NWS FORM E-5 (11-88) (PRES. by NWS Instruction 10-924)	**U.S. DEPARTMENT OF COMMERCE** NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL WEATHER SERVICE
HYDROLOGIC SERVICE AREA (HSA)	**Tulsa, Oklahoma (TSA)**
MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS	REPORT FOR: MONTH **August** YEAR **2012**
TO: Hydrometeorological Information Center, W/OH2 NOAA / National Weather Service 1325 East West Highway, Room 7230 Silver Spring, MD 20910-3283	SIGNATURE **Steven F. Piltz** (Meteorologist-in-Charge) DATE **September 11, 2012**

When no flooding occurs, include miscellaneous river conditions, such as significant rises, record low stages, ice conditions, snow cover, droughts, and hydrologic products issued (NWS Instruction 10-924)

[X] An "X" in the box indicates no flood stages were reached in this Hydrologic Service Area (HSA) during the month above.

August 2012 started off very hot and ended with the remnants of Hurricane Isaac. August is climatologically the second driest non-winter month for the Tulsa HSA. Normal rainfall for August ranges from 2.6 inches in McIntosh County to 3.8 inches in Ottawa County. In the Ozark region of northwest Arkansas, rainfall averages 3.7 inches for the month.

Monthly Summary

Using the radar-derived estimated observed precipitation from the RFCs (Fig. 1a), rainfall totals for August 2012 ranged from around a meager 0.50" in isolated areas to near 8" in a few spots. Most of the HSA received 2"-4". Localized rainfall this month meant that some areas of eastern OK and northwest AR received near to above normal rainfall for August, many areas only received 25-75% of the normal August rainfall. Portions of central Osage County only received 10-25% of the normal August rain (Fig. 1b).

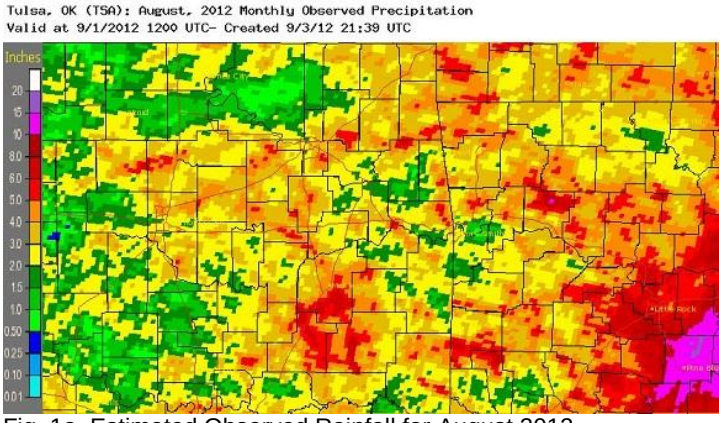

Fig. 1a. Estimated Observed Rainfall for August 2012

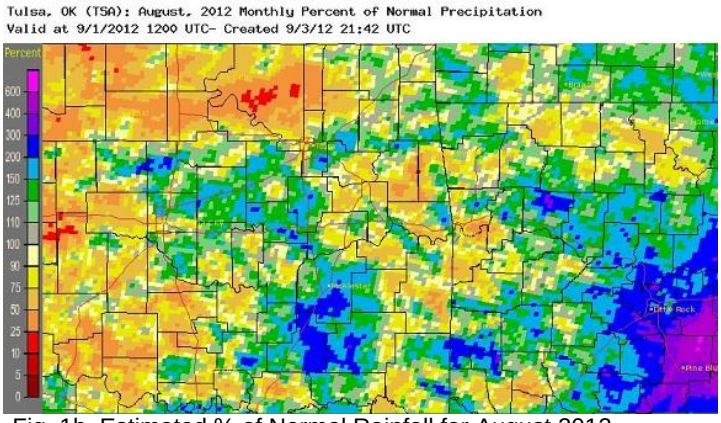

Fig. 1b. Estimated % of Normal Rainfall for August 2012

In Tulsa, OK, August 2012 ranked as the 44th warmest August (82.9°F, tied 1991, 1988; since records began in 1905) and the 52nd driest August (3.32"; since records began in 1888). Fort Smith, AR, was the 35th warmest August (83.8°F, tied with 1929) and the 56th driest August (2.18") since records began in 1882.

