

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)
		REPORT FOR: MONTH June YEAR 2019
MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS		SIGNATURE Steven F. Piltz (Meteorologist-in-Charge)
TO: Hydrometeorological Information Center, W/OH2 NOAA / National Weather Service 1325 East West Highway, Room 7230 Silver Spring, MD 20910-3283		DATE July 25, 2019

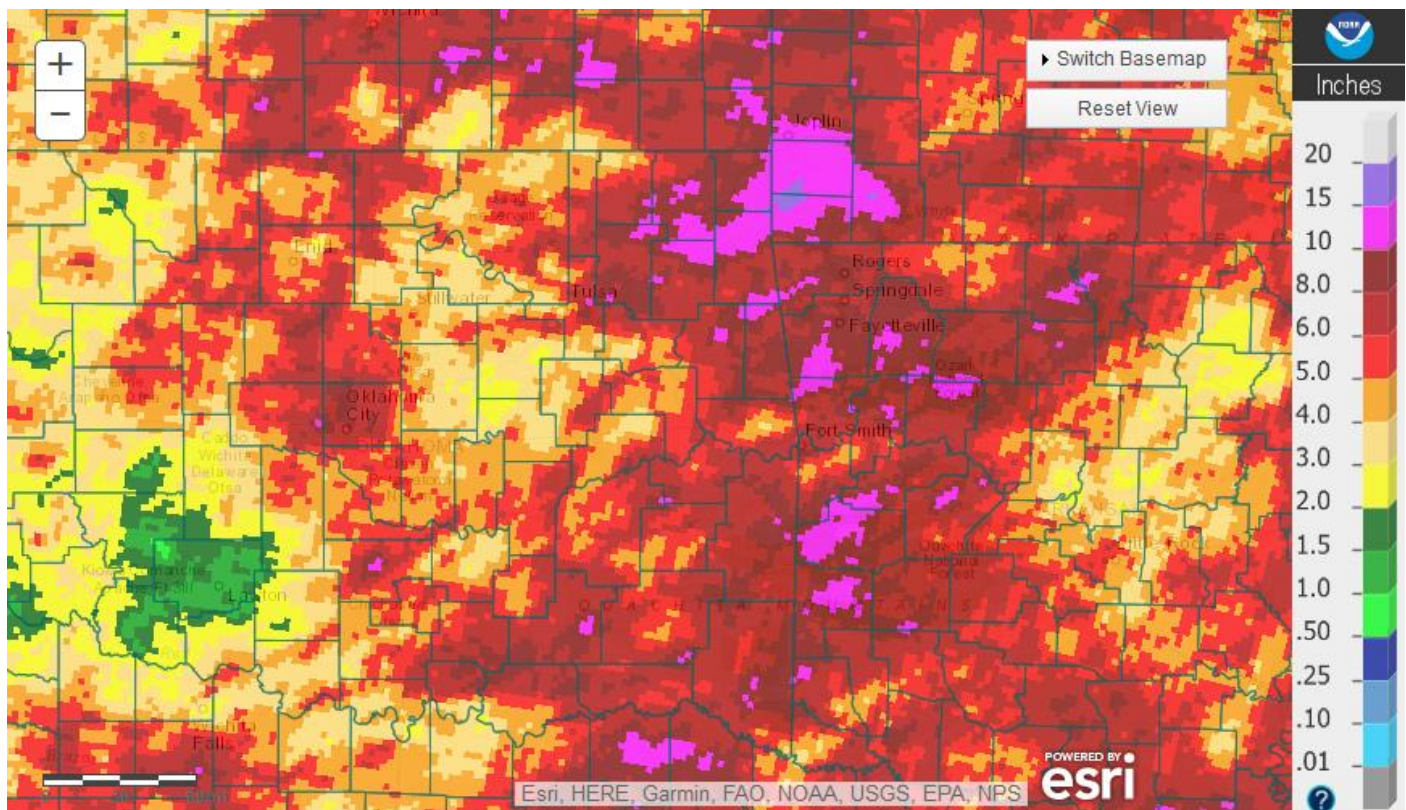
When no flooding occurs, include miscellaneous river conditions, such as significant rises, record low stages, ice conditions, snow cover, droughts, and hydrologic products issued (NWS Instruction 10-924)

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

Flooding from May 2019 continued into June, with additional heavy rain events through the month causing renewed flooding throughout eastern OK and northwest AR. 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 2019 ranged from 2" to near 15" across eastern OK and northwest AR. A large portion of the HSA received 5"-8" of rain this month. These rainfall totals correspond to 50%-90% of the normal June rainfall generally west of Highway 75, with far eastern OK and western AR receiving 125%-300% of the normal June rainfall (Fig. 1b).



Tulsa, OK: June, 2019 Monthly Observed Precipitation
 Valid on: July 01, 2019 12:00 UTC

Fig. 1a. Estimated Observed Rainfall for June 2019

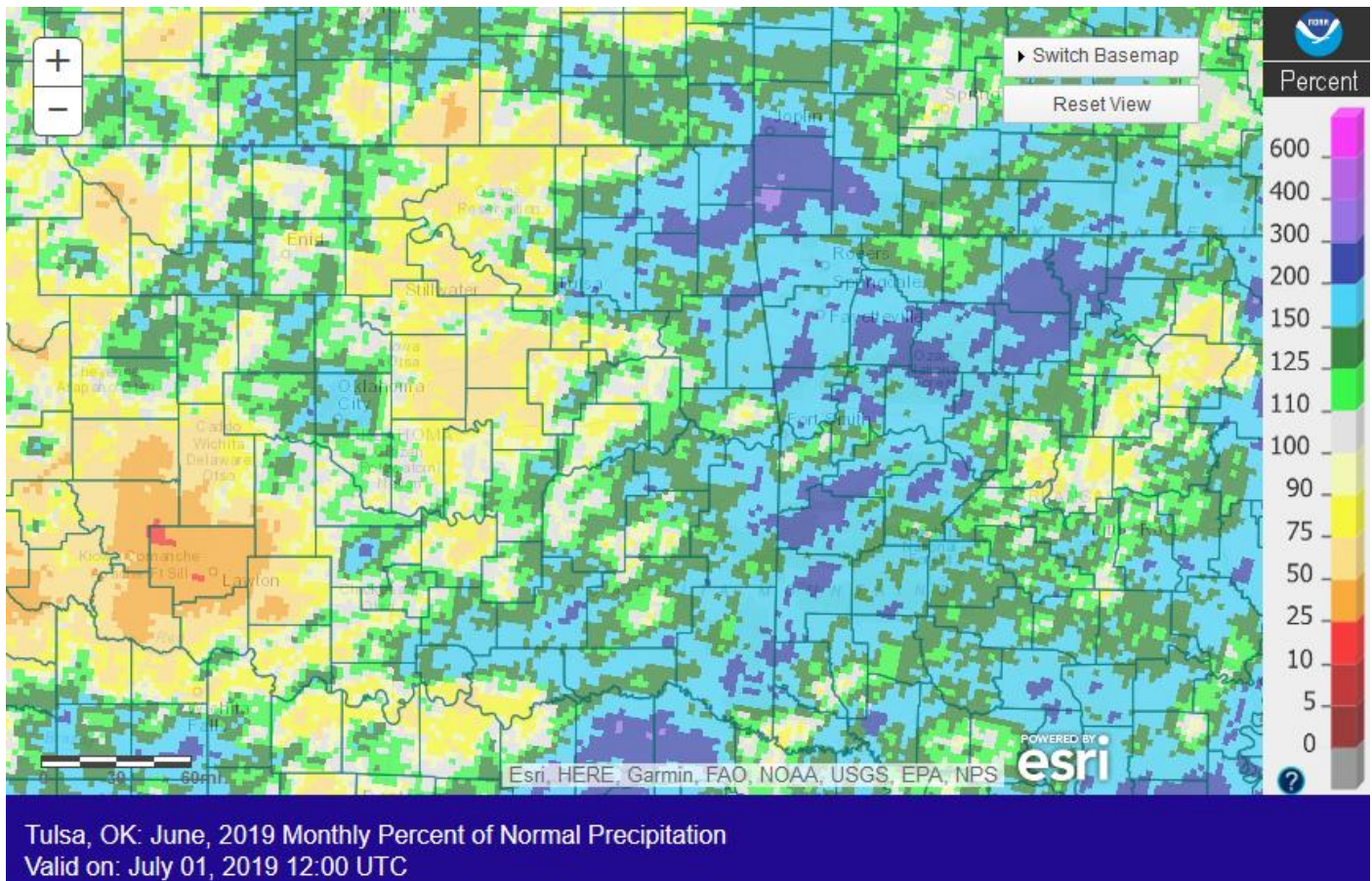


Fig. 1b. Estimated % of Normal Rainfall for June 2019

In Tulsa, OK, June 2019 ranked as the 55th coldest June (77.3°F, tied 1966, 1926; since records began in 1905) and the 22nd wettest June (6.92"; since records began in 1888). Fort Smith, AR had the 67th warmest June (77.9°F, tied 1897, 1923, 1950, 1958; since records began in 1882) and the 7th wettest June (8.47"; since records began in 1882). Fayetteville, AR had the 28th coldest (72.9°F) and the 3rd wettest (8.93") June since records began in 1950.

Some of the larger precipitation reports (in inches) for May 2019 included:

Jay 3.3NNE, OK (coco)	13.63	Jay, OK (meso)	12.77	Winslow 7NE, AR (coop)	11.92
Wyandotte 7.3NE, OK (coco)	11.62	Tahlequah, OK (meso)	11.52	Inola, OK (meso)	11.36
Siloam Springs 1.8N, AR (coco)	11.22	Ozark, AR (coop)	10.63	Vinita, OK (meso)	10.46

Some of the lowest precipitation reports (in inches) for May 2019 included:

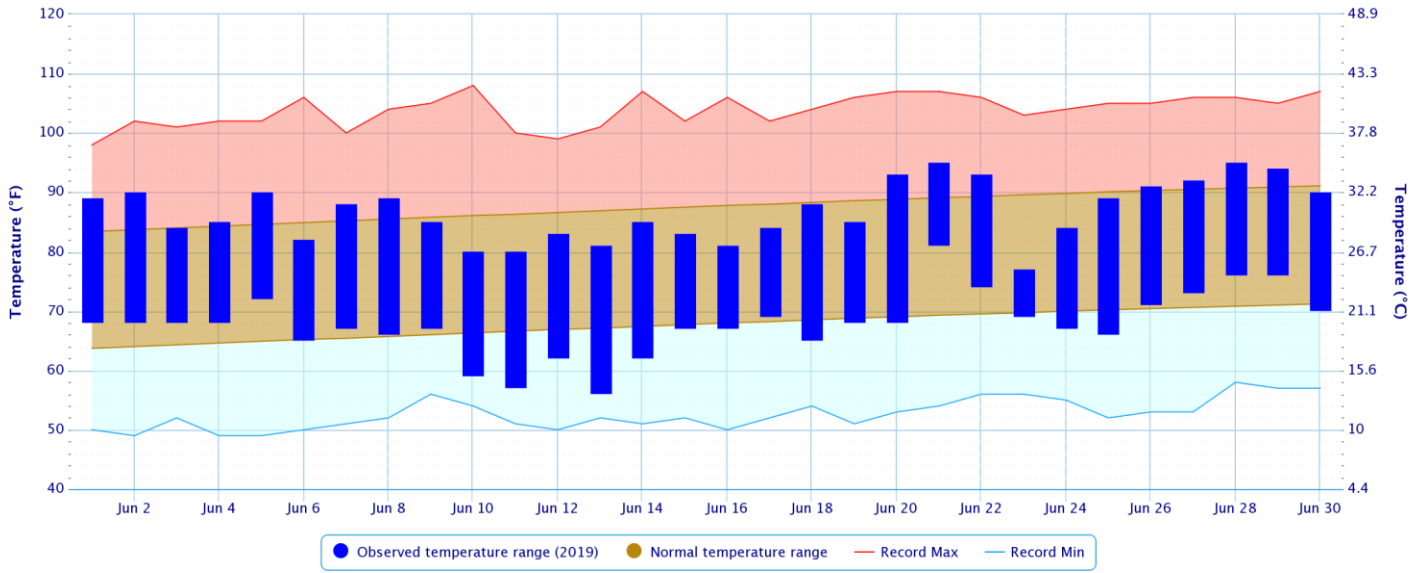
Pawnee, OK (meso)	3.13	Burbank, OK (meso)	3.27	Bristow, OK (meso)	3.52
Foraker, OK (meso)	3.59	Okemah, OK (meso)	3.60	Hectorville, OK (meso)	3.77
Bixby, OK (meso)	4.21	Muskogee, OK (ASOS)	4.56	Oilton, OK (meso)	4.73

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

Rank since 1921	June 2019	Last 60 Days (May 2 – Jun 30)	Last 90 Days (Apr 2 – Jun 30)	Warm Growing Season (Mar 1 – Jun 30)	Year-to-Date (Jan 1 – Jun 30)	Water Year-to-Date (Oct 1 – Jun 30)	Last 365 Days (Jul 1, 2018– Jun 30, 2019)
Northeast OK	18 th wettest	1 st wettest	2 nd wettest	3 rd wettest	3 rd wettest	4 th wettest	5 th wettest
East Central OK	22 nd wettest	15 th wettest	10 th wettest	10 th wettest	11 th wettest	10 th wettest	9 th wettest
Southeast OK	12 th wettest	13 th wettest	6 th wettest	9 th wettest	11 th wettest	7 th wettest	2 nd wettest
Statewide	27 th wettest	5 th wettest	3 rd wettest	4 th wettest	5 th wettest	2 nd wettest	1 st wettest

Daily Temperature Data – Tulsa Area, OK (ThreadEx)

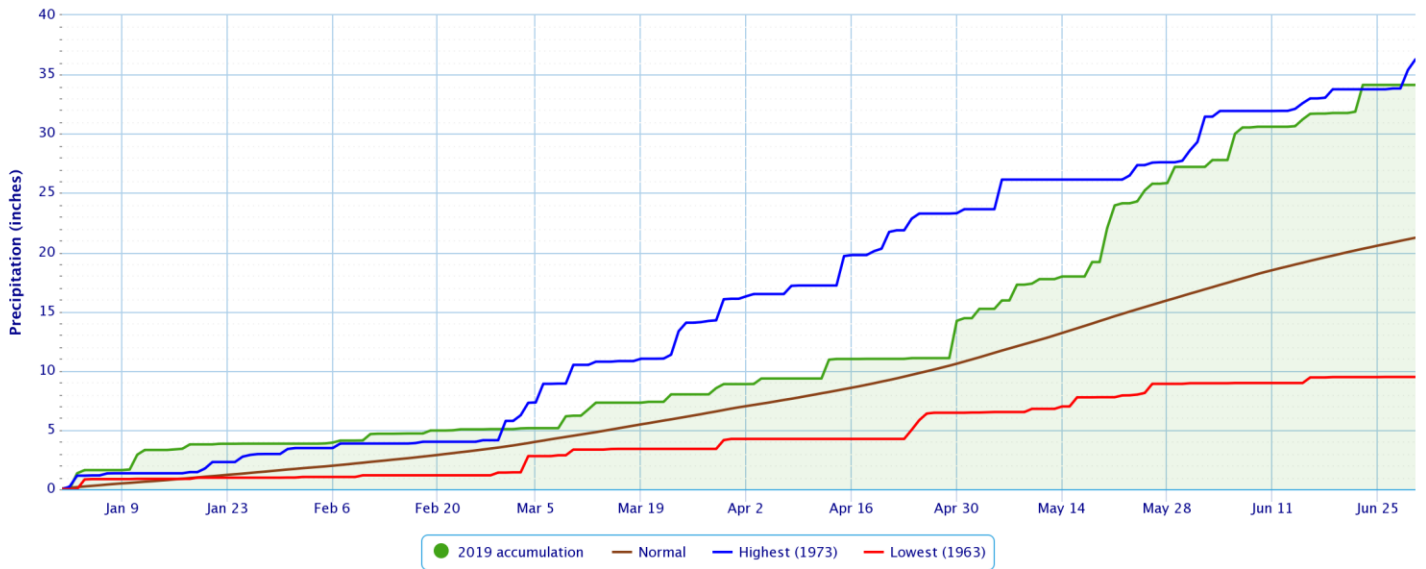
Period of Record – 1905-01-06 to 2019-06-30. Normals period: 1981-2010. Click and drag to zoom chart.



Powered by ACIS

Accumulated Precipitation – Tulsa Area, OK (ThreadEx)

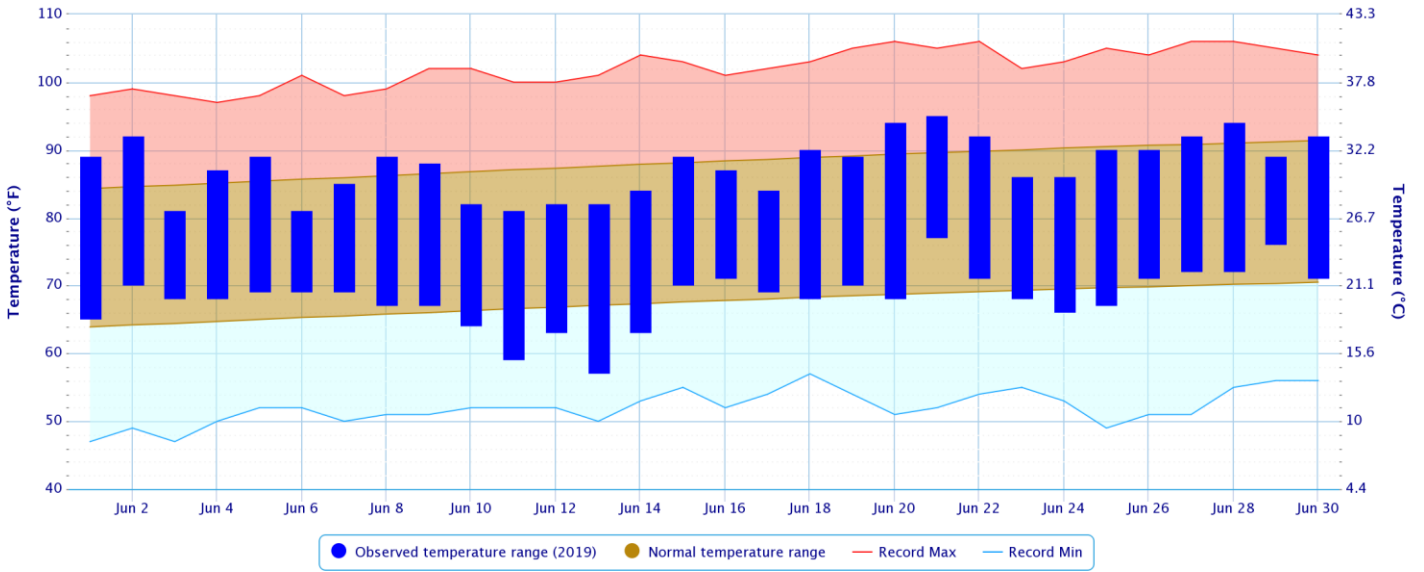
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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

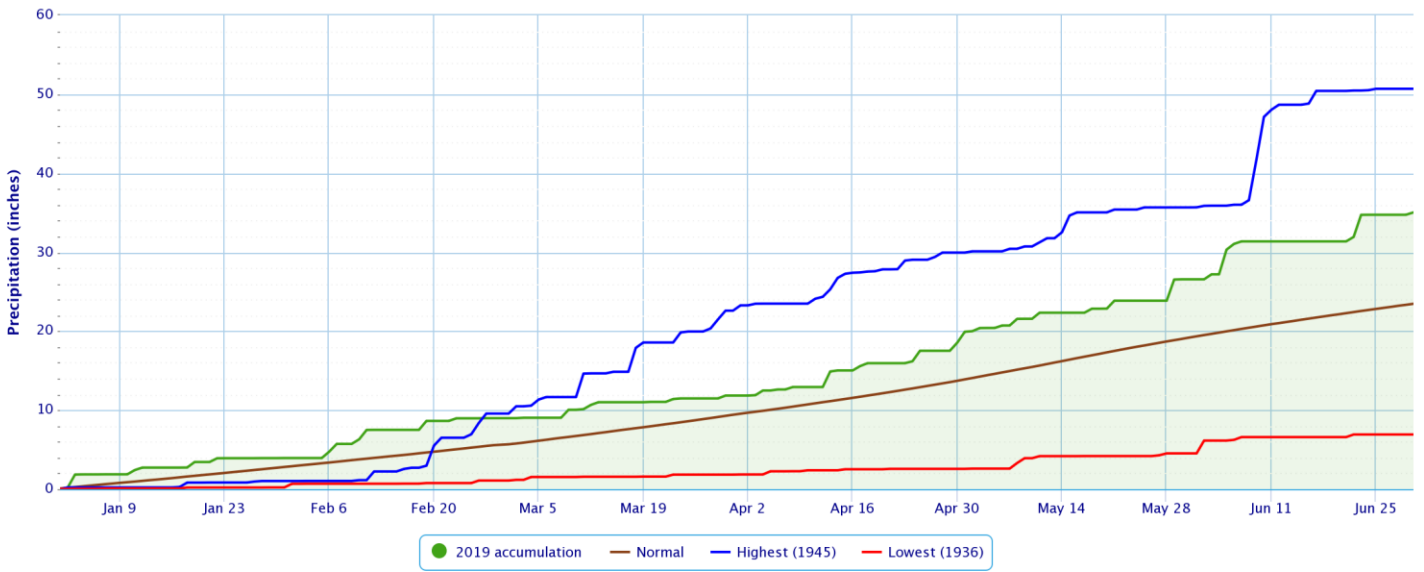
Period of Record – 1882-06-01 to 2019-06-30. Normals period: 1981-2010. Click and drag to zoom chart.



Powered by ACIS

Accumulated Precipitation – Fort Smith Area, AR (ThreadEx)

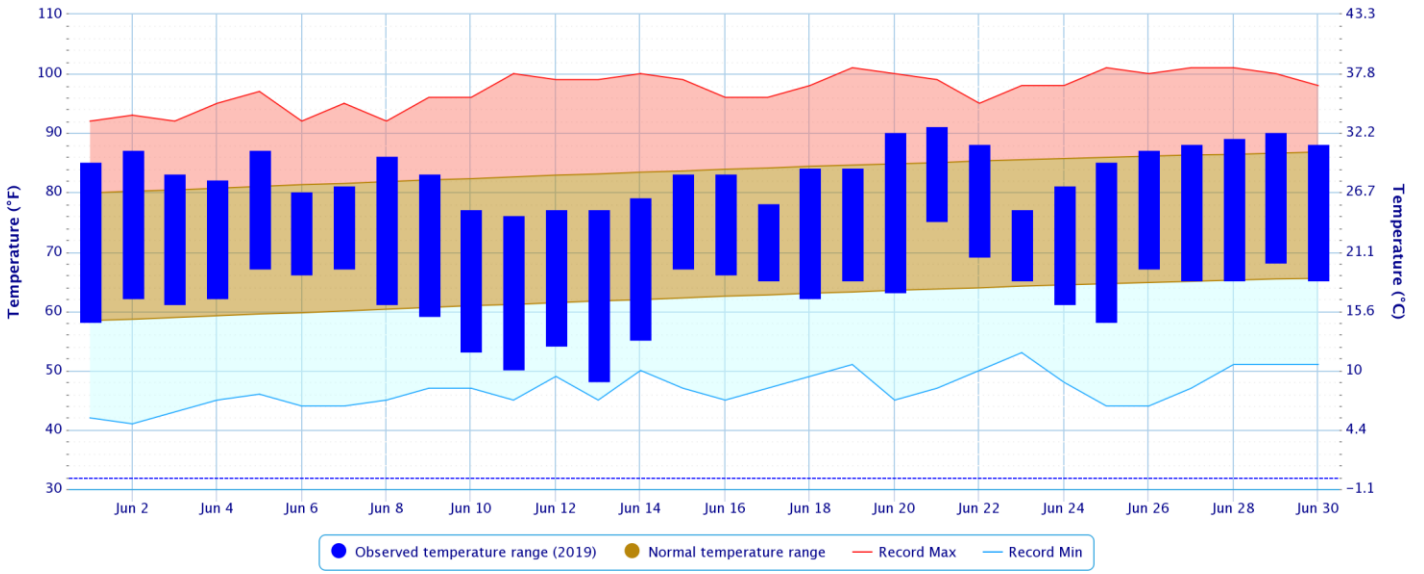
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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Daily Temperature Data – FAYETTEVILLE DRAKE FIELD, AR

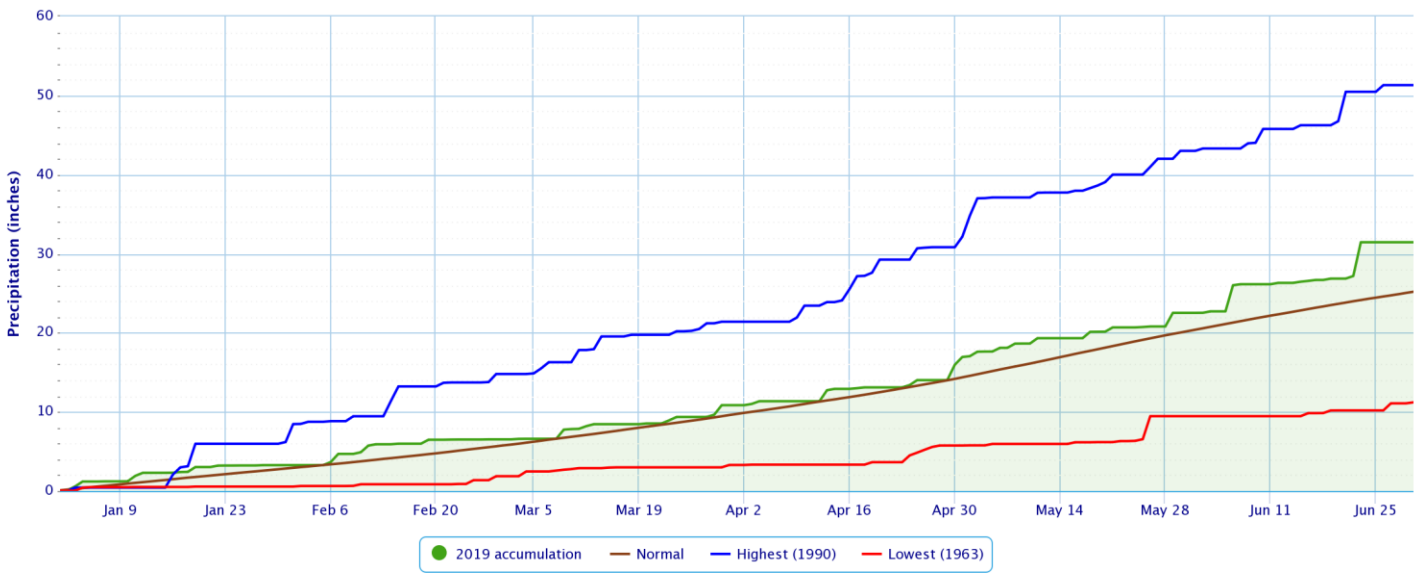
Period of Record – 1949-07-14 to 2019-06-30. Normals period: 1981-2010. Click and drag to zoom chart.



Powered by ACIS

Accumulated Precipitation – FAYETTEVILLE DRAKE FIELD, AR

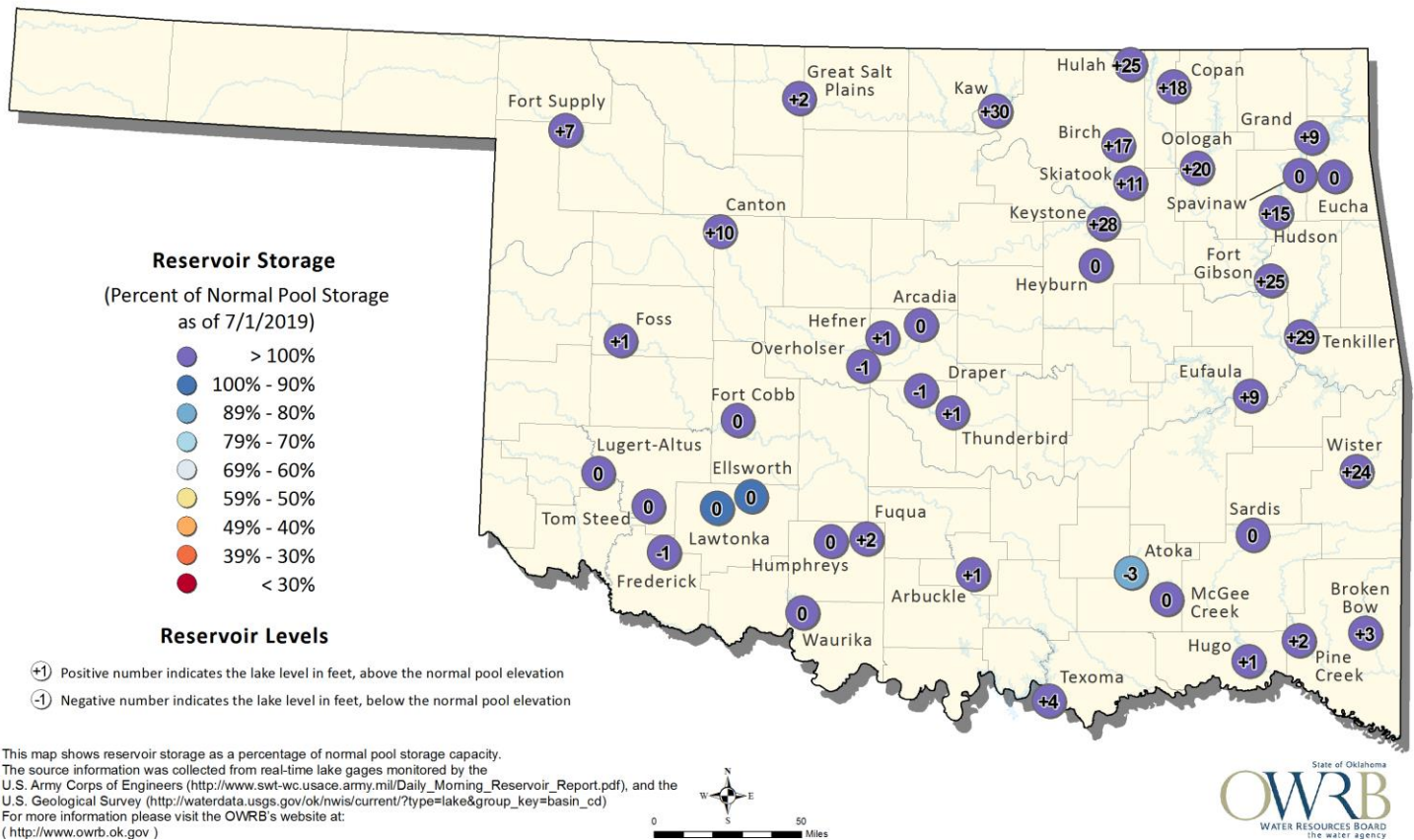
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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Reservoirs

**Oklahoma Surface Water Resources
Reservoir Levels and Storage as of 7/1/2019**



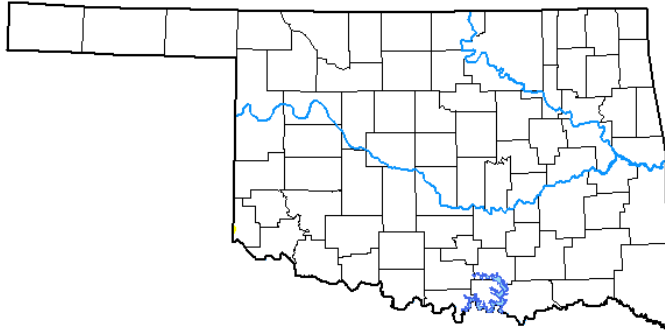
According to the USACE, all but two lakes in the HSA were utilizing more than 3% of their flood control pools as of 7/01/2019: Wister Lake 99%, Beaver Lake 87%, Keystone Lake 85%, Hudson Lake 84%, Ft. Gibson Lake 84%, Kaw Lake 82%, Oologah Lake 81%, Tenkiller Lake 79%, Grand Lake/Pensacola 77%, Eufaula Lake 76%, Copan Lake 72%, Skiatook Lake 71%, Hulah Lake 65%, Birch Lake 65%, and Sardis Lake 5%.

Drought

According to the [U.S. Drought Monitor](#) (USDM) from July 2, 2019 (Figs. 2, 3), no drought or abnormally dry conditions were present across eastern OK and northwest AR.

U.S. Drought Monitor Oklahoma

July 2, 2019
(Released Wednesday, Jul. 3, 2019)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	99.98	0.02	0.00	0.00	0.00	0.00
Last Week 06-25-2019	100.00	0.00	0.00	0.00	0.00	0.00
3 Months Ago 04-02-2019	96.71	3.29	0.00	0.00	0.00	0.00
Start of Calendar Year 01-01-2019	94.85	5.15	0.00	0.00	0.00	0.00
Start of Water Year 09-25-2018	72.93	27.07	9.11	4.16	0.00	0.00
One Year Ago 07-03-2018	23.25	76.75	54.55	27.49	8.51	0.40

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. See accompanying text summary for forecast statements.

Author:

Richard Tinker
CPC/NOAA/NWS/NCEP



droughtmonitor.unl.edu

Fig. 2. Drought Monitor for Oklahoma

U.S. Drought Monitor Arkansas

July 2, 2019
(Released Wednesday, Jul. 3, 2019)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	100.00	0.00	0.00	0.00	0.00	0.00
Last Week 06-25-2019	100.00	0.00	0.00	0.00	0.00	0.00
3 Months Ago 04-02-2019	100.00	0.00	0.00	0.00	0.00	0.00
Start of Calendar Year 01-01-2019	98.79	1.21	0.00	0.00	0.00	0.00
Start of Water Year 09-25-2018	93.15	6.85	2.59	0.00	0.00	0.00
One Year Ago 07-03-2018	20.17	79.83	35.85	2.19	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. See accompanying text summary for forecast statements.

Author:

Richard Tinker
CPC/NOAA/NWS/NCEP



droughtmonitor.unl.edu

Fig. 3. Drought Monitor for Arkansas

Outlooks

The [Climate Prediction Center](#) (CPC) outlook for June 2019 (issued May 31, 2019) indicates an enhanced chance for below normal temperatures and above median rainfall across east central and northeast OK and northwest AR, and an equal chance for above, near, and below normal temperatures and precipitation across southeast OK. This outlook takes into account weather conditions forecast over the first two weeks of July, the weeks 3-4 outlook, continued influence of a weak El Niño, and the above normal soil moisture over the central and southern Plains, which will make above normal temperatures less likely.

For the 3-month period July-August-September 2019, CPC is forecasting an enhanced chance for below normal temperatures and above median rainfall across all of eastern OK and northwest AR (outlook issued June 20, 2019). This outlook is based on both statistical and dynamical forecast tools, decadal timescale climate trends, current soil moisture conditions, and influence from El Niño. The enhanced odds for above median rainfall is primarily based on dynamical model. Very high soil moisture over the region played a large role in the temperature outlook. According to CPC, the combined effect of the ocean-atmosphere system is consistent with the continuation of weak El Niño conditions through May 2019. A continuation of the weak El Niño is expected, though some models indicate ENSO neutral conditions. There is a 66% chance that El Niño conditions will continue through summer 2019, and a 50-55% chance it will continue in the fall. There is a very low chance for La Niña. CPC continues the El Niño Advisory.

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

Thunderstorms developed during the morning hours of the 3rd across southeast OK within a warm and humid airmass, increasing in coverage as they moved northeast into east central OK and west central AR during the afternoon. Storms continued to redevelop across southeast OK through the afternoon and evening, finally coming to an end by late evening. Additional development occurred across northeast OK during the afternoon hours, spreading into northwest AR during the evening. Rainfall totals ranged from 0.50"-2" across much of southeast OK into west central AR, with pockets of 2"-4" (Figs. 4, 5). For northeast OK and northwest AR, rainfall totals were 0.25"-1.5" with isolated 1.5"-2.5" (Figs. 4, 5).

As an upper-level low began to approach the region from the southwest, shower and thunderstorms developed across southeast OK, east central OK, and west central AR during the afternoon of the 5th. This activity continued through the evening hours. Scattered light showers affected all of eastern OK and northwest AR overnight. Rainfall totals ranged from around 0.25" to around 1.5" for most of the area along and south of I-40. However, there were localized pockets of 1.5"-3", and far southeast Pushmataha County/far northeast Choctaw County received 3"-5" of rain (Figs. 6, 7).

As the main upper-level low moved into the area on the 6th, convection increased across much of eastern OK and northwest AR during the afternoon and widespread rain continued through the evening. A jet streak lifting east from west Texas interacted with a weak surface trough/convergence zone near I-44, providing a focus for storms. All of the activity moved east and out of the area shortly after midnight. These storms were efficient rain producers since the precipitable water (PWAT) values were high, approaching 2 inches. The high PWAT values combined with slow storm motions resulted in heavy rain and flash flooding. A large portion of northeast OK and northwest AR received 0.75"-4" of rain, with a portion of Washington County, AR receiving 6"-7" (Fig 12). The Tulsa mesonet rain gauge measured 0.68" in just 10 minutes, which is an impressive 4"/hour rate. 3.12" was measured in 1 hour at this site (Fig. 8), and 4.06" fell within 3 hours (Fig. 9). Several rain gauges across Tulsa measured 2"-3" in one hour (Fig. 10), and flash flooding occurred throughout the city. I-244 had to be shut down in Tulsa due to high water (Fig. 11) and homes near this area were flooded. Numerous road closures were reported across northeast OK and northwest AR from the Tulsa metro area through the Fayetteville metro area. Flash flooding also occurred in areas near the Arkansas River, partly due to the inability to properly drain into the river. This rainfall also resulted in moderate flooding along the Illinois River. The Arkansas River near Muskogee and at Van Buren were still above flood stage from May, but this rain caused the river to rise again to the moderate flood level. Lee Creek at Van Buren also had moderate flooding, with minor flooding along the Poteau River near Panama. Bird Creek saw fast rises, but remained below flood stage. See preliminary hydrographs at the end of this report and E3 Report for details.

Much of eastern OK and northwest AR received 1"-3" of rain during the first 10 days of June, with some locations receiving 4"-7" (Fig. 13).

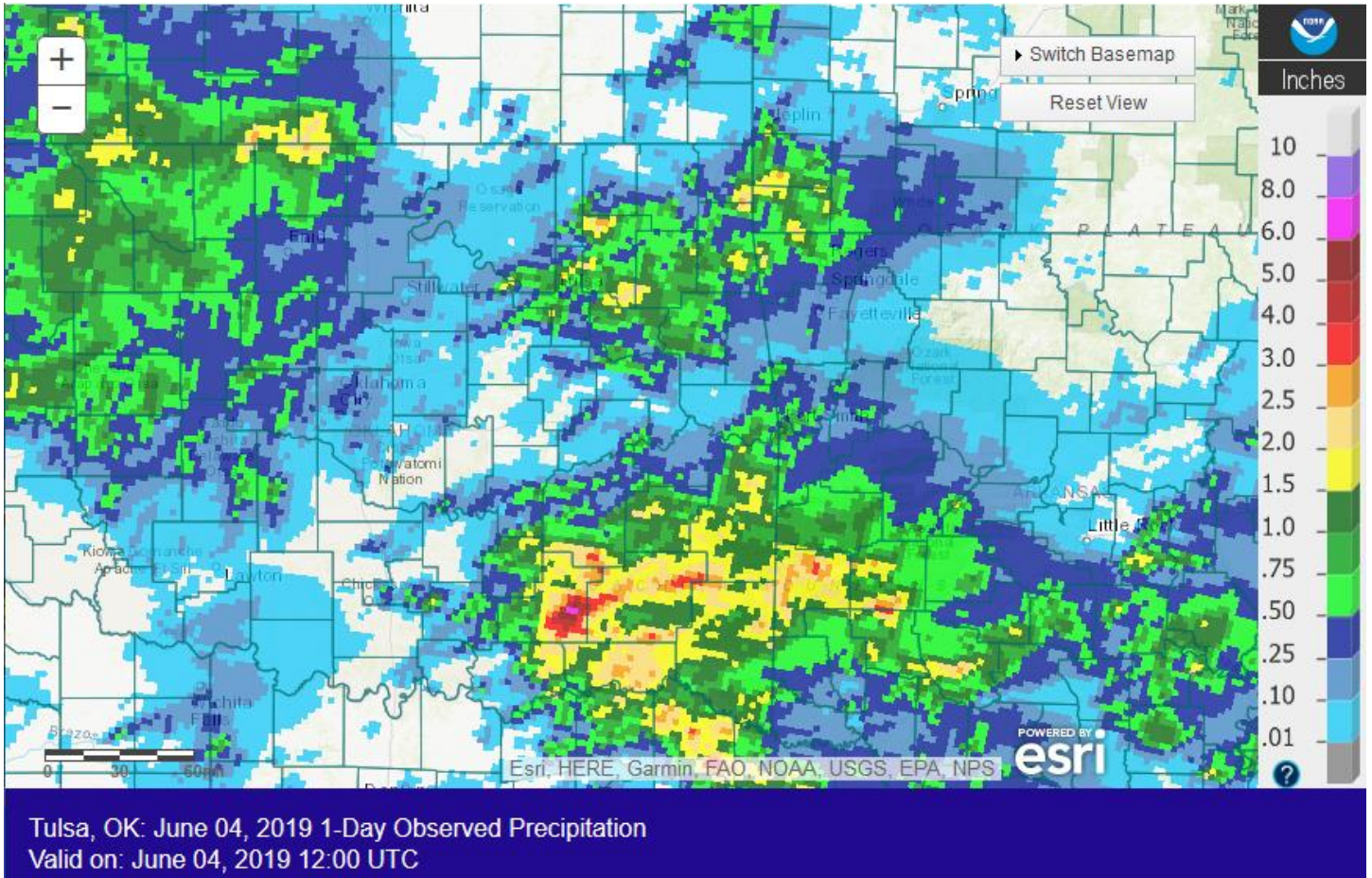


Fig. 4. 24-hour Estimated Observed Rainfall ending at 7am CDT 6/04/2019.

