

# THE AQUAHOMAN

Volume X, Issue III, August 2014

The newsletter of the

**OKLAHOMA  
WATER RESOURCES CENTER**

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### INTERIM DIRECTOR:

**Garey Fox**

**PROGRAM  
COORDINATOR:  
Leslie Elmore**



## From the Director's Desk (by Garey Fox)

It is an exciting time in the Oklahoma Water Resources Center! My first two months as Interim Director have been busy "learning the ropes" and initiating programs that will benefit Oklahoma water resources.

The process to fund a new round of water research grants, open to researchers at any Oklahoma university, through the USGS 104(b) grant program is underway. Funding for the USGS 104(b) grant program comes through the Water Resources Research Act, a unique grant program that is based on water research needs identified by state agency and tribal representatives. The grant program's impact is significant! An example is described in this issue, and additional stories will be included in future publications.

The Oklahoma Water Research Symposium held in conjunction with the Governor's Water Conference is being planned. You won't want to miss this

year's event. A new session is being organized this year on "Research Conducted at Federal Agencies in Oklahoma" and ways to collaborate with these federal partners. Dr. Francois Birgand, a professor at North Carolina State University, will be presenting on real-time water quality monitoring, what he refers to as the "Next Leap in Hydrology". Attend the symposium to learn more about the amazing research being conducted across Oklahoma!

The Water Center recently compiled updated information on the various water research and Extension faculty in the Division of Agricultural Sciences and Natural Resources (DASNR) at Oklahoma State University. What resulted from this survey was confirmation of the intellectual horsepower and productivity (175 research and Extension publications in the last year and a half, six patents, and three book chapters) of DASNR water experts across a range of disciplines! Water issues in the state of Oklahoma, wheth-



**Dr. Garey Fox, Interim Director**

er water quantity or quality issues, require multidisciplinary solutions. The DASNR water faculty, especially in collaboration with other water faculty at OSU and also our sister Oklahoma institutions, possess the necessary knowledge and skills to reach optimal solutions to difficult water issues. The Water Center can help connect you to these outstanding individuals and help compile teams of experts. Find the booklet at [water.okstate.edu/connect/contacts/faculty-members](http://water.okstate.edu/connect/contacts/faculty-members).

One of the most exciting creations is a joint sympo-

*("Advances" continued on page 6)*

## **Scenic Rivers Administrator Says Protecting State Water is Vital**

(by Ed Fite, Administrator of the Oklahoma Scenic Rivers Commission)

During the more than 30 years that I have worked with the Oklahoma Scenic Rivers Commission, one thing has been consistently clear: We can never step back and say we have sufficient water resources and that the work of protecting our water is finished.

If we remain diligent, there will always be work to do. Our population is growing, and with it the demand for clean water. The Illinois River, the most renowned of Oklahoma's six designated scenic rivers, has been my home throughout the years I have been blessed to serve the state of Oklahoma. Two things I have observed concern me more now than ever before. First, people have a tendency to take clean water for granted. Second, most people know very little about the importance of our state's rivers.

Oklahoma claims more than 78,000 miles of rivers. There is no resource more important to our state than these rivers and the water that runs through their reaches.

About a month into the recent 2nd Session of the 54th Oklahoma Legislature, I found myself in lengthy discussion with Sen. Ron Justice and former Secretary of the Environment Gary Sherrer about the importance of water.

My intention was to impress upon them that while most Oklahomans recognize the necessity of good, clean and reliable sources of water in order to grow the food we eat, nourish our bodies, and provide for the varying uses to support our schools, businesses, industries, and overall economy, many have never paused to consciously consider the value of water.

The majority of us take for granted that each time we turn on the faucet of a sink, a bathtub, a drinking fountain or other water conveyance, water will flow endlessly. The majority of us don't really worry about the availability of water, although on a daily basis every one of us depends upon water for our very existence. We have yet to admit to ourselves this simple fact: although water may be a renewable resource, clean water is already becoming scarce.

Protection of the Illinois River and the other five scenic rivers dates back to 1970. It is a state policy to preserve and protect these special rivers.

In the 1970s, the Oklahoma Legislature enacted a law to designate approximately 200 miles of these rivers as state scenic rivers. In essence, the new policy declared that portions of these six rivers would be afforded the state's highest and best protections that could ever be brought to bear.

