

*La Nina Departs For the Summer...What Type of Summer Will Follow
In It's wake?*



Summer 2008 Outlook For Southeast Lower Michigan
(Also Includes Brief Spring 2008 Review)

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Temperatures:

Overall, look for summer temperatures to average on the higher side of normal / 0.0 to +1.5 degrees of the summer average/ in the final analysis. Local data reveals that prevailing temperatures in our analogue summers generally averaged around normal (within a degree of). At the same time, projections for the upper wind pattern suggest ridging developing in the vicinity of the Great Lakes to the East Coast during the summer which would bring warmer weather. Therefore, it boils down to our analogue summers being a bit on the cooler-side of the equation, while upper wind projections are aiming for more warmth. At this time, it is more prudent to scale the outlook to the higher side of normal.

Rainfall:

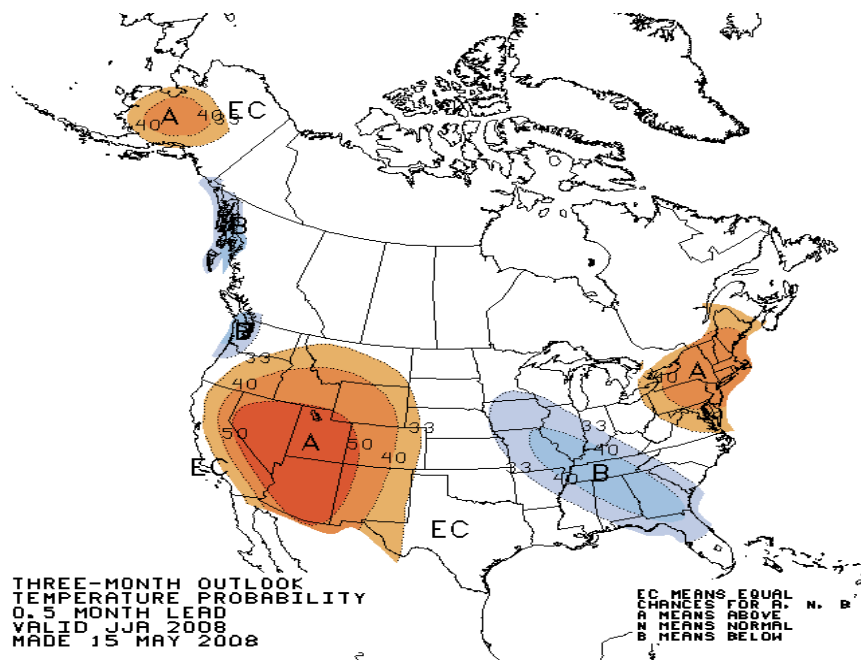
Overall rainfall will average below normal (with some local amounts near normal) in the summer convective rains. General consensus leans toward a drier than normal summer (particularly if the expected upper ridge develops during the summer).

Severe Weather:

The severe weather season has been fairly benign thus far (through the spring) while past La Nina's have been known to be busier in this neck of the woods. As anyone who listens to the news knows, it has been very busy south and now west of the Great Lakes. It is expected that the pattern is shifting north and thus, so will the risk of more storm activity. Just because the season has been fairly quiet doesn't mean it will remain that way.

