Oklahoma Water Survey

Education, Research, Outreach on Water Issues

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Oklahoma’s Water Challenge

Increasing demands for sources of water

- changing land use,
- population growth,
- aging infrastructure, and
- climate change,

We must manage our state's waters in an integrated, sustainable manner to maintain economic prosperity and aquatic & human health.
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1. Vision and Goals
2. Water Information System
3. Initial Priorities
Oklahoma Water Survey
Established by the University of Oklahoma Regents, January 26, 2011

to study the state’s water resources and to collect, analyze, interpret and disseminate research-based information about water to researchers, students, teachers, citizens, state and tribal governments, businesses and organizations.
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- catalyst for the University’s wide and deep expertise in education, research and outreach on water issues
- work with federal, state and tribal governments, organizations, businesses, communities and citizens with interests in Oklahoma’s water resources
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...serve as an open, trusted source of information that will be constantly updated with the most recent data, methods and applications
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2

• Water Information System
Water Information System

- Web-based information on key topics
- Water quantity and quality data for state, synthesized from multiple sources, available in consistent formats and outputs
- Presented to meet the needs and interests of multiple users
- Focus on science, but explain relationship with policy and practice
- Linked to further information and supporting data and policies
- Written and reviewed by experts
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Water Information System

Graphical User Interface

Database
Modelling GIS

WEB PORTAL
Important Topics/Themes

- Water Resource Sustainability
- Ground Water – Surface Water Interactions
- Climate and Water Resources
- Agriculture and Water Resources
- Water Monitoring
- Water and Energy
- Water Quality
Water Resource Sustainability

Development and use of ground water and surface water in a manner that can be maintained for an indefinite time without causing unacceptable environmental, economic, or social consequences.
Sustainable environmental flows are essential for tourism and recreation industries which depend on these resources. Valuation studies of environmental flows need to be done. Conflicts will increase as water shortages increase and the tension between consumptive and nonconsumptive uses escalate.
Ground Water: Is often taken for granted because of “out of sight-out of mind mentality”.

Understanding the connections between ground and surface water as part of the hydrologic cycle is crucial to successfully managing water resources.
Climate and Water Resources

*Climate* has significant impact on water resource management and sustainability, especially in Oklahoma.

Water is a renewable resource; after it is used, it goes somewhere else in the hydrologic cycle.

Certain compartments are however threatened

- degraded urban riparian corridors,
- ground water depletion
- reduced river and stream flows
  - ground water pumping
  - drought
Agriculture is projected to require more than 40% of the states water needs by 2060.

Those regions of the state where agricultural demand is greatest are also regions where the primary water sources are ground water.
Projected Water Demands by Sector
2060 Regional Water Demands

2060 Total Regional Water Demand & Water Sector Demand Distribution

Pie Charts
2060 - Total Demands by Sector (% of Total Region Demands)
- Thermoelectric Power
- Self-Supplied Rural Residential
- Self-Supplied Large Industrial
- Oil and Gas
- Municipal and Industrial
- Livestock
- Crop Irrigation

Map Base
2060 - Total Demands by Region (AFY)
- 55,637 - 100,000
- 100,001 - 250,000
- 250,001 - 350,000
- 350,001 - 473,636

Total State Water Demand (2060)
= 2,492,466 AFY

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Surface and Ground Water Quality programs should be better coordinated among state and federal agencies and municipalities

- Increased ground water monitoring data will make future projections of water needs more accurate
- “a comprehensive evaluation could not be performed for ground water given the lack of statewide ambient ground-water quality monitoring”
Water Resources and Energy Production

- Water supply and Energy are interconnected
- Energy needs are projected to account for more than 20% of OK needs by 2050 but things change
- Where water is already scarce, water re-use or use of marginal waters is an option, but more research is needed.
2060 Regional Water Demands

2060 Total Regional Water Demand & Water Sector Demand Distribution

Pie Charts
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Map Base
2060 - Total Demands by Region (AFY)
- 55,637 - 100,000
- 100,001 - 250,000
- 250,001 - 350,000
- 350,001 - 473,836

Total State Water Demand (2060) = 2,492,486 AFY
Multiple agencies are responsible for water quality monitoring

Better coordination of all water quality monitoring (surface and ground water) needs to be implemented

- OWS can serve as data clearinghouse and education source
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3

• Initial Priorities
Workshops on Important Topics/Themes

- **Present** current scientific state of knowledge
- **Identify** needed research
- **Provide** opportunities for technical expert interaction, disseminate up-to-date information
- **Elevate** the knowledge level among public leaders, industry, state agencies, general public

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Workshops and Research on Important Topics/Themes

- Oil and Gas Operations and the Protection of Water Resources
- Science of Water Availability and Meeting Public Needs
- Valuation of Instream or Environmental Flows
- Climate Change and Water
Research Important Topics/Themes

- “Tools and Approaches for Decision Makers and Communities Addressing Water Resource Concerns in Areas of (NEW) Oil and Gas production”
- “Evaluation of Environmental Flow Requirements for Freshwater Mussels in Mountain Fork, Kiamichi and Little Rivers, OK”
- “A Virtual Water Surveillance System to Monitor Oklahoma Total Water Budget”
Research Important Topics/Themes

- “Development of methods for minimizing water quality impacts from oil and gas production”
- “Adapting Socio-ecological Systems to Increased Climate Variability”
Research Important Topics/Themes

- Other Areas for Research
  - Aquifer Recharge and Aquifer Storage and Recovery
  - Valuation of environmental flows
  - Green Infrastructure
  - Conservation and water reuse
We need education & outreach to change current thinking and psychology about the value of our water resources and how we efficiently use those resources.
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www.oklahomawatersurvey.org