



May 14 – 31

The boundary that produced the severe weather on May 10<sup>th</sup> and 13<sup>th</sup> became quasi-stationary across the HSA on the 14<sup>th</sup>. Showers and thunderstorms continued along the boundary as moisture surged northward. Additional rainfall totals of 0.5 to near 2 inches were estimated across eastern OK and northwest AR along and southeast of I-44. All of this precipitation led to moderate river flooding along the Neosho River near Commerce, which crested on the 15<sup>th</sup> (see the E3 report for details). A mid-level short wave led to showers and thunderstorms across locations between I-44 and I-40 on the 15<sup>th</sup> and into the early morning hours of the 16<sup>th</sup>. Most of this area received from 0.25 to around 1 inch of rain; however, the area near the OK/AR/MO state lines had rainfall totals of 2-3 inches. Showers and thunderstorms continued during the day on the 16<sup>th</sup>, bringing an additional 0.10 to 1 inch of rain to far eastern OK and western AR. A brief tornado occurred in southern Sebastian County during the late morning hours of the 16<sup>th</sup>. A supercell tracked into far southeast OK during the afternoon hours, bringing upwards of 1 inch of rainfall to the areas it affected.

A non-severe squall line moved across northeast OK and far northwest AR during the morning hours of the 19<sup>th</sup>, followed by another round of severe weather during the evening and overnight hours. Supercell thunderstorms developed along the warm front that extended from north central OK into northeast OK and along the dry line in western OK, with additional scattered strong to severe thunderstorms developing in the warm sector across east central OK. Four tornadoes occurred during this event. As the evening wore on, the thunderstorms transitioned into a linear system. All of this activity was moving slowly and produced copious rainfall, causing some locations to see rainfall rates of over 1 inch per hour. The ASOS raingage at Muskogee reported 2.16" from 8:53 pm – 9:53 pm and an additional 1.67" from 9:53 pm – 10:53 pm CDT. The rainfall lingered across southeast OK into the afternoon of the 20<sup>th</sup>. Almost the entire HSA received rainfall totals of 1 to 2 inches from this event, with several locations receiving 3 to 5 inches (see Figs. 1 and 2 and "Additional Measurements"). Widespread flash flooding and areal flooding occurred due to all of the rain falling on nearly saturated soils. In addition, moderate flooding was observed along Polecat Creek near Sapulpa, and minor flooding was observed along the Neosho River near Commerce (see E3 report for details).

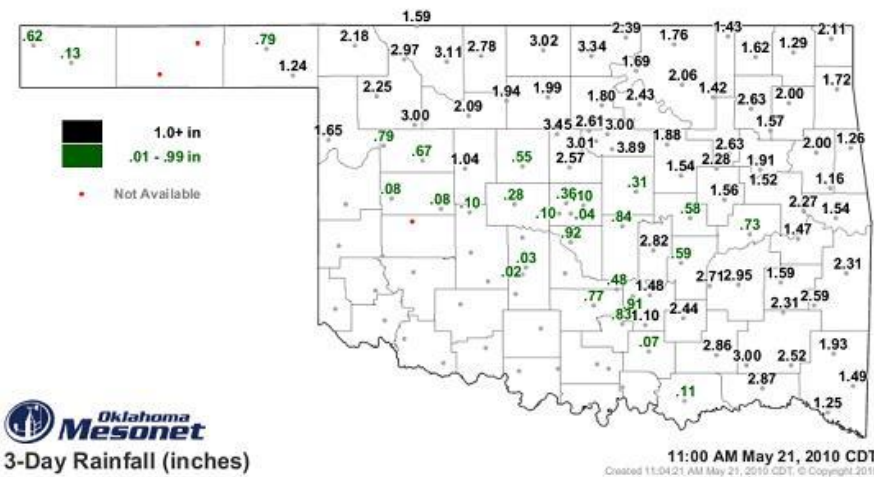


Fig. 1 (left). Rainfall totals from the early morning May 19 through May 20 storms. *Courtesy of the Oklahoma Mesonet.*

Additional Measurements:

*NWS Cooperative Observer reports from 7am 5/19 through 7am CDT 5/20:*

- 2NE Oktaha, OK 4.33"
- Muskogee, OK 4.22"
- Ashland, OK 4.00"

*NWS ASOS measurement from 12pm 5/19 through 7am CDT 5/20:*  
Muskogee, OK 4.50"

Tulsa, OK (TSA): Current 1-Day Observed Precipitation  
Valid at 5/20/2010 1200 UTC - Created 5/20/10 15:43 UTC

