

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 January 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 February 1, 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.

Northeast OK and northwest AR saw well above normal January rainfall this year, while southeast OK had below normal values. Rises occurred along several rivers this month. Normal precipitation for January ranges from 1.2 inches in Pawnee County to 2.2 inches in Haskell County. In the Ozark region of northwest Arkansas, precipitation averages 2.2 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 January 2019 ranged from 2" to 6" across eastern OK and northwest AR. This corresponds to 50% of the normal January rainfall in southeast OK to around 250% of normal in northeast OK (Fig. 1b).

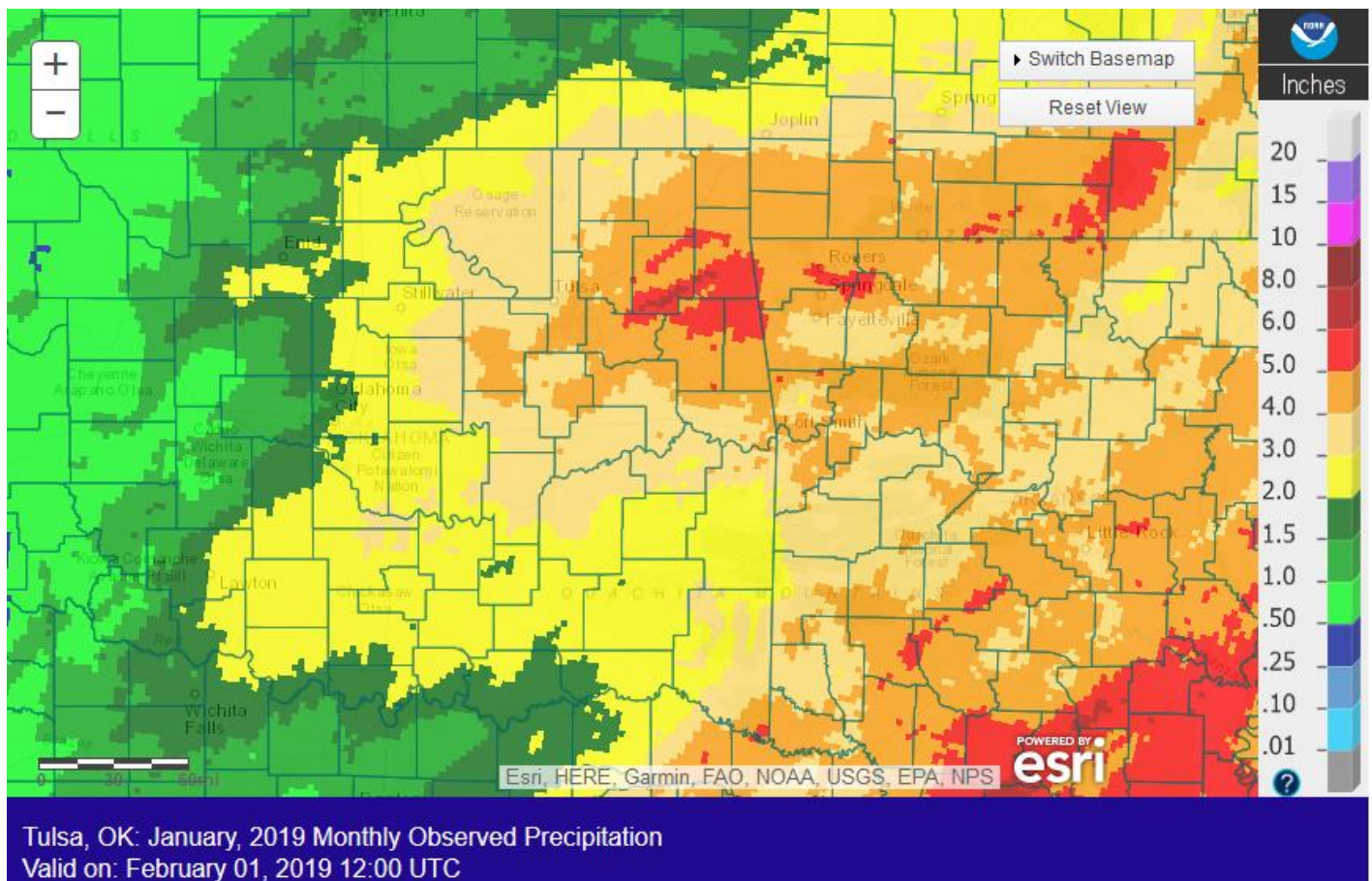
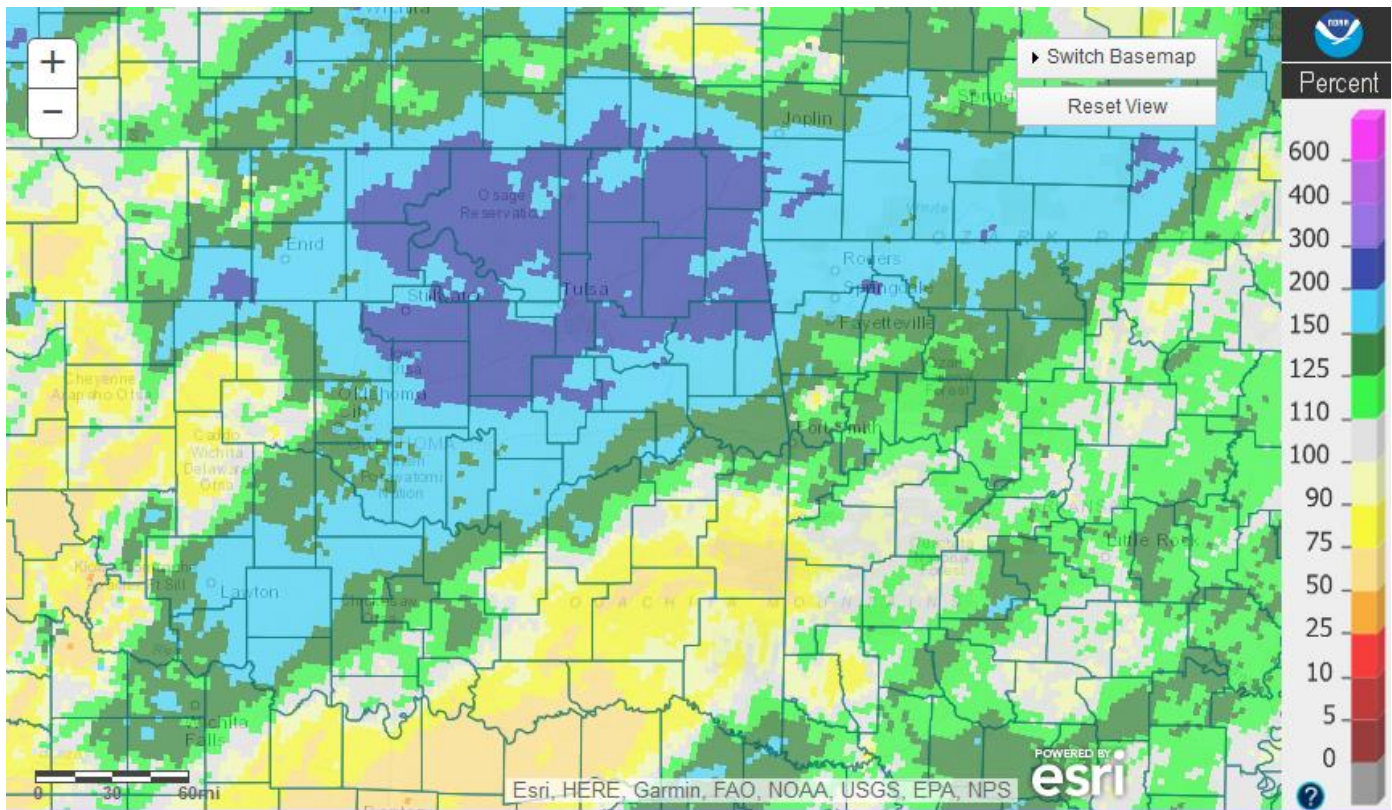


Fig. 1a. Estimated Observed Rainfall for January 2019



Tulsa, OK: January, 2019 Monthly Percent of Normal Precipitation
 Valid on: February 01, 2019 12:00 UTC

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

In Tulsa, OK, January 2019 ranked as the 56th warmest January (37.9°F; since records began in 1905), the 6th wettest January (3.84"; since records began in 1888), and the 34th least snowy January (0.3", tied 1923, 1965, 1982; since records began in 1900). Fort Smith, AR had the 62nd warmest January (40.0°F, tied 1980; since records began in 1883), the 26th wettest January (3.94"; since records began in 1883), and the 56th snowiest January (1.0", tied 2003, 1980, 1958, 1885; since records began in 1884). Fayetteville, AR had the 33rd warmest (36.1°F), the 16th wettest (3.27"), and 35th least snowy (0.9") January since records began in 1950.

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

Upper Spavinaw Port, OK (coop)	6.75	Bentonville 6.6SSW, AR (coco)	6.38	Rogers 2.4 SSW, AR (coco)	5.79
Hindsville 10NNE, AR (coco)	5.59	Jay 3.3NNE, OK (coco)	5.53	Rogers 2.1SE, AR (coco)	5.48
Spavinaw, OK (coop)	5.47	Westville 0.2ENE, OK (coco)	5.46	Tahlequah, OK (meso)	5.41

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

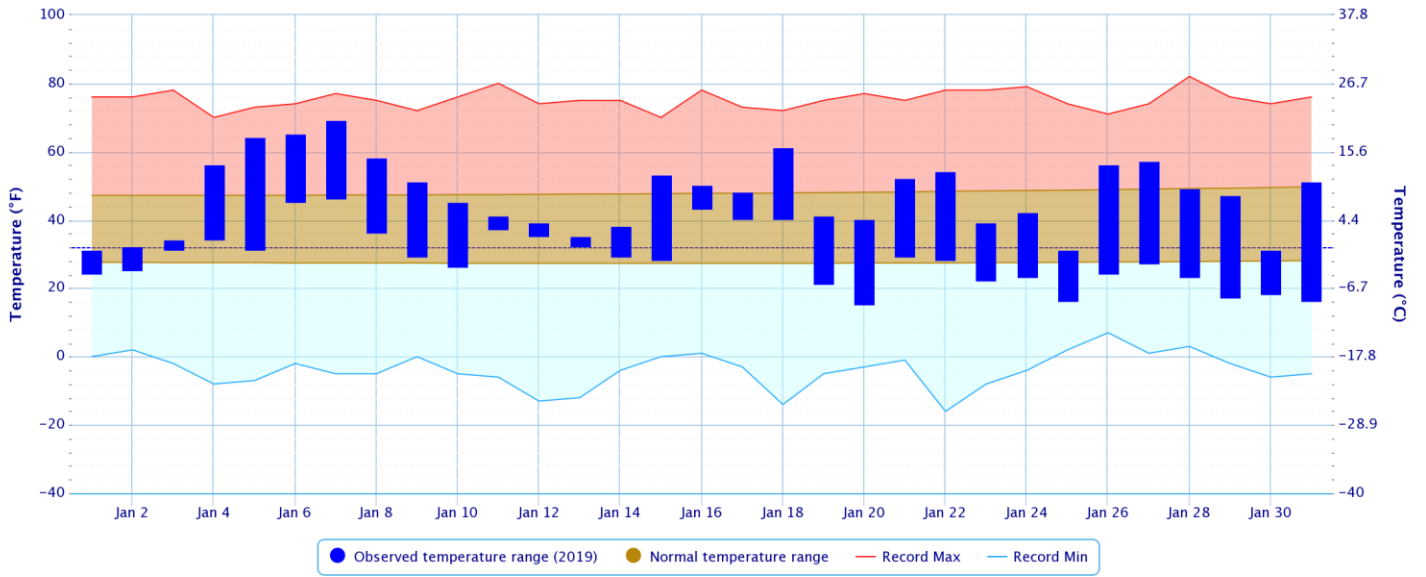
Talihina, OK (meso)	2.39	Hugo, OK (meso)	2.39	Antlers, OK (meso)	2.42
Clayton, OK (meso)	2.49	Wister, OK (meso)	2.55	Foraker, OK (meso)	2.60
Pawnee, OK (meso)	2.62	Wilburton, OK (meso)	2.78	Cloudy, OK (meso)	2.80

