

# THE AQUAHOMAN

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THE **AQUAHOMAN** is published four times a year by the Oklahoma Water Resources Research Institute (OWRRI) at Oklahoma State University.

To receive this free newsletter or inquire about available resources, contact OWRRI.

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## 2005 Oklahoma Water Conference

The Oklahoma Water Conference is an annual event sponsored by the Oklahoma Water Resources Research Institute and the Department of Biosystems and Agricultural Engineering at OSU. It brings together professionals involved in Oklahoma water resources and research from across the state and neighboring states. This year it will be held in the Conference Center at the OSU-Tulsa campus on September 27th and 28th.

### TENTATIVE SESSION TOPICS AND PRESENTATIONS:

#### Session 1: Arbuckle Simpson

- **Update on the Arbuckle Simpson Hydrology Study**  
Noel Osborn, Oklahoma Water Resources Board
- **Age dating and geochemistry of the Arbuckle-Simpson aquifer**  
Andrew Hunt, USGS
- **Geophysical methods for determining aquifer properties in the Arbuckle-Simpson aquifer**  
Todd Halihan, OSU
- **Reconstruction of precipitation and stream flow using tree ring analysis**  
Aondover Tarhule, OU
- **Science, development, and public opinion: the adjudication of groundwater policy for the Arbuckle-Simpson aquifer**  
Beth Caniglia, OSU

#### Session 2: Nutrient Water Issues

- **Evaluation of Methods for Trend Analysis of Phosphorus Data in the Illinois River Basin, Arkansas and Oklahoma**  
Robert Tortorelli, USGS
- **Algal Nutrient Limitation at Lake Eucha, Oklahoma, 2003-2005**  
Brian Haggard, USDA-ARS
- **Reductions in Phosphorus Loading to an Agricultural Watershed Through Implementation of Best Management Practices: A Clean Water Act Success Story**  
Shannon Phillips, Oklahoma Conservation Commission

#### Session 3: CEAP (Conservation Environmental Assessment Program)

- **STEWARDS: An Integrated Data System for ARS Watershed Research**  
Jean L. Steiner, USDA-ARS
- **The Fort Cobb Reservoir Watershed CEAP Study**  
Patrick J. Starks, USDA Agricultural Research Service
- **Assessing the Effects of Conservation Practices: A National Perspective**  
C. W. Richardson, USDA
- **TMDL Development for the Fort Cobb Lake Watershed**  
Mark Derichsweiler, Oklahoma Department of Environmental Quality

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## Introduction

The Environmental Institute at Oklahoma State University seeks to stimulate and promote interdisciplinary research, graduate education and public education relating to understanding, protecting, utilizing and sustaining the natural environment. The federally supported Oklahoma Water Resources Research Institute, created under Section 104 of the Water Resources Research Act, is one of 54 state and territorial water institutes. It has been housed at OSU since 1965 and in the Environmental Institute since 1992.

## Notable Awards and Achievements

The 2004 program year was one of great changes in the OWRRI. Two new staff members joined the OWRRI team: a new Unit Assistant and an Outreach Specialist. These additions will significantly increase the productivity of OWRRI. The Outreach Specialist is especially important as OWRRI seeks to provide information to policymakers, researchers, students, and the public. The addition of this position allowed the development of this newsletter, *The Aquahoman*, which is distributed quarterly to the OWRRI constituency.

Also in 2004, the OWRRI co-sponsored the second annual Oklahoma Water Research Conference. This conference brought together more than 130 professionals, policy makers, researchers, and students to discuss water research developments and needs in Oklahoma. The OWRRI cooperated with the OSU's Biosystems and Agricultural Engineering Department in sponsoring the two-day event. The planning committee for the conference included representatives of three state agencies, three federal agencies, and the University of Oklahoma.

