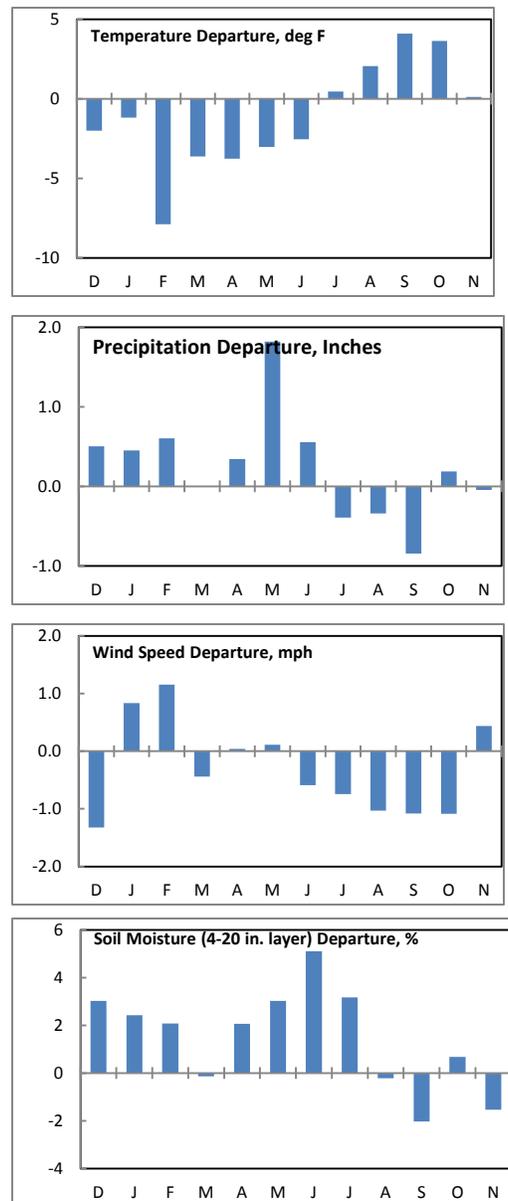


Figure 1. Statewide departures from normal for 18 locations.

November 1-13

Temperatures varied from periods of below and above normal during the first two weeks of November. Warm temperatures ahead of a cold front produced a maximum temperature of 65F at Glendive on the first. Though light precipitation fell most areas on the 4th and 5th, the southern mountains, including the Beartooths, picked up 6 to 10 inches of snow. Warmer temperatures and windy conditions returned on the 10th and 11th. Powderville reached 65F on the 11th. Meanwhile, very gusty winds were occurring along the Rocky Mountain Front. Babb reached gusts of 69 mph while Logan Pass gusted to 87 mph. While winds prevailed on the east slopes, snow amounts of up to a foot fell over the Missions, Swans and Northern Rockies. Windy conditions again on the 13th produced gusts to 92 mph at Logan Pass.

November 14 – 20

The third week of November was cooler and unsettled. A cold front with produced some convection with isolated lightning strikes near Inverness on the 13th. As this system stalled over north central Montana, up to two feet of snow fell from west of Choteau to east of Lewistown on the 13th and 14th (Fig. 5). As this system passed the Heron area, very strong winds downed a few trees and caused power outages. After the skies cleared, on the morning of the 16th, Elk Park (Jefferson) dropped to -22F for the month's lowest temperature. Additional weather systems brought wind and snow through the rest of the period. A system on the 17th and 18th dropped up to 1.5 feet of snow over the Absarokas, and in the Noxon area (Sanders) of western Montana. Meanwhile, up to a foot of snow fell in the Helena area.

