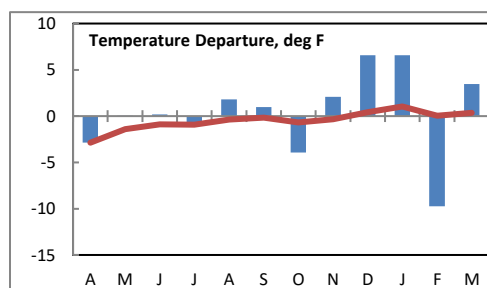
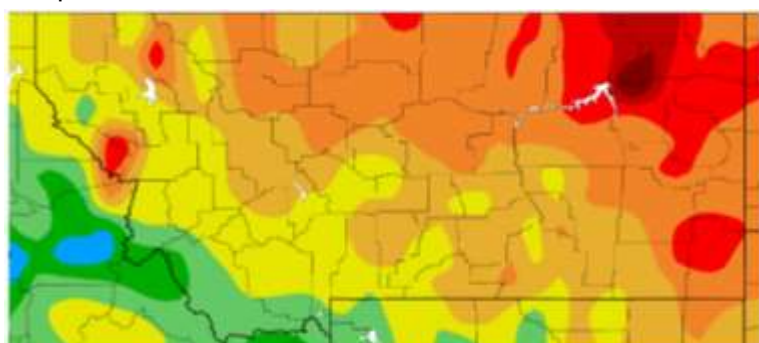


Montana Weather/Precipitation Summary

March 2021 NOAA's National Weather Service Great Falls Montana

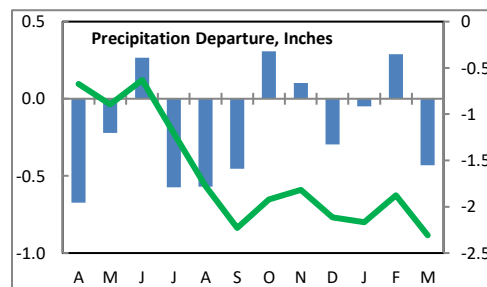
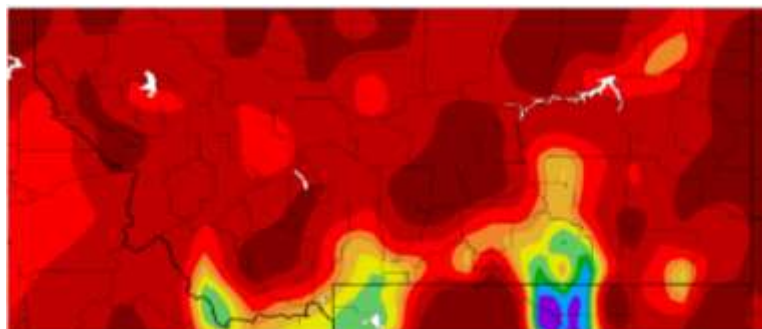
Wester flow aloft dominated during March (Fig. 1), which is normal. In Montana temperatures averaged above normal and precipitation below normal. Generally, winds averaged below normal speeds, except along the Rocky Mountain Front.

March temperature anomalies ranged from 0.2°F below normal at West Yellowstone to 7.7°F above normal at Glasgow. The map below shows the variation in departures. The warmest average temperatures were in central and northeast Montana. The warmest average temperature of 41.4°F was at Dry Blood Creek (Petroleum), while the coolest was 22.1°F at Yellow Mule (Gallatin). The highest temperature was 76°F at Glasgow on the 19th. The coldest temperature was -16°F at Elk Park on the 11th. This range of 92°F is below the March average range of 98°F. The statewide temperature average of 36.6°F was 3.5°F above normal and the 21st warmest. This was the warmest March since 2017. The red line on the graph shows the cumulative 12-month departure from normal, which was right at normal. See the state summary and temperature tables below for more details.