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

Rank since 1921	January 2019	Water Year-to-Date (Oct 1 – Jan 31)	Winter 2018-19 (Dec 1 – Jan 31)	Last 180 Days (Aug 5 – Jan 31)	Last 90 Days (Nov 3 – Jan 31)	Cool Growing Season (Sep 1 – Jan 31)	Last 365 Days (Feb 1, 2018–Jan 31, 2019)
Northeast OK	6th wettest	16 th wettest	6th wettest	25 th wettest	21 st wettest	30 th wettest	44 th wettest
East Central OK	9th wettest	22 nd wettest	7th wettest	14 th wettest	19 th wettest	26 th wettest	9th wettest
Southeast OK	47 th driest	16 th wettest	17 th wettest	3rd wettest	28 th wettest	6th wettest	9th wettest
Statewide	21 st wettest	12 th wettest	11 th wettest	4th wettest	25 th wettest	5th wettest	12 th wettest

Daily Temperature Data – Tulsa Area, OK (ThreadEx)

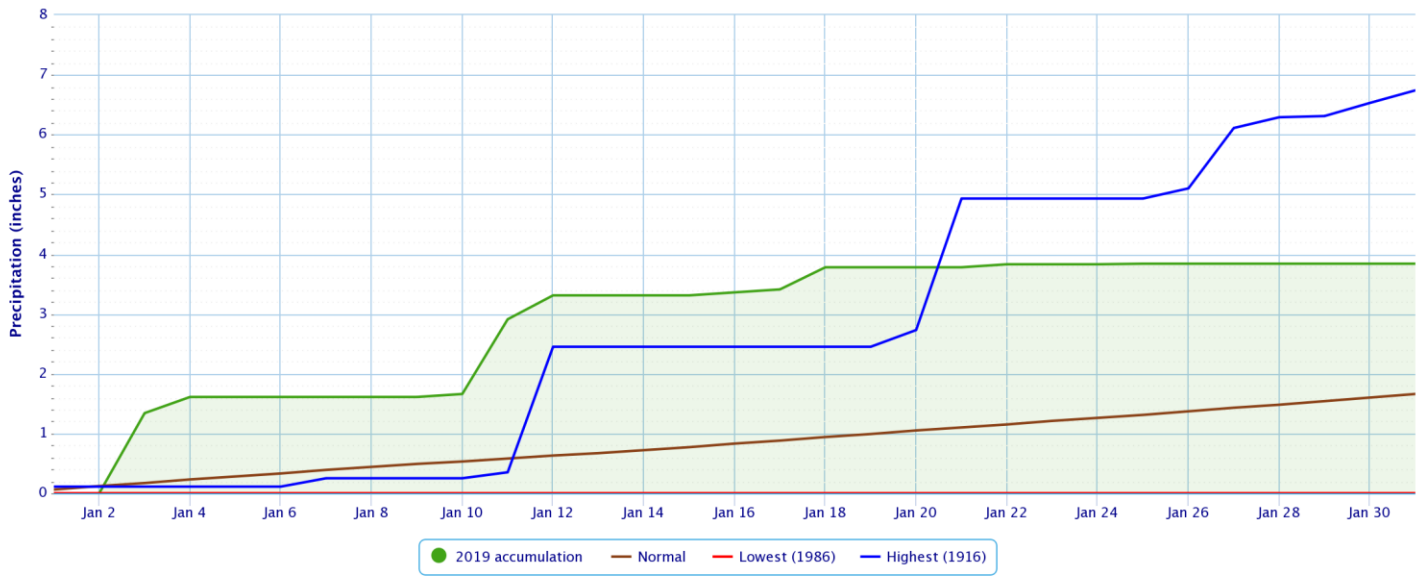
Period of Record – 1905-01-06 to 2019-01-31. Normals period: 1981-2010. Click and drag to zoom chart.



Powered by ACIS

Accumulated Precipitation – Tulsa Area, OK (ThreadEx)

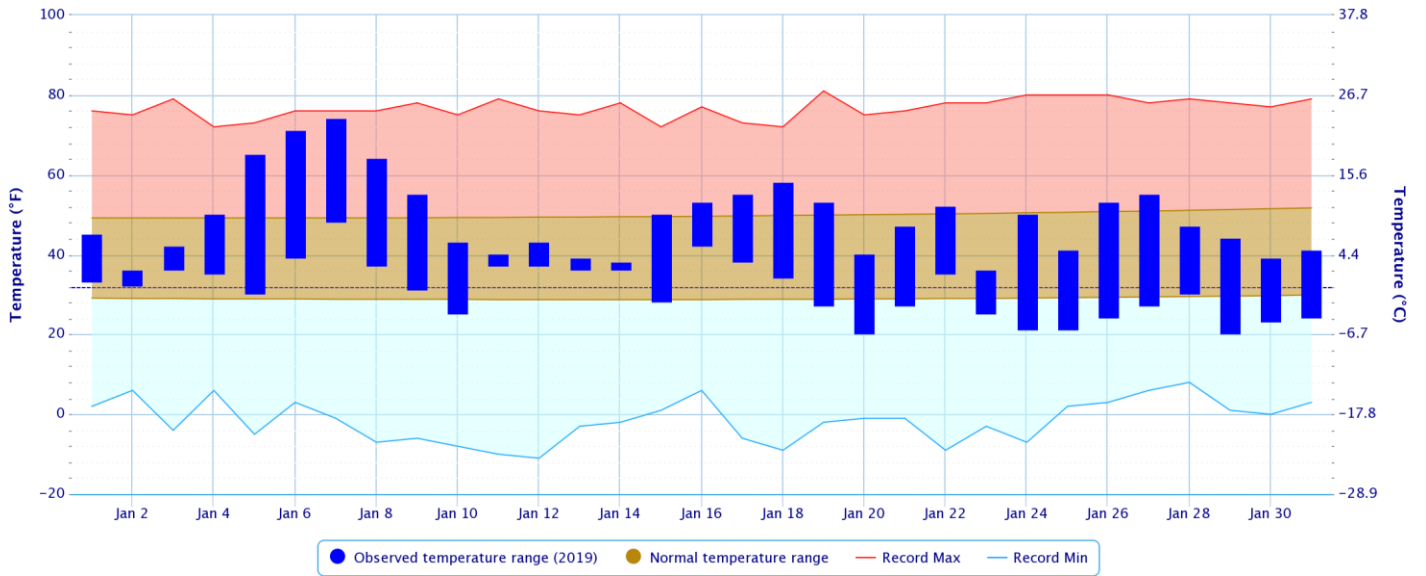
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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

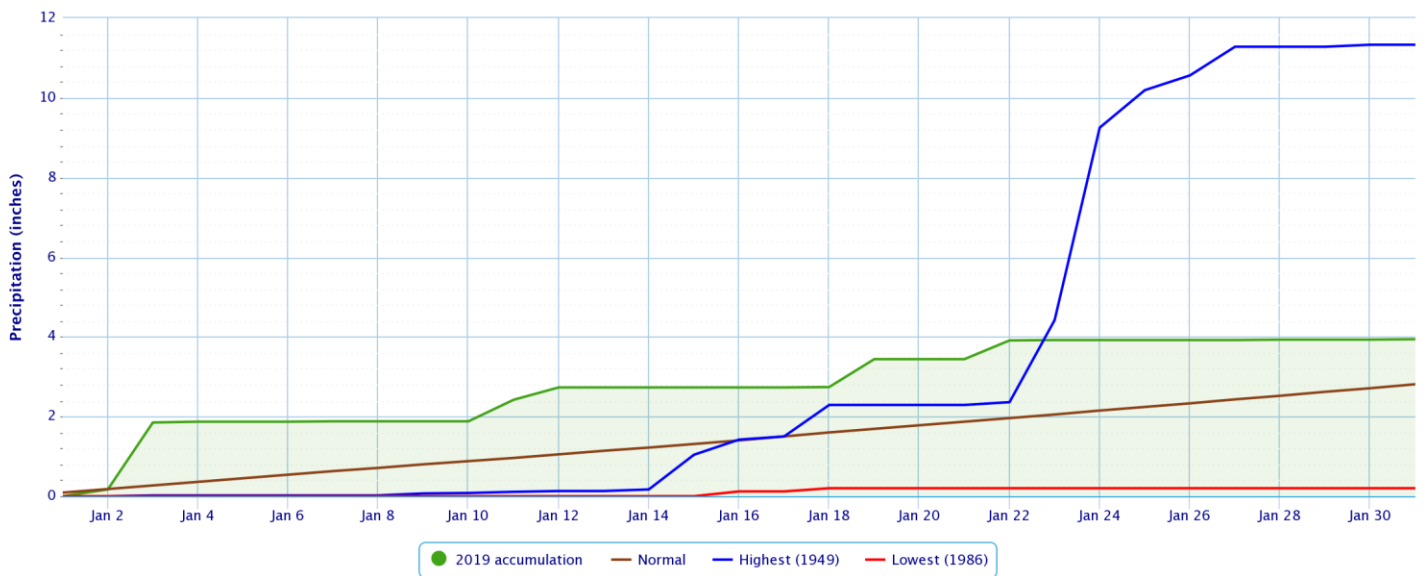
Period of Record – 1882-06-01 to 2019-01-31. Normals period: 1981-2010. Click and drag to zoom chart.



