

<b>NWS FORM E-5</b> (11-88) (PRES. by NWS Instruction 10-924)	<b>U.S. DEPARTMENT OF COMMERCE</b> NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL WEATHER SERVICE	HYDROLOGIC SERVICE AREA (HSA)	
		<b>Tulsa, Oklahoma (TSA)</b>	
<b>MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS</b>		REPORT FOR:	
		MONTH <b>June</b>	YEAR <b>2021</b>
TO: Hydrometeorological Information Center, W/OH2 NOAA / National Weather Service 1325 East West Highway, Room 7230 Silver Spring, MD 20910-3283		SIGNATURE <b>Steven F. Piltz</b> (Meteorologist-in-Charge)	
		DATE <b>July 6, 2021</b>	

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.

The I-44 corridor and far southeast OK received well above normal rainfall in June 2021, with both flash flooding and river flooding occurring. A greater than 1000-year rainfall event occurred in Okmulgee and Muskogee Counties. Normal rainfall in the month of June ranges from 3.9 inches in McIntosh County to 5.9 inches in Wagoner County. The Ozark region of northwest Arkansas averages 5.1 inches for the month. This report, past E-5 reports, and monthly hydrology and climatology summaries can be found at <http://www.weather.gov/tsa/hydro-monthly-summary>.

### Monthly Summary

Using the radar-derived estimated observed precipitation from the RFCs (Fig. 1a), rainfall totals for June 2021 ranged from 1" to around 15" across eastern OK and northwest AR, with much of the area receiving 2"-6". The heaviest rainfall occurred primarily in far southeast OK and along the I-44 corridor, where the rainfall was 100%-400% of normal June rainfall. For the remainder of the area, the rainfall totals correspond to 25% to 75% of the normal June rainfall (Fig. 1b).

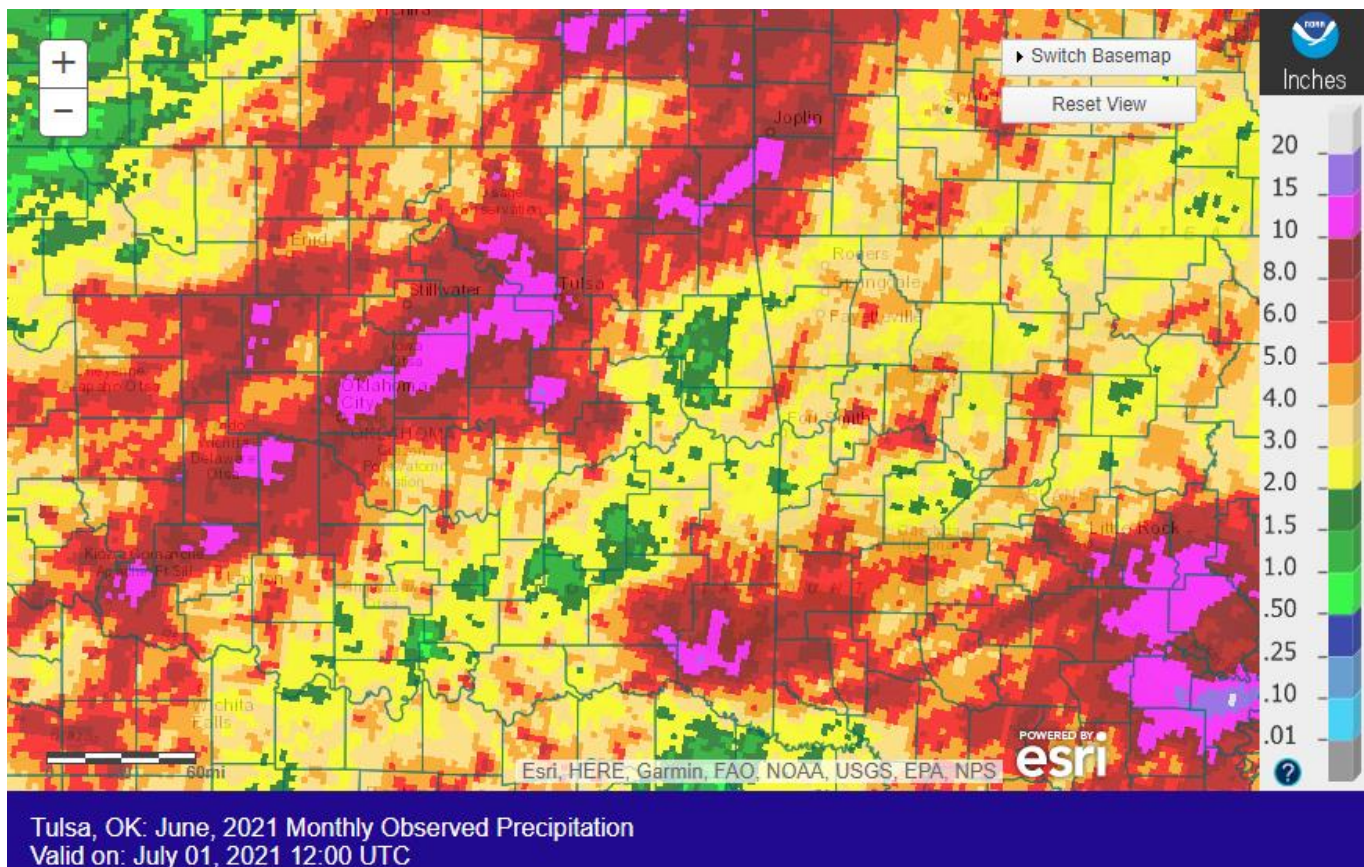


Fig. 1a. Estimated Observed Rainfall for June 2021



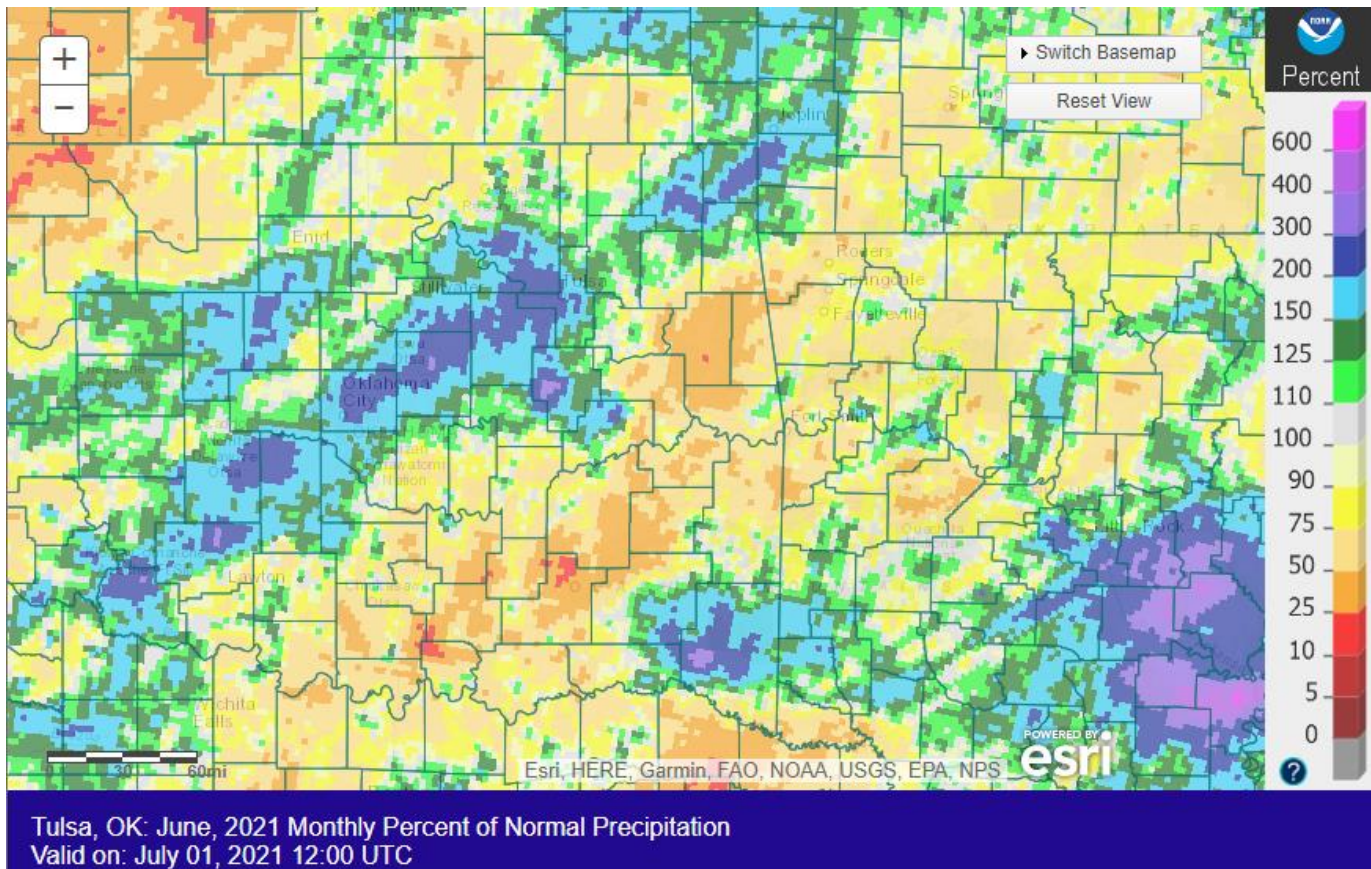


Fig. 1b. Estimated % of Normal Rainfall for June 2021

In Tulsa, OK, June 2021 ranked as the 38<sup>th</sup> warmest June (79.2°F; since records began in 1905) and the 20<sup>th</sup> wettest June (7.14"; since records began in 1888). Fort Smith, AR had the 40<sup>th</sup> warmest June (79.1°F, tied 1939; since records began in 1882) and the 58<sup>th</sup> driest June (3.05", tied 1978; since records began in 1882). Fayetteville, AR had the 21<sup>st</sup> warmest (75.4°F) and the 35<sup>th</sup> driest (4.02") June since records began in 1950.

Some of the larger precipitation reports (in inches) for June 2021 included:

Cloudy, OK (meso)	12.62	Wyandotte 7.3NE, OK (coco)	12.28	Tulsa 6.3WSW, OK (coco)	11.92
Drumright 0.6SW, OK (coco)	11.38	Oilton, OK (meso)	10.50	Sand Springs 4.6WNW, OK (coco)	10.44
Tulsa 8.9SW, OK (coco)	10.40	Broken Arrow 2.2SW, OK (coco)	9.04	Bristow 2.9WNW, OK (coco)	8.98

Some of the lowest precipitation reports (in inches) for June 2021 included:

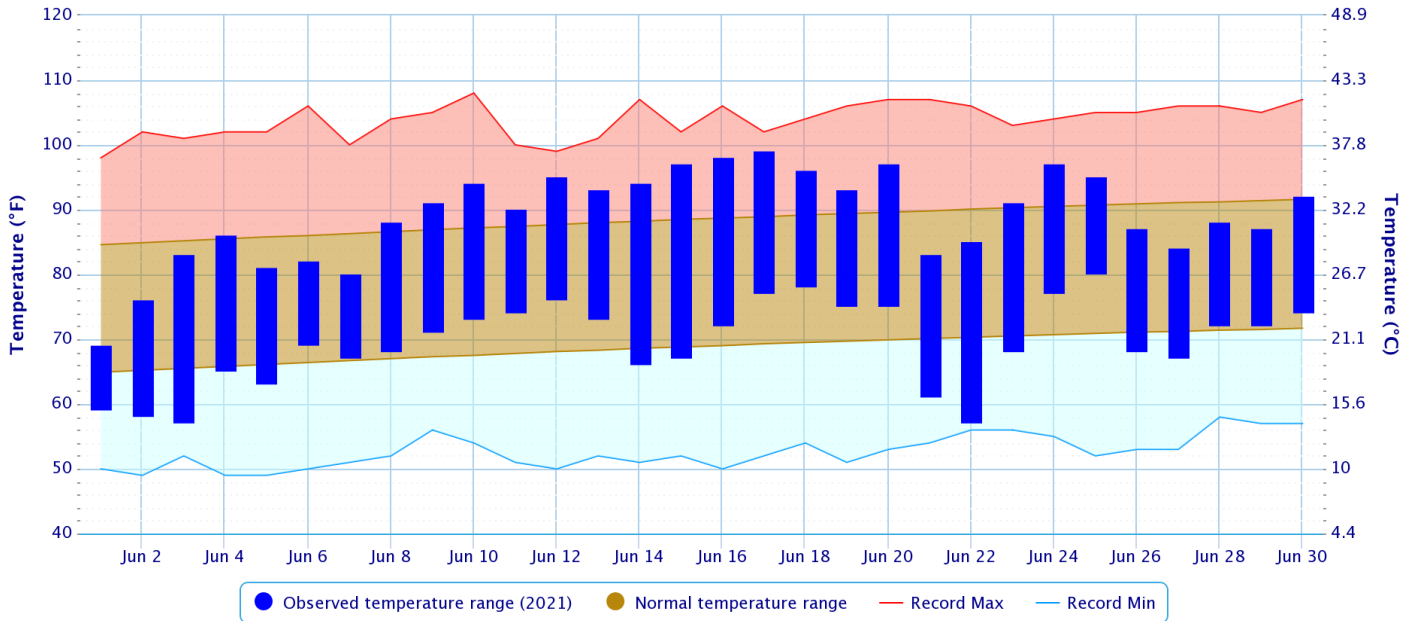
Siloam Springs, AR (AWOS)	1.76	Tahlequah, OK (meso)	1.90	Clayton, OK (meso)	2.37
Charleston 1.7E, AR (coco)	2.53	McAlester, OK (ASOS)	2.61	Wister, OK (meso)	2.69
Wilburton, OK (meso)	2.72	Cookson, OK (meso)	2.75	Westville, OK (meso)	2.84

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

Rank since 1921	June 2021	Last 60 Days (May 2 – Jun 30)	Last 90 Days (Apr 2 – Jun 30)	Warm Growing Season 2021 (Mar 1 – Jun 30)	Year-to-Date (Jan 1 – Jun 30)	Water Year-to-Date (Oct 1, 2020 – Jun 30, 2021)	Last 365 Days (Jul 1, 2020 – Jun 30, 2021)
Northeast OK	33 <sup>rd</sup> wettest	19 <sup>th</sup> wettest	22 <sup>nd</sup> wettest	20 <sup>th</sup> wettest	19 <sup>th</sup> wettest	19 <sup>th</sup> wettest	23 <sup>rd</sup> wettest
East Central OK	51 <sup>st</sup> wettest	36 <sup>th</sup> wettest	18 <sup>th</sup> wettest	22 <sup>nd</sup> wettest	33 <sup>rd</sup> wettest	40 <sup>th</sup> wettest	22 <sup>nd</sup> wettest
Southeast OK	43 <sup>rd</sup> driest	<b>9<sup>th</sup> wettest</b>	<b>9<sup>th</sup> wettest</b>	11 <sup>th</sup> wettest	20 <sup>th</sup> wettest	38 <sup>th</sup> wettest	18 <sup>th</sup> wettest
Statewide	28 <sup>th</sup> wettest	20 <sup>th</sup> wettest	21 <sup>st</sup> wettest	21 <sup>st</sup> wettest	33 <sup>rd</sup> wettest	36 <sup>th</sup> wettest	24 <sup>th</sup> wettest

### Daily Temperature Data – Tulsa Area, OK (ThreadEx)

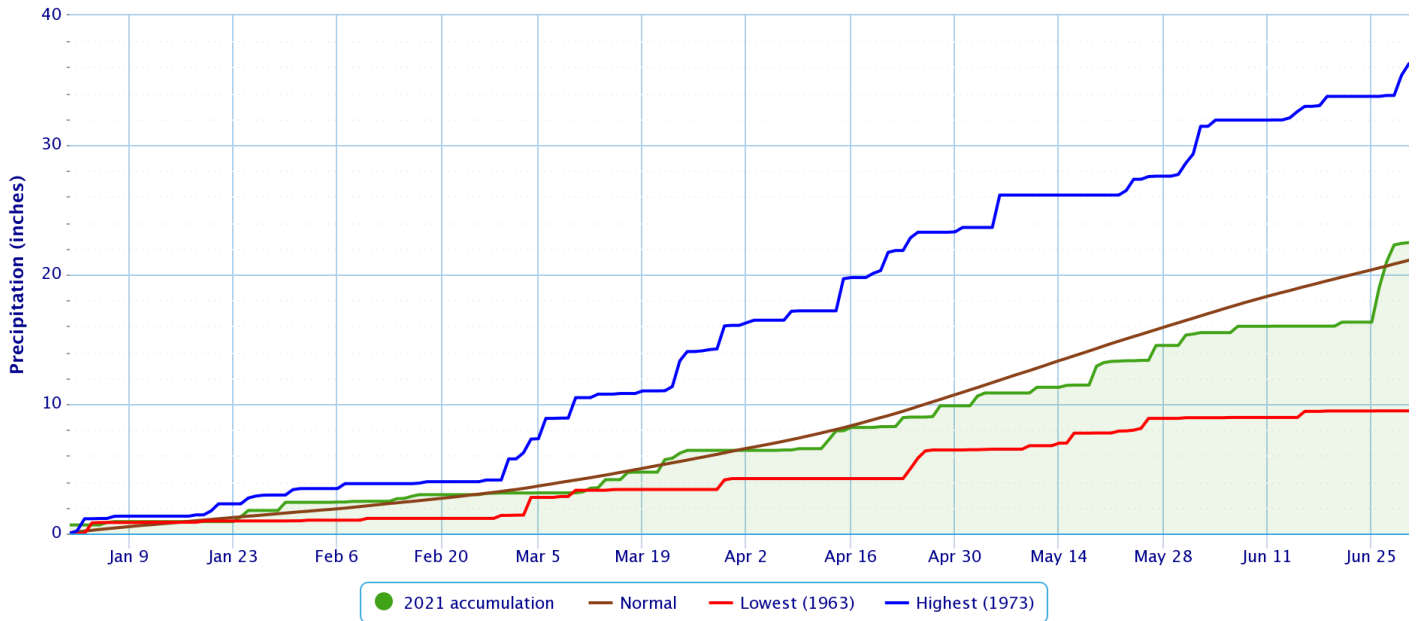
Period of Record – 1905-01-06 to 2021-06-30. Normals period: 1991-2020. Click and drag to zoom chart.



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### Accumulated Precipitation – Tulsa Area, OK (ThreadEx)

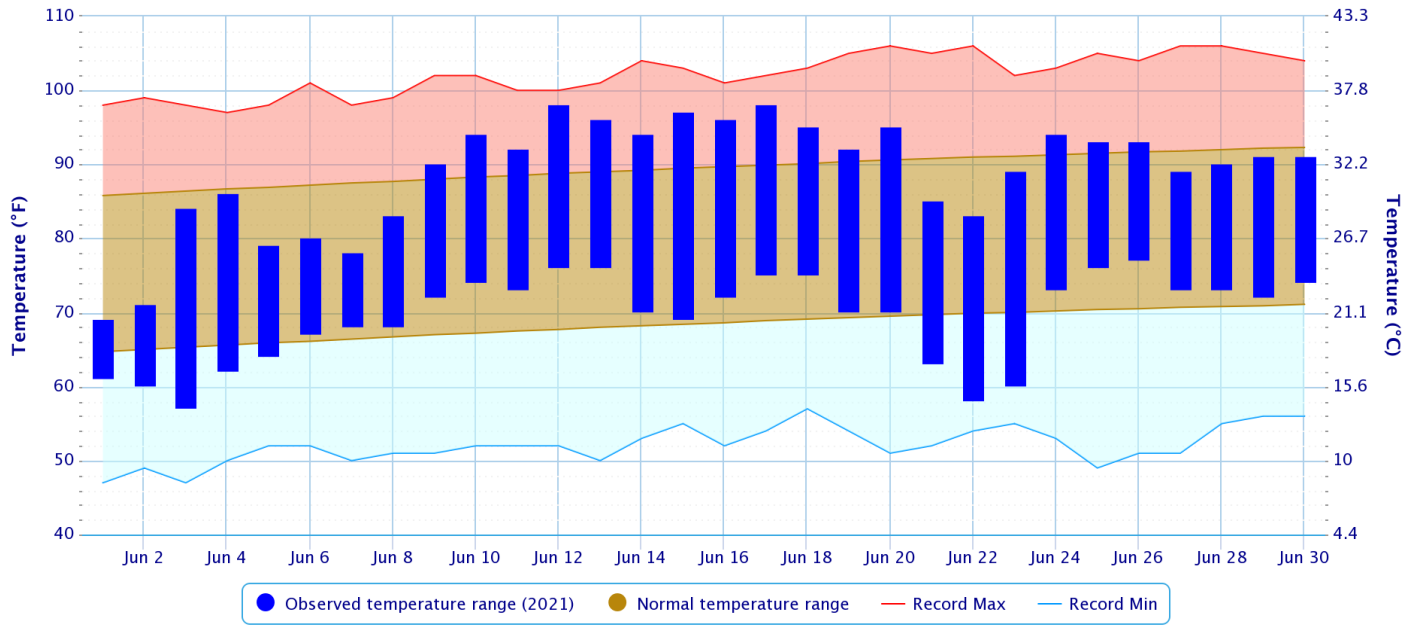
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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

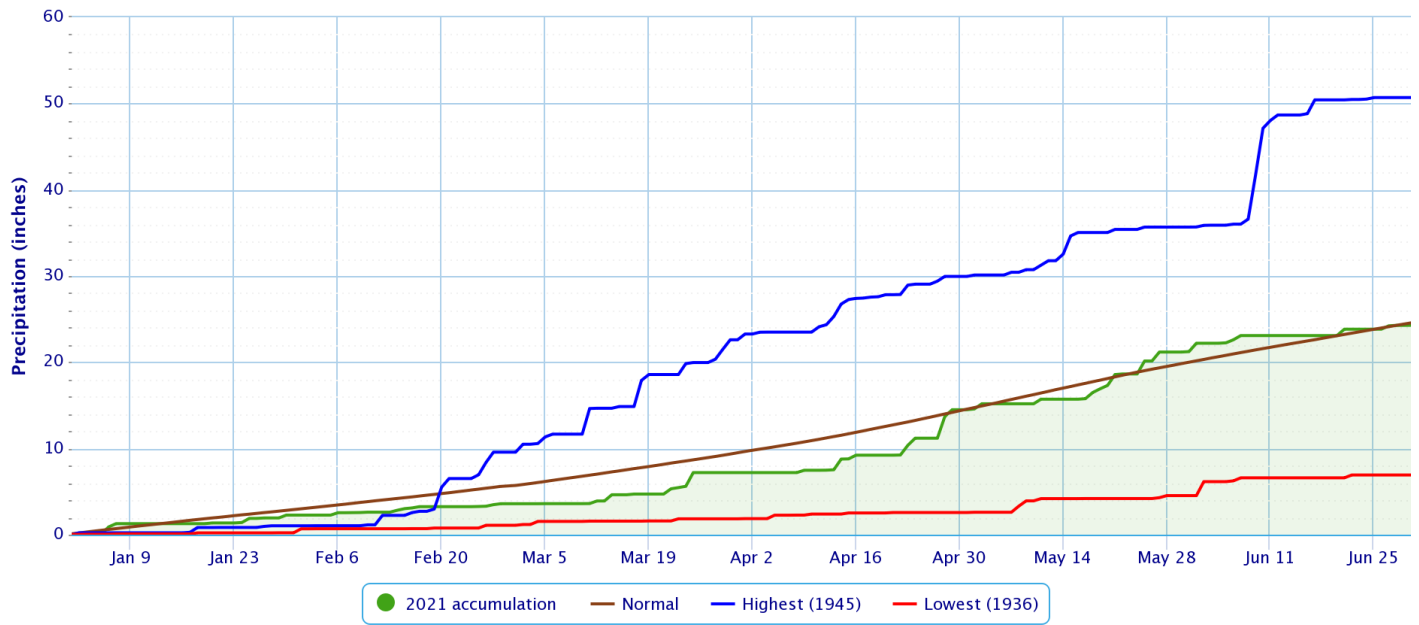
Period of Record – 1882-06-01 to 2021-06-30. Normals period: 1991-2020. Click and drag to zoom chart.



