

## Summer 2008 Review and Autumn Outlook

Written by: William R. Deedler, Weather Historian NWS White Lake  
September 5<sup>th</sup> 2008

General comments heard about the Summer of '08 was how comfortable it was and indeed, Southeast Lower Michigan had one of its more pleasant summers. Temperatures averaged just on the higher side of normal. Any warm or hot spells (few that there were) were quickly extinguished by an active parade of cold fronts during the summer. While the fronts brought copious rain (note rainfall table below), they also brought several storm outbreaks with damaging severe weather (more below under Severe Weather). Here are the summer monthly climate stats for Detroit, Flint, Saginaw and here at the NWS in White Lake

Table - 1

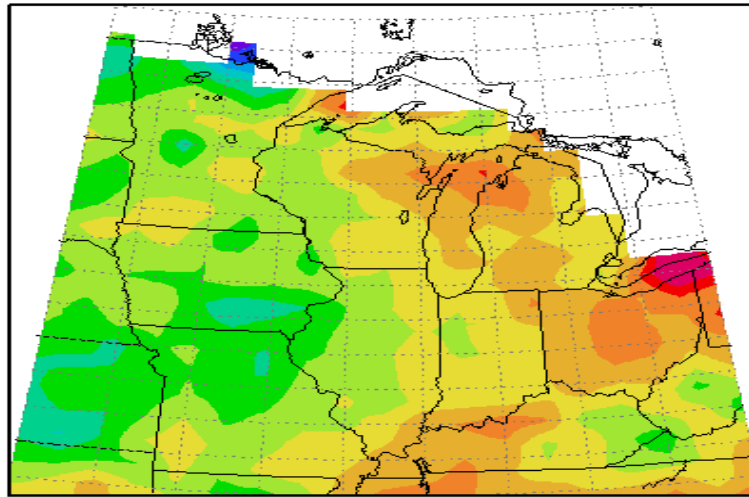
2008 SUMMER STATISTICS - SOUTHEAST LOWER MICHIGAN						
TEMPS	JUN	JUL	AUG	SUMMER AVERAGE	SUMMER NORM	DEPART
DETROIT	70.6	73.1	72.1	71.9	71.4	
DEPART	1.6	-0.4	0.3			0.5
FLINT	68.9	70.7	68.6	69.4	68.4	
DEPART	2.7	0.1	0.1			1.0
SAGINAW	68.3	70.6	67.6	68.8	68.9	
DEPART	1.5	-0.6	-1.1			-0.1
WHITE LK	66.8	68.8	67.2			
<b>AVE</b>				70.0	69.5	0.5
RAIN	JUN	JUL	AUG	TOTAL	NORM	DEPART
DETROIT	4.05	3.24	0.27	7.56	9.81	
DEPART	0.50	0.08	-2.83			-2.25
FLINT	4.11	3.56	1.89	9.56	9.67	
DEPART	1.04	0.39	-1.54			-0.11
SAGINAW	5.65	3.27	2.72	11.64	8.94	
DEPART	2.59	0.77	-0.66			2.70
WHITE LK	4.77	5.76	0.92			
<b>AVE</b>				9.59	9.47	0.12

Color Legend:	Temps	Degrees	Rain	Inches	Note: Average summer temps and rainfall do not include NWS White Lake
	Below	1.0>	Below	1.00>	
	Normal	0.0-1.0	Normal	0.00-1.00	
	Above	1.0>	Above	1.00>	

Overall, Southeast Lower Michigan averaged within the normal or typical temperature range for the summer. When using our three main climate stations in our Outlook, the area averaged an even 70 degrees or a half degree /+0.5/ above normal (refer to table-1). The warmest weather (relative to normal) during the summer months occurred mainly early in the summer. While June averaged around two degrees above normal, July and August averaged normal to below. When all data in Southeast Michigan is considered, note the departure temperature map for the region (courtesy of the Midwest Regional Climate Center) displays around normal.

