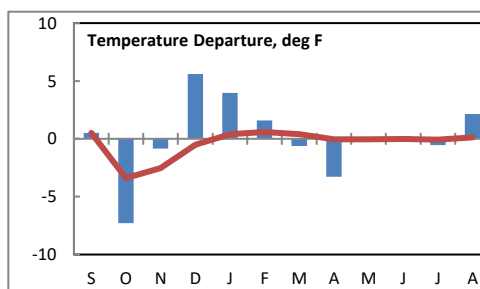
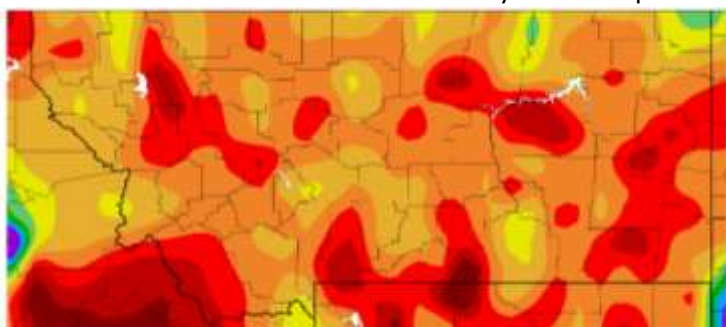


Montana Weather/Precipitation Summary

August 2020 NOAA's National Weather Service Great Falls Montana

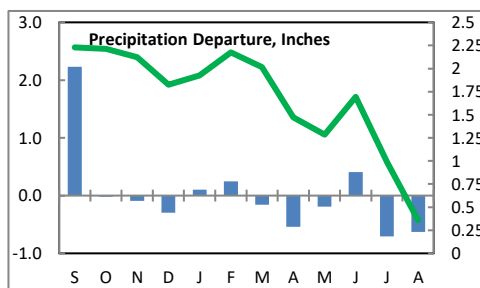
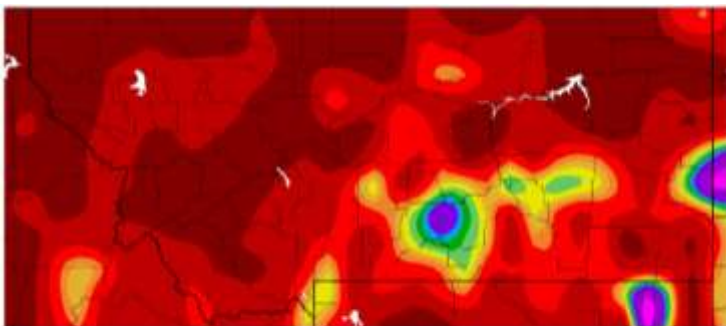
Westerly aloft dominated for much of August over Montana, which was close to normal (Fig. 1). The trough over the Gulf of Alaska was stronger than normal, and the ridge over North America was a bit stronger than normal. This produced above normal temperatures and below normal precipitation for the month. Winds averaged near to slightly below normal.

August temperature anomalies ranged from 0.7°F above normal at Kalispell to 4.1°F above normal at Jordan. The map below shows the variation in departures. The warmest average temperatures were in eastern Montana. The warmest average temperature was at Broadus, with an average of 75.6°F, while the coolest was 53.4°F at Placer Basin. The highest temperature was 104°F at Trout Creek and Libby on the 1st, at Billings on the 17th and at Medicine Lake on the 19th. The coldest temperature was 22°F at Elk Park on the 14th. This range of 82°F is normal for August. The statewide temperature average of 68.9°F was the 24th warmest of record. The red line on the graph shows the cumulative 12-month departure from normal, which was 0.1°F above normal. See the state summary and temperature tables below for more details.