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### Accumulated Precipitation – Fort Smith Area, AR (ThreadEx)

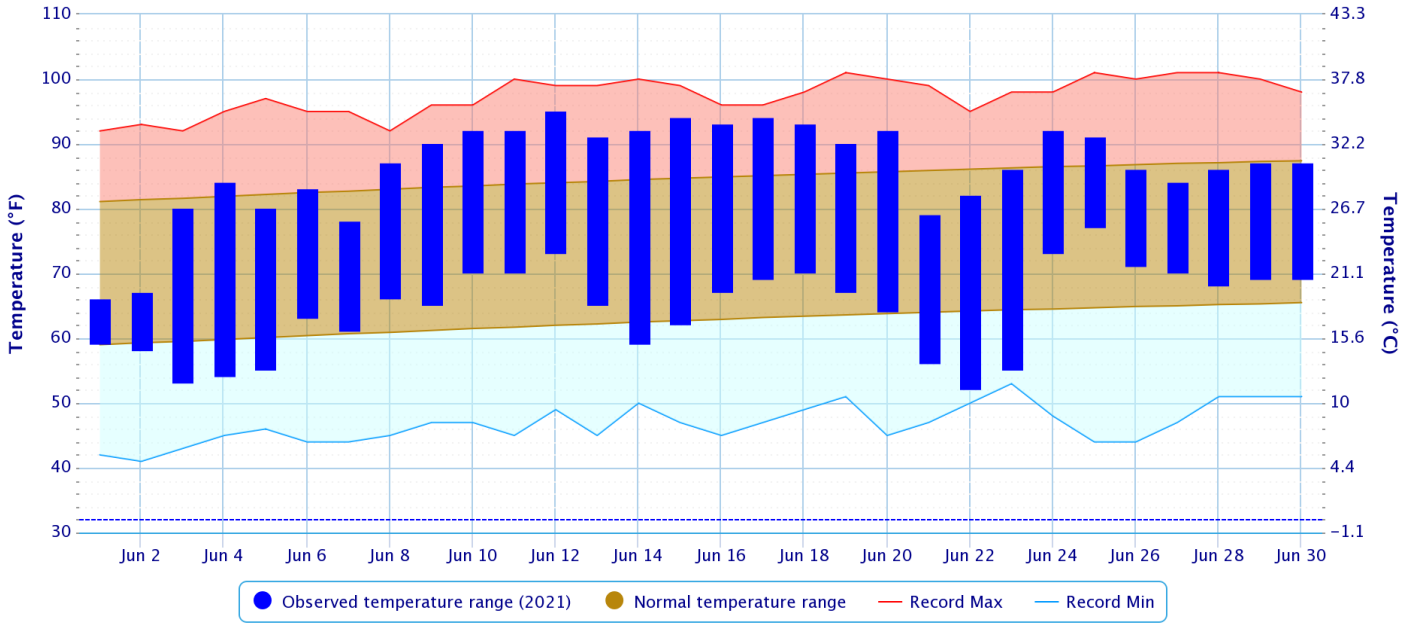
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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### Daily Temperature Data – FAYETTEVILLE DRAKE FIELD, AR

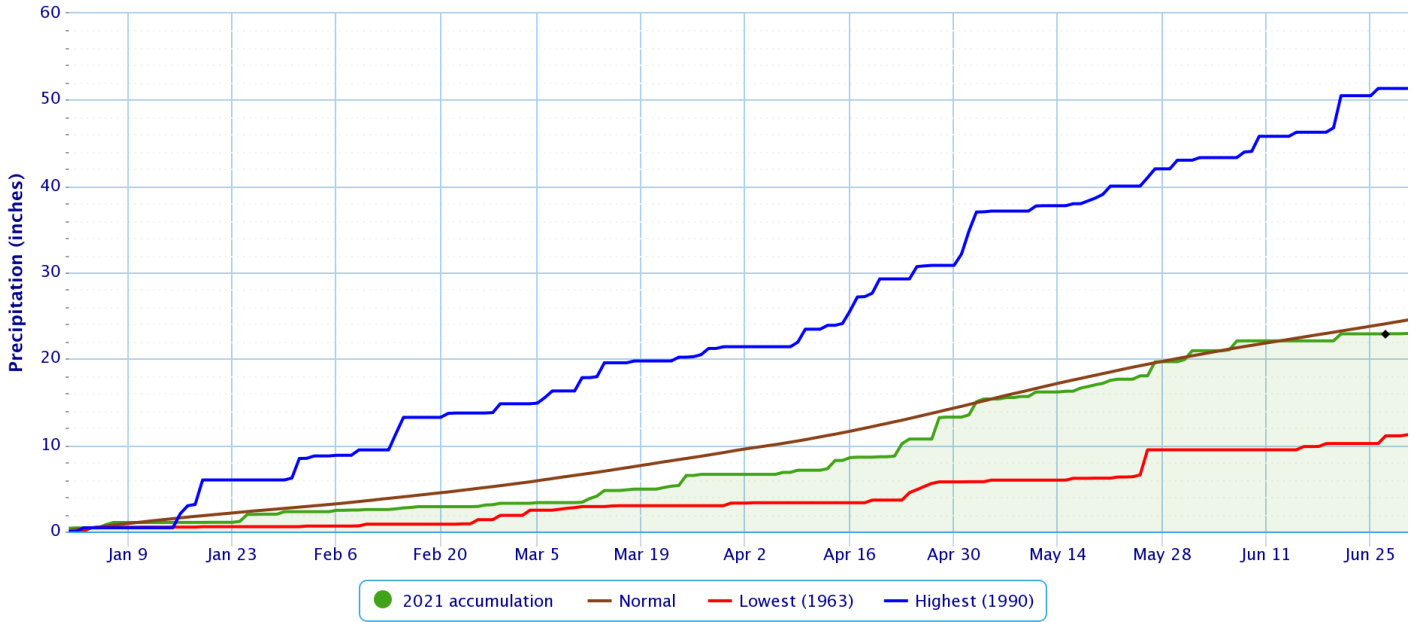
Period of Record – 1949-07-14 to 2021-06-30. Normals period: 1991-2020. Click and drag to zoom chart.



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### Accumulated Precipitation – FAYETTEVILLE DRAKE FIELD, AR

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



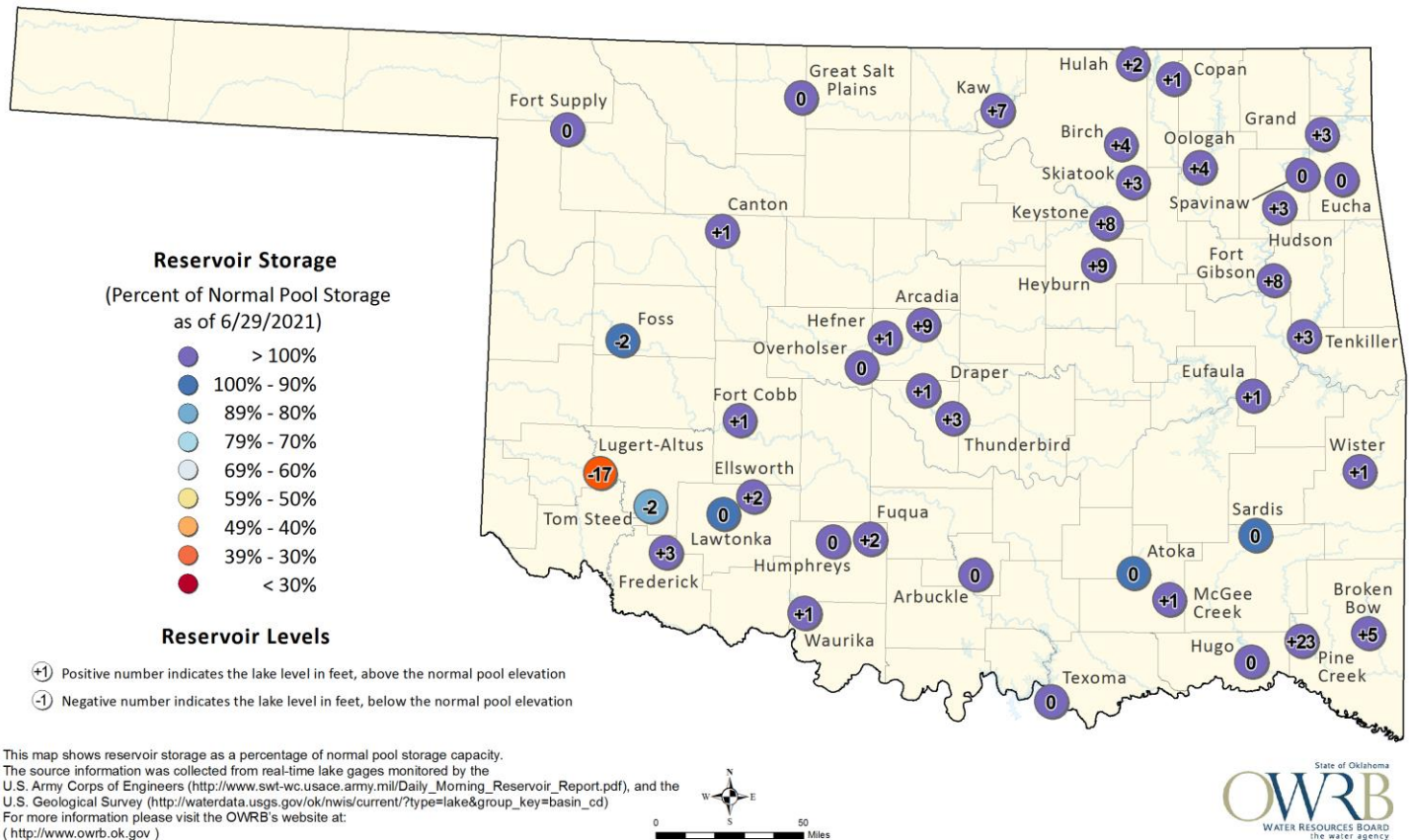
Powered by ACIS



## Reservoirs

According to the USACE, most of the lakes in the HSA were higher than 3% of top of their conservation pools as of 7/01/2021: Beaver Lake 71%, Fort Gibson Lake 27%, Grand Lake 27%, Keystone Lake 27%, Oologah Lake 22%, Skiatook Lake 20%, Kaw Lake 16%, Lake Eufaula 13%, Heyburn Lake 11%, Birch Lake 9%, Hudson Lake 8%, Tenkiller Lake 7%, Hulah Lake 5%, and Copan Lake 5%.

## Oklahoma Surface Water Resources Reservoir Levels and Storage as of 6/29/2021

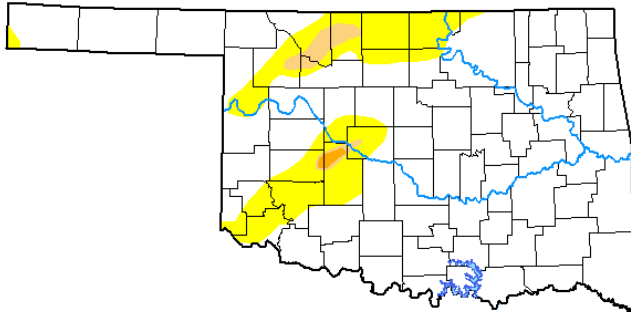


## Drought

According to the [U.S. Drought Monitor](#) (USDM) from June 29, 2021 (Figs. 3a, 3b), no drought conditions were present across eastern OK and northwest AR. Abnormally Dry (but not in drought) conditions were occurring in a portion of Osage and eastern Kay Counties in eastern OK.

# U.S. Drought Monitor Oklahoma

**June 29, 2021**  
(Released Thursday, Jul. 1, 2021)  
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	84.11	15.89	1.77	0.24	0.00	0.00
<b>Last Week</b> 06-22-2021	75.77	24.23	5.75	0.74	0.00	0.00
<b>3 Months Ago</b> 03-30-2021	63.05	36.95	10.71	3.42	0.08	0.00
<b>Start of Calendar Year</b> 12-29-2020	56.83	43.17	25.21	7.75	1.45	0.00
<b>Start of Water Year</b> 09-29-2020	66.79	33.21	17.71	11.97	1.55	0.00
<b>One Year Ago</b> 06-30-2020	34.87	65.13	43.03	15.39	4.46	0.10

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

Deborah Bathke  
National Drought Mitigation Center



[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)

Fig. 3a. Drought Monitor for Oklahoma

# U.S. Drought Monitor Arkansas

**June 29, 2021**  
(Released Thursday, Jul. 1, 2021)  
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	100.00	0.00	0.00	0.00	0.00	0.00
<b>Last Week</b> 06-22-2021	100.00	0.00	0.00	0.00	0.00	0.00
<b>3 Months Ago</b> 03-30-2021	100.00	0.00	0.00	0.00	0.00	0.00
<b>Start of Calendar Year</b> 12-29-2020	16.45	83.55	6.87	0.00	0.00	0.00
<b>Start of Water Year</b> 09-29-2020	96.07	3.93	0.62	0.00	0.00	0.00
<b>One Year Ago</b> 06-30-2020	94.43	5.57	0.00	0.00	0.00	0.00

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

Deborah Bathke  
National Drought Mitigation Center



[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)

Fig. 3b. Drought Monitor for Arkansas

## **Outlooks**

The [Climate Prediction Center](#) (CPC) outlook for July 2021 (issued June 30, 2021) indicates an enhanced chance for below normal temperatures and above median precipitation across all of eastern OK and northwest AR. This outlook was largely based on dynamical model output combined with soil moisture, forecast chances for above median rainfall, and influence from a cold front early in the month.

For the 3-month period July-August-September 2021, CPC is forecasting a slightly enhanced chance for above median precipitation and an equal chance for above, near, and below normal temperatures across all of eastern OK and northwest AR (outlook issued June 17, 2021). This outlook is based on long-term trends, as well as incorporating both statistical and dynamical forecast tools. The equal chances for temperatures are due to weaker signals among temperature tools coupled with abnormally wet soil moisture conditions across most of this region, and represents a reduction in above normal temperature probabilities. According to CPC, the combined effect of the ocean-atmosphere system is consistent with ENSO neutral conditions. ENSO-neutral conditions are favored through early fall, followed by a 50% chance for a return of La Niña conditions late fall through winter 2021-22.

**Summary of Heavy Precipitation Events** Daily quality-controlled rainfall maps can be found at: [http://water.weather.gov/precip/index.php?location\\_type=wfo&location\\_name=tsa](http://water.weather.gov/precip/index.php?location_type=wfo&location_name=tsa)

A weakening MCS moved into eastern OK mid-morning on May 31<sup>st</sup>. The southern portion of the line dissipated by early afternoon, while storms continued across northeast and east central OK during the afternoon and evening hours. A few of the storms impacted northwest AR in the evening as well. A second MCS was moving across northern TX, with the northern periphery crossing the Red River into far southeast OK during the evening. 850 mb warm air advection and frontogenesis combined with a 700 mb speed max resulted in additional shower and thunderstorm development during the overnight hours, with the most widespread activity across northeast OK and northwest AR between I-44 and I-40. Near historic precipitable water values led to locally heavy rainfall before the rain shifted east of the area by noon on June 1. Rainfall totals ranged from 0.25" to around 3", with 1.5" to around 3" falling in a corridor from Okmulgee County through Delaware County in OK and southern Washington County in Arkansas (Figs. 4, 5). This rainfall resulted in minor flooding along the Deep Fork River near Beggs and rises along the Arkansas River at Ozark L&D (see preliminary hydrographs at the end of this report and the E3 Report for details).

A broad, weak upper-level low was centered on north central Texas on the morning of the 5<sup>th</sup> and made a very slow trek to the north and northeast over the next couple days. Several embedded vorticity maximums rotated around the center of the low and aided in increasing shower and thunderstorm activity on the 5<sup>th</sup> through 7<sup>th</sup>. Pockets of heavy rainfall occurred within this pattern given the anomalously high moisture content through a deep layer of the atmosphere and the slow storm movement due to weak steering flow. While isolated to scattered showers and thunderstorms occurred during the day of the 5<sup>th</sup>, more widespread activity affected southeast OK during the late evening and overnight hours. Rainfall totals by 7am CDT on the 6<sup>th</sup> ranged from around 0.25" to around 4" primarily south of I-40, with the heaviest rain occurring over eastern Choctaw, eastern Pushmataha, and southwest Le Flore Counties (Fig. 6).

Scattered storms affected southeast OK into northwest AR during the late morning through the afternoon hours on the 6<sup>th</sup>. By evening, a short line segment developed over south central OK and moved east across southeast OK, exiting shortly after midnight. By now, the center of the broad upper-low had moved to the OK/KS/MO border. At 2 am on the 7<sup>th</sup>, new convection was developing across Okmulgee County in east central OK. Storms continued to develop through sunrise from Osage County through Okmulgee County and into west central AR. Okmulgee, Okfuskee, McIntosh, and Muskogee Counties were hit particularly hard as storms continued over the same location for several hours (Figs. 8, 9). A personal weather station in Council Hill, OK measured 13.69" of rain on June 7<sup>th</sup> (around a 0.1% annual chance or 1000-year storm for 24-hour rainfall), with 11" falling between 4 am and 7:30 am CDT (exceeding a 0.1% annual chance or 1000-year storm for a 3-hour event). A rain rate of 6.5"/hour was observed around 5:30 am at this station. Another personal weather station in Okmulgee, OK measured 13.46" of rain on June 7<sup>th</sup> (around a 0.1% annual chance or 1000-year storm for 24-hour rainfall) with 10.5" falling from 3 am to 5:40 am CDT (exceeding a 0.1% annual chance or 1000-year storm for a 3-hour event). The station recorded rainfall rates of 3.5"-4" per hour for 1 hour and 45 minutes. Widespread flash flood damage was reported in the eastern half of Okfuskee County, where many gravel county roads were washed down to bare dirt and at least 14 tin horns (from 2'-8' in diameter) were



washed out or totally destroyed. 11 homes in Okmulgee were impacted by flash flooding, with numerous water rescues. High water closed Highway 75 in Okmulgee and I-44 (between Hwy 75 and I-244 interchange) in Tulsa. Reports of road damages were received elsewhere across the areas of heaviest rainfall. By 7 am CDT June 7, the 24-hour rainfall totals ranged from around 0.50" to over 13" across the affected areas (Fig. 7). Showers and thunderstorms, still with localized heavy rain, continued through the morning, before finally dissipating during the afternoon. This heavy rain also caused minor flooding to occur along Polecat Creek near Sapulpa and the Deep Fork River near Beggs (see preliminary hydrographs at the end of this report and the E3 Report for details). Additional thunderstorms continued across southeast OK and west central AR through the evening as another vorticity maximum rotated around the main upper-level low. This activity finally exited the area by midnight. However, as the low-level jet increased, a new cluster of thunderstorms developed over southeast OK during the overnight hours and began to lift north. This produced additional heavy rain across Pushmataha and Choctaw Counties (Figs. 11, 12). At 7 am on the 8<sup>th</sup>, the 24-hour rainfall total ranged from 0.50" to near 8" (Fig. 10). The rain continued generally south of I-40 before dissipating by noon on the 8<sup>th</sup>. Isolated terrain-induced thunderstorms developed over northwest AR during the heat of the afternoon, but quickly dissipated at sunset. The additional rainfall on the 8<sup>th</sup> ranged from around 0.25" to around 4" (Fig. 14). In the end, a few areas of eastern OK received 4"-14" of rain during this rainy period (Fig. 15).

Showers and thunderstorms developed across northeast OK and northwest AR around sunrise on the 21<sup>st</sup> as a cold front moved into the area. Thunderstorms continued along and behind the front as it quickly moved south across eastern OK and western AR. The cold front was south of the Red River by early afternoon, with the post frontal rain ending from north to south by late afternoon. Rainfall totals ranged from around 0.10" to near 2" (Fig. 16).

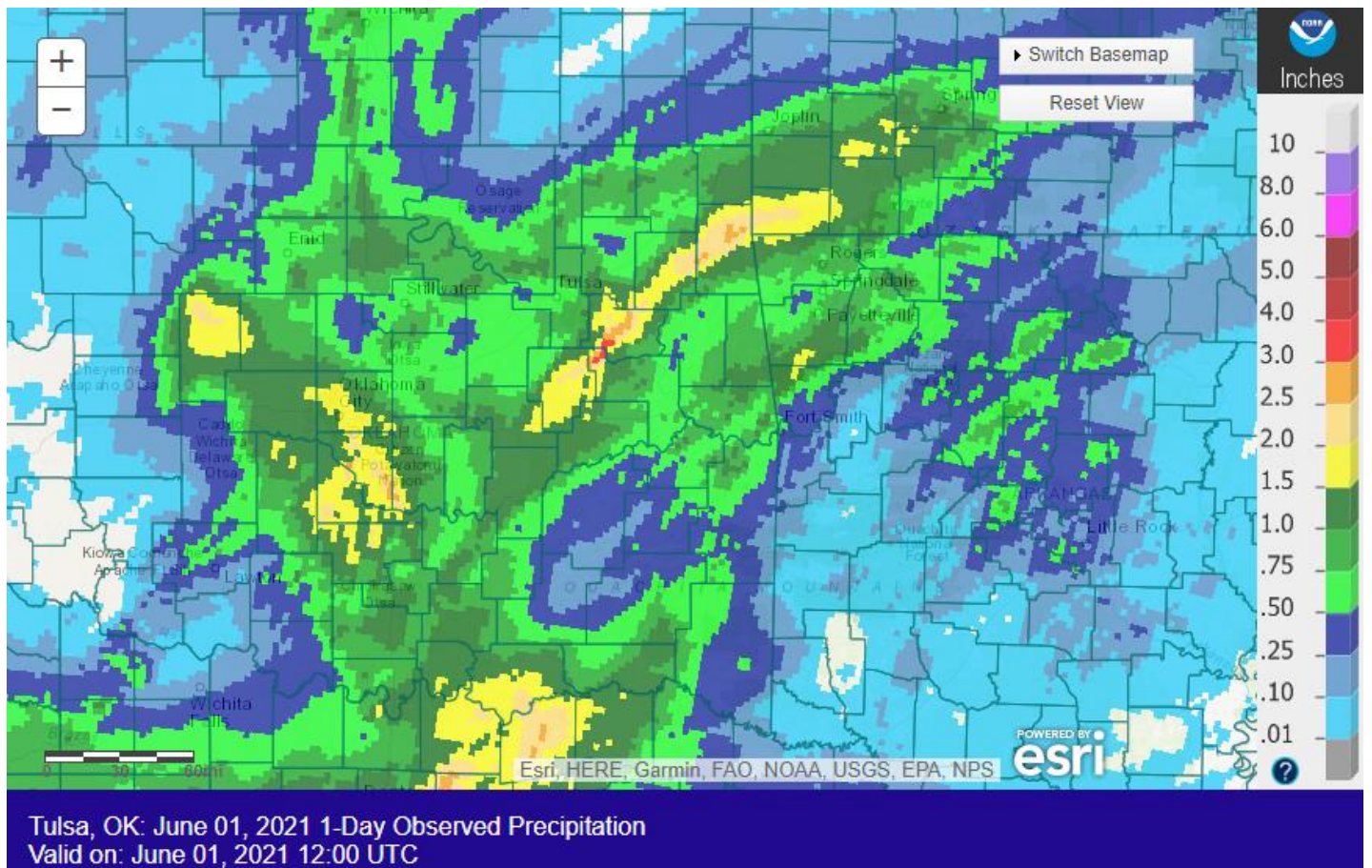
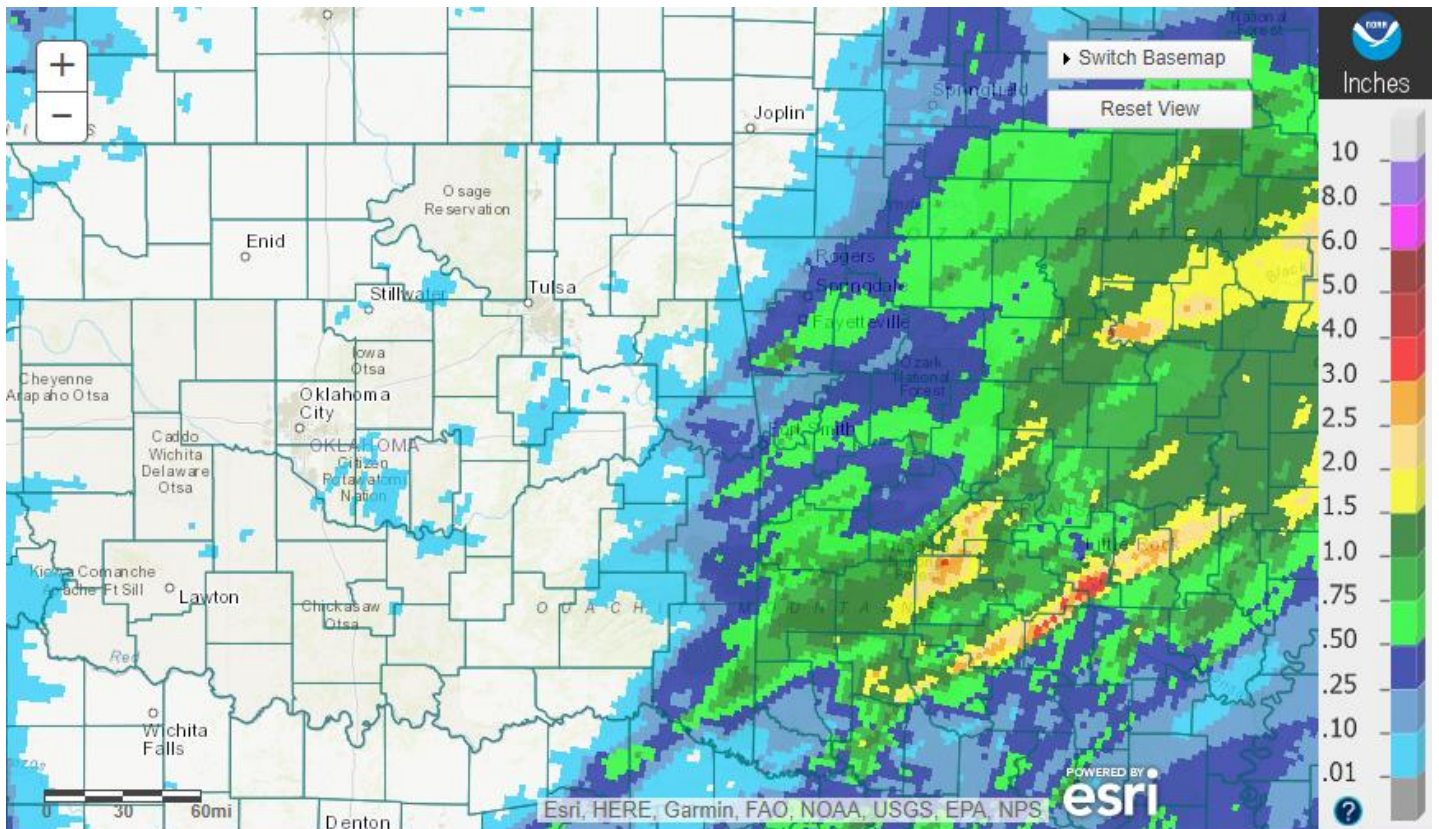


