...2016 ANNUAL MID-SOUTH CLIMATE SUMMARY...

Synopsis

The Mid-South climate of 2016 was characterized by abnormally warm temperatures, with each of the four official climate sites of the region recording one of their top ten warmest years on record (Fig 4). Precipitation totals varied greatly around the Mid-South (Fig 3), with some locales abnormally wet while others were abnormally dry. Despite final annual precipitation totals, drought conditions were a factor at nearly all locations during the summer and early fall months.

2016 began with near normal temperatures for January, which would be a rare occurrence for the warm year. Climatologically the snowiest month of the year across the region, January was the only instance of measurable snow the entire year (Fig 1). This, however, was not enough to be significant as all sites, with the exception of Jackson, recorded well under 1" of snowfall. The region was mostly drier than normal during January, as only Tupelo had a near normal precipitation total. February was warmer than normal by nearly 2.0 degrees across the region, with Memphis actually 2.6 degrees warmer than normal. Precipitation values for February were varied; Memphis was over an inch above normal, Jackson was near normal, and Jonesboro and Tupelo were near 1.50" drier than normal.

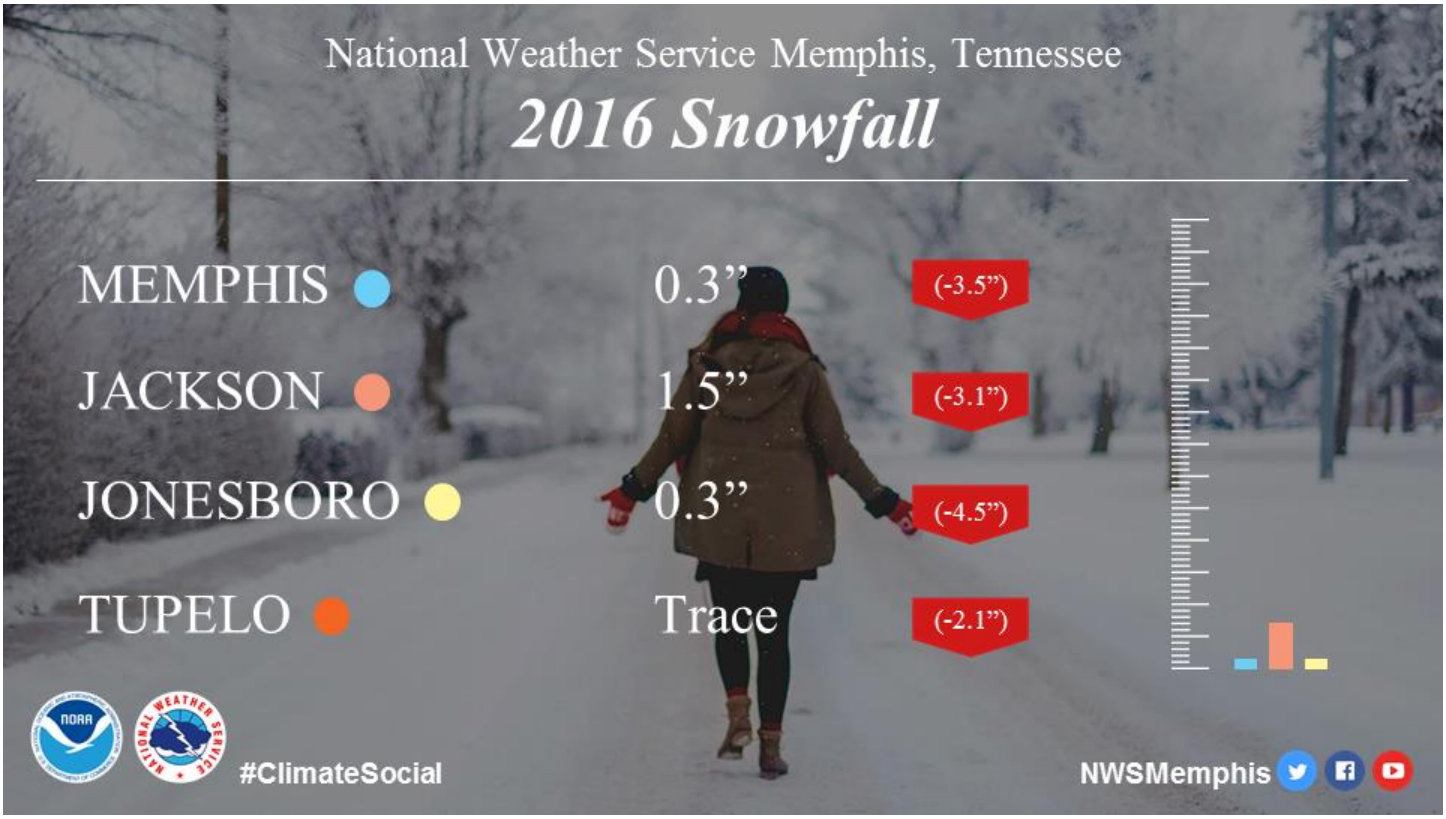

Fig 1: This figure displays total snowfall values for 2016. The region experienced below normal snowfall values for the year by as much as 4.5" below the annual normal. All of the measurable snow for the year fell during a single event in January.

