

<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
		YEAR	<b>June</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 2, 2015</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.

Two tropical systems affected the HSA this month. The remnants of Tropical Storm Bill brought widespread flooding rains to an already saturated eastern Oklahoma and northwest Arkansas during June 2015. Despite this, several areas still received below normal rainfall for June. 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.srh.noaa.gov/tsa/?n=hydro-monthly-summary>.

### Monthly Summary

Using the radar-derived estimated observed precipitation from the RFCs (Fig. 1a), rainfall totals for June 2015 ranged from around 1.5" to around 10" across eastern OK and northwest AR. The lowest totals occurred in eastern Kay, northern Osage, Le Flore, and Sebastian Counties, while the highest totals affected Creek, Okfuskee, Okmulgee, Pittsburg, and Madison Counties. A large portion of the HSA received 5"-8" of rain this month. Despite the high rainfall totals, several areas recorded below normal rainfall for June (Fig. 1b). Portions of Osage, Kay, Pawnee Counties, far northeast OK, southeast OK, and west central AR got only 25%-90% of the normal June rainfall, while elsewhere, the June rainfall was 125% to around 200% of normal.

Tulsa, OK (TSA): June, 2015 Monthly Observed Precipitation  
 Valid at 7/1/2015 1200 UTC- Created 7/1/15 13:59 UTC

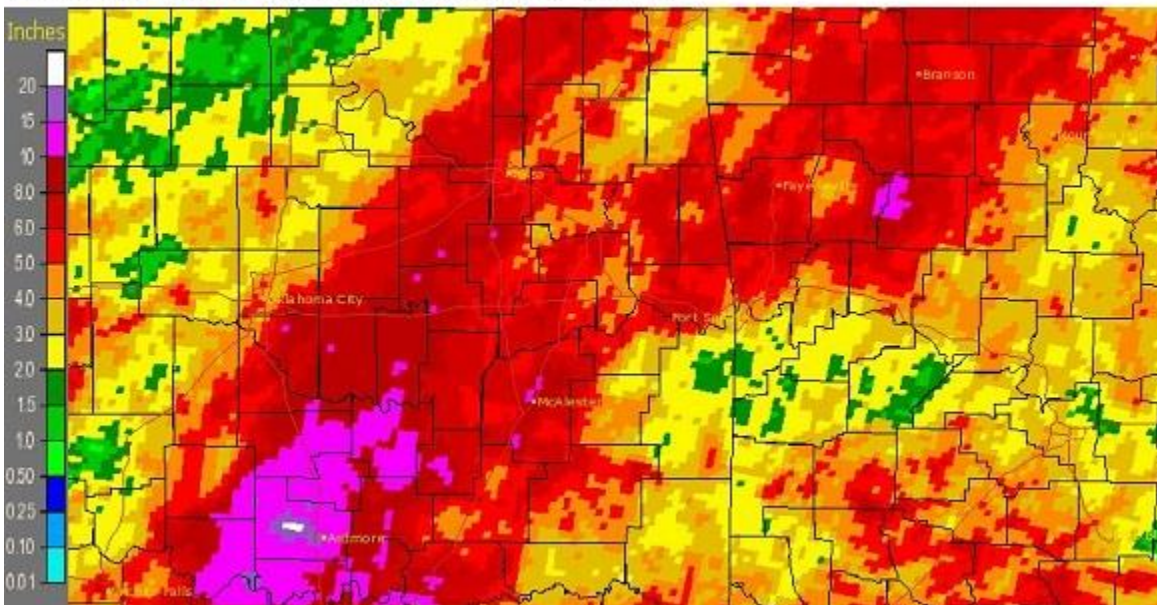


Fig. 1a. Estimated Observed Rainfall for June 2015

Tulsa, OK (TSA): June, 2015 Monthly Percent of Normal Precipitation  
 Valid at 7/1/2015 1200 UTC- Created 7/1/15 14:00 UTC

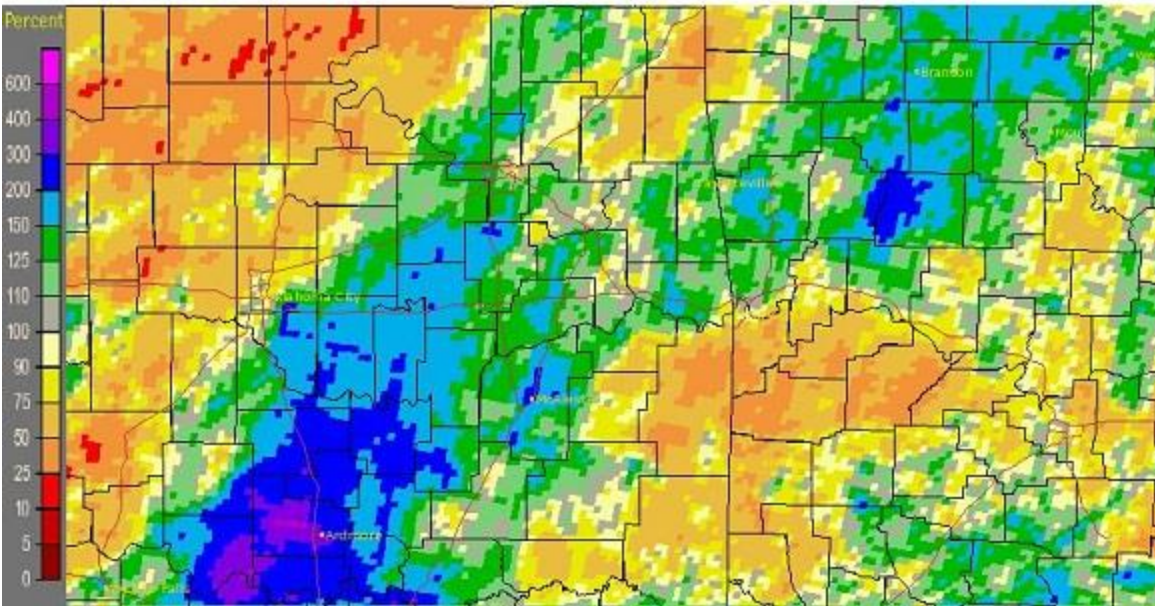


Fig. 1b. Estimated % of Normal Rainfall for June 2015

In Tulsa, OK, June 2015 ranked as the 18<sup>th</sup> warmest June (80.8°F; since records began in 1905) and the 59<sup>th</sup> wettest June (4.77"; since records began in 1888). Fort Smith, AR had the 14<sup>th</sup> warmest June (80.8°F, tied 1943, 1933; since records began in 1882) and the 57<sup>th</sup> driest June (3.13"; since records began in 1882). Fayetteville, AR had the 18<sup>th</sup> warmest (75.2°F) and the 14<sup>th</sup> wettest (6.77") June since records began in 1950.

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

Kingston 2S, AR (coop)	11.62	Winslow 7NE, AR (coop)	9.18	McAlester, OK (meso)	9.05
Hectorville, OK (meso)	8.90	McAlester, OK (ASOS)	8.67	Sallisaw, OK (meso)	8.35
Okemah, OK (meso)	8.18	Tahlequah, OK (meso)	7.99	Cookson, OK (meso)	7.94

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

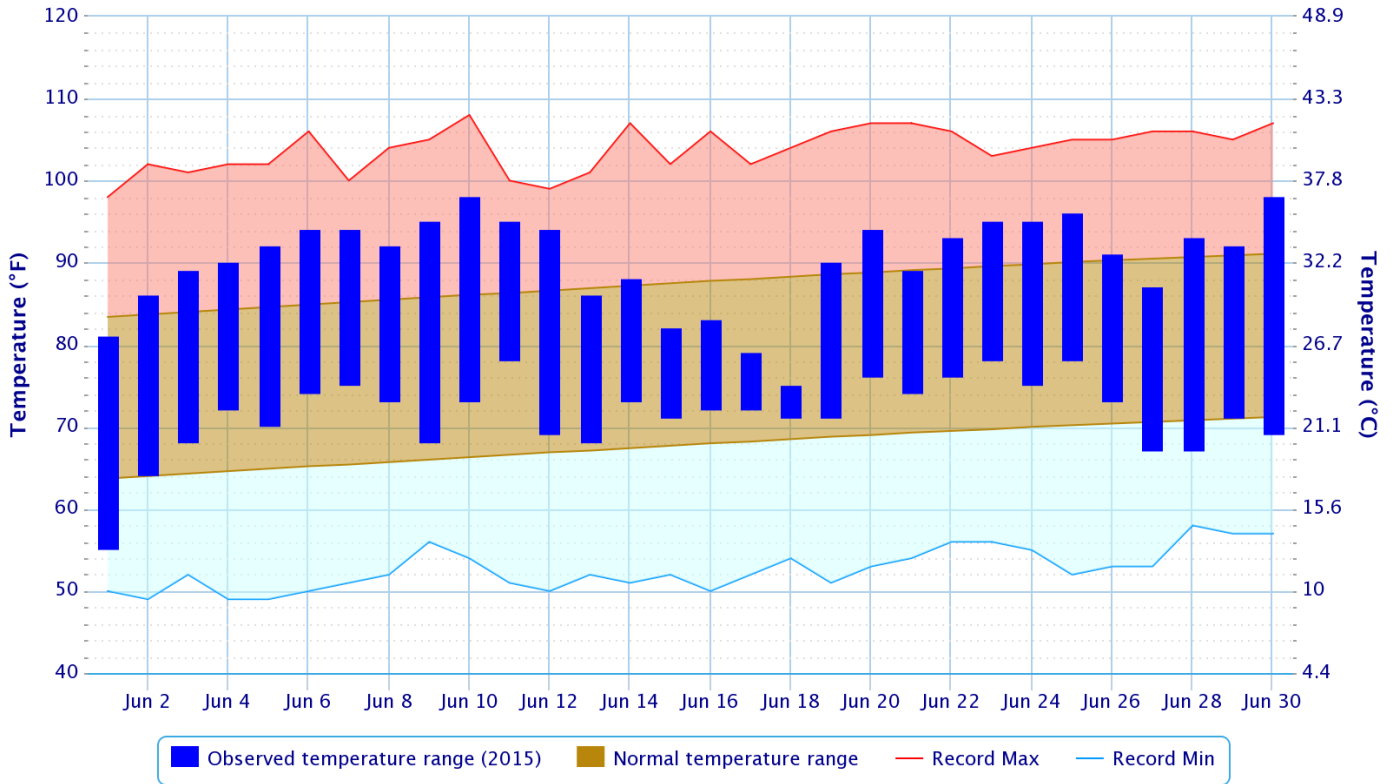
Wister, OK (meso)	1.87	Talihina, OK (meso)	2.26	Foraker, OK (meso)	2.45
Pawnee, OK (coop)	2.45	Pawnee, OK (meso)	2.79	Spavinaw, OK (coop)	3.00
Fanshawe, OK (coop)	3.02	Fort Smith, AR (ASOS)	3.13	Jay, OK (meso)	3.18

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

Rank since 1921	June 2015	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, 2014 – Jun 30, 2015)	Last 365 Days (Ju1 1, 2014 – Jun 30, 2015)
Northeast OK	43 <sup>rd</sup> wettest	<b>5<sup>th</sup> wettest</b>	<b>9<sup>th</sup> wettest</b>	12 <sup>th</sup> wettest	16 <sup>th</sup> wettest	15 <sup>th</sup> wettest	23 <sup>rd</sup> wettest
East Central OK	16 <sup>th</sup> wettest	<b>1<sup>st</sup> wettest</b>	<b>1<sup>st</sup> wettest</b>	<b>2<sup>nd</sup> wettest</b>	<b>3<sup>rd</sup> wettest</b>	<b>3<sup>rd</sup> wettest</b>	<b>4<sup>th</sup> wettest</b>
Southeast OK	47 <sup>th</sup> wettest	<b>2<sup>nd</sup> wettest</b>	<b>2<sup>nd</sup> wettest</b>	<b>2<sup>nd</sup> wettest</b>	<b>5<sup>th</sup> wettest</b>	<b>7<sup>th</sup> wettest</b>	<b>6<sup>th</sup> wettest</b>
Statewide	26 <sup>th</sup> wettest	<b>1<sup>st</sup> wettest</b>	<b>2<sup>nd</sup> wettest</b>	<b>2<sup>nd</sup> wettest</b>	<b>2<sup>nd</sup> wettest</b>	<b>5<sup>th</sup> wettest</b>	<b>6<sup>th</sup> wettest</b>

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

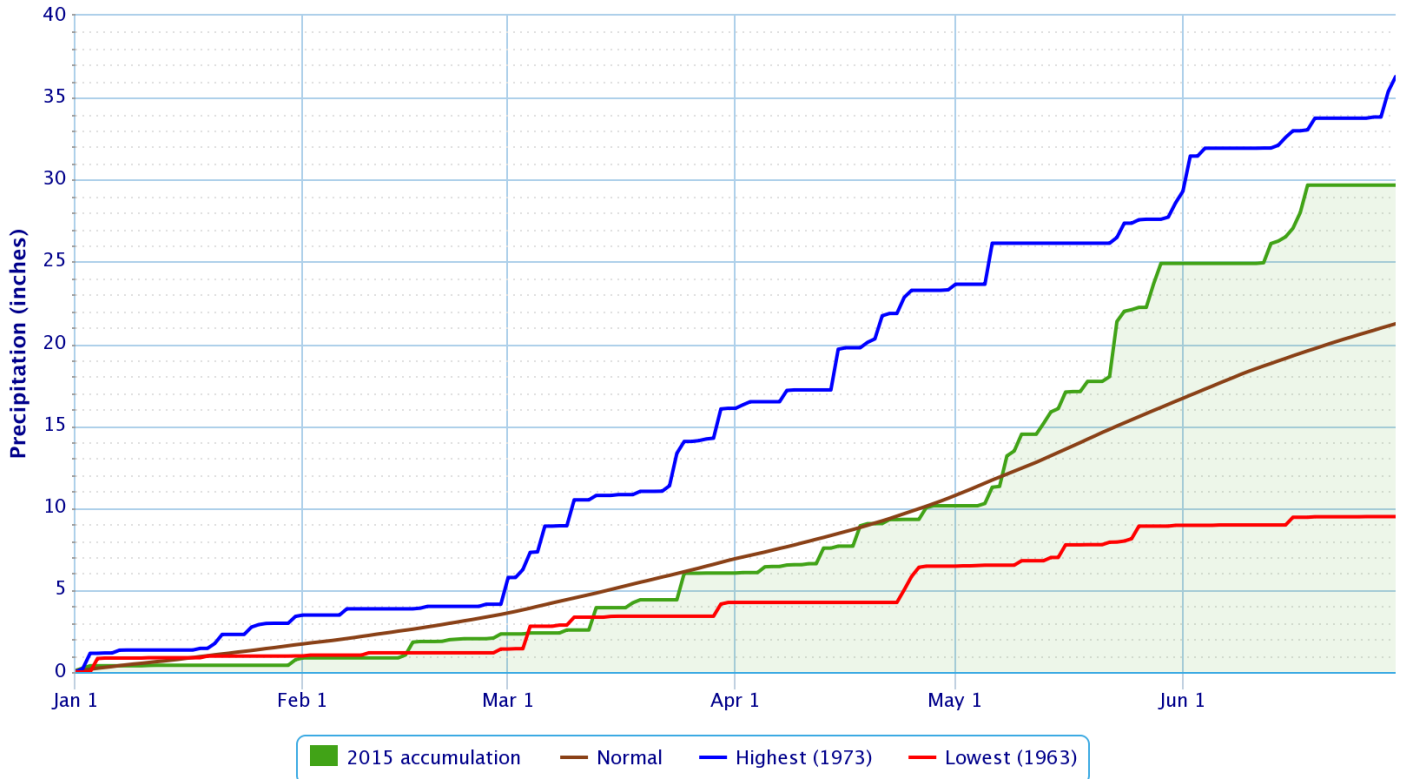
Period of Record – 1905-01-06 to 2015-06-30. Normals period: 1981-2010. Click and drag to zoom chart.



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

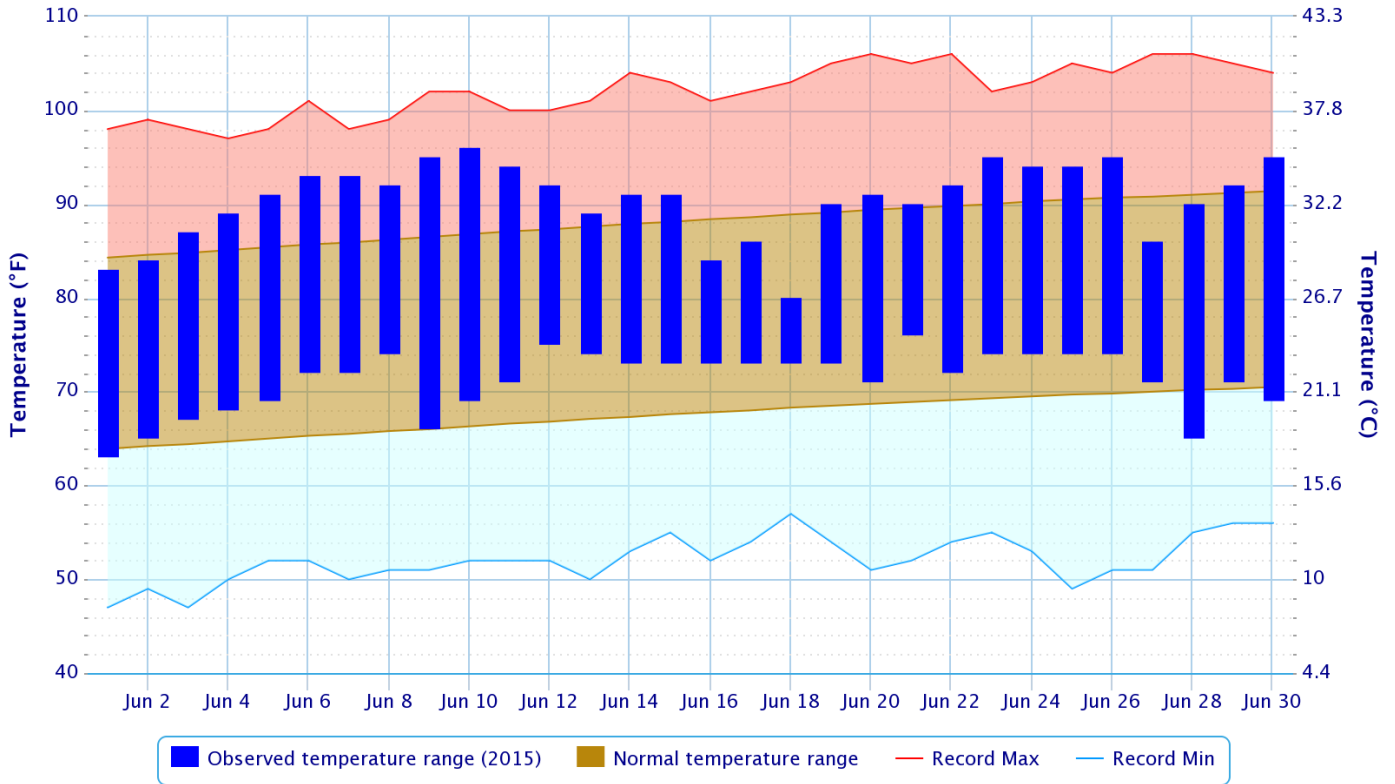
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



Powered by ACIS

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

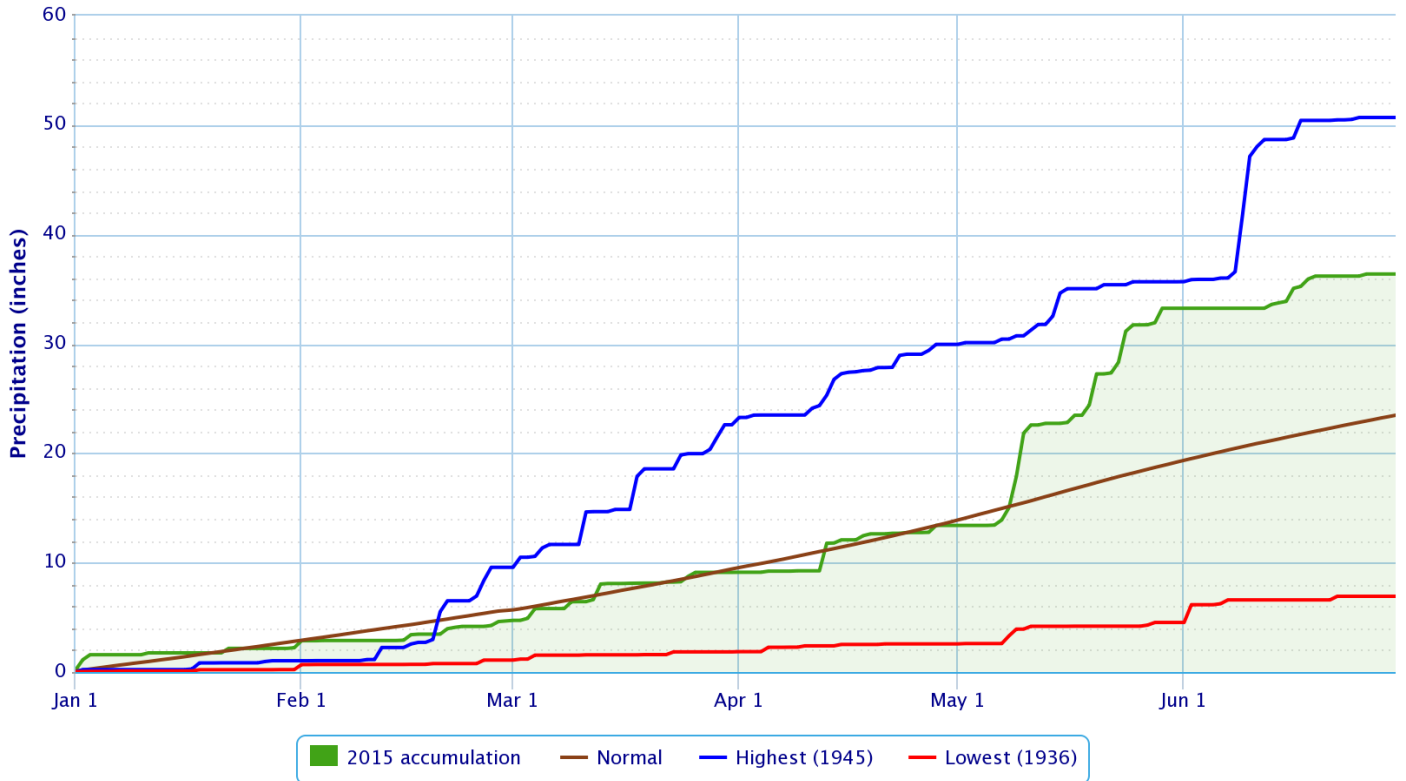
Period of Record – 1882-06-01 to 2015-06-30. Normals period: 1981-2010. Click and drag to zoom chart.



