2008 Spring Climate Summary

ISSUED BY THE NATIONAL WEATHER SERVICE
GRAND RAPIDS MI

By William Marino

What Actually Happened?

The spring of 2008 over southwest Michigan exhibited near to slightly below normal temperatures (figures 5 and 6) and below normal precipitation (figures 7, 8 and 9). Snowfall was well below normal (figures 10 and 11). This can also be viewed in tables 1 and 2. The precipitation and snowfall anomalies are in stark contrast to the very wet and snowy winter it followed.

While it is true that the spring of 2008 mean area temperature averaged near normal across the region, it turned out to be the 4th coldest spring in the past 10 years (figure 1). This was the first spring since 2004 in Southwest Michigan which did not average above normal. Only four springs since 1999 have averaged near to below normal: 2002, 2003, 2005 and 2008. The remaining six springs since 1999 were significantly warmer than normal.

After a record wet winter, the spring of 2008 was drier than normal (figures 8 and 9), averaging about 1.7 inches below normal over all of Southwest Michigan. This is only the second spring in the past 10 years which was drier than normal (figure 2). In fact the regional average departure from normal since 1999 was nearly an inch wetter than normal. Only the area from Muskegon north and from US-131 west was wetter than normal this spring, while the remainder of the area was drier than normal. The precipitation was well above normal (figures 9 and 10) across all of Southwest Lower Michigan.

Why it happened

As seen in figure 3, the mean steering wind (which is the polar jet core--strongest band of prevailing winds from South Dakota to Iowa) carved out a trough over the Great Lakes area during the spring of 2008. If you compare that to figure 4, the mean position of the polar jet during the spring from 1968 through 1996, it can be seen that the Polar Jet Stream was strongly farther south over the central and eastern United States than in a typical spring. Besides that the core of the jet speed is typically over eastern Quebec, Canada, while this spring it was over the Midwest.

Based on the CPC composite analysis, this sort of jet stream pattern fits well with the typical of La Niña Springs (see CPC Briefing Page Item 32 link at the end of this) with a negative Arctic Oscillation.

The drier than normal precipitation over Lower Michigan, in combination with the much wetter than normal precipitation pattern from Southern Missouri to Southern Ohio (figure 12), fits the CPC composites very nicely. It should be of little surprise that the slightly below normal temperature anomalies seen in table 2 and figure 9 fit the pattern of a La Niña with a negative AO in the CPC composite analyses.

	GRAND RAPIDS	MUSKEGON	LANSING
HIGH:	56.5°	54.7°	56.5°
LOW:	36.2°	35.2°	34.5°
MEAN:	46.3°	45.0°	45.5°
PRECIPITATION:	9.42”	8.22”	8.13”
SNOWFALL:	11.8”	14.2”	11.2 ”

Table 1

Spring normals for the primary climate sites in southwest Michigan

2008 Spring Data March through May	GRAND RAPIDS	MUSKEGON	LANSING
AVG HIGH:	56.6°	54.0°	56.0°
Departure from Normal	+0.1°	-0.7°	-0.5°
AVG LOW:	35.9°	34.3°	35.1°
Departure from Normal	-0.3°	-0.9°	+0.6°
AVG MEAN:	46.2°	44.2°	45.6°
Departure from Normal	-0.1°	-0.8°	+0.8°
PRECIPITATION:	8.16”	7.73”	5.83”
Departure from Normal	-1.26”	-0.49”	-2.30”
SNOWFALL:	9.2”	8.5”	7.0”
Departure from Normal	-2.6”	-5.7”	-4.2”

Table 2

The primary climate sites’ actual values for the spring of 2008

Temperature Section:

As seen in figures 3 and 4, all of Lower Michigan was cooler than normal. The central and eastern sections were closest to normal, but even there for the most part the climate stations showed below normal temperatures. Figure 1 shows the spring temperatures from 1895 through 2007. Note the slow warming trend seen that begins in the mid 1980s. Overall though this trend line is significantly more flat than the winter curve is (see the winter summary).

