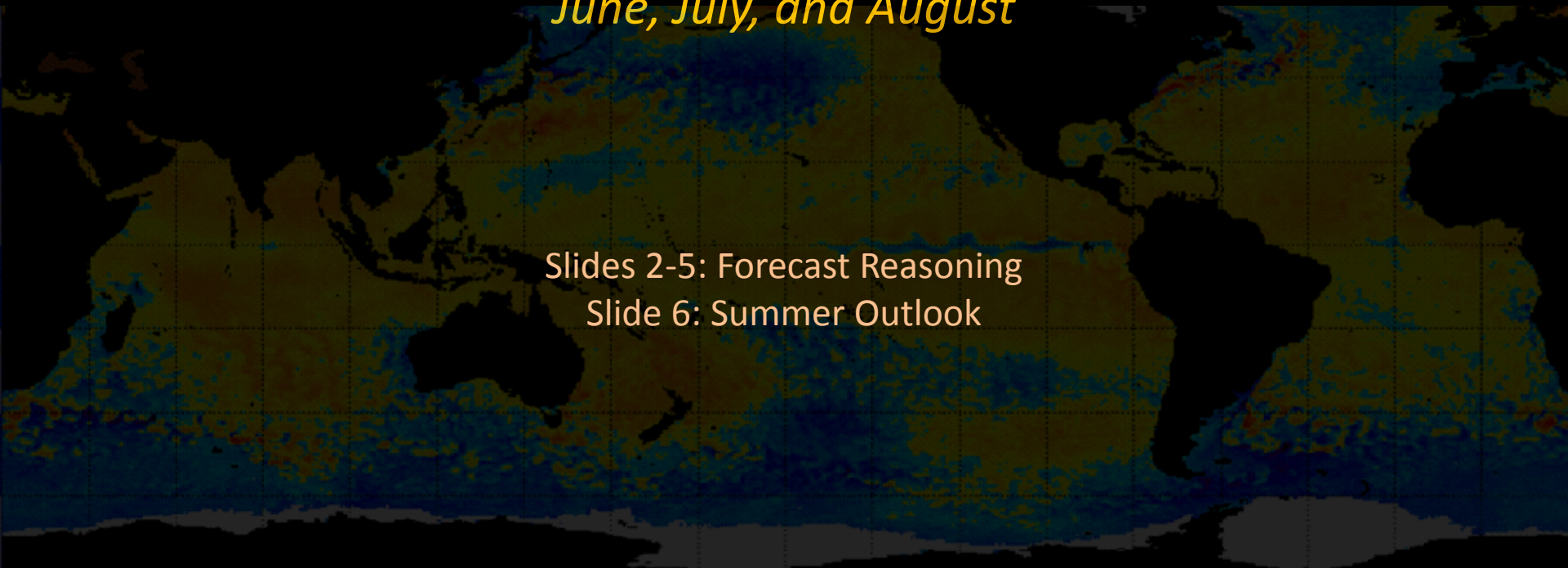
# Summer Outlook 2018

## Southeast Lower Michigan

*June, July, and August*



Slides 2-5: Forecast Reasoning
Slide 6: Summer Outlook

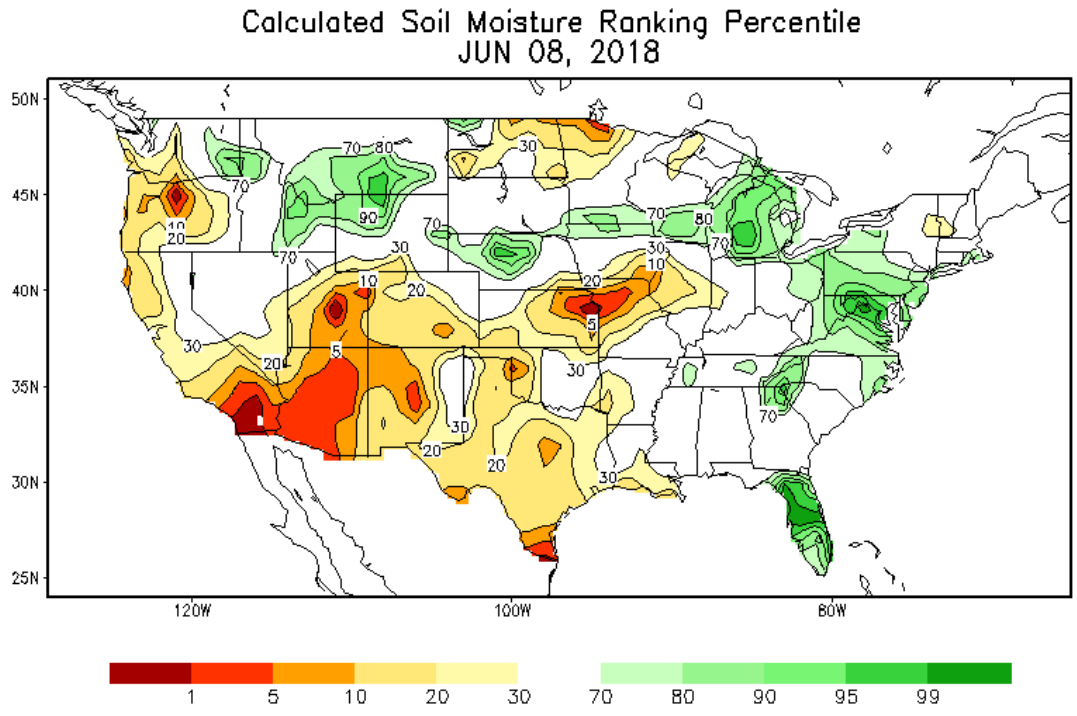
# Current Conditions

## Current Soil Moisture

***Summary***
Soil moisture is locally high after a wet May, but upstream moisture from Texas into the Lower Missouri and Middle Mississippi Valleys is low as a result of expanding drought.