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

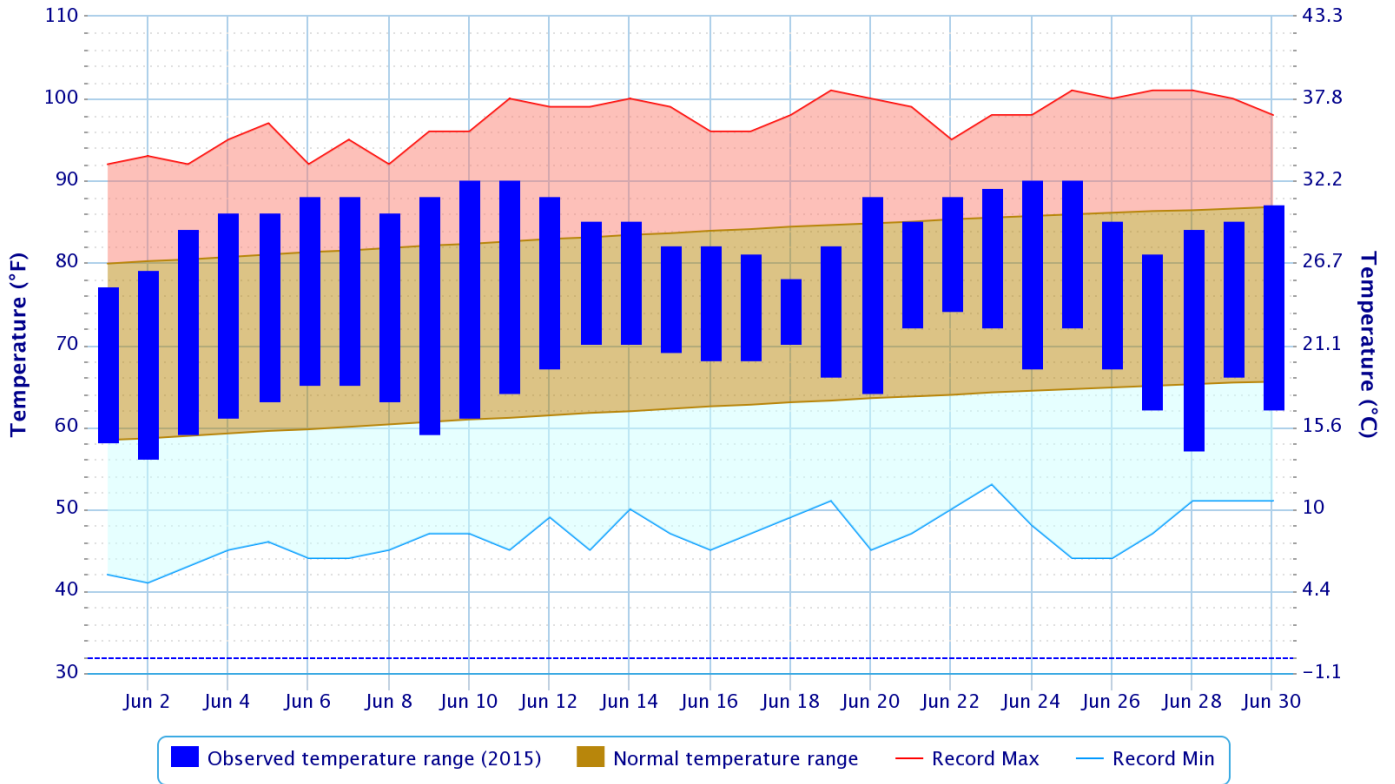


Powered by ACIS



## Daily Temperature Data – FAYETTEVILLE DRAKE FLD, AR

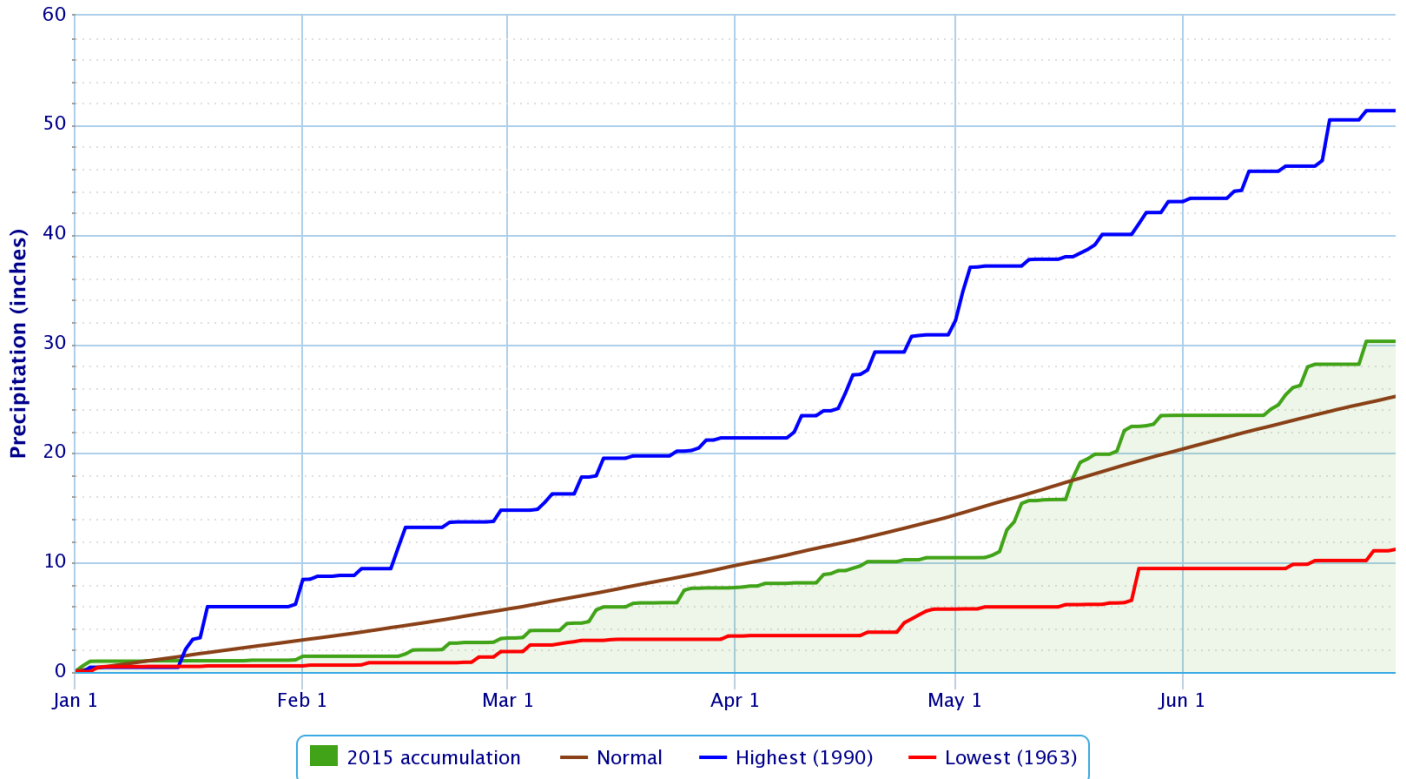
Period of Record – 1949-07-14 to 2015-06-30. Normals period: 1981-2010. Click and drag to zoom chart.



Powered by ACIS

## Accumulated Precipitation – FAYETTEVILLE DRAKE FLD, AR

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



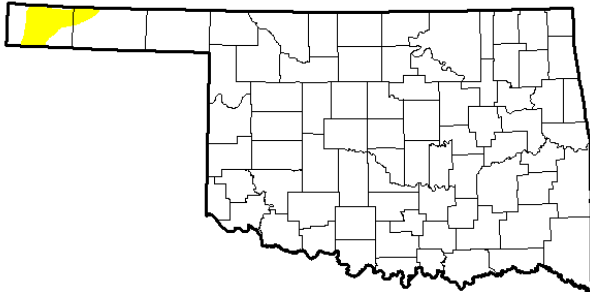
Powered by ACIS

**Drought**

According to the [U.S. Drought Monitor](#) (USDM) from June 30, 2015 (Figs 2, 3), drought free conditions continued across eastern Oklahoma and northwest Arkansas.

**U.S. Drought Monitor  
Oklahoma**

**June 30, 2015**  
(Released Thursday, Jul. 2, 2015)  
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	98.28	1.72	0.00	0.00	0.00	0.00
<b>Last Week</b> 6/23/2015	98.28	1.72	0.00	0.00	0.00	0.00
<b>3 Months Ago</b> 3/31/2015	14.36	85.64	68.62	50.68	37.38	8.41
<b>Start of Calendar Year</b> 1/20/2014	25.63	74.37	62.03	40.84	21.74	5.70
<b>Start of Water Year</b> 9/30/2014	8.95	91.45	73.31	58.13	20.92	4.64
<b>One Year Ago</b> 7/1/2014	5.50	94.50	80.12	65.61	30.07	6.67

*Intensity:*

- 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:**  
Brian Fuchs  
National Drought Mitigation Center

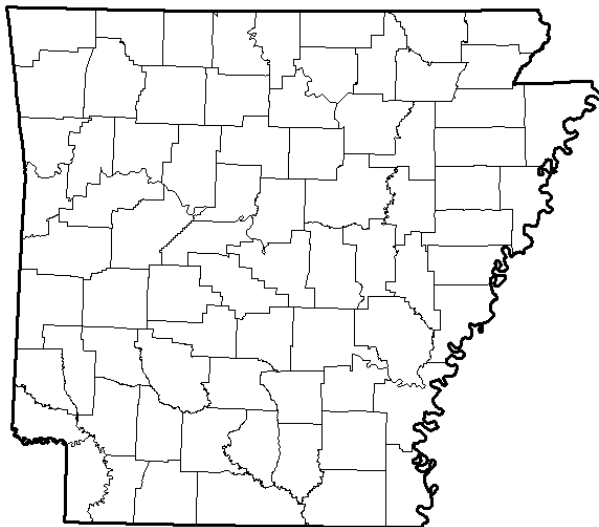


<http://droughtmonitor.unl.edu/>

Fig. 2. Drought Monitor for Oklahoma

**U.S. Drought Monitor  
Arkansas**

**June 30, 2015**  
(Released Thursday, Jul. 2, 2015)  
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> 6/23/2015	100.00	0.00	0.00	0.00	0.00	0.00
<b>3 Months Ago</b> 3/31/2015	95.38	4.62	0.00	0.00	0.00	0.00
<b>Start of Calendar Year</b> 1/20/2014	36.88	63.12	14.40	0.00	0.00	0.00
<b>Start of Water Year</b> 9/30/2014	54.54	45.46	9.13	0.00	0.00	0.00
<b>One Year Ago</b> 7/1/2014	82.50	17.50	0.04	0.00	0.00	0.00

*Intensity:*

- 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:**  
Brian Fuchs  
National Drought Mitigation Center



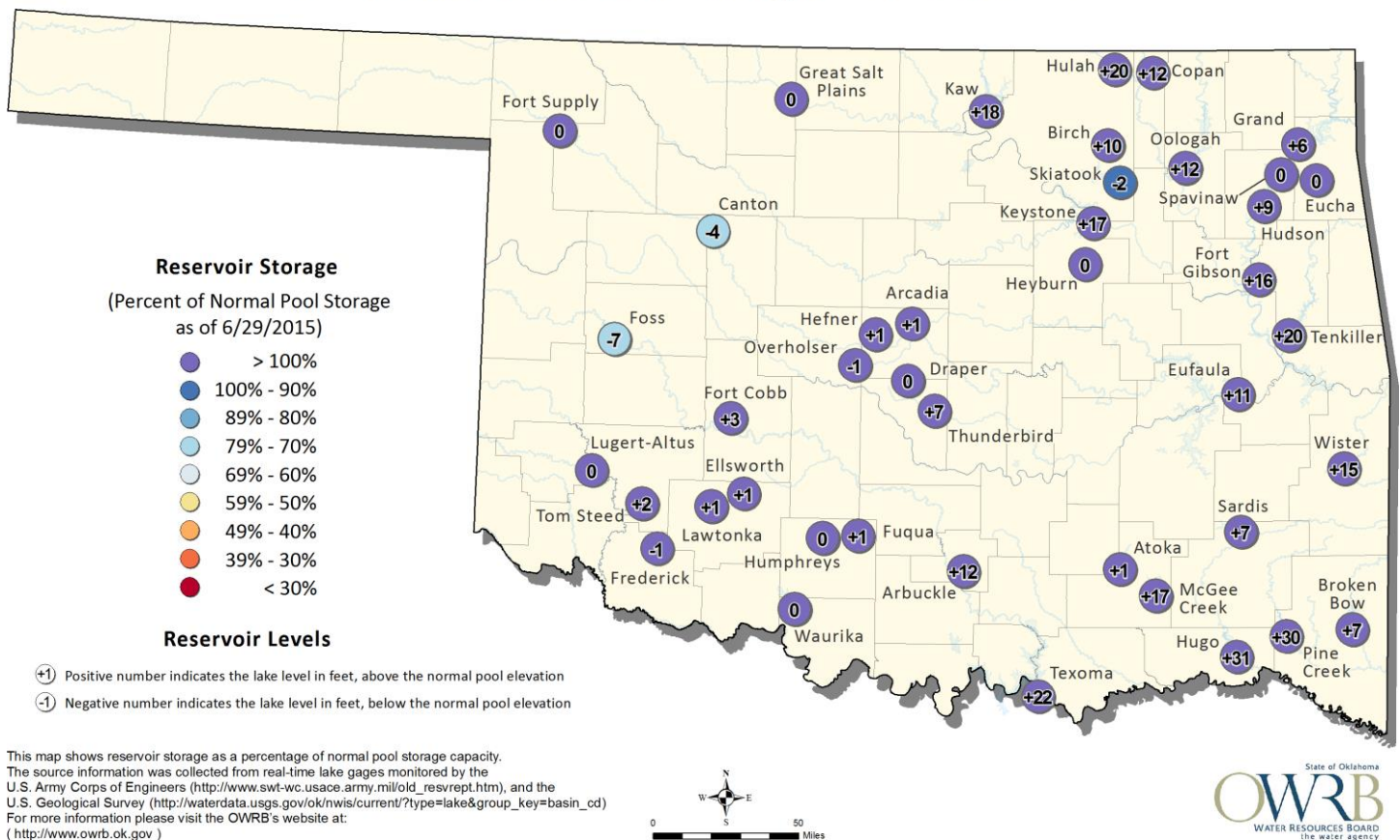
<http://droughtmonitor.unl.edu/>

Fig. 3. Drought Monitor for Arkansas

## Reservoirs

According to the USACE, all of the major reservoirs in the HSA were operating well into their flood pools as of 6/30/2015, except for Skiatook Lake, which was at 93% of its conservation pool (but up from 53% at the end up April). The following lakes were operating in their flood control pools (percentage of flood pool listed) as of 6/30/15: Hugo Lake 93%, Sardis Lake 92%, Beaver Lake 89%, Eufaula Lake 86%, Tenkiller Lake 49%, Kaw Lake 45%, Hulah Lake 43%, Ft. Gibson Lake 43%, Grand/Pensacola Lake 42%, Hudson Lake 42%, Wister Lake 41%, Keystone Lake 41%, Oologah Lake 41%, Copan Lake 40%, Birch Lake 31%.

## Oklahoma Surface Water Resources Reservoir Levels and Storage as of 6/29/2015



## Outlooks

The [Climate Prediction Center](#) (CPC) outlook for July 2015 (issued June 30, 2015) indicates an enhanced chance for below normal temperatures and above median rainfall across all of eastern OK and northwest AR. This outlook is based substantially on information from the short-term forecast for the first half of July. The overall expected weather pattern during this time is a ridge over western North America with a downstream trough near the east coast of the U.S. Some models indicate this pattern will persist through the remainder of July, while others show this pattern breaking down.

For the 3-month period July-August-September 2015, CPC is forecasting an enhanced chance for below normal temperatures and a slightly enhanced chance for above median precipitation across all of eastern OK and northwest AR (outlook issued June 18, 2015). According to CPC, El Niño conditions continue to strengthen and are currently of moderate strength. The coupling between the ocean and atmosphere remains strong over the tropical Pacific. A moderate to strong El Niño is forecast to persist into early 2016. However, El Niño impacts are generally most significant in the Southern Plains during the cold seasons. Therefore, this outlook is based primarily on both statistical and dynamical forecast tools, but does consider El Niño conditions and possible impacts.





Tulsa, OK (TSA): 6/14/2015 1-Day Observed Precipitation  
Valid at 6/14/2015 1200 UTC- Created 6/25/15 1:06 UTC

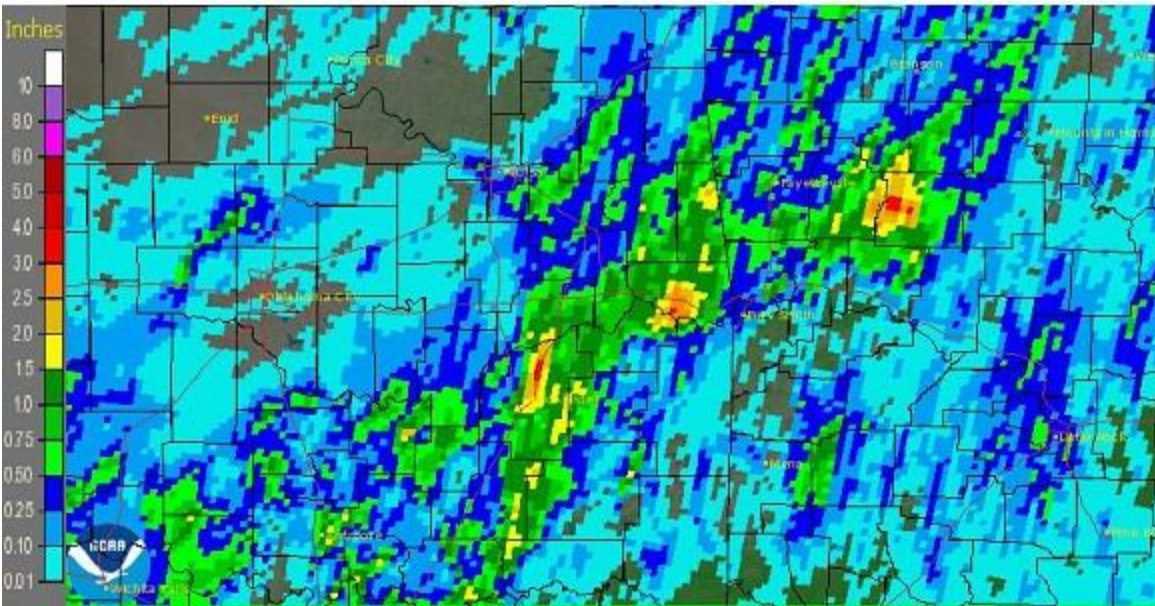


Fig. 5. 24-hr Estimated Observed Rainfall ending at 7am CDT 6/14/2015.