November 21-30

The final period of the month was dominated by wind. On the 21st, gusts to 80 mph occurred in higher terrain south of East Glacier. On the 22nd, gusts to 79 mph occurred at Heart Butte. Meanwhile, heavy snow fell in the Mullan Pass area, with up to 22 inches measured. On the 23rd, gusts from 65 to 92mph occurred from Cascade to Sweet Grass. A semi-truck was overturned near Sweet Grass. Warm temperatures produced a record high temperature at Bozeman and Havre. On the 24th, gusts to 67 mph occurred west of Pendroy. On the 25th, a gust to 69 mph occurred near Heart Butte. On the 27th, gusts to 78 mph occurred near Nye, and gusts from 60 to 92 mph occurred from Cascade to Sunburst. Winds caused an accident near Browning. Another record high temperature was set at Bozeman on the 28th. As the month ended, a strong cold front produced gusty winds across eastern Montana, with gusts reaching 67 mph at Porphyry Peak on the 30th.

New Temperature Records for the current month

Station	Record Type	New Record	Date	Previous Record	Year of Previous Record
Havre	High Daily Min	49	23	42	1942
Bozeman	High Daily Max	60	23	60	1942
Havre	High Daily Min	49	23	42	1942
Havre	High Daily Max	65	23	62	1942
Livingston	High Daily Min	47	23	47	1925
Great Falls	High Daily Min	45	27	44	1945
Havre	High Daily Min	43	27	41	1949
Bozeman	High Daily Max	53	28	53	1998

Precipitation/convection

Severe convective weather occurred on zero days in November.
No new precipitation records were set in November.

November summary information:

High Temperature	67°F at Jordan (23 rd)	Greatest Precip	7.13" at Mullan Pass 11.00" at Poorman Creek (Lincoln) & Flatop Mountain (Flathead)
Low Temperature	-22°F at Elk Park (16 th) (Jefferson)		
Warmest Ave Temp	38.6°F at Yellowtail Dam	Peak Wind Gust	92 mph at Pendroy (23 rd) 95 mph at Logan Pass (27 th)
Coollest Ave Temp	20.3°F at West Yellowstone		
Range of Temp departures	-3.9°F at Wisdom to +1.8°F at Chester & Ekalaka	Highest Ave Wind	18.7 mph at Deep Creek; 13.0 mph at Norris Hill
21 city mean monthly Temperature/Normal	30.3/30.2; 51 st warmest of record Fall: 45.8/43.1; 34 th warmest of record. (since 1880)	20 city mean monthly wind speed/Normal	9.6 mph/9.2 mph; 38 th windiest of record. Fall: 8.4/8.8; 20 th calmest of record. (since 1936)
22 city mean monthly precipitation/Normal	0.78/0.83" – 94% normal; 66 th driest of record. Fall: 2.32/3.03; 20 th driest of record. (since 1880)	19 city mean monthly snow/Normal	9.5/7.9 – 1.6 inches above normal; 36 th lowest of record. Fall: 9.6/11.2; 64 th lowest of record. (since 1880)

