Spring 2011 Outlook for Southeast Lower Michigan

Are Springs Trending Warmer?

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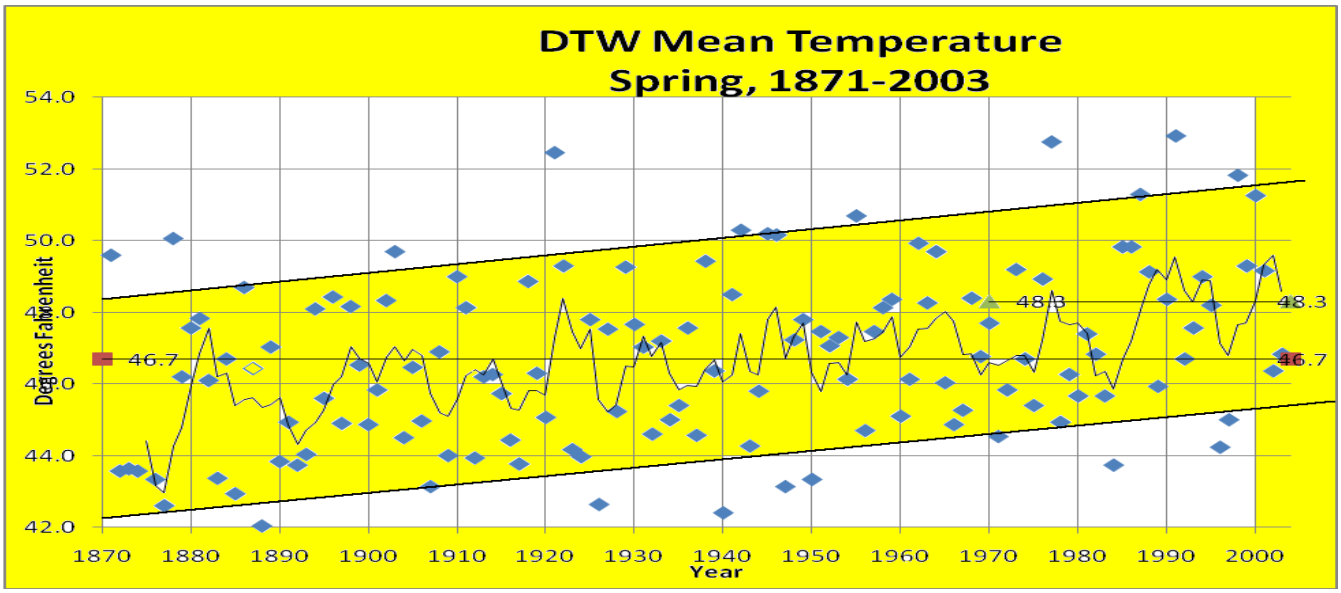
The impacts of a strong La Nina and another winter with a predominant negative North Atlantic Oscillation /NAO/ were well reflected in our winter weather pattern. Temperatures averaged around 22 ½ degrees over the entire region and which was near 2 ½ degrees below normal. After a cold and snowy winter, many are wondering how long these conditions will persist into the spring. Can we expect a warm spring like last year, a cold spring or a more typical spring which may start out cold but warms nicely with time? Clearly it would be exceptional to have two top warmest springs back to back. Curiously and surprising for some, there have been a number of recent springs which have ended up in the top 20 warmest at Detroit. Recent top 20 warmest springs the past decade or so include: 2010, 2007, 2006, 2004 and 2000 and therefore; the trend for warmer springs has been our friend. What's even more interesting is the last time Detroit placed in the top 20 coldest springs, how about 1950? Yes, it was the Spring of 1950 (placed 11th for coldest) with an average temperature of 43.4. However, both Flint and Saginaw have placed in the coldest list the past decade. Flint back in 2005 with 43.6 degrees and Saginaw in both 2003 and 2002 with 42.3 and 42.5 respectively. There are two prime reasons why Detroit hasn't placed in the coldest springs recently. The first is the obviously larger data base, making for more competition for placement, and two, the heat island around Detroit which has skewed up the mean temperature somewhat, leading to warmer temperatures and keeping the springs of 2003 and 2002 out of the list.