Average Temperature Departure from Mean in Degrees F  
June 1, 2008 to August 31, 2008



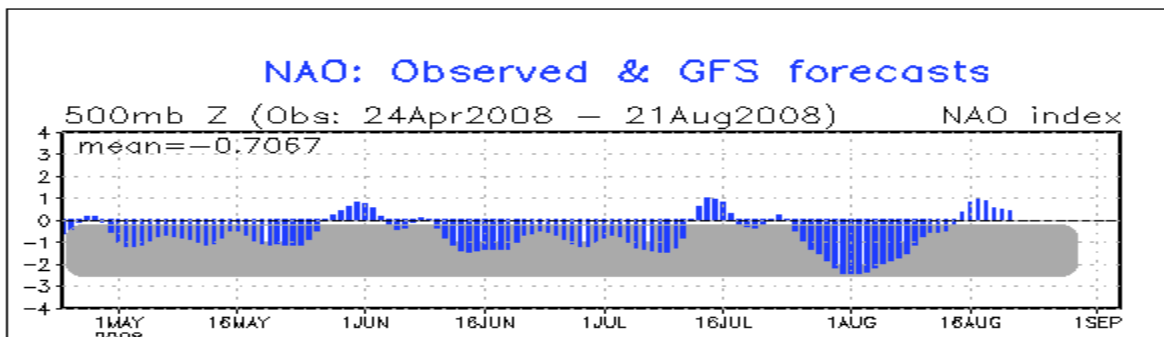
NOAA Midwestern Regional Climate Center  
Illinois State Water Survey  
Champaign, Illinois

### Lack of 90 Degree Days

The Summer of '08 was more comfortable than usual in spite of the near normal temperature average. One of the main reasons for the comfortable summer was the lack of 90 degree days.

At Detroit, just four days reached 90 or above through August (we had another in early Sept) and normally Detroit averages around 12 days. Flint actually had one more 90 than Detroit with five through August while Saginaw totaled just two (both areas generally see about seven).

The lack of 90s and resultant comfortable summer was our periodic northwesterly flow aloft due to the predominance of a negative North Atlantic Oscillation /NAO/. Yes, that same North Atlantic Oscillation that brings us bitter cold northwesterly winds when negative in the winter, can also bring some refreshingly temperate and agreeable weather during the summer. Check out the dominant phase of the NAO these past several months, from May to late August...almost exclusively negative.



## Analogue and Summer Outlook Performance

### Temperature

The analogue summer data and with the subsequent Outlook was exceptionally helpful for not only indicating higher side of normal temperature average but also the temperature trend.

#### Taken from the Summer Outlook:

*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.*

*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.*

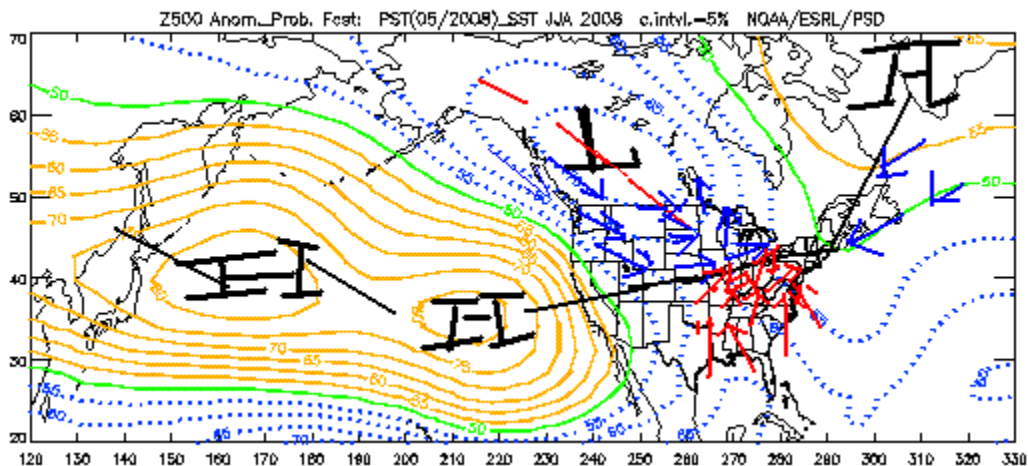
#### Actual Temperature Data:

Temperatures verified, averaging a half degree above normal /+0.5/, while the trend seen June did indeed average above normal while July and August showed normal to below temperatures.

