

Toward a hydrologic observatory in the Suwannee River watershed

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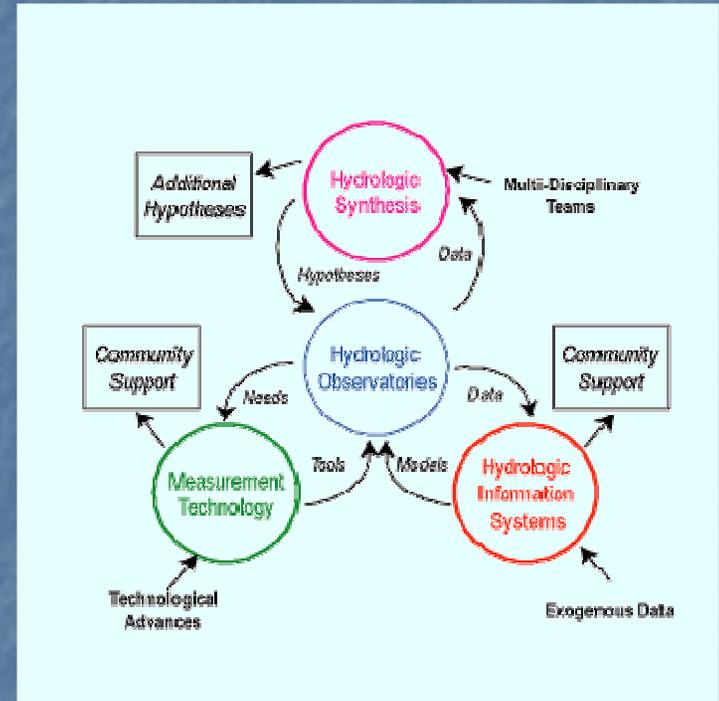
Hydrologic Observatories

- National Science Foundation funded initiative
- Coordinated through CUAHSI
 - Consortium of Universities for the Advancement of Hydrologic Sciences, Inc.
- A consortium of 90 research universities and 1 affiliate member



HydroView

- Four mutually supportive elements:
 - Instrumentation
 - Proposal about to be submitted for 3-yr pilot (Oregon State, Stanford, UNH, UVM, Tufts)
 - Informatics
 - \$2.5M, 2-year grant (Texas, SDSC, UIUC, Drexel + 9 additional collaborators)
 - Synthesis
 - (UNH, Utah State, UC Berkeley, UC Irvine)
 - **Hydrologic Observatories**



What is an HO?

- “Tool” to answer hydrologic and related questions
 - Watershed – loosely defined
 - Sufficiently large (1 to 5 x 10⁴ km²) to explore all interfaces, include LS/Atm
- Community Resource
 - Core data available to all through common interface
 - Equal access to site
 - Support for remote investigators
- National-scale Network of 5 HO's
 - Comparable data across observatories
 - Test hypotheses in different hydrologic settings

Resource Available

- 5 yr renewable grant
- \$3 million/year in operating expenses
- \$10 million for infrastructure

HO & Data

- Collect:
 - Core data
 - Investigator data
- Curate:
 - Core and Investigator data
 - Available ancillary data
- Disseminate:
 - Hydrologic Information Systems

Core Data

- Provides estimates of fundamental characteristics
- Common to multiple hypotheses
- Immediately available to community

Neuse River Prototype

- Designed by committee of experts from across country
- Committee given specific charge
- http://www.cuahsi.org/HO/Neuse_ver4.PDF

Cross-cutting Themes

- Scaling
- Forcing, Feedbacks, and Coupling
- Predictions and Limits-to-Prediction

Science Topics

- Linking Hydrologic and Biogeochemical Cycles
- Hydrologic Extremes
- Sustainability of Water Resources
- Transport of Chemical and Biological Contaminants
- Hydrologic Influence on Ecosystem Functions

Hydrologic Characterization

Three fundamental properties

1. Fluxes between "stores"
2. Residence time within "stores"
3. Flowpaths among "stores"

Stores include surface, subsurface and atmosphere.

