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 **April** YEAR **2015**
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 **May 1, 2015**

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)

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

April 2015 brought plenty of April showers to east central and southeast Oklahoma, with below normal rainfall across much of northeast OK and northwest AR. Normal precipitation for the month of April ranges from 3.1 inches in Pawnee County to 4.7 inches in Latimer County. The Ozark region of northwest Arkansas averages 4.3 inches for the month. This report, past E-5 reports, and monthly hydrology and climatology summaries can be found at http://www.srh.noaa.gov/tsa/?n=hydro-monthly-summary.

Monthly Summary

Using the radar-derived estimated observed precipitation from the RFCs (Fig. 1a), rainfall totals for April 2015 ranged from 1.50" in northwest AR and northeast OK to near 8" in southeast and east central OK. The majority of the HSA received 2"-5" of rain this month. Locations northeast of a Pawnee to Tahlequah to Fort Smith line received below normal rainfall this April, ranging from 25% to 90% of normal (Fig. 1b). South of this line, most locations had above normal rainfall with 110% to 200% of the normal April rainfall.

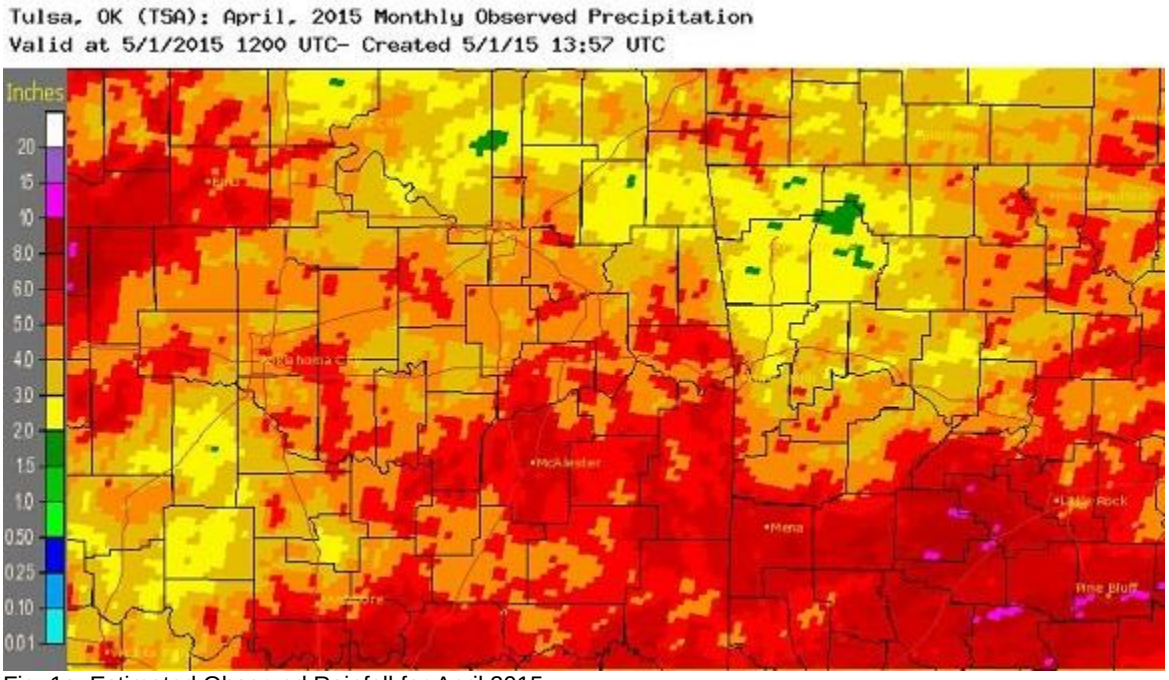


Fig. 1a. Estimated Observed Rainfall for April 2015

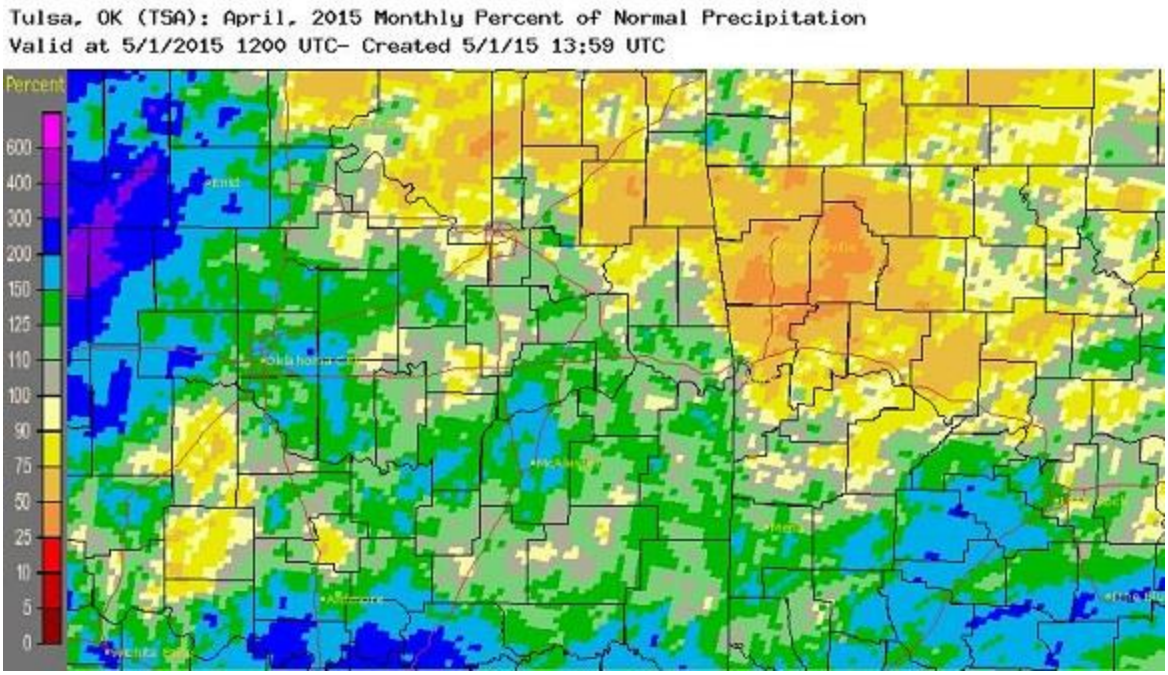


Fig. 1b. Estimated % of Normal Rainfall for April 2015

In Tulsa, OK, April 2015 ranked as the 29th warmest April (62.9°F; since records began in 1905) and the 58th wettest April (4.10"; since records began in 1888). Fort Smith, AR had the 32nd warmest April (63.5°F, tied 1991, 1986, 1970; since records began in 1883) and the 53rd wettest April (4.29"; since records began in 1883). Fayetteville, AR had the 25th warmest (59.0°F, tied 1999) and the 15th driest (2.76) April since records began in 1950.

Some of the larger precipitation reports (in inches) for April 2015 included:

Talihina, OK (meso)	7.91	Bengal, OK (coop)	6.71	McAlester, OK (meso)	6.59
McAlester, OK (ASOS)	6.24	Cloudy, OK (meso)	6.00	Fanshawe, OK (coop)	5.89
Wilburton, OK (meso)	5.86	Antlers, OK (coop)	5.76	Stigler, OK (meso)	5.73

Some of the lowest precipitation reports (in inches) for April 2015 included:

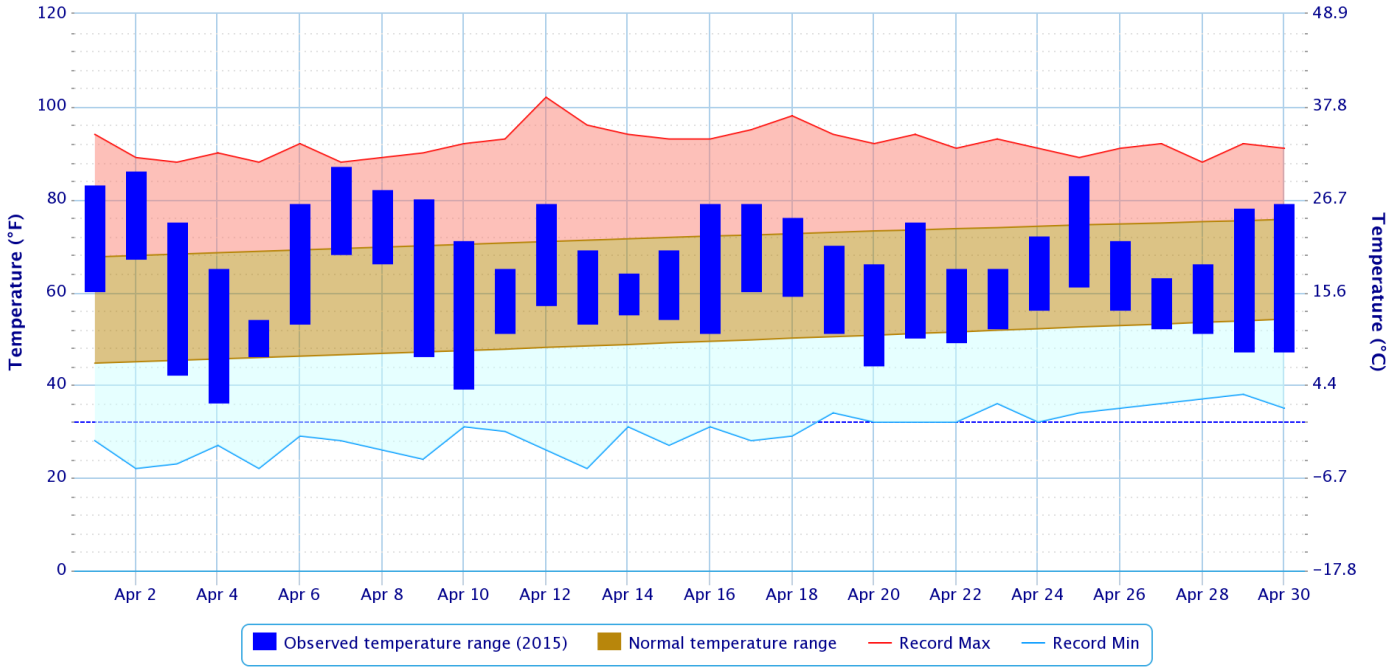
Hindsville 10NNE, AR (coop)	1.99	Talala, OK (meso)	2.05	Kingston 2S, AR (coop)	2.28
St. Paul, AR (coop)	2.30	NW AR Regional Arpt (ASOS)	2.43	Mountainburg 2NE, AR (coop)	2.49
Fayetteville, AR (ASOS)	2.76	Spavinaw, OK (coop)	2.81	Pryor, OK (meso)	2.81