Temperature departure from normal

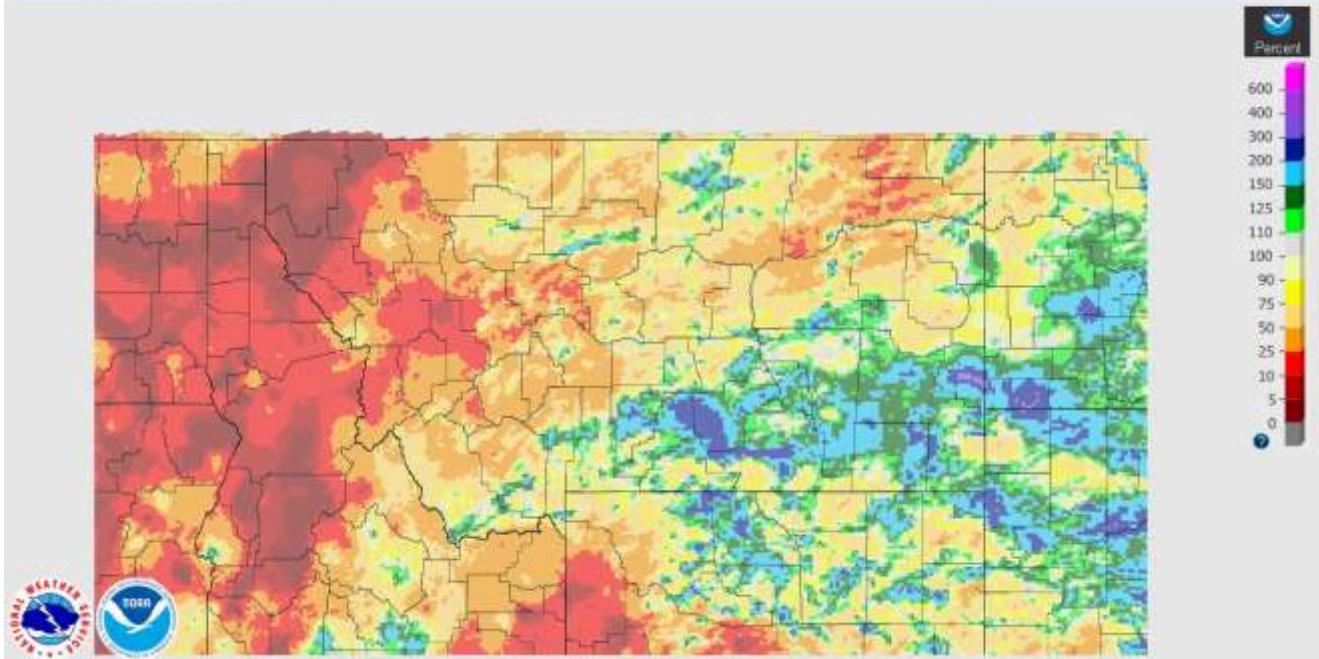
Precipitation was heaviest over isolated areas of extreme east central and south central Montana. The highest amount (2.93-inches) fell near Livingston, with the Baker area receiving around 2.50-inches. On the 3rd, 1.10-1.50-inches of rain fell in the Molt and Billings areas, and thunderstorms produced over 1.5-inches of rain around Baker on the 13th. Another isolated thunderstorm dropped nearly one-inch of rain near Choteau on the 20th. Otherwise the state was dry. The second map below shows the departure from normal over eastern Montana. One can pick out storm tracks. The statewide composite of 0.52-inches for August was 0.63" below normal. This ranks as the 24th driest August of record for Montana. Some areas were even drier. Cut Bank (0.10") was 10th driest of record and driest July since 2011. Dillon (0.18") had their 6th driest July. The green line on the precipitation graph shows the cumulative 12-month departure from normal, which is now only 0.36" above normal. See state summary and precipitation tables below for more details.