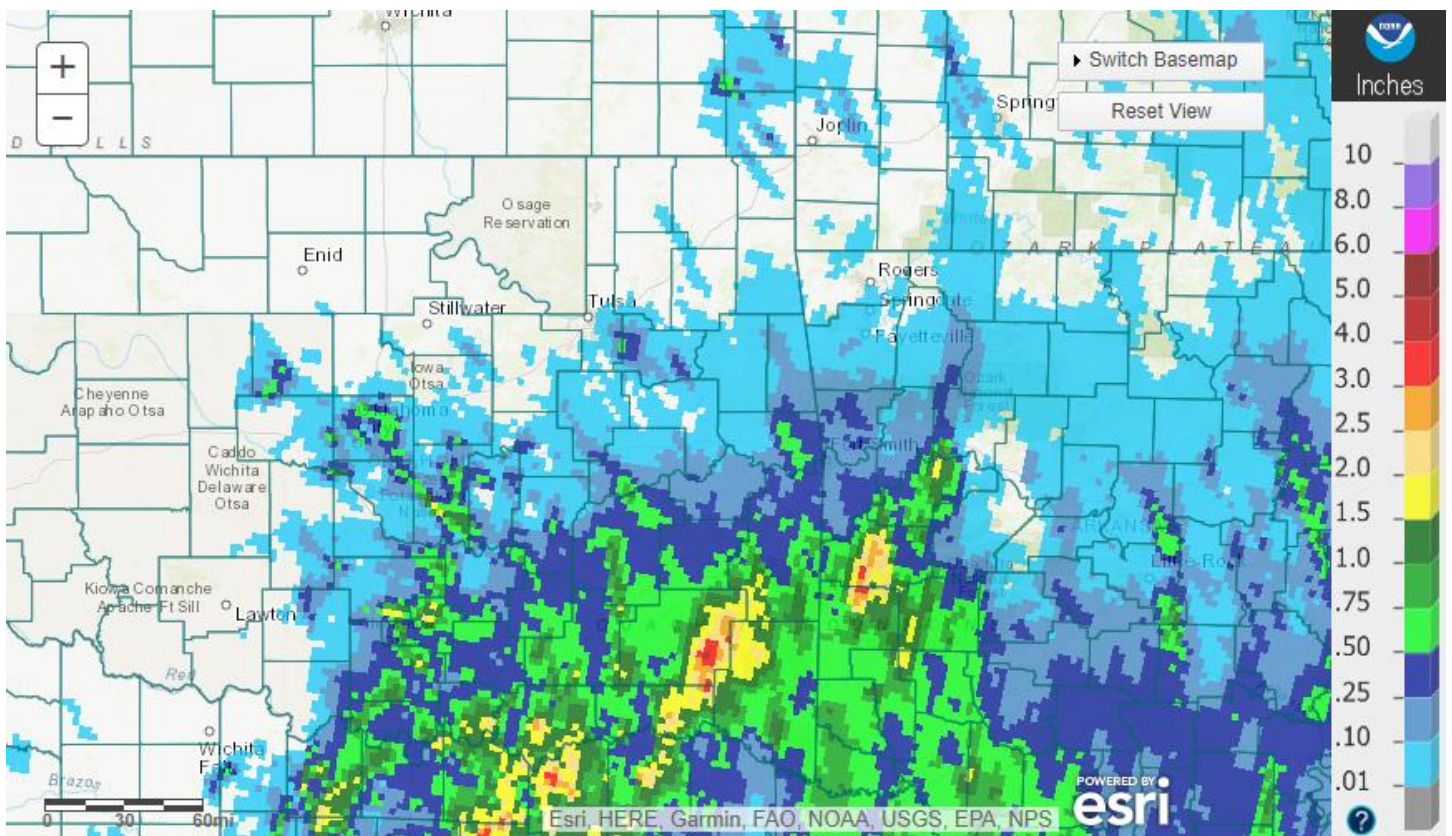
Fig. 4. 24-hour Estimated Observed Rainfall ending at 7am CDT 06/01/2021.





Tulsa, OK: June 02, 2021 1-Day Observed Precipitation  
Valid on: June 02, 2021 12:00 UTC

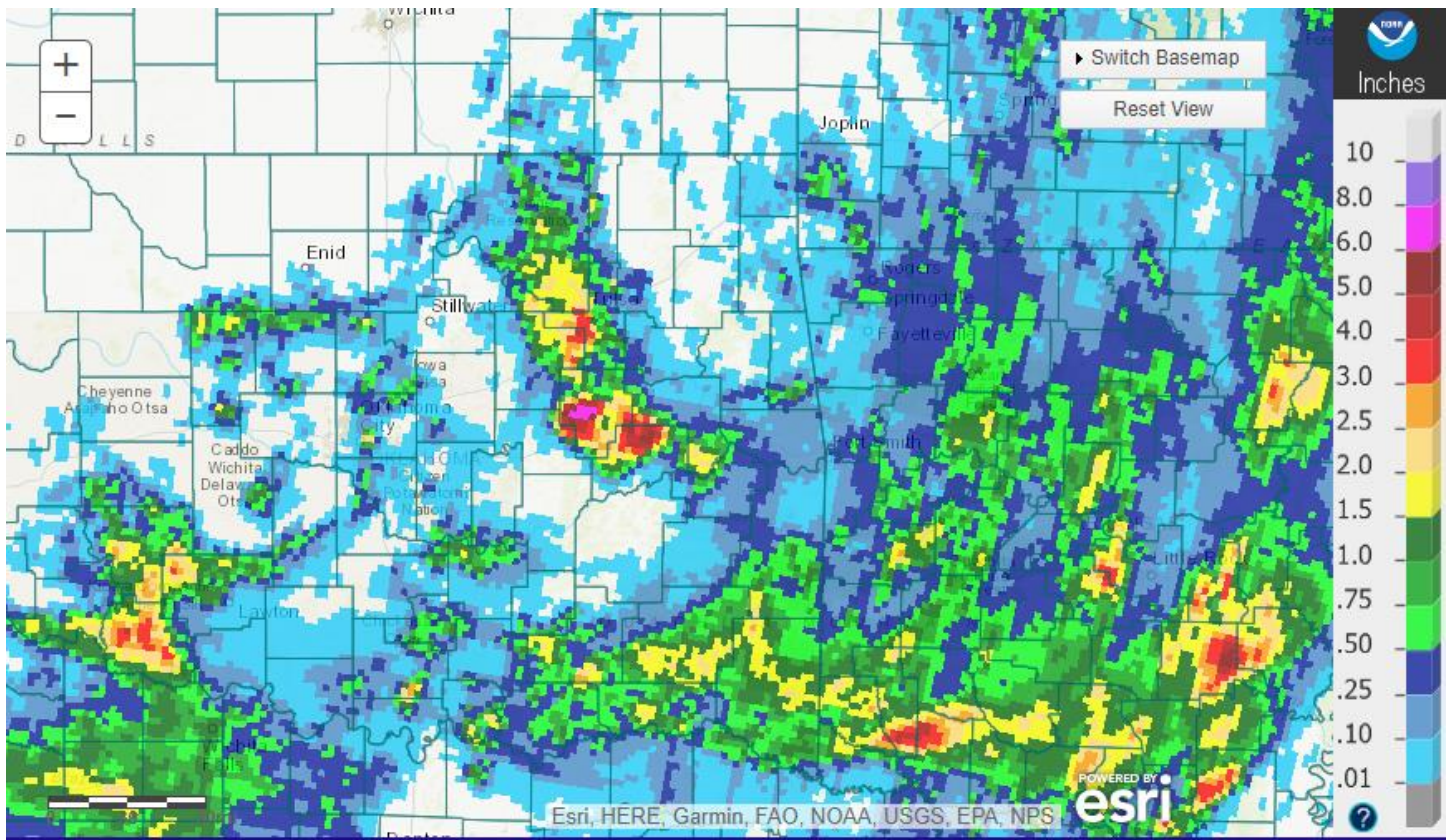
Fig. 5. 24-hour Estimated Observed Rainfall ending at 7am CDT 06/02/2021.



Tulsa, OK: June 06, 2021 1-Day Observed Precipitation  
Valid on: June 06, 2021 12:00 UTC

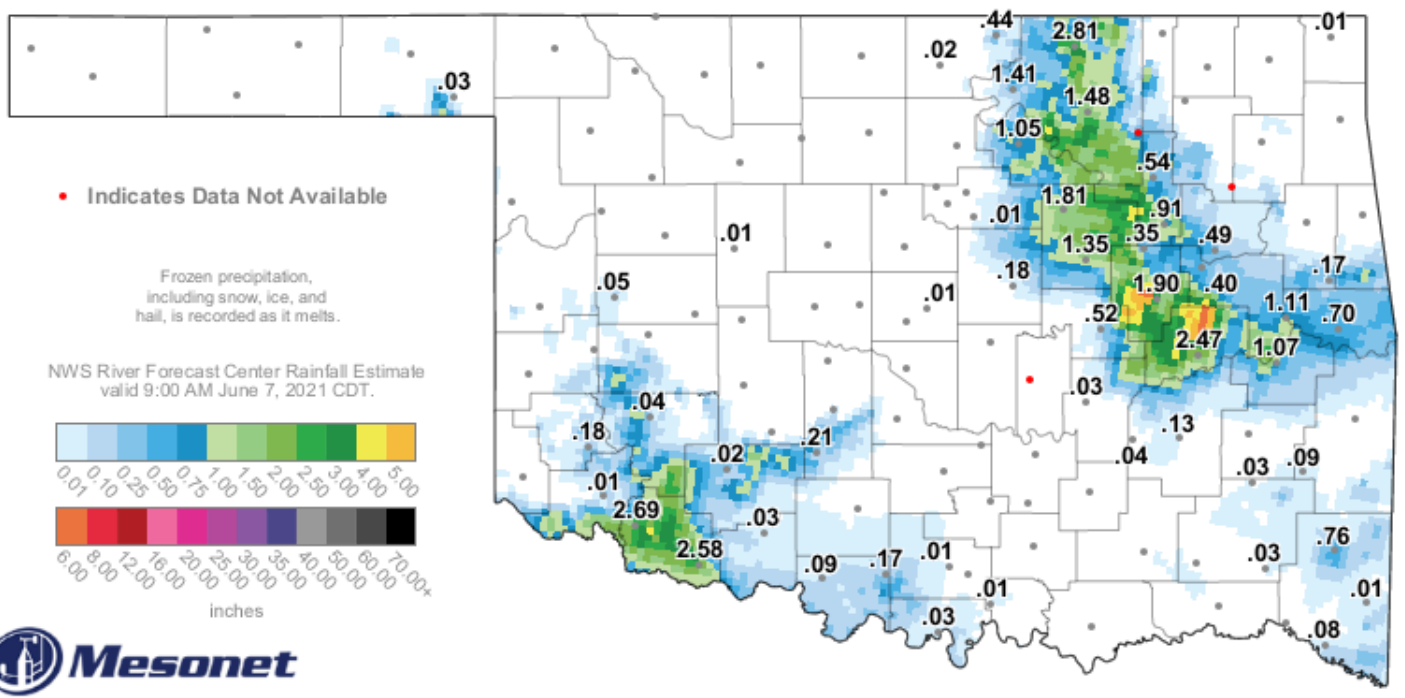
Fig. 6. 24-hour Estimated Observed Rainfall ending at 7am CDT 06/06/2021.





Tulsa, OK: June 07, 2021 1-Day Observed Precipitation  
 Valid on: June 07, 2021 12:00 UTC

Fig. 7. 24-hour Estimated Observed Rainfall ending at 7am CDT 06/07/2021.



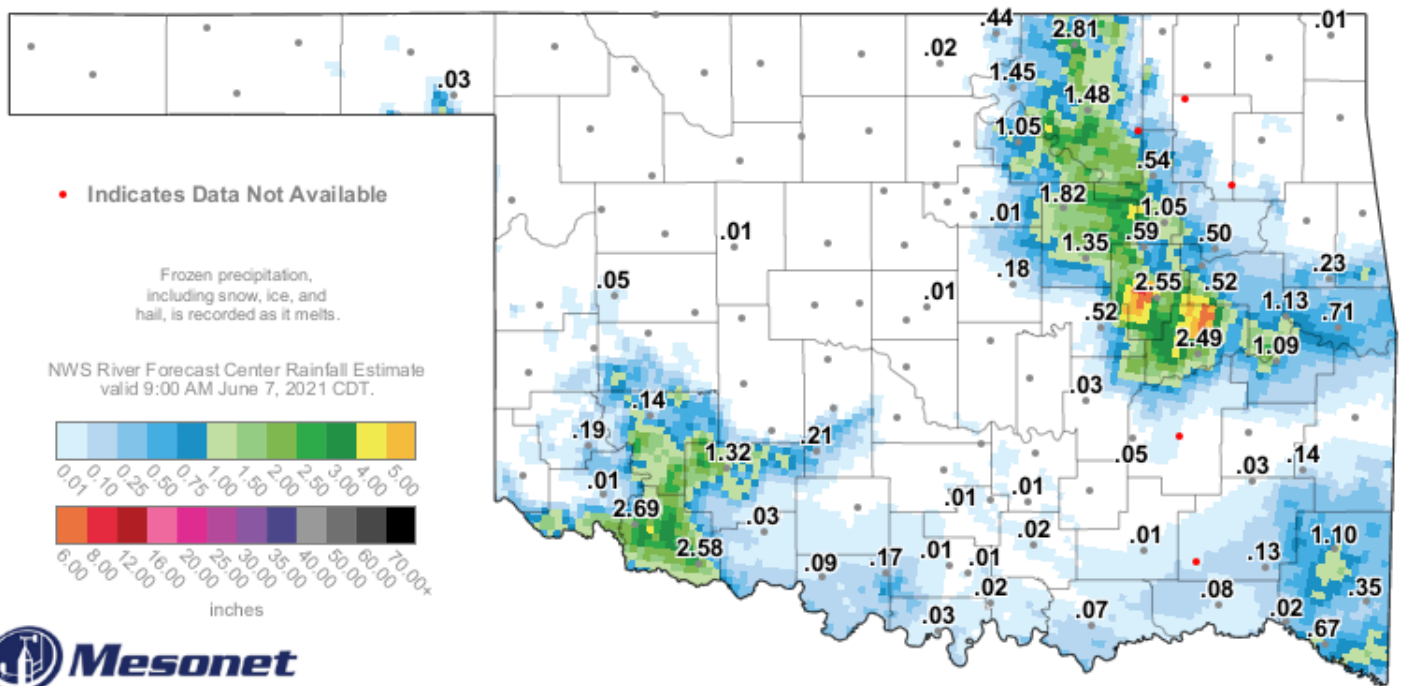
**6-Hour Rainfall Accumulation (inches)**

9:45 AM June 7, 2021 CDT

Created 9:51:00 AM June 7, 2021 CDT. © Copyright 2021

Fig. 8. OK Mesonet (values) and NWS RFC rainfall estimate (image) 6-hour rainfall ending at 9:45 am CDT 6/07/2021.



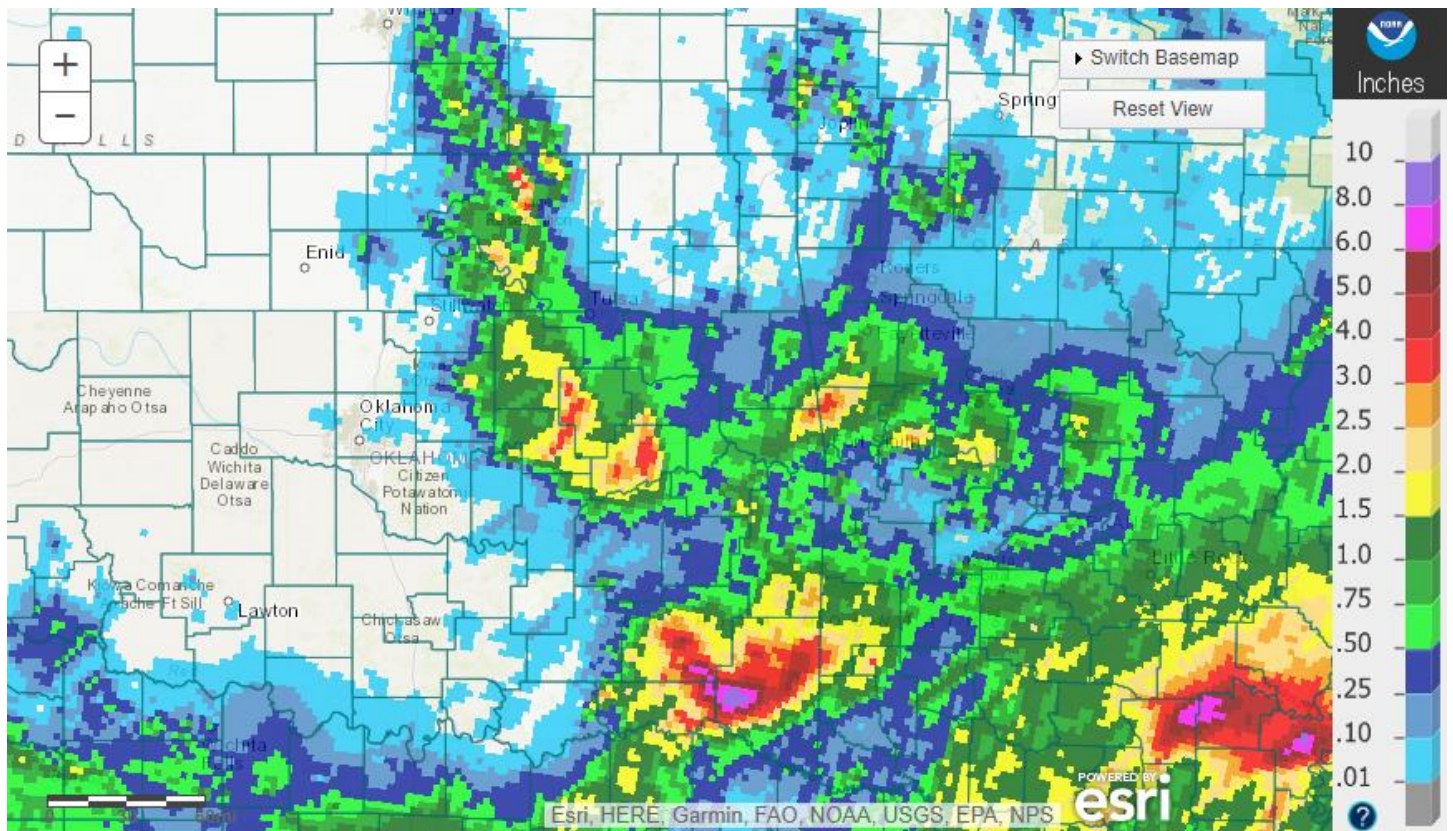


### 12-Hour Rainfall Accumulation (inches)

9:50 AM June 7, 2021 CDT

Created 9:56:25 AM June 7, 2021 CDT. © Copyright 2021

Fig. 9. OK Mesonet (values) and NWS RFC rainfall estimate (image) 12-hour rainfall ending at 9:50 am CDT 6/07/2021.



Tulsa, OK: June 08, 2021 1-Day Observed Precipitation  
Valid on: June 08, 2021 12:00 UTC

Fig. 10. 24-hour Estimated Observed Rainfall ending at 7am CDT 06/08/2021.



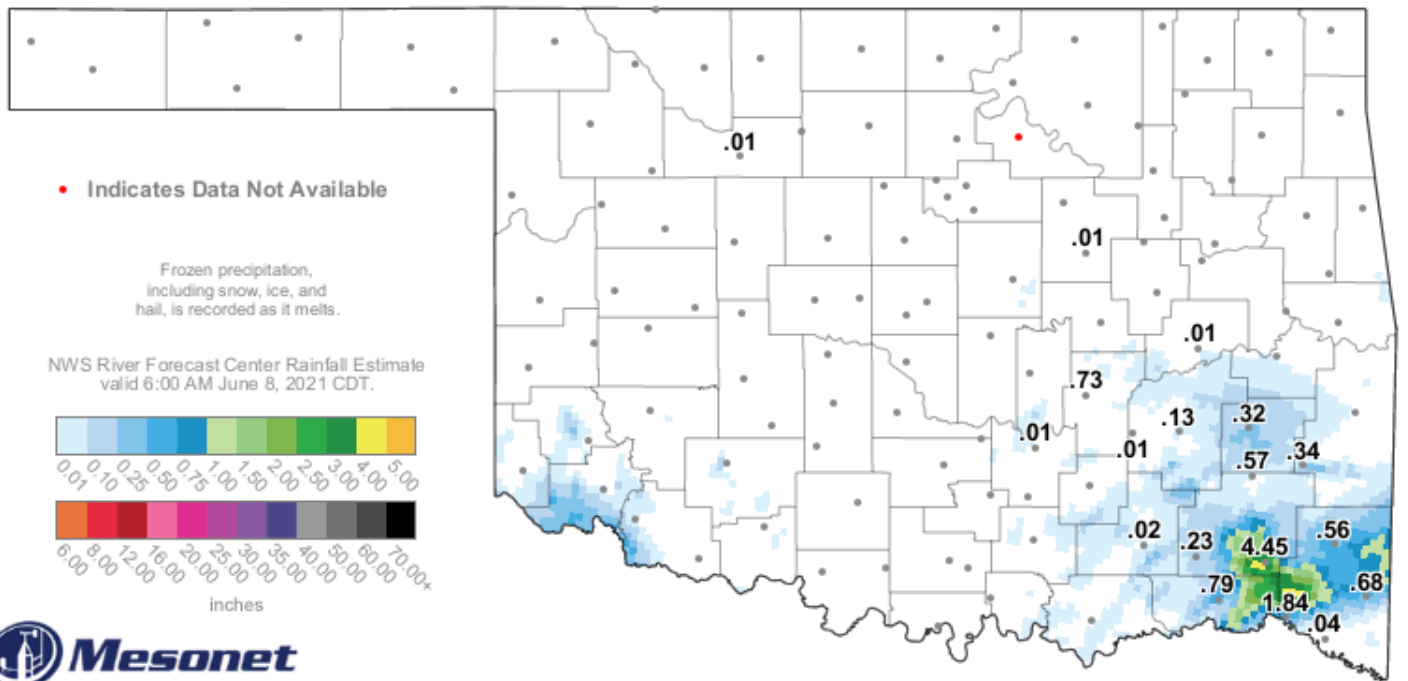


Fig. 11. OK Mesonet (values) and NWS RFC rainfall estimate (image) 6-hour rainfall ending at 7:40 am CDT 6/08/2021.