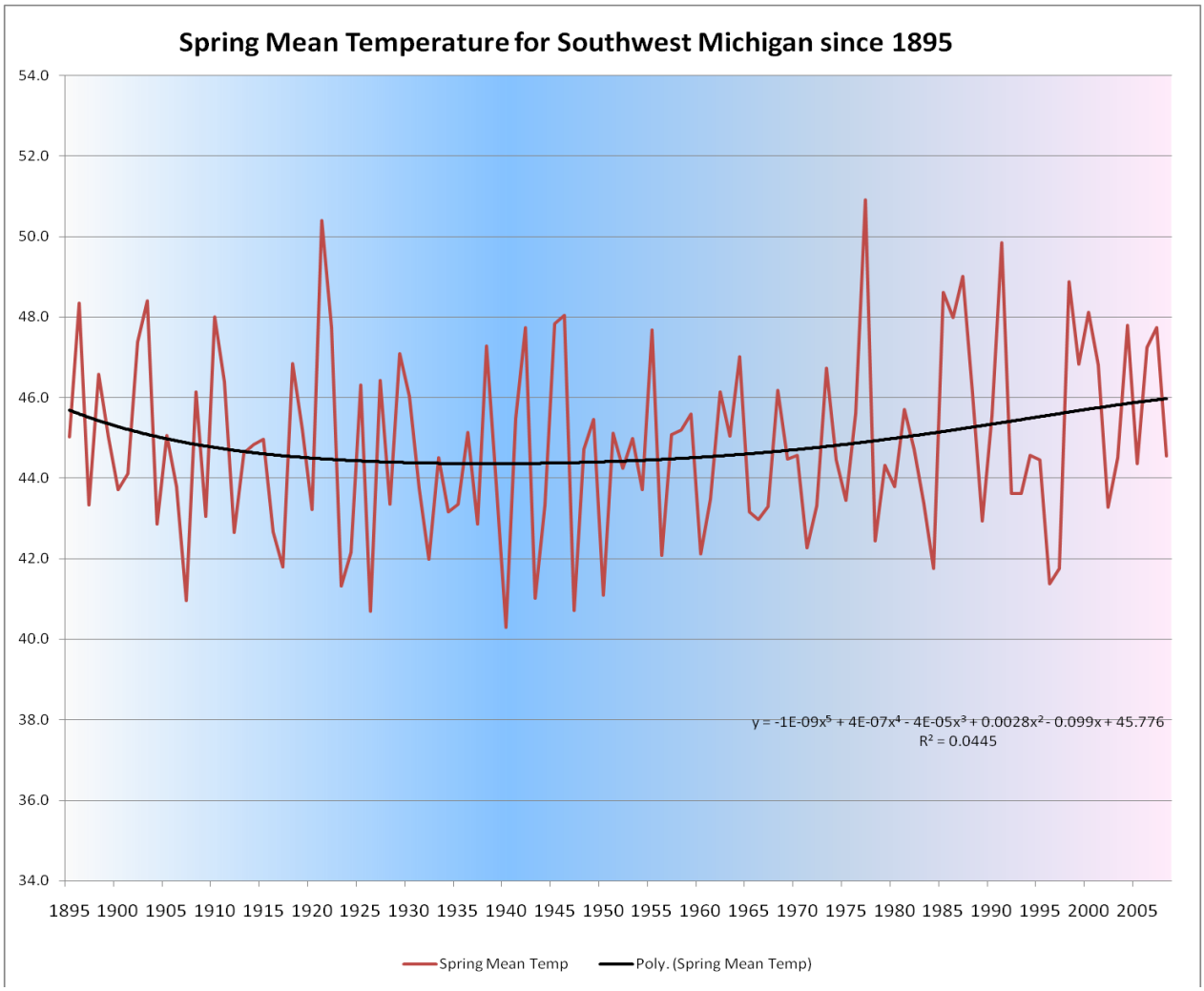

Figure 1

Spring Mean Temperature from 1895 through 2007. A trend line (Polynomial) was added to show the warming after 1985. This chart uses all the available climate sites in Southwest Michigan (37 long term stations).

Precipitation Section:

Figure 2 shows the yearly total mean area precipitation for the spring for all 37 long term climate stations in Southwest Lower Michigan, from 1895 to 2007. Clearly this shows the flattest trend of any of the trend charts for both the winter and spring. Even so there is a slight upward trend since 1998 in the overall precipitation totals.

