
WATER MANAGEMENT ISSUES IN ALABAMA

A Report to
The Honorable Robert Bentley
Governor of Alabama

by the

Alabama Water Agencies Working Group

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GOAL

A group of state agency representatives, herein referred to as the *Alabama Water Agencies Working Group (AWAWG)*, is comprised of the membership listed below. The purpose of this document is to provide overviews, considerations, and policy options for important water resource issues in Alabama.

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WATER MANAGEMENT ISSUES IN ALABAMA

INTRODUCTION

Alabamians assume that water resources will be available for their use in sufficient quantities to drink, facilitate commerce and transportation, help meet our energy needs, and provide recreation and wildlife habitat. This has indeed been the case since the beginning of statehood, but Alabama's water resources face an uncertain future due to several landmark events specifically: population and industrial growth, development (with its associated impact on land use), increased occurrences of drought, the legal unpredictability of interstate water disputes, and the vagaries of riparian common law when there is increased demand for finite water resources. In light of these events, current state water policies need to be reformed and a comprehensive statewide water management plan created to guide the development, use, and protection of water resources and to protect Alabama from future uncertainty with respect to water availability. The lack of adequate water management policies and a comprehensive statewide water management plan places state resources at risk and invites the continued and ever increasing encroachment of federal entities into managing Alabama's water resources.

This situation can, however, be changed by adopting comprehensive statewide policies on water resources, developing a statewide water management plan and by state agencies working cooperatively on water issues. A statewide water management plan will have implications in future interstate water negotiations, provide for better drought coordination and management, encourage economic development, and create an improved water quantity assessment process.

Accordingly, Governor Robert Bentley created the Alabama Water Agencies Working Group (AWAWG) in 2011 to conduct an assessment of water resource programs and policies and provide recommendations on how to update water policies and improve the planning and management of this resource. The Working Group was initially comprised of:

- The Alabama Office Water Resources (OWR), a division of the Alabama Department of Economic and Community Affairs (ADECA)
- The Alabama Department of Environmental Management (ADEM)
- The Geological Survey of Alabama (GSA)
- The Alabama Department of Conservation and Natural Resources (ADCNR)

After reviewing the Working Group's initial summary of water issues in Alabama, Governor Robert Bentley issued a new charge to the agencies on April 18, 2012, with four objectives:

- Continue meetings and report progress and developments to the Governor's Office;
- Create a comprehensive database of Alabama's water resources by gathering all existing data and reviewing surface water, groundwater and instream flows/ecosystems assessments to provide a full understanding of the State's water resources, the use of those resources and need for those resources (including, but not limited to, industrial, economic, public health and safety and environmental needs);
- Conduct stakeholder meetings with the Governor's staff, key legislators and outside stakeholders from groups that represent—at a minimum—economic, industrial,

- utility, public drinking water supply, public safety, recreational, environmental, ecological and agricultural interests; and
- Recommend a statewide water management plan and timeline that takes into account and equitably manages the demands on the State's water resources. Include in the plan any proposed legislation necessary to implement such a plan.

Later, on June 11, 2012, the Governor's Office added a fifth agency, the Alabama Department of Agriculture and Industries (AGI) to the AAWWG to provide insight on farming, irrigation and the agribusiness sector. The Governor's Office has also been an active participant in the AAWWG since the Governor issued the new charge in April 2012. The AAWWG is working to develop a set of recommendations, based on sound science, policy and law, for water resources management that will benefit all Alabamians now and for generations to come.

While these state agencies have worked cooperatively for years on a number of key issues, the creation and tasking of this group provided a timely and critical opportunity to focus on developing specific recommendations needed to update water policies and advance water resource planning and management in Alabama. Many water-related issues were debated and, while there were some differences of opinion, there was no debate about the need to identify the future water needs of the state and improve water management by developing comprehensive water policies and a flexible and "living" statewide water resources management plan. Water management policies and plans are important to Alabama's water future in three significant areas:

Economic stability and quality of life—Population growth without adequate water and infrastructure planning often results in economic uncertainty and increased risk of higher costs for water supply and environmental degradation. There is a need to invest in water management to protect state resources and make Alabama more competitive with other southeastern states. Examples from other states demonstrate that "business-as-usual" with regard to water planning is not an effective business model, nor an effective economic development tool.