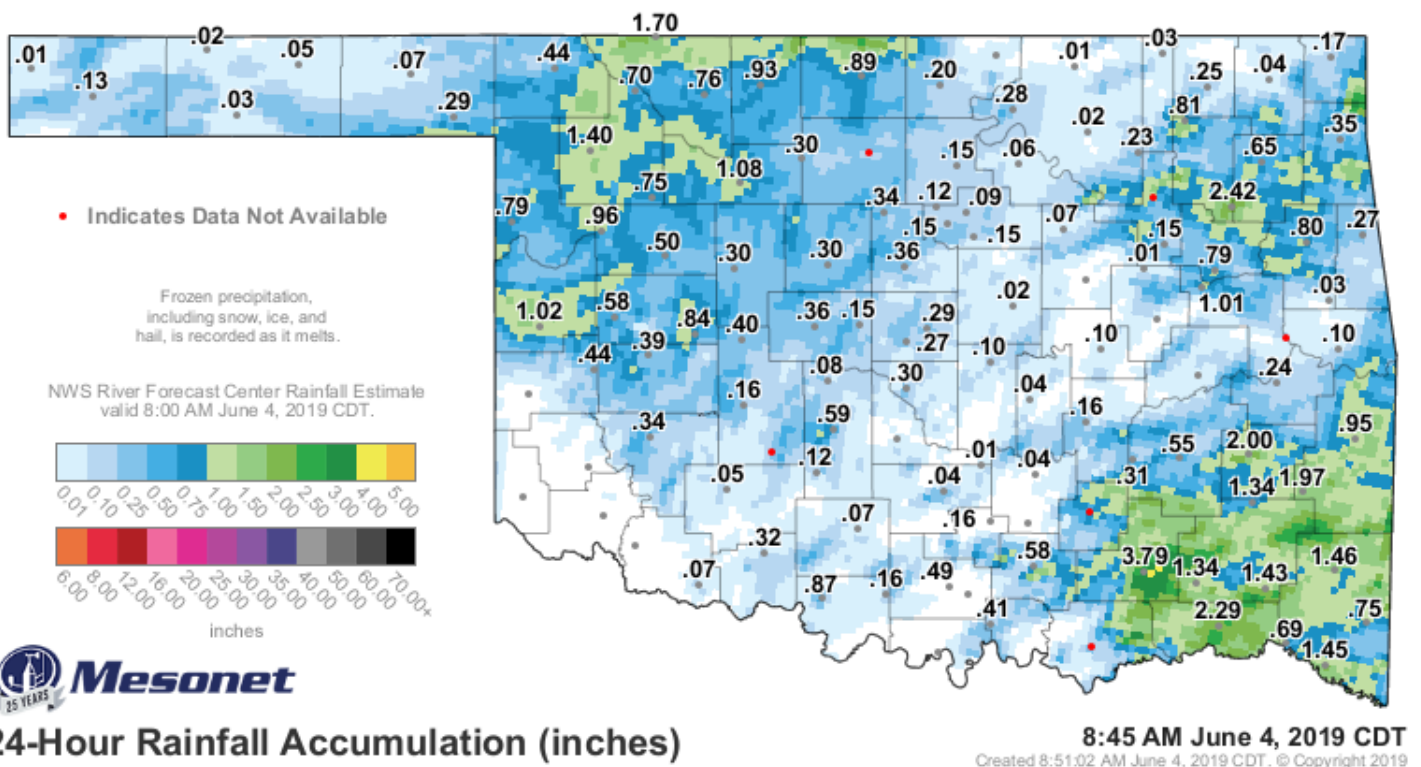


Fig. 5. OK Mesonet (values) and NWS RFC rainfall estimate (image) 24-hour rainfall ending at 8:45 am CDT 06/04/2019.

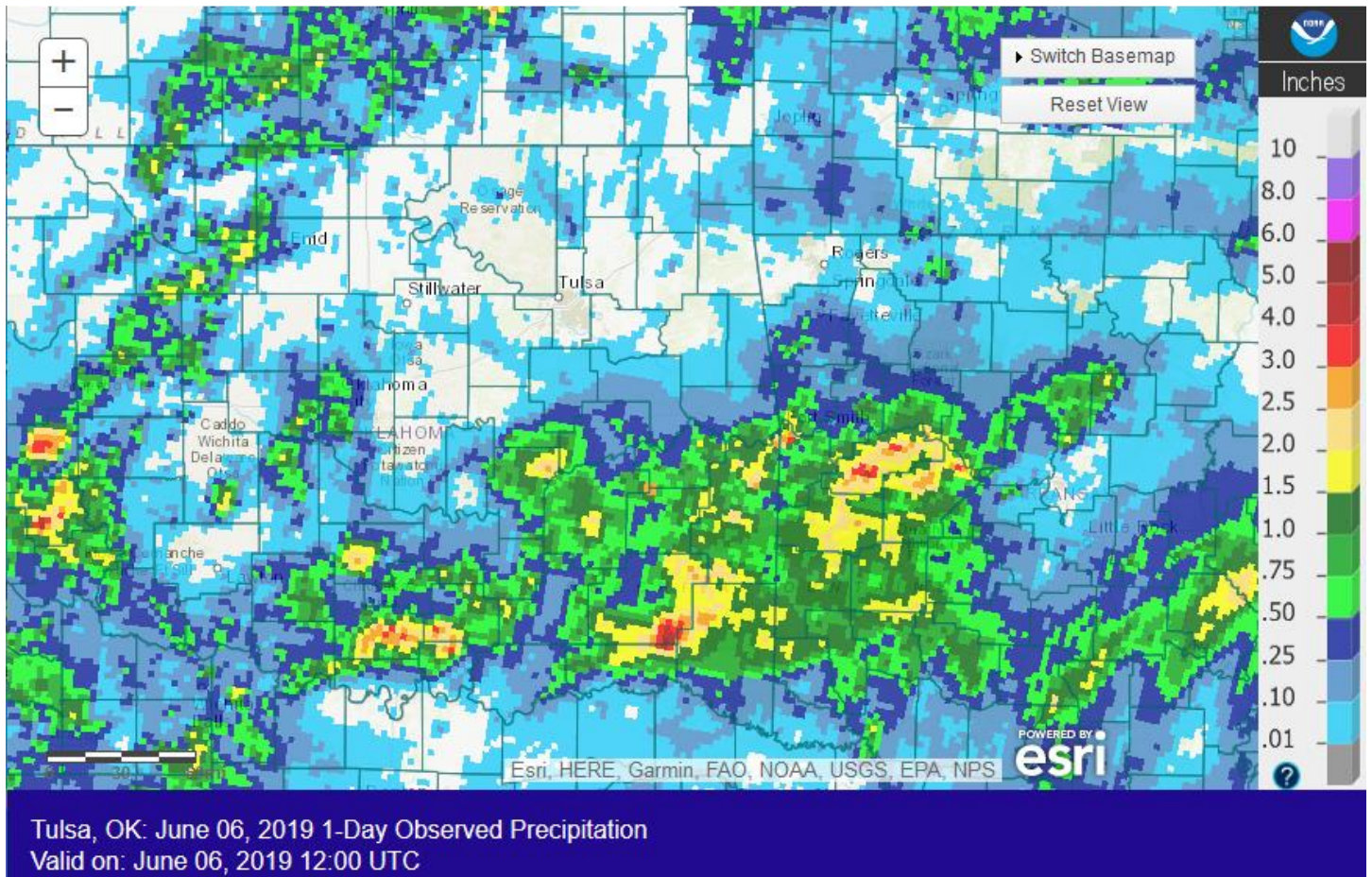
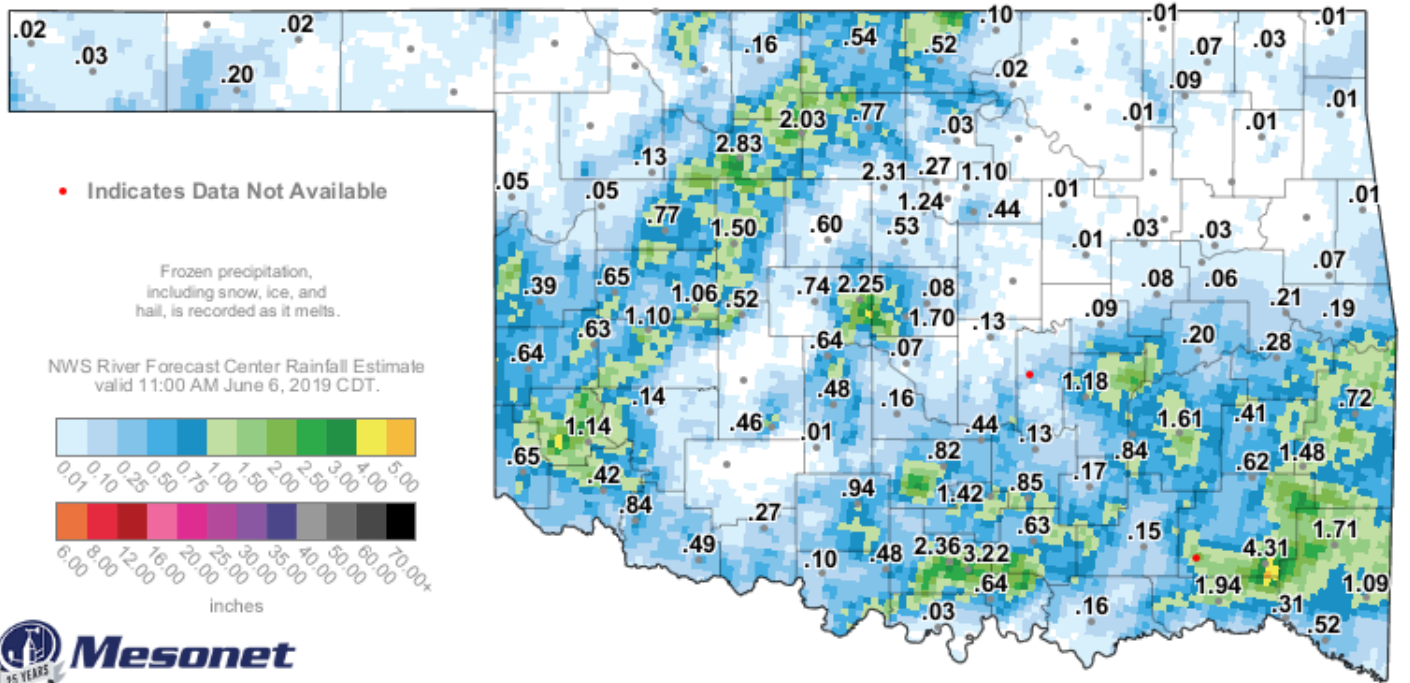
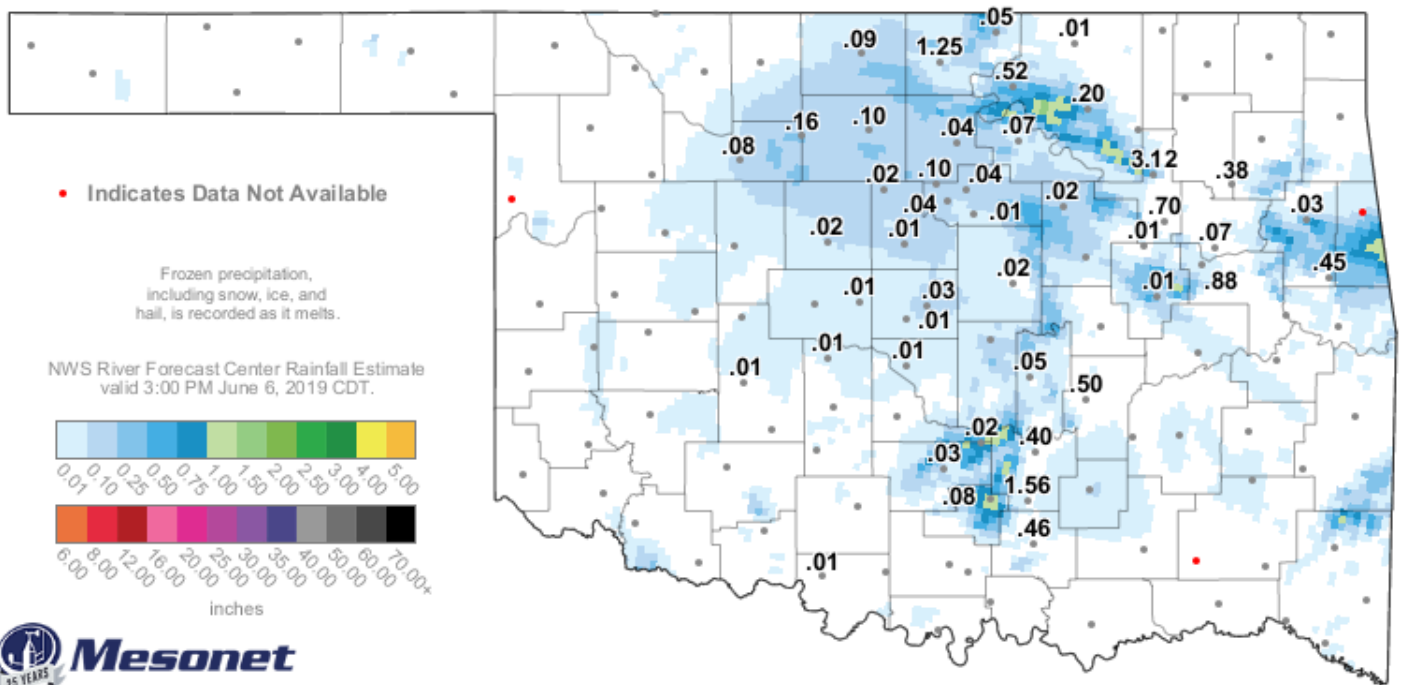


Fig. 6. 24-hour Estimated Observed Rainfall ending at 7am CDT 6/06/2019.



24-Hour Rainfall Accumulation (inches)
12:20 PM June 6, 2019 CDT
Created 12:25:47 PM June 6, 2019 CDT. © Copyright 2019

Fig. 7. OK Mesonet (values) and NWS RFC rainfall estimate (image) 24-hour rainfall ending at 12:20 pm CDT 06/06/2019.

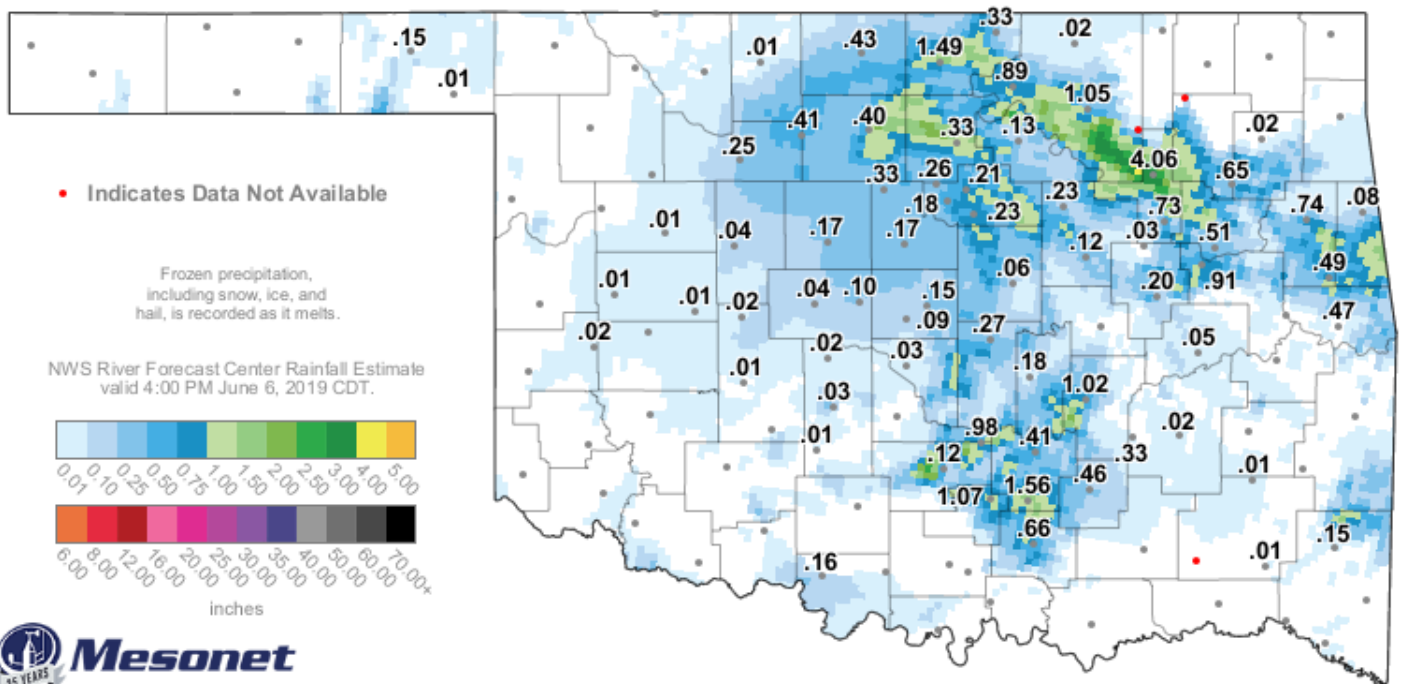


1-Hour Rainfall Accumulation (inches)

3:50 PM June 6, 2019 CDT

Created 3:55:51 PM June 6, 2019 CDT. © Copyright 2019

Fig. 8. OK Mesonet (values) and NWS RFC rainfall estimate (image) 1-hour rainfall ending at 3:50 pm CDT 06/06/2019.



3-Hour Rainfall Accumulation (inches)

4:45 PM June 6, 2019 CDT

Created 4:50:57 PM June 6, 2019 CDT. © Copyright 2019

Fig. 9. OK Mesonet (values) and NWS RFC rainfall estimate (image) 3-hour rainfall ending at 4:45 pm CDT 06/06/2019.









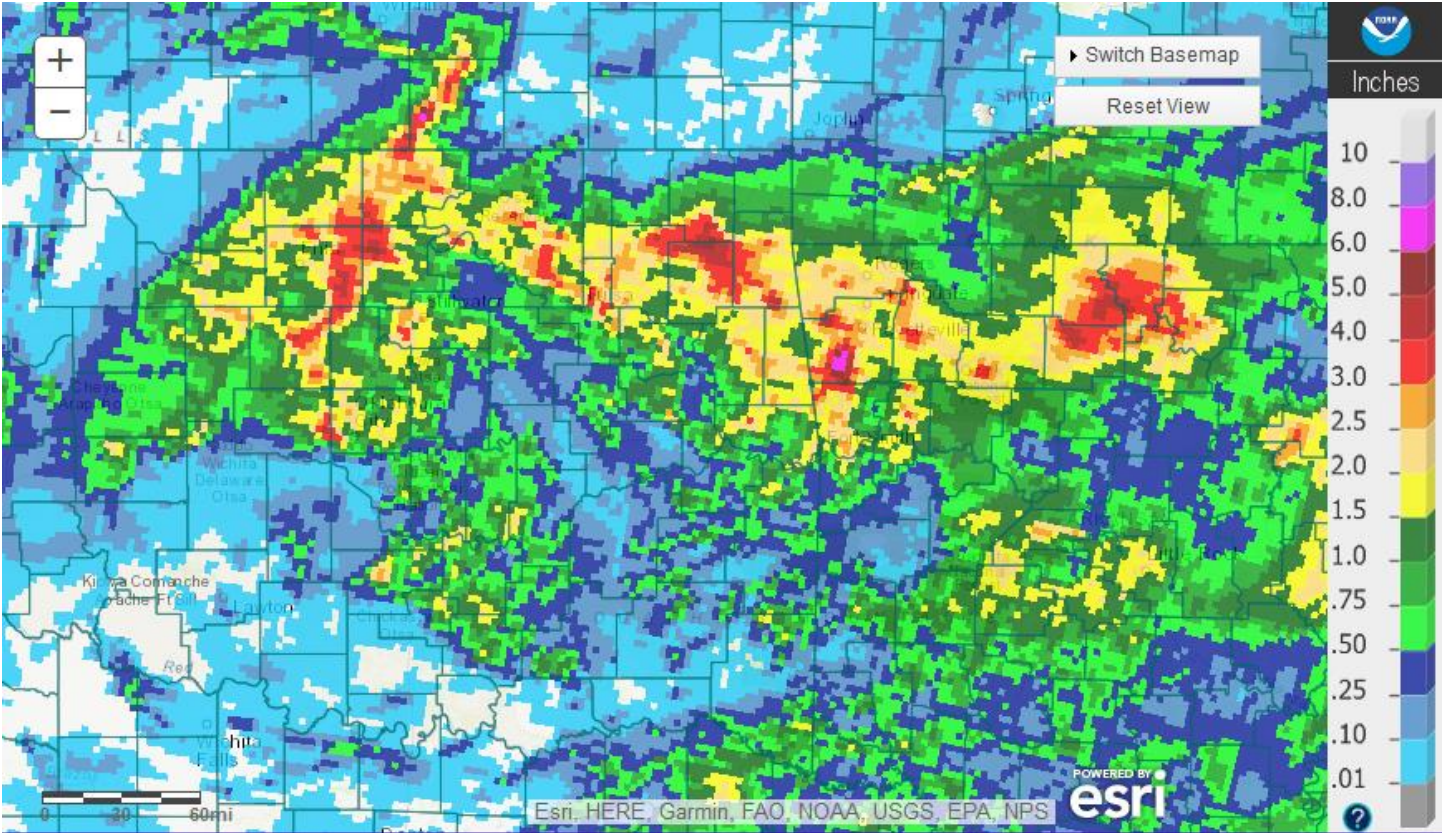
Site 	Sensor	Group	15 Min 	30 Min 	1 Hour 	3 Hour 
Bryant Elem Virginia	Precipitation increment (3017)	Coal	0.32in	1.14in	2.95in	3.35in
Celia Clinton	Precipitation increment (2917)	Coal	0.24in	0.83in	2.87in	3.47in
Upper Mingo Creek 	Precipitation increment (4827)	Mingo	0.12in	0.55in	2.68in	2.95in
Flatrock @ N Hartford Ave	Precipitation increment (2117)	Flat Rock	0.12in	0.55in	2.60in	3.31in
Dirty Butter at Apache St	Precipitation increment (2817)	Dirty Butter	0.39in	0.75in	2.40in	2.95in
Fire Station 27	Precipitation increment (4917)	Mingo	0.12in	0.47in	2.20in	2.20in
Mingo Detention - 11th St S	Precipitation increment (3847)	Mingo	0.08in	0.39in	2.13in	2.13in
Mingo Creek @ 11th St 	Precipitation increment (3817)	Mingo	0.08in	0.39in	2.01in	2.05in
Tupelo Detention	Precipitation increment (3917)	Mingo	0.08in	1.18in	1.97in	1.97in
Turner Park Detention	Precipitation increment (3727)	Coal	0.16in	0.39in	1.97in	1.97in
MacArthur School	Precipitation increment (3827)	Mingo	0.00	0.43in	1.73in	1.81in
Tulsa Soccer	Precipitation increment (4927)	Mingo	0.20in	0.51in	1.61in	1.61in
Osage Pond on Dirty Butter Creek 	Precipitation increment (2827)	Dirty Butter	0.20in	0.51in	1.54in	1.54in

Fig. 10. City of Tulsa ALERT rain gauge data at 4:22 pm CDT 06/06/2019.



Fig. 10. Twitter post from Travis Meyer @newson6wxguy at 4:49 pm 6/6/2019: Von Castor is in the Tulsa metro at I-244 where the highway has been closed due to flooding. TURN AROUND, DON'T DROWN! #NewOn6 #okwx



Tulsa, OK: June 07, 2019 1-Day Observed Precipitation
Valid on: June 07, 2019 12:00 UTC

Fig. 12. 24-hour Estimated Observed Rainfall ending at 7am CDT 6/07/2019.

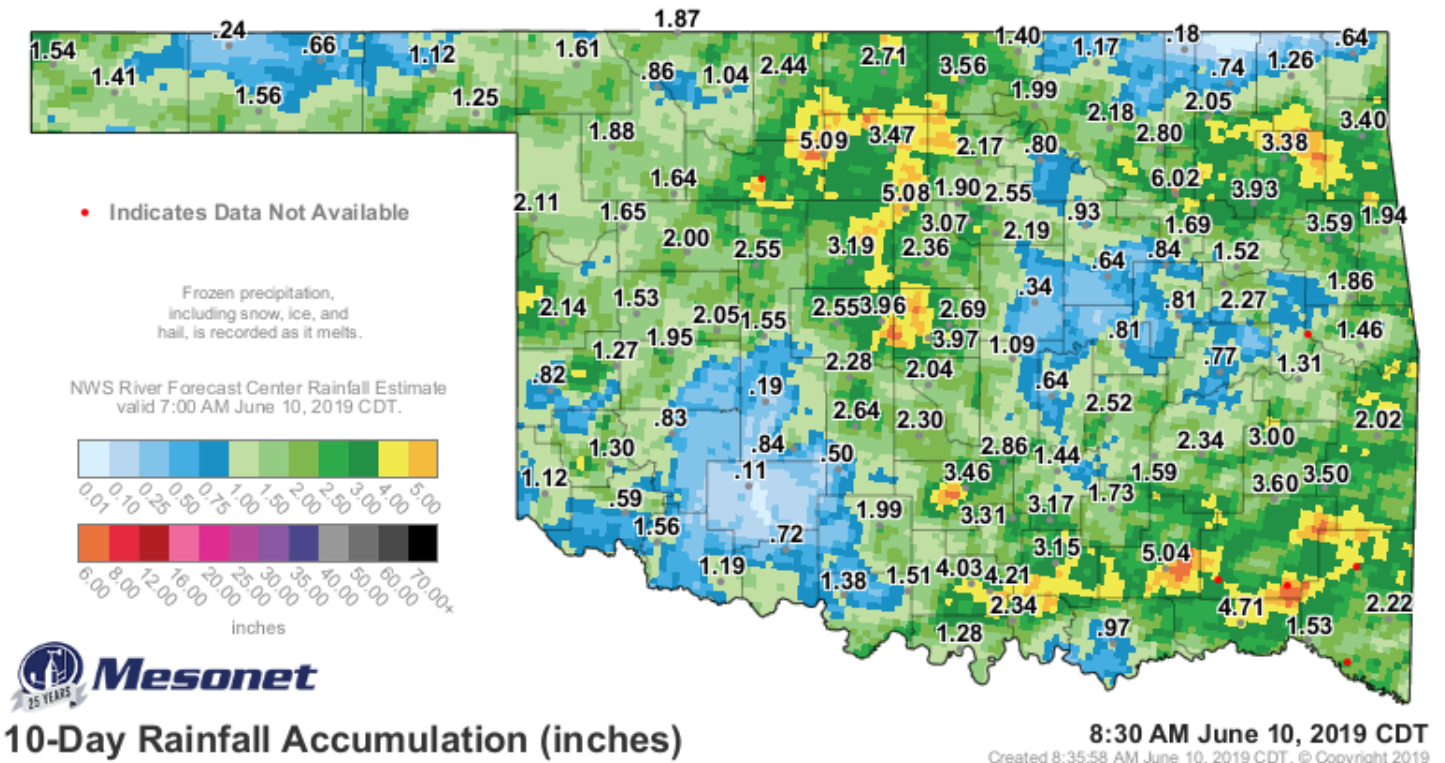


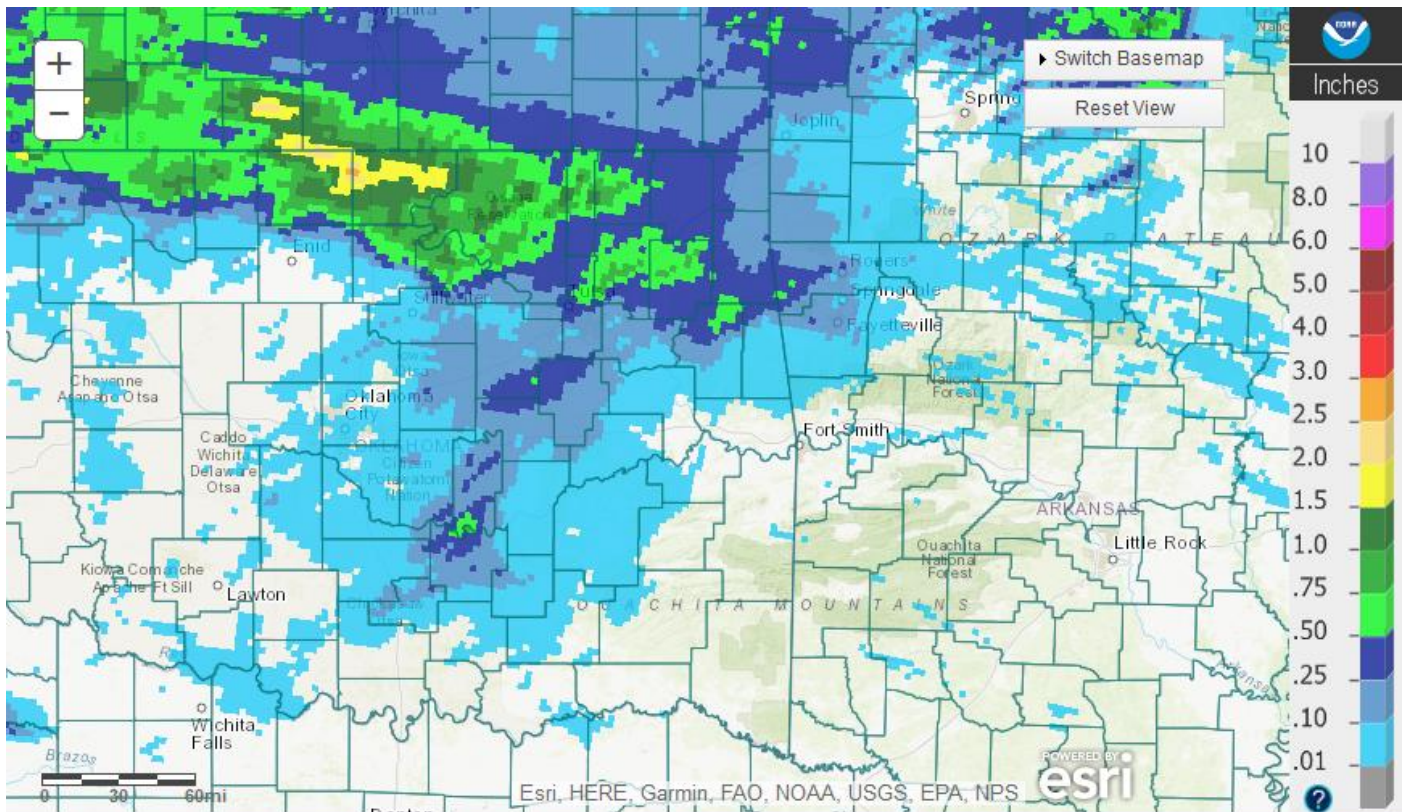
Fig. 13. OK Mesonet (values) and NWS RFC rainfall estimate (image) 10-day rainfall ending at 8:30 am CDT 06/10/2019.

Thunderstorms moved out of north central OK/central KS into northeast OK during the pre-dawn hours of the 14th. This activity weakened and dissipated as it moved across eastern OK through the morning. A mesoscale convective system (MCS) crossed KS and moved into northeast OK just after midnight on the 15th. The MCS moved across northeast OK and northwest AR during the overnight through morning hours, dissipating by noon.

Another, larger MCS moved into eastern OK around midnight on the 16th, and again, weakened as it crossed eastern OK. Most of the rain had dissipated by sunrise on the 16th, though showers continued across southeast OK through mid-morning. Thunderstorms redeveloped near the Red River in southeast OK in the afternoon and continued through the evening before dissipating. Further north, thunderstorms developed near and north of I-44 west of Tulsa during the late afternoon hours. This activity moved northeast along I-44 through the evening, moving into MO by midnight. Meanwhile, new development occurred over northeast OK just after midnight on the 17th. This activity affected northeast OK and northwest AR through mid-morning.

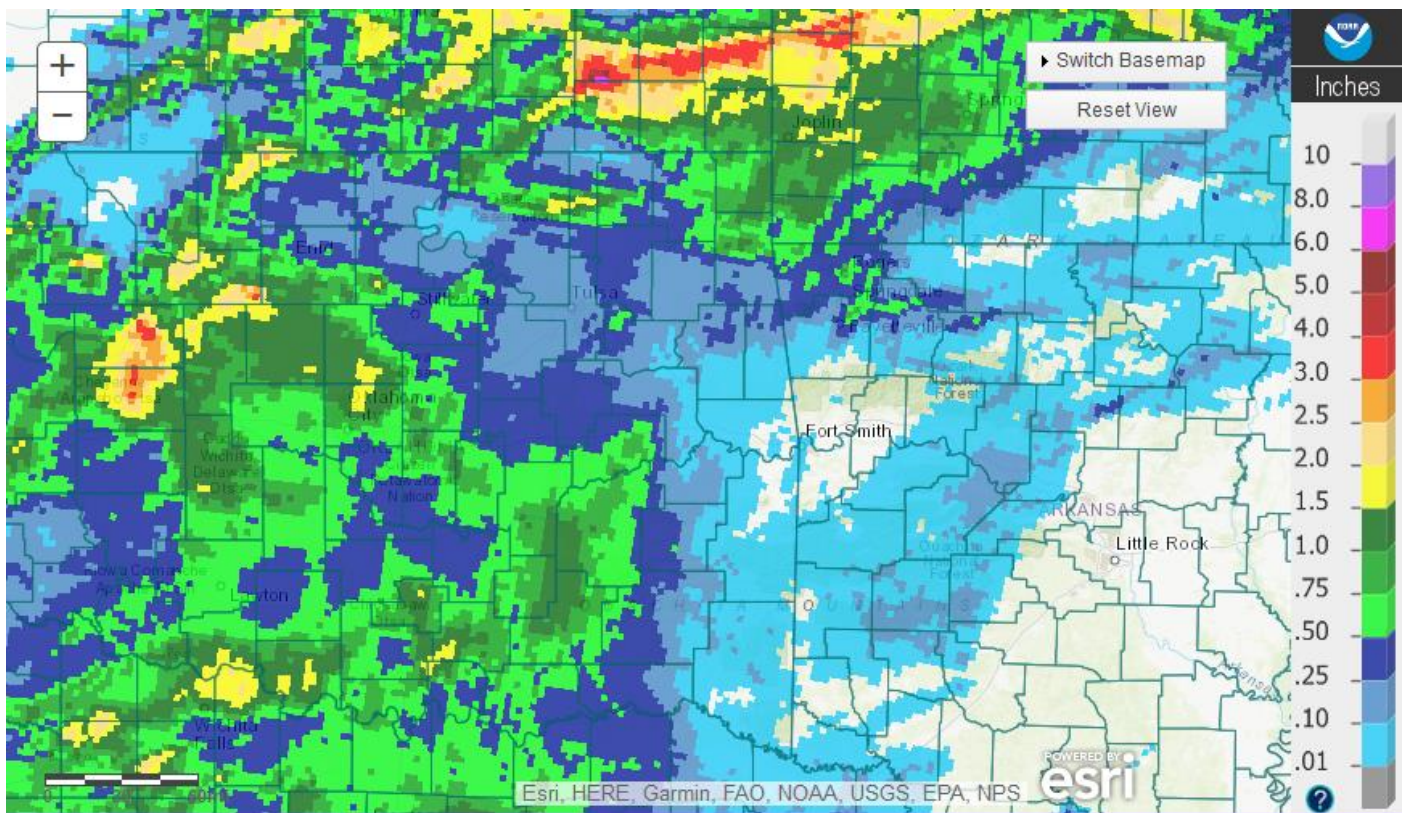
By 7 am on the 15th, rainfall totals across northeast OK and far northwest AR were 0.25" to around 1.5" (Fig. 14). Over the next 24-hours, an additional 0.25" to around 1.5" fell across northeast OK and northwest AR, with 0.25" to around 1.25" fell over portions of southeast OK (Fig. 15). Then, by 7 am of the 17th, locations along I-44 and portions of Choctaw County had received 0.50" to 2.5" of rain, with scattered totals of 0.10" to around 1" elsewhere (Fig. 16). This rainfall led to minor flooding along the Neosho River near Commerce (see preliminary hydrographs at the end of this report; E3 Report for details).

A potent mid-level vorticity maximum moved from southeast CO into central KS on the 18th, igniting thunderstorms within an unstable airmass over northeast OK during the evening. Most of these storms were north of I-44 until late evening, when the moved east into northwest AR. Meanwhile, a large MCS developed across western OK, which moved into the eastern part of the state during the overnight hours. This line of storms marched east across the entire HSA, exiting the area by mid-morning on the 19th after producing widespread wind damage. Rainfall totals across southeast KS, northeast OK, and far northwest AR were 1"-4" (Fig. 17). 0.50"-2" also fell over Choctaw County in southeast OK. Elsewhere, totals were around 0.75" or less. The heavy rain over the Neosho River basin caused another rise along the Neosho River near Commerce, leading to moderate flooding, and minor flooding occurred along the Verdigris River near Lenapah (see preliminary hydrographs at the end of this report; E3 Report for details).



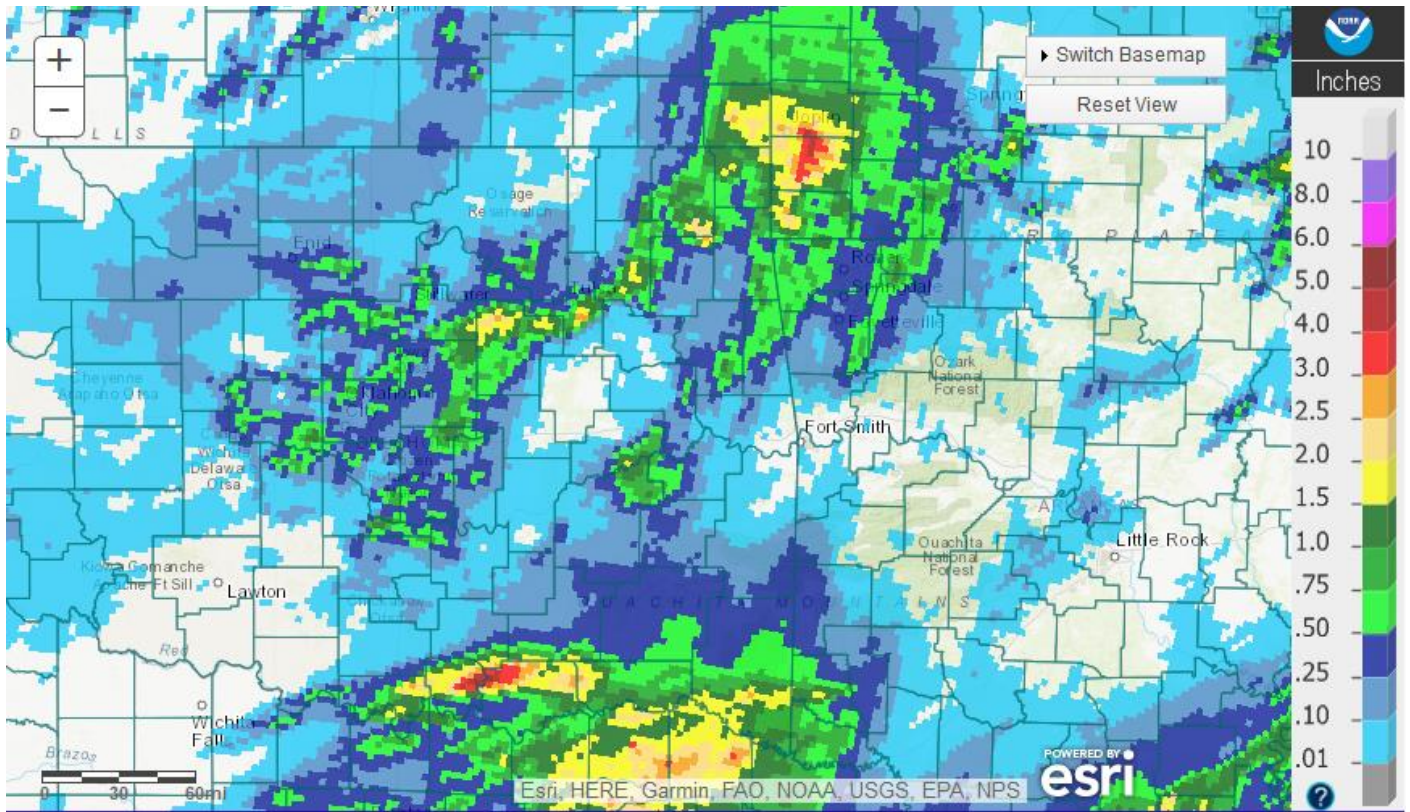
Tulsa, OK: June 15, 2019 1-Day Observed Precipitation
Valid on: June 15, 2019 12:00 UTC

Fig. 14. 24-hour Estimated Observed Rainfall ending at 7am CDT 6/15/2019.



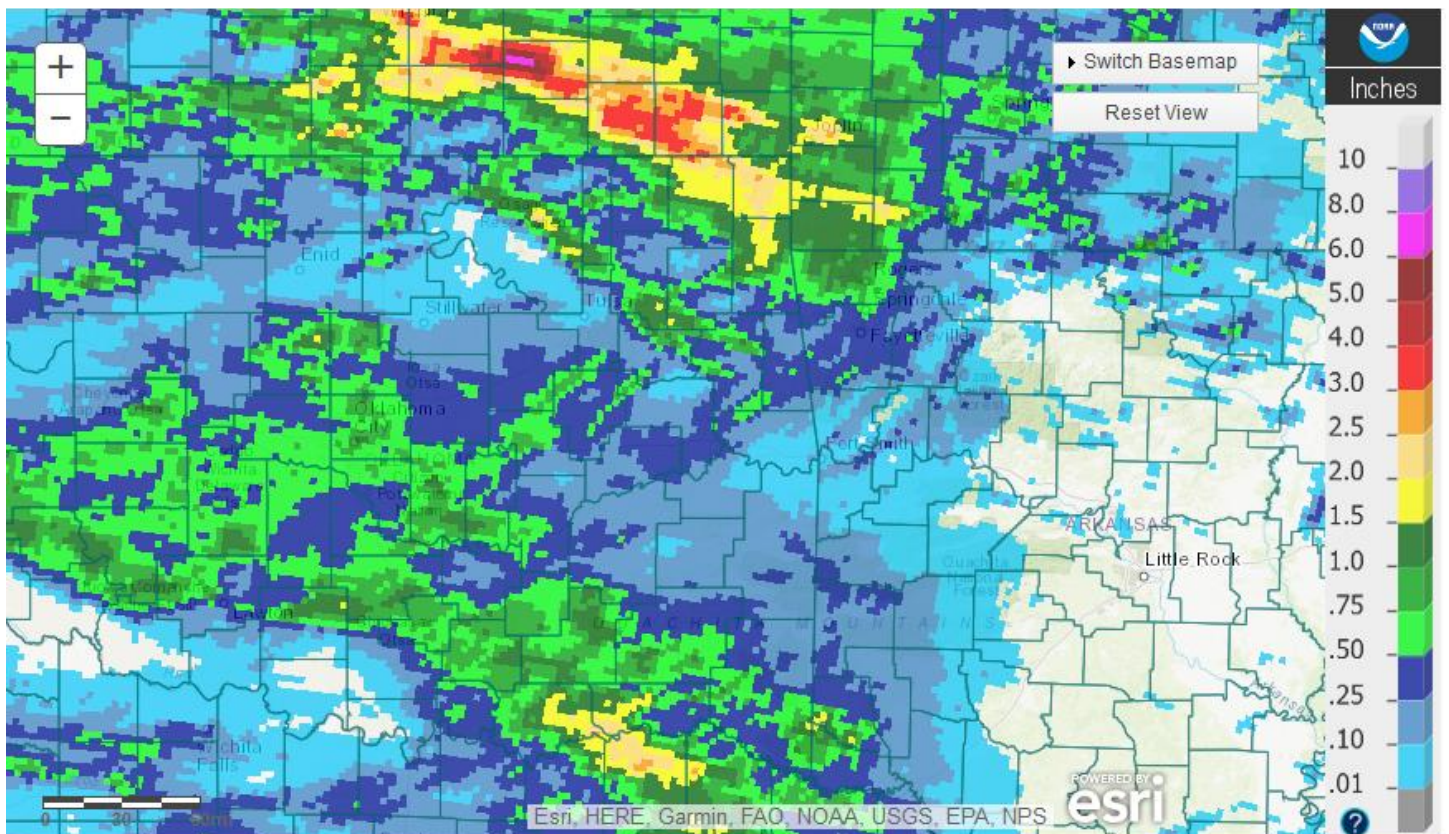
Tulsa, OK: June 16, 2019 1-Day Observed Precipitation
Valid on: June 16, 2019 12:00 UTC

Fig. 15. 24-hour Estimated Observed Rainfall ending at 7am CDT 6/16/2019.



Tulsa, OK: June 17, 2019 1-Day Observed Precipitation
Valid on: June 17, 2019 12:00 UTC

Fig. 16. 24-hour Estimated Observed Rainfall ending at 7am CDT 6/17/2019.



Tulsa, OK: June 19, 2019 1-Day Observed Precipitation
Valid on: June 19, 2019 12:00 UTC

Fig. 17. 24-hour Estimated Observed Rainfall ending at 7am CDT 6/19/2019.

