

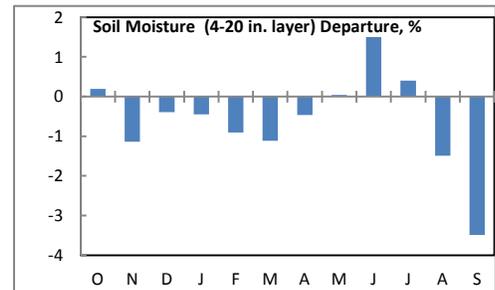
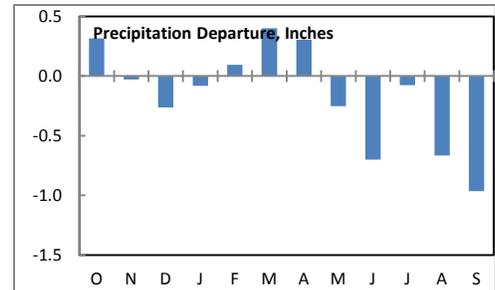
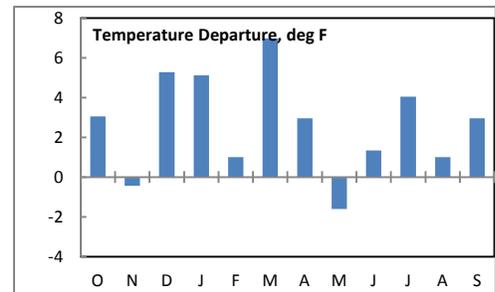
Montana Weather/Precipitation Summary

September 2012 by NOAA's National Weather Service Great Falls Montana

Dominated by a ridge of high pressure aloft (Fig. 1), September was a month of above normal temperatures and much below normal precipitation. Temperature anomalies ranged from near 1.7° below normal at Sidney to five degrees above normal at Dillon (Fig. 2). This was the fourth consecutive month with above average temperatures. As a statewide composite, for the past 12-months, there is a 2.6°F warm departure in average temperatures. Only two months in the past 12 have had temperature averages below normal (see temperature figure to right). The dryness of September is starkly reflected in Figure 3, the percentage of normal precipitation for the month. This figure illustrates that very little precipitation fell across the state. The wettest area was in the West Yellowstone area. Many locations recorded no measurable precipitation at all. Further, this is the fifth-consecutive month with below normal precipitation (see precipitation figure on right). The statewide composite over the past 12-months is 1.93-inches below normal). Several locations recorded their driest September of record. At Helena this September was the driest September *and* month of record. No precipitation for an entire month has occurred only once at Helena. No measurable precipitation has occurred in only nine months since December 1891 at Great Falls. This was the first September since 1934 that no precipitation fell at Billings, and since 1932 that no precipitation fell at Great Falls. The dryness is also reflected in the soil moisture at the end of the month. A composite of 30 locations across Montana shows deepening dryness in the soil (soil moisture figure on right). The average value of 12.5% in September is the lowest value since such records began in May 1995.

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

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



September 1-6

Above normal temperatures and dry conditions prevailed the first few days of September. Thunderstorms in the southwest produced winds to 61 mph near Livingston. Some power poles were snapped near Gallatin Gateway (Gallatin). The warmest temperature of the month occurred at Sidney (Richland) on the second, they reached 97F. A cold front brought rain and some snow to western Montana on the fifth and sixth. Around one-inch of rain fell at Hawkins Lake (Lincoln) and Somers (Flathead). Up to four inches of snow fell at Swiftcurrent Lookout in Glacier National Park.

September 7-24

Mainly dry and warm conditions continued through the rest of the month. Thunderstorms over the hi-line caused gusts to 59 mph near Kremlin (Hill) on the 9th, along with reports of hail. Pine Hill (Wibaux) topped out at 97F on the 10th. Meanwhile, gusty winds returned to the Rocky Mountain Front. Logan Pass recorded a gust to 85 mph. Cooler air settled across the state on the 11th and 12th. Record low temperatures occurred at Kalispell, falling to 24F. Wisdom (Beaverhead) had their coolest September temperature since 2000. They fell to 10F.

