

Montana Weather/Precipitation Summary

October 2009 by NOAA's National Weather Service Great Falls Montana

After a warm and dry September, October was cool and moist in most areas. It was the 16th coolest October of record across the state, with some areas recording their second coolest October of record. It was the coolest October since 2002 in most areas. A mean trough of low pressure dominated the weather bringing very cold temperatures for the first one-half of the month, with milder conditions during the later half. Temperatures ranged as much as 10 degrees below normal (Fig. 1).

A mean ridge dominated the west coast, with a mean trough of low pressure over north central North America for the month, which contributed to the below normal temperatures (Fig. 3). The trough was very deep during the first half of the month, with the coldest air over the Northern Hemisphere centered over Montana.

With precipitation spread throughout the month, precipitation was above normal most areas. Some mountain locations collected large amounts. Neihart measured nearly five inches of precipitation in October, while Flattop Mountain recorded nearly 9 inches (Fig. 2). Thunderstorms persisted into the early part of the month, with temperatures pushing close to 100F. Severe thunderstorms occurred near the middle of the month, but probably the biggest weather event occurred on the last day, when widespread snow fell over southwest Montana, with nearly 2-3 inches reported in the Bozeman area. Even with the late month precipitation, most of the state was below normal (Fig. 3).

Oct 1-8

Below normal temperatures and periods of precipitation dominated during this period. The month started out windy, with widespread wind damage in northwest Montana. Some docks were damaged on Flathead Lake while winds gusted to 87 mph at Logan Pass on the fourth. Heavy snow fell over the Rockies and southwest mountains. Beagle Springs (Beaverhead Co) picked up 15", while Badger Pass collected 8 inches. Snow continued across the west and southeast on the fifth. Red Lodge measured 20", while 9" fell south of Helena. All but the northeast saw some snow during this storm. Temperatures warmed ahead of the next cold system. Havre reached 67°F on the sixth. A cold front ushered in the big weather change to cold on the evening of October 8.

Oct 9-14

A strong cold front pushed across the state on the evening of the eighth, with bitter cold conditions following for the next few days. Hundreds of cold records fell during this period. Some areas had their earliest below zero temperatures, while other areas had their earliest and longest string of sub-freezing temperatures. A listing of records is found elsewhere in this report. Low temperatures fell to near -15°F. High temperature did not rise higher than the teens on a couple of days during this period. A slow warm-up began on the 13th, but temperatures remained below normal through the 14th. Temperatures were as much as 35-40 degrees below normal.

Oct 15-18

The warmest period during October was short-lived. While heavy rain fell over portions of northwest Montana (up to 1.25 inches fell), warmer temperatures and dry conditions prevailed east of the divide. The highest temperature for the month occurred on the 17th, while windy conditions returned with the warmer temperatures. Fort Benton reached 80°F. A gust to 64 mph occurred at Heart Butte on the 18th.

Oct 19-25

A cold front brought a return to near normal temperatures. A storm system brought heavy rain with some snow to central Montana. A location near Grass Range collected 1.62" of precipitation on the 19th. Close to 2" of snow fell as the rain was ending over central Montana. Gusty winds revisited the state on the 23rd. Gusts to 60 mph occurred near Wyola (Big Horn Co). Another cold

front brought showers to central and western Montana on the 24th. Thunderstorms with gusty winds and .75" hail occurred in the Great Falls vicinity.

Oct 26-31

The last week of October brought warm temperatures, then cold with heavy snow to the central Montana Island Ranges, then windy and warm on the last two days. Temperatures pushed into the 50s on the 26th across the state ahead of a cold front. The front brought much colder air, with some higher areas in the south central falling below zero. Otherwise, heavy snow fell over the Little Belts and Snowys. One location picked up three feet of snow in the Little Belts. Much warmer air returned on the 30th and 31st. Temperatures pushed into the lower 70s in southeast Montana, but very windy conditions prevailed along and just east of the continental divide. A location west of Pendroy recorded winds to 88 mph on the 30th and 109 mph on the 31st. Choteau reported some damage with gusts to 101 mph. Even Cut Bank reported a gust to 72 mph. Winds averaged near 30 mph all day from Cut Bank to Great Falls and west to the divide.

