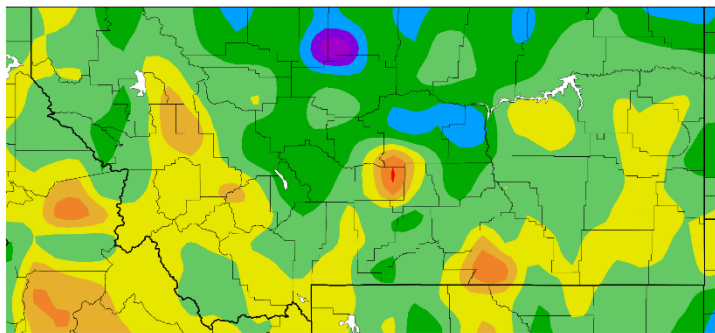


# Montana Weather/Precipitation Summary

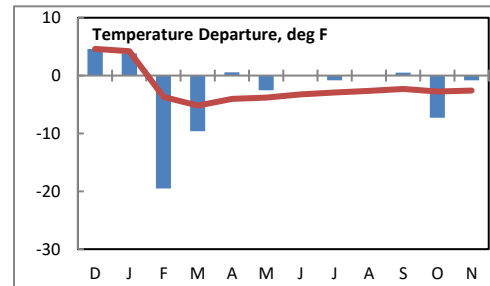
**November 2019** NOAA's National Weather Service Great Falls Montana

For November, the upper level flow over Montana was generally from the northwest. The ridge along the west coast was anomalously strong (Fig. 1). November's average temperatures were generally below normal. Precipitation amounts were variable, with a large area of above normal values over central and northern Montana. Winds averaged below normal.

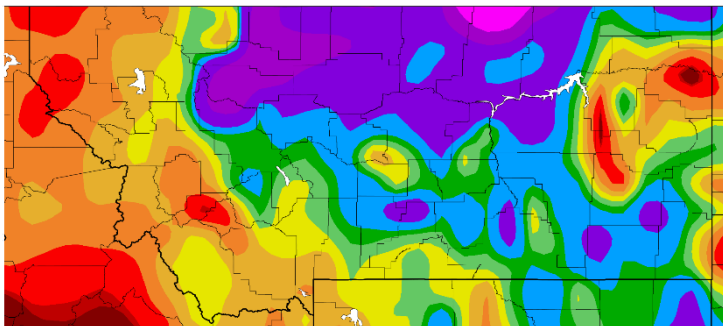
November temperature anomalies ranged from 4.4°F below normal at Havre to 3.2°F above normal at West Yellowstone. The map below shows the variation. The warmest average temperatures were in eastern and southern Montana. The warmest average temperature was at Yellowtail Dam, with an average of 41.9°F, while the coolest was 21.1°F at Porphory Peak (Meagher). The highest temperature was 70°F at Columbus on the 9<sup>th</sup>. The coldest temperature was -30°F north of Rudyard (Hill) on the 11<sup>th</sup>. This was the earliest -30°F temperature in the state since 1986. This absolute range of 100°F was slightly above average for November (November's record is 128°F). The statewide temperature average of 29.8°F was the 48<sup>th</sup> coldest of record. The red line on the graph shows the cumulative 12-month departure from normal, which is 2.6°F below normal. See the state summary and temperature tables below for more details.