One of our research projects, begun in FY04 and continuing through FY05, has been of particular interest to lawmakers. Senator Inhofe's staff of the Senate Environment and Public Works Committee requested information generated by a team of OSU researchers led by Dr. Brian Adam. The project, ***Optimal Selection of Management Practices, Policies, and Technological Alternatives for Phosphorus Abatement: Using GIS and Economic Methodology to Model a Watershed***, was a timely and important project that sought to address the issue of accelerated eutrophication in the Eucha-Spavinaw basin by providing spatially optimal, least-cost allocations of management practices between point and non-point sources. In addition, it provided recommendations on management practices and investigated the feasibility of a facility to convert poultry litter into electricity.



Lake Tenkiller

A new area of emphasis for OWRRI is the support of social science projects that address Oklahoma's priorities for water research. This is just the first step in an effort to establish a truly interdisciplinary vein of water research in Oklahoma. To this end, OWRRI supported the work of the Institute for Issue Management and Alternative Dispute Resolution (IIMADR) in resolving conflicts over the Lake Tenkiller water supply. Several years ago, IIMADR began a multi-year effort to facilitate a dialogue among the participants in the Tenkiller Utilities Authority (TUA). In the OWRRI project, researchers developed and tested a protocol for linking stakeholder input to such issues as water quality and quantity, environmental justice,

compliance with federal water laws, and homeland security. To accomplish this, IIMADR provided stakeholders with information about these issues, facilitated dialogues among TUA participants, and served as a neutral clearinghouse for public access and involvement in the TUA project. The response to both the information transfer and facilitation from the TUA has been completely positive. One participant summed up the sentiments of many by stating, "[IIMADR] got parties talking and got the project moving...got us looking at the project from a regional standpoint." TUA is again making progress toward regional water planning, and participants are optimistically seeking funds for water infrastructure development which will allow further economic development.

OWRRI continues its effort to sponsor truly interdisciplinary research with a project for FY 2005 led by Dr. Beth Caniglia titled ***Science, Development & Public Opinion: The Adjudication of Groundwater Policy for the Arbuckle-Simpson Aquifer***. The Institute recognizes that many natural resource problems are at their core, behavioral problems. Thus, it is anticipated that addressing both the social and natural science aspects of issues will contribute to a swifter and more acceptable resolution.

### Research Program

In Fiscal Year 2004, the USGS grant to OWRRI was matched by \$200,000 in non-federal money. These funds supported three research projects and water research administration and development activities as well as the information transfer program. The three research projects supported by the OWRRI program in 2004 were the following:

1. ***Springs in Time: Comparison of Present and Historical Flows*** (Aondover Tarhule & Elizabeth Bergey, University of Oklahoma). This project expands upon an earlier OWRRI funded study titled: *Springs in Peril: Have changes in groundwater input affected Oklahoma Springs?*. In that project, anecdotal evidence emerged, mostly from landowners, which suggests many springs in Oklahoma have either gone dry or are experiencing significantly diminished flow rates. Such an outcome implies major changes in the groundwater aquifers that feed the springs. The present study was developed to investigate those claims. The project compiled a comprehensive database of spring flows throughout Oklahoma and analyzed trends for springs with long, continuous records. The vast majority of wells showing decreases are in the Oklahoma Panhandle (Ogallala Formation). Outside the Panhandle, well levels generally rose. This result, as well as precipitation trend analysis, is consistent with findings reported in the literature that suggests that groundwater level increases in North America are probably related to recent precipitation increases.
2. ***Evaluation of Chemical and Biological Loading to the Blue River*** (Guy Sewell, East Central University). This project conducted a baseline assessment of natural or background biological loading to evaluate water quality standards, and to serve as a baseline for the detection of, and for evaluating degradation of water quality. The biological and chemical assessment of Blue River samples indicate good to marginal water quality with a general trend of decreasing quality as the river travels to the South East. Sections of the river overlaying the Arbuckle-Simpson Aquifer, which appear to have significant base flow discharge from the aquifer, tend to have more desirable characteristics that were subject to some fluctuation. These fluctuations are apparently related to rainfall events and seasonal variations.
 
