

Montana Weather/Precipitation Summary

February 2011 by NOAA's National Weather Service Great Falls Montana

With a weakening La Nina, February produced another month of wintry weather across Montana. West-northwest flow aloft (Fig. 2) produced regular disturbances to provide ample snowfall to some portions of the state. This pattern also allowed polar air to overspread the state for much of the month. Temperatures in Montana during February were below to much below average. Precipitation and snowfall totals varied widely.

Temperatures across the state (Fig. 1) in February were averaged 16.5F, over eight degrees below average. This produced the 24th coolest February, and the coolest February since 2001. Temperatures averaged coolest across northern portions of the state (Fig. 3).

Precipitation and snowfall amounts for the month were above average (Fig. 1). The statewide average of 1.01 inches was a 0.39-inch surplus or 162 percent of average for the month. This was the 13th wettest of record, and the third consecutive month of above normal precipitation. Snow and precipitation were heaviest over the western mountains and portions of central Montana. A large portion of eastern and valleys of southwest Montana recorded below normal precipitation. Precipitation was above normal in most areas (Fig. 4). In some areas of northeast Montana, this was one of the wettest Januarys of record. Snow-on-ground totals were near 145 inches at a few locations in the Mission and Swan Ranges.

Wind speeds continued to be slightly above normal. The February average of 10.1 mph was 1.2 mph above normal, or the 26th windiest February of record.

February 1-5

After a bitterly cold start, temperatures warmed to above normal in most areas. On the 1st, high temperatures were near -20F and low temperatures lower than -40F along the hi-line. Simpson was the cold spot in the state, reporting -47F. Glasgow and Livingston reported record low minimums on the 1st. The cold air caused temperatures to be nearly 50F below normal on the 1st. Warming on the 2nd through 5th brought a bout of precipitation across portions of the state, and windy conditions along the Rocky Mountain Front. Rain fell across portions of southeast Montana, while Fisher Creek (Park) picked up 18 inches of snow. Across northeast Montana, 3-4 inches of snow fell on the 2nd. Winds gusted to 93 mph near East Glacier, with 72 mph gusts west of Bynum on the 3rd. A new weather system moving in on the 5th brought heavy snow to central Montana. Over two feet of snow fell in the Little Belts, with 8 inches at Bridger Bowl.

February 6-11

A storm that dropped heavy snow and brought blowing snow to much of the state moved across in the 6th through 8th. Again, heavy snow fell in central Montana. The Highwood Mountains picked up 16 inches with three-foot drifts. Klein (Musselshell) reported 15 inches, while Billings picked

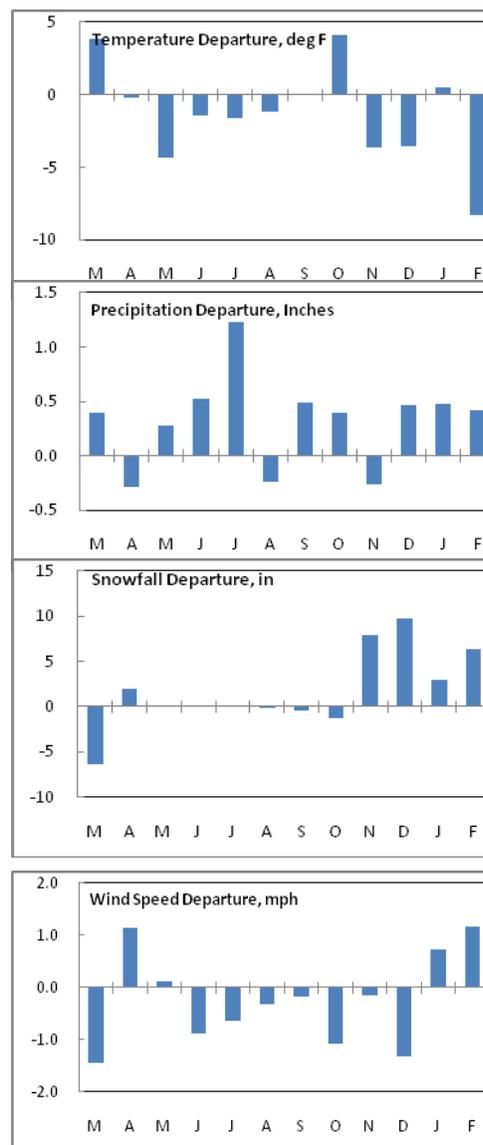


Figure 1. Statewide departures from normal for 18 locations.

