

**Testimony on H.R. 135  
Subcommittee on Water Resources and Environment  
Committee of Transportation and Infrastructure  
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Mr. Chairman, my name is Aris Peter Georgakakos and I am Professor of Civil and Environmental Engineering at the Georgia Institute of Technology, in Atlanta, Georgia. For the past 10 years, I have also served as Director of the Georgia Water Resources Institute (GWRI) established by the Water Resources Research Act in 1964. This Act created a water resources research institute in each of the fifty states, the District of Columbia, and the territories of the US. The mission of the institutes is to help improve water resources management through innovative new research, education, technology transfer, and information dissemination. GWRI has unique expertise in the development and implementation of integrated information and decision support systems for water resources planning and management and has had involvement in several world regions including the Southeastern US, California, Europe, China, East Africa, and South America. As a disclaimer, I would like to state that the views presented herein are my own and should not be interpreted as those of the Georgia Institute of Technology or the National Institutes for Water Resources of which GWRI is a member.

First, I would like to thank you for the opportunity to testify in support of the H.R. 135, advocating the establishment of a Twenty-First Century Water Commission to study and develop recommendations for a comprehensive water strategy to address future water needs. I cannot overemphasize the need for a comprehensive strategy as water challenges are becoming increasingly complex, threatening our quality of life, compromising the integrity of the nation's environment and ecosystems, and undermining economic growth and prosperity.

In 2001 and 2004 two seminal National Research Council Reports ("Envisioning the Agenda for Water Resources Research in the Twenty-First Century" and "Confronting the Nation's Water Problems: The Role of Research") thoroughly examined the urgency and complexity of water resources issues facing the US. Among others, the following water resources challenges were cited as motivation for these studies:

- There is abundant evidence that the condition of water resources in many parts of the US and the world is deteriorating;

- Our institutions appear to have limited capacity to manage water-based habitats to maintain and improve species diversity and provide ecosystem services while concurrently supplying human needs;
- In some regions of the country, the availability of sufficient water to service growing domestic uses is in doubt, as is the future sufficiency of water to support agriculture in an increasingly competitive and globalizing agricultural economy;
- Demands for water resources to support population and economic growth continue to increase, although water supplies to support this growth are fixed and already fully allocated in most areas;
- Renewal and repair of the aging water supply infrastructure will require time and hundreds of billions of dollars;
- The frequency and magnitude of damages attributable to droughts and floods are increasing, providing evidence of increasing vulnerability to extreme climate and weather events;
- The threat of waterborne disease is constantly present, as exemplified by recent outbreaks of cryptosporidium.

My own state of Georgia, Mr. Chairman, is presently in the second year of an unprecedented drought, rapidly depleting our water supplies, halting our economy, threatening the sustainability of aquatic ecosystems, and increasing tensions among water users in our state and across the borders with Alabama and Florida. While droughts are the result of a natural climate cycle, drought stresses and impacts reach a new height with every new drought as urban, industrial, and agricultural water demands rise steadily. Georgia, as well as most US regions, is not well prepared to effectively manage these unprecedented water stresses. The main reasons for the lack of preparedness are symptomatic across the US and include:

- Lack of comprehensive knowledge and information on the interdependencies of natural processes and water uses;
- Narrow perspective on the part of water user groups acting to protect their short term interests with total disregard of long term risks; Lack of a shared and system-wide management vision and strategy;
- Lack of federal and state agency coordination and cooperation; Inflexible legal and institutional bureaucracies;
- Insufficient federal and state research investments for the development and implementation of innovative, adaptive, and integrated management technologies, systems, and processes; and
- Weakening of water resources research and education programs which are naturally suited to integrate knowledge across disciplines and create human resources qualified to develop sustainable solutions for our complex water resources challenges.

I would like to briefly comment on each of these areas.

*Knowledge and information:* There are many critical areas where knowledge and information need improvement for better water resources management. The above cited NRC reports developed a comprehensive list of 43 areas needing further scientific inquiry. Selected examples are listed below:

- Improve existing supply enhancing technologies such as wastewater treatment, desalinization, and groundwater banking;
- Understand the impact of land use changes and best management practices on pollutant loading to waters, ecosystem services, biotic indices, and higher organisms;
- Understand regional and national hydrologic measurement needs and develop a program that will provide these measurements;
- Understand and predict the frequency and cause of severe weather (floods and droughts);
- Understand global change and the associated hydrologic impacts;
- In all sectors develop more efficient water use strategies and optimize the economic return for the water used;
- Develop legal regimes that promote groundwater management and conjunctive use of surface water and groundwater;
- Develop adaptive management;
- Understand the role of the private sector in achieving efficient water and wastewater services; and
- Develop different processes for obtaining stakeholder input in forming water policies and plans.

These areas exemplify the need to improve our current understanding on the interdependence of water quantity and quality; the balance between human and ecological water uses; and the legal, institutional, and social factors that contribute to sustainable water resources management.