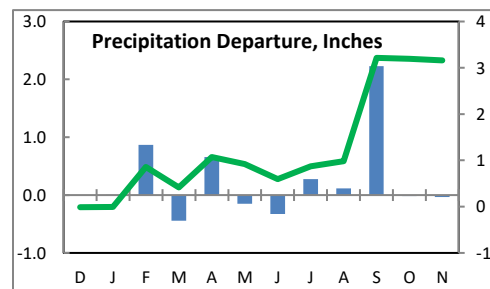
Temperature departure from normal



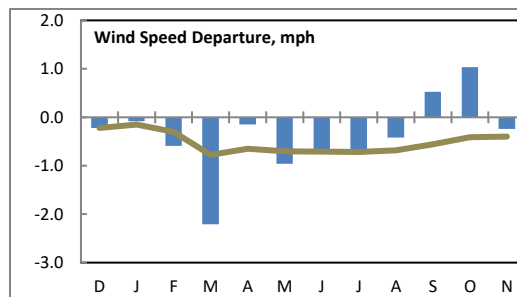
Precipitation was heaviest in the northern Rockies and the mountains around Bozeman. The highest amount (3.60-inches) fell at the Pike Creek and Shower Falls SNOTELs. The statewide composite of 0.83-inches was 0.03" below normal. This ranks as the 66<sup>th</sup> driest November of record for the state. The green line on the precipitation graph shows the cumulative 12-month departure from normal, which is 3.16" above normal. See state summary and precipitation tables below for more details. Record snow fell over much of north central Montana. The heaviest monthly snow amount was 37.0-inches near Lewistown.



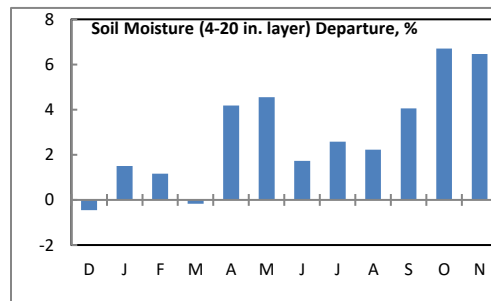
Percent of normal precipitation



Wind speed averages were near normal. Statewide, the month ranked as the 28<sup>th</sup> calmest November October, with an average speed of 8.8-mph. The strongest averages were in along the Rocky Mountain Front and Livingston areas. The composite statewide average was 0.2-mph below normal. The brown line of the wind graph to the right shows the 12-month cumulative statewide wind departure from normal. The 12-month average is running 0.4-mph below normal.



Statewide soil moisture averages continued above normal for November (right). This data is from 33 NRCS SCAN and SNOTEL, NOAA CRN and MT Mesonet stations. For November, this was the wettest of record, replacing 2016. The record began in 1995.



Refer to NCEI’s State of the Climate report for the latest monthly discussion: <http://www.ncdc.noaa.gov/sotc/>

The first week of November was generally cool. Record cold temperatures were recorded over north central Montana on the 6<sup>th</sup>, with Cut Bank dropping to -9°F. Up to six inches of snow fell in the Zortman and Winnett areas on the 6<sup>th</sup>. Warming occurred by the 8<sup>th</sup>, with temperatures topping out in the 60s. The warmest of 70°F occurred at Columbus on the 9<sup>th</sup>. Much colder air with snow returned on the 10<sup>th</sup> and 11<sup>th</sup>. Six to 10 inches of snow fell over the Hi-line, with temperatures dropping well below zero in this area on the 11<sup>th</sup>. A point north of Rudyard fell to -30°F, which was the earliest temperature so cold in Montana since 1986. Mild and windy weather returned. By the 17<sup>th</sup>, winds were gusting over 60 mph along the Rocky Mountain Front. Gusts reached 96 mph at Deep Creek RAWS on the 17<sup>th</sup>, with gusts of 72 mph near Bynum, 67 mph near Big Sandy and 65 mph at Coffee Creek. Another storm brought heavy snow to northeast Montana on the 20<sup>th</sup>. Up to a foot fell at Plentywood. Winds returned on the 23<sup>rd</sup> and 24<sup>th</sup>. Gusts reached 92 mph at Deep Creek, with gusts to 82 mph east of Ringling, 77 mph at Greycliff (Sweet Grass), 74 mph near Bynum and Livingstone, and 70 mph near Wibaux. The end of the month brought colder air and heavy snowfall. On the

### Precipitation/convection

Severe convective weather occurred on zero days in November, which is normal.

