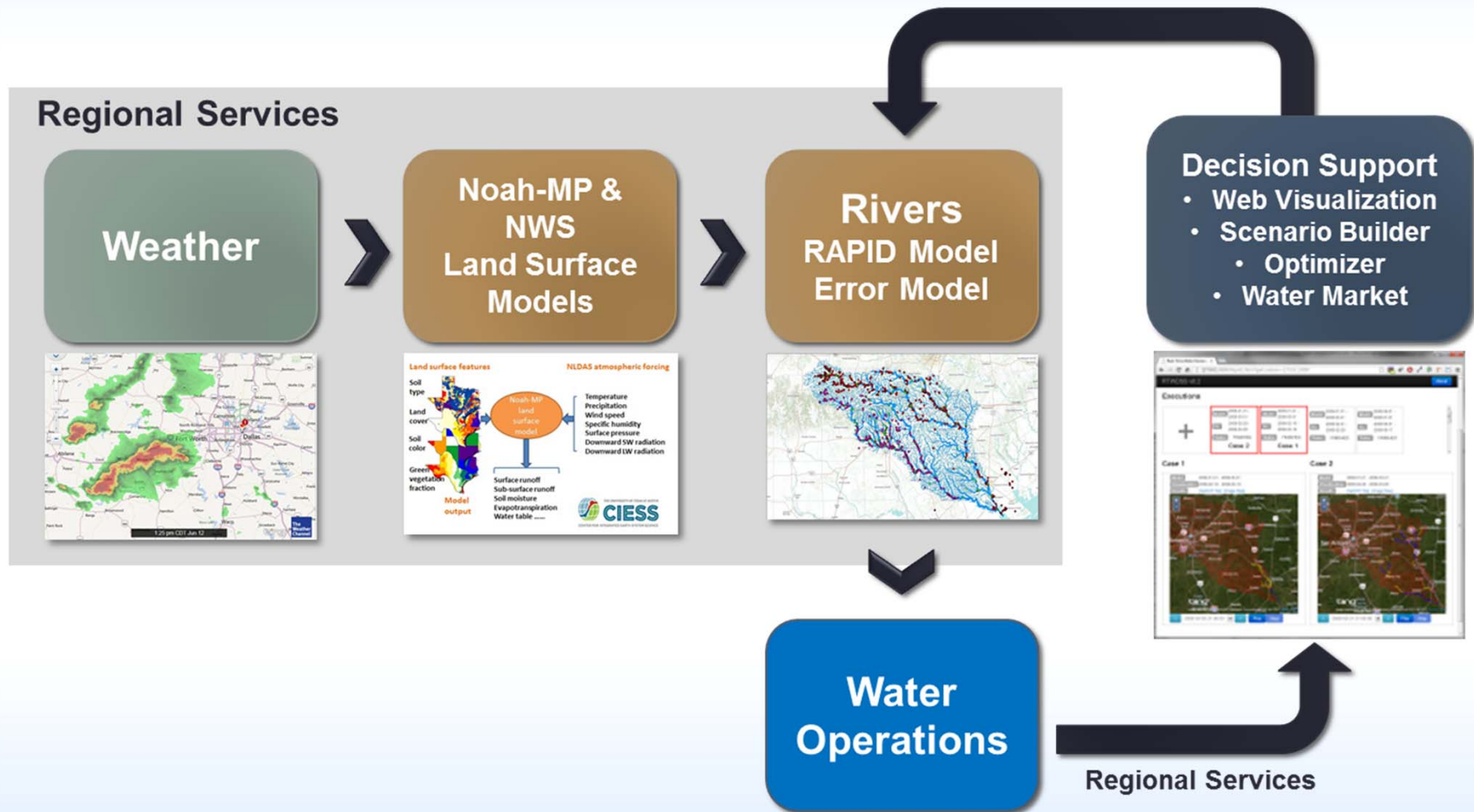# Real-Time Water Modeling and Decision Support Framework

U. of Illinois: Barbara S. Minsker (minsker@illinois.edu), Erhu Du, Jong Lee, Tingting Zhao
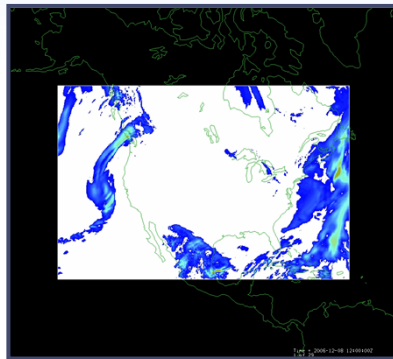
U. of Texas: David Maidment, Fernando Salas, Zong-Liang Yang