While there is a lot to learn, a lot is already known and can significantly benefit water resources planning and management. However, making this knowledge and information meaningful for and accessible to those involved in decision making processes has proved to be another very serious challenge. Paradoxically, in spite of our information age, water resources policy makers, managers, and stakeholder groups are becoming ever more removed from current scientific and technological advances. There is thus a compelling need to establish and invest in effective information and technology transfer mechanisms.

*Local vs. system-wide perspectives:* Water stresses are often compounded by the efforts of individual stakeholders acting to safeguard their own local interests without regard for the long term risks of such actions. A local and short term perspective by each water user group sharing the resource cannot be sustainable and only serves to hasten the depletion of water reserves and the onset of disastrous impacts for *all*. The same

“tragedy of the commons” scenario is likely to occur when water uses and impacts are planned and managed individually, without regard for their multiple temporal and spatial linkages. It is thus imperative that the Twenty-First Century Water Commission take a holistic perspective in the development of a comprehensive national water strategy.

*Federal and state agency coordination and cooperation:* Water resources management falls within the mandates of several federal agencies including EPA, NASA, and NSF and various Departments such as Agriculture, Commerce, Defense, Energy, Health and Human Services, Homeland Security, and Interior. Further complicating water management, monitoring and oversight responsibilities are found within different groups of these departments, for example, ARS, NOAA, CORPS, USGS, ATSDR, NIEHS, and USBR. In reviewing the existing federal coordination mechanisms, the 2004 NRC report concluded that “coordination among agencies has occurred only sporadically over the last several decades, despite repeated calls for more coordination.” As a result, the national water resources agenda among the federal agencies is fragmented and has a disciplinary rather than a broad and holistic scope. Furthermore, although the adjudication, administration, and regulation of water rights and uses rests with the States, federal and state agencies must work together to ensure harmonization of and compliance with federal and state laws in the management of transboundary water resources. However, the existing coordination and cooperation mechanisms, if any, have been ineffective, and more often than not turn water conflicts and disputes into costly litigious battles. This ineffective federal and state agency culture and modus operandum need to be improved so as not to undermine the implementation and positive impact of the H.R. 135 Commission strategy recommendations.

*Lack of investments in integrated and adaptive management:* A striking finding of the 2004 NRC report was that over the last 30 years total funding in the areas of (1) water supply augmentation and conservation, (2) water quality management and protection, (3) water resources planning and institutional issues, and (4) water resources data collection severely declined. As a result, long-term basic research and technology transfer in integrated and adaptive water resources planning and management have been neglected, and the majority of our water resources are managed by reactive, disciplinary, and inefficient methods and procedures. In a recent assessment for the Apalachicola-Chattahoochee-Flint (ACF) River Basin in the southeast US, GWRI demonstrated that the use of integrated and adaptive forecast-decision methods can mitigate drought impacts and sustain adequate water services for all human users and ecosystems. Similar assessments and similar findings have been carried out and obtained for the northern California river system, as well as for other river basins. The main impediments in the use of modern management methods are the (1) inflexible bureaucracies that have evolved around the use of old management procedures and (2) inadequate training of agency personnel. Thus, a promising and largely unexplored strategy to address water scarcity is the modernization of the current management

procedures through recent but proven scientific advances, transferred to professional practice through education and training. The proposed H.R. 135 Commission provides an opportunity to realize the merits of such non-structural approaches along with other means of augmenting water supplies (through recycling, desalinization, and other technologies) and managing demands (through pricing and other incentives).

*Water resources research and educational programs:* The other casualty of declining funding has been the weakening of our water resources research and educational programs. At a time when universities increasingly depend on "soft" funding, faculty positions and student support migrated to other higher priority areas. In sharp contrast to the 60's, 70's, and early 80's, very few academic programs can now claim significant expertise in water resources. This is not to imply that academic programs have shrunk. On the contrary, they have expanded to cover much finer and very exciting frontiers of geophysical, environmental, and life sciences. In doing so, however, universities lost their capacity to provide interdisciplinary education and became over-specialized. An important role that water resources programs can play is to provide a scientific and policy framework for inter-disciplinary research, education, and technology transfer. Such a framework is necessary to create broadly educated scientists, engineers and policy makers able to invent technological and institutional solutions for the nation's water resources and environmental challenges.

In this regard, the Water Resources Research Institutes provide a unique network to address the challenges of interdisciplinary research, education, and technology transfer. However, the institutes cannot fully realize their potential at the current low rate of federal and state investment. I hope that the Commission envisioned by H.R. 135 will also address the need for sustainable and sufficient funding needed to reverse the continued weakening of our water resources programs.

Mr. Chairman, thank you for the opportunity to testify before this Committee. I strongly support the establishment of a National Water Commission to study and develop recommendations for a comprehensive water strategy to address our nation's future water needs.