Sea surface temperatures across the equatorial Pacific Ocean were well warmer than normal during the winter of 2015-2016, in a phenomenon commonly known as El Niño. This event happened to be one of the strongest on record, with typical impacts on the region and much of the continental United States much more subdued than expected. Much of this can be attributed to the fact there are many other

climate systems at work, and their various phases and cycles also have an impact on the climate of the local region. The strong El Niño was waning during the months of March and April. Past reviews of similar events indicated April was likely to be wetter than normal. However, March ended up being the wettest month of the year, as significant rainfalls impacted the region in another El Niño expected impact upset. The month was just over 3.00" wetter than normal at Tupelo, to just over 11.00" wetter than normal at Memphis (Fig 2). In addition to being one of the top ten wettest months of March, March 2016 was also one of the wettest months on record at Memphis, Jackson, and Jonesboro, a remarkable feat. The month was also significantly warmer than normal around the region by 3.5 to 4.5 degrees, making for the 8th warmest month of March on record at Tupelo. March was perhaps the busiest weather month for the region; in addition to the flooding rainfall, 5 of the 9 regional tornadoes of 2016 occurred during the month.

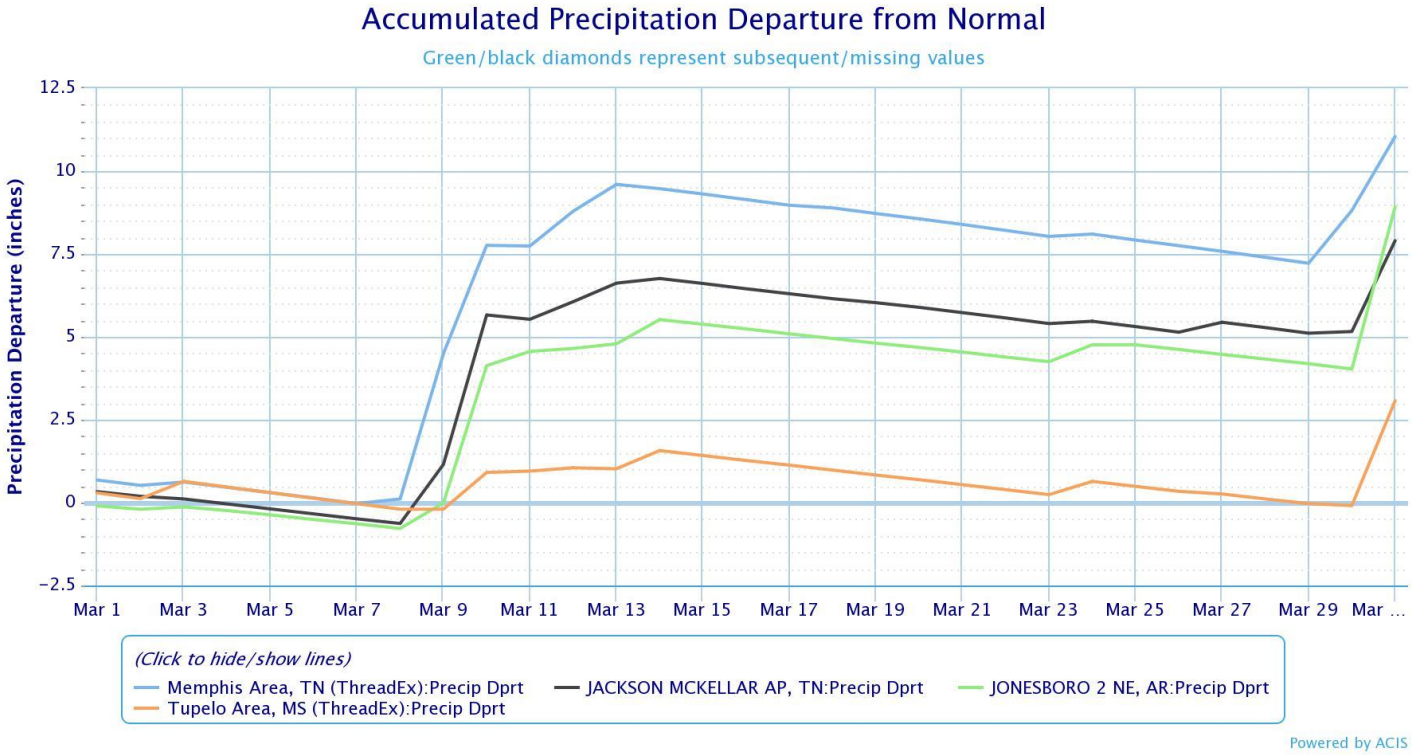

Fig 2: This figure displays the precipitation departures from normal during the month of March, the wettest month of 2016 for the region. This graph depicts a precipitation event around the 8th to 10th of the month which provided up to 8.00" of precipitation above normal for Memphis. After little rain for the middle of the month, a late month precipitation event is evident by the spike in departures