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Accumulated Precipitation – Fort Smith Area, AR (ThreadEx)

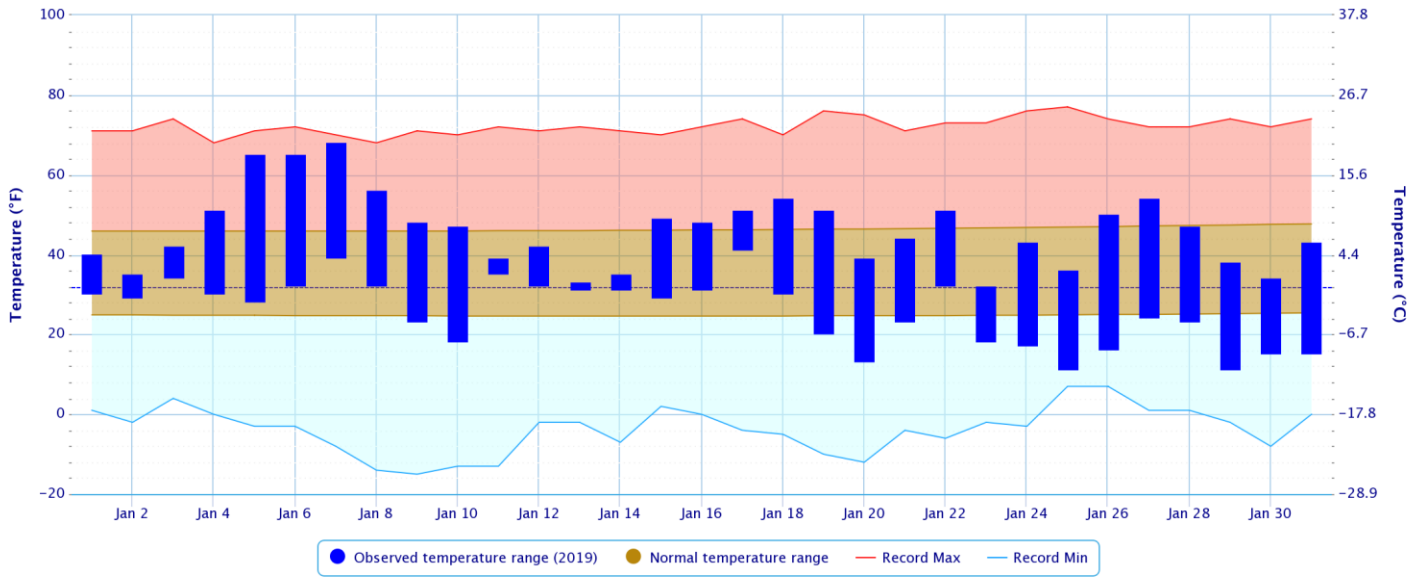
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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Daily Temperature Data – FAYETTEVILLE DRAKE FIELD, AR

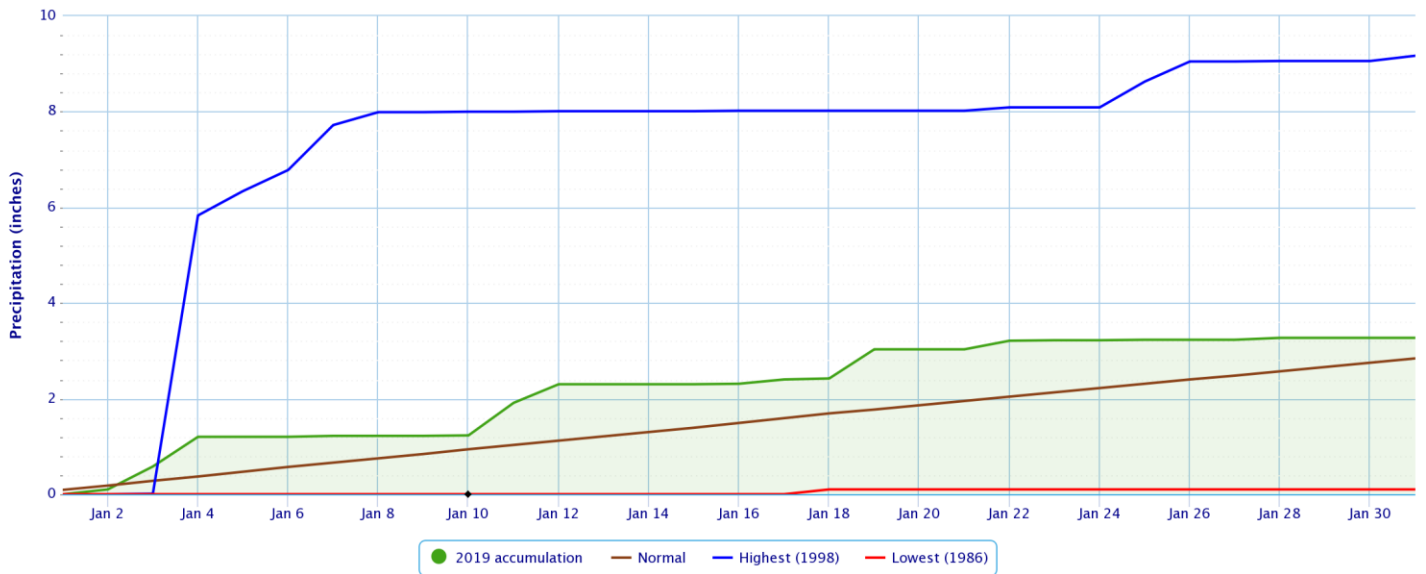
Period of Record – 1949-07-14 to 2019-01-31. Normals period: 1981-2010. Click and drag to zoom chart.



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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

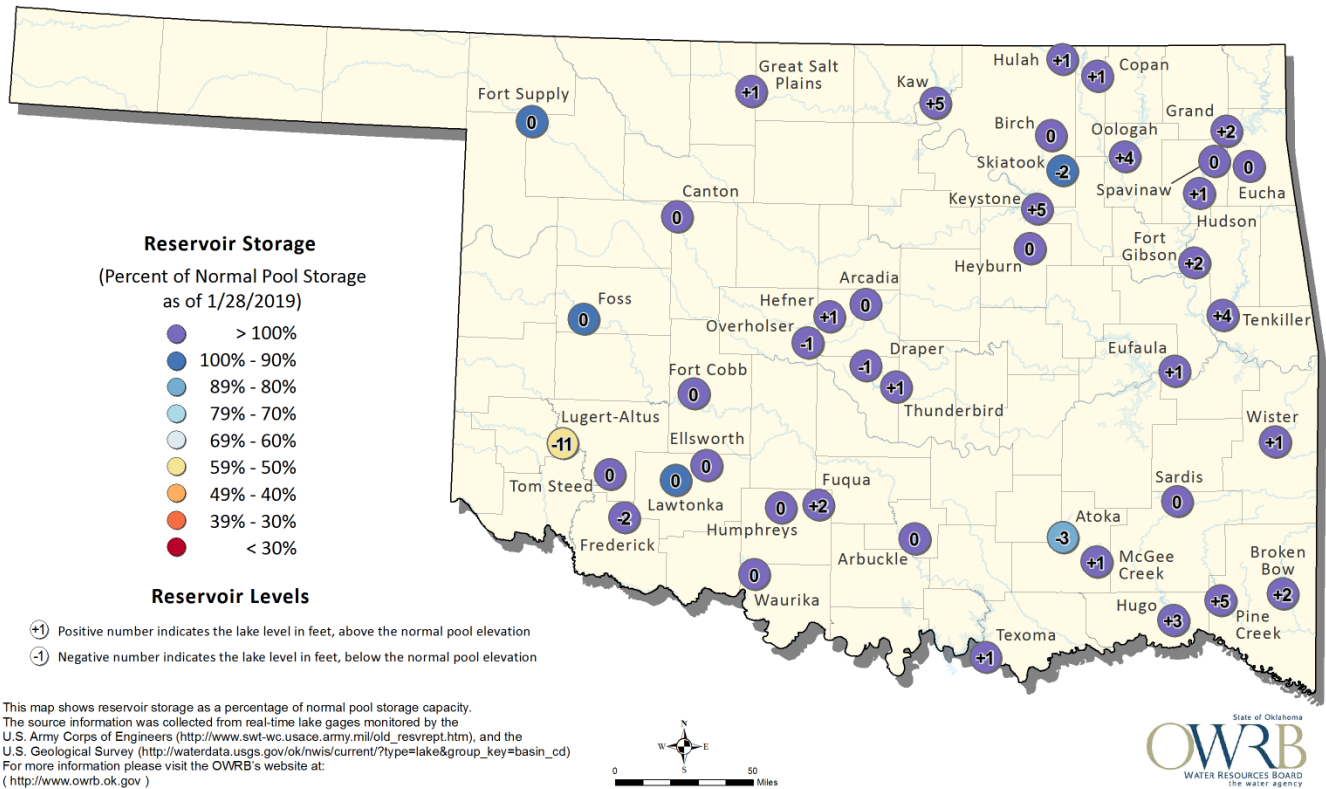


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Reservoirs

Oklahoma Surface Water Resources

Reservoir Levels and Storage as of 1/28/2019

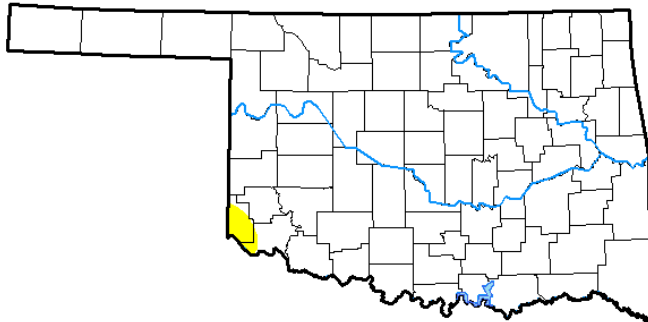


According to the USACE, several lakes in the HSA were above $\pm 3\%$ of their conservation pool level as of 1/31/2019: Oologah Lake 111%, Beaver Lake 110%, Grand Lake 109%, Keystone Lake 108%, Kaw Lake 107%, Tenkiller Lake 106%, Hugo Lake 106%, Eufaula Lake 105%, and Hudson Lake 104%. Only one reservoir was below 3% of its conservation pool storage as of 1/31/2019: Skiatook Lake 92%.

Drought

According to the [U.S. Drought Monitor](#) (USDM) from January 29, 2019 (Figs. 2, 3), no drought or abnormally dry conditions were present across eastern OK and northwest AR.

U.S. Drought Monitor Oklahoma



January 29, 2019

(Released Thursday, Jan. 31, 2019)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	99.22	0.78	0.00	0.00	0.00	0.00
Last Week 01-22-2019	100.00	0.00	0.00	0.00	0.00	0.00
3 Months Ago 10-30-2018	92.31	7.69	1.60	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 01-30-2018	0.00	100.00	99.76	81.45	21.11	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. 2. Drought Monitor for Oklahoma

U.S. Drought Monitor Arkansas



January 29, 2019

(Released Thursday, Jan. 31, 2019)

Valid 7 a.m. EST

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 01-22-2019	100.00	0.00	0.00	0.00	0.00	0.00
3 Months Ago 10-30-2018	96.38	3.62	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 01-30-2018	7.78	92.22	66.87	30.98	2.37	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

Outlooks

The [Climate Prediction Center](#) (CPC) outlook for February 2019 (issued January 31, 2019) indicates a slightly enhanced chance for below normal temperatures across Osage, Washington, and Pawnee Counties in northeast OK and equal chances for above, near, and below normal temperatures elsewhere across eastern OK and northwest AR. This outlook also indicates increased odds for above median precipitation across all of eastern OK and northwest AR. This outlook takes into account weather conditions forecast over the first week of February, 8-10day outlook, weeks 3-4 outlook, and sub-seasonal climate signals. The signal for enhanced chances of below normal temperatures is due to a strong trough that may orient itself from central Canada southwestward into the southwest CONUS. This troughing is expected to offset or overcome the warmth expected at the beginning of February. This trough, along with an active southern jet stream, favors an active storm pattern, and therefore, enhanced chances for above median precipitation.

For the 3-month period February-March-April 2019, CPC is forecasting an equal chance for above, near, and below normal temperatures and precipitation across all of eastern OK and northwest AR (outlook issued January 17, 2019). This outlook is based on both statistical and dynamical forecast tools, decadal timescale climate trends, and to a decreasing extent, influence from El Niño. According to CPC, the combined effect of the ocean-atmosphere system is more consistent with ENSO neutral than with El Niño, despite relatively warm ocean sea surface temperatures in the Tropical Pacific. "Subseasonal variability associated with episodes of robust Madden-Julian Oscillation (MJO) activity have dominated the U.S. climate since Oct. 2018. There is no obvious indication that the ocean-atmosphere coupling will take place before the end of boreal winter." This 3-month outlook is therefore "based primarily on the expectation of continued robust MJO activity with less of an influence anticipated from a weak El Niño that still may form." There is a 65% chance that El Niño conditions develop and continue through spring 2019. The El Niño Watch issued by CPC continues.

