Montana Weather/Precipitation Summary

May 2008 by NOAA's National Weather Service Great Falls Montana

May 2008 was highlighted by two major storms. One storm affected the southeast and eastern portions on the 1st, with the other of longer duration near Memorial Day. This second storm was very slow moving, producing precipitation in the state over a six-day period. Overall, temperatures were a bit above normal west and below normal east (Fig. 1). There was not a general pattern of below normal to above, but pockets scattered throughout the state. Precipitation was above normal over most of the eastern 2/3 of the state (Fig. 2). The colder temperatures and periods of precipitation kept snowpack at high levels in the mountains. The coldest area of the state was the extreme northeast and extreme southeast, where temperatures were as much as 3F below average. The average upper flow pattern for the month showed a weak ridge of high pressure over the west coast and a trough of low pressure over the Great Lakes (Fig. 3). This contributed to the colder temperatures across the state.

A major winter storm with blizzard conditions crossed southeast Montana dumping large snow amounts and high water contents of the snow on the 1st. Major damage was done to power lines, with more than two feet of snow in the Ekalaka area. The highest precipitation value was also at Mill Iron in Carter County, where 4.98 inches collected. The satellite image (Fig. 4) shows the distribution of the snowfall across eastern and southeastern Montana by the afternoon of the 2nd.

By the 7th, another storm hit central and southeast Montana, dropping nearly one inch of precipitation in the Baker area. Again on the 9th, another storm dropped heavy snow across south central Montana, when 11 inches of snow fell at Red Lodge. At the same time, rainfall amounts of up to one inch were recorded at Winnett. On the 12th, a new daily snowfall record was set at Bozeman, when 3.7 inches of snow fell. Temperatures gradually warmed with the weekend of the 17th expected to be very warm. Fears were raised that snow in the mountains could melt at an accelerated rate with high temperatures anticipated in the lower 90s. Libby topped out at 94, and Dillon tied their record high of 84. Flooding did occur mainly in western Montana as a result of the very warm temperatures.

After a tranquil and warm period, a cold front brought thunderstorms to eastern Montana on the 18th. Wind gusts to 62 mph occurred at Glasgow. Later in the week, a cold front moved through the state on the 20th. Thunderstorm wind gusts to 66 mph occurred at Livingston, and 67 mph at Ennis, with a microburst producing local damage near Fort Shaw. Thunderstorm gusts to 63 mph also occurred at Avon. This ushered in another storm, where rain fell for the next 6 days in central Montana. Higher points in south central Montana picked up nearly 2 feet of snow, while 2.5 feet of snow fell at Badger Pass. Heavy rain fell over much of the state. Two to five inches of rain were common over much of eastern Montana, except the northeast. Flooding resulted at many locations - first from the warm temperatures that preceded the storm – which was mainly west of the divide, then from the heavy precipitation and some contribution from snowmelt east of the divide. Very cool temperatures during the rain produced record cool maximum values at several locations on the 22nd. Dillon only reached 42 on the 22nd. Record high precipitation amounts also occurred. Dillon recorded 1.02 inches on the 22nd, a new record. As the storm continued, record high daily rain amounts also occurred on the 23rd at several locations in central Montana. The highest value was 1.91 inches at Martinsdale, breaking a record set in 1904. On the 24th, Lewistown received 1.19 inches, bettering a record set in 1904. Badger Pass received the most precipitation at 11 inches, they also picked up 31 inches of snow during this storm. Swift Dam also received over 9 inches. In central Montana, Half Moon Pass in the Snowys collected nearly 9 inches of rain. Deep Creek (near East Glacier) collected three inches on the 23rd, 2.5 inches on the 24th and 2.31 inches on the 25th.

After the heavy rain, soil moisture conditions improved over most of the state.

Severe weather occurred on 8 days. The average for all of May is 4.5 days. There were a couple of days during the Memorial weekend storm that produced severe weather. Then again, from the 28th-30th, another bout of scattered severe thunderstorms brought strong winds and hail up to one inch to the state. Interestingly, Billings recorded their latest-first thunderstorm of record this spring. They saw their first thunderstorm on May 23rd, which beat the old record of May 20th.