According to statistics from the Oklahoma Climatological Survey (OCS) Mesonet:

Rank since 1921	April 2015	Warm Growing Season (Mar 1 – Apr 30)	Last 90 Days (Jan 31 – Apr 30)	Year-to-Date (Jan 1 – Apr 30)	Last 180 Days (Nov 2 – Apr 30)	Water Year-to-Date (Oct 1, 2014 – Apr 30, 2015)	Last 365 Days (May 1, 2014 – Apr 31, 2015)
Northeast OK	45th driest	46th driest	36th driest	22nd driest	24th driest	44th driest	40th driest
East Central OK	32nd wettest	20th wettest	31st wettest	40th wettest	46th driest	36th wettest	43rd driest
Southeast OK	29th wettest	17th wettest	25th wettest	29th wettest	45th driest	46th driest	32nd wettest
Statewide	16th wettest	21st wettest	26th wettest	33rd wettest	45th wettest	38th wettest	46th wettest

Daily Temperature Data – Tulsa Area, OK (ThreadEx)

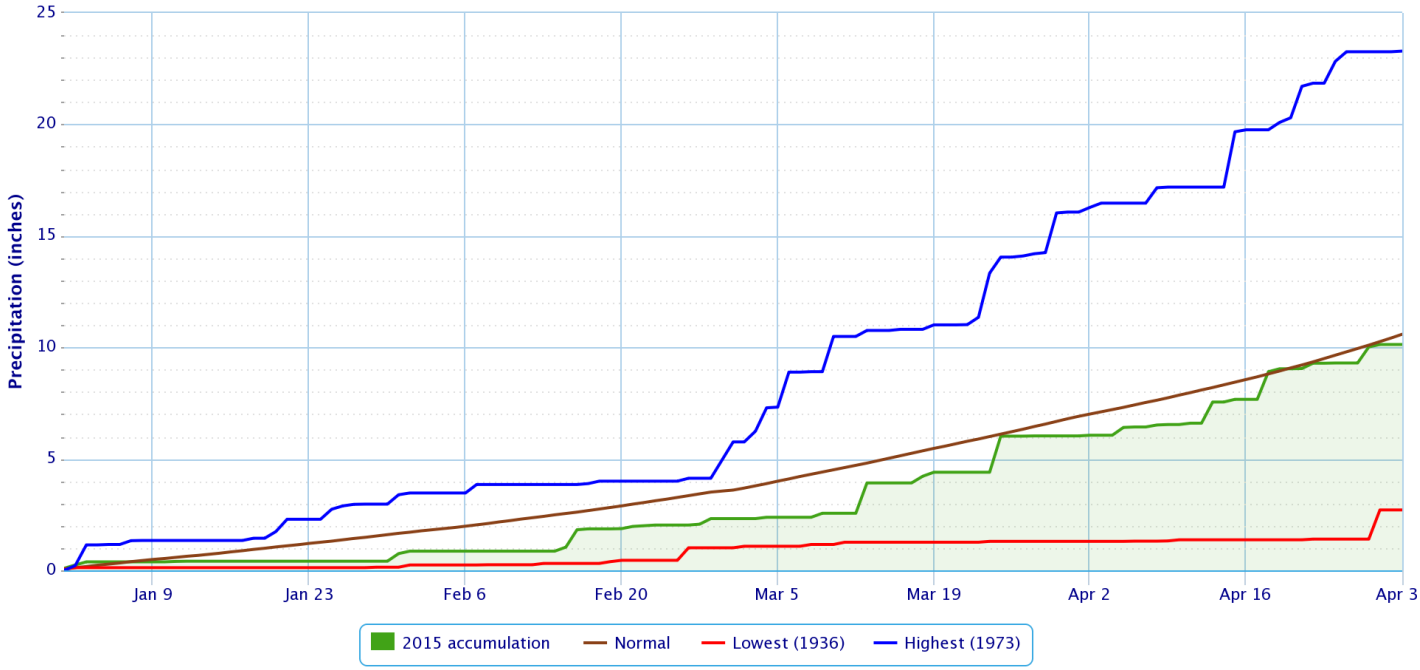
Period of Record – 1905-01-06 to 2015-04-30. Normals period: 1981-2010. Click and drag to zoom chart.



Powered by ACIS

Accumulated Precipitation – Tulsa Area, OK (ThreadEx)

Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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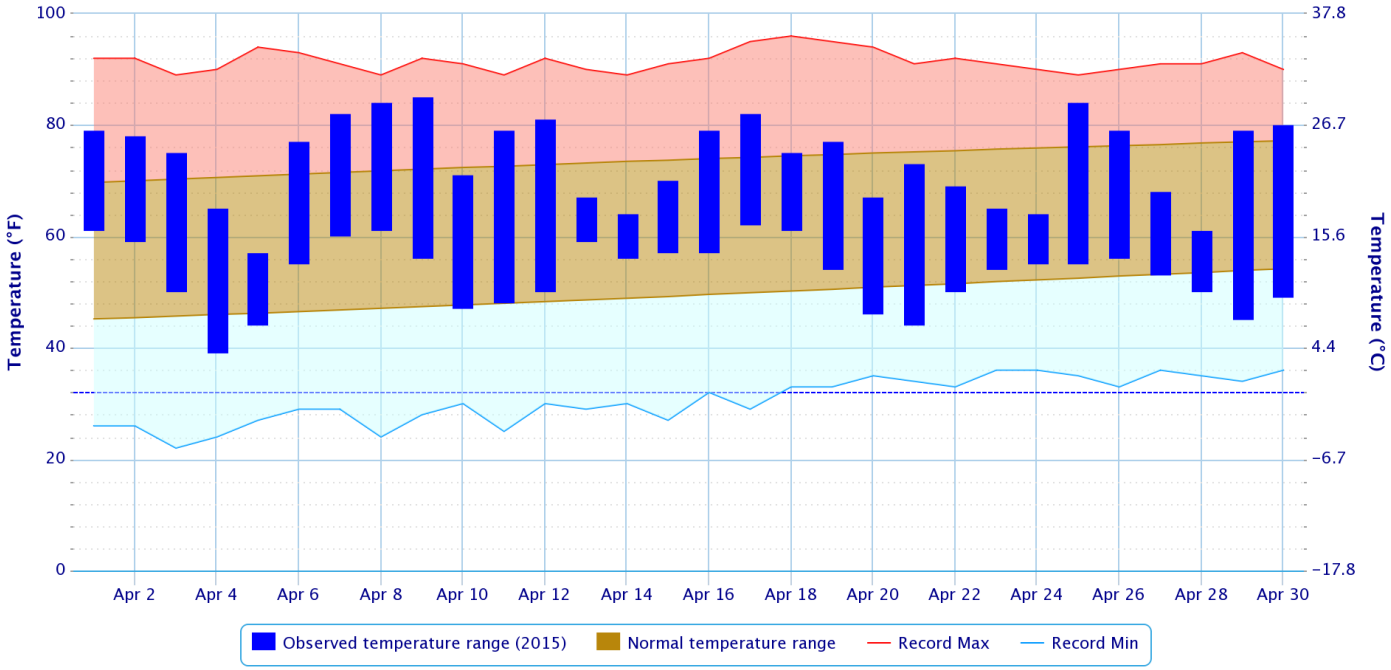
Daily Temperature Data – Fort Smith Area, AR (ThreadEx)

Period of Record – 1882-06-01 to 2015-04-30. Normals period: 1981-2010. Click and drag to zoom chart.



