

# Integrated Water Resources Management

EPSCoR Research Infrastructure Improvement Program: Track-1  
Suggestion for a New Scientific Research Theme  
for 2012 Application

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# Two Presentation Goals

I. EPSCoR research theme

II. A new theme for Oklahoma's Strategic Plan  
for Science and Technology

# Goal I: EPSCoR Research Theme

“Water, more than any other element or natural resource, has reached a crucial level of importance to Oklahomans.”

Oklahoma Comprehensive Water Plan (OCWP),  
Executive Report (2011)



# From the Human Perspective...

By 2060 -

- Consumptive demand for water will increase by 33%
- Changing climate → changes in water supplies, demand patterns, availability

OCWP Executive Report (2011)

# From the Ecological Perspective...

- “For most freshwater systems scientists can... neither estimate the quantities of water that can be extracted nor the temporal changes in flow that can be tolerated.”

Dudgeon et al., (2006)

# Integrated Water Resources Management

Two components:

- Using water for human needs (municipal, industrial, agricultural, recreational)
- while
- Maintaining the ecological integrity of the water source

Dudgeon et al., (2006)

# Oklahoma Economic Development

Fish or wildlife-related recreation in 2006  
(all directly or indirectly dependent upon water)

- 1.2 million people participated
- They spent \$1.3 billion
- They supported 28,142 jobs
- And created \$696 million in salaries and wages

OCWP Executive Report (2011)

# Also Dependent Upon Water...

- Mining
- Tourism
- Navigation
- Agriculture
- Recreation
- Water supply
- Oil production
- Gas production
- Private Industry
- Rural development



# Expand Water Quality Monitoring Programs

- Acquire
- Integrate
- Assess
- Disseminate
- Store
- Predict

Utilization of Cyberinfrastructure

# Strategic Research Opportunities

Areas in which Oklahoma has strength

- Corix Water Institute
- Oklahoma Water Survey
- Water Research and Extension Center
- Ecotoxicology & Water Quality Research Laboratory



# Partnerships with Stakeholders

- 15 state agencies
- 8 federal agencies
- Private industry
- Tribal governments
- Municipal governments
- Non-profit organizations



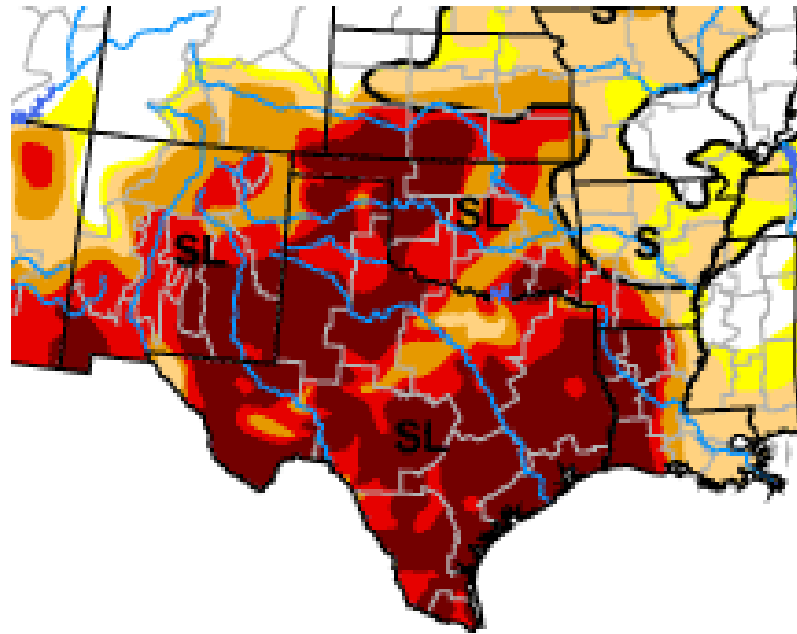
# EPSCoR Criterion for Eligibility

“addressing bold opportunities characterized by regional relevance and national importance”

# U.S. Drought Monitor

November 8, 2011

Valid 7 a.m. EST



Intensity:



# Multidisciplinary

- Biology
- Chemistry
- Computer and Information Science
- Economics
- Education
- Engineering
- Environmental Science
- Geology
- Hydrology
- Mathematics
- Meteorology
- Physics
- Political Science

# Multicampus & Diversity

## Institutions

- Research universities
- 2-year and 4-year institutions
- Minority-serving institutions
- Urban and rural institutions

## Underrepresented Groups

- Race
- Gender
- Ethnicity
- Disabilities
- Geographic
- Economically disadvantaged
- First generation college students

# Intellectual Merit

- Well qualified faculty in many disciplines
- Research facilities at both flagship universities
  - Water
  - Climate
  - Geology
  - Computing
- Newly published State water plan
- Potential to solve a pressing global problem on integrated water resources management



# Integrated Water Resources Management

- “Oklahoma could become a leader in developing a [predictive water management] tool...”

OCWP Supplemental Report, Climate (2011)

# K-12 Teachers Professional Development



# K-12 Students

- Research opportunities
- Career mentoring
- Summer academies



# Public Involvement

- Oklahoma Conservation Commission's  
Blue Thumb Stream Monitoring Program



# Broader Impacts

- Include K-16 students as participants
- Professional development for teachers
- Establish research and educational collaborations with underrepresented groups
- Develop multi-user facilities
- Develop exhibits, public presentations, media releases, websites
- Provide new information to policy makers

# Goal II

A new theme for Oklahoma's Strategic  
Plan for Science and Technology

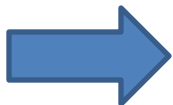
# OK Strategic Research Opportunities

- \*Alternative forms of energy  
Aviation/aerospace
- \*Human and animal health
- \*Information technology and cyber security
- \*Meteorological sciences  
Nanotechnology and advanced materials
- \*Plant science and genomics
- \*Sensors and sensor technology

\* = potential for water-related research

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Integrated Water Resources Management



# Conclusion

“Integrated Water Resources Management”  
will meet EPSCoR RII-Track 1 goals of

- Diversity
- Economic development
- STEM workforce development
- External engagement and outreach
- Integrate research and education
- Utilization of cyberinfrastructure