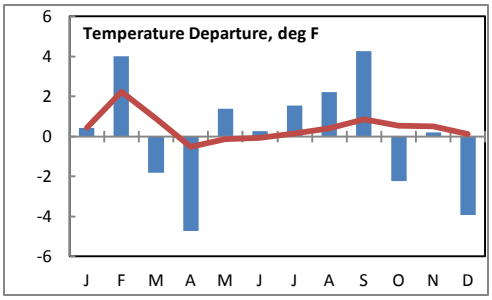
Montana Weather/Precipitation Summary

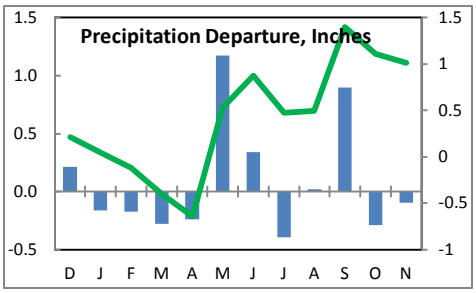
December 2013 by NOAA's National Weather Service Great Falls Montana

Temperatures averaged below normal across most of the state in December. A ridge of high pressure just off the west coast of North America brought sustained northwest flow to Montana. The trough of low pressure over central North America was stronger than normal (Figure 1).

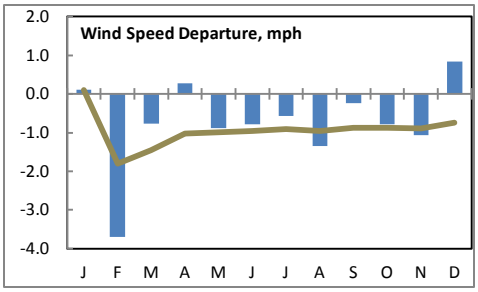
Statewide composite temperatures averaged 3.9°F below normal for the month. Figure 2 shows the areas of below and above normal conditions. Temperatures were as much as 10°F below normal over portions of north central Montana, and 2°F above normal at Helena. The warmest average December temperature was 28.7°F at Norris, and the coolest was 9.0°F at West Yellowstone. For the past 12-months, the statewide composite average temperature is 0.1°F above normal. This was the coldest December since 2009.



The monthly departure from normal for precipitation across Montana is shown in Figure 3. This figure shows above normal precipitation across the eastern one-half of the state. The driest areas were along the Rocky Mountain Front and southwest Montana. The heaviest precipitation fell over the northern Rockies and western border regions of the state, receiving over four inches of precipitation. The precipitation figure to the right shows that this month had a 0.19" positive departure. The statewide composite precipitation for the past 12 months is over one inch above normal.



On a statewide average, winds were above normal this month. This December was the 36th windiest of record, with an average speed of 9.8-mph. Only three of the past 12-months have had wind speeds averaging above normal. The fastest measured gust of the month, 114 mph, occurred at Logan Pass. For the past 12-months, winds are running 0.7-mph below average.



Refer to NCDC's State of the Climate report for the latest monthly discussion: http://www.ncdc.noaa.gov/sotc/.

December 1-11

After a warm start, with Billings warming to 61F on the second, temperatures plummeted for the coldest period and temperatures in nearly four years. Heavy snow fell over the west, with some freezing rain near Superior on the first and second. Heavy snow fell across the south on the second and third, ahead of the arctic outbreak. One and one-half feet of snow fell at Red Lodge, with 10 inches at Billings, and 1.5 feet at Heart Butte. Cold air set record lows at Dillon on the third. A lake-effect event produced 8-inches of snow at Woods Bay on Flathead Lake on the 5th. From the fourth through eighth, the cold air was in-place across the state, with averages of 50 degrees below normal. Wind chills reached -52F at Havre on the sixth. Temperatures fell as low as -48F at Sunburst on the seventh. This was the coldest temperature recorded in Montana since January 2007. Low temperatures of colder than -40F were measured in the state on the sixth through the eighth. As warmer air moved back into the west, winds gusted to 85 mph at Deep Creek on the 9th. Heavy snow fell at Missoula and Kalispell. Strong winds in the Livingston area caused ground blizzard conditions on the 10th, with wind gusts to 87 mph. Meanwhile, up to 10 inches of snow fell in the Little Belts.

