

Montana Weather/Precipitation Summary

March 2017 NOAA's National Weather Service Great Falls Montana

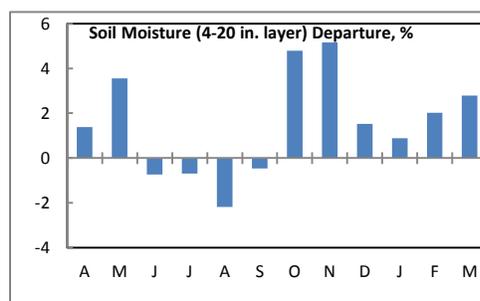
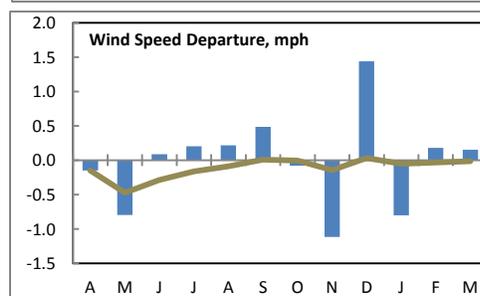
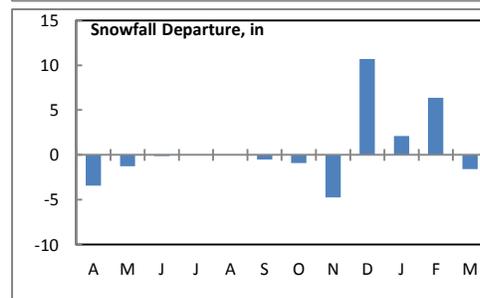
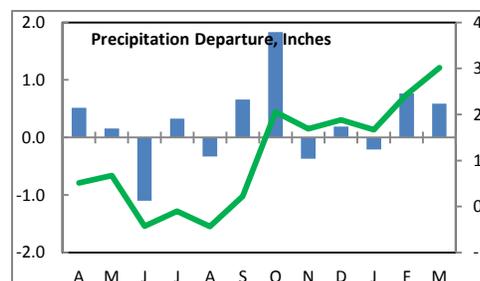
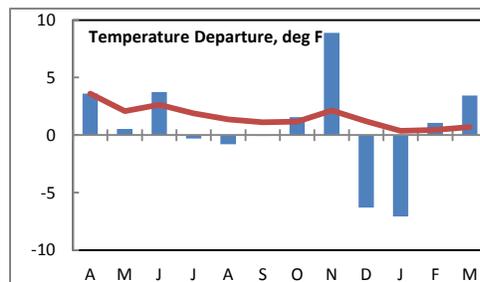
A stronger-than-normal ridge of high pressure was centered over Montana during March (Fig. 1). This produced generally above normal temperatures in the state (Fig. 2). Some areas reported below normal averages over the northern tier. Above normal precipitation fell across the west and southern portions of the state, with below normal most other areas (Fig. 3). Wind averages were near to above normal.

After a cold winter period, temperatures rebounded in March. Most areas recorded above normal temperatures, with the statewide composite of 36.7° at 3.4°F above normal. The red line on the graph to the right shows the cumulative 12-month departure from normal, which is about 0.7°F above normal. The temperature anomalies ranged around two degrees below normal in northwest Montana to seven degrees above normal around Bozeman (Fig. 2). The warmest average monthly temperature was 43.5°F at Whitehall and the coolest was 23.6°F at Point Six (Missoula). This was the 20th warmest March of record. Seven of the last 12 months have had warmer than normal temperatures.

The monthly departure from normal for precipitation across Montana is shown in Figure 3. The wettest areas were across western and southern Montana. The highest precipitation amount recorded was 16.50-inches at Poorman SNOTEL. This was close to the March monthly record of 18.30-inches set in 2014. Elsewhere, 8.70" was reported at Many Glacier and 6.30" at 28SSW of Libby. New monthly records for precipitation were set at Mullan Pass. Billings had their third wettest March of record. Statewide, this month averaged 1.53", or 0.59" above normal. This was the 8th wettest of record and the wettest since 2013. The statewide composite precipitation for the past 12 months is 3.02" above normal. The green line on the graph to the right shows the cumulative 12-month departure from normal. Eight of the past 12 months have measured above normal precipitation.