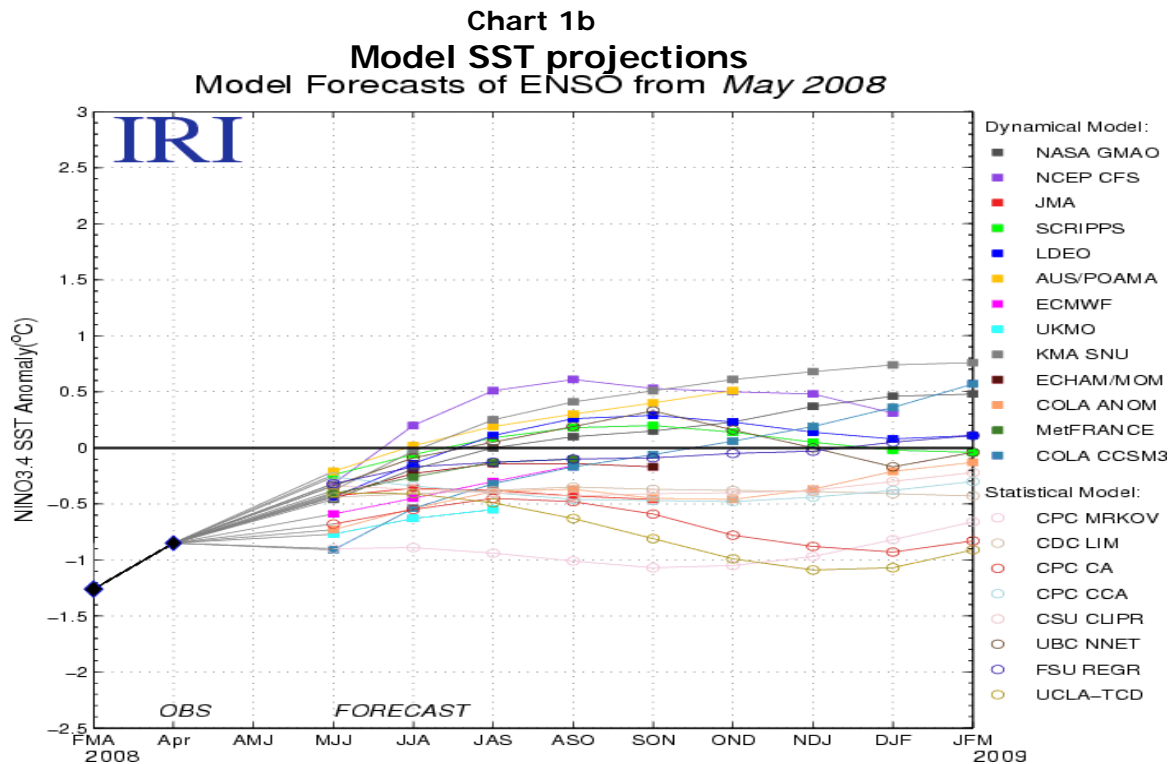
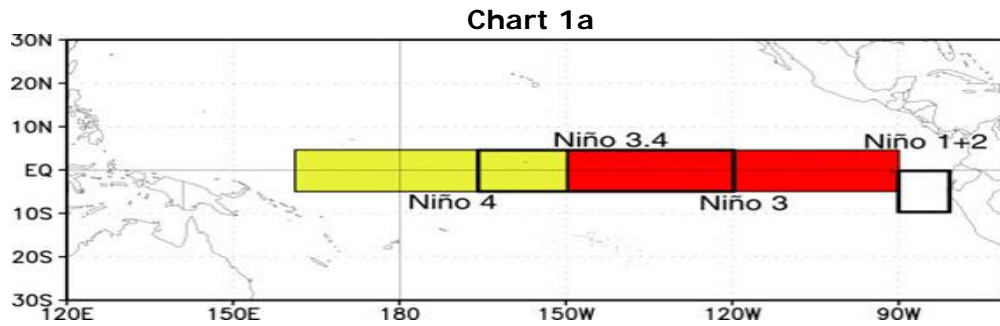
National Outlook

The [national outlook from CPC](#) shows equal chances for Southeast Lower Michigan summer temperatures being above or below normal. Note our region is basically sandwiched between the higher probability of above normal temperatures to our east and below normal to our south (mixed signals nearby - not unlike our local data below).



Broad Scale Discussion

Last summer, generally Neutral conditions prevailed over the eastern Pacific through the summer. After a robust La Nina this past winter, water temperatures began moderating this spring to a weaker La Nina. As one can see with Chart-1a and 1b (location of Nino 3.4 and the projected sea surface temperatures /SST/ for the summer), the majority of model members are projecting a continuation of the recent warming (or moderation) of the sea surface temperatures /SSTs/ in area Nino 3.4. Latest May guidance continues the weakening of La Nina into the summer to possibly a Neutral state by late summer or early fall.