Real-Time Water Operations Decision Support System
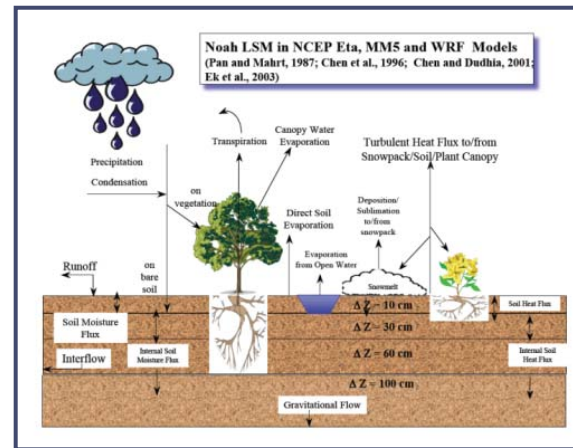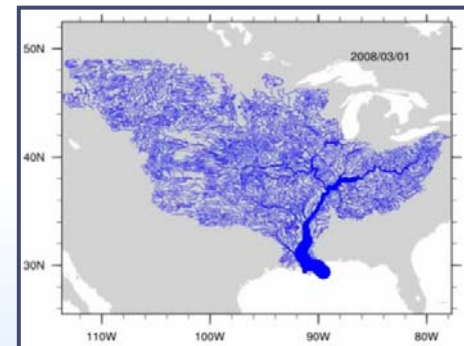
River Flow – Model as a Service

Observations
Datasets, Numerical
Weather Model

Land Surface Model

RAPID River Flow Model

Automated workflow at Univ. of Illinois uses LDAS data from NASA to run river model at Univ. of Texas