September 25-30

Light showers on the 25th ended a 24-day streak of no precipitation at Great Falls. Many parts of the state remained dry through the end of the month.

Precipitation/convection

Severe convective weather occurred on two days in September. The normal for the month is one day. Severe thunderstorms produced up to 61 mph winds (Park County).

September summary information:

High Temperature	97°F at Sidney (2 nd) and Pine Hill (Wibaux) (10 th)	Greatest Precip	1.32" at Red Rock RAWS (Beaverhead)
Low Temperature	10°F at Wisdom (12 th)		1.70" at Many Glacier SNOTEL (Glacier)
Warmest Ave Temp	66.1°F at Yellowtail Dam (Big Horn)	Peak Wind Gust	85 mph at Logan Pass (10 th)
Coollest Ave Temp	48.3°F at Wisdom (Beaverhead)		
Range of Temp departures	-1.7°F at Sidney (Richland) to +4.9°F at Dillon (Beaverhead)	Highest Ave Wind	11.5 mph at McDonalds (Roosevelt) 14.5 mph at Logan Pass (Glacier)
21 city mean monthly Temperature/Normal	59.2/56.2F 3.0F above normal. 24 th warmest of record (since 1880) 82 nd percentile.	20 city mean monthly wind speed/Normal	6.9 mph/8.4 mph; 3 rd calmest of record. (since 1936) 5 th percentile
22 city mean monthly precipitation/Normal	0.13/1.10" – 12% of normal; driest of record. (since 1880) 1 st percentile		

Water-year 2012 mean temperature was 46.0°F (normal is 43.3°F). This was the 4th warmest of record, and the warmest since 1981.

September composite precipitation of 0.13-inches was the driest of record.

The water-year mean precipitation was 12.72-inches, the 25th driest of record and the driest since 2002. Over a period for the calendar-year-to-date, the statewide mean precipitation is 9.98-inches, which is the 17th driest of record, and the driest since 2000. The mean water-year wind speed of 8.9-mph is 0.2-mph below normal, and the 20th calmest of record.

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

Location	Sep	% of Norm	Rank	Pcntl	Oct 1 – Sep 30	% of norm	Rank	Pcntl	Years
Baker	0.65	57%	3	14	10.63	91%			14
Billings	T	0%	1	1	7.41	50%	17	15	108
Belgrade	0.21	19%	7	8	8.59	61%	2	1	75
Butte	0.03	3%	3	2	8.69	68%	13	10	117
Cut Bank	0.05	4%	6	5	9.67	89%	30	28	104
Dillon	0.16	19%	11	14	6.40	61%	3	3	72
Glasgow	0.02	2%	3	2	12.64	108%	63	56	112
Great Falls	T	0%	1	1	12.58	85%	35	29	120
Havre	0.19	17%	16	11	11.13	99%	55	41	132
Helena	0.00	0%	1	1	7.86	70%	11	8	134
Jordan	0.03	2%			7.46	59%			14
Kalispell	0.44	32%	22	18	17.59	104%	85	72	118
Lewistown	0.02	1%	2	1	16.27	97%	47	40	116
Livingston	0.10	8%	5	4	9.03	61%	5	4	104
Miles City	0.02	2%	5	3	5.82	47%	2	1	135
Missoula	T	0%	3	2	14.36	101%	75	59	126
Mullan Pass	0.01	1%	1	1	45.21	119%	56	80	70
Wolf Point	0.02	2%			10.48	86%			14
Glendive	0.04	3%	3	2	12.85	95%	44	40	108
Sidney	0.14	11%	5	6	7.96	56%	2	1	71
BZN-MSU	0.21	15%	7	5	15.17	77%	16	12	125