December 12-18
A warmer period, with windy conditions prevailed mid-month. Gusts reached 78 mph at Millegan on the 12th, 81 mph at Two Medicine on the 15th, and 114 mph at Logan Pass on the 16th. Even on the 17th, strong winds spread across the Rocky Mountain Front with gusts to 82 mph at Cascade and 81 mph at Whitlash. Temperatures reached near 60F in central Montana on the 17th during this warmer period.

December 19-23
While cold air spread across eastern Montana again, with low temperatures reaching the mid-minus 20F range, the cold air briefly visited central and western Montana. Temperatures were as cold as -37F near Poplar on the 23rd. Heavy snow fell west of the divide on the 21st, with ten inches of snow at Bigfork. Heavy snow continued across southern Montana on the 22nd, with 10 inches falling at Big Timber and Belfry (Carbon County).

December 24-31
The month ended with generally mild conditions, with a return to cold in the east on the last day. With the mild conditions, winds were generally above normal.

Precipitation/convection

Severe convective weather occurred on no days in December. This is normal for the month.

December summary information:

High Temperature	62°F at Sunburst and Yellowtail Dam (27th)	**Greatest Precip**	4.46" at Mullan Pass
Low Temperature	-48°F at Sunburst (7th)		12.70" at North Fork Jocko SNOTEL
Warmest Ave Temp	28.7° at Norris	**Peak Wind Gust**	114 mph at Logan Pass (Glacier) (16th)
Coolest Ave Temp	9.0°F at West Yellowstone		
Range of Temp departures	-10.0°F at Rudyard 21N to +2.1°F at Helena	**Highest Ave Wind**	23.6 mph at Deep Creek RAWS 23.7 mph at Livingston
21 city mean monthly Temperature/Normal	16.4/20.3F 3.9F below normal. 25th coolest of record (since 1880). 18th percentile. Jan-Dec 43.5/43.3 0.2F above normal. 53th coolest of record. 59th percentile	**20 city mean monthly wind speed/Normal**	9.8 mph/9.0 mph; 36th windiest of record (since 1936). 53rd percentile. Jan-Dec 8.5mph/8.9 0.2-mph below normal. 7th calmest of record. 9th percentile.
22 city mean monthly precipitation/Normal	0.99/0.80" – 123% of normal. 40th wettest of record (since 1880). 69th percentile Jan–Dec 16.29"/14.63" 1.66" above normal. 35th wettest of record. 72nd percentile	**20 city mean monthly snowfall and normal**	13.1/10.8" – 2.7" above normal. 32nd highest. 76th percentile. Jan-Dec 51.5"/56.4" 4.9" below normal. 59th lowest. 44th percentile.

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

Location	Dec	% of Norm	Rank	Pcntl	Oct 1 – Dec 31	% of norm	Rank	Pcntl	Years
Baker	0.52	219%			2.55	130%			16
Billings	1.98	296%	113	99	4.89	182%	111	98	113
Belgrade	0.33	65%	22	28	1.05	44%	5	5	77
Butte	0.22	43%	24	19	1.04	55%	22	18	120
Cut Bank	0.44	220%	78	73	1.12	112%	58	54	107
Dillon	0.14	54%	24	32	0.49	37%	5	5	74
Glasgow	0.86	215%	98	84	1.45	94%	52	44	116
Great Falls	0.94	171%	93	75	2.05	103%	60	49	122
Havre	1.29	323%	125	93	2.01	143%	91	68	134
Helena	0.29	73%	35	25	1.00	64%	22	16	136
Jordan	1.52	524%			2.41	154%			17
Kalispell	1.58	101%	75	62	4.45	111%	82	68	120
Lewistown	0.66	100%	59	50	2.08	83%	36	30	118
Livingston	0.78	150%	91	81	2.29	97%	51	45	111
Miles City	0.61	210%	104	76	1.68	105%	64	46	137
Missoula	1.11	109%	81	59	1.71	57%	20	14	134
Mullan Pass	4.46	100%	33	44	10.01	81%	19	25	74
Wolf Point	0.11	37%			0.56	37%			16
Glendive	0.70	184%	96	80	2.27	120%	84	73	115
Sidney	0.41	79%	36	48	2.38	110%	54	74	73
BZN-MSU	1.25	134%	103	77	3.18	83%	53	39	135