New Temperature Records for Oct 2009

Station	Record Type	New Record	Date	Previous Record	Year of Previous Record
Boulder	Low Daily Max	37	5	38	2000
Bozeman MSU	Low Daily Min	17	6	18	2000
Kalispell	Low Daily Min	14	8	16	1985
Billings	Low Daily Min	18	9	18	1993
Kalispell	Low Daily Min	10	9	12	1932
Cut Bank	Low Daily Max	19	9	30	1932
Dillon	Low Daily Max	35	9	35	1985
Glasgow	Low Daily Max	28	9	32	1985
Great Falls	Low Daily Max	22	9	25	1919
Havre	Low Daily Max	25	9	29	1919
Lewistown	Low Daily Max	22	9	27	1919
Billings	Low Daily Min	16	10	21	1987
Cut Bank	Low Daily Min	1	10	10	1977
Dillon	Low Daily Min	8	10	15	1987
Great Falls	Low Daily Min	4	10	14	1919
Helena	Low Daily Min	9	10	15	1987
Kalispell	Low Daily Min	5	10	16	1987
Lewistown	Low Daily Min	11	10	12	1987
Livingston	Low Daily Min	8	10	19	1980
Missoula	Low Daily Min	10	10	20	1973
Billings	Low Daily Max	24	10	33	2008
Bozeman	Low Daily Max	30	10	39	1946
Butte	Low Daily Max	22	10	36	1913
Cut Bank	Low Daily Max	20	10	26	1972
Dillon	Low Daily Max	26	10	33	2008
Great Falls	Low Daily Max	20	10	34	1959
Havre	Low Daily Max	28	10	29	1959
Helena	Low Daily Max	25	10	36	1959
Kalispell	Low Daily Max	34	10	39	1958
Lewistown	Low Daily Max	17	10	28	1959
Miles City	Low Daily Max	31	10	32	1959
Missoula	Low Daily Max	32	10	42	1985
Billings	Low Daily Min	14	11	22	1959
Bozeman	Low Daily Min	14	11	15	1987
Butte	Low Daily Min	13	11	14	1987
Dillon	Low Daily Min	12	11	17	1986

Great Falls	Low Daily Min	10	11	21	1969
Helena	Low Daily Min	14	11	17	1881
Kalispell	Low Daily Min	6	11	20	1987
Lewistown	Low Daily Min	5	11	18	1969
Livingston	Low Daily Min	2	11	17	1986
Missoula	Low Daily Min	11	11	20	1990
Billings	Low Daily Max	23	11	28	1969
Bozeman	Low Daily Max	27	11	29	1985
Butte	Low Daily Max	23	11	32	1969
Cut Bank	Low Daily Max	20	11	28	1972
Dillon	Low Daily Max	26	11	29	2008
Great Falls	Low Daily Max	23	11	30	1969
Helena	Low Daily Max	26	11	30	1899
Kalispell	Low Daily Max	32	11	36	1899
Lewistown	Low Daily Max	20	11	27	1969
Miles City	Low Daily Max	29	11	33	1969
Missoula	Low Daily Max	30	11	44	1981
Billings	Low Daily Min	13	12	22	1969
Bozeman	Low Daily Min	11	12	18	1969
Butte	Low Daily Min	6	12	10	2008
Cut Bank	Low Daily Min	-3	12	6	2002
Dillon	Low Daily Min	12	12	14	2008
Great Falls	Low Daily Min	13	12	16	2002
Helena	Low Daily Min	8	12	14	1881
Kalispell	Low Daily Min	2	12	14	2002
Lewistown	Low Daily Min	7	12	18	1969
Livingston	Low Daily Min	1	12	18	1969
Missoula	Low Daily Min	8	12	22	2002
Cut Bank	Low Daily Max	29	12	30	1969
Glasgow	Low Daily Max	31	12	31	1928
Kalispell	Low Daily Max	36	12	37	1899
Miles City	Low Daily Max	33	12	33	2008
Missoula	Low Daily Max	33	12	35	1969
Choteau	Low Daily Max	30	13	38	1966
Glasgow	Low Daily Max	35	13		
Glasgow	Low Daily Max	34	14		

Precipitation

Severe weather occurred on no days in October. A strong thunderstorm with ¾-inch hail occurred at Great Falls on the 24th.

