

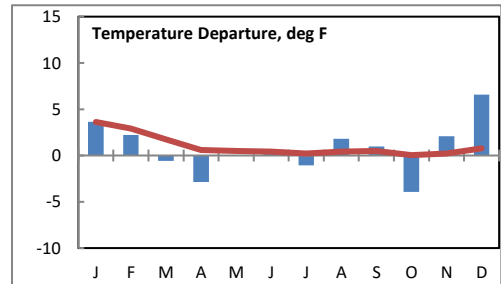
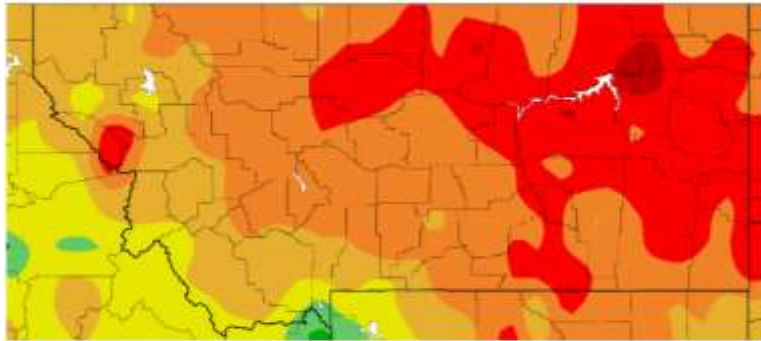
# Montana Weather/Precipitation Summary

December 2020 NOAA's National Weather Service Great Falls Montana

Northwesterly flow aloft dominated during December (Fig. 1), resulting from a strong ridge of high pressure remained along the west coast. Flow is normally northwest, with a weaker ridge. This pattern produced much above normal temperatures for the month, with generally below normal precipitation. Winds averaged above normal.

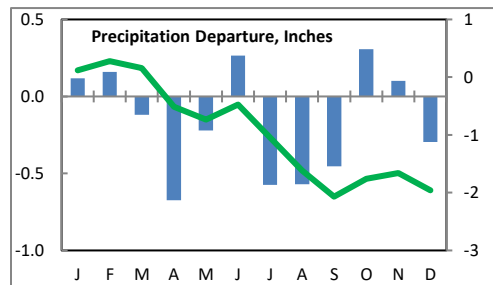
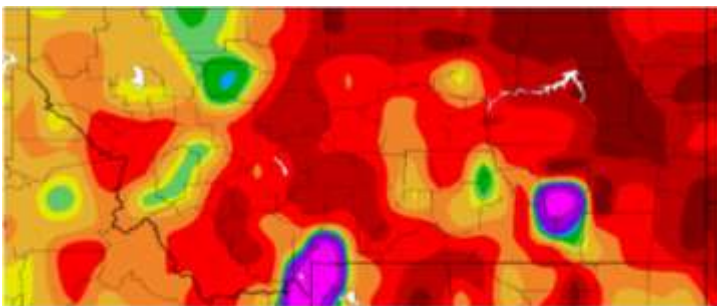
December temperature anomalies ranged from 3.2°F above normal at West Yellowstone to 11.6°F above normal at Jordan. The map below shows the variation in departures. The warmest average temperatures were in central and south central Montana. The warmest average temperature of 35.4°F was at Big Timber (Sweet Grass), while the coolest was 13.5°F near West Yellowstone. The highest temperature was 70°F at Hardin on the 8<sup>th</sup>. The coldest temperature was -26°F near West Yellowstone on the 29<sup>th</sup>. This was the warmest extreme minimum in December since 2003. This range of 96°F is a bit below the December average range of 100°F. The statewide temperature average of 28.5°F was 8.5°F above normal and the 12<sup>th</sup> warmest of record. This was the warmest December since 1999. The red line on the graph shows the cumulative 12-month departure from normal, which was 1.0°F above normal. See the state summary and temperature tables below for more details.