Early morning surface analysis on the 22nd indicated a surface low located over the OK/TX panhandles into northeast NM. From the low, a dryline extended southward to far southwest TX and a nearly stationary front was positioned from the low through central KS and into western MO. South and east of these boundaries, breezy southerly winds were helping to keep temperatures warm with dewpoints in the low/mid 70s across eastern OK and northwest AR. Also, ongoing convection along the frontal boundary in KS had put out a southward moving outflow boundary into the HSA. Aloft, an upper-level low continued to drop southeast through NV while a vorticity max had developed over southern TX. The combination of all of these features led to an active weather pattern across the region through the 24th. PWAT values were three standard deviations above normal, up to 2.3", during this time, meaning thunderstorms were very efficient at producing heavy rain.

The vorticity max in southern TX moved into eastern OK during the afternoon hours of the 22nd and into southern MO during the night. The combination of this vorticity max and leftover outflow boundaries from convection in KS allowed for scattered thunderstorm development over eastern OK and northwest AR during the late afternoon and evening hours. Thunderstorm coverage increased again over the HSA after midnight of the 23rd, as the vorticity max slowly moved into MO. During the early morning hours, additional thunderstorms developed along and ahead of a cold front positioned from a surface low in the TX panhandle northeast through central/northern KS. These storms then moved into eastern OK around sunrise on the 23rd and continued across the entire HSA, except for far southeast OK, through late afternoon. By mid-afternoon, new convection began over central OK along the cold front. The leading edge of the thunderstorms moved across east central/southeast OK and northwest AR through the evening hours, with trailing rain lingering for a couple of hours past midnight. There were numerous reports of wind damage and flash flooding across northeast OK, east central OK, and northwest AR. Many roads had water over them. A portion of AR HWY 220 near Devils Den was washed away. Significant street flooding occurred in Fort Smith and throughout Benton and Washington Counties in northwest AR.

These rounds of storm activity brought widespread rain to much of eastern OK and northwest AR, with 2-day totals of 2" to 6" (Figs. 18-21). In addition to the flash flooding, several rivers exceeded flood stage. Major flooding occurred along Lee Creek at Van Buren; Moderate flooding occurred along the Neosho River near Commerce, Spring River near Quapaw, Illinois River near Watts, Chewey, and Tahlequah, Arkansas River near Muskogee and at Van Buren, Poteau River near Poteau and near Panama; and Minor flooding occurred along the Caney River near Collinsville, Baron Fork near Eldon, Arkansas River at Ozark L&D (see preliminary hydrographs at the end of this report; E3 Report for details).

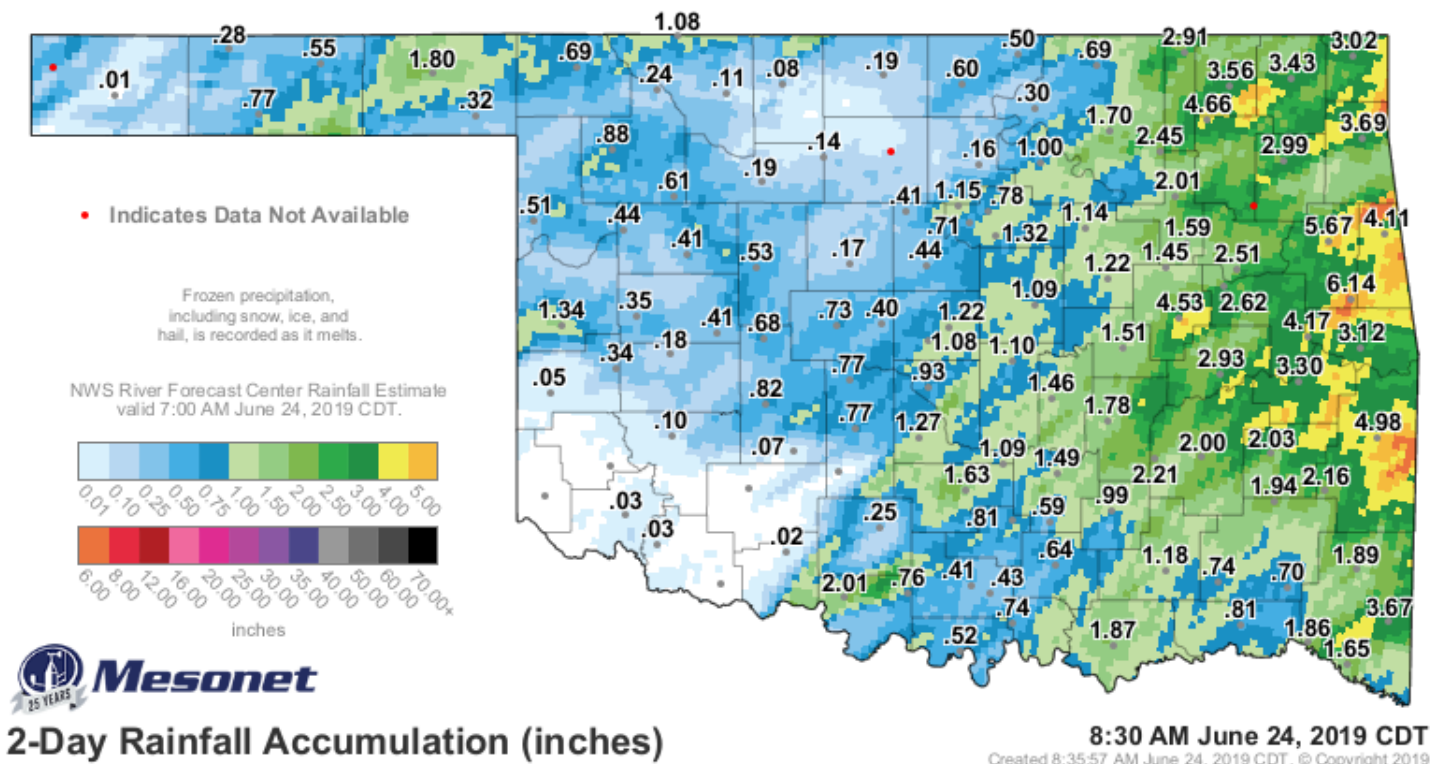


Fig. 18. OK Mesonet (values) and NWS RFC rainfall estimate (image) 2-day rainfall ending at 8:30 am CDT 06/24/2019.

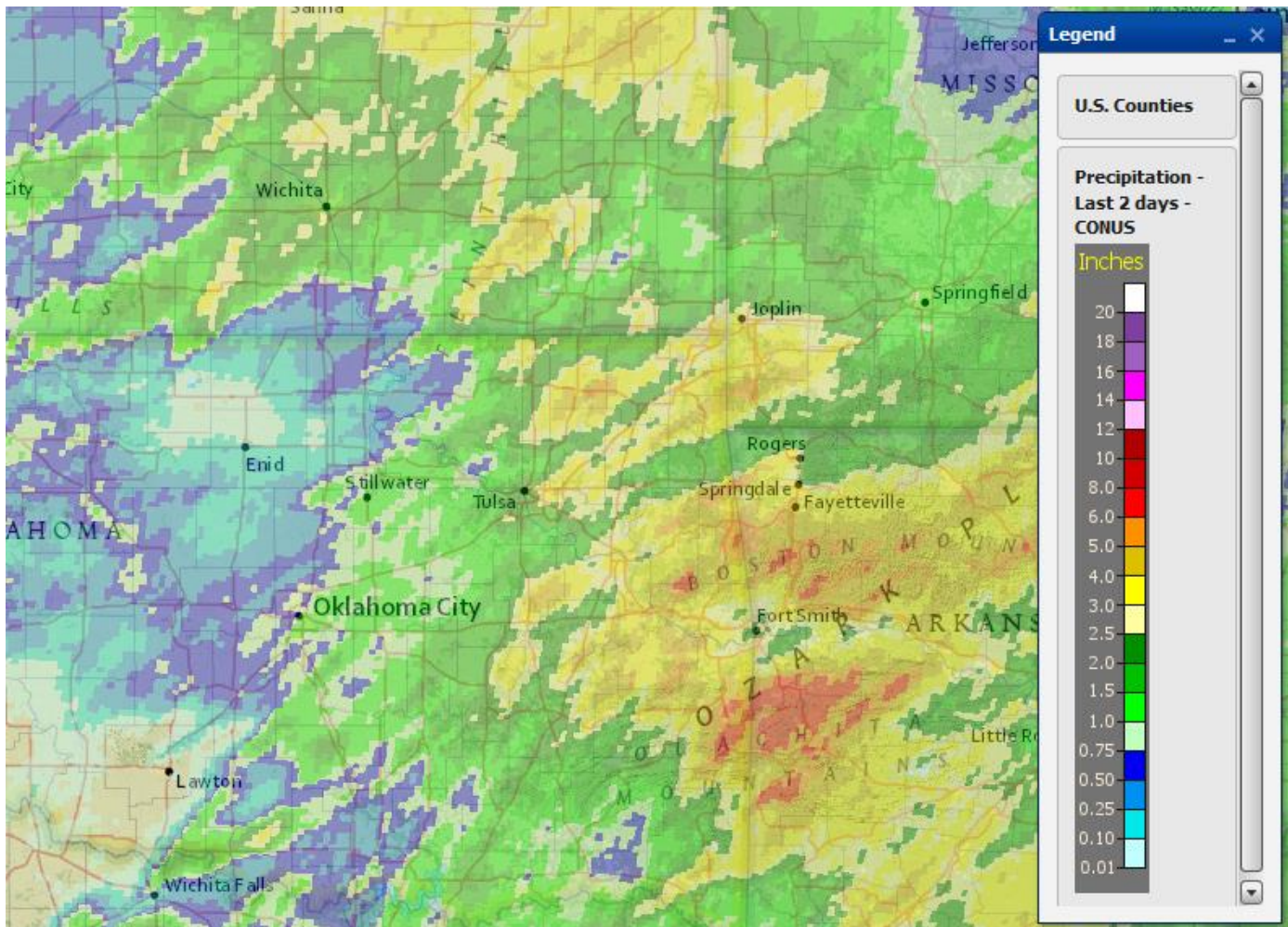


Fig. 19. 48-hour Estimated Observed Rainfall ending at 9am CDT 6/24/2019.

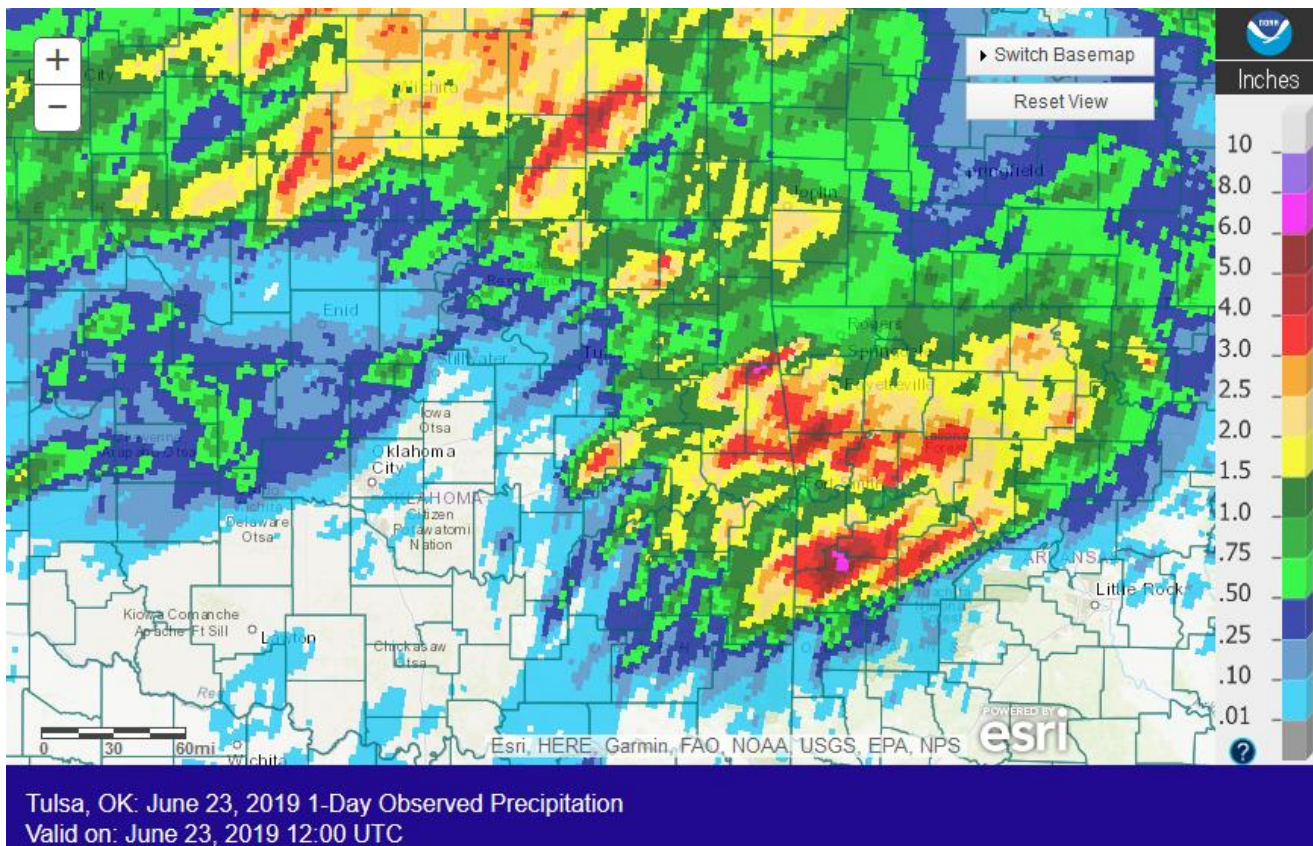
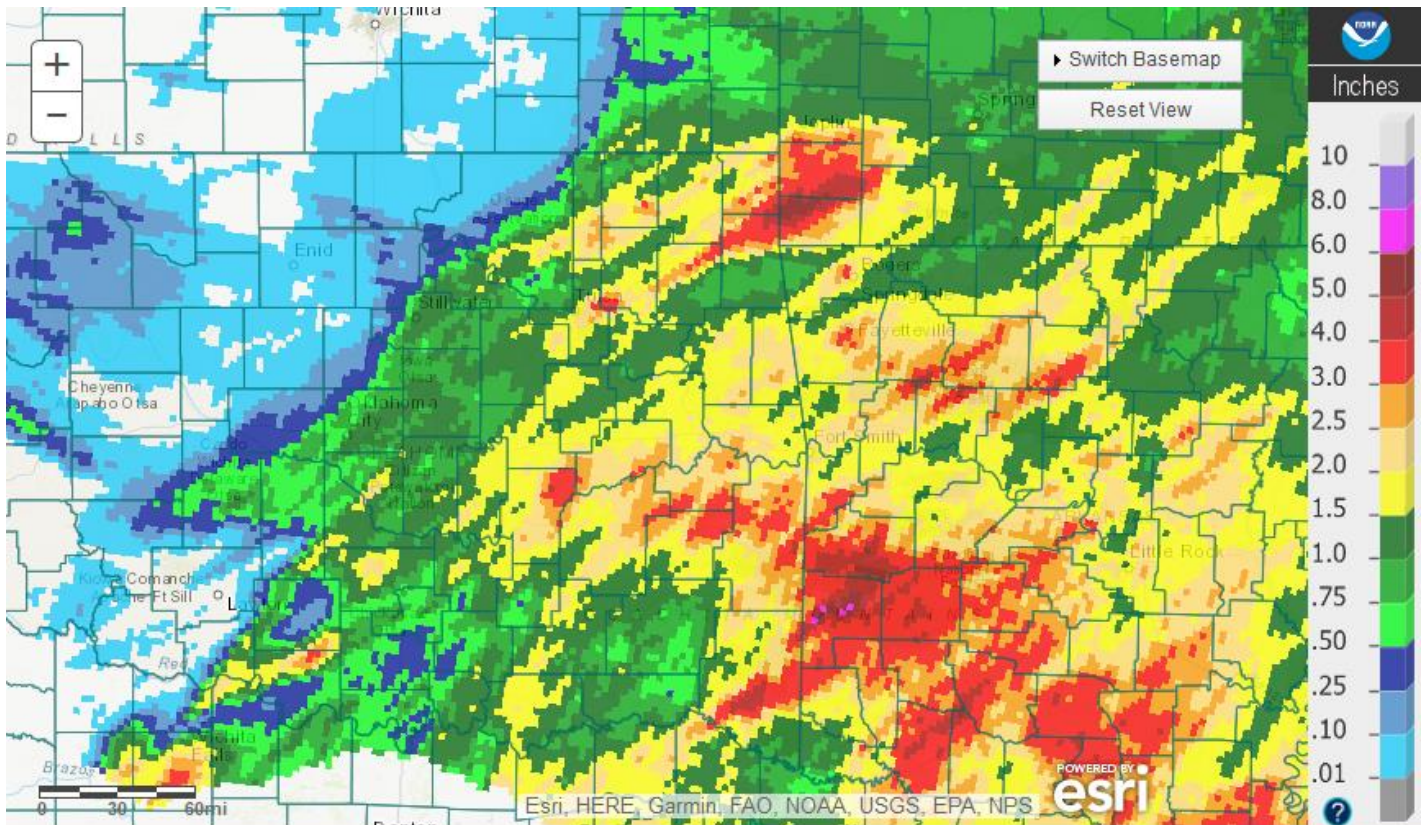


Fig. 20. 24-hour Estimated Observed Rainfall ending at 7am CDT 6/23/2019.



Tulsa, OK: Current 1-Day Observed Precipitation
Valid on: June 24, 2019 12:00 UTC

Fig. 21. 24-hour Estimated Observed Rainfall ending at 7am CDT 6/24/2019.



Tulsa, OK: June 27, 2019 1-Day Observed Precipitation
Valid on: June 27, 2019 12:00 UTC

Fig. 22. 24-hour Estimated Observed Rainfall ending at 7am CDT 6/27/2019.

Thunderstorms developed and lingered over Carroll and Madison Counties during the afternoon of the 26th in response to a well-defined mesoscale convective vortex (MCV) over central MO and high instability over northern AR. Rainfall totals were around 1" to around 3" from these nearly stationary storms (Fig. 22).

Written by:

Nicole McGavock
Service Hydrologist
WFO Tulsa

Products issued in June 2019:

*CWYO2 became a daily river forecast point September 7, 2016

*MLBA4 and OZGA4 transferred to NWS Tulsa HSA February 5, 2014

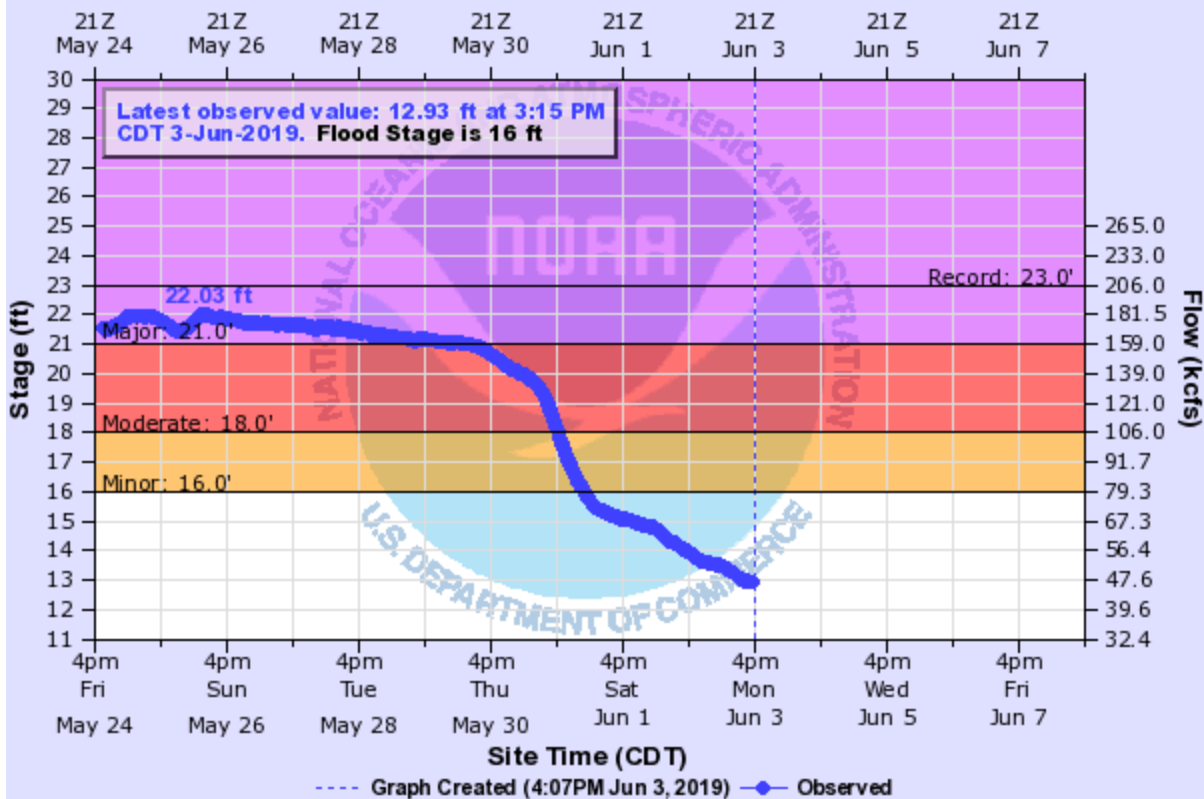
*Mixed case River Flood products began July 31, 2013

- 27 Flash Flood Warnings (FFW)
- 9 Flash Flood Statements (FFS)
- 3 Flash/Areal Flood Watches (FFA) (9 Watch FFA CON/EXT/EXA/EXB/CAN)
- 30 Urban and Small Stream Advisories (FLS)
- 14 Areal Flood Warnings (FLW)
- 6 Areal Flood Statements (FLS)
- 41 River Flood Warnings (FLW) (includes category increases)
- 463 River Flood Statements (FLS)
- 15 River Flood Advisories (FLS) (90 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:

ARKANSAS RIVER AT RALSTON

Universal Time (UTC)

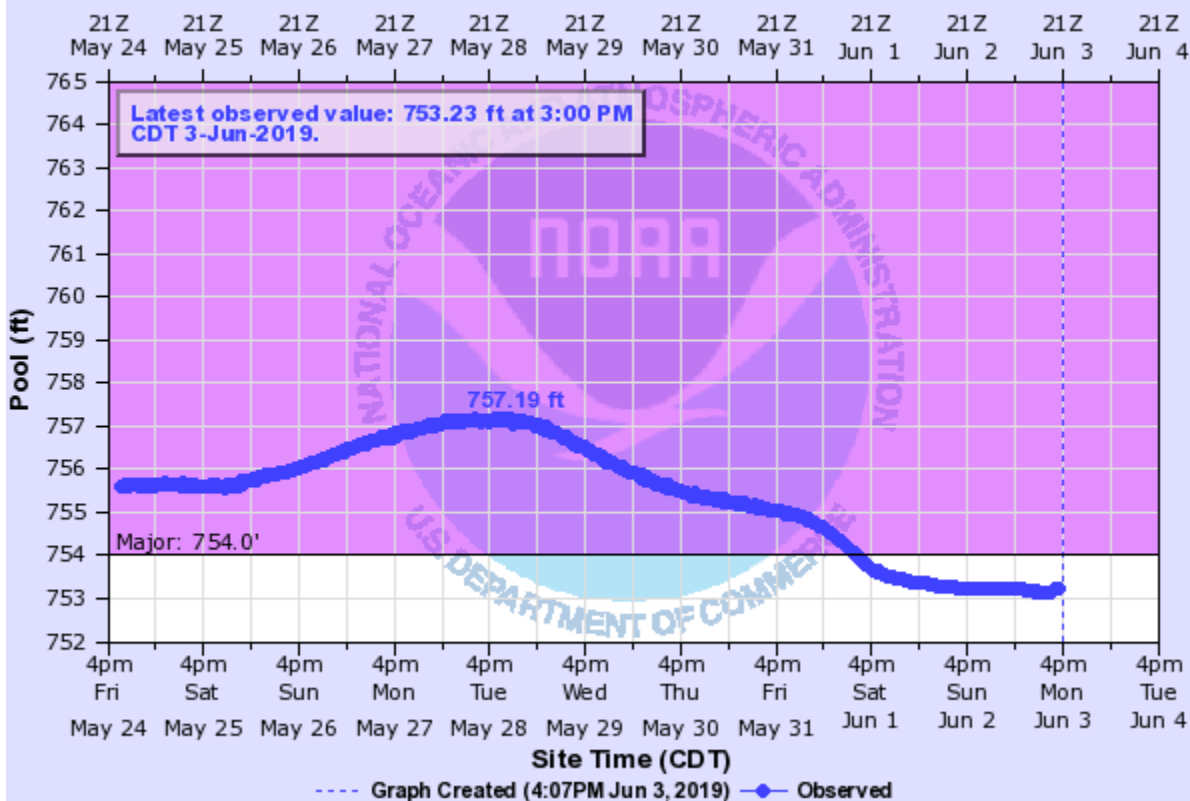


RLSO2(plotting HGIRG) "Gage 0" Datum: 776.7'

Observations courtesy of US Geological Survey

EASTERN OKLAHOMA LAKES AT KEYSTONE LAKE

Universal Time (UTC)

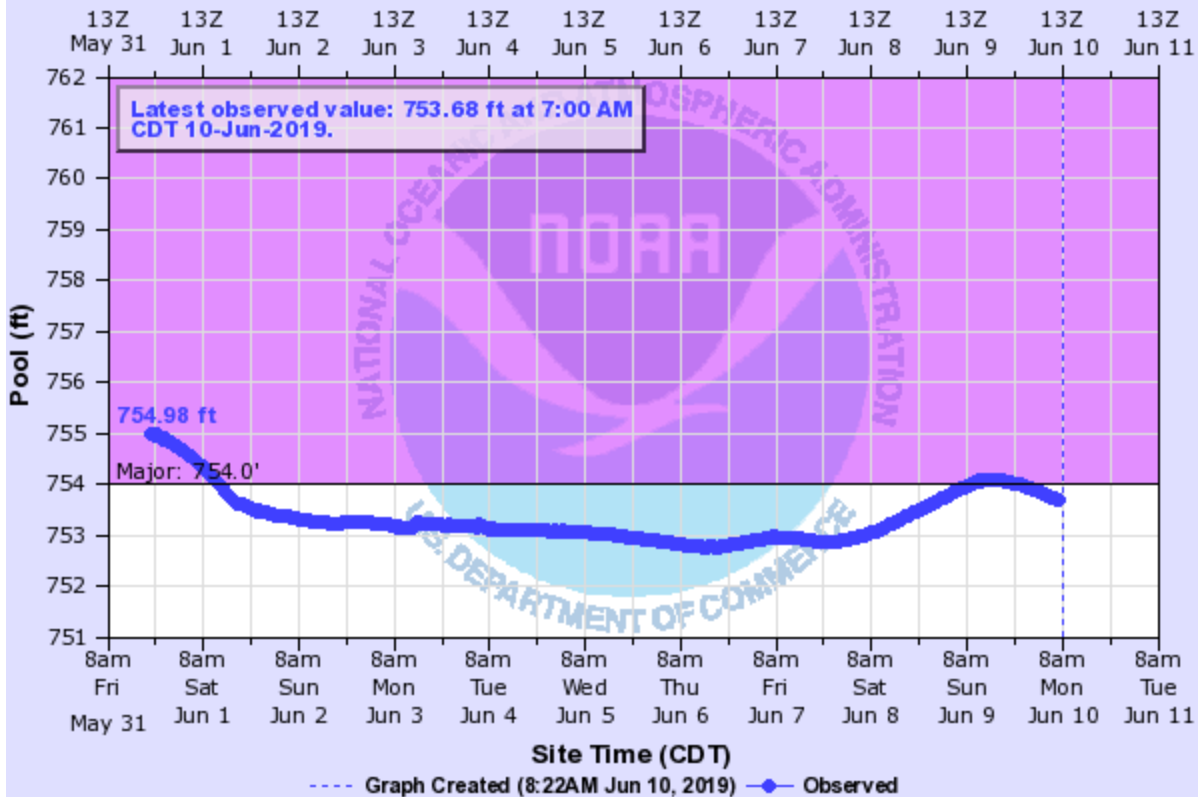


KEYO2(plotting HPIRG) "Gage 0" Datum: 0'

Observations courtesy of US Army Corps of Engineers

EASTERN OKLAHOMA LAKES AT KEYSTONE LAKE

Universal Time (UTC)

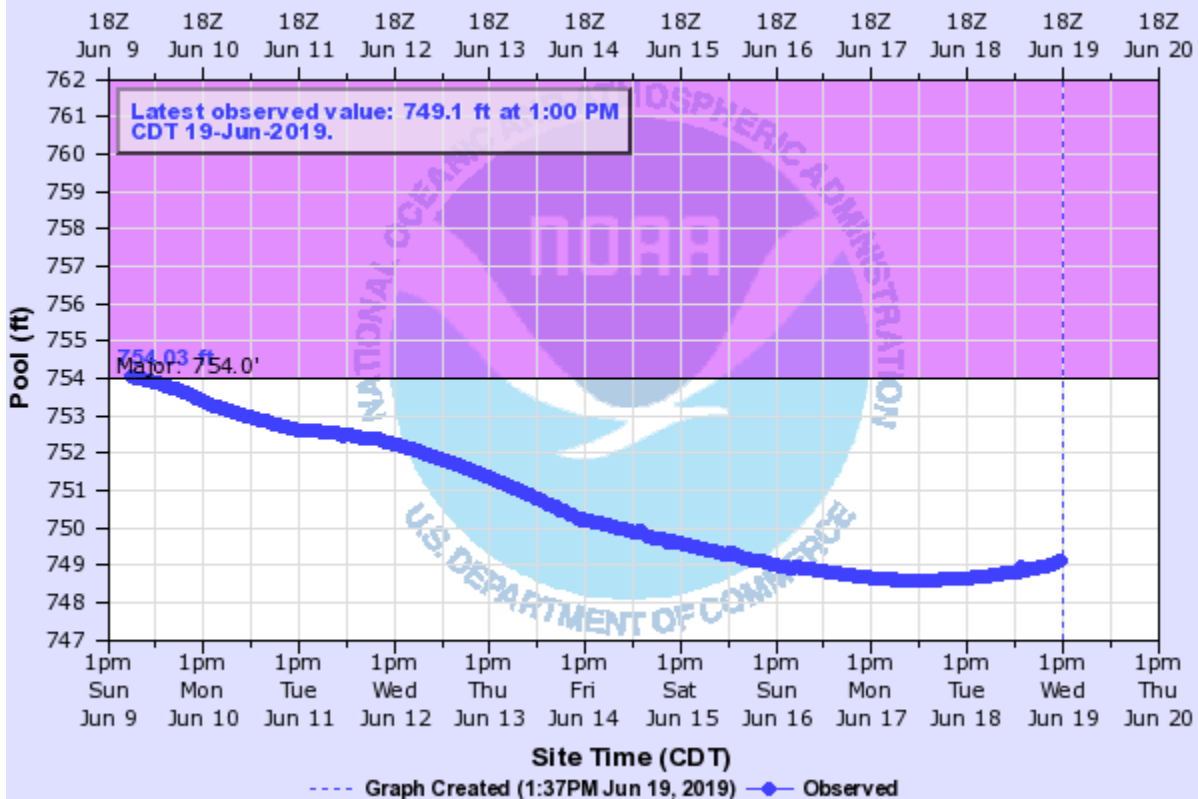


KEYO2(plotting HPIRG) "Gage 0" Datum: 0'

Observations courtesy of US Army Corps of Engineers

EASTERN OKLAHOMA LAKES AT KEYSTONE LAKE

Universal Time (UTC)

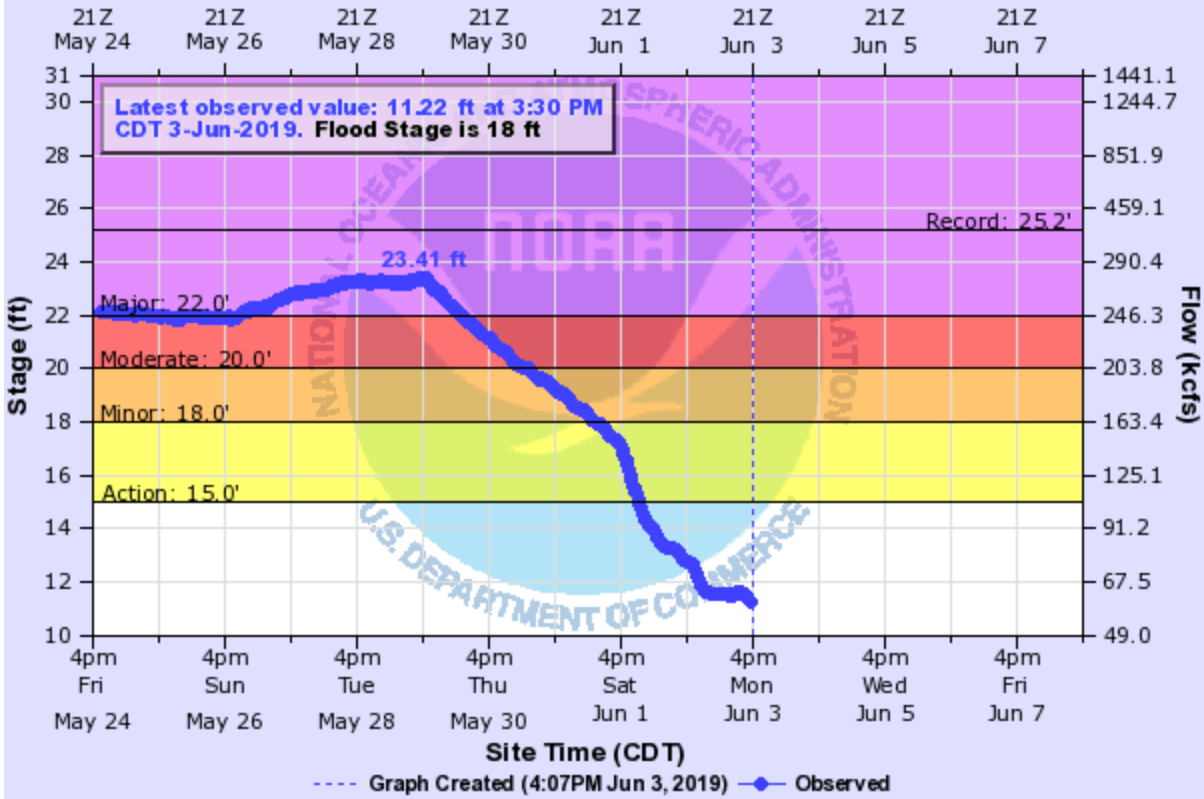


KEYO2(plotting HPIRG) "Gage 0" Datum: 0'

Observations courtesy of US Army Corps of Engineers

ARKANSAS RIVER AT TULSA

Universal Time (UTC)

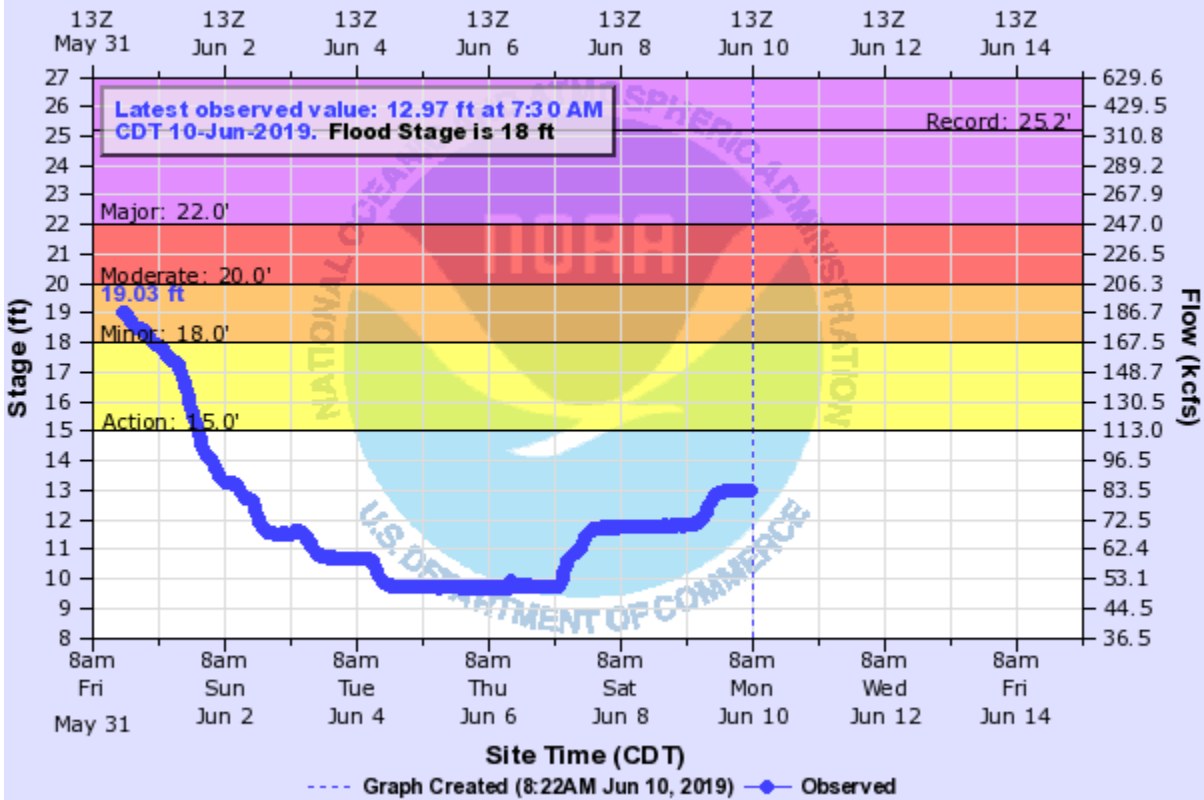


TLSO2(plotting HGIRG) "Gage 0" Datum: 615.23'

Observations courtesy of US Geological Survey

ARKANSAS RIVER AT TULSA

Universal Time (UTC)

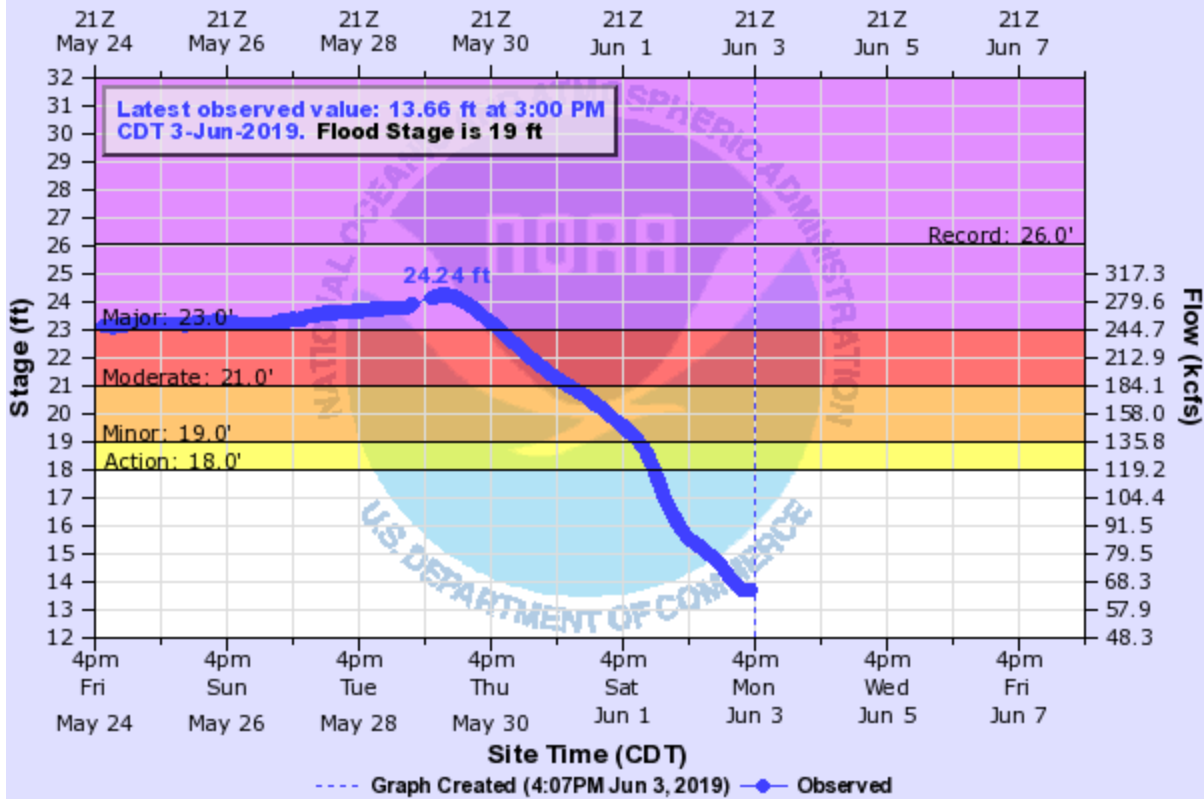


TLSO2(plotting HGIRG) "Gage 0" Datum: 615.23'

Observations courtesy of US Geological Survey

ARKANSAS RIVER NEAR HASKELL

Universal Time (UTC)

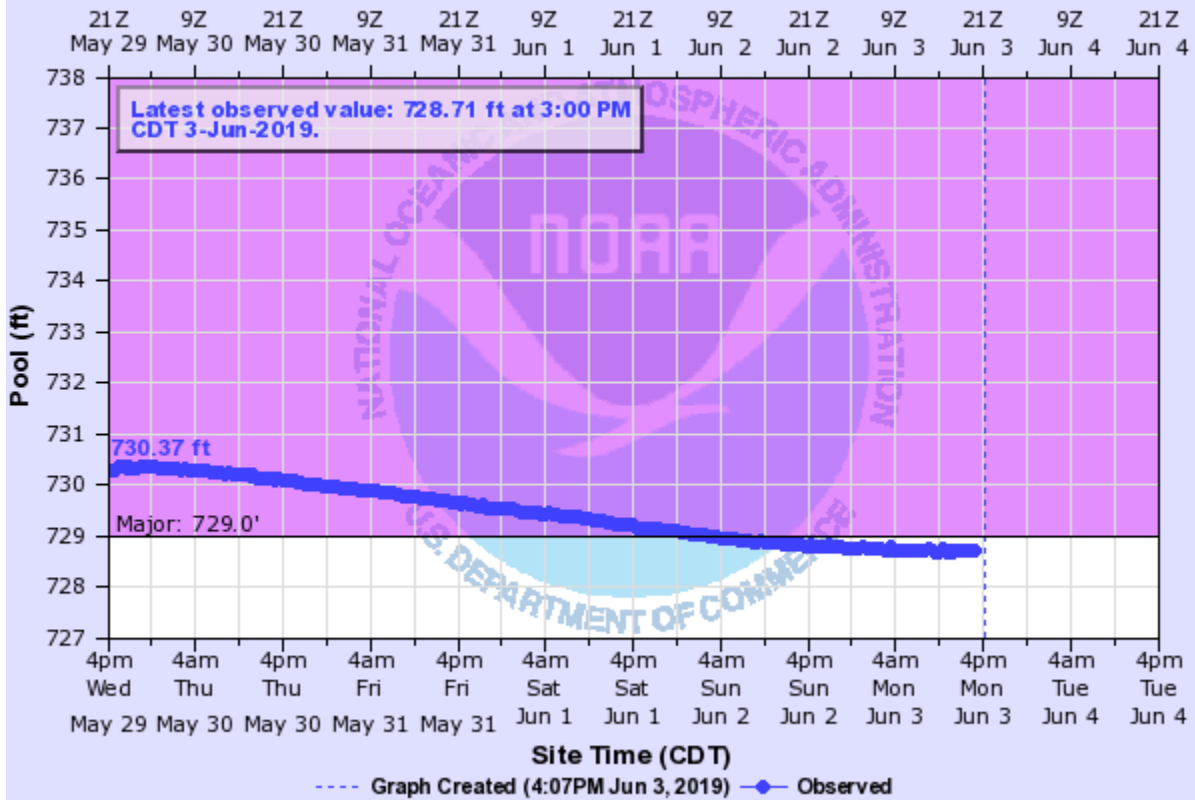


HSK02(plotting HGIRG) "Gage 0" Datum: 530'