River Modeling Web Application
http://rapid.ncsa.illinois.edu:8080/rapid2/

WorldWide Telescope Visualization
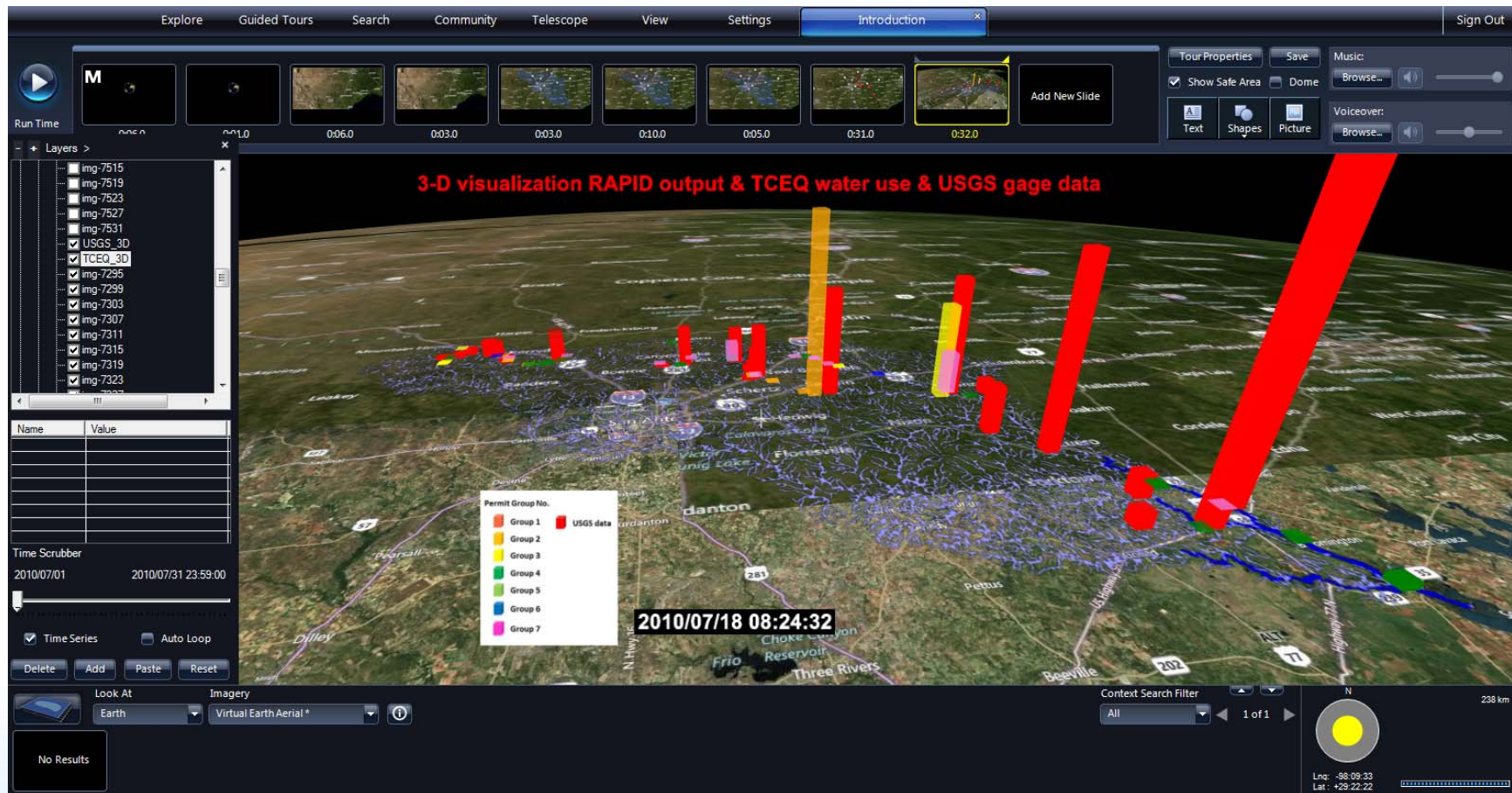