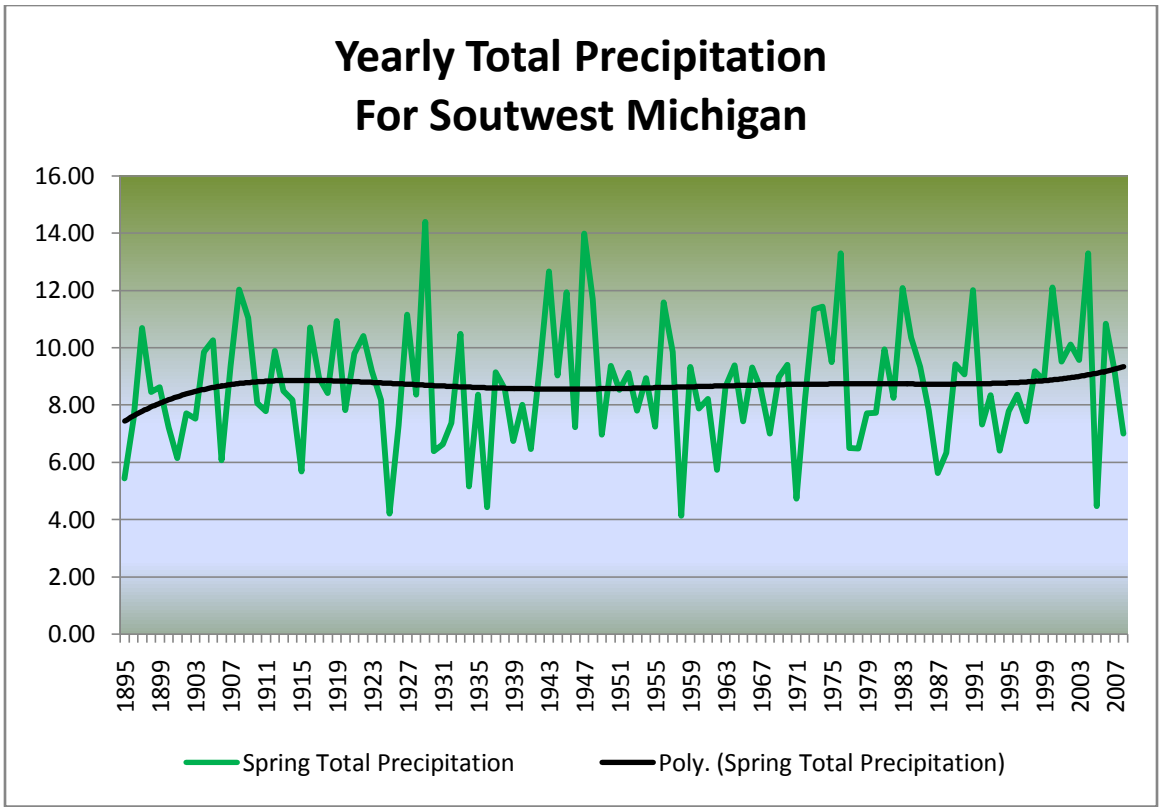

Figure 2

Spring total precipitation based on the average of all long term climate stations (37). Note the trend line shows for the most part there is not a trend, except over the last 10 years when a very slight trend toward a wetter regime begins.

Snowfall Section:

Looking at figure 3 it should not be surprising that the snow storms in March were for the most part over the southern Counties. There was a 3 to 6 inch snow storm from the evening of the 4th into the morning of the 5th. The biggest storm of the month was the 8 to 14 inches that fell from the morning of the 21st into the early morning hours of the 22nd. That was mostly south of a line from Holland to Jackson. Finally there was a 2 to 4 inch event during the mid to late morning hours of the 25th near and north of route 10. This resulted in the snowfall anomaly pattern seen in figures 10 and 11. That is near to above normal snowfall near and south of Interstate 94 and below normal snowfall north of that.

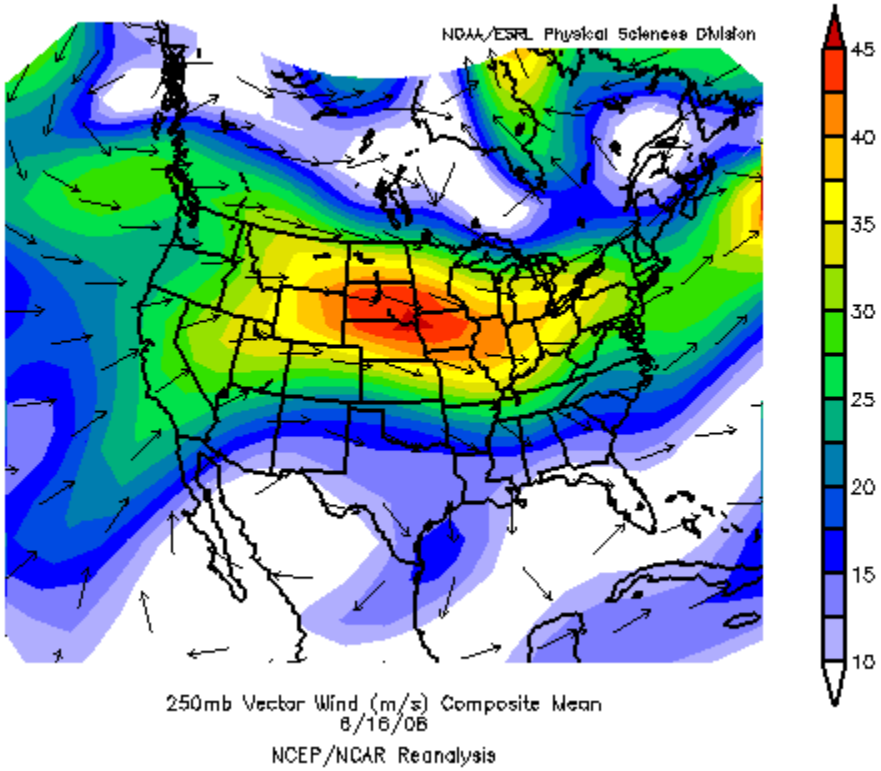

Figure 3
Mean Spring Steering Level Wind Anomaly.