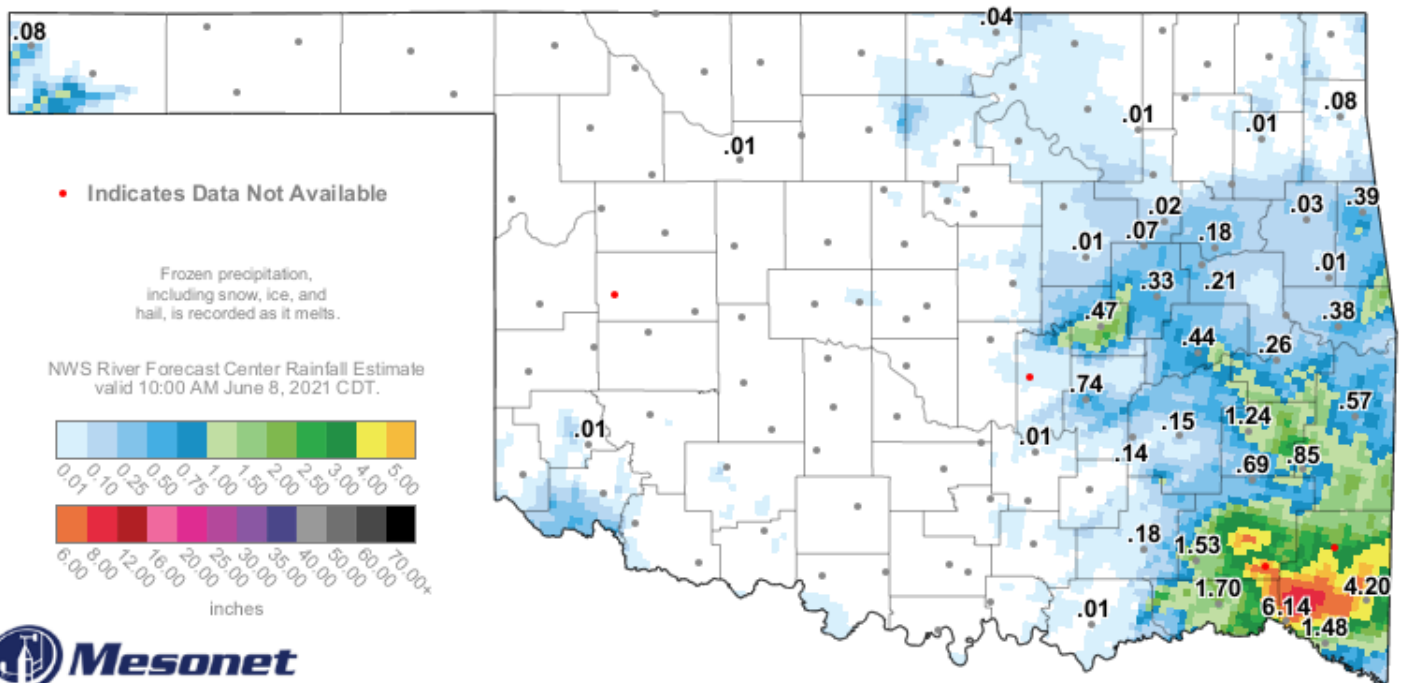
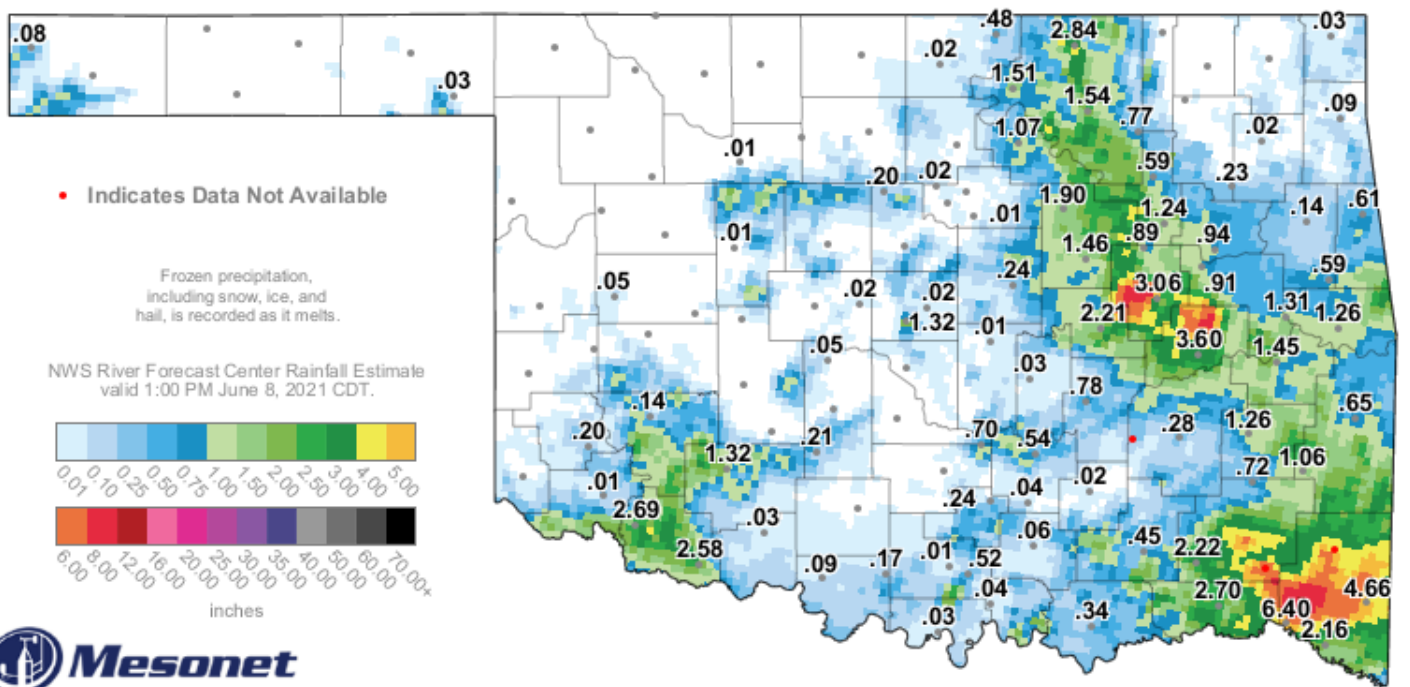


Fig. 12. OK Mesonet (values) and NWS RFC rainfall estimate (image) 24-hour rainfall ending at 11:20 am CDT 6/08/2021.

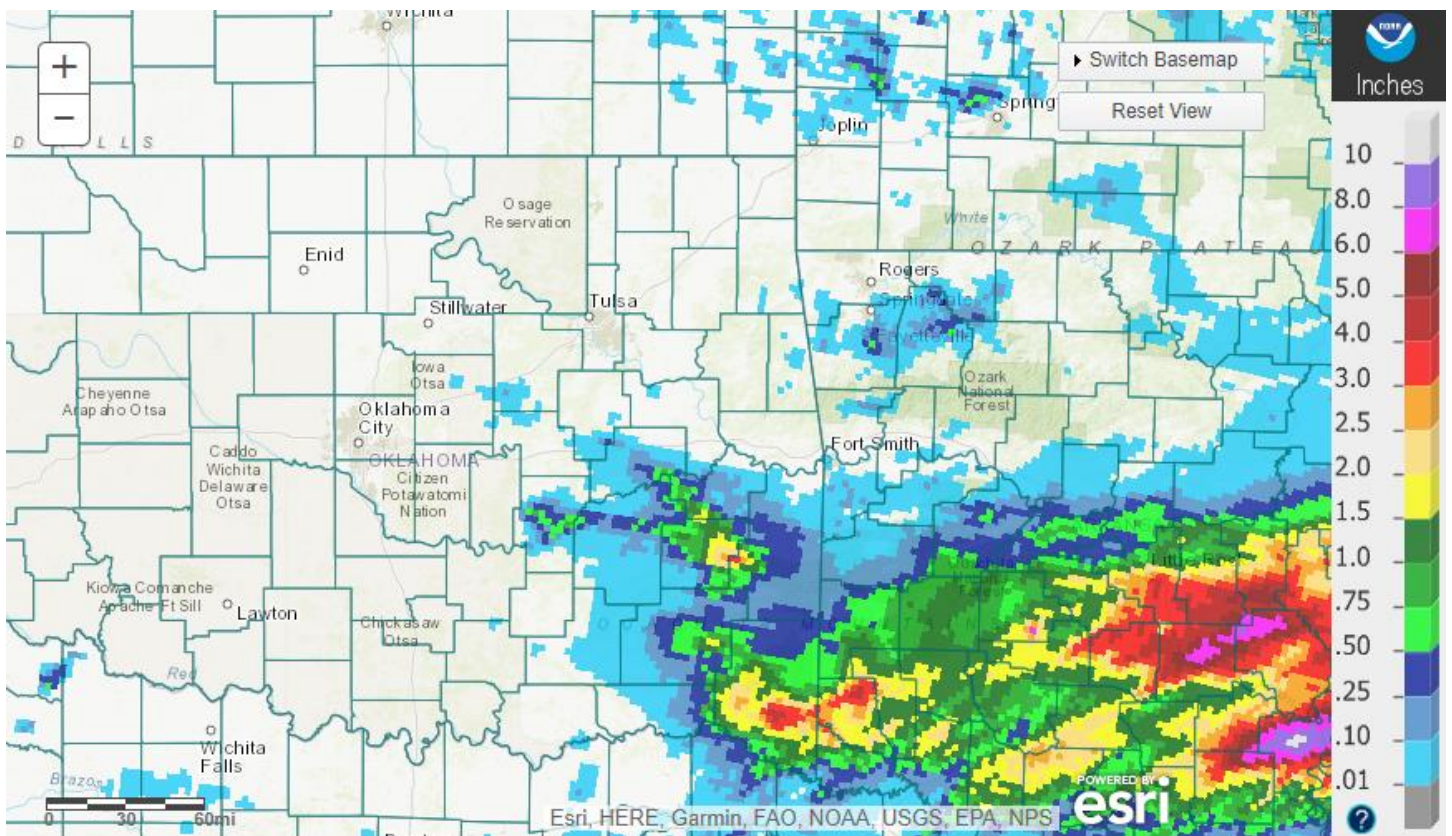


## 2-Day Rainfall Accumulation (inches)

2:25 PM June 8, 2021 CDT

Created 2:30:24 PM June 8, 2021 CDT. © Copyright 2021

Fig. 13. OK Mesonet (values) and NWS RFC rainfall estimate (image) 2-day rainfall ending at 2:25 pm CDT 6/08/2021.



Tulsa, OK: June 09, 2021 1-Day Observed Precipitation  
Valid on: June 09, 2021 12:00 UTC

Fig. 14. 24-hour Estimated Observed Rainfall ending at 7am CDT 06/09/2021.



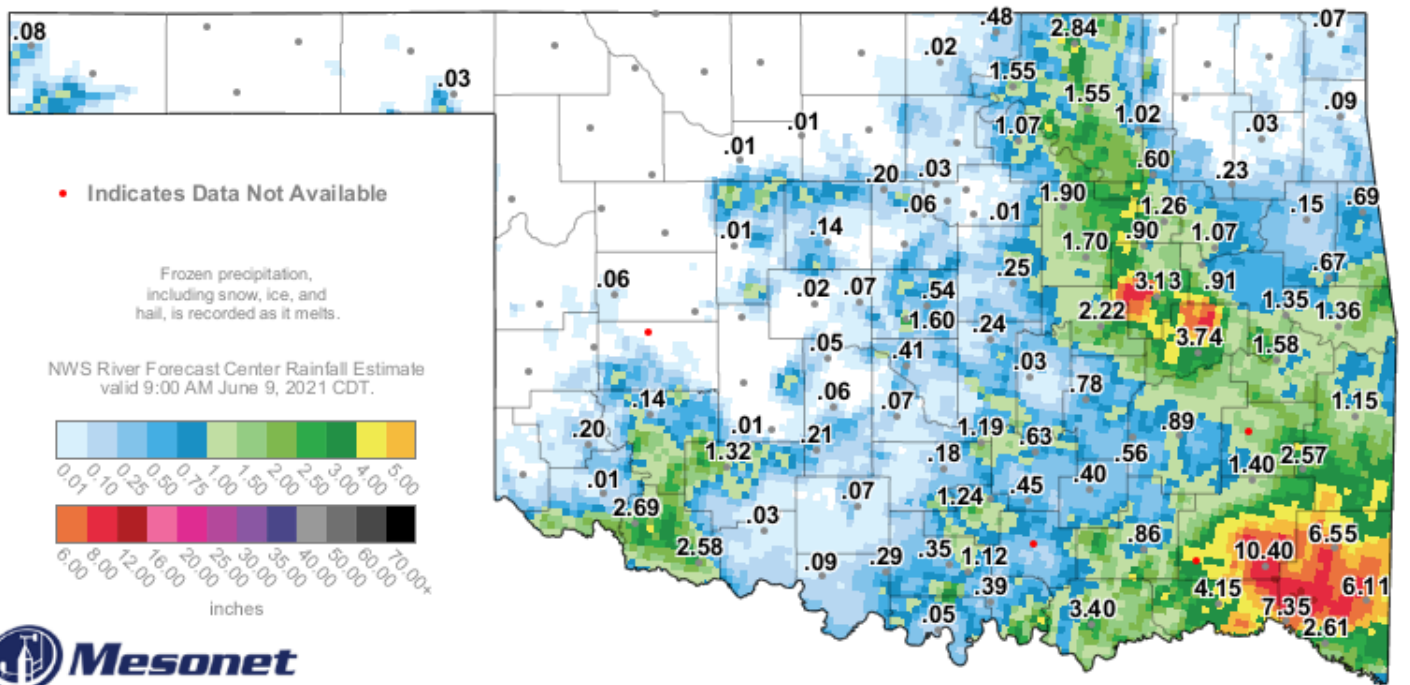
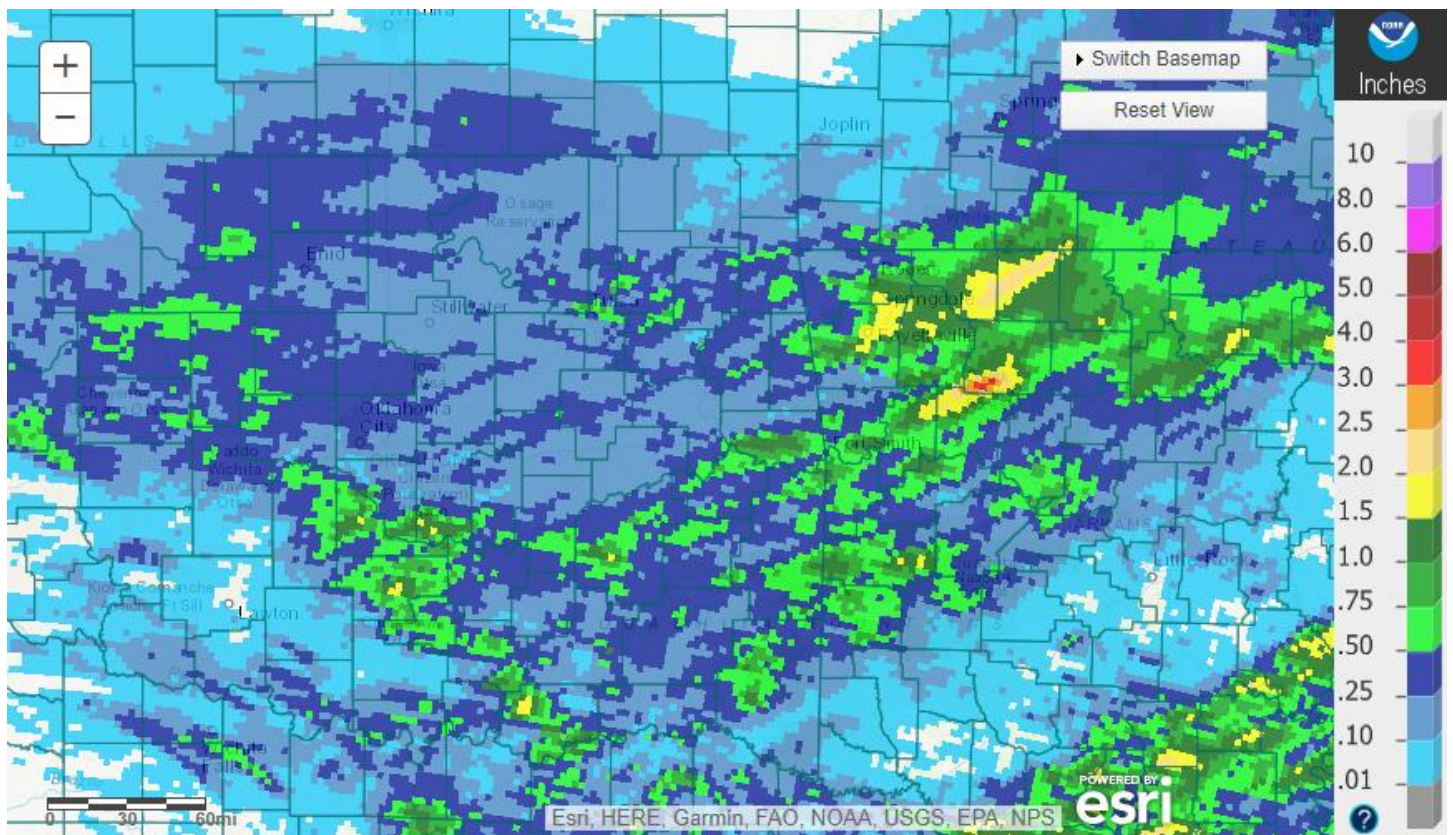


Fig. 15. OK Mesonet (values) and NWS RFC rainfall estimate (image) 4-day rainfall ending at 10:00 am CDT 6/09/2021.



Tulsa, OK: June 22, 2021 1-Day Observed Precipitation  
Valid on: June 22, 2021 12:00 UTC

Fig. 16. 24-hour Estimated Observed Rainfall ending at 7am CDT 06/22/2021.

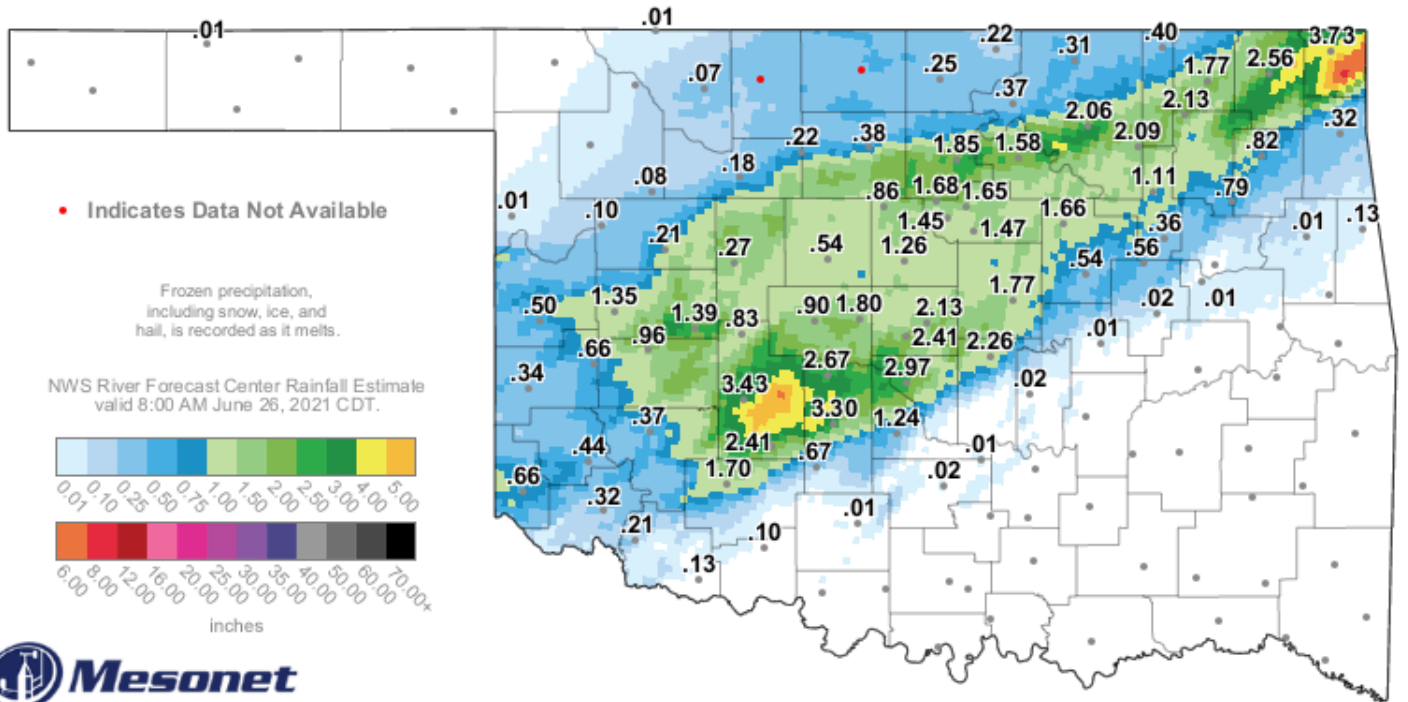
Another long period of active weather, due to a nearly stationary front in the area, brought more flooding to the area starting early on the 26<sup>th</sup>. Two areas of storms first developed on the 25<sup>th</sup>: one near a cold front in KS (which brought heavy rain to the upper Neosho River basin) and another across western OK that moved east as a mesoscale convective system (MCS). These two areas began to converge across northeast OK just after midnight on the 27<sup>th</sup>. These storms brought heavy rain along and northwest of I-44 through most of the morning, before weakening and dissipating around noon. 4"-8" of rain fell across Ottawa County between 2:30 and 9:30 am CDT (Figs. 17, 18). Most of the Neosho River basin in eastern KS received 1.5"-8" of rain as well, resulting in flooding along the Neosho River near Commerce (Fig 19; see preliminary hydrographs at the end of this report and the E3 Report for details). Elsewhere along and north of the I-44 corridor in OK, rainfall totals were around 1"-4" (Fig. 19).