3. ***Optimal Selection of Management Practices for Phosphorus Abatement Using GIS and Economic Methodology in the Modeling of a Watershed*** (Brian Adam, Arthur Stoecker, Daniel Storm & Bailey Norwood, Oklahoma State University). This team developed a biophysical model to determine combinations of Best Management Practices (BMPs) that would meet the Total Maximum Daily Load (TMDL) for each of 695 locations in the Eucha-Spavinaw watershed at least cost. They determined that the total costs to poultry producers, the city of Decatur, the city of Tulsa, and recreation users of the lakes would be minimized when total annual phosphorus loads are reduced from 50.6 tons to approximately 27.5 tons per year. These results do not consider the beneficial impact of a proposed waste-to-energy plant or the addition of a recently proposed discharge facility.

In a separate financial feasibility simulation of the proposed waste-to-energy plant over a 20-year planning horizon, the team concluded that the plant would achieve an internal rate of return on investment of 16%, assuming that the firm receives the federal "green energy" tax credit and that years with low or negative returns are few and mild so that viability of the firm is not threatened. Under such circumstances, the plant could be profitable, greatly reducing the cost of limiting phosphorus loading.

The full Annual Report including each of the project reports can be found at <http://environ.okstate.edu/owrri/reports.htm>.

Session 4: Urban River Corridors

- **Arkansas River Corridor Master Planning, Phase 1 & 2**  
Gavlon Pinc, INCOG
- **Reclaiming Oklahoma City's Urban River Corridor**  
Pat Downes, Oklahoma City Riverfront Redevelopment Authority
- **Flood Plain Management on the Arkansas River**  
Joe Remondini, US Army Corps of Engineers
- **Water Quality Issues in the Arkansas River Tulsa Corridor**  
Richard Smith, INCOG Tulsa, OK

Session 5: Emerging Issues

- **Freshwater Mussel Populations in Southeastern Oklahoma: Population Trends and Ecosystem Services**  
Caryn Vaughn, Oklahoma Biological Survey
- **Changing Mercury Advisory Levels for Fish**  
Jay Wright, Oklahoma Department of Environmental Quality

Session 6: Perspectives on Water Research Needs in Oklahoma

Moderator: Mike Mathis, Oklahoma Water Resources Board  
Panelists:

- Duane Smith, OWRB (State Government perspective)
- Richard Smith, INCOG (Municipal perspective)
- Terry Detrick, Oklahoma Farmers Union (Rural/Agriculture perspective)
- Ed Fite (Tribal perspective)
- Summer Goebel, OG&E (Industry perspective)
- Will Focht, Oklahoma Water Resources Research Institute (Researcher's perspective)

More information is available online at <http://environ.okstate.edu/okwater>. Also available online are abstracts from the 2003 and 2004 Oklahoma Water Conferences.



Duane Smith of OWRB at the 2004 Oklahoma Water Conference

## Events and Conferences

(More listings at <http://environ.okstate.edu/owrri/conferences>)

<p><b>Elements of Water Infrastructure Master Planning</b> 1-Day Workshop OSU-Tulsa September 26 <a href="http://environ.okstate.edu/okwater">http://environ.okstate.edu/okwater</a></p>	<p><b>Working with HEC-HMS</b> 1-Day Workshop OSU-Tulsa September 26 <a href="http://environ.okstate.edu/okwater">http://environ.okstate.edu/okwater</a></p>	<p><b>2005 Oklahoma Water Conference</b> September 27-28 OSU-Tulsa <a href="http://environ.okstate.edu/okwater">http://environ.okstate.edu/okwater</a></p>	<p><b>2006 OWRI RFP</b> Applications due November 1 RFP &amp; Guidelines available under "Project Funding" at <a href="http://environ.okstate.edu/owri">http://environ.okstate.edu/owri</a></p>
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