April continued the streak of warmer than normal months, with all sites 1.5 to just under 3.0 degrees above normal. Precipitation values varied around the region; both Memphis and Jonesboro received near normal amounts, while Jackson was drier than normal by nearly 2.00" and Tupelo was wetter than normal by just over an inch. A break from the warmer than normal conditions occurred in May, the only cooler than normal month for Memphis the entire year, with the site being 1.2 degrees warmer than normal. Jackson was also warmer than normal for May by 1.5 degrees, while Jonesboro and Tupelo were near normal. Precipitation amounts were again varied for the month of May, with Tupelo much drier than normal, Jackson drier than normal, and Memphis was near normal having missed its monthly normal amount by only 0.18". Jonesboro was abnormally wet during May, recording 6.21" of rain above the normal monthly amount. This made for the wettest month of May on record for Jonesboro, with May 24th going down as the wettest single day on record for the site, with 6.19" of rain falling that day. The end of May also

concluded climatological spring, encompassing the months of March, April, and May collectively. It came as no surprise for Spring 2016 to end between 1.0 and 2.0 degrees warmer than normal around the region, with precipitation values also well above normal. The exception to the latter was Tupelo, which only observed near normal precipitation during the months of spring, a preamble of conditions to come. The abnormally wet conditions at Memphis and Jonesboro during Spring 2016 made for the 4th and 2nd wettest springs on record at those locations, respectively.

