

# Fall 2008 Forecast

## For Southwest Michigan

By William Marino

### The Forecast

*The Climate Prediction Center's official 2008 Fall (September-November) forecast indicates an enhanced probability for above normal temperatures (Figure 1) and equal chances for below normal, near normal, or above normal precipitation (Figure 2) for the western Great Lakes region. For Southwest Lower Michigan, the forecast is for above normal temperatures and for below normal precipitation.*

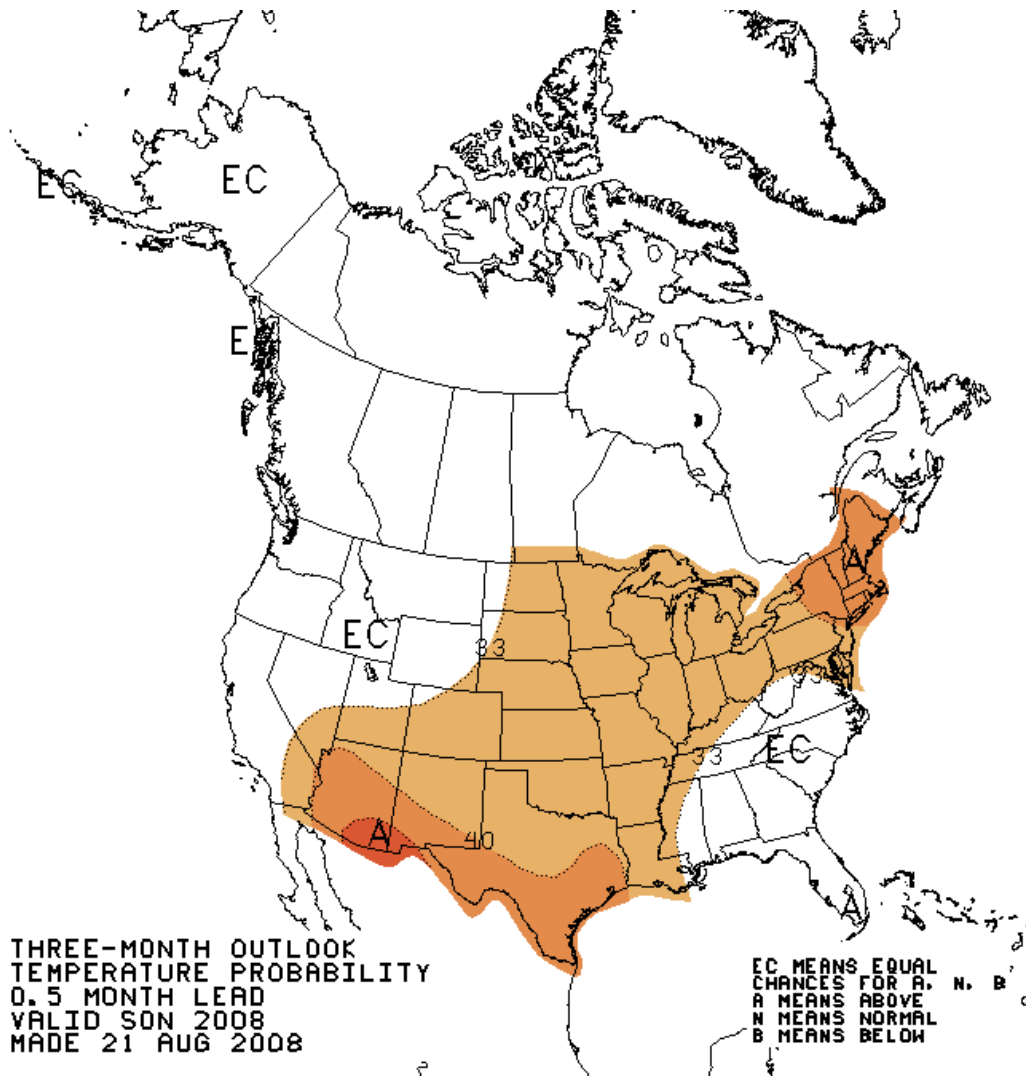


Figure 1: CPC's Fall Forecast for Temperature