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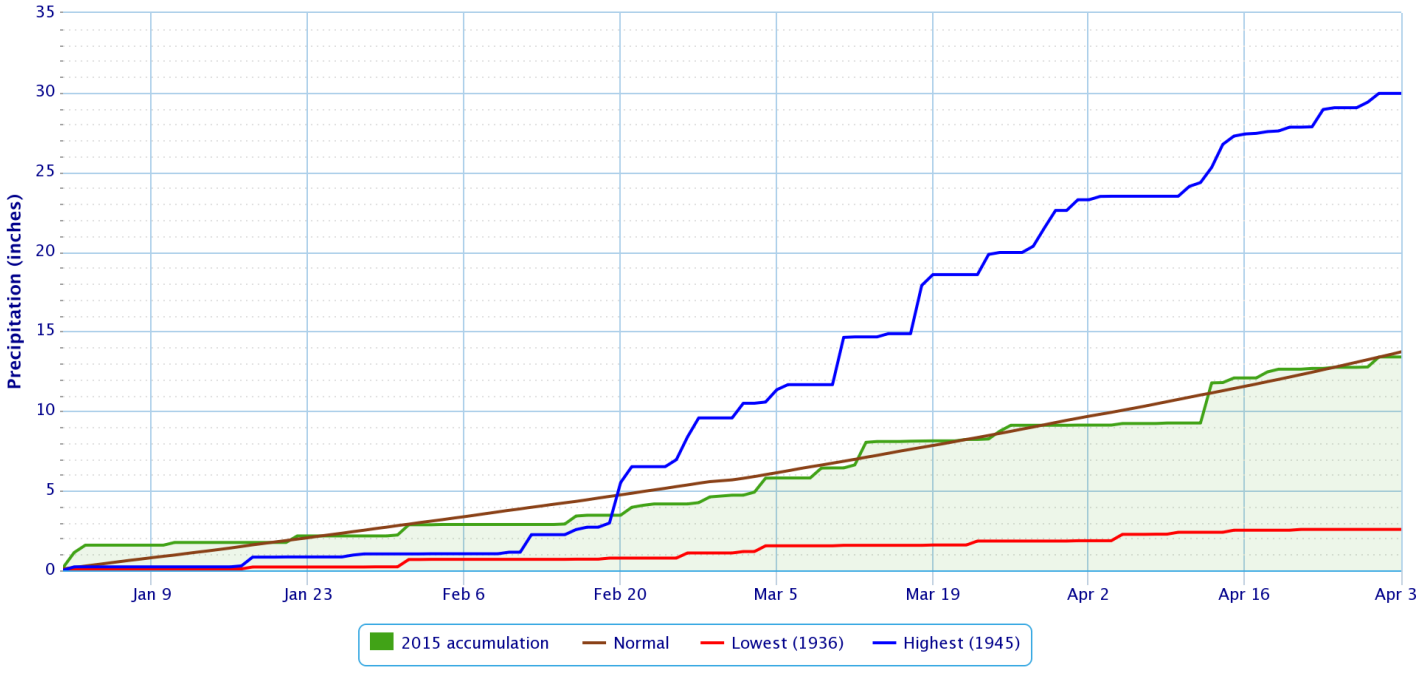
Accumulated Precipitation – Fort Smith Area, AR (ThreadEx)

Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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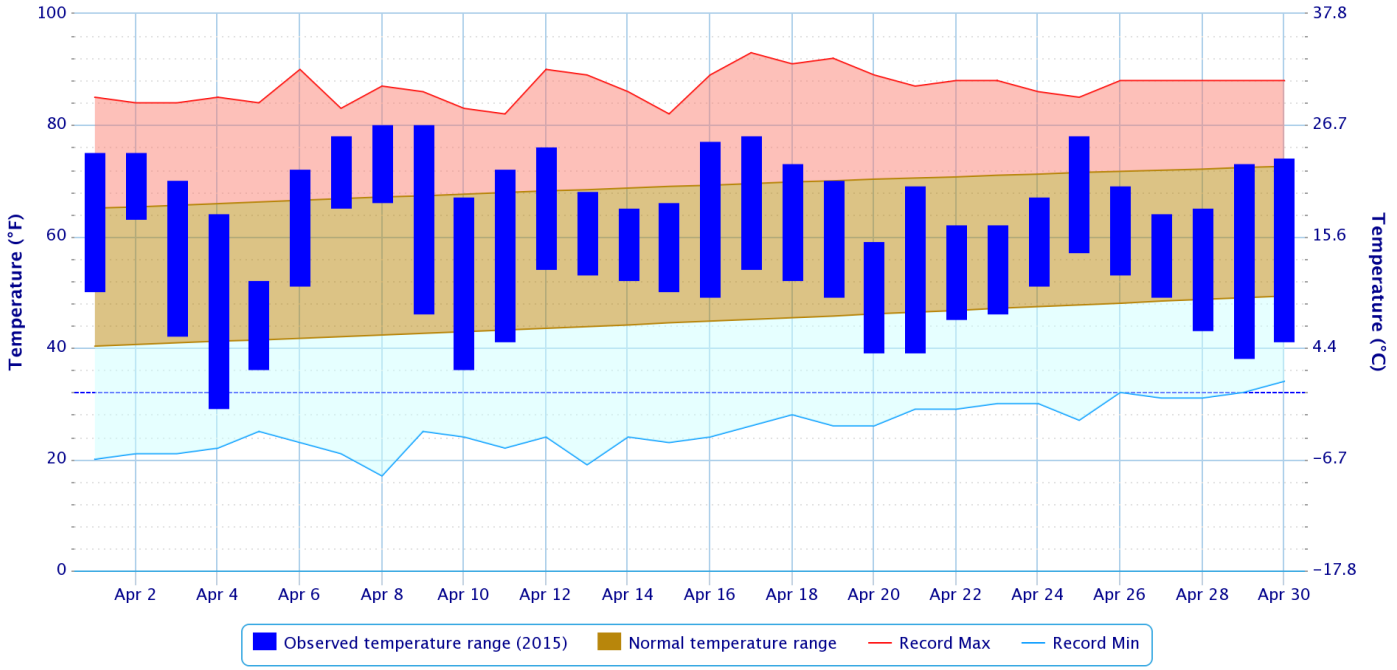
Daily Temperature Data – FAYETTEVILLE DRAKE FLD, AR

Period of Record – 1949-07-14 to 2015-04-30. Normals period: 1981-2010. Click and drag to zoom chart.



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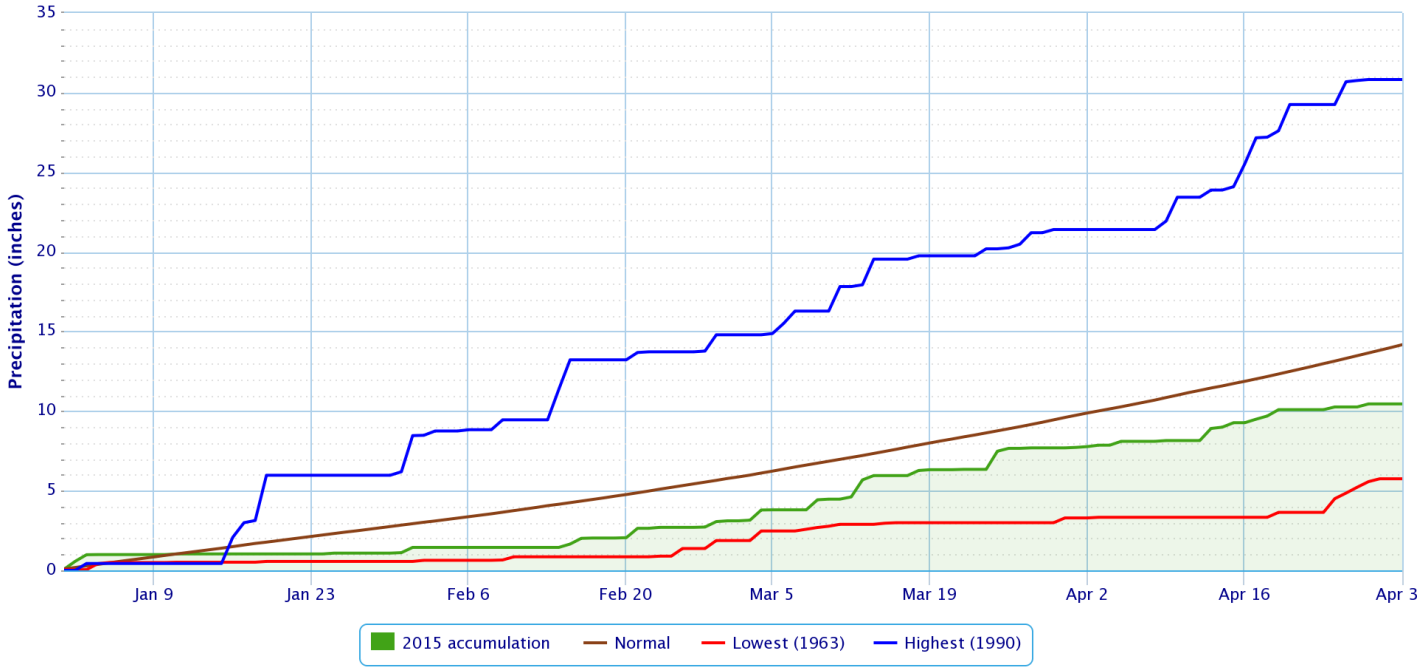
Accumulated Precipitation – FAYETTEVILLE DRAKE FLD, AR

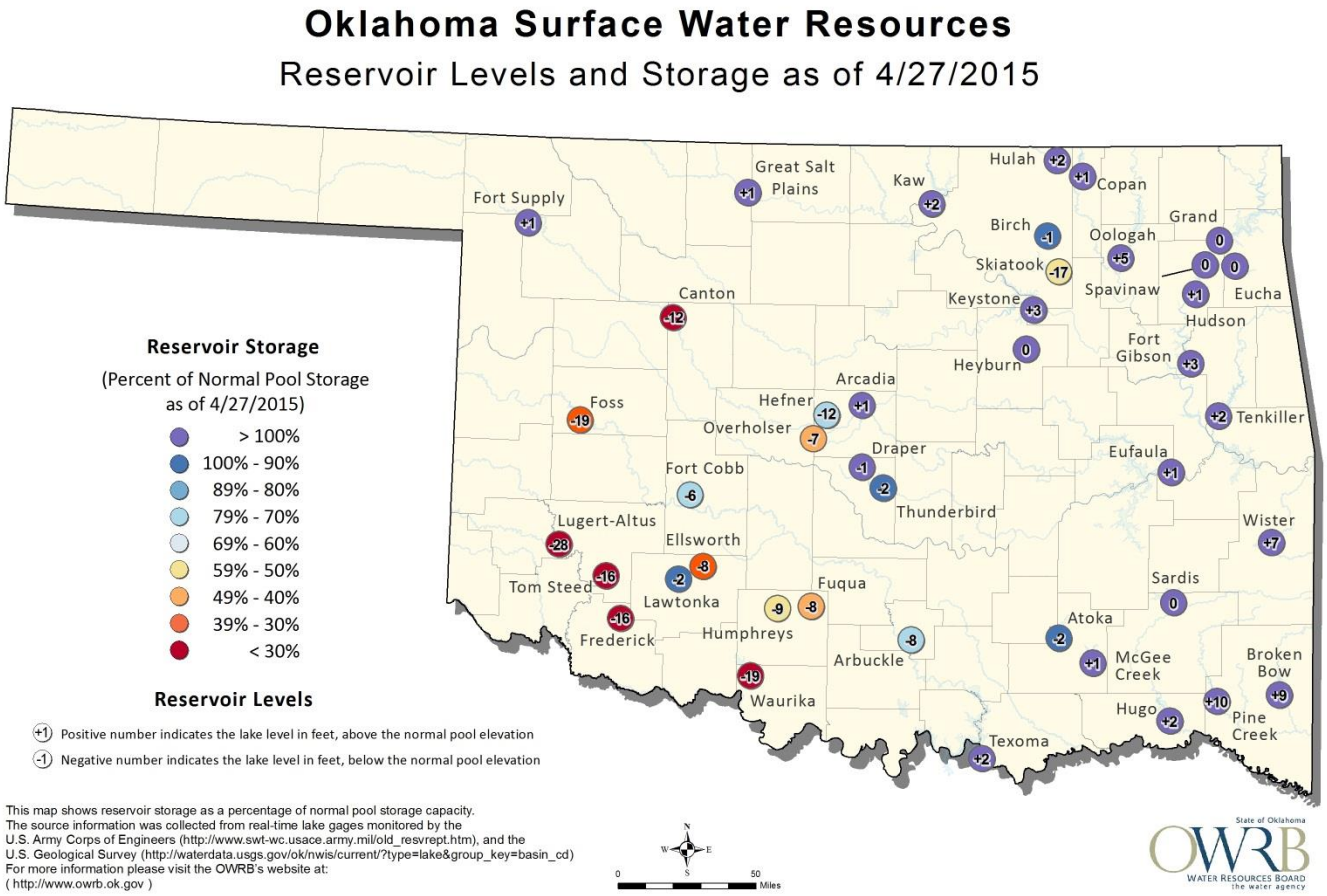
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