Tulsa, OK (TSA): 6/16/2015 1-Day Observed Precipitation  
Valid at 6/16/2015 1200 UTC- Created 6/25/15 20:37 UTC

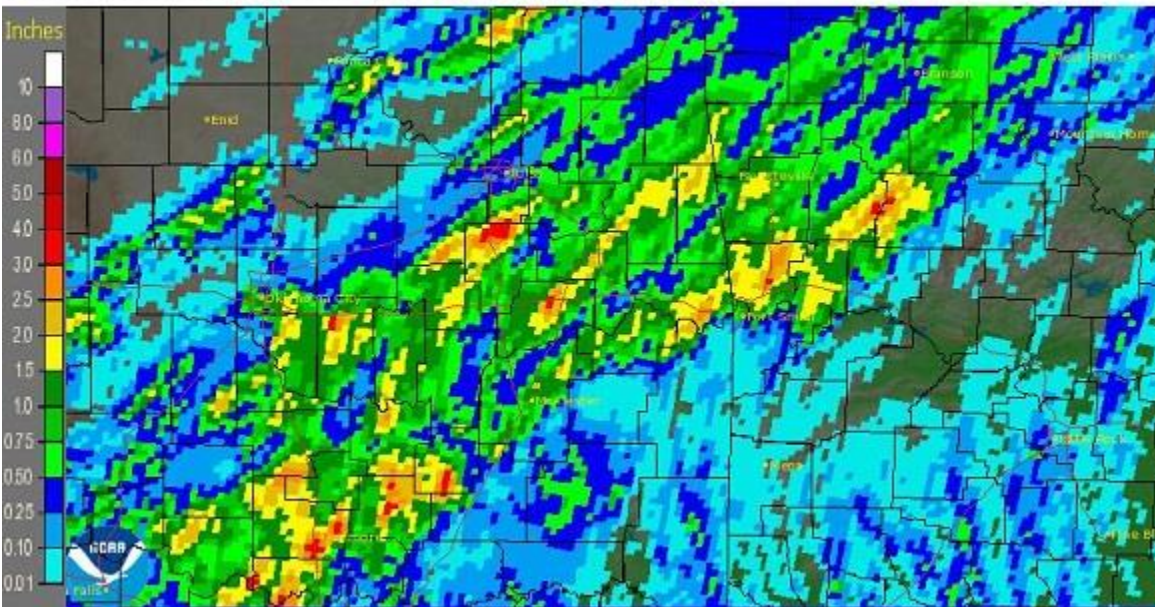


Fig. 6. 24-hr Estimated Observed Rainfall ending at 7am CDT 6/16/2015.

The atmosphere then became increasingly more tropical from the Gulf of Mexico. Widespread rain developed over the HSA as a series of mid-level shortwaves passed, despite a lack of synoptic low-level forcing. The majority of eastern OK and northwest AR received some rain on the 14<sup>th</sup>, though totals remained mostly around 0.50" or less. A few spots received around 1"-1.5", with far eastern Madison County getting 1.5"-2.5". A weak shear axis set up over the area on the 15<sup>th</sup>, with widespread rain once again occurring. The majority of the heaviest rain fell near and south of I-44 and north of a McAlester to Fort Smith line (Fig. 6). Most locations received 0.50"-1.5", though isolated areas had totals of 1.5"-3.5". This activity continued through the 16<sup>th</sup>, bringing an additional 0.25" to 2" of rain (Fig. 7). Flash flooding occurred again with this activity. In Okmulgee County, roads that had been repaired from the May flooding were once again washed away or damaged.



Tulsa, OK (TSA): 6/17/2015 1-Day Observed Precipitation  
 Valid at 6/17/2015 1200 UTC- Created 6/25/15 18:18 UTC

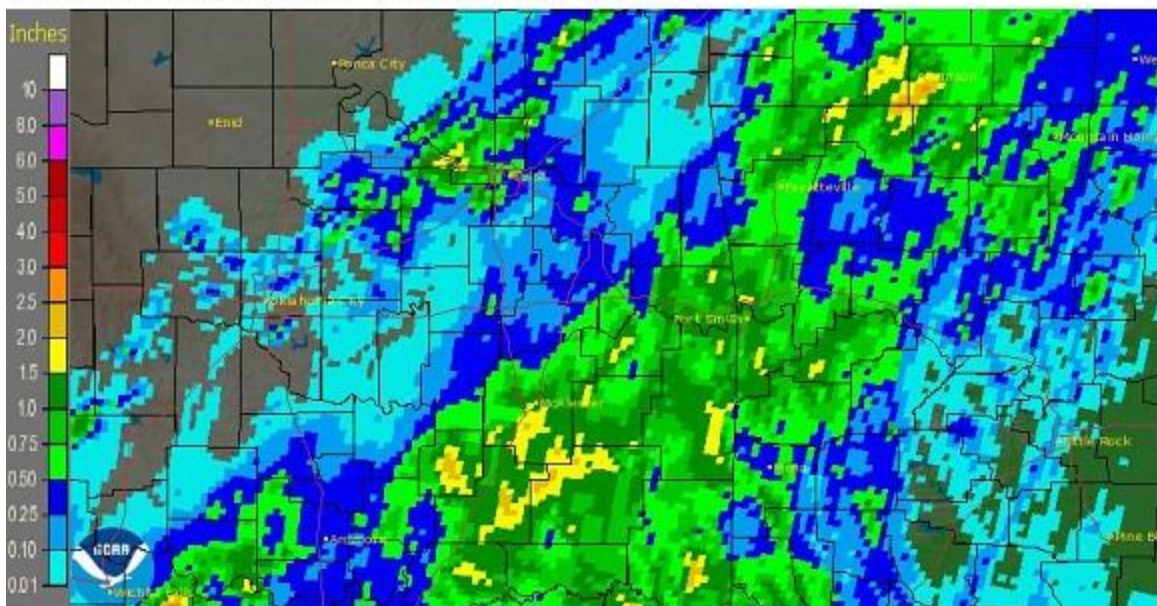


Fig. 7. 24-hr Estimated Observed Rainfall ending at 7am CDT 6/17/2015.

**June 17-30**

The remnants of Tropical Storm Bill moved north out of the Gulf of Mexico, across central TX, and into south central OK on the 17<sup>th</sup>. The tropical system then slowed and began moving northeast across the HSA late on the 17<sup>th</sup> and through the 18<sup>th</sup>. The center of the remnants moved from south central OK to near McAlester by late morning on the 18<sup>th</sup> (Figs. 8, 9). The storm then travelled along a path from there to near Stigler, to Fort Smith, to southern Madison County through the remainder of the 18<sup>th</sup>. Feeder bands of heavy rain occurred ahead of the circulation center, while the highest rainfall totals occurred near the path of the center. Abnormally high atmospheric moisture, near record high precipitable water for June (Fig. 14), made the system very efficient at making rain, with amounts of 2” to 5” across a large area of eastern OK and northwest AR. The highest totals of 5”-12” occurred from south central OK up through portions of northeast and east central OK and into northwest AR (Figs. 10-13). Portions of southeast OK, including Le Flore County, as well as portions of west central AR and Osage and Pawnee Counties received the least amount of rain, generally less than 2”.

With nearly saturated soils from the excessive rainfall and flooding in May, as well as the heavy rain a few days prior, much of the rain became runoff and resulted in flash flooding and river flooding. Several high water rescues were reported in Tulsa County. There were also widespread reports of high water making roads impassable throughout eastern OK. There were 13 river forecast points that went into flood, two of which crested in Major Flood, 3 crested in Moderate Flood, and 8 crested in Minor Flood. Major flooding occurred along the Deep Fork River near Beggs and along the Red River near Arthur City. Preliminary hydrographs are available at the end of this report, and specific river flood information is available in the E3 report. Most of the large reservoirs were still at 50%-70% of their flood pools prior to Bill’s rains, with Sardis and Hugo Lakes at 88% and 94% of their flood pools respectively. Sardis (101%), Hugo (101%), and Eufaula (107%) Lakes exceeded the top of their flood pools from this additional rainfall.

Some of the larger precipitation reports (in inches) for “Bill” – 48hr total ending 7am CDT 6/18/15 included:

Bristow 4SSE, OK	5.79	Okemah 3E, OK	5.53	Tahlequah 4NNW, OK	4.93
Hectorville, 4W, OK	4.65	Tahlequah 2ENE, OK	4.50	Heyburn Lake, OK	4.26
Viney Grove 2.4NW, OK	4.25	Glenpool 0.6S, OK	3.95	Tahlequah 7.3N, OK	3.83

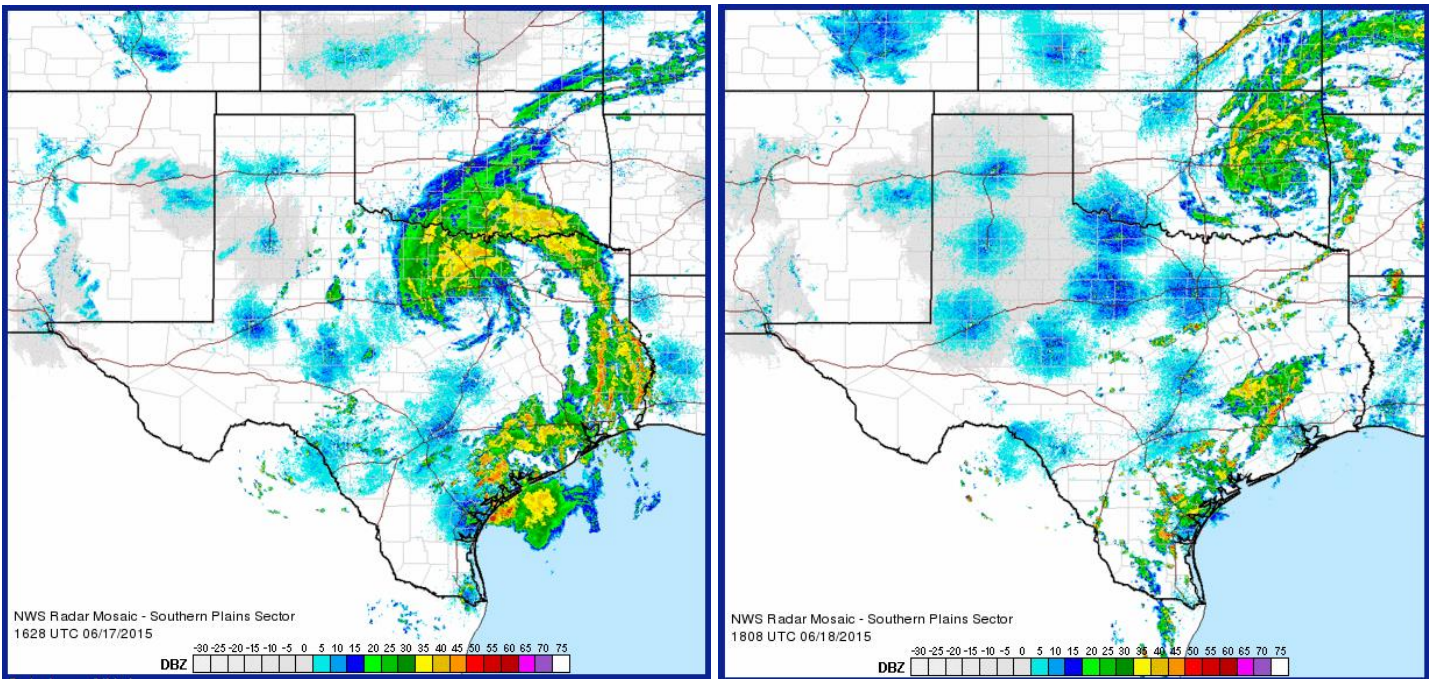


Fig. 8. Radar images of "Bill" in central TX valid at 11:28am CDT 6/17/2015 (left) and at 1:08pm CDT 6/18/2015 (right).

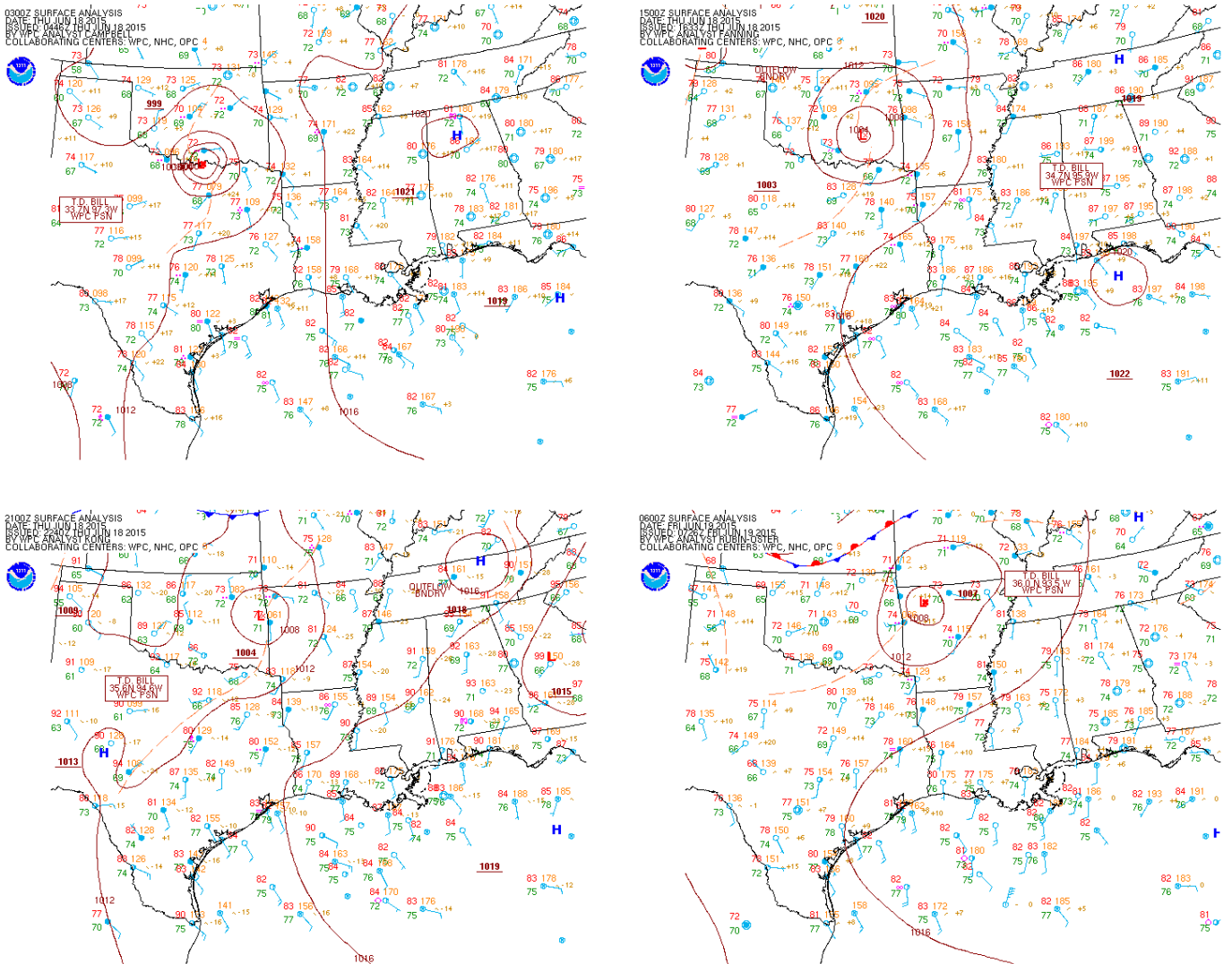


Fig. 9. Surface analysis as "Bill" moved across HSA, left-to-right: 10pm CDT 6/17; 10am CDT 6/18; 4pm CDT 6/18; 1am CDT 6/19/15.



Tulsa, OK (TSA): 6/18/2015 1-Day Observed Precipitation  
Valid at 6/18/2015 1200 UTC- Created 6/20/15 23:41 UTC

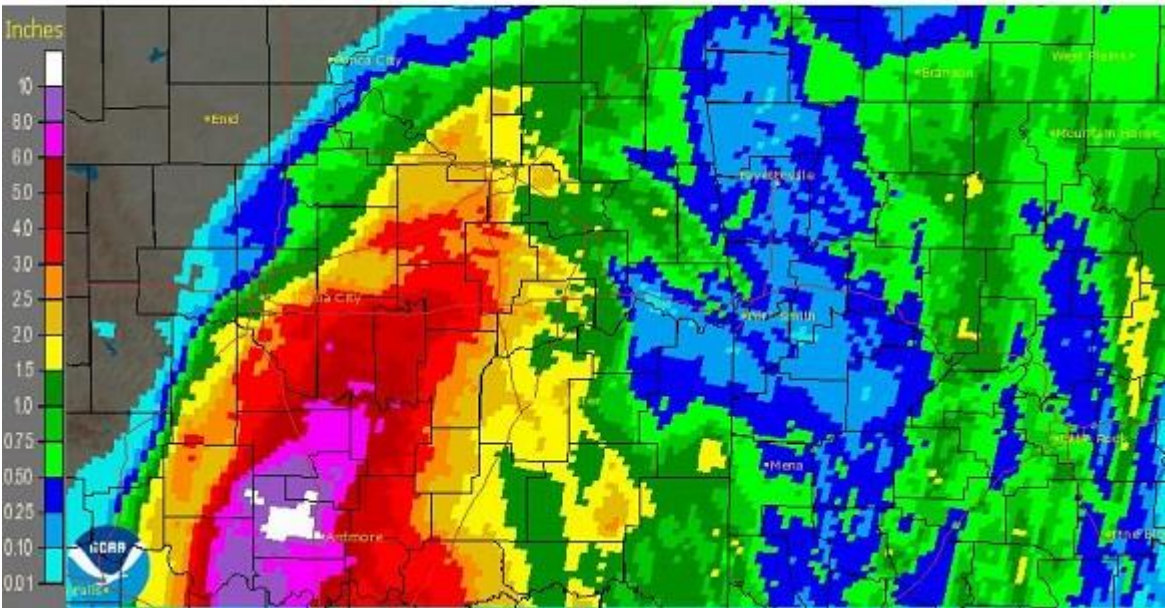


Fig. 10. 24-hr Estimated Observed Rainfall ending at 7am CDT 6/18/2015.

Tulsa, OK (TSA): 6/19/2015 1-Day Observed Precipitation  
Valid at 6/19/2015 1200 UTC- Created 6/21/15 23:34 UTC

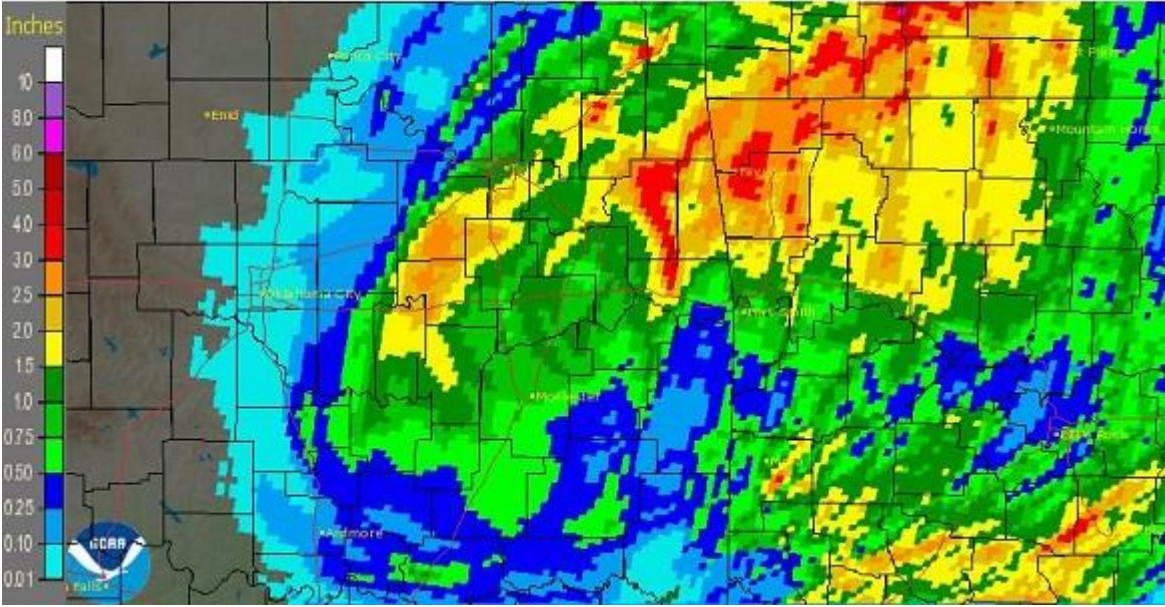
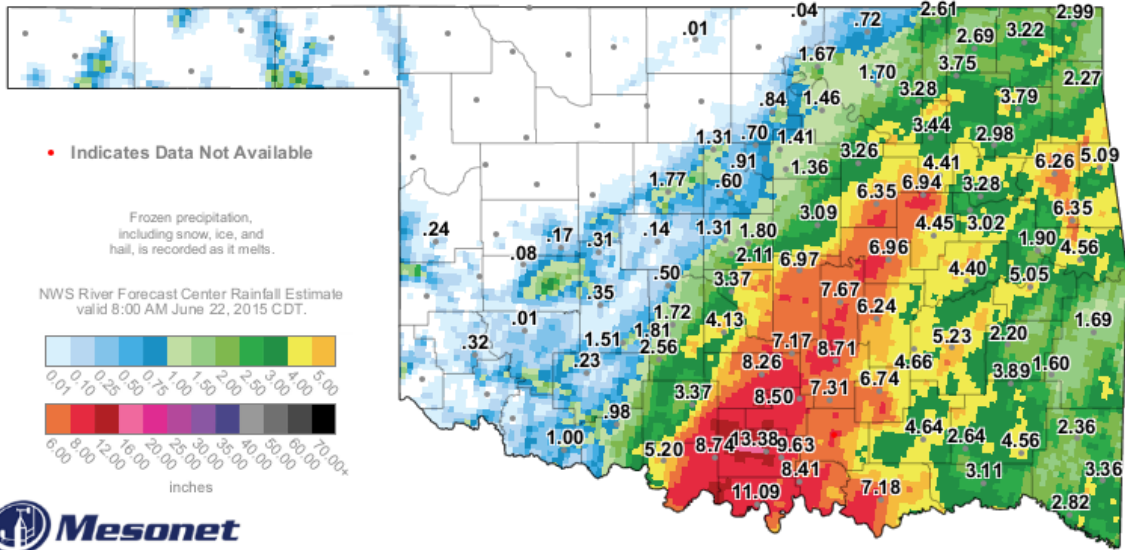


Fig. 11. 24-hr Estimated Observed Rainfall ending at 7am CDT 6/19/2015.