up 6.5 inches of snow. Severe drifting in northeast Montana caused road closures near Plentywood (Sheridan). Over 16 inches of snow fell at Great Falls over a 3-day period. A new weather system affected western Montana on the 7th. Sixteen-inches of snow fell at Lindburgh Lake (Missoula). At Missoula, 9.7 inches of snow fell over a 24-hour period. This was the third highest 24-hour amount in February at Missoula, and the 7th highest all-time 24-hour amount. Temperatures fell as low as -38F at West Yellowstone on the 8th, after the storm moved eastward. Cold temperatures were also across northern Montana. On the 9th, warmer air began to spread across the plains. At Kevin, the temperature warmed 51 degrees in three hours, from -30F at 716 am to 21F at 1016 am. As usual, gusty west winds blew along the Rocky Mountain Front.

February 12-16

The warmest period of the month was also the windiest. One of the strongest jet streams in years moved across the state on the 12th and 13th. Winds averaged 46.1 mph at Livingston on the 12th. This was the strongest daily average wind at Livingston since January 25, 2002. Winds gusted to 77 mph. Farther west, the strong winds crashed onto the plains east of the Rocky Mountain Front. Both Heart Butte and Choteau reported gusts to 114 mph. These were the strongest winds on the plains since November 2006. The gusts could have been higher. At both locations, the wind gusts blew over the anemometers. Winds at 18,000 feet were the highest of record in February from the Great Falls upper air sounding. Speeds reached 130 mph. Ground-blizzard conditions occurred from Babb through Heart Butte areas. Widespread damage was reported in the state. Trees were blown over in the Red Lodge area, with many power lines down. Horse trailers and a semi trailer were blown over near Conrad. Cut Bank recorded their highest February wind gust since 1972 when gusts reached 75 mph. In spite of the wind, temperatures were the warmest of the month. Many areas reached the 50s, with Billings reaching 65F on the 15th. The warming caused some rivers and streams to rise, with ice jam conditions reported for a time on the Flatwillow Creek and Musselshell River in central Montana. Several record high temperatures were set on the 14th and 15th. By the 16th, colder air moved into the state, accompanying another storm system. Heavy snow fell across the northern Rockies, with over a foot of snow falling near Marias Pass.

February 17-23

Temperatures plummeted once again, with lows dropping into the -20F range on the 19th. This was also a snowy period. On the 17th, Mullan Pass collected 14.5 inches of snow. From the 19th-21st, portions of the southeast measured over a foot of snow. Carlyle (Wibaux) reported 14 inches, with two-foot drifts. Record low maximum temperatures were established at several locations on the 20th. Great Falls reached only 0F on the 19th. Warmer and windy conditions pushed into the state on the 21st and 22nd. Winds also returned. Areas along the Rocky Mountain Front saw gusts to 67 mph on the 21st. Meanwhile, heavy snow fell. West Yellowstone and the Bridgers picked up 14 inches of snow. Areas to the northwest, including Many Glacier, Eureka and portions of Ravalli County measured 10 to 14 inches of new snow. Some areas in the Mission Mountains had over 12 feet of snow on the ground.

February 24-28

Cold air settled across the state once again, with temperatures plummeting to -35F at Cut Bank. This was the coldest so late in the season at Cut Bank. Temperatures only reached -10F at Great Falls and Havre. This was the coldest high temperatures so late in the season at Great Falls. On the 26th, Miles City dropped to -31F. This is the coldest so late in the season at Miles City. By the 27th and 28th, warmer air returned to much of the state, with high temperatures reaching the lower 40s. On the 28th, yet another polar cold front pushed into northern Montana, dropping temperatures below zero once again.