Some of the larger precipitation reports (in inches) for August 2012 included:

St. Paul, AR (coop)	6.18	Antlers, OK (meso)	5.53	Clayton 14WNW, OK (coop)	5.12
Ashland, OK (coop)	4.99	Antlers, OK (coop)	4.95	McAlester, OK (ASOS)	4.70
McAlester, OK (meso)	4.62	Fayetteville, AR (ASOS)	4.32	Jay, OK (meso)	4.25

Some of the lowest precipitation reports (in inches) for August 2012 included:

Ralston, OK (coop)	0.91	Wynona, OK (meso)	0.94	Bartlesville, OK (ASOS)	1.09
Burbank, OK (meso)	1.29	Cookson, OK (meso)	1.52	Pawnee, OK (meso)	1.58
Claremore, OK (meso)	1.62	Skiatook, OK (meso)	1.63	Pawnee, OK (coop)	1.63

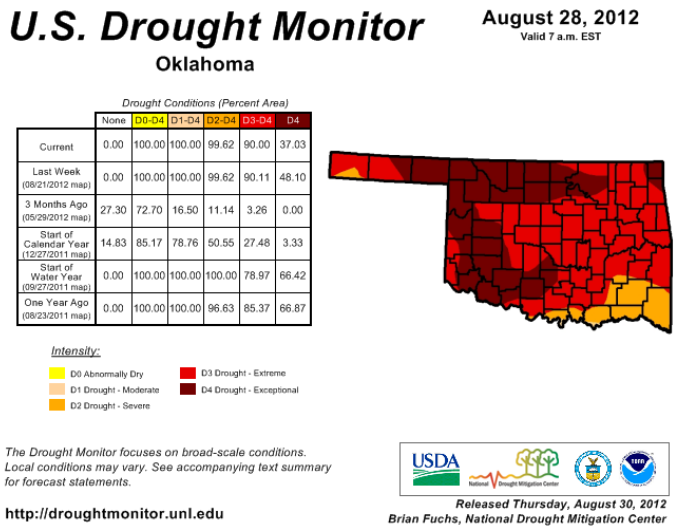

Fig. 2. Drought Monitor for Oklahoma

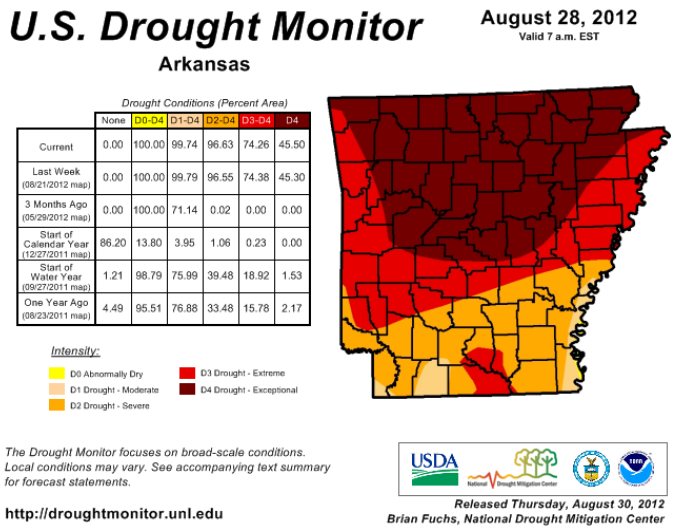

Fig. 3. Drought Monitor for Arkansas

Significant deterioration in drought conditions occurred during August 2012. According to the U.S. Drought Monitor (USDM) from August 28, 2012 (Figs 2, 3), all of eastern OK and northwest AR were in drought conditions. Exceptional drought (D4) included portions of Osage, northern Pawnee, Ottawa, and northern Delaware Counties in northeast OK and Benton, eastern Washington, Carroll, Madison, and eastern Franklin Counties in northwest AR. Extreme drought (D3) was affecting the remainder of the HSA, with the exception of Pushmataha and Choctaw Counties in southeast OK, which were in Severe (D2) drought.