Looking way back to when records began at Detroit in the 1870s; have the springs on a long term basis become warmer? The answer would seem to be yes. The chart below (Fig-1) runs from 1871 - 2003 and displays a slight but definite rise (yellow highlight) in average temperatures. Furthermore, if the springs from 2004 through 2010 were included (and remember four of those placed in the warmest list) our uptrend would surely be intact. Note the 30 year average now stands at 48.3 degrees, whereas the average for the entire period (1871 through 2003) stands at a decidedly cooler 46.7. The trend line plotted on the chart shows a gradual uptrend while jumping and diving through the years.

(Fig – 1)



Average Trend Line ----- 30 year mean: 48.3 Long term mean (1871-2003): 46.7

On To Spring:

The transition seasons, spring and autumn, are always the most difficult to try to peg a dominant trend from past analogues, just because the seasons are in transition (or changing). While the trend you expect may occur, the age old adage of timing is most problematic, especially in spring. If the colder or warmer trend you expect lasts much longer or shorter, your overall spring temperature forecast can be easily blown.

<u>Temperatures:</u>

The analogues this go-around are strongly suggesting a cooler than normal spring (see the details in Analogues section). The best chance of below normal temperatures generally speaking, are in March and May. Spring has a good chance of being cooler than normal early and again late in the season is the best way to look at it. I feel the magnitude of the cold in the analogues is too strong and warm spells will offset the cooler weather that is anticipated. I look for a spring closer to normal than the analogues portray. Look for temperatures to average around normal /+1.0 to -1.5 of normal/.

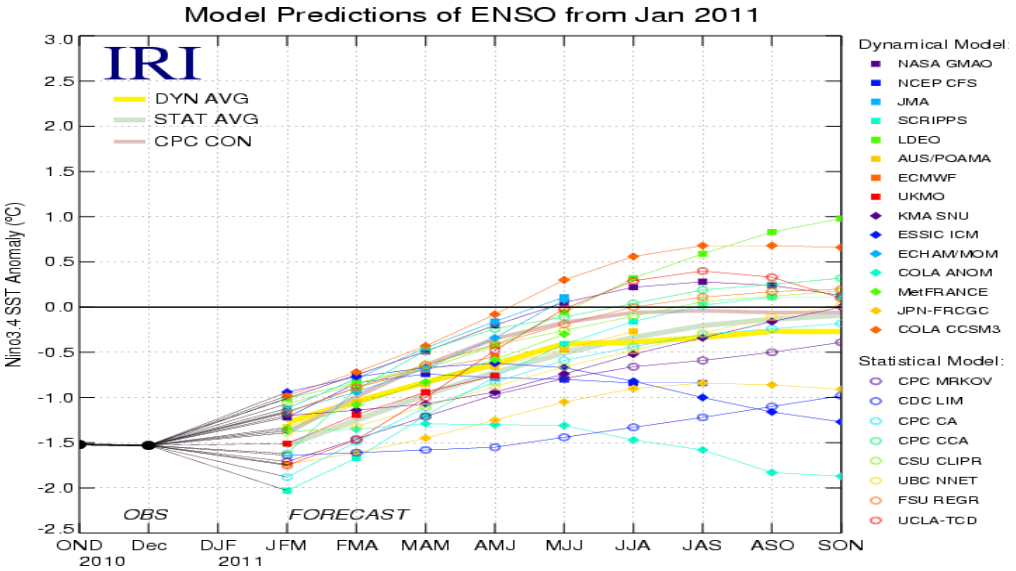
<u>Precipitation:</u>

While temperatures were decidedly cooler in the analogues, precipitation amounts were all over the board with the most predominant being near average. On this front, I expect the precipitation to be near normal to above across the entire region. We'll keep the best chance of above normal precipitation where the trend has been since last summer, from the I-69 corridor south to the Ohio border.