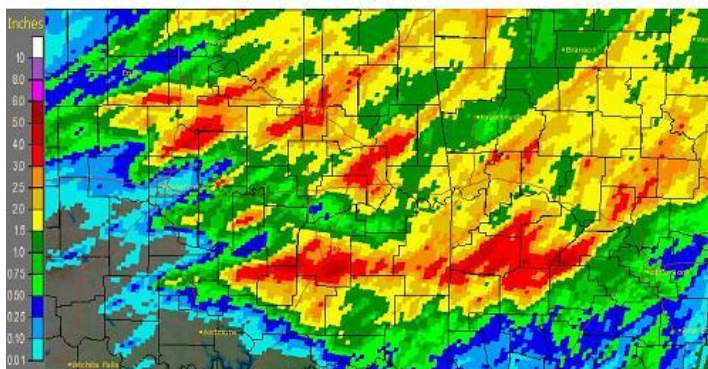


Fig. 2. Estimated Observed Precip. from 7am 05/19 -7am CDT 05/20

Tulsa, OK (TSA): Current 14-Day Observed Precipitation  
Valid at 5/21/2010 1200 UTC - Created 5/21/10 16:07 UTC

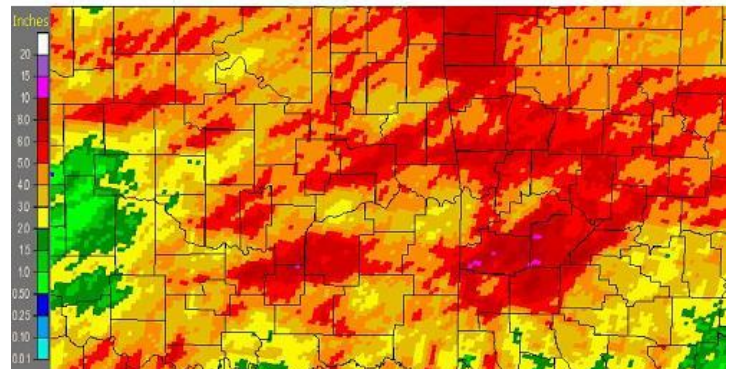


Fig. 3. Rainfall totals from 7am CDT 05/07 through 7am CDT 05/21

May 25 – 27 brought summer-like showers and thunderstorms to the region. Each day, widely scattered afternoon convection developed, with very localized heavy rainfall totals of over 1 inch. However, most locations received little to no rainfall on these days.

On the afternoon and evening of the 30<sup>th</sup>, storms developed along a weak front near I-35. This activity spread eastward, affecting the western portion of the HSA primarily along and west of a Bartlesville, to Muskogee, to Hugo line. This activity lingered into the morning hours on the 31<sup>st</sup>. Rainfall totals were generally 0.1”-1.5”, with isolated higher amounts around 2 inches.

**Monthly Summary**

Using the radar-derived estimated observed precipitation from the RFCs (Fig. 4a.), rainfall totals for May 2010 ranged from around 3” to near 10” across the HSA. While isolated areas received high totals this month, overall, much of the HSA received near to below normal rainfall for the month (see Fig. 4b).

Tulsa, OK (TSA): May, 2010 Monthly Observed Precipitation  
Valid at 6/1/2010 1200 UTC- Created 6/2/10 17:45 UTC

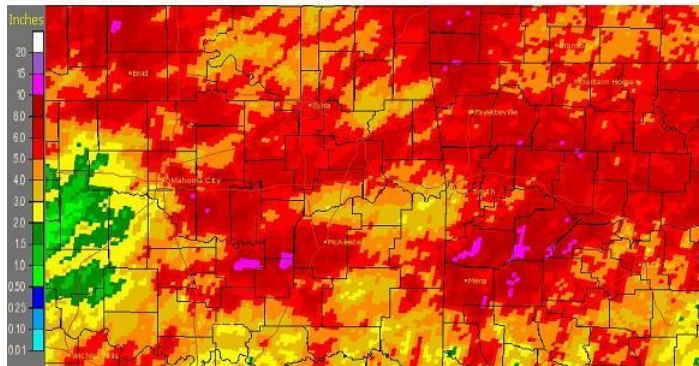
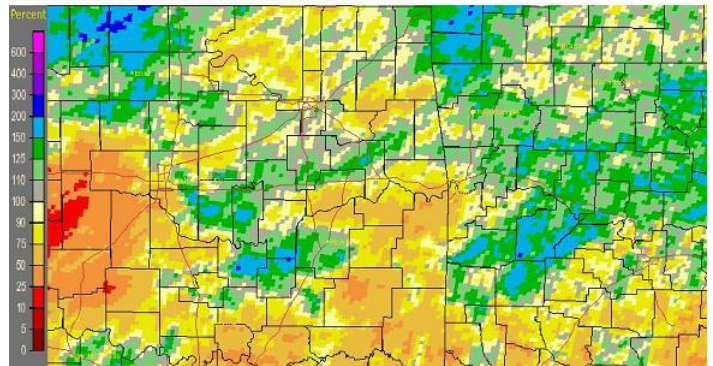


