From the Director:

Oklahoma Comprehensive Water Plan Themes Identified

The OWRRi received a contract from the Oklahoma Water Resources Board last year to assist with revising the State’s comprehensive water plan by directing the public participation aspects of the planning process. This process is being conducted in five phases extending over four and one-half years. This article presents the results of the first phase.

This first phase consisted of 42 local input meetings (LIMs) held across the state from April 12 to November 15, 2007. These meetings attracted 2,276 Oklahomans – an average of 54 attendees per meeting. We received more than 2,400 comments at these meetings and through our website, http://okwaterplan.info. The purpose of these meetings was to obtain citizens’ opinions about the issues that should be considered in the revision of the State’s Comprehensive Water Plan. The LIMs were the first of five public participation opportunities that will inform the new plan, which will be published in July 2011.

Here are some of the issues that were expressed in comments offered by LIM participants.

Value of Water

Water is increasingly valued for its contribution to economic growth, ecological services (e.g., flood control, stormwater treatment, aquifer recharge, wildlife habitat), aesthetic attributes, and spiritual benefits. Economic impact concerns include unfunded EPA mandates, low lake levels, federal and state funding cutbacks, litigation costs, conflicting water quality standards, excessive groundwater pumping, and water diversions.

Water Use and Conservation

Currently there is no priority of water uses. Many people think drinking water should be accorded highest priority. No agreement exists on the relative importance of non-drinking water uses. Ecological and recreational uses of water should be protected. More reservoirs should be constructed and existing reservoirs should be better maintained. Gray water should be reused and measures should be taken to reduce wasting water, especially in irrigation. Conservation should be encouraged through incentives and education.

Water Quality

Concern persists about non-point source contamination, particularly from construction sites, unpaved roads, agricultural operations, and oil and gas operations. Some contaminants are over-regulated however (e.g., risks do not justify costs, as is the case with naturally occurring arsenic)
The annual Oklahoma Water Research Symposium began in 2003 as an opportunity for researchers, professionals, students, and others to meet, discuss, and learn about the water research advances and needs in Oklahoma. In 2007, for the first time, the Symposium was combined with the Oklahoma Water Resource Board’s (OWRB) annual Governor’s Water Conference. This partnership provided an opportunity for each organization to present information to audiences they may not ordinarily reach. On October 23–25, 2007, more than 450 people from multiple organizations gathered at the Cox Center in Oklahoma City for the WATER for LIFE Conference. OWRRI occupied the first day and a half of the Conference with session topics such as the Arbuckle-Simpson Aquifer study, The Grand Lake Watershed, Water Sustainability, and Water Science and Policy.

Two sessions were used to discuss in detail the Arbuckle-Simpson hydrology study. Noel Osborn, of the OWRB, chaired the sessions with researchers Todd Halihan, Scott Christenson, Baxter Vieux, Benjamin Harding, and Bill Fisher presenting the findings of the research they have been conducting over the last several years. This study is in its last year and these researchers are working to complete reports, conduct computer simulations, and solicit input from stakeholders.

Each year as part of the Symposium, OWRRI invites students from any university in Oklahoma to enter the Student Poster Competition by creating and displaying a poster of their water research. Roughly 20 competitors displayed their posters throughout the day. The competitors were judged on layout and design, content, scientific merit, and presenter interaction. First place won $500, 2nd place won $300, and 3rd place won $200. The judges had a difficult time deciding the winners, as all posters were of high caliber. This indecision resulted in a tie for first place and for the first time, OWRRI proudly awarded two first prize winners with $500 each. OWRRI would like to congratulate the winners:

1st Place, tie
Michael White
OSU
A Quantitative Phosphorus Index for CNMP Development

1st Place, tie
John W. Fuchs
OSU
Potential Subsurface Transport of Phosphorus in Riparian Floodplains: Tracer and Phosphorus Transport Experiments

2nd Place
Rachel Cancienne
OSU
Potential Subsurface Transport of Phosphorus in Riparian Floodplains: Tracer and Phosphorus Transport Experiments

3rd Place
Maria A. Moreno
OU
Water Balance and Recharge Estimates for the Blue River Basin

Thank you to all who entered the contest! Everyone did a great job and we hope you will be interested in competing again in the future.