New Temperature Records for the current month

Station	Record Type	New Record	Date	Previous Record	Year of Previous Record
Glasgow	Low Daily Max	-21	1	-20	1905
Livingston	Low Daily Min	-20	1	-20	1989
Bozeman	High Daily Min	40	12	36	1981
Glasgow	High Daily Min	32	12	28	1987
Kalispell	High Daily Min	38	12	36	1924
Miles City	High Daily Min	35	12	33	1991
Helena	High Daily Max	58	14	58	1921
Livingston	High Daily Min	41	14	41	1981
Billings	High Daily Max	62	15	61	1982
Butte	High Daily Min	34	15	34	1981
Dillon	High Daily Min	33	15	33	1961
Helena	High Daily Max	58	15	58	1982
Helena	High Daily Min	42	15	39	1913
Livingston	High Daily Max	58	15	58	1991
Livingston	High Daily Min	44	15	43	1982
Billings	Low Daily Max	2	20	6	1957
Butte	Low Daily Max	11	20	15	1918
Dillon	Low Daily Max	12	20	12	1957
Lewistown	Low Daily Max	2	20	2	1957
Miles City	Low Daily Max	3	20	6	1957
Miles City	Low Daily Min	-18	21	-17	1949
Billings	Low Daily Max	3	24	3	1962
Butte	Low Daily Max	5	24	5	2003
Kalispell	Low Daily Max	7	24	8	1919
Livingston	Low Daily Max	5	24	6	2003
Miles City	Low Daily Max	0	24	3	1993
Billings	Low Daily Max	-2	25	6	1962
Billings	Low Daily Min	-14	25	-10	1994
Bozeman	Low Daily Max	3	25	7	1962
Cut Bank	Low Daily Max	-9	25	-3	1919
Cut Bank	Low Daily Min	-35	25	-24	1993
Dillon	Low Daily Min	-16	25	-15	2002
Glasgow	Low Daily Max	-9	25	-1	1962
Great Falls	Low Daily Max	-10	25	1	1962
Helena	Low Daily Min	-19	25	-19	1890
Lewistown	Low Daily Max	-6	25	2	1962
Lewistown	Low Daily Min	-23	25	-19	1945
Livingston	Low Daily Min	-20	25	-15	2002
Miles City	Low Daily Max	-7	25	7	1962
Miles City	Low Daily Min	-28	25	-16	1993
Missoula	Low Daily Max	13	25	13	1962
Glasgow	Low Daily Min	-30	26	-30	1917
Miles City	Low Daily Min	-31	26	-20	1962

Precipitation

Severe convective weather occurred on zero days in February.

Precipitation totals were mixed across the state, from much above normal northeast, to areas of below normal from the Rocky Mountain front through the southwest and south central (Fig. 4).

New Precipitation Records for the current month

Station	Record Type	New Record	Date	Previous Record	Year of Previous Record
Great Falls	High Daily Precip	0.17	5	0.15	1933
Billings	High Daily Precip	0.29	7	0.27	1975
Billings	High Daily Snow	6.3	7	4.0	2001
Great Falls	High Daily Snow	9.4	7	8.0	1938
Helena	High Daily Snow	5.7	7	5.0	1975
Missoula	High Daily Precip	0.32	16	0.29	1952
Glasgow	High Daily Snow	4.7	17	2.7	1952
Glasgow	High Daily Precip	6.6	20	2.7	1993
Helena	High Daily Precip	0.20	20	0.16	1901
Missoula	High Daily Snow	2.4	20	1.5	2005
Livingston	High Daily Precip	0.21	21	0.14	1968
Great Falls	High Month Snow	31.7		28.8	1958

New Wind Gust Records for the current month

Station	Record Type	New Record	Date	Previous Record	Year of Previous Record
Helena	High Daily Gust	59	4	56	1952
Cut Bank	High Daily Gust	75	12	59	1948
Dillon	High Daily Gust	40	12	33	1991
Kalispell	High Daily Gust	43	12	39	2007
Lewistown	High Daily Gust	53	12	38	1991
Livingston	High Daily Gust	77	12	72	1976
Billings	High Daily Gust	56	13	48	2008
Bozeman	High Daily Gust	44	13	38	2008
Butte	High Daily Gust	44	13	38	2008
Dillon	High Daily Gust	55	13	41	1979
Glasgow	High Daily Gust	62	13	43	2008
Helena	High Daily Gust	55	13	51	2008
Lewistown	High Daily Gust	58	13	45	2002
Miles City	High Daily Gust	49	13	41	2008
Missoula	High Daily Gust	48	13	39	1995
Bozeman	High Daily Gust	32	14	32	1981
Dillon	High Daily Gust	45	14	45	2007
Bozeman	High Daily Gust	44	15	34	1985
Bozeman	High Daily Gust	45	16	44	1972
Bozeman	High Daily Gust	41	17	40	1986
Cut Bank	High Daily Gust	69	26	49	1965