## Temperature departure from normal



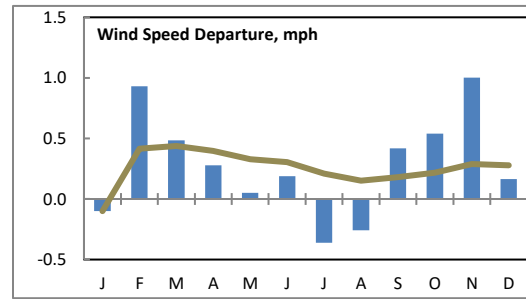
Precipitation was heaviest over mountain areas of northwest Montana. The highest amount (9.10-inches) fell over higher elevations in Lincoln County, with the highest amount at a lower elevation at Noxon (3.01-in) (Sanders). The month's statewide composite of 0.49" was 0.27" below normal. This ranks as the 28<sup>th</sup> driest December of record for Montana, and driest since 2002. As in the past three months, some areas were very dry and some ranked wetter. Bozeman airport recorded its driest December of record, Dillon, Glendive and Sidney had their second driest, Baker had its third driest, and Great Falls had its 6<sup>th</sup> driest December. The green line on the precipitation graph shows the cumulative 12-month departure from normal, which is now

## Precipitation percent of normal (gauge only)



1.62" below normal. Snowfall was below normal as well. The statewide average of 5.4-in is the 25<sup>th</sup> lowest for December and the lowest December average since 1997. See state summary and precipitation tables below for more details.

Wind speed averages were near to above normal. Even so, statewide, the month ranked as the 28<sup>th</sup> calmest December, with an average speed of 9.1-mph. This was the strongest December average since 2017. The strongest averages were along the Rocky Mountain Front and Livingston areas. The composite statewide average was 0.1-mph above normal. The brown line of the wind graph to the right shows the 12-month cumulative statewide wind departure from normal.



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

December was generally mild, with a couple of period with below normal temperatures. Very windy conditions accompanied the mild temperatures. On the 6<sup>th</sup>, with temperatures in the 50s in many areas, gusts reached 79-mph at Browning and 65-mph at Horse Thief RAWS (Musselshell). Temperatures peaked on the 8<sup>th</sup> when Hardin reached 70°F. This was the first 70°F in the state in December since 1995. Wind gusts reached 61-mph at Great Falls and 72-mph at Two Medicine. As mild conditions continued east of the divide, some freezing rain fell over northwest Montana on the 9<sup>th</sup>. Temperatures were falling into the -15°F range in the upper Madison Valley around West Yellowstone. Mild and windy conditions returned on the 16<sup>th</sup>. Wind gusts reached 62-mph at Browning on the 18<sup>th</sup> with more widespread stronger winds on the 19<sup>th</sup> and 20<sup>th</sup>. On the 19<sup>th</sup>, gusts reached 88-mph at Deep Creek RAWS, 81-mph west of Bynum, 79-mph southwest of Augusta, 76-mph at Big Timber, and 69-mph at Jordan. On the 20<sup>th</sup>, gusts were 96-mph at Deep Creek RAWS, 81-mph at Judith Peak (Fergus), 78-mph in the Crazy Mtns, and 74-mph at Livingston and near Augusta. After a one-day break, strong winds returned to western and southwest Montana. A cold front pushing through these areas produced gusts to 79-mph at Mount Sentinel (Missoula), 74-mph at Mt Aeneas (Flathead), 72-mph near Warren (Carbon) and 70-mph at Livingston and Hyalite Mountain (Gallatin). Snowfall up to one-foot fell over the northern slopes of the Little Belts on the 22<sup>nd</sup>. Snowfall of 6-8-inches fell over northwest Montana on the 22<sup>nd</sup> and 23<sup>rd</sup>. Warmer conditions brought another round of wind on the 24<sup>th</sup>, with gusts to 80-mph at Deep Creek RAWS, 69-mph at Two Medicine and 65-mph west of Bynum. The coldest temperatures of the month were felt on the 29<sup>th</sup>, when the West Yellowstone area dropped to -26°F. Generally mild conditions continued through the end of the month. Snow fell over western portions of the state on the 30<sup>th</sup> and 31<sup>st</sup>.

The highest daily temperatures in December occurred on three days at Gardiner, Jordan and Billings area. West Yellowstone had the state's lowest temperature on ten days.

