

Collaborative Stakeholder-Driven Water-Energy-Food Resource Modeling and Planning

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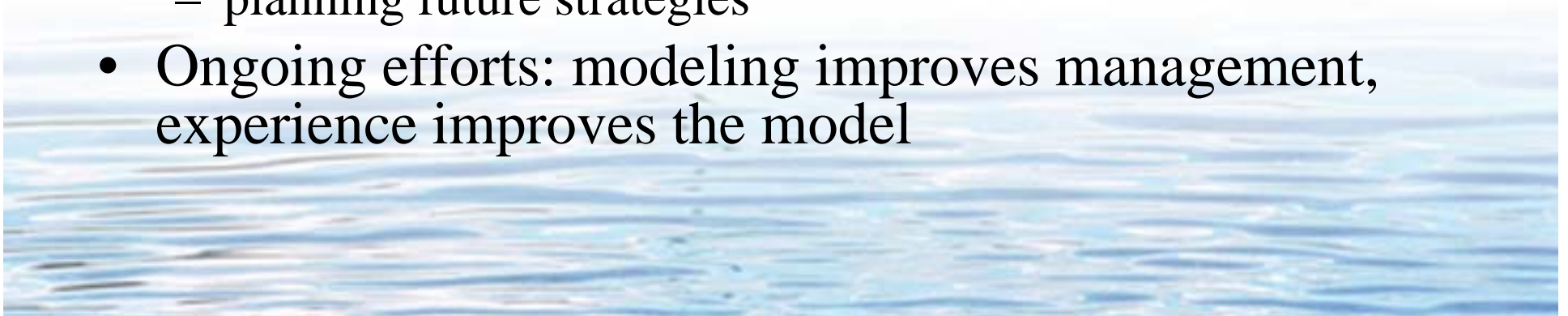
Resource planning is more complicated and more critical than it has ever been

- Increasing population
- Increasing resource consumption
- Decreasing resource availability
- Increasing stakeholder involvement
- Increasing transboundary issues
- Increasing appreciation of the complexity
 - multi sector/discipline
 - many variables, interdependencies, feedbacks, time lags