What is going on with La Nina?

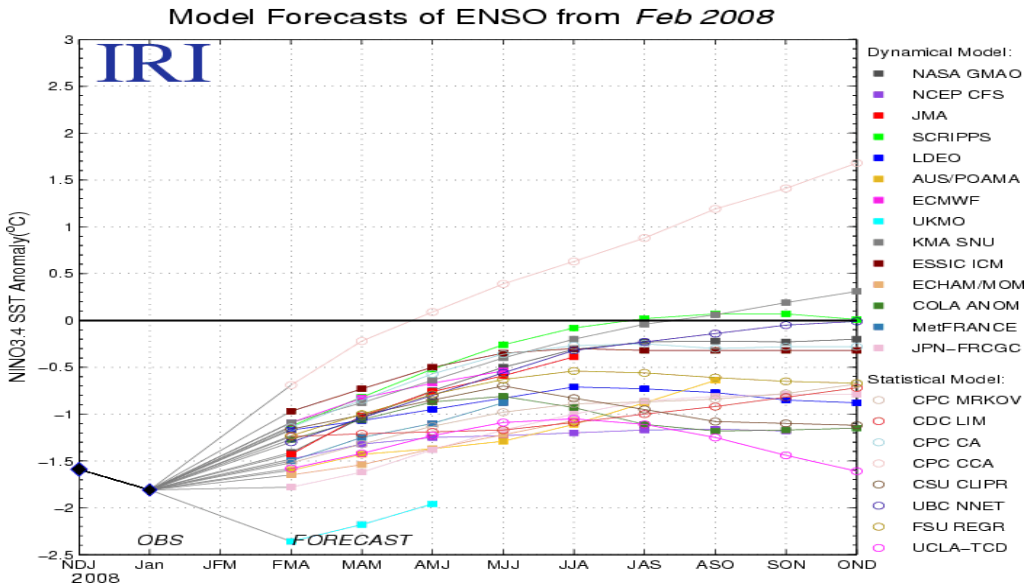
As seen by the projected Sea Surface Temperatures /SST/ below, the below normal SST's or La Nina is expected to steadily warm during the spring and summer shifting primarily normal (or Neutral) during the summer though some members do hold onto La Nina longer (see Fig-2 below).

(Fig –2)



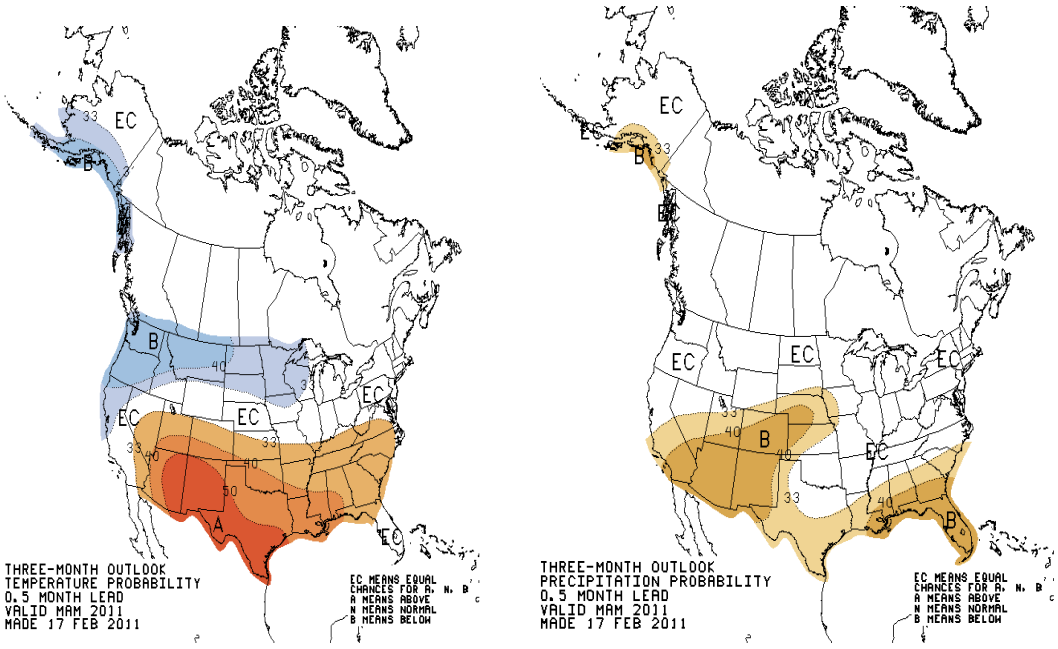
An interesting comparison (and subsequent similarity) can be drawn from the computer members back in the projection of the SST's in the Spring of 2008 (Fig - 3) after that winter's La Nina. The actual SST pattern that spring and summer season did indeed creep back to neutral conditions.