<b>2008 SUMMER STATISTICS - SOUTHEAST LOWER MICHIGAN</b>						
<b>TEMPS</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SUMMER AVERAGE</b>	<b>SUMMER NORM</b>	<b>DEPART</b>
<b>DETROIT</b>	70.6	73.1	72.1	71.9	71.4	
<b>DEPART</b>	1.6	-0.4	0.3			0.5
<b>FLINT</b>	68.9	70.7	68.6	69.4	68.4	
<b>DEPART</b>	2.7	0.1	0.1			1.0
<b>SAGINAW</b>	68.3	70.6	67.6	68.8	68.9	
<b>DEPART</b>	1.5	-0.6	-1.1			-0.1
<b>WHITE LK</b>	66.8	68.8	67.2			
<b>AVE</b>				70.0	69.5	0.5

## Summer Rainfall and Severe Weather

Severe weather and resulting heavy rainfall in June and July was the main news of the summer. The projected upper air and associated surface pattern materialized with a vengeance early in summer, resulting in numerous severe weather events. The experimental CDC 500 MB projection pattern for the summer along with local annotations included in the Summer Outlook indicated this early-midsummer pattern well.



The “battle lines” so to speak, were drawn on the map in the outlook along with the following:

### [vere 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.*

### Derecho of June 8<sup>th</sup>

A strong squall line intensified into a derecho as it surged through Southeast Lower Michigan in the late afternoon and evening on the 8th. The worst hit area extended across Detroit's northern suburbs in the counties of Livingston, Oakland and Macomb. Winds up to at least 70-80 mph slammed the central portions of the counties bringing down copious amounts of tree branches, uprooting trees and knocking down power lines. Some of the locations in the worst hits areas included, White Lake, Waterford, Walled Lake, Commerce Township, eastward through Pontiac, West Bloomfield, Bloomfield Hills and then on into Macomb and Chesterfield townships. This resulted in days without power with between 250,000 and 300,000 customers losing power because of this derecho. More can be read [here](#) on the entire event from the severe storms prediction center.

As mentioned, early-midsummer was busy in the severe weather department and more information on the June (or any other month) in regard to many specific severe weather events can be found in the [monthly](#) climate report in the monthly weather summary /CLM/ under products.

Summer Rainfall totals throughout Southeast Lower Michigan

<i>RAIN</i>	<u>JUN</u>	<u>JUL</u>	<u>AUG</u>	<u>TOTAL</u>	<u>NORM</u>	<u>DEPART</u>
<i>DETROIT</i>	4.05	3.24	0.27	7.56	9.81	
<i>DEPART</i>	0.50	0.08	-2.83			-2.25
<i>FLINT</i>	4.11	3.56	1.89	9.56	9.67	
<i>DEPART</i>	1.04	0.39	-1.54			-0.11
<i>SAGINAW</i>	5.65	3.27	2.72	11.64	8.94	
<i>DEPART</i>	2.59	0.77	-0.66			2.70
<i>WHITE LK</i>	4.77	5.76	0.92			
<i>AVE</i>				9.59	9.47	0.12

<i>RAIN</i>	<u>JUN</u>	<u>JUL</u>	<u>AUG</u>	<u>TOTAL</u>	<u>NORM</u>	<u>DEPART</u>
CARO	5.45	5.82	3.38	14.65	9.46	5.90
ADRIAN	6.61	6.97	0.49	14.07	10.6	2.98
ANN ARBOR	6.00	2.59	0.72	9.31	10.25	-1.95
BAD AXE	4.64	3.86	4.74	13.24	9.63	3.61
DET CTY	5.45	3.01	0.73	9.19	9.81	-0.62
GRSS PTE	5.92	2.96	0.32	9.20	10.44	-1.24
H BEACH	5.18	3.50	5.97	14.65	9.25	5.40
HOWELL	4.81	2.53	0.47	7.81	9.32	-1.51
LAPEER	4.29	8.01	3.41	15.71	10.34	5.37
MIDLAND	5.36	1.86	1.64	8.86	10.04	-1.18
MILFORD	7.26	3.56	1.26	12.08	8.59	3.49
MORENCI	5.87	7.71	0.78	14.36	10.54	3.82
OWOSSO	3.22	4.36	2.46	10.04	9.74	0.30
P HURON	6.32	3.92	1.10	11.34	9.29	2.05
SANDUSKY	4.28	4.61	2.85	11.74	9.65	2.09
YALE	6.67	5.02	1.96	13.65	9.55	4.10
<b>AVERAGE</b>	5.46	4.39	2.02	11.87	9.78	2.09

Col or	Rai n	I nches
Legend:	Bel ow	1.00>
	Normal	0.00-1.00
	Above	1.00>

When averaging the majority of our cooperative observers rain reports above, the surplus of rain ran over two inches.