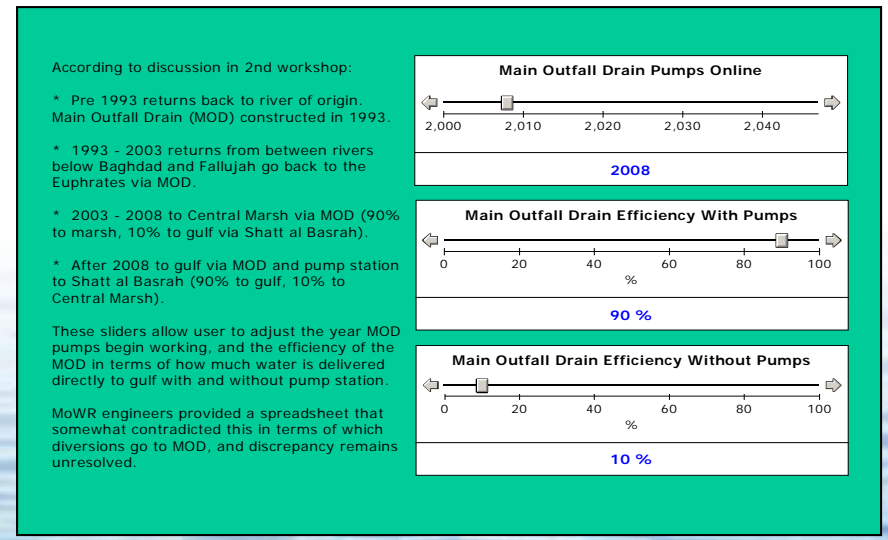
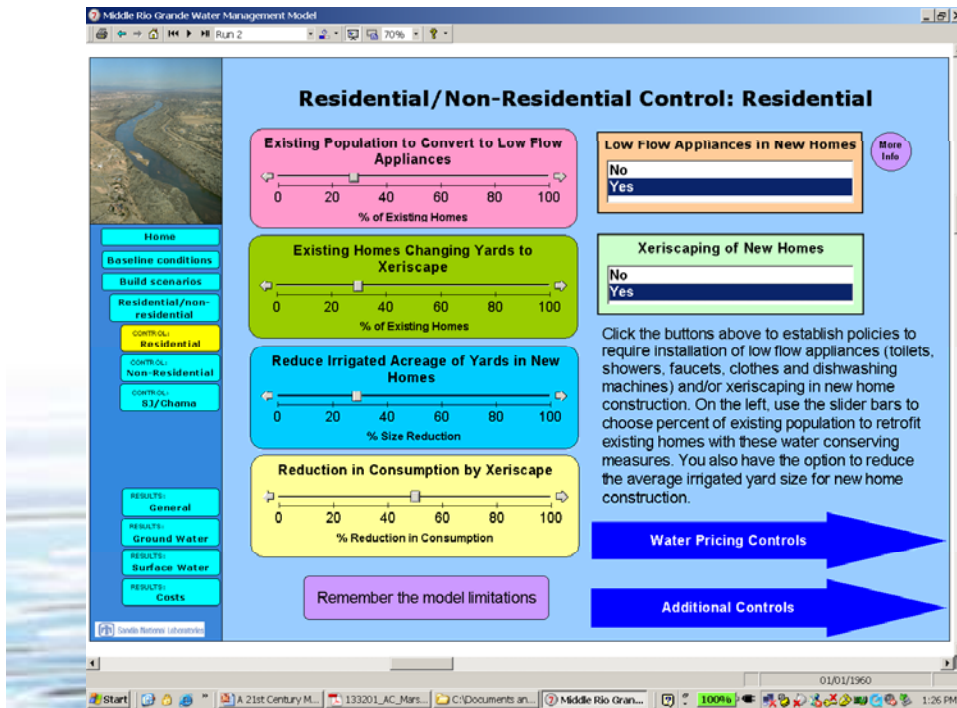
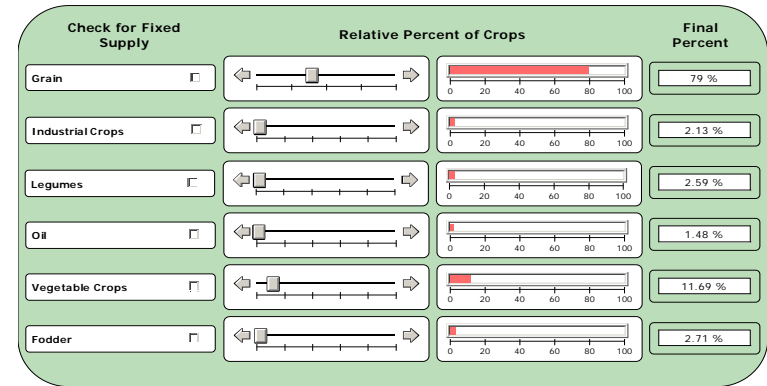
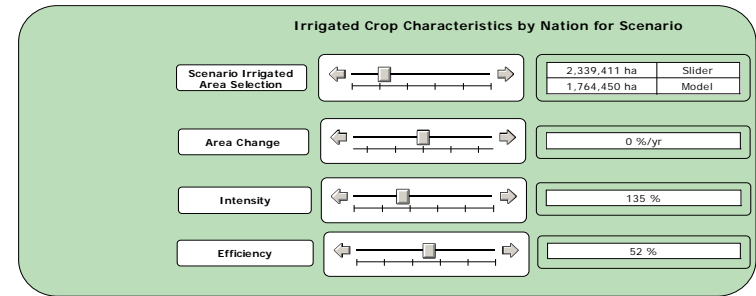
One solution: Collaborative Stakeholder-Driven Modeling, Roadmapping and Planning

- Engage multi-sector, multi-disciplinary experts
- Collect knowledge, data, information
- Build computer simulation models for
 - evaluating tradeoffs
 - developing consensus
 - educating stakeholders, policy makers & public
 - planning future strategies
- Ongoing efforts: modeling improves management, experience improves the model