The statewide mean temperature at 18 cities in May was 51.8F, with the normal of 51.9. The precipitation average was 2.94 inches or 133 percent of normal, with a normal value of 2.21. The winds average of 0.3 mph was a bit below the long-term average at 9.6 mph.

Other record or notable information for May:

- Badger Pass recorded 13.1" of precipitation. This is the greatest May amount since records began in 1980. The old record was 9.5" in May 1982. This is also the greatest monthly precipitation recorded at Badger Pass. The old record was 11.9" in December 1996. It is also likely that Half Moon Pass set a new monthly record. They received nearly 9" of precipitation during this late May storm. Their May record precipitation is 9.55" set in 1981. This would also be a record setter for any month.
- Billings had their wettest May since 1981, and the 4th wettest of record.
- Bozeman has had their 10th calmest water-year-to-date of record at 5.5 mph. The normal is 6 mph. They also had their calmest May of record at 5.8 mph. The previous calmest May was 5.9 mph set in 2007.
- Butte recorded their 4th calmest May of record at 6.6 mph – normal is 7.7 mph. They also have had the 4th calmest water-year period of record.
- Cut Bank has had their wettest May since 1981. It has been the 6th wettest spring period (March-May), recording 4.78 inches – normal is 3.67 inches.
- Glasgow has had their 4th wettest spring period (March-May) of record, with 4.58 inches during this period. Normal is 2.94 inches.
- Great Falls has had their wettest May since 1990.
- Havre had their wettest May since 1991.
- Kalispell had their 5th calmest May with an average of 5.6 mph – normal is 7.2 mph.
- Lewistown had their wettest May since 1982, and their 7th wettest May of record.
- Missoula had their 3rd calmest spring period (March-May) of record, with an average of 5.5 mph. Normal is 7.2 mph.
- Mullan Pass had their 2nd driest May of record, with only 0.76 inches. The spring period (March-May) was also the 2nd driest of record, with only 3.81 inches.
- Missoula recorded their 4th calmest May of record at 5.7 mph. The normal May wind speed is 7.5 mph. The calmest May of record is 5.2 mph recorded in 1997.
- Sidney has had their 4th driest water-year-to-date of record. Since October, 3.03 inches of precipitation has fallen. The driest same period has been 2.15 inches in 1950-51. They have also seen their 3rd driest January through May period of record, collecting only 1.71 inches. The driest same period was in 1952, when only 0.99 inches fell.

May summary information:

High Temperature	94°F at Libby (18th)	**Greatest Precip**	7.54" at Grass Range 11.22" nr East Glacier
Low Temperature	15°F at Wisdom & 6°F at Darkhorse Lake SNOTEL (1st)		13.2" at Dupuyer Creek SNOTEL
Warmest Ave Temp	57.2°F at Glendive	**Peak Wind Gust**	74 mph Snowslip (18th) & 67 mph at Ennis (20th)
Coolest Ave Temp	42.9°F at Big Sky		
Range of Temp departures	-2.9°F at Culbertson - +1.1°F at Kalispell	**Highest Ave Wind**	16.0 mph at Alzada
18 city mean monthly Temperature/Normal	51.8/51.9	**18 city mean monthly wind speed/Normal**	9.3mph/9.8mph
18 city mean monthly precipitation/Normal	2.96"/2.21" – 133% of normal		