### New Snowfall Records established in November...

Location	Nov Snowfall (inches)	Previous Record	Sep-Nov Snowfall	Previous Record	Records Began
Chinook	19.0	17" in 1991	22.5	17.5" in 1991	1895
Choteau	32.9	22" in 1966	68.6	28.5" in 1985	1893
Cut Bank	35.9	17" in 1930	61.7	39.5" in 1934	1903
East Glacier	37.8	no new record	108.8	83" in 1985	1949
Fort Belknap	19.1	No new record	23.1	22" in 1958	1930
Galata	24.0	16.5" in 1985	67.5	24.5" in 1957	1949
Gold Butte	21.5	No new record	43.0	35.0" in 1994	1905
Great Falls	24.1	No new record	60.4	31.2" in 1919	1892
Havre	24.8	No new record	37.2	26.4" in 1958	1893

Loma	20.0	18" in 1978	29.5	24.5" in 1965	1950
Simpson	23.4	19.5" in 2010	34.5	20.5" in 1959	1931
Stanford	13.6	No new record	37.5	32.5" in 1973	1927
Sun River	27.9	27.2" in 2017	49.6	45" in 2913	1941
Turner	19.6	17" in 1959	34.6	21.5" in 1959	1932

Several locations have already exceeded their seasonal average snowfall. Following is a table showing several sites, along with their seasonal normal snowfall. If they have already exceeded their normal, it is denoted with an \*.

Location	Current Season Snow	Normal for whole season
Bozeman	17.9	40.2"
Bozeman MSU	35.1	91.0"
Chinook	22.5	31.2"
Choteau*	68.6*	39.8"
Cut Bank*	61.7*	33.6"
Dillon	25.6	37.9"
East Glacier	90.8	176.6"
Gold Butte	43.0	82.5"
Great Falls	60.4	63.5"
Havre	37.2	39.5"
Helena	19.3	38.1"
Lewistown	29.1	63.1"
W Yellowstone	35.6	162.7"

### Season (Sept-Nov)

The fall seasonal average temperature was 41.0°F and 2.5°F below normal. This was the coolest such period since 2000 and the 13<sup>th</sup> coolest of record.

Fall season composite precipitation was 5.49-inches and 2.21-inches above normal. This was the wettest fall period since 1946 and the second wettest of record.

Seasonal snowfall was 23.1-inches and 12-inches above normal. This was the third highest amount for the fall season and snowiest since 1919.

Winds averaged 9-mph which was 0.4-mph above normal. This was the 42<sup>nd</sup> windiest such period and the windiest since 2003.

### Calendar year (Jan-Nov)

The calendar-year average temperature was 42.1°F and 3.2°F below normal. This is running as the 2<sup>nd</sup> coldest year of record, and coolest since 1880.

Composite calendar-year precipitation totaled 17.89-inches, 1.18" above normal. This was the fifth wettest such season, and wettest since 1993.

Calendar-year snowfall has averaged 66.3-inches and 21-inches above normal. This was the 6<sup>th</sup> snowiest such period of record and snowiest since 1982.

Winds averaged 8.4-mph, which is 0.4-mph below normal. This was the third calmest calendar-year to date.

Of the 20-city snowfall composite, this is the 6<sup>th</sup> snowiest year-to-date. With an average of 66.3-inches, this is the snowiest such period since 1989.