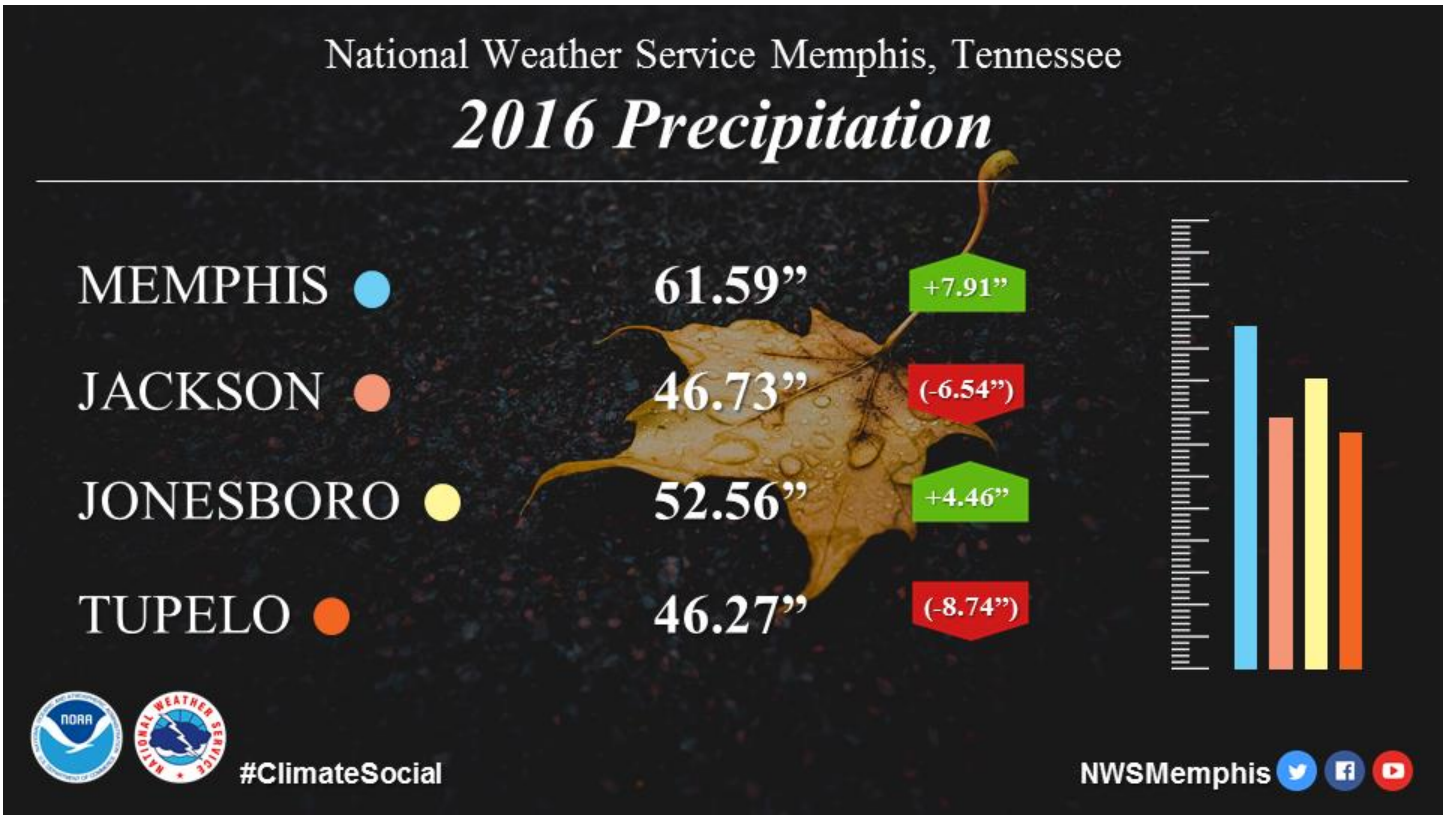

Fig 3: This figure displays precipitation totals for 2016. The region experienced a mixture of above and below normal precipitation totals. The lack of sufficient precipitation resulted in prolonged periods of drought conditions, particularly across north Mississippi, during the summer and fall months.

While June, the first month of climatological summer, is typically warm, it was abnormally so during 2016. Average temperature departures at each of the four sites ranged from 2.7 to 3.6 degrees above normal. This was warm enough to make for the 7th warmest month of June on record at Memphis and the 9th such at Jackson. June was largely a dry month for the region, with all sites except Tupelo as much as 3.00” of rain below normal. In fact, Jonesboro only received 0.54” of rain total during June, which made for the 6th driest June on record at the site. Tupelo actually recorded a wetter than normal June, with its monthly precipitation total being 1.54” above normal. July continued the streak of warmer than normal temperatures for the region, with monthly average temperature departures between 2.0 and 3.0 degrees above normal. Memphis’ July average temperature of 85.0 degrees made for the 8th warmest July on record. The warmest daily high temperatures of the year were achieved during July, with July 22nd specifically being warm, as Memphis, Jackson, and Jonesboro all recorded their annual maximum temperatures on this date. Much of the area was drier than normal, as Extreme Drought conditions developed across portions of northeast Mississippi, with much of the rest of north Mississippi categorized in some level of drought by the US Drought Monitor product. Jonesboro had a monthly rainfall total which was near normal, while Memphis recorded a monthly total some 3.43” above normal,

which made July 2016 the 8th wettest on record for the site. Jackson was nearly 2.00" drier than normal for July, while Tupelo ended the month near 1.50" drier than normal.

August, the final month of climatological summer, was again warmer than normal for the region. All four official climate sites had monthly average temperature departures above normal, ranging from 1.1 degrees above at Jonesboro to 2.6 degrees above at Memphis. Memphis continued in its six month span of top ten warmest months on record (June through November) with August 2016 the 10th warmest August on record for the site. The region received a much needed surplus of rainfall during the month of August, with Jackson recording a near normal monthly total, and the other three sites receiving above normal amounts. Overall, Summer 2016 (May through August) was between 2.0 and 3.0 degrees warmer than normal area-wide, resulting in the 4th, 5th, and 7th warmest summers on record for Memphis, Tupelo, and Jackson, respectively. Not surprisingly, precipitation departures from normal varied across the region during the summer, with Jackson and Jonesboro coming in drier than normal, while Memphis and Tupelo were wetter than normal.