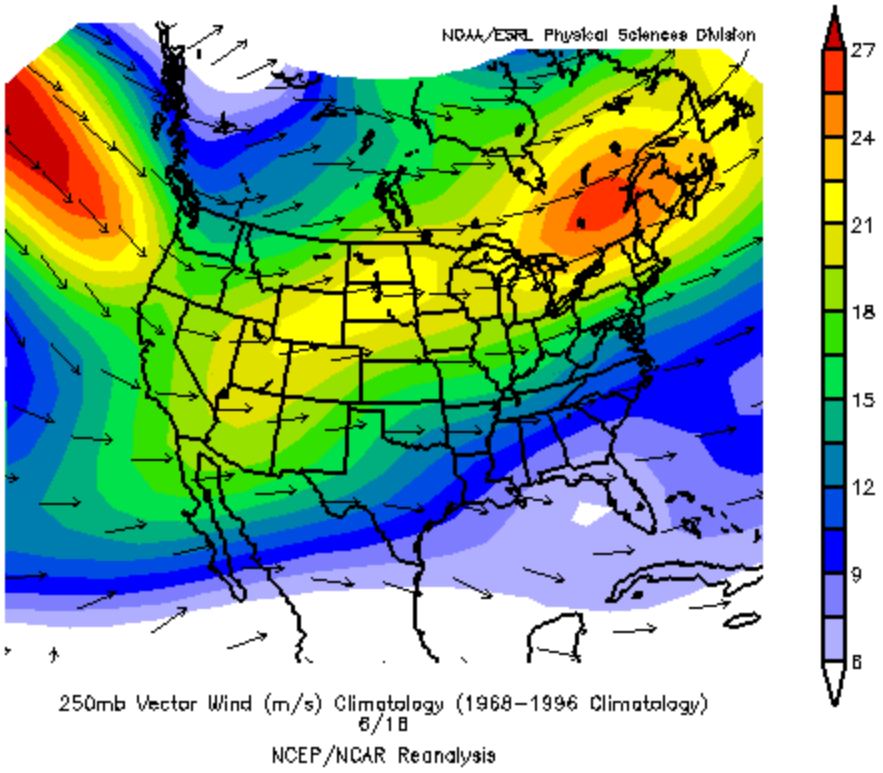

Figure 4

Mean Spring Steering Wind from 1968 to 1996.

Spring Anomalies Charts 2008

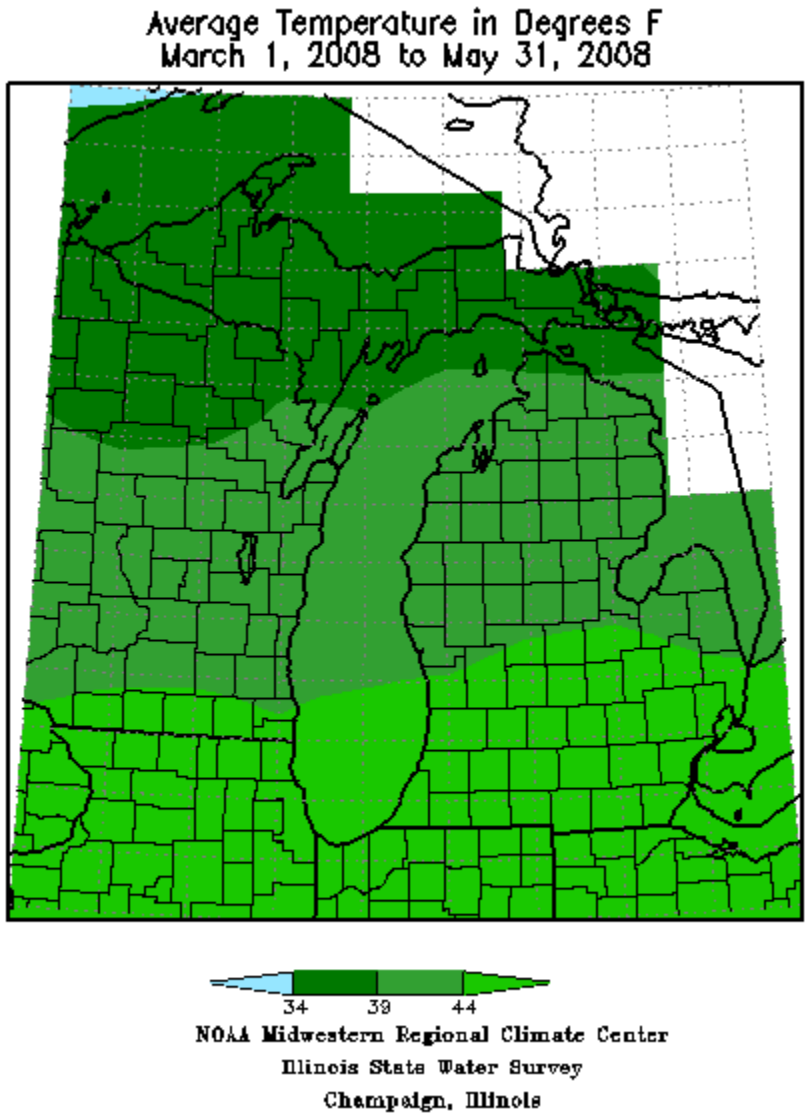

Figure 5

Spring 2008 Average Temperature in Degrees F for Michigan.