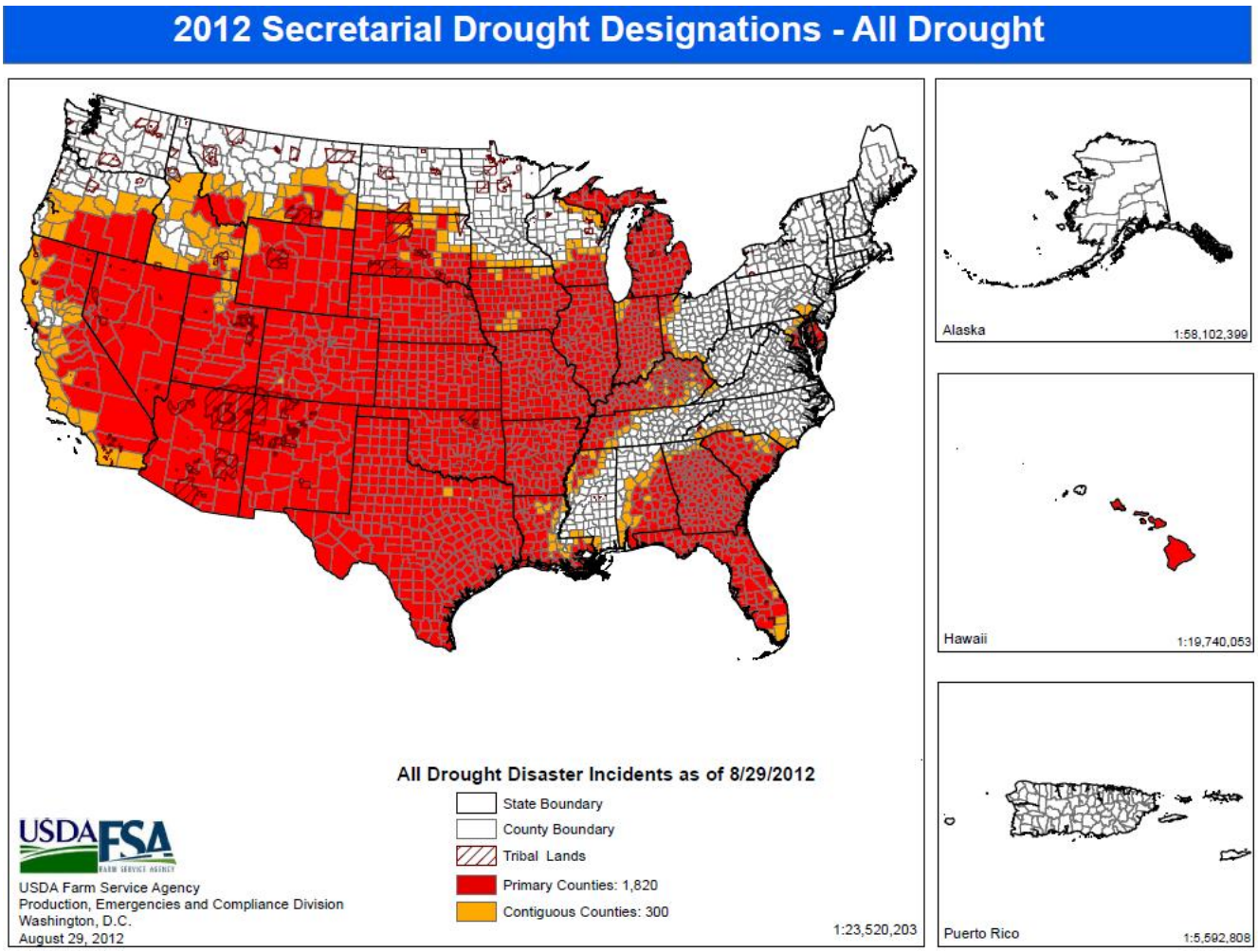

Fig. 4. Map showing the counties the USDA declared as natural disaster areas due to drought as of 8/29/2012. All counties in OK/AR are now disaster areas due to drought.

Most of the major reservoirs in the Tulsa HSA were operating well below 90% of their conservation pools as of August 24, 2012, with the exception of Grand Lake, which was operating at 4% of its flood pool. Reservoirs reporting conservation pool deficits below 90% as of August 24, 2012: Ft. Gibson Lake 32%, Heyburn Lake 44%, Hugo Lake 61%, Beaver Lake 74%, Birch Lake 75%, Eufaula Lake 75%, Skiatook Lake 76%, Tenkiller Lake 76%, Hulah Lake 76%, Keystone Lake 80%, Copan Lake 86%, Wister Lake 88%, and Oologah Lake 89%.

In Tulsa, OK, Summer 2012 ranked as the 6th warmest Summer (84.2°F; since records began in 1905) and the 45th driest Summer (8.99"; since records began in 1888). Fort Smith, AR, was the 6th warmest Summer (84.8°F) and the 44th driest Summer (7.66") since records began in 1882.

Outlooks

The Climate Prediction Center (CPC) outlook for September 2012 (issued August 31, 2012) indicates a slightly enhanced chance for above normal temperatures and an equal chance for above, near, and below median rainfall across eastern OK and northwest AR. This outlook was based primarily on short-term dynamic computer models and very low soil moisture effects.

For the 3-month period Sep-Oct-Nov 2012, CPC is forecasting an enhanced chance for above average temperatures and equal chances for above, near, and below median precipitation across the region (outlook issued August 16, 2012). This outlook is based on dynamic computer model output, long term trends, and initial soil moisture conditions. According to CPC, ENSO neutral conditions continued through August. Equatorial sea-surface temperatures continue to warm and there is an increasing chance El Niño conditions to develop during the Sep-Oct-Nov period.

Summary of Precipitation Events

August 1 – 15

The first few days of August were some of the hottest days this summer, with nearly the entire region reaching triple digits temperatures during the afternoon on the 1st (Fig. 5). Eastern Carroll County was on the convective edge of the 'ring of fire' on the periphery of the upper level ridge and picked up from 0.25" to 1" of rain. A mesoscale convective complex in KS moved southeast, affecting portions of far northeast OK and northwest AR on the 2nd. Rainfall was generally light, around 0.25" or less, with a few locations receiving near 0.75".