Our rainfall outlook was updated early in the summer to go mainly above normal rainfall because of the frequent convergence zone that set up over the Great Lakes held longer than anticipated. In the updated Outlook I mentioned how variable summer convective rains can be and frequently some areas see above normal rain while others see below...yet would receive criticism if that was forecast. From the Update:

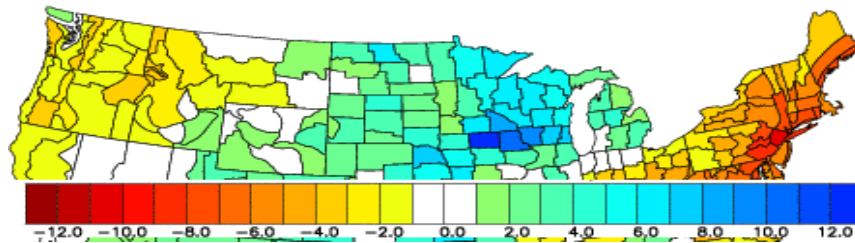
Since summer rain amounts are so variable in the first place (because of their convective nature), it is one of the most difficult to forecast on a broad scale (not to mention out for three months). And strictly speaking, many summers go by with rainfall totals ranging from below normal to above (or even well above) because of just one or two storms that were big dumpers.

Now look at the three summer total rainfalls at Detroit, Flint and Saginaw (below, normal and above). Of course, projecting the exact locations of drier and wetter amounts would be great.

Initially, the majority of our analogues indicated normal to below normal rainfall as this convergence area was expected to lift northward by midsummer. The Outlook for later in the summer /August/ however, was kept drier, since the drying trend was still anticipated...just later.

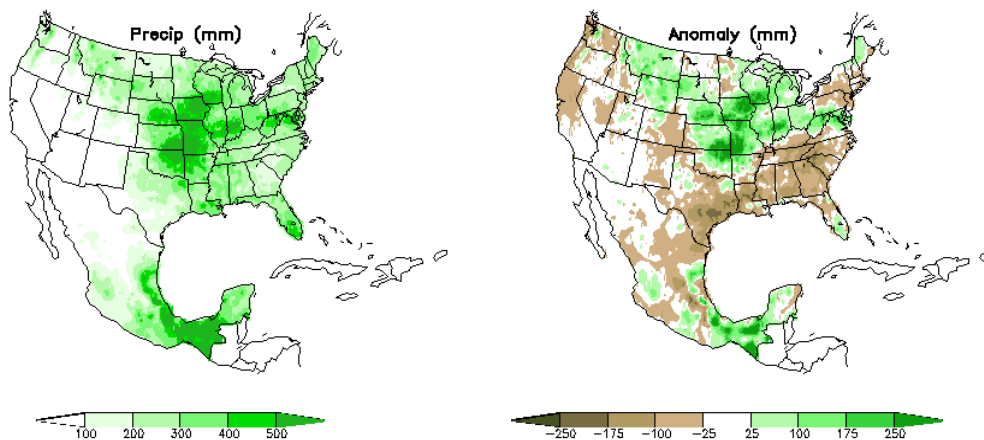
Further investigation in the analogue years (and indicated in the update) showed the late spring into mid summer of 1999 was a good analogue year for the rainfall pattern in the upper Midwest and Lakes. Note the rainfall pattern in 1999 from April – July and then in 2008 (especially the anomaly).

Precipitation Anomalies (inches)  
Apr to Jul 1999  
Versus 1971–2000 Longterm Average