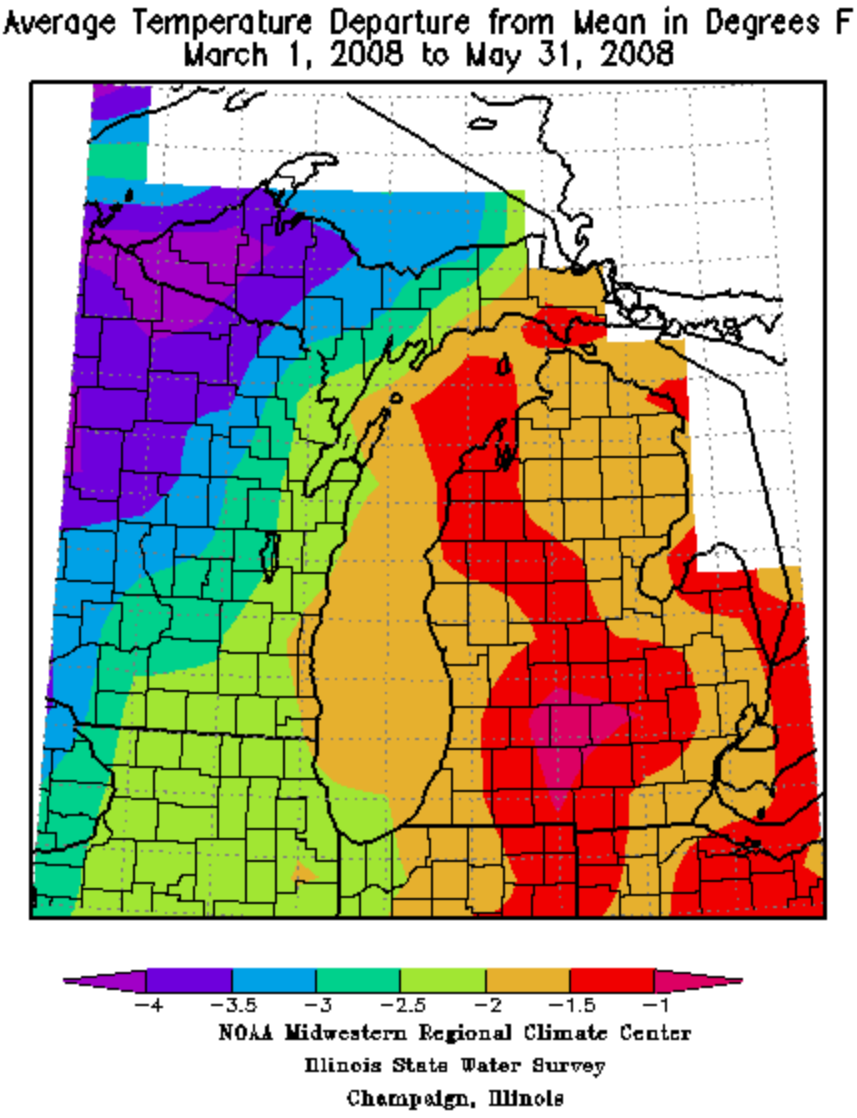

Figure 6

Average Temperature Departure from the Mean in degrees F for the spring of 2008.