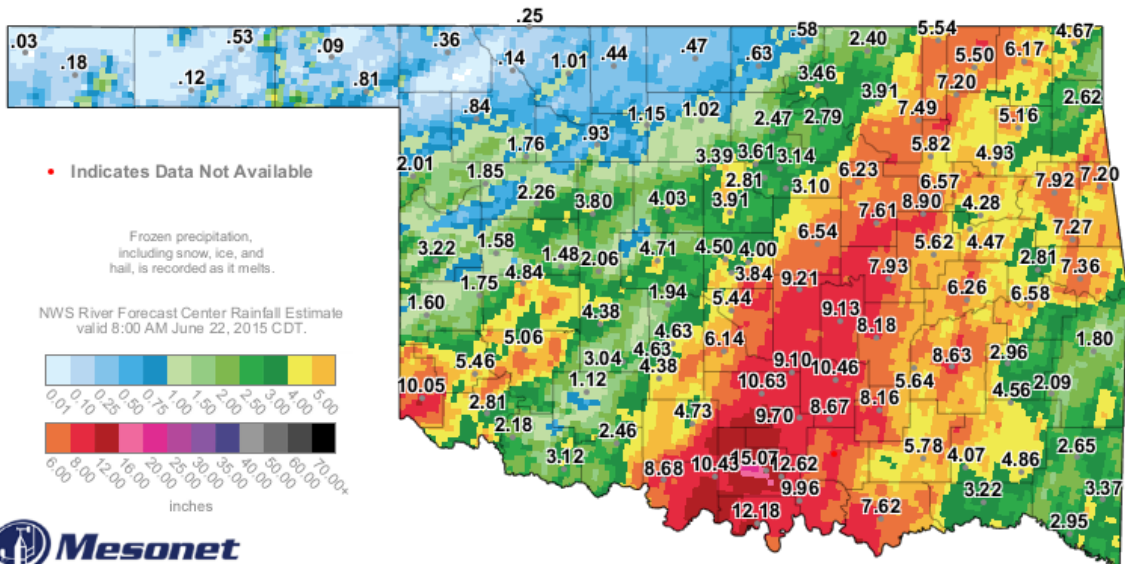


**7-Day Rainfall (inches)**

Fig. 12. 7-day Estimated Observed Rainfall (Image, NWS) and measurements (OK Mesonet) ending at 9:25am CDT 6/22/2015.

9:25 AM June 22, 2015 CDT

Created 9:30:14 AM June 22, 2015 CDT. © Copyright 2015

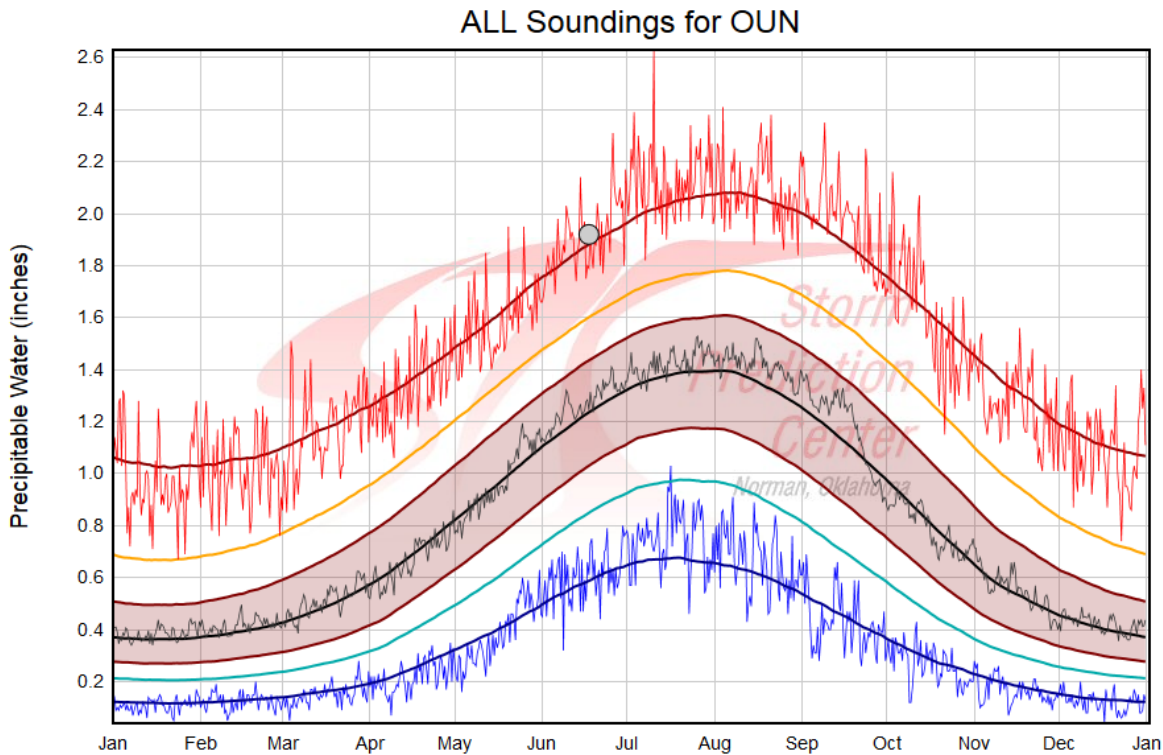


**10-Day Rainfall (inches)**

Fig. 13. 10-day Estimated Observed Rainfall (Image, NWS) and measurements (OK Mesonet) ending at 9:25am CDT 6/22/2015.

9:25 AM June 22, 2015 CDT

Created 9:30:14 AM June 22, 2015 CDT. © Copyright 2015



**18 Jun 00 UTC**

**Daily Min (Thin Line): 0.73**  
**Min Moving Average: 0.59**  
**10% Moving Average: 0.85**  
**25% Moving Average: 1.03**

**Median Moving Average: 1.24**  
**Daily Mean (Thin Line): 1.31**

**75% Moving Average: 1.44**  
**90% Moving Average: 1.60**  
**Max Moving Average: 1.89**  
**Daily Max (Thin Line): 1.95**

**Period of Record**  
 OKC (1948/01/02-1967/06/30; 13909 soundings)  
 TIK (1967/07/01-1971/03/31; 2723 soundings)  
 OUN (1974/01/01-1975/01/06; 734 soundings)  
 OKC (1975/01/07-1989/03/27; 10362 soundings)  
 OUN (1989/03/28-2014/10/26; 17940 soundings)

Fig. 14. Precipitable water climatology for Norman, OK, with grey circle showing the measured value on 6/17/2015.

Rain fell along the Red River on the 21<sup>st</sup>, bringing 0.50"-0.75" of additional rain to southern Choctaw County. However, a nearly stationary storm brought a small area of 3"-7" of rain to south central OK, just east of I-35. This water then flowed downstream, causing the Red River at Arthur City to crest a couple feet higher than the crest expected from "Bill's" rains alone.

After several days of hot and humid conditions, a cold front moved through the HSA on the 26<sup>th</sup>. The front brought cooler temperatures, as well as rain. Storms initially affected northeast OK and northwest AR during the morning. Redevelopment occurred ahead of the front by early afternoon, while stronger scattered thunderstorms developed along the outflow generated by the morning convection. The activity exited the HSA by the late night hours. Most of the areas affected by rain received around 0.50" or less. However, portions of east central and southeast OK and northwest AR got 0.50" to around 2" of rain. The highest totals were over Washington Co. AR, where rain totaled 1.5" to around 3" (Fig. 15). Most of this rain fell in the Illinois River basin, causing the Illinois River near Tahlequah to rise above Action Stage but remain below flood stage. Flash flooding was also reported in Washington Co. AR.

Tulsa, OK (TSA): 6/27/2015 1-Day Observed Precipitation  
Valid at 6/27/2015 1200 UTC- Created 6/29/15 15:33 UTC

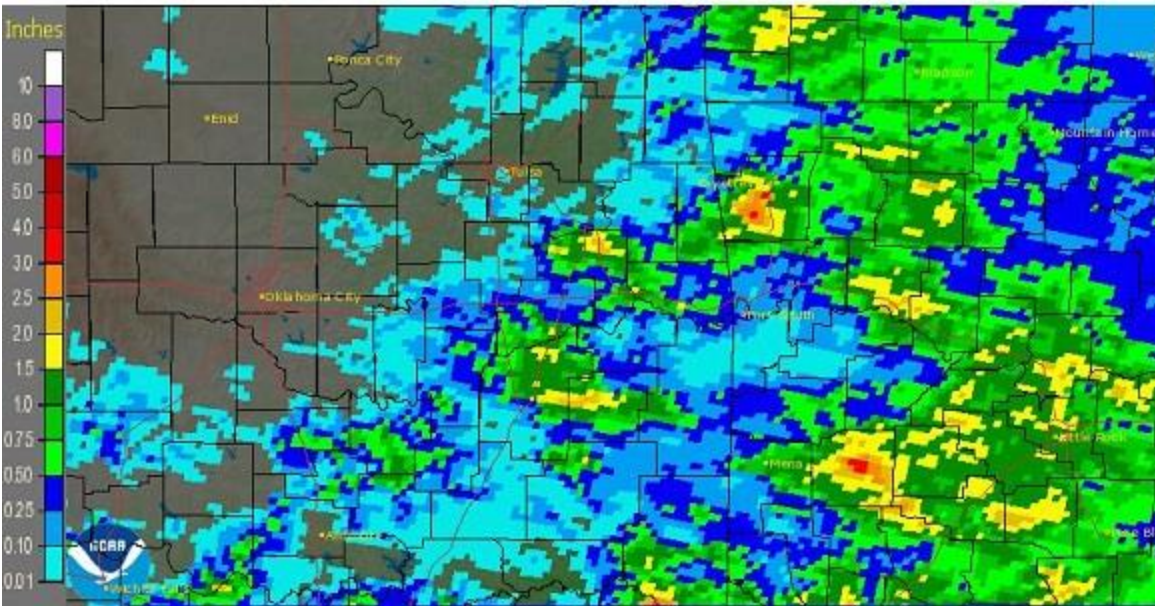


Fig. 15. 24-hr Estimated Observed Rainfall ending at 7am CDT 6/27/2015.

A couple of isolated severe thunderstorms developed along a quasi-stationary front during the evening of the 29<sup>th</sup>, affecting southern Pittsburg and northeast Pushmataha Counties in southeast OK. These storms not only brought 1.5"-3.5" of rain to a small area, but also large hail. Tennis ball-sized hail was reported near Kiowa.

Written by:

Nicole McGavock  
Service Hydrologist  
WFO Tulsa

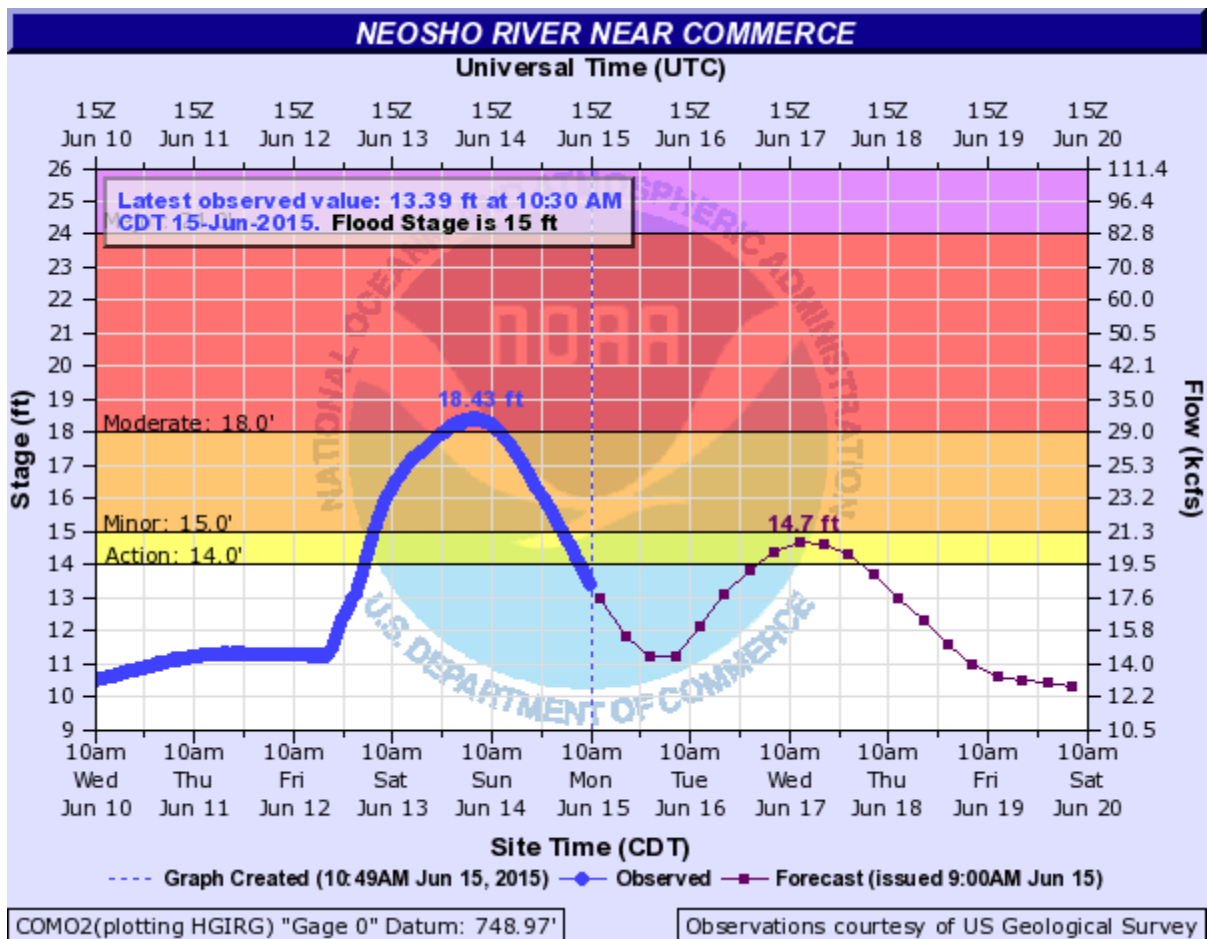
**Products issued in June 2015:**

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

\*Mixed case River Flood products began July 31, 2013

- 23 Flash Flood Warnings (FFW)
- 21 Flash Flood Statements (FFS)
- 2 Flash/Areal Flood Watches (FFA) (14 Watch FFA CON/EXT/EXA/EXB/CAN)
- 32 Urban and Small Stream Advisories (FLS)
- 18 Areal Flood Warnings (FLW)
- 0 Areal Flood Statements (FLS)
- 35 River Flood Warnings (FLW)
- 309 River Flood Statements (FLS)
- 12 River Flood Advisories (FLS) (49 Advisory FLS CON/EXT/CAN)
- 0 River Flood Watches (FFA) (0 Watch FFA CON/EXT/CAN)
- 1 River Statements (RVS)
- 0 Hydrologic Outlooks (ESF)
- 0 Drought Information Statements (DGT)

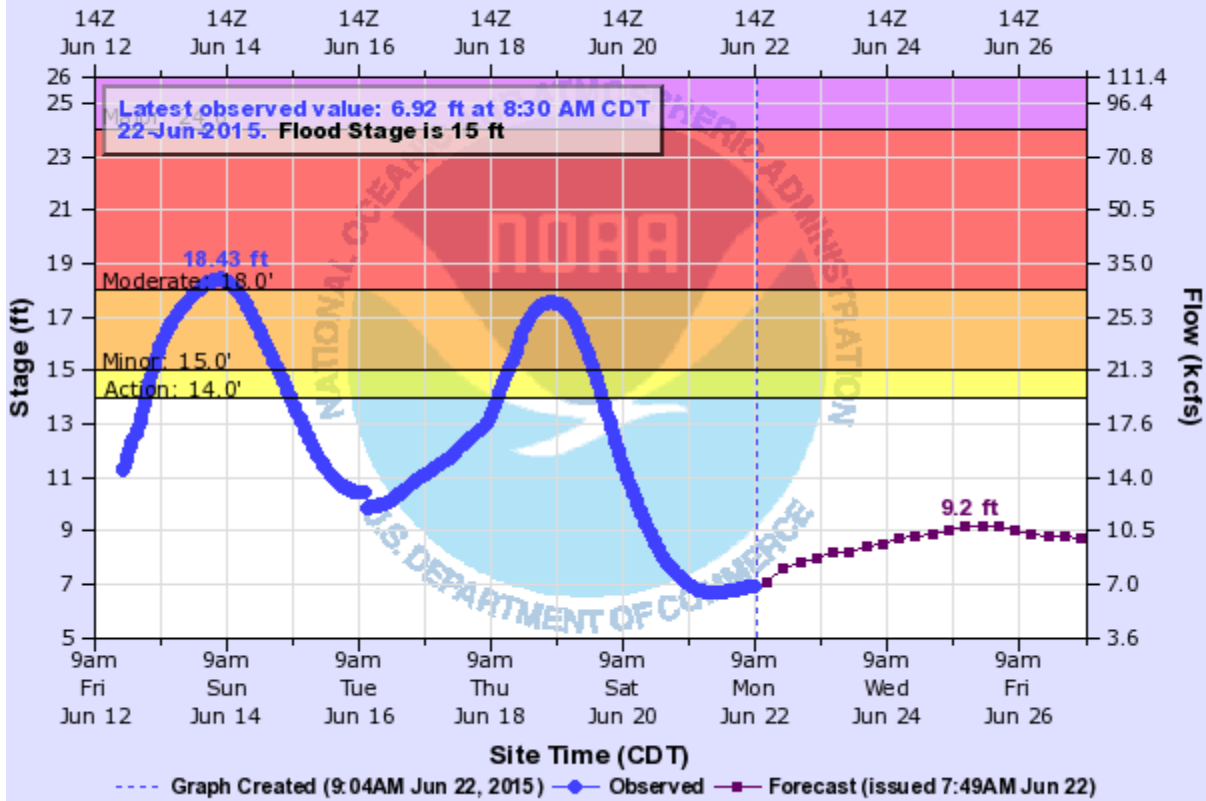
**Preliminary Hydrographs:**





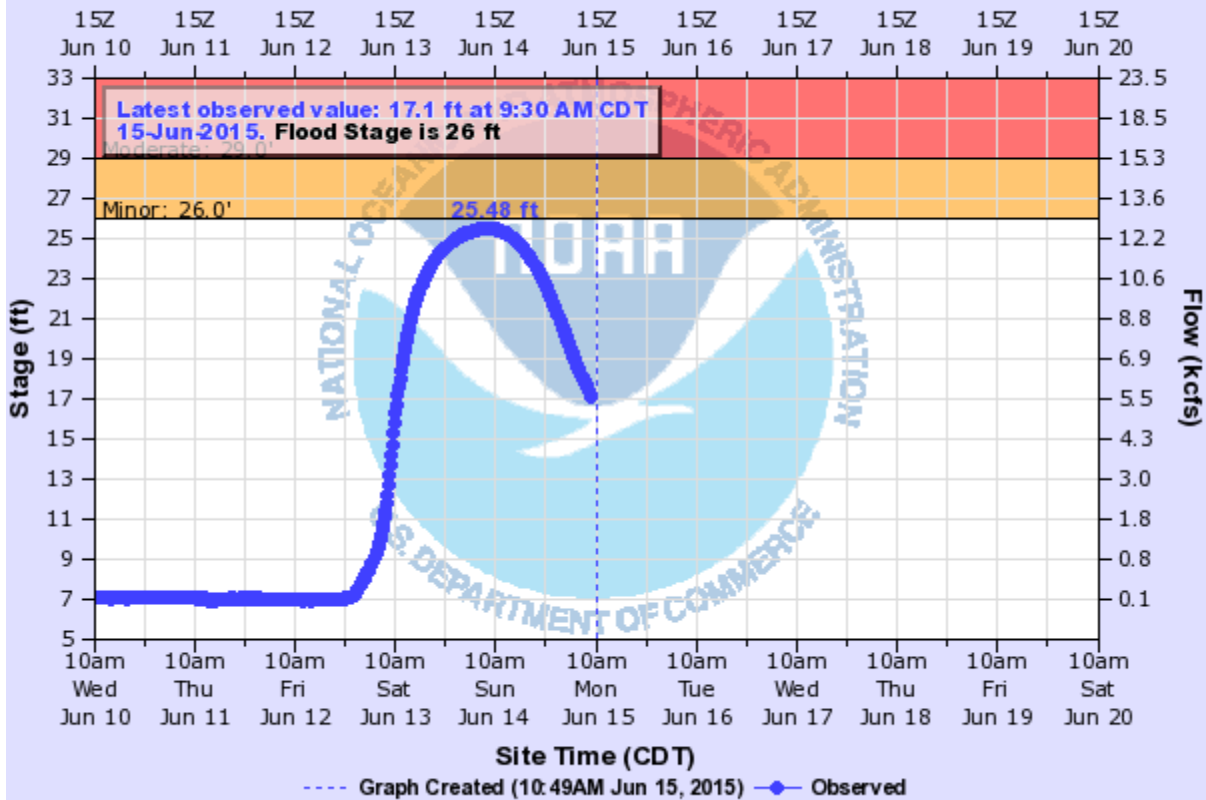
## NEOSHO RIVER NEAR COMMERCE

Universal Time (UTC)