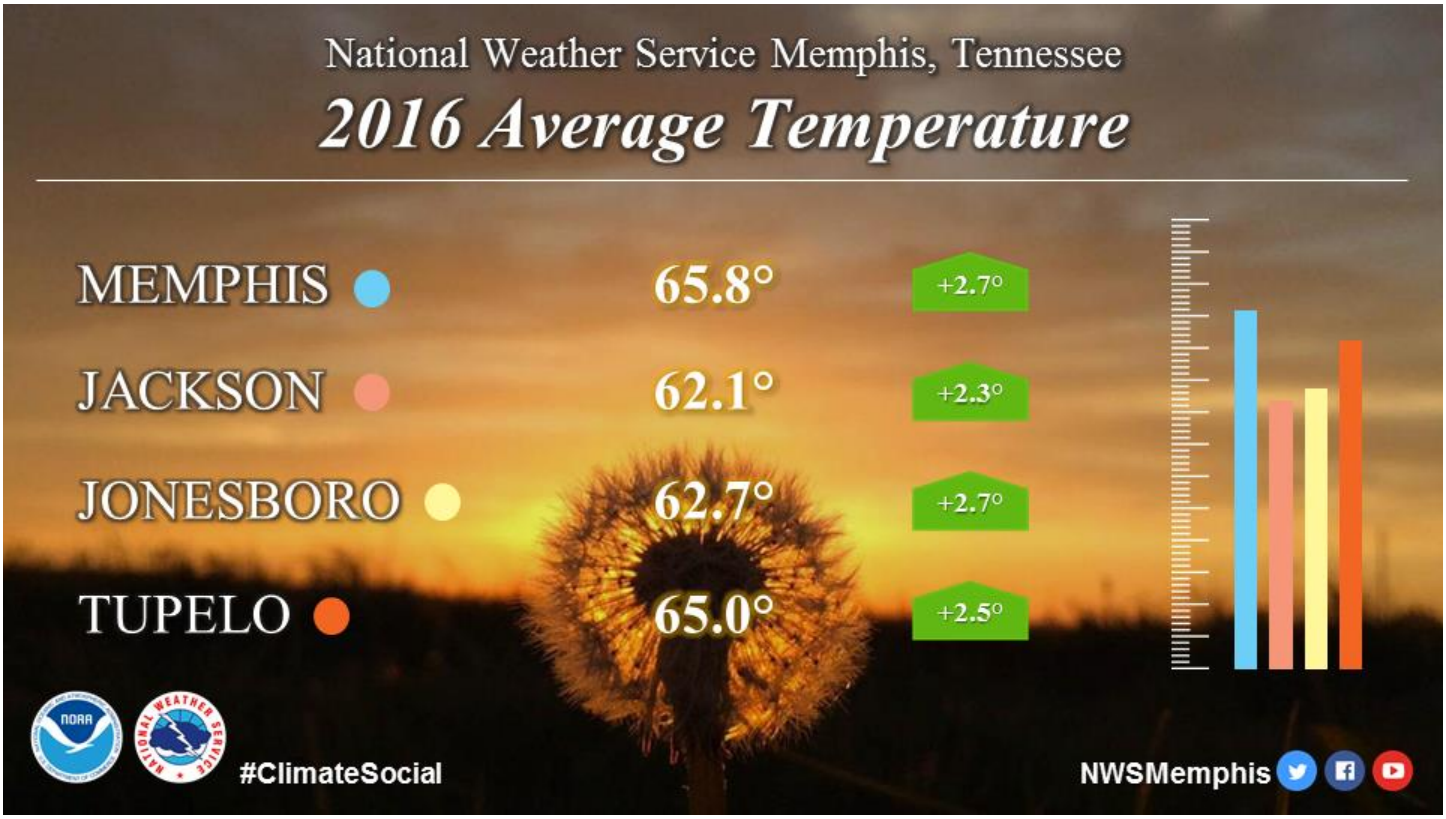

Fig 4: This figure displays annual average temperatures for 2016. The region experienced a much warmer than normal year, with each of the four sites observing one of their top 10 warmest years on record.

September was markedly warmer than normal, with monthly average temperature departures near 4.0 to over 5.0 degrees above normal values. This was warm enough for Memphis, Jackson, and Tupelo to record their 4th, 8th, and 5th warmest months of September on record, respectively. September below normal precipitation values exacerbated drought conditions entering the fall months. In fact, September 2016 was the 7th driest month of September on record for Tupelo, with only 0.43" of rain observed. Unfortunately the dry conditions only continued into October, which was again both warmer and drier than normal. Monthly average temperature departures from normal were staggering, at or near 7.0 degrees above normal area-

wide. This produced the warmest month of October on record at Memphis, a significant feat for a site with a temperature record extending back to 1875. The month also went down as the 3rd warmest month of October on record at Jackson, Jonesboro, and Tupelo. Most of the region fell between 2.00" and 3.00" of precipitation below normal for October, with Tupelo coming in at 3.68" below normal. As a result, some portions of northeast Mississippi were highlighted in D4 Exceptional Drought, the most severe drought classification by the US Drought Monitor product, during the month. Tupelo only recorded 0.44" of rain total for October, resulting in the 7th driest month of October on record for the site.

