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Oklahoma WATER ISSUES

Valuing Oklahoma's Water

BY DR. STEVE PATTERSON

Valuing Water: Economy, Ecology, and Culture is the theme for this year's conference of the Oklahoma Clean Lakes and Watersheds Association which will be held March 29 & 30, 2016 in Stillwater.

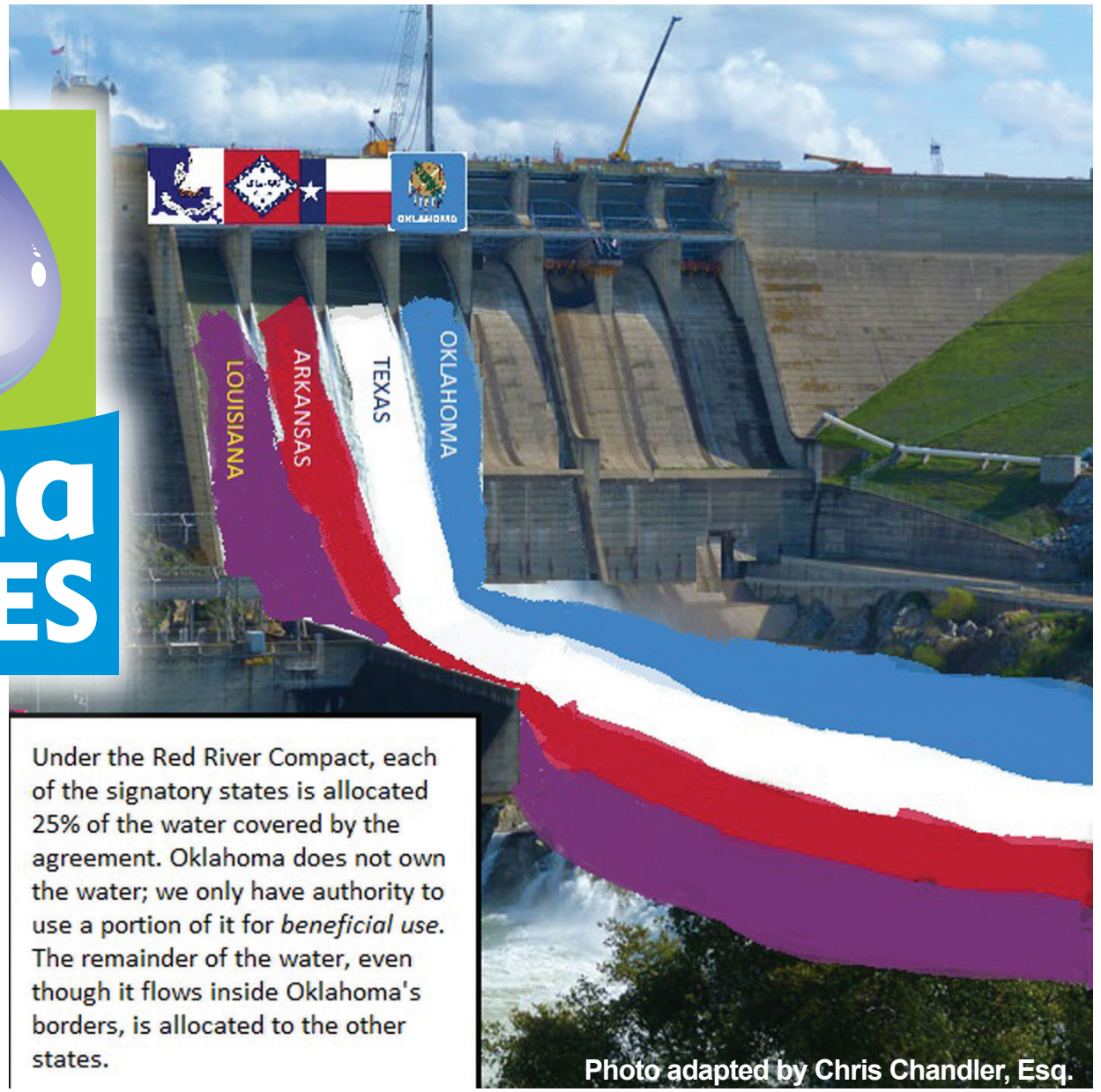
From economists to fishermen, from water providers to Native American elders, a full day of speakers will address the multiple values of water in life and in our economy.

We will look at different methods for placing a value on water and for in turn using that information to protect water and the landscapes dependent on it.