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

During the late evening hours of Dec. 30th, rain developed across eastern OK and northwest AR as an upper-level low lifted out of northern Mexico and to the northeast across the Southern Plains. This activity spread over the entire area during the overnight hours before shifting northeast by mid-morning of Dec. 31st. Some additional wrap-around precipitation affected northeast OK before noon. Rainfall totals were around 0.50" to near 1.5". This rainfall, combined with the higher amounts from Dec. 26th (see Dec. 2018 E5 Report for details), resulted in minor flooding along the Neosho River near Commerce (see preliminary hydrographs at the end of this report; see E3 Report for details).

The first heavy rain event of 2019 began just before sunrise on the 3rd as an upper-level low over the TX panhandle tracked east through north central TX during the day. Warm conveyor belt precipitation spread northeast into eastern OK during the morning hours and into northwest AR just before noon. The precipitation became heavier during the afternoon as the upper-low tracked across northwest TX/southwest OK and continued east near the Red River. The widespread precipitation shifted north as the dry slot moved over southeast OK during the evening. This activity continued through the overnight hours and finally shifted east of the area by mid-morning on the 4th. Shallow arctic air over the region allowed for some frozen precipitation in the form of freezing rain and sleet throughout the event. With temperatures hovering around freezing, there was not much accumulation. Storm total ice amounts were estimated to range from a trace to near 0.2" (Fig. 4). Rainfall and liquid equivalent totals ranged from around 0.50" to around 2.5" (Fig. 5). This rainfall resulted in rises along several mainstem rivers, and minor flooding along the Illinois River near Tahlequah and the Poteau River near Panama (see preliminary hydrographs at the end of this report; see E3 Report for details).

Storm Total Ice Amounts

Estimated by reports...radar and satellite

Weather Forecast Office

Tulsa, OK

Issued Jan 04, 2019 10:15 AM CST

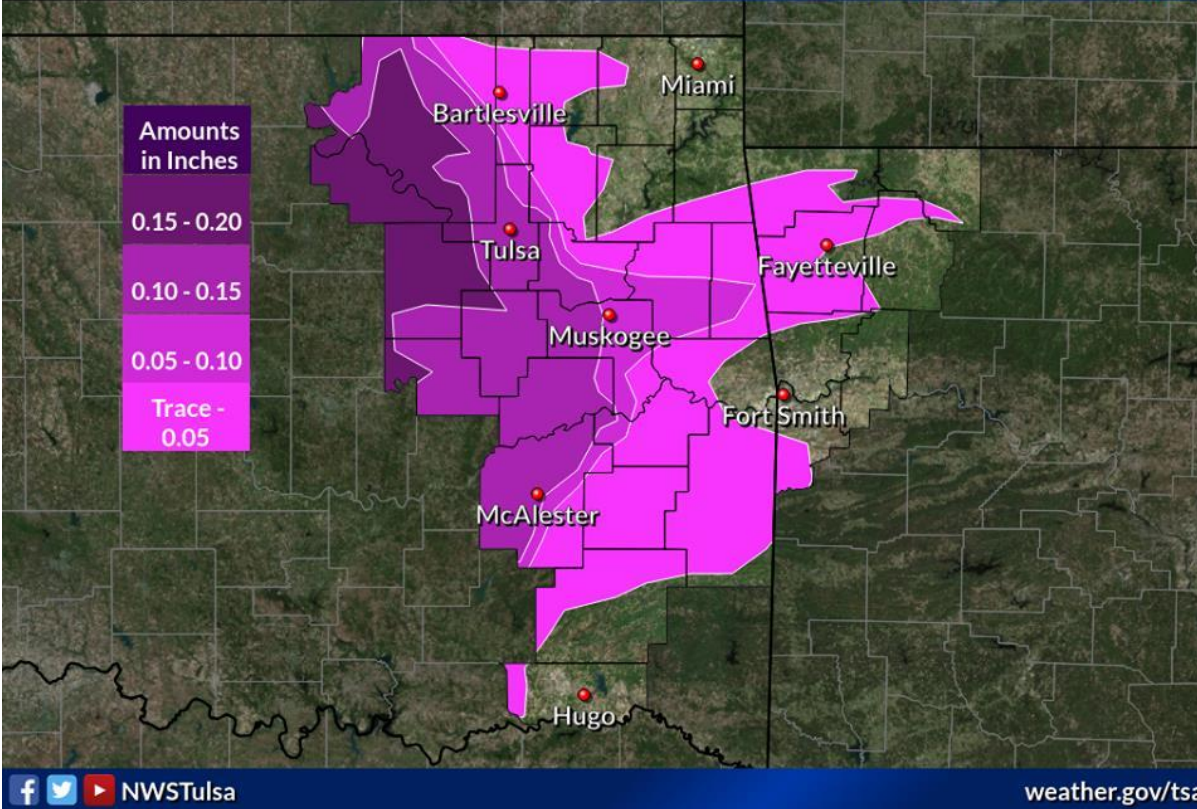


Fig. 4. Storm total ice estimated amounts ending at 10:15 am CST 01/04/2019.

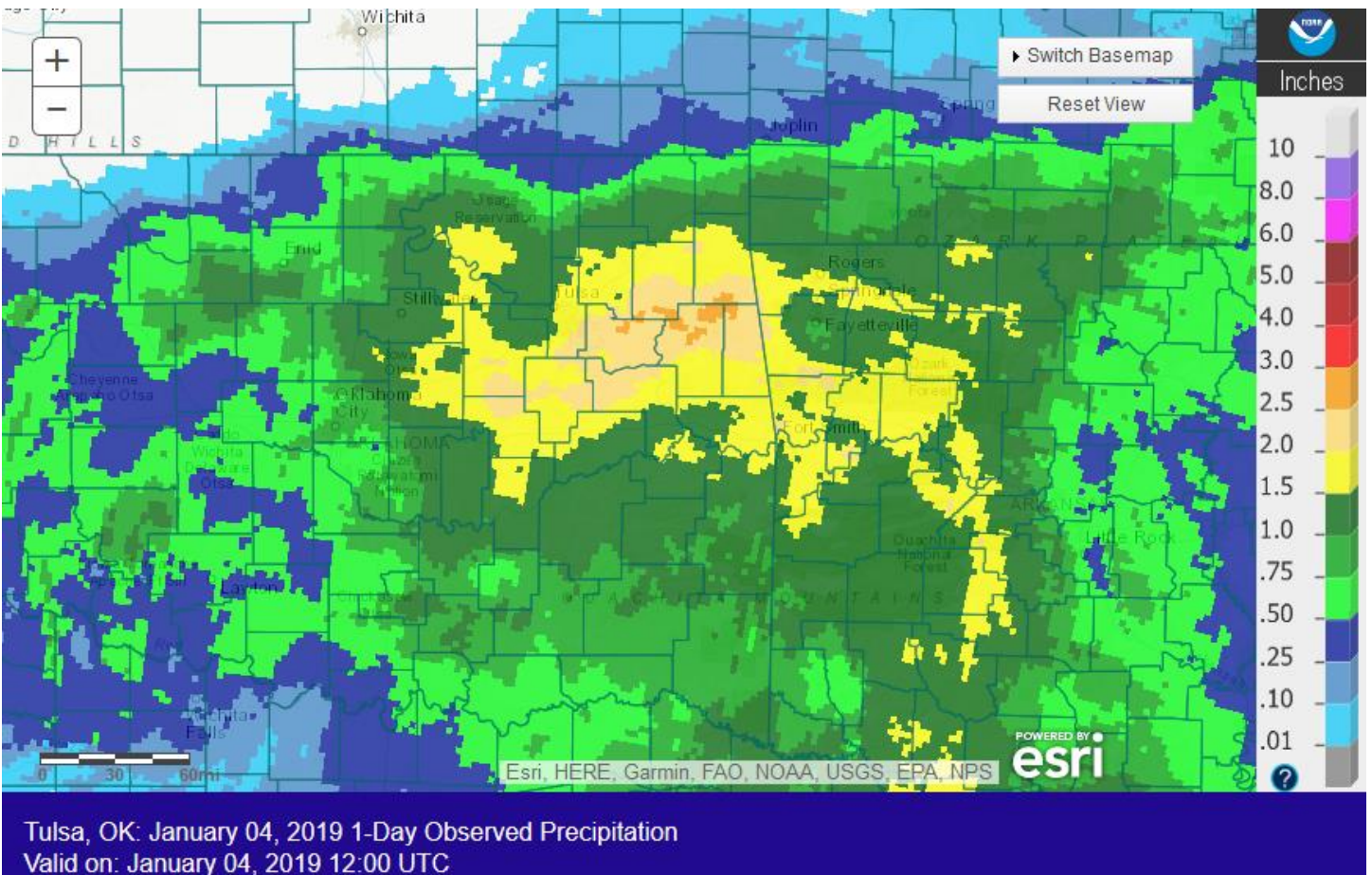


Fig. 5. 24-hour Estimated Observed Rainfall ending at 6am CST 1/04/2019.

An upper-level trough over the Four Corners region shifted into the Central and Southern Plains on the 11th. In response, areas of moderate to occasionally heavy rain spread across eastern OK and northwest AR and continued most of the day. Southeast OK and west central AR had a break from the rain during the late afternoon through early evening hours, but then the rain spread back in later in the evening as a cold front moved through. The main area of rain shifted east of the area by sunrise on the 12th, though additional wrap around precipitation near the passing surface low impacted northeast OK through mid-morning. Rainfall totals ranged from around 2.5" in northeast OK to around 0.50" in southeast OK (Fig. 6). 1.5"-2.5" of rain across the lower Neosho River basin resulted in the Neosho River near Commerce rising to flood stage (see preliminary hydrographs at the end of this report; see E3 Report for details). Rises also occurred along the Illinois River, but the river did not exceed flood stage.

Convection began to increase across northeast OK during the evening of the 18th as a strong cold front approached from the west. Showers and thunderstorms continued along and ahead of the front as it swept southeast across eastern OK and northwest AR through the overnight hours. A second area of precipitation developed over south central OK and moved east into southeast OK and northwest AR as the upper level low moved into the region. With sub-freezing air behind the front, a dusting to 5" of snow fell across southeast OK and northwest AR. The precipitation finally moved east of the region by noon on the 19th. Rainfall and snow liquid equivalent totals ranged from a few hundredths of an inch to around 2" (Fig. 7).

Another cold front moved into the area on the 22nd, with rain developing near it across eastern OK and western AR during the evening hours. Widely scattered precipitation continued until the early morning hours before exiting the area. Light freezing rain and freezing drizzle were reported across northeast OK and northwest AR. Rainfall totals were 0.50"-1" across far southeast OK and west central AR, with a trace to near 0.50" elsewhere (Fig. 8).