Powered by ACIS

Reservoirs

According to the USACE, most of the major reservoirs in the HSA were operating at or above the top of their conservation pools as of 4/30/2015. The following lakes were operating above 3%, within their flood control pools: Wister Lake 118%,Oologah Lake 115%, Eufaula Lake 111%, Tenkiller Lake 106%, Beaver Lake 106%, Keystone Lake 105%, and Ft. Gibson Lake 104%. A couple of lakes continued to report below normal pool levels: Skiatook Lake 53% (no change from the end of March) and Birch Lake 93% (up from 50% at the end of March).



Drought

According to the U.S. Drought Monitor (USDM) from April 28, 2015 (Figs 2, 3), Extreme Drought (D3) conditions remained over eastern Kay, western Osage and northern Pawnee Counties in eastern OK. Severe Drought (D2) conditions were occurring across portions of Osage, Pawnee, and western Washington Counties in eastern OK. Moderate Drought (D1) conditions were present across portions of Osage, Pawnee, Tulsa, Creek, Washington, Nowata, and Rogers Counties in eastern OK. Abnormally Dry (D0), but not experiencing drought, conditions existed across parts of Nowata, Craig, Ottawa, Delaware, Mayes, Rogers, Tulsa, Creek, Wagoner, Cherokee, and Adair Counties in northeast OK. Abnormally Dry (D0) conditions were also present in Benton, Washington, and Madison Counties in northwest AR.

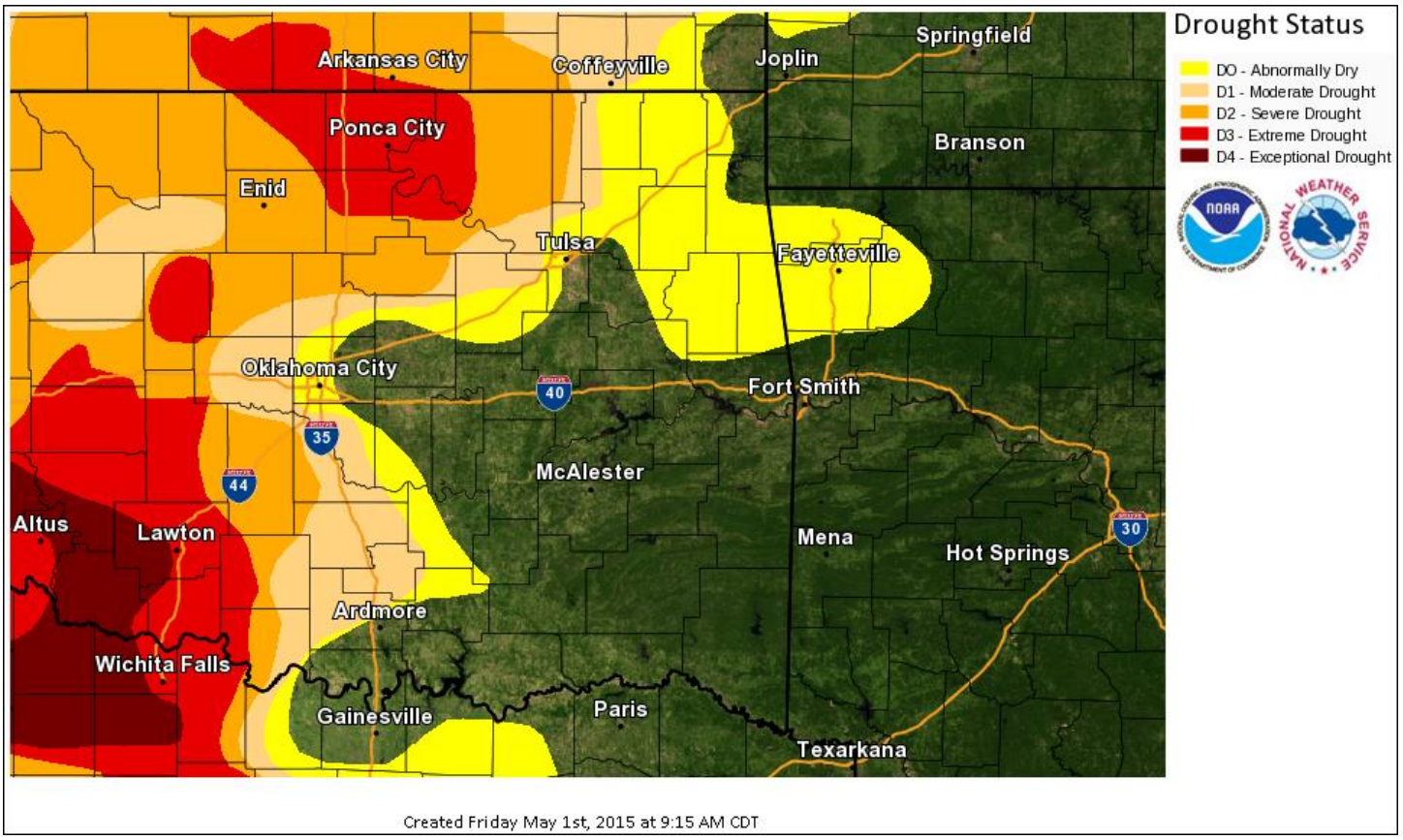


Fig. 2. Drought Monitor April 28, 2015

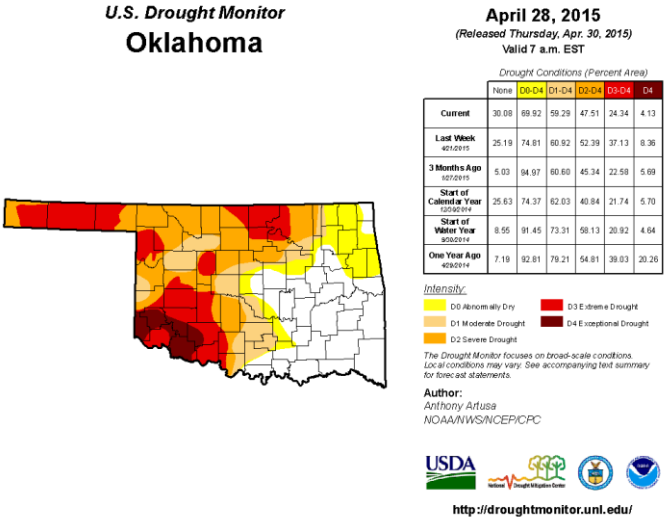


Fig. 3a. Drought Monitor for Oklahoma

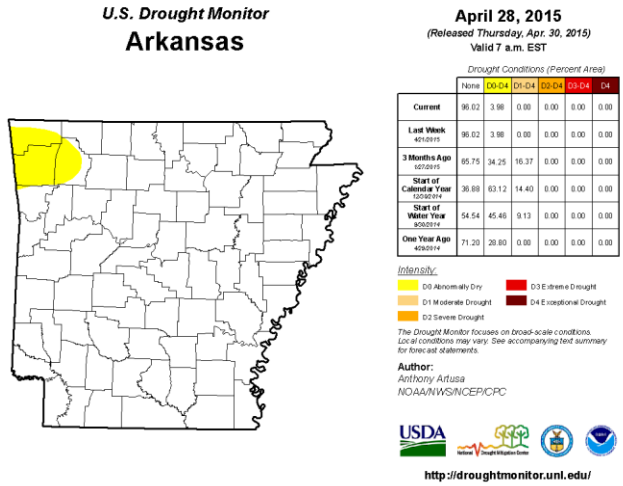


Fig. 3b. Drought Monitor for Arkansas

Outlooks

The Climate Prediction Center (CPC) outlook for May 2015 (issued April 30, 2015) indicates an equal chance for above, near, and below normal temperatures across all of eastern OK and northwest AR. This outlook also calls for a slightly enhanced chance for above median rainfall across eastern OK, with an equal chance for above, near, and below median precipitation across western AR. This outlook is based on short- and extended-range computer models that indicate a wet start to the month across the Plains, followed by an active southern jet stream and generally wet pattern for much of the U.S. This generally reflects the on-going El Niño conditions.