Snow amounts were generally below normal. The warmer temperatures caused much of the precipitation to fall as rain. The statewide average was 1.6-inches below normal. Even so, it was only the 53rd lowest snow total of record. East Glacier reported the largest amount (48").

The statewide average winds were stronger than normal over most of the state. Statewide, the month ranked as the 32nd calmest February of record. The statewide composite average was 9.6 mph, 0.2-mph above 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 near normal. Seven of the past 12 months have had above normal average speeds. The fastest average speed was 18.7 mph at Norris Hill (Madison). At lower elevations, the strongest average was



17.9 mph at Livingston. The strongest wind gust was 96 mph at Deep Creek RAWS on the 10th. Soil moisture in March ranks as the 4th highest of record (records from 1995). This is the wettest soil conditions in March since 2015.

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

Mar 1-12

After a mild start with some gusty winds over eastern Montana, temperatures fell to below normal values by the 5th. Some snow was seen in central Montana on the 2nd, with 6-9-inches from Neihart to Forest Grove. On the 4th, windy conditions continued over southern Montana (gusts to 61 mph at Red Lodge), and 4-6-inches of snow fell from Seeley Lake to the Flathead Lake area. Once cooler air settled across the state, snow fell over most of the state. Just before the general snow set in, wind gusts in the 50 mph range were experienced across eastern Montana. The highest gust was 61 mph at Comertown on the 7th. Over the 9th and 10th, varying amounts of snow fell. The heaviest was in northwest, central and south central Montana. Grass Range measured 10-inches, Melville and Polebridge got 15" and Big Timber picked up 17th. Even the Billings area had six or more inches. Some freezing rain fell in the Helena Valley.

Mar 13-31

Conditions warmed significantly, with above normal temperatures on the 13th. This trend continued, with temperatures maxing out on the 18th. Many areas in central and eastern Montana saw their earliest in the season 75°F temperature. A high temperature of 85°F was reported at Four Mile RAWS (Sweet Grass) on the 18th, the earliest in the season for an 85°F value. The earliest was Mar 22 set in 1910. New daily high temperatures for the state were set on the 18th (85F at Four Mile RAWS) and on the 20th (83F at Broadus – tied the record). The warm conditions also brought on flooding. Flooding was seen on rivers in eastern Montana, including the Milk, Poplar and Big Muddy. Several high wind gusts were also observed during this period. West of Pendroy, gusts to 81 mph were observed on the 18th and a gust to 66 mph was measured on the 25th.

Precipitation/convection

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

Water-year-to-date summary

The composite statewide average temperature for the water year through March was 29.0°F (0.2°F above normal). This was the 59th coolest of record and the coolest since 2014.

The composite precipitation was 7.88", or 2.80" above normal. September, October, February and March were particularly wet. This is the 2nd wettest such period of record, and the wettest since 1881.

Composite snowfall was 60.4". This is 12.0" above normal and the heaviest period snowfall since 2014. This is the 16th highest period snowfall amount.

Helena has had 51.5" of snow, their highest since 1993 and 42nd highest of record. Cut Bank has measured 60.2" of snow, their 2nd highest of record and most since 1947.

For winds, the average state wind speed was 9.0-mph, or normal. This was the 17th calmest year of record.

March summary information:

High Temperature	85°F at Four Mile RAWs (Sweet Grass) (18 th)	Greatest Precip	6.30" at Libby 28SSW
Low Temperature	-17°F near Opheim (12 th)		16.5" at Poorman SNOTEL
Warmest Ave Temp	43.5°F at Whitehall	Peak Wind Gust	83 mph near Pendroy (3 rd)
Coolest Ave Temp	23.6°F at Point Six (Missoula)		
Range of Temp departures	-2.0°F at Thompson Falls to 7.1° at Bozeman Exp Farm	Highest Ave Wind	16.8 mph at Livingston 19.5 mph at Deep Creek RAWs
21 city mean monthly Temperature/Normal	36.7/33.2F normal. 20 th warmest of record (since 1880). 85 th percentile.	20 city mean monthly wind speed/Normal	9.6 mph/9.4 mph; 22 nd calmest of record (since 1936). 41 st percentile.
22 city mean monthly precipitation/Normal	1.53"/0.94" - 162% of normal. 8 th wettest of record (since 1880). 94 th percentile.		