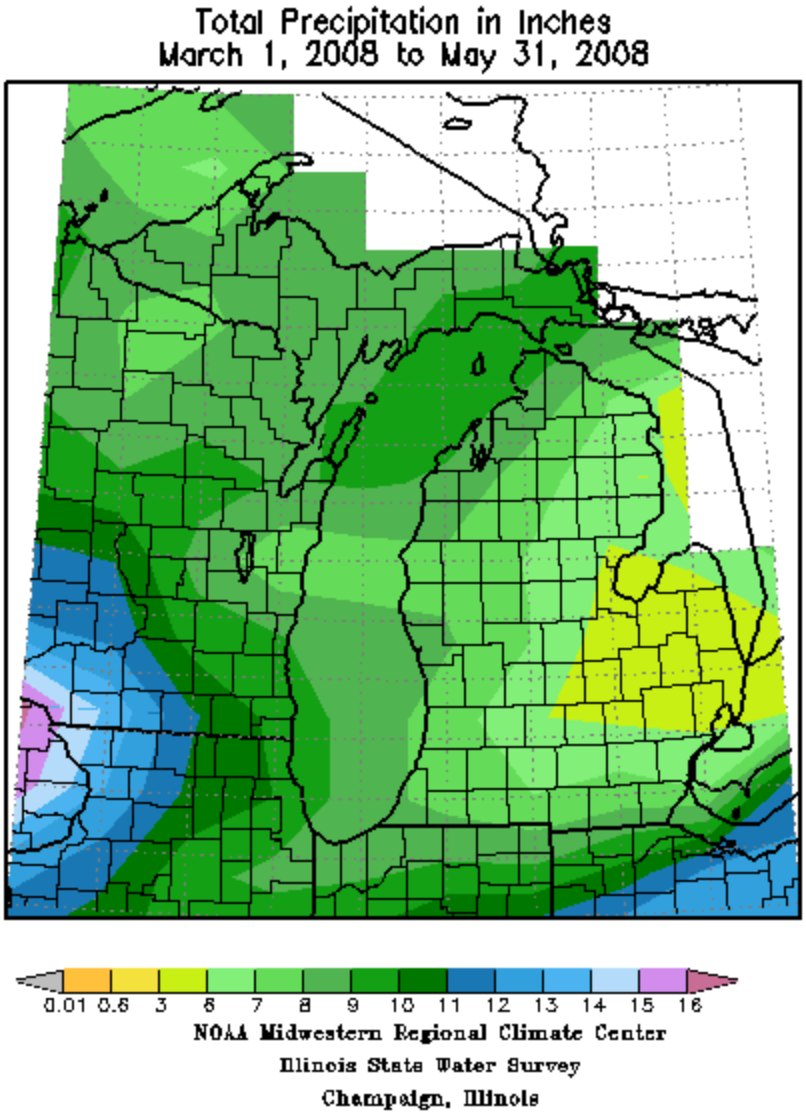

Figure 7
Total Precipitation for the spring of 2008.

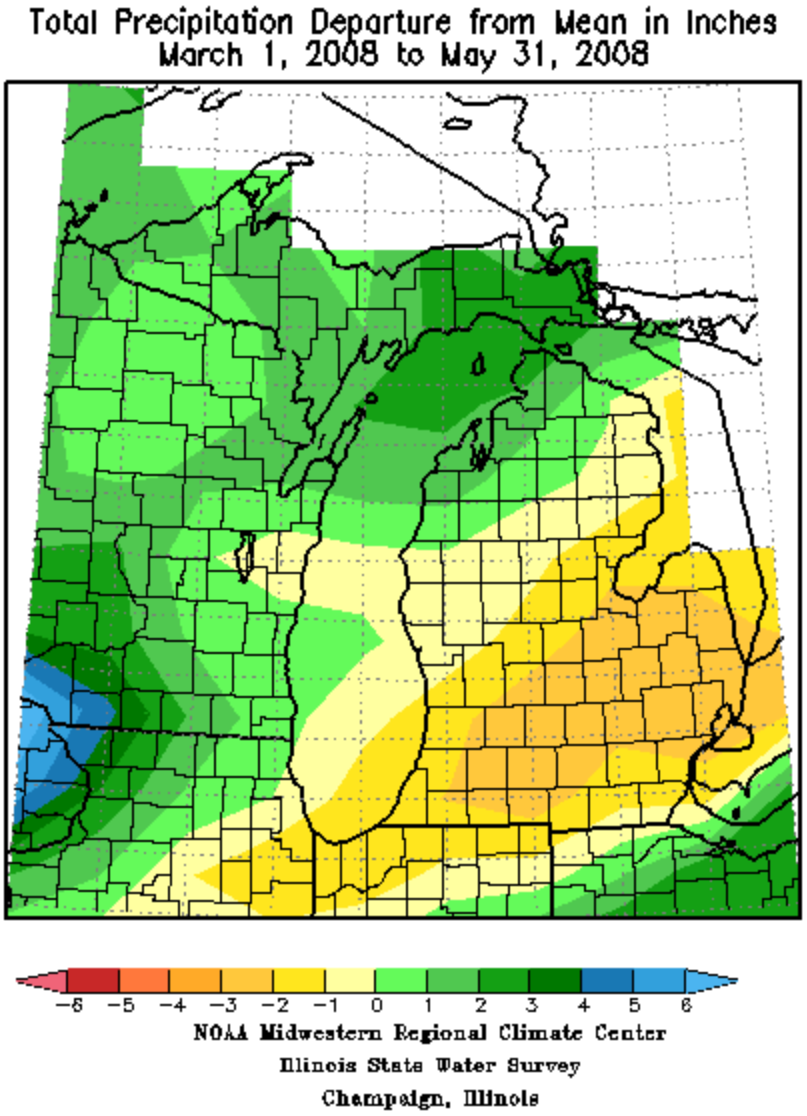

Figure 8

Total Precipitation Departure from the Mean in inches for the spring of 2008.