I serve on the Oklahoma Water Resources Board; my term is set to expire in one year. Looking at my own career realistically, I've remained with the OSRC for more than three decades simply because the Illinois River is my lifelong passion. As a child I learned to love this river and was taught that water is necessary to sustain life. As I'm in my waning days on this board and eventually will also be as OSRC administrator, this forces me to shift my attention to all Oklahoma waters. They are the most valuable natural resource we'll ever have.

When I ponder the value of water, I see much more than the food we produce, the physical and spiritual nourishment that water provides, and a healthy economy. It goes beyond sustaining our natural environment, fisheries, wildlife, and providing recreational opportunities.

What is it about water? Why are we drawn to it? More than 80 percent of the world's population lives immediately adjacent to water sources. In the winter when most folks are drawn to the warmth of a fireplace and captivated by its flames, I find myself drawn to the river – getting out a kayak or canoe and allowing myself to be captivated by the water.

Rivers are cultural, religious and sustaining gifts from God, and for me they are the lifeblood of the human soul.

Preservation of our water resources is a cause that has no end.



## Improving Drought Resilience in Oklahoma: ODAFF Ag Research and Education Extension Contract

(by Randy Raper, Associate Director of Oklahoma Agricultural Experiment Stations)

Numerous infrastructure and education projects will be completed statewide with the designated funds made available to the Oklahoma Agricultural Experiment Station (OAES) in 2014. These funds will be used to provide additional water resources at many of our research stations throughout the state, making possible additional research and extension activities that will focus on how best to utilize available water resources. A short description of activities around the state are listed below:

### WASTEWATER UTILIZATION

South Central Research Station at Chickasha, OK – The OAES will work with the City of Chickasha to utilize much of the 1.7 million gallons of wastewater currently being pumped into the Washita River every day. The pipeline to the river runs directly under our research station and will be tapped to allow access from a pumping station that will be placed nearby. The wastewater will enable irrigation to be used for crop research and crop production, both from a linear-irrigation system and drip-irrigation system. Research will be conducted to determine the usefulness and challenges associated with wastewater reuse for agricultural production purposes.

### INCREASING WATER DELIVERY EFFICIENCY

Tipton Valley Research Center at Tipton, OK – Given the devastating effects of the drought during last several years in southwestern Oklahoma, we have been unable to conduct research on irrigated crops at the Southwest Research and Extension Center in nearby Altus because of low water levels in Lake Altus. The lake currently sits at 11 percent capacity. Water cannot be used for irrigation purposes unless the lake is at least 22 percent full. A tornado leveled our Tipton research facility in 2011 and we have just finished construction of the new Tipton Valley Research Center. A new well will be drilled and a new linear-irrigation system will be installed to assist with addressing the need to increase irrigation efficiency in this region where water is becoming a scarce commodity.

Oklahoma Panhandle Research and Extension Center at Goodwell, OK – With the Ogallala aquifer continuing to decline and water becoming more difficult to acquire in the Panhandle of Oklahoma, we recently made a significant investment in a drip-irrigation system at Goodwell that optimizes water use for crop production. Ad-

ditional improvements to the drip-irrigation system will be made to expand its capacity and enable more research to be conducted using this highly efficient method of irrigation. In addition, our aging linear-irrigation systems have broken down several times this summer and will be replaced with newer, more efficient equipment. We hope these changes will extend the useful life of our current wells at Goodwell. The station recently lost one of its wells and we failed to obtain adequate water when we drilled another.



### INCREASING IRRIGATION CAPACITY

Stillwater Agronomy Station at Stillwater, OK – For four years, the water level at Lake Carl Blackwell has been too low for our two linear-irrigation systems to operate. Reasons for the inadequate water levels include the drought and additional water use from the lake for campus and drilling needs. Test wells will be drilled to determine if an adequate water supply can be found around the old creek bed near the lake inlet. If successful, a larger well will be drilled to obtain water for crop-production irrigation purposes.

Oklahoma Vegetable Research Station at Bixby, OK – Due to the success of the turf development team at Oklahoma State University, an additional research site is necessary. The best site in the state seems to be in the heart of the Oklahoma turf industry near our current research facility in Bixby. However, the station has an inadequate water capacity and facilities to fully develop this program at the location. An additional well will be drilled in the alluvial terrace of the Arkansas River to increase irrigation capacity at our Bixby facility. New equipment also will be installed that will include an additional linear-irrigation sys-

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## Documenting the Impact of the Water Center's Grants Program

(by Garey Fox, Interim Director, Professor, and Orville L. and Helen L. Buchanan Endowed Chair)

Remember the movie "Field of Dreams" and the famous line: "If you build it, he will come." In terms of the USGS grants program administered through the Oklahoma Water Resources Center, the equivalent line could be: "If you research it (with USGS support), impact will come." We can discuss impact from a number of different perspectives: water quantity and quality information produced for the state of Oklahoma, journal publications, Extension fact sheets, student training, software, and patents. I can guarantee that the impact from our grants program is wide reaching and encompasses all the facets mentioned above!