Precipitation was generally above normal across the state. There were small dry areas near Cut Bank, Missoula and south of Billings

New Precipitation Records for Oct 2009

Station	Record Type	New Record	Date	Previous Record	Year of Prev Record
Missoula	Daily Max Snowfall	1.0	9	1.0	1905
Havre	Daily Max Snowfall	1.0	14	1.0	1992
Bozeman	Daily Maximum Rainfall	0.45	19	0.45	1943
Butte	Daily Maximum Rainfall	0.76	19	0.36	1894
Dillon	Daily Maximum Rainfall	0.86	19	0.36	1943
Helena	Daily Maximum Rainfall	0.59	19	0.22	1963

Big Sky 2WNW	Monthly Max Snowfall	30.4		20.7	2004
Cascade 20SSE	Monthly Max Snowfall	28.1		13.0	1984
Millegan 14SE	Monthly Max Snowfall	49.0		27.0	1984
Neihart	Monthly Max Snowfall	48.3		25.0	1981
Millegan 14SE	Monthly Max Precip	3.56		2.44	2006
Neihart	Monthly Max Precip	4.90		4.24	2006

Other Information

Billings and Dillon recorded their second coolest October of record. Kalispell and Livingston had their third coolest of record, while Lewistown and Missoula recorded their fourth coolest of record. At Great Falls and Butte the fifth coolest October of record occurred.

The gust to 109 mph near Pendroy on the 31st set a new monthly gust record in Montana. The old record was 106 mph at Logan Pass and near Babb.

October summary information:

High Temperature	80°F at Fort Benton (17 th)	Greatest Precip	4.90" at Neihart 11.80" at Poorman SNOTEL
Low Temperature	-16°F at Utica 22SW (10 th)		
Warmest Ave Temp	44.4°F at Superior	Peak Wind Gust	109 mph at Pendroy 17WNW
Coolest Ave Temp	29.9°F at Cooke City		
Range of Temp departures	-2.3°F at Sula to -10.9F at Cascade 20SSE	Highest Ave Wind	17.1 mph at McDonalds DOT (northeast) 17.5 mph at Deep Creek RAWS
18 city mean monthly Temperature/Normal	36.2/42.3 coolest since 2002; 16 th coolest. CY: 43.8/44.2		
18 city mean monthly precipitation/Normal	1.31"/1.06" – 123% of normal - 19 th wettest CY: 11.65/12.76 – 41 st driest	18 city mean monthly wind speed/Normal	9.1 mph/8.9 mph 39 th windiest CY: 8.5/9.2 - 5 th calmest

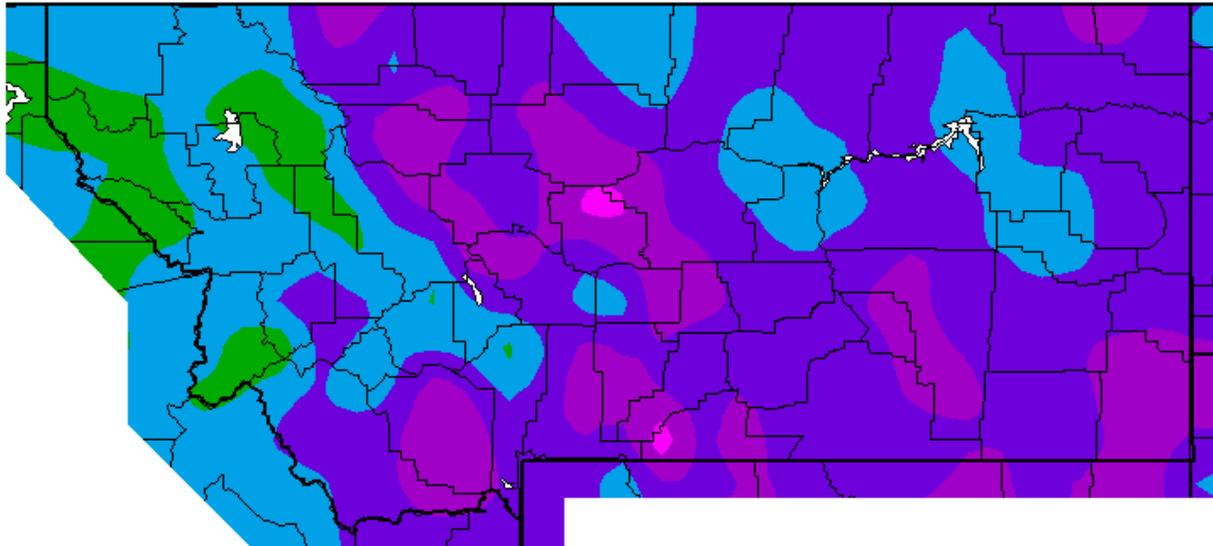


Figure 1. Average temperature departure from normal for October 2009. Temperatures were below normal across the state (Western Region Climate Center).