Real-Time Model Service Architecture
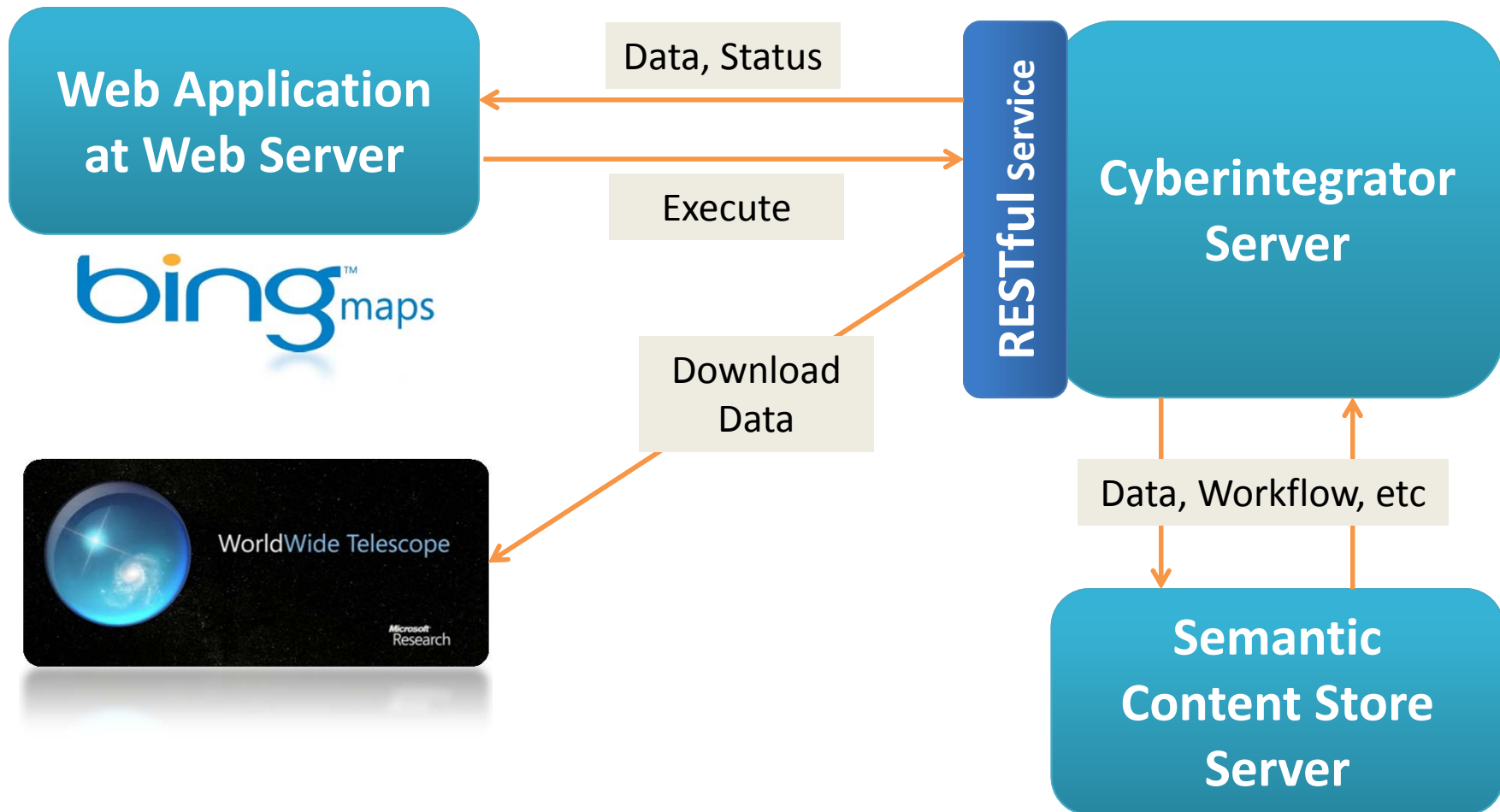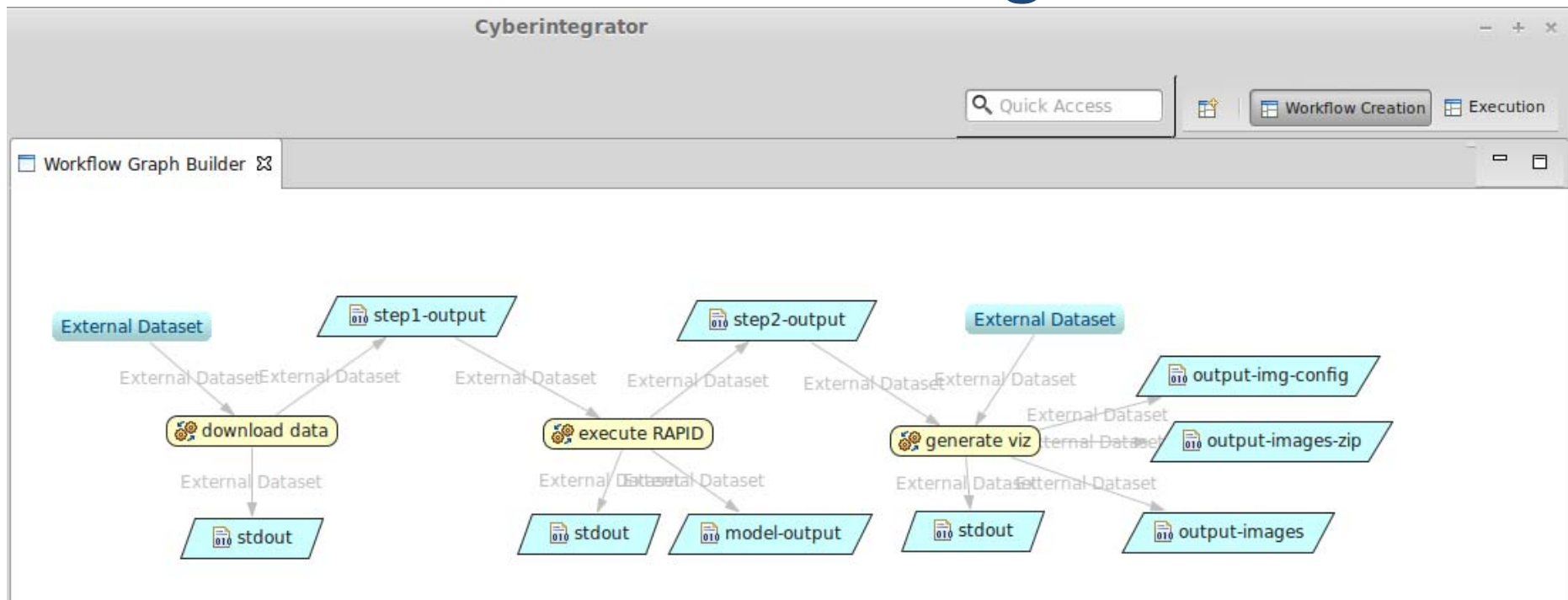
Implement in CyberIntegrator: Exploratory Workflow