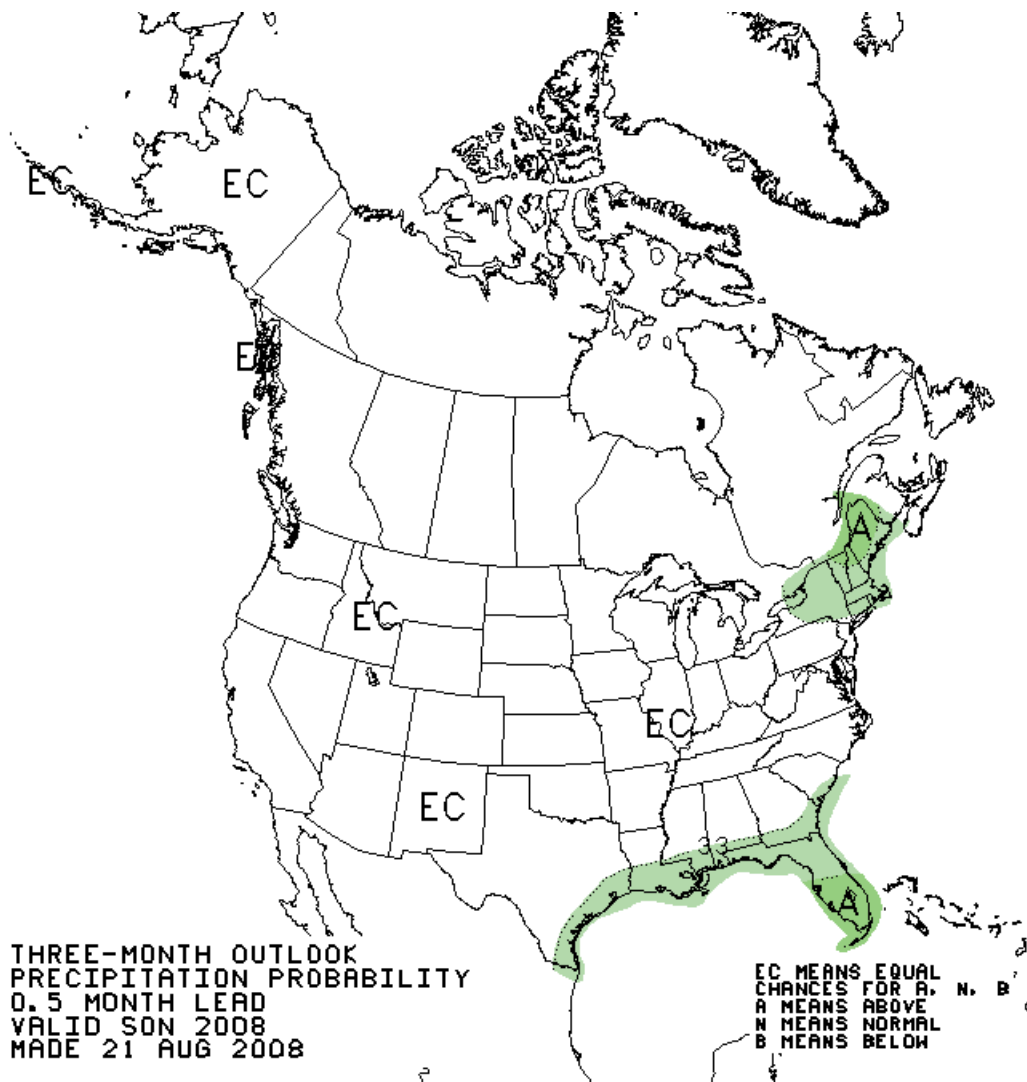


Figure 2: CPC's Fall Forecast for Precipitation

## Normals

Table 1 shows the 1971 to 2000 Normals for September through November for selected locations in Southwest Michigan:

<b>Table 1. Fall Seasonal Normals for Southwest Lower Michigan (Sep- Nov).</b>			
<b>Average Temperature</b>	<b>Grand Rapids</b>	<b>Muskegon</b>	<b>Lansing</b>
<b>High</b>	59F	58F	59F
<b>Low</b>	41F	41F	39F
<b>Mean</b>	50F	50F	49F
<b>Total Precipitation (rain and snow)</b>	10.43"	9.55"	8.43"
<b>Fall Season Snowfall</b>	8"	9"	3"
<b>Date for the First 1" Snowfall</b>	11/17	11/17	11/20