Observations courtesy of US Geological Survey

EASTERN OKLAHOMA LAKES AT SKIATOOK LAKE

Universal Time (UTC)

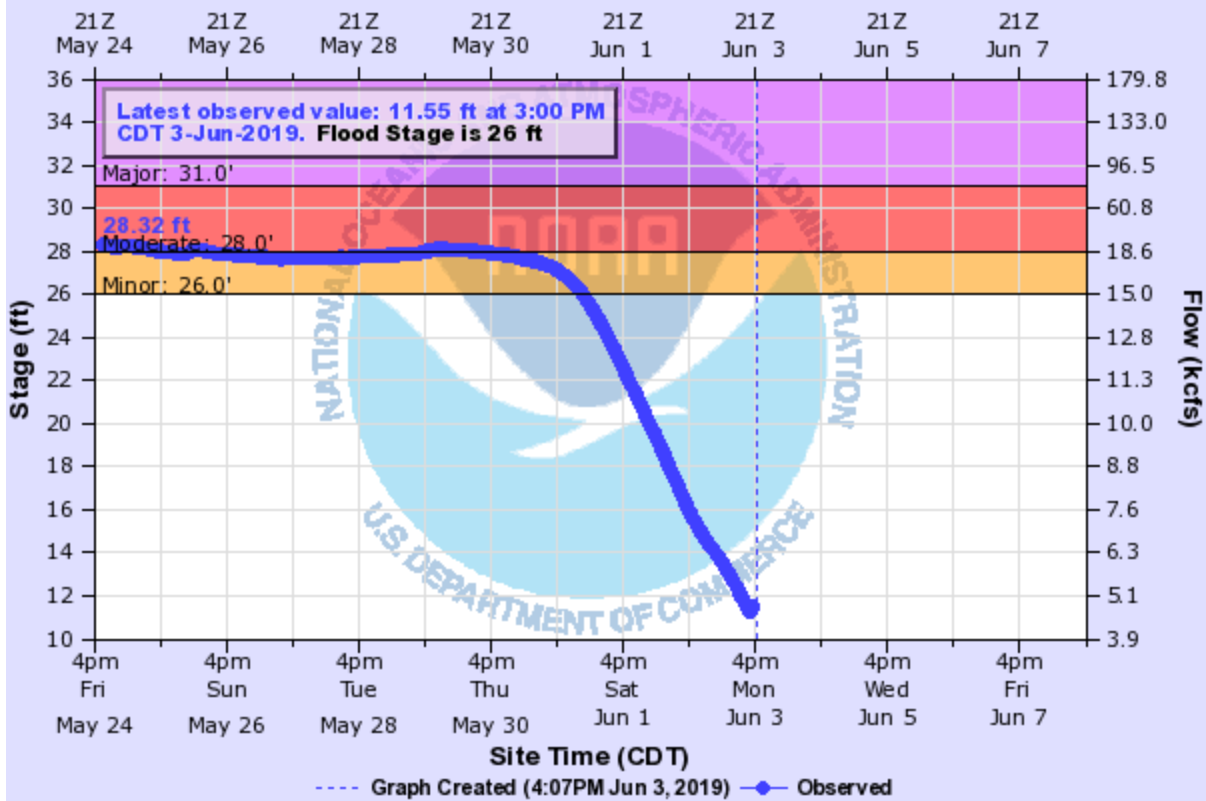


SKL02(plotting HPIRG) "Gage 0" Datum: 0'

Observations courtesy of US Army Corps of Engineers

CANEY RIVER NEAR RAMONA

Universal Time (UTC)

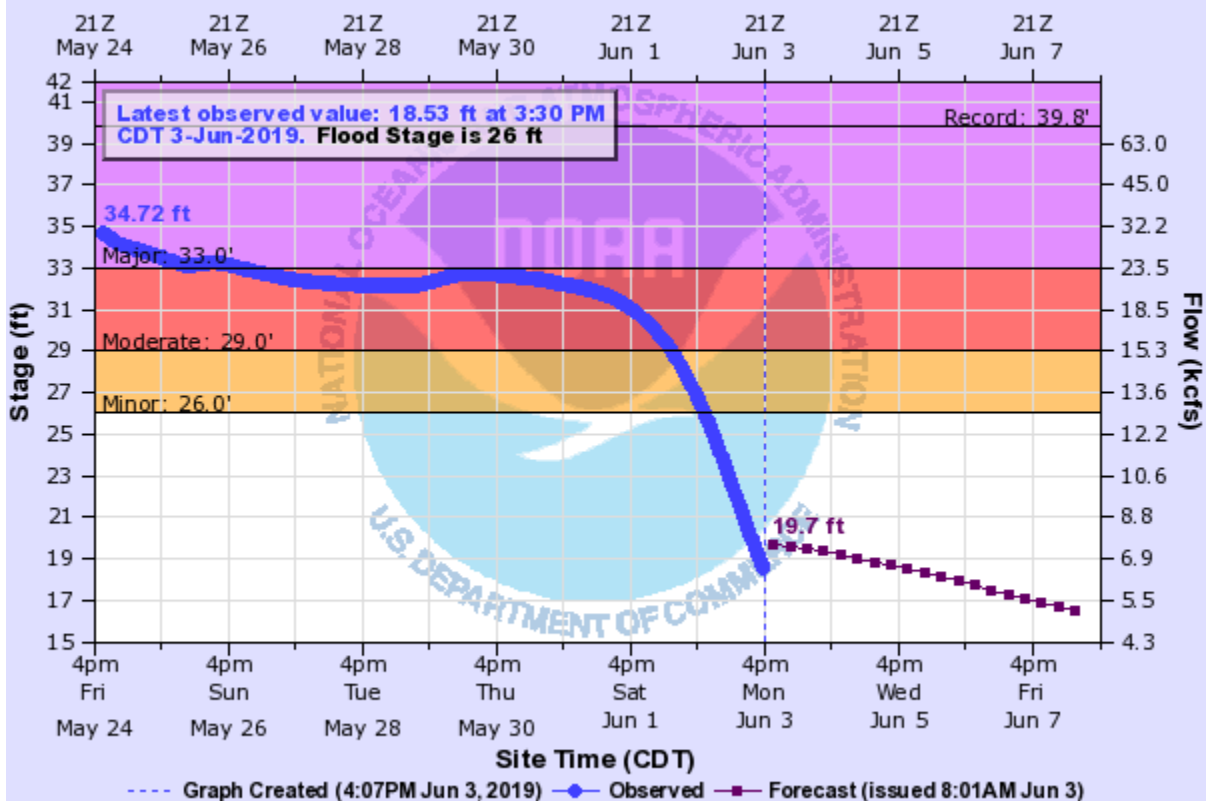


RAMO2(plotting HGIRG) "Gage 0" Datum: 586.43'

Observations courtesy of US Geological Survey

CANEY RIVER NEAR COLLINSVILLE

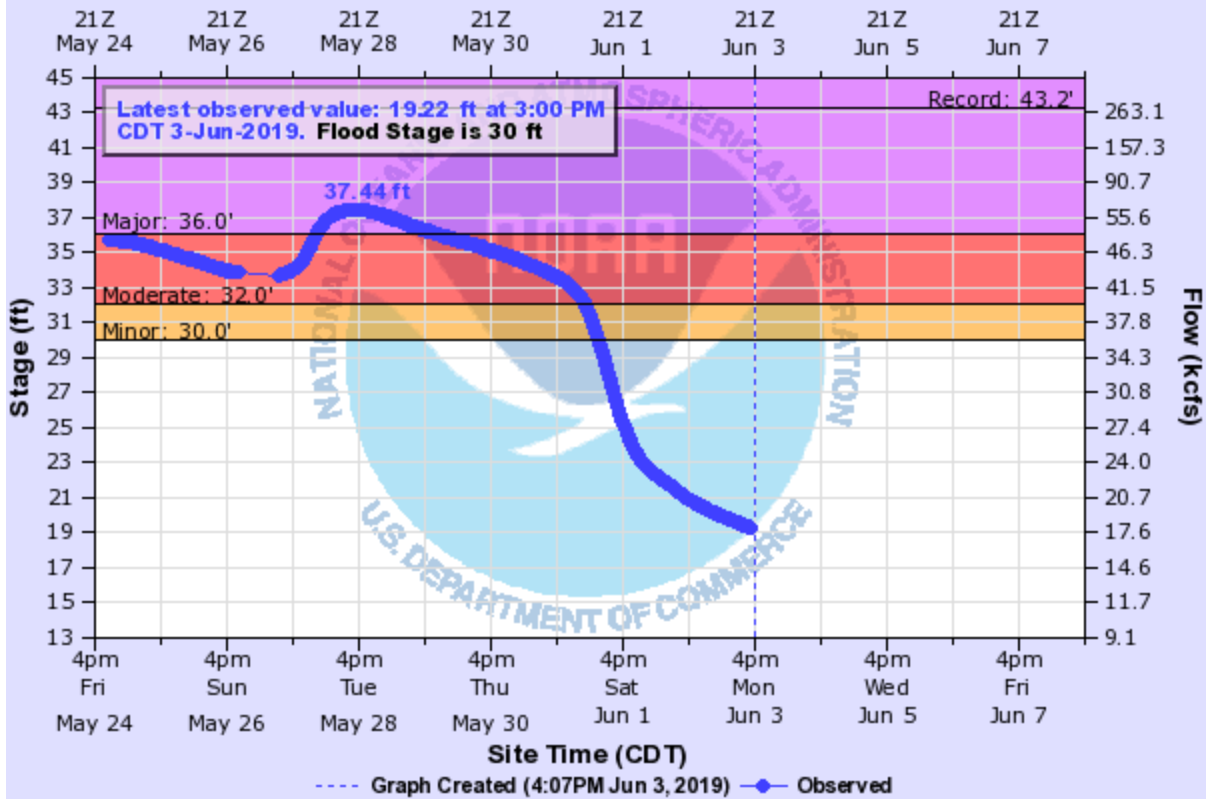
Universal Time (UTC)



CVLO2(plotting HGIRG) "Gage 0" Datum: 565.72'

VERDIGRIS RIVER NEAR LENAPAH

Universal Time (UTC)

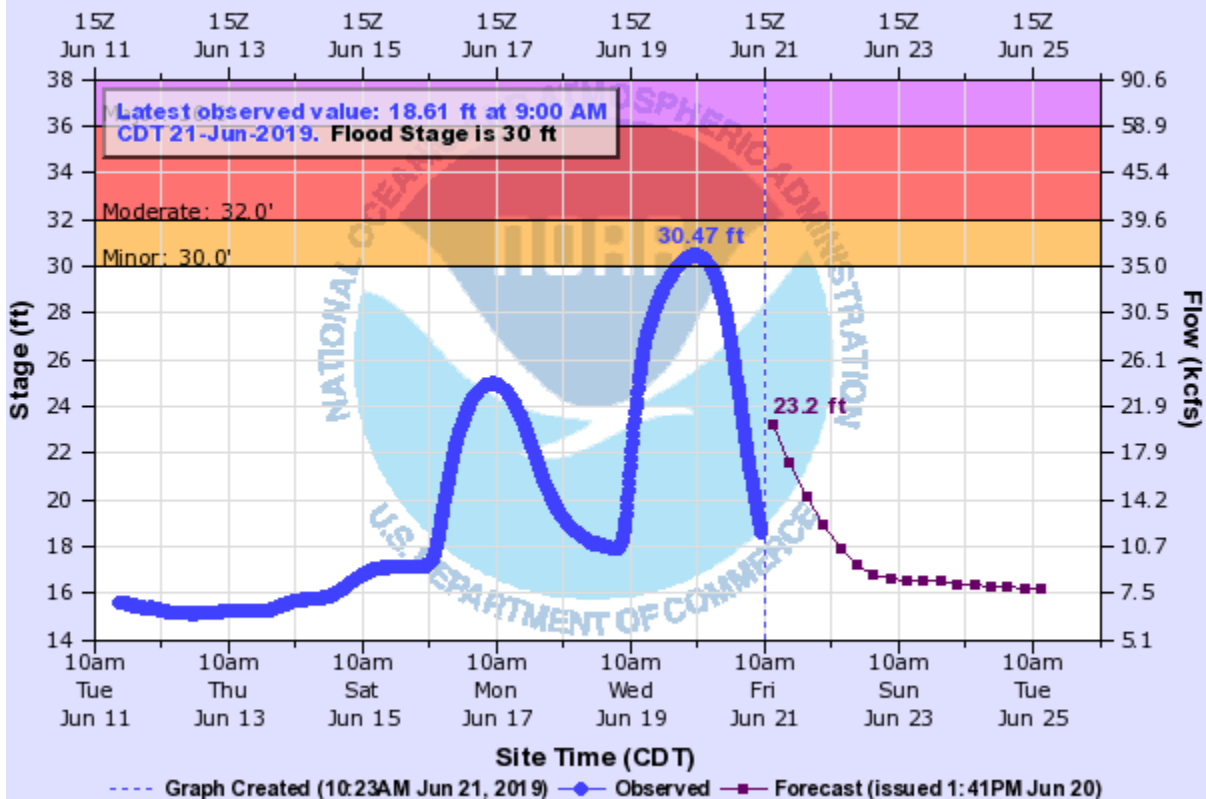


LEPO2(plotting HGIRG) "Gage 0" Datum: 644.9'

Observations courtesy of US Geological Survey

VERDIGRIS RIVER NEAR LENAPAH

Universal Time (UTC)

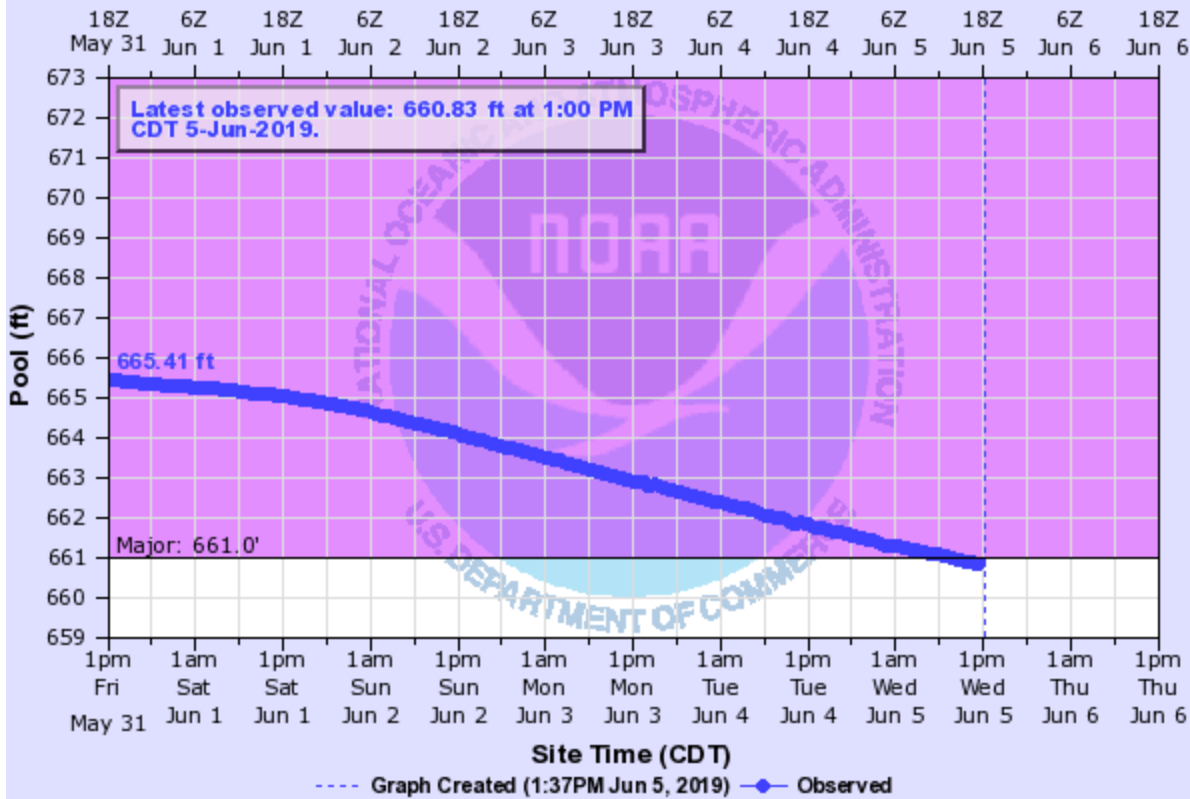


LEPO2(plotting HGIRG) "Gage 0" Datum: 644.9'

Observations courtesy of US Geological Survey

EASTERN OKLAHOMA LAKES AT OOLOGAH LAKE

Universal Time (UTC)

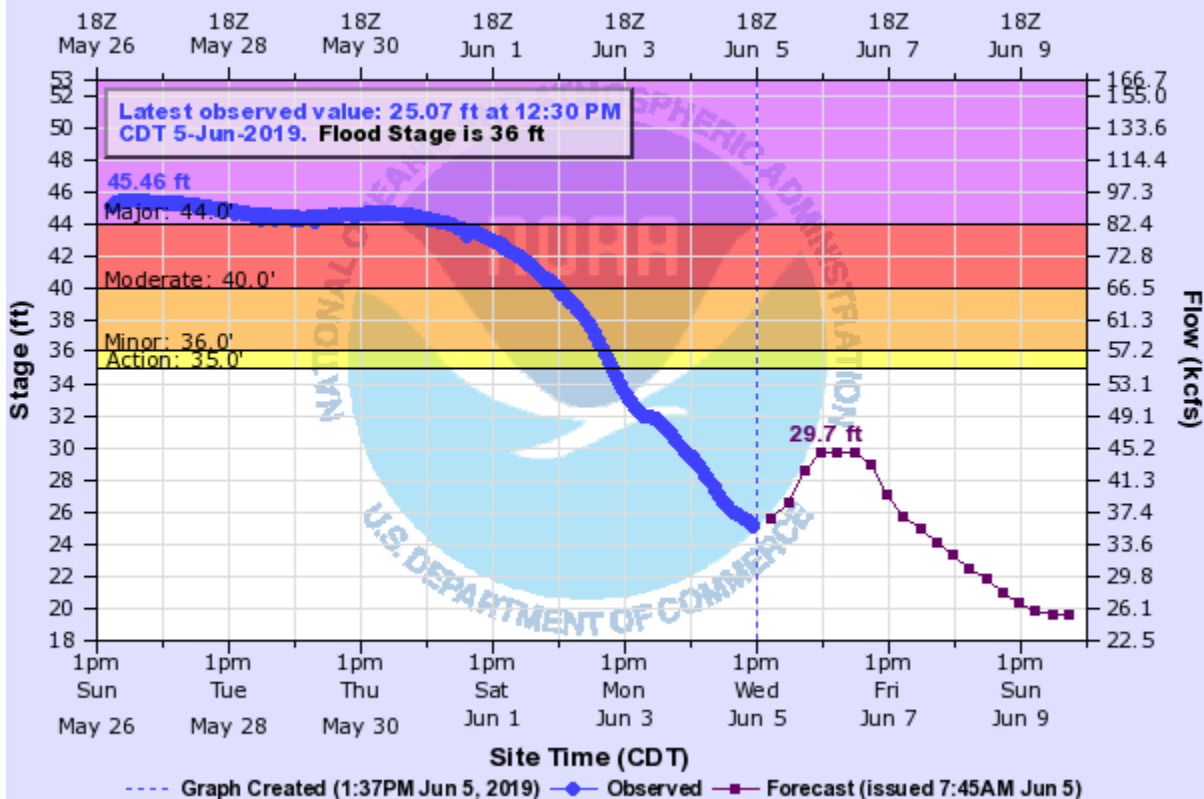


OOL02(plotting HPIRG) "Gage 0" Datum: 0'

Observations courtesy of US Army Corps of Engineers

VERDIGRIS RIVER NEAR CLAREMORE

Universal Time (UTC)

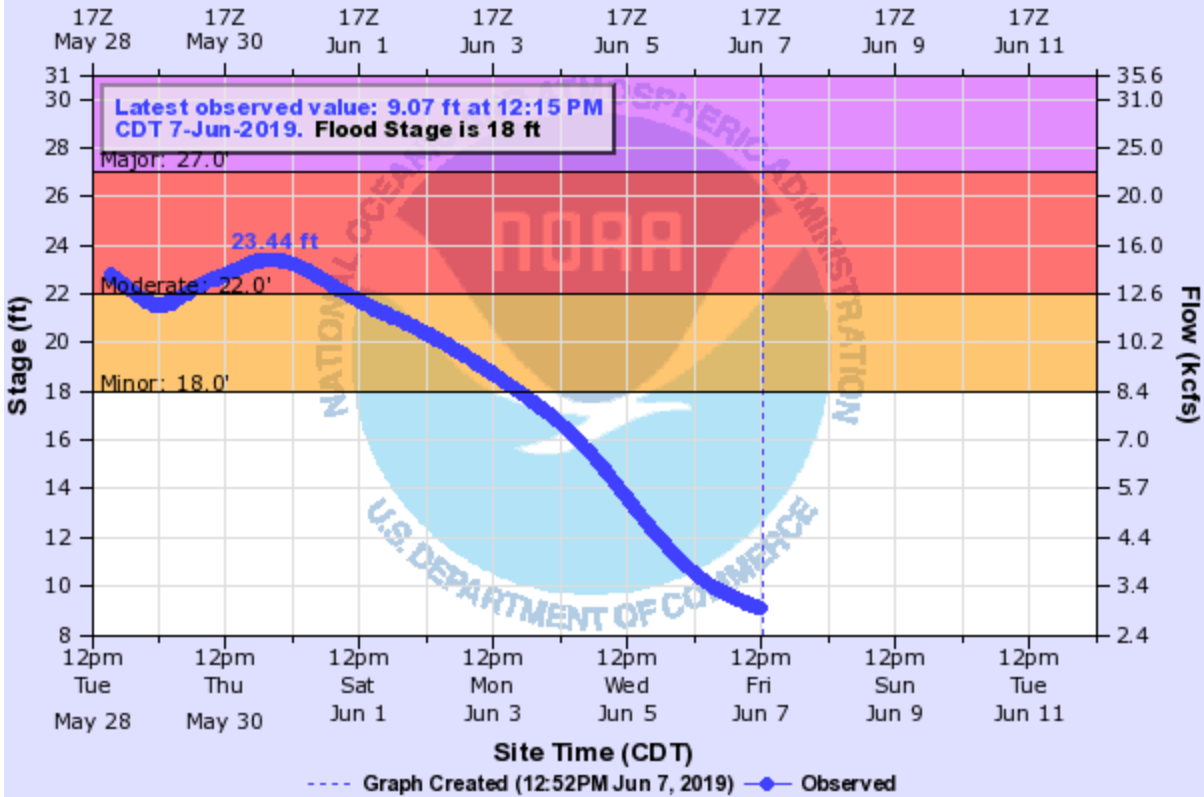


CLR02(plotting HGIRG) "Gage 0" Datum: 538.62'

Observations courtesy of US Geological Survey

DEEP FORK RIVER NEAR BEGGS

Universal Time (UTC)

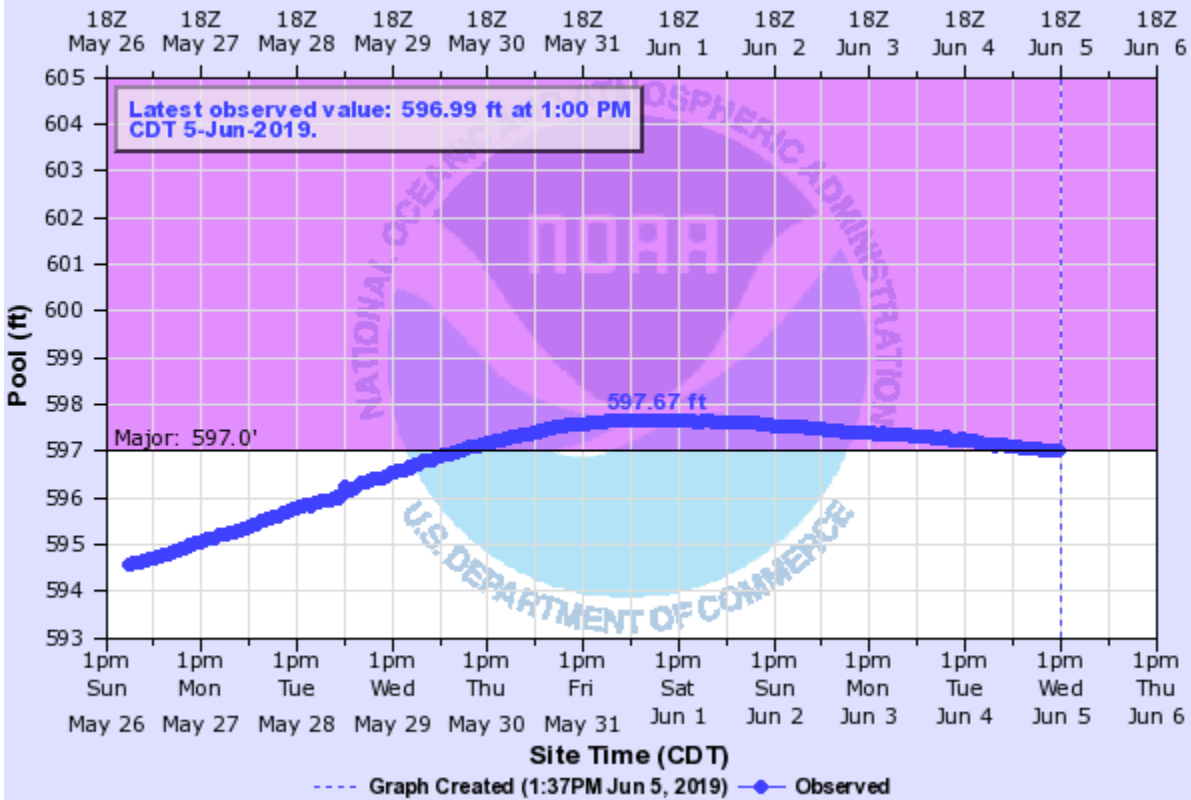


BGS02(plotting HGIRG) "Gage 0" Datum: 632.55'

Observations courtesy of US Geological Survey

EASTERN OKLAHOMA LAKES AT EUFALA LAKE

Universal Time (UTC)

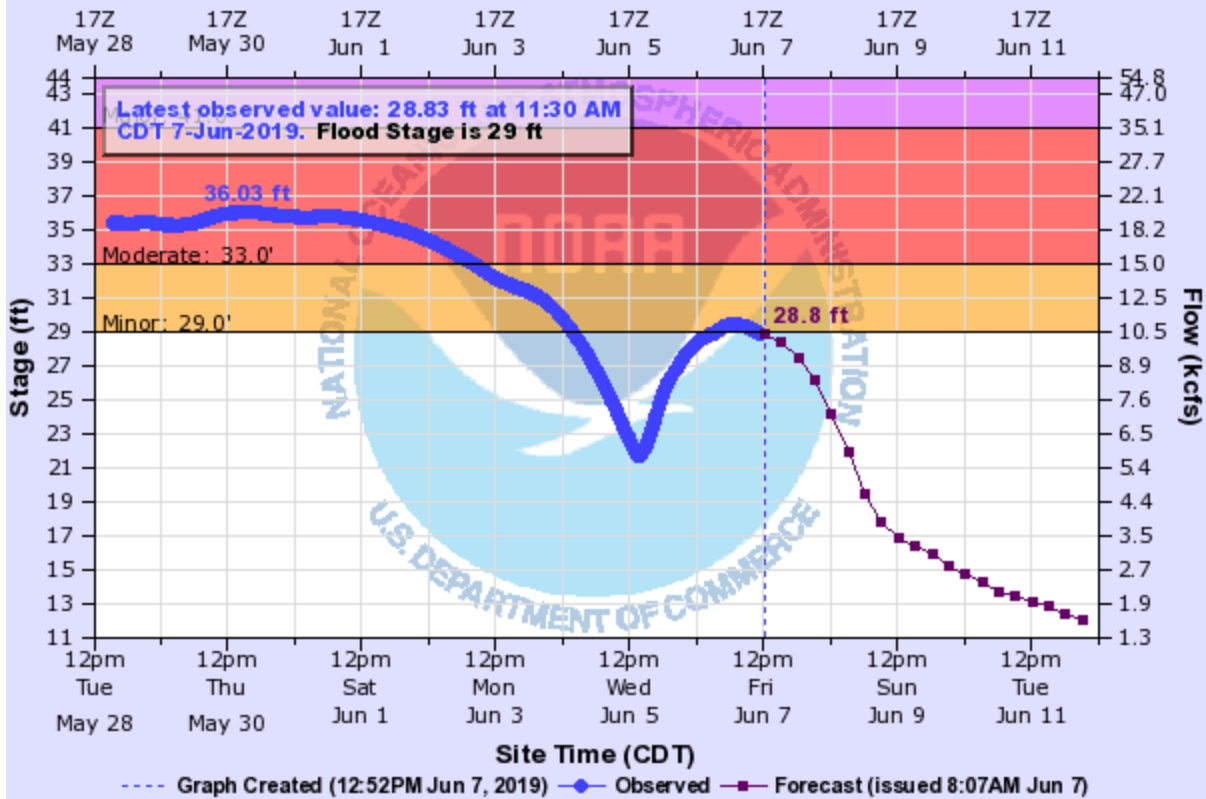


EUFO2(plotting HPIRG) "Gage 0" Datum: 0'

Observations courtesy of US Army Corps of Engineers

POTEAU RIVER NEAR PANAMA

Universal Time (UTC)

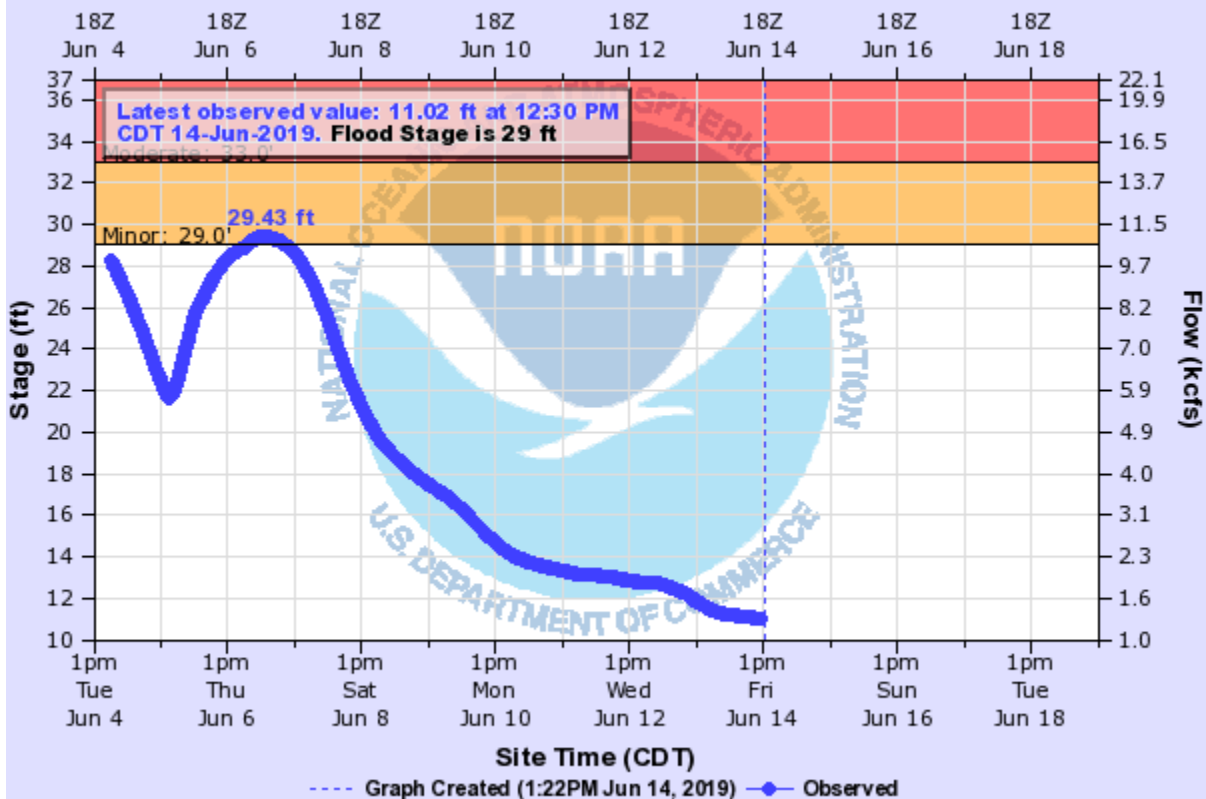


PANO2(plotting HGIRG) "Gage 0" Datum: 387.96'

Observations courtesy of US Geological Survey

POTEAU RIVER NEAR PANAMA

Universal Time (UTC)

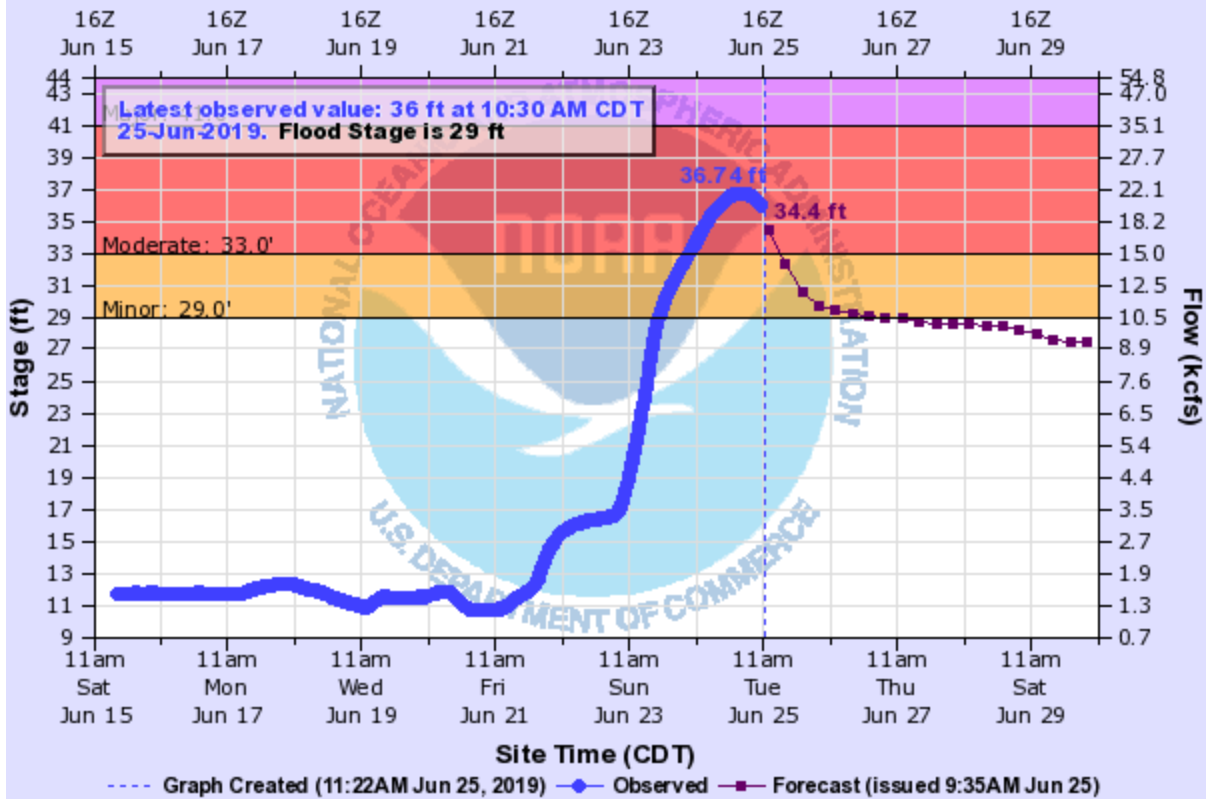


PANO2(plotting HGIRG) "Gage 0" Datum: 387.96'

Observations courtesy of US Geological Survey

POTEAU RIVER NEAR PANAMA

Universal Time (UTC)

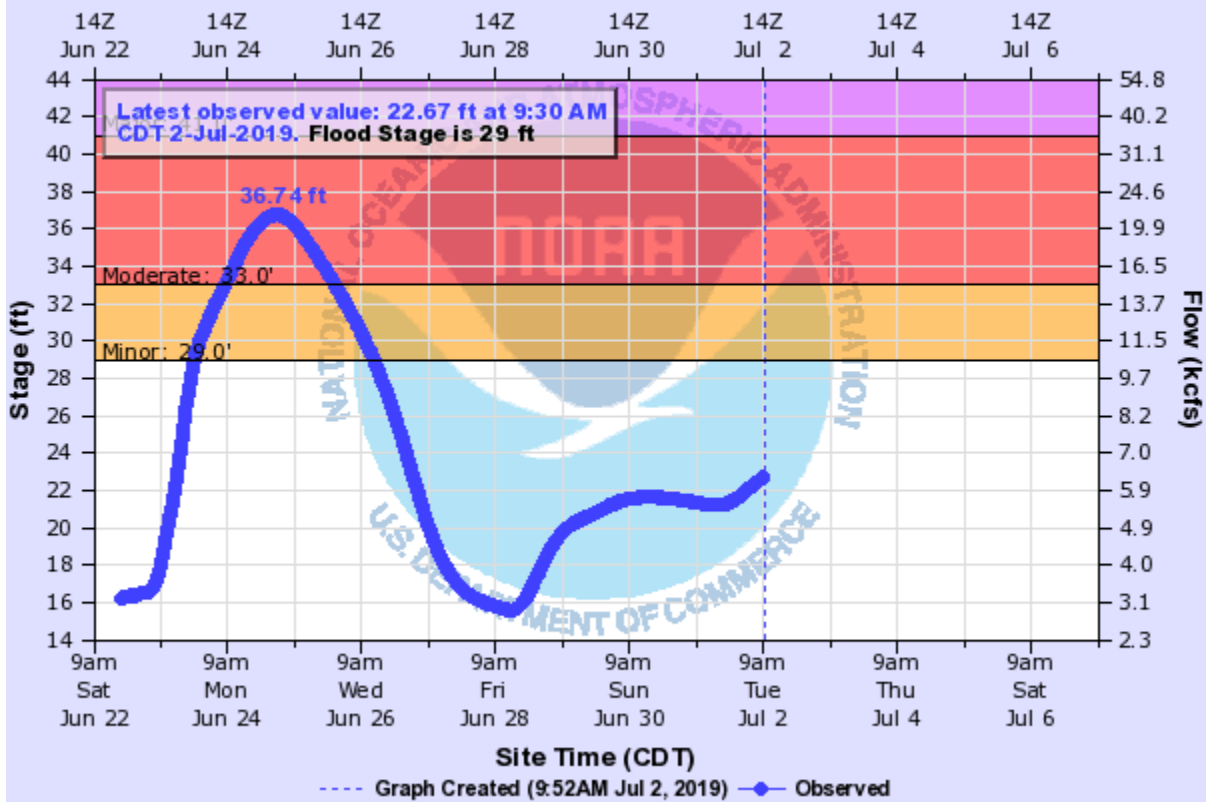


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Observations courtesy of US Geological Survey

POTEAU RIVER NEAR PANAMA

Universal Time (UTC)

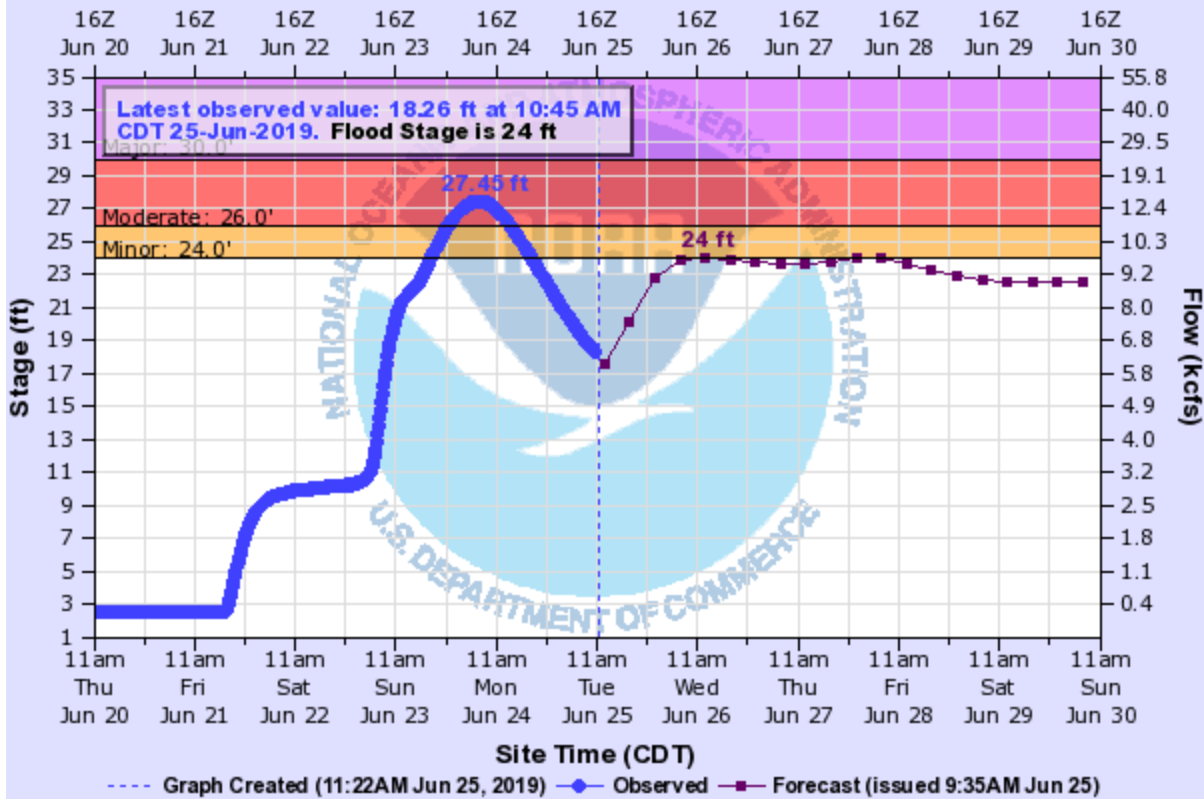


PANO2(plotting HGIRG) "Gage 0" Datum: 387.96'