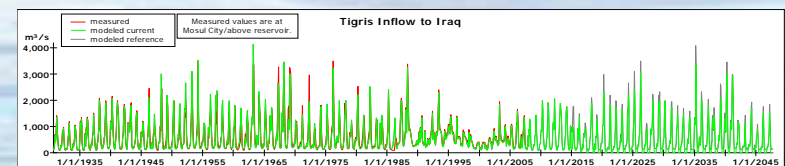
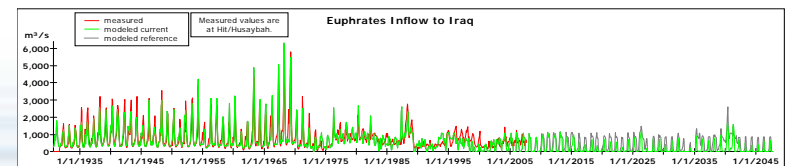
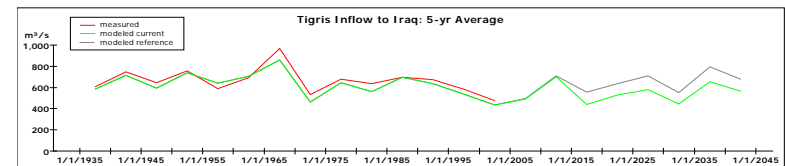
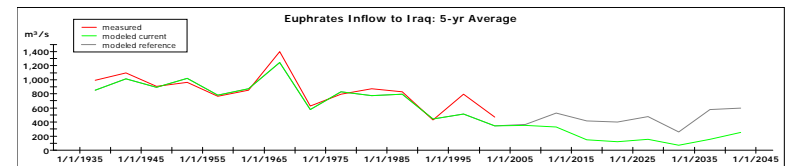
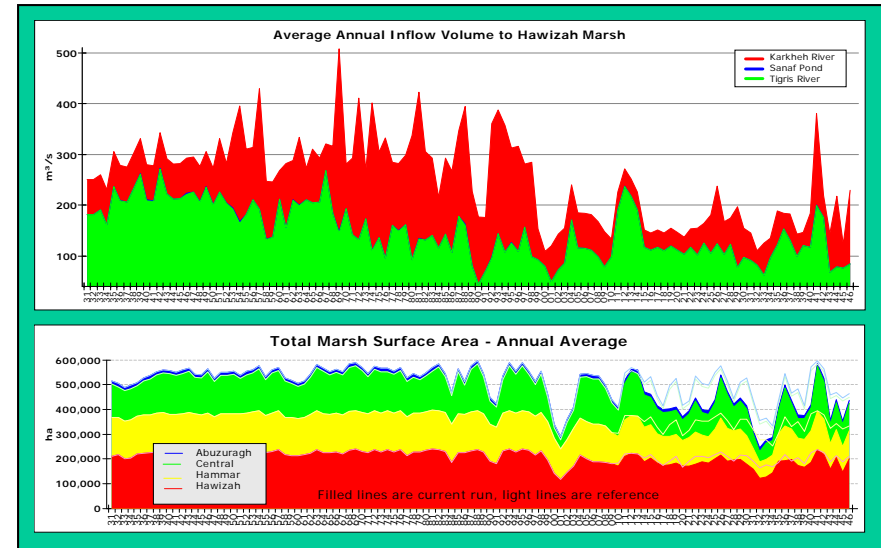
INTERACTIVE, USER FRIENDLY MODELS

Allows for real time construction and evaluation of competing development strategies



GRAPHICAL OUTPUT

Allows real time comparison of alternatives, education of stakeholders and policy makers, and development of rigorous, quantitative development plans



General Results Settings

Back to:

- Residential/non-residential
- Bosque
- Agriculture
- Reservoirs
- Desalination
- Pop. Growth
- Drought
- Transfers

Global Settings

Random Seed: 1.0

Annual Cost, 2000 dollars

Present Value: \$629,772,603.20

Annual Reduction in Consumption

Annual average reduction: 72,960.90 AF

Cumulative R.G. Compact Balance

Cumulative RGC balance: -12,404.88 AF

Cumulative Groundwater Depletion

Total GW depletion: -1,726,501.67 AF

Avg. cost/AF water saved: \$267.85 per AF

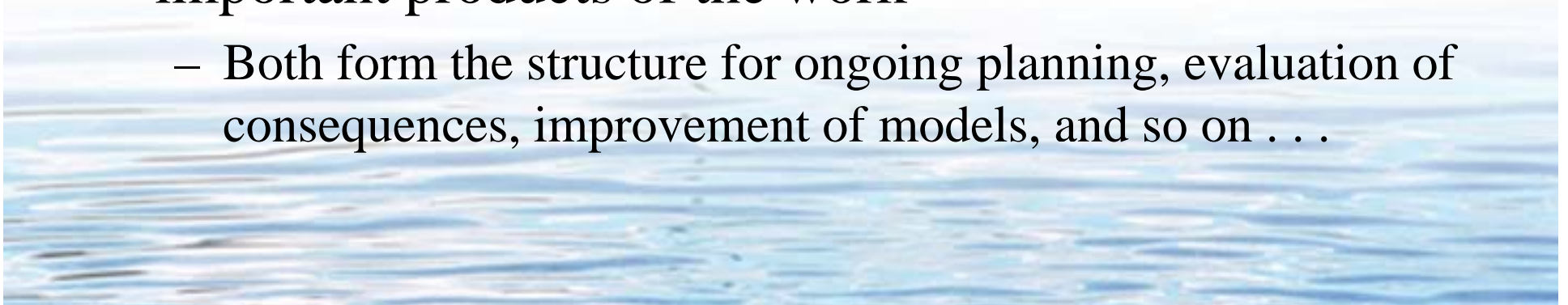
More info

Tabular annual output

Graphs show cumulative results for all changes made to the model. These cumulative results are plotted against the baseline condition that assumes no changes to current water use practices. See other results pages for more results.