Very hot temperatures, low relative humidities, gusty winds, and ongoing drought conditions led to very high fire danger on the 3rd and 4th. A large fire in Creek Co. started on the 3rd, and it took several days before it was under control and finally extinguished. This fire burned 58,500 acres in northern Creek Co, destroying many residences. A cold front moved into the region during the afternoon and evening hours of the 4th, bringing scattered showers and thunderstorms to northeast OK and northwest AR, generally north of Hwy 412. Rainfall totals ranged from 0.25" to around 1", with portions of Nowata and Craig Counties getting around 2" of rain. A wind gust of 71 mph was recorded at the Tulsa International Airport as a thunderstorm collapsed, setting the record for highest wind gust (3 sec gust) in Tulsa (previous record 64 mph May 24, 2011). Additional isolated thunderstorms developed during the afternoon near the stalled front over far southeast OK on the 5th and 6th. Very localized 1"-2" rainfall occurred with this activity.

On the 7th and 8th, the upper-level ridge retrograded enough for northwesterly flow to develop over the region. Afternoon heating was sufficient on the 7th to allow isolated showers and thunderstorms to develop across a large portion of the HSA, though far northeast OK and far northwest AR remained dry. These storms produced 0.25" to very localized 1.5" of rain, as well as damaging downburst winds. A short-wave trough moving through the upper-level flow sparked showers and thunderstorms on the 8th, bringing the most wide-spread rain for the month so far. While most locations received around 0.5" or less, portions of Haskell, Le Flore, Pittsburg, Pushmataha, and Choctaw Counties had 1.5" to around 3" of rain (Fig. 6). 3.08" was measured 2E of Panama and 2.05" was measured 1ENE of Poteau (both in Le Flore County). Localized street flooding was reported in Poteau. These storms also produced damaging downburst winds.

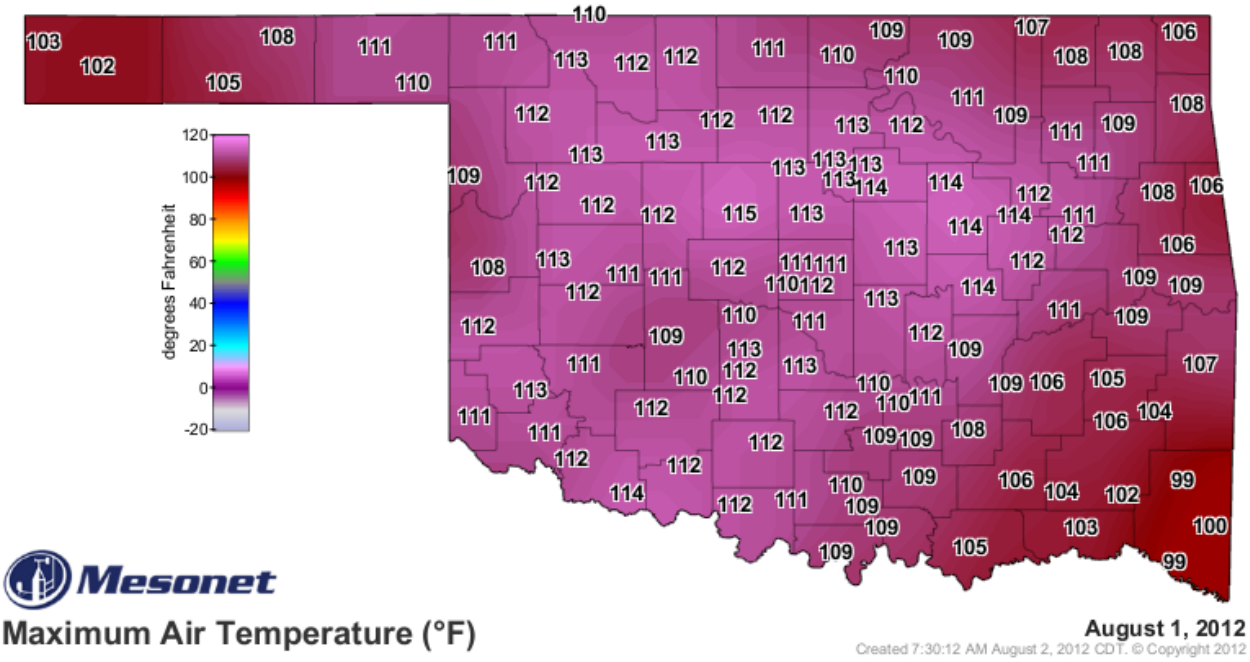

Fig. 5. High temperatures in Oklahoma 8/1/2012. Courtesy of the Oklahoma Climatological Survey.