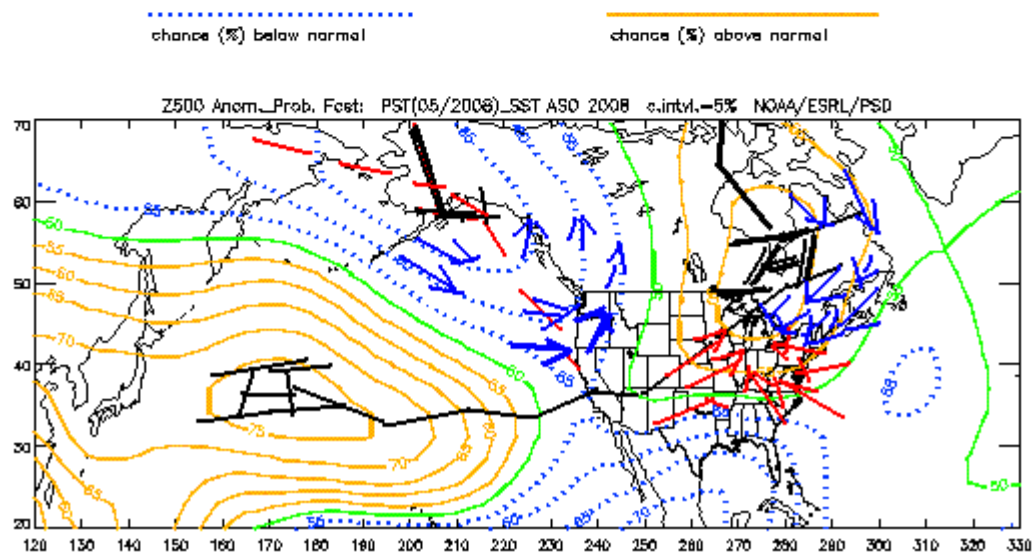
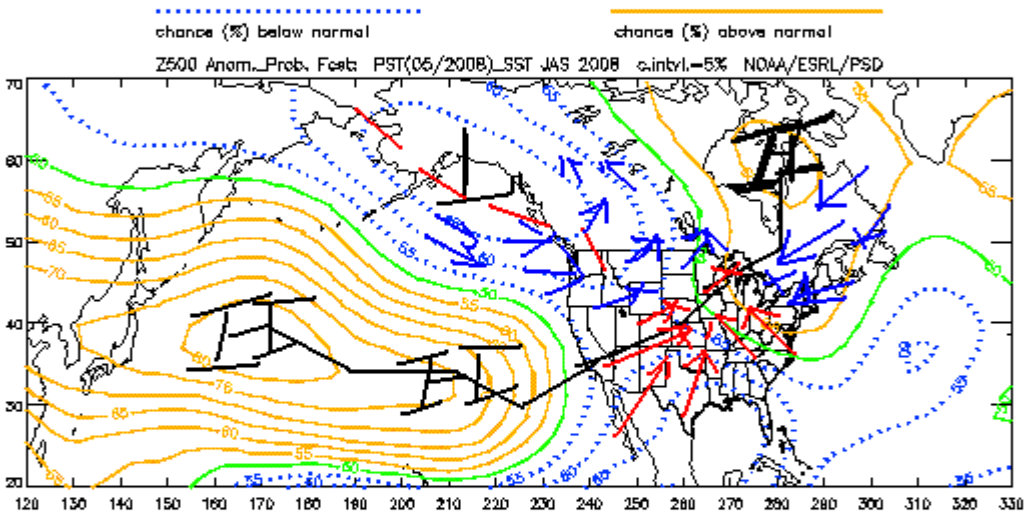
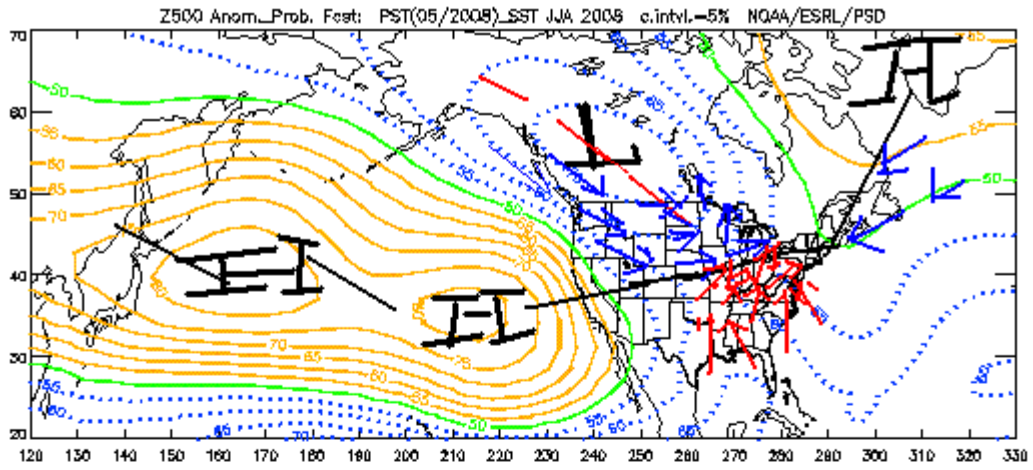


Looking above at each specific dynamic model above shows they generally are in the same camp with the gradual warming expected to continue into summer and by mid-summer /JAS/, project just a hint below the normal (or treading in "Neutral territory"). Under these conditions little, if any, significant downwind affects are slated for the Great Lakes. While there are some affects seen across the U.S. during stronger La Ninas (as with El Ninos), they are generally negligible when it comes to weak La Ninas or Neutral conditions.

Projected upper wind data from CDC (Persistence)

The following 500MB projections have been roughly annotated to give an idea of the general low-level wind flow with the upper wind projection. Experimental upper wind projections suggest ridging developing with time (later summer into the fall). While analogue data shows mixed data for the summer, the position of the summer ridge will definitely be the determining factor on this summer's heat. If the ridge axis oscillates from the East Coast to the Lakes region, look for the warmer summer to be the outcome. Any further to the west retrogression of the ridge axis, would allow cooler winds at times out of Canada and into the region, leaving closer to normal conditions. Therefore, the warmer side of normal is the best logical play this time.

The experimental upper wind data from CDC



Analogue Summers

Researching as far back as the early 1900s, 13 summers were chosen for our analogue summers this go around (see Analogue Summers 2008 chart below). The analogue summers were scouted-out based on similar broad-scale conditions but it is the local trends and similarities found, that we will focus on. All these selected summers followed a similar sequence of events seen recently over the Eastern Pacific the past few seasons. A La Nina was in full swing the previous winter (mainly moderate to a few strong) which faded toward Neutral conditions during the summer months in these summers.