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

Location	4	% of Norm	Rank	Pcntl	Oct 1 - MM	% of norm	Rank	Pcntl	Years
Baker	0.60	96%			1.81	59%			19
Billings	2.22	198%	3	2	9.24	178%	2	1	116
Belgrade	1.28	136%	15	18	5.18	121%	22	27	80
Butte	0.93	122%	39	31	4.94	139%	26	21	122
Cut Bank	0.46	92%	46	41	4.21	220%	7	6	110
Dillon	0.65	120%	25	31	3.65	153%	4	4	77
Glasgow	0.49	117%	39	32	5.04	194%	10	8	118
Great Falls	0.41	45%	104	82	4.76	122%	48	38	125
Havre	0.15	28%	114	82	5.52	216%	5	3	137
Helena	0.42	71%	99	71	4.70	167%	33	23	138
Jordan	0.57	110%			3.92	153%			19
Kalispell	2.71	249%	5	3	13.69	185%	1	0	123
Lewistown	0.43	43%	99	81	5.86	130%	29	23	121
Livingston	1.02	121%	39	32	7.53	179%	4	3	114
Miles City	0.57	95%	67	47	2.12	77%	114	81	140
Missoula	2.02	210%	8	5	9.95	181%	9	6	137
Mullan Pass	12.61	282%	1	1	41.43	162%	3	3	76
Wolf Point	0.14	30%			2.35	95%			19
Glendive	0.73	122%	44	36	3.49	110%	45	37	119
Sidney	0.62	103%	30	38	3.63	103%	25	32	77
BZN MSU	1.67	121%	42	30	9.22	135%	10	7	138
W Yellow	2.91	179%	12	11	21.02	186%	3	2	98

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>

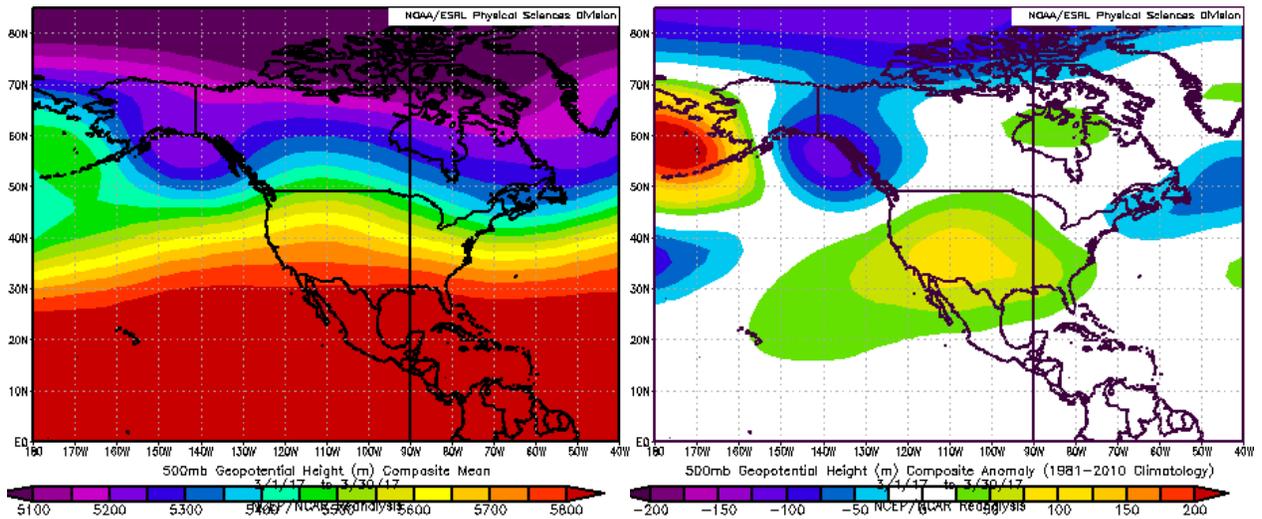


Figure 1. Mean flow at 500 millibars (~18,000 ft) for this month (upper left) and departure from normal (upper right).