Speakers will include university scientists and scholars, leaders from local, state, and federal water agencies, from the Choctaw and Chickasaw Nations, and water planning

Turn to **VALUES**, page 3

RELATED STORIES



Under the Red River Compact, each of the signatory states is allocated 25% of the water covered by the agreement. Oklahoma does not own the water; we only have authority to use a portion of it for *beneficial use*. The remainder of the water, even though it flows inside Oklahoma's borders, is allocated to the other states.

Photo adapted by Chris Chandler, Esq.

The Red River Compact & Oklahoma

""Oklahoma's future is solely dependent upon our ability to manage our water resources. Tourism, recreation, culture, history, and wildlife are sustainable sources of economic activity for Oklahoma, even during repeated cycles of extreme drought.

- Rick Branam, ORWP Vice-President & OK Retired District Judge

Advocates for out-of-state water sales are back at it! They are trying to sell the decades-old idea by preying on fears over Oklahoma's growing budget deficit. There are several legal, scientific, and moral reasons why out-of-state water sales are not possible.

First, Oklahoma does not have a right to all the water that flows into the Red River. The state signed the Red River Compact, which fairly divides the entire Red River basin among Oklahoma, Texas, Arkansas, and Louisiana.

Second, the Red River Compact bluntly prevents the hoarding of water from downstream neighbors. The Compact directs each state to use compacted water only for beneficial uses, "Each Signatory State may use the water allocated to it by this Compact in any manner deemed beneficial by that state."

However, Oklahoma does not recognize the out-of-state transport, export, and/or sale of water as a beneficial use. The State of Oklahoma does not have the right to horde all water that otherwise would flow to our neighbors so that we can extort them for money.

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Looking to stay in touch with Oklahoma's water news?

New Website

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ORWP has a newly designed website at the same 'ol address. On our front page, you will find a live news feed on all of Oklahoma's latest water news. The news feed is also published in RSS for those of you who subscribe to news feeds.

The latest news and information is also shared on ORWP's facebook and twitter accounts. @ORWP_NOW has just joined twitter, so be sure to look us up

Oklahoma Blue Thumb

www.ok.gov/conservation/Agency_Divisions/Water_Quality_Division/WQ_Blue_Thumb/index.html

An often overlooked part of conserving our water resources is simply keeping our water healthy. Clean, healthy lakes, rivers and streams are waters available not only for domestic and commercial use, but also crucial to Oklahoma's $7.1 billion recreation and tourism industry. Oklahoma Blue Thumb is a water pollution and water quality education program that operates under the Oklahoma Conservation Commission Water Quality Division.

Students, Girl and Boy Scout troops, families and individual citizens are Oklahoma Blue Thumb volunteers who monitor 100 streams across Oklahoma, screen groundwater and educate the public about pollution prevention.

Values

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practitioners.

OCLWA has been bringing people together annually to learn and share information about water and water quality for 25 years.

In addition to the slate of speakers on the conference theme, expect a wide range of topics to be explored in other talks over the two-day conference.

You will hear reports on fish, mussels, and other aquatic wildlife, the status of water quality across the state, learn about streambank and riparian restoration and its benefits, about what volunteer organizations are doing to improve and monitor water quality in local communities—and much, much more!

If you would like to attend, or for more information, visit the OCLWA website at www.oclwa.org.

Conducting Ethnographic Research in the Kiamichi Watershed

by Dr. Mike Stanton - University of Oklahoma

While living and working in the Kiamichi Region I have spent most of my time interacting with local people during several events, discussions, and interviews.

In-depth interviews focus on key stakeholders and industries to better comprehend the context in which regional socio-economic and ecological conditions are understood and interpreted.

These observations are critical to understanding the values and activities of individuals, resource managers, community organizations, and other decision makers.

"Water, it's our lifeline and we need to protect it."

KIAMICHI BASIN RESIDENT

The Kiamichi is an economically poor area of the state and diversification through multiple sources of income is key to long-term economic survival in the region.

A focus on agriculture as a primary means of subsistence and an expanding tourism industry highlight regional vulnerabilities and the importance of socio-ecological resilience to the region.

An overwhelming majority of the people I have spoken with are concerned about the future of water use and allocation in the region and having enough water in the lakes and streams to continue living and working in the Kiamichi Region.

Discussions and observations of the past growing season suggest that the notion of surplus water in the region is not supported by the realities of a landscape that is highly susceptible to drought conditions.

One person I interviewed summed up the predominant view of participants in the Kiamichi by saying; "Water, it's our lifeline and we need to protect it."

