

# Sandia Water Modeling Overview

*Briefing to  
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**August 13, 2009**

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## *Topics for Discussion*

- **Water “Modeling” – What do we mean by “modeling”?**
  - We develop and implement models (tools) to “inform” decision-making in a number of areas:
    - Water Resource Management
    - Energy-Water Interdependencies (e.g. production, sequestration, etc.)
    - Energy and Transportation Fuels
    - Energy-Water-Ag Interdependencies
    - Biofuel Deployment
    - Enhance International Cooperation
    - R&D Investment Support
    - Infrastructure Protection and Sustainability



# Sandia's Modeling/Management Water Program

**Sandia has developed methods and tools to assist “decision-makers” in making decisions!**

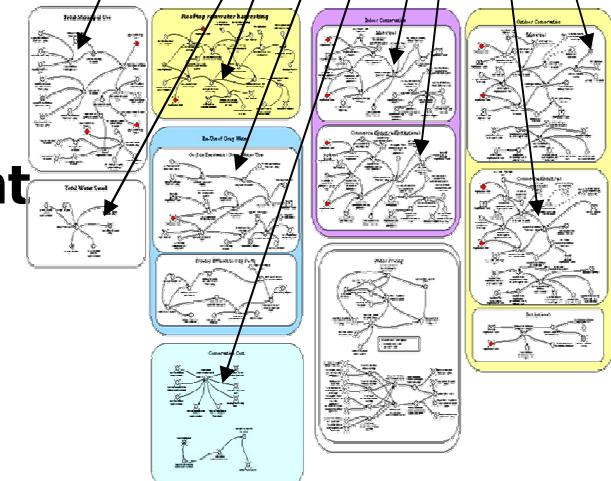
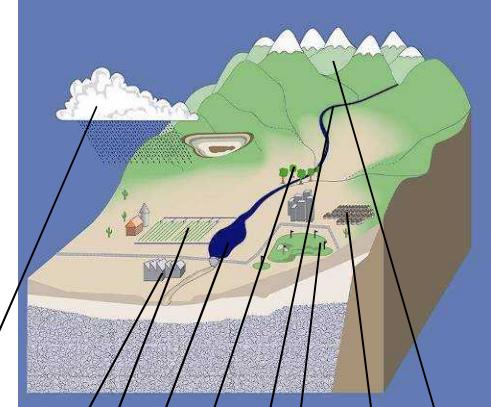
**These tools are being applied in New Mexico, the United States, and Internationally**