Temperature departure from normal

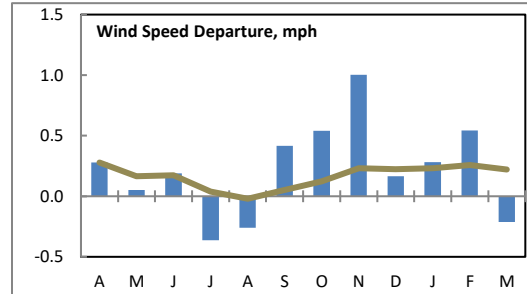
Precipitation was heaviest over mountain areas of northwest and southwest Montana. The highest amount (4.90-inches) fell at NF Jocko SNOTEL (Missoula), with the highest amount at a lower elevation at Mystic Lake (1.48-in) (Stillwater). The month's statewide composite of 0.45" was 0.43" below normal. This ranks as the 10th driest March of record for Montana, and the driest since 2004. Portions of the northeast were very dry, recording a tenth of an inch or less. The green line on the precipitation graph shows the cumulative 12-month departure from normal, which is now 2.31" below normal.



Precipitation percent of normal (gauge only)

Snowfall was below normal as well. The statewide average of 2.5-inches was the 7th lowest for March and lowest since 2015. See state summary and precipitation tables below for more details.

Wind speed averages were below normal except in the Chinook wind zone to the lee of the Rockies. Statewide, the month ranked as the 23rd calmest March, with an average speed of 9.2-mph. The strongest averages were 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. All but three of the past 12-months have had above normal wind speed averages.



As we approach the growing season, soil moisture values are above normal. At the end of March, the state soil moisture composite ranked second wettest (since 1995).

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

March was generally dry and mild. Daily temperature averages were above normal until the 23rd. A period with some precipitation and snowfall occurred from the 23rd through 30th. Some areas recorded their coldest temperature of the month on the 30th. A strong cold front brought very windy conditions on the 29th and 29th. Several locations set daily wind records during this period. Some are summarized below. The extreme monthly minimum of -16°F at Elk Park was the warmest such value since 2010, and 10°F warmer than the long-term average extreme minimum.

Location	Date	Speed	Old record	Comments
Bozeman	29 th	Daily 20.9 mph		Highest March value since Mar 22, 1955 and highest for any day since Apr 24, 1996.
Cut Bank	28 th	Gust 88 mph	78 mph – 1961	All-time high gust for March. Old record was 78 mph Mar 1, 1961. This was the highest gust since Nov 27, 2011.
Glasgow	29 th	Gust 66 mph	62 mph – 2008	All-time high gust for March. Old record was 62 mph Mar 24, 2008.
Great Falls	28 th	Gust 64 mph		Fifth highest March gust of record and highest in March since 1975.
Great Falls	28 th	Daily 28.9 mph		Highest daily average in March since 2007.
Havre	29 th	Daily 25.0 mph		Seventh highest daily average for March and highest March daily average since 1966.
Helena	29 th	Daily 24.4 mph		Record for day and second highest in March. Highest March daily average since 1936. Highest for any day since Dec 12, 1953.
Jordan	29 th	Gust 70 mph		All-time high gust for March. Old record was 66 mph Mar 24, 2008

The highest daily temperatures in February occurred on eight days at Alberton. West Yellowstone had the state’s lowest temperature on ten days.

Water Year-to-date

For the water-year through March, composite temperatures averaged 29.9°F, which was 0.8°F above normal. This has been the warmest water year since 2016. Precipitation tallied 5.16-inches, which was 0.92" above normal. Statewide average snowfall since July has been 47.0-inches or 1.5-inches below normal. Winds averaged 9.4-mph, which is 0.4-mph higher than normal. This was the highest average since 2007 and 23rd lowest of record.

Calendar Year-to-date

The calendar year has produced a composite temperature average of 25.9°F, which was 0.1°F above normal. Precipitation totaled 2.11-inches, which was 0.19" below normal. Snowfall averaged a bit more than six inches below normal, at 20.6-inches. Winds averaged 9.3-mph, 0.2-mph higher than normal. This was the 28th lowest of record.