Thunderstorms began to develop again across northeast OK during the evening of the 26<sup>th</sup> as the southerly low-level jet increased and interacted with a leftover outflow boundary from the early storms. With precipitable water values around 2", heavy rainfall once again occurred. Nearly 1" of rain fell in just 10 minutes as measured by the Bartlesville ASOS, with flash flooding reported across the city, water completely covering Highway 75 between Highway 60 and Price Rd., and drains backwashing out of the sewers. These storms continued to expand across much of northeast OK and northwest AR during the evening and overnight hours as a mesoscale convective vortex (MCV) lifted east northeast out of southwest OK and further enhanced the lift over the region. The convection began to diminish rapidly after sunrise as the low-level jet weakened, with just scattered showers and thunderstorms across eastern OK and northwest AR until shortly after noon on the 27<sup>th</sup>. Through mid-morning on the 27<sup>th</sup>, much of northeast OK and far northwest AR had received 1"-6" of rain, with the highest totals along the I-44 corridor (Figs. 20-22). Widespread flooding was reported across the northern half of Okmulgee County. Over the 2-day period, most of the I-44 corridor received 4"-12" of rain (Fig. 23). Minor flooding occurred along Polecat Creek near Sapulpa and Bird Creek near Owasso-Mingo, and the Neosho River near Commerce rose into moderate flood (see preliminary hydrographs at the end of this report and the E3 Report for details).

Scattered showers and thunderstorms once again developed during the afternoon and evening of the 27<sup>th</sup>, primarily southeast of the I-44 corridor. This activity then dissipated by midnight. However, another line of showers and thunderstorms developed during the early morning hours of the 28<sup>th</sup> in the vicinity of a weak surface boundary from Henryetta, OK into far northwest AR. This activity moved northward and began to dissipate with the loss of the low-level jet after sunrise. By 7 am CDT, an additional 0.25" to 3" of rain had fallen across eastern OK and northwest AR (Fig. 24). More storms developed across northeast OK later in the morning and afternoon northwest of I-44 and west of Highway 75, in closer proximity to the stationary front. During the heat of the afternoon, a line of convection developed once again further south across east central OK and northwest AR. This line moved northwest across northeast OK through the evening, while more scattered storms continued to develop elsewhere across eastern OK and northwest AR. With a large plume of tropical moisture streaming from the Gulf of Mexico into the Southern Plains, these storms were still producing periods of heavy rainfall. Most of the rain finally waned after midnight. These storms brought another 0.25" to around 3" of rain (Fig. 26). There was a respite from the rain on the 29<sup>th</sup>, with just a few isolated storms during the afternoon and evening hours.

As the very moist airmass remained in place (precipitable water values at or above 2"), scattered convection developed across much of eastern OK and northwest AR around noon on the 30<sup>th</sup>. While much of this activity ended by evening, storms persisted across northeast OK and far northwest AR during the evening hours. The weak surface boundary across KS then sagged into northeast OK overnight, and convection renewed near it in the pre-dawn hours of July 1<sup>st</sup> as the low-level jet strengthened. Scattered showers and thunderstorms continued to spread southward across eastern OK and northwest AR through the morning and afternoon hours of the 1<sup>st</sup>. This activity weakened and dissipated by late evening, finally marking an end to this active weather pattern. Rainfall totals over the two days ranged from around 0.25" to around 5" across the region, with the highest totals once again over northeast OK (Figs. 27- 29). Rises occurred along Bird Creek, with minor flooding near Owasso-Mingo (see preliminary hydrographs at the end of this report and the E3 Report for details). 2"-10" of rain fell over the Deep Fork River basin over a 7-day period (Figs. 30, 31), with near major flooding occurring along the Deep Fork River near Beggs (see preliminary hydrographs at the end of this report and the E3 Report for details).



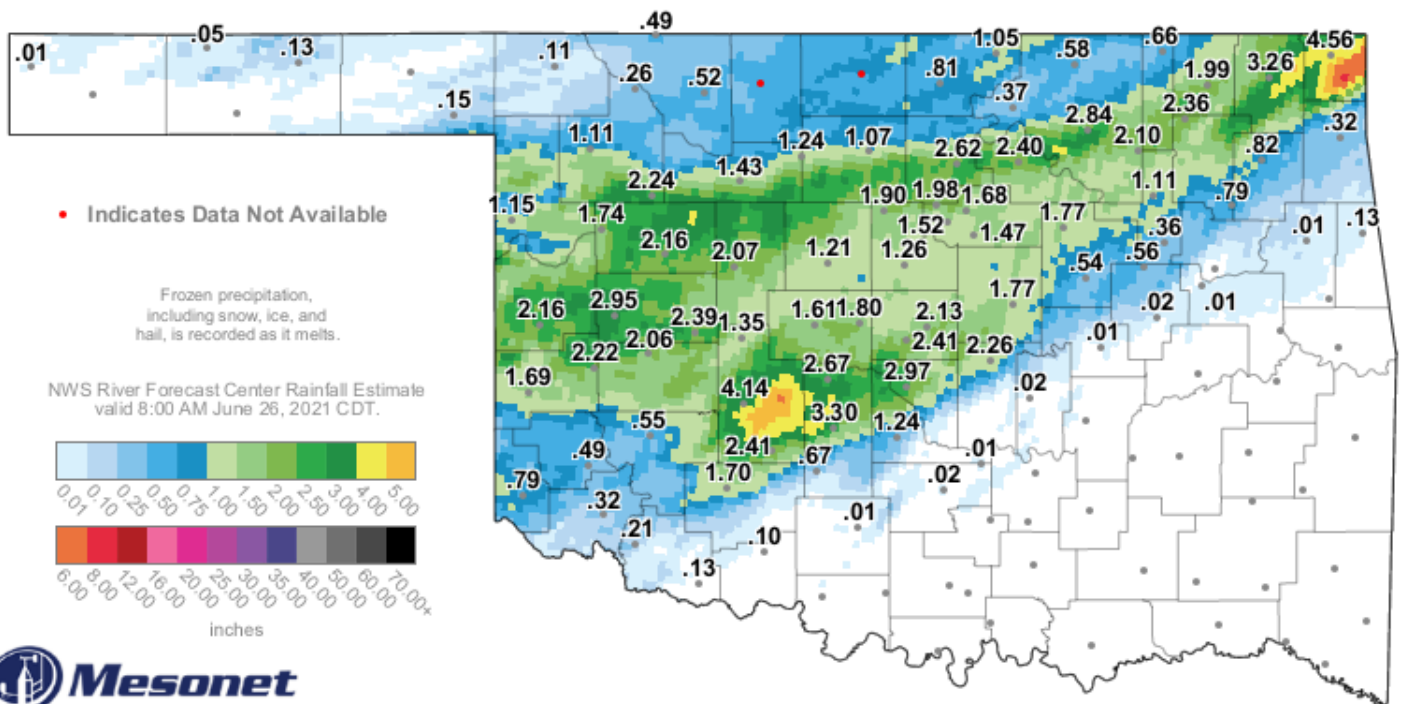


### 6-Hour Rainfall Accumulation (inches)

9:30 AM June 26, 2021 CDT

Created 9:35:54 AM June 26, 2021 CDT. © Copyright 2021

Fig. 17. OK Mesonet (values) and NWS RFC rainfall estimate (image) 6-hour rainfall ending at 09:30 am CDT 6/26/2021.



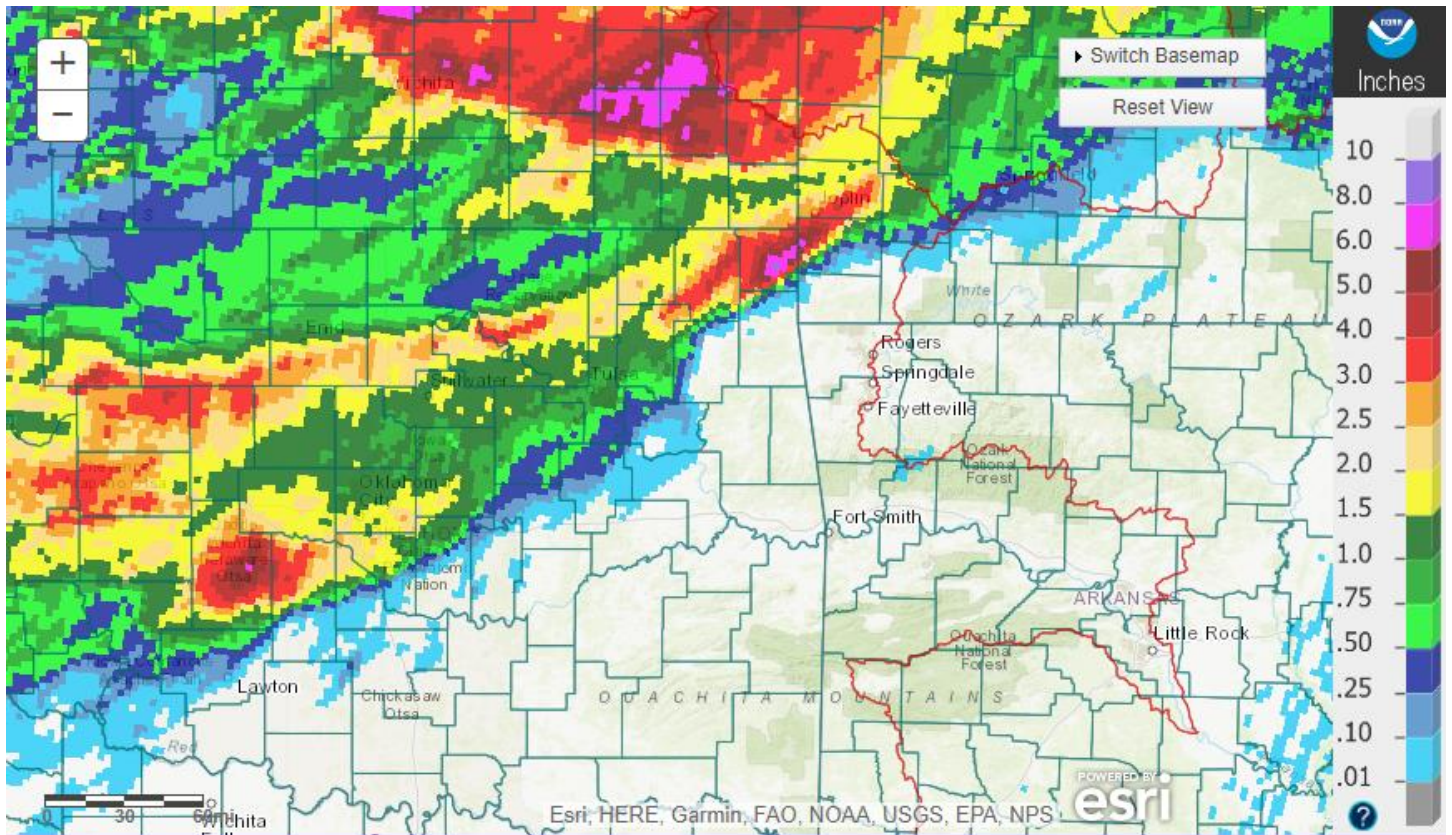
### 12-Hour Rainfall Accumulation (inches)

9:30 AM June 26, 2021 CDT

Created 9:35:54 AM June 26, 2021 CDT. © Copyright 2021

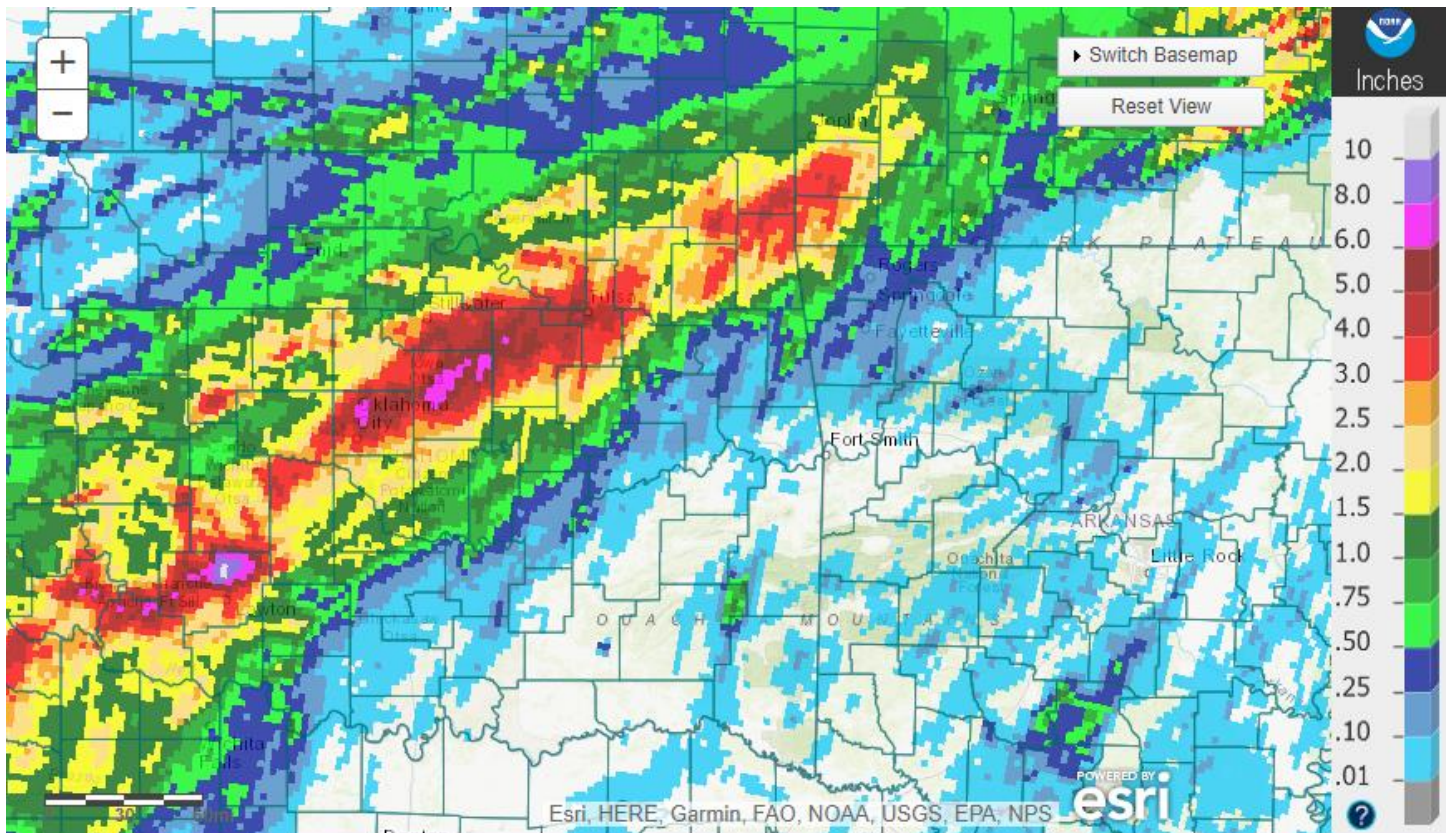
Fig. 18. OK Mesonet (values) and NWS RFC rainfall estimate (image) 12-hour rainfall ending at 09:30 am CDT 6/26/2021.





Tulsa, OK: June 26, 2021 1-Day Observed Precipitation  
Valid on: June 26, 2021 12:00 UTC

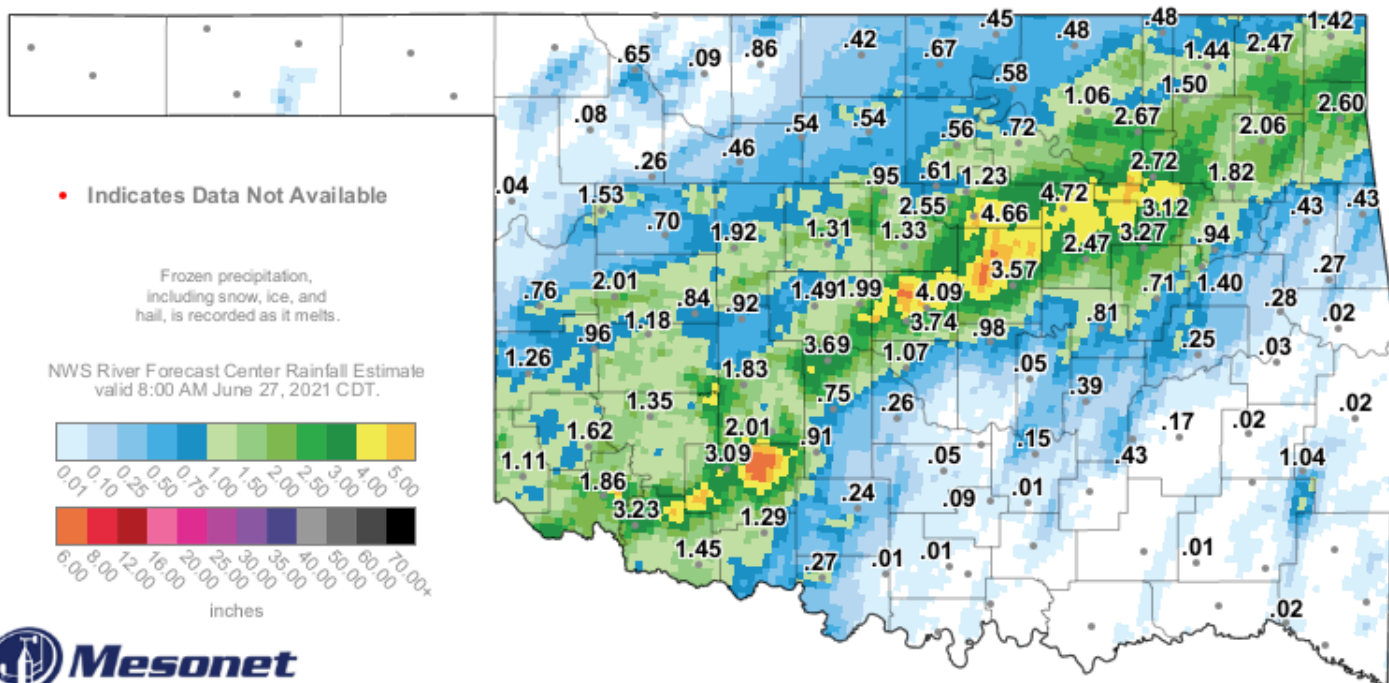
Fig. 19. 24-hour Estimated Observed Rainfall ending at 7am CDT 06/26/2021.



Tulsa, OK: June 27, 2021 1-Day Observed Precipitation  
Valid on: June 27, 2021 12:00 UTC

Fig. 20. 24-hour Estimated Observed Rainfall ending at 7am CDT 06/27/2021.



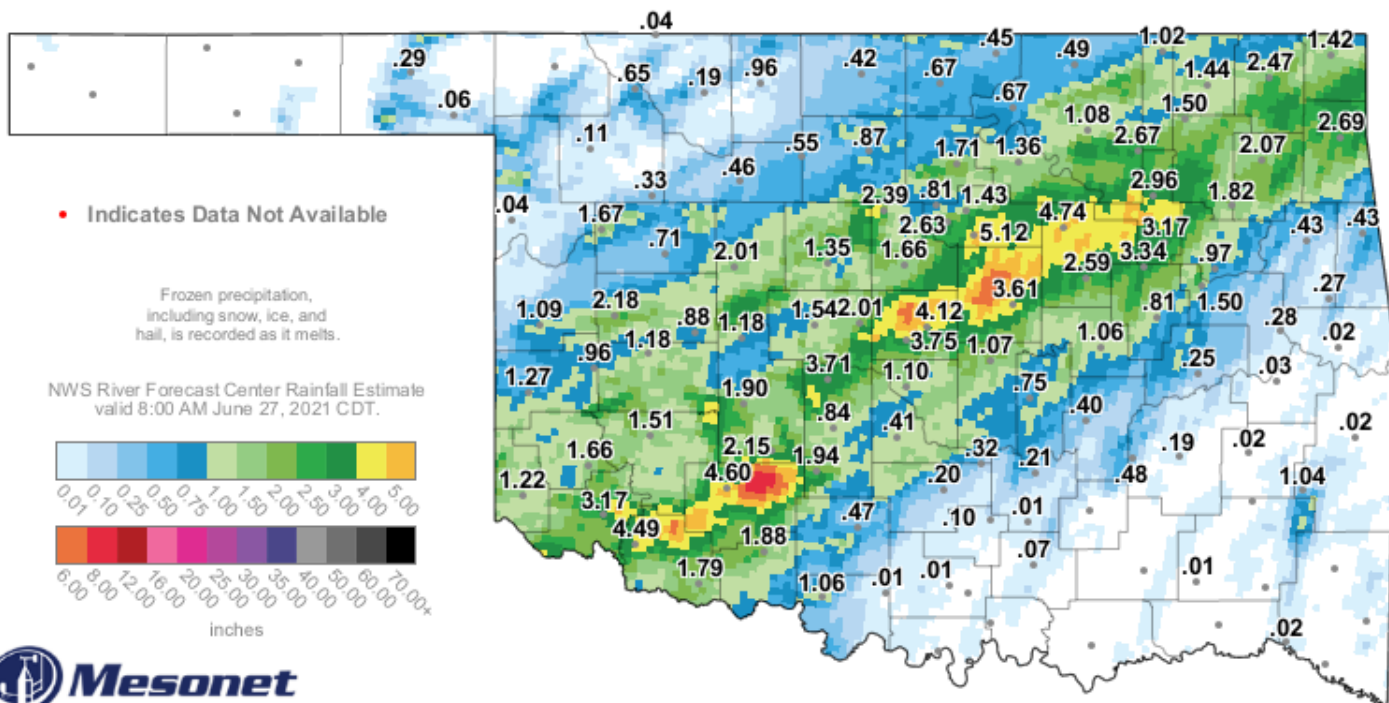


### 12-Hour Rainfall Accumulation (inches)

9:35 AM June 27, 2021 CDT

Created 9:39:40 AM June 27, 2021 CDT. © Copyright 2021

Fig. 21. OK Mesonet (values) and NWS RFC rainfall estimate (image) 12-hour rainfall ending at 09:35 am CDT 6/27/2021.

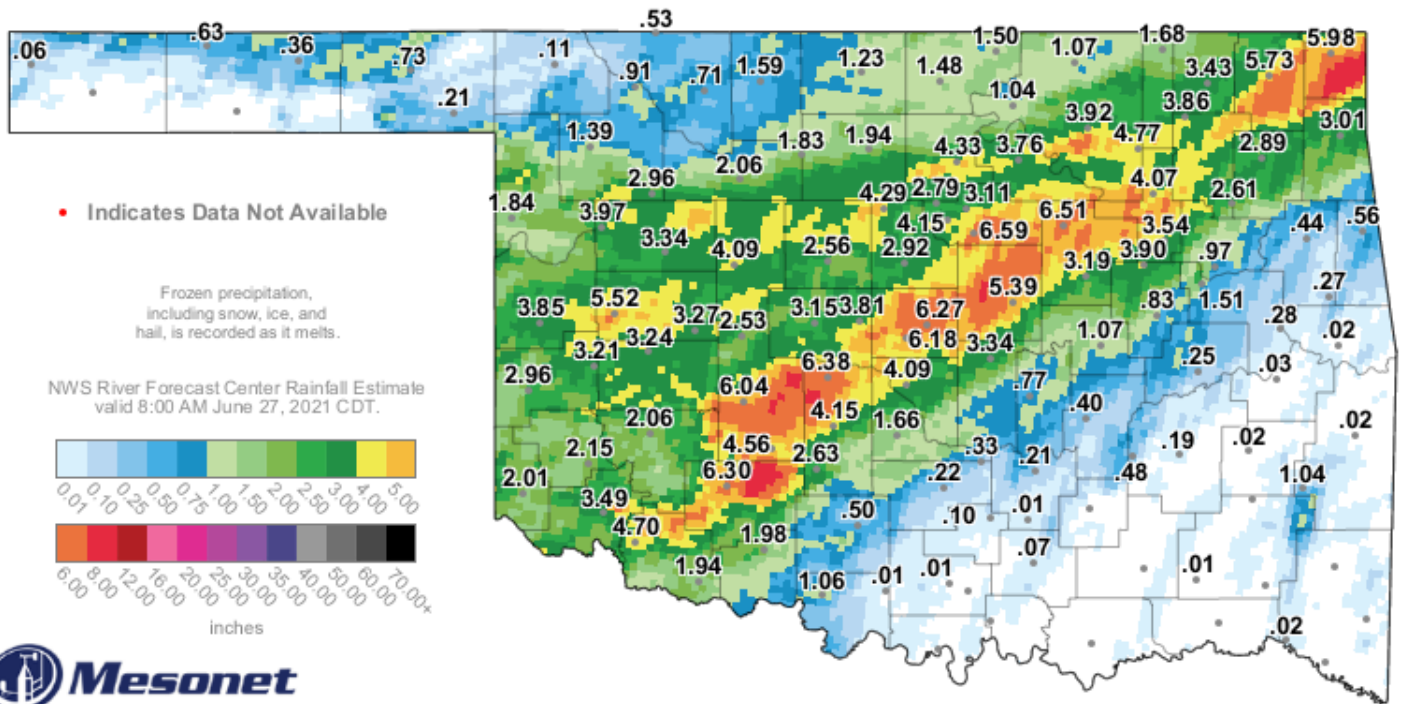


### 24-Hour Rainfall Accumulation (inches)

9:35 AM June 27, 2021 CDT

Created 9:39:40 AM June 27, 2021 CDT. © Copyright 2021

Fig. 22. OK Mesonet (values) and NWS RFC rainfall estimate (image) 24-hour rainfall ending at 09:35 am CDT 6/27/2021.

