

Summer Outlook 2016

Southeast Lower Michigan

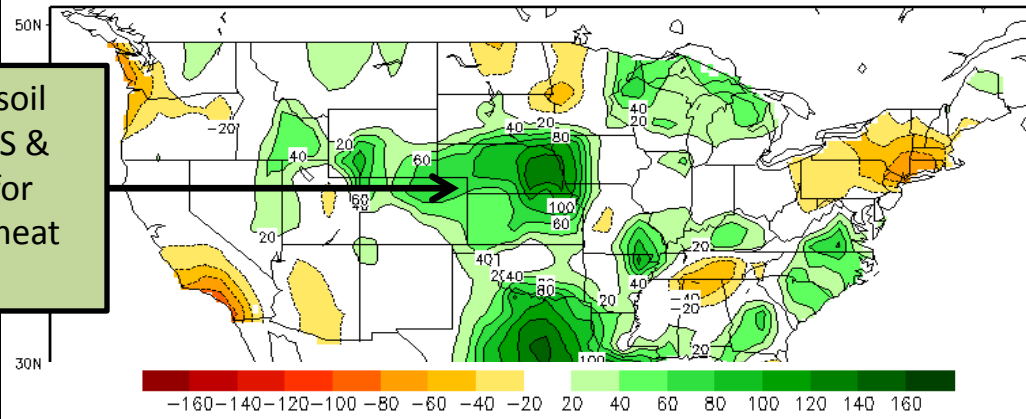
June, July, and August

Pages 2-6: Forecast reasoning
Page 7: Summer outlook for Southeast Michigan

Current Conditions

Soil Moisture & Drought

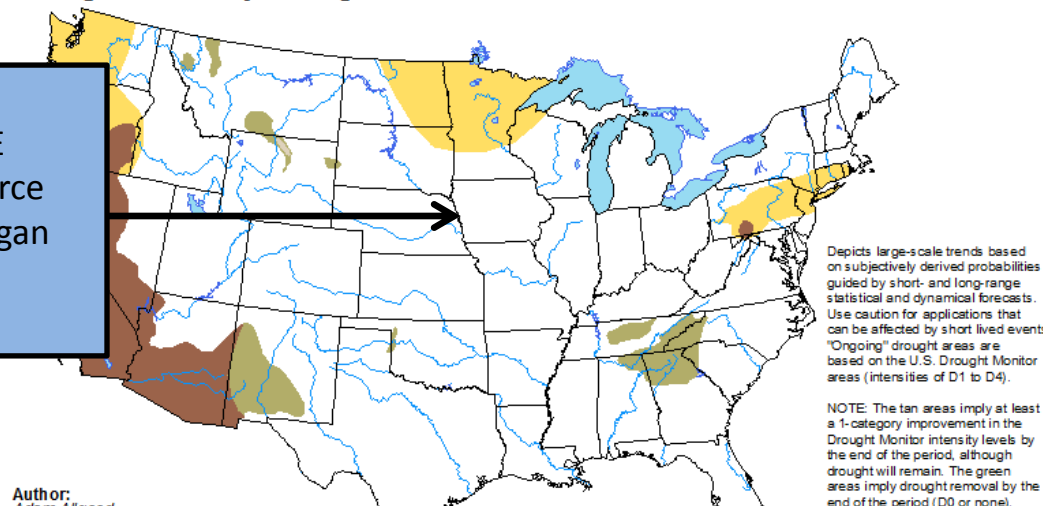
Calculated Soil Moisture Anomaly (mm)
MAY 28, 2016



Widespread above-normal soil moisture over the central US & Great Lakes limit potential for both drought and extreme heat in SE Michigan