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

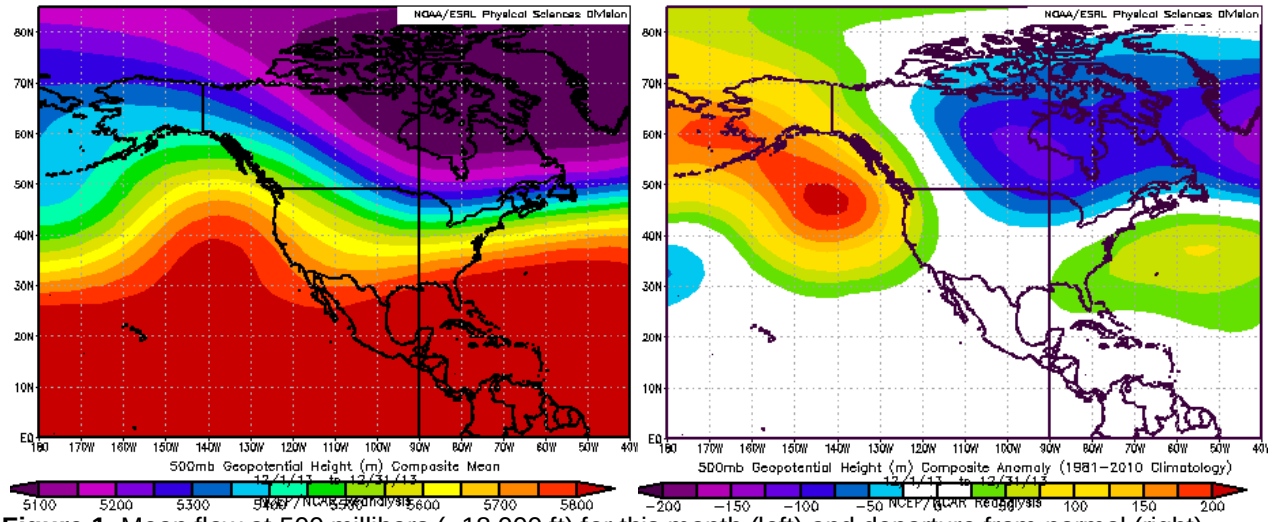


Figure 1. Mean flow at 500 millibars (~18,000 ft) for this month (left) and departure from normal (right).