For the 3-month period May-June-July 2015, CPC is forecasting an equal chance for above, near, and below normal temperatures and precipitation across all of eastern OK and northwest AR (outlook issued April 16, 2015). According to CPC, current atmospheric and oceanic observations show El Niño conditions, and these conditions are favored to continue through at least the autumn months. The atmospheric response to the equatorial sea surface temperatures became more robust in March and April, and this, combined with on-going oceanic conditions, indicate El Niño conditions are likely strengthening. However, El Niño impacts are generally most significant during the cold seasons. Therefore, this outlook is based on both statistical and dynamical forecast tools and considering El Niño conditions.

Summary of Precipitation Events Daily quality controlled rainfall maps can be found at: http://water.weather.gov/precip/index.php?location_type=wfo&location_name=tsa

April 1-15

Two areas of showers and thunderstorms affected the HSA on the 1st. Storms moved out of northeast TX and brought some light precipitation, around 0.25" or less, to far southeast OK. The second area of storms affected northeast OK, generally north of Hwy 412, as well as a northwest AR. Overall, rainfall totals were around 0.25" or less; however, 0.50" to around 1.5" fell across Craig, northwest Delaware, and Ottawa Counties.

Thunderstorms developed during the evening of the 2nd along a stationary front that extended from north central Oklahoma into southeast Kansas. This activity affected locations in far northeast Oklahoma and far northwest Arkansas during the evening and late night hours. Supercells quickly developed due to plenty of instability and shear present in the atmosphere. One tornado formed during this event, damaging locations near Afton, OK. These storms also brought hail to the size of golf balls. A second round of severe thunderstorms moved out of southeast Kansas and across far northeast Oklahoma a few hours later. Rainfall totals were 0.25" to around 1.5". More information about the Afton tornado can be found at http://www.srh.noaa.gov/tsa/?n=weather-event_2015apr2

As high pressure slide east, moisture increased across the region on the 4th. Showers and isolated thunderstorms developed after midnight on the 5th and increased during the morning hours as an upper-level low approached from the southwest. Most of the HSA received around 0.10" to around 0.50", though locations northwest of a Pawnee to Nowata line only received a trace of rain, if any.

A few thunderstorms developed across northeast OK during the afternoon of the 8th. One area of storms affected locations from Tulsa to Grove, bringing around 0.10" to around 0.50" of rain. The second area was far northwest Pawnee, northern Osage, and eastern Kay Counties. This area is experiencing extreme drought (D3) conditions, so the 0.25" to around 1" of rain was needed.

A cold front swept through the HSA on the 9th, with thunderstorms developing along it along and east of a Grove to McAlester line during the afternoon and evening hours. Some of these storms produced hail and damaging winds. Rainfall totals were generally light, with less than 0.25". Areas affected by the cores of the thunderstorms received 0.25" to around 1" of rain.

Significant rain fell across southeast OK and west central AR on the 13th. Showers and thunderstorms developed along a front as it moved into northeast OK around midnight on the 13th. The front moved southeast, and slowed just south of I-40 during the late morning and early afternoon hours. In addition to the storms along the front, scattered showers developed ahead of the front as well. Widespread, slow steady rain affected much of eastern OK and northwest AR through the day. While most of the rain rates were around 0.25"/hour, near the front, rain rates of 0.50"-1"/hour occurred. The heaviest rain fell along and south of I-40, where the front moved slowest. This area received a longer period of heavier rain, combined with several hours of slow, steady rain. Rainfall totals of 2.5"-4" was common, especially over Pittsburg, McIntosh, Le Flore, and Sebastian Counties (Fig. 7). This resulted in flash flooding, with many streets impassible due to high water (Figs. 4-6). The widespread heavy rain also caused flooding along the Poteau River. The Poteau River near Poteau crested right at flood stage early on the 14th. The Poteau River near Panama reached moderate flood levels during the late evening of the 14th (see preliminary hydrographs below). Most of the remainder of eastern OK and northwest AR received at least 0.75" of rain from this event, with a tenth to near 0.75" across far northeast OK and along the AR/MO state line (Figs. 8, 9).

24-hr Rainfall measurements (in.) ending at 7am CDT 4/14/2015:

Charleston 1.7E, AR	4.18	Page 5N, OK	3.67	Krebs 0.3WNW, OK	3.40
Talihina 4SE, OK	3.39	Big Cedar 2E, OK	3.20	Panama 2E, OK	3.12
Poteau 1ENE, OK	3.07	Greenwood 1.4W, AR	2.98	Wister 3ENE, OK	2.89

Rain around a cutoff low brought light rain to eastern OK and northwest AR through the day on the 14th. The rain ended from south to north as the low moved northeast into KS and away from the HSA. Additional light scattered showers affected western AR and far eastern OK during the late night and into the morning hours of the 15th in an area of weak warm air advection. Rainfall totals were light for most of the area, with less than 0.25". However, western Pawnee, western Osage, portions of east central and southeast OK, and northwest AR, received 0.25"-0.50". The highest totals of 0.50" to around 1" occurred across much of Latimer, western Pawnee, and eastern Benton Counties.

Fig. 4. 4/13/2015 Near Poteau (via twitter @LiftPrayWrite)

Fig. 5. 4/13/2015 Shuman Rd. 1 mile south of Frink Rd. (Pittsburg Co.) (via twitter @dljames0001)

Fig 6. 4/13/2015 High Hill Rd. between Alderson Rd & Bache Rd near McAlester (via twitter @dljames0001)