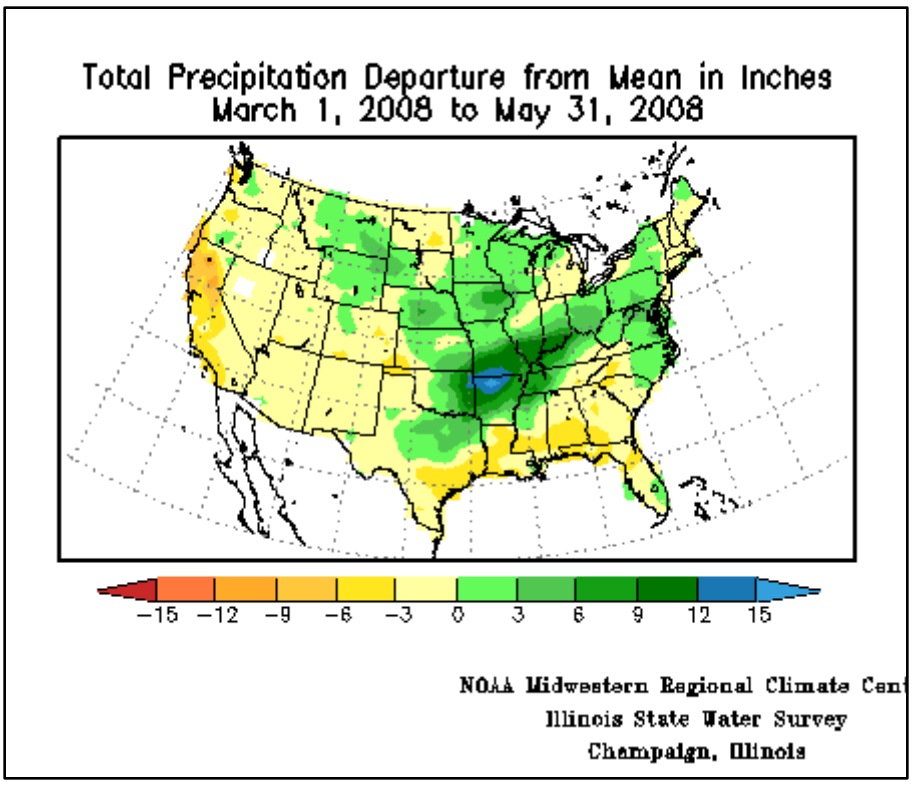

Figure 9

Entire CONUS Precipitation Departure from Mean for the spring of 2008.