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>

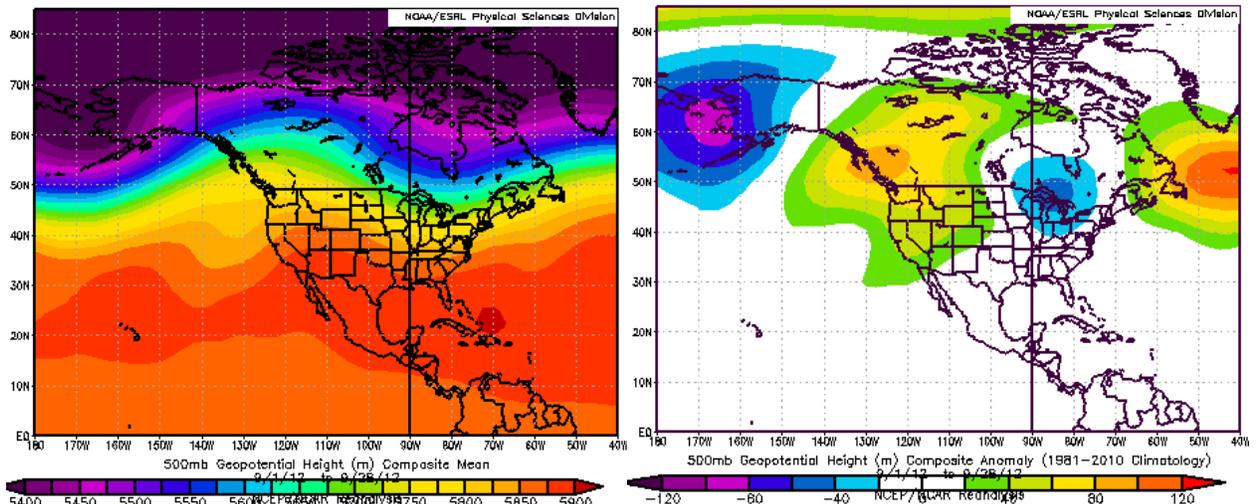


Figure 1a (left); 1b (right). Mean flow at 500 millibars (~18,000 ft) for September 2012 (left) and anomaly (right). Heights across Montana were above normal. This contributed to the warmer than normal temperatures and below normal precipitation.

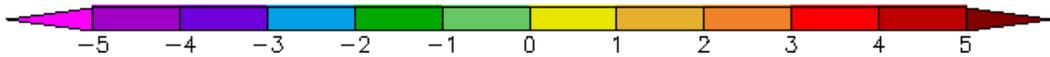
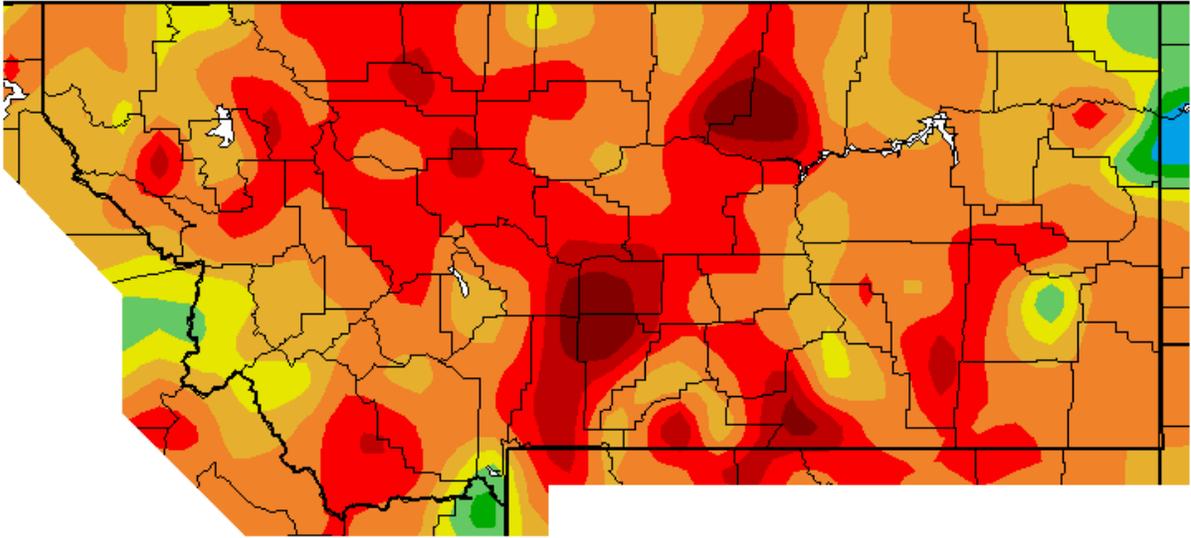