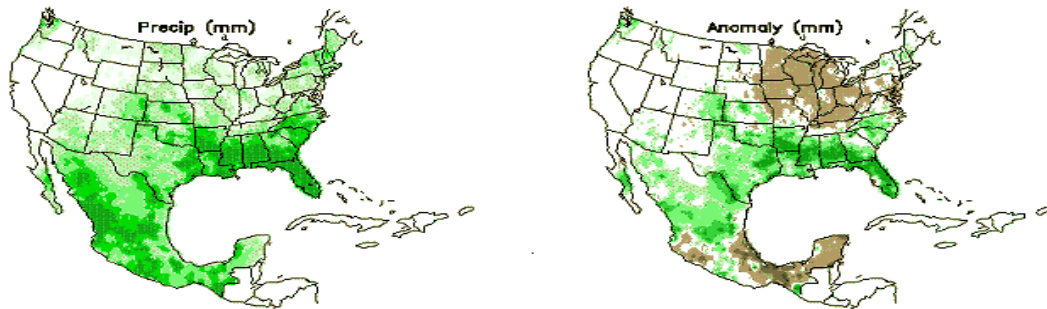
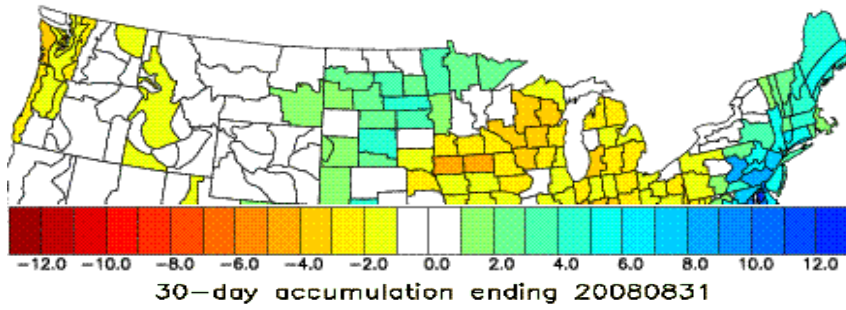
**Apr to July 2008**

90-day accumulation ending 20080704



In late summer /Aug/, shows the dry spell that encompassed the region in 1999, again like the Summer of '08, below that.

Precipitation Anomalies (inches)  
Aug to Sep 1999  
Versus 1971–2000 Longterm Average



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**Fall 2008 Outlook**

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**Fall 2008 Outlook**

**Temperatures:**

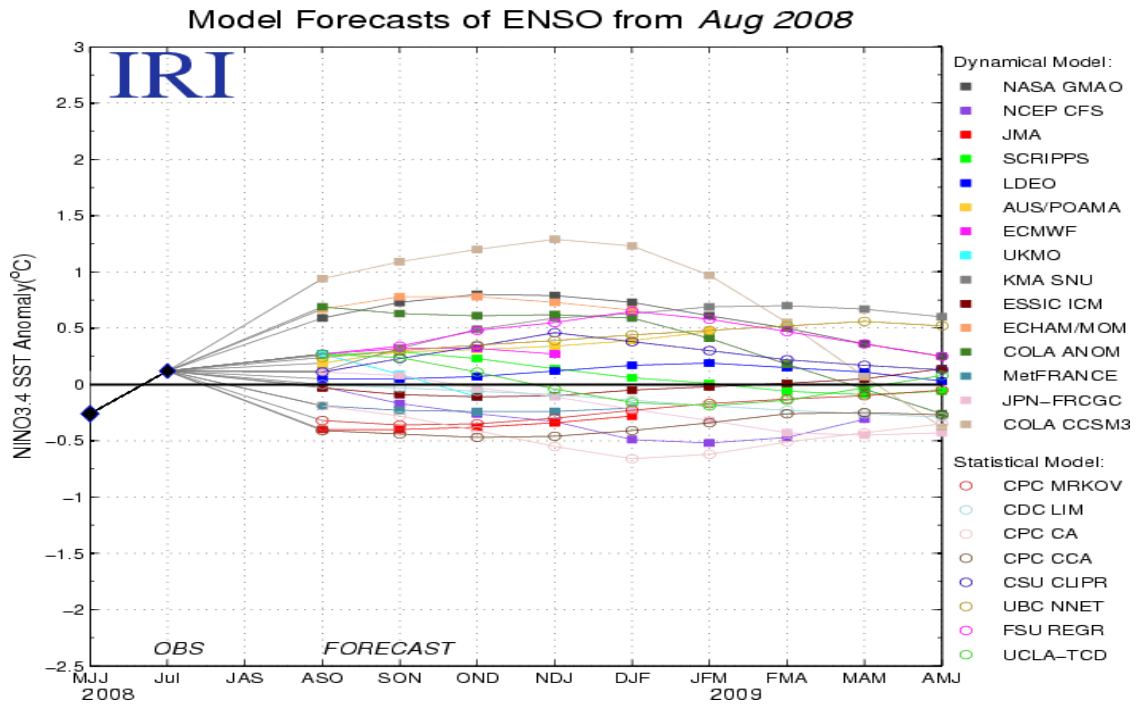
*Indications are temperatures this fall will be quite variable (even more than usual) but in the end, temperatures should average near normal (or -1.5 to +1.0 degrees of normal). The data in our analogue falls remains quite mixed and looking at that, along with the upper wind projections, suggest end results will be near normal.*

**Precipitation:**

**Precipitation over the area is projected to average around normal to below.**



The ENSO pattern over the Pacific Ocean is expected to hold in the Neutral state through the fall. The chart of the model forecast (below) pretty much keeps the Nino 3.4 region hovering in the Neutral (or normal ) range.