My ethnographic research in the Kiamichi Watershed continues to build on a body of data provided by participants from diverse socio-economic backgrounds who have very generously offered useful insights into changing land-use and resource patterns throughout the region.

OKLAHOMA EPSCoR

UNIVERSITY OF OKLAHOMA CENTER for APPLIED SOCIAL RESEARCH

Social demand for ecosystem services in the Kiamichi River Basin

from Dr. Caryn Vaughn, Presidential Professor of Biology - University of Oklahoma

There are well known competing demands for the high quality water that flows through rivers in southeastern Oklahoma.

Dr. Caryn Vaughn and her colleagues at the University of Oklahoma recently completed a sociocultural preference assessment for the ecosystem services provided by the Kiamichi River..

Healthy freshwater ecosystems provide essential ecosystem services that benefit society including drinking water and irrigation, water quality and habitat for aquatic species, and recreation and spiritual enrichment.

Vaughn's group conducted over 500 face-to-face interviews with "ecosystem service beneficiaries", i.e. watershed residents, tourists and eventual water users in Oklahoma City.

They found that all beneficiaries thought that habitat for species and water regulation were important, but that there were differences in the perceived importance of specific ecosystem services among different beneficiary groups.

This information can be used in water allocation planning. This research was recently published in the Journal of the American Water Resources Association.

Castro, A.J., C.C. Vaughn, J.P. Julian and M. Garcia-Llorente. 2016. Social demand for ecosystem services and implications for watershed management. Journal of the American Water Resources Association. DOI: 10.1111/1752-1688.12379

Dr. Caryn C. Vaughn

Oklahoma Map of Open Surface Water Body in 2010 at 30-m Spatial Resolution from Landsat Images

FROM DR. XIAO XIANGMING - UNIVERSITY OF OKLAHOMA

Summary

Surface water body is important natural resource and provides ecosystem services to millions of people in Oklahoma.

Geospatial datasets of surface water bodies in Oklahoma are used to support water resource management, and climate modeling.

The researchers at the Earth Observation and Modeling Facility, University of Oklahoma are carrying out a pilot project to map open surface water bodies in 2010, which aims to lay a sound foundation for mapping annual dynamics of open surface water bodies from 1985 to 2015 in the State.

Data and Methods

We use Landsat TM and ETM+ images at 30-m spatial resolution in 2010. Several water-related spectral indices are used to map surface water bodies, including the mNDWI (Xu, 2006).

Provisional Open Surface Water Body Data Product (Year 2010)

There are 36,262 water bodies, and their sizes range from 900 m2 (single pixel) to 336 km2. The total area of water bodies is ~2,334 km2, accounting for 1.29 % of entire state (181,195 km2).

Reference

Xu, H., 2006, Modification of normalized difference water index (NDWI) to enhanced open water features in remotely sensed imagery, International Journal of Remote Sensing, 27(14): 3025-3033