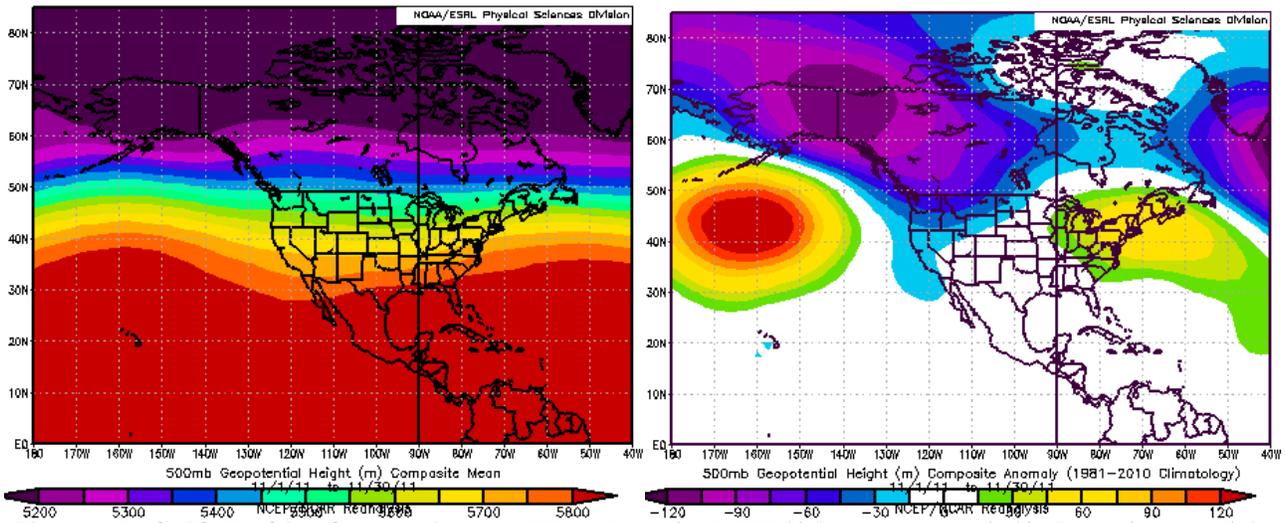
**Historical Rank of Precipitation (inches)
for the Current Month and Water Year to Date**

Location	Nov	% of Norm	Rank	Pcntl	Oct 1 – Nov 30	% of norm	Rank	Pcntl	Years
Baker	0.06	11%			0.87	50%			14
Billings	0.46	61%	46	41	2.12	105%	74	66	111
Belgrade	0.31	40%	13	16	1.15	61%	17	22	75
Butte	0.25	42%	29	24	0.97	70%	39	32	118
Cut Bank	0.01	3%	8	7	1.31	164%	86	82	105
Dillon	0.37	95%	40	55	1.03	95%	43	59	72
Glasgow	0.73	183%	96	83	1.44	125%	81	71	114
Great Falls	0.35	59%	43	35	2.59	179%	108	90	120
Havre	0.51	119%	77	58	0.68	67%	41	31	132
Helena	0.77	157%	95	71	1.32	113%	72	54	133
Jordan	0.37	95%			1.60	125%			15
Kalispell	0.42	29%	8	6	2.28	93%	59	50	118
Lewistown	0.68	96%	60	51	3.26	177%	109	94	116
Livingston	0.60	102%	59	53	1.68	91%	43	39	109
Miles City	0.22	56%	38	28	0.88	67%	41	30	135
Missoula	0.85	80%	67	50	3.25	166%	118	89	132
Mullan Pass	7.13	147%	60	82	10.79	136%	56	77	72
Wolf Point	0.23	59%			1.23	103%			14
Glendive	0.21	47%	39	32	1.04	69%	52	45	114
Sidney	0.26	47%	25	33	0.69	42%	18	24	71
BZN-MSU	1.15	97%	81	61	2.71	93%	79	59	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 November (left). Zonal (westerly) flow dominated the United States (left). Normally, a weak ridge of high pressure holds over western North American, but the ridge was suppressed this month (right).