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

Location	Oct	% of Norm	Rank	Pcntl	Oct 1 – Oct 31	% of norm	Rank	Pcntl	Years
Baker	1.31	109%			1.31	109%			12
Billings	1.45	115%	79	78	1.45	115%	79	78	101
Belgrade	0.98	88%	37	51	0.98	88%	37	51	73
Butte	1.28	162%	93	80	1.28	162%	93	80	116
Cut Bank	0.29	62%	45	43	0.29	62%	45	43	103
Dillon	1.10	172%	56	80	1.10	172%	56	80	70
Glasgow	0.83	117%	75	66	0.83	117%	75	66	113
Great Falls	1.49	160%	102	86	1.49	160%	102	86	118
Havre	0.79	127%	89	68	0.79	127%	89	68	130
Helena	0.89	135%	88	67	0.89	135%	88	67	130
Jordan	1.67	176%			1.67	176%			13
Kalispell	1.29	134%	91	78	1.29	134%	91	78	116
Lewistown	2.12	200%	103	90	2.12	200%	103	90	114
Livingston	1.40	95%	72	67	1.40	95%	72	67	107
Miles City	1.09	96%	93	70	1.09	96%	93	70	133
Missoula	0.62	75%	44	33	0.62	75%	44	33	130
Mullan Pass	4.13	139%	53	75	4.13	139%	53	75	70
Wolf Point	0.95	105%			0.95	105%			12
Glendive	1.66	168%	96	84	1.66	168%	96	84	113
Sidney	1.37	134%	56	80	1.37	134%	56	80	70
BZN-MSU	1.21	75%	55	42	1.21	75%	55	42	131

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>

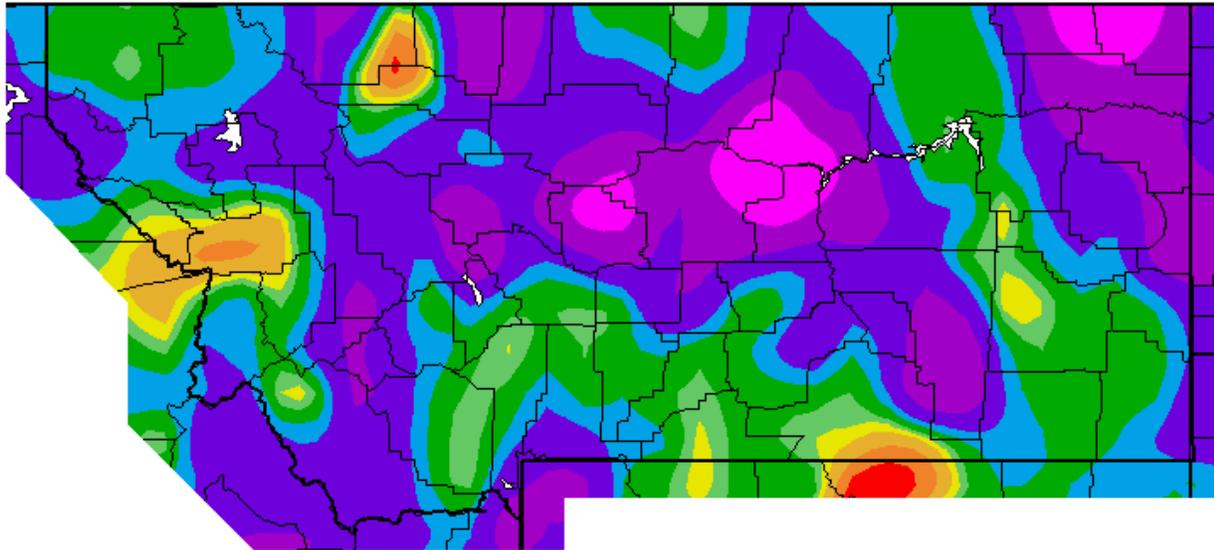


Figure 2. Precipitation anomaly (% of normal) for October. (Western Regional Climate Center).