Water availability—Water resources should be systematically and fairly allocated during water shortage periods. Only through a stakeholder accepted statewide water management plan with appropriate legislative implementation can this be done in an economically feasible, environmentally acceptable, and legally binding manner.

Resource protection—Maintaining and protecting the integrity and health of natural stream channels, floodplains and riparian zones, groundwater aquifers, and aquatic biological resources is essential to a sustainable water resource future and is fundamental to any statewide water management plan.

Adopting comprehensive policies and creating a statewide water management plan will ensure sustainability of our water resources and will profoundly influence Alabama's future economic competitiveness and quality of life for its citizens. While the Working Group recognizes that state agencies have extensive expertise and institutional knowledge to assist in this effort, we also understand that public input and review is a vital component to this effort as well. We encourage the Governor and Legislature to ensure that appropriate and timely input for stakeholders and the public is included in this process.

CURRENT STATUS OF WATER RESOURCES MANAGEMENT IN ALABAMA

The current status of water management in Alabama reflects the fact that water resources are managed through a series of policies, laws, and regulations under the jurisdiction of multiple agencies without a comprehensive management framework. Historically Alabama has had adequate water resources with brief but intense periods of water shortfalls. While a drought crisis creates a temporary groundswell of public concern, once rains return there is little pressure to implement major changes to our current water management system.

State agencies have mandates in many water resources areas. OWR has responsibilities for administering the Alabama Water Use Reporting Program, water planning, drought response planning, hydrologic modeling of rivers and reservoirs, coordination of federal water resources funding, and providing technical support to interstate water negotiations and litigation. ADEM has expertise in water quality management, administers several water permitting programs, conducts water-quality and biological monitoring, and coordinates a statewide stakeholder and public education and outreach effort focusing on water quality. ADCNR has responsibilities in state land management, boating safety, as well as protection of wildlife resources. ADCNR also serves as the lead natural resource trustee for the state. The GSA conducts water and other natural resources investigations, including but not limited to, surface-water hydrology and groundwater hydrogeology, water and biological resource assessments, and serves as the state groundwater trustee. The AGI provides expert regulatory control over product, business entities, movement, and application of goods and services for which applicable state and federal law exists and works to initiate and support economic development activities including the use of water in the extensive agribusiness sector. In addition, OWR, ADEM, ADCNR, and GSA have a statutory advisory role to the Permanent Joint Legislative Committee on Water Policy and Management (created by Act No. 2008-164).

Although state agencies have conducted water resource investigations for some time, the level of detail and statewide coverage of information regarding water resource availability is incomplete. State agencies, constrained by limited budgets, must prioritize activities to fulfill their respective missions. Accurate and meaningful water resource assessments are a continual process that depends on daily infusions of water resource data (streamflows, groundwater levels, rainfall, water quality). Declines in federal funding are placing additional pressure on state budgets thus reducing agency capacities for monitoring and assessments.

Creation of the Permanent Joint Legislative Committee on Water Policy and Management by the Alabama Legislature was a major step forward in evaluating and addressing water-related issues in the state. The meetings of this committee were valuable and afforded the opportunity to further educate the Legislature and stakeholders about water issues and water management and allowed better coordination and communication between stakeholders and state agencies that deal with water. Limited funding was appropriated by the Legislature to work on some water data needs. Future issues that the Committee identified in its 2009 report were as follows:

- Assessing the proper structure for a regionalized approach to water planning and management.
- Exploring the application and efficacy of the existing riparian doctrine as it relates to future water demand.

