

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!

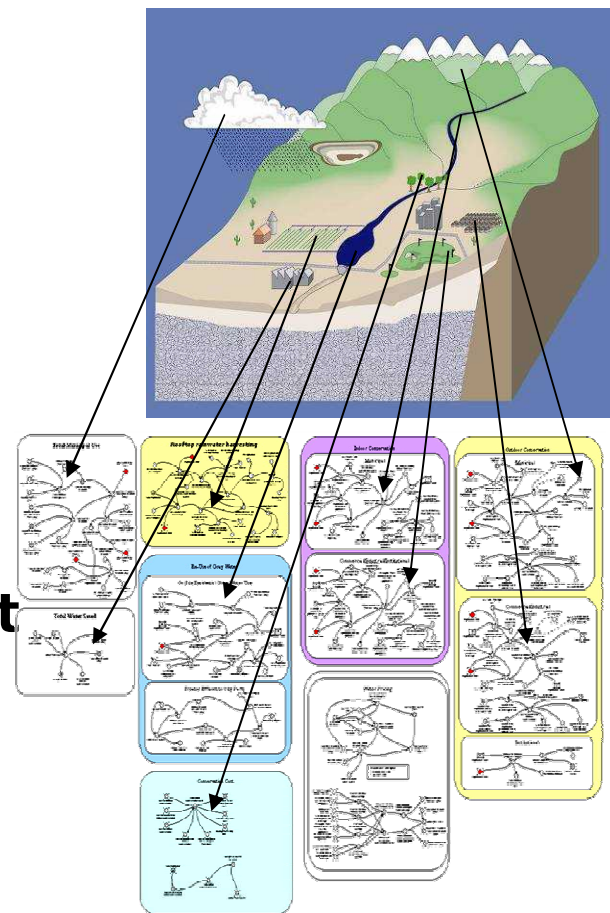
These tools are being applied in New Mexico, the United States, and Internationally

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)

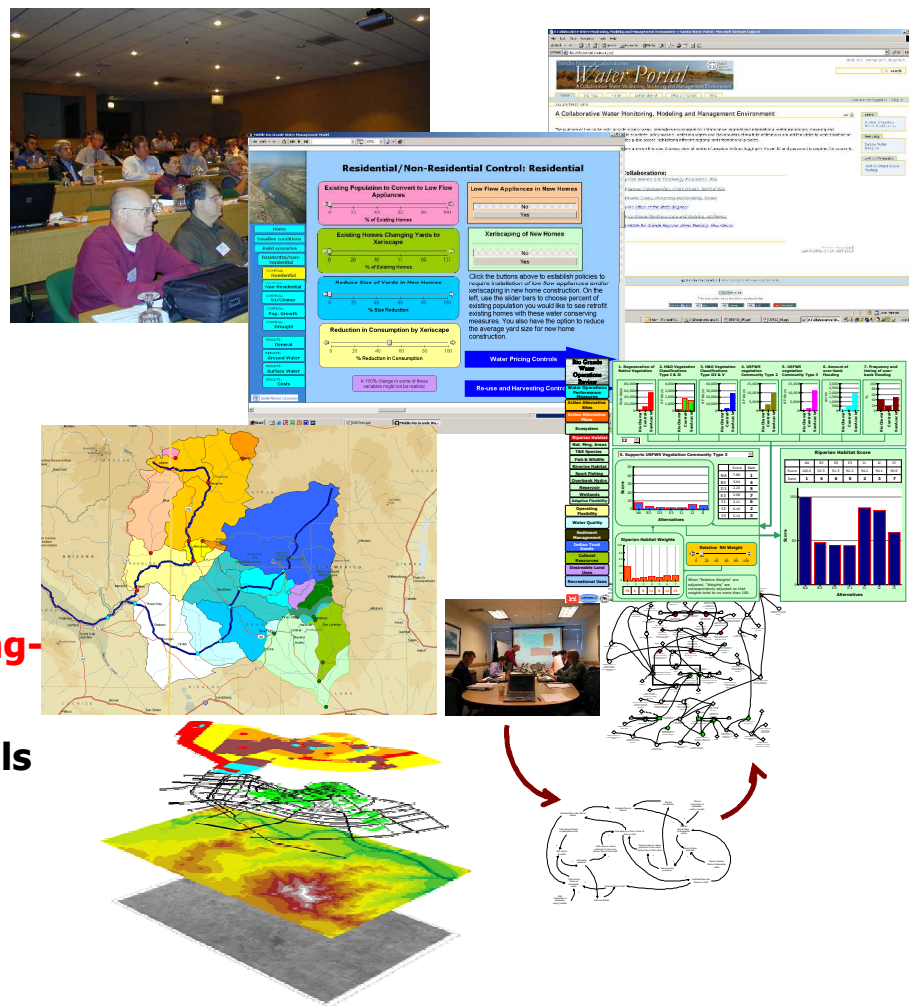
Algae and cellulosic ethanol biofuel models (national)

