

## Montana Weather/Precipitation Summary

**November 2014** by NOAA's National Weather Service Great Falls Montana

Temperatures averaged below normal across the state in November. Flow aloft was from the northwest during the month. Normally, flow aloft averages almost due westerly this month. The west coast ridge and Great Lakes trough was much stronger than normal this month (Fig. 1).

Statewide composite temperatures averaged 5.0°F below normal for the month. Conversely, October was 5°F above normal! Figure 2 shows the areas of temperature anomalies. The temperature anomalies ranged from +0.4°F at Ennis to -8.8°F at Gold Butte. The warmest average monthly temperature was 35.9°F at Norris Madison, and the coolest was 17.8°F at Porphory. For the past 12-months, the statewide composite average temperature is 1.1°F below normal. Seven of the past 12 months have recorded temperature averages below normal.

The monthly departure from normal for precipitation across Montana is shown in Figure 3. Above normal precipitation fell across much of the state. There were pockets of below normal in the southwest and eastern portions of the state. The highest amount was 14.90-inches at Poorman Creek (Lincoln County) and 6.55-inches at Hungry Horse Dam. Statewide, November averaged 1.35-inches, or 0.46-inches above normal. The statewide composite precipitation for the past 12 months is 2.86-inches above normal. Snowfall was somewhat heavier most areas of the state. The average was 11.8-inches, or 3.4-inches above normal. The heaviest amount was 43.9-inches at Red Lodge.

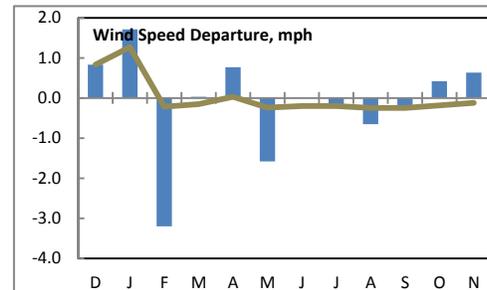
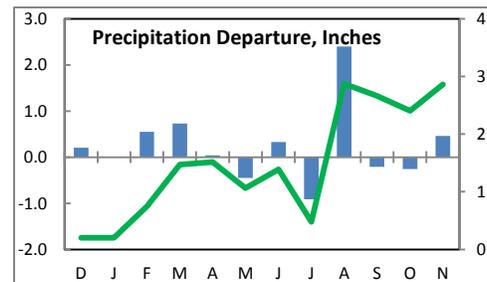
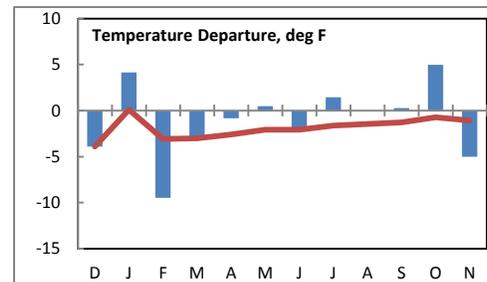
On a statewide basis, winds averaged above normal this month. This was the 27<sup>th</sup> windiest November of record, and the windiest since 2006. The statewide composite average was 9.8 mph (0.6-mph above normal), with the 12-month average running 0.1-mph below average. The fastest average speed was 20.1 mph at Deep Creek RAWS, while Livingston recorded an average of 18.6 mph. The fastest measured gust of the month, 83 mph, occurred at Pendroy on the 6<sup>th</sup>.

Refer to NCDC's State of the Climate report for the latest monthly discussion:

<http://www.ncdc.noaa.gov/sotc/>.