- Creating a statewide water conservation policy and program that is sensitive to regional parameters in its application and is based on sound science principles.
- Exploring water management technologies and developing appropriate legislative initiatives to support greater use of such technology.
- Examining and recommending appropriate flow dynamics [instream flows] for rivers and streams to support biological, recreational, and industrial/transportation needs and requirements.

WORKING GROUP'S FINDINGS AND POLICY OPTIONS

Over the course of fourteen meetings in four months, the Alabama Water Agencies Working Group evaluated critical water issues drawing on the conclusions of the Joint Legislative Committee on Water Policy and Management, the 1990 report *Water for a Quality of Life*, and on the vast professional experience and institutional knowledge of respective representatives from the water agencies. Twelve issue areas were identified and discussed. Detailed summaries for each issue area are found in the appendix. The following list highlights each issue area and key policy options.

Water Resources Management

- Direct the Alabama Water Agencies Working Group to develop a process for creating a statewide water management plan and identify the necessary components consistent with the Alabama Water Resources Act.
- Involve the Alabama Water Resources Commission in the development of a statewide water resources management plan.

Enhanced Certificates of Use/Permitting

- Review the benefits, costs, and issues associated with establishing a more formal system for managing water withdrawals in the state.
- Determine the legal basis under which Alabama will manage its water resources.
- Any enhanced system for managing water should be part of a comprehensive statewide plan based on water quality, water quantity, instream flow, and water use data.

Economic Development

- Provide policies and guidance for water resources development by encouraging: regional/local planning, public/private partnerships, and the use of water development concepts such as off-stream storage.
- Consider water resource implications in all business and industry recruiting efforts.
- Support recommendations for water-resource related infrastructure that would benefit economic development.

- Encourage long-term new water source infrastructure planning and regional cooperation.
- Protect existing water needs and promote the sustainable use of water in Alabama's growing agribusinesses and industries.
- Establish an information clearinghouse to provide eligibility criteria, funding sources and contact information for programs available to support infrastructure development.

Surface Water and Groundwater Availability

- Enhance funding and expand the State's capability for acquiring and evaluating surface water and groundwater resources data and information.
- Establish groundwater regulations relative to water production rates, protection of aquifer recharge zones, and identification of priority groundwater uses and integrate them into a statewide water management plan.
- Support, enhance, and implement protective measures of groundwater quality through existing water-quality programs.

Drought Planning

- Establish a statutory basis and mechanism for drought planning, monitoring, and management.
- Require periodic review of the state's drought management plan and promote water conservation and water reuse in the plan.
- Develop standard operating procedures for input into the Alabama portion of the U.S. Drought Monitor program.

Water Conservation and Reuse

- Develop a public education program concerning the need for and benefits of water conservation and reuse.
- Support development of water reuse regulations to conserve water while being protective of human health and water quality and promote water reuse as a practical conservation measure.
- Encourage water conservation and efficiency for public drinking water utilities through the statewide water management plan.

Interbasin Transfers

- Determine an appropriate basin unit for evaluating and accounting for interbasin transfers of water resources.
- Identify and summarize existing interbasin transfers.
- Establish a regulatory mechanism for interbasin transfers that provides for existing transfers and establishes criteria for new or expanded transfers to ensure they are reasonable and beneficial to the state.

Instream Flows

- Provide funding and resources for instream flow investigations and for evaluating appropriate instream flow hydrologic tools.
- Develop a policy concerning instream flows which can serve as a cornerstone of a statewide water management plan.
- Develop an acceptable legal and regulatory framework for implementation of an instream flow policy.

Water Resources Data

- Provide enhanced funding to support state efforts to develop a robust and scientifically based surface-water and groundwater data foundation for conducting assessments and determining water allocations.
- Encourage the Governor and other officials and representatives to work with federal water agencies to fund water flow gages in Alabama.
- Expand Alabama's rainfall monitoring network working through the State Climatologist and through public climate data collaboratives.
- Develop and apply consistent data quality standards and protocols for acquisition, management, and disposition of water resources data.