Observations courtesy of US Geological Survey

POTEAU RIVER NEAR POTEAU

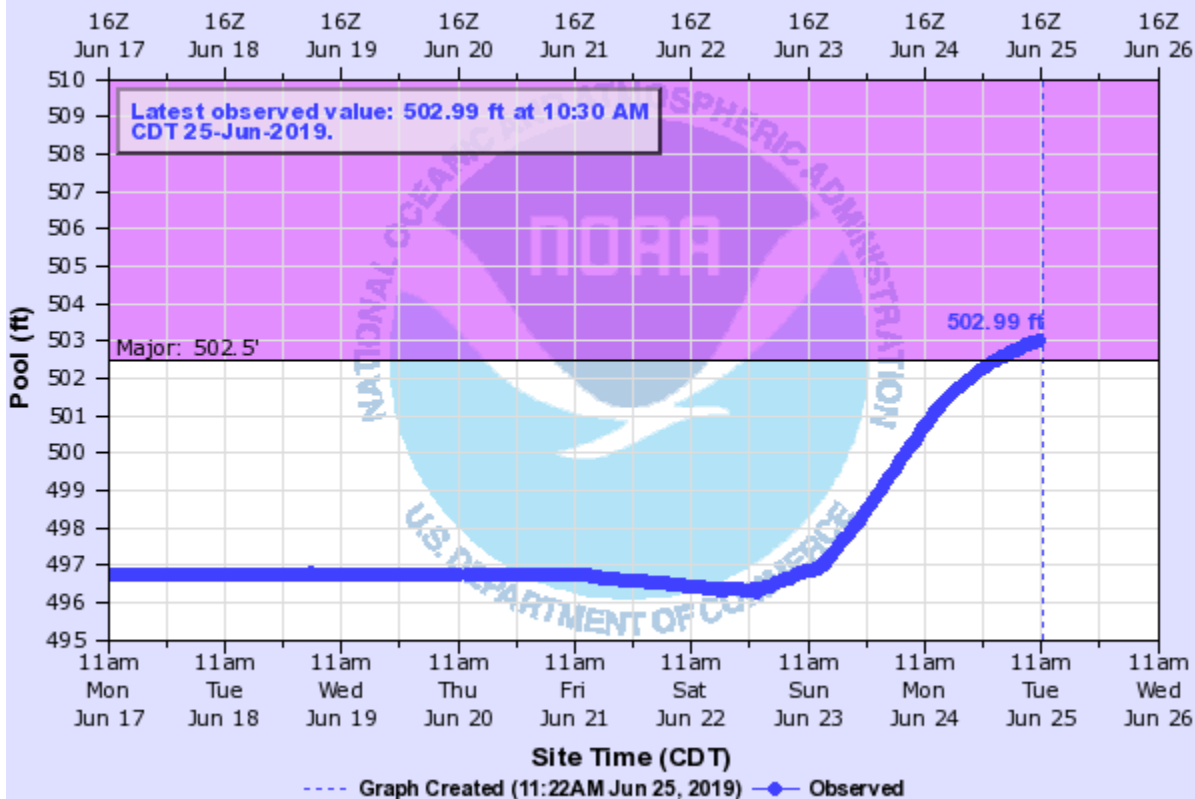
Universal Time (UTC)



PTAO2(plotting HGIRG) "Gage 0" Datum: 409.4'

EASTERN OKLAHOMA LAKES AT WISTER LAKE

Universal Time (UTC)

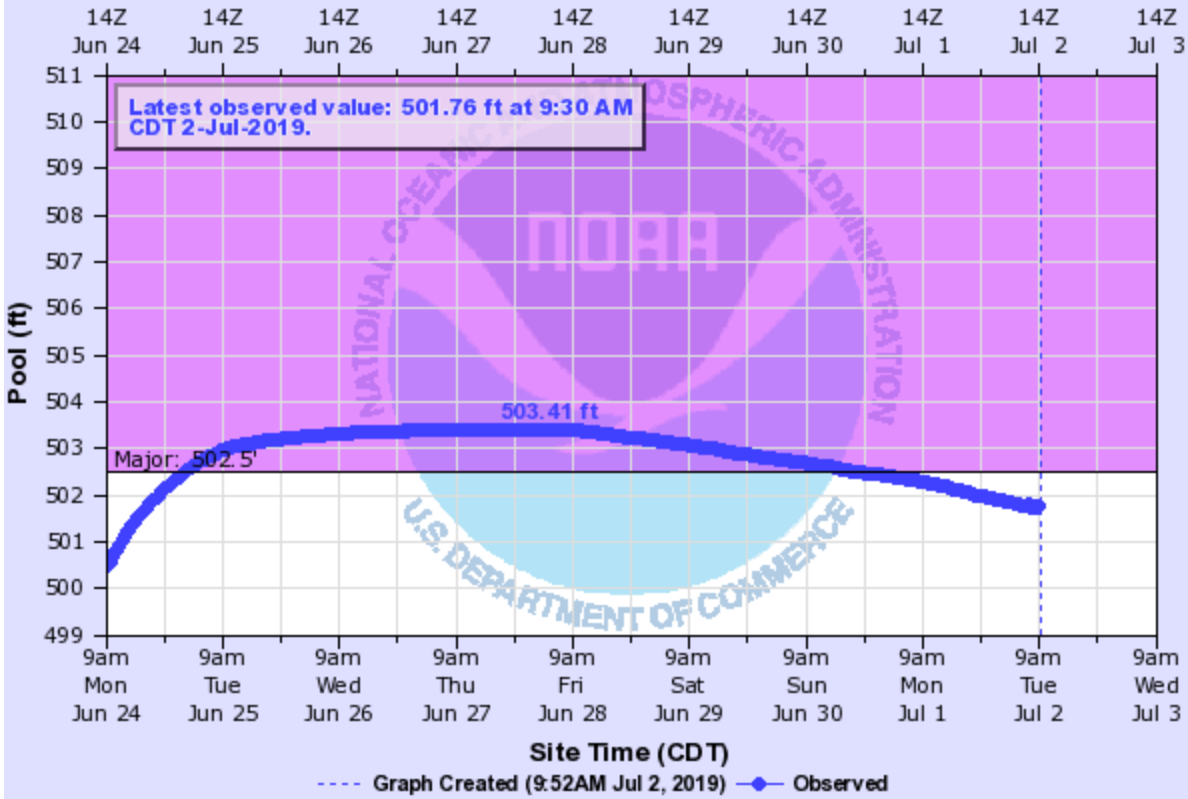


WSLO2(plotting HPIRG) "Gage 0" Datum: 0'

Observations courtesy of US Army Corps of Engineers

EASTERN OKLAHOMA LAKES AT WISTER LAKE

Universal Time (UTC)

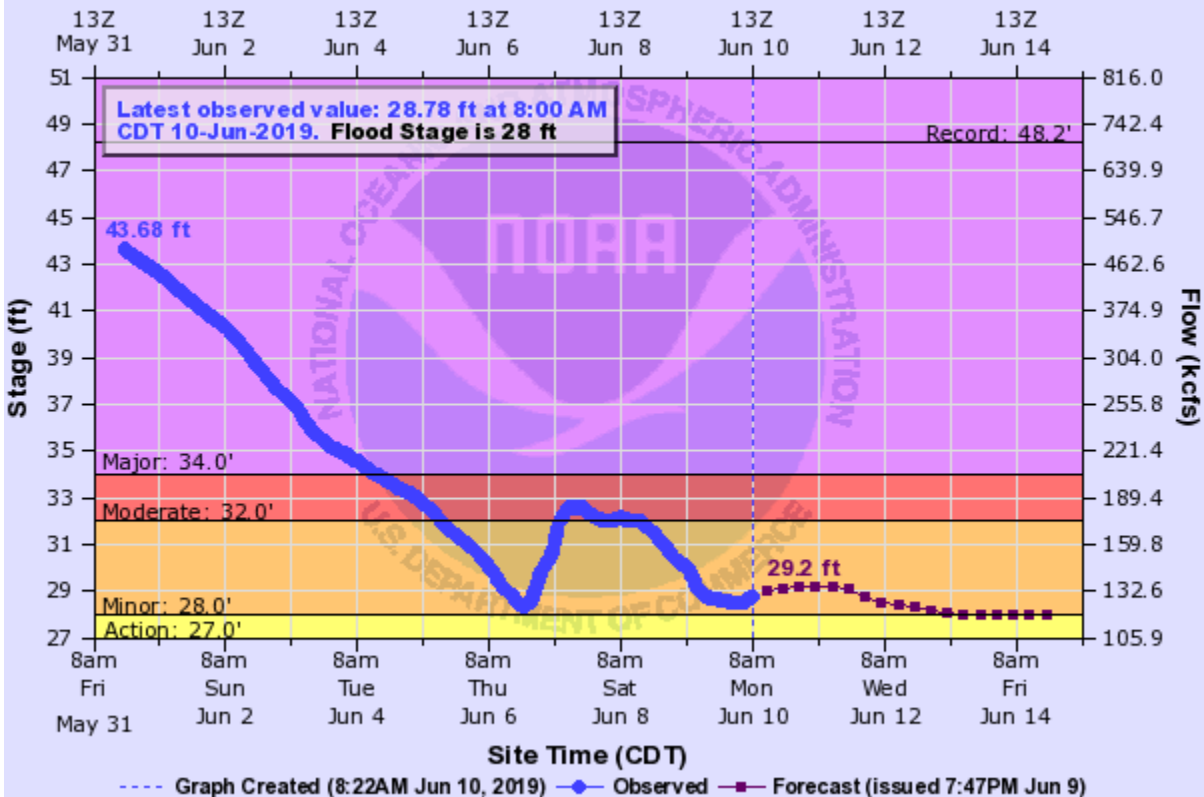


WSLO2(plotting HPIRG) "Gage 0" Datum: 0'

Observations courtesy of US Army Corps of Engineers

ARKANSAS RIVER NEAR MUSKOGEE

Universal Time (UTC)

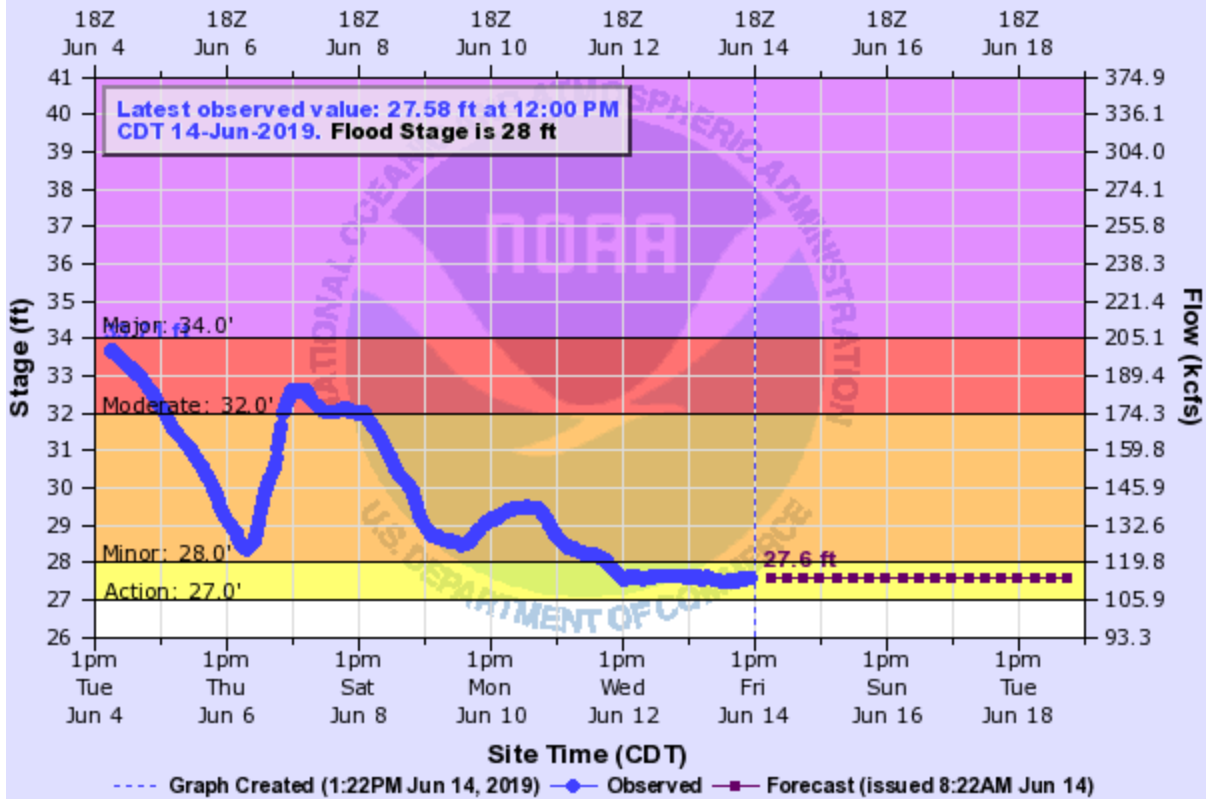


MKGO2(plotting HGIRG) "Gage 0" Datum: 471.38'

Observations courtesy of US Geological Survey

ARKANSAS RIVER NEAR MUSKOGEE

Universal Time (UTC)

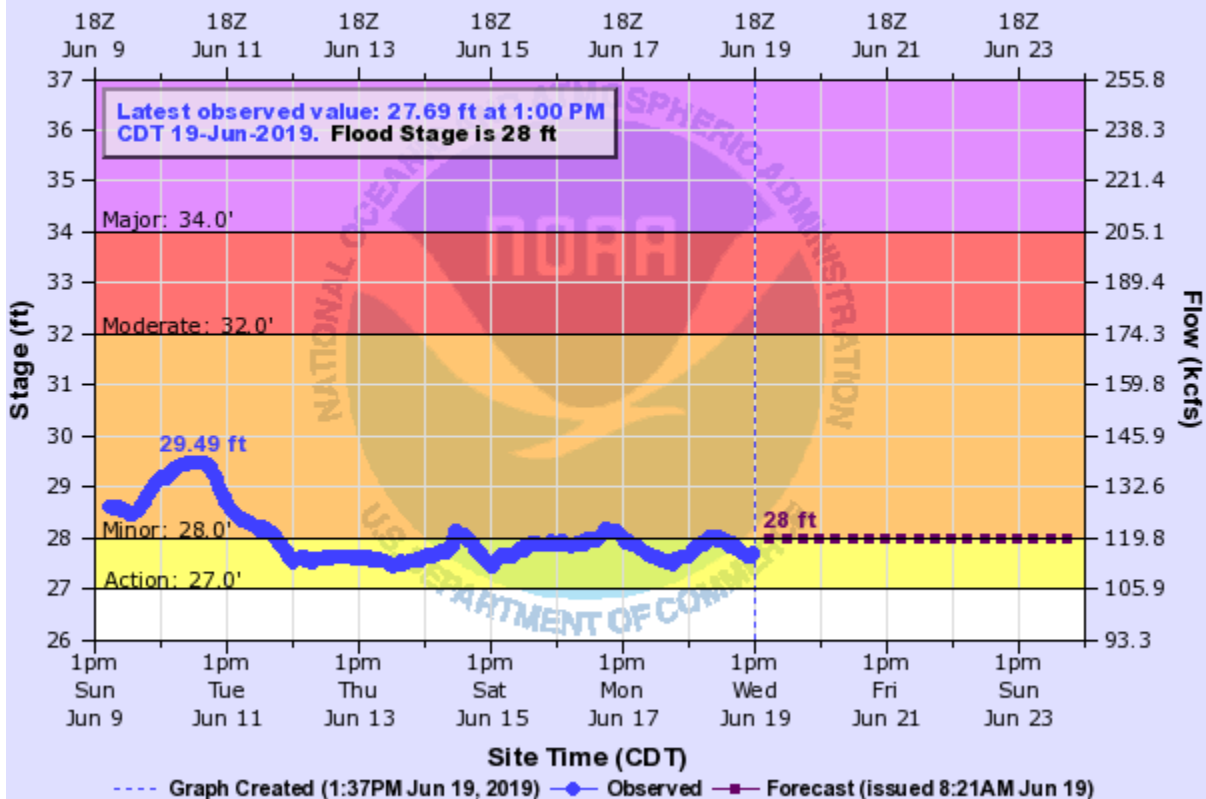


MKGO2(plotting HGIRG) "Gage 0" Datum: 471.38'

Observations courtesy of US Geological Survey

ARKANSAS RIVER NEAR MUSKOGEE

Universal Time (UTC)

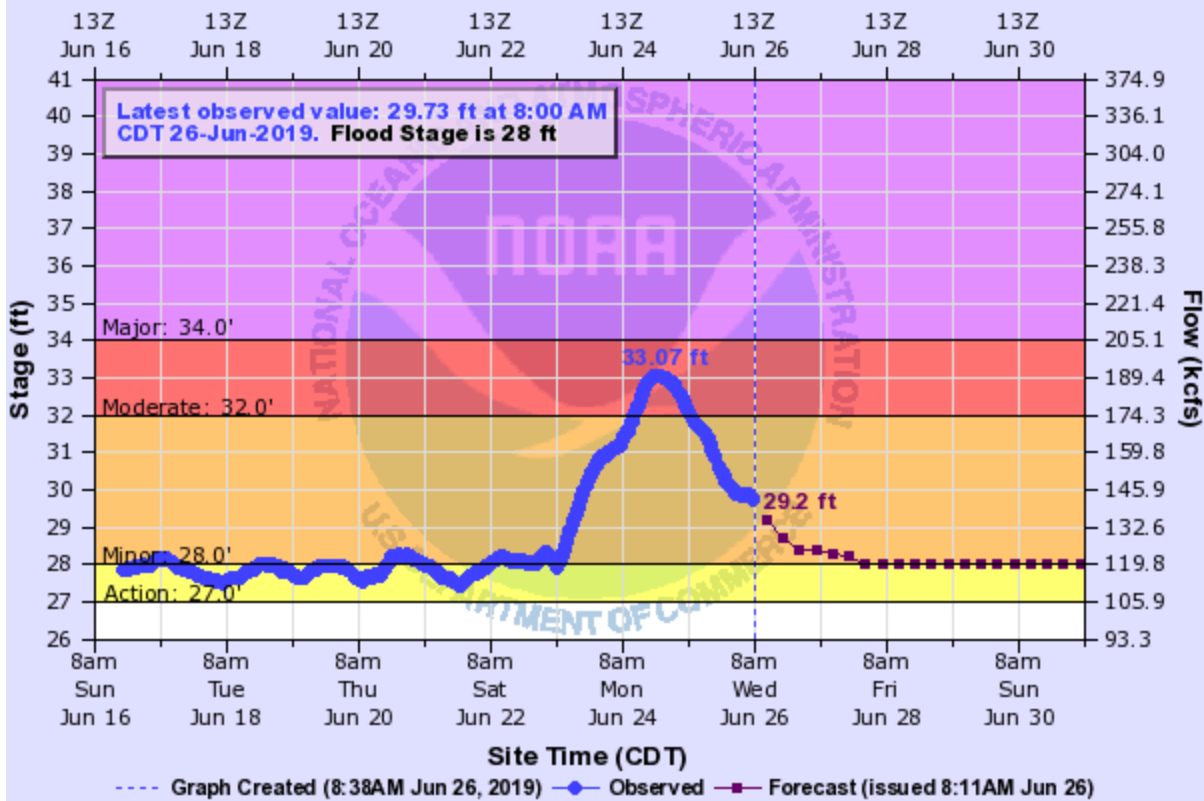


MKGO2(plotting HGIRG) "Gage 0" Datum: 471.38'

Observations courtesy of US Geological Survey

ARKANSAS RIVER NEAR MUSKOGEE

Universal Time (UTC)

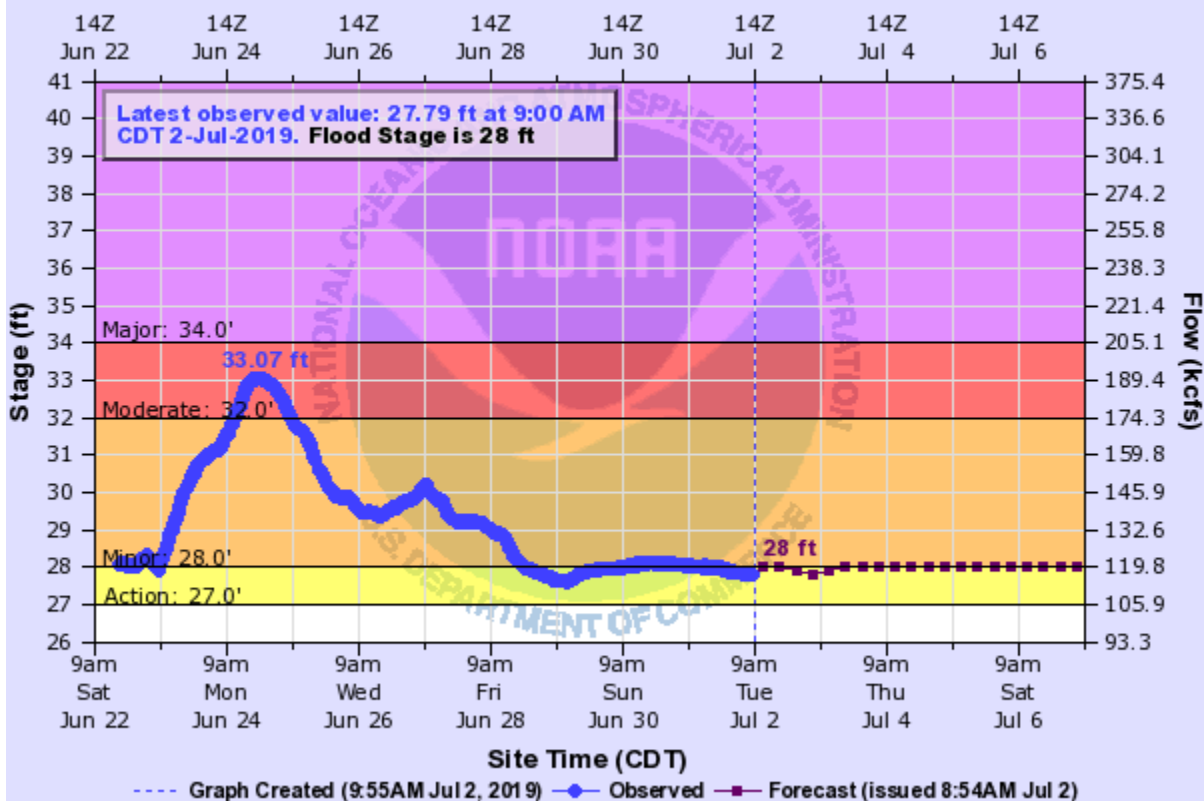


MKGO2(plotting HGIRG) "Gage 0" Datum: 471.38'

Observations courtesy of US Geological Survey

ARKANSAS RIVER NEAR MUSKOGEE

Universal Time (UTC)

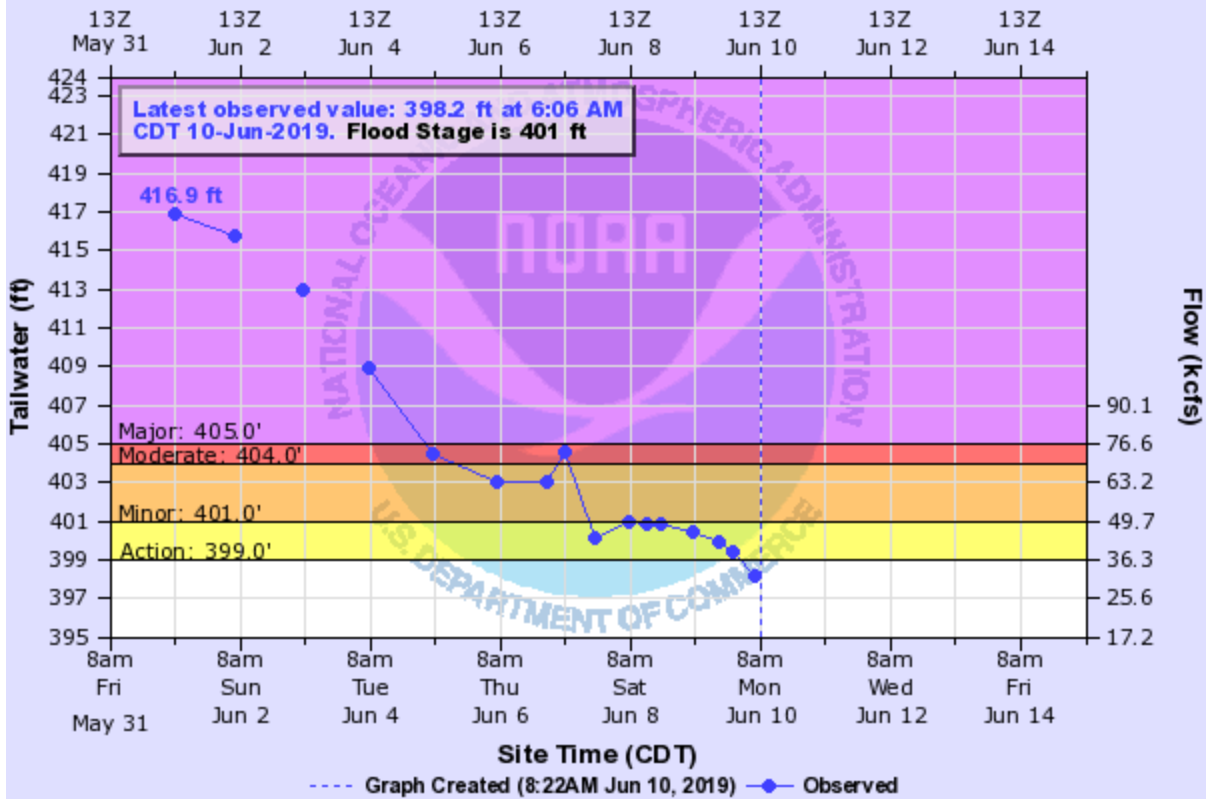


MKGO2(plotting HGIRG) "Gage 0" Datum: 471.38'

Observations courtesy of US Geological Survey

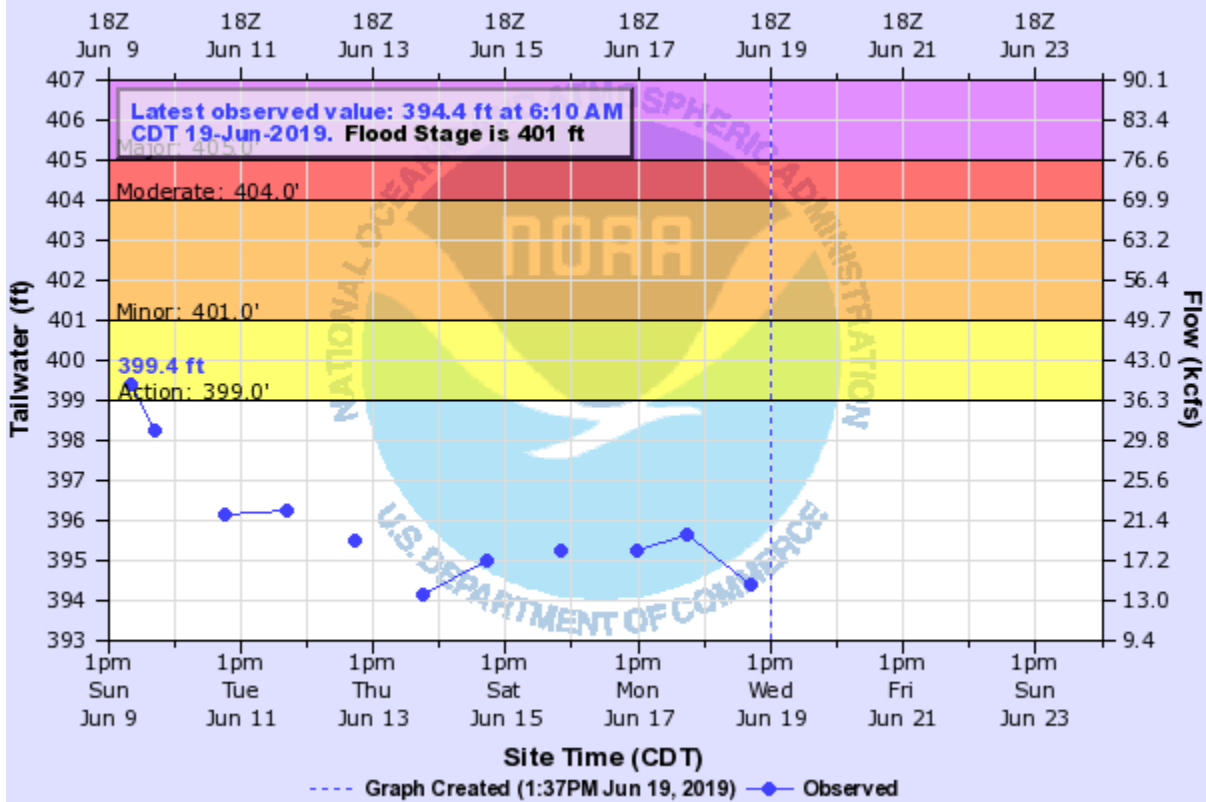
LEE CREEK NEAR VAN BUREN LCR

Universal Time (UTC)



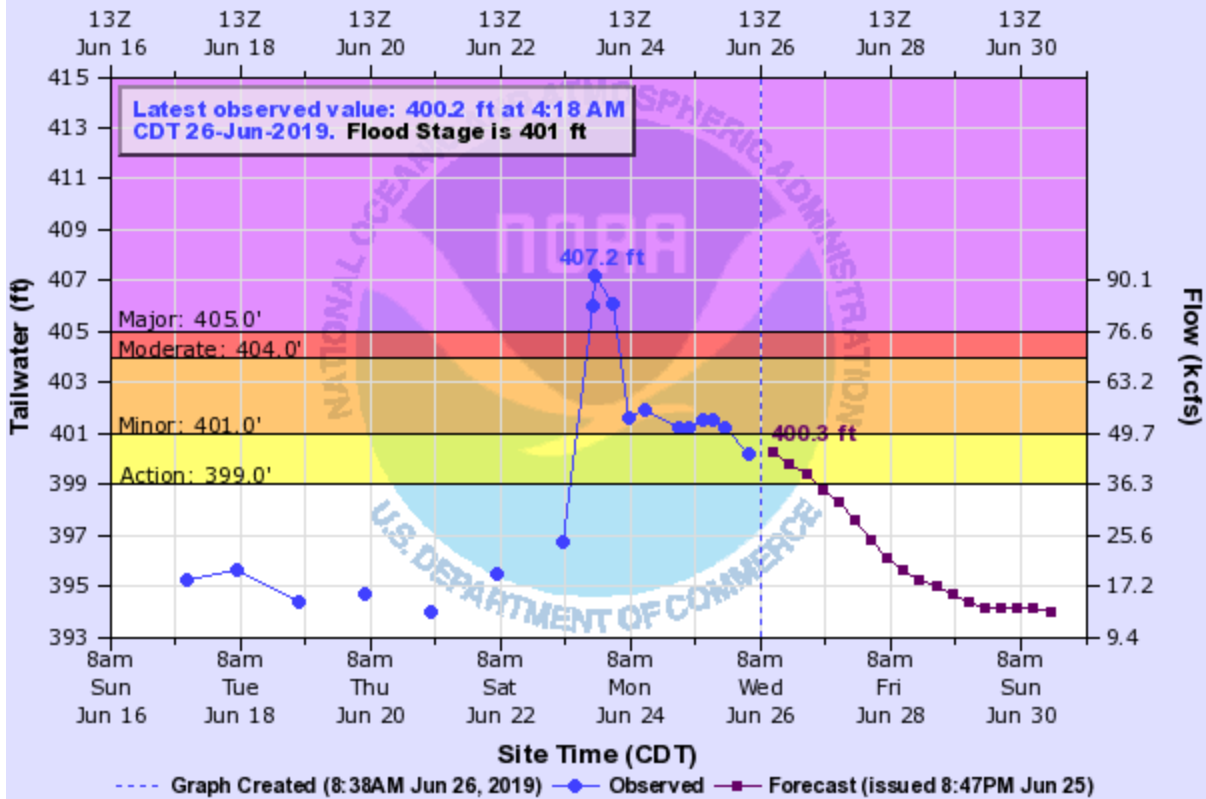
LEE CREEK NEAR VAN BUREN LCR

Universal Time (UTC)



LEE CREEK NEAR VAN BUREN LCR

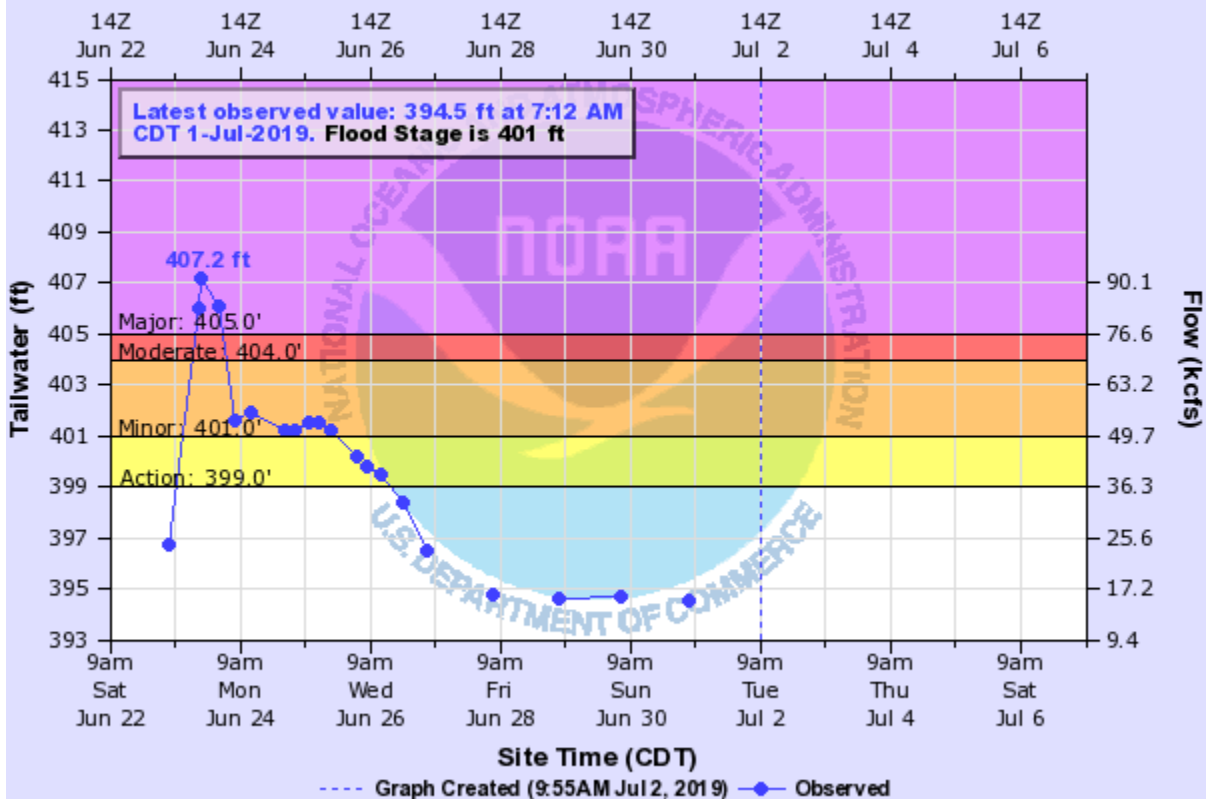
Universal Time (UTC)



VBRA4(plotting HTIRZ) "Gage 0" Datum: 0'

LEE CREEK NEAR VAN BUREN LCR

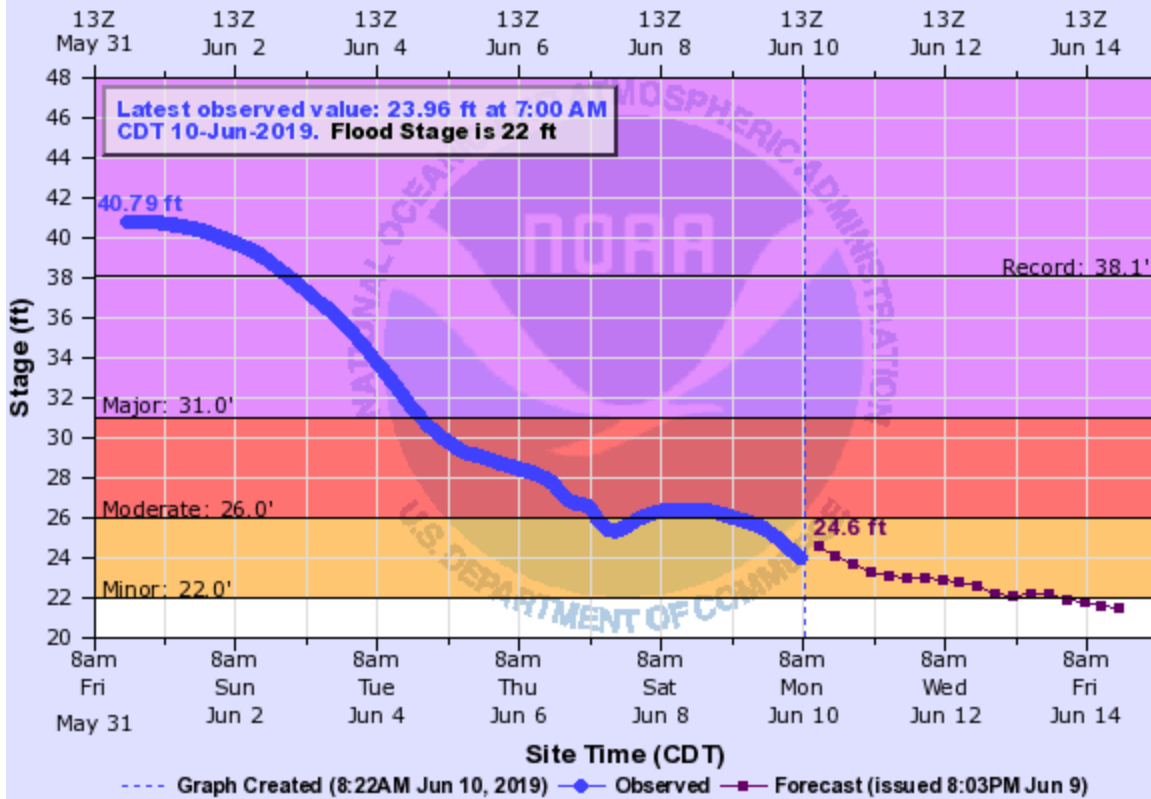
Universal Time (UTC)



VBRA4(plotting HTIRZ) "Gage 0" Datum: 0'

ARKANSAS RIVER AT VAN BUREN

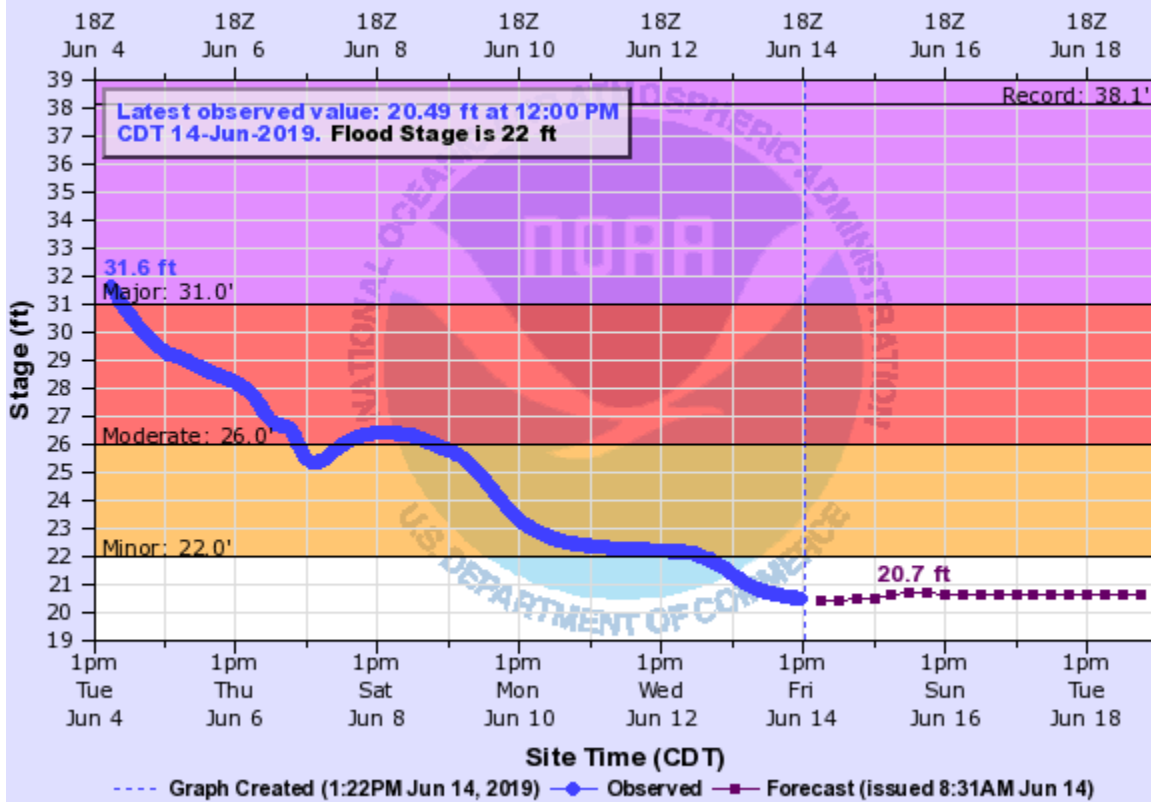
Universal Time (UTC)



VBUA4(plotting HGIRG) "Gage 0" Datum: 372.36'

ARKANSAS RIVER AT VAN BUREN

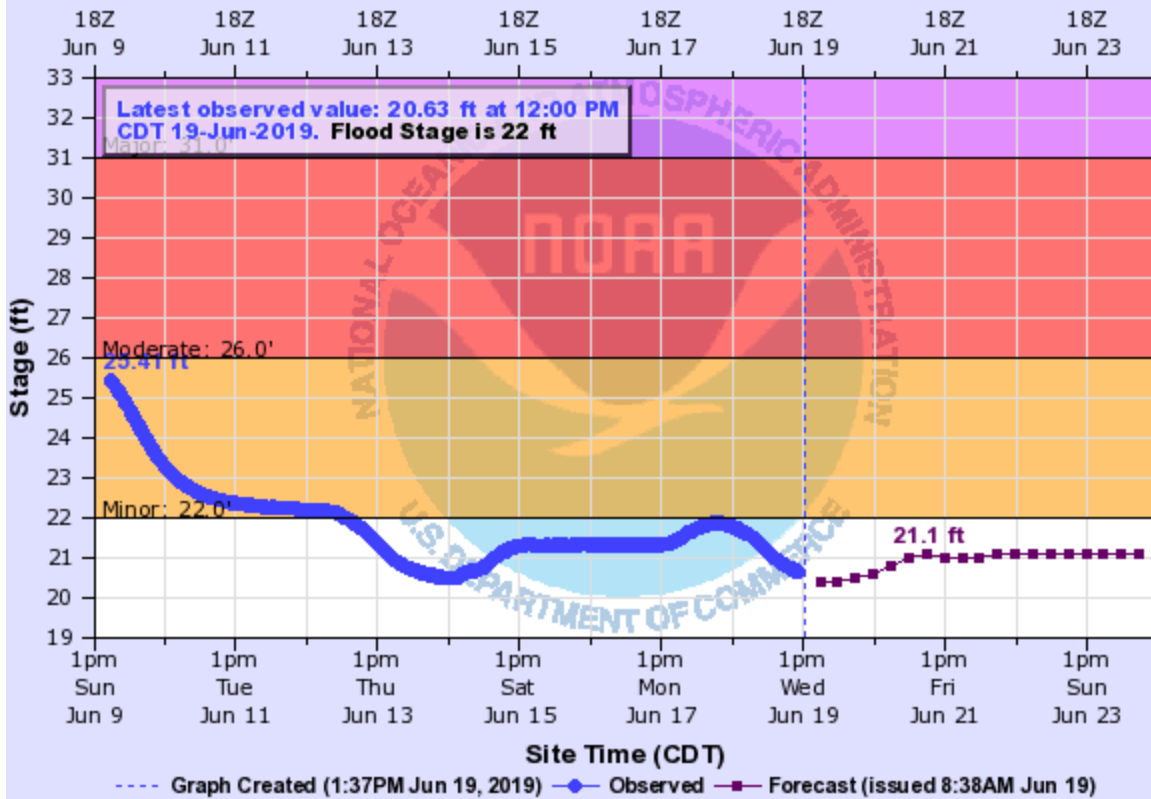
Universal Time (UTC)