### Nov 1-9

The first days of November delivered above normal temperatures. A cold front passing through the state on the first produced thunderstorms from Deer Lodge to Butte. Up to 8-inches of snow fell over portions of western Montana behind this cold front, with lesser amounts east. Ahead of the cold front, Bridger recorded the state highest temperature for the month, reaching 73°F on the second. A warm and windy period started on the third, with wind gusts reaching 70 mph at Deep Creek on the 4<sup>th</sup> and 62 mph at Livingston. On the sixth, temperatures pushed into the 60s over portions of western and central Montana. Missoula set a record high temperature, reaching 63°F. Winds gusted over 80 mph along the northern Rocky Mountain Front. On the 9<sup>th</sup>, a strong cold front pushed across the state. Strong winds caused trees to be blown down over portions of northwestern Montana. Temperatures fell from the 50s to near zero.



**Nov 11-15**

A very cold period persisted during this period. A band of snow near the Bears Paw and Highwood mountains produced up to 10-inches of snow on the 10<sup>th</sup>. From the 10<sup>th</sup>-12<sup>th</sup>, 4 to 14 inches of snow fell over a large portion of the state. The heaviest amounts were around Red Lodge. Temperatures fell to as cold as -36F at Placer Basin and -26F at Jordan during this cold snap.

**Nov 16-27**

With warmer conditions during this period, temperatures started out 10-15F below normal to as much as 15F above normal. Windy conditions also returned. On the 22<sup>nd</sup>, gusts reached 68 mph at Livingston and 74 mph west of Choteau. Deep Creek RAWS gusted to 80 mph. West of the divide, freezing rain fell in the Kalispell, Libby and Troy areas causing severe driving conditions. Winds returned east of the divide on the 24<sup>th</sup>, with gusts to 77 mph at Babb. A cold front passed through the state on the 25<sup>th</sup> and 26<sup>th</sup>. Up to two feet of snow fell over the higher elevations in south central Montana. A foot of snow fell at Seeley Lake and 8 inches at Helena. A wide swath of amounts from 6-12 inches of snow fell in western and southern Montana. On the 27<sup>th</sup>, freezing rain fell in northeast Montana. Meanwhile, wind gusts reached 73 mph along the Rocky Mountain Front and 76 mph near Cascade.

**Nov 28-30**

A strong cold front brought sharply colder conditions to Montana on the 28<sup>th</sup>. Before the cold air hit all areas, Missoula and Helena both set or tied record high temperatures of 57F and 58F, respectively. On the 28<sup>th</sup>, the temperature dropped 27F in 9 minutes at Great Falls, and 33F in 32 minutes, when the front passed through. In 15 hours, from 3 pm on the 28<sup>th</sup> to 6 am on the 29<sup>th</sup>, the temperature fell 64F, from 54F to -8F. Bozeman set a new 24-hour temperature change record. From 8 am on the 29<sup>th</sup> to 6 am on the 30<sup>th</sup>, the temperature fell from 49F to -22F, a range of 71F. See the following table for other notable changes. Snow continued to fall across southern Montana on the 30<sup>th</sup>. Red Lodge picked up another 15-inches, while Bridger (Carbon) measured 7-inches. The morning of November 30<sup>th</sup> was very cold over many areas of Montana. Polebridge bottomed out at -38°F, the coldest November temperature in Montana since 1985. Cut Bank recorded their second coldest all-time November temperature at -32°F.

**Notable temperature changes on Nov 28-30**

Temperature change	Time period	Location	Date(s)
26°F 47F to 21F	6 minutes	Livingston	Nov 29, 2014
27°F 52F to 28F	7 minutes	Great Falls	Nov 29, 2014
33°F 41F to 8F	20 minutes	Boulder Hill	Nov 29, 2014
58°F 61F to 3F	9 hours	Fort Benton	Nov 28, 2014

**Precipitation/convection**

Severe convective weather occurred on zero days in November. This is normal for the month.

**Fall summary**

Although October was dry and warm, and November was cool and wet, the fall period temperature was close to normal. Precipitation was also close to normal. The winds averaged slightly higher than normal.