Percent of normal precipitation

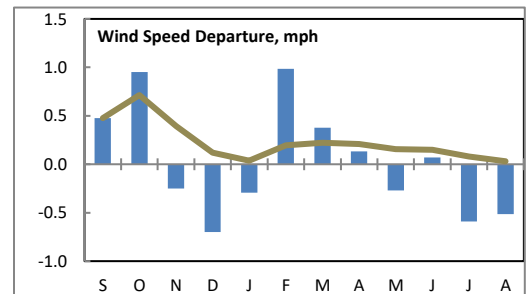
August 31, 2020 Month to Date Percent Precipitation

Created on: August 31, 2020 - 16:35 UTC
Valid on: August 31, 2020 12:00 UTC

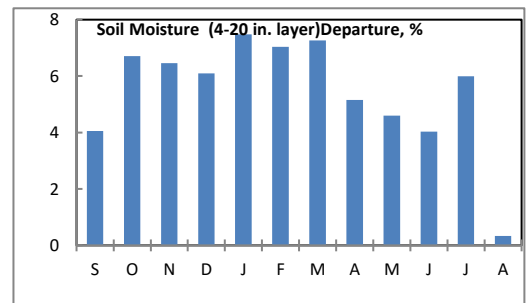


Percent of normal precipitation for August over Montana (radar and gauge-based)

Wind speed averages were near to slightly below normal. Statewide, the month ranked as the 11th calmest August, with an average speed of 7.5-mph. The strongest averages were along the Rocky Mountain Front and northeast Montana. The composite statewide average is running normal. The brown line of the wind graph to the right shows the 12-month cumulative statewide wind departure from normal.



With normal drying and significantly below normal precipitation over the past two months, statewide soil moisture averages dropped. While still marginally above normal (right), August ranks as 13th wettest/driest of 26 years. This data is from 33 NRCS SCAN and SNOTEL, NOAA CRN and MT Mesonet stations.



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

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

Other than a very warm and dry August, it was fairly typical with thunderstorms throughout the month. Temperatures averaged above normal for the first week, then near to below normal for the next week. High temperatures reached 104° at Trout Creek and Libby on the 1st. Except for the last two days, the rest of the month had above normal temperatures. A few record lows were set. On the 15th, Livingston tied their record low, and on the 31st, Miles City set a new record low of 41°F. A few record highs were set as well. Helena tied their record high on the 16th, with additional record highs set on the 17th, when Billings hit 104°F. Medicine Lake also hit 104°F on the 19th. A couple of cool record highs were set on the 31st, when temperatures failed to reach 60°F at Bozeman and Dillon.

Severe thunderstorms moved through southern Montana on the 3rd. After producing one-inch hail near Bozeman and West Yellowstone, wind gusts to 75 mph occurred at Livingston. This was their highest August gust of record, exceeding the old record set in 2010 and 1947.

Thunderstorms again moved through the state on the 6th, producing 64-mph winds at Townsend and 71-mph gusts at Fort Peck. On the 12th, another round of thunderstorms moved through southern Montana. Gusts reached 68-mph at Livingston, which is now their second highest August gust of record. Heavy rain fell in the Baker area on the 13th, with over 1.5-inches in a short period of time. On the 20th, moved through the state. Golf-ball size hail fell near Bynum, with nearly one-inch of rain in 30 minutes near Choteau. Wind gusts of 65-mph occurred at Deep Creek (Big Belt Mtns) and 68-mph at Jordan. The strongest thunderstorm winds occurred on the 25th, when gusts reached 77-mph at Shawmut (Wheatland). The 26th also had severe thunderstorms, with gusts to 71-mph at Twin Bridges. On the 27th, thunderstorms in far eastern Montana produced gusts to 70-mph at Sioux Pass (Richland).

Haze from smoke spread over much of the state between the 23rd and 26th. Some areas saw visibilities drop below 3 miles in low air quality conditions. A cold front cleared the smoke out of most areas on the 26th.

The highest daily temperatures in August occurred on four days at several locations including, Mizpah, Plains, Powderville, Troy and Wolf Point. Gates Park had the state's lowest temperature on 18 days.

Many locations had more than normal days of 90°F or higher in August, but for the season the tally is near normal.