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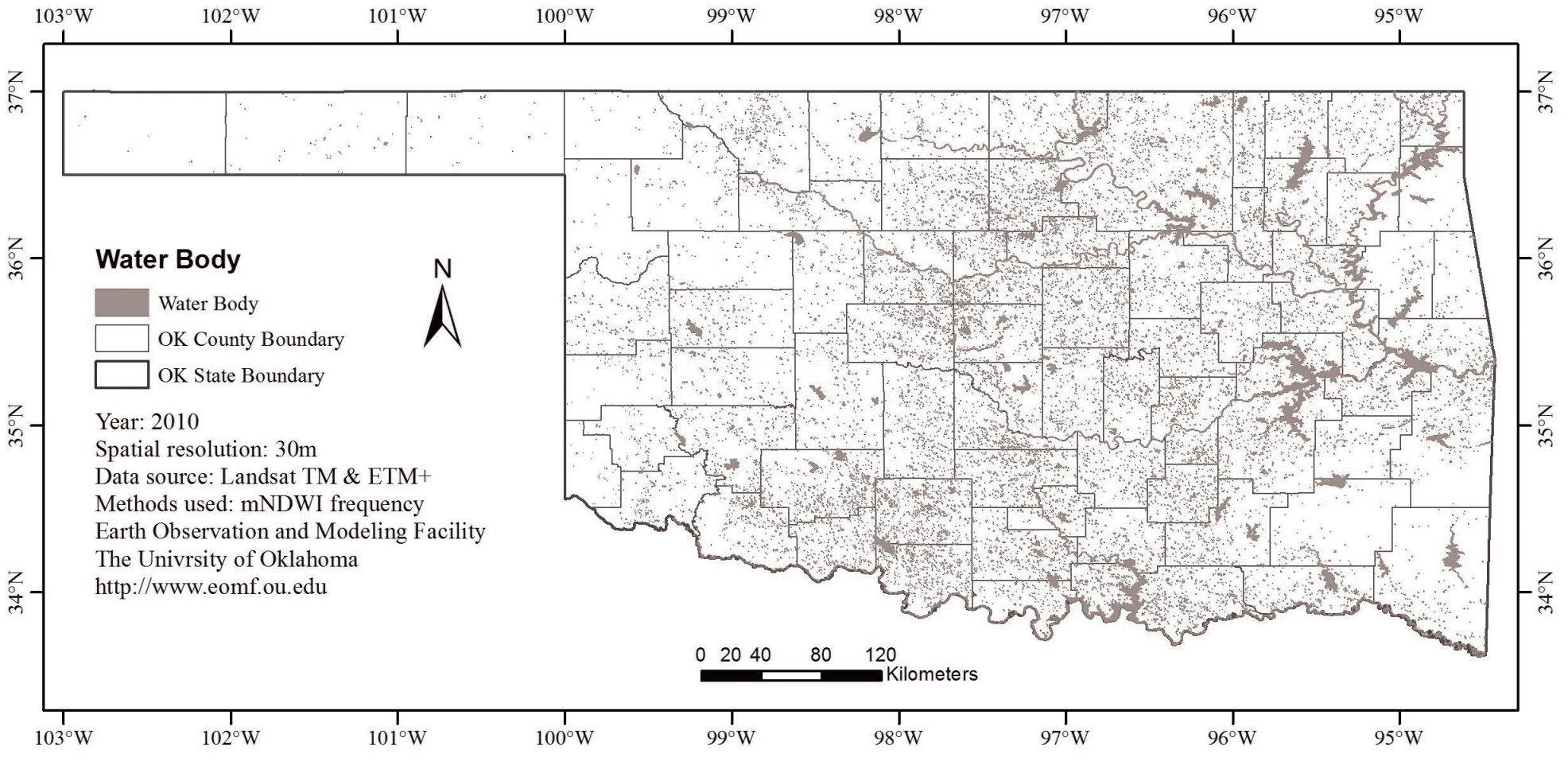

Figure 1. *Spatial distribution of open surface water bodies in Oklahoma in 2010 at 30-m spatial resolution*

Oklahoma WATER ISSUES

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Advancing the Science: USGS State Grant Recipients Selected for 2016 Funding by the Oklahoma Water Resources Center

from Dr. Garey Fox - Oklahoma State University

The Water Resources Research Act of 1964 authorized the establishment of a water resources research and technology institute or center at a land-grant university in each state.

As a result of the Water Resources Act, the Oklahoma Water Resources Research Institute (OWRRI, currently known as the Oklahoma Water Resources Center) was founded in 1965 at Oklahoma State University.

This Act (also known as the USGS 104(b) grant program) provides base support for identifying water resources research needs, selecting university researchers equipped to conduct beneficial research, and leveraging federal funds with other resources to sponsor the investigators.

The non-federal portion of the required 2:1 non-federal:federal funding match was provided by the Oklahoma Agricultural Experiment Station.

Although headquartered at OSU, the Oklahoma Water Resources Center (http://water.okstate.edu) serves the entire state of Oklahoma. The Center strives to help Oklahoma achieve high levels of water quality and sustainable use through integrated programs of research, education, training, and technology assistance.

During the past 50 years we have funded scores of research projects that help us understand Oklahoma's water needs and solve problems. This year was no different.

After a competitive selection process, including external proposal reviews and input from our Water Research Advisory Board, we announced projects to be funded in 2016.

Project titles and investigators of the selected projects are below. More information about each of these projects is at http://water.okstate.edu/funded-projects.

Above: Evaluating the Reuse of Swine Lagoon Effluent and Recycled Municipal Water for Agricultural Production (Hailin Zhang, Doug Hamilton, Saleh Taghvaeian, Scott Carter)

Western Oklahoma Irrigation Water and Energy Audits: Findings, Recommendations & Educational Materials (Scott Frazier, Saleh Taghvaeian, Jason Warren, Don Sternitzke, Cameron Murley)

Left: Algal Remediation of Waste Water Produced during Hydraulic Fracturing (Nurhan Dunford, PI)

Oklahoma Water Resources Center

Red River Basin Drawing More Attention In Drought

BY MIKE RAY

Concerns about and conflicts over water in the Red River Basin have been growing because of increases in water use for power generation and other purposes and a chronic drought in Texas aggravated by the mounting need for drinking water in the Dallas-Fort Worth metroplex.