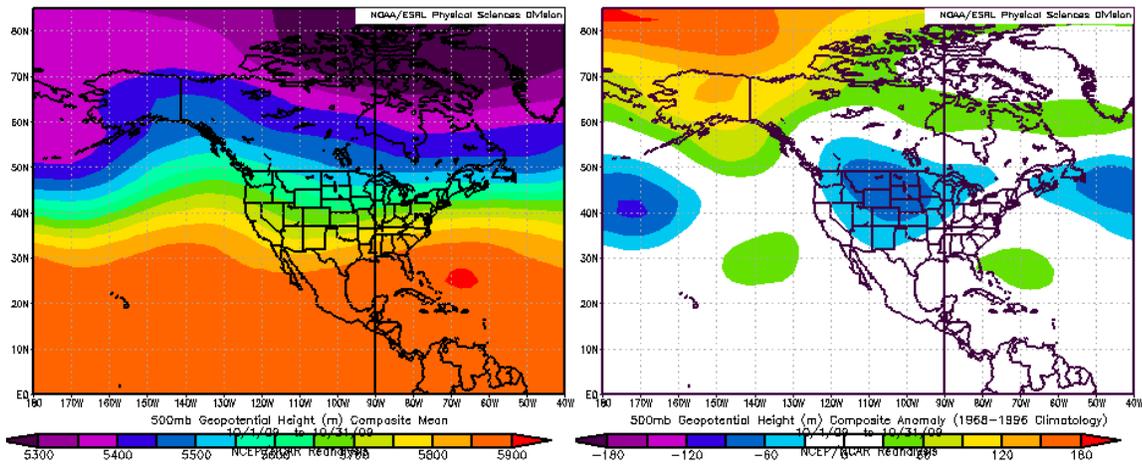


Figure 3. October 2009 mean flow at 500 mb (18000 ft) (left) with the departure from normal (right).

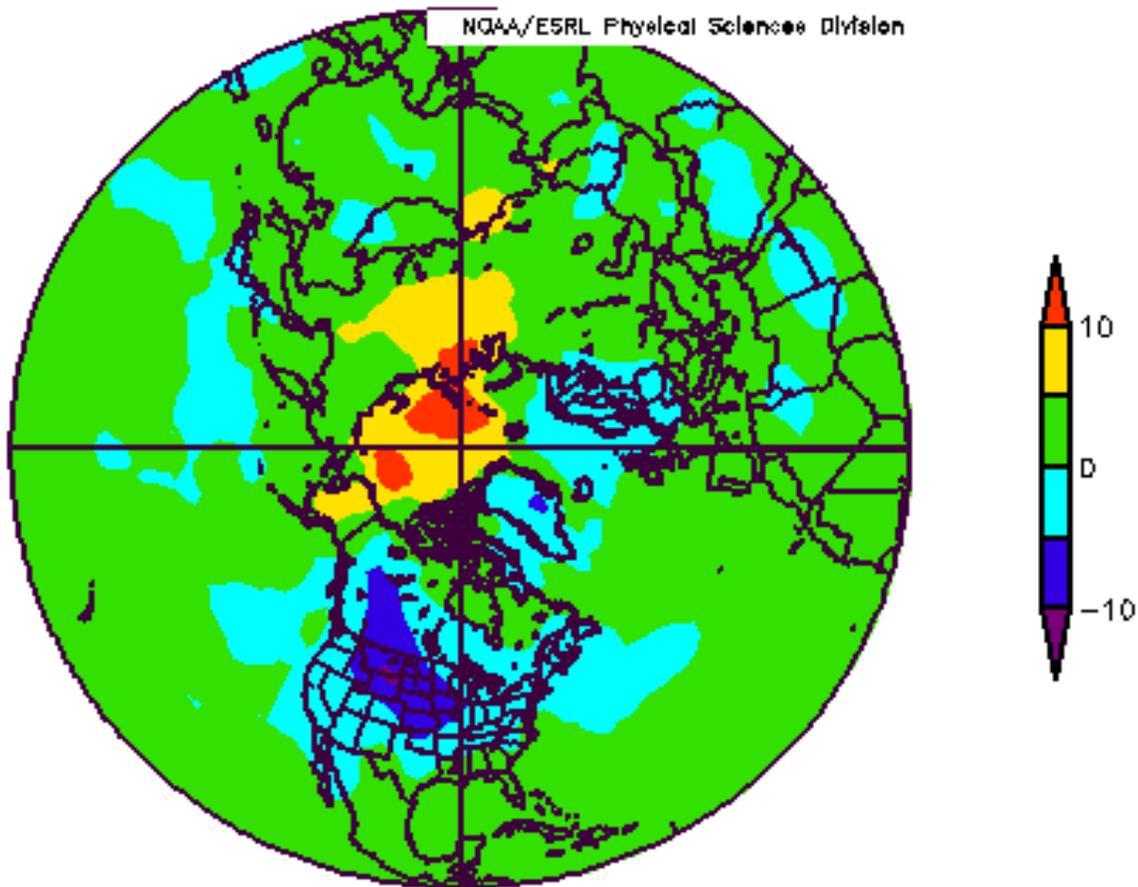


Figure 4. Temperature anomaly from October 1-15, 2009. Note the purple are over southern Montana and northern Wyoming. Temperatures were as much as eleven degrees below normal ($^{\circ}\text{C}$) for this period (NOAA ESRL Physical Sciences Division).

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=tfx&type=data&loc=hydro&fx=watyr_pcnorm.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 accessed 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=tfx>