Algae Roadmap Model for technology deployment (national)

Various Energy/Fuel/Transportation Models

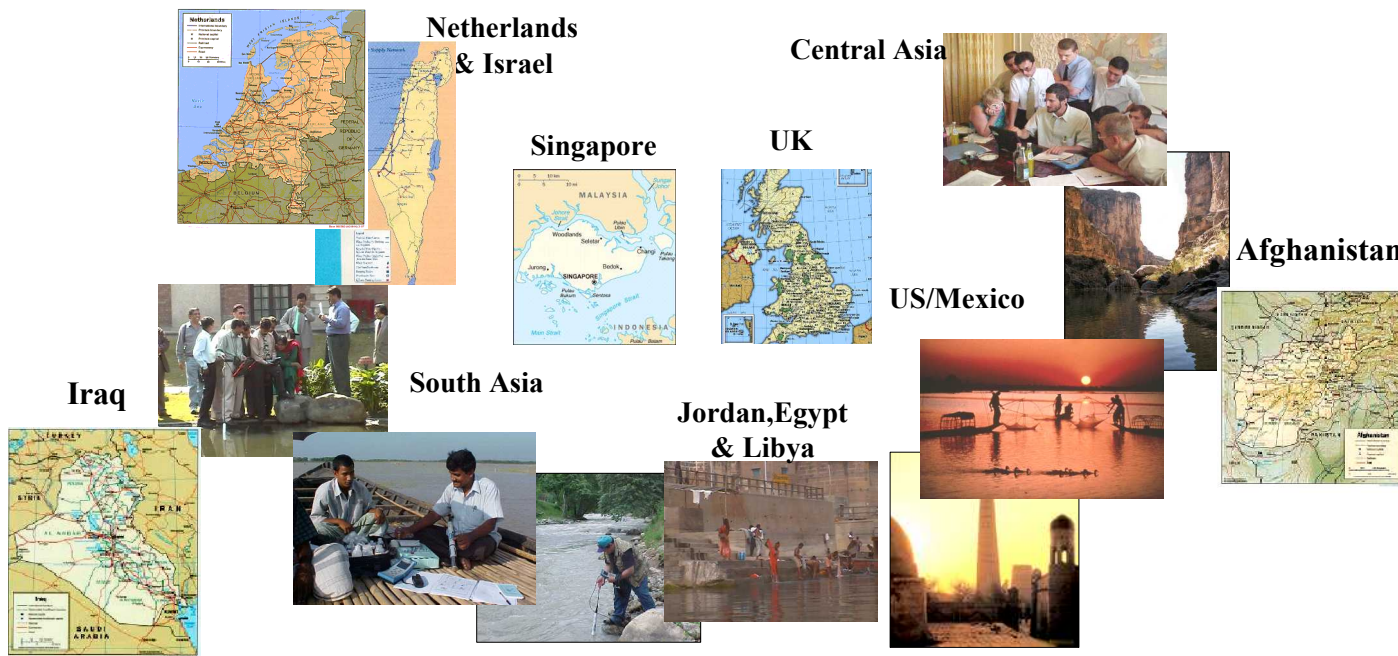
Energy-Water Toolbox Model

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)

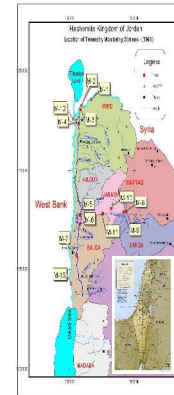
21st Century Marshall Plan for Energy-Water-Agriculture in Developing Countries – Led by the Atlantic Council, this effort proposes a new paradigm for US Foreign Aid investments

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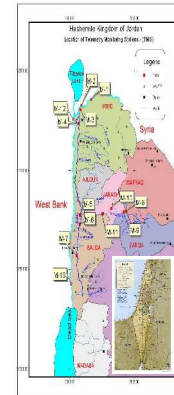
Rainy River - Developed decision support model for the Rainey River basin (US-Canada) that can be used to evaluate the consequences of various alternative water resources management decisions

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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