Precipitation/convection

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

March information:

High Temperature	76°F at Glasgow (19 th)	Greatest Precip	4.05" at Bigfork (Flathead)
Low Temperature	-16°F at Elk Park (11 th)		10.20" at North Fork Jocko SNOTEL (Missoula)
Warmest Ave Temp	41.4°F at Dry Blood Creek (Petroleum)	Peak Wind Gust	94 mph near Moore (13 th)
Coollest Ave Temp	22.1°F at Yellow Mule (Gallatin)		100 mph at Deep Creek RAWS (19 th)
Range of Temp departures	-0.2°F at West Yellowstone to 7.7°F at Glasgow	Highest Ave Wind	22.7 mph at Deep Creek RAWS 19.1 mph at Livingston
21 city mean monthly Temperature/Nrml	36.6/33.2F normal. 21 st warmest of record (since 1880). 85 th percentile.	20 city mean monthly wind speed/Nrml	9.2 mph/9.4 mph; 23 rd calmest of record (since 1936). 28 th percentile.
22 city mean monthly precipitation/Nrml	0.45"/0.88" – 51% of normal. 10 th driest of record (since 1880). 8 th percentile.	20 city mean monthly snowfall/Nrml	2.5"/9.0" – 7 th lowest of record (since 1880). 5 th percentile

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

Location	Mar	% of Norm	Rank	Pcntl	Oct 1 – Mar 31	% of norm	Rank	Pcntl	Years
Baker	0.10	14%	92	43	1.20	35%	93	99	94
Billings	0.67	76%	72	59	4.94	109%	40	33	120
Belgrade	0.37	43%	81	95	3.04	76%	70	83	84
Butte	0.33	49%	108	85	2.56	74%	89	70	127
Cut Bank	0.22	53%	81	70	3.76	154%	13	11	114
Dillon	0.08	14%	79	96	0.53	22%	81	100	81
Glasgow	0.21	45%	61	49	3.02	98%	52	42	122
Great Falls	0.42	62%	105	81	4.36	106%	67	52	129
Havre	0.15	30%	117	82	2.55	87%	97	69	141
Helena	0.26	50%	123	86	4.01	127%	59	41	142
Jordan	0.21	42%	85	85	1.66	48%	85	88	96
Kalispell	0.44	40%	111	87	8.59	112%	33	25	127
Lewistown	0.24	27%	120	95	3.17	72%	114	91	125
Livingston	0.54	66%	86	70	4.28	93%	66	56	118
Miles City	0.27	49%	111	77	1.90	73%	123	85	144
Missoula	0.28	30%	132	91	6.05	98%	62	44	141
Mullan Pass	2.38	53%	62	76	35.29	131%	10	11	82
Wolf Point	0.29	66%	43	47	1.08	47%	71	95	75
Glendive	0.12	21%	114	90	1.62	50%	118	95	124
Sidney	0.30	51%	53	64	1.38	40%	77	95	81
BZN MSU	0.82	59%	106	73	6.20	89%	78	54	144
W Yellowst	1.16	68%	76	69	12.33	105%	38	36	105

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	Mar	Normal	rank.eq	Pcntl	Oct 1 – Mar 31	Normal	rank.eq	Pcntl	Years
Baker	36.9	34.0	11	9	30.3	28.4	18	16	108
Billings	41.1	38.0	18	14	34.8	34.3	39	32	121
Belgrade	36.4	34.0	17	19	29.4	28.9	28	32	86
Butte	32.7	31.6	40	31	27.5	26.8	56	44	127
Cut Bank	36.6	31.1	12	10	29.2	28.7	36	32	112
Dillon	34.5	34.5	27	34	29.3	30.3	50	64	77
Glasgow	39.4	30.9	6	4	29.3	25.8	12	9	125
Great Falls	39.1	34.3	18	13	32.4	31.9	56	45	124
Havre	38.9	31.8	13	9	29.9	27.6	30	21	141
Helena	39.6	36.0	14	9	33.0	31.2	21	14	141
Jordan	38.3	33.4	16	15	30.5	28.5	25	25	98
Kalispell	38.2	34.9	19	15	31.9	30.7	27	22	121
Lewistown	36.8	32.8	17	13	30.2	30.2	55	46	119
Livingston	38.9	36.7	31	25	34.1	34.1	49	41	118
Miles City	39.1	35.2	22	15	31.3	30.4	34	24	139
Missoula	38.0	37.8	45	34	32.8	32.4	41	31	128
Mullan Pass	29.6	27.9	8	17	27.3	26.8	15	33	44
Wolf Point	37.1	30.8	15	18	27.4	25.1	19	25	74
Glendive	38.1	34.3	19	15	29.3	29.8	48	38	125
Sidney	36.8	32.9	16	16	28.2	27.8	28	29	98
W Yellowst	23.2	25.2	55	49	20.3	20.9	72	64	112