February summary information:

High Temperature	65°F at Billings (15 th)	Greatest Precip	7.91" at Mullan Pass
Low Temperature	-47°F at Simpson (1 st)		10.1" at Stahl Peak SNOTEL (Lincoln)
Warmest Ave Temp	27.9°F at Heron	Peak Wind Gust	114 mph at Choteau and Heart Butte (12 th)
Coollest Ave Temp	7.7°F at Westby		
Range of Temp departures	-0.8°F at Libby 30SSE to -11.7°F at Del Bonita	Highest Ave Wind	20.2 mph at Livingston and 20.3 mph at Deep Creek
18 city mean monthly Temperature/Normal	16.5/24.8; 24 th coolest of record (since 1880)	18 city mean monthly wind speed/Normal	10.1 mph/8.9 mph; 26 th windiest of record (since 1936)
18 city mean monthly precipitation/Normal	1.01/0.62" – 1.2 times normal; 13 th wettest of record (since 1880)		

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

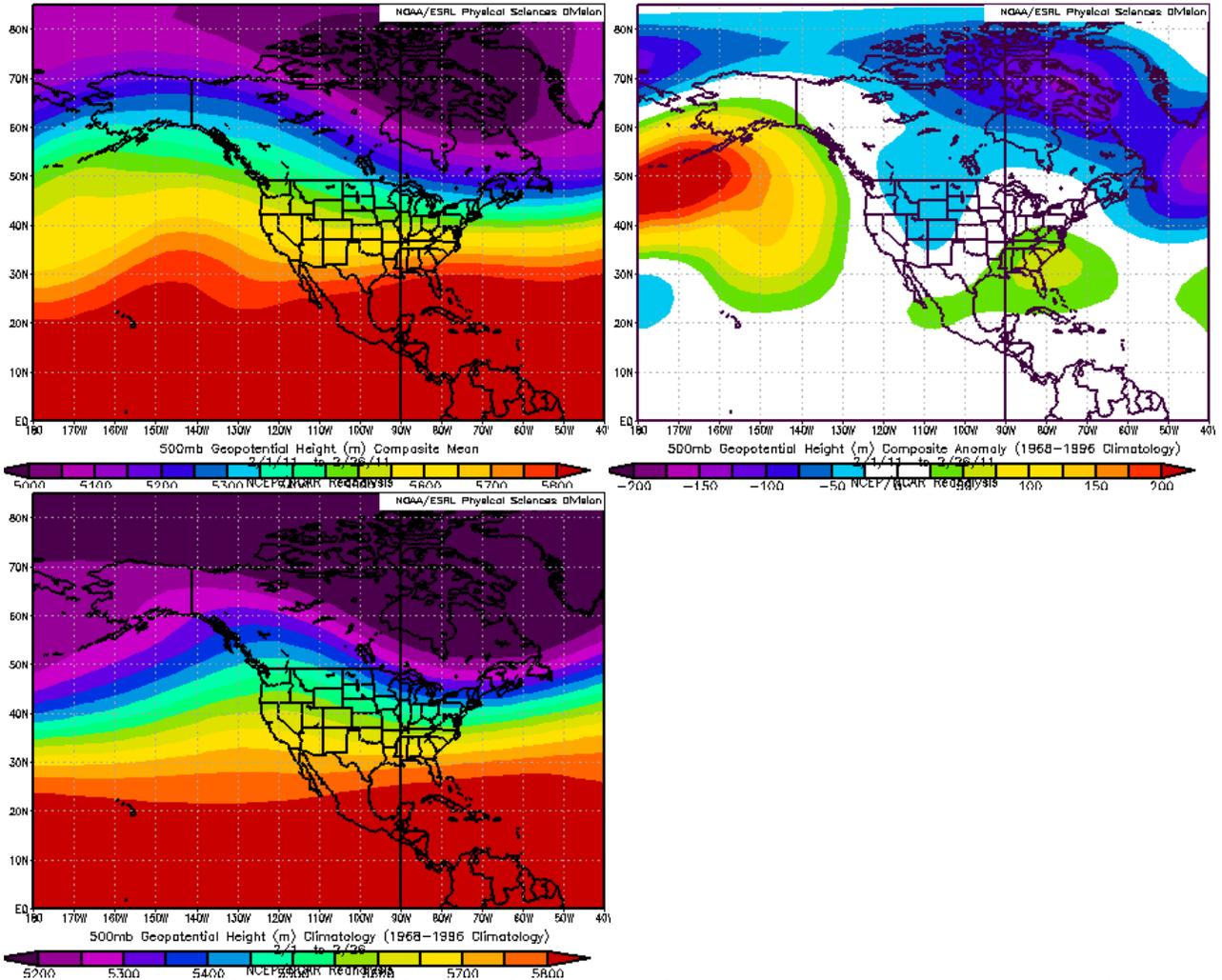
Location	Feb	% of Norm	Rank	Pcntl	Oct 1 – Feb 28	% of norm	Rank	Pcntl	Years