VBUA4(plotting HGIRG) "Gage 0" Datum: 372.36'

ARKANSAS RIVER AT VAN BUREN

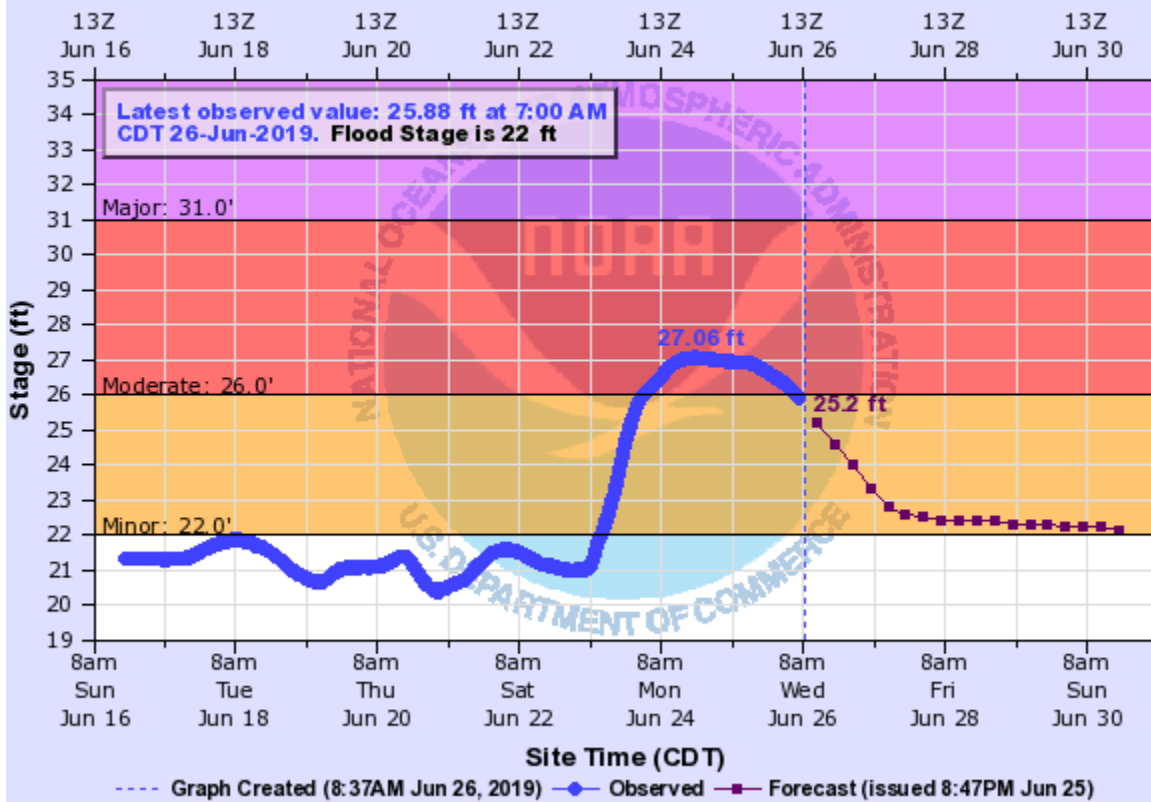
Universal Time (UTC)



VBUA4(plotting HGIRG) "Gage 0" Datum: 372.36'

ARKANSAS RIVER AT VAN BUREN

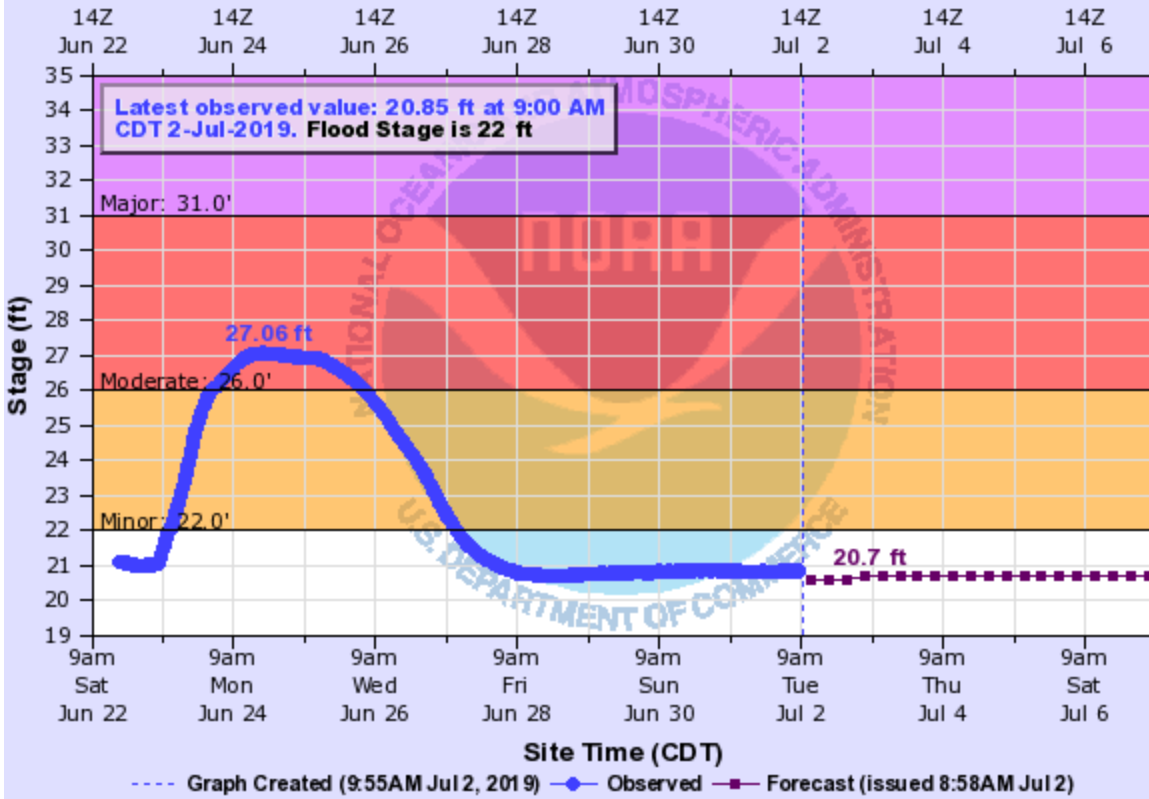
Universal Time (UTC)



VBUA4(plotting HGIRG) "Gage 0" Datum: 372.36'

ARKANSAS RIVER AT VAN BUREN

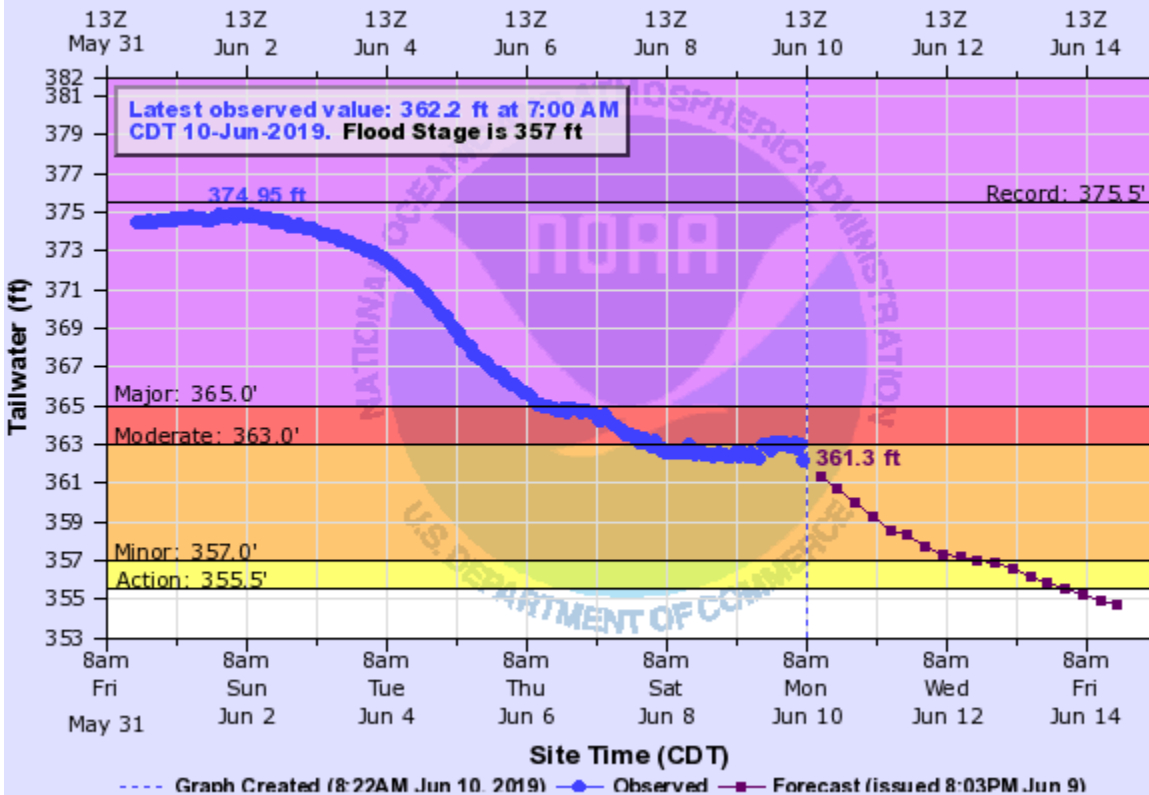
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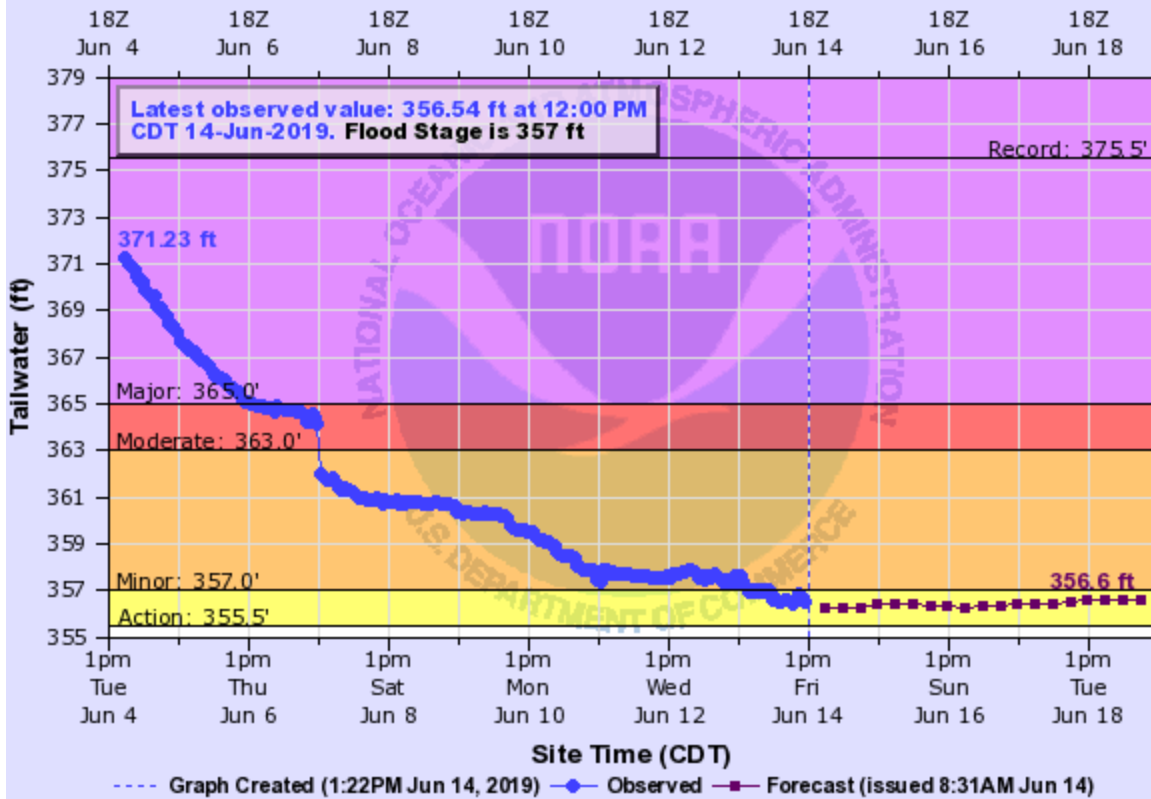
ARKANSAS RIVER AT OZARK L/D TAILWATER

Universal Time (UTC)



ARKANSAS RIVER AT OZARK L/D TAILWATER

Universal Time (UTC)

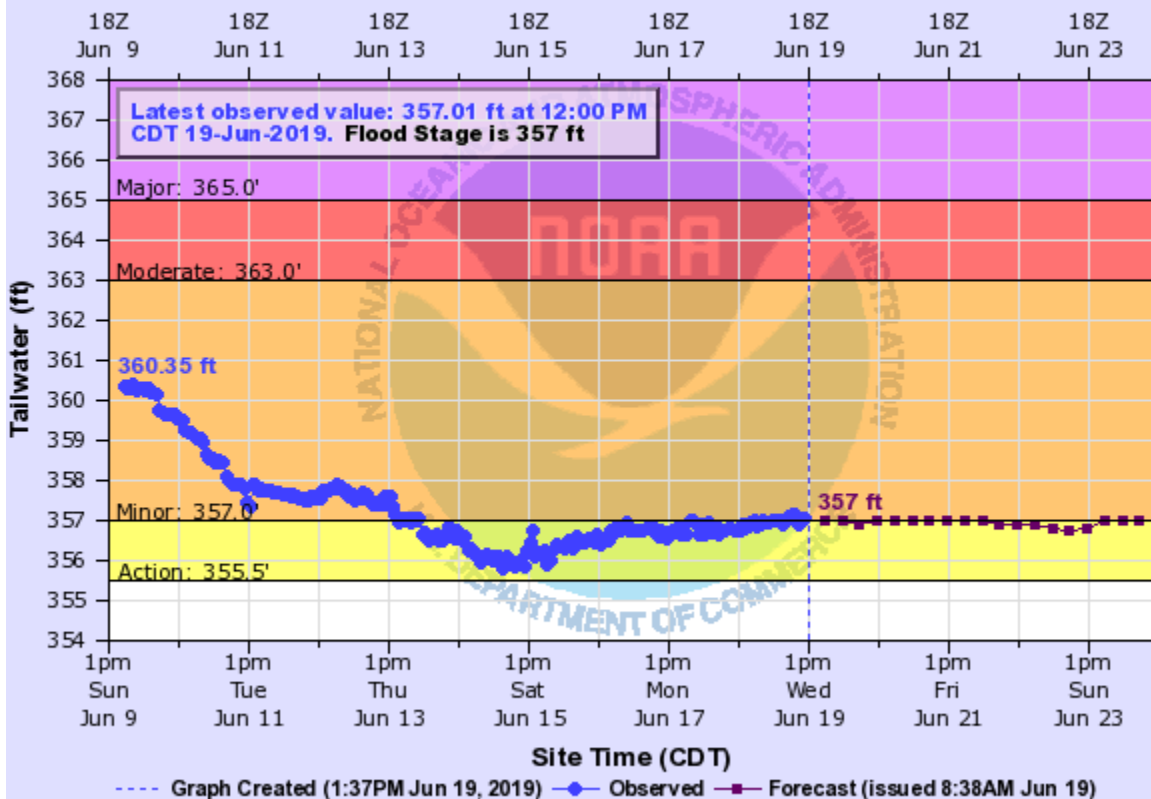


OZGA4(plotting HTIRG) "Gage 0" Datum: 0'

Observations courtesy of US Army Corps of Engineers - LRD

ARKANSAS RIVER AT OZARK L/D TAILWATER

Universal Time (UTC)

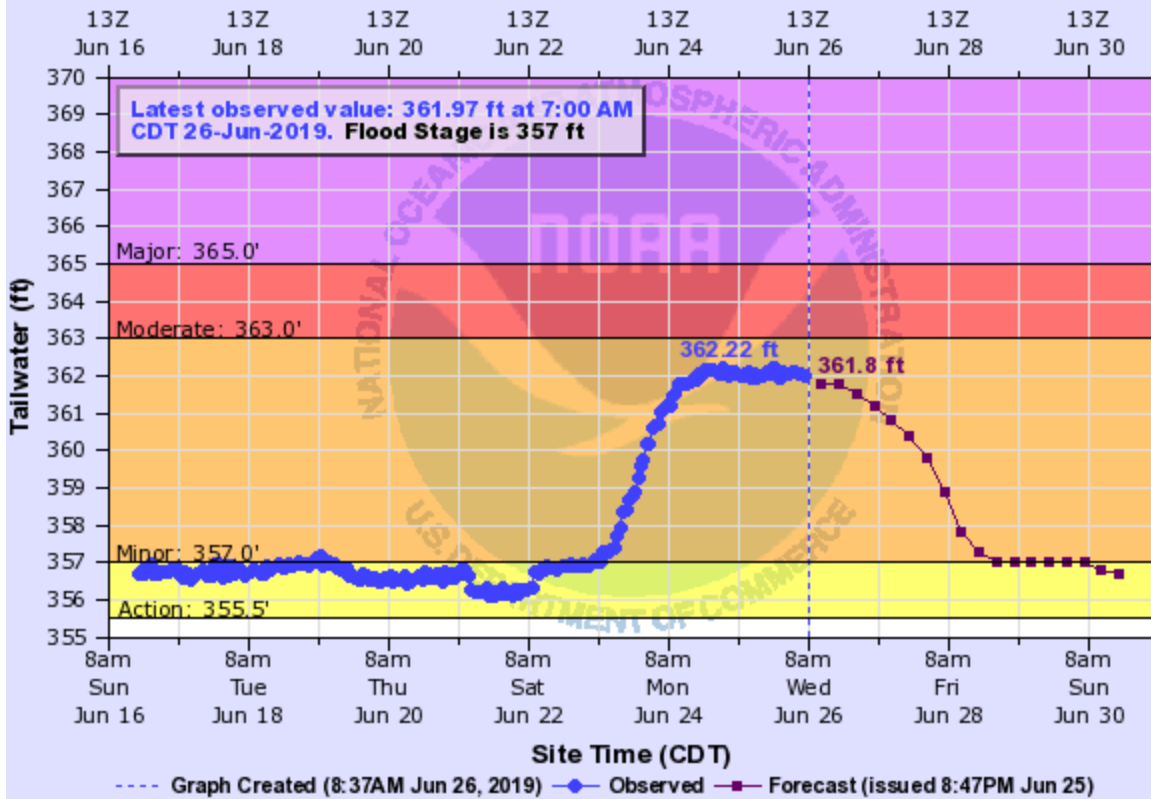


OZGA4(plotting HTIRG) "Gage 0" Datum: 0'

Observations courtesy of US Army Corps of Engineers - LRD

ARKANSAS RIVER AT OZARK L/D TAILWATER

Universal Time (UTC)

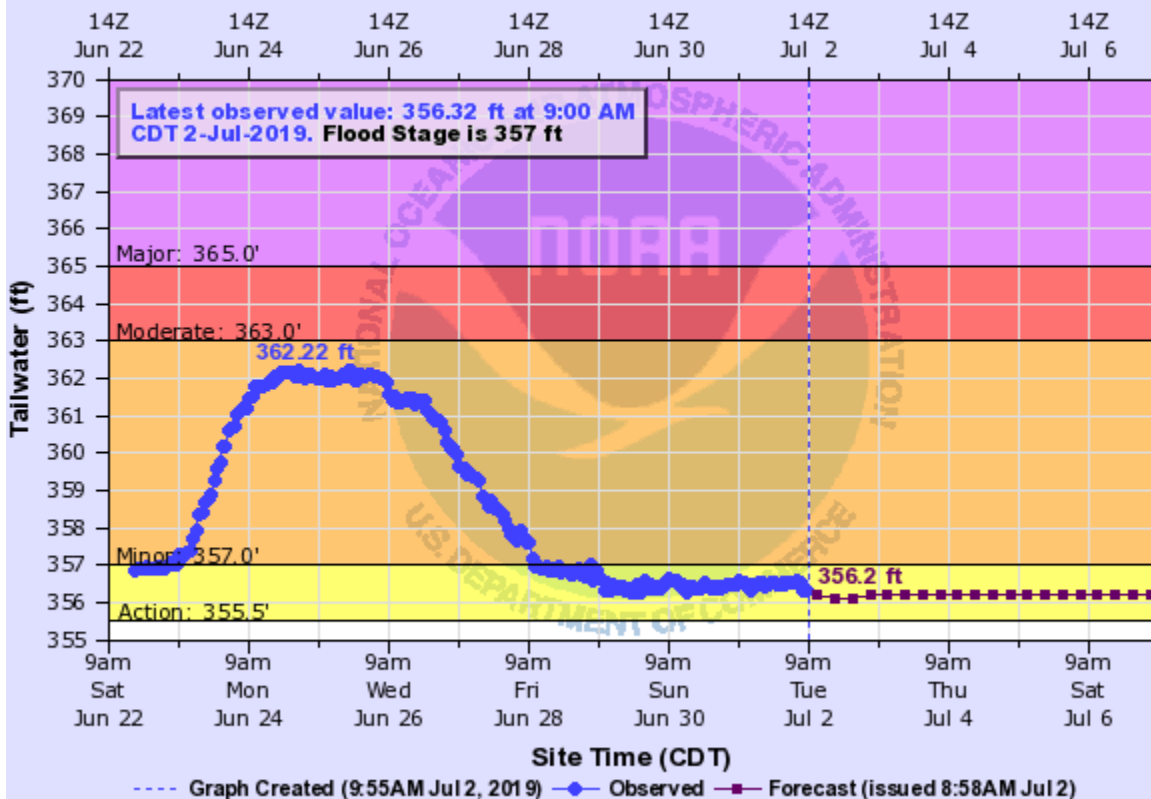


OZGA4(plotting HTIRG) "Gage 0" Datum: 0'

Observations courtesy of US Army Corps of Engineers - LRD

ARKANSAS RIVER AT OZARK L/D TAILWATER

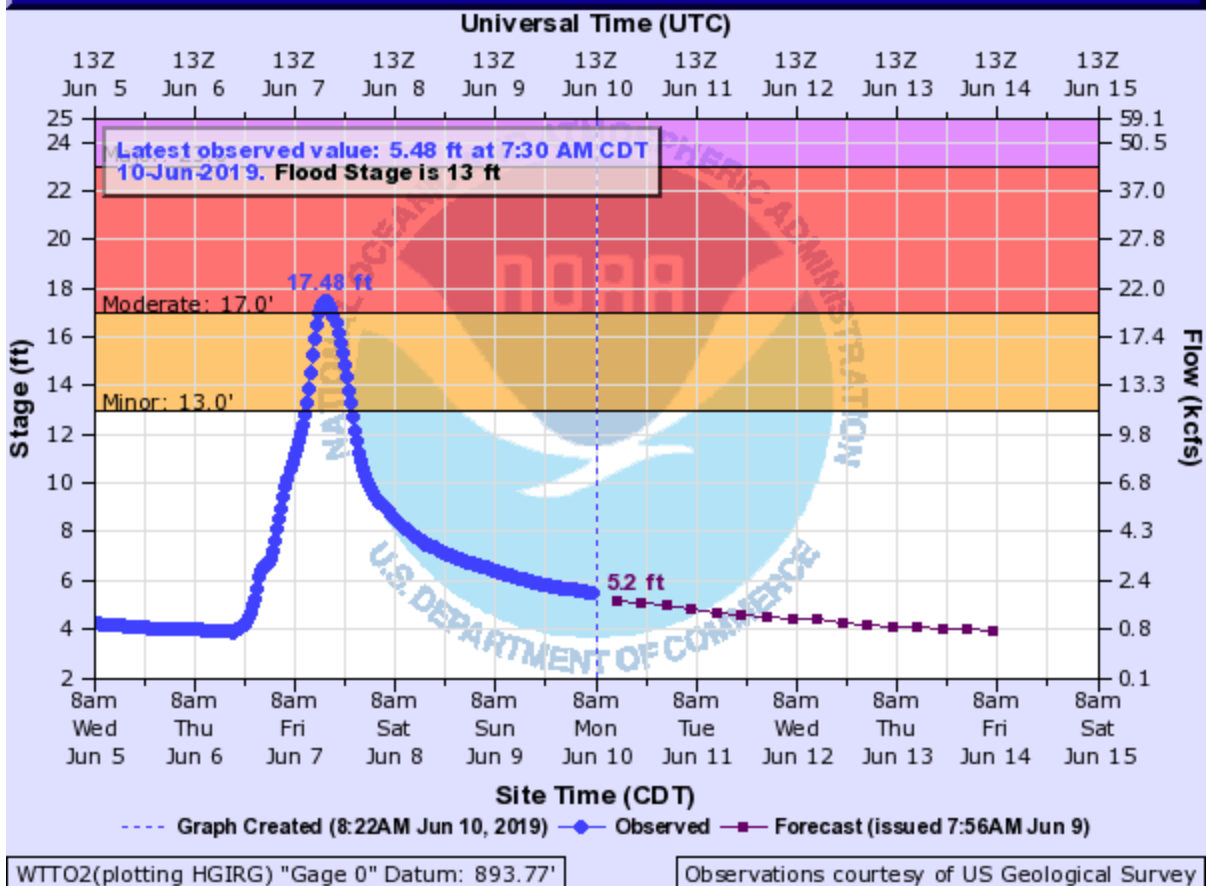
Universal Time (UTC)



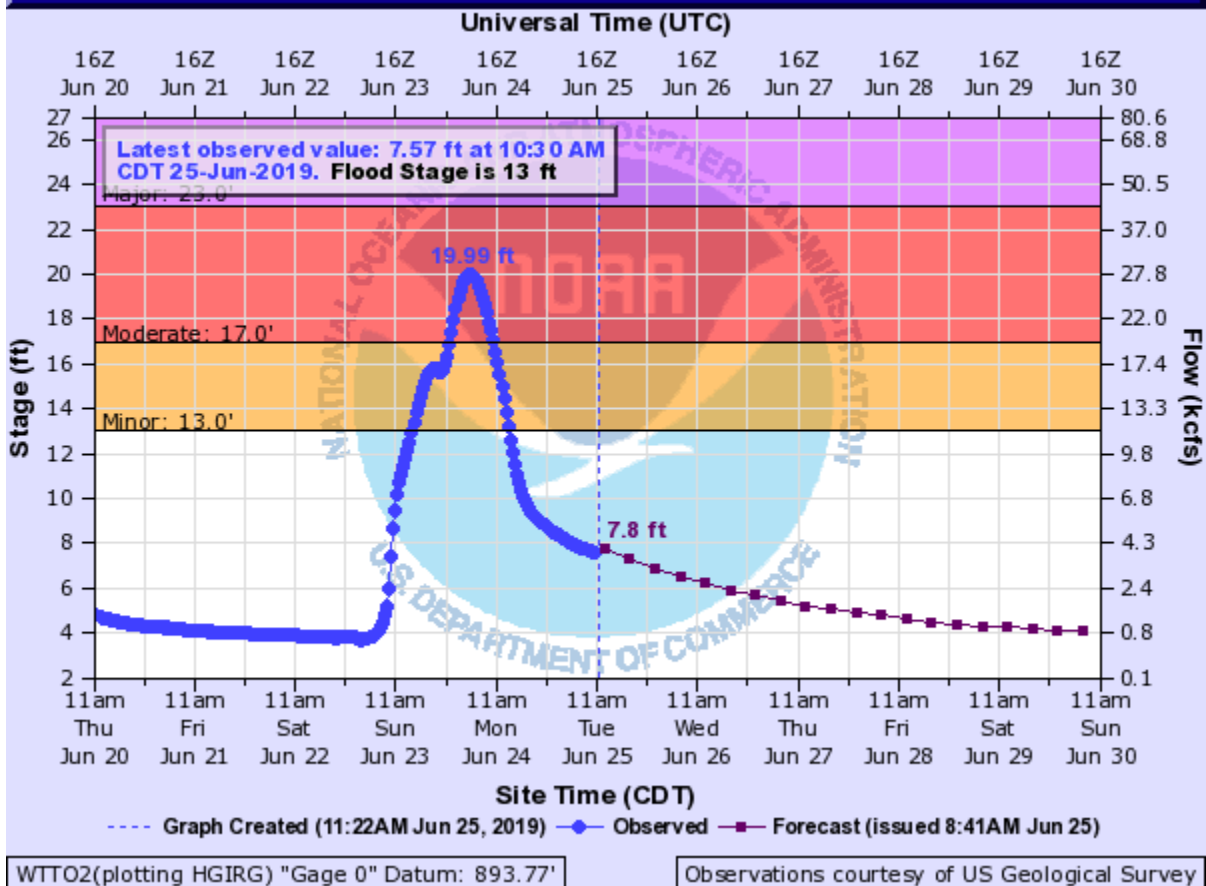
OZGA4(plotting HTIRG) "Gage 0" Datum: 0'

Observations courtesy of US Army Corps of Engineers - LRD

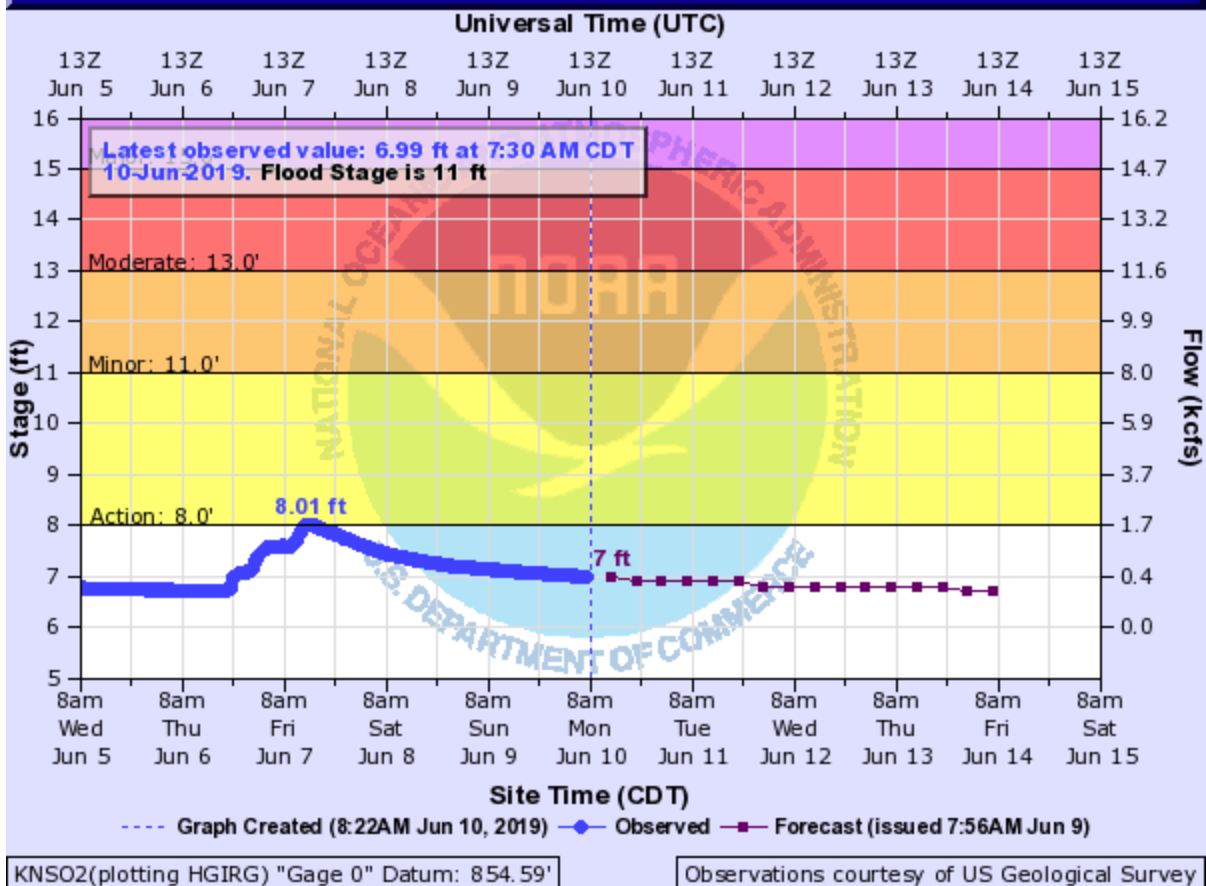
ILLINOIS RIVER (AR OK) NEAR WATTS



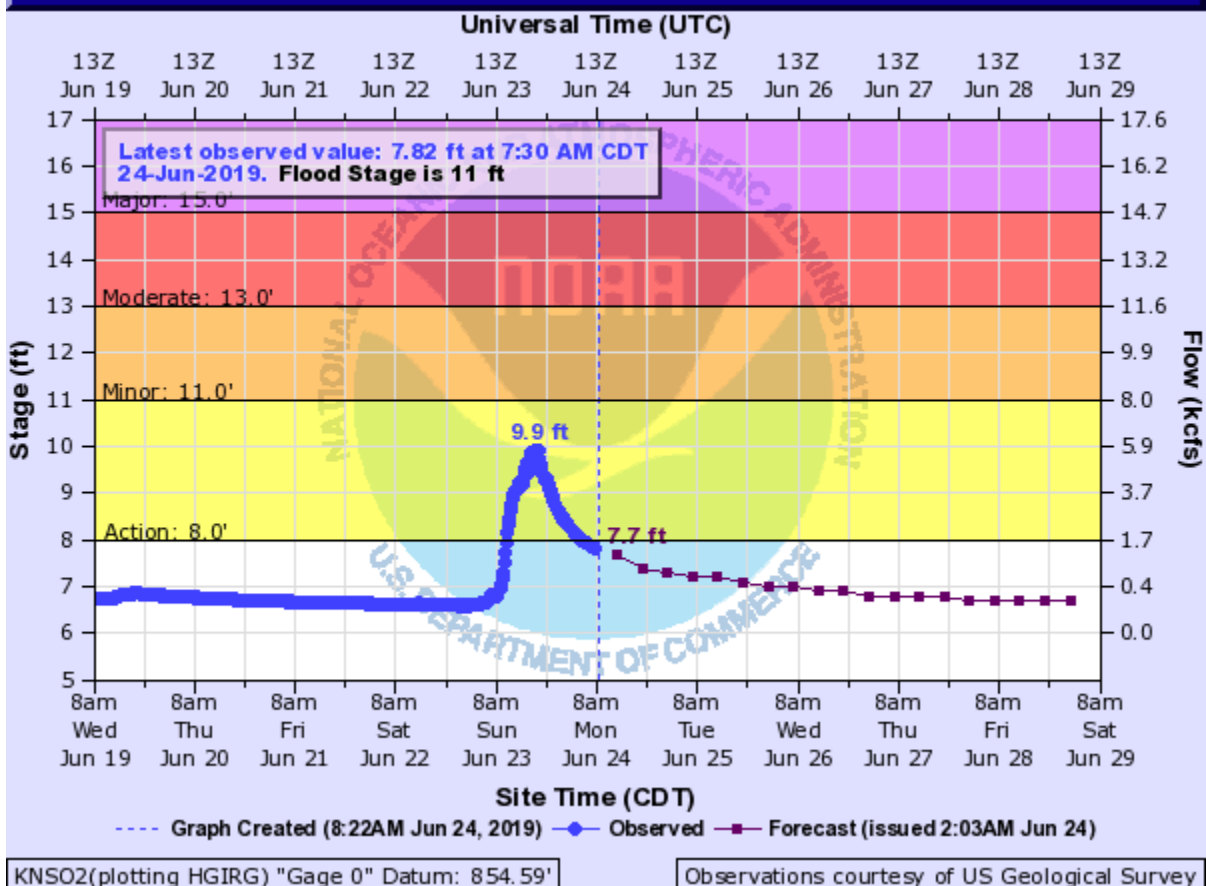
ILLINOIS RIVER (AR OK) NEAR WATTS



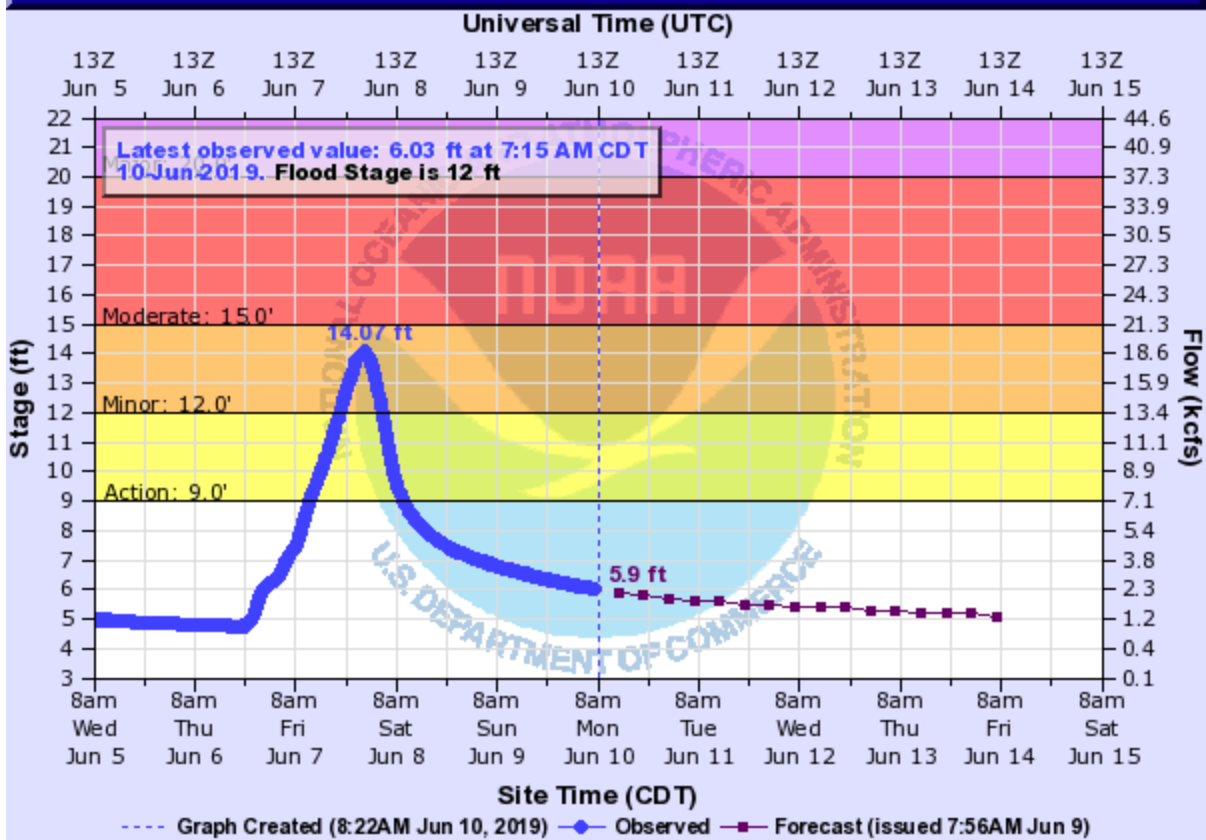
FLINT CREEK (OK) NEAR KANSAS



FLINT CREEK (OK) NEAR KANSAS



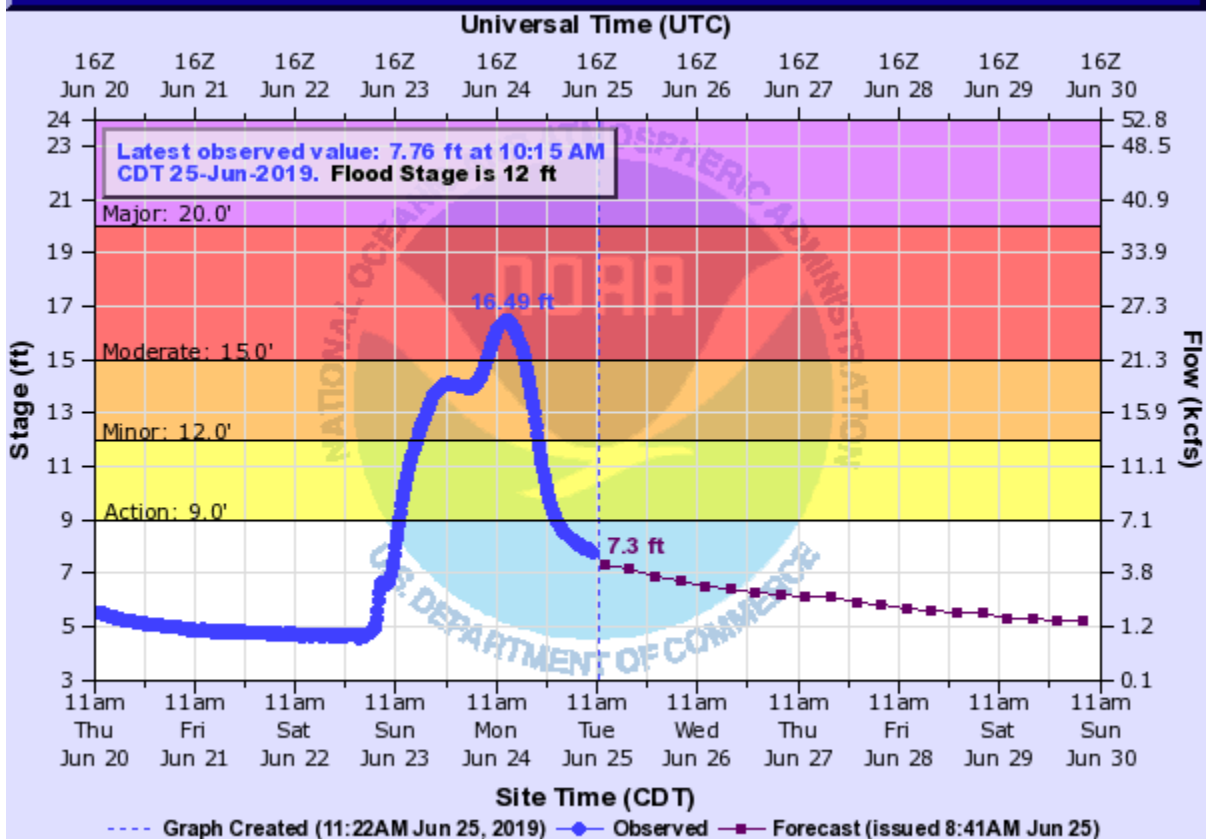
ILLINOIS RIVER (AR OK) AT CHEWEY



CWYO2(plotting HGIRG) "Gage 0" Datum: 800.88'