U.S. Seasonal Drought Outlook
Drought Tendency During the Valid Period

Valid for May 19 - August 31, 2016
Released May 19, 2016



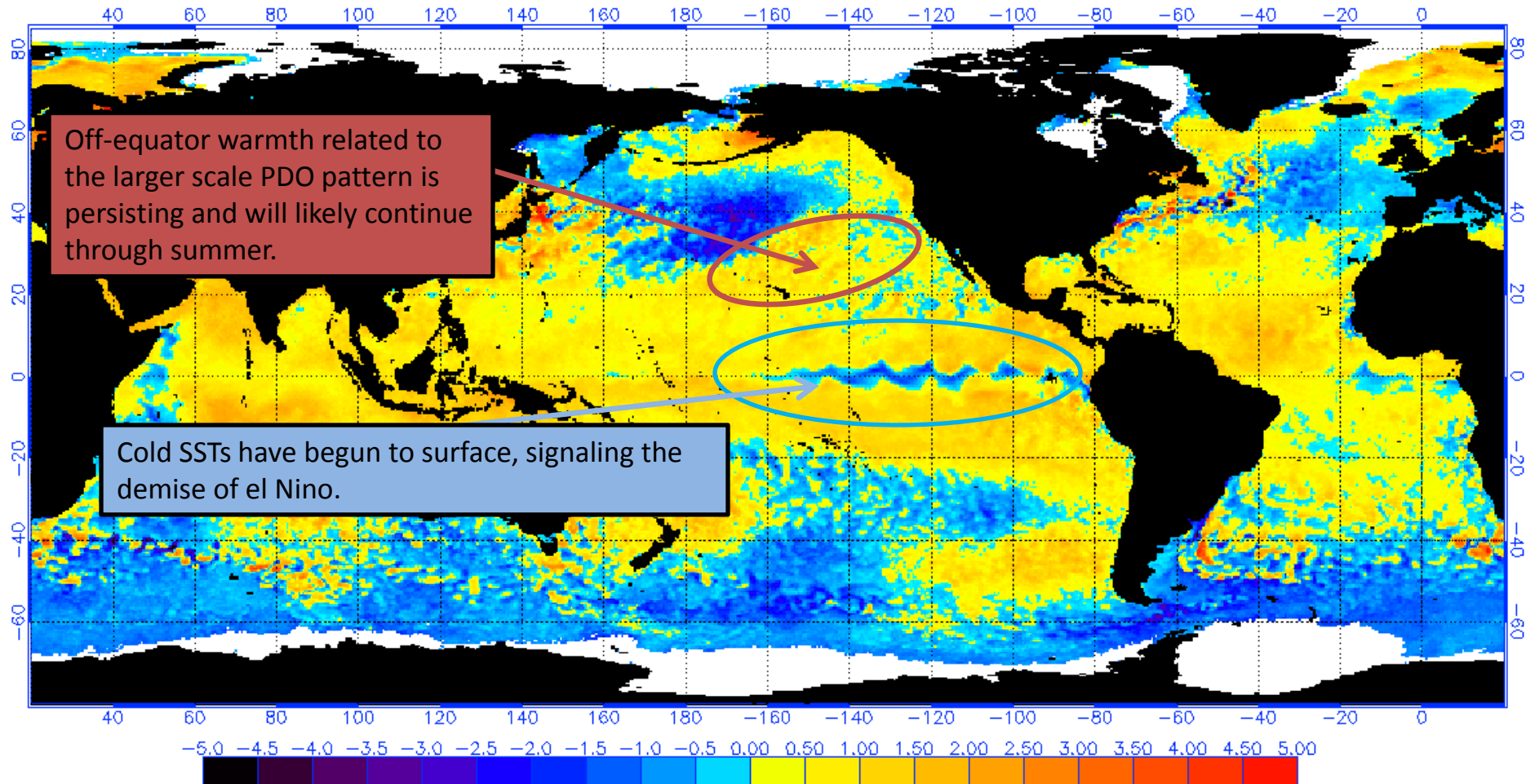
Per the Climate Prediction Center's outlook, neither SE Michigan nor upstream source regions for heat in SE Michigan are forecast to experience drought this season.

Drought is not only a concern for agriculture, but expansive drought regions are key generators of heat during extremely hot summers such as those experienced in the Dustbowl, 1988, & 2012. No such drought is anticipated this year.

Current Conditions

Current Sea Surface Temperature Anomalies

NOAA/NESDIS 50 KM GLOBAL ANALYSIS: SST Anomaly (degrees C), 5/26/2016
(white regions indicate sea-ice)