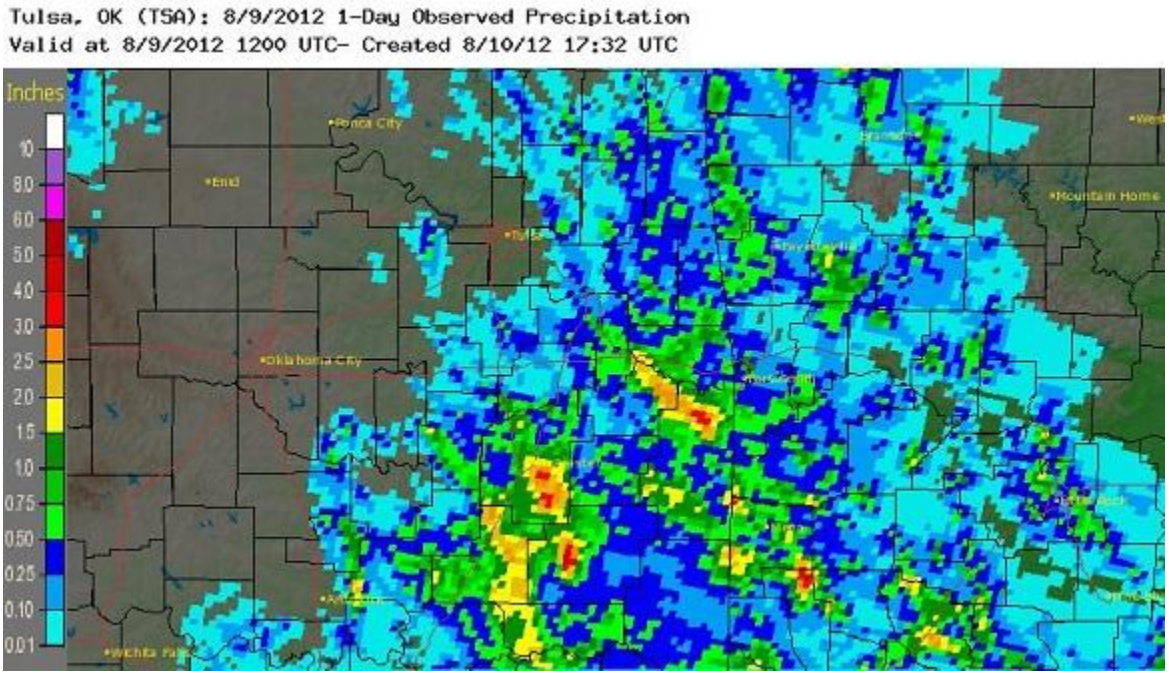

Fig. 6. 24-hr Observed Rainfall ending 7am 8/9/2012.

A cold front moved into eastern OK and northwest AR during the evening of the 12th. Isolated showers and thunderstorms developed along and ahead of the front, affecting portions of eastern OK and northwest AR. While most locations that had storms received less than half an inch of rain, a few spots did get 0.5" to around 1.5".

Showers and thunderstorms that had developed in Colorado and moved through Kansas, entered eastern OK during the afternoon of the 14th, bringing some gentle rain, less than 0.25", to locations west of Highway 75 in northeast OK. Additional showers and thunderstorms developed during the evening hours, bringing 0.10" to near 0.75" to portions of Okfuskee, southwest McIntosh, Pittsburg, western Latimer, and northern Pushmataha Counties in eastern OK. Further south and closer to a stalled frontal boundary over northern TX, 0.10" to near 0.50" of rain fell in Choctaw County.

August 16 – 31

On the 16th, showers and thunderstorms developed during the afternoon along and ahead of a cold front as it moved southeast through the HSA. Most of this activity affected locations along and between I-44 and I-40 in eastern OK and northwest AR. Rainfall totals ranged from a few sprinkles to over 3" (see Fig. 7). The highest totals occurred in northern Cherokee and southern Madison Counties. 3.45" was measured 1E of St. Paul, AR.

Showers and thunderstorms developed during the very early morning hours of the 18th in association with mid-level lift and moisture. This activity continued through much of the day and into the evening, affecting all but far northeast OK and northwest AR (generally along and north of a Tulsa to Fort Smith line received little to no rain). The highest rainfall totals of 2"-4" occurred over Pittsburg, Latimer, and Pushmataha Counties in southeast OK (see Figs. 8, 9).

Fig. 7. 24-hr Observed Rainfall ending 7am 8/17/2012.

Fig. 8. 24-hr Observed Rainfall ending 7am 8/18/2012.