The Tarrant Regional Water District, which serves the Fort Worth, Texas, area, has tried to obtain water from Red River tributaries in Oklahoma, but Oklahoma denied the claim and the U.S. Supreme Court sided unanimously with Oklahoma, 9-0, in 2013. The nation's high court cited provisions of the Red River Compact, a congressionally sanctioned agreement adopted in 1978 that allocates water rights within the Red River basin among the states of Oklahoma, Texas, Arkansas and Louisiana.

A new USGS study evolved from a resolution adopted by the Oklahoma Legislature a year and a half ago. In Senate Concurrent Resolution 32 by former Sen. Jerry Ellis, D-Valliant, and former Rep. Curtis McDaniel, D-Smithville, the Oklahoma Legislature appealed to Congress to instruct the USGS to conduct "a master multi-state study" of the Red River basin, analyzing the quantity and quality of water along the entire length of the river and its entire watershed.

The USGS will "update old studies" pertaining to surface water, groundwater, and rainfall runoff, said William J. Andrews, a hydrologist who is director of the USGS Water Science Center in Oklahoma City.

"It's part of our national water census," he said. The new study will "contribute additional knowledge to what we know about the watershed from Texas to the Red River's confluence with the Mississippi River."

Upstream Diversions Would Affect Salinity Levels

Any significant upstream diversions or withdrawals of water that would affect salinity levels of the Red River would be challenged by commercial interests at Lake Texoma.

The Red and several of its myriad tributaries ñ which include the 295-mile-long Washita River, which forms in the Texas Panhandle and passes through Roger Mills, Custer, Washita, Caddo, Grady, Murray, Carter and Johnston counties before it empties into Lake Texoma ñ carry heavy loads of sediment and salts. The estimated natural chloride load in the Red River Basin is 4,400 tons per day. (Chlorides constitute only about one-third of the total dissolved solids in the river, the U.S. Army Corps of Engineers reports.)

"Landowners and other citizens downstream from Lake Texoma... would be adversely affected if significant volumes of freshwater were diverted from the Red River."
RICHARD BRONTOLI
Executive Director
Red RIver Valley Association

Lake Texoma stakeholders "are concerned about removal of natural chloride in the river and tributaries" above the reservoir because reducing the salt concentrations could have an adverse effect on the multimillion-dollar annual striped-bass fishing industry of the lake, Andrews pointed out.

A Corps of Engineers study six years ago estimated that Lake Texoma attracts seven million visitors each year, including 62,000 Oklahoma anglers and 39,000 Texas fishermen and women. The lake also is credited with supporting more than 2,500 fishing-related jobs in the two states.

The Corps contends that lowering the chlorides in the Red River would have a "minimal impact" on the adult population of striped bass in the lake, but added that there is no consensus on the survival rate of young striped bass if the chloride content decreased substantially.

Red River Water Diluted Downstream from Denison Dam

Landowners and other citizens downstream from Lake Texoma, particularly in Arkansas and Louisiana, would be adversely affected if significant volumes of freshwater were diverted from the Red River, thereby increasing its salinity, noted Richard Brontoli, executive director of the Red River Valley Association.

Freshwater tributaries of the Red River include the Kiamichi River and Boggy Creek in southeastern Oklahoma, downstream from Denison Dam, which impounds the Red to create Lake Texoma.

Most of the rain that falls in the drainage basin from below Lake Texoma to Shreveport is considered "uncontrolled" since much of that rainfall enters the Red River through streams, creeks or bayous that do not pass through a lake, Brontoli said. "This large, uncontrolled area contributes a lot of fresh water" to the Red River.

Consequently, the river is a direct source of drinking water for Bossier City, La. In addition, the Natural Resources Conservation Service of the U.S. Department of Agriculture is participating in a Red Bayou Watershed Project north of Shreveport, La., in which approximately 14,000 acres of crops are irrigated with water siphoned from the Red River.

Water-grabbing: is Oklahoma next?

BY CHRIS CHANDLER, JD

Over the last 20 years, Saudi Arabia emptied an aquifer which had been supplying water to people in the desert since biblical times. Now companies from Saudi Arabia and the UAE are pumping vast amounts of water from aquifers in drought-stricken Arizona and California. Oklahoma could be next.