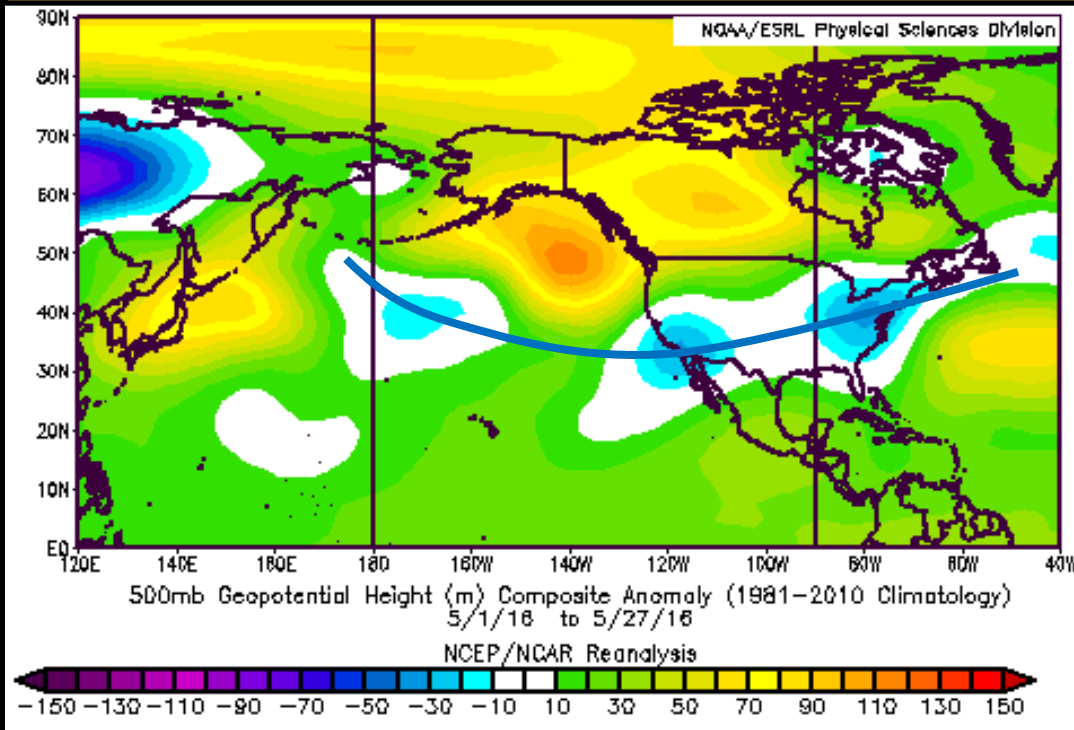


Although ENSO is not as strong of a contributor to summer weather, enhanced convection associated with the highlighted off-equator warmth could negatively interfere with la Nina processes by late summer.

Current Conditions

Observed May 2016

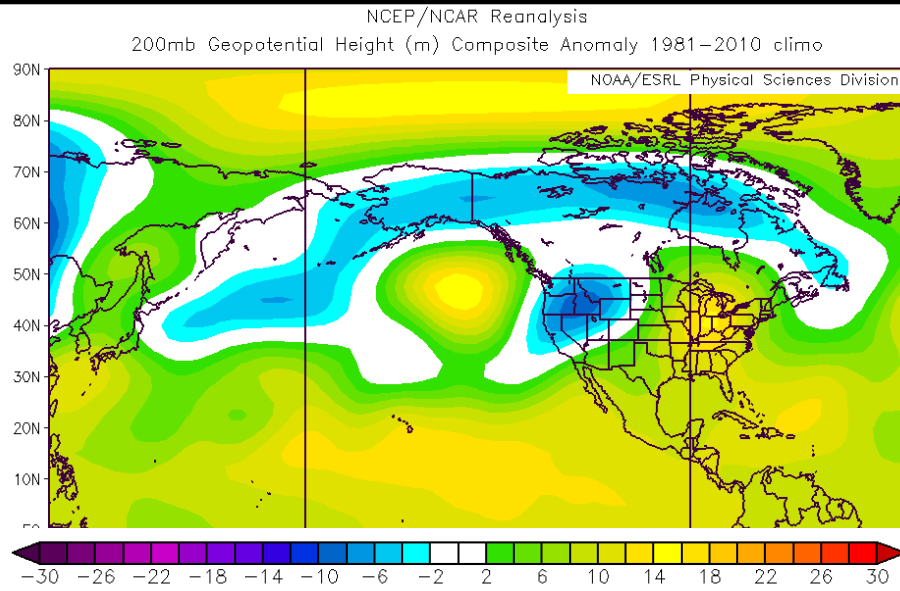
Observed May 2016 upper-atmosphere pattern.



May 2016 has been dominated by **low & high latitude ridging** and **mid-latitude troughing**. A high amplitude ridge persists in the Northwest US.