(For more information on the Symposium and to view the abstracts and presentation materials for each session, visit our website at: http://environ.okstate.edu/OKWATER)
Sierra Club, and Chesapeake Energy, OWRRI, OWRB, and the 4-H Clubs of Oklahoma sponsored an essay contest for students in 7th-12th grades on the topic of water conservation, asking students to present innovative ideas how Oklahomans can conserve water. With 141 essays submitted, students across the State showed an obvious interest in Oklahoma’s natural resource. Congratulations to the winners:

**7th & 8th Grade**
- First Place - Aaron Jackson - How to Catch a Raindrop
- Runners-up:
  - McKenzie Kay LaValle - Conserving Oklahoma’s Water
  - Jani Hawkey - Sinkpositive

**9th & 10th Grade**
- First Place - Jo Eike - Drought
- Runners-up:
  - Kelsey Bowen - Can More be Done?
  - Allie Barton - Water Recycling

**11th & 12th Grade**
- First Place - Amber Bolinger - Water Credits as a Management Tool
- Runners-up:
  - Chase Harris - Xeriscaping
  - Michael T. Stith - A Wasteful World

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Water Infrastructure

Rural water districts should upgrade their water lines to accommodate fire fighting. Regionalized water supply systems can save money and provide resilience during droughts.

Water Rights

Many citizens are concerned about infringement on their water rights. Greater restrictions on access to water can threaten the economic viability of agricultural and other business operations. The doctrine of first in time - first in right should be amended to give priority to local water uses.

Compensation and Control

Water should be used to address Oklahoma's needs before any is sold to Texas or any other state. If water is sold, the source region should be compensated. In addition, no water should be transferred or sold unless safeguards are in place to ensure that Oklahoma's (and the source region's) water needs are met first. Sales of water out-of-state should benefit all of Oklahoma.

Water Policy and Institutions

The water use permitting process should be streamlined and OWRB should issue permits for water use withdrawals in all of Oklahoma - including Grand Lake. Grant and loan application processes should be simplified. The roles of the various State agencies involved in water resource management in Oklahoma should be reviewed and consolidated where appropriate. Water should be managed in the interests of all Oklahomans; no tribe, region, water district, city, business, or individual should benefit at the expense of the State as a whole.

Education and Research

More resources should be dedicated to developing a well-organized, integrated, and user-friendly web portal to educate the public about water resources availability, conservation, law, and administration. Hands-on water education should start in grade school. Research on aquifer storage and sustainable withdrawal, climate change effects on water supply, and ground-surface water hydrologic relationships should be pursued. In addition, more stream flow gauging is needed.

Planning Process

The process being used to involve citizens in revising the water plan is fair, inclusive, and transparent. Some citizens have suggested the process may be interrupted, however, by judicial intervention and thus may need to be accelerated. Water planning, and public participation in it, should be a continuous process that extends beyond 2011.

Acknowledgements

I want to thank all those who attended the meetings and submitted comments. Your enthusiastic participation has provided the foundation for defining the issues that will be considered in the water plan. I also want to thank the Oklahoma Cooperative Extension Service and the Oklahoma Association of Regional Councils of Government for their assistance in meeting arrangements and advertising, the Oklahoma Water Resources Board for its informative presentations about water availability and use in the State, and our various partnering organizations that helped us recruit participants through their websites, newsletters, meetings, and office visits. In particular, I thank the OWRRI staff members who conducted the meetings: Mike Langston (facilitator), Jeri Fleming (recorder), and Alison Stone (coordinator). We have completed a very successful start to the public involvement process and look forward to the second phase: regional input meetings, which will be conducted this year. I will discuss the regional meetings in the next issue of the Aquahoman.
New WRAB Members Added

The Water Research Advisory Board (WRAB) was formed in 2005 to define the research funding priorities, recommend projects for funding, and guide future OWRRI efforts. The WRAB meets twice a year; once in January and once in the summer.