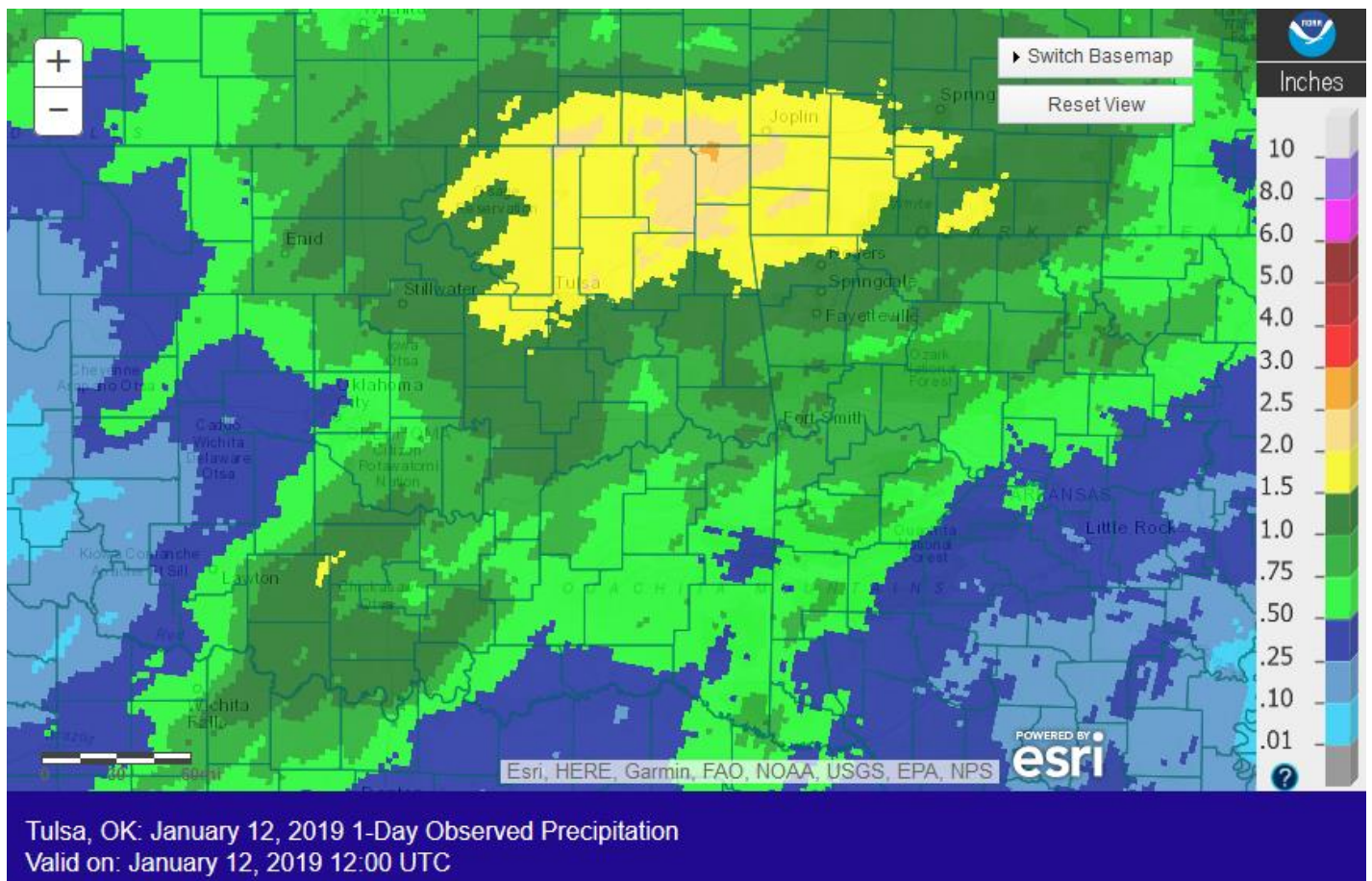
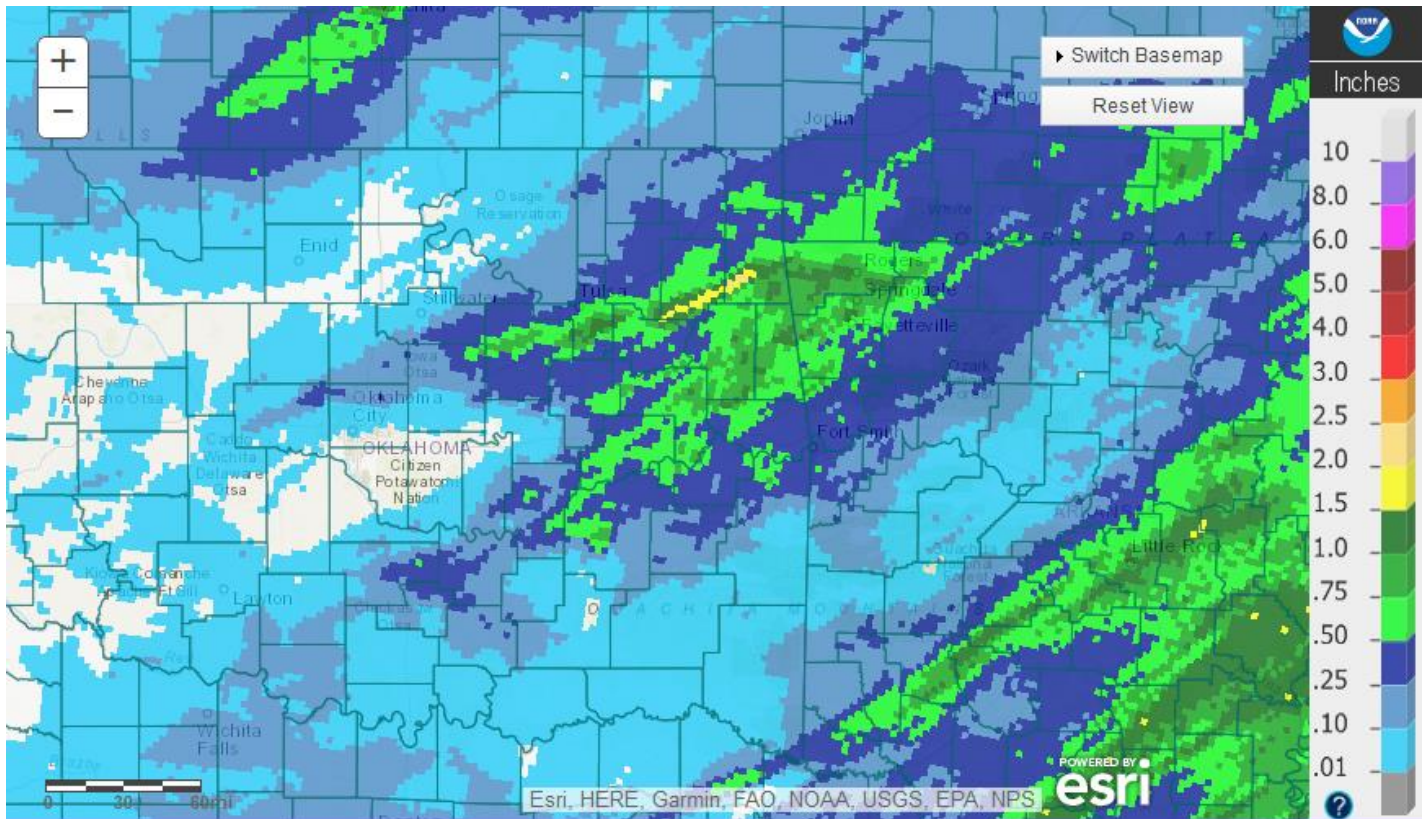
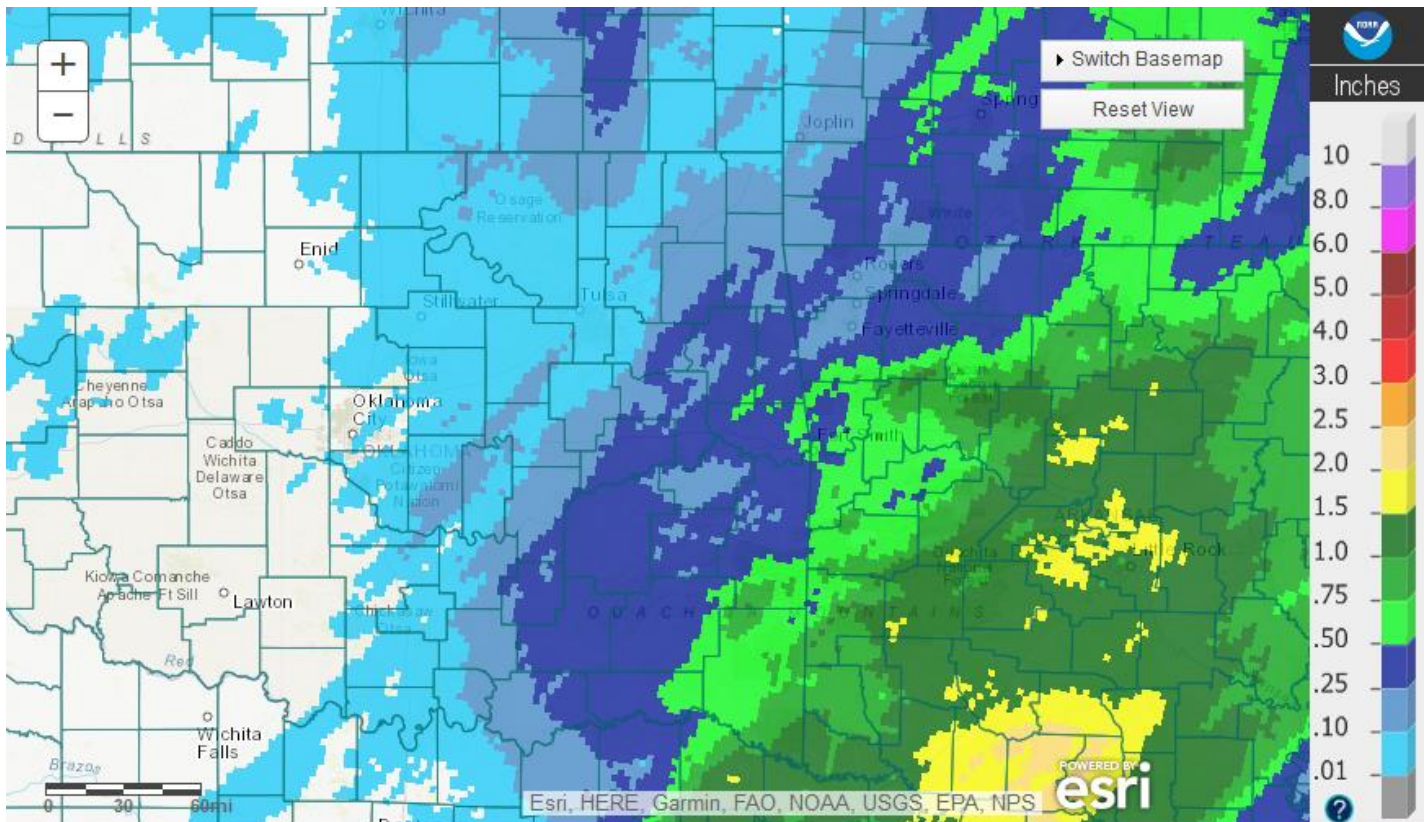


Fig. 6. 24-hour Estimated Observed Rainfall ending at 6am CST 1/12/2019.



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

Fig. 7. 24-hour Estimated Observed Rainfall ending at 6am CST 1/19/2019.



Tulsa, OK: January 23, 2019 1-Day Observed Precipitation
Valid on: January 23, 2019 12:00 UTC

Fig. 8. 24-hour Estimated Observed Rainfall ending at 6am CST 1/23/2019.