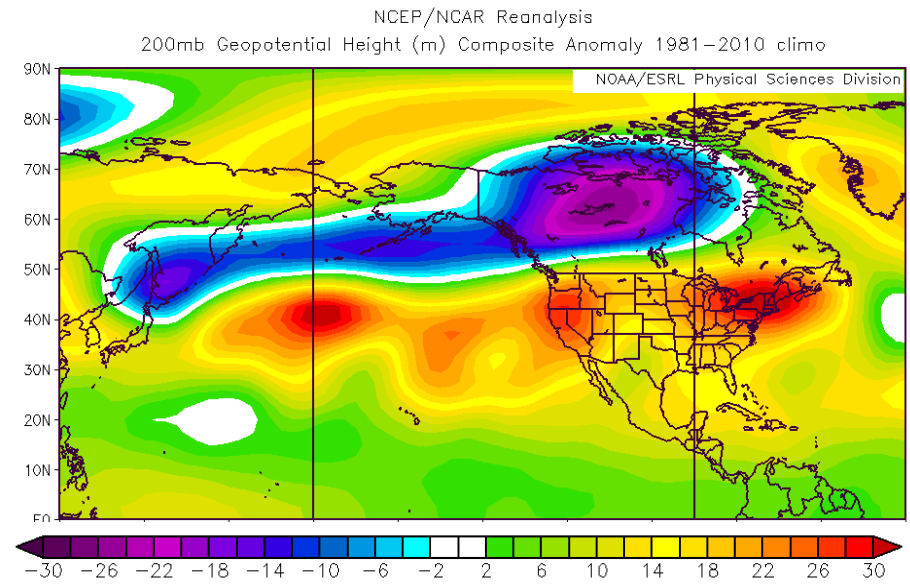
Insight into Tropical Influence el Nino influences in early summer & transitions

June & July when coming out of a wintertime el Nino



Previous similar years suggest a retrogression of high pressure off the west coast from its current position in May 2016 and the emergence of warm high pressure east of the Rockies.

July, August & September during a transition to la Nina*



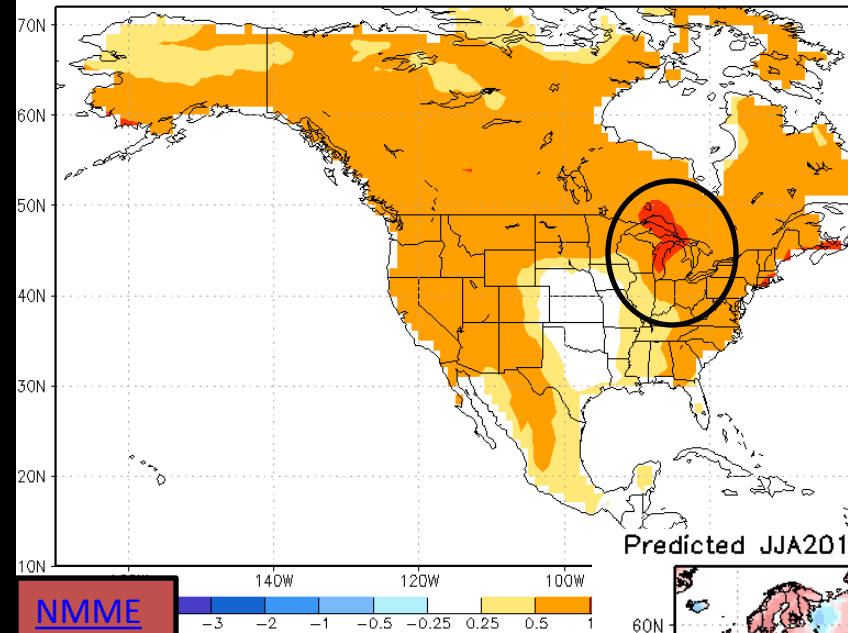
When considering a transition to la Nina conditions in the tropics by late summer, a substantial signal emerges for widespread mid-latitude ridging with the strongest signal over the North/East US, including the Great Lakes.

*Only includes transition years with similar off-equator/PDO-related warmth (Slide 3) due to potential eventual interference with la Nina signal.