(Fig – 3)



The Official 2011 Spring Outlook from the Climate Prediction Center (Fig – 4) for the region is calling for Equal Chances for Above, Below or Normal Temperatures and Precipitation this spring.

(Fig – 4)



La Nina Springs in Southeast Michigan

The dominant temperature pattern surfacing from the analogue springs (Fig - 5) is a bit scary with a strong dominant trend of below normal conditions (a substantial 10 out of 13 springs, see below). In the past, when an overwhelming number of analogues have suggested a particular trend that strongly, most of the time that dominant trend was the right way to go. One big exception to that rule, ironically occurred just last spring when the dominant analogue temperature trend was also strongly below normal. In that outlook however, I felt the analogue guidance was skewed too cold for the trend at the time and also dismissed it as an inherent cold bias relative to normal since Detroit's averages are now higher (and thus, the earlier analogue years would have a larger departure below normal). Flint and Saginaw's averages have changed little when compared to Detroit and the number of below normal spring seasons were less. I chose near normal temperatures last spring rather than forecast, below normal temperatures, but in the end, I still wasn't warm enough. Spring of 2010 turned out to be the warmest on record at Detroit. Also, that record warm spring initiated a six month warmest spring through summer period on record for all three sites.

(Fig - 5)

Analogue Springs

	DETROIT	T	E	M	P	S				
	SEASON	March	April	May	SPG AVE	SPRING	SPRINGS	SEASON		
ANALOGUE LA NINAS	1890	30.4	46.5	54.6	43.8	1		1890		
	1899	29.3	50.5	59.8	46.5	2		1899		
	1904	33.1	41.2	59.2	44.5	3		1904		
	1917	36.3	43.6	51.4	43.8	4		1917		
	1925	37.3	51.4	54.7	47.8	1		1925		
	1943	33.8	42.4	56.6	44.3	5		1943		
	1956	32.4	45.7	56.0	44.7	6		1956		
	1965	30.1	44.9	63.1	46.0	7		1965		
	1971	32.0	45.2	56.4	44.5	8		1971		
	1974	35.7	49.2	55.2	46.7	9		1974		
	1989	35.2	45.1	57.5	45.9	10		1989		
	1999	34.8	50.7	62.4	49.3	3	3	1999		
	2008	33.4	51.8	57.4	47.5	10	10	2008		
	Ave	33.4	46.8	57.3	45.8			Ave		
	NORM 30Y	36.9	48.1	59.8	48.3			Norm		
	Dep	-3.5	-1.3	-2.5	-2.5			Dep		