While Oklahoma law generally prohibits foreign ownership of Oklahoma real estate outside of "incorporated cities and towns" per Article 22 § 2 of the Oklahoma Constitution and " no foreign corporation shall be formed or licensed ...for the purpose of owning or leasing any interest in land to be used in the business of farming or ranching" per Title 18 § 951, there appears to be an exception in § 953(C) for corporations engaged in "food canning operations, food processing or frozen food processing insofar as such corporations engage in the raising of food products for aforesaid purposes." A 1999 Attorney General Opinion states "Domestic and foreign corporations that are engaged in enumerated operations may own or lease an interest in land to be used in the business of farming or ranching pursuant to 18 O.S. 953(C) and 18 O.S. 954 (1998)." 1999 OK AG 50, at ¶6. (emphasis added).

There is no incentive for a foreign corporation to conserve groundwater. The long-term effects will not impact Saudis, Emiratis, or Chinese; they will just move their operation to another location, leaving their former neighbors to deal with the consequences. Almarai Co., the Saudi dairy corporation which purchased 15 square miles of land to grow alfalfa in Arizona, did so because the area they purchased, unlike other parts of Arizona, has minimal restrictions on groundwater. They will drain the aquifer, then move on.

Foreign-owned corporations are already operating in Oklahoma. Smithfield Foods, Inc., headquartered in Smithfield, Va., is now a subsidiary of Chinese Shuanghui Group, now known as WH Group. Smithfield already has hog-farm operations in Oklahoma. It is vital that Oklahoma clarify and strengthen its laws to protect its water from being plundered by foreign corporations.

COMPACT

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Third, the US Supreme Court unanimously ruled in 2013 against the diversion of water by Texas before it reaches the Red River. Likewise, if Oklahoma were to attempt the same diversion of water for more nefarious purposes, then they'd undoubtedly be dealt the same heavy-handed blow from the US Supreme Court.

Fourth, if Oklahoma were to start hoarding and selling water, then a multi-state lawsuit would explode. Why?

Downstream states, irrigators, and other water right holders who have been pumping from the Red River for decades have vowed to hold Oklahoma accountable in the court of law if Oklahoma were to violate their dual commitment to improving water quality and navigation on the Red River. The Compact is a matter of water quantity and quality.

Lastly, it is ethically wrong to advocate that Oklahoma sell its most vital and precious resource – as if it were oil, gas, or some other commodity. Oklahoma's state agencies, legislature, tribal nations, and universities are hard at work conducting scientific studies to gather the information we need to make responsible decisions.

For instance, Senate Concurrent Resolution 32 adopted by the Oklahoma legislature in 2014 kicked-off a master study of the Red River; Governor Mary Fallin has masterminded the state's most arduous water goals by initiating studies through the Water for 2060 and Instream Flow committees; and, Oklahoma is beginning to research and learn about the connection between surface and groundwater.

Rick Branam, ORWP Vice-President and retired Oklahoma District Judge, envisions, "Oklahoma's future is solely dependent upon our ability to manage our water resources. Tourism, recreation, culture, history, and wildlife are sustainable sources of economic activity for Oklahoma, even during repeated cycles of extreme drought. These industries paint a bright picture for Oklahoma hundreds of years into the future – if our water is managed responsibly."