### **Precipitation/convection**

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

**December information:**

<b>High Temperature</b>	70°F at Hardin (8 <sup>th</sup> )	<b>Greatest Precip</b>	3.01" at Noxon
<b>Low Temperature</b>	-26°F West Yellowstone (29 <sup>th</sup> )		8.40" at Stahl Peak SNOTEL (Lincoln)
<b>Warmest Ave Temp</b>	35.4°F at Big Timber (Sweet Grass)	<b>Peak Wind Gust</b>	81 mph at 14W Bynum (19 <sup>th</sup> )
<b>Coollest Ave Temp</b>	13.5°F at West Yellowstone 1N		96 mph at Deep Creek RAWS (20 <sup>th</sup> )
<b>Range of Temp departures</b>	32°F at West Yellowstone to 11.6°F at Jordan	<b>Highest Ave Wind</b>	28.0 mph at Deep Creek RAWS 21.6 mph at Cut Bank
<b>21 city mean monthly Temperature/Nrml</b>	28.5/20.3F normal. 12 <sup>th</sup> warmest of record (since 1880). 91 <sup>st</sup> percentile.	<b>20 city mean monthly wind speed/Nrml</b>	9.1 mph/9.0 mph; 28 <sup>th</sup> calmest of record (since 1936). 34 <sup>th</sup> percentile.
<b>22 city mean monthly precipitation/Nrml</b>	0.49"/0.77" – 63% of normal. 28 <sup>th</sup> driest of record (since 1880). 63 <sup>rd</sup> percentile.	<b>20 city mean monthly snowfall/Nrml</b>	5.4"/11.2" – 25 <sup>th</sup> lowest of record (since 1880). 18 <sup>th</sup> percentile

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

Location	Dec	% of Norm	Rank	Pcntl	Oct 1 – Dec 31	% of norm	Rank	Pcntl	Years
Baker	0.03	8%	91	7	1.04	50%	73	24	96
Billings	0.43	86%	59	48	2.96	128%	32	26	120
Belgrade	0.06	12%	84	100	1.44	61%	72	86	84
Butte	0.10	20%	119	94	1.39	74%	71	56	127
Cut Bank	0.25	125%	56	49	2.84	284%	6	4	114
Dillon	0.01	4%	79	98	0.26	19%	81	100	81
Glasgow	0.01	3%	75	60	2.05	132%	32	25	123
Great Falls	0.10	18%	124	95	3.07	154%	19	14	129
Havre	0.08	20%	125	89	1.57	111%	69	49	141
Helena	0.21	53%	118	82	2.60	166%	32	22	142
Jordan	0.09	31%	88	90	0.87	55%	79	81	97
Kalispell	1.21	78%	70	55	5.69	142%	18	13	127
Lewistown	0.38	58%	91	73	2.05	82%	91	73	125
Livingston	0.26	50%	90	75	2.97	125%	36	30	118
Miles City	0.02	7%	136	94	1.15	72%	104	72	144
Missoula	0.41	40%	122	85	3.96	133%	40	28	141
Mullan Pass	4.59	103%	44	53	19.28	156%	10	11	83
Wolf Point	0.01	3%	48	61	0.71	47%	62	79	78
Glendive	0.02	5%	122	95	1.30	69%	77	62	124
Sidney	0.01	2%	80	99	0.86	40%	71	88	81
BZN MSU	0.49	53%	114	80	2.59	67%	110	76	144
W Yellowst	2.06	80%	54	50	6.48	105%	37	33	110

Rankings and Percentiles are 1=wettest, higher numbers=drier.

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	Dec	Normal	Rank	Pcntl	Oct 1 – Dec 31	Normal	Rank	Pcntl	Years
Baker	30.7	19.0	4	3	34.9	30.7	21	19	109
Billings	34.6	26.5	6	4	39.3	36.8	24	19	123
Belgrade	26.9	19.0	9	10	33.0	30.7	28	32	86
Butte	23.6	17.4	33	25	30.6	28.6	61	48	127
Cut Bank	29.8	22.2	12	10	33.9	31.8	27	23	112
Dillon	25.6	20.8	25	32	33.0	31.6	44	57	77
Glasgow	27.2	16.3	4	2	32.7	30.1	31	24	126
Great Falls	33.8	24.8	15	11	37.3	34.5	48	38	124
Havre	30.4	19.1	8	5	34.1	31.2	31	21	141
Helena	30.7	21.8	9	6	36.5	33.3	24	16	141
Jordan	30.4	18.8	4	3	35.0	31.0	26	25	102
Kalispell	28.4	22.7	15	12	34.1	32.2	30	24	122
Lewistown	30.7	23.3	14	11	35.3	33.0	36	29	121
Livingston	34.2	26.1	12	9	38.8	35.1	30	25	118
Miles City	30.1	20.3	11	7	36.0	32.9	37	26	139
Missoula	27.8	23.9	37	28	34.6	34.1	60	46	129
Mullan Pass	27.1	20.0	2	2	30.9	28.3	8	16	44
Wolf Point	26.2	15.0	3	3	31.3	28.8	25	32	76
Glendive	27.8	20.7	17	13	33.6	33.8	68	54	125
Sidney	28.2	19.2	6	6	32.9	32.6	32	33	98
W Yellowst	13.7	10.5	45	42	23.4	22.3	71	62	114