	DETROIT	SNOW			PCPN					
	SEASON	March	April	May	March	April	May	Total	SPRING	SEASON
SPRING 2011	1890	7.9	0.6	0.0	1.32	2.74	3.94	8.00	1	1890
	1899	24.1	0.5	0.0	4.36	0.53	3.38	8.27	2	1899
	1904	14.7	1.8	0.0	4.09	1.65	2.36	8.10	3	1904
	1917	3.1	T	0.0	2.61	4.61	3.32	10.54	1	1917
	1925	8.4	0.0	T	3.44	1.42	1.21	6.07	1	1925
	1943	3.9	0.9	0.0	2.18	4.11	8.05	14.34	2	1943
	1956	13.3	0.7	0.0	3.57	3.78	6.03	13.38	3	1956
	1965	12.9	2.4	0.0	3.02	3.04	2.16	8.22	4	1965
	1971	2.5	2.5	0.0	1.59	0.92	1.97	4.48	2	1971
	1974	4.5	3.6	0.0	4.20	2.75	3.49	10.44	4	1974
	1989	7.8	2.0	0.0	2.16	2.22	4.16	8.54	5	1989
	1999	13.2	0.0	0.0	1.12	5.13	2.20	8.45	6	1999
	2008	21.0	T	0.0	3.17	0.96	2.03	6.16	3	2008
	Ave	10.6	1.4	0.0	2.83	2.60	3.41	8.85		
	NORM 30Y	7.0	1.7	T	2.52	3.05	3.05	8.62		
	Dep	3.6	-0.3	0.0	0.31	-0.45	0.36	-0.23		

Color	Temps	Degrees		Rain	Inches		Snow	Inches
Legend	Below	1.0>		Below	1.00>		Below	1.00>
	Normal	0.0-1.0	57.3	Normal	0.00-1.00		Normal	0.00-1.00
	Above	1.0>		Above	1.00>		Above	1.00>