Fluxes include mass (water, dissolved components, sediment) and energy

Steps Toward the HO

- Aug. 2, 2004: 10-page prospectus
 - http://www.cuahsi.org/HO/prospectus_list.htm
- Aug. 24-25, 2004: National Workshop
 - Strawman HO Network: Pacific Northwest, Great Salt Lake Basin, Illinois River, Potomac River, and Suwannee River
- Jan, 2005: NSF Program Announcement
- Apr, 2005: Proposals Due
- Sep/Oct 2005: Award 1 to 2 HO's
- 2008: Competition for 3rd HO

Evaluation Criteria

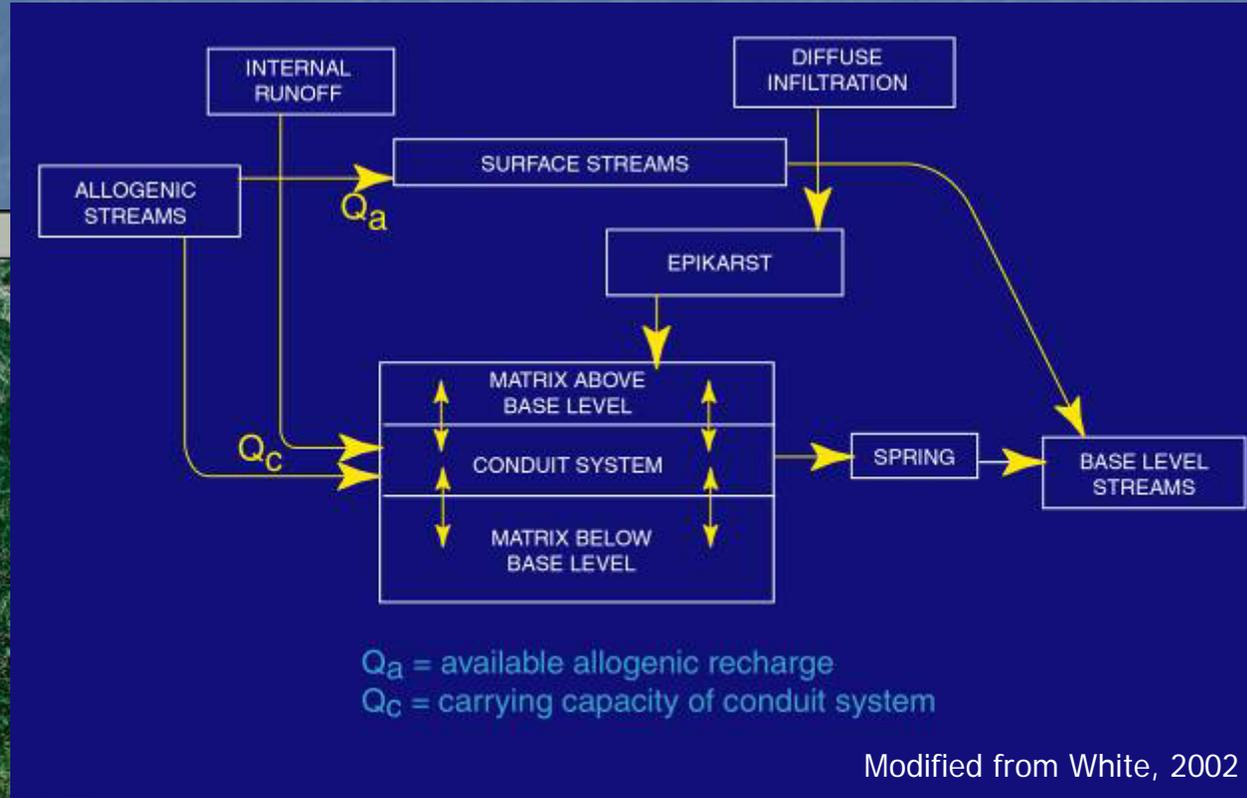
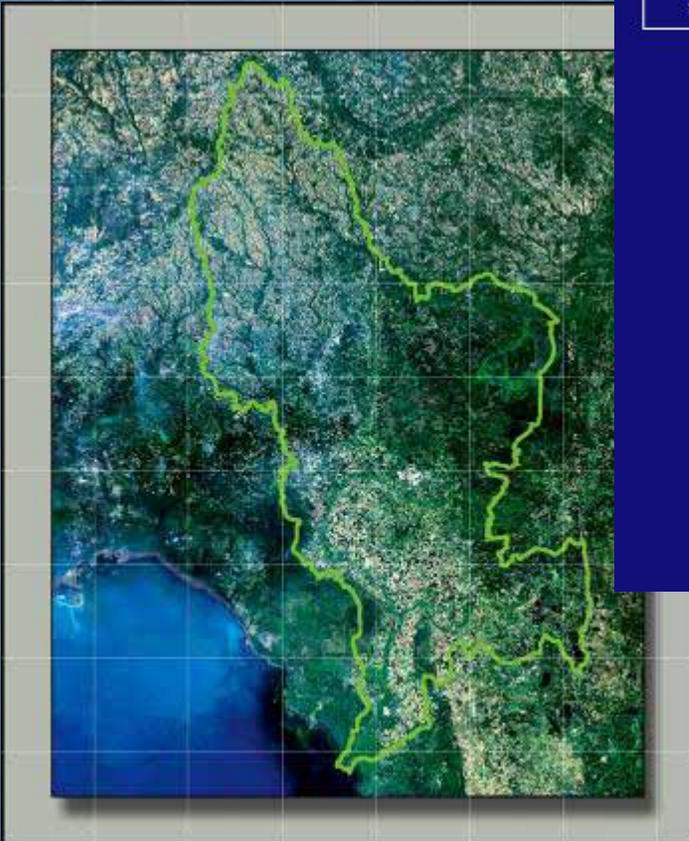
- **Community Resource – number of outside investigators wanting to use HO.**
- Hypotheses Posed
 - Meet at least 3 of 5 topics
 - Interdisciplinary
 - Innovative
- Design of Core Data Collection
 - Range of scales, including largest
 - Nested, intensive basins with broader surveys
 - Models—benchmark, iteration between field and model