Precipitation/convection

Severe convective weather occurred on eight days in August, which is normal. The cumulative number of days this season is 32, which is eight days below normal. This is the lowest cumulative number since 29 days in 2015, and the fourth lowest since 1990. On the 3rd, thunderstorm gusts reached 75-mph at Livingston, causing local damage, while heavy rain fell in the Molt and Billings areas. On the 6th, gusts reached 64-mph near Townsend and 71-mph at Fort Peck. Hail to 1.75-inches fell near Bynum on the 20th, while wind gusts reached 65-mph at Deep Creek MDT in the Big Belts. Thunderstorm gusts also reached 68-mph at Jordan. The strongest thunderstorm gusts occurred on the 25th, when a gust of 77-mph hit Shawmut. Gusts to 71-mph occurred at Twin Bridges on the 26th and 70-mph at Sioux Pass on the 27th. The largest hail reported was 1.75-inches near Bynum on the 20th.

Summer period (Jun-Aug)

The summer period average temperature for the state was 65.6°F, which was 0.6°F above normal and the warmest since 2017. This was the 63rd warmest of record (of 141 years).

The summer composite precipitation was 4.25-inches, nearly one-inch below normal. Normal is 5.18-inches. This was the driest since 2017 and 40th driest of record.

Winds averaged 8.0-mph, which was 0.3-mph below normal. This was the 15th calmest summer period (of 85-years), but windiest since 2017.

Water-year-to-Date (Oct-Aug)

The water-year average temperature for Montana was 42.1°F, which was normal. This was the 58th warmest of record.

This season's composite precipitation was 11.90-inches, 1.87-inches below normal. This was the driest such period since 2003 and the 33rd driest of record. Very dry conditions prevail over southwest Montana. Dillon has seen its driest such period since 1966.

Winds averaged 9.0-mph, which was normal. This was the 23rd calmest such period, but windiest since 2008.

Crop Season (Apr-Aug)

The average temperature for Montana was 57.7°F, which was 0.3°F below normal. This was the 45th coolest of record.

This year's composite precipitation was 7.15-inches, which was 1.66-inches below normal. This was the driest such period since 2017 and the 36th driest of record.

Winds averaged 8.6-mph, which was 0.3-mph below normal. This was the 16th calmest such period, but windiest since 2016.

August information:

High Temperature	104°F at Trout Creek & Libby (1 st), Billings (17 th) and Medicine Lake (19 th)	Greatest Precip	2.93" near Livingston
Low Temperature	22°F Elk Park (14 th)		
Warmest Ave Temp	75.6°F at Broadus	Peak Wind Gust	77 mph at Shawmut (Wheatland) (25 th) (tstm)
Coollest Ave Temp	53.4°F at Placer Basin SNOTEL		
Range of Temp departures	+0.7°F at Kalispell to +4.1°F at Jordan	Highest Ave Wind	14.4 mph at Deep Creek RAWS 10.4 mph at Cut Bank & Glasgow
21 city mean monthly Temperature/Normal	68.9/66.8F normal. 24 th warmest of record (since 1880). 83 rd percentile.	20 city mean monthly wind speed/Normal	7.5 mph/8.0 mph; 11 th calmest of record (since 1936). 14 th percentile.
22 city mean monthly precipitation/Normal	0.52"/1.15" – 45% of normal. 24 th driest of record (since 1880). 22 nd percentile.		

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

Location	Aug	% of Norm	Rank	Pcntl	Oct 1 - Aug	% of norm	Rank	Pcntl	Years
Baker	2.10	153%	20	80	10.12	76%	74	21	93
Billings	1.45	193%	21	17	11.68	94%	53	45	116
Belgrade	0.20	19%	79	94	9.78	76%	75	90	83
Butte	0.22	16%	115	90	8.95	76%	96	76	126
Cut Bank	0.24	21%	100	88	8.80	91%	79	70	112
Dillon	0.34	32%	64	79	5.09	53%	79	99	80
Glasgow	0.29	23%	80	63	11.10	104%	63	52	120
Great Falls	0.10	6%	124	96	13.57	102%	60	46	128
Havre	0.03	3%	138	98	8.33	83%	113	81	140
Helena	0.07	6%	135	96	8.87	88%	103	73	141
Jordan	0.37	31%	79	80	10.09	88%	57	61	93
Kalispell	0.29	29%	102	80	14.89	95%	57	45	126
Lewistown	1.14	66%	70	56	14.18	91%	83	67	124
Livingston	0.71	64%	75	64	10.51	77%	90	79	114
Miles City	0.73	80%	80	55	9.46	83%	113	79	143
Missoula	0.38	32%	98	69	11.85	91%	80	59	134
Mullan Pass	0.12	9%	66	81	36.52	100%	42	53	78
Wolf Point	0.17	13%	72	79	7.83	70%	66	92	72
Glendive	0.45	33%	99	79	10.18	82%	94	79	118
Sidney	0.56	48%	66	81	6.87	53%	79	99	80
BZN-MSU	0.89	62%	87	60	14.76	81%	107	76	141
W Yellowstone	0.67	59%	82	71	18.52	92%	56	57	97