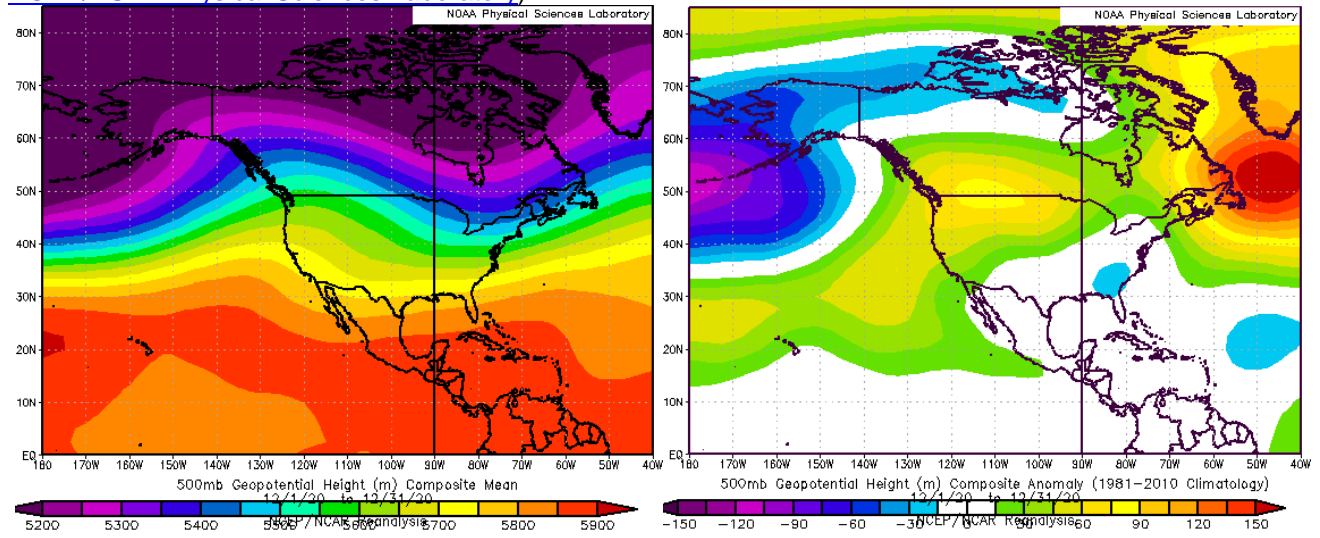
Rankings and Percentiles are 1=coldest, higher numbers=warmer.

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

Location	Dec	Normal	Rank	Pcntl	Oct 1 – Dec 31	Normal	Rank	Pcntl	Years
Baker	10.8	11.2			11.0	10.8			23
Billings	14.2	12.6	14	15	13.2	11.6	8	8	86
Belgrade	4.1	4.6	48	87	5.1	4.9	25	44	55
Butte	4.1	5.2	46	80	4.9	5.7	40	70	57
Cut Bank	14.6	14.4	42	53	15.4	14.0	12	14	78
Dillon	9.4	9.2	37	55	10.2	9.1	14	20	67
Glasgow	8.0	9.3	34	43	9.4	9.7	47	61	76
Great Falls	14.8	14.6	39	46	14.7	13.7	28	33	83
Havre	11.0	9.5	30	22	11.5	9.2	6	4	132
Helena	5.1	5.7	118	84	6.2	6.2	105	74	141
Jordan	7.7	7.2	12	31	8.3	7.4	4	8	37
Kalispell	3.0	4.1	78	64	4.6	4.5	114	93	122
Lewistown	10.2	10.3	46	58	10.7	9.9	24	30	78
Livingston	21.4	19.8	16	27	19.6	18.0	11	18	56
Miles City	9.5	9.6	41	31	9.7	9.8	40	30	130
Missoula	2.5	4.3	83	96	3.7	4.6	73	85	86
Mullan Pass	6.0	5.6	14	43	5.8	5.9	19	62	30
Wolf Point	6.9	7.1			7.3	7.4			23
Glendive	9.9	10.1	15	52	9.9	10.1	18	62	29
Sidney	8.6	9.0	20	61	9.07	9.0	14	42	33
W Yellowst	M				M				

Rankings and Percentiles are 1=windiest, higher numbers=calmer.

**Figure 1.** Mean flow at 500 millibars (~18,000 ft) for this month (left) and climatology for the month (right) (from [NOAA/ESRL Physical Sciences Laboratory](#)).



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 NCEI. Therefore, these data are subject to revision. Final and certified climate data can be access at the National Centers for Environmental Information (NCEI) <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=txf>. 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.