***Why it matters***
Exceptionally dry conditions can beget heat and/or drought, while wet ground conditions can be a harbinger of cooler temperatures.

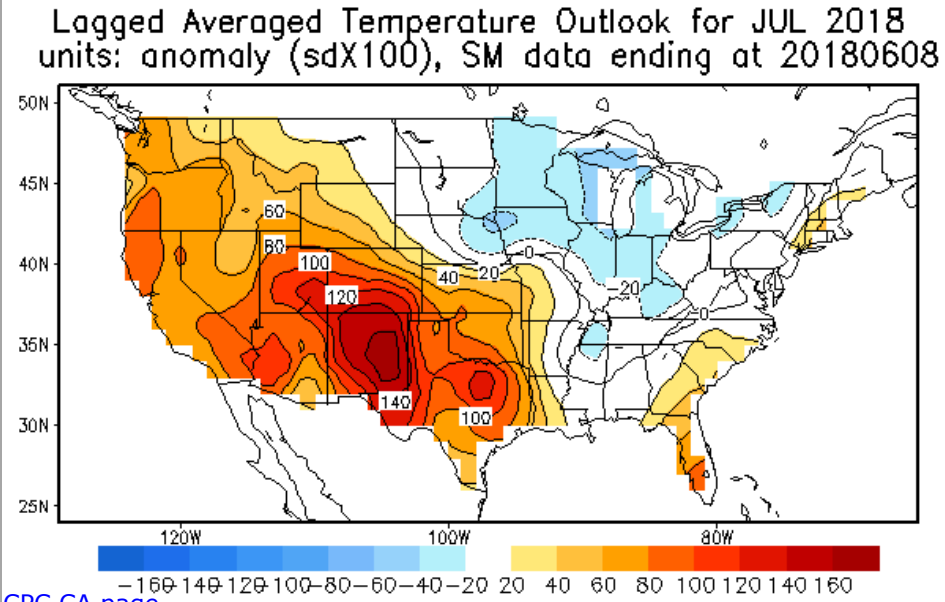
**Implication**
Our source regions for heat are mainly dry or near-normal, which is favorable for warmer or near-normal upstream airmass temperatures.