Observations courtesy of US Geological Survey

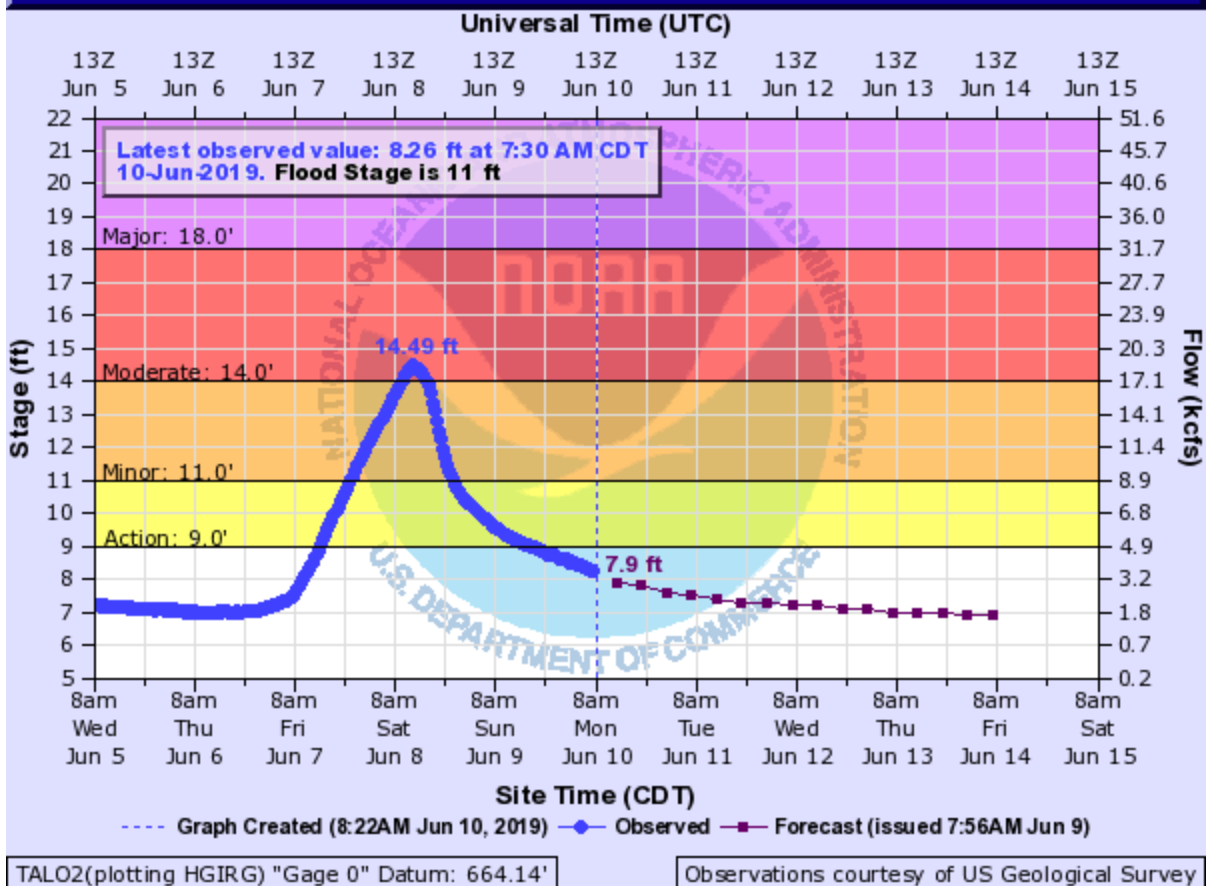
ILLINOIS RIVER (AR OK) AT CHEWEY



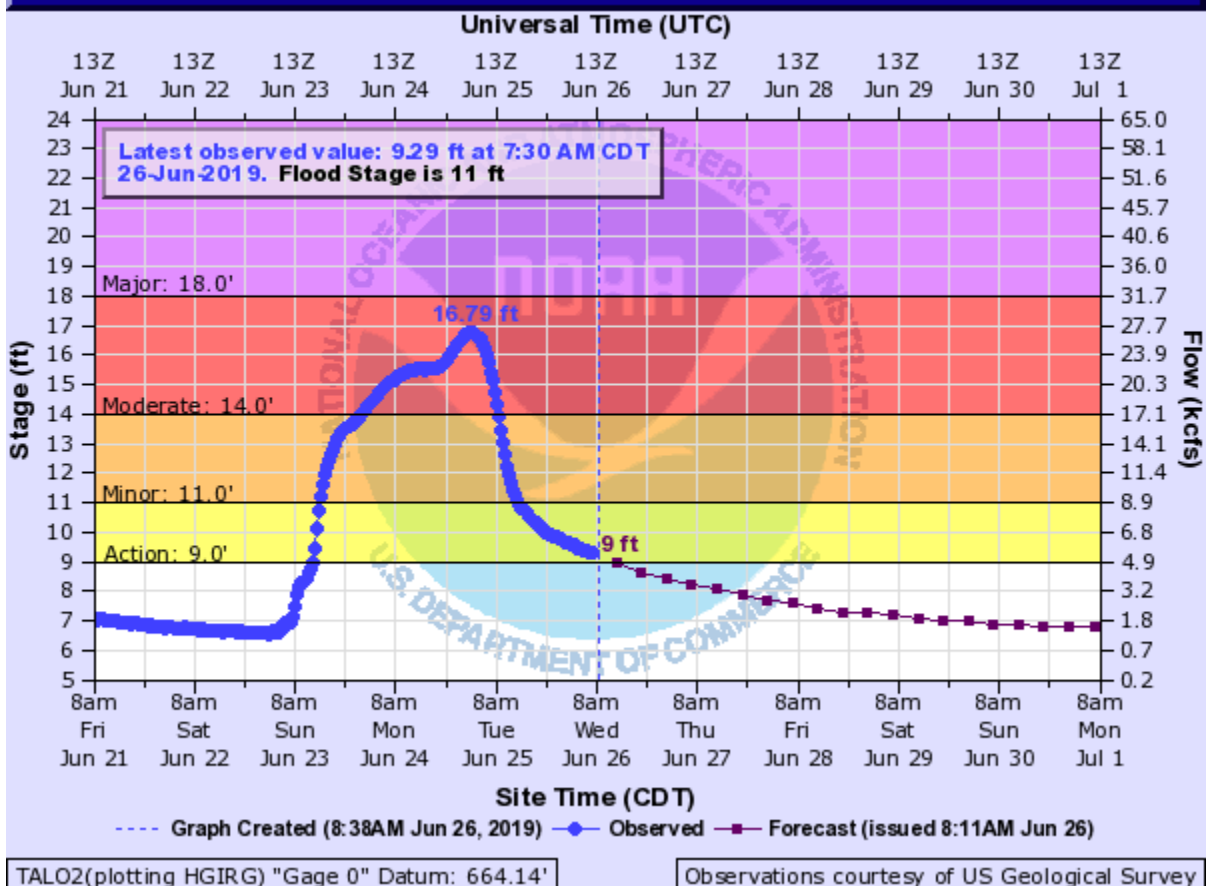
CWYO2(plotting HGIRG) "Gage 0" Datum: 800.88'

Observations courtesy of US Geological Survey

ILLINOIS RIVER (AR OK) NEAR TAHLEQUAH

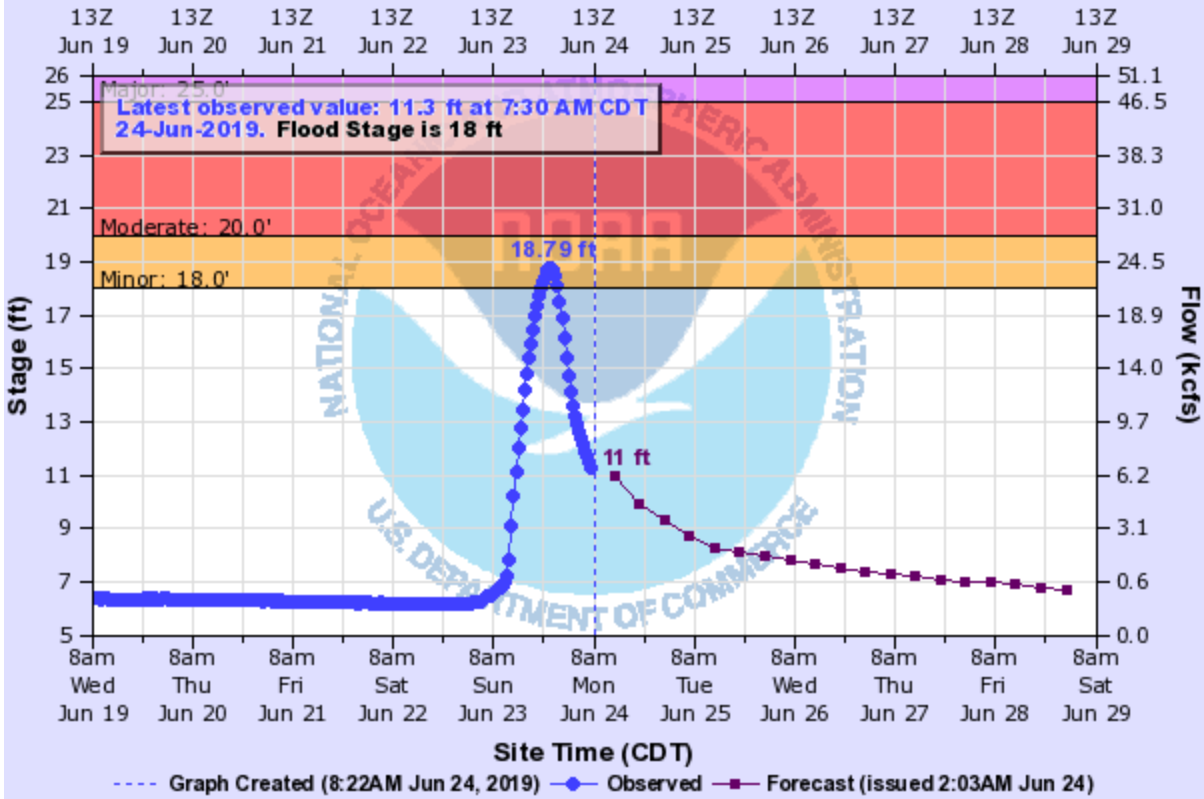


ILLINOIS RIVER (AR OK) NEAR TAHLEQUAH



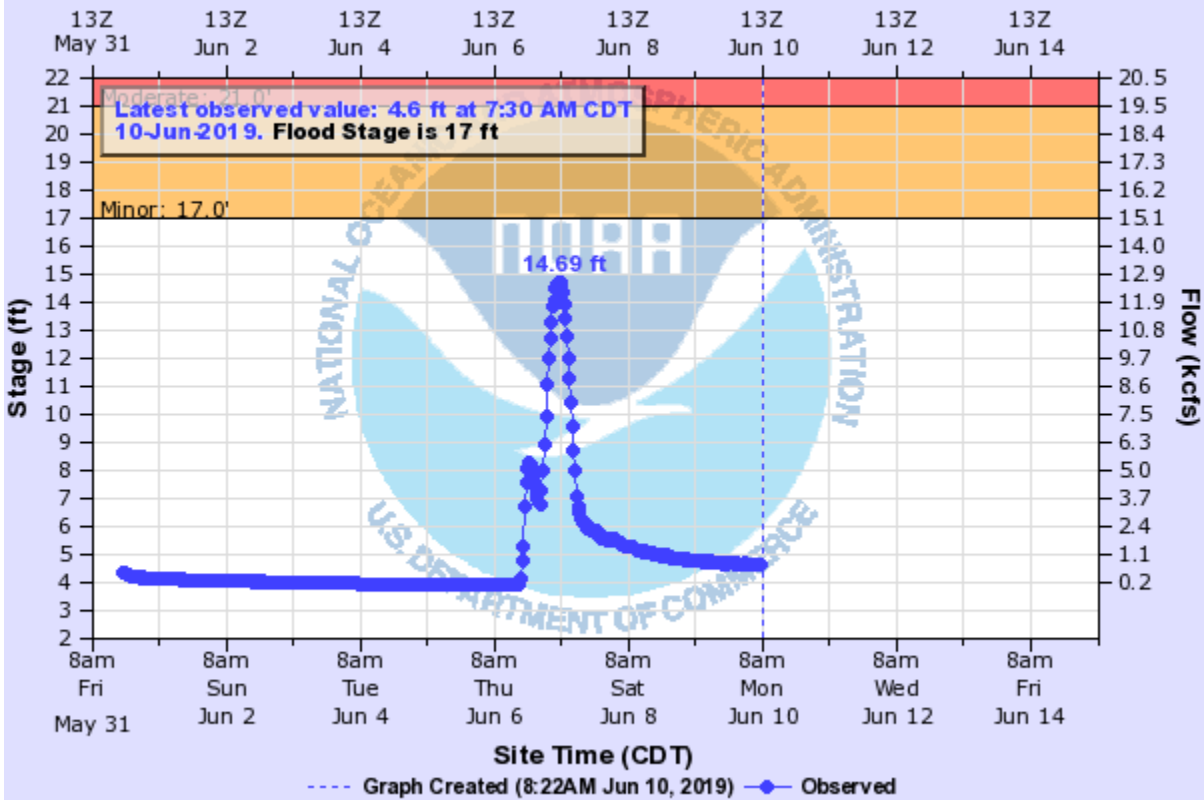
BARON FORK AT ELDON

Universal Time (UTC)



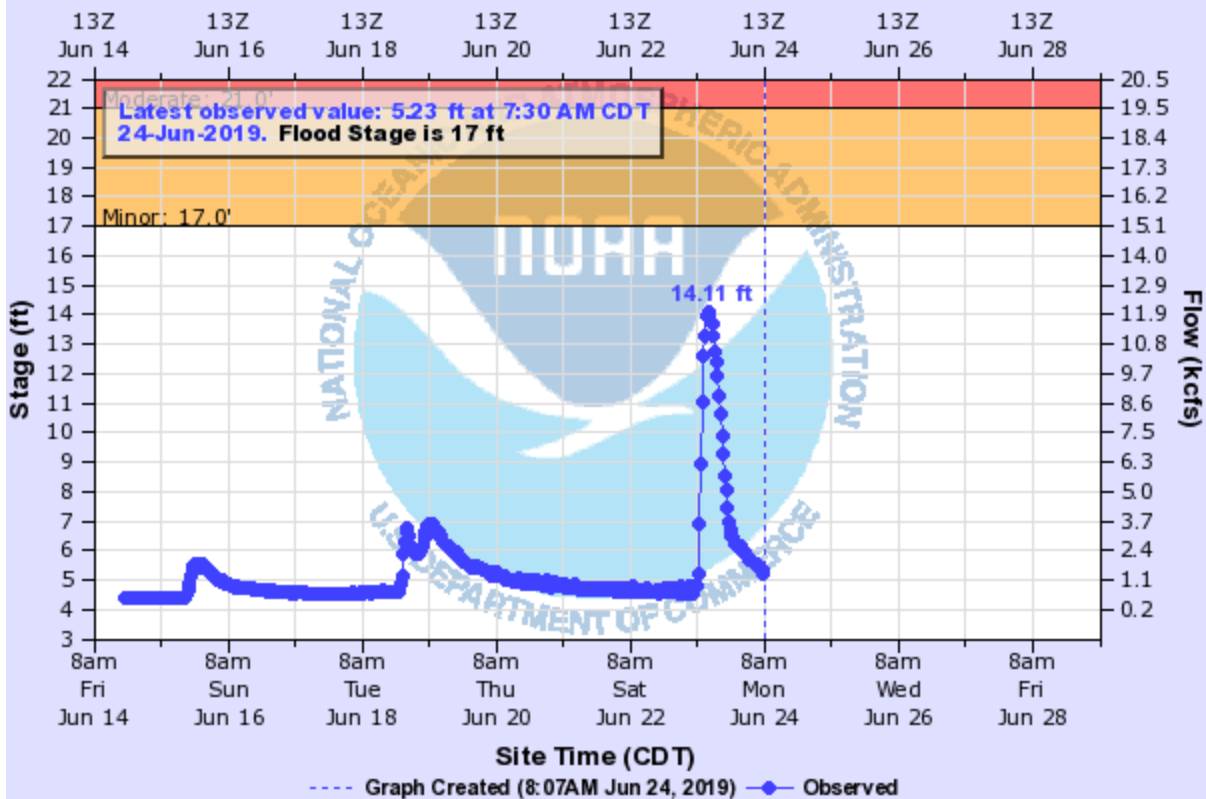
BIRD CREEK AT AVANT

Universal Time (UTC)



BIRD CREEK AT AVANT

Universal Time (UTC)

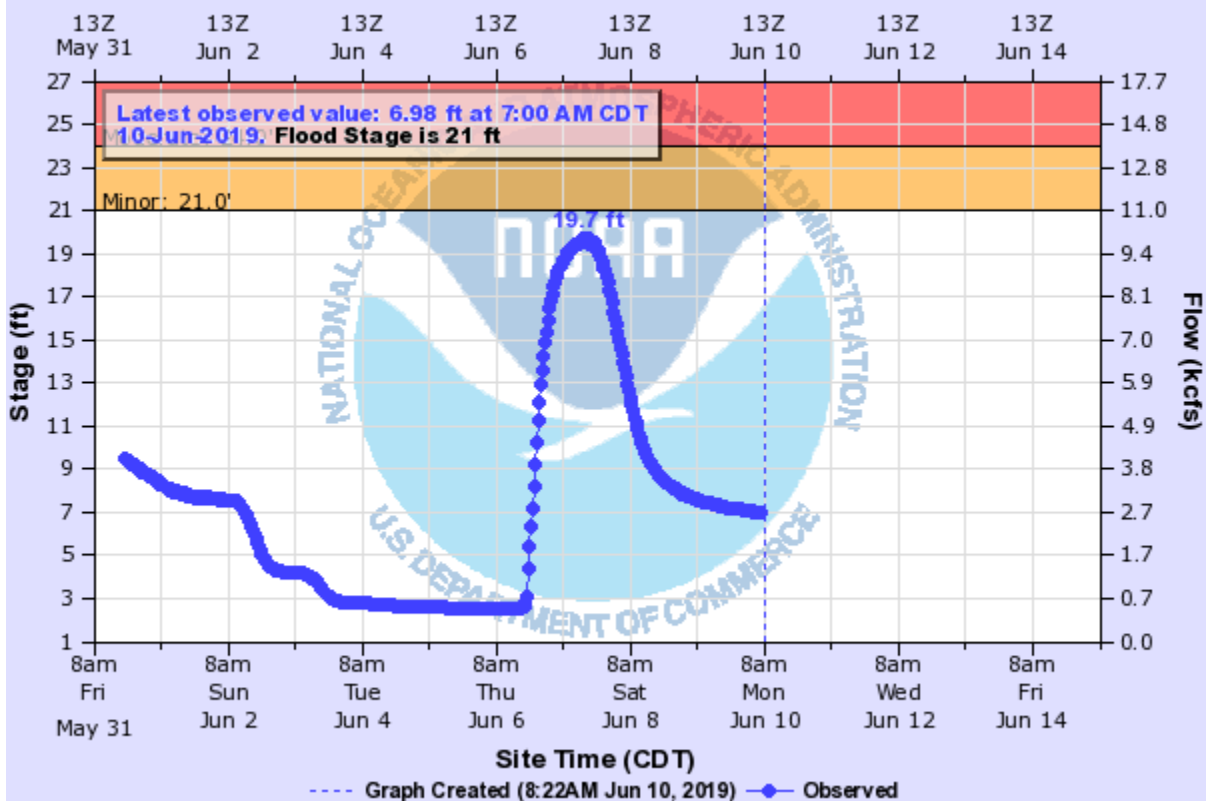


AVT02(plotting HGIRG) "Gage 0" Datum: 646.28'

Observations courtesy of US Geological Survey

BIRD CREEK NEAR SPERRY

Universal Time (UTC)

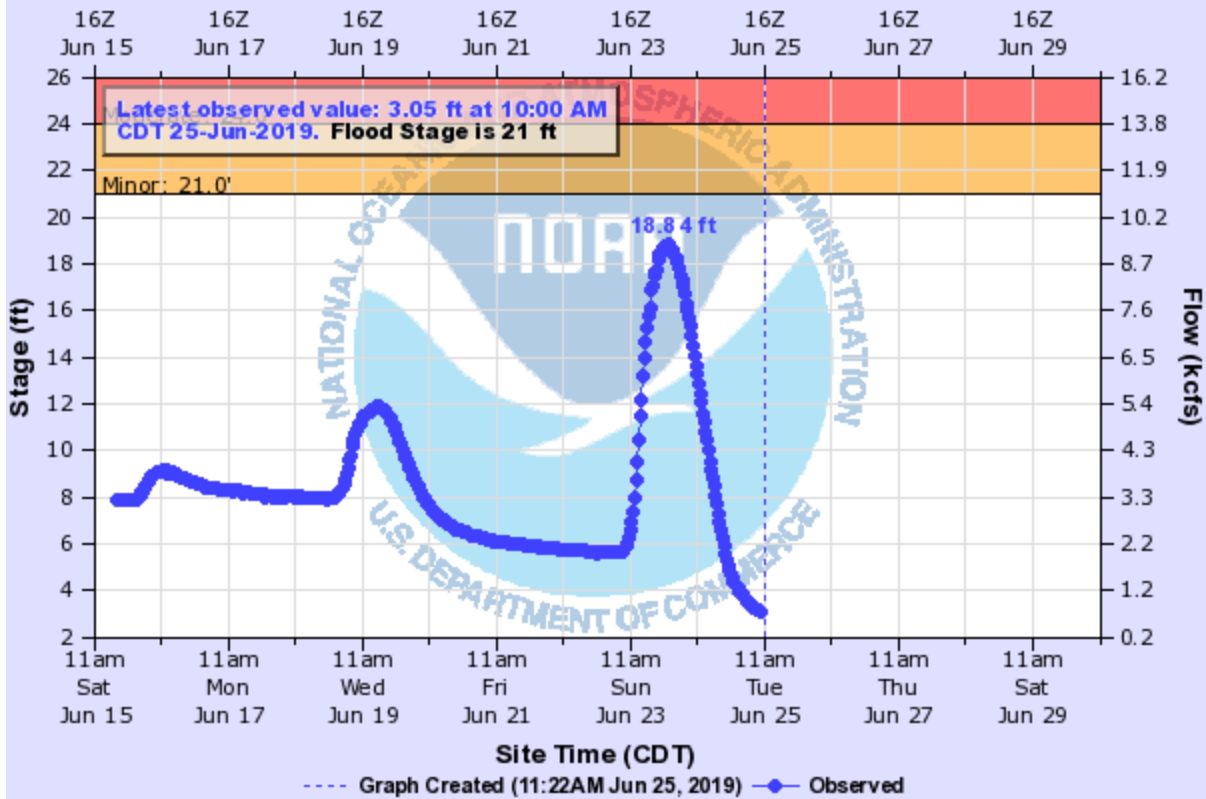


SPE02(plotting HGIRG) "Gage 0" Datum: 579.43'

Observations courtesy of US Geological Survey

BIRD CREEK NEAR SPERRY

Universal Time (UTC)

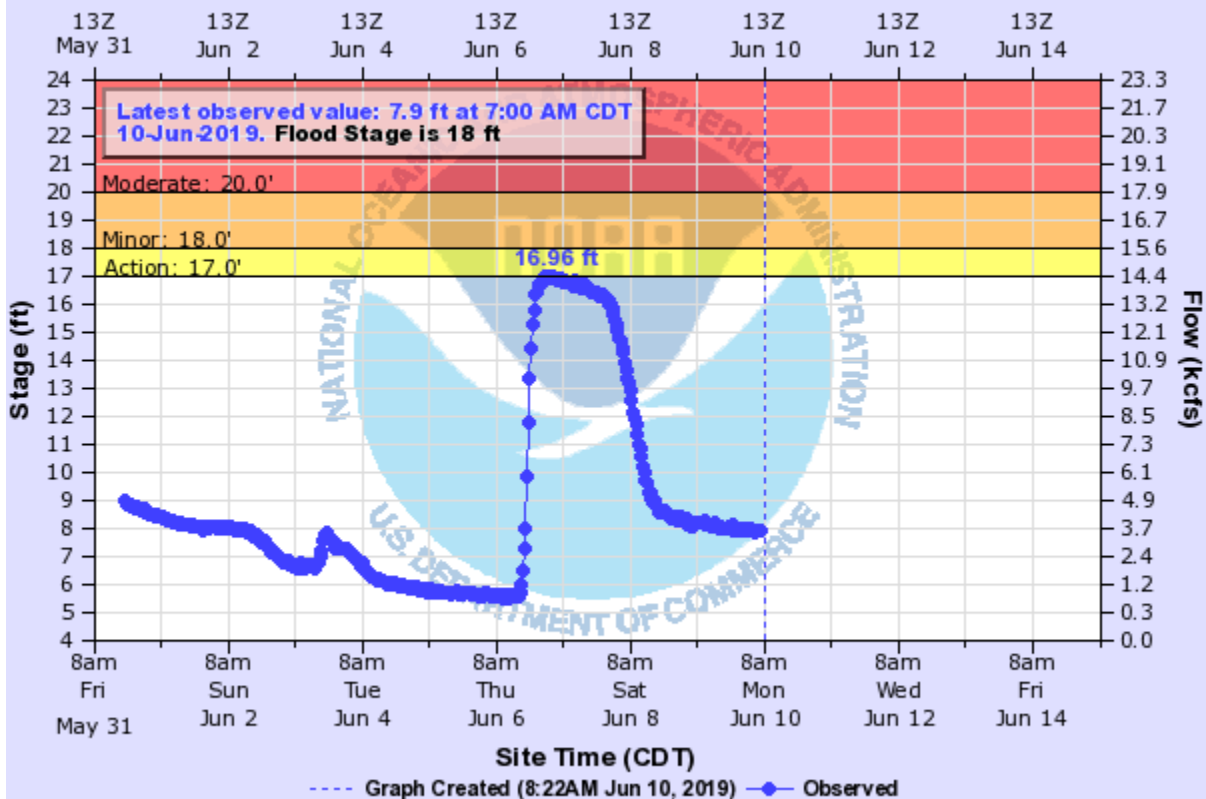


SPEO2(plotting HGIRG) "Gage 0" Datum: 579.43'

Observations courtesy of US Geological Survey

BIRD CREEK NEAR OWASSO

Universal Time (UTC)

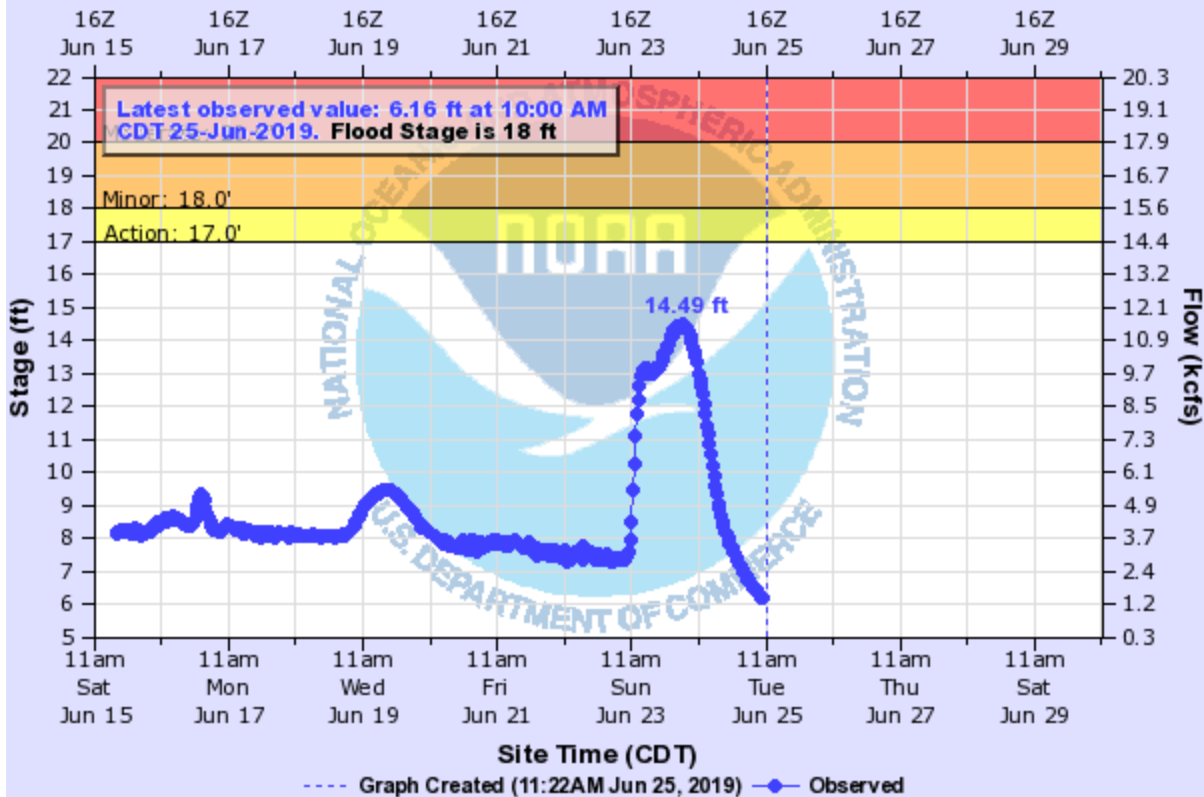


OWSO2(plotting HGIRG) "Gage 0" Datum: 560.17'

Observations courtesy of US Geological Survey

BIRD CREEK NEAR OWASSO

Universal Time (UTC)

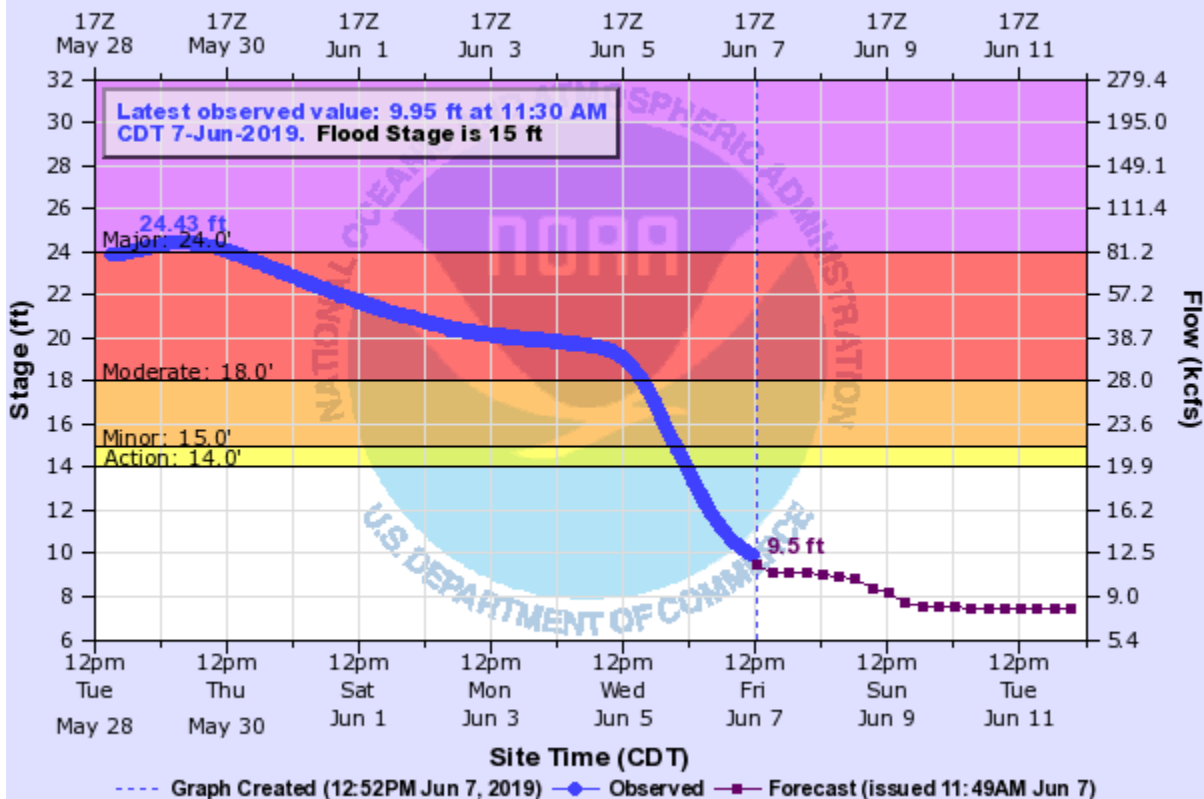


OWSO2(plotting HGIRG) "Gage 0" Datum: 560.17'

Observations courtesy of US Geological Survey

NEOSHO RIVER NEAR COMMERCE

Universal Time (UTC)

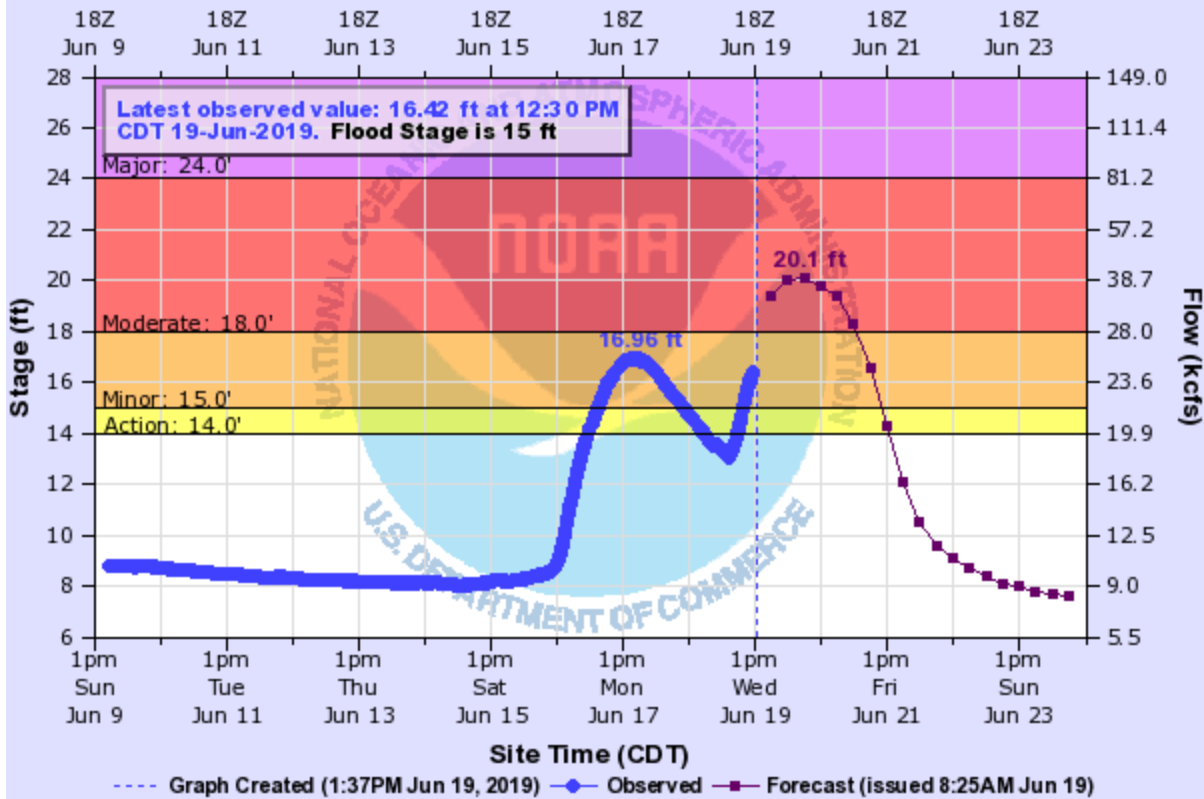


COMO2(plotting HGIRG) "Gage 0" Datum: 748.97'

Observations courtesy of US Geological Survey

NEOSHO RIVER NEAR COMMERCE

Universal Time (UTC)

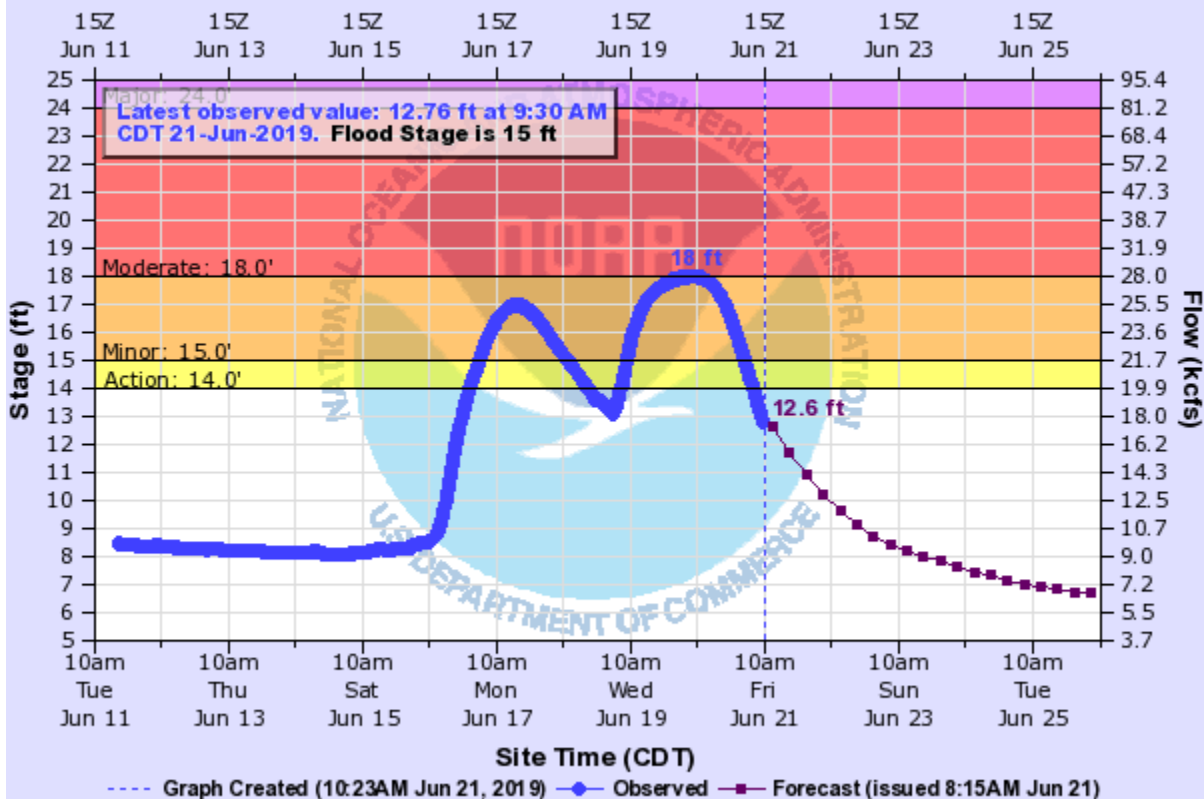


COMO2(plotting HGIRG) "Gage 0" Datum: 748.97'

Observations courtesy of US Geological Survey

NEOSHO RIVER NEAR COMMERCE

Universal Time (UTC)

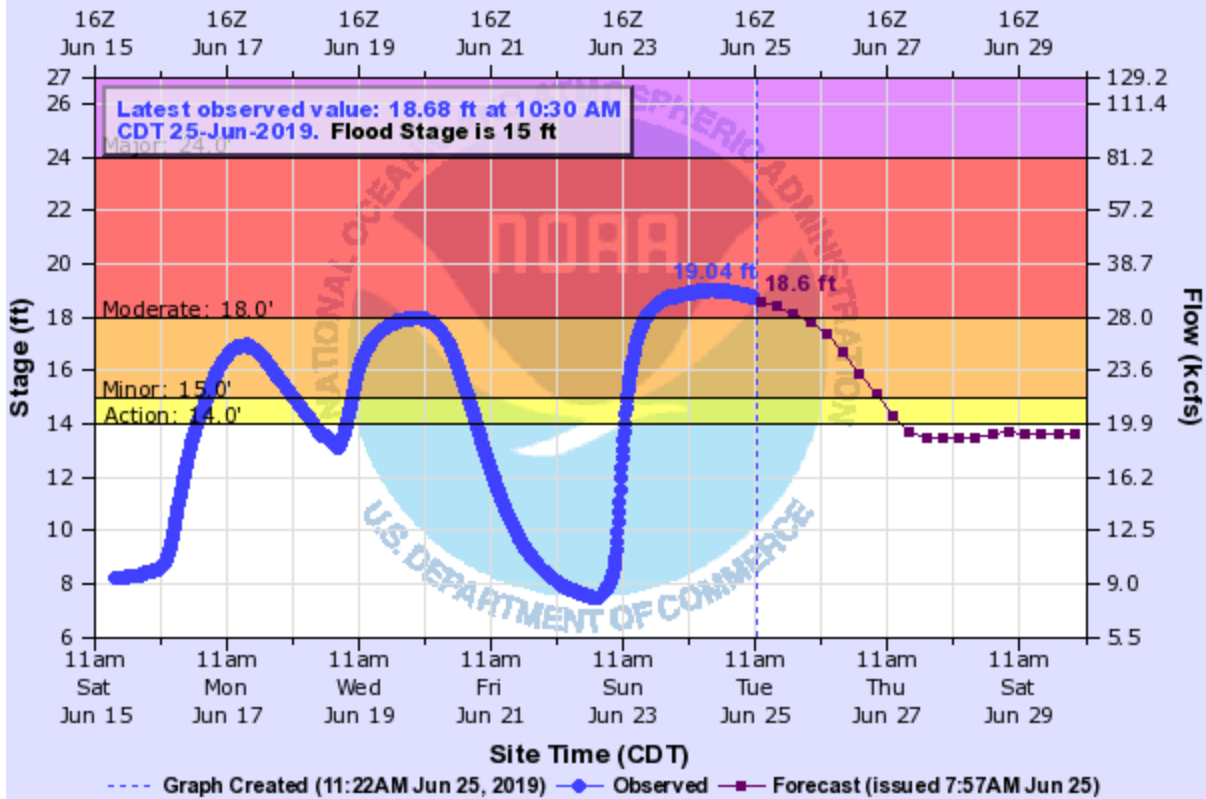


COMO2(plotting HGIRG) "Gage 0" Datum: 748.97'

Observations courtesy of US Geological Survey

NEOSHO RIVER NEAR COMMERCE

Universal Time (UTC)

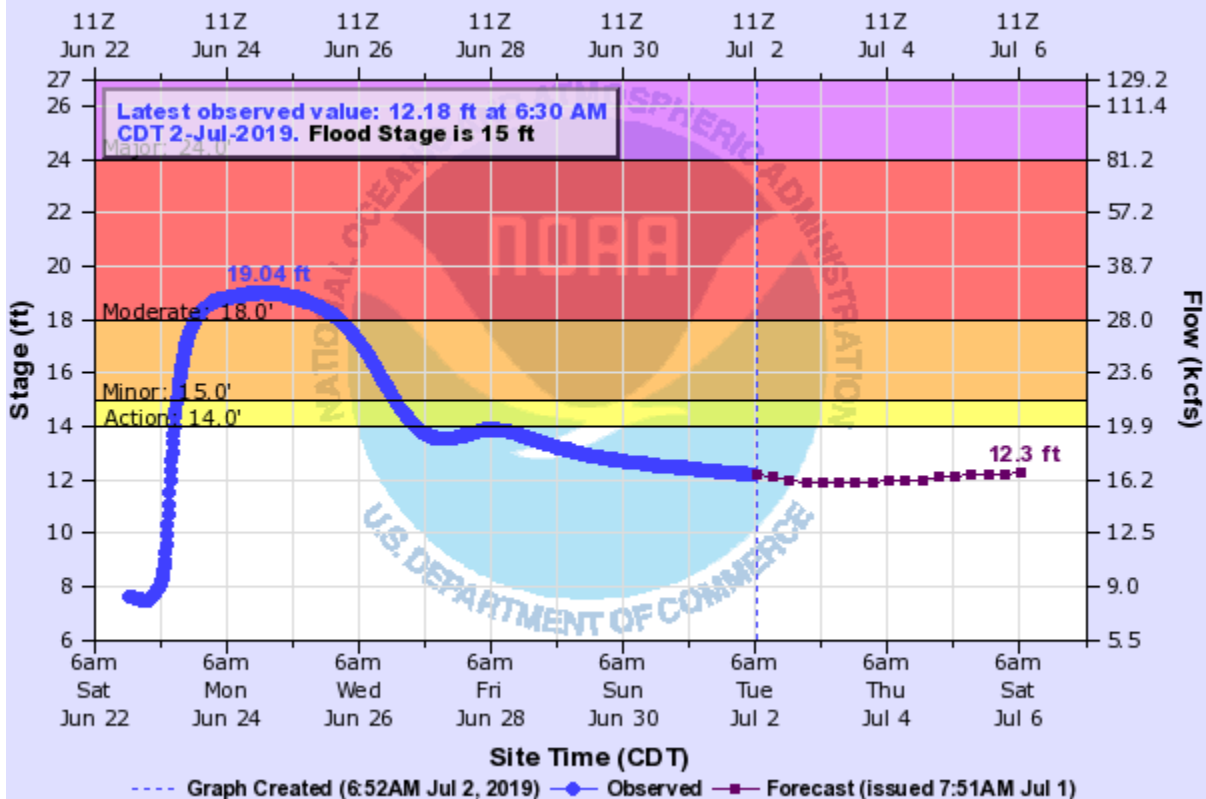


COMO2(plotting HGIRG) "Gage 0" Datum: 748.97'