**November information:**

<b>High Temperature</b>	70°F at Columbus (9 <sup>th</sup> )	<b>Greatest Precip</b>	2.90" at Cut Bank
<b>Low Temperature</b>	-30°F at Rudyard 21N (11 <sup>th</sup> )		3.60" Pike Creek and Shower Falls SNOTELs
<b>Warmest Ave Temp</b>	41.9°F at Yellowtail Dam	<b>Peak Wind Gust</b>	96 mph at Deep Creek RAWS (17 <sup>th</sup> ) and 77 mph at Greycliff (Sweet Grass) (24 <sup>th</sup> )
<b>Coollest Ave Temp</b>	21.1°F at Porphory Peak RAWS (Meagher)		
<b>Range of Temp departures</b>	-4.4°F at Havre +3.2°F at West Yellowstone	<b>Highest Ave Wind</b>	20.5 mph at Deep Creek RAWS 18.5 mph at Browning
<b>21 city mean monthly Temperature/Normal</b>	29.8/30.6F normal. 48 <sup>th</sup> coldest of record (since 1880). 35 <sup>th</sup> percentile.	<b>20 city mean monthly wind speed/Normal</b>	8.8 mph/9.0 mph; 28 <sup>th</sup> calmest of record (since 1936). 34 <sup>th</sup> percentile.
<b>22 city mean monthly precipitation/Normal</b>	0.83"/0.87" – 95% of normal. 66 <sup>th</sup> driest of record (since 1880). 47 <sup>th</sup> percentile.	<b>20 city mean monthly snowfall/Normal</b>	12.5"/4.6" 13 <sup>th</sup> highest 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	0.27	51%	11	52	1.54	89%			22
Billings	0.96	128%	28	23	1.80	90%	46	38	119
Belgrade	0.71	94%	42	50	1.53	83%	50	60	83
Butte	0.20	33%	102	81	0.54	39%	89	70	126
Cut Bank	2.25	625%	1	1	3.33	416%	2	1	113
Dillon	0.10	26%	67	84	0.52	48%	65	81	80
Glasgow	0.85	213%	12	9	1.47	128%	36	29	122
Great Falls	1.28	217%	24	18	2.53	174%	16	12	128
Havre	1.55	360%	5	3	1.81	179%	25	17	140
Helena	0.81	165%	40	28	1.81	155%	32	22	141
Jordan	0.76	195%			1.91	149%			23
Kalispell	1.00	70%	78	62	1.92	79%	83	66	126
Lewistown	1.22	172%	18	14	2.38	129%	37	29	124
Livingston	0.67	114%	55	46	1.99	108%	53	45	117
Miles City	0.17	44%	113	79	0.44	34%	129	90	143
Missoula	0.80	75%	77	54	1.43	73%	92	65	140
Mullan Pass	1.31	27%	76	94	5.42	69%	61	76	80
Wolf Point	0.23	59%			0.79	66%			22
Glendive	0.45	100%	47	37	1.21	80%	58	47	123
Sidney	0.28	51%	49	60	1.01	61%	49	61	80
BZN MSU	1.13	95%	59	41	3.37	116%	29	20	143
W Yellowst	1.35	65%	67	60	2.71	76%	67	61	109

Rankings and Percentiles are 1=driest, higher numbers=wetter.

For an automated version of this chart, updated daily, go to

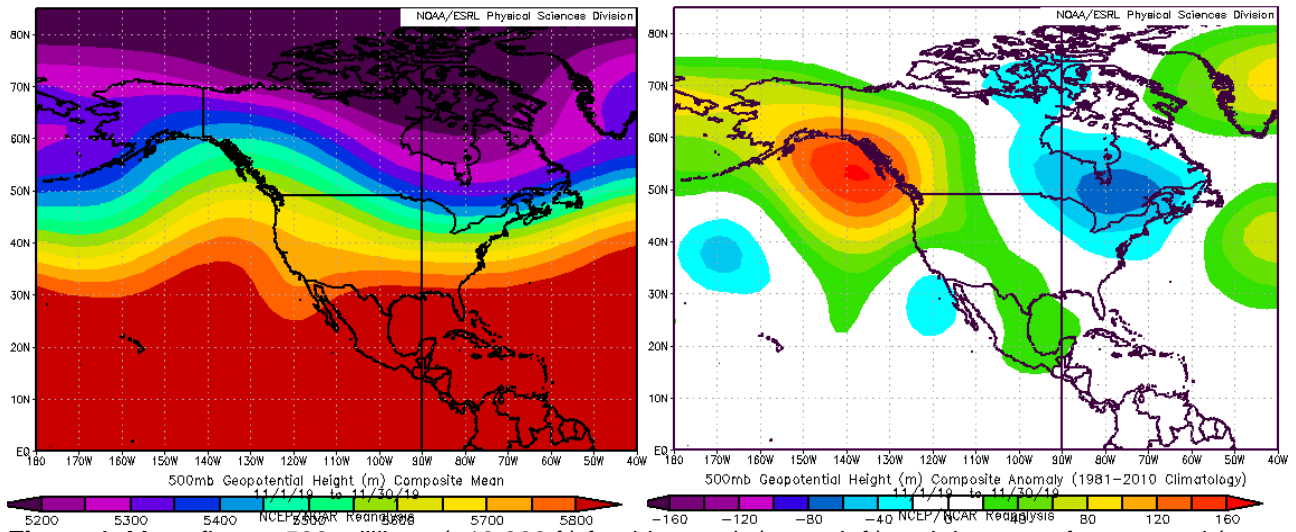
<http://www.wrh.noaa.gov/tfx/dx.php?wfo=tfx&type=&loc=products&fx=PCPNTOTALS>