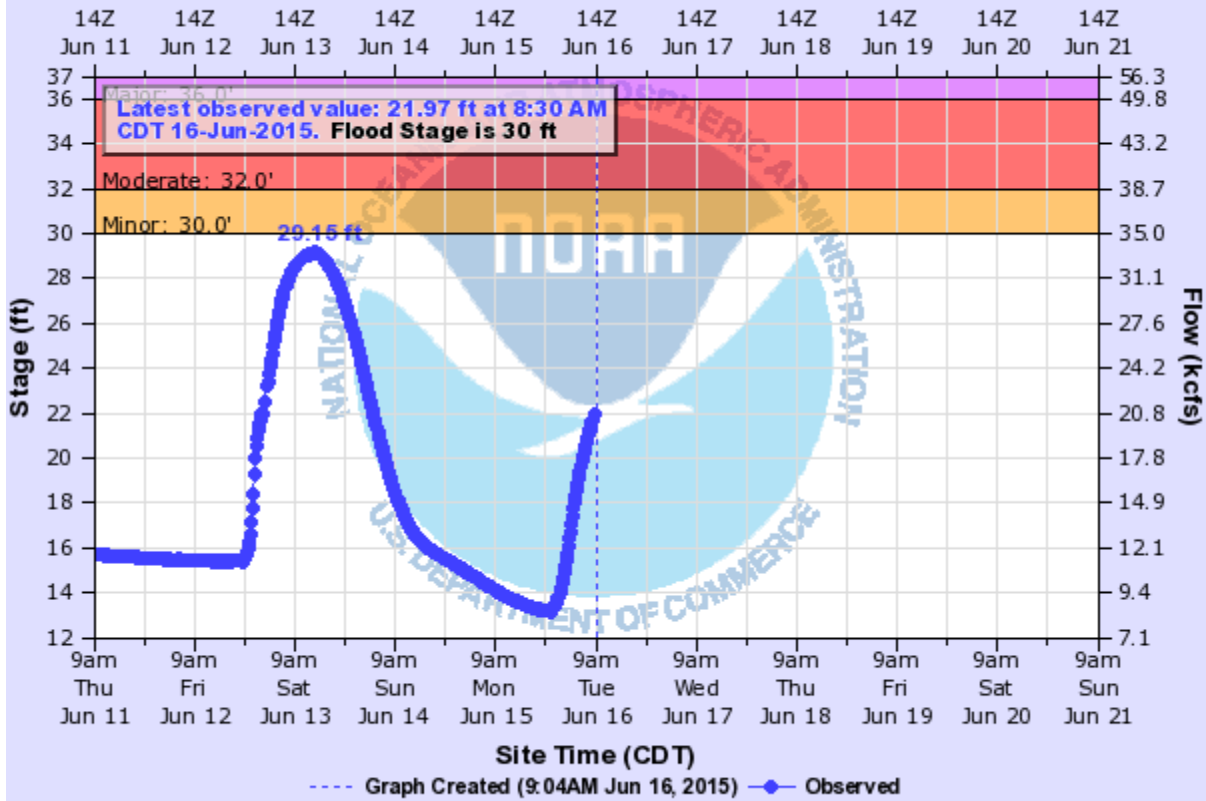
## CANEY RIVER NEAR COLLINSVILLE

Universal Time (UTC)



## VERDIGRIS RIVER NEAR LENAPAH

Universal Time (UTC)

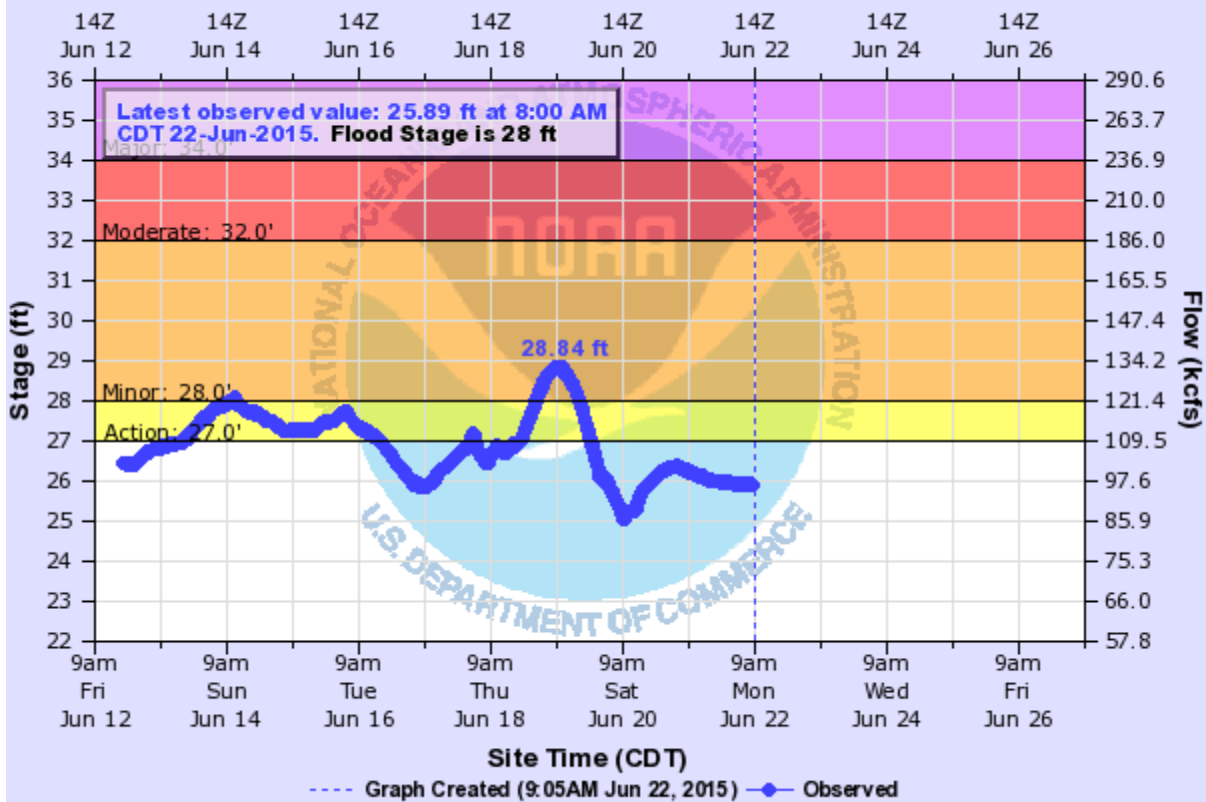


LEPO2(plotting HGIRG) "Gage 0" Datum: 644.9'

Observations courtesy of US Geological Survey

## ARKANSAS RIVER NEAR MUSKOGEE

Universal Time (UTC)

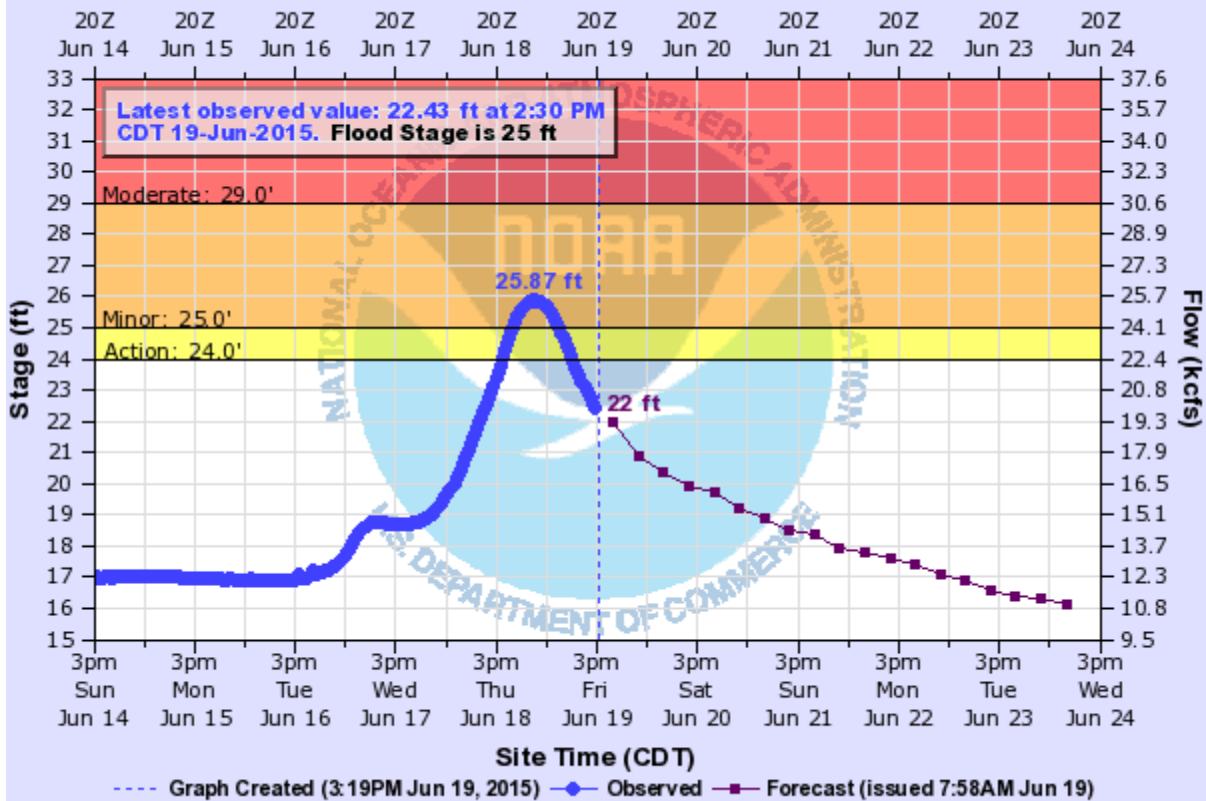


MKGO2(plotting HGIRG) "Gage 0" Datum: 471.38'

Observations courtesy of US Geological Survey

## KIAMICHI RIVER NEAR ANTLERS

Universal Time (UTC)

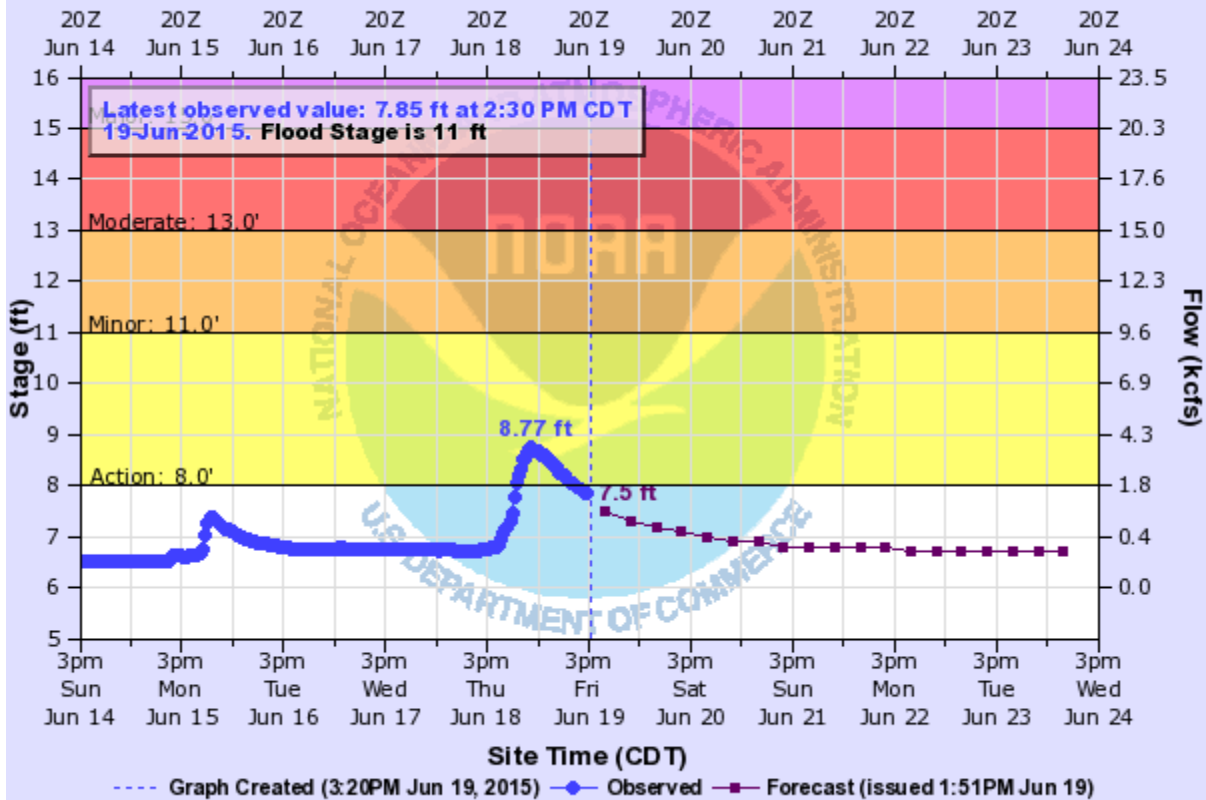


ANTO2(plotting HGIRG) "Gage 0" Datum: 419.82'

Observations courtesy of US Geological Survey

## FLINT CREEK (OK) NEAR KANSAS

Universal Time (UTC)

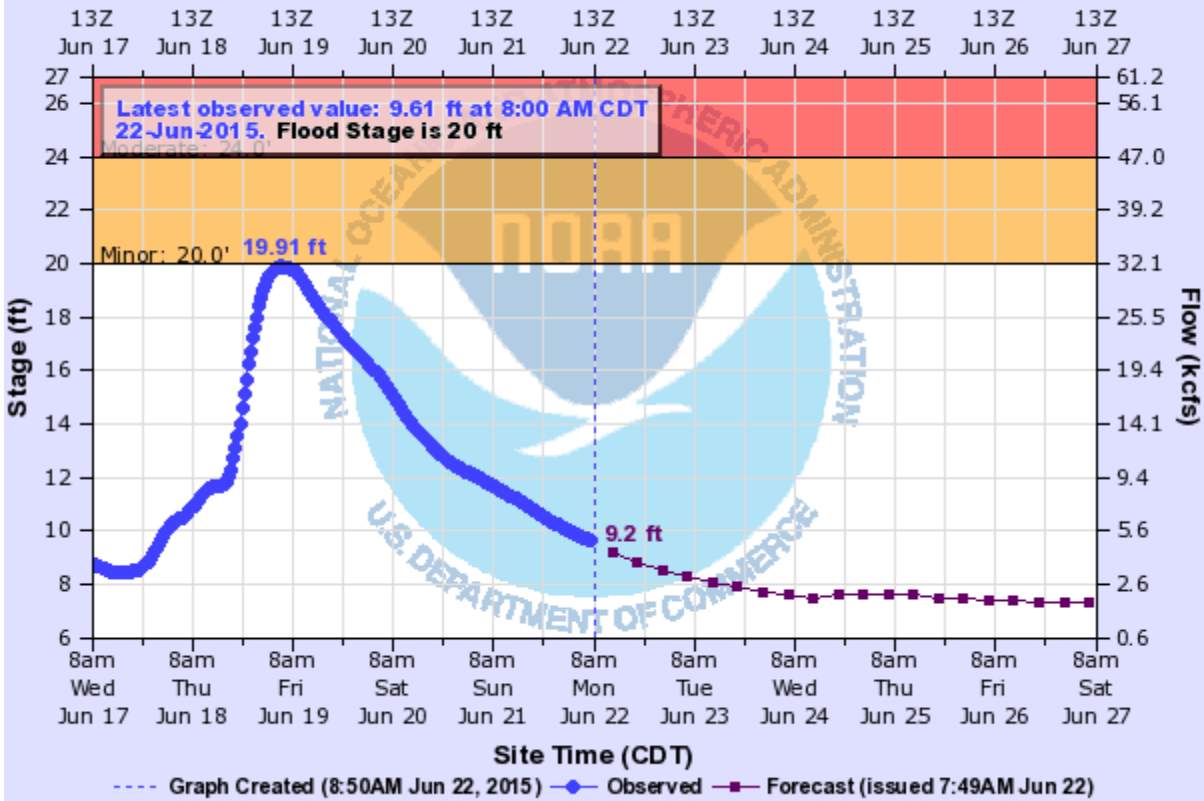


KNSO2(plotting HGIRG) "Gage 0" Datum: 854.59'

Observations courtesy of US Geological Survey

## SPRING RIVER NEAR QUAPAW

Universal Time (UTC)

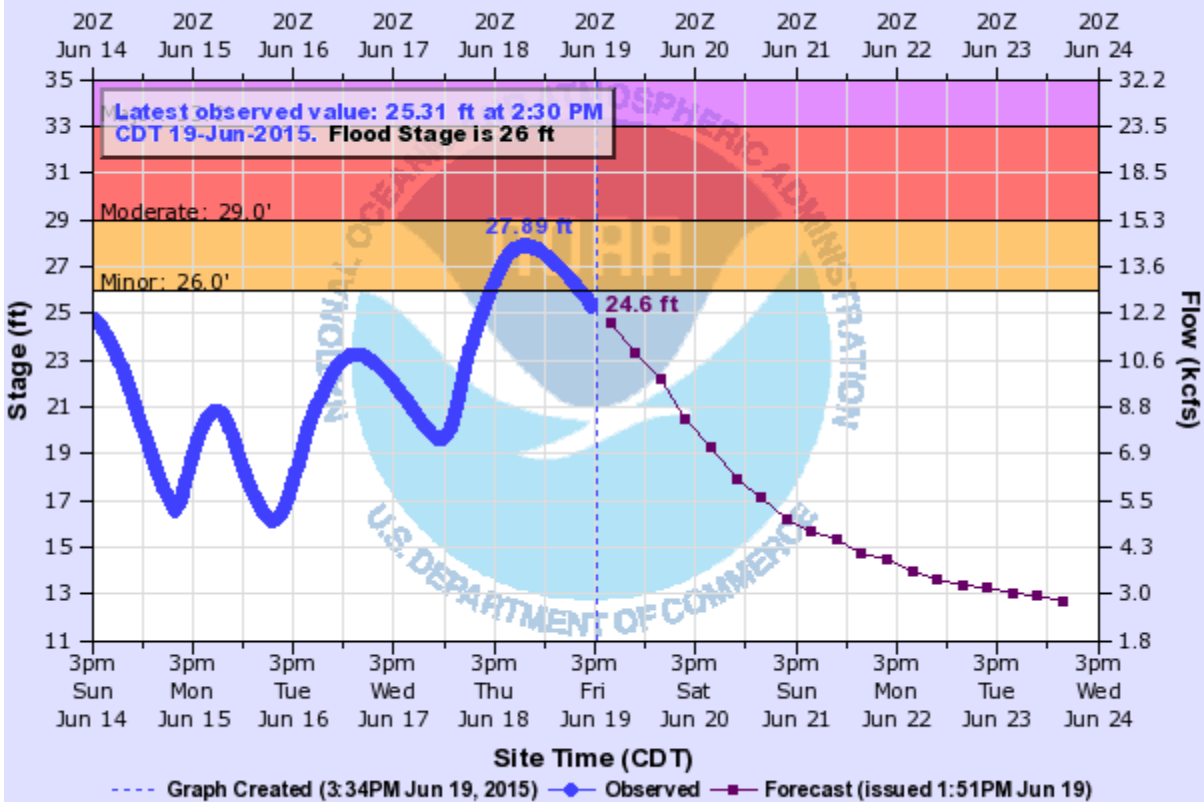


QUAO2(plotting HGIRG) "Gage 0" Datum: 746.25'