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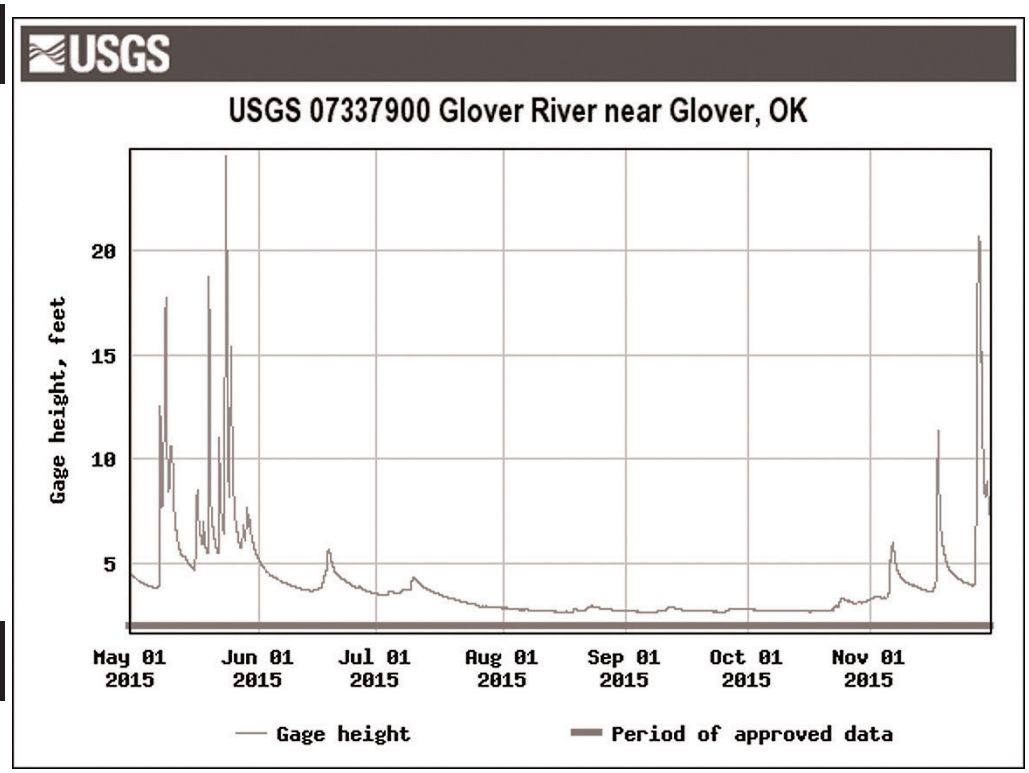
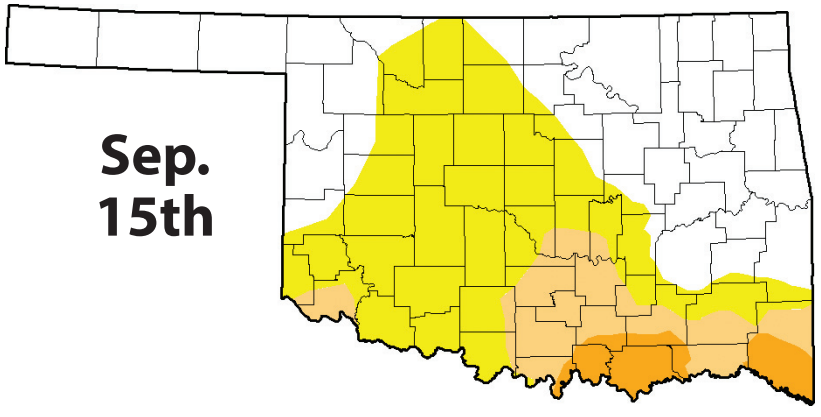
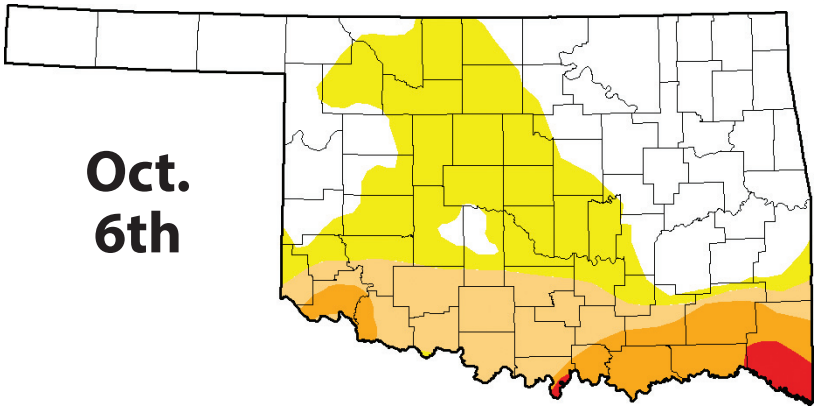


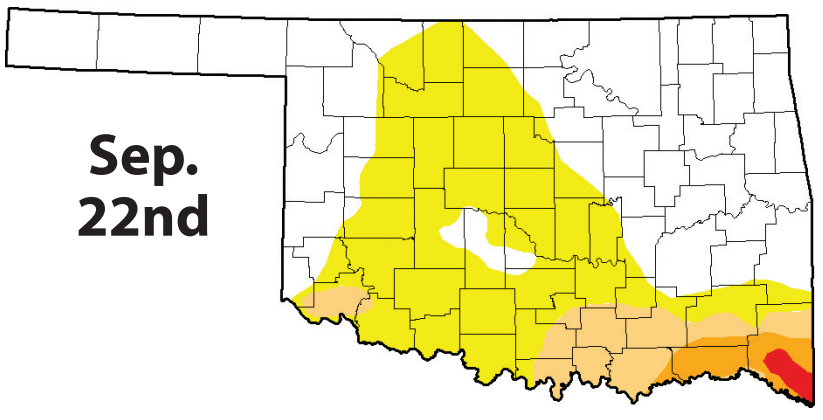
Glover River gauge height May thru November 2015. This graph demonsrates that surface water flows out of Oklahoma very quickly.