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

Location	May	% of Norm	Rank	Pcntl	Oct 1 – May 31	% of norm	Rank	Pcntl	Years
Baker	4.79	305%			6.73	121%			10
Billings	4.83	195%	97	97	9.02	96%	70	70	99
Belgrade	2.78	112%	55	76	9.12	107%	50	74	67
Butte	1.76	87%	58	50	5.04	74%	25	21	114
Cut Bank	4.54	205%	99	98	5.69				101
Dillon	2.29	127%	51	74	5.69	114%	48	70	68
Glasgow	3.46	201%	99	89	7.08	141%	85	79	108
Great Falls	3.82	151%	104	91	8.51	102%	74	65	114
Havre	2.73	148%	107	83	4.42	76%	24	18	128
Helena	2.62	147%	108	84	5.63	97%	42	32	130
Jordan	3.35	239%			8.37	172%			9
Kalispell	1.46	72%	59	51	7.01	63%	17	14	114
Lewistown	5.26	180%	106	95	8.90	93%	56	50	112
Livingston	4.18	161%	93	88	9.66	105%	69	67	102
Miles City	3.48	159%	110	85	4.15	58%	16	12	131
Missoula	1.59	82%	66	50	6.34	72%	17	13	127
Mullan Pass	0.76	26%	2	1	31.43	113%	35	52	67
Wolf Point	2.73	144%			4.35	94%			10
Glendive	2.56	125%	85	75	4.66	72%	22	20	106
Sidney	1.01	50%	17	24	3.03	46%	4	5	66
BZN-MSU	3.97	123%	102	77	12.90	110%	101	78	129

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

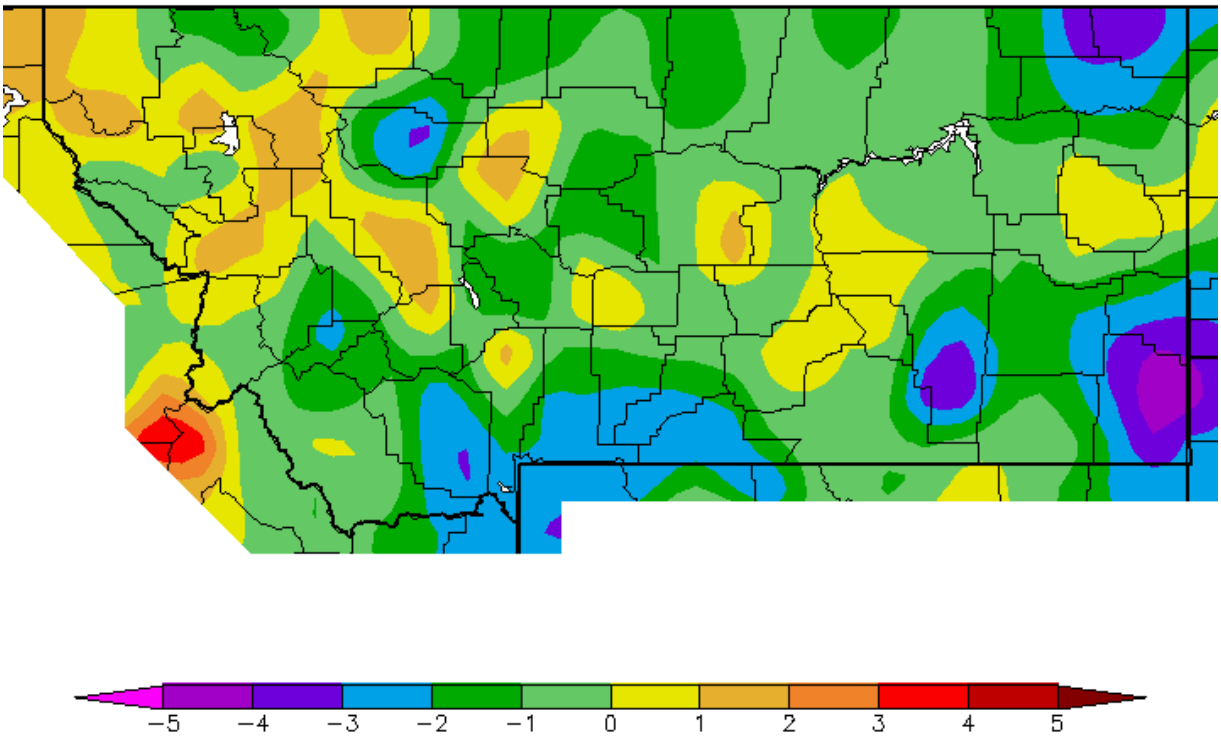

Figure 1. Temperature anomaly for May. Montana experienced temperatures below normal across most of the state. (Western Regional Climate Center).

