

# PANEL DISCUSSION: INDICATORS FOR SUSTAINABLE WATER RESOURCES IN GEORGIA

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**Abstract.** Sustainability has been defined many ways, but most definitions include a vision of the future in which human activities maintain or improve the health of our social, economic, and ecological systems. The health of these systems can be monitored using appropriate indicators in ways that are similar to how individuals and health care providers monitor human health using measures such as oral temperature or blood pressure. However, just as no single measure is sufficient to judge the comprehensive health of an individual, a system as complex as Georgia's water resources will require a collection of indicators – some agreeing but others probably conflicting, some that are local in scope but others that span across a region, and some that are easy to measure but others that are difficult to quantify. Sorting through this complexity, and developing consensus on a set of measures and how to interpret them is a difficult but important challenge. This panel discussion will address (1) the role of indicators in resource management, (2) previous work done in Georgia to develop indicators, and (3) the process that Georgia's citizens, policy makers, businesses, and farmers need to engage in to develop a suite of indicators to help ensure sustainable water resources in Georgia.

## BACKGROUND

Georgia, the largest state east of the Mississippi River, has significant water resources. Georgia boasts more than 70,000 miles of rivers and streams in its 14 major river basins, of which about 44,000 miles are perennial. Georgia is also home to about 425,000 lake acres, 4.8 million wetlands acres, including approximately 432,000 estuarine wetland acres, and 100 miles of coastline. However, rapid population growth is putting pressure on Georgia's water resources (quality and quantity) through increased demands and increased point source and non-point source pollution.

In order to address the future sustainability of Georgia's water resources, the development of a comprehensive State Water Plan has been proposed through both a Governor's Executive Order (October 20<sup>th</sup>, 2003) and through state legislation (House Bill 237, 2004). The working outline of the State Water Plan states its vision that "Georgia manages its water resources in a sustainable manner to support the state's economy, to protect public health and natural systems, and to enhance the quality of life for all citizens." (GWRC, 2003) How will we know whether we are accomplishing this vision, or at least moving in the right direction?

## PANELISTS AND CONTRIBUTING AUTHORS

- Nap Caldwell, Planning & Policy Advisor, Georgia Environmental Protection Division
- Michael Chang, Sr. Research Scientist, School of Earth & Atmospheric Sciences, Georgia Institute of Technology
- Gary Hawkins, Agricultural Pollution Prevention Specialist and Public Service Assistant, Biological and Agricultural Engineering Coastal Plain Experiment Station, University of Georgia
- Zaneta Ivery, Senior Policy Analyst, Office of Research, Georgia Department of Community Affairs

## INDICATORS AND RESOURCE MANAGEMENT

We recommend that an agreed-upon set of measures be developed to indicate the progress towards the sustainability of Georgia's water resources. These indicators provide critical feedback on the conditions of our water resources, the effects of our decisions, and the effectiveness of our efforts. We feel that this effort needs to be *coordinated* at the state level to avoid the potentially sub-optimal "rush to the trough" approach currently used by local government officials (Keefer, 2003). However, a watershed/river basin approach is likely better for the actual management and

implementation of plans, as recognized by the River Basin Planning Act and subsequent efforts to develop plans. To help support the state's economy, perhaps the river basin planning should be coordinated with Regional Development Centers, as in the case of the Metropolitan North Georgia Water Planning District. An appropriate set of water sustainability indicators could serve the State Water Plan, as the plan is both statewide in policy and regional in implementation. We envision these indicators as a part of this plan.

Clearly, water resources are linked with our activities on land and in the air, and so these aspects need to be included. The more holistic our approach, the better we will avoid sub-optimizing our systems. However, this raises several questions about indicators in general: (Smith, 2004)

- *What is the appropriate number of indicators?* Too many, and we lose our ability to comprehend; too few, and we do not have a complete picture.
- *At what spatial scale should indicators be?* We would like to be able to report on the sustainability of water resources at the state level, but many of the important interactions are local and regional in nature.
- *At what temporal scale should indicators be?* This involves questions of how often to measure and report data, given natural cycles such as rainfalls, river flows, floods and droughts as well as human cycles of demand (and stress).
- *How do you prioritize these indicators?* Given a potentially long list of desired indicators and limited institutional resources, how do you choose what to measure and report?
- *What makes a good indicator?* One set of criteria is suggested (Moffat et al., 2001). The indicator or the information from which it is calculated should be:
  - Readily available,
  - Relatively easy to understand,
  - About something that can be measured,
  - Something believed to be important in its own right,
  - Based on information that can be used to compare different geographical areas,
  - Internationally comparable,
  - There should only be a short lag time between the state of affairs referred to and the indicator becoming available.

Ideally, the set would include as many *leading* indicators as possible, as opposed to *lagging* indicators. A leading indicator is predictive, suggesting what is likely to happen; a lagging indicator is reactive, telling

you how things were over a given period. A leading indicator could be the percent of impervious surfaces in a watershed, enabling the prediction of stormwater flow. A lagging indicator would be the percentage of streams on the 303(d) list – this determination comes *after* the streams have been impaired as a result of pollutant loads.

## STANDING ON THE SHOULDERS OF GIANTS

Significant work has been done by many organizations on indicators of sustainability as well as on indicators of water resource condition. We should build upon this work, not re-invent the wheel. This is a short list starting with some Georgia-specific work, and ending with national and international work – the list is not intended to be comprehensive:

- The Environmental Protection Division reports annually on the condition of Georgia's environment and the efforts going towards improvement.
- A workshop was held in 1999 to begin to determine a set of agreed-upon sustainability indicators for the Atlanta region.
- The Department of Community Affairs has developed a set of Georgia Community Indicators to measure the quality of life in Georgia communities.
- The Sustainable Water Resources Roundtable, formed in 2001 as an outcropping of the USGS, is working on a set of indicators of water sustainability at the national level.
- There are national and global indicator sets developed and used by the U.S. EPA, the World Resources Institute, the H. John Heinz Center for Science, Economics and the Environment, and the United Nations, among many others.

## HOW DO WE PROCEED?

Indicators are not ends in themselves, but are a means to inform policy and decisions. Assuming the development of a set of agreed-upon indicators of Georgia's water sustainability is a worthy goal, there are several more questions to ask at this point.

- Who should perform this task?
- Who are the stakeholders that should be involved, and how are they engaged?
- What criteria will be used to determine and select good indicators?
- What indicator sets should we draw upon?
- What sources of data are available to calculate indicators?

- What are the information gaps that need to be filled?
- How do we coordinate this effort, given differing natural and political boundaries?

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