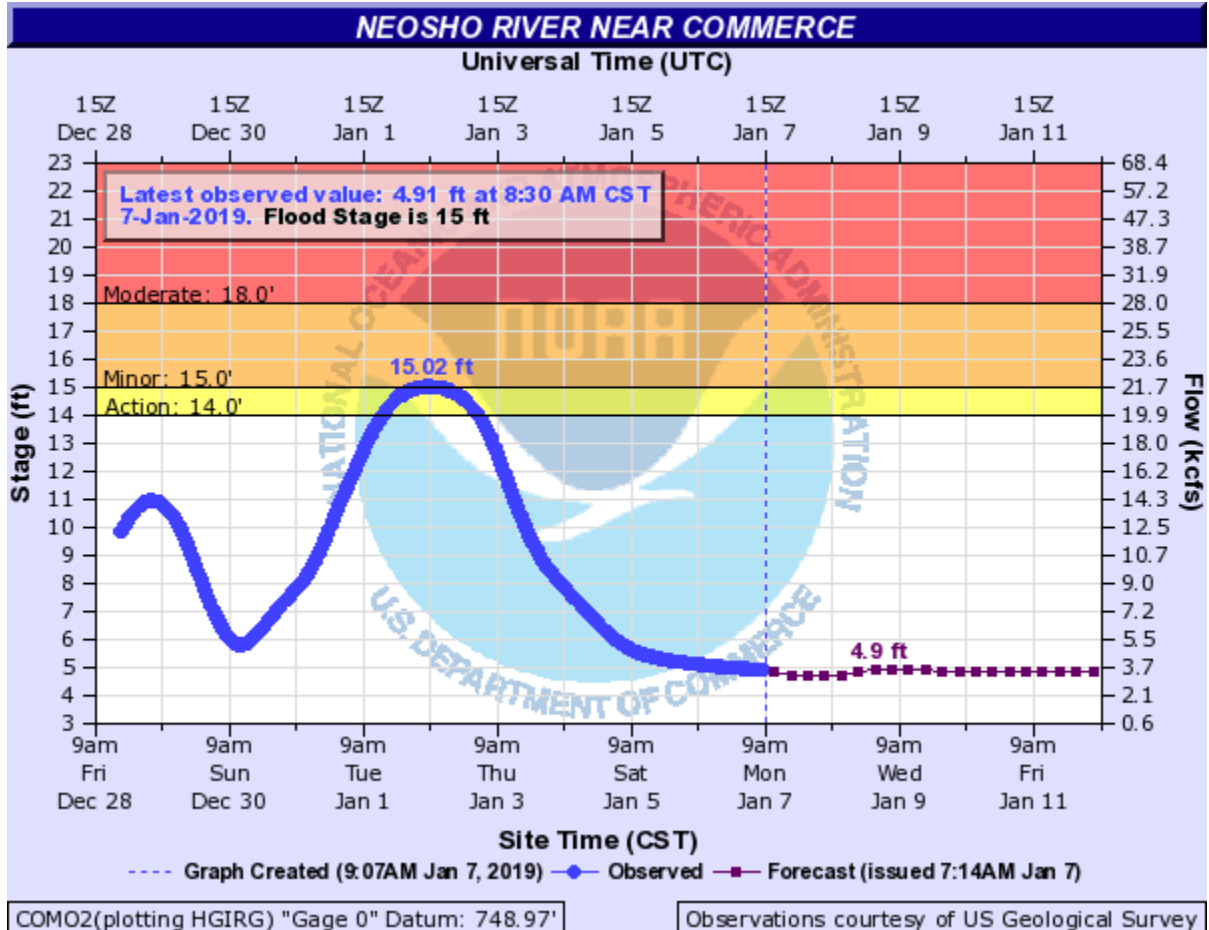
Written by:
 Nicole McGavock
 Service Hydrologist
 WFO Tulsa

Products issued in January 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

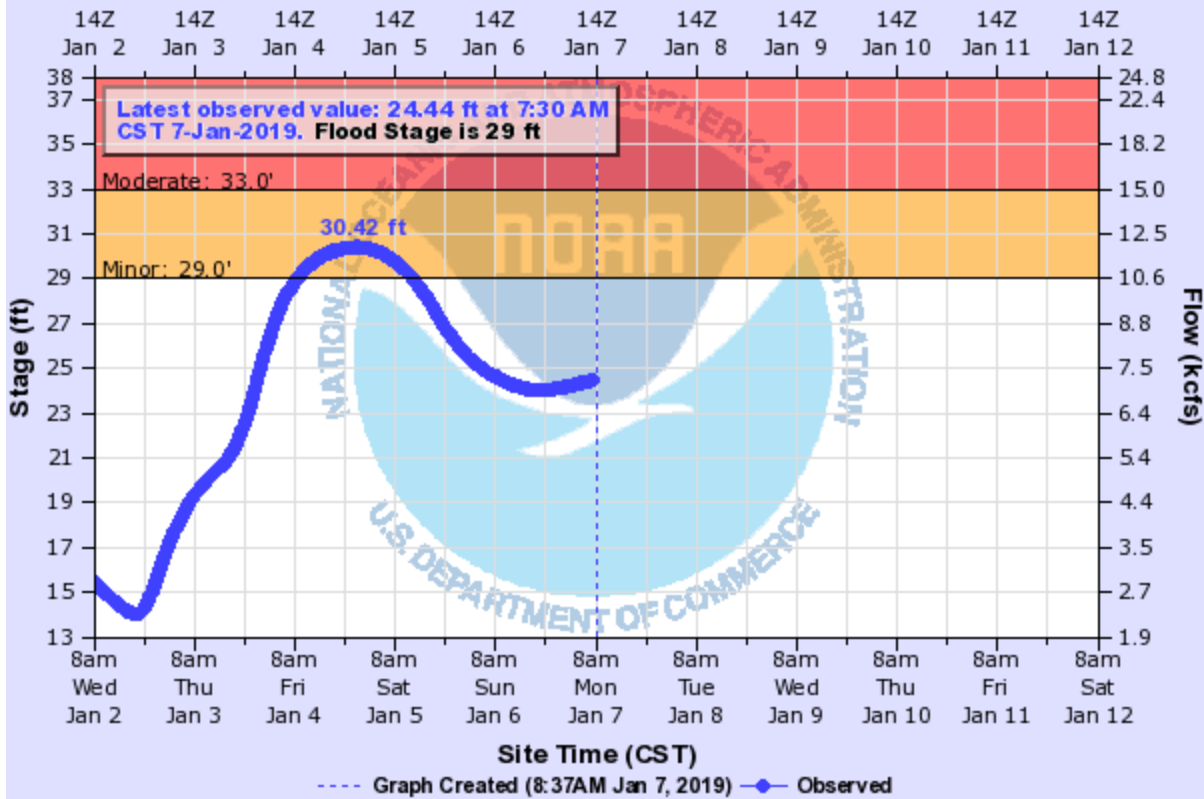
- 0 Flash Flood Warnings (FFW)
- 0 Flash Flood Statements (FFS)
- 0 Flash/Areal Flood Watches (FFA) (0 Watch FFA CON/EXT/EXA/EXB/CAN)
- 2 Urban and Small Stream Advisories (FLS)
- 0 Areal Flood Warnings (FLW)
- 0 Areal Flood Statements (FLS)
- 6 River Flood Warnings (FLW) (includes category increases)
- 32 River Flood Statements (FLS)
- 7 River Flood Advisories (FLS) (20 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:



POTEAU RIVER NEAR PANAMA

Universal Time (UTC)

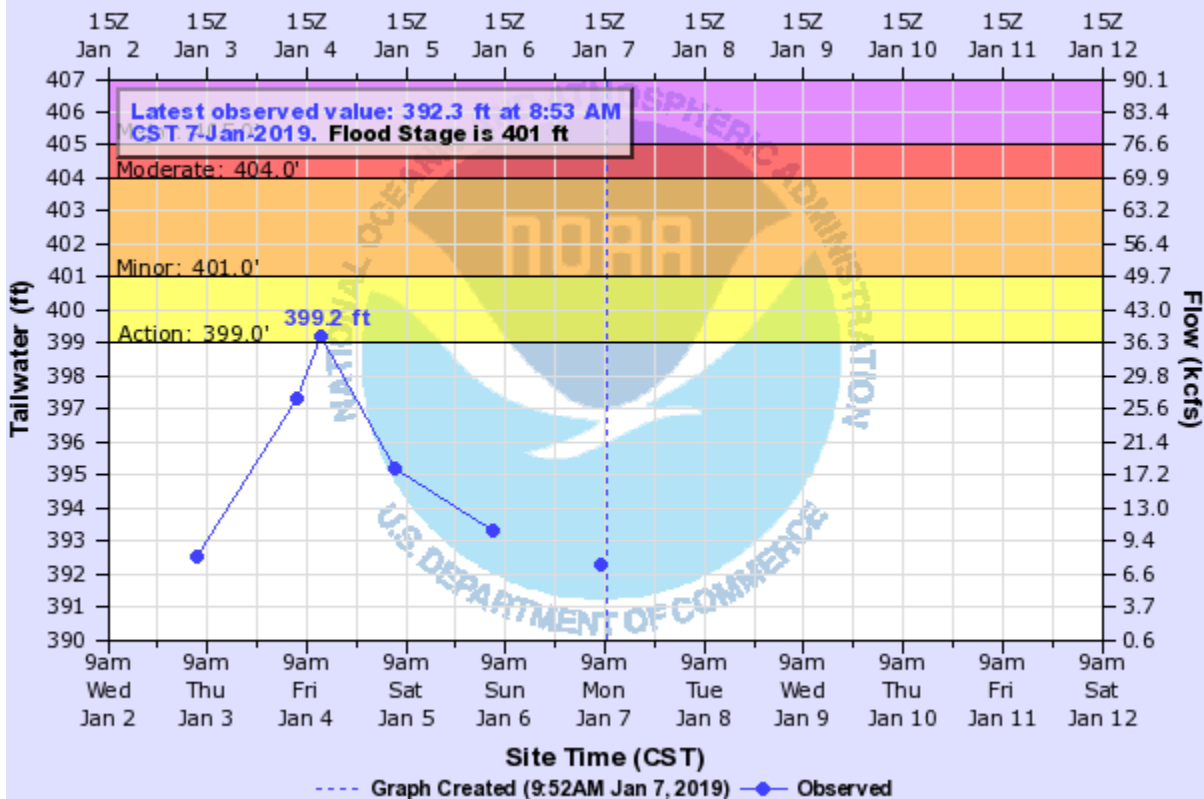


PANO2(plotting HGIRG) "Gage 0" Datum: 387.96'