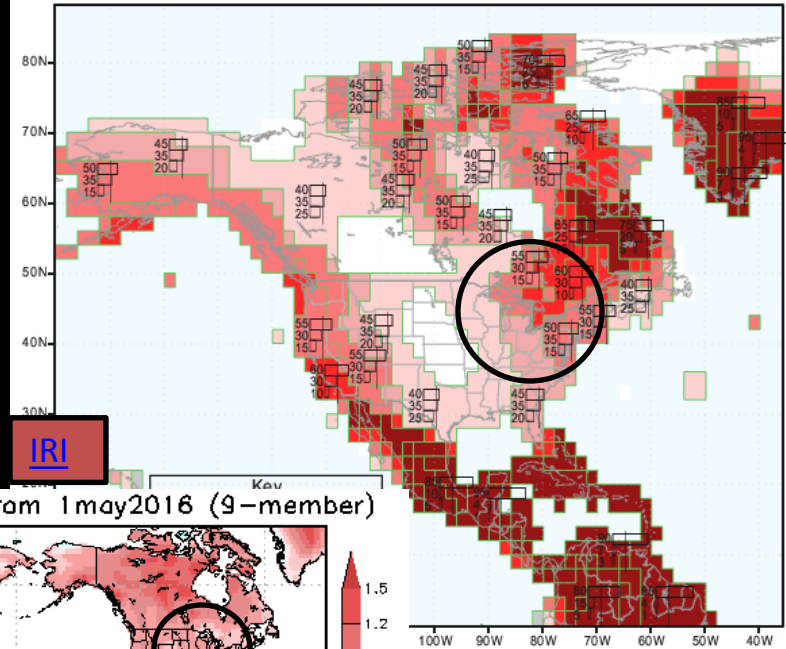
Climate Model Output

Model output supports a warm forecast

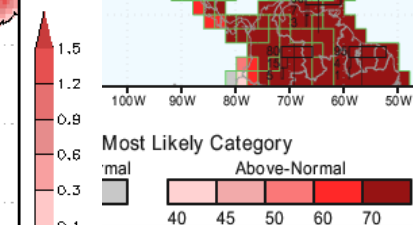
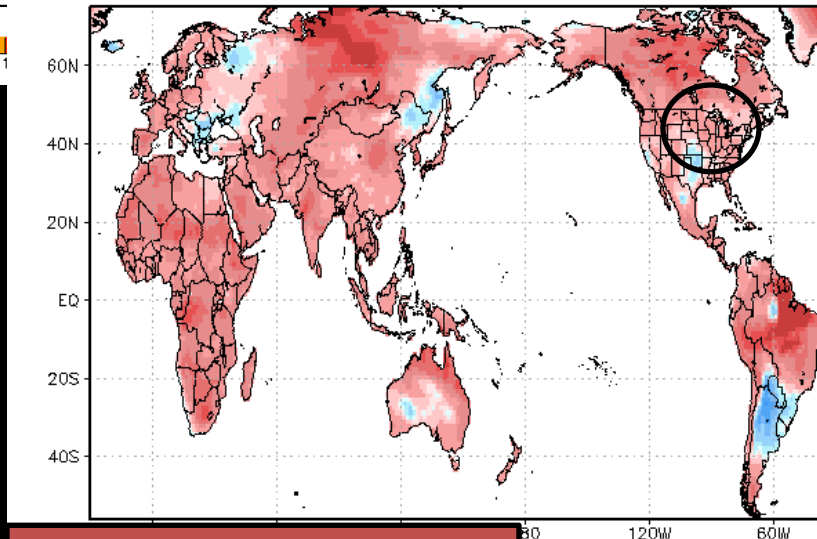
NMME Forecast of TMP2m Anom IC=201605 for 2016JJA



IRI Multi-Model Probability Forecast for Temperature for June-July-August 2016, Issued May 2016



Predicted JJA2016 temp2 anom. from 1 may 2016 (9-member)



Summer Outlook for Southeast Michigan

Temperature Trends

There is an increased probability of above normal this summer, especially during the second half of the season. Short-range models suggest a cooler beginning to June. Despite the strong signal for warmth, the potential for widespread drought and extreme heat is low due to high antecedent moisture conditions near the Great Lakes & in upstream source areas. Therefore, warm periods may exhibit a tendency to be persistent but also lacking the potential to become extreme.

June through August: Warmer than normal, particularly during the second half of summer.

Precipitation Trends

Warm season precipitation is dominated by thunderstorm activity and is notoriously difficult to predict at seasonal time scales. However, the expectation for a tendency toward ridging does lower expectations for rainfall.

June through August: Slightly below normal rainfall

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: 74.8F (2012)

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 1876)

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 17th, Flint: Jun 18th, Detroit: Jun 19th

Climatological chance of reaching 100 degrees: 13-14% or once every 18-20 years.