ANALOGUE SUMMERS 2008

DETROIT	JUN	JUL	AUG	SUM AVE	SUMMER	FLINT	JUN	JUL	AUG	SUM AVE	SUMMER	SAGINAW	JUN	JUL	AUG	SUM AVE	SUMMER			
1904	67.0	71.2	68.2	68.8	1	1904	65.8	68.5	65.0	66.4	1	1904	67.0	70.3	66.4	67.9	1			
1907	64.8	71.0	68.0	67.9	2	1907	63.9	69.2	65.5	66.2	2	1907	66.2	71.2	68.1	68.5	2			
1911	69.5	73.6	70.7	71.3	1	1911	65.5	70.6	67.3	67.8	1	1911	69.9	73.9	69.7	71.2	1			
1925	70.6	71.0	72.1	71.2	2	1925	71.7	71.7	70.7	71.4	1	1925	68.6	68.6	70.3	69.2	3			
1951	67.8	72.7	69.5	70.0	3	1951	65.5	70.2	66.6	67.4	2	1951	64.8	69.1	66.0	66.6	1			
1956	69.8	71.8	71.2	70.9	3	3	1956	68.2	68.7	68.5	68.5	3	1956	68.3	67.5	68.2	68.0	4		
1965	67.8	70.4	70.0	69.4	4	1965	65.4	68.4	67.6	67.1	4	1965	64.8	68.3	67.6	66.9	2			
1971	70.8	69.6	70.3	70.2	5	1971	69.5	67.5	67.4	68.1	5	1971	72.3	69.6	69.1	70.3	2			
1974	65.9	72.5	72.3	70.2	6	1974	64.9	71.3	69.7	68.6	6	1974	65.1	71.6	69.9	68.9	5			
1976	70.6	72.7	70.2	71.2	7	1976	69.4	71.1	68.2	69.6	2	1976	70.5	71.7	68.5	70.2	3	3		
1985	62.8	71.3	69.2	67.8	8	1985	62.5	70.4	67.2	66.7	3	3	1985	62.8	68.4	66.9	66.0	3	3	
1989	67.5	73.0	69.9	70.1	9	9	1989	66.2	71.3	68.0	68.5	7	7	1989	66.5	72.4	68.5	69.1	6	
1999	70.8	76.8	70.2	72.6	1	1	1999	68.5	73.0	66.4	69.3	3	3	1999	69.7	72.3	66.3	69.4	7	7
Ave	68.1	72.1	70.1	70.1	-1.3	Ave	66.7	70.1	67.5	68.1	-0.3	Ave	67.4	70.4	68.1	68.6	-0.3			
Norm	69	73.5	71.8	71.4	Norm	66.2	70.6	68.5	68.4	Norm	66.8	71.2	68.7	68.9						
DETROIT	JUN	JUL	AUG	SUM TOT	SUMMER	FLINT	JUN	JUL	AUG	SUM TOT	SUMMER	SAGINAW	JUN	JUL	AUG	SUM TOT	SUMMER			
1904	1.08	2.94	3.20	7.22	1	1904	0.61	2.68	2.35	5.64	1	1904	1.96	4.44	2.06	8.46	1			
1907	3.60	2.71	0.62	6.93	2	1907	1.41	2.60	1.62	5.63	2	1907	1.66	1.39	0.50	3.55				
1911	1.48	0.79	1.31	3.58	3	1911	3.76	0.89	3.03	7.68	1	1911	2.70	1.21	2.36	6.27				
1925	4.26	6.94	2.81	14.01	1	1	1925	1.34	1.34	2.96	5.64	3	1925	1.23	2.92	4.89	9.04	2		
1951	3.13	4.10	2.99	3.41	4	1951	3.78	2.17	2.62	8.57	2	1951	3.98	2.11	3.73	9.82	3			
1956	1.61	1.20	6.53	9.34	1	1956	2.97	3.90	8.68	15.55	1	1956	1.19	3.13	5.05	9.37	4			
1965	2.11	2.99	3.24	8.34	5	1965	1.87	1.64	4.55	8.06	3	1965	2.49	1.01	4.80	8.30	5			
1971	2.17	1.95	1.62	5.74	6	1971	2.43	3.90	1.62	7.95	4	1971	1.94	3.12	1.30	6.36				
1974	2.38	0.59	2.95	5.92	7	1974	1.93	1.72	2.75	6.40	4	1974	3.83	2.58	1.74	8.15	6			
1976	3.26	1.47	1.68	6.41	8	8	1976	4.11	1.98	0.81	6.90	5	5	1976	4.71	2.11	1.80	8.62	7	
1985	1.62	3.96	4.88	10.46	2	1985	1.54	2.99	4.33	8.86	5	1985	2.34	2.31	3.41	8.06	8			
1989	3.79	4.21	2.14	10.14	3	1989	4.90	2.65	5.56	13.11	2	2	1989	3.68	0.45	2.30	6.43	4		
1999	5.46	3.62	1.31	10.39	4	4	1999	3.89	4.13	2.64	10.66	6	6	1999	1.92	4.70	1.85	8.47	9	9
Ave	2.77	2.88	2.71	7.84	-1.97	Ave	2.66	2.51	3.35	8.51	-1.16	Ave	2.59	2.42	2.75	7.76	-1.18			
Norm	3.55	3.16	3.1	9.81	Norm	3.07	3.17	3.43	9.67	Norm	3.06	2.50	3.38	8.94						
Color	Temps	Degrees	Rain	Inches	Color	Temps	Degrees	Rain	Inches	Color	Temps	Degrees	Rain	Inches						
Legend:	Below	1.0>	Below	1.00>	Legend:	Below	1.0>	Below	1.00>	Legend:	Below	1.0>	Below	1.00>						
	Normal	0.0-1.0	Normal	0.00-1.00		Normal	0.0-1.0	Normal	0.00-1.00		Normal	0.0-1.0	Normal	0.00-1.00						
	Above	1.0>	Above	1.00>		Above	1.0>	Above	1.00>		Above	1.0>	Above	1.00>						