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	Aug	Normal	Rank	Pcntl	Oct 1 - Aug	Normal	Rank	Pcntl	Years
Baker	71.7	65.7	24	21	42.4	41.3	45	42	106
Billings	74.1	71.5	14	10	46.9	47.0	38	22	116
Belgrade	67.3	65.7	21	24	41.9	41.6	35	40	85
Butte	63.8	61.7	28	21	39.0	38.8	60	47	126
Cut Bank	66.2	63.6	17	14	39.9	40.9	57	51	111
Dillon	66.4	64.2	15	18	40.5	41.6	60	79	76
Glasgow	73.3	70.2	11	8	43.0	41.8	33	26	124
Great Falls	68.9	66.3	38	29	43.1	43.5	86	70	123
Havre	70.3	68.0	23	16	41.9	42.2	65	46	140
Helena	71.9	68.3	5	3	45.2	44.2	18	12	140
Jordan	73.0	68.9	13	12	44.7	42.2	26	27	95
Kalispell	64.6	63.9	44	36	42.9	42.3	45	37	119
Lewistown	67.6	65.1	16	13	41.3	41.9	61	53	115
Livingston	69.0	65.6	23	19	44.8	43.7	48	42	114
Miles City	74.5	72.6	36	25	44.9	44.7	56	40	138
Missoula	68.9	67.5	24	18	44.8	44.8	31	24	125
Mullan Pass	61.1	59.4	12	26	36.7	36.7	21	48	43
Wolf Point	71.6	69.2	16	21	41.6	40.7	25	35	70
Glendive	72.6	72.9	48	38	44.3	45.1	55	46	119
Sidney	71.4	71.1	18	18	42.1	44.2	42	43	97
W Yellowstone	59.1	57.1	24	21	33.0	33.1	76	69	110