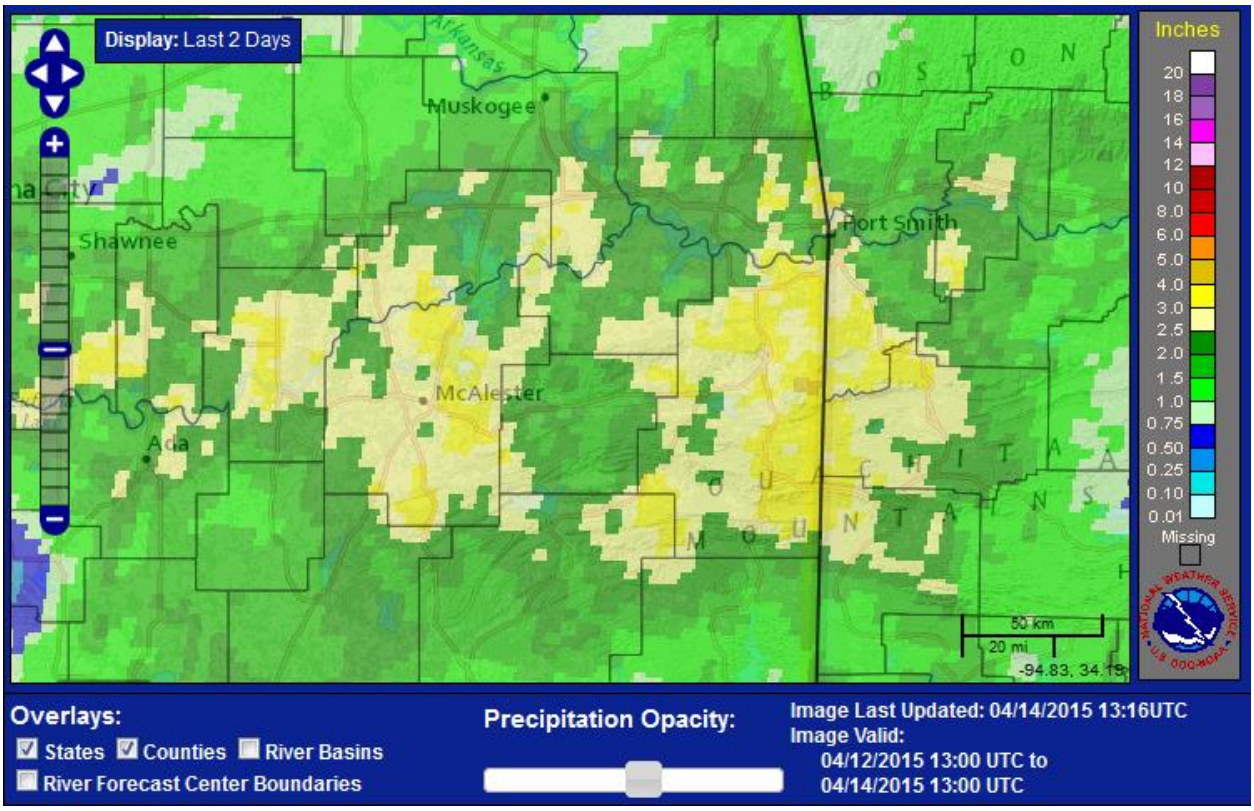


Fig. 7. 2-day Estimated Observed Rainfall ending at 8am CDT 04/14/2015

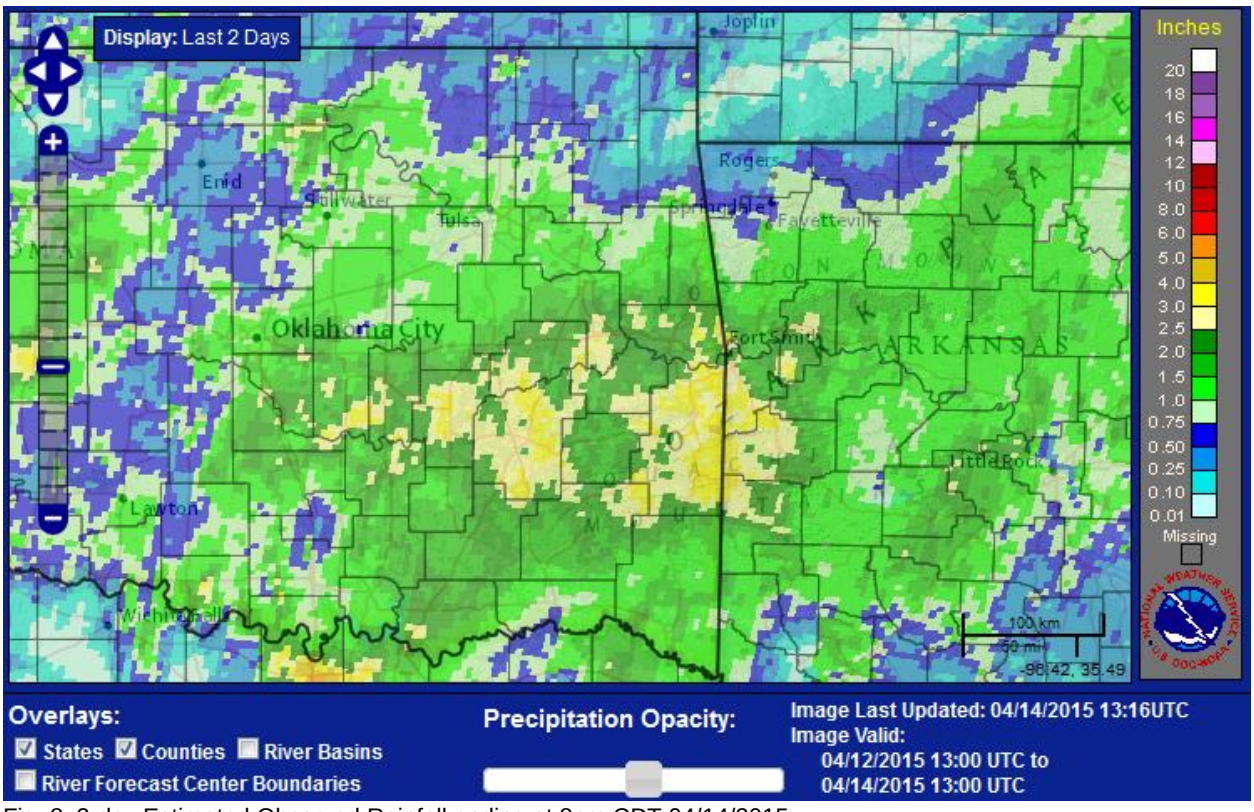


Fig. 8. 2-day Estimated Observed Rainfall ending at 8am CDT 04/14/2015

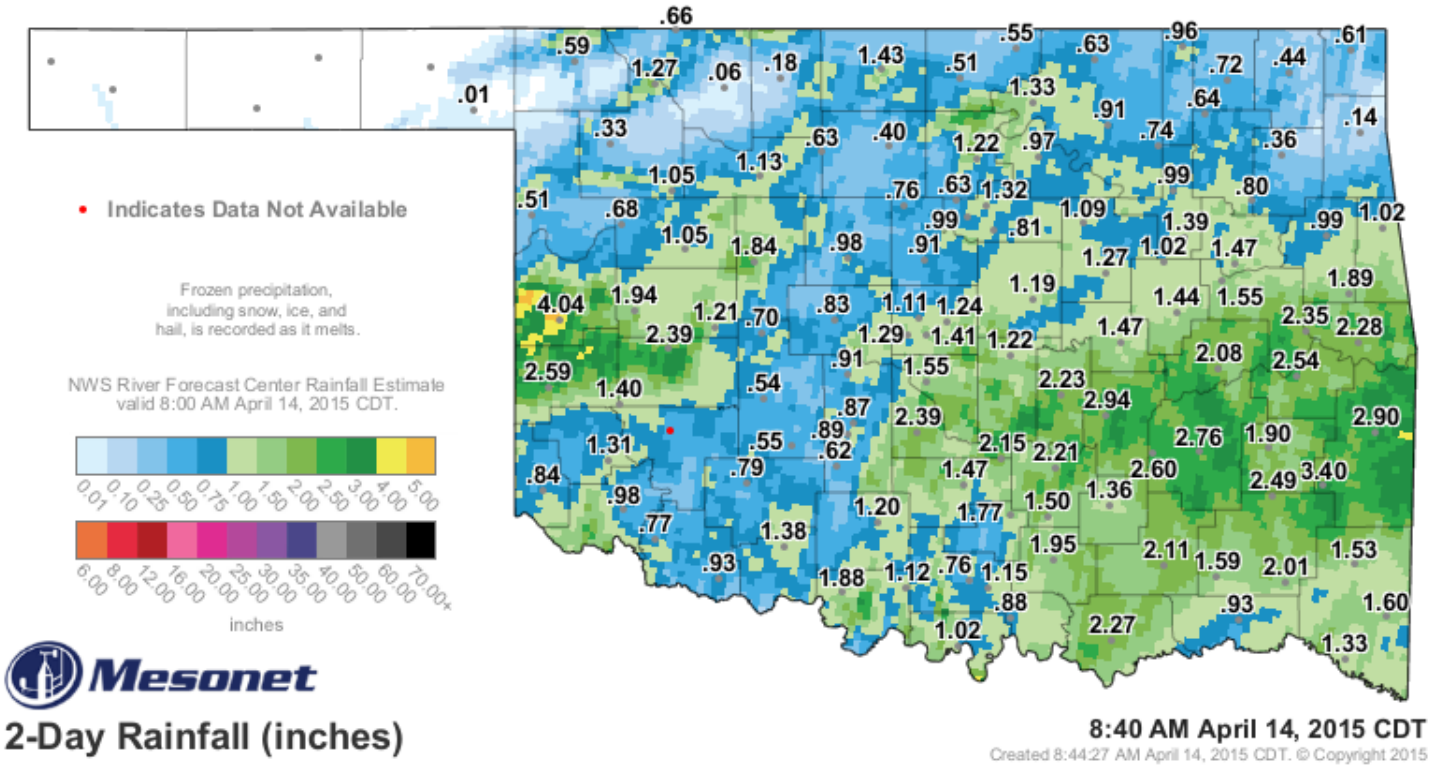


Fig. 9. 2-day Mesonet Rainfall Measurements and Estimated Observed Rainfall (image, from RFC) ending at 8:40am CDT 04/14/2015

April 16-31

An active weather pattern set up during the second half of the month. An upper-level low spinning over northern New Mexico and southern Colorado led to periods of showers and thunderstorms on the 17th-19th. During the morning hours of the 17th, strong thunderstorms developed across north central OK and moved east, affecting northeast OK and northwest AR before lifting north out of the area. There was a break in the rain before a second round of storms developed during the evening and overnight hours. This activity continued through the morning and early afternoon of the 18th, moving west to east across the HSA. Thunderstorms then developed along a dryline in western OK and moved east into the area during the evening and overnight hours. The upper low finally began to move east, driving a cold front through the region on the 19th. Scattered storms developed ahead of the front. All of eastern OK and northwest AR received rainfall during this 3-day period. Most of the area received a combined total of less than 1.5" of rain, with a isolated locations in Nowata, Ottawa, Delaware, Adair, Sequoyah, Le Flore, and Benton Counties getting 1.5"-2.5" of rain.

Showers and thunderstorms moved southeast out of KS into far northeast OK and far northwest AR after midnight on the 22nd. Additionally, a cluster of thunderstorms developed in northwest OK and moved southeast across eastern OK and northwest and west central AR during the morning and early afternoon hours. Rainfall totals from both rounds of storms were light, with most of eastern OK and western AR receiving between 0.10" and 0.50" of rain. An area from Foraker to Pryor to Fayetteville missed out on both rounds of rain and remained dry.

During the evening hours of the 22nd, thunderstorms developed over the TX panhandle and moved east along a cold front that was located near the Red River. These storms arrived in southeast OK during the late night hours and were dissipating soon after sunrise. Since the storms were weakening by the time they arrived in southeast OK, rainfall amounts remained light, with around a third of an inch or less of rain. Some light rain also fell across a portion of west central AR as these storms dissipated.

A little before sunrise on the 24th, thunderstorms developed in northeast OK and moved northeast over northwest AR, affecting locations north of a Wagoner to Tahlequah to Fayetteville to Huntsville line for a few hours. Rainfall amounts were generally around 0.25" or less, with localized areas of around 0.50" to around 1".

Around the same time, another area of showers and thunderstorms developed over northeast TX and moved north into southeast OK. This activity developed within the warm conveyor of an approaching shortwave trough that was situated over the desert southwest. By mid-day, this activity had spread north, with widespread rain across east central and southeast OK, as well as west central AR, along and south of I-40. Much of Pushmataha and southern Le Flore Counties received 1"-2.5", with 2.5" to near 4" occurring over Choctaw County (Fig. 10). The remainder of the affected locations received less than 0.50". The Red River rose nearly 14' as measured by the gaging station at Arthur City due to this heavy rain (Fig. 11).