Since the ENSO state will hold Neutral, this leaves very little to go on for the fall period in regards to influencing patterns for the Great Lakes from the Pacific. This is the [National](#) Fall Outlook issued by the Climate Prediction Center

Next, let's take a look at the analogue years for the autumn period along with the Climate Diagnostics experimental projected 500 MB patterns.

## ANALOGUE AUTUMN SEASONS

DETROIT	SEP	OCT	NOV	FALL AVE	AUTUMNS	FLINT	SEP	OCT	NOV	FALL AVE	AUTUMNS	SAGINAW	SEP	OCT	NOV	FALL AVE	AUTUMNS		
1904	63.7	50.5	40.1	51.4	1	1	1904	61.1	48.6	37.4	49.0	1	1904	63.7	50.5	40.1	51.4	1	
1907	62.8	47.3	38.2	49.4	1		1907	61.3	44.2	35.8	47.1	1	1907	62.3	46.7	37.4	48.8	1	
1951	62.5	55.4	34.6	50.8	2		1951	59.8	52.9	30.9	47.9	2	1951	58.9	51.5	29.9	46.8	1	
1956	60.4	57.5	40.9	52.9	1		1956	57.5	55.2	38.3	50.3	2	1956	56.9	55.2	37.5	49.9	2	
1965	66.2	51.3	42.7	53.4	2		1965	62.5	49.4	40.9	50.9	1	1965	61.7	49.6	40.3	50.5	2	
1976	62.1	47.4	33.5	47.7	3		1976	60.6	46.8	33.3	46.9	3	3	1976	60.8	46.4	33.3	46.8	2
1985	64.3	53.0	42.4	53.2	3		1985	63.3	51.4	39.8	51.5	2		1985	62.6	49.8	38.1	50.2	3
1989	61.9	52.1	38.2	50.7	4	4	1989	59.6	51.2	35.9	48.9	3	3	1989	59.5	50.8	34.2	48.2	3
2000	62.5	55.1	40.2	52.6	4	4	2000	60.1	53.5	38.6	50.7	3	3	2000	59.3	52.7	38.5	50.2	4
Ave	62.9	52.2	39.0	51.4	-0.8		Ave	60.6	50.4	36.8	49.3	1.0		Ave	60.6	50.4	36.6	49.2	-0.2
Norm	63.9	51.9	40.7	52.2			Norm	60.7	49.2	38.1	49.3			Norm	60.7	49.5	38.0	49.4	

DETROIT	SEP	OCT	NOV	FALL AVE	AUTUMNS	FLINT	SEP	OCT	NOV	FALL AVE	AUTUMNS	SAGINAW	SEP	OCT	NOV	FALL AVE	AUTUMNS		
1904	4.23	0.86	0.19	5.28	1		1904	2.69	4.07	0.25	7.01		1904	2.98	2.01	0.15	5.14	1	
1907	4.10	1.86	1.46	7.42	1		1907	5.40	1.65	1.51	8.56		1907	5.57	1.41	2.02	9.00	1	
1951	1.97	4.96	3.48	10.41	1		1951	2.02	3.95	3.06	9.03		1951	4.09	5.29	2.06	12.24	1	
1956	0.58	0.61	3.32	4.51	2		1956	0.66	0.38	1.55	2.59		1956	0.83	0.28	1.11	2.22	2	
1965	4.15	2.88	1.20	8.23	2		1965	2.90	1.06	2.35	6.31		1965	4.84	1.52	2.66	9.02	2	
1976	3.66	2.01	0.79	6.46	3	3	1976	2.66	3.17	1.22	7.05	4	4	1976	1.55	2.53	0.84	4.92	3
1985	2.59	3.91	5.51	12.01	2		1985	8.29	3.45	3.16	14.90		1985	6.02	2.26	4.00	12.28	2	
1989	3.03	1.73	2.53	7.29	3	3	1989	4.33	1.67	2.86	8.86	3	3	1989	1.33	2.69	3.55	7.57	4
2000	6.71	3.05	1.69	11.45	3	3	2000	6.24	1.96	1.96	10.16	2	2	2000	3.44	1.86	2.39	7.69	5
Ave	3.45	2.43	2.24	8.12	-0.04		Ave	3.91	2.37	1.99	8.27	-0.48		Ave	3.41	2.21	2.18	7.79	-1.30
Norm	3.27	2.23	2.66	8.16			Norm	3.76	2.34	2.65	8.75			Norm	3.95	2.49	2.65	9.09	