## Forecast Reasoning

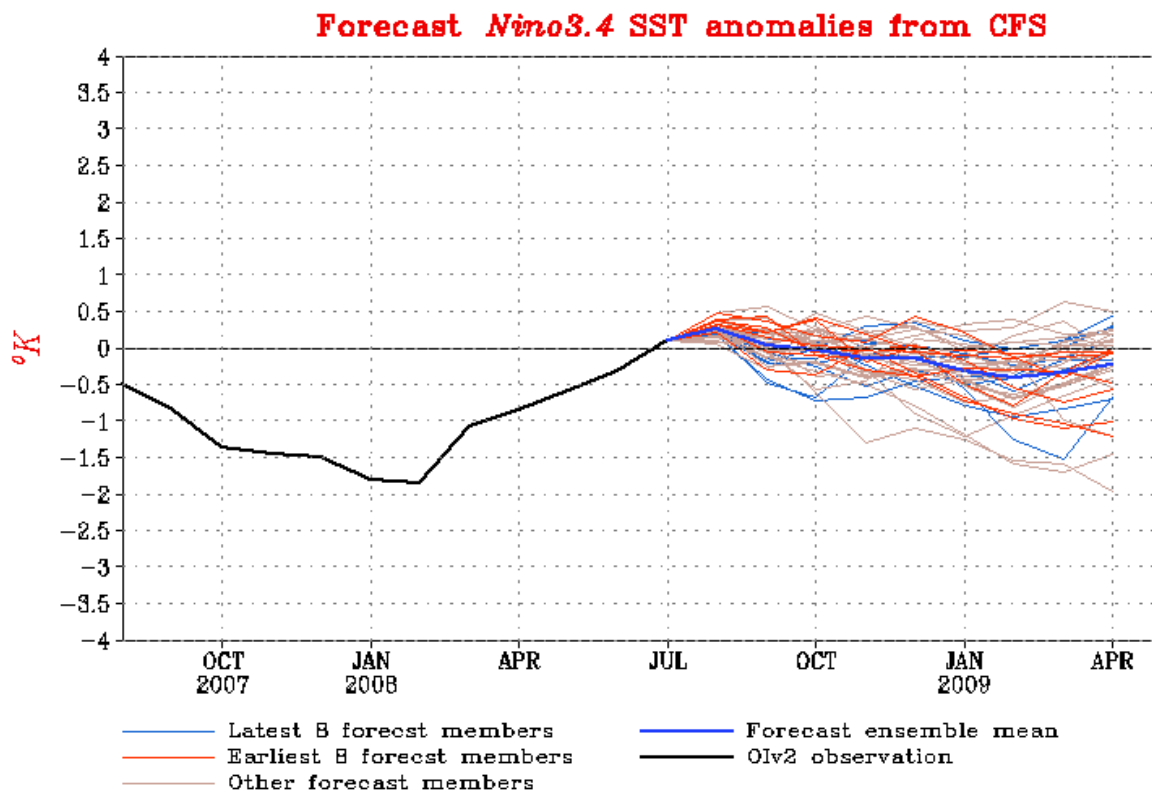
As with all seasonal forecasts, this fall's forecast is based on five factors that influence seasonal climate patterns over the United States. These factors are: the influence of both the Pacific and Atlantic Ocean sea surface temperatures on the position of the polar jet stream, recent trends in the climate pattern, short term atmospheric oscillations such as the North Atlantic Oscillation (NAO), soil moisture, and snow and ice cover over northern Canada, Asia and the North Pole.

The strongest indicators of near future climate patterns are typically most strongly indicated by the current ENSO state and recent climate trends. There was a strong La Niña this past winter, but that had faded to ENSO neutral by late June. Even though we now are experiencing ENSO neutral conditions, there typically is a lag of several months that the atmosphere still acts like a La Niña still exists. This summer has seen such a pattern in the increase in Atlantic tropical storm systems and slight suppression of Eastern Pacific tropical systems. ENSO is forecasted to remain near neutral through the spring of 2009 (Figure 3).