Baker	0.26	81%			1.81	73%			13
Billings	0.72	124%	80	78	4.43	109%	83	81	102
Belgrade	0.30	56%	27	35	3.10	85%	38	51	74
Butte	0.39	83%	54	46	2.50	86%	44	37	117
Cut Bank	0.10	36%	23	21	1.00	53%	18	17	104
Dillon	0.02	10%	8	10	1.92	114%	41	57	71
Glasgow	0.47	181%	85	74	4.60	221%	108	96	112
Great Falls	1.77	347%	120	100	5.99	177%	116	97	119
Havre	0.32	89%	57	43	3.89	161%	115	88	131
Helena	0.92	242%	118	88	3.69	148%	101	76	133
Jordan	0.45	128%			3.91	177%			13
Kalispell	1.16	101%	74	62	8.83	132%	13	10	117
Lewistown	0.40	70%	36	30	4.35	106%	75	65	115
Livingston	0.42	60%	57	51	2.73	64%	34	31	108
Miles City	0.15	44%	30	22	1.59	54%	27	20	134
Missoula	1.82	236%	130	96	7.48	157%	118	90	131
Mullan Pass	7.91	216%	68	99	32.15	169%	67	96	70
Wolf Point	0.07	60%			1.70	103%			13
Glendive	0.28	54%	58	49	3.24	116%	85	76	112
Sidney	0.59	164%	63	87	4.88	168%	68	97	70
BZN-MSU	1.06	151%	105	79	5.03	100%	66	50	132