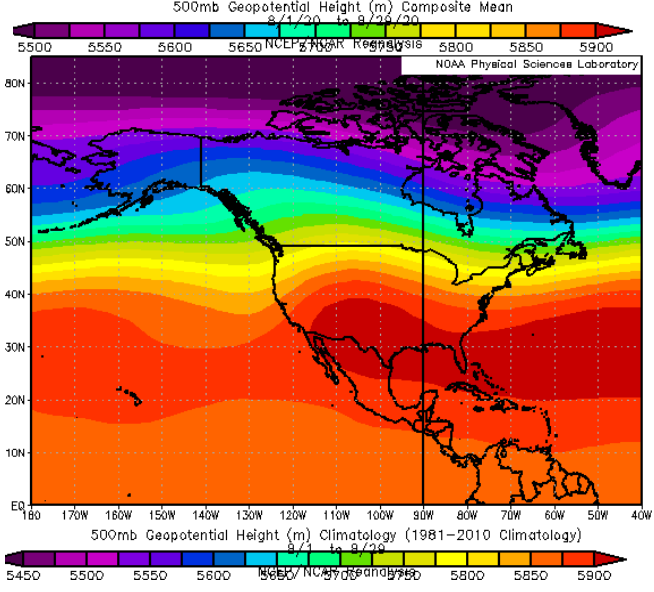
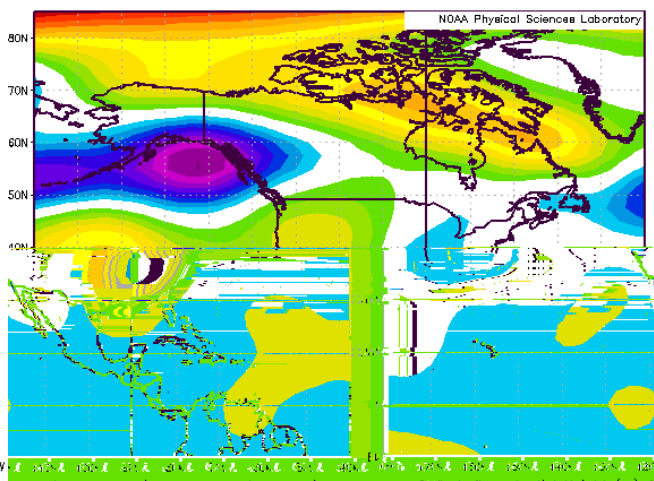
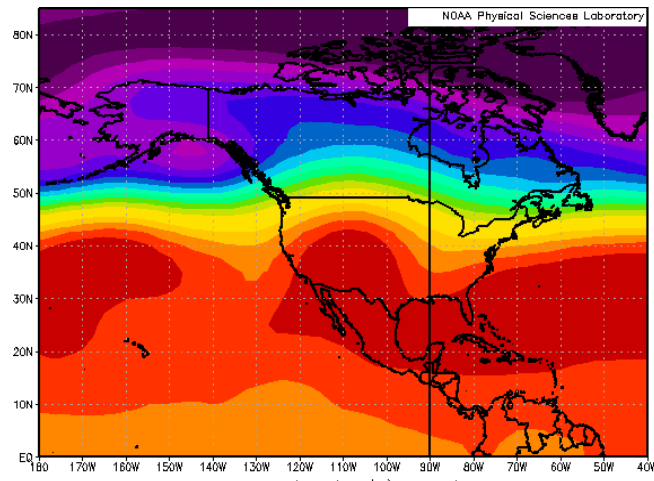
Rankings and Percentiles are 1=coldest, higher numbers=warmer.

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

Location					Oct 1 -				
	Aug	Normal	Rank	Pcntl	Aug	Normal	Rank	Pcntl	Years
Baker	9.7	10.1			10.8	11.2			22
Billings	8.1	8.9	81	94	11.1	10.7	37	43	84
Belgrade	5.7	6.0	43	78	5.8	5.6	31	56	55
Butte	5.5	6.9	45	79	5.5	6.6	44	78	56
Cut Bank	10.4	9.9	33	42	13.9	12.7	17	21	78
Dillon	7.5	7.5	42	62	9.7	9.1	19	28	66
Glasgow	10.4	10.6	21	27	10.4	10.5	44	58	75
Great Falls	8.8	9.6	61	73	12.0	12.2	45	54	82
Havre	9.3	8.2	20	15	10.7	9.1	7	5	131
Helena	6.1	6.6	121	86	7.1	7.0	106	76	140
Jordan	8.4	7.9	10	25	8.6	8.1	9	22	37
Kalispell	5.4	5.6	94	77	5.7	5.5	111	92	121
Lewistown	7.0	7.9	63	81	9.5	9.3	36	45	78
Livingston	8.7	11.0	53	95	15.2	15.4	23	42	53
Miles City	8.7	9.7	63	48	9.7	10.2	56	43	129
Missoula	5.0	6.1	72	85	4.9	5.7	72	85	85
Mullan Pass	3.8	4.9	27	87	4.8	5.6	26	89	29
Wolf Point	7.3	7.6			7.9	8.1			22
Glendive	9.0	10.1	22	79	9.8	10.4	21	75	28
Sidney	7.8	8.4	18	77	8.8	9.1	22	71	31
W Yellowstone	5.4	5.3			6.2	6.4			6

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 Division).



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=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.