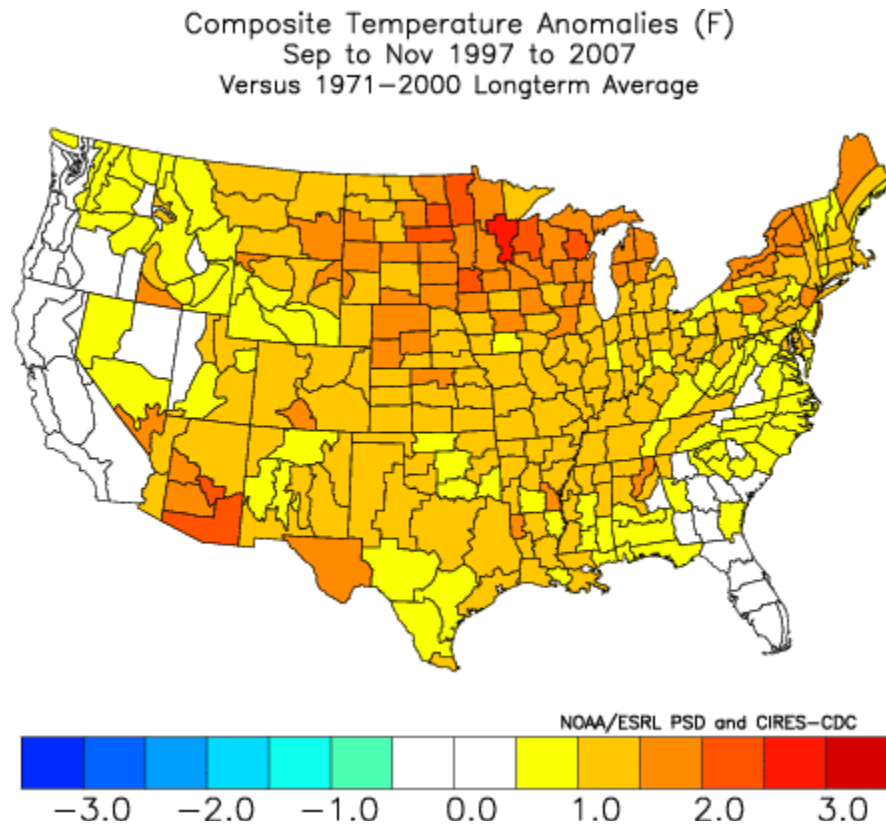
NWS/NCEP

Last update: Sat Aug 9 2008  
Initial conditions: 29Jul2008-07Aug2008



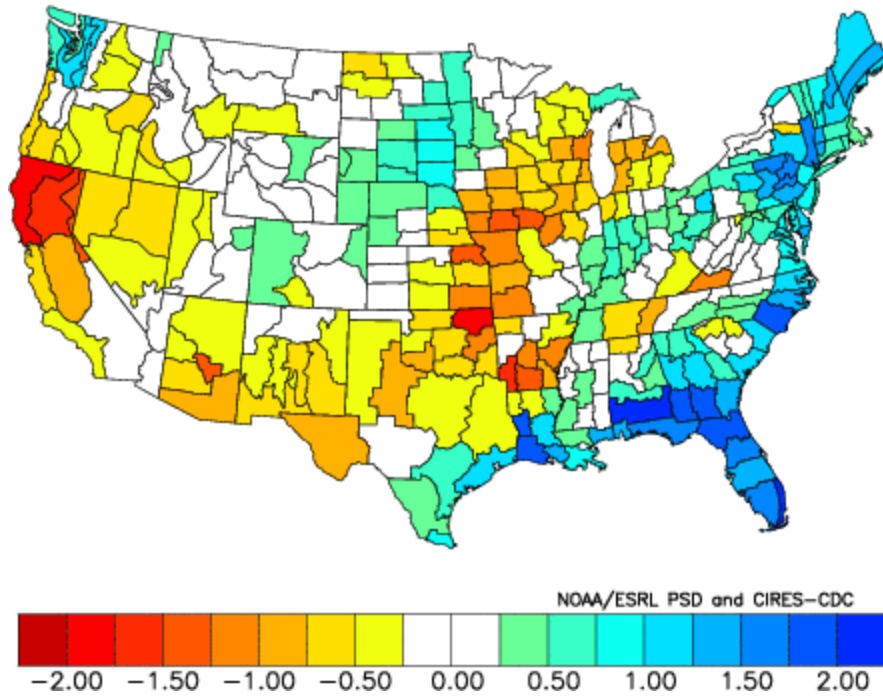
**Figure 3: The Ensemble Forecast for ENSO into Spring of 2009**