Observations courtesy of US Geological Survey

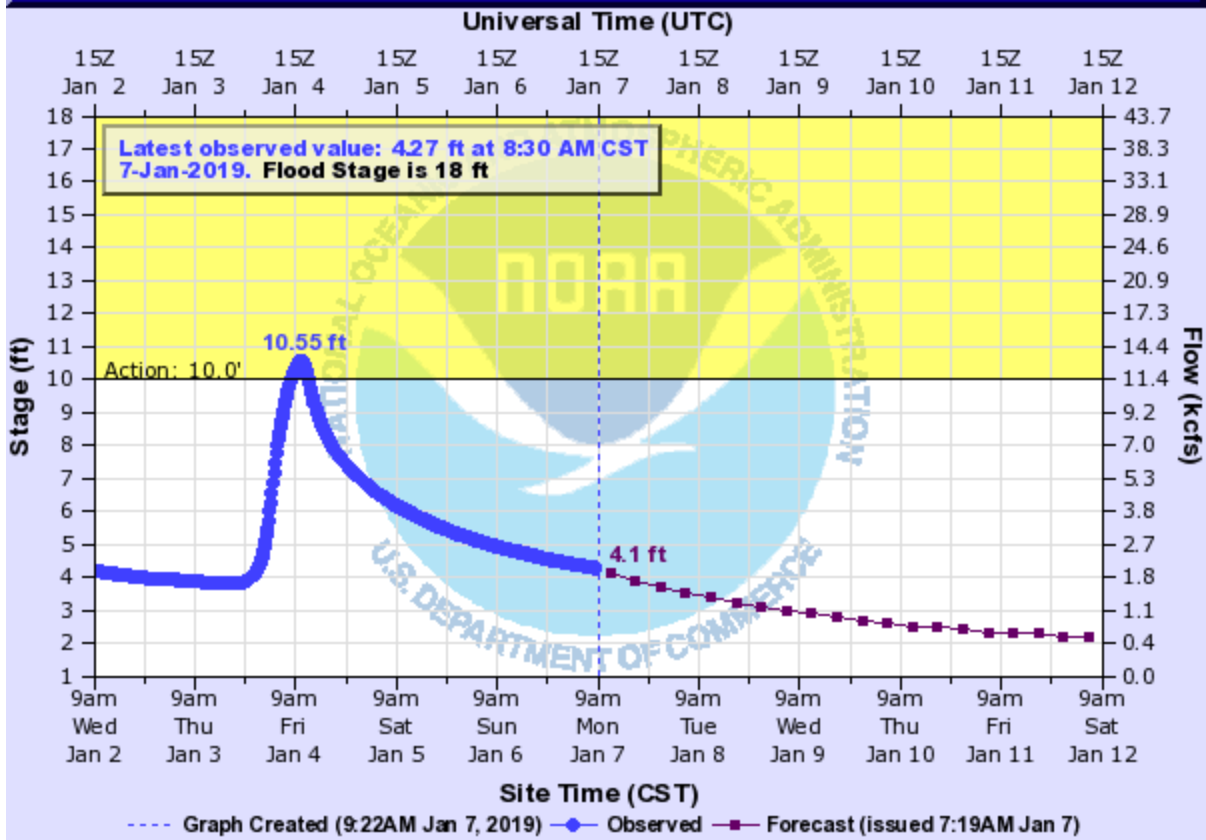
LEE CREEK NEAR VAN BUREN LCR

Universal Time (UTC)