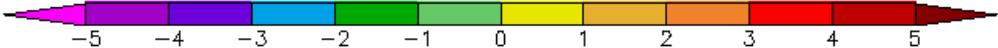
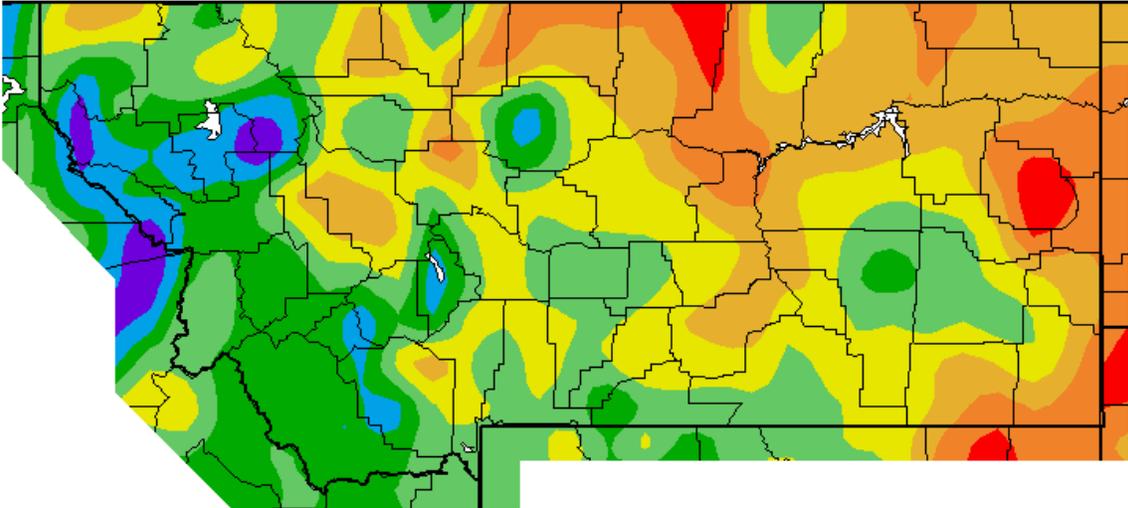


Figure 3. Temperature anomaly for November. Temperatures averages were a mix of above and below normal conditions. (Western Region Climate Center).

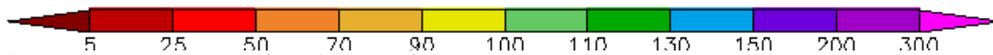
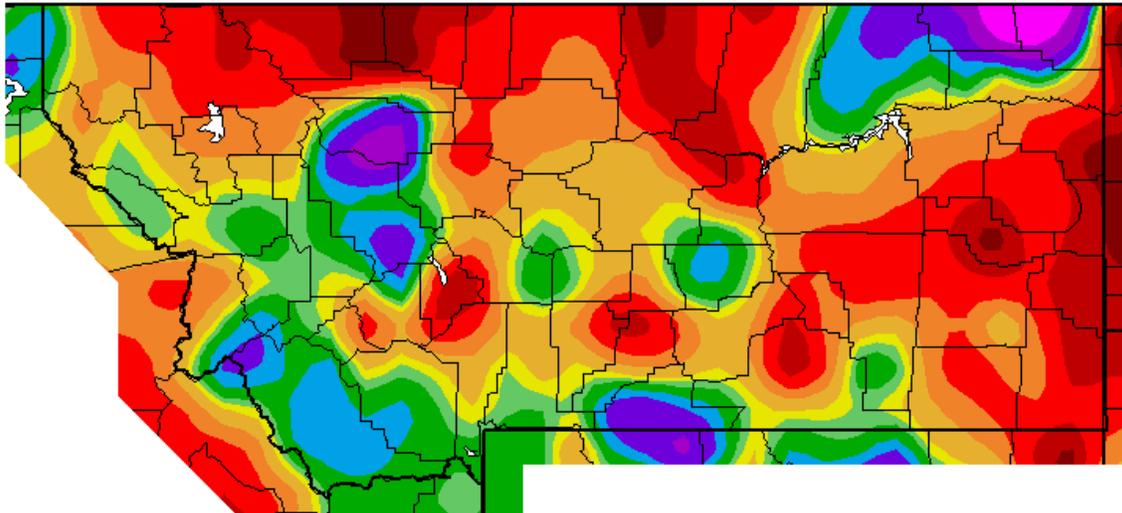


Figure 4. Precipitation anomaly (% of normal) for November.

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>. The climatological record for normals is 1971-2000. 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.