Observations courtesy of US Geological Survey

NEOSHO RIVER NEAR COMMERCE

Universal Time (UTC)

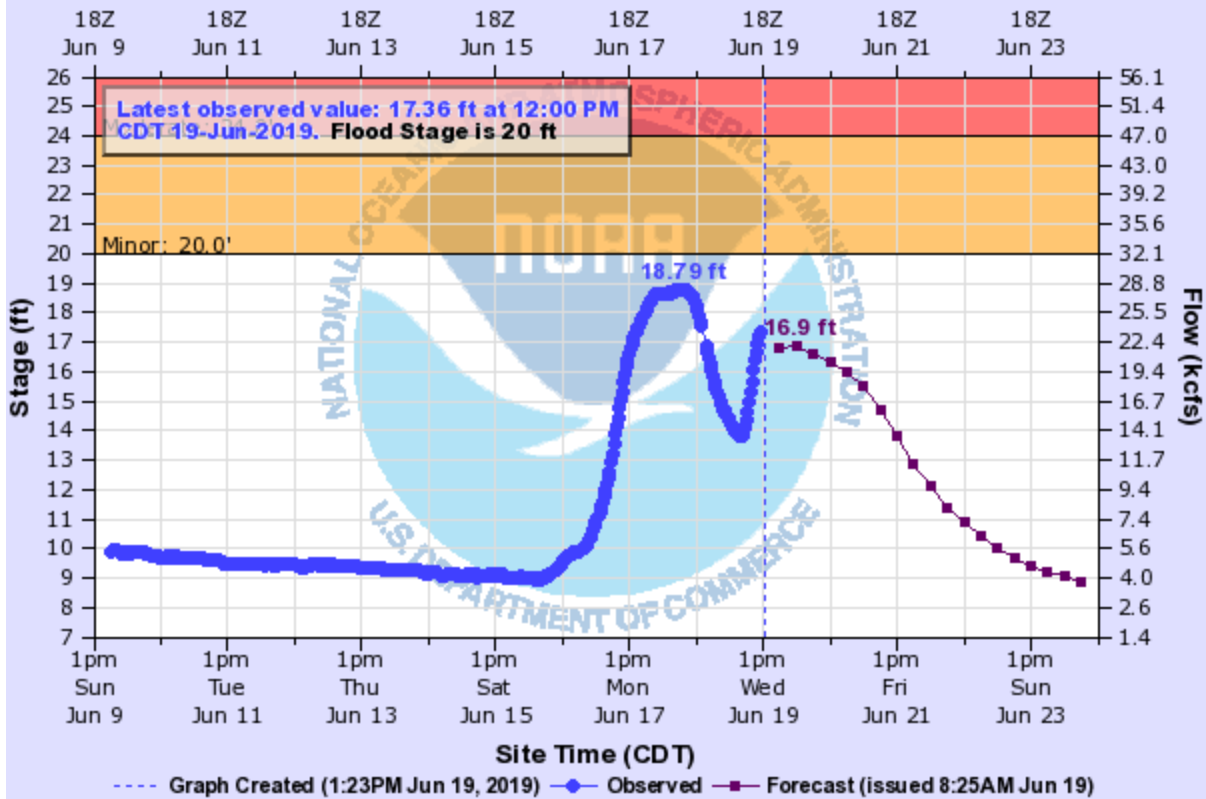


COMO2(plotting HGIRG) "Gage 0" Datum: 748.97'

Observations courtesy of US Geological Survey

SPRING RIVER NEAR QUAPAW

Universal Time (UTC)

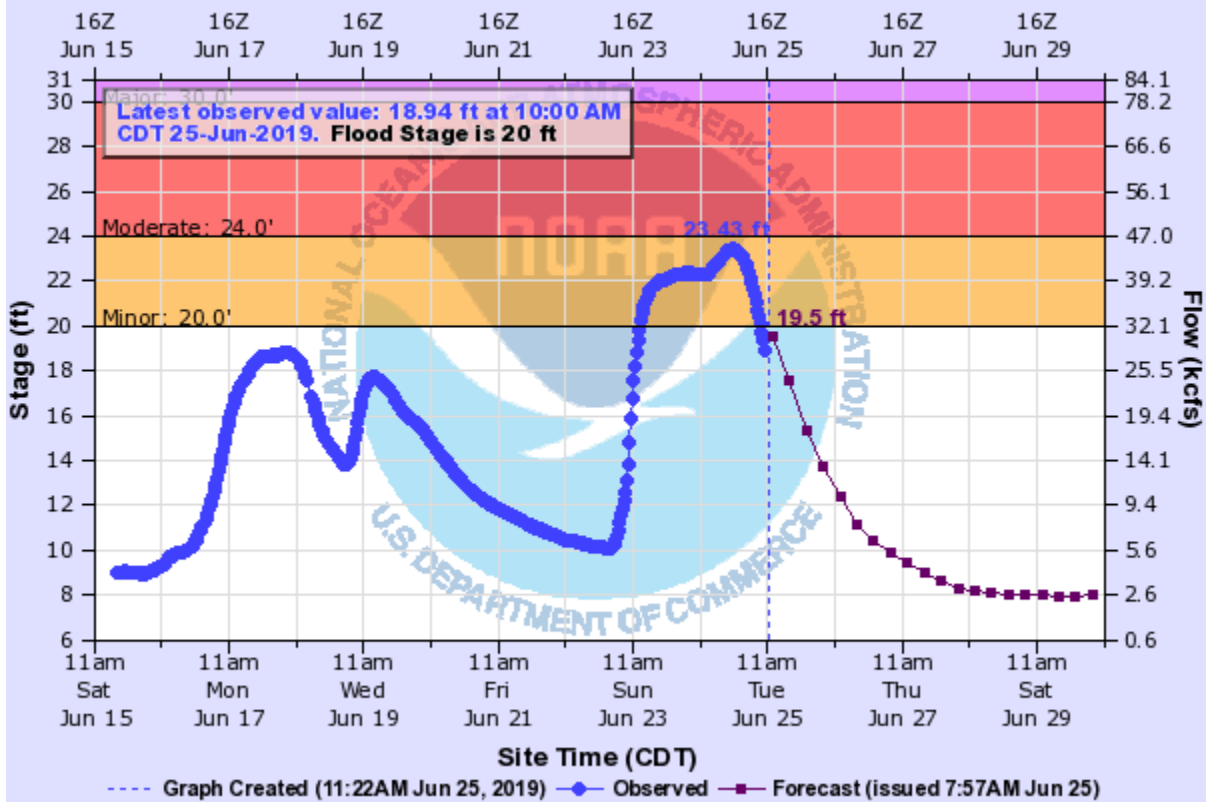


QAO2(plotting HGIRG) "Gage 0" Datum: 746.25'

Observations courtesy of US Geological Survey

SPRING RIVER NEAR QUAPAW

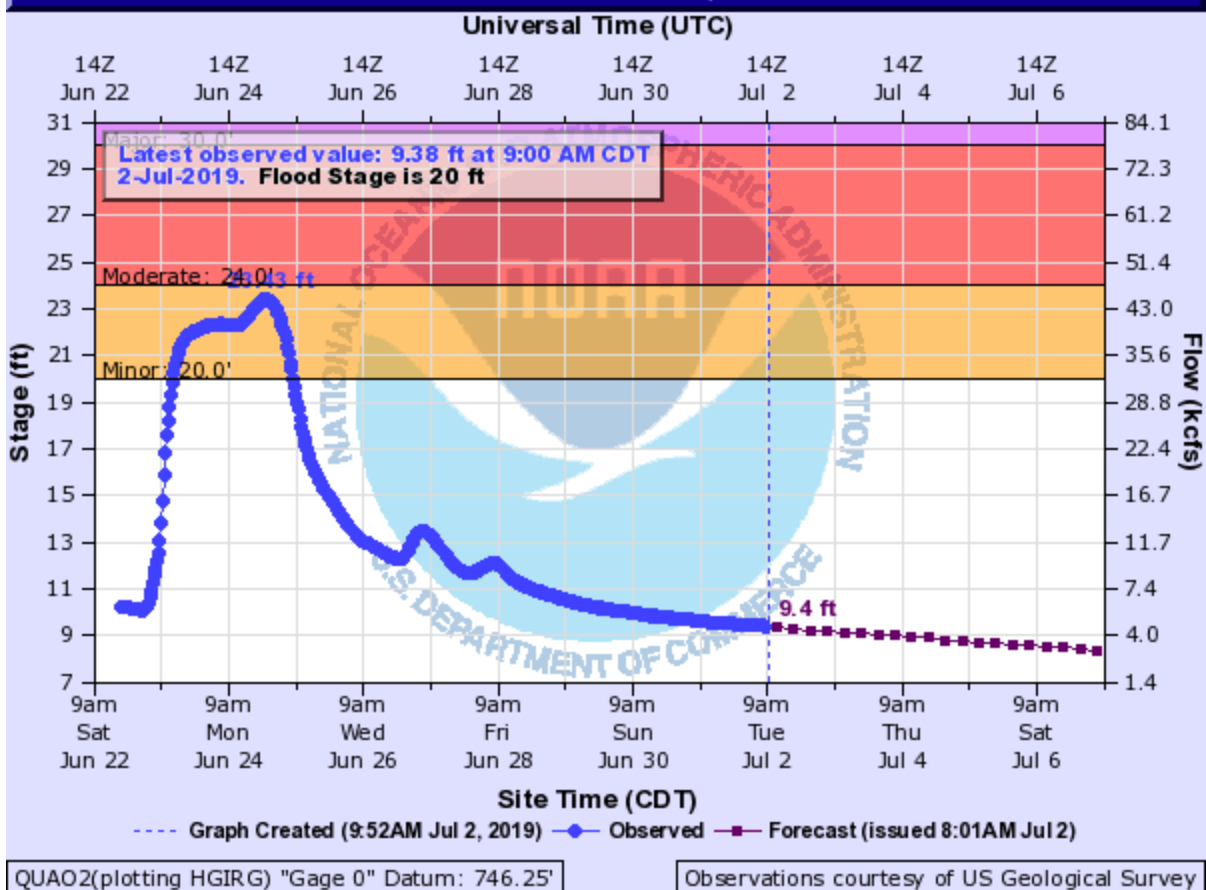
Universal Time (UTC)



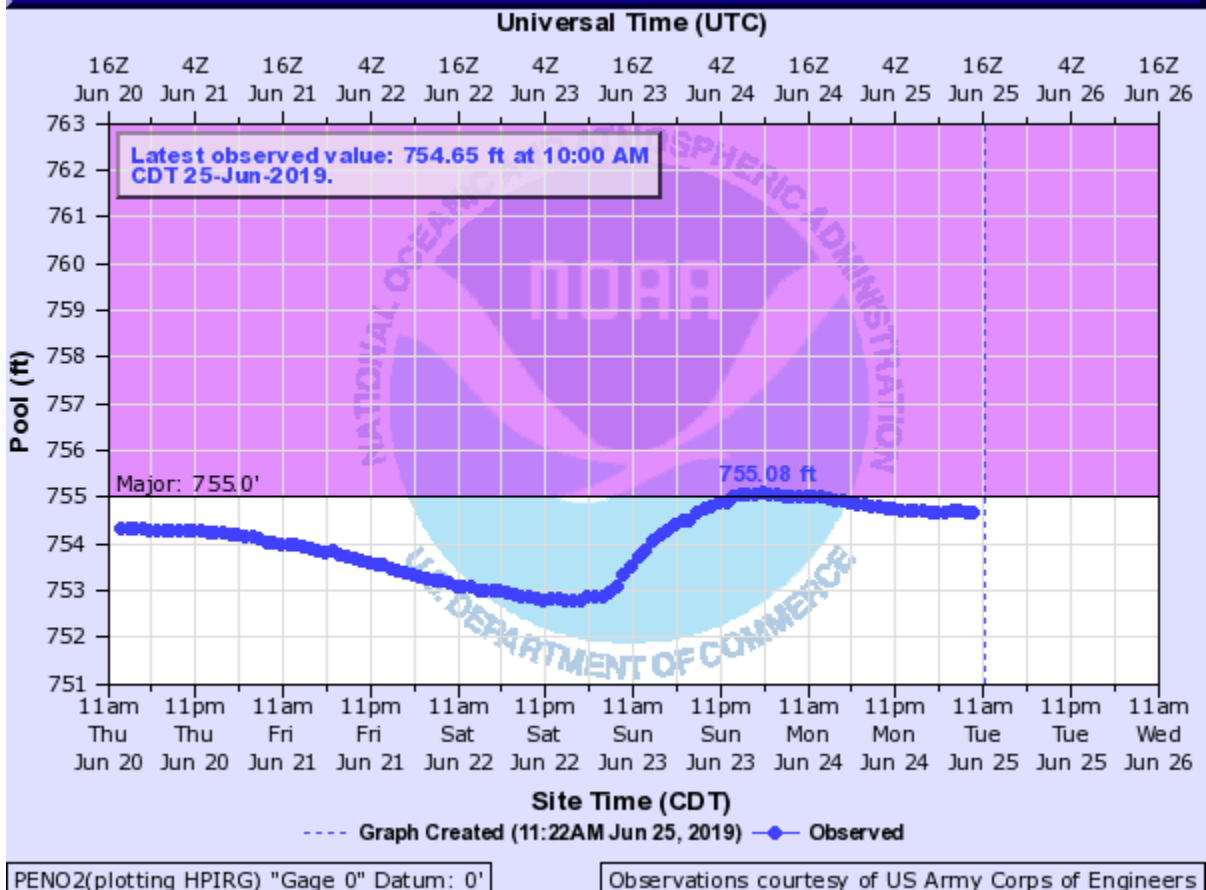
QAO2(plotting HGIRG) "Gage 0" Datum: 746.25'

Observations courtesy of US Geological Survey

SPRING RIVER NEAR QUAPAW

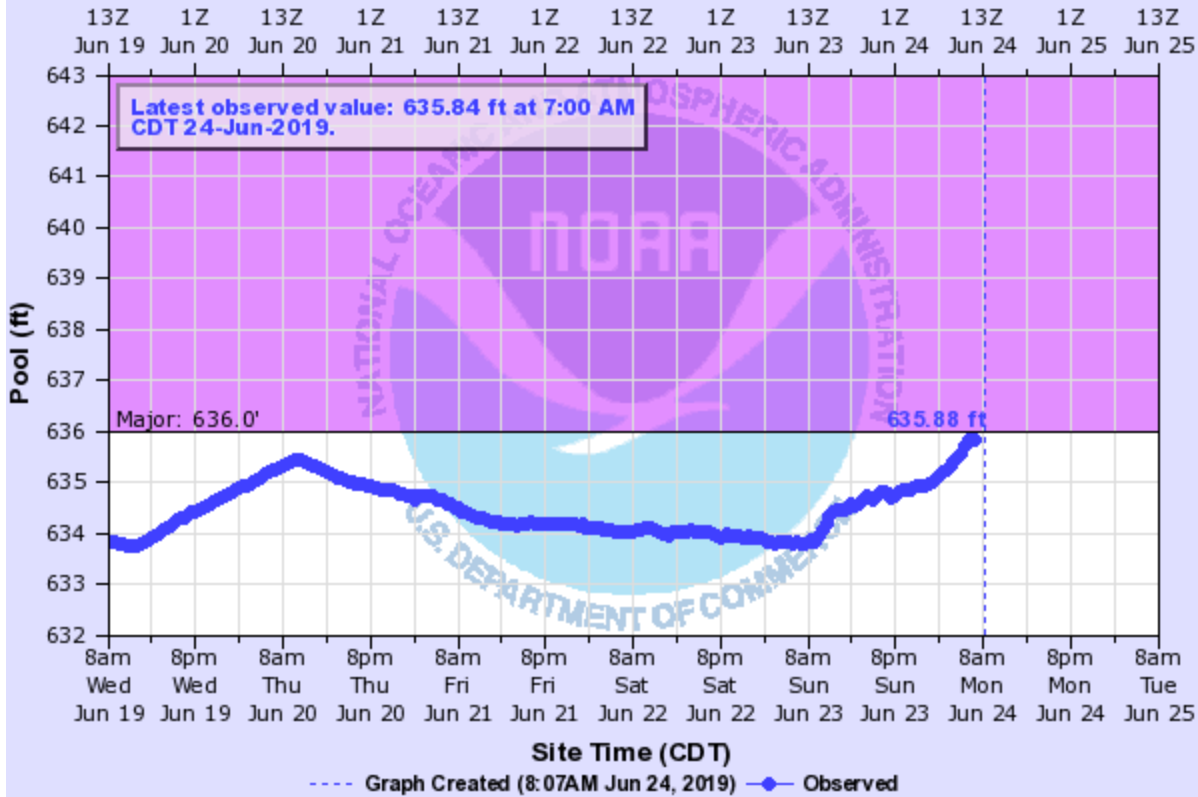


EASTERN OKLAHOMA LAKES AT GRAND LAKE



EASTERN OKLAHOMA LAKES AT HUDSON LAKE

Universal Time (UTC)

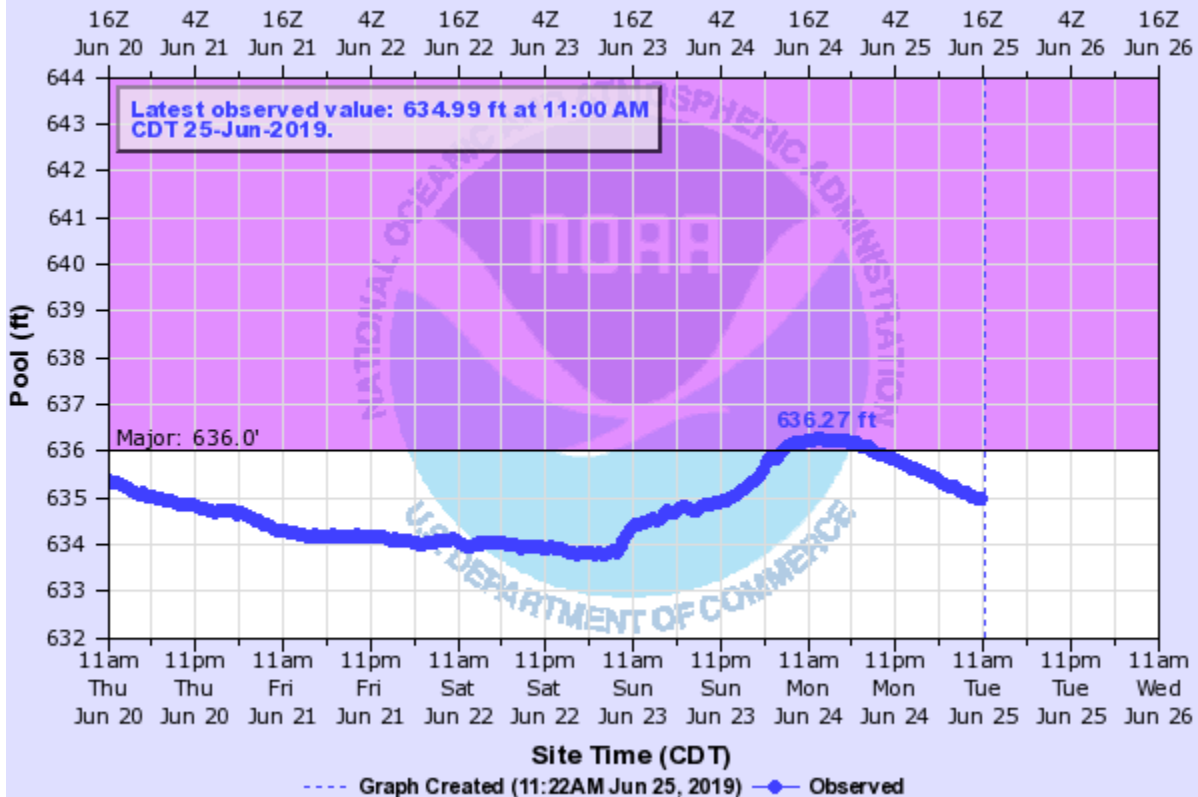


MFDO2(plotting HPIRG) "Gage 0" Datum: 0'

Observations courtesy of US Army Corps of Engineers

EASTERN OKLAHOMA LAKES AT HUDSON LAKE

Universal Time (UTC)

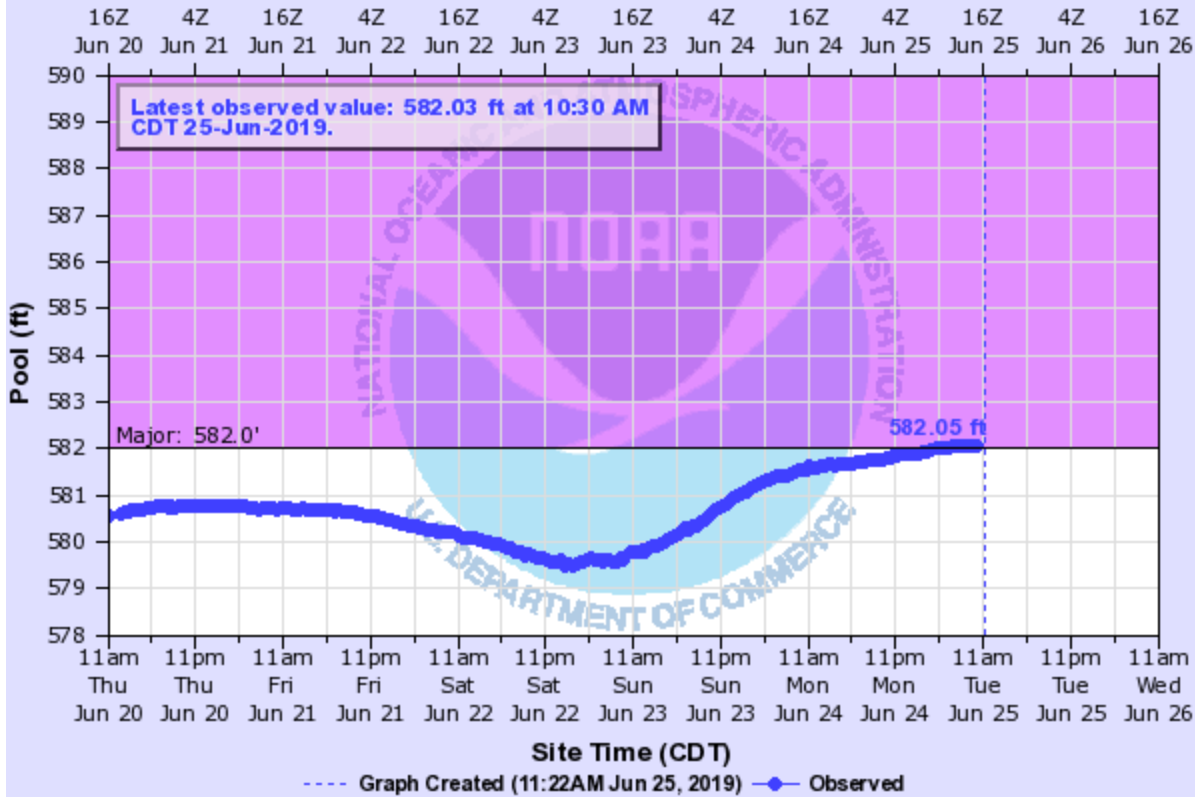


MFDO2(plotting HPIRG) "Gage 0" Datum: 0'

Observations courtesy of US Army Corps of Engineers

EASTERN OKLAHOMA LAKES AT FT. GIBSON LAKE

Universal Time (UTC)

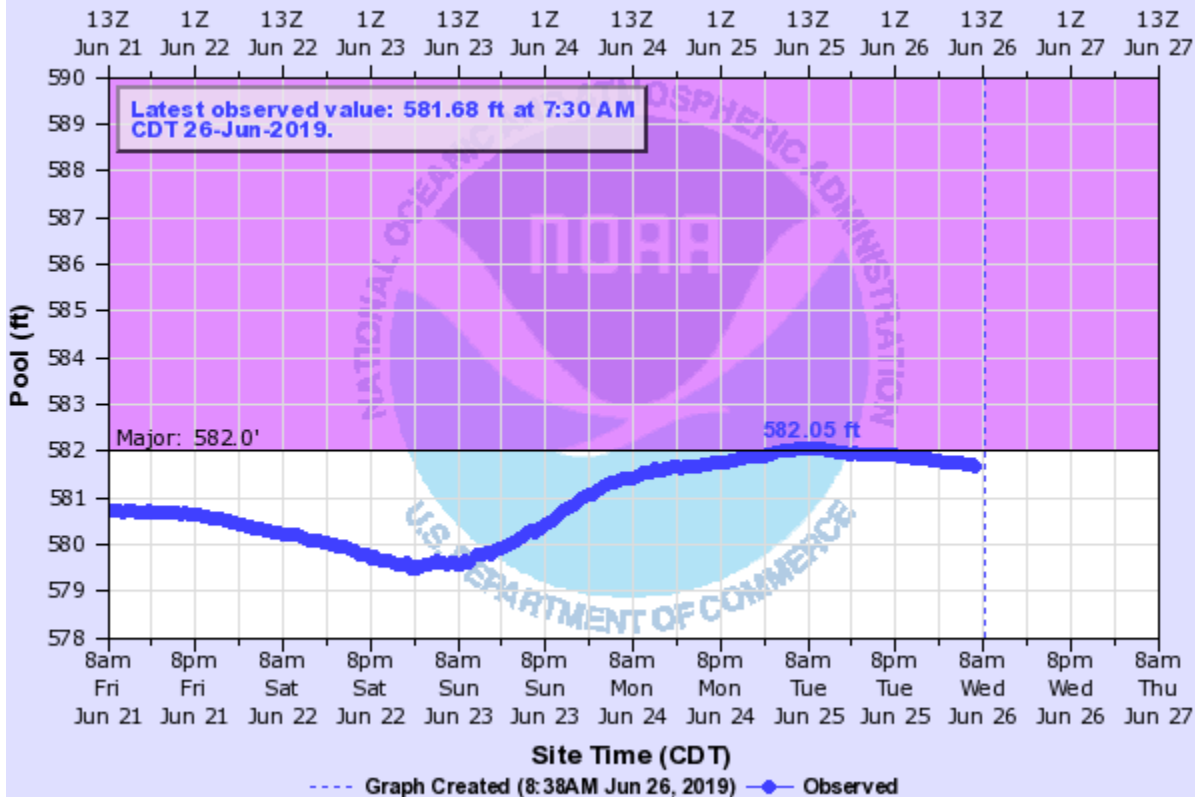


GIBO2(plotting HPIRG) "Gage 0" Datum: 0'

Observations courtesy of US Army Corps of Engineers

EASTERN OKLAHOMA LAKES AT FT. GIBSON LAKE

Universal Time (UTC)

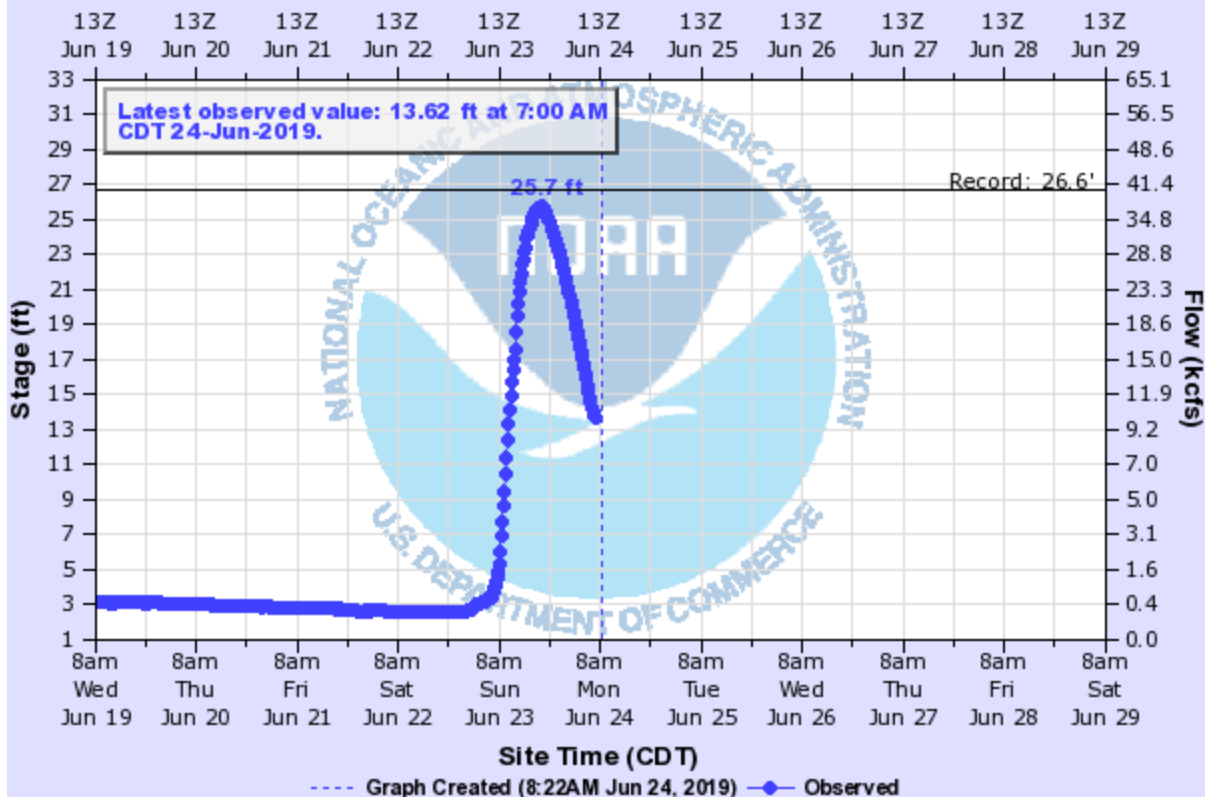


GIBO2(plotting HPIRG) "Gage 0" Datum: 0'

Observations courtesy of US Army Corps of Engineers

WHITE RIVER NEAR FAYETTEVILLE

Universal Time (UTC)

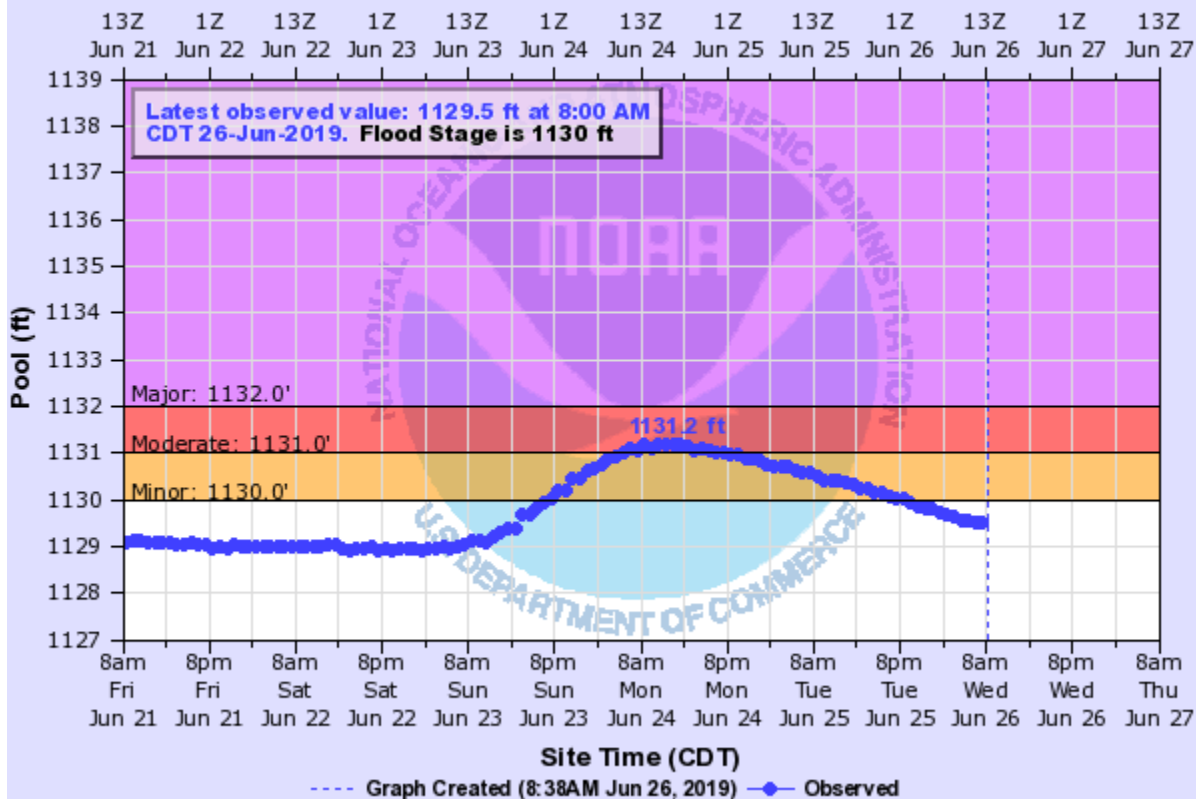


FYGA4(plotting HGIRG) "Gage 0" Datum: 1138.25'

Observations courtesy of US Geological Survey

NORTHWEST ARKANSAS LAKES AT BEAVER LAKE

Universal Time (UTC)

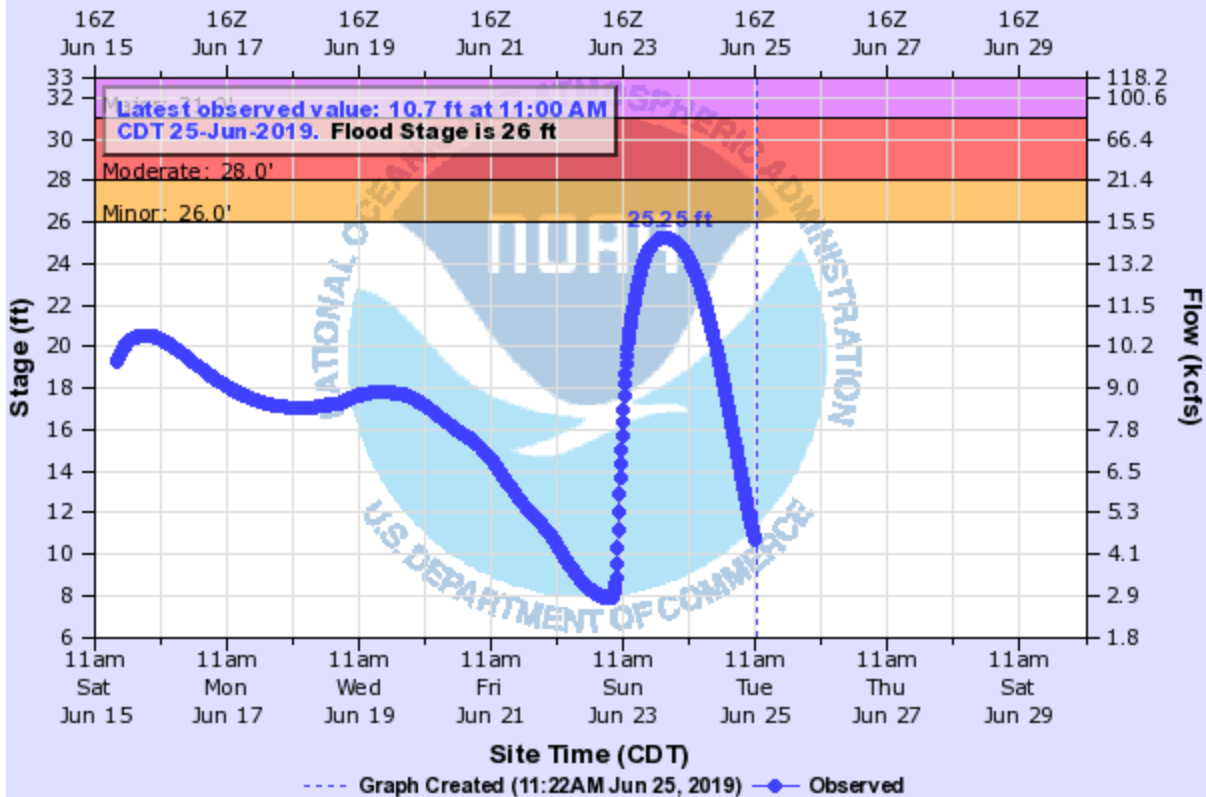


BVGA4(plotting HPIRG) "Gage 0" Datum: n/a

Observations courtesy of US Army Corps of Engineers

CANEY RIVER NEAR RAMONA

Universal Time (UTC)

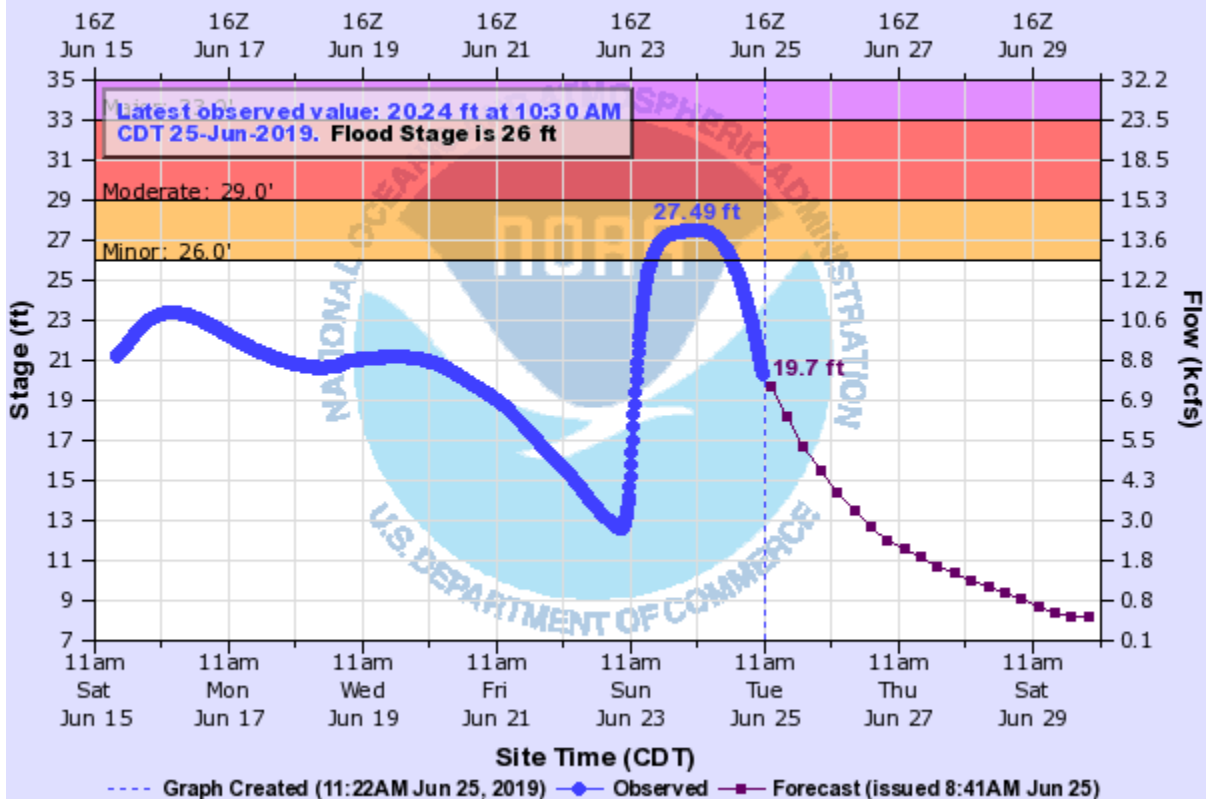


RAMO2(plotting HGIRG) "Gage 0" Datum: 586.43'

Observations courtesy of US Geological Survey

CANEY RIVER NEAR COLLINSVILLE

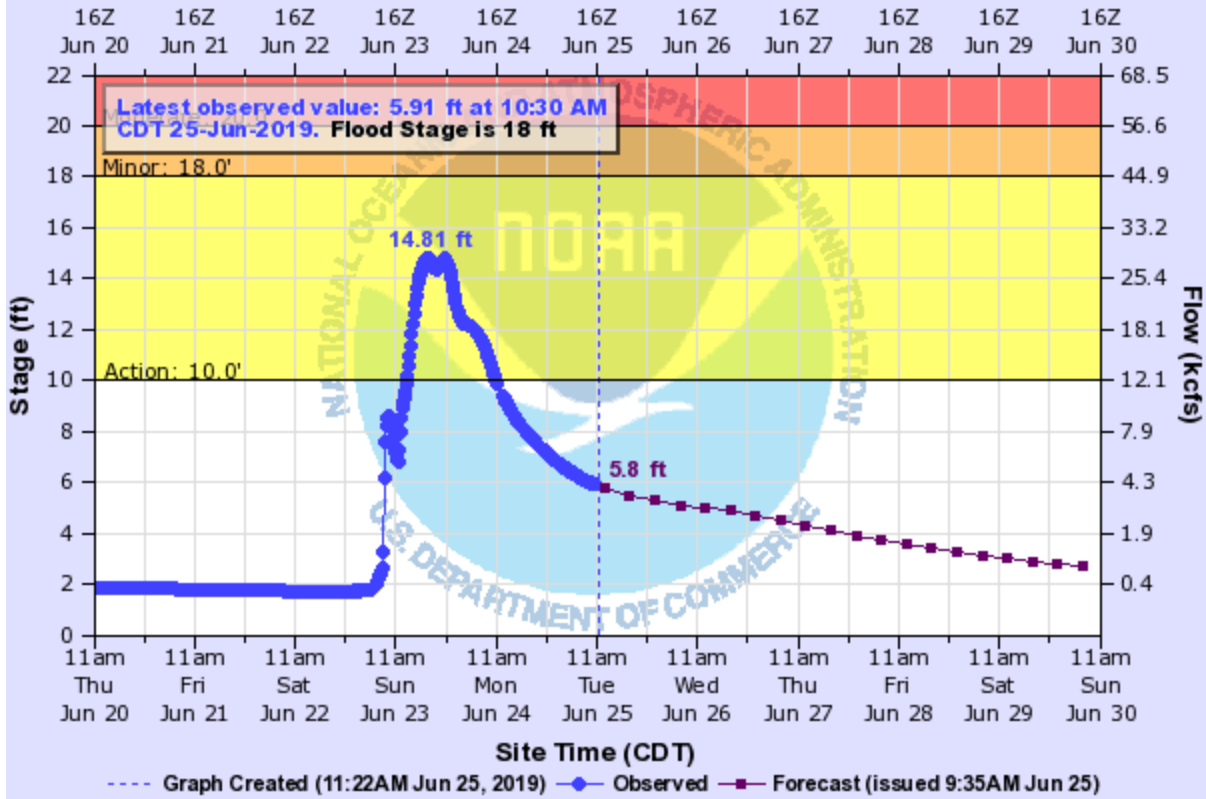
Universal Time (UTC)



CVLO2(plotting HGIRG) "Gage 0" Datum: 565.72'

MULBERRY RIVER (AR) NEAR MULBERRY

Universal Time (UTC)



MLBA4(plotting HGIRG) "Gage 0" Datum: 432.75'

Observations courtesy of USGS/USACE/ADEQ