Given that the ENSO neutral state is the most likely scenario for this fall, the strongest indicator for the fall weather pattern then becomes recent trends in both temperature and precipitation. Typically, the past 10 years is used for temperature trends and the past 15 years is used for precipitation trends. Figure 4 shows the trend in the temperature for the lower 48 states since 1990 for the fall and it shows Southwest Michigan in a strong trend towards warmer falls. In fact, during this period, 1997 was the only year with a cooler than normal fall season. Figure 5 shows a significant trend over Lower Michigan since 1990 for drier falls. Since 1995, there have been only three wetter than normal falls.



**Figure 4: Fall climate trend since 1997 for temperature. This chart compares the temperature trend from 1997 to 2007 compared to the 1971 to 2000 normal period.**

Composite Precipitation Anomalies (inches)  
Sep to Nov 1992 to 2007  
Versus 1971–2000 Longterm Average

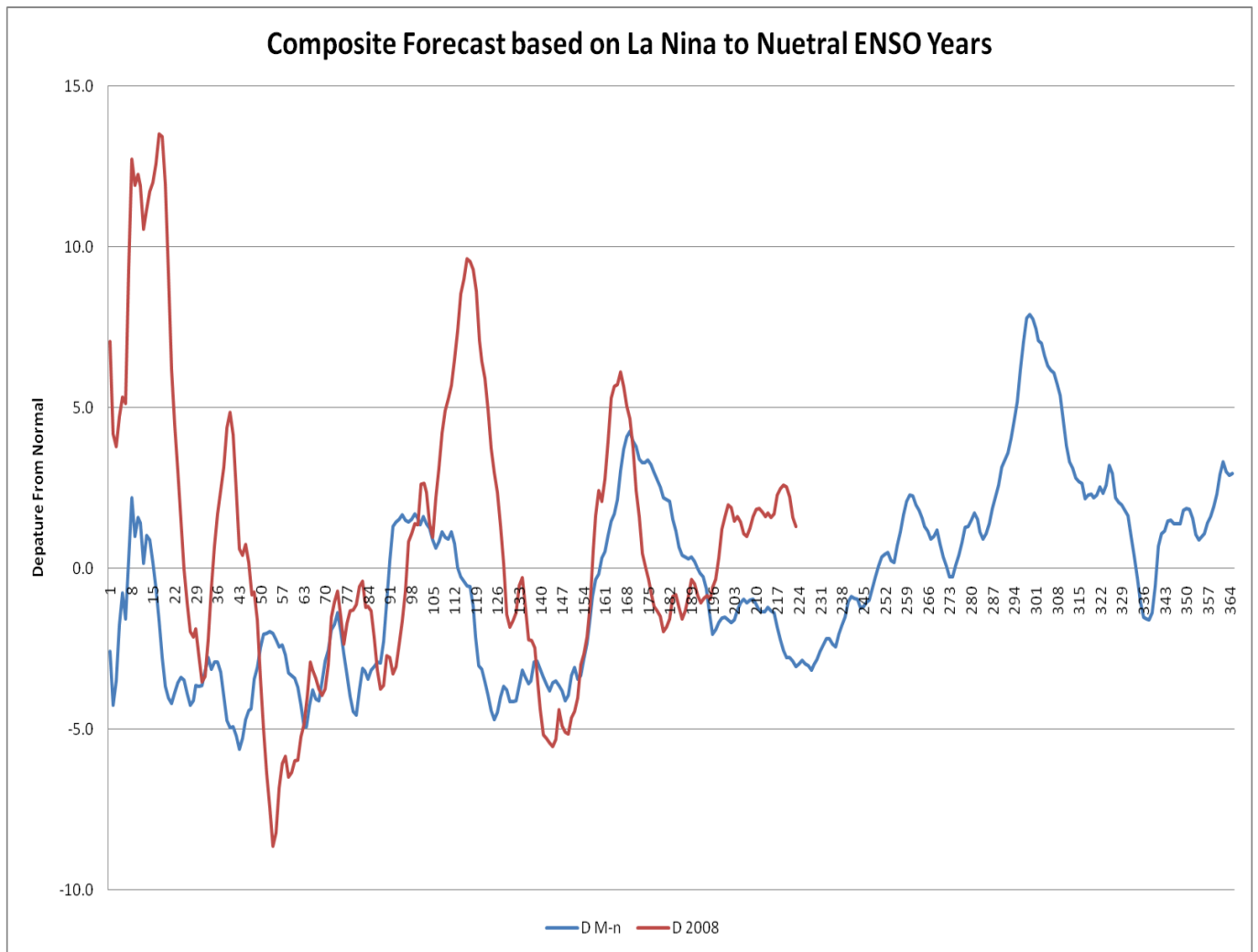


**Figure 5: Fall climate trend since 1992 for Precipitation. This chart compares the precipitation trend from 1992 to 2007 compared to the 1971 to 2000 normal period.