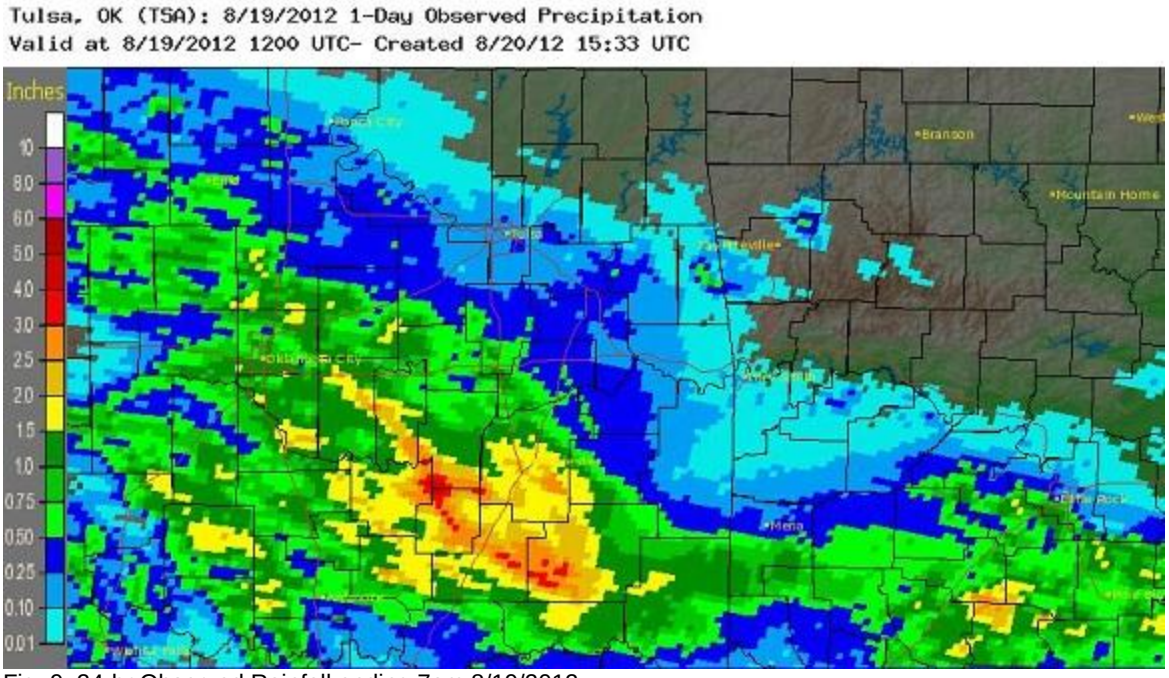

Fig. 9. 24-hr Observed Rainfall ending 7am 8/19/2012.

Scattered showers and thunderstorms developed over portions of eastern OK and northwest and west central AR during the afternoon and evening hours of the 19th in advance of a cold front. Overall precipitation was light with this activity, though a few lucky spots received 0.75”-1.5”.

Widespread rainfall occurred over eastern OK and northwest AR on the 25th-26th as a mid-level trough moved slowly through the region (Figs. 10, 11, 12). Most locations north of I-40 received between 0.50” to 1.5” of rainfall over the 2-day period, with several areas receiving 2”-4” of rain. South of I-40, the shower and thunderstorm activity was spottier, with most locations receiving around 0.25” or less.

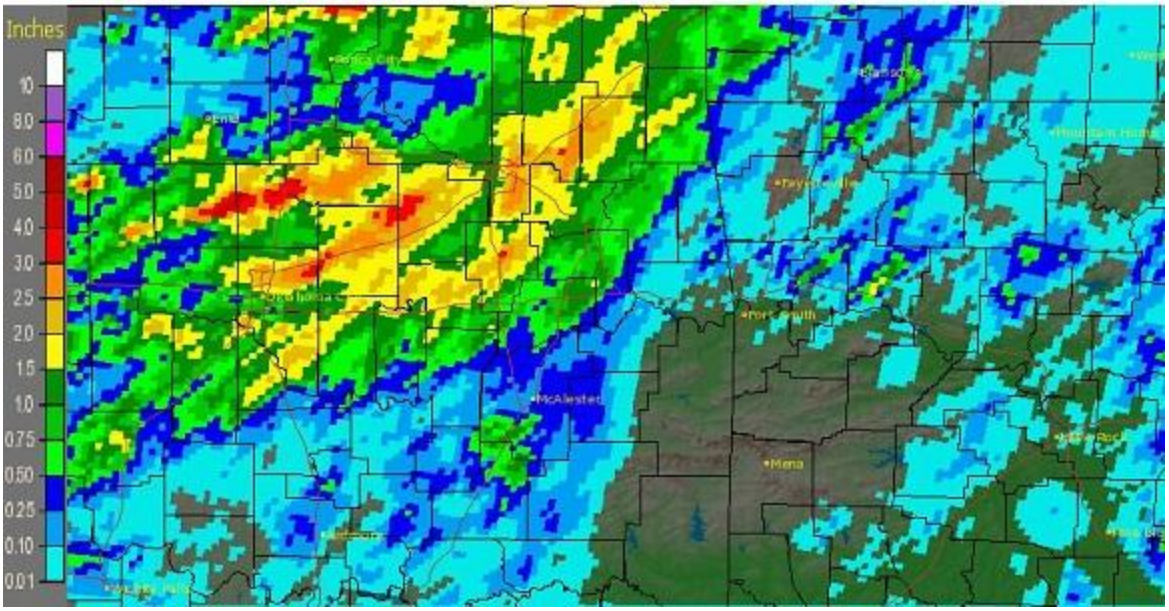

Fig. 10. 24-hr Observed Rainfall ending 7am 8/26/2012.