Trends Seen

Just a few distinctive trends are seen this time in the analogue summers. First off, many summers were dominated by overall normal temperatures. However, when looking at Detroit's data, it appears that below normal summers dominated but this is mainly due to the latest norms/1971 -2000/ rising at Detroit. Thus, this skews the analogue departure data, cooler (see more on that, below).

In addition, it was unusual to go through a whole summer with each month consecutively either above normal temperatures or below. Aside from Detroit's skewed data, both Flint's and Saginaw's data reveal only a couple of consistently warm or cool summers with most being variable. This variability led to seven summers out of the 13 at Flint and Saginaw being around normal and only three above normal and three below.

At Detroit, where the norms have risen due to mainly the "heat island" a somewhat misleading nine departures resulted in below normal. It is interesting to note, that if Detroit's previous set of normals /1961-90/ are used (and where an urban heat island was much less of a factor at Detroit Metro Airport), the normal for the summer drops substantially /1.2 degrees/ to 70.2. Now, using that normal for the summer gives us only a tenth of a degree/70.1/ difference between the average of all the summers and the 70.2 degree norm. Also, at that base of 70.2 degrees, we now have just two summers averaging below and above normal with an appreciable nine near normal (and much more in line with both Flint and Saginaw).

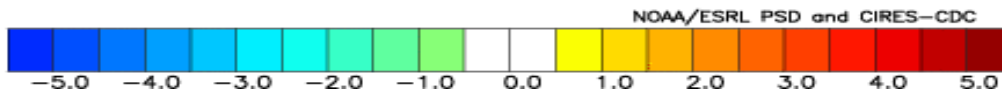
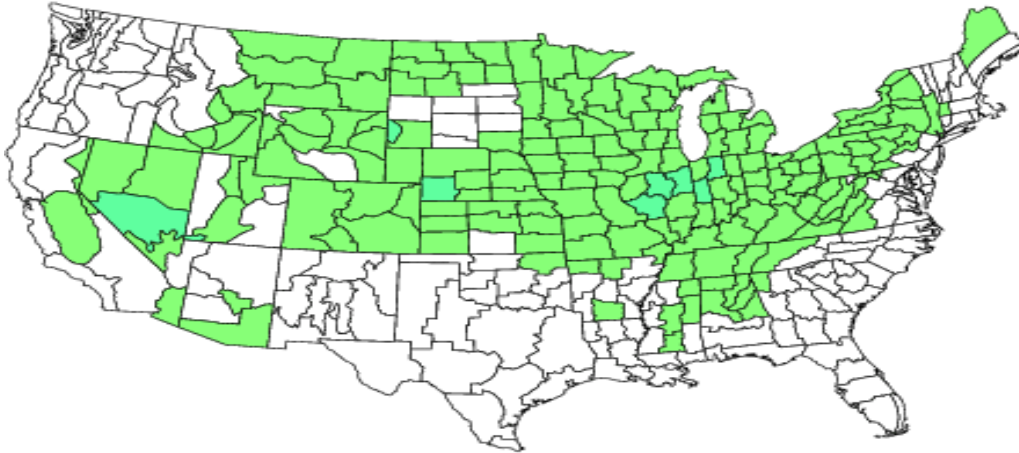
A few notes on the following composites:

1) Its best to look at the trend of the temperatures or precipitation for entire season when looking at the monthly projections. In other words, warm or cool periods don't always come neatly wrapped up in one month, many times a trend is seen overlapping from one month into another. As an example, one month's data may be above normal while the next, below and the third below. The whole season may indeed start out above normal but toward the middle or end, temperature departures average below.