- **Identify Inputs**
  - (e.g. NEXRAD data)

- **Link analyses and models**
  - Could be Matlab, or C/C++ or Fortran code

- **Provenance tracking**
  - All data, metadata, configuration information stored
  - Future users know where analyses came from

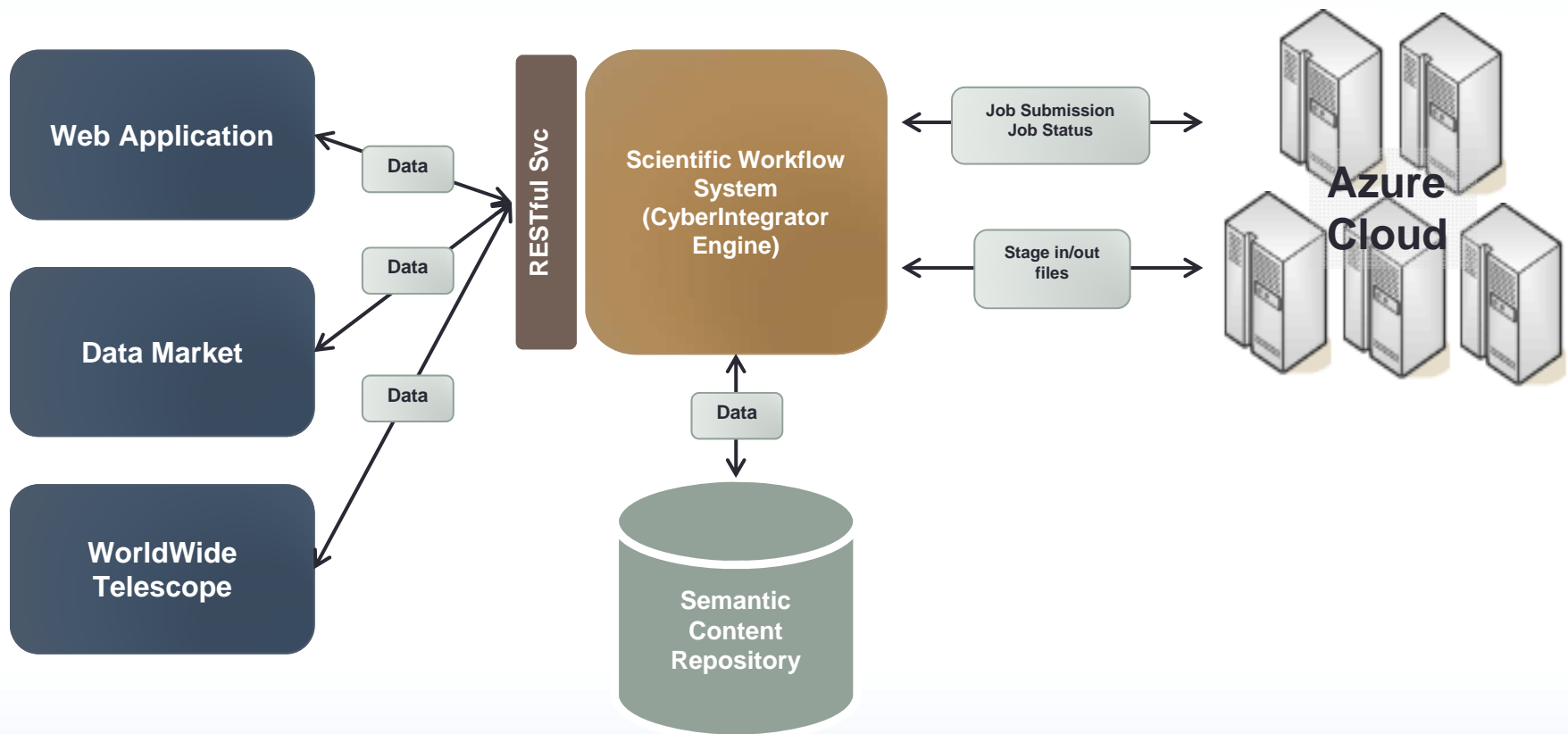# Cyberintegrator Workflow for Real-Time River Modeling

- Download NLDAS data
- Execute RAPID model
- Generate visualization (images) of the model results