The OWRRI would like to welcome Tom Buchannan, Angie Burckhalter, Glen Cheatham, and Marla Peek to their Water Research Advisory Board. Below is a complete list of members:

- **James R. Barnett**
  President
  Environmental Federation of Oklahoma

- **Jerry Brabander**
  Field Supervisor
  U.S. Fish and Wildlife Service

- **Tom Buchannan**
  District Manager
  Lugert-Altus Irrigation District

- **Angie Burckhalter**
  Vice President of Regulatory Affairs
  Oklahoma Independent Petroleum Association

- **Glen Cheatham**
  Manager
  Waterways Branch
  Oklahoma Department of Transportation

- **Jeff Cloud**
  Chairman
  Oklahoma Corporation Commission

- **Cara Cowan Watts**
  Cherokee Nation
  Tribal Council Member
  Inter-Tribal Environmental Council

- **Jon Craig**
  Director
  Water Division
  Oklahoma Dept. of Environmental Quality

- **Cheryl Dorrance**
  Director of Research
  Oklahoma Municipal League

- **Ed Fite**
  Administrator
  Oklahoma Scenic Rivers Commission

- **Michael Fuhr**
  State Director
  The Nature Conservancy

- **Richard Hatcher**
  Assistant Director
  Oklahoma Dept. of Wildlife Conservation

- **Stephen L. Nolen**
  Chief, Environmental Analysis and Compliance Branch
  U.S. Army Corps of Engineers

- **Quang Pham, P.E.**
  Environmental Programs Manager
  Oklahoma Dept. of Ag, Food and Forestry

- **Stephen Schmelling**
  Director
  EPA - Kerr Lab

- **Duane Smith**
  Executive Director
  Oklahoma Water Resources Board

- **Chris Stoner**
  State Conservation Engineer
  Natural Resources Conservation Service

- **Mike Thralls**
  Executive Director
  Oklahoma Conservation Commission

- **Darrell Townsend, II Ph.D.**
  Director
  Ecosystems Management
  Grand River Dam Authority

- **Shawna Turner**
  President, Sustainable Shawnee
  Oklahoma Sustainability Network

- **Trish Weedn**
  Executive Director
  Oklahoma Association of Regional Councils

- **Gene Whatley**
  Executive Director
  Oklahoma Rural Water Association

- **Kim Winton, Ph.D.**
  Director
  Oklahoma Water Science Center

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  Director
  Oklahoma Water Science Center

This map shows the distribution of the attendance during the 42 Local Input Meetings held across the State. The numbers are total number of attendees, total number of meetings per region are in parenthesis.
The AQUAhoman

2008 Water Research Grant Competition

The OWRRI conducts an annual research grant competition. Funding for these grants is provided by the US Geological Survey and the Oklahoma Water Resources Board. The funding is targeted toward applied research that uses basic science to inform decisions made by water resource policymakers, managers, and users.

To assist in identifying state research needs, OWRRI has established a Water Research Advisory Board that consists of state regulators, policymakers and other water resource professionals. This Board sets funding priorities for the research competition and recommends proposals to receive funding each year.

The priorities established by the Board for 2008 were divided into two groups, Higher and Lower Priority Research Topics. Although projects on any topic are encouraged, this year and for the next three years, the priorities selected reflect the State’s water planning needs. The specific priorities are:

**Higher Priority Research Topics**
- Probabilistic Correlation of Surface Water Supply, Use, and Economic Value
- Probabilistic Correlation of Ground Water Supply, Use, and Economic Value
- Probabilistic Correlation of Ground and Surface Water Interaction
- Regionalization of Water Supply Infrastructure

**Lower Priority Research Topics**
- Remote Monitoring of Water Use and/or Water Quality
- Prioritization of Flood Control Dams
- Conservation of Water Resources

Proposals were solicited from all comprehensive universities in Oklahoma. Thirteen proposals were submitted, and from these three were selected for funding. The proposals selected for funding are described below.