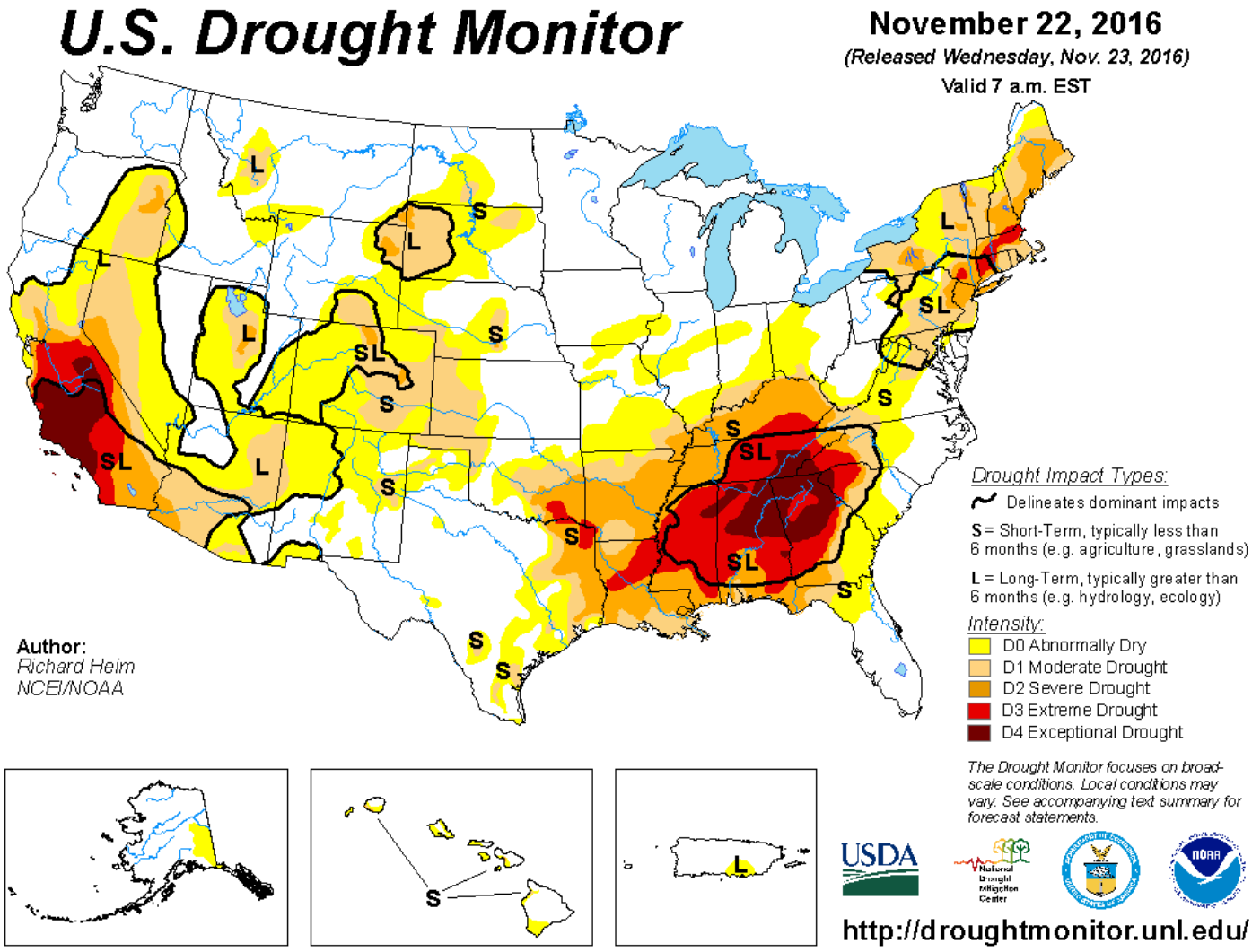

Fig 5: This figure displays the US Drought Monitor product from November 22, 2016. This was the peak of drought conditions across the Mid-South, with portions of northeast Mississippi included in D4 Exceptional Drought, and most of the region highlighted in at least D2 Severe Drought.

Warm and dry conditions persisted into November, with the month finishing from near 3.5 to over 5.0 degrees warmer than normal for the region. This made for the 8th warmest month of November on record at Memphis, Jackson, and Jonesboro, while being the 6th warmest month of November on record at Tupelo. In addition, the six month period spanning from June to November was the warmest such period on record for Memphis by one degree, which is remarkable. The same period was also the warmest on record for Tupelo and the 2nd warmest on record for Jackson. Only Tupelo recorded a near normal precipitation total for November, with the rest of the sites near 1.50" to near 3.00" of precipitation drier than normal. This

further exacerbated dry conditions, with area-wide drought conditions reaching their peak severity during the month of November (Fig 5).

November also concluded climatological fall, which encompasses the months of September, October, and November. Fall 2016 was the warmest fall on record for all four official climate sites, with each having an average temperature for the fall 4.9 to 5.9 degrees warmer than normal. Additionally, the season was abnormally dry, with all four sites just over 5.00" to over 8.00" of precipitation below normal. This made for the 6th, 7th, and 8th driest fall on record at Memphis, Jackson, and Tupelo, respectively. The year ended with more near normal temperatures, just as it began in January, for Memphis and Jackson. Jonesboro and Tupelo were both between 1.0 and 2.0 degrees warmer than normal for the month. Precipitation values for the month varied; Tupelo was drier than normal by 1.38" for December, Jonesboro was near normal, while Memphis and Jackson were between 1.00" and 2.00" wetter than normal.