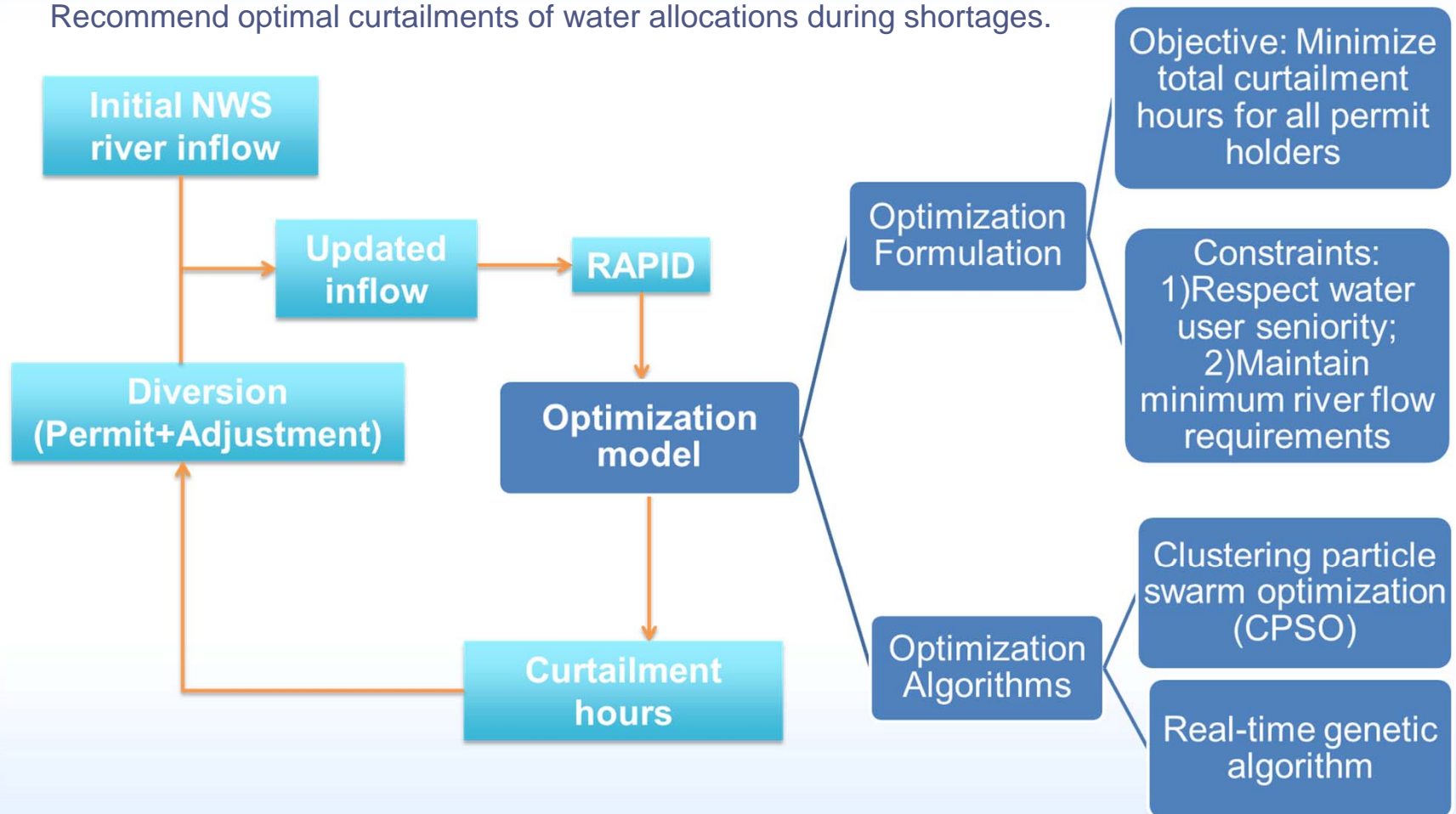# Next Steps: Real-Time Data and Model Services
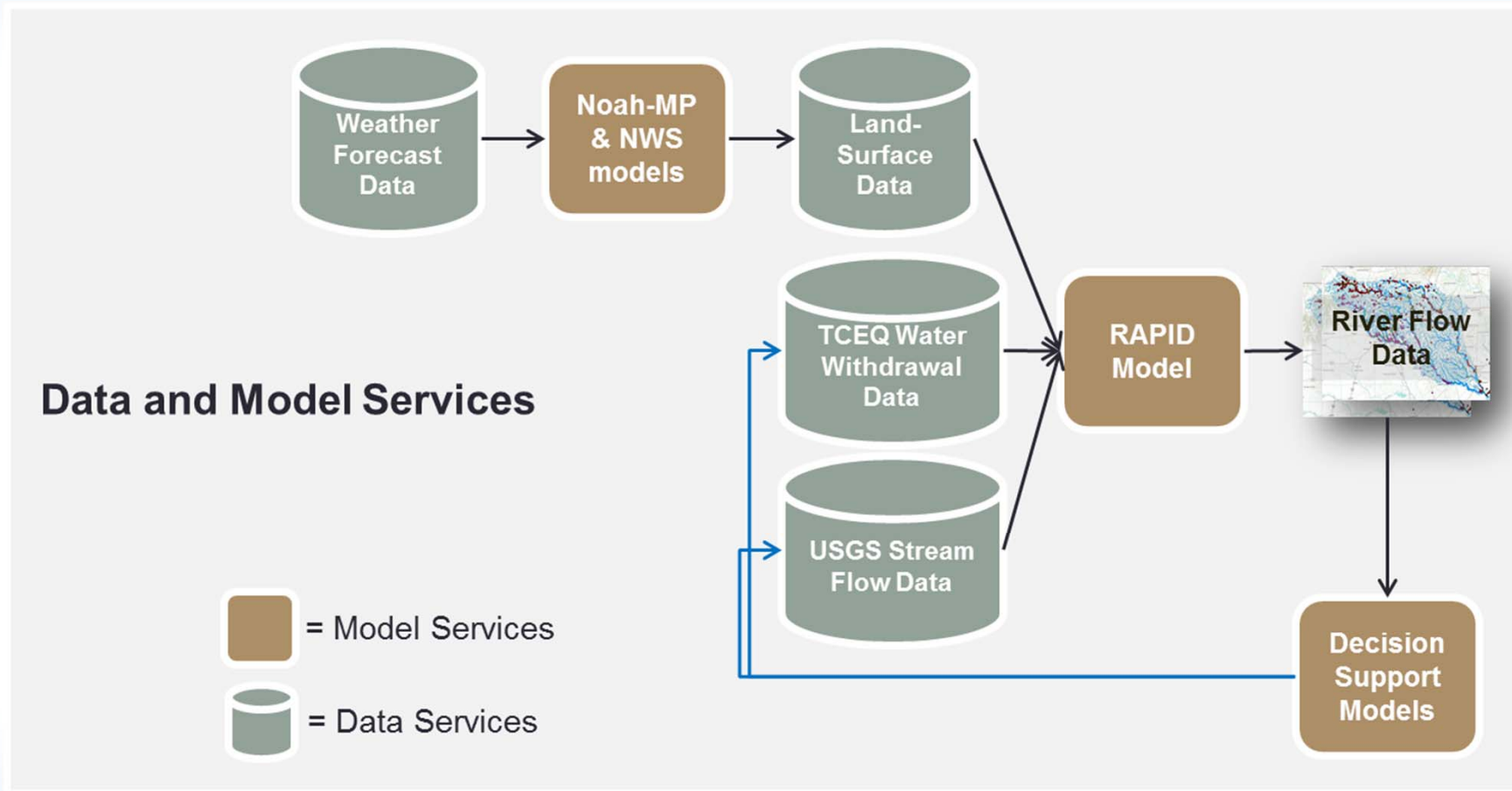