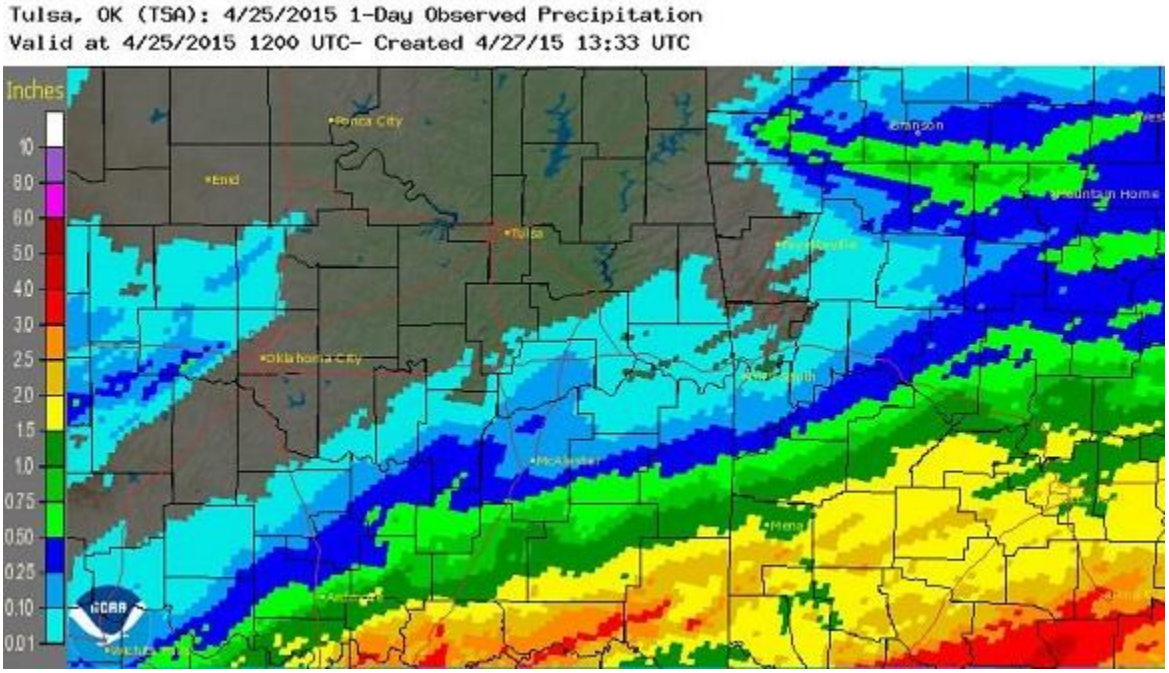


Fig. 10. 24-hr Estimated Observed Rainfall ending at 7am CDT 04/25/2015

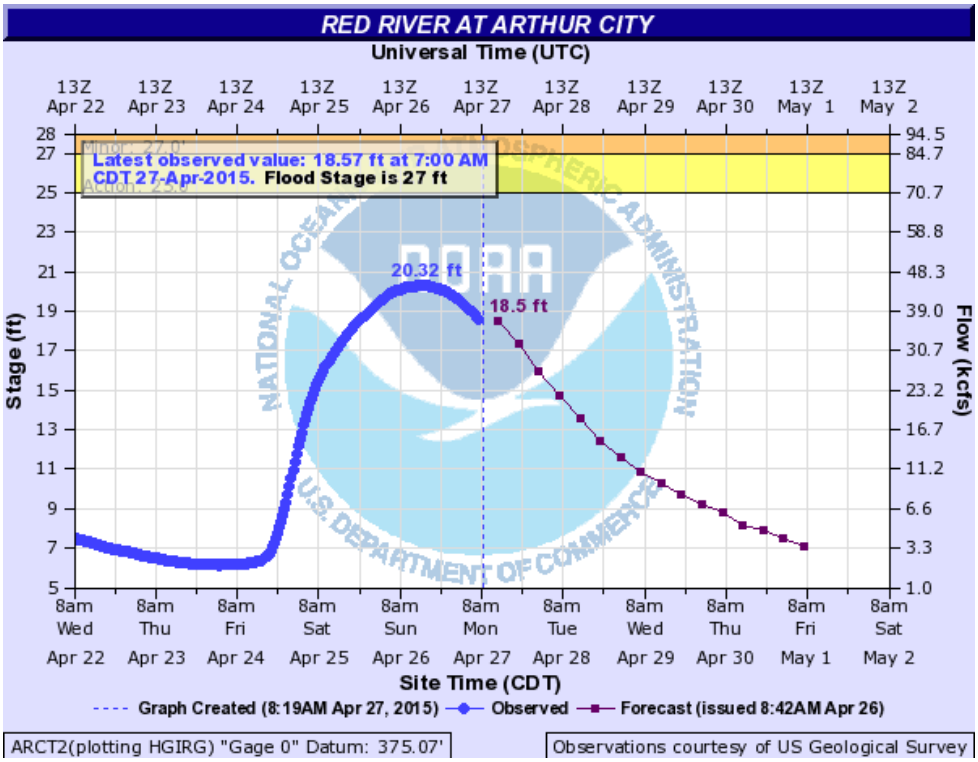


Fig. 11. Red River at Arthur City observations and forecast

Convection expanded into eastern OK and northwest AR late on the 26th and into the early morning hours of the 27th in an area of diffluent flow aloft ahead of an upper low over southern New Mexico. The heaviest rain with this activity fell across Pittsburg County, where the McAlester mesonet station measured 1.81" of rain.

The remainder of the county, as well as portions of the surrounding counties, received 1” to near 2.5” of rain (Fig. 12). Drought-stricken eastern Kay and western Osage Counties also received some good rain, with amounts of 0.50” to near 1.5”. Other locations in eastern OK and isolated spots in northwest AR received 1” or less of rain.

Some light showers persisted through the morning of the 27th, before another round of storms affected the region during the late afternoon and evening hours as the upper-level low moved closer. Scattered light rain then continued to wrap around the low as it moved across Texas on the 28th. Locations north of a Ponca City to Bentonville to Ozark line remained rain free or only had a few hundredths of an inch of rain. Elsewhere, rainfall totals ranged from around 0.10” to near 2.5” (Fig. 13). Much of Creek and portions of Okmulgee, Tulsa, Wagoner, and Rogers Counties received 1.5”-2.5” of rain from this event.