**November summary information:**

<b>High Temperature</b>	73°F at Bridger (2 <sup>nd</sup> )	<b>Greatest Precip</b>	6.55" at Hungry Horse
<b>Low Temperature</b>	-38°F at Polebridge (30 <sup>th</sup> )		14.9" at Poorman SNOTEL (Lincoln)
<b>Warmest Ave Temp</b>	35.9°F at Norris Madison	<b>Peak Wind Gust</b>	83 mph at Pendroy (6 <sup>th</sup> )
<b>Coollest Ave Temp</b>	17.8°F at Porphory		
<b>Range of Temp departures</b>	+0.4°F at Ennis to -8.8°F at Gold Butte	<b>Highest Ave Wind</b>	18.6 mph at Livingston 20.1 mph at Deep Creek
<b>21 city mean monthly Temperature/Normal</b>	25.6/30.6F 5.0F below normal. 12 <sup>th</sup> coolest of record (since 1880). 9 <sup>th</sup> percentile. Sep-Nov 43.6/43.5 0.1F above normal. 50 <sup>th</sup> warmest of record.	<b>20 city mean monthly wind speed/Normal</b>	9.8 mph/9.2 mph; 27 <sup>th</sup> windiest of record (since 1936). 64 <sup>th</sup> percentile. Sep-Nov 8.9 mph/8.6 0.3-mph above normal. 27 <sup>th</sup> calmest of record.
<b>22 city mean monthly precipitation/Normal</b>	1.35/0.89" – 152% of normal. 16 <sup>th</sup> wettest of record (since 1880). 87 <sup>th</sup> percentile Sep-Nov 3.09"/3.10" – 0.01" below normal. 67 <sup>th</sup> wettest of record.		

**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	0.74	141%			1.00	58%			17
Billings	0.74	99%	76	66	0.90	45%	26	22	114
Belgrade	0.95	123%	55	70	1.34	72%	26	32	78
Butte	1.00	167%	101	83	1.83	133%	92	76	121
Cut Bank	1.28	356%	106	98	1.80	225%	101	93	108
Dillon	0.42	108%	46	61	0.68	63%	25	32	75
Glasgow	0.74	185%	99	84	1.15	100%	66	56	117
Great Falls	1.38	234%	107	87	1.85	128%	88	71	123
Havre	0.47	109%	75	55	1.23	122%	79	58	135
Helena	1.07	218%	116	85	1.47	126%	82	60	136
Jordan	0.80	205%			0.92	72%			18
Kalispell	2.54	178%	106	88	3.73	153%	104	86	121
Lewistown	0.69	97%	63	53	1.55	84%	51	42	119
Livingston	1.24	210%	92	82	1.53	83%	36	32	112
Miles City	0.40	103%	71	51	0.83	63%	38	27	138
Missoula	2.88	272%	136	99	4.04	206%	130	96	135
Mullan Pass	7.52	155%	62	81	11.12	141%	59	78	75
Wolf Point	0.15	38%			0.42	35%			17
Glendive	0.55	122%	78	64	1.47	97%	70	59	117
Sidney	0.39	71%	44	57	1.49	90%	43	57	75
BZN-MSU	1.63	137%	109	80	3.35	115%	108	79	136