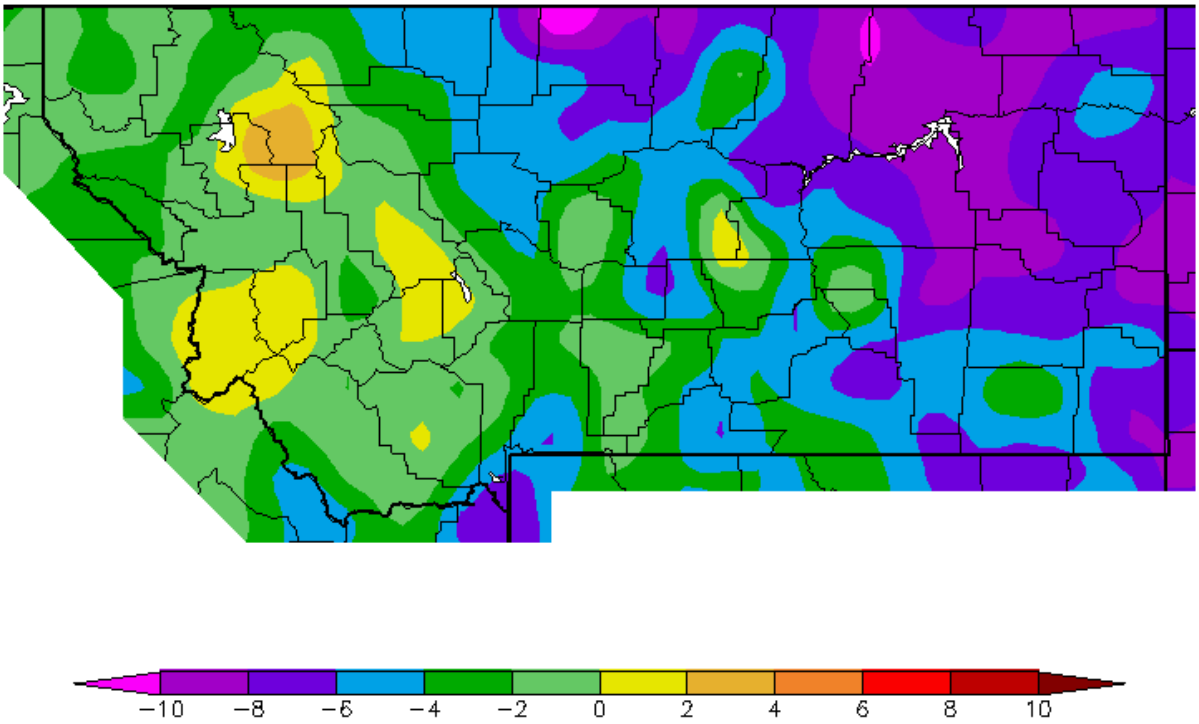


Figure 2. December 2013 temperature departures from normal (°F) (Western Region Climate Center).

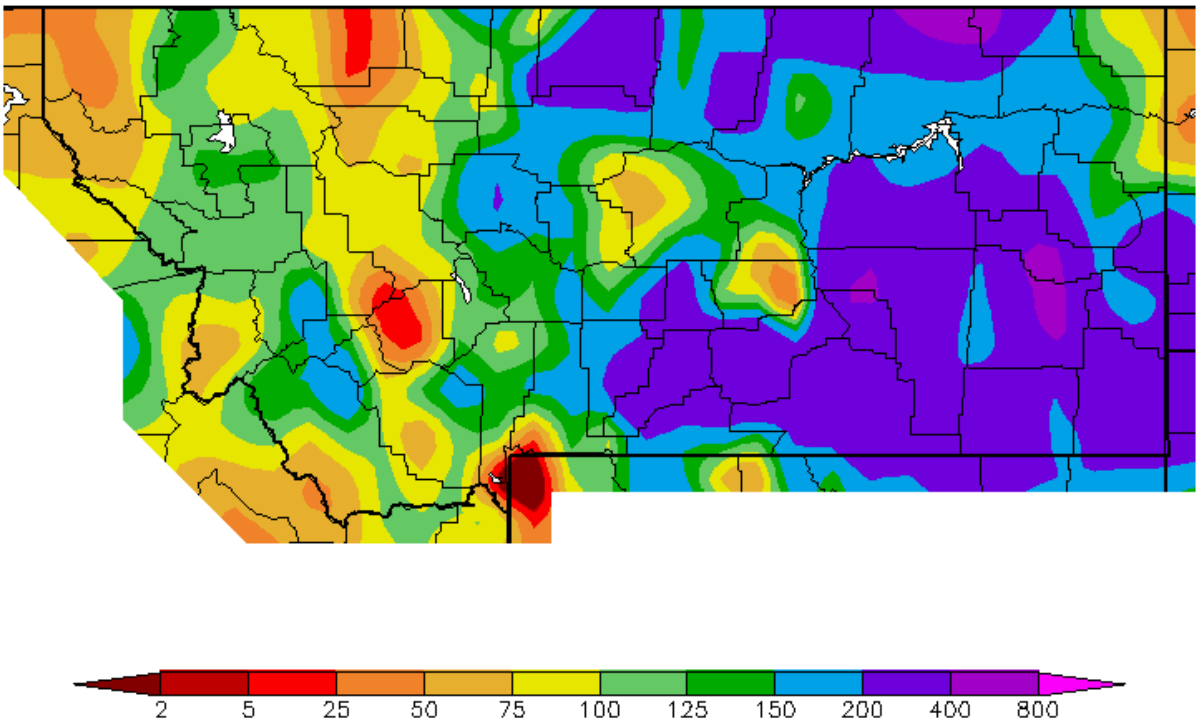


Figure 3. December 2013 precipitation departures from normal (percent) (Western Region Climate Center).

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=tfx&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=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.