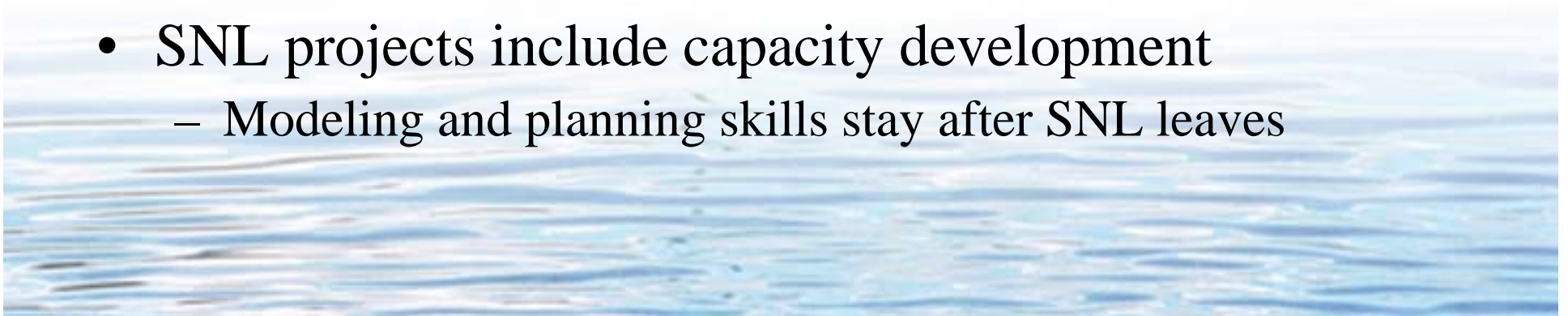
Collaborative Stakeholder Involvement

- Collaborative stakeholder involvement is key
 - Brings together experts from across disciplines and sectors
 - Over months or years they work together to better understand interdependencies among systems
 - Their collaborative experience is captured in a quantitative model
 - Model is clearinghouse for best data and knowledge
- Model *AND* the collaborative process are both important products of the work
 - Both form the structure for ongoing planning, evaluation of consequences, improvement of models, and so on . . .



Overall advantages of the approach

- Reduces guess work associated with large-scale infrastructure planning projects
- Includes climatic variability, demographic patterns, economics
- Provides rigorous and quantitative evaluation of outcomes
- Provides a user-friendly, interactive tool perfect for educating policy makers and the public
- SNL projects include capacity development
 - Modeling and planning skills stay after SNL leaves



Collaborative Modeling & Planning Project Examples

- Aral Sea Basin
- Middle and Lower Rio Grande
- Gila Basin
- Mimbres Basin
- US Water/Energy Interdependencies
- Willamette Basin
- Iraq/Tigris-Euphrates
- Libya Great Man Made River Basin
- Santa Fe Renewables (SNL/Wild Earth Guardians collaboration)
- Atlantic Council 21st Century Marshall Plan for Water, Energy and Agriculture in Developing Nations
- Ecology of National Security/Environmental Security
- Algae Biofuels



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[Project Report](#)

[Summary Results](#)

[Transboundary Inputs](#)

1

[Transboundary Inputs](#)

2

[Transboundary Results 1](#)

[Transboundary Results 2](#)

[Surface Water Inputs](#)

[Surface Water Results 1](#)

[Surface Water Results 2](#)

[Salinity Results](#)

[Agriculture Inputs 1](#)

[Agriculture Inputs 2](#)

[Agriculture Results](#)

[M & I Inputs](#)

[M & I Results](#)

[Marsh Inputs](#)

[Marsh Results](#)

[How to Use the Model](#)

Strategy for Land and Water Resources in Iraq (SLWRI) Water Systems Planning Model

A simulation tool for long term water planning developed collaboratively by:

Iraq Ministry of Water Resources,
US DOS Iraq Transition Assistance Office,
UNESCO, and Sandia National Laboratories



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