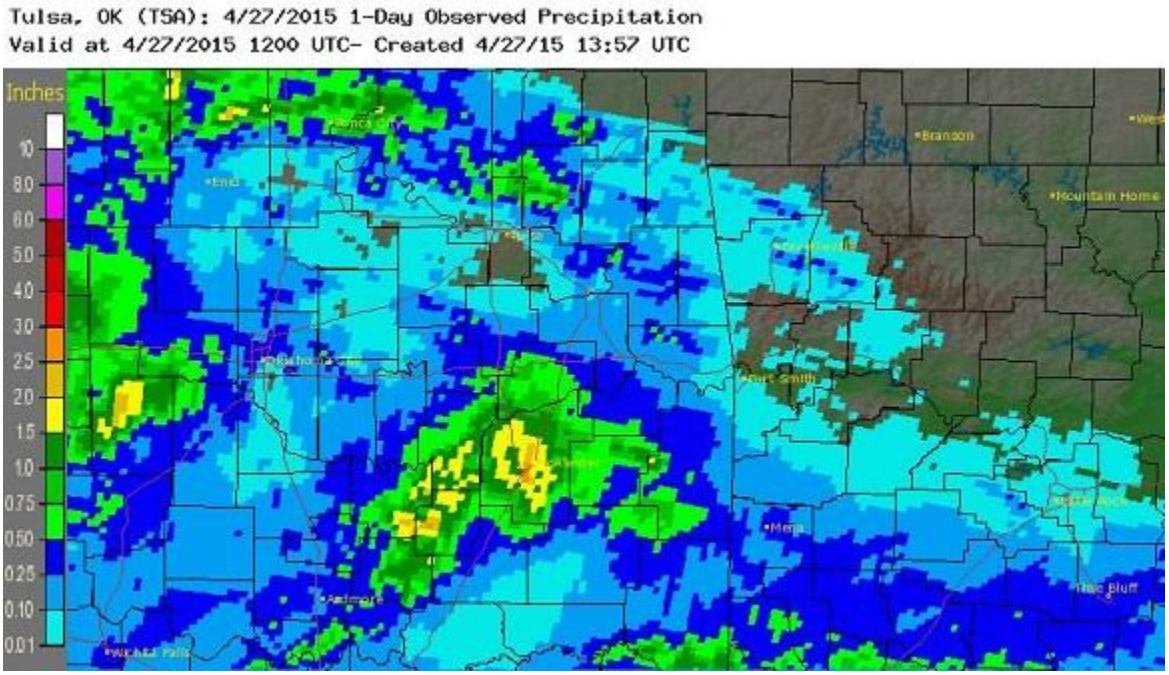


Fig. 12. 24-hr Estimated Observed Rainfall ending at 7am CDT 04/27/2015

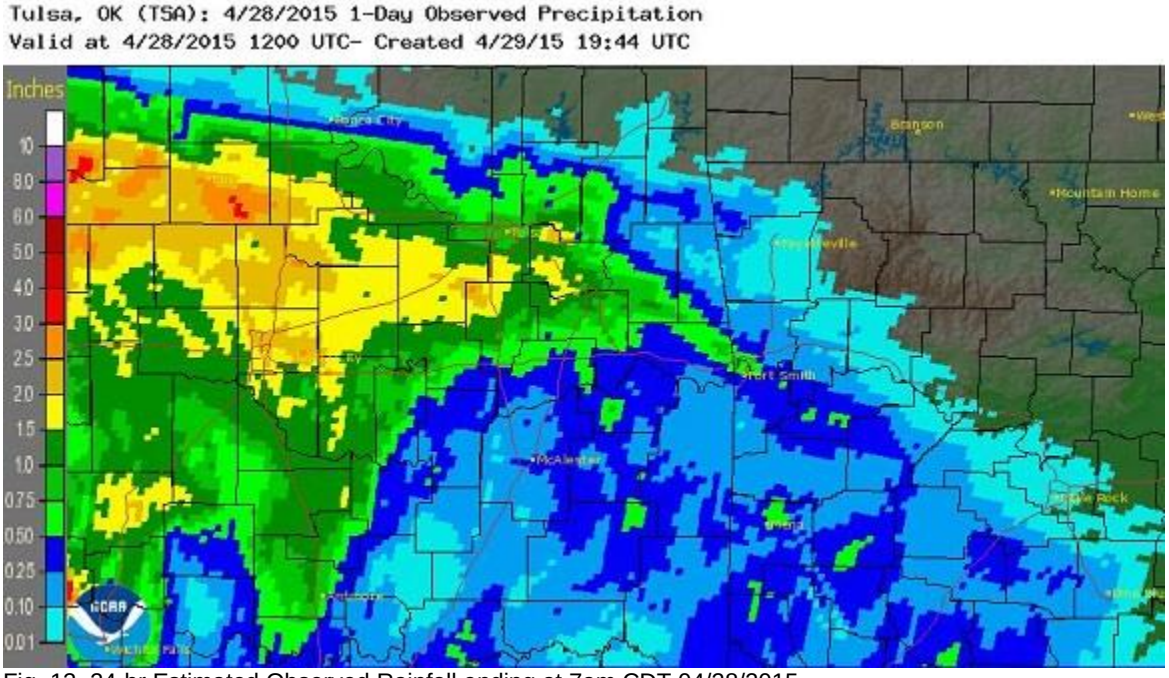


Fig. 13. 24-hr Estimated Observed Rainfall ending at 7am CDT 04/28/2015

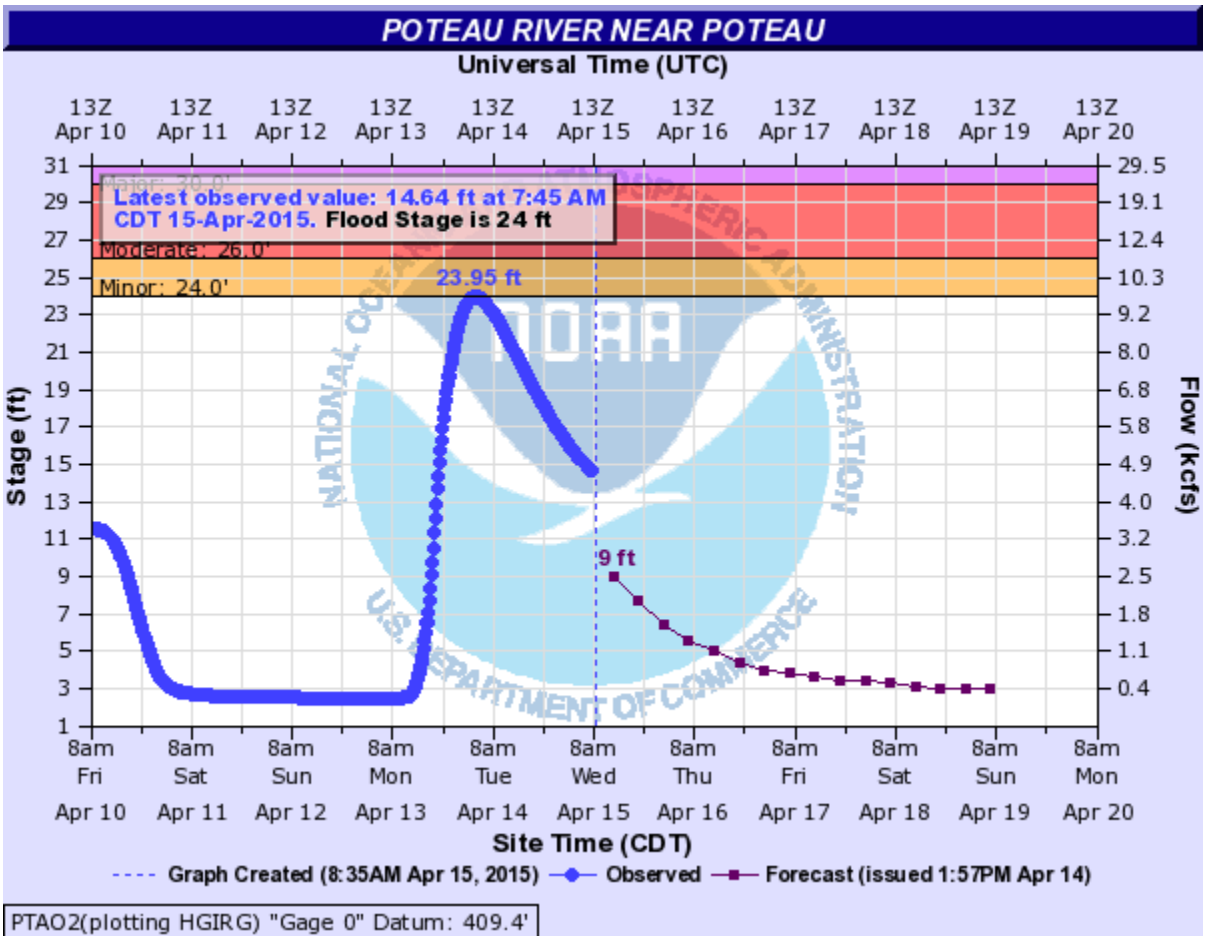
Written by:
Nicole McGavock
Service Hydrologist
WFO Tulsa

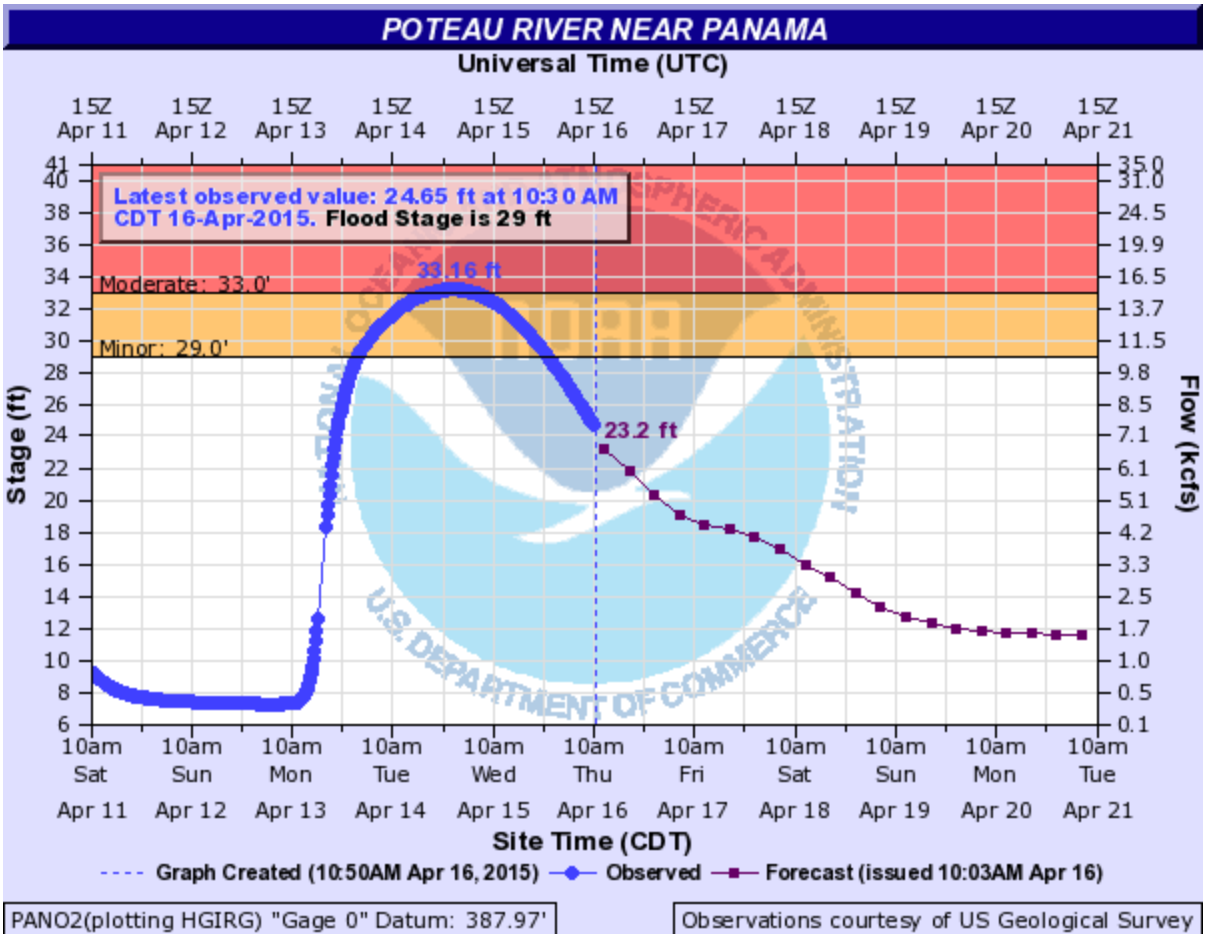
Products issued in April 2015:

*MLBA4 and OZGA4 transferred to NWS Tulsa HSA February 5, 2014
*Mixed case River Flood products began July 31, 2013

3 Flash Flood Warnings (FFW)
5 Flash Flood Statements (FFS)
0 Flash/Areal Flood Watches (FFA) (0 Watch FFA CON/EXT/EXA/CAN)
10 Urban and Small Stream Advisories (FLS)
2 Areal Flood Warnings (FLW)
0 Areal Flood Statements (FLS)
3 River Flood Warnings (FLW)
11 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)
1 Drought Information Statements (DGT)

Preliminary Hydrographs:




POTEAU RIVER NEAR PANAMA
Universal Time (UTC)
15Z Apr 11
15Z Apr 12
15Z Apr 13
15Z Apr 14
15Z Apr 15
15Z Apr 16
15Z Apr 17
15Z Apr 18
15Z Apr 19
15Z Apr 20
15Z Apr 21
Latest observed value: 24.65 ft at 10:30 AM CDT 16-Apr-2015. Flood Stage is 29 ft
33.16 ft
23.2 ft
Moderate: 33.0'
Minor: 29.0'
Stage (ft)
Flow (kcfs)
10am Sat Apr 11
10am Sun Apr 12
10am Mon Apr 13
10am Tue Apr 14
10am Wed Apr 15
10am Thu Apr 16
10am Fri Apr 17
10am Sat Apr 18
10am Sun Apr 19
10am Mon Apr 20
10am Tue Apr 21
Site Time (CDT)
Graph Created (10:50AM Apr 16, 2015)
Observed
Forecast (issued 10:03AM Apr 16)
PANO2(plotting HGIRG) "Gage 0" Datum: 387.97'
Observations courtesy of US Geological Survey