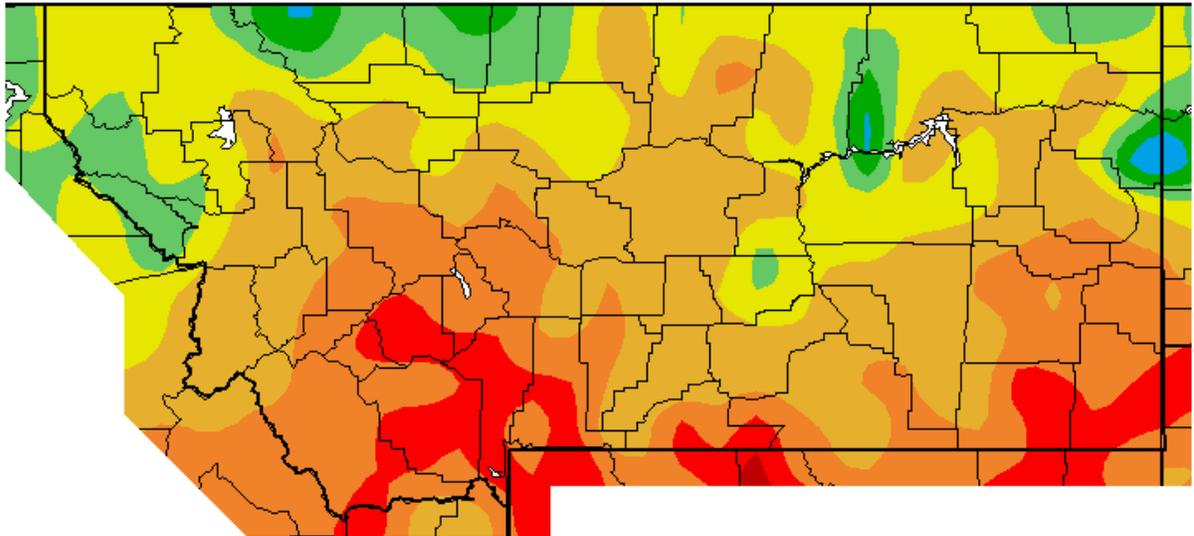


Figure 3. March 2017 temperature departures from normal (°F) (Western Region Climate Center).

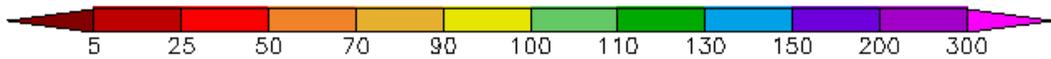
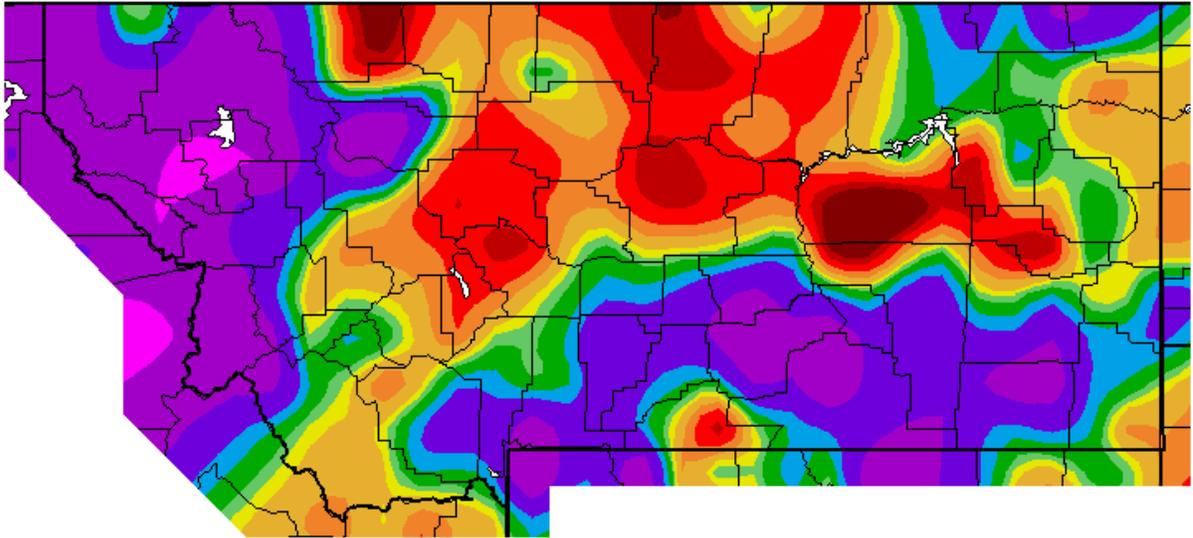


Figure 4. March 2017 precipitation departures from normal (percent) (Western Region Climate Center).

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/climate/monthlysum/climatesum.php?wfo=txf>

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 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.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=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.