Funding for the USGS 104(b) grants program in Oklahoma, formerly referred to as the Oklahoma Water Resources Research Institute (OWRRI) grants program, comes through the Water Resources Research Act. These funds are used to support state-based research important to Oklahoma's water resources. Research and Extension projects funded through this program are vested by representatives of Oklahoma's agencies and tribes, and the work explicitly supports the water-related information and research needs of the state.

One of the first projects I worked on upon arriving in Oklahoma was a 2007-funded OWRRI project titled "Subsurface Transport of Phosphorus to Streams: A Potential Source of Phosphorus not Alleviated by Best Management Practices". The project was also supported by matching funds from the Oklahoma Water Resources Board (OWRB). Project team members included Drs. Dan Storm, Glenn Brown, and Chad Penn.

The objective of the research was to determine the potential of subsurface transport of phosphorus in floodplains characterized by cherty or gravelly soils and the impact of preferential flow pathways on phosphorus transport. Subsurface transport is commonly assumed negligible for phosphorus transport from uplands to surface water systems; the primary transport mechanism is typically considered to be surface runoff. However, certain local conditions can lead to situations where subsurface transport may be significant.

The project established critical collaborations that have benefited my career in Oklahoma and without a doubt contributed to the reputation of the Oklahoma Water Resources Center, the Division of Agricultural Sciences and Natural Resources, and Oklahoma State University. For example, this research resulted in really what should

be referred to as a "research station" for Oklahoma State University along the Barren Fork Creek, owned by Mr. Dan Butler, the former director of Water Quality Division of the Oklahoma Conservation Commission (see figure).



As soon as it was announced that the team would receive funding through the OWRRI grants program, Dan Butler contacted us and offered the use of his land. My research program is indebted to Dan Butler for his generosity in allowing us to utilize his land for many research projects over the years. In fact, that single research site has contributed to the generation of 14 peer-reviewed publications and many more conference proceedings papers and presentations. One peer-reviewed publication resulting directly from the work (see figure below) funded by the OWRRI grant and matching funds from OWRB, was published in the *Journal of Environmental Quality*, one of the premier environmental science journals, and has been cited over 40 times since being published in 2009.

Critical collaborations were established with numerous Oklahoma leaders in the fields of water quality protection because of this OWRRI grant: Dan Butler, Ed Fite (Scenic Rivers Commission), Shanon Phillips (Oklahoma Conservation Commission), Greg Kloxin (Scenic Rivers Commission), and members of the Cherokee Nation, when Ed Fite invited me to share our results at a well-attended board meeting of the Oklahoma Scenic Rivers Commission and the project was highlighted as part of a field tour and demonstration for former Principal Chief Chad Smith of the Cherokee Nation.

That project evolved to such regional importance that additional federal funding was secured, including a na-

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tional USGS 104(g) grant and a US EPA Region VI grant, totaling more than \$350,000. The USGS 104(g) grant fostered even more collaborations with the USGS and with the University of Arkansas. The funding also contributed to the professional training and development of even more students, such as a recent Ph.D. graduate who is now a faculty member at the University of Nebraska-Lincoln.

Grant proposals are currently being submitted on this topic with collaborators at the University of Arkansas, University of Florida, and the University of Nebraska-Lincoln. New work is focused on developing modeling strategies to fully address the impact of subsurface P transport on the efficiency of riparian buffers.

I expect that most OWRRI grant recipients can tell similar stories from their previous projects: stories where the grants have produced software used for water rights administration in the U.S. and abroad, quantitative justification for best management practice implementation in the state of Oklahoma, and numerous additional publications and conference presentations.

More so today than ever before, these stories are critically important for demonstrating the impact of the OWRRI grant program. If you are awarded an OWRRI grant, impact will come. The Oklahoma Water Resources Center would love to hear and share stories from grant recipients. If you are a current or previous OWRRI grant recipient, what is your story? What was built from your OWRRI funding?

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tem for agronomic and horticultural crops as well as an underground system with pop-up sprinklers for turf research.