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>

For the December through February winter season, temperatures averaged below normal. The statewide average temperature was 18.2F, 3.8F below normal. This was the 30th coolest season of record. The precipitation average of 1.11 inches was 0.41 inches above normal. This was the 34th wettest winter season of record. Winds have averaged a bit above normal this winter. The average of 9.3 mph is 0.2 mph above normal. Snow has been the big story this winter. The statewide average of 46.9 inches from December through February is 20.7 inches above normal. This ranks as the third snowiest winter season of record, and the snowiest since 1907.



Figures 2a (top-left), 2b (top-right) and 2c (bottom-right). Mean flow at 500 millibars (~18,000 ft) for February (top-left). A mean ridge of high pressure was displaced of the west coast of North America (1a). Normally, the ridge is along the Rocky Mountains (1c). This produced below normal heights across Montana in February.

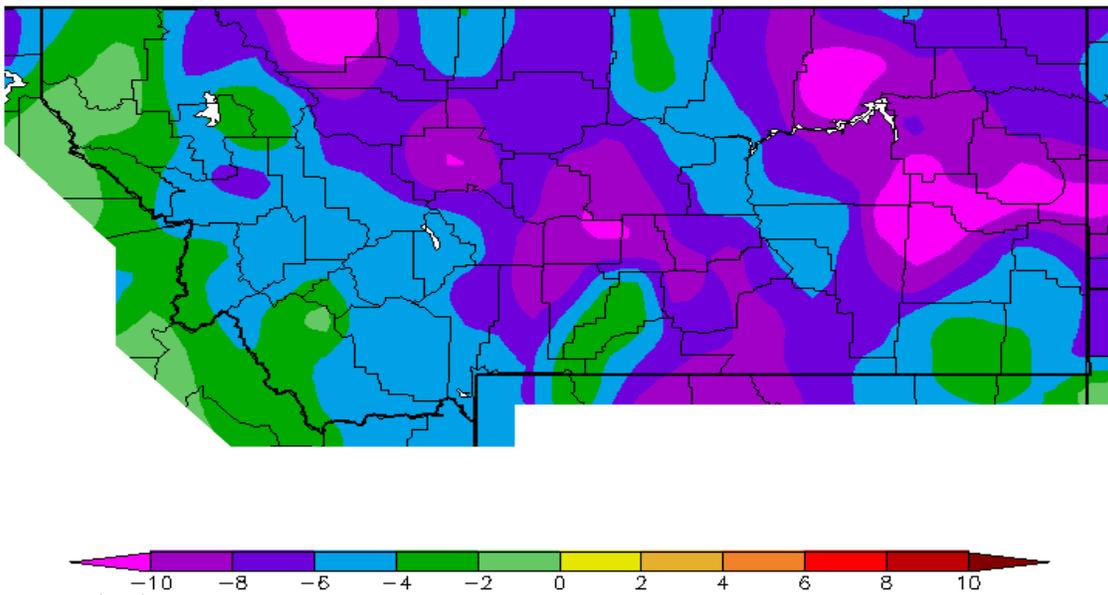
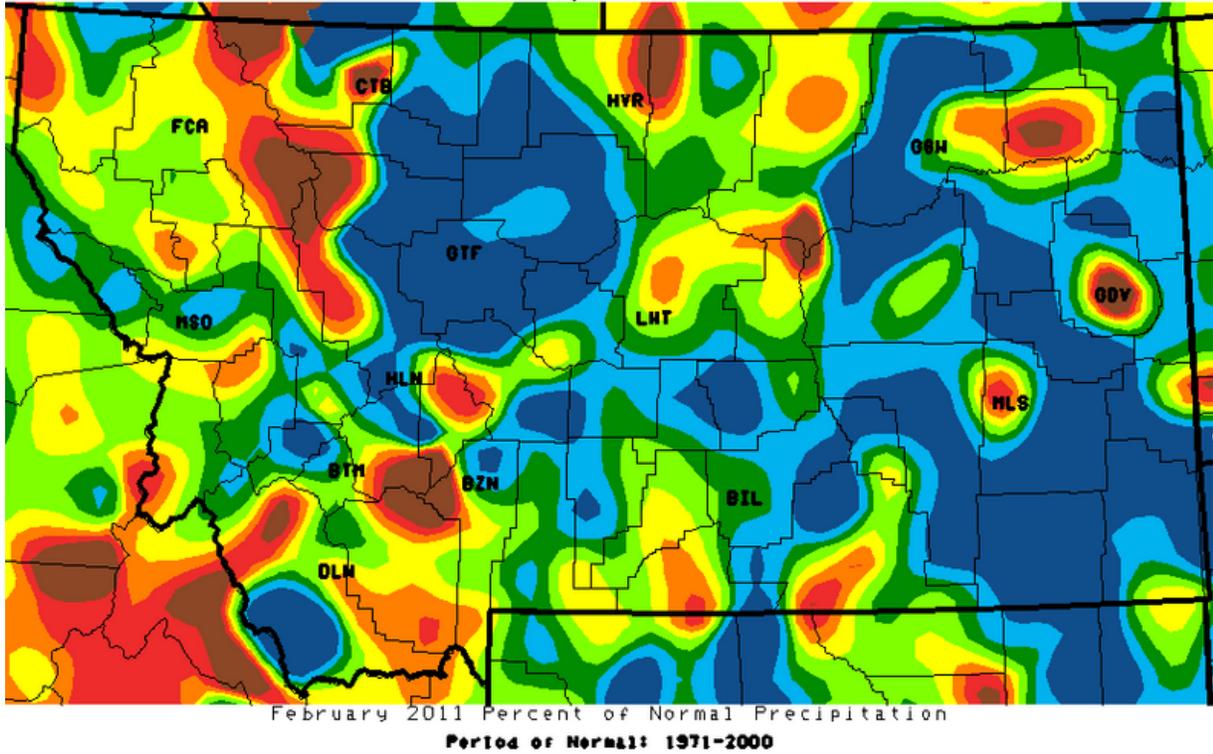


Figure 3. Temperature anomaly for February. Temperatures were below to much below normal over eastern Montana (Western Region Climate Center).