2008 Funded Research Projects

**Evaluation of Water Use Monitoring by Remote Sensing ET Estimation Methods**
Yang Hong and Baxter Vieux
School of Civil Engineering and Environmental Sciences
University of Oklahoma

Currently, the primary method for estimating evapotranspiration (ET) relies on in-situ weather station measurements, but it is almost impossible to monitor water consumption through ET over large regions with this method. With the advent of new satellite technology and comprehensive water balance and runoff models, opportunities exist to develop algorithms and apply remote sensing information for the benefit of water resources management. Remote sensing methods can provide ET maps over large areas at very high resolutions (30m and daily). However, transforming remotely sensed images into quantitative water use information at scales relevant to water management agencies is a primary goal that has not been fully realized. The primary objective of this project is to evaluate and improve the ability and usefulness of the remote sensing ET estimation algorithms in Oklahoma that do not require placement of in-situ monitoring/metering devices.

The project team will review and evaluate the remote sensing ET methods developed for the western U.S. They will calibrate and improve these methods, with focus on surface irrigation water usage for OK. Next, the team will combine a water balance model, Vflo, with remote sensing ET estimates to provide more accurate prediction of runoff, soil moisture, etc. Accuracy of the estimated ET, runoff, and soil moisture results will be evaluated using Mesonet and other in-situ observations.

Improved water/drought management and possibly flood forecasting are contributions expected from this research.
Decision Support Model for Evaluating Alternative Water Supply Infrastructure Scenarios
Brian Whitacre & Art Stoeker
Agricultural Economics Department
DeeAnn Sanders
Civil & Environmental Engineering Department
Oklahoma State University

This project team will develop a step-by-step method to assist rural water systems in planning and updating their water supply infrastructure. To accomplish this they will:

- Hold discussions with system managers and the community to understand the current system and potential future needs
- Develop a list of data requirements for modeling possible upgrades, such as population changes, future industry growth, terrain maps, and road networks
- Develop a methodology for analyzing the existing distribution system (on free software such as EPANET)
- Provide a methodology for estimating the capital and operating costs associated with any necessary pipelines, storage, or treatment systems
- Identify methods for financing these costs, including grants and loans available at both the state and federal level

An Assessment of Environmental Flows for Oklahoma
Don Turton and Bill Fisher
Natural Resource Ecology and Management Department
Oklahoma State University

Previous Oklahoma Water Plans (1980 and 1995) considered only consumptive water uses; however, there is a need to include non-consumptive, environmental flows that sustain aquatic animals and plants in any planning effort. River ecologists and conservationists generally agree that a regulated river needs to mimic the five components of the natural flow regime (magnitude, timing, frequency, duration, and rate of change and predictability of flow events, plus the sequence of these conditions).

This project will use the Hydroecology Integrity Assessment Process (HIP) developed by the US Geological Survey to assess environmental flows in Oklahoma’s perennial streams. The HIP is a modeling tool that identifies 10 non-redundant hydrologic indices that are ecologically relevant, specific to stream classes, and characterize the five components. Results will be used to make environmental flow recommendations for the Oklahoma Comprehensive Water Plan.
### Upcoming Water Events

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Location</th>
<th>Contact Information</th>
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<tbody>
<tr>
<td><strong>Jan 30</strong></td>
<td>Webcast- Incorporating Green Infrastructure Approaches Into Stormwater MS4 Permits</td>
<td>Oklahoma State University, Oklahoma</td>
<td>(703) 385-6000&lt;br&gt;<a href="mailto:garrett.budd@tetratech.com">garrett.budd@tetratech.com</a></td>
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<tr>
<td><strong>Feb 16</strong></td>
<td>Trout Derby&lt;br&gt;Lake Pawhuska</td>
<td>Pawhuska, OK</td>
<td>(918) 287-3553</td>
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<tr>
<td><strong>Feb 16-17</strong></td>
<td>President’s Day Blue River Trout Derby&lt;br&gt;Blue River</td>
<td>Tishomingo, OK</td>
<td>(580) 371-9288</td>
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<tr>
<td><strong>March 5</strong></td>
<td>Resource Management Conference</td>
<td>Tulsa, OK</td>
<td>(918) 584-7526</td>
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<tr>
<td><strong>April 8-10</strong></td>
<td>Stream and Riparian Corridor Restoration Workshop</td>
<td>Tulsa, OK</td>
<td>(918) 596-9475&lt;br&gt;<a href="mailto:brobinson@cityoftulsa.org">brobinson@cityoftulsa.org</a></td>
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**The AQUAhuman**

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