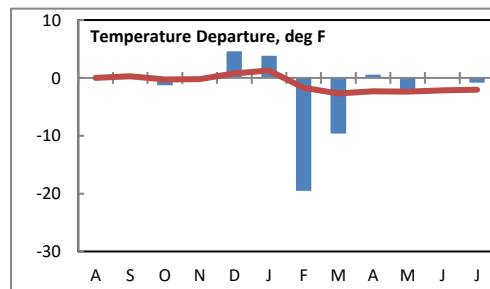
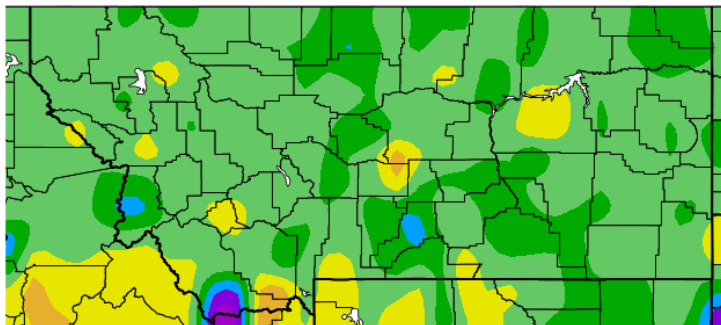


Montana Weather/Precipitation Summary

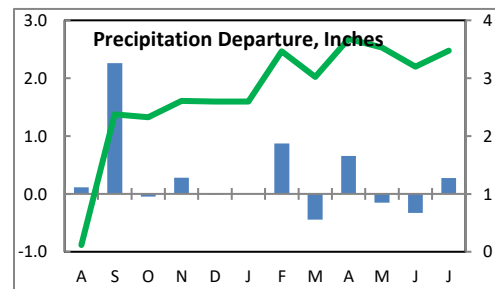
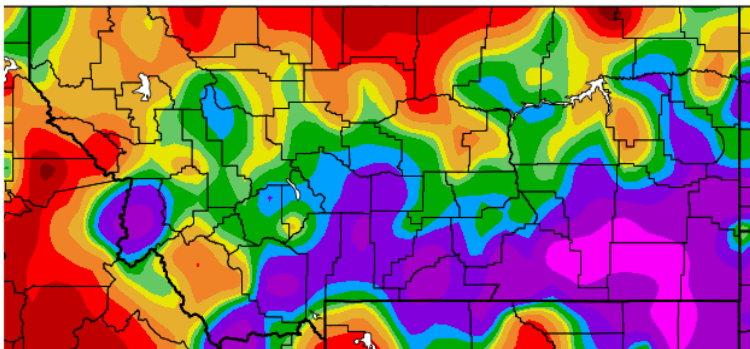
July 2019 NOAA's National Weather Service Great Falls Montana

July's average temperatures were a near to a couple of degrees above or below normal. Precipitation was variable with above normal amounts across the northeast and below normal over portions of the west. Winds averaged below normal. The upper level flow was generally from the west (Fig. 1), which was normal for the month.

July temperature anomalies ranged from 1.5°F below normal at Baker to 1.6°F above normal at Glasgow. The map below shows the variation. The warmest average temperatures were in eastern Montana. The warmest average temperature was at Broadus, with an average of 72.8°F, while the coolest was 51.6°F at Placer Basin (Sweet Grass). The highest temperature was 102°F at Jordan and Glasgow on the 24th. The coldest temperature was 23°F at Elk Park on the 20th. This absolute range of 79°F was close to average for July (July's record is 94°F). The statewide temperature average of 67.1°F was slightly cooler than normal and coolest since 2010. The red line on the graph shows the cumulative 12-month departure from normal, which is about 2°F below normal. See the state summary and temperature tables below for more details.



Precipitation was heaviest in southeast Montana. The highest amount (7.55-inches) fell at Albion. The statewide composite of 1.96-inches was 0.28" above normal. The green line on the precipitation graph shows the cumulative 12-month departure from normal, which is 3.5" above normal. See state summary and precipitation tables below for more details.



Percent of normal precipitation

Wind speed averages were below normal. Statewide, the month ranked as the fifth calmest July, with an average speed of 7.4-mph. The strongest averages were in eastern Montana. The composite statewide average was 0.8-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

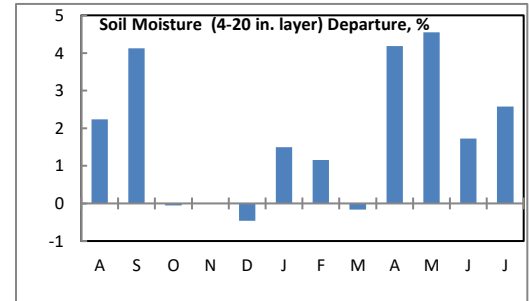
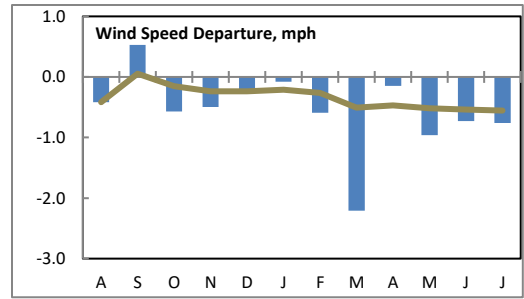
average is running 0.7-mph below normal. All months since January 2018 have had below average wind speeds.