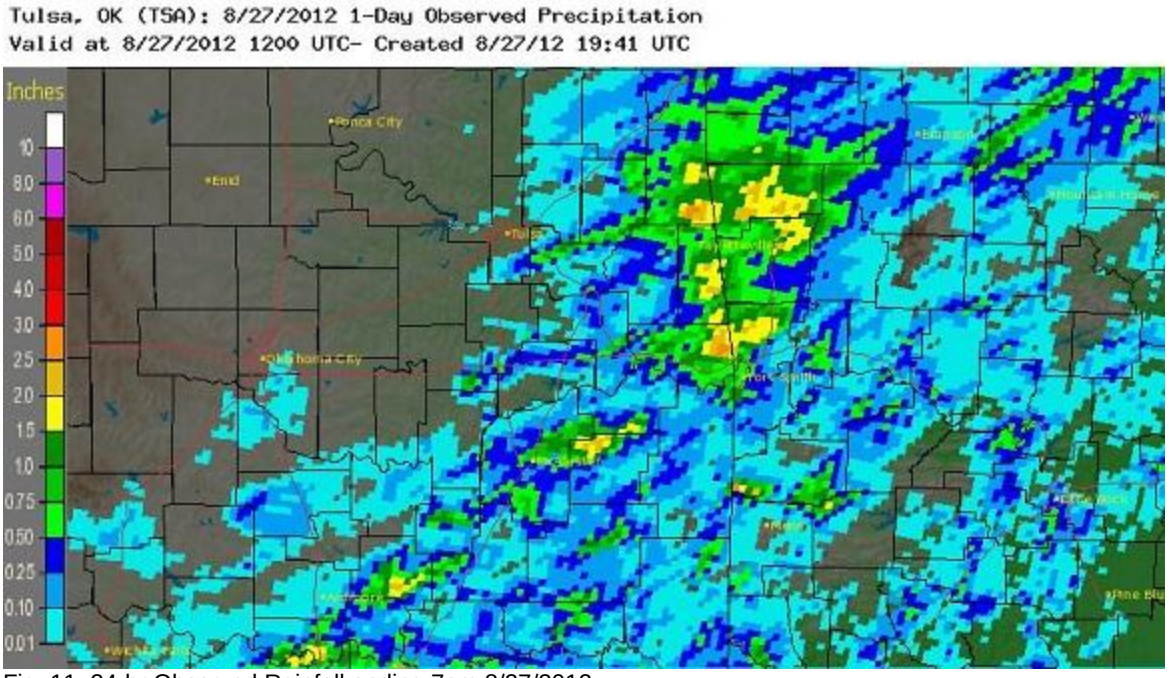

Fig. 11. 24-hr Observed Rainfall ending 7am 8/27/2012.

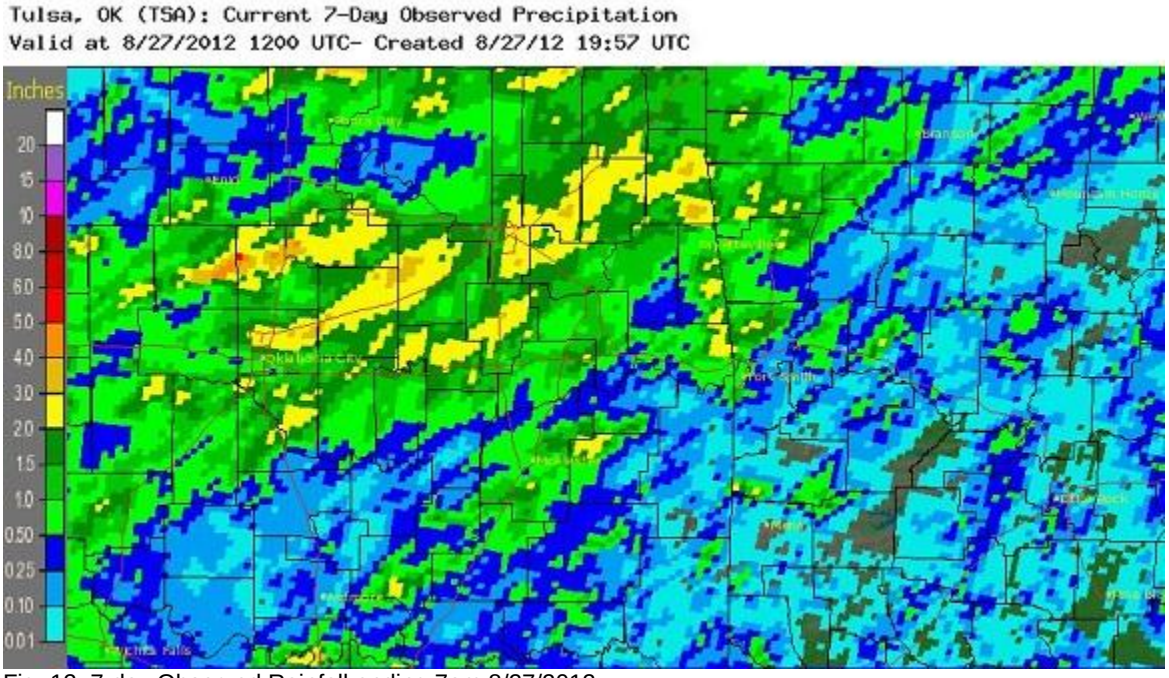

Fig. 12. 7-day Observed Rainfall ending 7am 8/27/2012.