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>

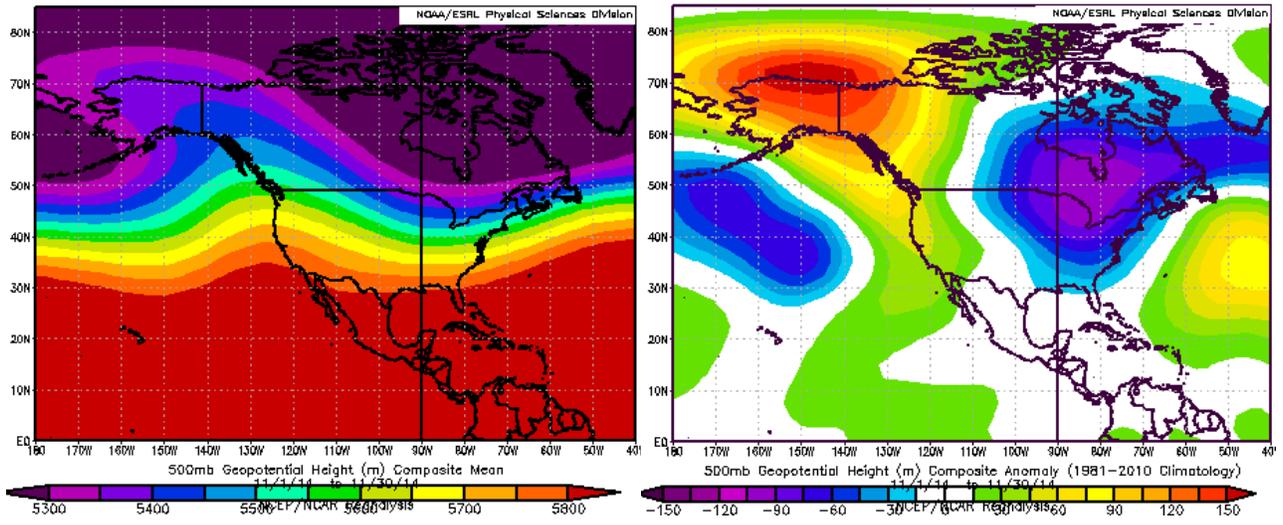


Figure 1. Mean flow at 500 millibars (~18,000 ft) for this month (top-left) and departure from normal (top-right).