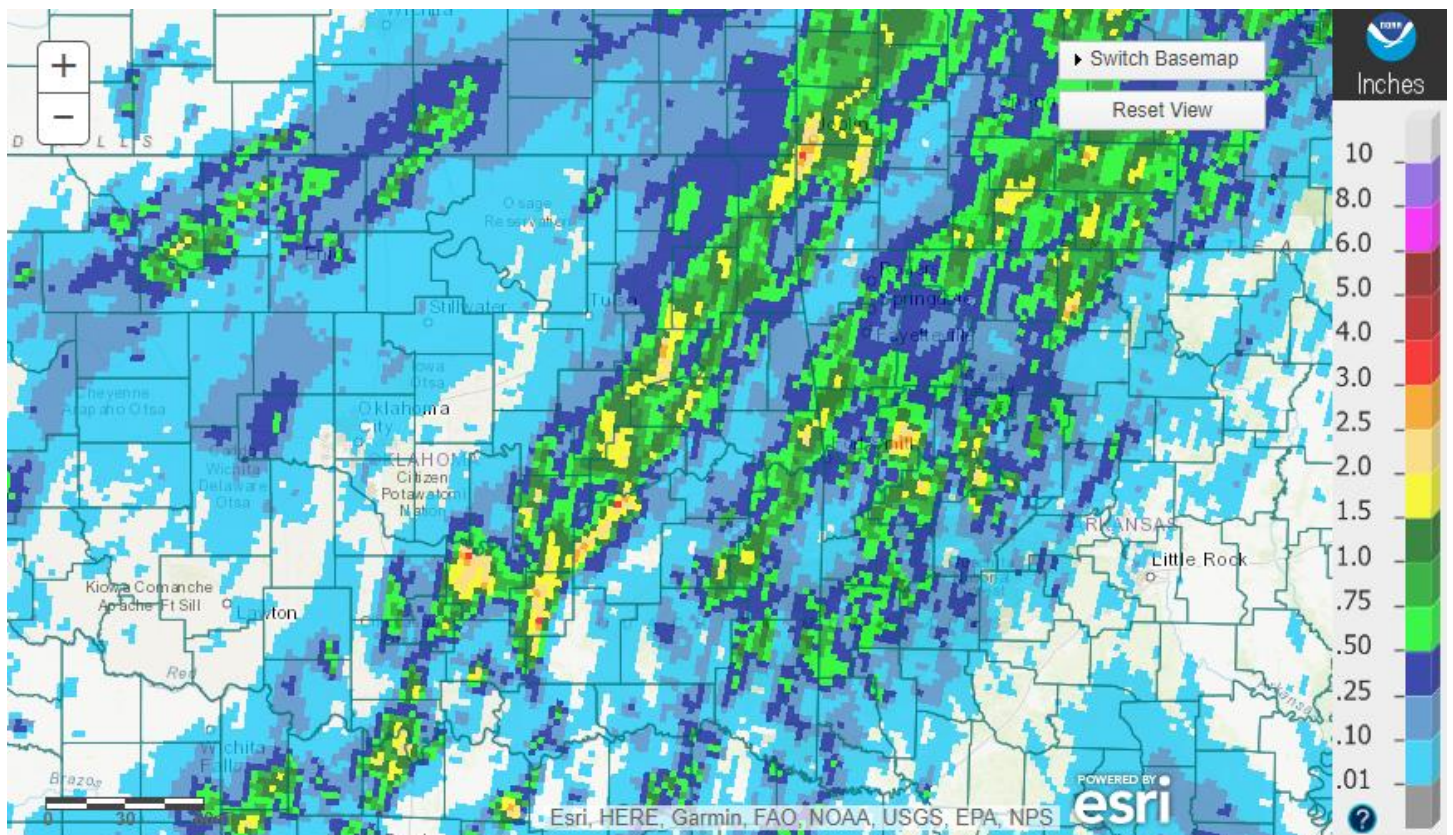


## 2-Day Rainfall Accumulation (inches)

9:35 AM June 27, 2021 CDT

Created 9:39:40 AM June 27, 2021 CDT. © Copyright 2021

Fig. 23. OK Mesonet (values) and NWS RFC rainfall estimate (image) 2-day rainfall ending at 09:35 am CDT 6/27/2021.

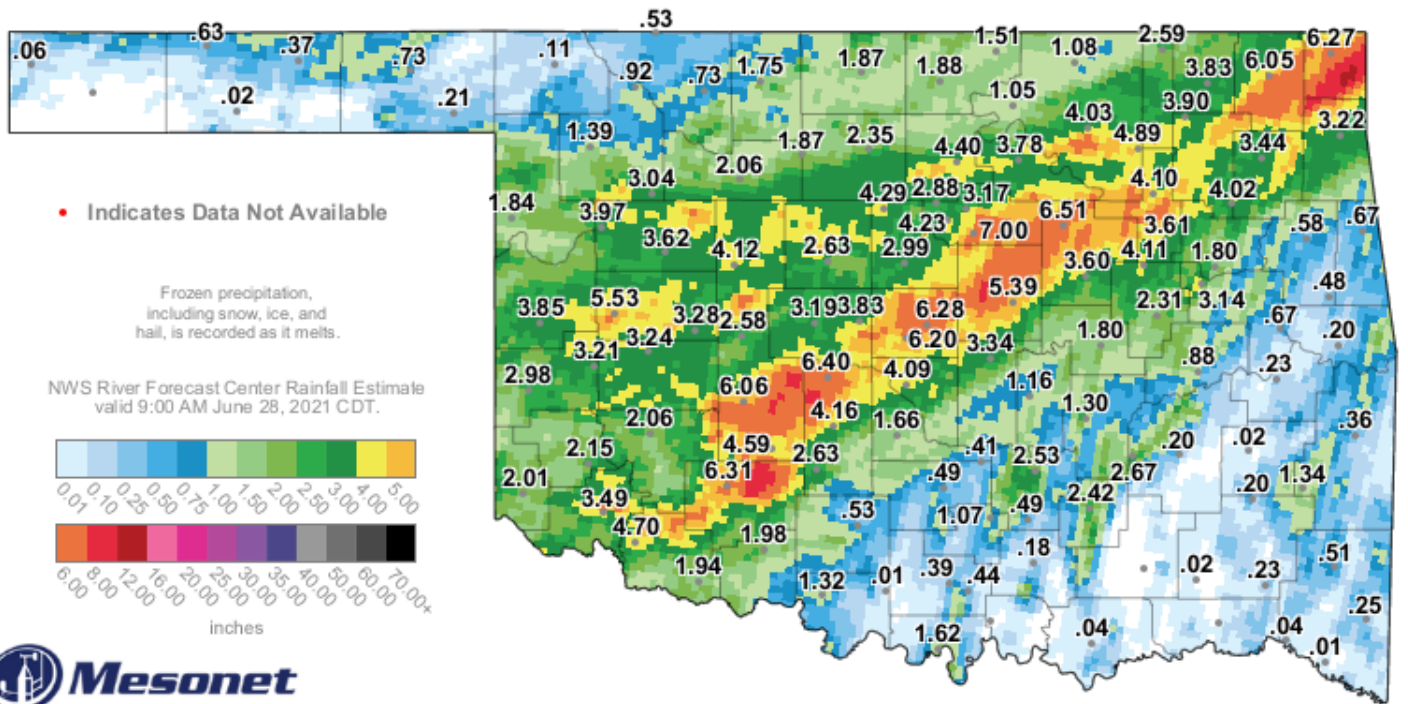


Tulsa, OK: June 28, 2021 1-Day Observed Precipitation

Valid on: June 28, 2021 12:00 UTC

Fig. 24. 24-hour Estimated Observed Rainfall ending at 7am CDT 06/28/2021.



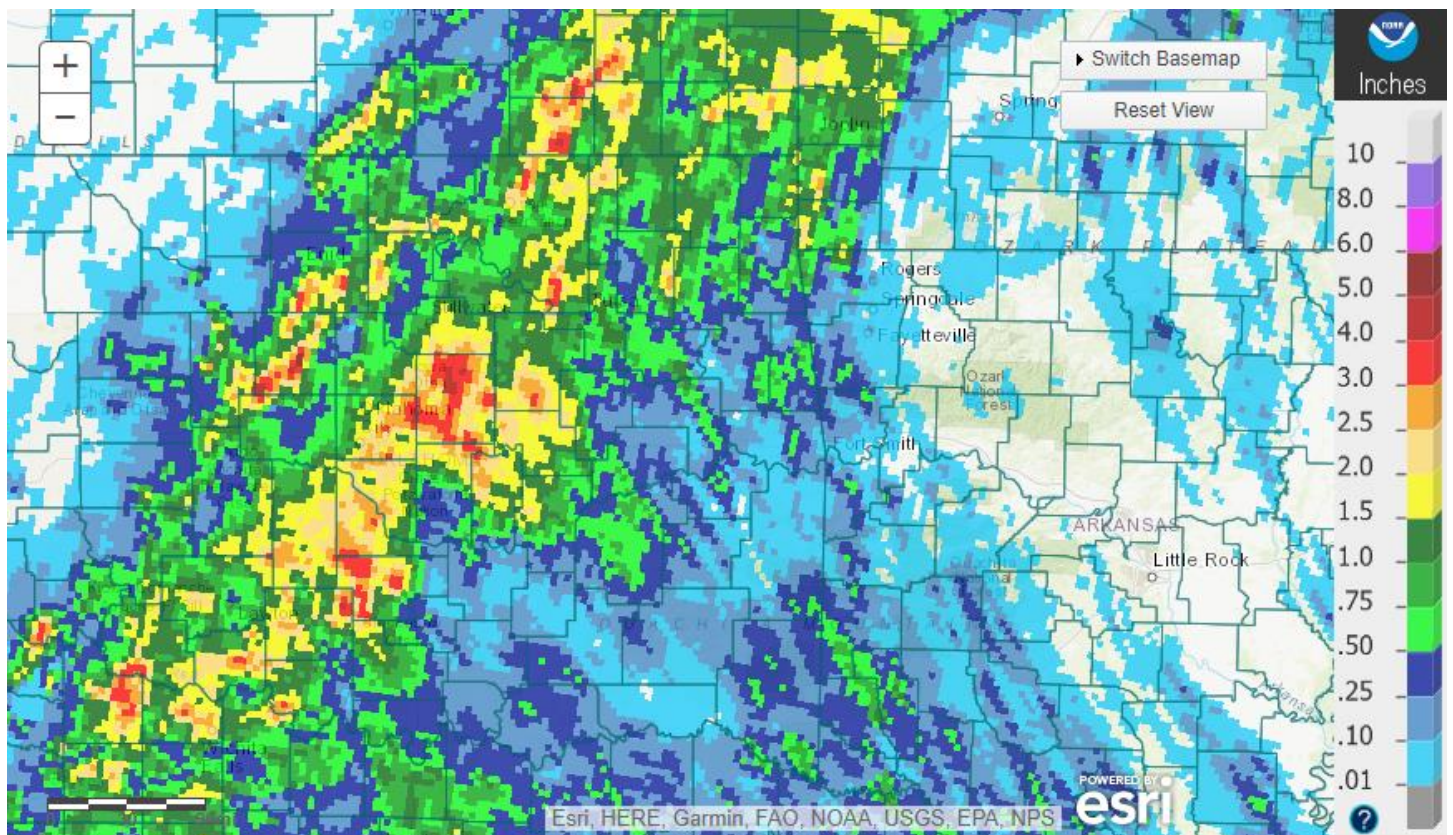


### 3-Day Rainfall Accumulation (inches)

9:50 AM June 28, 2021 CDT

Created 9:55:57 AM June 28, 2021 CDT. © Copyright 2021

Fig. 25. OK Mesonet (values) and NWS RFC rainfall estimate (image) 3-day rainfall ending at 09:50 am CDT 6/28/2021.

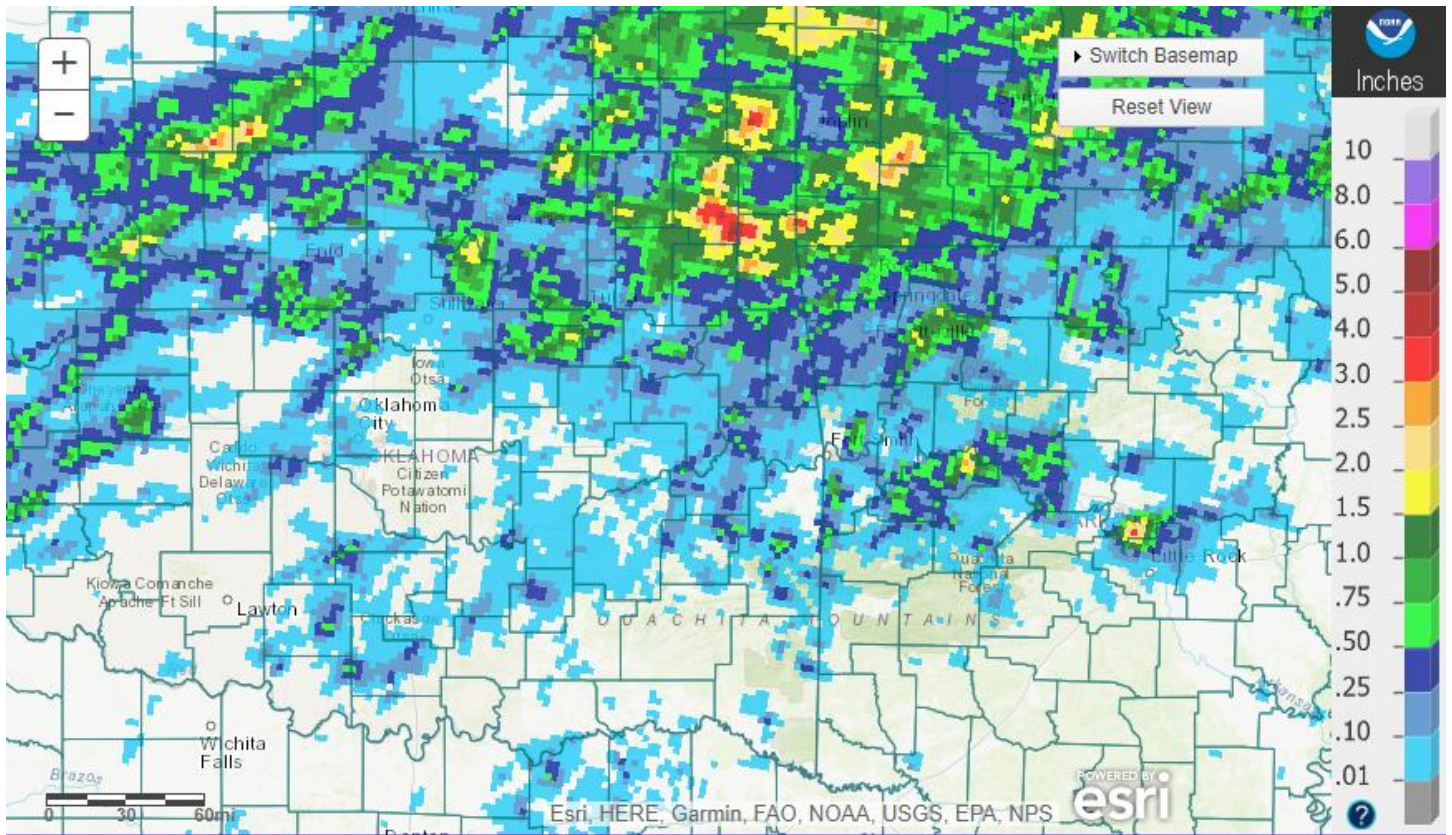


Tulsa, OK: June 29, 2021 1-Day Observed Precipitation

Valid on: June 29, 2021 12:00 UTC

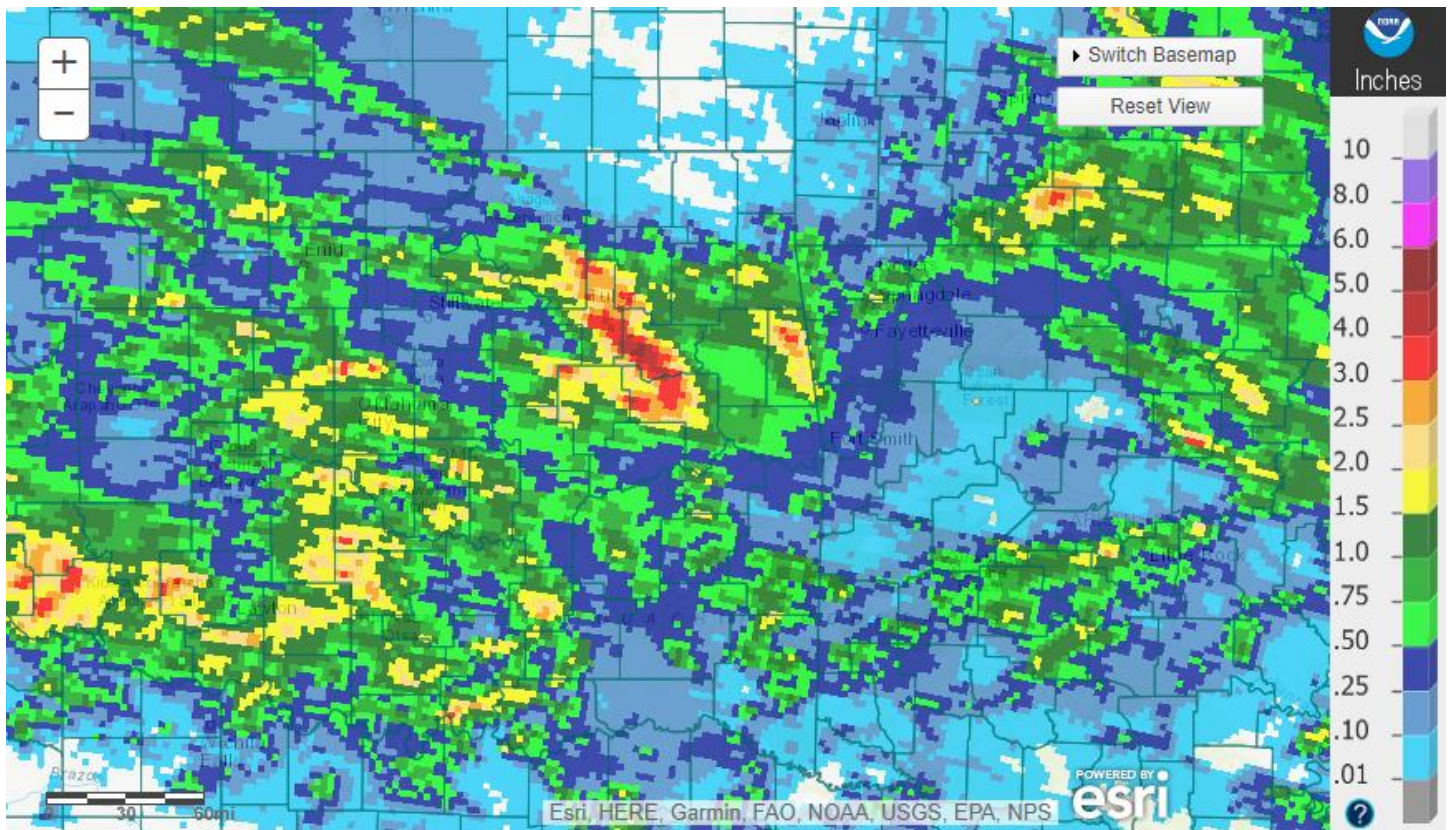
Fig. 26. 24-hour Estimated Observed Rainfall ending at 7am CDT 06/29/2021.





Tulsa, OK: July 01, 2021 1-Day Observed Precipitation  
 Valid on: July 01, 2021 12:00 UTC

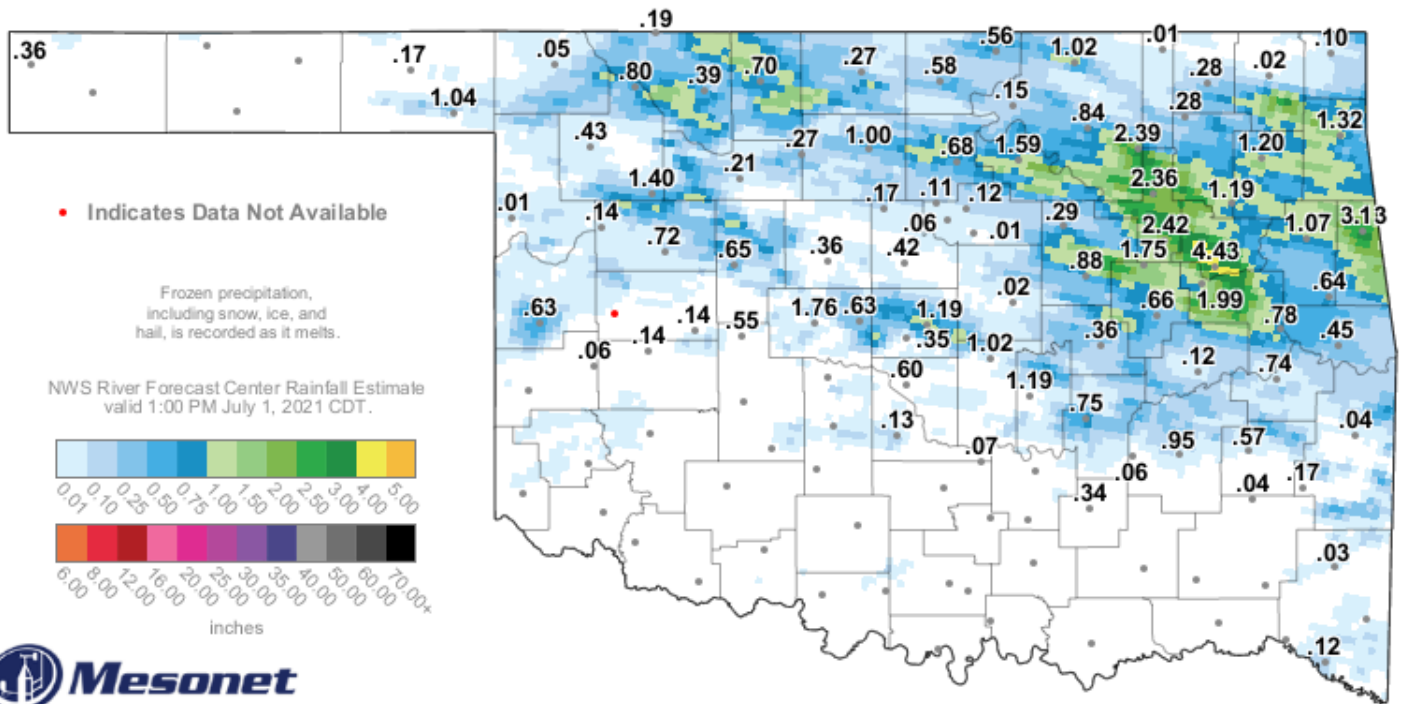
Fig. 27. 24-hour Estimated Observed Rainfall ending at 7am CDT 07/01/2021.



Tulsa, OK: July 02, 2021 1-Day Observed Precipitation  
 Valid on: July 02, 2021 12:00 UTC

Fig. 28. 24-hour Estimated Observed Rainfall ending at 7am CDT 07/02/2021.