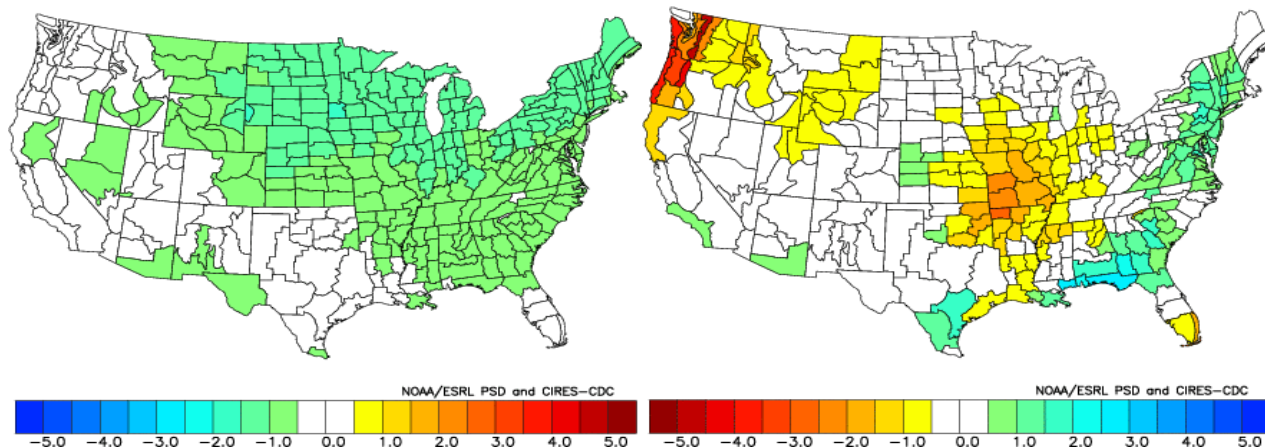
Color	Temps	Degrees	Rain	Inches	Color	Temps	Degrees	Rain	Inches	Color	Temps	Degrees	Rain	Inches
Legend:	Below	1.0>	Below	1.00>	Legend:	Below	1.0>	Below	1.00>	Legend:	Below	1.0>	Below	1.00>
	Normal	0.0-1.0	Normal	0.00-1.00		Normal	0.0-1.0	Normal	0.00-1.00		Normal	0.0-1.0	Normal	0.00-1.00
	Above	1.0>	Above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

**Our analogue fall statistics are extremely mixed and basically, there are as many of warmer falls as cooler with some normal falls tossed in for good measure. Interestingly, the same can be said about the precipitation side of things with some dry falls, wets falls and near normal falls. This “equal-parts” variability is somewhat unusual and one of the most mixed season data set seen. In this smorgasbord of weather, are there even any subtle trends? Yes. One subtle trend noted was the data leaned toward a somewhat drier than normal fall. How about monthly trends? Temperatures in September and October were mixed with little in the way of prevalent trends. Novembers did show a bit more consensus toward a cooler than normal, but even that wasn’t a strong trend. Overall, the composite charts for the fall do indicate temperatures averaging a degree or so below normal for Southeast Lower Michigan while precipitation averages around normal.**