Evaluation Criteria

- Leveraging of Existing Data
 - Intensive studies (LTER, USGS, ARS, USFS)
 - Monitoring data sets (Federal, state and local)
- Institutional support
 - State/Local support
 - Stakeholder organizations (access, data)
- Educational/Outreach Opportunities

Suwannee River HO

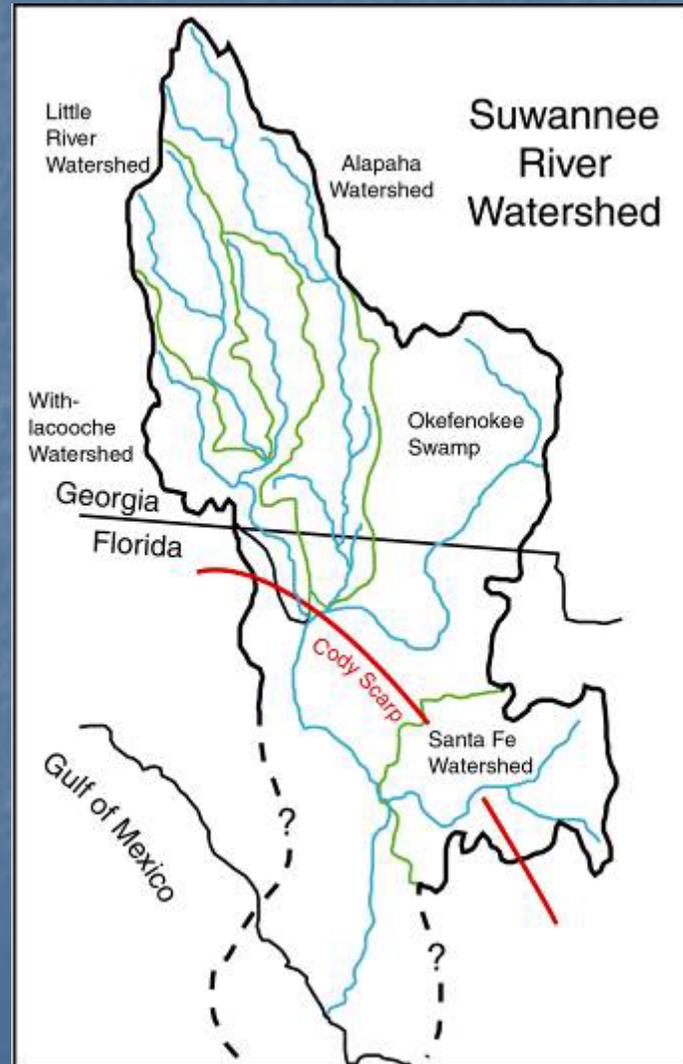
~25,000 km²



An example conceptual model for middle/karst reaches

Suwannee River HO

- Cody Scarp:
 - Upper reaches: distinct surface and ground water
 - Middle reaches: unconfined with extensive surface ground water interactions
 - Large deltaic estuary



Suwannee River HO

- Climate

- Distinct seasonality – rainy and dry seasons
- Weather extremes – hurricanes, extra-tropical storms, droughts

- Biology/ecology

- Endangered species: Manatee, mussels, sturgeon, stygobitic organisms

Suwannee River HO

- Flow largely unregulated
 - Urban threats – water transfer
- Land Use
 - Largely agricultural
 - Agrichemicals and water quality
 - Increasing population, but non-urban

Suwannee River HO

- Large range of current projects/monitoring:
 - USDA-ARS Watershed Research Lab, Little River sub-basin
 - Suwannee River Water Management District
 - Florida DEP springs initiative
 - Suwannee River Partnership
 - **USGS Suwannee River Initiative**

Consortium

- Universities: UF, USF, FSU, UCF, UGa
- Governmental agencies: USDA, SRWMD, FLDEP, USGS

- Interested??
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