**

These trends would support a warm and dry fall for Southwest Michigan. Next, we'll look at what happened during fall seasons when there was a La Niña during the previous winter that faded to neutral in the summer. We'll take these years and refine the list further to include only those years that had the most similar monthly averaged temperature anomalies in the May-July 2008 timeframe. These analogous (i.e., analog) years to the current year can then be investigated to infer what might happen this coming fall.

The analog years that fit these criteria were 1956, 1963, 1967, 1971, and 1994. A 14-day running mean of temperatures was taken for each of these years, and then results from each year were averaged to obtain a composite forecast. These composite forecasts have some striking similarities to what has happened so far in 2008 (Figure 6) – namely, a relatively warm period in late April/very early May (Julian days 110-120), followed by a cool period in late May (Julian days 140-150), followed by a warm period in mid-June (Julian days 165-170).

For the rest of 2008, the composite suggests a warm fall (Julian days 245 to 335). October is shown to be a very warm month. It is not until the very end of November into early December that a significant cooling period starts. This very much supports the idea of warm fall.



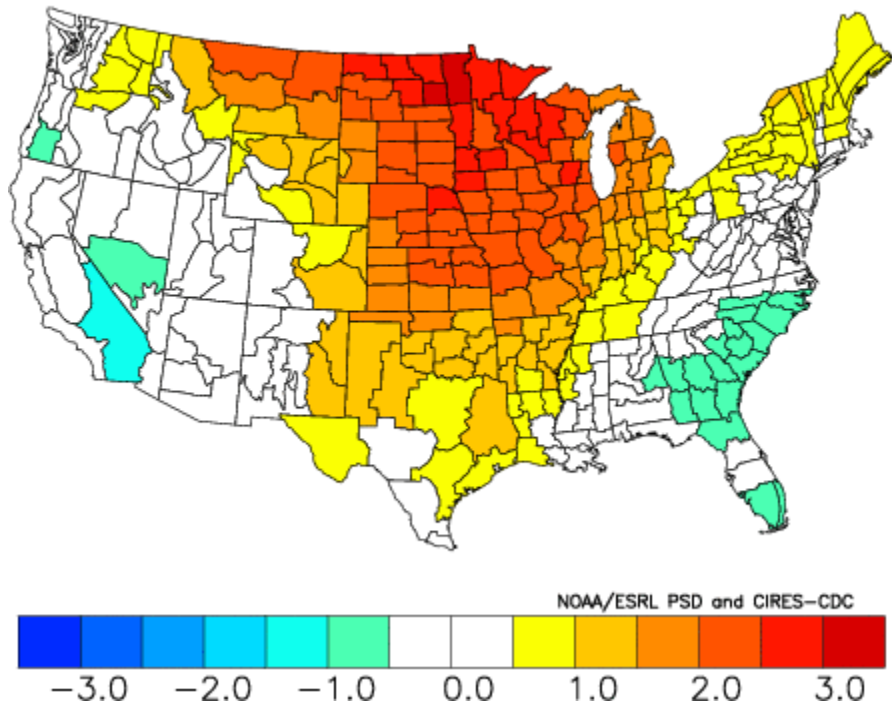
**Blue line = mean anomaly for analog years**