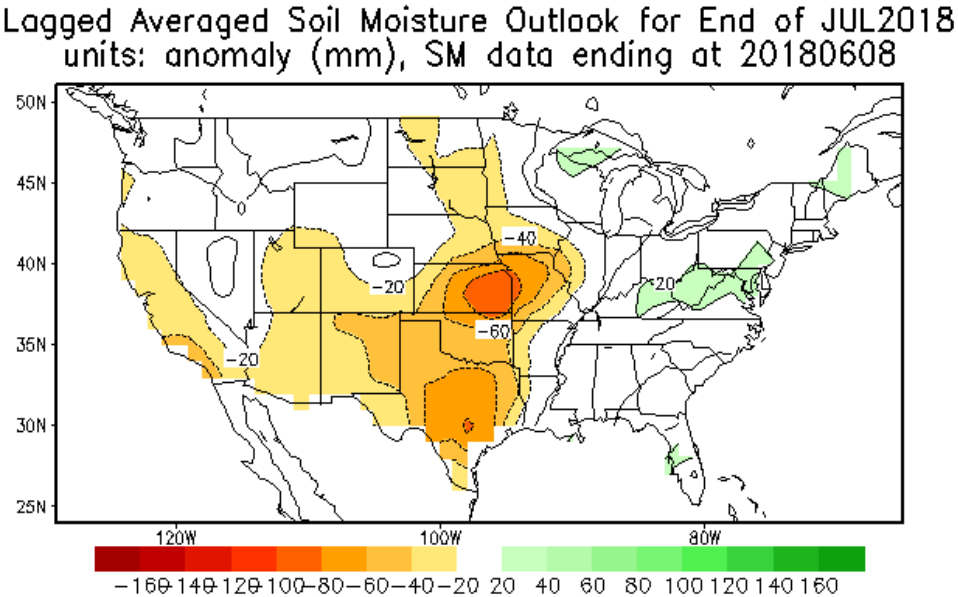



CPC SM page

# What it Could Mean

## CPC Soil Moisture Constructed Analog Outlook for July

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Pictured above is output from the NWS Climate Prediction Center's *Soil Moisture Constructed Analog Outlook* for July. By analyzing years with similar soil moisture qualities as this year, it provides a statistically-based outlook for future temperatures and precipitation. The output for July is similar, if slightly cooler, than the output for the summer period (not shown).

*Left*
Soil moisture analaogs favor locally cooler temperatures mid-summer. Overall (not shown), analogs produce near-normal output.

*Right*
The analogs also favor near-normal precipitation.