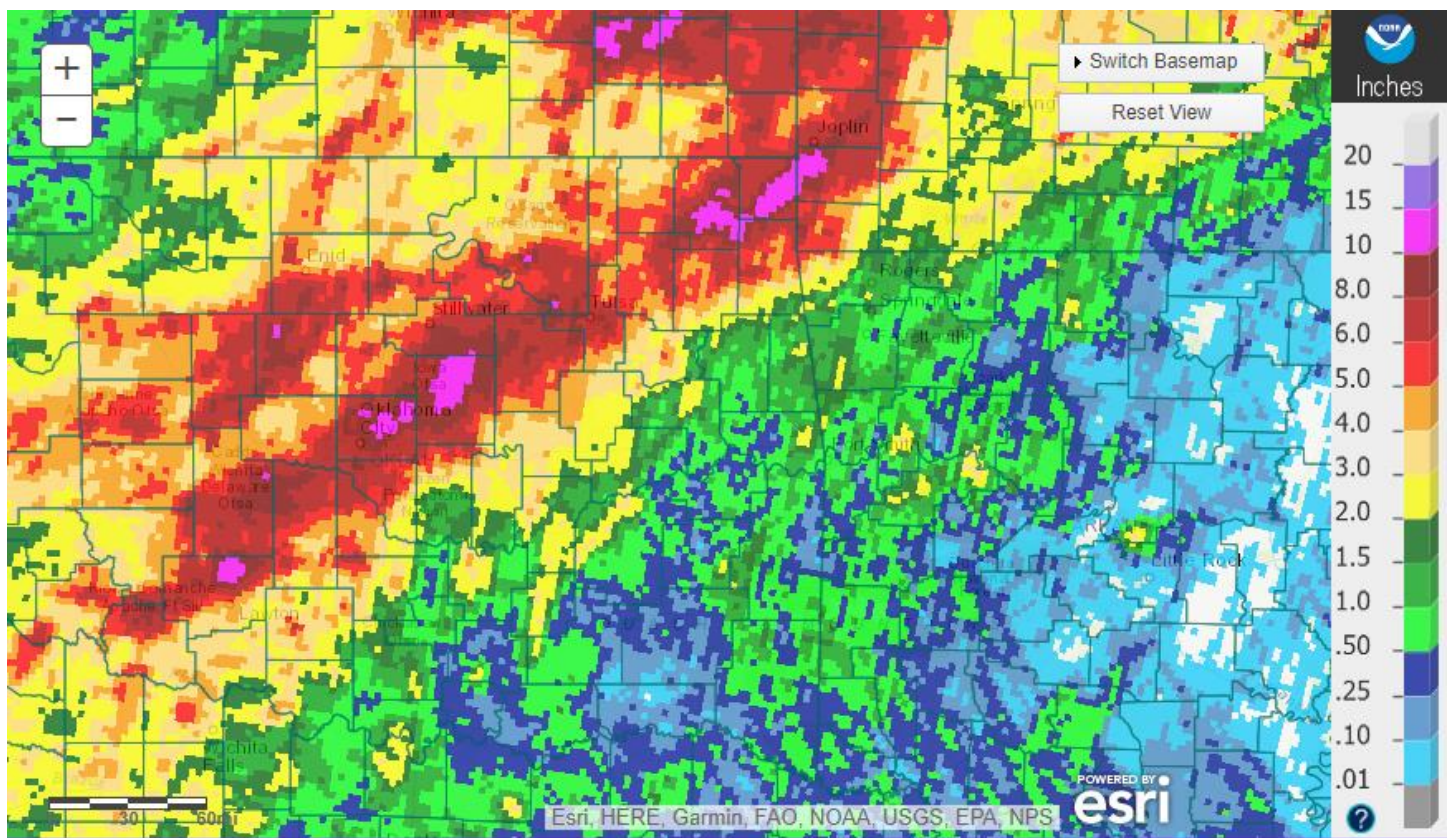


### 12-Hour Rainfall Accumulation (inches)

2:40 PM July 1, 2021 CDT

Created 2:45:53 PM July 1, 2021 CDT. © Copyright 2021

Fig. 29. OK Mesonet (values) and NWS RFC rainfall estimate (image) 12-hour rainfall ending at 02:40 pm CDT 7/01/2021.



Tulsa, OK: Last 7-Day Observed Precipitation  
Valid on: July 01, 2021 12:00 UTC

Fig. 30. 7-Day Estimated Observed Rainfall ending at 7am CDT 07/01/2021.

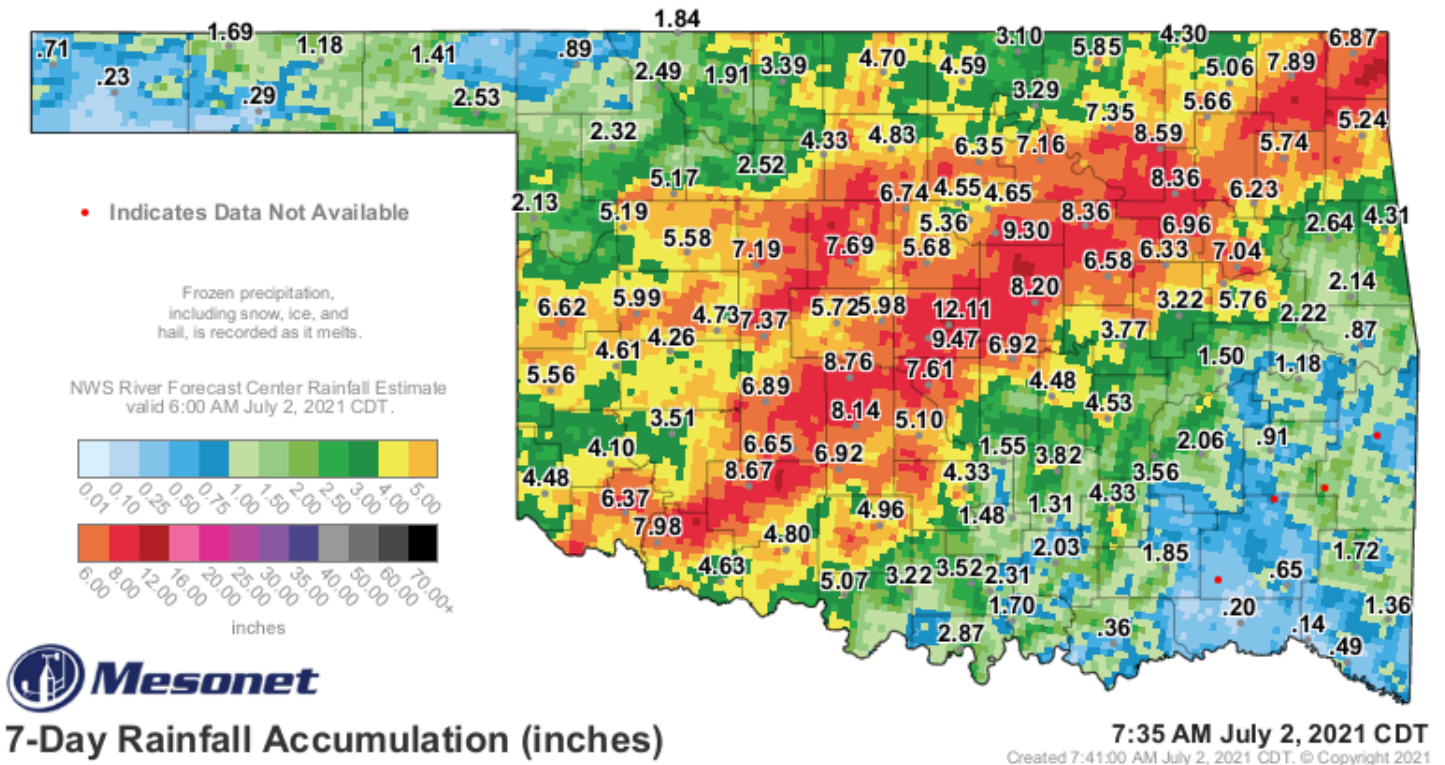


Fig. 31. OK Mesonet (values) and NWS RFC rainfall estimate (image) 7-day rainfall ending at 07:35 am CDT 7/02/2021.

Written by:

Nicole McGavock  
 Service Hydrologist  
 WFO Tulsa

**Products issued in June 2021:**

- \*CWYO2 became a daily river forecast point September 7, 2016
- \*MLBA4 and OZGA4 transferred to NWS Tulsa HSA February 5, 2014
- \*Mixed case River Flood products began July 31, 2013

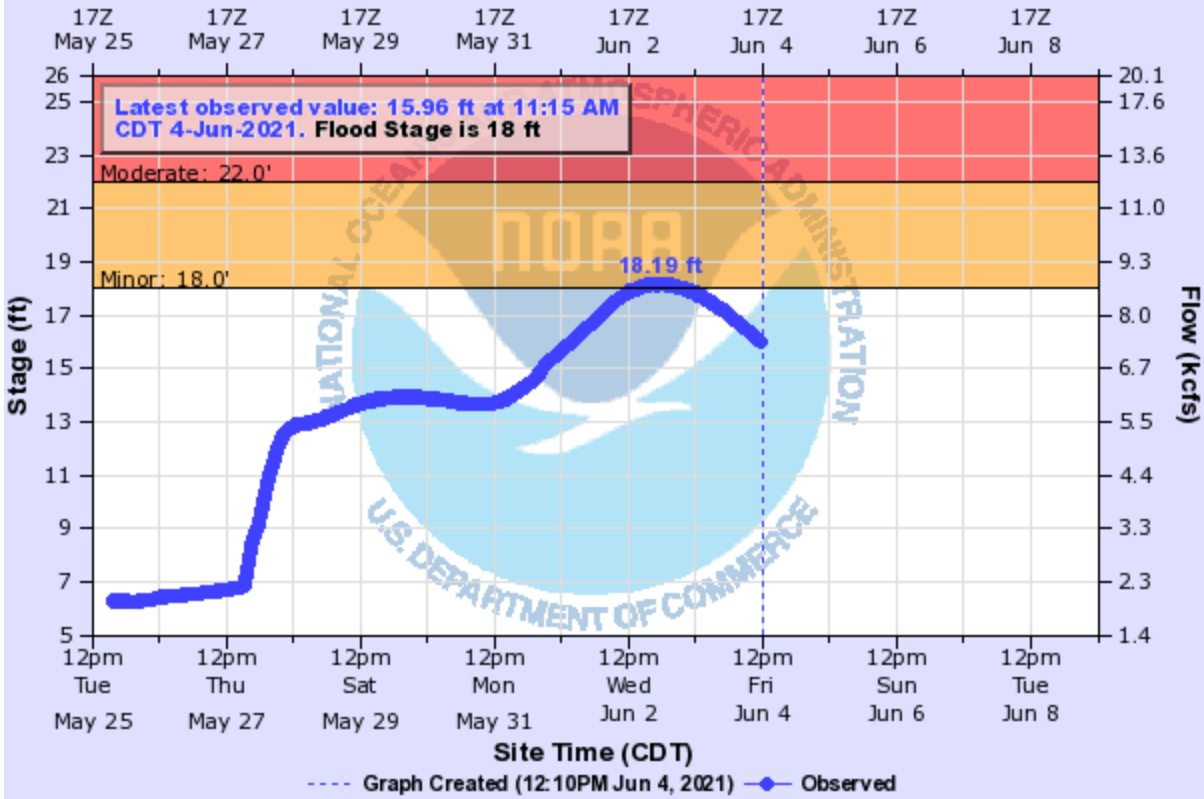
- 16 Flash Flood Warnings (FFW)
- 12 Flash Flood Statements (FFS)
- 4 Flash/Areal Flood Watches (FFA) (17 Watch FFA CON/EXT/EXA/EXB/CAN)
- 43 Urban and Small Stream Advisories (FLS)
- 9 Areal Flood Warnings (FLW)
- 2 Areal Flood Statements (FLS)
- 9 River Flood Warnings (FLW) (includes category increases)
- 43 River Flood Statements (FLS)
- 1 River Flood Advisories (FLS) (10 Advisory FLS CON/EXT/CAN)
- 0 River Flood Watches (FFA) (0 Watch FFA CON/EXT/CAN)
- 0 River Statements (RVS)
- 0 Hydrologic Outlooks (ESF)
- 0 Drought Information Statements (DGT)

**Preliminary Hydrographs:**



## DEEP FORK RIVER NEAR BEGGS

Universal Time (UTC)

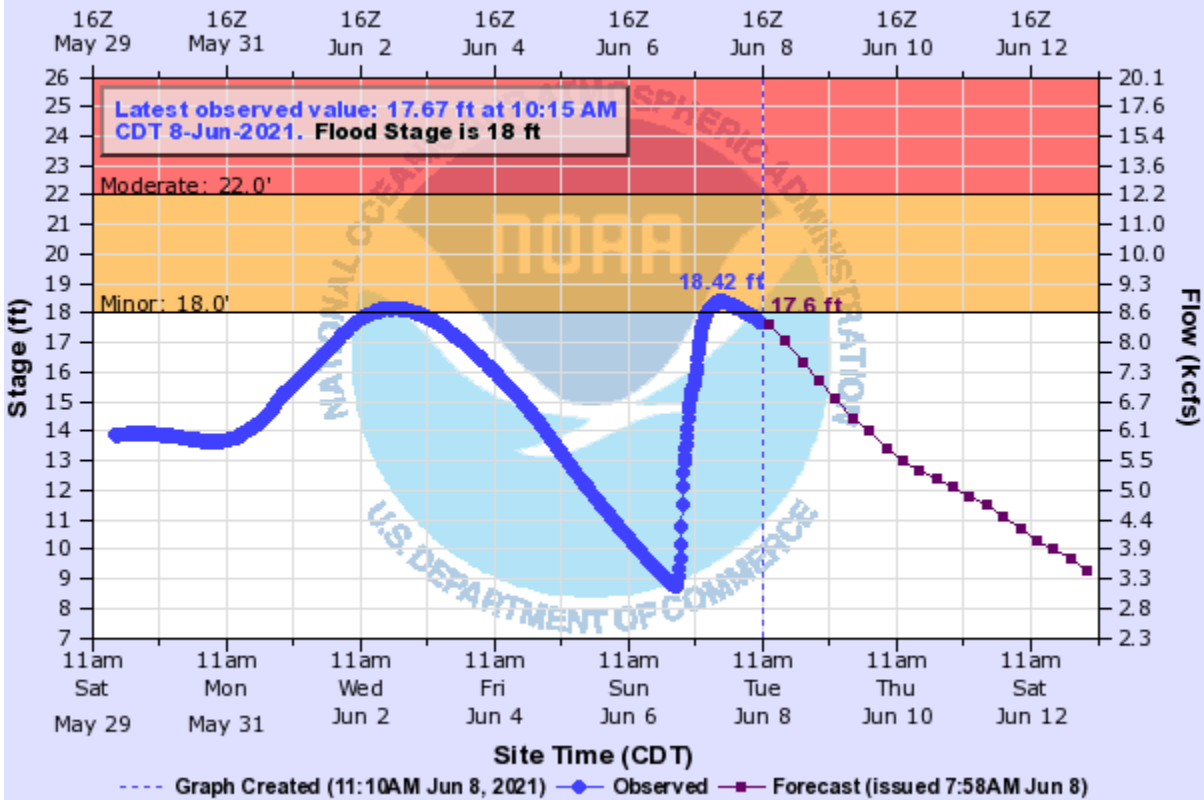


BGSO2(plotting HGIRG) "Gage 0" Datum: 632.55'

Observations courtesy of US Geological Survey

## DEEP FORK RIVER NEAR BEGGS

Universal Time (UTC)

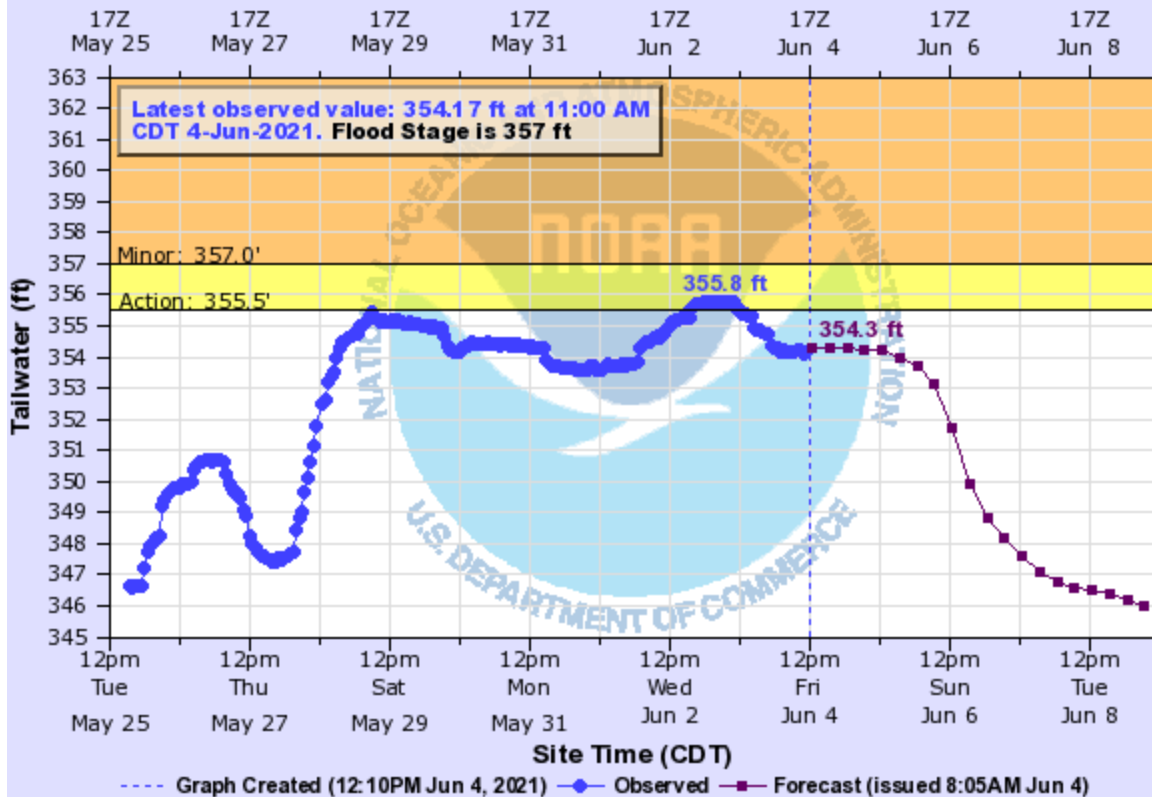


BGSO2(plotting HGIRG) "Gage 0" Datum: 632.55'

Observations courtesy of US Geological Survey

## ARKANSAS RIVER AT OZARK L/D TAILWATER

Universal Time (UTC)

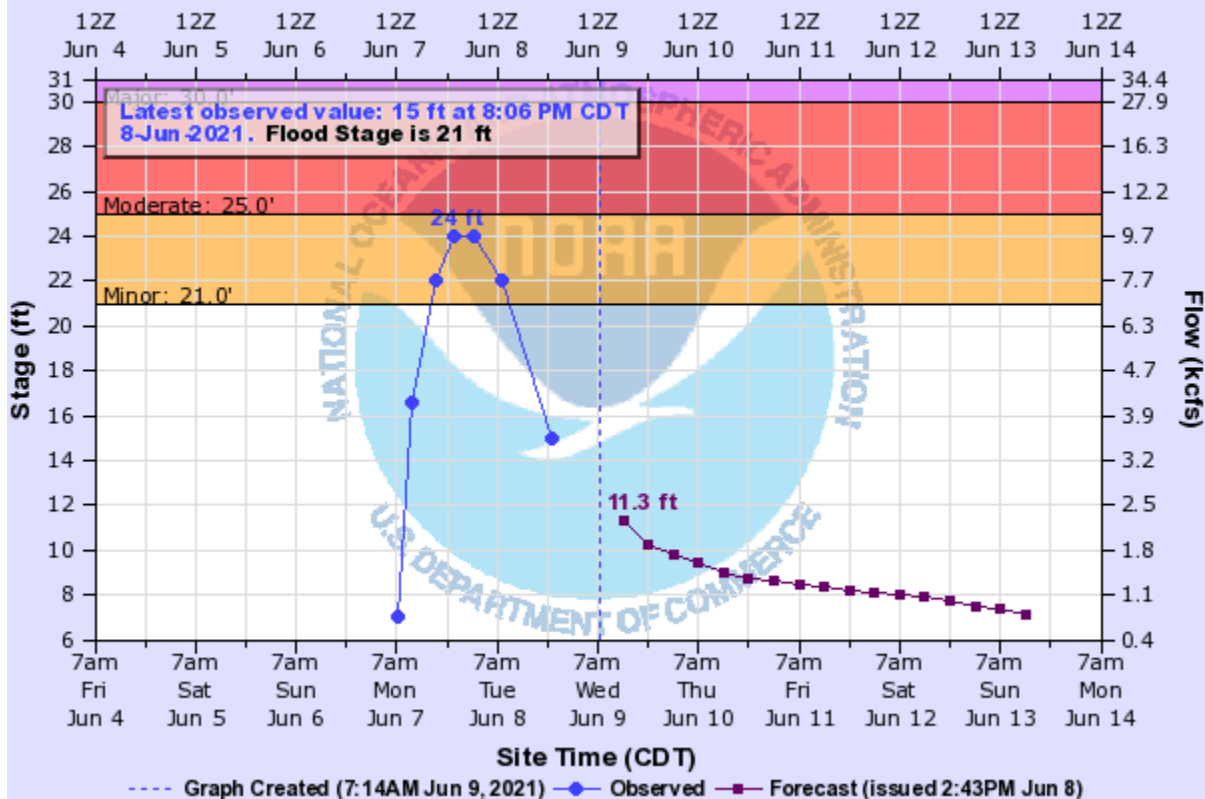


OZGA4(plotting HTIRG) "Gage 0" Datum: 0'

Observations courtesy of US Army Corps of Engineers - LRD

## POLECAT CREEK NEAR SAPULPA

Universal Time (UTC)

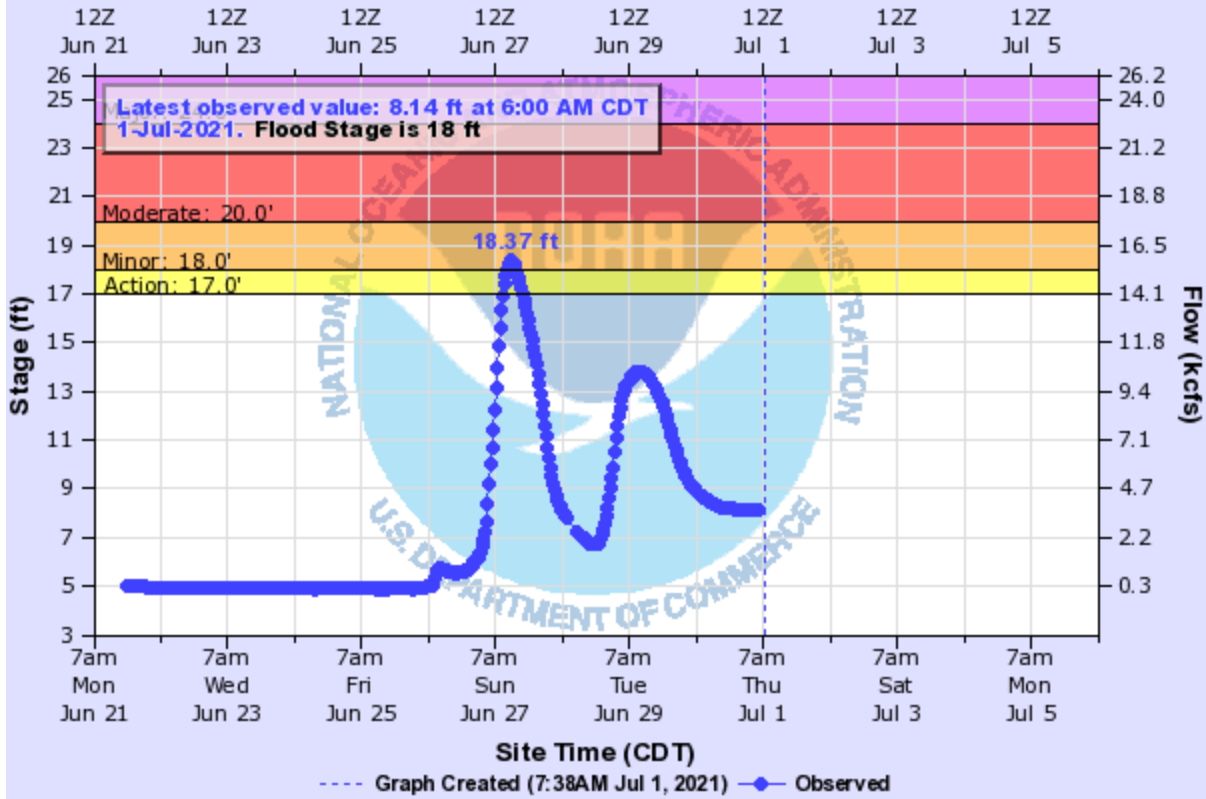


SPCO2(plotting HGIRZ) "Gage 0" Datum: 626.2'