Observations courtesy of US Geological Survey

## CANEY RIVER NEAR COLLINSVILLE

Universal Time (UTC)

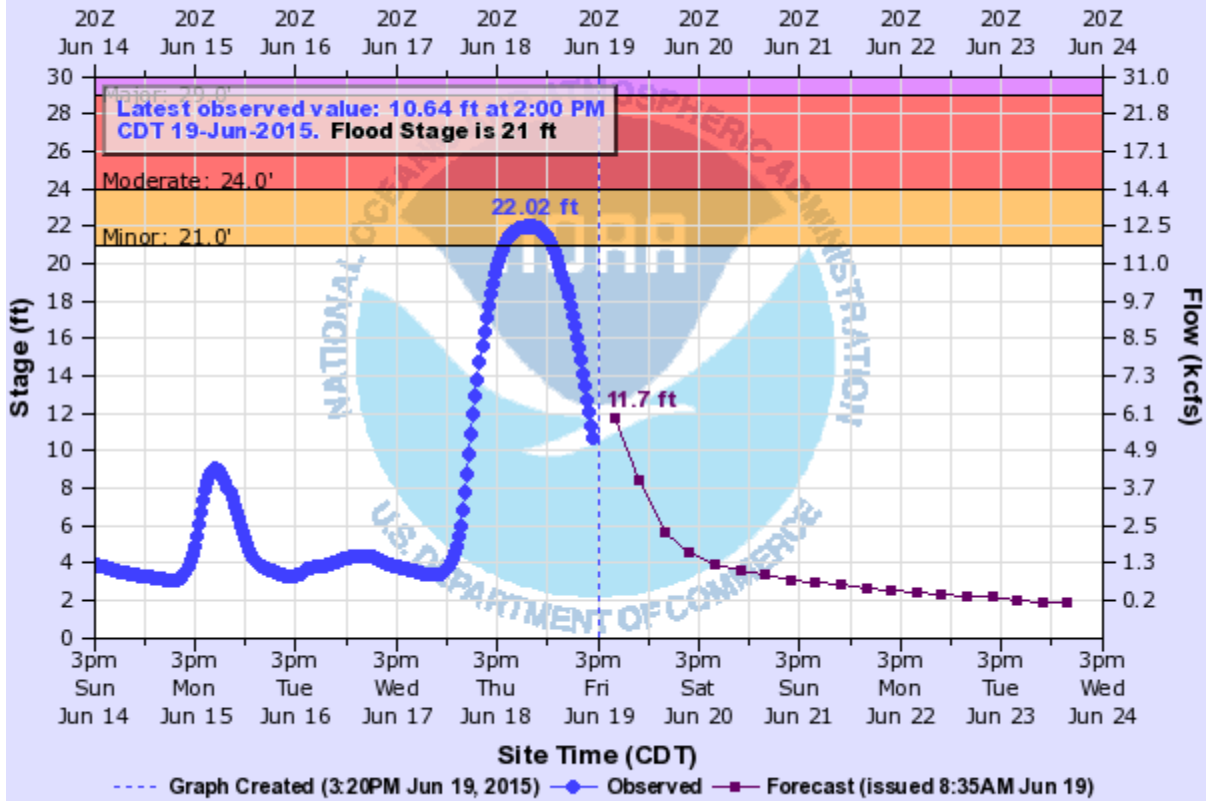


CVLO2(plotting HGIRG) "Gage 0" Datum: 565.72'



## BIRD CREEK NEAR SPERRY

Universal Time (UTC)

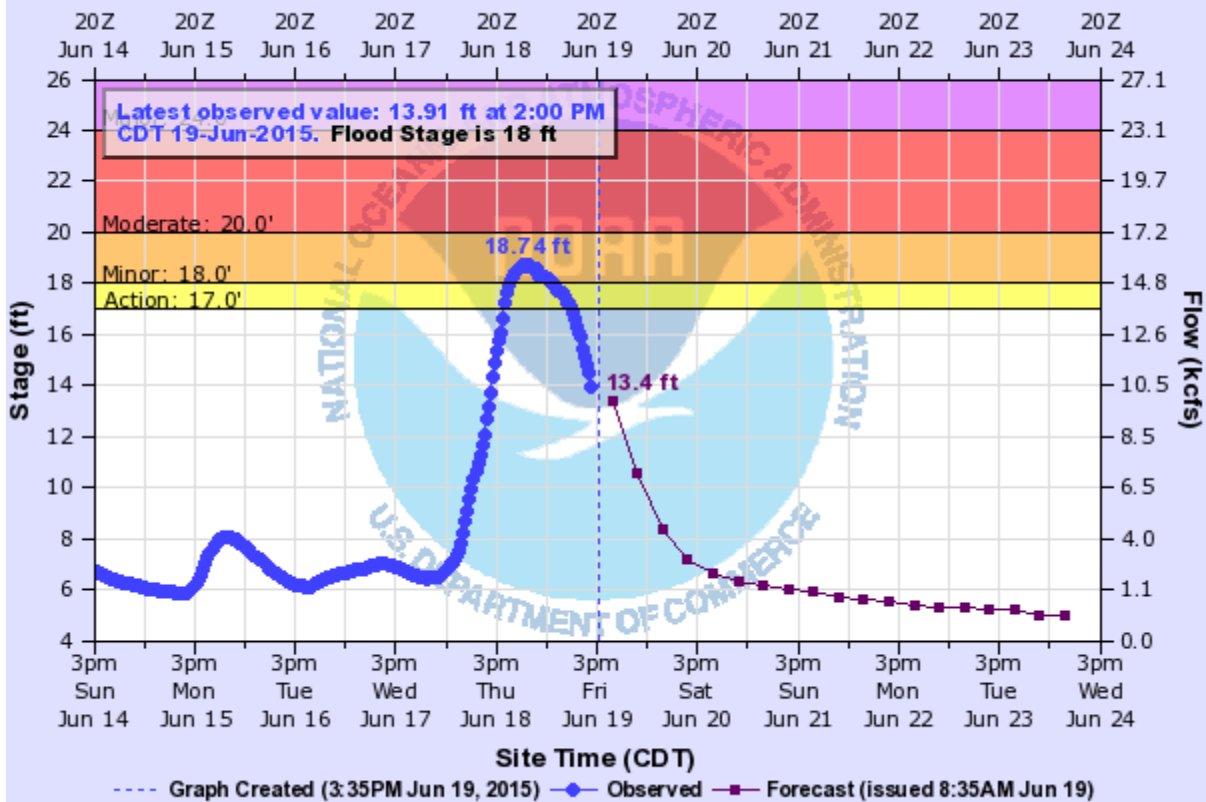


SPEO2(plotting HGIRG) "Gage 0" Datum: 579.43'

Observations courtesy of US Geological Survey

## BIRD CREEK NEAR OWASSO

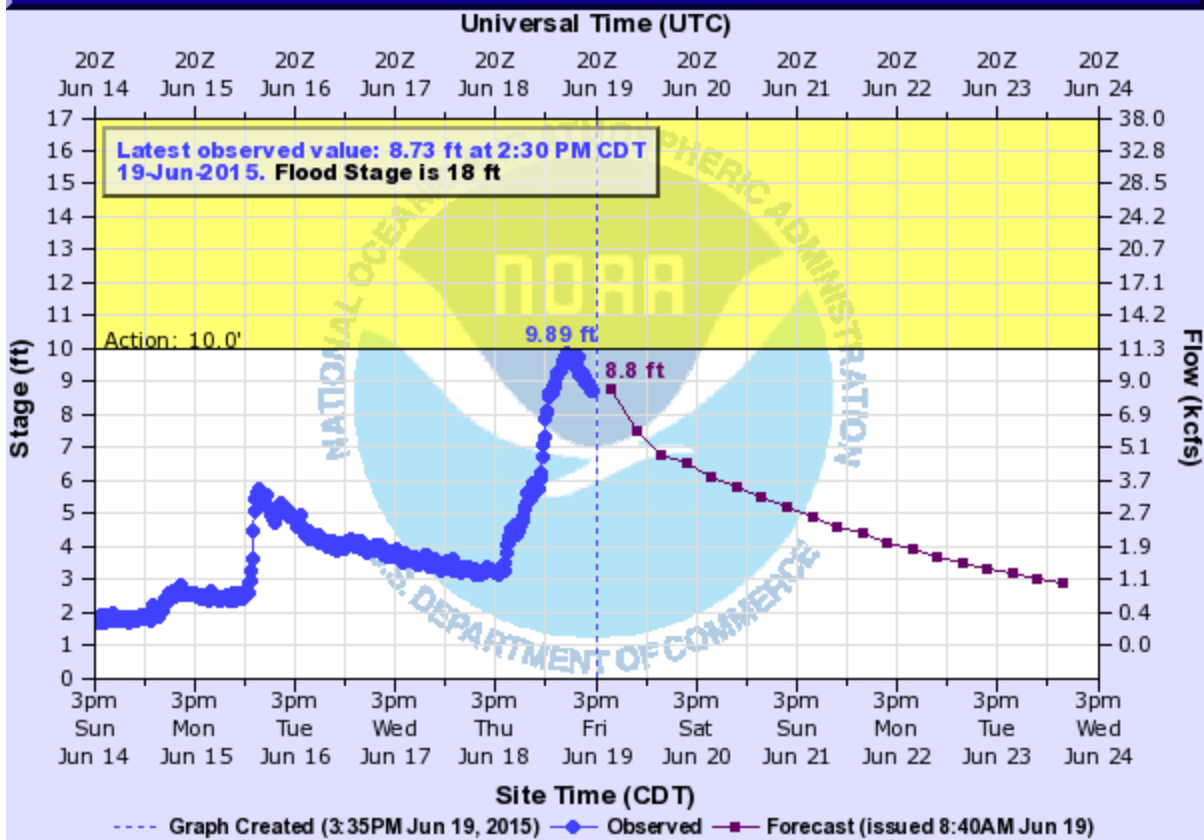
Universal Time (UTC)



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

Observations courtesy of US Geological Survey

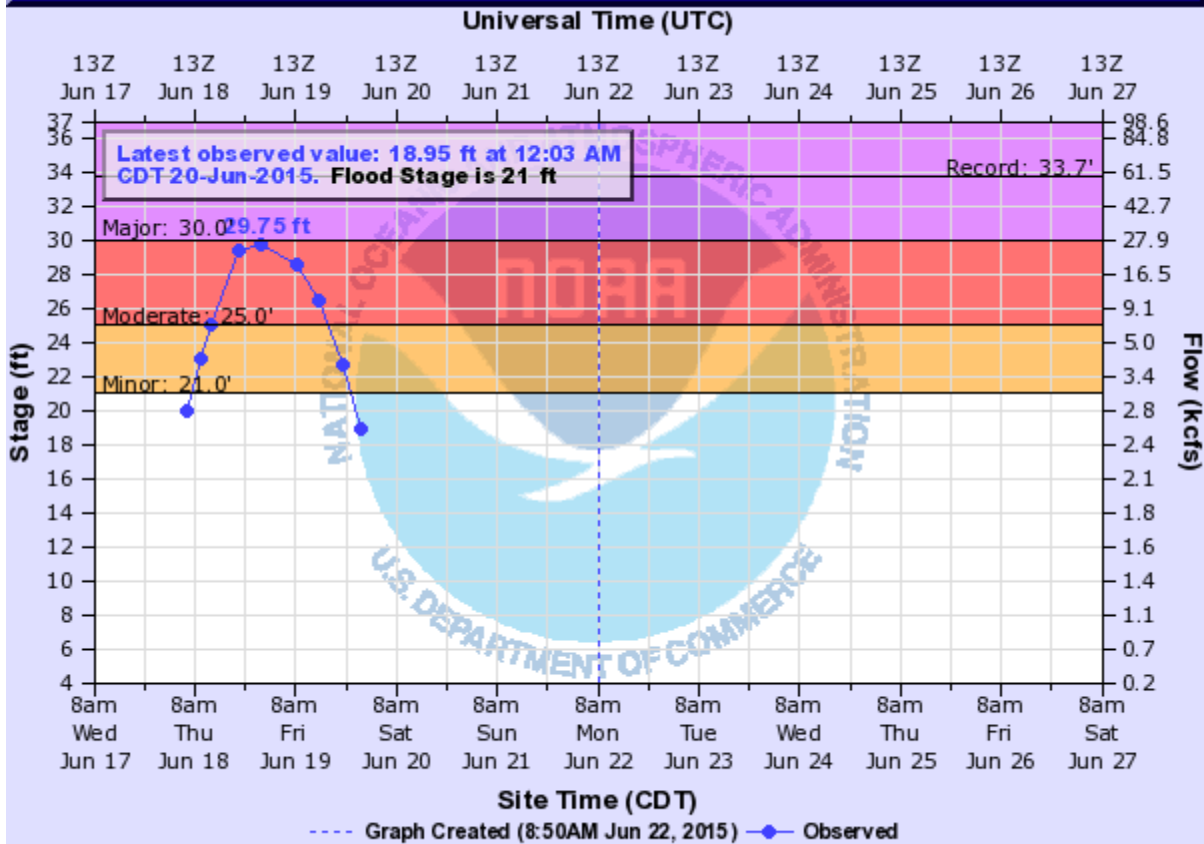
## MULBERRY RIVER (AR) NEAR MULBERRY



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

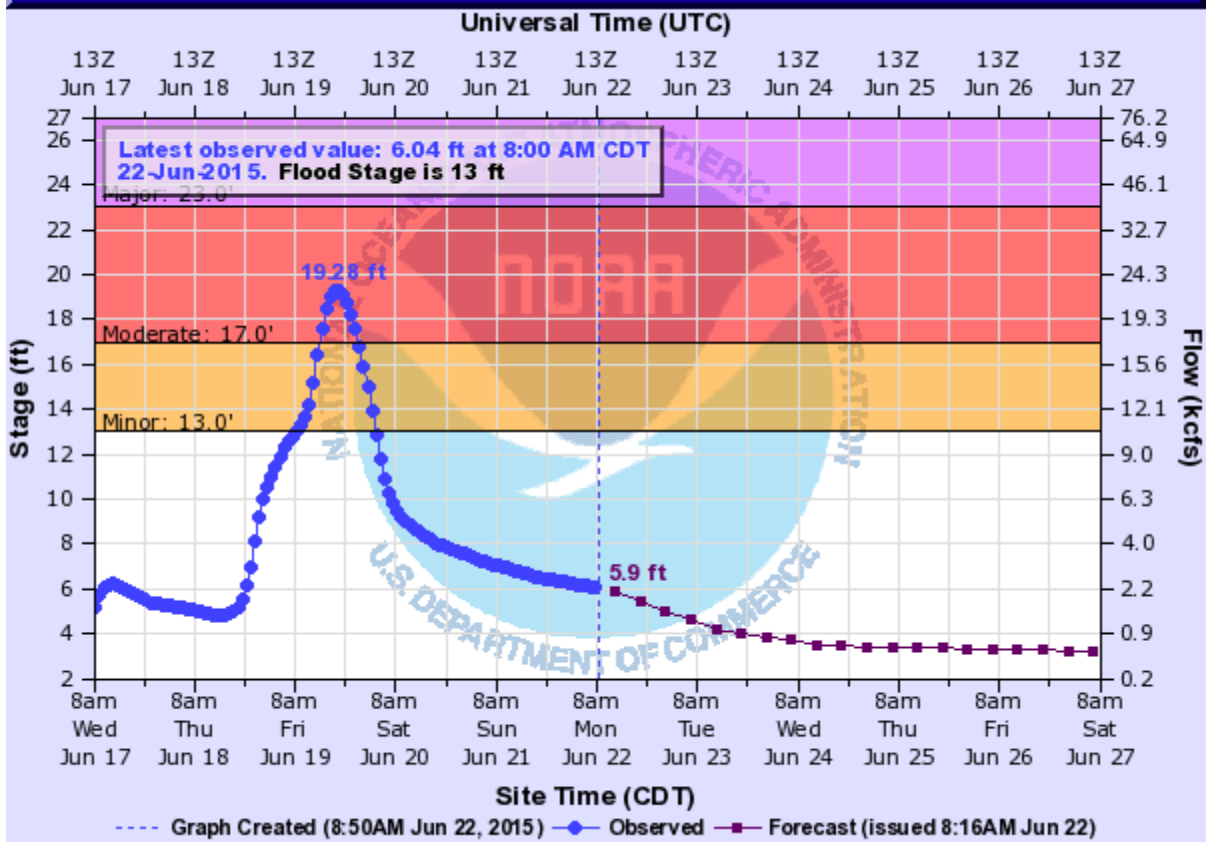
Observations courtesy of USGS/USACE/ADEQ

## POLECAT CREEK NEAR SAPULPA



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

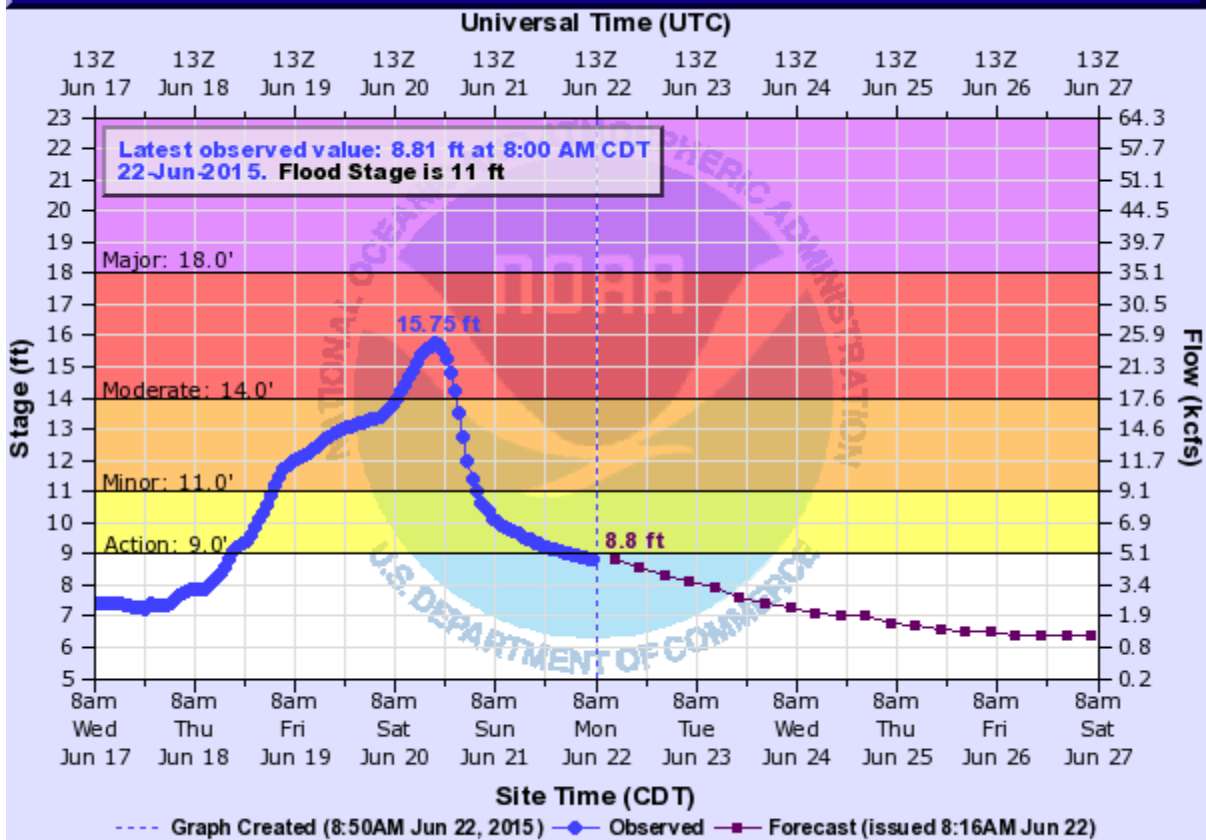
## ILLINOIS RIVER (AR OK) NEAR WATTS



WT02(plotting HGIRG) "Gage 0" Datum: 893.77'

