

THE AQUAHOMAN

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The newsletter of the
OKLAHOMA
WATER RESOURCES CENTER

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From the Director's Desk (by Dave Engle)

Advances in Water Research in Oklahoma

Oklahoma research scientists are positioned for significant advances in understanding the state's water budget and to develop sophisticated technologies for managing the state's water resources. The Water Center serves as a partner in several of these.

A research infrastructure grant funded by the National Science Foundation to the Oklahoma EPSCoR office will be a game changer in terms of enhancing the research community competitiveness for grants from the major federal research funding agencies. The EPSCoR grant builds meaningfully on Oklahoma Mesonet's weather observation system that includes soil moisture. However, the largest advance of this project is that it integrates the biophysical sciences with the social sciences into a socio-ecological observation system to comple-

ment Mesonet's weather observation system. A multi-institutional partnership between OSU, OU, and the University of Tulsa, the project employs scientists in the state while enriching scientific expertise with post-doctoral researchers, graduate students, and research technicians. Enhancing preparation for careers in the STEM fields and achieving greater workplace diversity will be additional major outcomes of the project. You will be hearing more about this project and its achievements and what it means to advancements in monitoring and forecasting related to the state's water budget.



A second grant dovetails nicely with the EPSCoR grant by adding infrastruc-



Dr. Dave Engle, Director

ture. The USDA-Agricultural and Food Research Initiative awarded a Coordinated Agricultural Program grant through their Regional Approaches to Climate Change program. The project is titled *Resilience and Vulnerability of Beef Cattle Production in the Southern Great Plains Under Changing Climate, Land Use and Markets*. This project is one of two funded for their 2012 grant competition. The Water Center directs the project of six collaborating institutions: the Noble Foundation, The University of Oklahoma, Kansas State University, Tarleton State

("Advances" continued on page 3)

Phosphorus Concentrations Declining in Illinois River

(by Josh Payne, Area Animal Waste Management Specialist, OSU OK Cooperative Extension Service)

A recent study from researchers at the University of Arkansas highlights water quality improvements within the Illinois River watershed. Water quality concerns related to elevated phosphorus (P) concentrations in northeastern Oklahoma watersheds (Eucha Spavinaw and Illinois River watersheds) have been the focus of regional and national attention and have resulted in increased regulation and litigation. Researchers recently examined in-stream P concentration data spanning from 1997 to 2009 within the Illinois River watershed. Results showed that flow-adjusted P concentrations have been decreasing since 2003 in the Illinois River at Arkansas Highway 59, at Watts, Oklahoma and further downstream at Tahlequah, Oklahoma. These decreases are tied to the reductions in waste water treatment effluent P, which occurred in 2002. However, changes in agricultural management practices are also likely responsible for P reductions and include: exporting the majority of poultry litter

outside nutrient sensitive watersheds, implementation of best management practices, strict regulations related to land application of manure and mandatory manure management education for poultry producers and manure applicators. The study also found that flow-adjusted P concentrations in Flint Creek, an Illinois River tributary, have been increasing over time until 2007, at which point a slight decrease in P concentrations was observed. This decrease was most likely due to reductions in waste water treatment effluent P concentrations discharged into Flint Creek beginning in 2007. It should be noted that long-term P trends in Flint Creek will impact long-term trends of downstream sites such as Tahlequah. Overall, it does look promising that P concentrations were decreasing in the Illinois River watershed and may continue to decline due to reductions in effluent P concentrations and continued improvements in agricultural land management.



Legal Field Use of Fish Sedatives

(by Jim Bowker, U. S. Fish and Wildlife Service
Fishery Biologist)

Over the years, we have found that many fisheries professionals continue to use clove oil (85-95% eugenol) and MS-222 as immediate-release sedatives, thinking that products that are Generally Recognized as Safe or are approved fish drugs must be okay to use in the field. Clove oil is not approved for any use in fish, and catchable fish treated with MS-222 cannot be immediately returned to the wild.

The primary goal of this outreach effort is to let fisheries professionals know that there is a legal option for sedating fish in the field where no withholding period is required: AQUIS-20. Although this drug is not yet approved by the U.S. Food and Drug Administration (the sponsor hopes to have an initial approval in 2015), AQUIS-20E can be used through authorization granted by the FDA to the USFWS's Aquatic Animal Drug Approval Partnership Program (AADAP). To learn more about using this fish sedative under the USFWS's Investigational New Animal Drug exemption, please visit the AADAP website (<http://www.fws.gov/fisheries/aadap/AQUIS-E.HTM>).