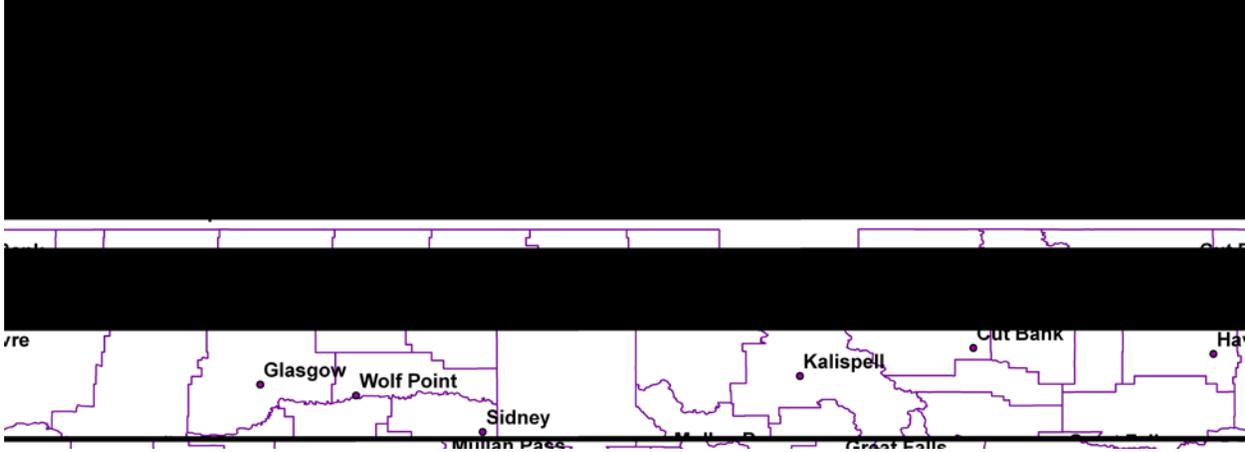
NOTE: Data used to generate this image are PROVISIONAL AND SUBJECT TO CHANGE.

<http://www.wrh.noaa.gov/Greatfalls>

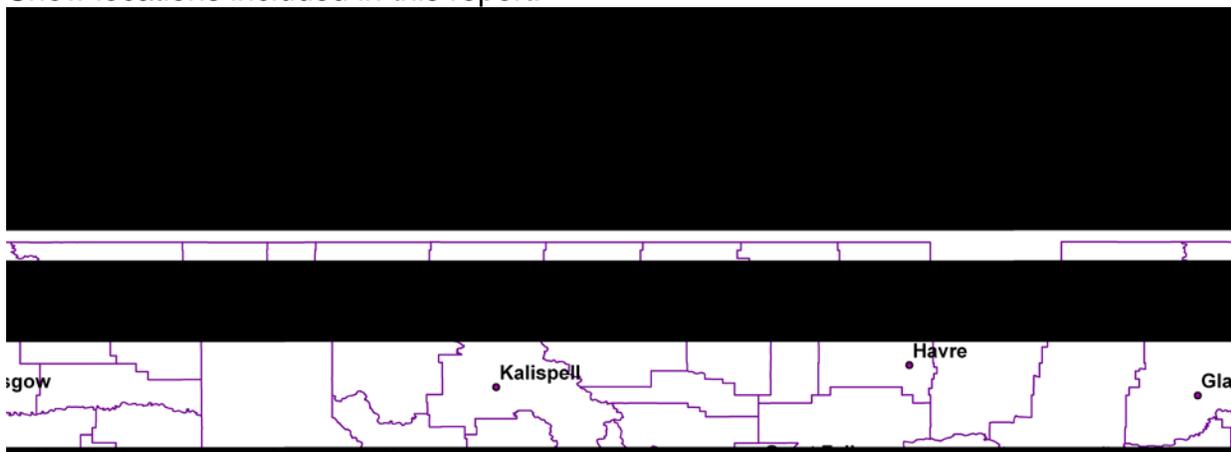
Figure 4. Precipitation anomaly (% of normal) for February

Appendix A.

Locations of Temperature, precipitation and wind stations included.



Snow locations included in this report.



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_pcbtnorm.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=tfx>. The climatological record for normals is 1971-2000. 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.