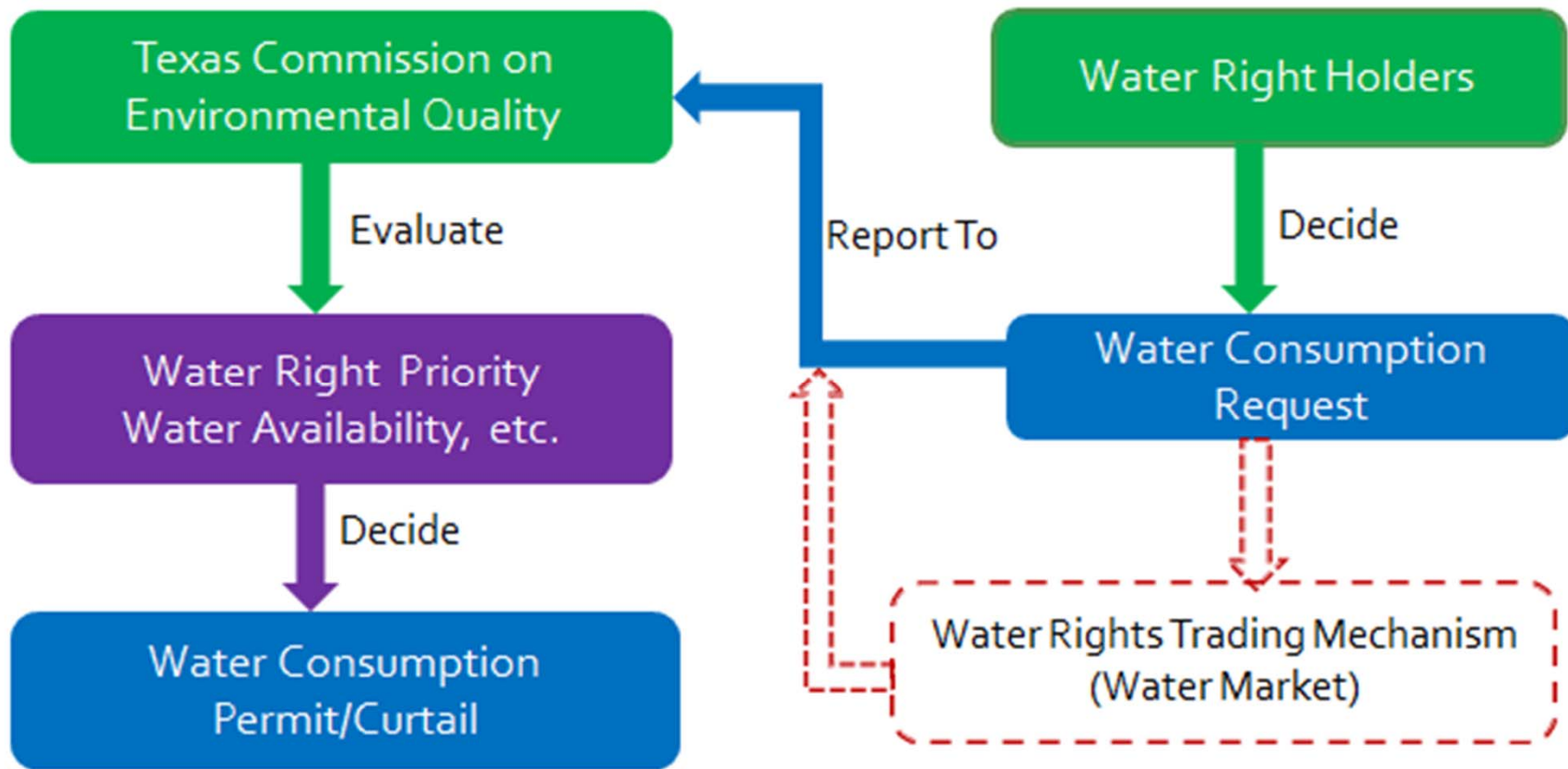# Next Steps: Decision Support Services in the Cloud