(“Advances” continued from page 1)

University, and the USDA-Agricultural Research Service laboratories at El Reno, Oklahoma and Bushland, Texas.

Outcomes from this project will include a coordinated functional research and Extension network capable of developing and delivering science-based information that addresses climate adaptation and mitigation. Optimizing water use in forage-based beef production and adapting to drought also will be key outcomes of the project.

My personal big news is that I will begin transitioning to retirement beginning July 1. The transition starts with stepping out of the Water Center and my position as director to focus on my partial faculty appointment in OSU’s Department of Natural Resource Ecology and Management. I am eager to tackle a backlog of research papers and to pursuing other scholarly interests.

The Division of Agricultural Sciences and Natural Resources remains committed to administering the Water Center. An interim director is expected to be named soon, so programs you associate with the Water Center will continue uninterrupted.

At almost six years since I returned to OSU to direct the newly christened Water Center, I reflect back to enjoyable work with a diverse group of professionals from a wide variety of walks of “water life.” Everyone welcomed me warmly back to Oklahoma and helped me become familiar with plethora of water issues in the state. I feel gratified by what we accomplished together, and I look forward to greater achievements for the sake of water resources. Thank you for supporting me and the Oklahoma Water Resources Center!

Congratulations to Dr. Mike Langston

Dr. Mike Langston, the Water Center’s assistant director, has taken a position with USGS serving as assistant director of the South Central Climate Science Center. We wish Mike the best as he provides leadership to this important Center!



A request for pre-proposals for 2015 funding will be sent out by June.

Watch for it in your inbox or visit water.okstate.edu for more information or to join our RFP mailing list.

Projects Selected for Funding in 2014

After a competitive selection process that included technical reviews of proposals and input from the Water Research Advisory Board, the Oklahoma Water Resources Center announced projects funded for 2014 by the Water Resources Research Act (the “104b” grant program). The nonfederal portion of the 2:1 nonfederal:federal funding match required by the 104b program was provided for each of the projects by the Oklahoma Agricultural Experiment Station. One part of the two-part match was in the form of actual dollars and the other part was in the form of other costs, including waived indirect costs.

Project titles and investigators of the selected projects are as follows.

Estimating Groundwater Recharge Using the Oklahoma Mesonet led by Tyson Ochsner, Department of Plant & Soil Sciences, Oklahoma State University. Co-PIs include Chris Fiebrich and Chris Neel.

Comparison of Grain Sorghum and Corn Productivity under Limited Irrigation with Subsurface Drip led by Jason Warren, Department of Plant & Soil Sciences, Oklahoma State University. Co-PIs include Rick Kochenower and Nicholas Kenny.

Increasing water yield and quality through redcedar removal and establishment of herbaceous biofuel feedstock production systems: Effect of vegetation on groundwater recharge in upland ecosystems led by Chris Zou, Department of Natural Resource Ecology & Management, Oklahoma State University.

More information about these projects will be posted on water.okstate.edu soon. Information from previous projects can be found at <http://water.okstate.edu/library/reports>.

Restricting Groundwater Rights?

(by Mike Langston, USGS South Central Climate Science Center)

Groundwater, in Oklahoma, is a property right. If you own the land, you own the water under it; but the state has the right to limit how much you can take out of the ground. Why would the state restrict access to your property? Because, unlike some other land-based resources, water is mobile. It can move from under my land to under your land. If I pump a lot of water from under my land, water under your adjacent land may flow toward my well.

In an effort to protect the water rights of some, the Oklahoma Water Resources Board, recently passed a rule that would reduce water allocations from one aquifer in the state by 90%. This has many landowners in the area upset and others celebrating.

The aquifer in question is the Arbuckle-Simpson in south-central Oklahoma. It has been designated a sole-source aquifer, meaning it supplies more than 50% of the drinking water for the municipalities overlying it, and so, is given greater protections.