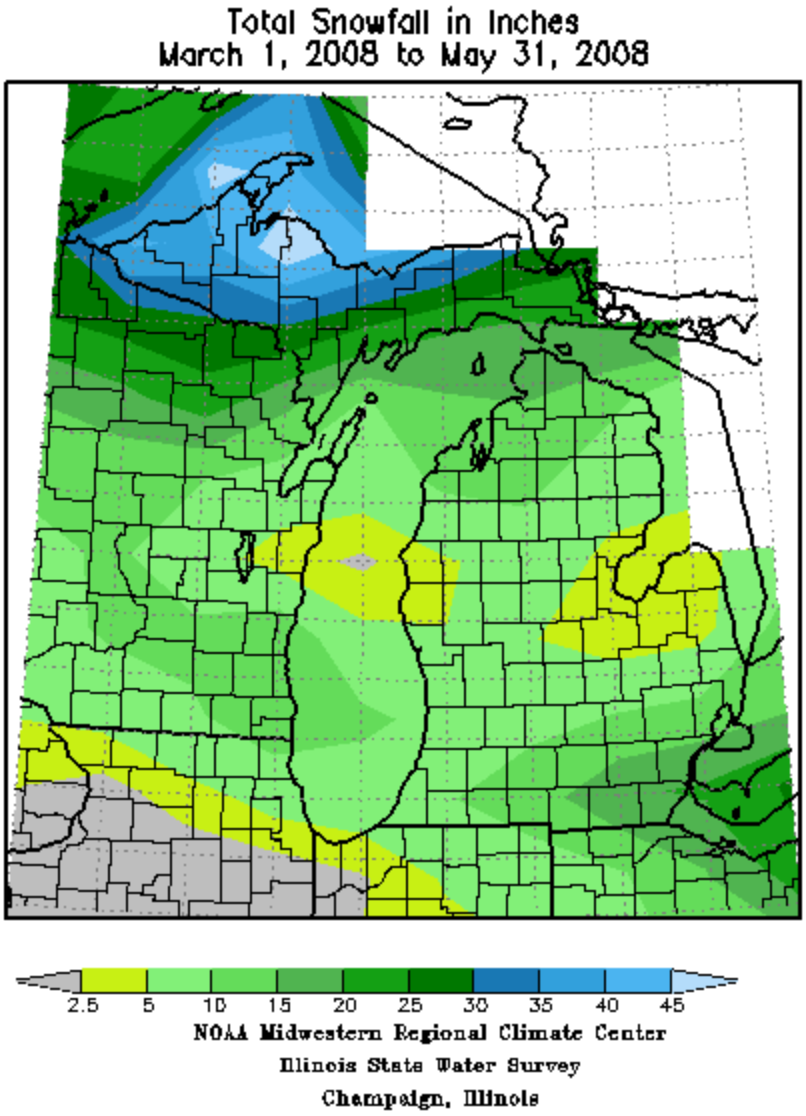

Figure 10
Total Snowfall for the spring of 2008.

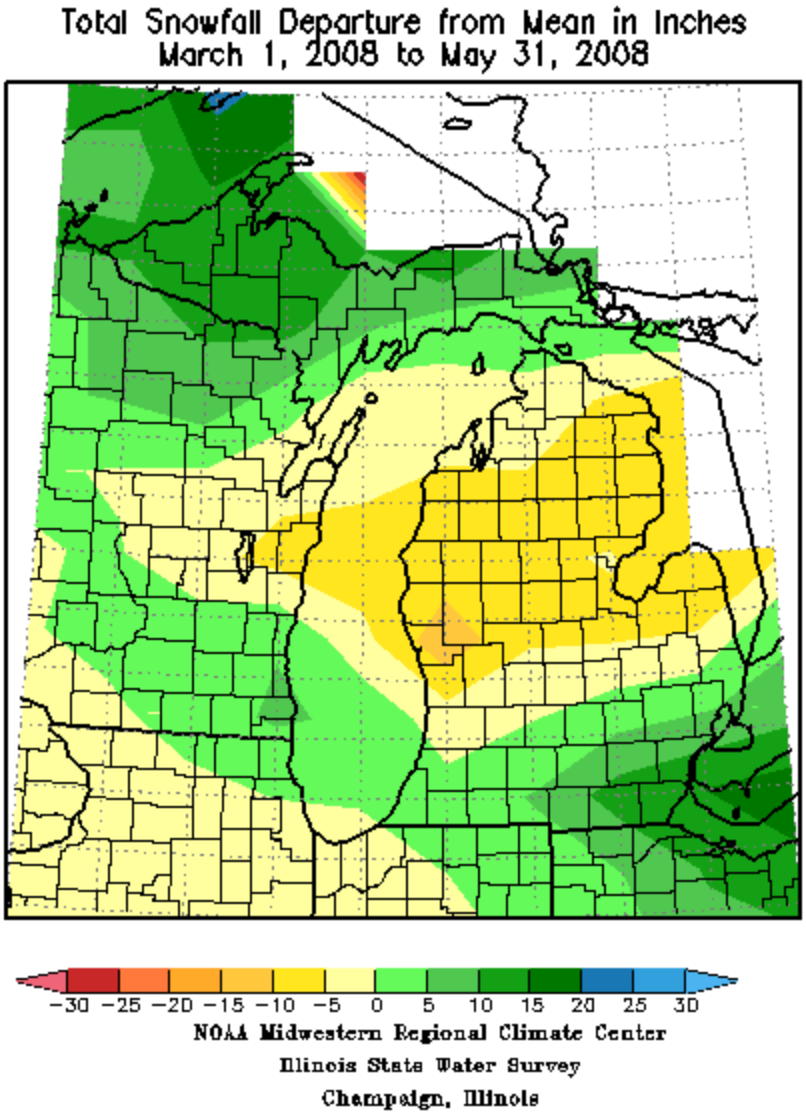

Figure 11

Total Snowfall Departure from Normal for the spring of 2008.

Climate Diagnostics Center:
http://www.cdc.noaa.gov/

Midwest Climate Center:
http://sisyphus.sws.uiuc.edu/cliwatch/watch.htm

National Weather Service:
http://www.weather.gov/

Grand Rapids National Weather Service Climate Page:
http://www.weather.gov/climate/index.php?wfo=grr

Atmospheric Blocking:
http://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/block.shtml

North Atlantic Oscillation / Pacific - North American pattern (NAO/PNA):
http://www.cpc.ncep.noaa.gov/www_images/telecalc_header.gif

Daily Madden-Julian Oscillation Indices:
http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_mjo_index/mjo_index.html

500-hPa heights and anomalies from the NCEP Global Data Assimilation System (GDAS)
http://www.cpc.ncep.noaa.gov/products/intraseasonal/z500_nh_anim.shtml

Drought Monitor:
http://www.drought.unl.edu/dm/monitor.html