**Red line= anomalies for 2008**

**Numbers in the middle are Julian days for the year**

**Figure 6: Average daily temperature anomalies for the composite of the analog years 1956, 1963, 1967, 1971, and 1994 versus the current year (2008).**

Composite Temperature Anomalies (F)  
Sep to Nov 1956,1963,1967,1971,1994  
Versus 1950–1995 Longterm Average

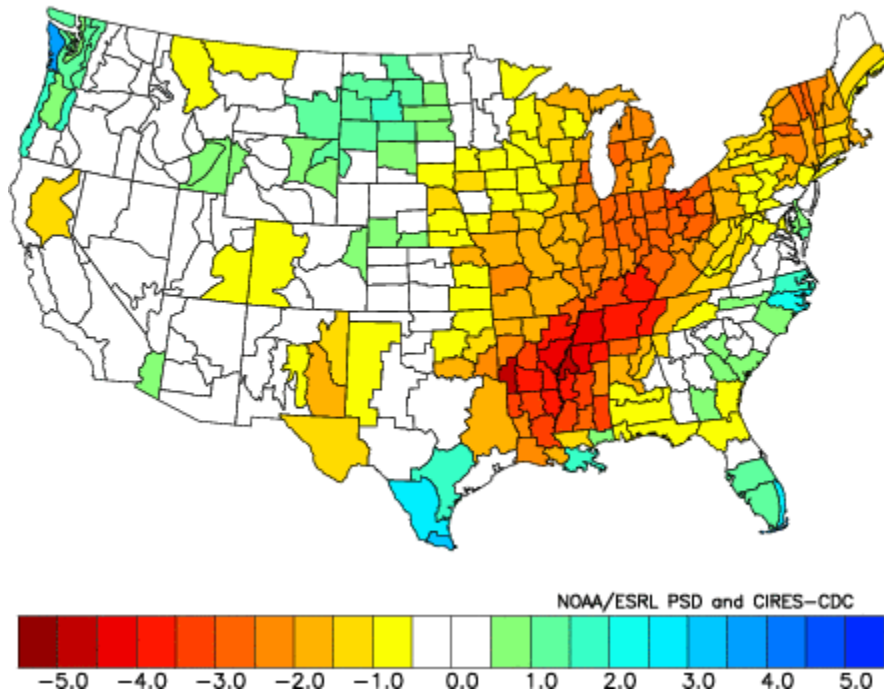


**Figure 7: Temperature Anomalies for the fall for the analog years**

Additional support for a warm fall comes from looking at the national anomalies for the composite years (Figure 7). Much of the North Central United States, including the Western Great Lakes, experienced warmer than normal conditions for the fall months during these years.



Composite Precipitation Anomalies (inches)  
Sep to Nov 1956,1963,1967,1971,1994  
Versus 1950–1995 Longterm Average



**Figure 8: Fall Analog year precipitation anomalies**

For the same composite of years, fall precipitation was below normal (Figure 8). This agrees with the dry precipitation trend for fall seen in Figure 5. It should be remembered that, even with these dry signals, the official CPC precipitation forecast shows equal chances of above, below, or near normal precipitation (Figure 2). A possible reason for this is that the precipitation trend seen in Figure 5 covers a relatively small area in Southwest Lower Michigan, while the rest of the state shows a much weaker signal. The CPC forecast is for a larger scale, which could explain the difference. Nonetheless, for Southwest Lower Michigan there are suggestions that a dry fall actually is favored.

***Summary:***

The most likely outcome for Fall of 2008 in Southwest Lower Michigan is for above normal temperatures and below normal precipitation. The above normal temperatures are a result of the recent trend for warmer falls and the analog years where a La Niña winter turned into an ENSO neutral summer. As a result of the agreement of both of these signals, it seems quite likely that a warmer than normal fall will occur. For precipitation, both trend and analog years suggest this coming fall will be drier than normal.