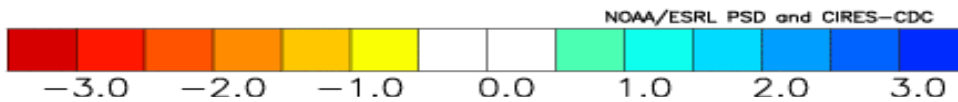
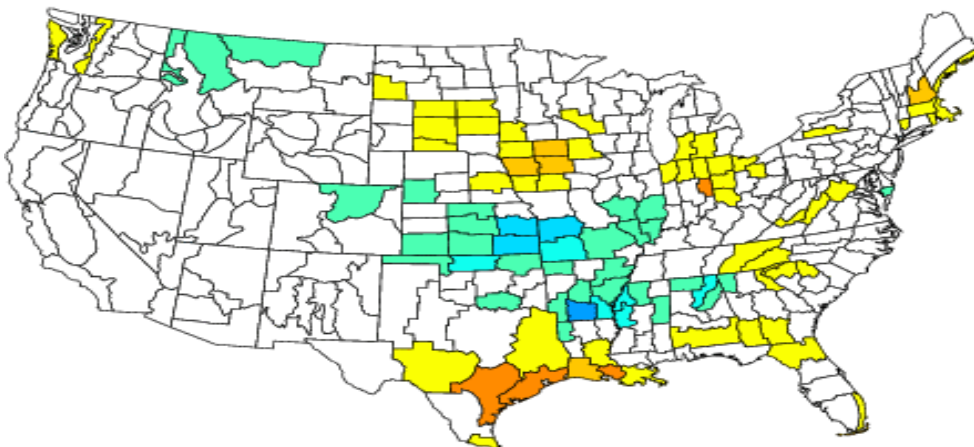
2) The actual numerical departure value above or below for analogue month or season projections is not as important as the sign(+/-) ahead of it.

ANALOGUE SUMMERS 2008 MAPS
(based on the 1895-2000 average)

Composite Temperature Anomalies (F)
Versus 1895–2000 Longterm Average
Jun to Aug 1904,1907,1911,1925,1951,1956,1965,1971,1974,1976
1985,1989,1999



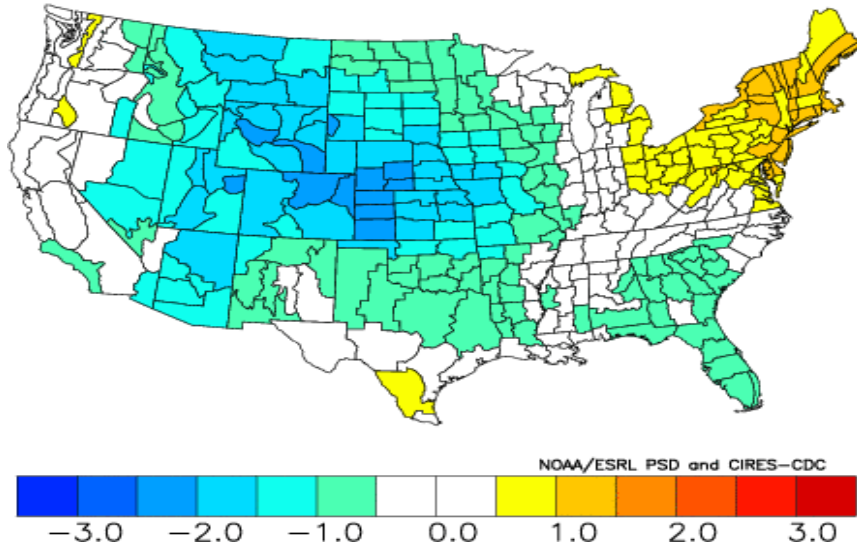
Composite Precipitation Anomalies (inches)
Versus 1895–2000 Longterm Average
Jun to Aug 1904,1907,1911,1925,1951,1956,1965,1971,1974,1976
1985,1989,1999



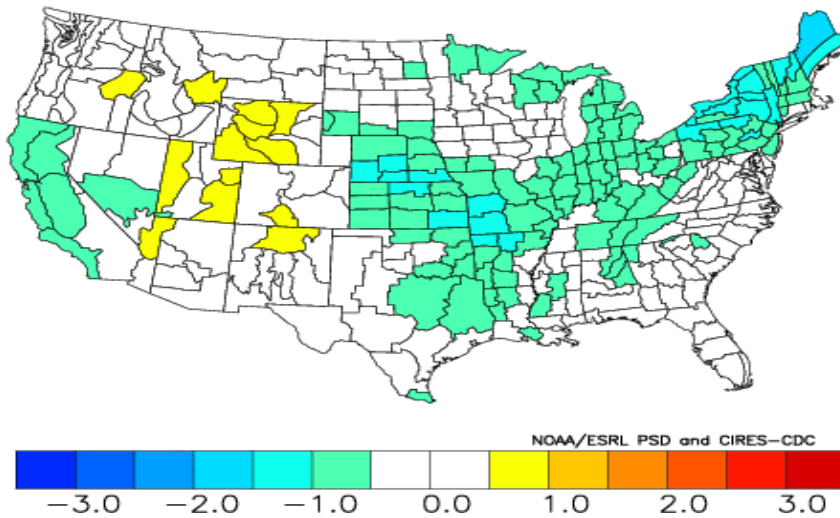
Any Monthly Trends?

While monthly trends were fairly weak, there were a few trends noted. In our best analogue years, June's temperatures tended to have the best chance to be above normal while July and/or August, had the best chance to be normal or below. Check out these temperatures composites for each month. Again, with these composites its best to look at the trend of the temperatures and not the actual departure value above or below. Precipitation maps were left behind since no definitive monthly pattern was noted.