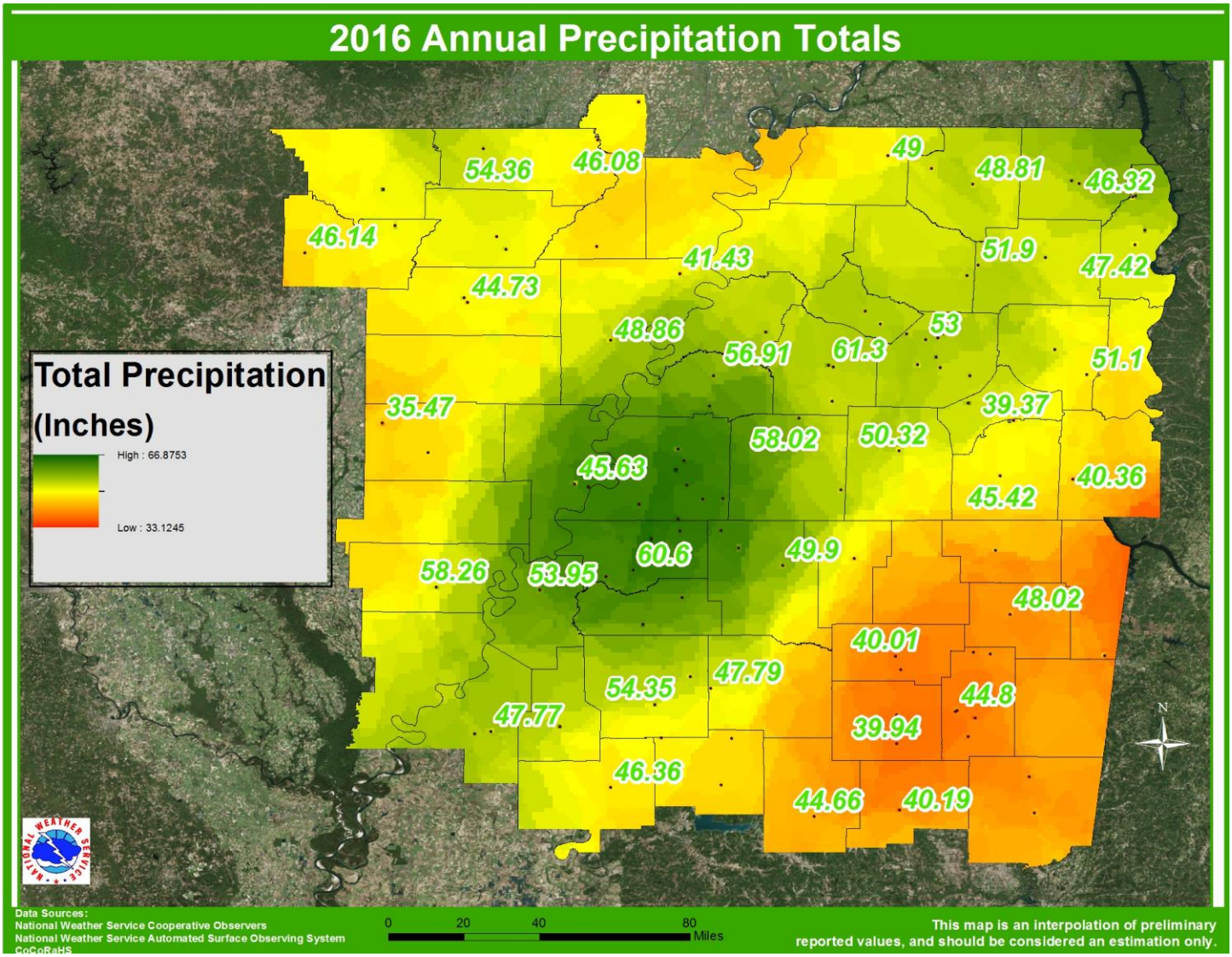

Fig 6: This figure displays an interpolation of total precipitation amounts for 2016. The driest areas of the Mid-South during the year were across northeast Mississippi, with the wettest areas located just east of the Mississippi River, including the Memphis metropolitan area.