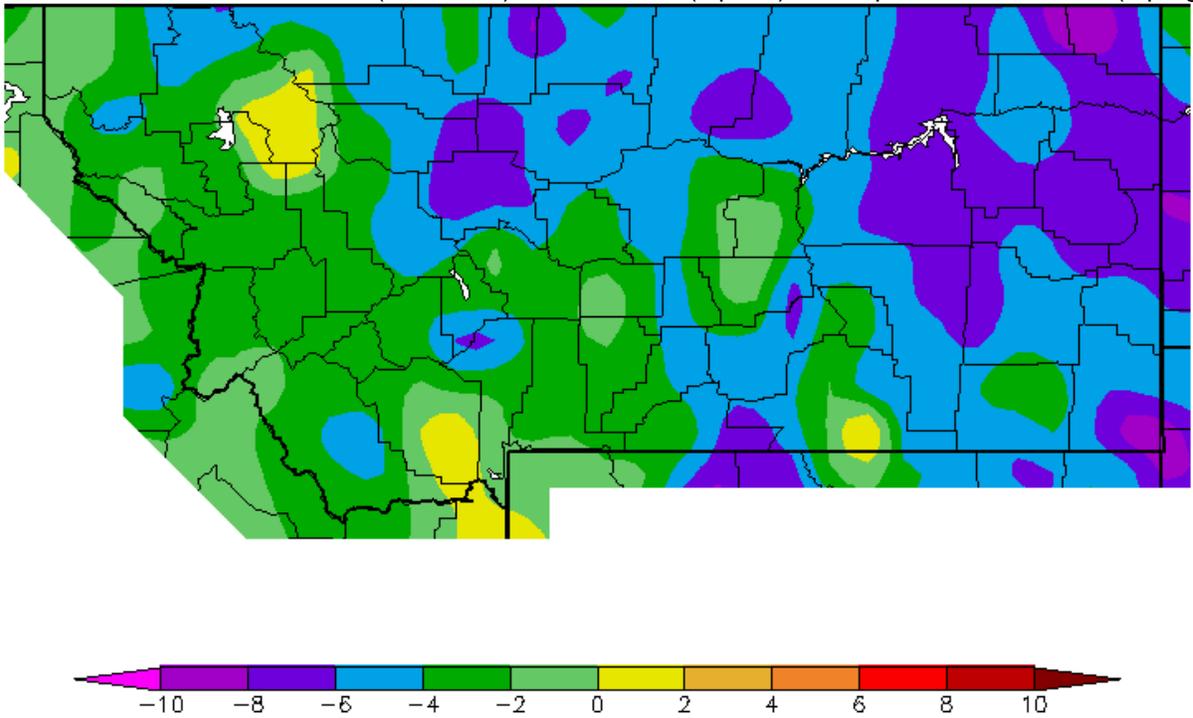
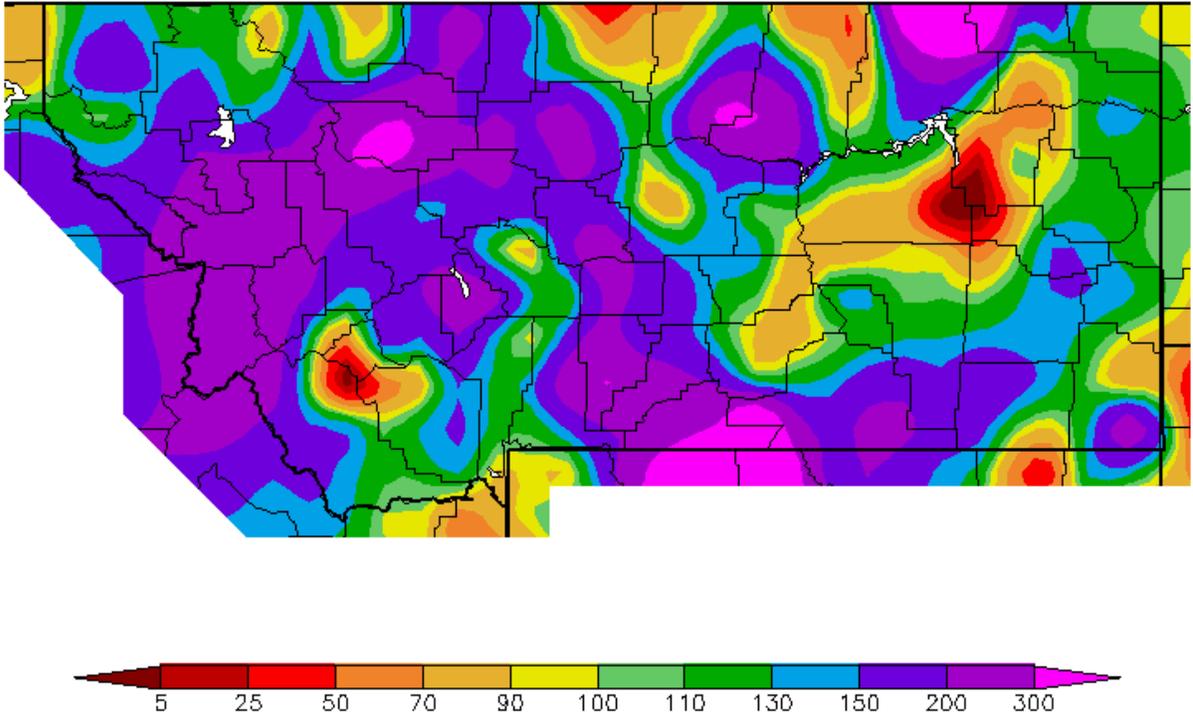


Figure 2. November 2014 temperature departures from normal (°F) (Western Region Climate Center).



**Figure 3.** November 2014 precipitation departures from normal (percent) (Western Region Climate Center).

For a state map of % of normal water year precipitation (updated around the 7<sup>th</sup> of each month), go to:  
<http://www.wrh.noaa.gov/tfx/climate/monthlysum/climatesum.php?wfo=tx>

For the latest information on mountain snowpack from the NRCS, go to: <http://www3.wcc.nrcs.usda.gov/snow/index.html>

For the latest U.S. Drought Monitor, issued weekly by the National Drought Mitigation Center, USDA and NOAA, go to:  
<http://droughtmonitor.unl.edu/>

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>. The climatological record for normals is 1981-2010. 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.