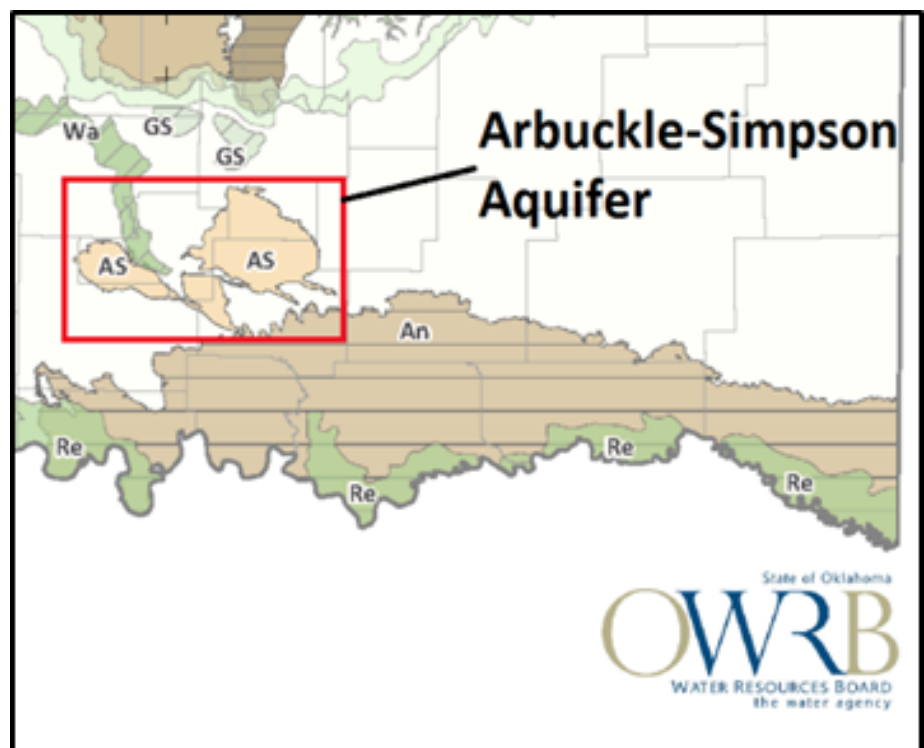
The Oklahoma Water Resources Board allocates water through permits. If you want to use water for something other than domestic uses, you must obtain a permit. For groundwater, the Board issues temporary permits to all applicants until the aquifer being tapped has been studied. For these unstudied aquifers, the default allowable withdrawal is two acre feet of water for every surface acre owned per year.

Once the aquifer has been studied, the Oklahoma Water Resources Board can determine

what the maximum annual yield should be. In the case of the Arbuckle-Simpson, the legislature's mandate to the Board was to determine "the amount that would not significantly alter the natural flow of the area's springs and streams."

After a five year study, the Board determined that the maximum annual yield should be set at 0.2 acre feet. This significant reduction has some landowners upset enough that they have filed a lawsuit asking the court to change it; but several of the area cities including Ada and Tishomingo say they are in favor of the restrictions even though it means they will have to acquire additional land in order to access the water they need. For them it is a matter of ensuring that the aquifer and the springs and streams it supplies, last forever.

Unfortunately, considering the history of similar law suits, it may be the court case that seemingly lasts forever.



Upcoming Events

Outdoor Water Conservation Workshop @ OSU-OKC; April 19, 2014

OSU Extension will show you how to have a beautiful landscape and still use water wisely outdoors. RSVP to Malarie Gotcher at 405-297-3380 or Malarie.Gotcher@okc.gov by April 11th.

Phosphorus Removal Structure Field Day in Westville, OK; May 23, 2014

Drs. Chad Penn and Josh Payne will discuss the phosphorus-removing filter that has been installed at a poultry operation within the Illinois River watershed. This innovative BMP has potential in both urban and rural landscapes.


Conference: Water Systems, Science, and Society under Global Climate Change in Medford, MA; June 18-20

Universities Council on Water Resources (UCOWR), National Institutes for Water Resources (NIWR), and the Consortium of Universities for the Advancement of Hydrologic Science (CUAHSI), are holding a joint conference on Water Systems, Science, and Society Under Global Climate Change.

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

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WWWeb Updates

- ◇ A new leaflet explains how redcedars affect the water quality and quantity in Oklahoma's rangelands. [Click here to view Water Use by Eastern Redcedar](#).

- ◇ There's an easy way to keep current on water.okstate.edu updates. Subscribe to the RSS feed at <http://water.okstate.edu/updates>.
- ◇ New videos go online weekly. out our [video page](#) for the newest timely topics.

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