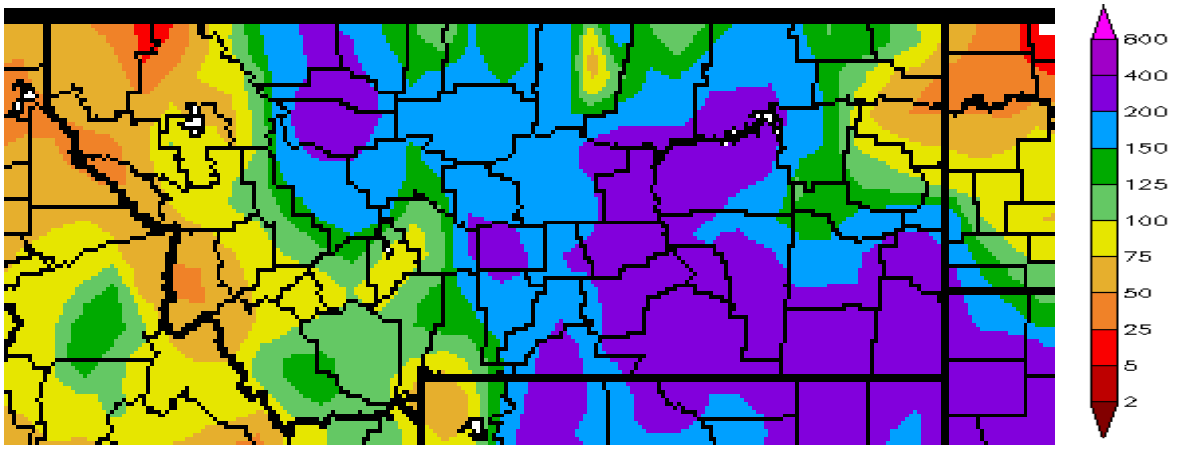

Figure 2. Precipitation anomaly (% of normal) for May. Much of central and southeast Montana had above normal precipitation (High Plains Regional Climate Center).

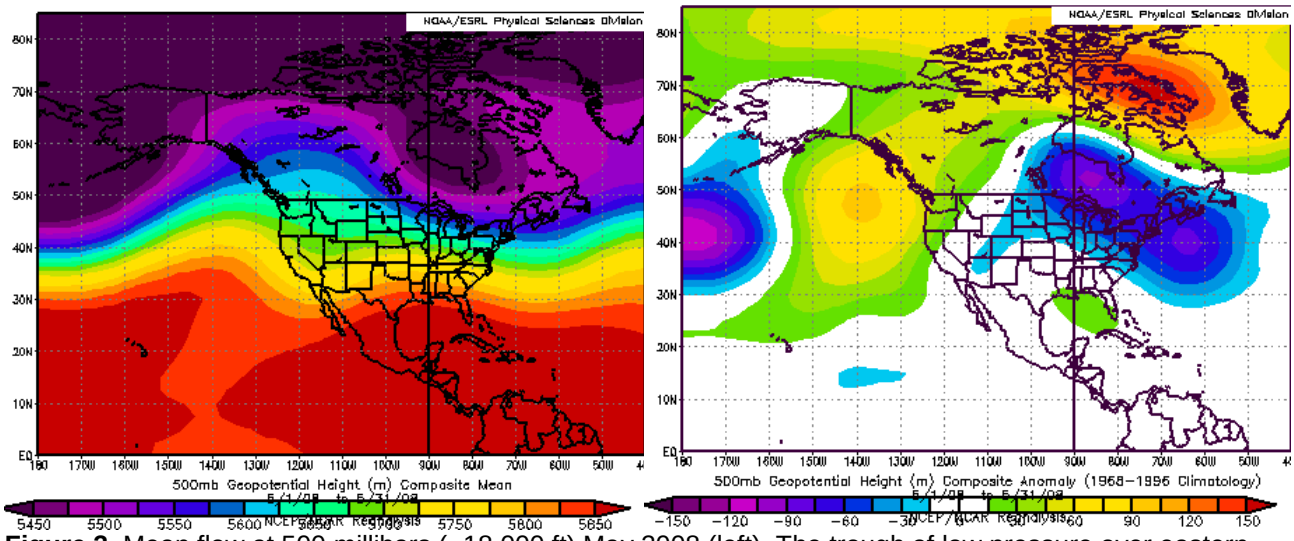

Figure 3. Mean flow at 500 millibars (~18,000 ft) May 2008 (left). The trough of low pressure over eastern North America was below normal for the month (right). This contributed to the below average temperatures in May over portions of eastern Montana.