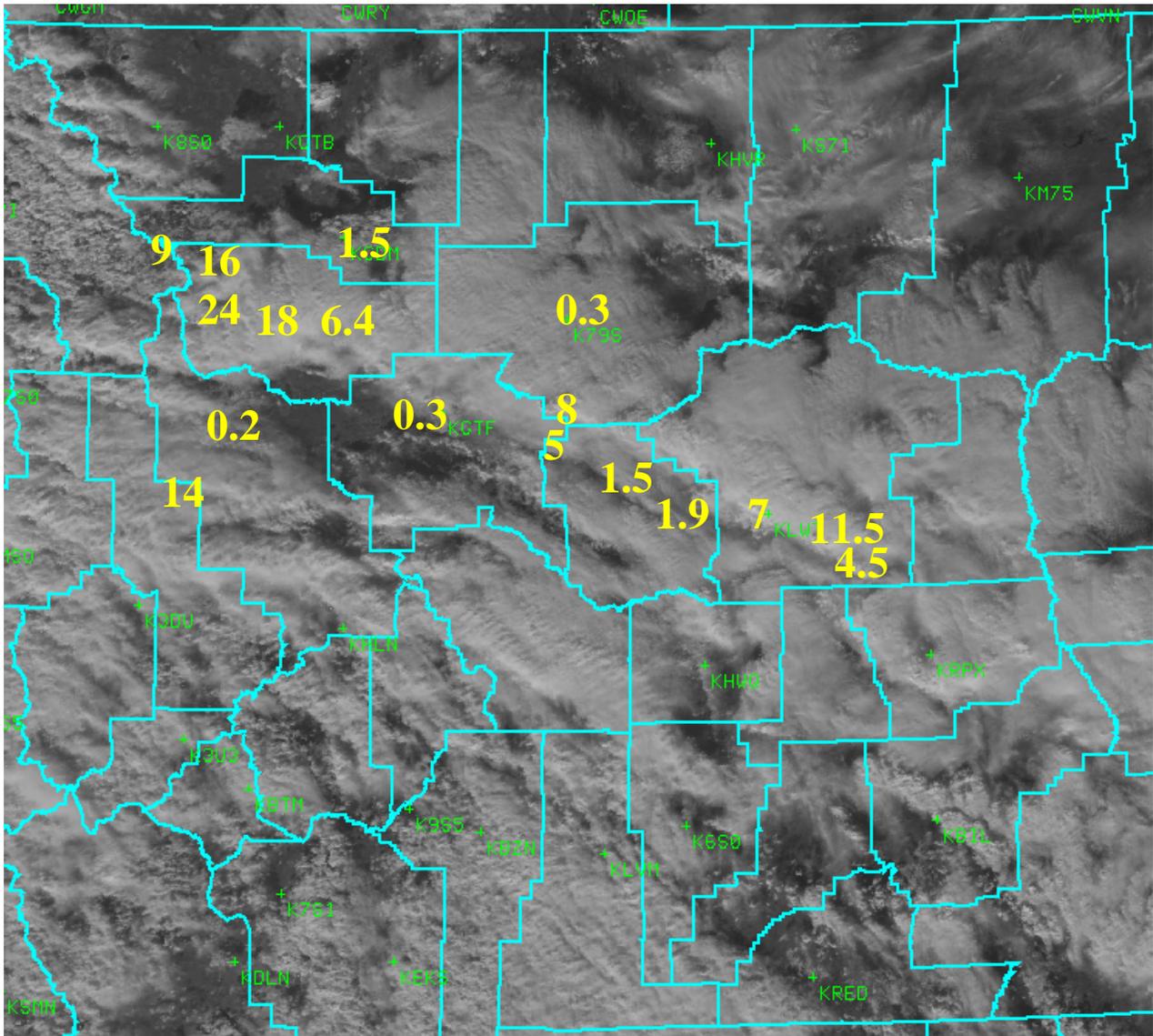


Fig. 5. MODIS visible satellite image 14 November 2011 at 241pm MST. Snowfall totals are plotted. This band of snow of snow developed on the 13th and remained nearly stationary across the region during the afternoon hours of the 13th.