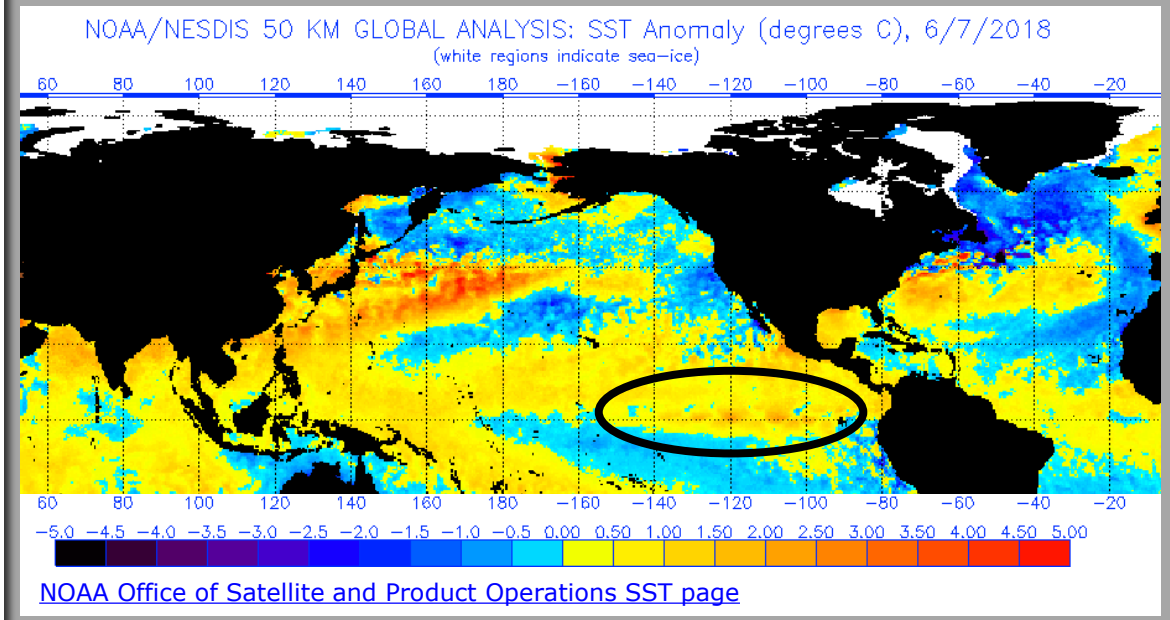
# Current Conditions

## ENSO

**Summary**
Highlighted in the black circle, anomalously warm temperatures have emerged in the eastern tropical Pacific.

**Why it matters**
Tropical water temperatures are a central fixture in seasonal weather patterns. This is especially true in the winter, but should not be ignored in summer. High and mid-latitude water temperatures can be important, but are generally less so. They are also more noisy and more difficult to predict.

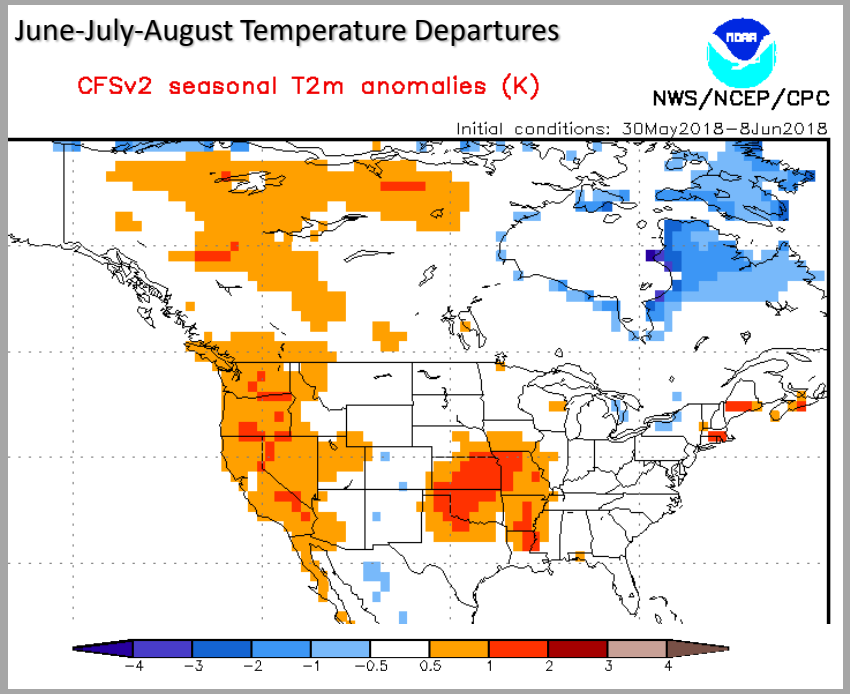
**Implication**
This data supports models that are predicting a neutral or weak el Nino condition emerging this summer. Such patterns tend to tip the balance ***away*** *from both anomalous warmth and dryness* in the Great Lakes.