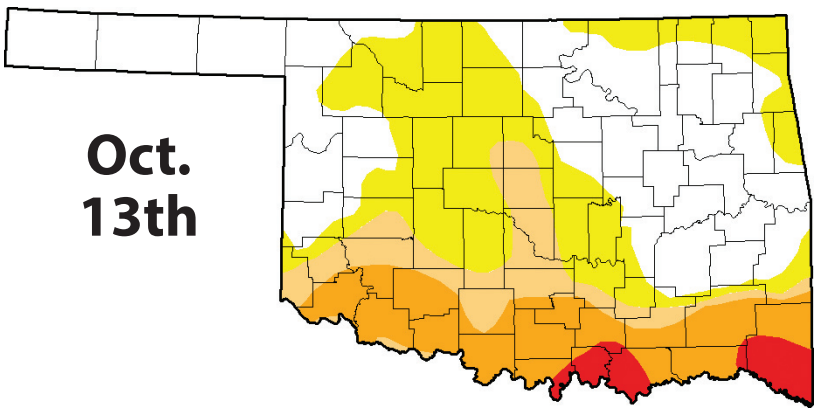
EXTREME DROUGHT 2015

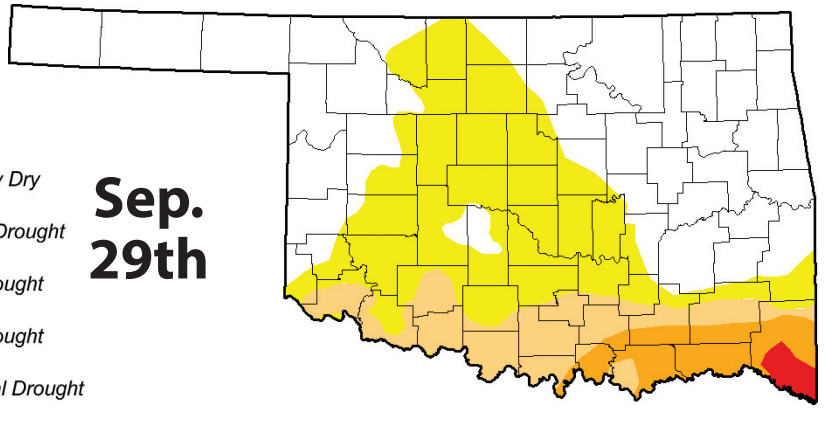
US Drought Monitor
OKLAHOMA



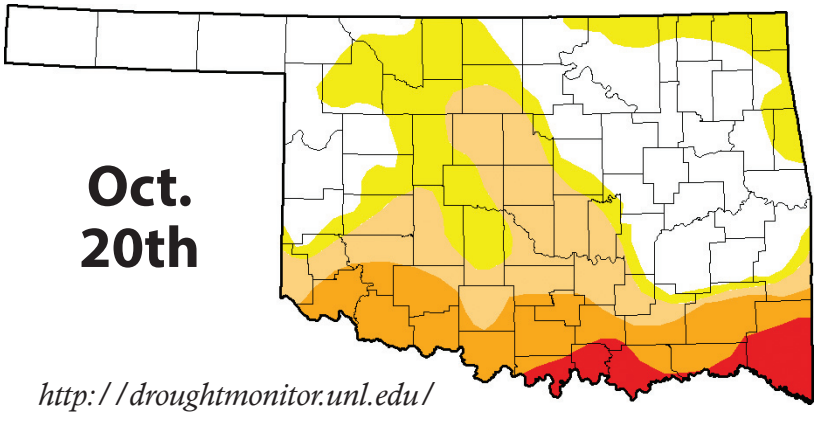








Intensity
- *D0 Abnormally Dry*
- *D1 Moderate Drought*
- *D2 Severe Drought*
- *D3 Extrme Drought*
- *D4 Exceptional Drought*



http://droughtmonitor.unl.edu/