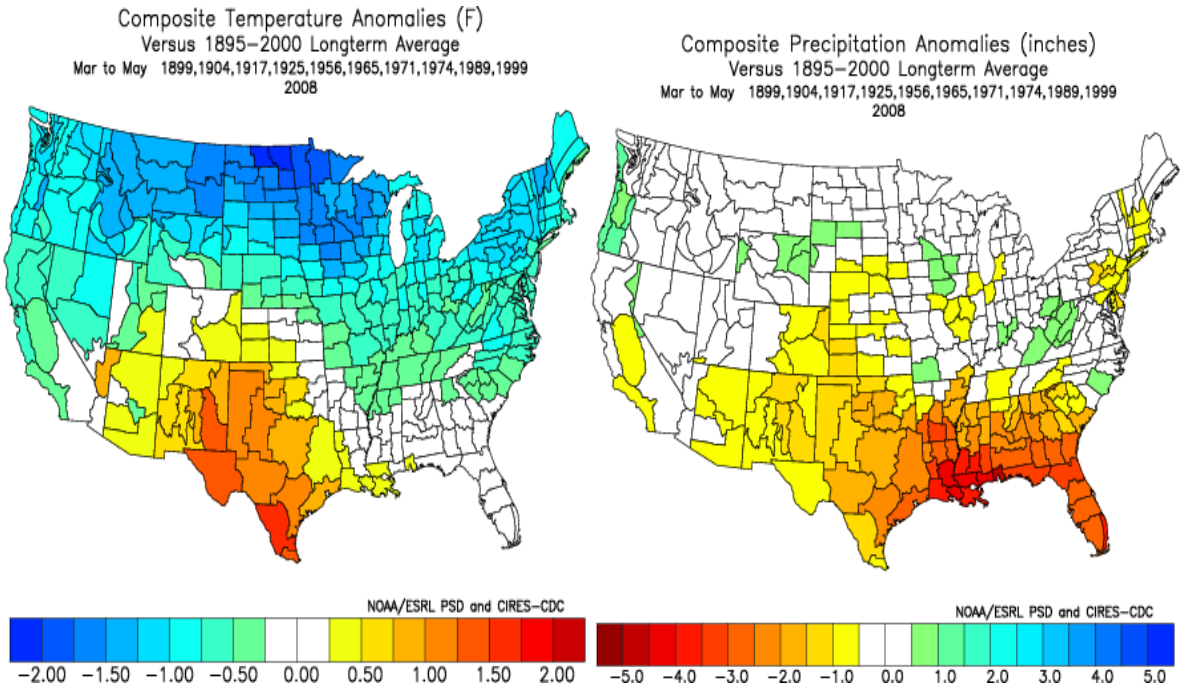
Monthly Trends

Another item noted was the larger below normal departures that occurred early and late in the season (March and May). These are two negatives for any warm weather lover or gardener by hindering the early spring clean up and May planting along with other warm weather outdoor activities. March by far had the coldest departures averaging -3.5 below normal. There were 11 out of 13 Marches that were colder than normal and some substantially colder.

Not only were many Marches cold, they were also snowy as the winter storm track remained in full force. Some snowfalls were eye-opening: 24.1" in March of 1899 and 21.0" occurring just last La Nina in March of 2008. Other high totals included 14.7", 13.3", 13.2" and 12.9". The mean snowfall jumped 3.6" above the average during these analogue seasons. On the other hand, there were enough Marches with below average snow to warrant at least a mention it (4 out of 13). However, our late winter pattern does give credence to the 9 of the 13 Marches that averaged normal to above for snow.

Snowfall risk seems to drop off markedly in April (this was not always seen in previous spring outlooks). Analogue Aprils also had the best chance of normal to above normal temperatures (which helps explain the lower snow risks). Curiously though, none of the Aprils in the study were typical (or normal) in temperatures. Will this April follow suit? A dominance of normal to below normal temperatures returned in May with two notable exceptions, 1965 and 1999. As stated earlier, it is more advisable to look at the overall trend of these past springs rather than a particular month's data as the timing can mess up the reliability. The local analogue springs displayed a dominance of normal to above normal precipitation with four relatively wet springs, six normal and three dry. Spring of 1943 placed second wettest at Detroit and contained an extremely wet May (second wettest) with 8.03" of rainfall. In May of 1956, 6.03" of rainfall /seventh wettest/ was measured in Detroit and that contributed to the 4th wettest spring. Both of these springs were also wet at Flint and Saginaw. On the flip side, 1971 was a very dry spring in Detroit with only 4.48" of rain making it the 5th driest spring at Detroit while 1925 just made the driest list at 19th place with 6.07". Interestingly, our last La Nina Spring in 2008 was also dry with only 6.16" in Detroit. All three years, 1925, 1971 and 2008 were also dry at Flint and Saginaw.

Temperature and Precipitation Composites from Analogue Springs of the Past



Severe Weather During La Nina Springs

Past experience has shown that La Nina springs tend to be feast or famine so to speak across Southeast Lower Michigan. Severe weather records since the 1950s show a number of the earlier springs were active, 1956, 1965 and1974 whereas the later springs, 1971, 1989 and 1999 were less active.

As far as the country as a whole, see below from NOAA:

> **What impacts do El Niño and La Niña have on tornadic activity across the country?**

Since a strong jet stream is an important ingredient for severe weather, the position of the jet stream determines the regions more likely to have severe weather. Contrasting El Niño and La Niña winters, the jet stream over the United States is considerably different. During El Niño the jet stream is oriented from west to east over the northern Gulf of Mexico and northern Florida. Thus this region is most susceptible to severe weather. During La Niña the jet stream extends from the central Rockies east - northeastward to the eastern Great Lakes. Thus severe weather is likely to be further north and west during La Niña than El Niño.

Back In the Spring of 2008 under a weakening La Nina, the severe weather season did not really get going until summer.

Check in later in the spring season (late April) for the final tally of snowfall in the Winter Review along with how the analogues performed.

This will be my last Local Season Outlook for Southeast Lower Michigan with the National Weather Service. I will be retiring from the NWS on April 23rd, 2011. I plan to remain active in the weather field as my interest remains strong. I wish to thank my readers for many years of encouraging comments on my past weather stories, season outlooks/reviews along current weather and climate summaries.

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