**Quantitatively compare water (and other systems) management alternatives and scenarios, in terms of:**

- water savings, and cost to implement and maintain the alternative**

**Engage policy makers, stakeholders, and the public in the decision process**

**Convey the interconnectedness and complexity of regional water (and other) systems**



# Sandia's Modeling/Management Additional Details

**Tools (models) are being applied to solve difficult water & resource management problems:**

**Middle Rio Grande**

**Upper Rio Grande**

**Lower Rio Grande (US-Mexico)**

**Gila/Mimbres Basin**

**Barton Springs Aquifer (Texas)**

**Willamette River Basin (Oregon)**

**Water Web Portal (web tool to enable long-distance collaborating)**

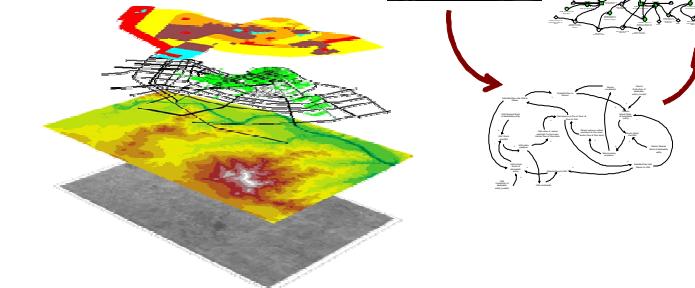
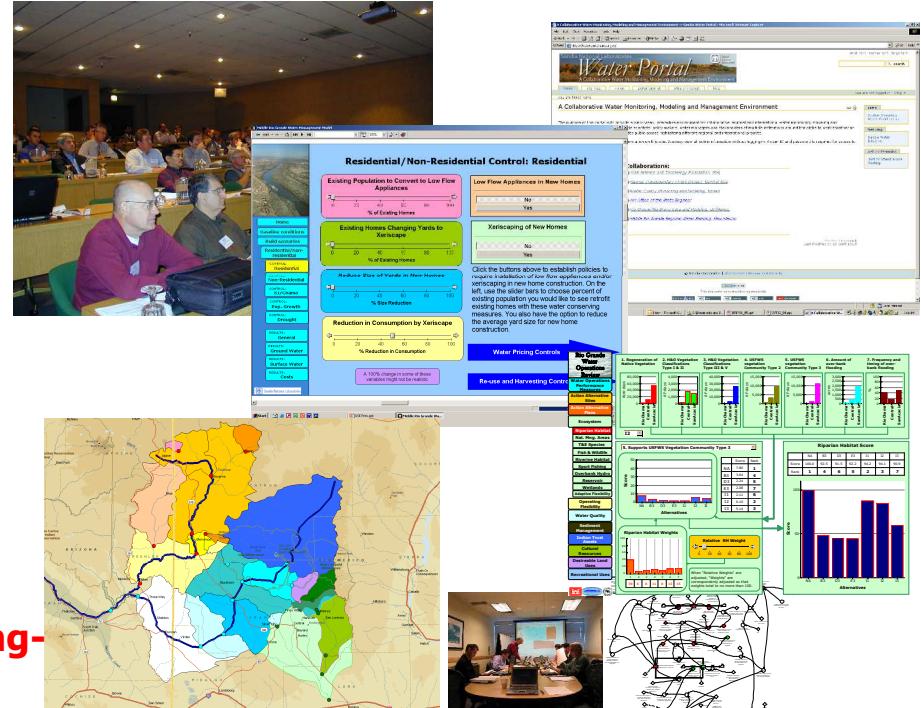
**Algae and cellulosic ethanol biofuel models (national)**