Cimarron Valley Research Station at Perkins, OK – Aging infrastructure has dramatically reduced our irrigation capability at Perkins. Replacement parts are no longer available on the wheel-line system currently used at the facility. A new linear-irrigation system will be installed to replace the outdated wheel-line system and allow greater research precision than was previously available. Also, we will be increasing irrigation capability for our horticultural crops, including our pecan orchard to reduce the influence of drought on vital research related to Oklahoma’s pecan industry, which produces approximately 25 million pounds of pecans annually. Of the nation’s top five pecan-producing states, only Oklahoma experienced an increase in the value of pecan production, from \$11.4 million in 2011 to \$24.7 million in 2012, according to the most recently available National Agricultural Statistics Service data.

**Know an Undergraduate  
Interested in Research?**



The Oklahoma Water Resources Center will be hosting an NSF-REU (Research Experiences for Undergraduates) on Stream Restoration/Rehabilitation this upcoming summer in Stillwater, Oklahoma.

The REU pays for student housing, meals, research supplies, travel to a future conference, and also provides a stipend during the 10-week program this summer.

You can learn more about the projects and faculty mentors at <http://studentwater.okstate.edu/content/nsf-reu-streams>.

If you have questions about the REU, please don’t hesitate to contact [water@okstate.edu](mailto:water@okstate.edu) about this opportunity. Application deadline is in February 2015.

## The Oklahoma Water Resources Center

invites abstracts for oral and poster presentations for the Water Research Symposium.

This event is held in conjunction with the Oklahoma Governor's Water Conference.

COX CONVENTION CENTER | OCTOBER 22-23, 2014 | OKLAHOMA CITY, OK

### Audience:

This symposium typically draws scientists, policymakers, agency personnel, consultants, and interested citizens from many disciplines. Technical presentations should focus on research while remaining comprehensible to a general, non-expert audience.

### Applicant Qualifications:

Professionals, researchers, and students are invited to present on any research or Extension/outreach topic related to water resources in Oklahoma. All presenters must register for the conference at <http://www.owrb.ok.gov/news/waterconference.php>.

### Application Details:

To be considered for the program, submit an abstract to present a paper or poster online (<http://water.okstate.edu/programs/symposium/submission-form>) by 5:00 p.m. August 29, 2014. You will receive an e-mail confirmation shortly after you have submitted your application that includes the information you submitted.

More information is available at <http://water.okstate.edu/programs/symposium/2014-symposium>.



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sium between two Water Centers! We are hosting an Illinois River Watershed Symposium with Arkansas in late September. The symposium is sponsored by the Cherokee Nation Environmental Programs and will be held at the Cherokee Casino in West Siloam Springs, Oklahoma.

The symposium will identify future research and Extension needs in the watershed. As evidenced by the recent water supply issues in Ohio, protecting our scenic rivers and drinking water supplies is paramount. Research and Extension is critical to this protection. University, state and federal agency, and tribal representatives are scheduled to attend and present. **Contact the Water Center if you are interested in participating!**

Water was an issue for the state of Oklahoma 100 years ago, is presently a critical issue for Oklahoma, and will be 100 years from now. Our responsibility is to work together to preserve this life-sustaining resource.





# Upcoming Events

**Big XII Faculty Fellowship Program: Dr. Sheshukov** in Stillwater, OK, September 16-17

**Illinois River Watershed Symposium** in Siloam Springs, AR; late September

The symposium will identify future research and Extension needs in the watershed. [Contact the Water Center](#) for more details.

**2014 Governor's Water Conference & Research Symposium** in Oklahoma City, OK; October 22-23

More information about these events and others is available at <http://water.okstate.edu>.



## [ WWWeb Updates ]

- ◇ Submissions for Symposium presentations are being accepted through 5:00p.m. August 29th at <http://water.okstate.edu/programs/symposium/submission-form>.
- ◇ New videos go online weekly. Check out our [video page](#) for some new videos discussing pond management.
- ◇ The newest Extension publications are linked at <http://water.okstate.edu/programs/extension/extensionpublications>.
- ◇ There's an easy way to keep current on [water.okstate.edu](http://water.okstate.edu) updates: Subscribe to the RSS feed at <http://water.okstate.edu/updates/updates-collection/RSS>.

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Oklahoma Water Resources Center

Oklahoma State University  
139 Agricultural Hall  
Stillwater, OK 74074-6010  
[water.okstate.edu](http://water.okstate.edu)

E-mail: [water@okstate.edu](mailto:water@okstate.edu)

Phone: 405.744.5615

Fax: 405.744.5339