**Historical Rank of Average Temperature (°F)  
for the Current Month and Water Year to Date**

Location	Nov	Normal	Rank	Pcntl	Oct 1 – Nov 30	Normal	Rank	Pcntl	Years
Baker	29.0	29.7	74	68	33.3	36.5	100	93	108
Billings	34.8	35.8	53	61	37.5	42.0	81	94	86
Belgrade	29.2	29.7	50	58	32.1	36.5	83	98	85
Butte	28.8	27.7	69	54	30.9	34.3	116	92	126
Cut Bank	26.5	30.3	84	75	29.9	36.6	105	95	111
Dillon	31.1	30.5	44	57	32.3	37.0	74	97	76
Glasgow	28.0	29.3	71	57	34.1	37.0	106	85	125
Great Falls	31.3	33.4	100	79	34.1	39.3	120	98	123
Havre	25.8	30.2	113	81	31.4	37.3	134	96	140
Helena	31.6	32.5	80	57	35.0	39.1	125	89	140
Jordan	30.8	30.1	60	58	34.8	37.2	92	91	101
Kalispell	30.1	31.8	52	43	33.5	37.0	59	48	121
Lewistown	29.1	32.0	93	77	31.9	37.9	118	98	121
Livingston	34.8	34.0	57	48	36.4	39.6	112	96	117
Miles City	31.6	32.0	84	60	35.4	39.3	130	93	139
Missoula	32.3	33.2	70	54	35.3	39.2	121	94	128
Mullan Pass	28.3	27.2	15	34	29.5	32.4	39	90	43
Wolf Point	27.5	27.7			33.4	35.7			22
Glendive	33.6	33.0	53	43	38.5	40.4	91	73	124
Sidney	27.0	31.6	65	66	32.8	39.3	90	93	97
W Yellowst	24.1	20.9	32	33	25.1	28.3	95	98	97

**Historical Rank of Average Wind Speed (mph)  
for the Current Month and Water Year to Date**

Location	12	Normal	Rank	Pcntl	Oct 1 - MM	Normal	Rank	Pcntl	Years
Baker	11.1	10.8			11.9	10.6			22
Billings	12.4	11.6	34	39	12.6	11.0	12	13	85
Belgrade	4.3	5.2	43	79	5.2	5.4	27	49	54
Butte	4.3	5.6	44	78	4.8	6.0	50	89	56
Cut Bank	15.3	14.1	20	25	15.0	13.5	15	19	76
Dillon	9.4	9.2	34	51	9.5	9.0	26	38	66
Glasgow	9.3	9.6	21	27	10.3	10.0	23	30	75
Great Falls	12.6	14.2	65	79	12.6	13.3	60	73	82
Havre	10.3	9.3	31	23	10.8	9.1	12	8	131
Helena	5.5	6.4	122	87	6.2	6.5	113	81	140
Jordan	8.3	7.1	6	14	9.2	7.5	2	3	36
Kalispell	4.6	4.8	118	98	4.8	4.7	115	95	121
Lewistown	9.0	10.1	60	79	9.5	9.7	47	61	76
Livingston	17.1	18.3	36	65	17.3	16.0	17	30	55
Miles City	9.6	9.6	35	27	10.3	9.8	22	16	129
Missoula	3.9	4.6	63	74	4.1	4.7	63	74	85
Mullan Pass	5.3	6.2	27	87	5.0	6.1	28	96	29
Wolf Point	8.3	7.3			8.7	7.5			22
Glendive	10.3	10.2	4	14	11.0	10.1	4	14	28
Sidney	9.1	9.1	12	37	10.10	9.0	2	6	32
W Yellowst	4.9	6.6			5.75	6.1			6



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

For the latest information on mountain snowpack from the NRCS, go to: <https://www.wcc.nrcs.usda.gov/gis/snow.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 NEIC. Therefore, these data are subject to revision. Final and certified climate data can be access at the National Environmental Information Center (NEIC) <http://www.ncei.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 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.