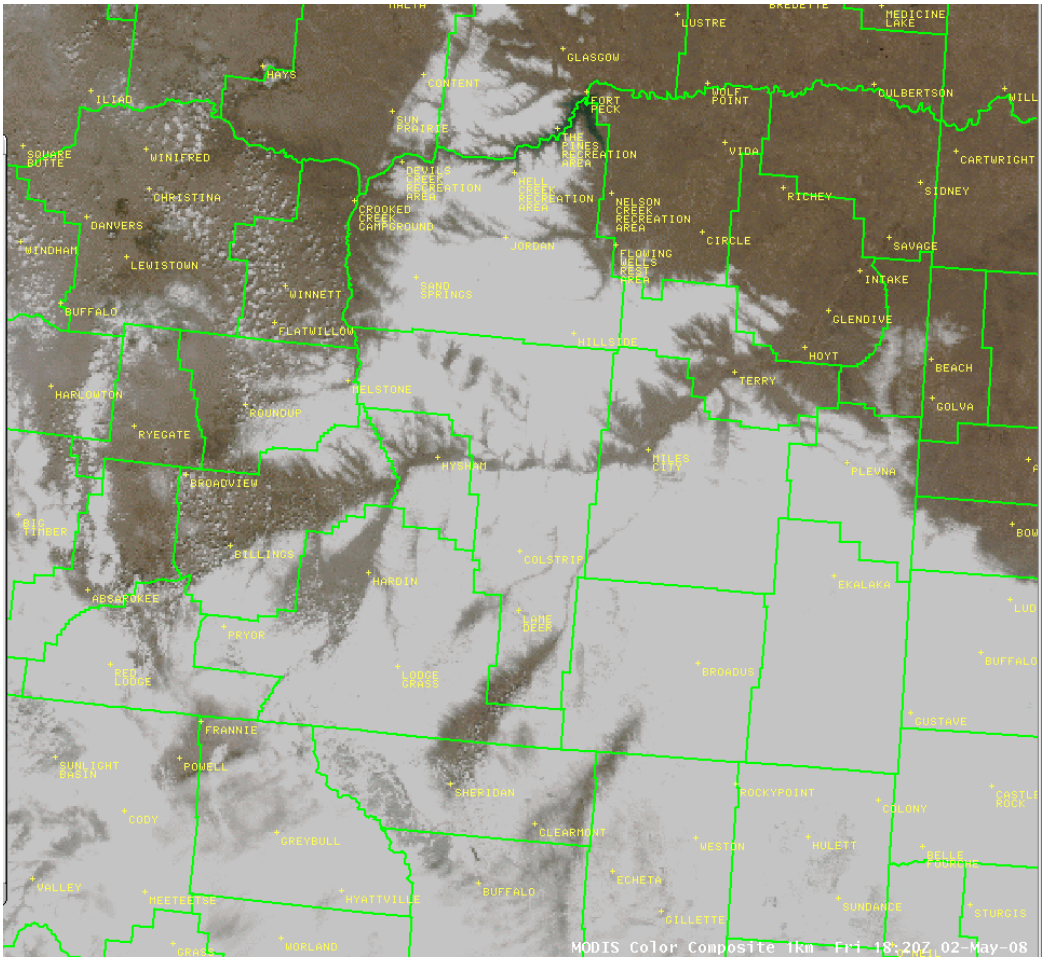

Figure 4. MODIS satellite image of snow cover on May 2, 2008

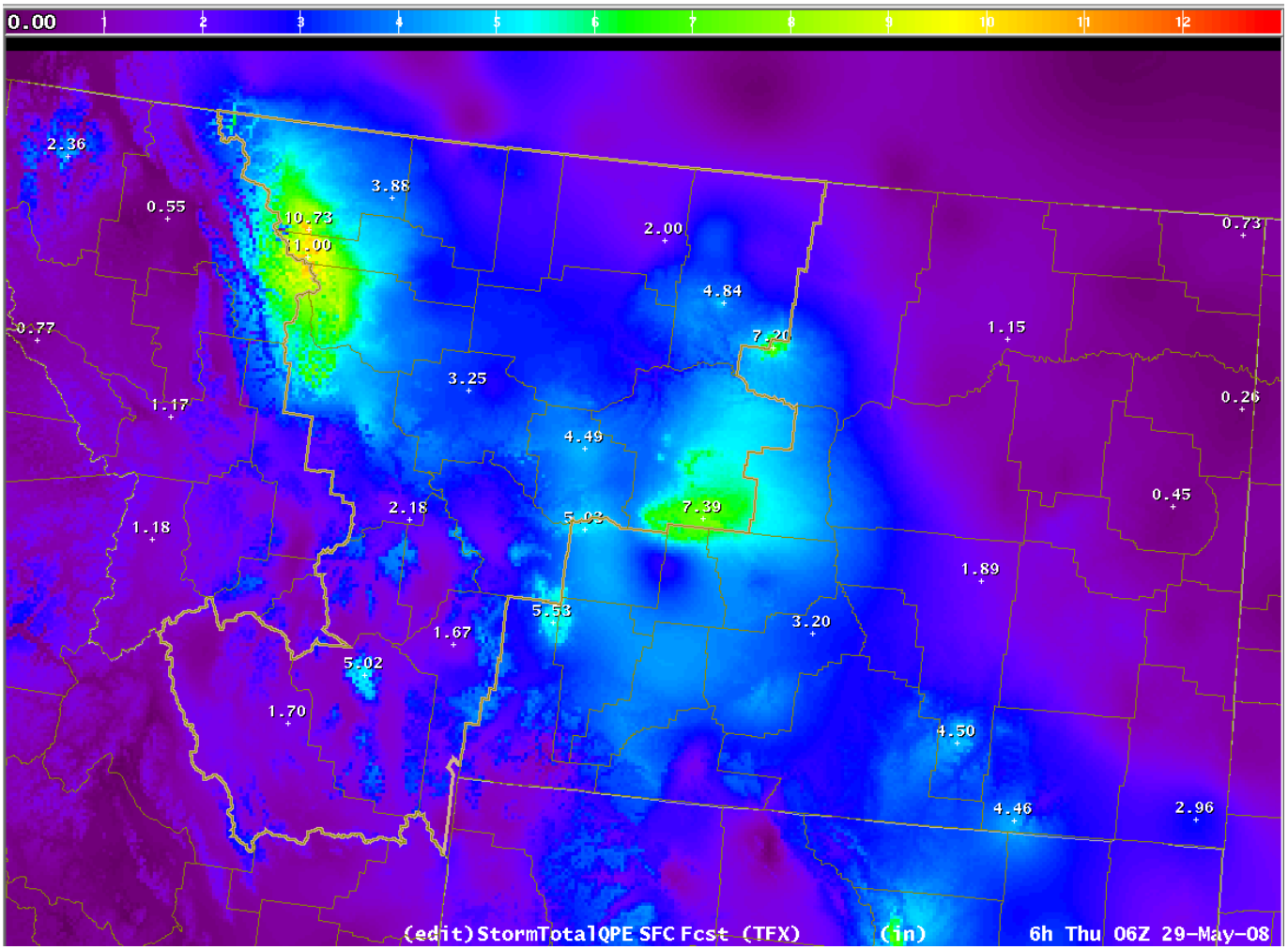

Figure 5. Map of Precipitation from May 21-May 26, 2008. The most fell over the Snowy, Little Rockies and along the northern Rocky Mountain Front. The greatest reported amount was 11 inches at Badger Pass, with over 30 inches of snow.

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