Observations courtesy of US Geological Survey

## ILLINOIS RIVER (AR OK) NEAR TAHLEQUAH

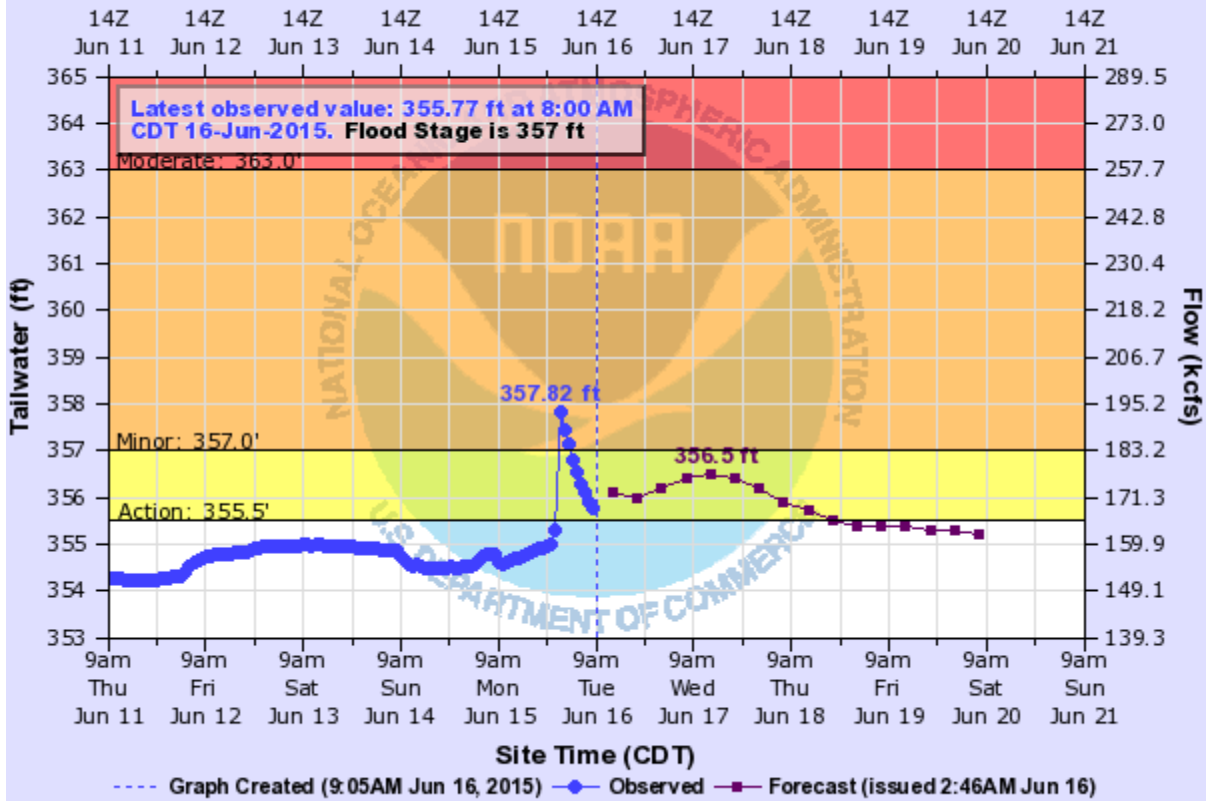


TAL02(plotting HGIRG) "Gage 0" Datum: 664.14'

Observations courtesy of US Geological Survey

## ARKANSAS RIVER AT OZARK L/D TAILWATER

Universal Time (UTC)

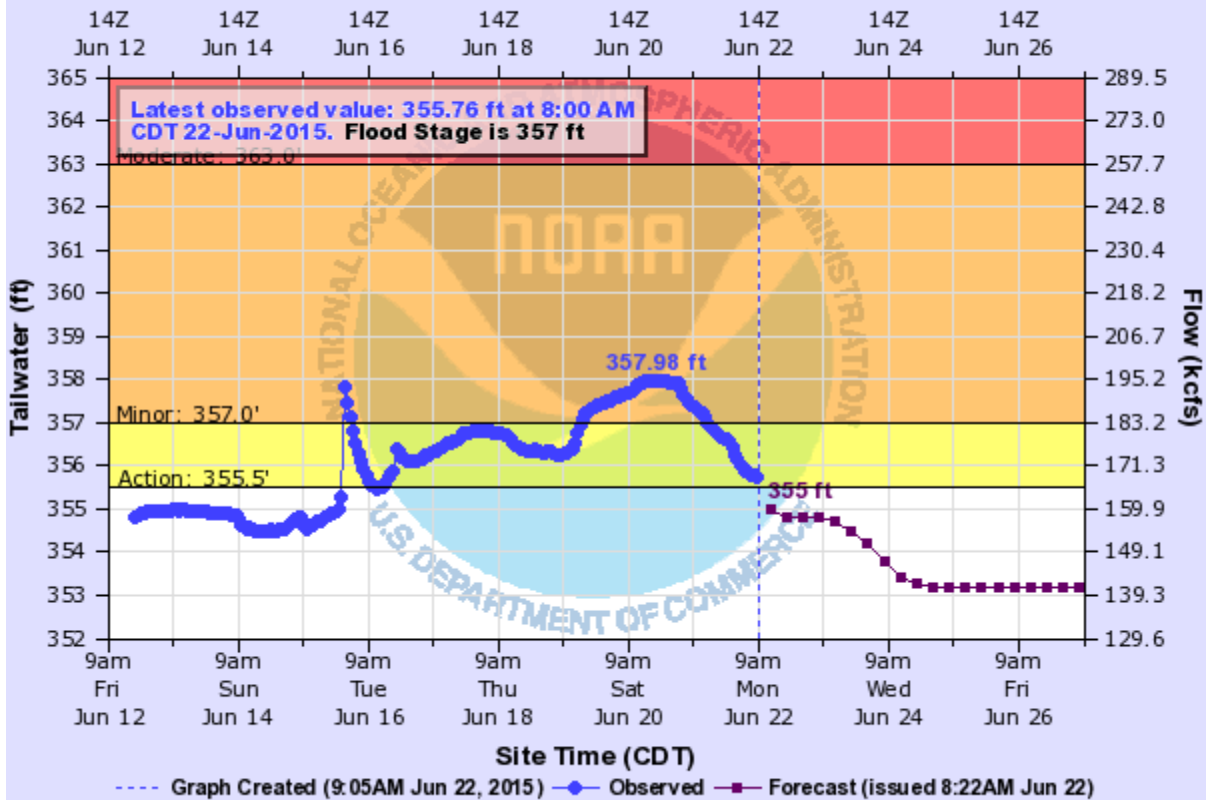


OZGA4(plotting HTIRG) "Gage 0" Datum: 0'

Observations courtesy of US Army Corps of Engineers - LRD

## ARKANSAS RIVER AT OZARK L/D TAILWATER

Universal Time (UTC)



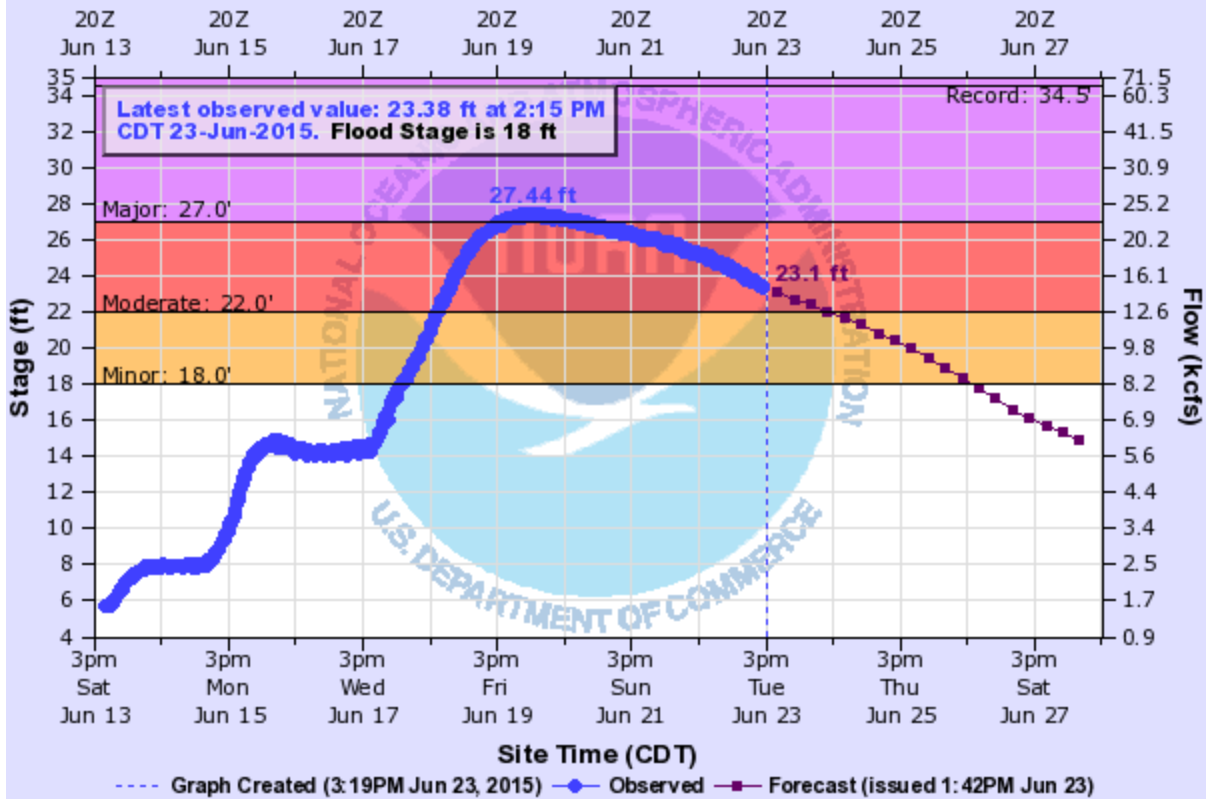
OZGA4(plotting HTIRG) "Gage 0" Datum: 0'

Observations courtesy of US Army Corps of Engineers - LRD



## DEEP FORK RIVER NEAR BEGGS

Universal Time (UTC)

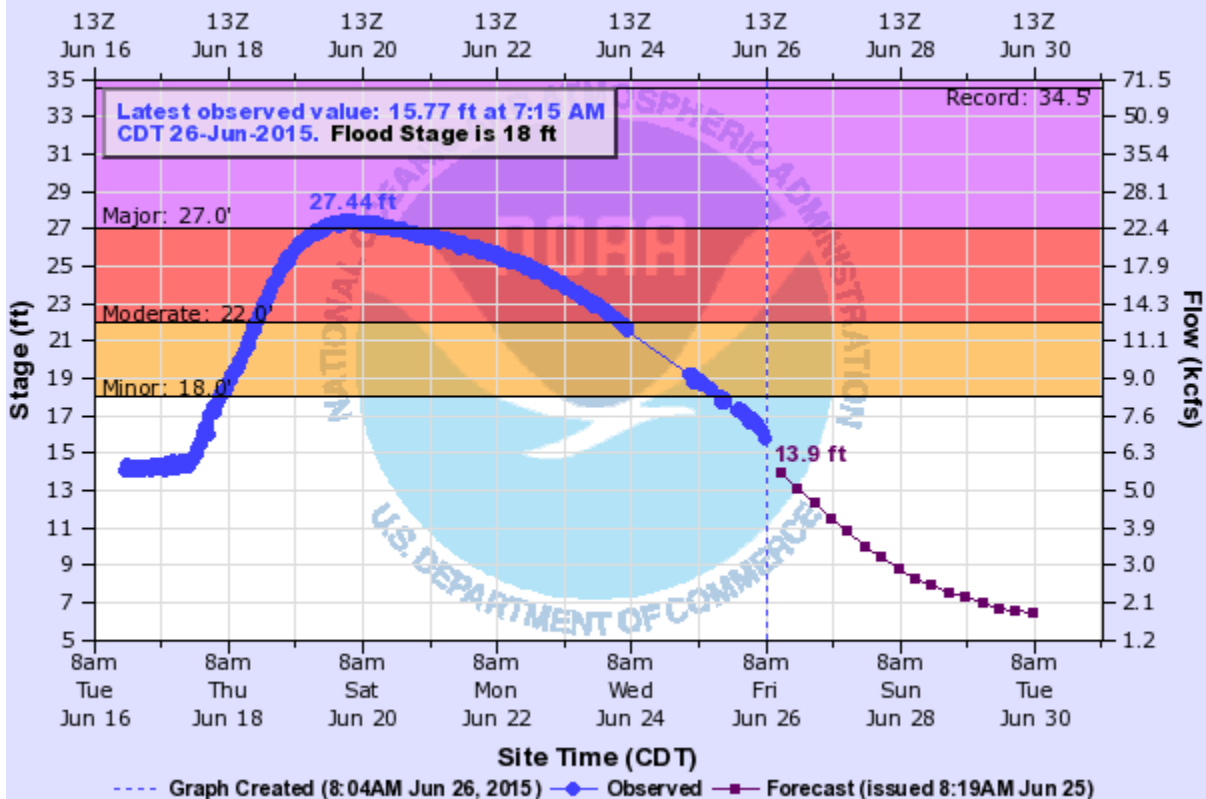


BGSO2(plotting HGIRG) "Gage 0" Datum: 632.55'

Observations courtesy of US Geological Survey

## DEEP FORK RIVER NEAR BEGGS

Universal Time (UTC)

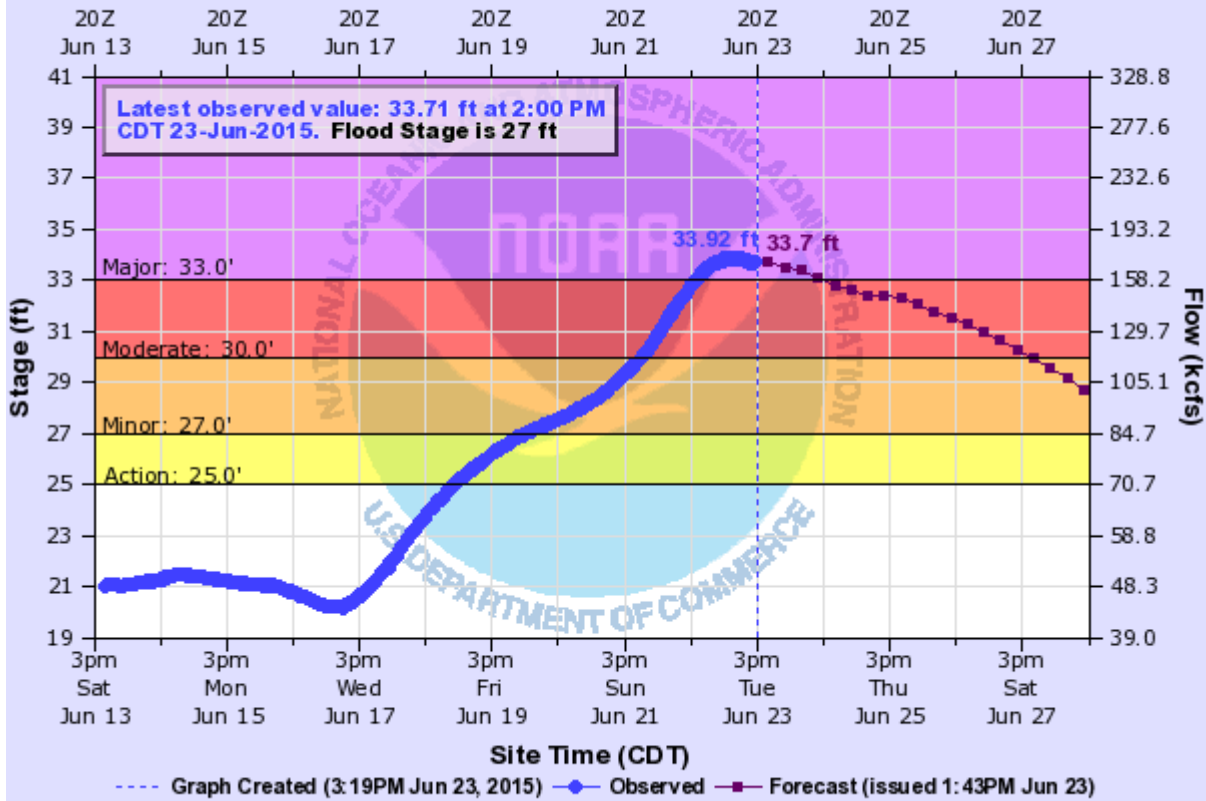


BGSO2(plotting HGIRG) "Gage 0" Datum: 632.55'

Observations courtesy of US Geological Survey

## RED RIVER AT ARTHUR CITY

Universal Time (UTC)

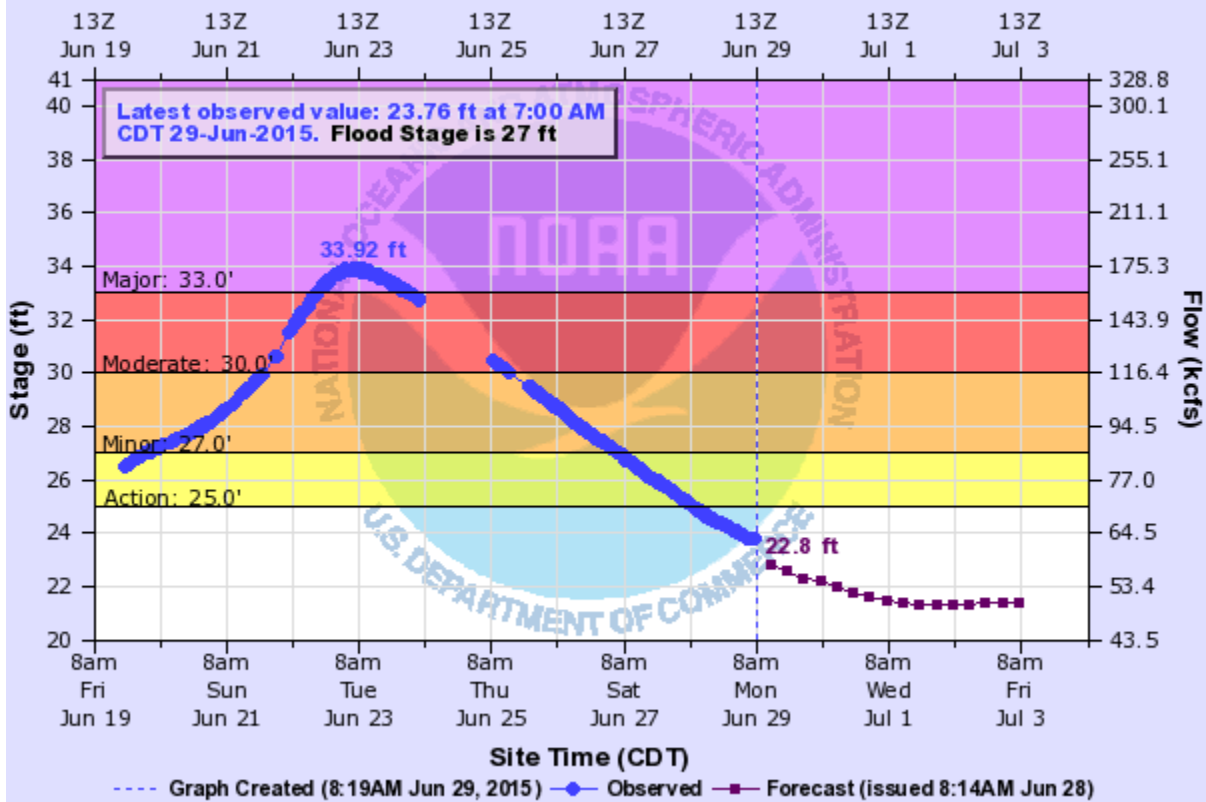


ARCT2(plotting HGIRG) "Gage 0" Datum: 375.07'

Observations courtesy of US Geological Survey

## RED RIVER AT ARTHUR CITY

Universal Time (UTC)

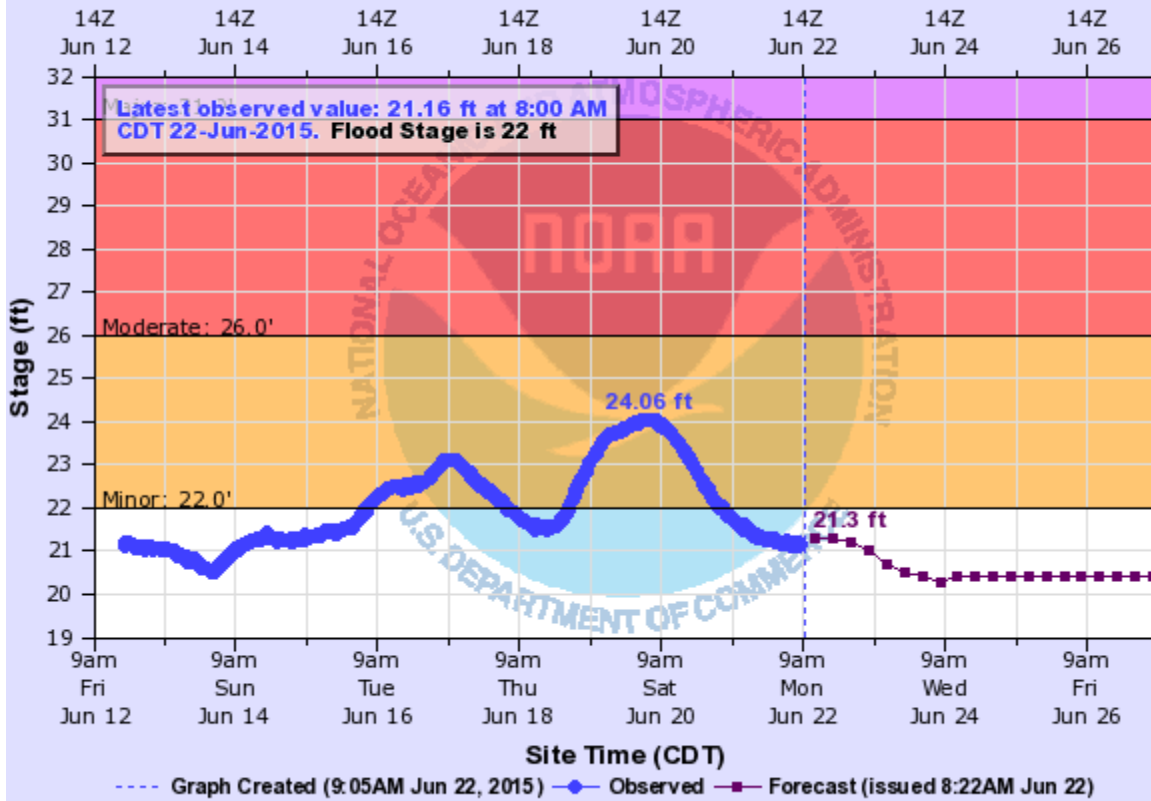


ARCT2(plotting HGIRG) "Gage 0" Datum: 375.07'