**Algae Roadmap Model for technology deployment (national)**

**Various Energy/Fuel/Transportation Models**

**Energy-Water Toolbox Model**

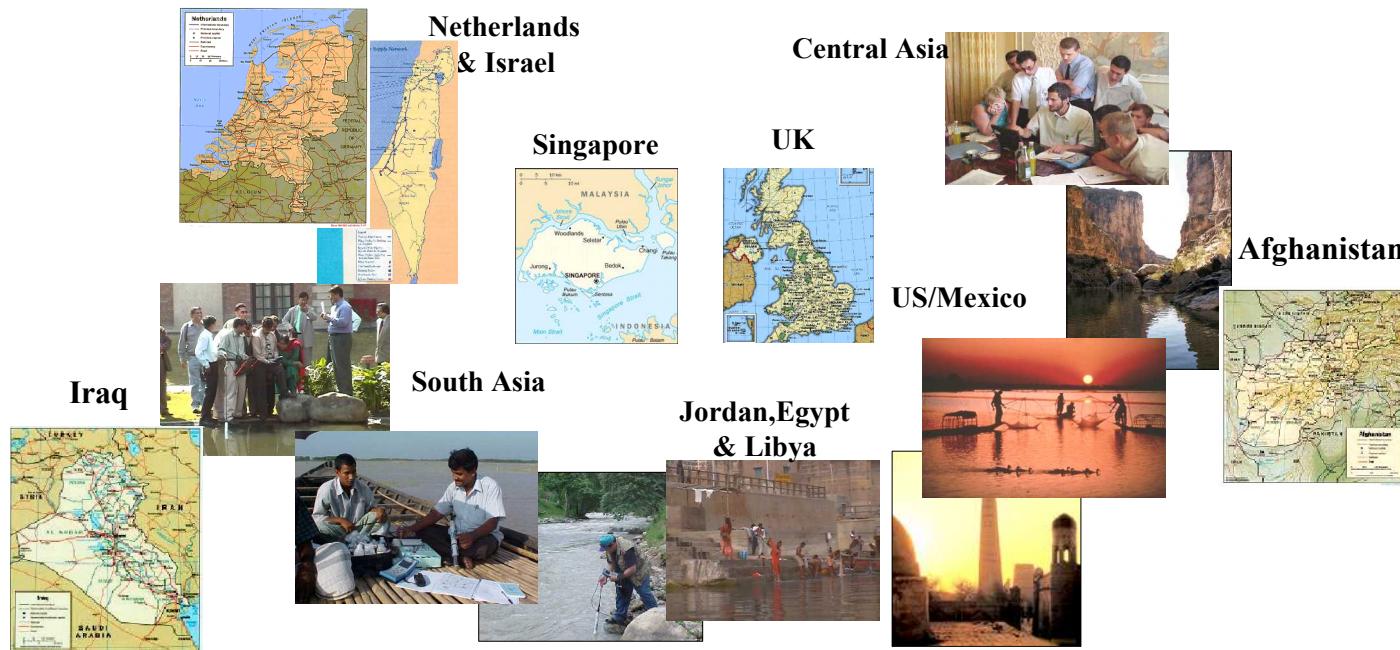
**International**





# ***Sandia's International Water "Modeling" Program***

**Sandia is leveraging technologies developed in sensors, security, modeling, treatment, desalination, technology & policy to impact areas of strategic importance to the United States!**



# Sandia's International Water/Resource Modeling Program

## Some examples of international projects:

**Iraq** – Through the DoS Iraq Transition Assistance Office – Have developed a country-wide water-energy-ag model to aid in resource management decision-making AND personnel capacity-building

**CSIS/SNL** – addresses major issues in U.S. Foreign Policy related to water resources management and technology – Upcoming CSIS workshop planned in Autumn, 2009 to draw attention to the opportunity of systems models and technology to inform policy in environmental security (inviting intel, DoD, DOE-IN, DoS, AC, others)

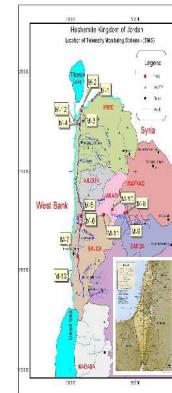
**21<sup>st</sup> Century Marshall Plan for Energy-Water-Agriculture in Developing Countries** – Led by the Atlantic Council, this effort proposes a new paradigm for US Foreign Aid investments

**Ecology of National Security/Environmental Security** – Advocating a proactive and holistic systems approach to the great environmental challenges of our time

**Singapore** - Have developed early warning system and water quality management software system for their Public Utility Board, and are developing a country-wide energy system model to aid decision-makers at the Energy Market Authority.

**Libya** – Are working with DOS and DOE to engage Libyan scientists and engineers in water system management employing our system models

**US-Mexico** – Have collaborated with Mexican water professionals to develop a preliminary water resource management model for the entire Rio Grande, including the transboundary reaches.



# Sandia's International Water/Resource Modeling Program

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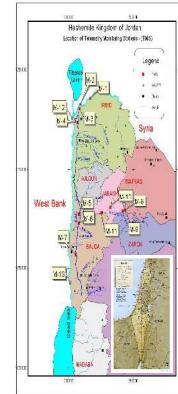
**Rainy River** - Developed decision support model for the Rainey River basin (US-Canada) that can be used to evaluate the consequences of various alternative water resources management decisions

**Jordan** – collaborated with RSS/JUST to develop a water management model of the Zarqa river basin to improve water quality and delivery

**Israel** - Keen interest in collaborating with Sandia, a recognized leader in water security technology development

**Central Asia** - Brings water resources professionals from the neighboring countries of Kazakhstan, Kyrgystan, Uzbekistan, Tajikistan, and Turkmenistan together over their shared water resources

**Also** - Afghanistan, UK, Netherlands, Brazil, Nile Basin, Pakistan-India, Iran interactions underway to develop projects/collaborations





# Sandia's International Water/Resource Modeling Program

## A Modeling Example:

### Water-Energy-Ag Model of Iraq





# **Sandia's International Water/Resource Modeling Program**

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