## Composites

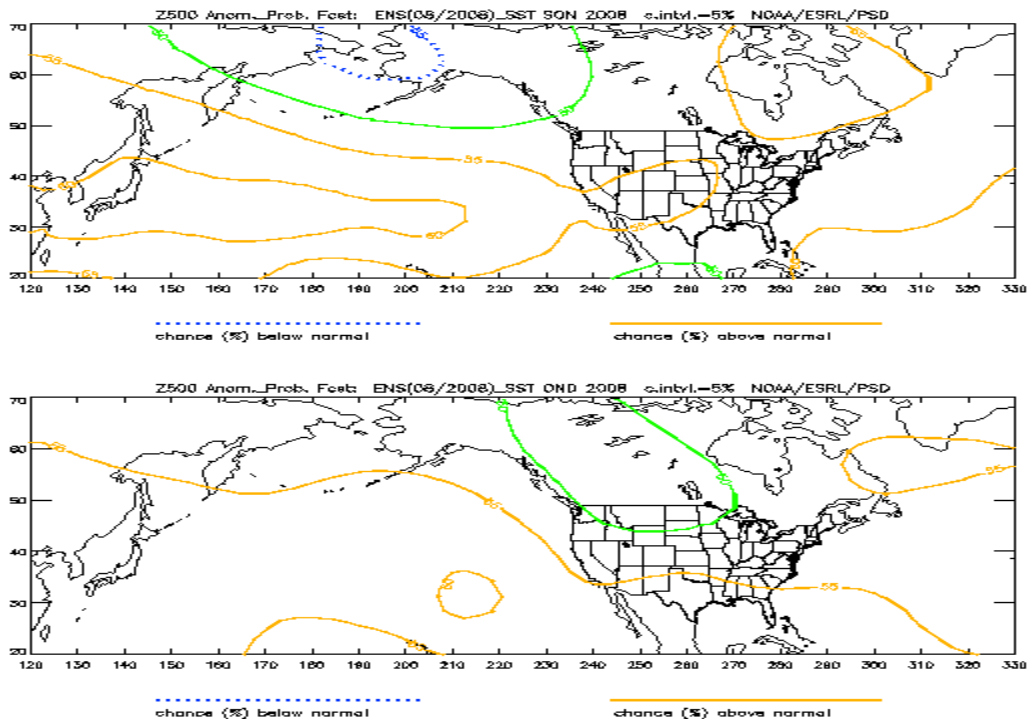
Composite Temperature Anomalies (F)  
Sep to Nov 1904,1907,1951,1956,1965,1976,1985,1989,2000  
Versus 1895–2000 Longterm Average

Composite Precipitation Anomalies (inches)  
Sep to Nov 1904,1907,1951,1956,1965,1976,1985,1989,2000  
Versus 1895–2000 Longterm Average



## Upper Wind

**Upper air general projections indicate a subtle ridging pattern prevalent at least early to mid fall with more troughing from mid Canada into the upper Midwest, later fall and early winter. This is somewhat in agreement with the normal season change and our analogue falls trending toward below normal temperatures later in fall.**



### **Frost and Freeze Trends:**

Our guidance indicates quite temperatures are quite variable and most years our frosts and freezes were on schedule. Checking back on the years in our study reveals some common frost/freeze statistics. Using our stats from Detroit, (and estimates of frost when most areas saw overnight lows fall in the lower to mid 30s for the first time). Our analogue falls show the risk of frost and/or freeze the last week of September into the first week of October. This is right in there with the average frost dates. The more widespread freezes occurred by the third week of October.

### **Indian Summer this Fall?**

Perusing our analogue autumns, the likelihood of a period or two of Indian Summer weather this fall looks promising. Note, most temperature patterns in October and November varied considerably in the analogue years, this is generally a pre-requisite for Indian Summer falls. You want a progressive amplified upper wind pattern during the fall to deliver large cold high pressure systems. While these highs can bring sharp cold snaps (and attending solid frost/freezes, necessary for Indian Summers), after they move east, impressive strong warm-ups, sometimes lasting as long as a weeks bring Indian Summer weather...let's hope. Check out the article on Indian Summer at: <http://www.crh.noaa.gov/dtx/stories/i-summer.php>

### **Notable Dates This Autumn**

**Harvest Moon:** Monday - Sep 15th, 2007 (Traditionally, this designation goes to the full moon that occurs closest to the Autumnal (fall) Equinox. The Harvest Moon usually comes in September, but about every three or four years it will fall in early October. closest full moon to the beginning of fall).

**Autumn Officially Begins:** Monday - September 22nd, 2008 at 1144am EDT

**Average First Freeze Date:** October 21st (Detroit area), October 11<sup>th</sup> (Flint and Saginaw area)

**Halloween:** Friday, October 31st, 2008

**Thanksgiving:** Thursday, November 27, 2008

Have a nice fall and join us here back late Oct or early Nov for the **Winter 2008-09 Outlook.**