Observations courtesy of US Geological Survey

## ARKANSAS RIVER AT VAN BUREN

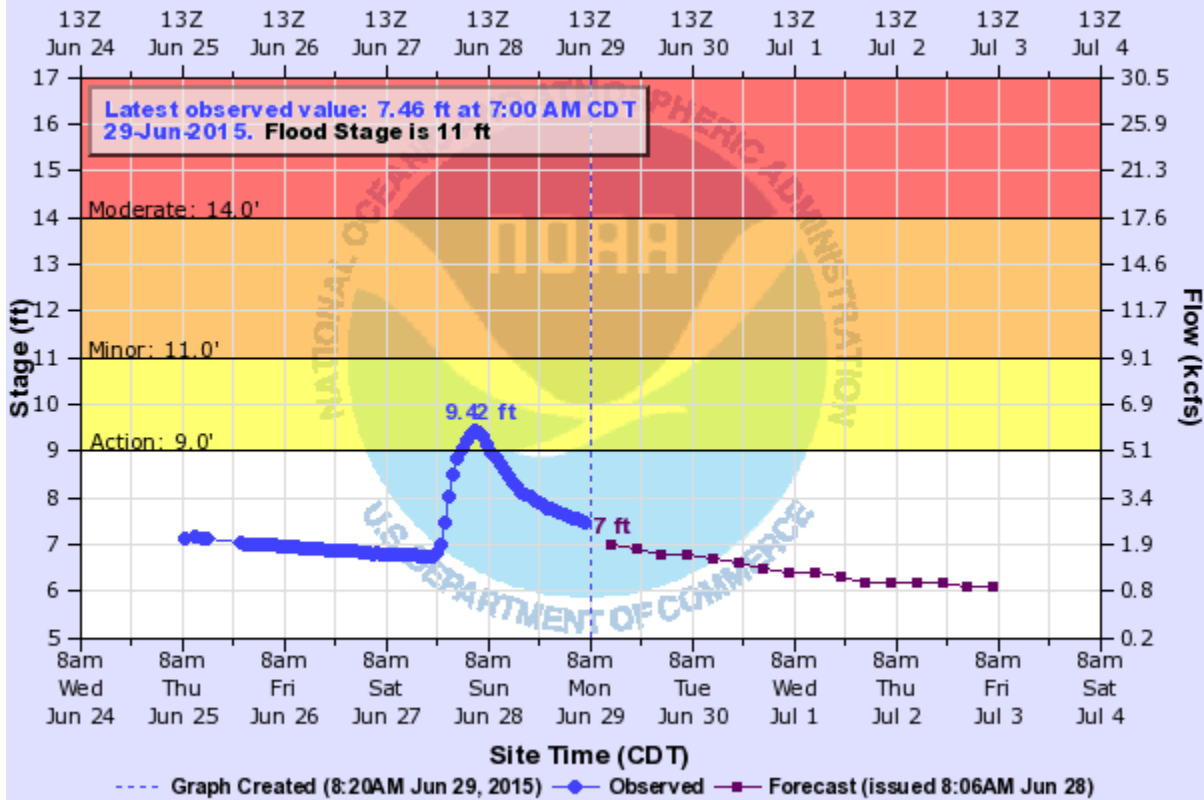
Universal Time (UTC)



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

## ILLINOIS RIVER (AR OK) NEAR TAHLEQUAH

Universal Time (UTC)

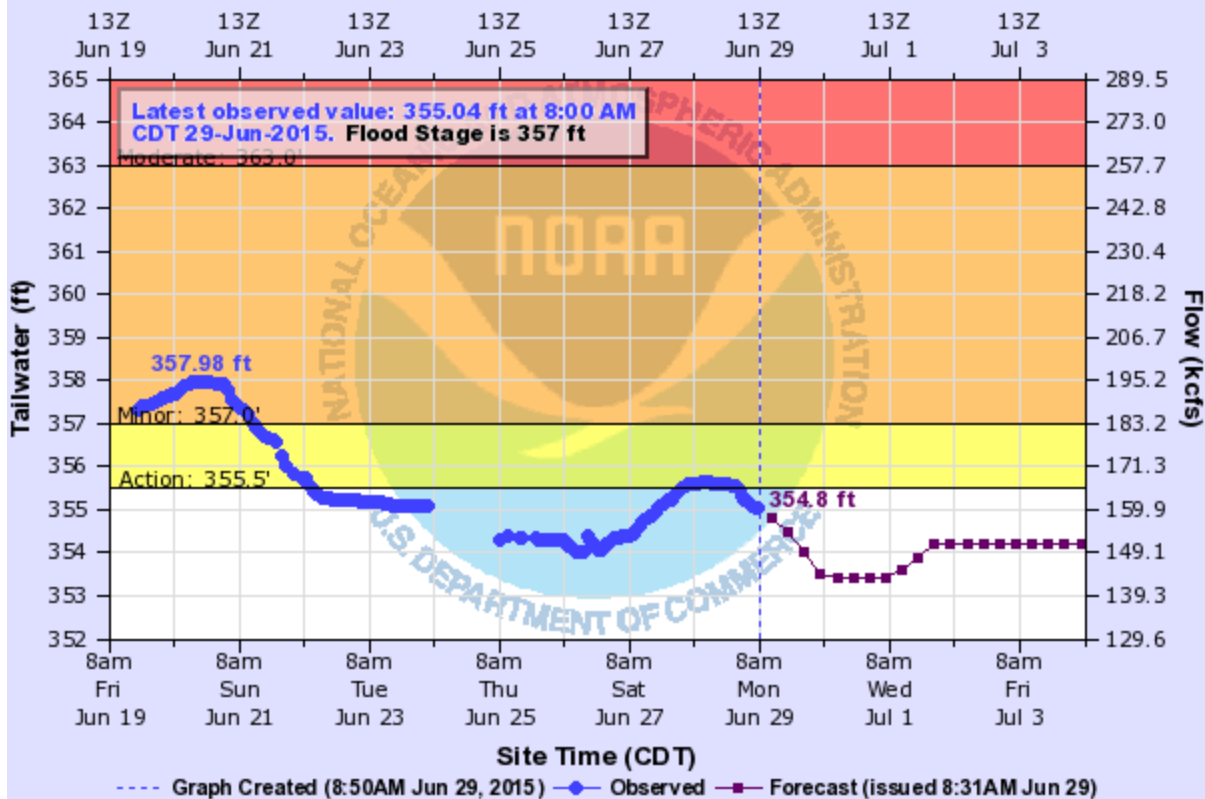


TALO2(plotting HGIRG) "Gage 0" Datum: 664.14'

Observations courtesy of US Geological Survey

## ARKANSAS RIVER AT OZARK L/D TAILWATER

Universal Time (UTC)

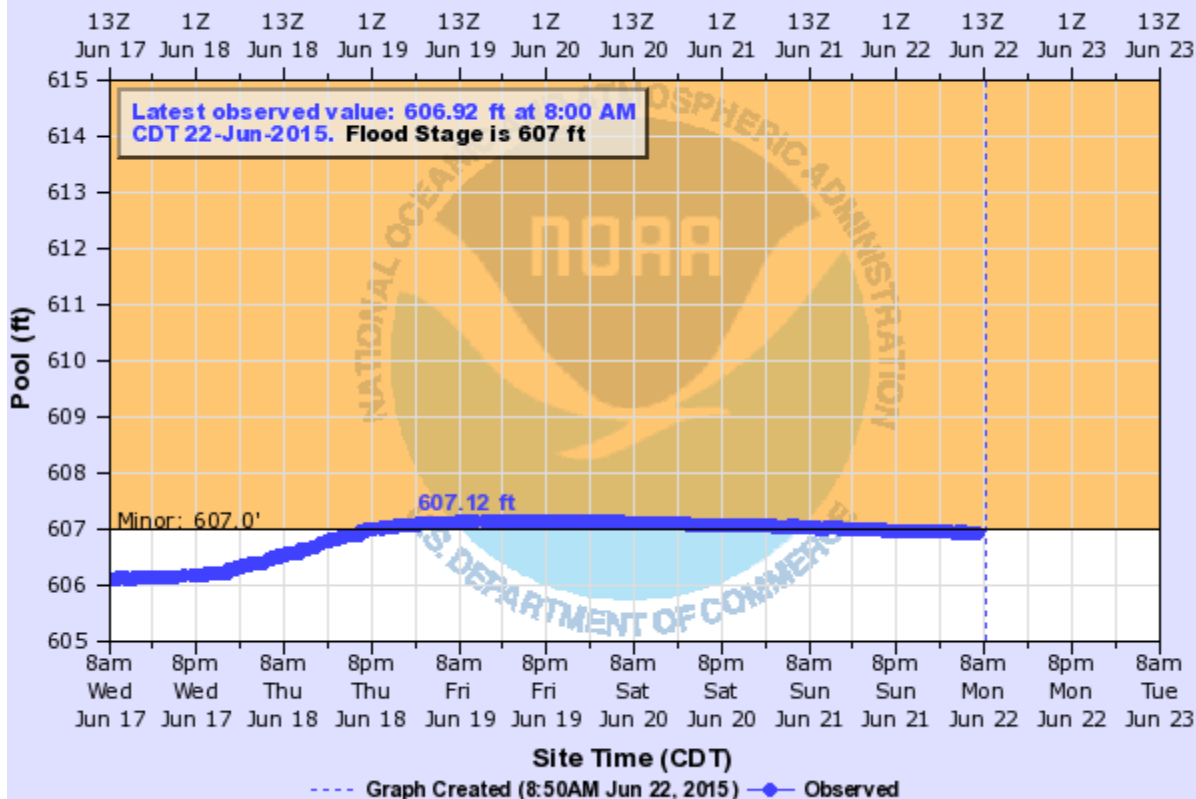


OZGA4(plotting HTIRG) "Gage 0" Datum: 0'

Observations courtesy of US Army Corps of Engineers - LRD

## EASTERN OKLAHOMA LAKES AT SARDIS LAKE

Universal Time (UTC)

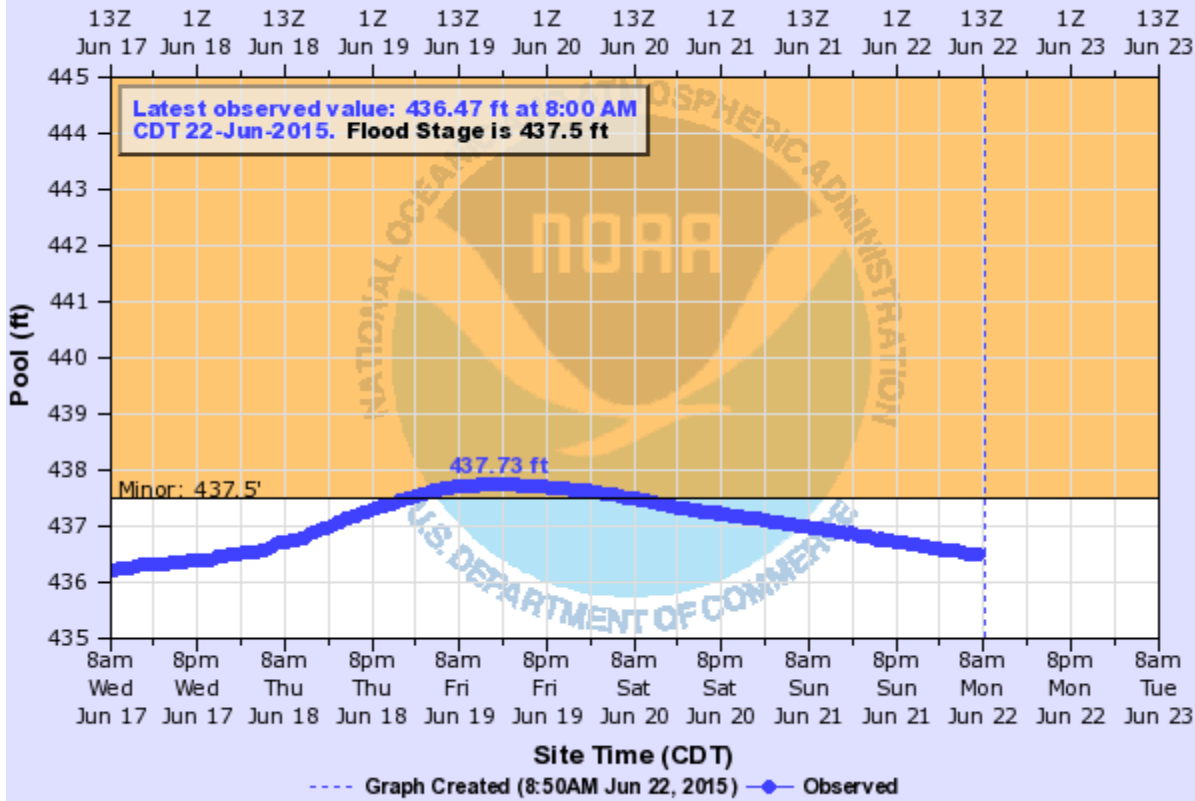


CYDO2(plotting HPIRG) "Gage 0" Datum: 0'

Observations courtesy of US Army Corps of Engineers

## EASTERN OKLAHOMA LAKES AT HUGO LAKE

Universal Time (UTC)

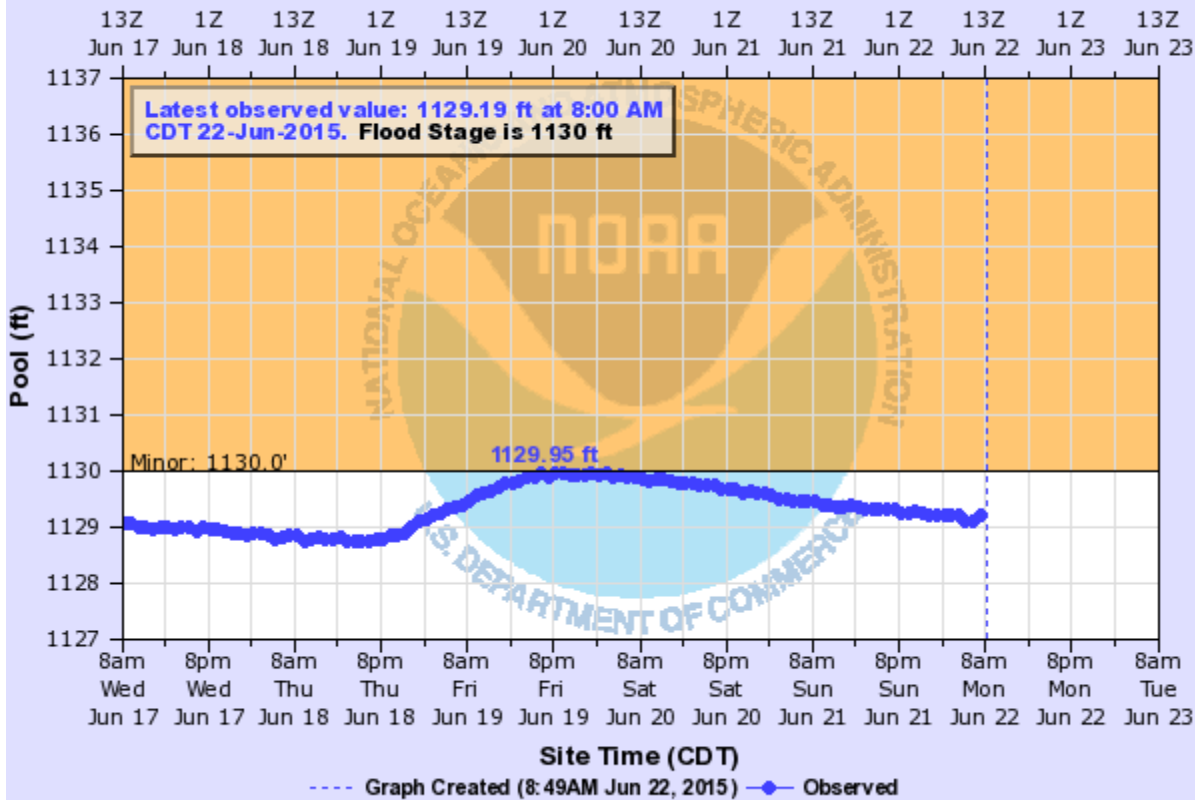


HGLO2(plotting HPIRG) "Gage 0" Datum: 0'

Observations courtesy of US Army Corps of Engineers

## NORTHWEST ARKANSAS LAKES AT BEAVER LAKE

Universal Time (UTC)



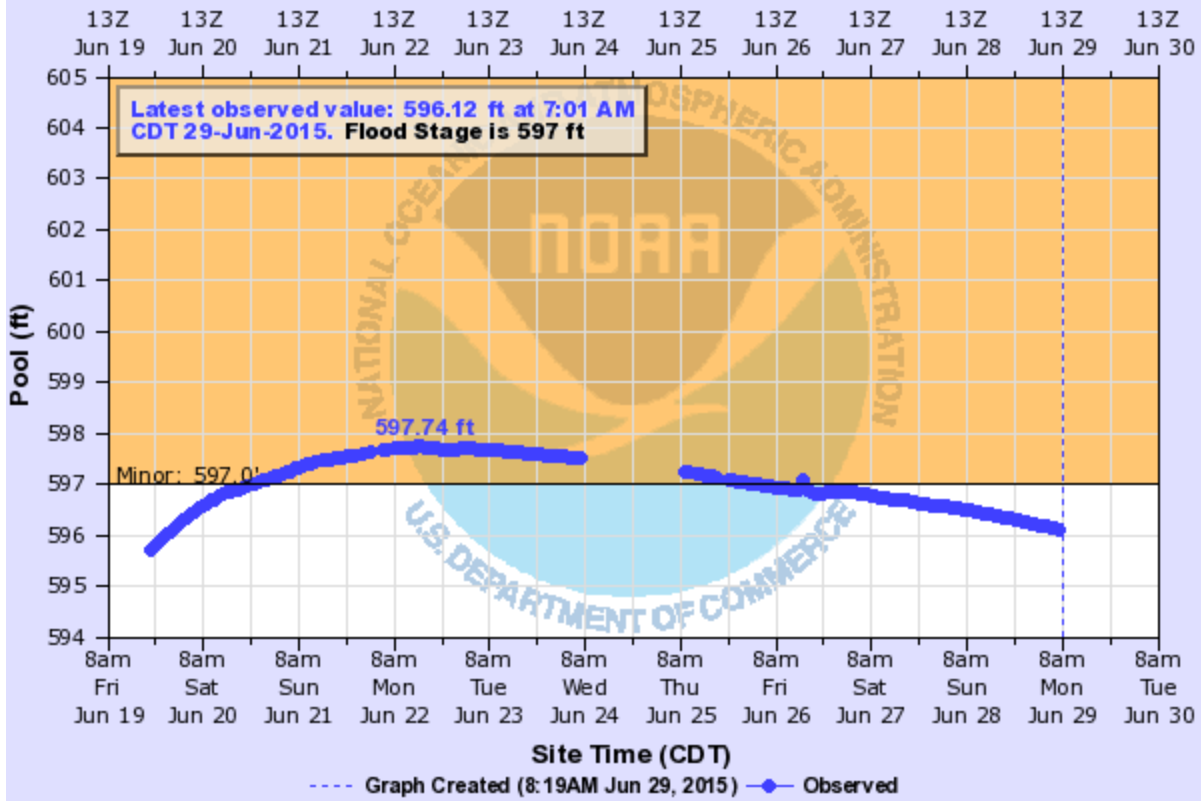
BVGA4(plotting HPIRG) "Gage 0" Datum: n/a

Observations courtesy of US Army Corps of Engineers



# EASTERN OKLAHOMA LAKES AT EUFALA LAKE

Universal Time (UTC)



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

Observations courtesy of US Army Corps of Engineers