

Information Technology Initiative in Louisiana Water Resources

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Introduction

The economic development and well being of Louisiana relies heavily on the water resources of the State. Here are just a few examples of the importance of the ground water and surface water to the State economy and examples of basic problems the State is currently facing in terms of resource management.

Fresh ground waters

Importance:

Source of water for municipal supplies, irrigation, and industrial cooling and processing.

Problems:

Declining water levels.
Salinization.
Sustainability.
Land subsidence.
Contamination by anthropogenic wastes.
Difficulties in remediation.

Subsurface brines

Importance:

Provide an understanding of deep hydrogeologic processes.
Repository for hazardous wastes.

Problems:

Vast volumes of brine brought to surface as a result of oil and gas production.
Waters co-produced with oil and gas typically have elevated levels of dissolved salt, heavy metals, benzene, and radium.
Removal of large volumes of fluids can cause land subsidence.
Fate of injected subsurface wastes not well known.

Fresh surface waters

Importance:

Source of water for municipal supplies, irrigation, and industrial cooling and processing.
Shipping, recreation.

Problems:

Flooding.
Point source contamination, such as municipal and industrial outfall.
Non-point source contamination, such as fertilizer runoff.
Erosion and land loss.

Brackish to saline surface waters

Importance:

Habitat for economically important Louisiana flora and fauna.

Problems:

Land loss in coastal environments.

Salt water encroachment.

Water Resource Research at LSU

Research into the water resources of Louisiana has been conducted within a large number of individual academic departments and institutes on the LSU campus. Here are a few examples:

- Department of Geology and Geophysics
- Department of Geography
- Louisiana Geological Survey
- Louisiana Office of State Climatology
- Louisiana Water Resources Research Institute
- Department of Chemical Engineering
- Department of Civil and Environmental Engineering
- Coastal Studies Institute
- Wetland Biogeochemistry Institute

Future Research Problems and Solutions

Many fundamental aspects of water resources within the State remain incompletely or poorly understood. Some geologically-related problems include:

- Effects of long- and short-term climate change on aquifer recharge.
- Ultimate fate of wastes injected into the subsurface.
- Long- and short-term response of aquifer systems to increases in pumping.
- Ground water remediation in geologically-complex sites.
- Effects of ground water withdrawal on faulting and subsidence.
- Physical and geochemical interaction between shallow fresh waters and deep brines.
- Geomicrobiology of ground water systems and the fate of anthropogenic wastes.
- More efficient utilization of water resources.

Research into water resources, even those with a strong geological focus, cuts across many disciplinary lines, and the potential exists for developing programs at LSU which could utilize talents within all of the departments and institutes cited above. An Information Technology Initiative in Water Resources could contribute both to the Environmental and to the Geoinformatics aspects of the overall IT initiative. It would better prepare students for entry into environmentally related fields and enhance dispersion of new concepts and technologies in resource management into the State.

Equally important, it could serve to enhance communication and collaboration among the various LSU units conducting water related research programs.

Examples of geologically-related new faculty who would enhance such a program include people with expertise in:

Long-term climate modeling

Quantitative ground water hydrogeology

Fluvial sedimentology

Earth surface processes

Many other disciplines would be represented in the overall program.