The chart below contains significant climate data for the four official reporting sites across the Mid-South during the year 2016:

	Memphis	Jackson	Jonesboro	Tupelo
Highest Temperature (F)	100 (7/22)	99 (7/22)	99 (6/16 & 7/22)	98 (8/4 & 9/24-25)
Lowest Temperature (F)	15 (12/19)	12 (1/18)	13 (12/19)	17 (1/11 & 1/19)
Average Temperature (F)	65.8	62.1	62.7	65.0
Normal Temperature (F)	63.1	59.8	60.0	62.5
Departure from Normal (F)	2.7	2.3	2.7	2.5
Wettest Day (inches)	4.53 (3/9)	4.64 (3/10)	6.19 (5/24)	3.31 (3/31)
Total Precipitation (inches)	61.59	46.73	52.56	46.27
Normal Precipitation (inches)	53.68	53.27	48.10	55.01
Departure from Normal (inches)	7.91	-6.54	4.46	-8.74
Total Snowfall (inches)	0.3	1.5	0.3	T
Normal Snowfall (inches)	3.8	4.6	4.8	2.1
Departure from Normal (inches)	-3.5	-3.1	-4.5	-2.1
Greatest Snow Depth (inches)	T (1/22)	1 (1/23)	T (1/22)	0
Earliest Freeze	Dec 8	Nov 10	Nov 20	Nov 20
Latest Freeze	Feb 26	Mar 21	Mar 21	Mar 2
Average Wind Speed (MPH)	7.4	6.4	7.5	6.2

Notable Statistics

Memphis

#2 Warmest Year on Record- 65.8°
#4 Wettest Month on Record- March with 16.20”
#4 Wettest Spring on Record- 27.24”
#4 Warmest Summer on Record- 84.3°
#1 Warmest Fall on Record- 69.5°
#6 Driest Fall on Record- 4.45”
#4 Wettest March on Record- 16.20”
#7 Warmest June on Record- 83.2°
#8 Warmest July on Record- 85.0° (tied with 1982)
#8 Wettest July on Record- 8.02”
#10 Warmest August on Record- 84.6°
#4 Warmest September on Record- 80.5°
#1 Warmest October on Record- 70.7°
#8 Warmest November on Record- 57.4°
#1 Warmest June – November Period on Record- 76.9°

Jackson

#4 Warmest Year on Record- 62.1°
#6 Wettest Month on Record- March with 12.65”
#7 Wettest Day on Record- March 10th with 4.64”
#7 Warmest Summer on Record- 80.5°
#1 Warmest Fall on Record- 65.6°
#7 Driest Fall on Record- 5.68”

#6 Wettest March on Record- 12.65”
#9 Warmest June on Record- 78.9°
#8 Warmest September on Record- 75.3°
#3 Warmest October on Record- 67.4°
#8 Warmest November on Record- 54.2°
#2 Warmest June – November Period on Record- 73.1°

Jonesboro
#6 Warmest Year on Record- 62.7°
#5 Wettest Month on Record- March with 13.22”
#1 Wettest Day on Record- May 24th with 6.19”
#2 Wettest Spring on Record- 28.50”
#1 Warmest Fall on Record- 66.8°
#5 Wettest March on Record- 13.22”
#1 Wettest May on Record- 10.82”
#6 Driest June on Record- 0.54”
#3 Warmest October on Record- 68.7°
#8 Warmest November on Record- 54.8°

Tupelo
#1 Warmest Year on Record- 65.0° (tied with 2007)
#5 Warmest Summer on Record- 82.5°
#1 Warmest Fall on Record- 68.3°
#8 Driest Fall on Record- 5.52”
#8 Warmest March on Record- 58.3°
#6 Driest May on Record- 1.19”
#5 Warmest September on Record- 78.9°
#6 Driest September on Record- 0.43”
#3 Warmest October on Record- 69.5°
#7 Driest October on Record- 0.44”
#6 Warmest November on Record- 56.6°
#1 Warmest June – November Period on Record- 75.5°

Severe Weather

The Mid-South experienced 9 total tornadoes during the year 2016. All 9 tornadoes, the date and time they occurred, the intensity rating, the location, and the path length and maximum width are listed in the chart below.

Date	Time (LST)	EF Rating	Location of Initiation	Path Length (miles)	Max Path Width (yards)
Feb 2	4:55 PM	1	Crockett County, TN (SE Cairo)	2.64	100
Mar 13	6:54 PM	0	Phillips County, AR (WSW Marvell)	2.88	100
Mar 13	7:16 PM	0	Phillips County, AR (WSW Edgewood)	3.79	125
Mar 13	8:10 PM	1	Cross County, AR (1.8 W Togo)	1.96	125
Mar 27	4:24 PM	1	Benton County, TN (1.3 WSW Gismonda)	2.01	100

Mar 31	3:28 PM	1	Hardin County, TN (1.8 NNW Counce)	1.46	75
Apr 29	2:26 PM	0	Monroe County, MS (2.1 W New Wren)	5.19	150
Apr 29	2:41 PM	0	Monroe County, MS (0.5 NE Acker)	0.93	50
Nov 29	6:15 PM	1	Monroe County, MS (2.9 W Muldon)	5.98	200

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