Fig. 4a. Estimated Observed Precip. for May 2010

Tulsa, OK (TSA): May, 2010 Monthly Percent of Normal Precipitation  
Valid at 6/1/2010 1200 UTC- Created 6/2/10 17:49 UTC



4b. Estimated % of Normal Precip. for May 2010

In Tulsa, OK May 2010 ranked as the 45<sup>th</sup> warmest May (69.7°F, since records began in 1905) and was the 55<sup>th</sup> wettest May (5.23”, since records began in 1888). Fort Smith, AR tied with 1920 as the 19<sup>th</sup> warmest May (72.2°F) and was the 45<sup>th</sup> driest May (3.58”) since records began in 1883.

Some of the larger precipitation reports (in inches) for May 2010 included:

Gravette, AR (coop)	9.67	Oktaha 2NE, OK (coop)	9.11	Muskogee, OK (ASOS)	8.85
Mountainburg 2NE, AR (coop)	8.06	NW AR Regional Airport (ASOS)	8.01	Muskogee, OK (coop)	7.92
Okemah, OK (coop)	6.95	Miami, OK (meso)	6.95	Jay, OK (meso)	6.93

According to the [U.S. Drought Monitor](#) (USDM) from May 25, 2010, drought conditions did not exist across northeast OK and northwest AR.

Most of the major reservoirs in the Tulsa HSA reported full conservation pools with flood control storage within 4% as of June 2, 2010. However, a few reservoirs were well into the flood control storage or experiencing deficits within the conservation pool. Conservation pools: Ft. Gibson Lake 84% and Hugo Lake 94%; Flood control pools: Eufaula Lake 17%, Oologah Lake 16%, and Keystone Lake 7%.

According to statistics from the [Oklahoma Climatological Survey](#) (OCS):

Rank since 1921 ("Last XX days" ending May 31, 2010)	Last 30 days	Year-to- Date 2010	Last 60 days (Apr. 2 – May 31)	Water Year (Oct.1, 2009 – May 31, 2010)	Spring (Mar. 1 – May 31)	Last 365 days (Jun. 1, 2009 – May 31, 2010)
Northeast OK	41 <sup>st</sup> wettest	41 <sup>st</sup> driest	26 <sup>th</sup> driest	37 <sup>th</sup> wettest	26 <sup>th</sup> driest	41 <sup>st</sup> wettest
East Central OK	40 <sup>th</sup> wettest	29 <sup>th</sup> driest	24 <sup>th</sup> driest	39 <sup>th</sup> wettest	22 <sup>nd</sup> driest	30 <sup>th</sup> wettest
Southeast OK	29 <sup>th</sup> driest	27 <sup>th</sup> driest	16 <sup>th</sup> driest	38 <sup>th</sup> wettest	14 <sup>th</sup> driest	17 <sup>th</sup> wettest



The [Climate Prediction Center](#) (CPC) outlook for June 2010 (issued May 31, 2010) indicates an enhanced chance for above median precipitation and above average temperatures. According to CPC, this outlook is based primarily on the expected weather conditions during the first half of June from shorter-term computer models and then modified by longer-term signals including local soil moisture conditions and long-term temperature trends. For the 3-month period Jun-Jul-Aug 2010, CPC is forecasting a slightly enhanced chance for below average temperatures and a slightly enhanced chance for above median precipitation (outlook issued May 20, 2010). This temperature outlook is based on above normal soil moisture, long-term temperature trends, and computer models, while the precipitation forecast is based on several statistical tools. Sea-surface temperatures in the equatorial Pacific are transitioning from El Niño conditions to ENSO-neutral conditions. According to CPC, many models are predicting ENSO-neutral conditions to continue, though there is a growing possibility of La Niña developing during the second half of 2010. These conditions also play a role in the above normal hurricane season forecast issued May 27, 2010 by the NWS.

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Products issued:

- 6 River Flood Warnings (FLW)
- 28 River Flood Statements (FLS)
- 3 River Flood Advisories (FLS) (11 Advisory FLS CON/EXT/CAN)
- 3 River Flood Watches (FFA) (3 Watch FFA CON/EXT/CAN)
- 0 River Statements (RVS)
- 1 Hydrologic Outlooks (ESF)
- 0 Drought Information Statements (DGT)