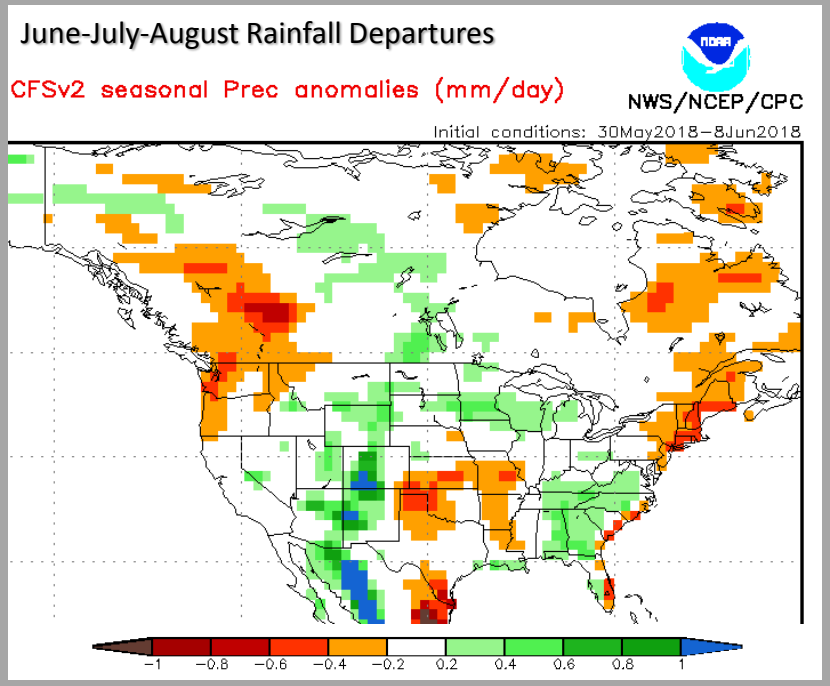



NOAA Office of Satellite and Product Operations SST page

# Climate Model Output

## CFS Model Simulation of Summer




CPC CFS page

Pictured above are modeled temperature anomalies (left) and rainfall anomalies (right) for the whole of Summer 2018.

The signal for some upstream heat, but near-normal temperatures across the northern tier into the Great Lakes is in line with the previous data. Likewise, so is the signal for near-to-slightly-above normal rainfall across the north and continued dry conditions in portions of the southern Great Plains and MS Valley.

# Summer Outlook for Southeast Michigan

## *Temperature Outlook*

No signal exists that points strongly either direction from normal, while soil moisture analogs, recent conditions in the first week of June, and climate model forecasts suggest near-normal temperatures overall. The upstream drought will be important factor, as it could serve as a source for occasional significant heat intrusions. It is forecast to expand in the coming weeks, but not necessarily into common source regions for Michigan temperatures.

***June through August: Normal to slightly warmer than normal***

## *Rainfall Outlook*

Warm season precipitation is dominated by thunderstorm activity and is notoriously difficult to predict at seasonal time scales. Soil moisture analogs and ENSO prospects suggest either normal or slightly wetter-than-normal results.

***June through August: Normal to slightly wetter than normal***

# Summer Trivia for Southeast Michigan

**Warmest temperature**: **Tri-Cities: 111F** (7/13/1936), **Flint: 108F** (7/13/1936), **Detroit: 105F** (7/24/1934)
**Warmest month**: **Tri-Cities**: **77.5F** (Jul 1921), **Flint: 78.0F** (Jul 1921), **Detroit: 79.3F** (Jul 2011)
**Warmest summer**: **Tri-Cities: 73.0F** (1931), **Flint: 74.2F** (1933), **Detroit: 74.9F** (2016)

**Coldest temperature**: **Tri-Cities**: **33F** (6/8/1949), **Flint: 33F** (6/4/1998), **Detroit: 36F** (6/11/1972)
**Coldest month**: **Tri-Cities**: **60.6F** (Jun 1982), **Flint: 60.1F** (Jun 1969), **Detroit: 62.8F** (Jun 1985)
**Coldest summer**: **Tri-Cities**: **64.8F** (1915), **Flint: 65.4F** (1992), **Detroit: 66.5F** (1915)

**Wettest month**: **Tri-Cities: 9.43”** (Aug 2012), **Flint: 11.18”** (Aug 1937), **Detroit: 8.76”** (Jul 1878)
**Wettest summer**: **Tri-Cities: 16.28”** (1928), **Flint: 18.39”** (1937), **Detroit: 16.96”** (1896)

**Driest month**: **Tri-Cities: 0.27”** (Aug 1927), **Flint: 0.16”** (Jul 1939), **Detroit: 0.16”** (Aug 1894)
**Driest summer**: **Tri-Cities: 3.54”** (1927), **Flint: 3.76”** (1930), **Detroit: 3.58”** (1911)

**Average first 90 degree temperature**: **Tri-Cities:** Jun 18$^{th}$ , **Flint:** Jun 18$^{th}$, **Detroit:** Jun 19$^{th}$
**Climatological chance of reaching 100 degrees**: Approx. 14%, or about 1 in every 7 years.