The remnants of Hurricane Isaac (which made landfall near the mouth of the Mississippi River in Louisiana at 645pm CDT on Aug. 29, 2012 with sustained winds of 80 mph) affected far eastern OK and northwest AR beginning the evening of the 30th and continuing for much of the 31st before moving north into the Midwest. The center of the low pressure moved northward across western AR, with the highest rainfall totals occurring along and east of the track. Rainfall totals across western AR ranged from near 0.25" to around 2" from Isaac, while little rain affected eastern OK. The exception was far northeast OK, where around 1" of rain fell, and across a few localized areas of east central OK (see Figs. 13, 14).

Fig. 13. 24-hr Observed Rainfall ending 7am 8/31/2012.

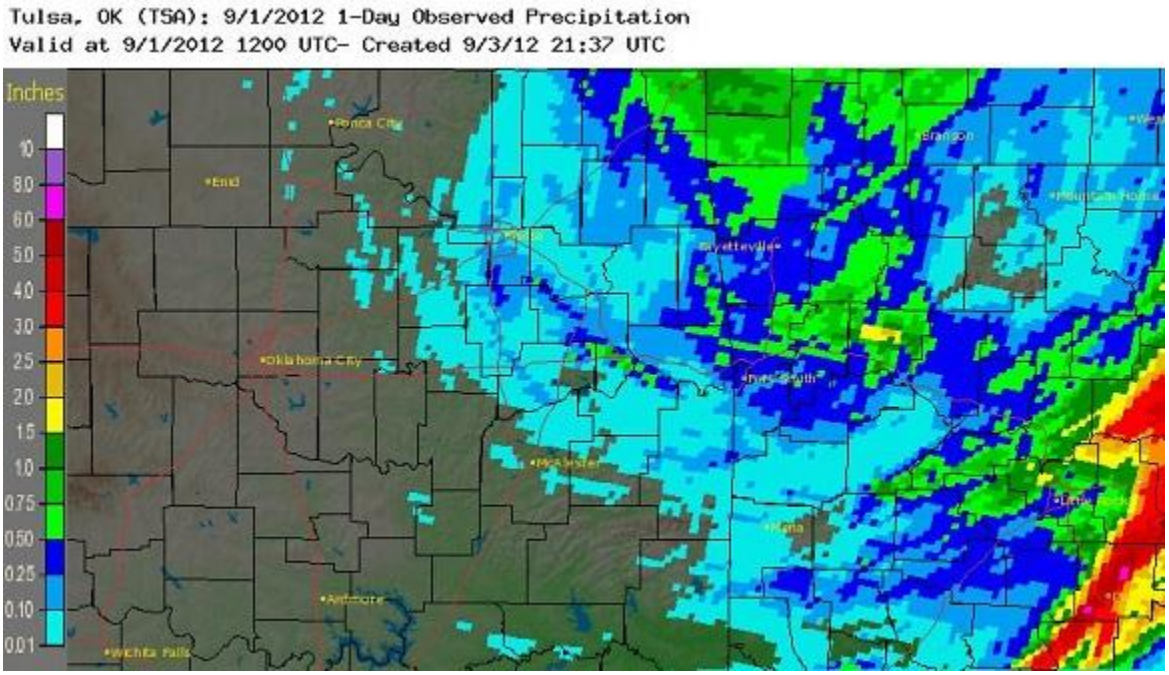

Fig. 14. 24-hr Observed Rainfall ending 7am 9/01/2012.

Written by:

Nicole McGavock
Service Hydrologist
WFO Tulsa

Products issued in August 2012:

3 Flash Flood Warnings (FFW)
3 Flash Flood Statements (FFS)
0 Flash/Areal Flood Watches (FFA) (1 Watch FFA CON/EXT/CAN)
3 Urban and Small Stream Advisories (FLS) (0 Advisory FLS CON/EXT/CAN)
0 Areal Flood Warnings (FLW)
0 Areal Flood Statements (FLS)
0 River Flood Warnings (FLW)

0 River Flood Statements (FLS)
0 River Flood Advisories (FLS) (0 Advisory FLS CON/EXT/CAN)
0 River Flood Watches (FFA) (0 Watch FFA CON/EXT/CAN)
0 River Statements (RVS)
0 Hydrologic Outlooks (ESF)
2 Drought Information Statements (DGT)

Preliminary Hydrographs:

No river flooding occurred this month.