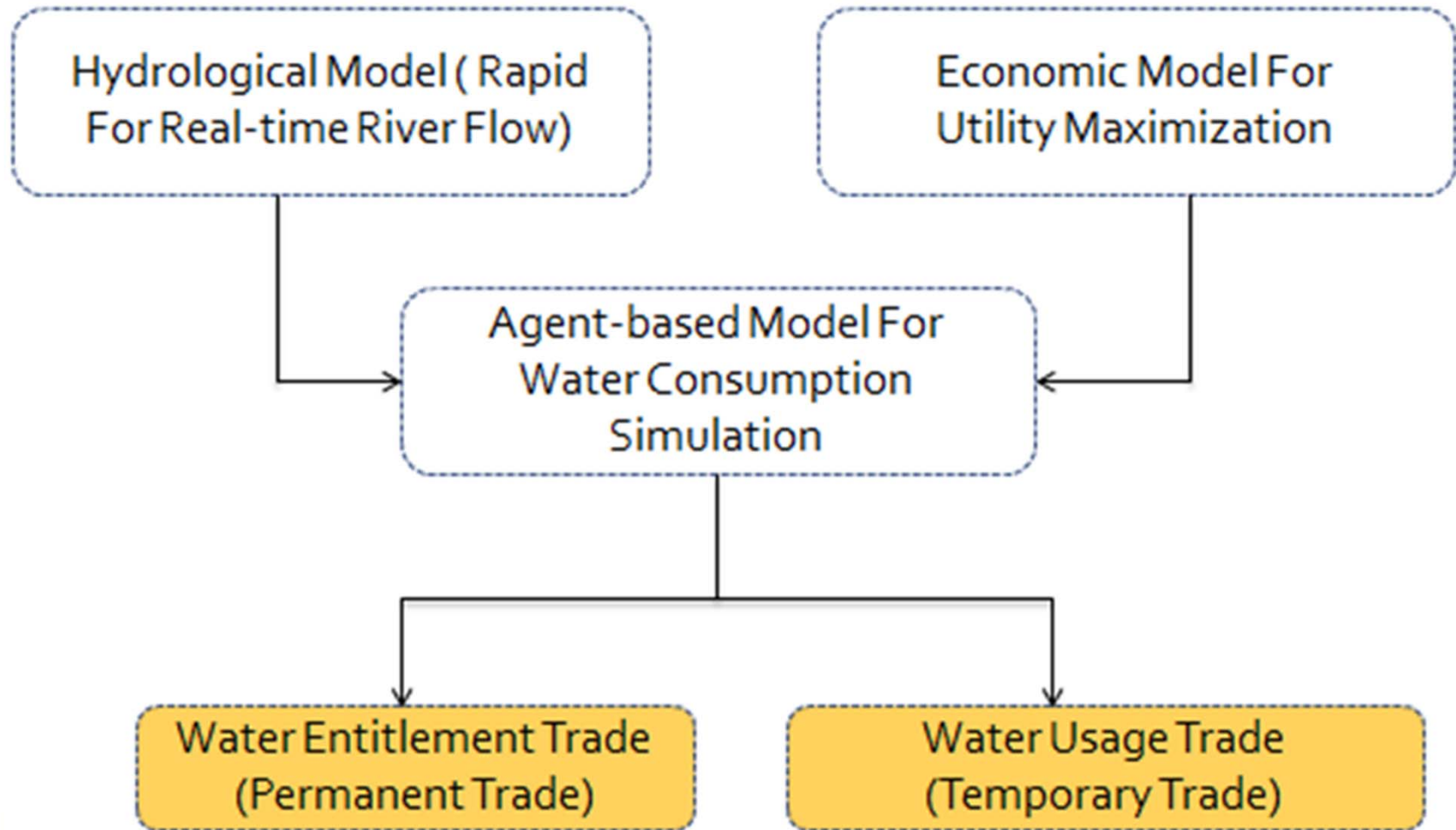# Decision Support Services: Optimizing Real-Time Water Allocation During Droughts

Recommend optimal curtailments of water allocations during shortages.

Decision Support Services: Feasibility of a Real-Time Water Trading Market

Decision Support Services: Simulating Impacts of a Real-Time Water Trading Market

Acknowledgments

- Funding Support
  - National Science Foundation
  - Microsoft Research
- Kathy Alexander, Cindy Hooper, Jordan Gouger, and others at TCEQ provided data and assistance in conceptualizing the framework