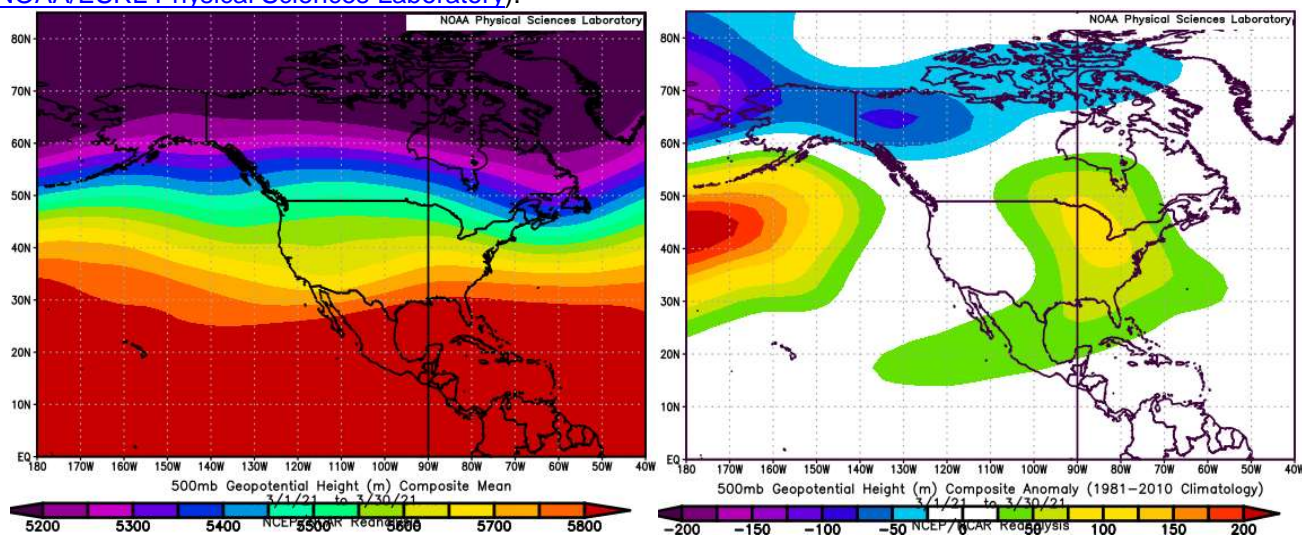
Rankings and Percentiles are 1=coldest, higher numbers=warmer.

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

Location	Mar	Normal	Rank	Pcntl	Oct 1 – Mar 31	Normal	Rank	Pcntl	Years
Baker	11.0	11.8			10.9	10.9			23
Billings	10.4	10.7	65	75	12.2	11.7	45	52	85
Belgrade	4.4	6.2	56	98	5.0	5.3	35	62	56
Butte	5.2	6.5	53	91	5.0	5.4	43	75	57
Cut Bank	14.1	13.2	37	48	14.9	13.7	27	33	79
Dillon	9.4	10.0	50	74	10.1	9.6	30	44	67
Glasgow	11.4	11.0	26	33	10.0	9.9	45	59	76
Great Falls	13.0	12.0	31	36	13.8	12.9	31	37	83
Havre	10.4	10.0	33	24	11.2	10.0	14	10	132
Helena	7.0	7.3	101	71	6.6	6.2	87	61	141
Jordan	9.0	8.5	11	29	8.6	7.8	3	6	37
Kalispell	5.6	5.9	96	79	5.0	4.5	112	92	122
Lewistown	9.5	9.7	50	64	10.4	9.9	43	54	79
Livingston	15.5	16.2	28	49	18.4	18.0	18	32	54
Miles City	9.6	10.5	60	46	9.6	9.8	51	39	130
Missoula	4.6	5.7	81	94	4.3	4.4	69	80	86
Mullan Pass	6.4	6.2	15	45	5.5	5.8	27	90	30
Wolf Point	7.6	8.8			7.6	7.7			23
Glendive	10.3	10.5	18	62	10.0	10.0	14	48	29
Sidney	9.3	9.3	18	53	9.20	9.0	11	34	32
W Yellowst	7.4	7.4				6.2			6

Rankings and Percentiles are 1=winiest, 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](http://www.noaa.gov/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=tfx>. The climatological record for normals is 1991-2020. 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.