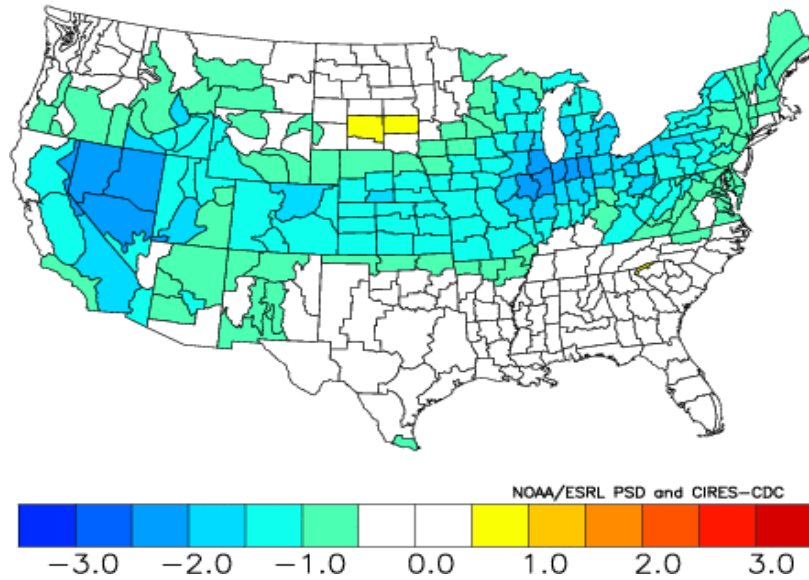
Composite Temperature Anomalies (F)
Jun 1904,1925,1951,1965,1976,1989,1999
Versus 1895–2000 Longterm Average



Composite Temperature Anomalies (F)
Jul 1904,1925,1951,1965,1976,1989,1999
Versus 1895–2000 Longterm Average

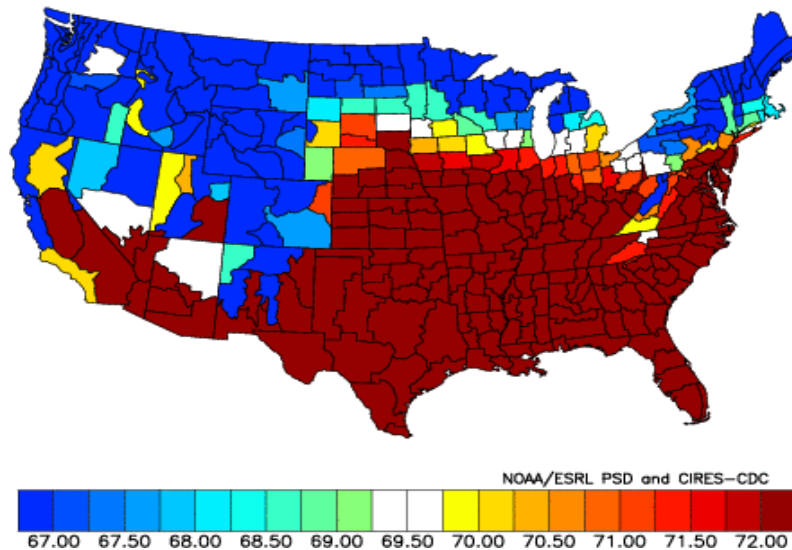


Composite Temperature Anomalies (F)
 Aug 1904,1925,1951,1965,1976,1989,1999
 Versus 1895–2000 Longterm Average



Since this average temperature departure is derived from the 1895-2000 average temperature (as opposed to the 30 year norm), it would be nice to know what the summer average (s) are in Southeast Lower Michigan for that century plus period.

Composite Temperature Climatology (F) 1895–2000



Actually two temperature averages are displayed for Southeast Lower Michigan. Area-1 paints much of Southeast Lower Michigan (roughly from the Flint and Port Huron areas south to the Ohio border), while Area-2 encompasses the Saginaw Valley and Thumb Region. Note history tells us that the Saginaw Valley and Thumb Region summers are a few degrees cooler on average than the remainder of Southeast Lower Michigan.