## BIRD CREEK NEAR OWASSO

Universal Time (UTC)

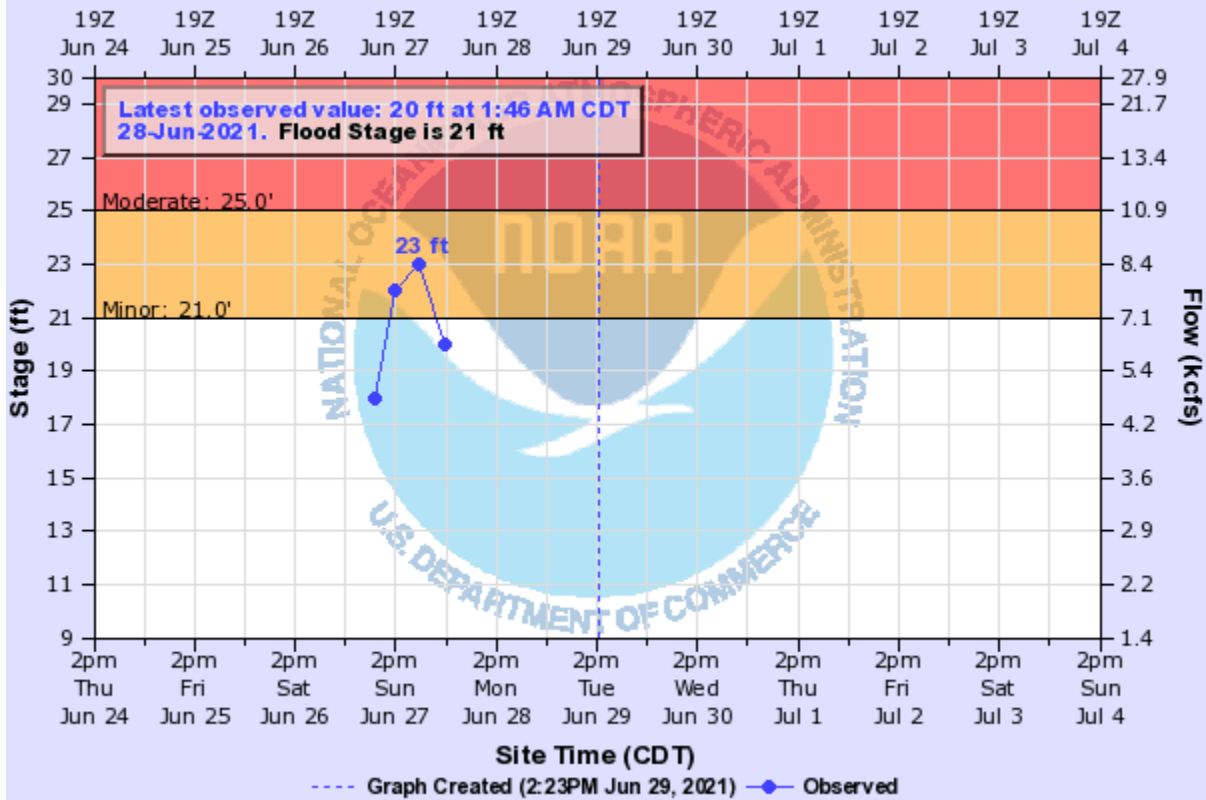


OWSO2(plotting HGIRG) "Gage 0" Datum: 560.17'

Observations courtesy of US Geological Survey

## POLECAT CREEK NEAR SAPULPA

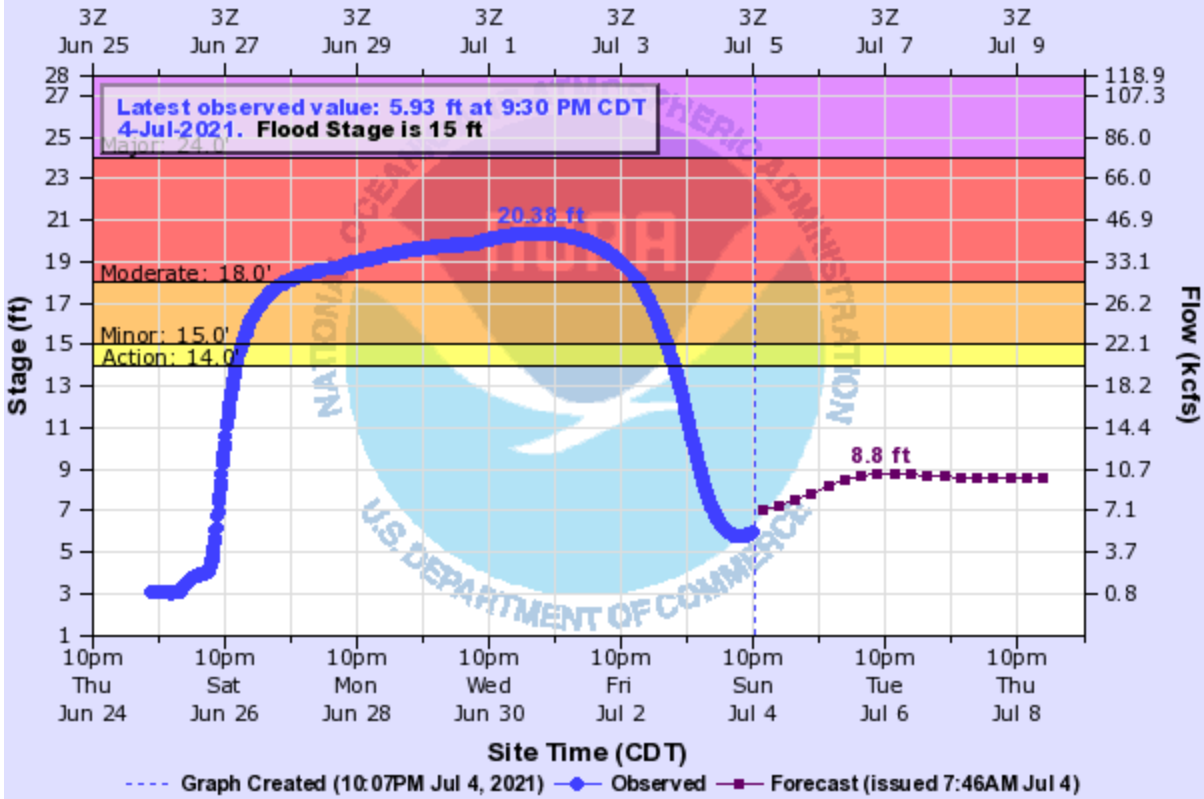
Universal Time (UTC)



SPCO2(plotting HGIRZ) "Gage 0" Datum: 626.2'

## NEOSHO RIVER NEAR COMMERCE

Universal Time (UTC)

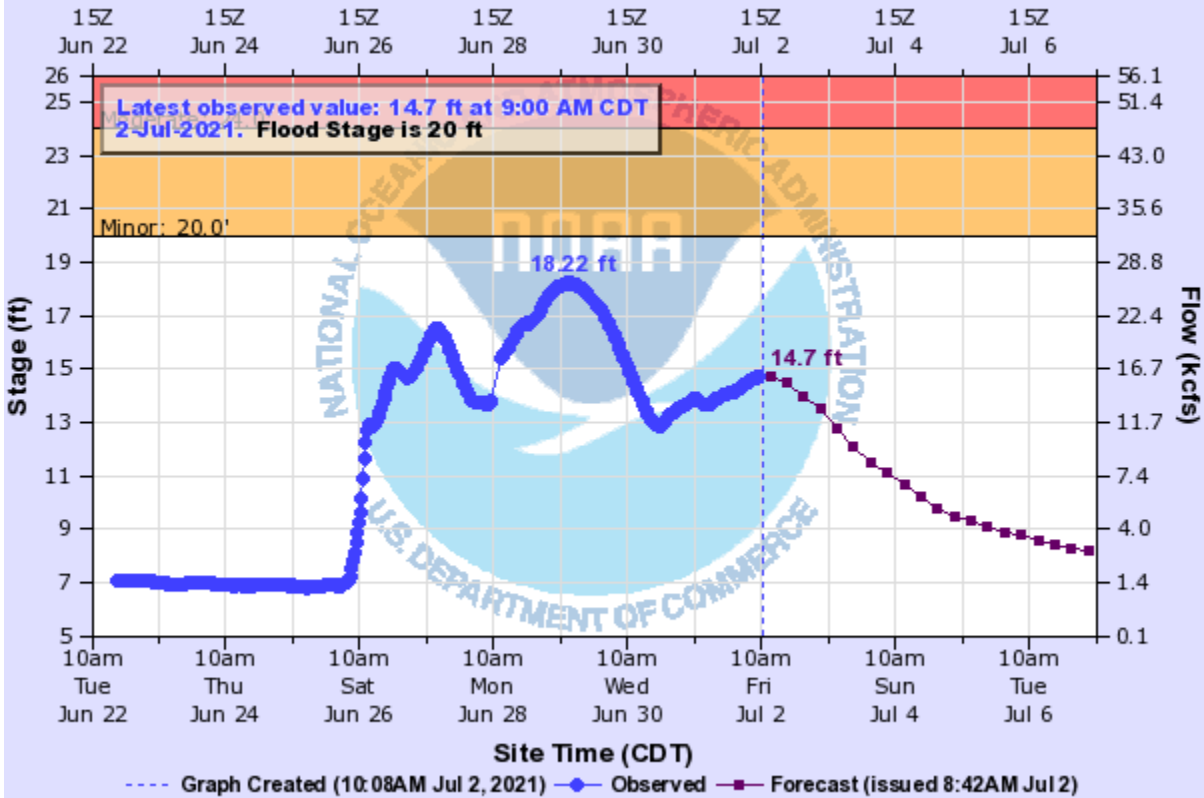


COMO2(plotting HGIRG) "Gage 0" Datum: 748.97'

Observations courtesy of US Geological Survey

## SPRING RIVER NEAR QUAPAW

Universal Time (UTC)



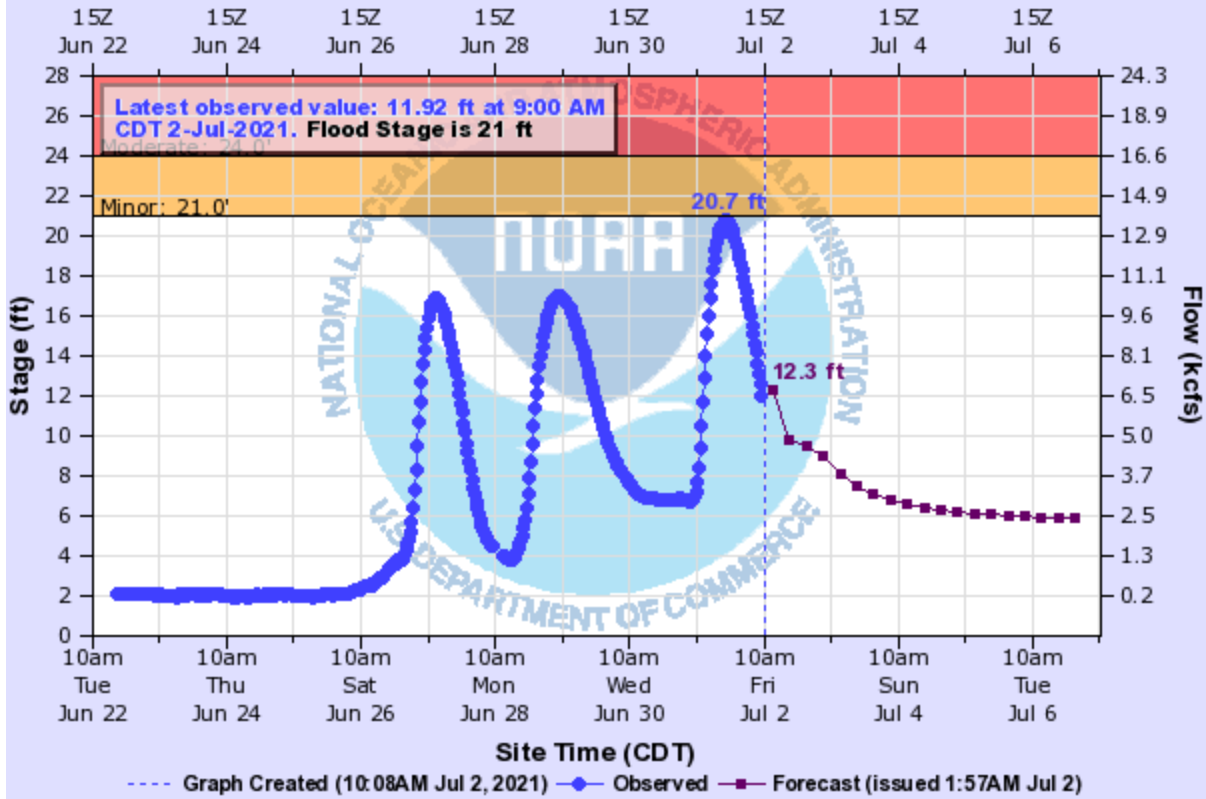
QUAO2(plotting HGIRG) "Gage 0" Datum: 746.25'

Observations courtesy of US Geological Survey



## BIRD CREEK NEAR SPERRY

Universal Time (UTC)

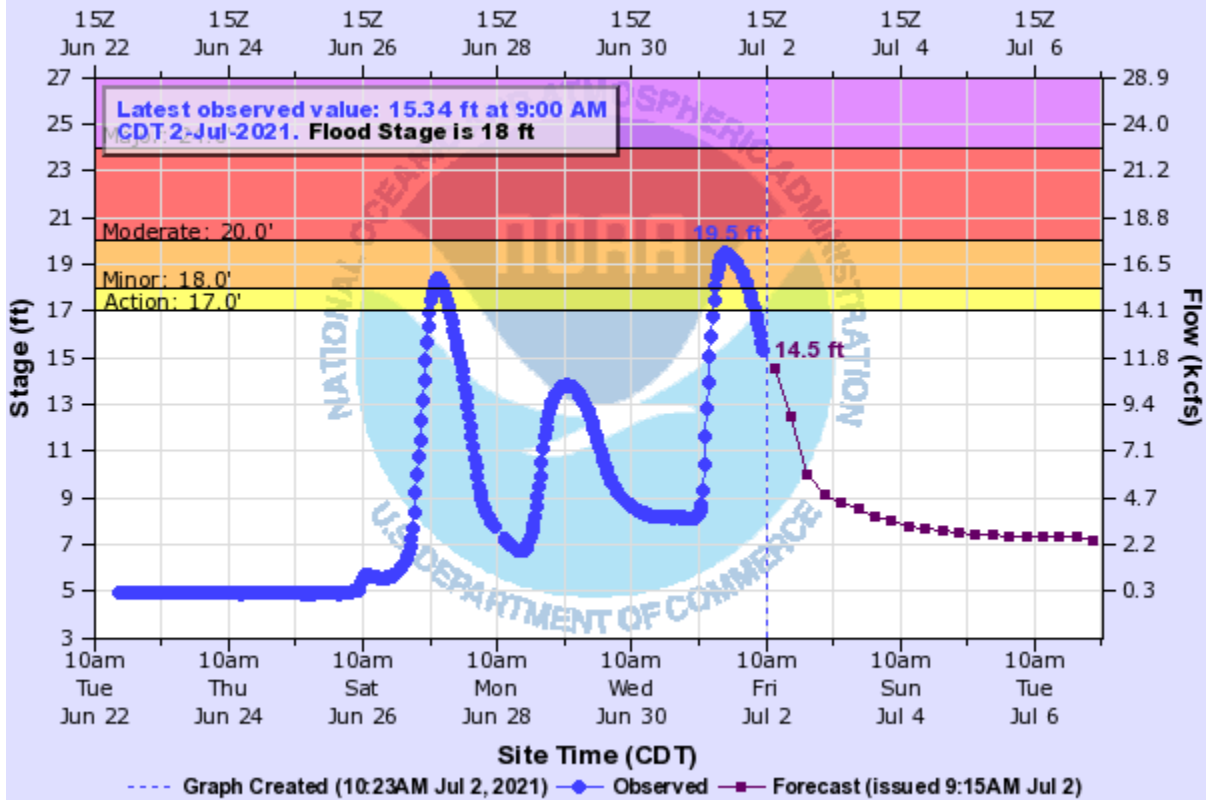


SPEO2(plotting HGIRG) "Gage 0" Datum: 579.43'

Observations courtesy of US Geological Survey

## BIRD CREEK NEAR OWASSO

Universal Time (UTC)

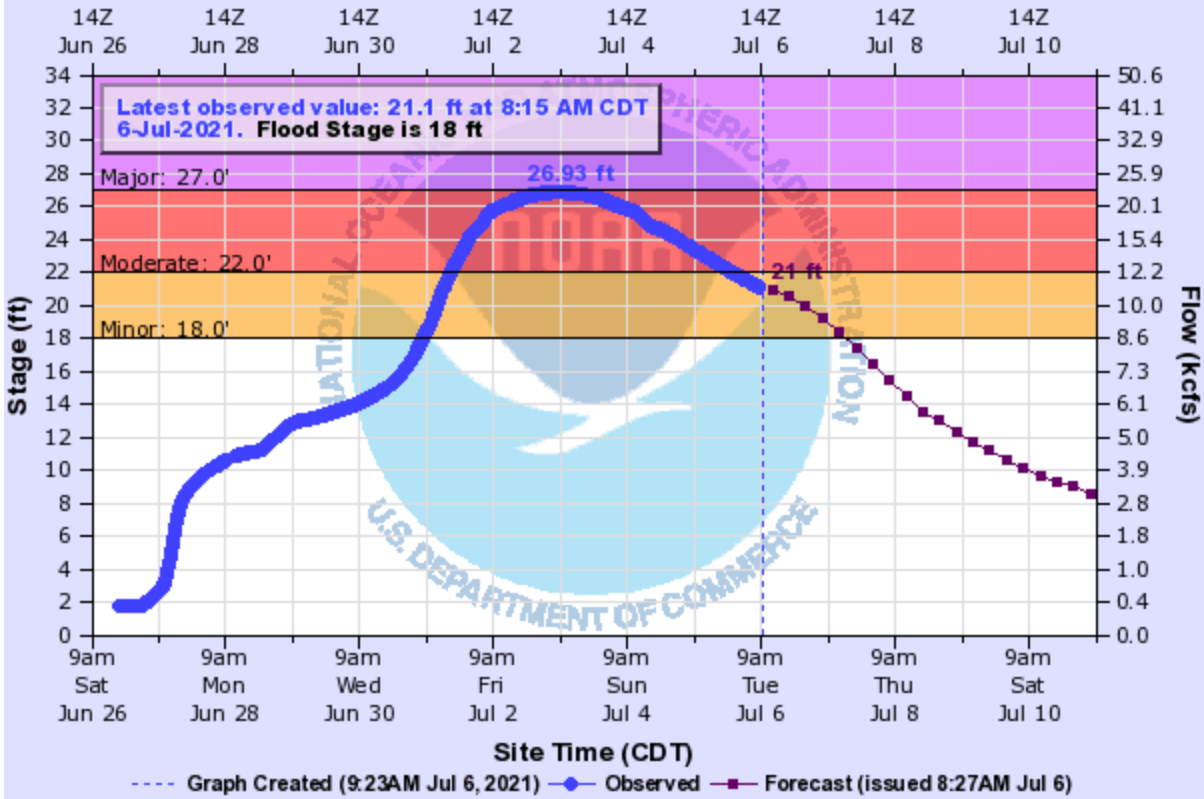


OWSO2(plotting HGIRG) "Gage 0" Datum: 560.17'

Observations courtesy of US Geological Survey

## DEEP FORK RIVER NEAR BEGGS

Universal Time (UTC)

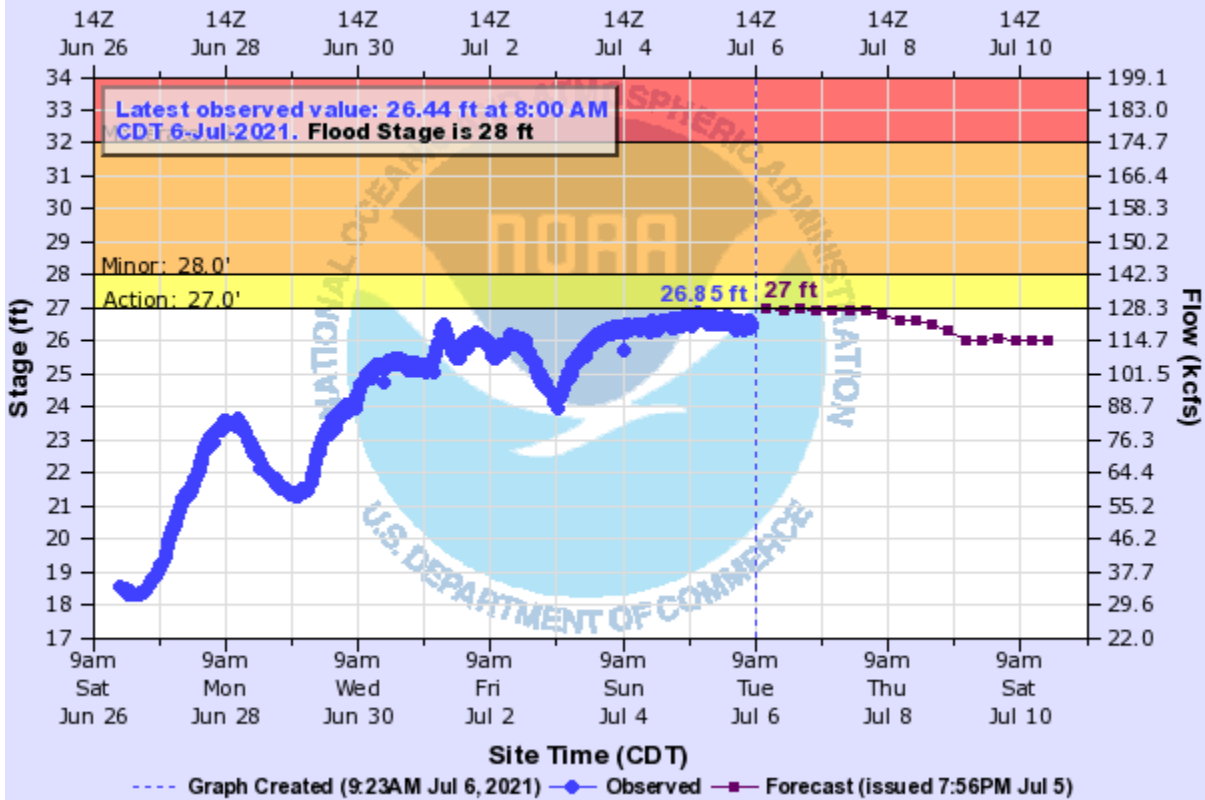


BGS02(plotting HGIRG) "Gage 0" Datum: 632.55'

Observations courtesy of US Geological Survey

## ARKANSAS RIVER NEAR MUSKOGEE

Universal Time (UTC)



MKGO2(plotting HGIRG) "Gage 0" Datum: 471.38'

Observations courtesy of US Geological Survey