Figure 2.September 2012 Temperature anomalies (Western Region Climate Center).

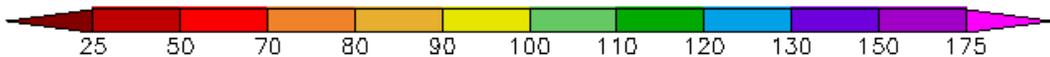
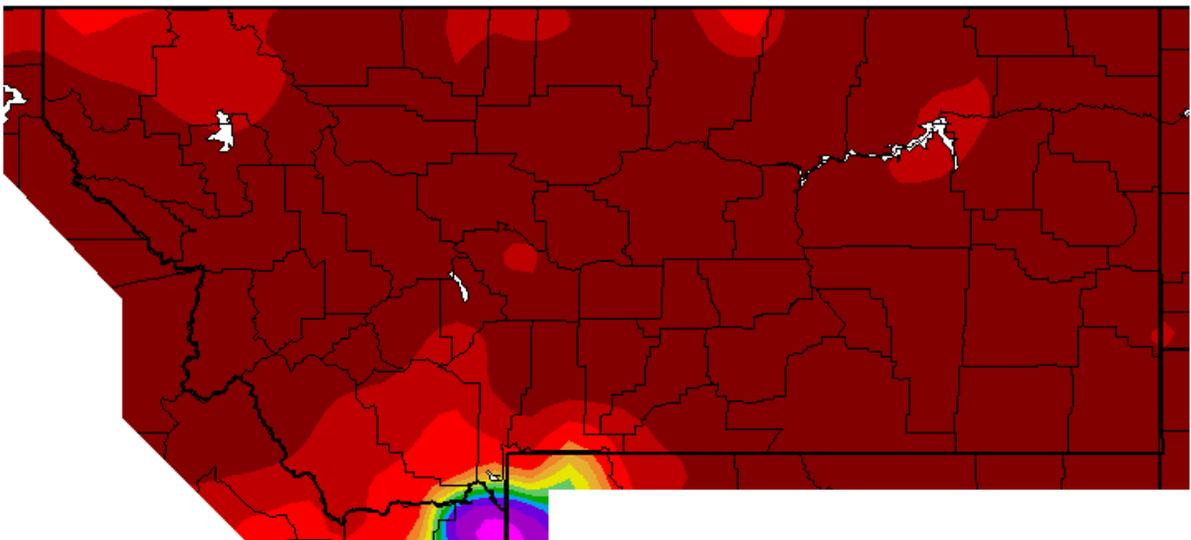


Figure 3. September 2012 Precipitation anomalies (Western Region Climate Center).

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/image.php?wfo=tx&type=data&loc=hydro&fx=watyr_pcntnorm.png

For the latest information on mountain snow pack from the NRCS, go to:
<http://www.mt.nrcs.usda.gov/snow/index.html>

For the latest U.S. Drought Monitor, issued weekly by the Climate Prediction Center (CPC), go to:
<http://www.drought.unl.edu/dm/monitor.html>

These data are preliminary and have not undergone final QC by NCDC. Therefore, these data are subject to revision. Final and certified climate data can be access at the National Climatic Data Center (NCDC) <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=tx>. 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.