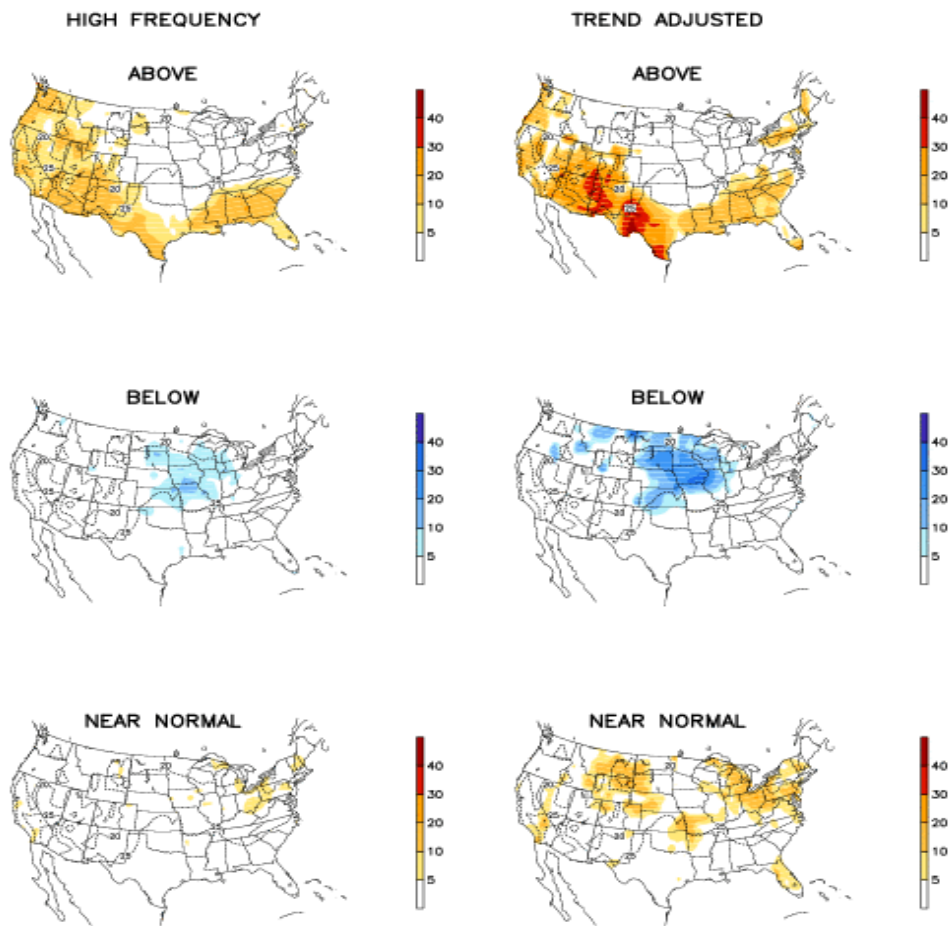
*Area-1 displays a summer average of about 70.5
 Area-2 displays a summer average of about 68.5*

Since it is expected that La Nina conditions will fade to Neutral during the summer, it might be worthy of a look at past effects over the country when Neutral conditions existed. The top maps denote above normal, the middle below and the bottom, normal. This agrees with our local data of the dominance Note, the Climate Prediction Center /CPC/ explains these two categories (high frequency and trend adjustment) this way:

There have been significant trends in precipitation and surface air temperature at many locations in **recent decades**, so it is worthwhile to examine the **influence of trends on ENSO composites**. For this purpose, two basic types of composites are examined:

- High-frequency (denoted HF) composites
- Trend adjusted (denoted TA) composites
-

JJA ENSO-NEUTRAL TEMPERATURE PROBABILITY ANOMALIES (%)
(25 CASES)



* Shading indicates departures from random chance (33.3%) of the indicated category.
* Dashed lines are the 1971-2000 climatology (°C).

SPRING TEMPERATURES SPRUNG UP AND DOWN

Spring started out cold and snowy with temperatures below normal in March, after, well above normal temperatures came in April only to reverse again to significantly below in May. With this sine-wave temperature pattern, the entire spring averaged just slightly below normal -0.2 over Southeast Lower Michigan. What was more noteworthy below normal was the precipitation with a $2\frac{1}{2}$ - 3.0 inch deficit and coming at the worst time to boot, mainly mid to late spring.

SPRING - MONTHLY AVERAGE TEMPERATURES AND RAINFALL

	Detroit	Flint	Saginaw	White Lk
MAR (T)	33.4/-3.5	33.2/-0.5	30.6/-2.9	30.4
(P)	3.17/+0.65	2.00/-0.22	1.98// -0.44	2.03
APR (T)	51.8/+3.7	51.0/+5.6	49.1/+3.6	49.5
(P)	0.96/-2.09	1.60/-1.53	1.57-1.25	1.46
MAY (T)	57.4/-2.4	54.6/ -2.5	54.6/-3.0	53.7
(P)	2.03/-1.02	1.59/ -1.15	1.63/-1.26	2.95

SPRING -SEASON/AVERAGE TEMPERATURES AND TOTAL RAINFALL

	Detroit	Flint	Saginaw	White Lk	SE MICH /DTW-FNT-MBS/
Ave (T)	47.5/-0.8	46.3/+0.9	44.8/-0.7	44.5	46.2 / -0.2
Norm (T)	48.3	45.4	45.5	N/A	46.4
Total (P)	6.16/-246	6.19/-2.90	5.18/-2.95	6.44	5.84
Norm P	8.62	8.09	8.13	N/A	8.29 / -2.45

Note: White Lake has no official normals at this time, the - /N/+ just denotes an estimate of above/normal/below (--/++ much below/above).

If conditions warrant, an updated Summer Outlook will be sent.

Have a good summer, enjoy any time off and may good weather be your traveling companion.

SUMMER BEGINS: JUNE 20th at 759 PM EDT