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

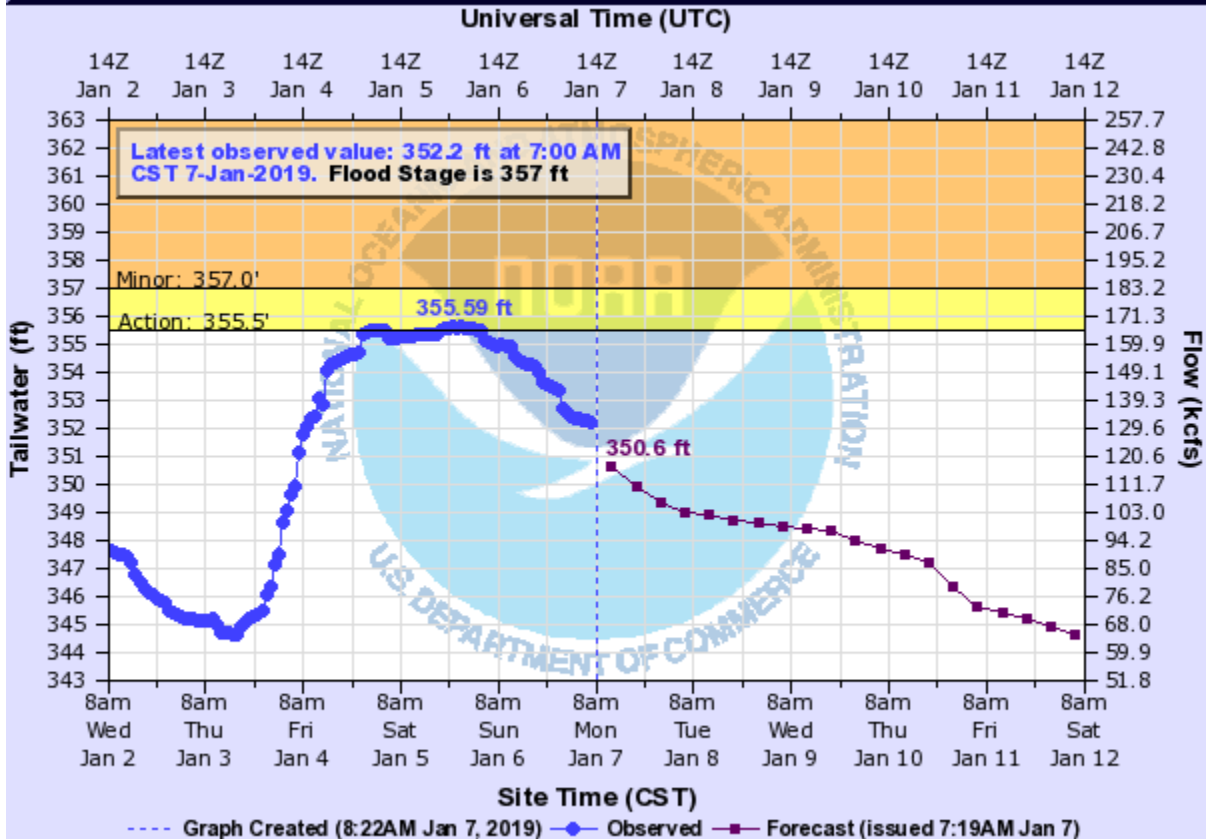
MULBERRY RIVER (AR) NEAR MULBERRY



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

Observations courtesy of USGS/USACE/ADEQ

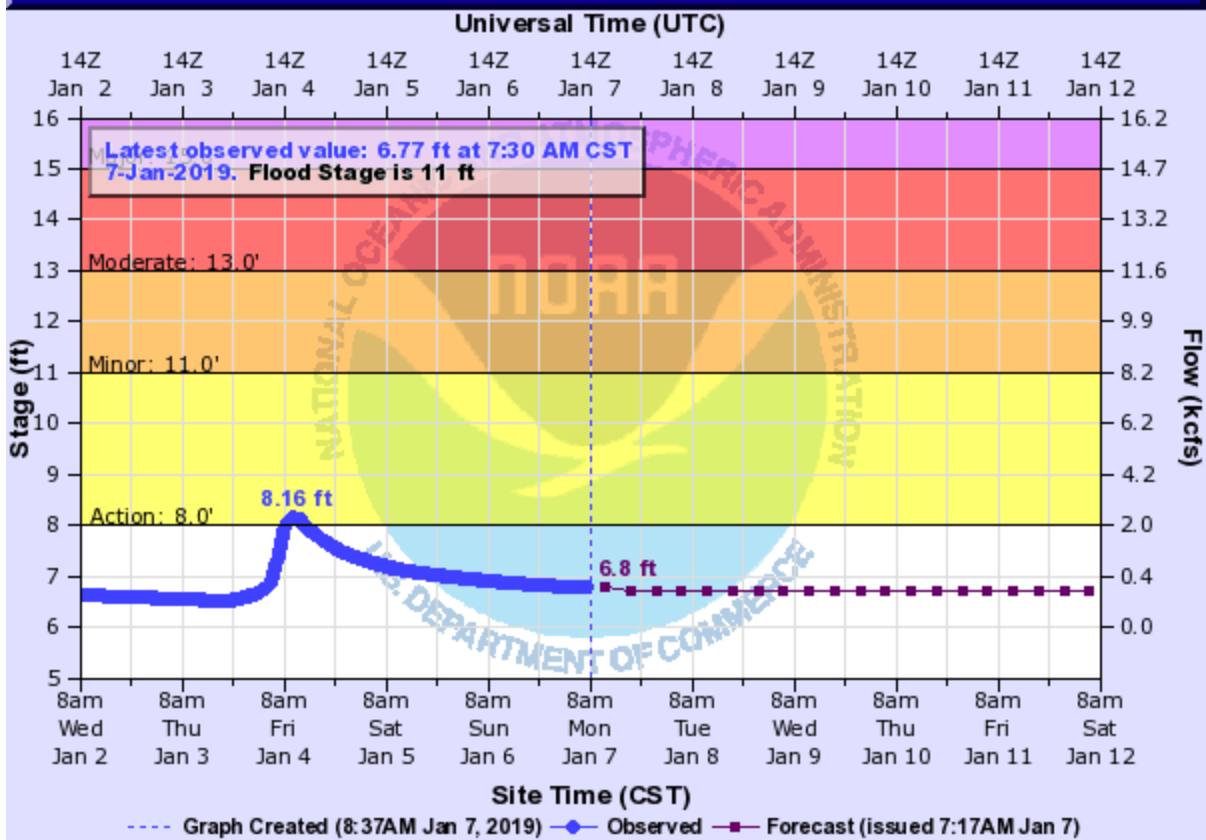
ARKANSAS RIVER AT OZARK L/D TAILWATER



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

Observations courtesy of US Army Corps of Engineers - LRD

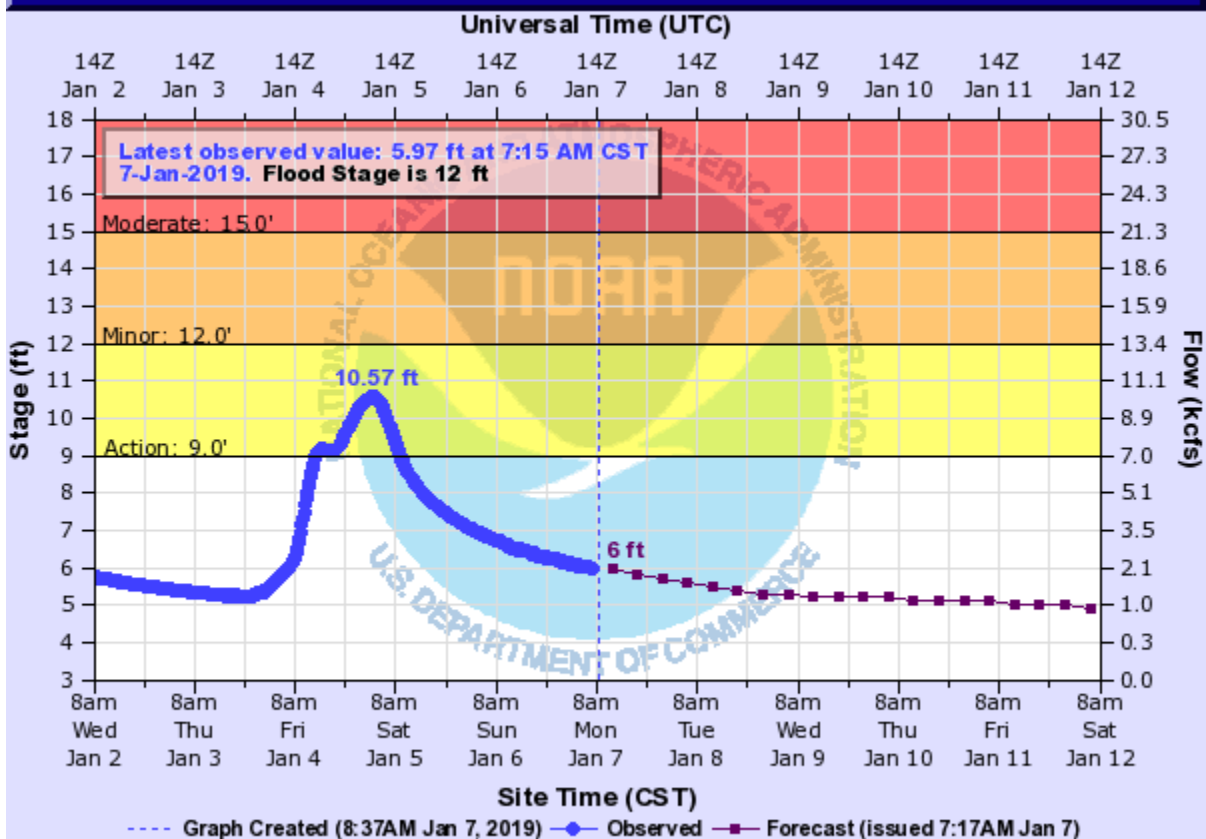
FLINT CREEK (OK) NEAR KANSAS



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

Observations courtesy of US Geological Survey

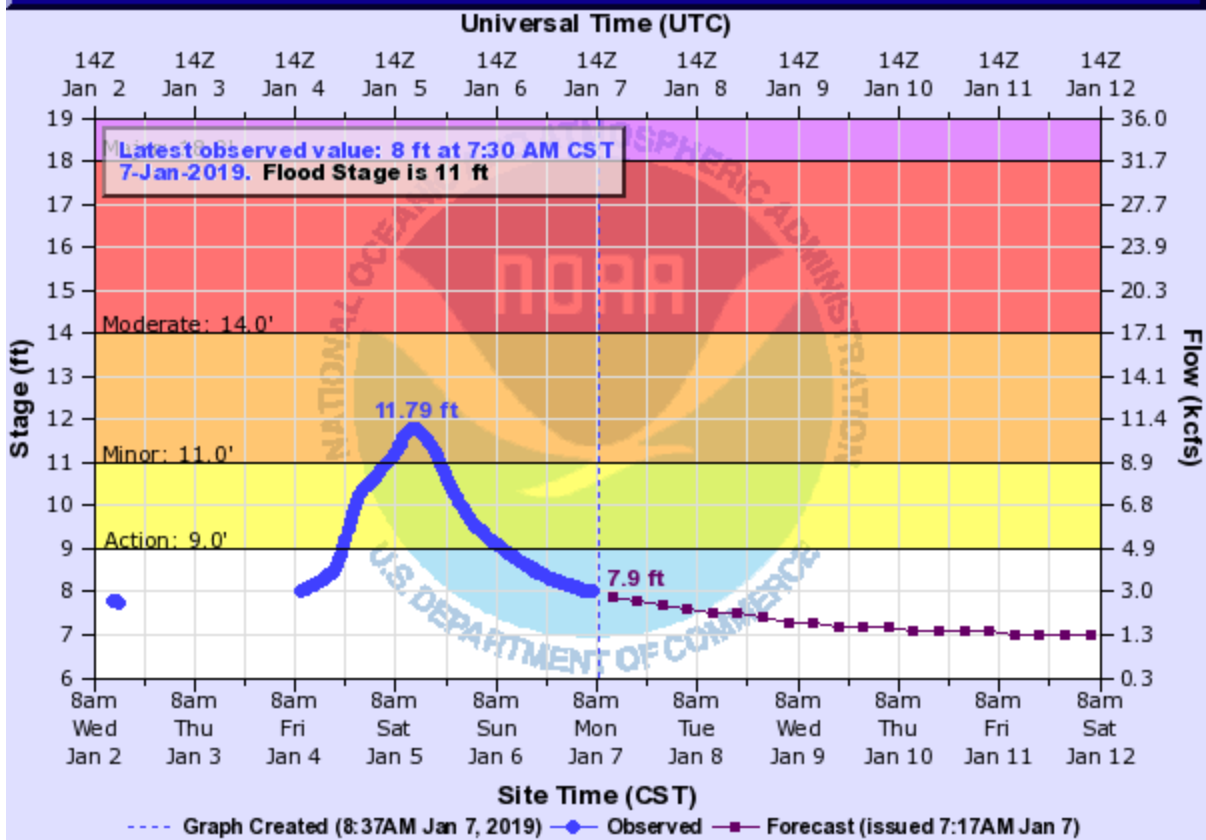
ILLINOIS RIVER (AR OK) AT CHEWEY



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

Observations courtesy of US Geological Survey

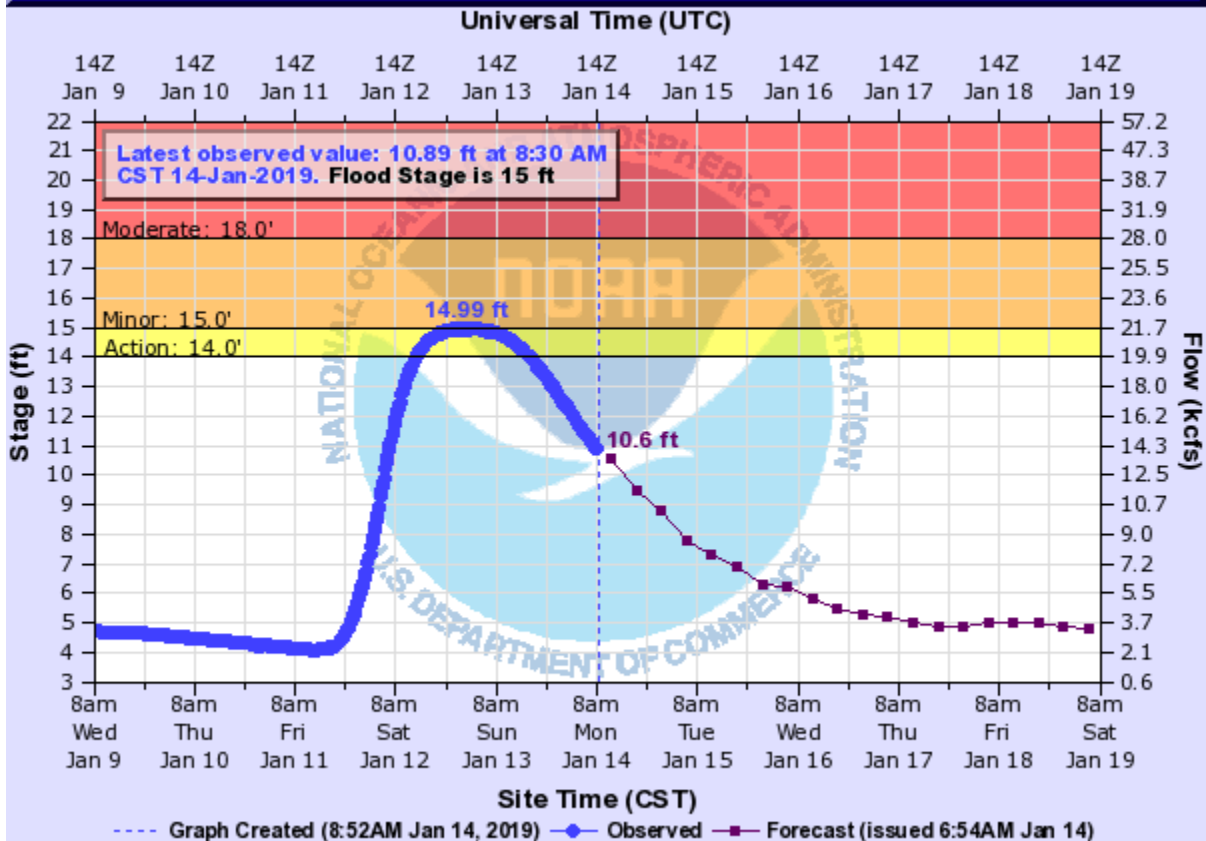
ILLINOIS RIVER (AR OK) NEAR TAHLEQUAH



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

Observations courtesy of US Geological Survey

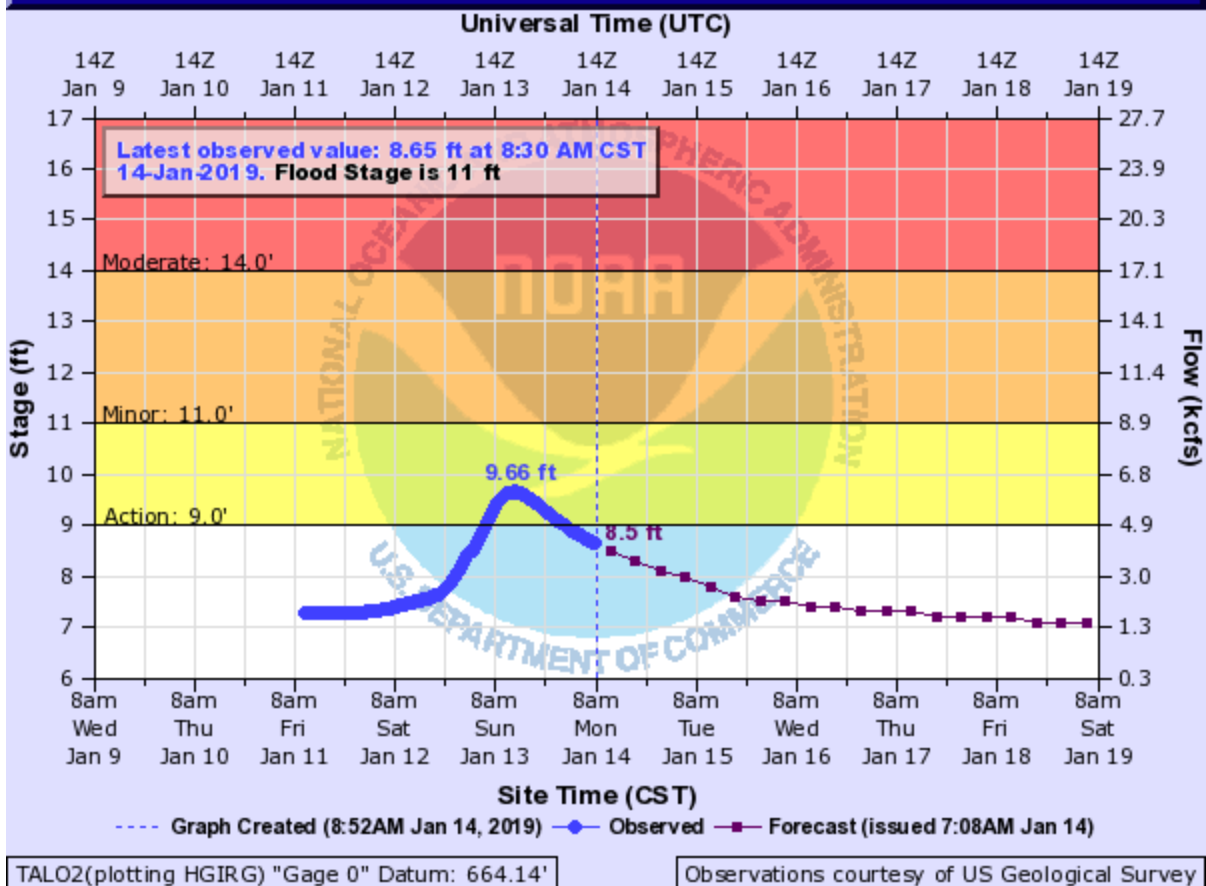
NEOSHO RIVER NEAR COMMERCE



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

Observations courtesy of US Geological Survey

ILLINOIS RIVER (AR OK) NEAR TAHLEQUAH



ILLINOIS RIVER (AR OK) NEAR TAHLEQUAH