Statewide soil moisture averages continued above normal for July (right). This data is from NRCS SCAN and SNOTEL, NOAA CRN and MT Mesonet stations. For July, this was the third wettest of record. 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 July had a period of severe thunderstorms over the east, with temperatures at or below normal. During this period, gusts of 78 mph were observed at Biddle and 73 mph at Glasgow. Hail to 1.75-inches fell at Ashland. Up to 6-inches of rain fell in the Powderville, and 4.5-inches around Nelson Creek.

Flooding was observed in many parts of southeast and northeast Montana. On the 12th, a severe thunderstorm produced gusts of 84-mph at Froid, with golf-ball size hail. With warmer conditions, thunderstorms continued...on the 13th, gusts of 67-mph occurred at Deer Lodge, with golf-ball size hail in Granite County. On the 13th, gusts of 92-mph were reported in the Saddle Butte area near Havre, with 1.5-inch hail at Helmville (Powell). With nearly daily severe thunderstorms continuing, an EF1 tornado occurred near Ridgeway (Carter) on the 19th. Heavy rain (3.7-inches) fell near Albion on the 21st, causing localized flash flooding. On the hottest day of the month (24th), 1.25-inch hail occurred at Pompeys Pillar. The last two days of the month also brought severe thunderstorm activity. Two-inch hail occurred at Peerless (Daniels), and on the 31st, 1.5-inch hail fell at Victor (Ravalli).



Precipitation/convection

Severe convective weather occurred on 20 days in July, which is 8 days above normal and the most recorded in any month since these records began in 1971.

July information:

High Temperature	102°F at Jordan and Glasgow (24 th)	Greatest Precip	7.55" near Albion (Carter)
Low Temperature	23°F at Elk Park (20 th)		
Warmest Ave Temp	72.8°F at Broadus	Peak Wind Gust	92 mph near Havre (13 th)
Coollest Ave Temp	51.6°F at Placer Basin		
Range of Temp departures	-1.6°F at Baker to +1.5 at Miles City	Highest Ave Wind	15.1 mph at Deep Creek RAWS 12.0 mph at Hillside
21 city mean monthly Temperature/Normal	60.3/60.3F normal. 39 th coldest of record (since 1880). 28 th percentile.	20 city mean monthly wind speed/Normal	7.4 mph/8.1 mph; 5 th calmest of record (since 1936). 8 th percentile.
22 city mean monthly precipitation/Normal	1.96"/1.68" – 86% of normal. 25 th wettest of record (since 1880). 81 st percentile.		

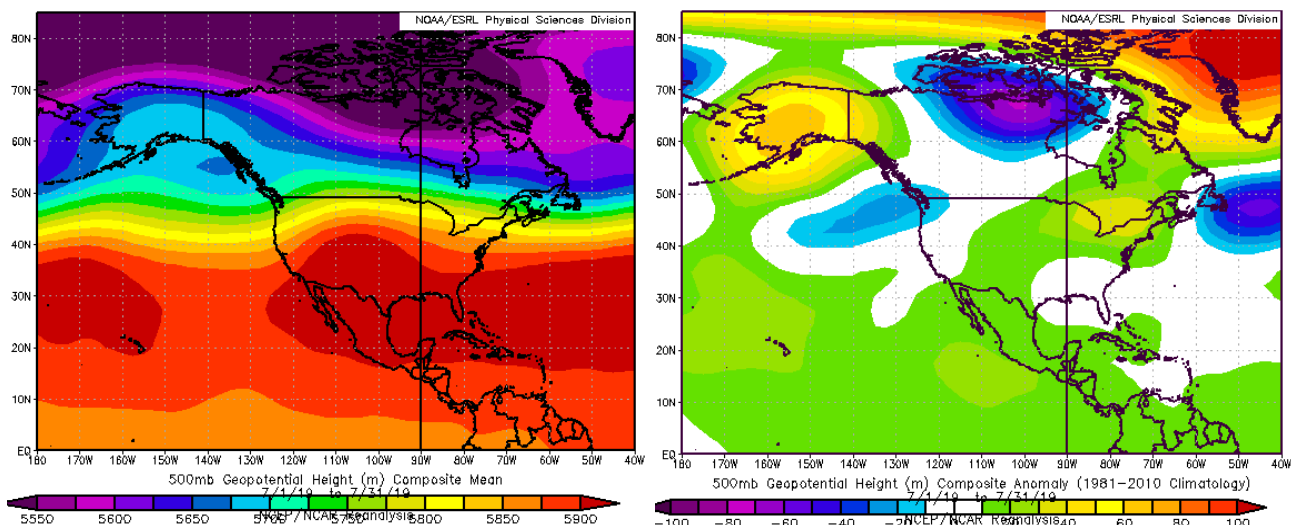


Figure 1. Mean flow at 500 millibars (~18,000 ft) for this month (upper left) and departure from normal (upper right).

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.nei.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.