Interstate Coordination

- Provide meeting support to strengthen staff-level peer relationships with neighboring states to improve coordination and information sharing.
- Support agencies' activities that involve interstate water resources.
- In accordance with the Alabama Water Resources Act, establish a clearinghouse to keep the Governor's office updated on all interstate water resources related issues.

Key Stakeholder Education and Outreach and Public Education and Outreach

- Identify key stakeholder groups to facilitate a more efficient and effective dialog for statewide water management.
- Afford the opportunity for all stakeholders to participate in the process of developing water policies and a statewide water management plan.
- Publicize and promote Alabama's water resources as fundamental to sustaining a desirable quality of life, future economic development, aquatic habitat, and biological diversity.

BUILDING BLOCKS FOR A FUTURE STATEWIDE WATER MANAGEMENT PLAN

Alabama has taken significant steps over the years in its efforts to manage water resources. However, current water demands, issues, and controversies and the need for a more secure water future require the state to now undertake the process of enhancing water policies and creating a statewide water management plan. This can be done by taking the existing

components of water management that work well, developing approaches for addressing issues such as interbasin transfers and instream flows, and reviewing the various agency roles and functions related to water resources management.

There exists a solid structure of state agencies working effectively in their water-related tasks, and stakeholder groups throughout the state with a keen interest in water resources management to begin crafting a statewide water management plan once sound water resources policies have been developed by the Governor and Legislature. As previously noted, many components of a plan currently exist in agencies' mandates and functions. What is needed is a legislative charge and authority to begin the process and a planning framework for creation of a comprehensive and adaptive plan that will serve the state well into the future. The state needs comprehensive water policies that provide legal clarity with respect to water rights to help ensure that future needs cannot be thwarted by federal intervention, actions by other states, or outside user/commercial entities.

Traditionally, most eastern states have relied on some variation of "riparian law" (i.e. legal rights associated with land ownership adjacent to a watercourse). However, pure riparian law as is used in Alabama is not an effective way to manage water resources for the betterment of all users. A regulated riparian legal structure is evolving in the southeastern states as a more effective way to manage water resources, ensuring that public and private needs are met and minimizing conflicts and litigation.

Statewide water management consists of the following basic components. Implementation of a plan, however, can be very complex, tedious, and expensive. The basic steps in the development of a plan include:

- The collection of pertinent water resources data including but not limited to:
 - Water Use—Determine how much water is used in what sectors of society and how this water can be used more efficiently.
 - Water Availability—Determine how much water of sufficient quality is available from surface and groundwater sources. Explore the possibilities of tapping underutilized aquifers and increasing the use of surface water in new yet sustainable ways.
 - Instream Flows—Determine how much water should remain in surface channels to support fish and wildlife and the functions of natural hydrologic systems. Determine how surface water and groundwater are linked in this context.
- Complete water resources assessments and establish a statewide surface water and groundwater monitoring network. Determine data and knowledge deficiencies and provide resources to address the identified deficiencies.
- Forecast water needs for drinking water and industrial use, economic development, agriculture, recreation, and energy production. Determine flow needs for wastewater assimilation, sustaining biological condition, and protecting the hydrologic system.
- Identify management practices necessary to meet the identified water needs and protect water resource functions. Stakeholder and political interaction are critical in this process.

- Implement the approved water management program. Proceed with an adaptive management approach for all stakeholders and have in place a robust conflict resolution process.
- Regionalize the state into smaller watershed/basin management units with local management and decision making relative to water resources in accordance with state policies and plans.
- Provide for stakeholder input as important decisions are made and during key process development steps.

PROPOSED NEXT STEPS

The Alabama Water Agencies Working Group believes all of the policy options presented in this paper will need to be implemented to eventually develop comprehensive water policies and a statewide water management plan. Several important steps to move this process forward will be required. These include:

- A document comparable to this report and any other available pertinent water issues studies should be made available to all interested parties to develop a common base from which to conduct policy and plan development;
- Funding should be provided to complete surface water and groundwater assessments, determination of instream flows and other data necessary to provide a scientific basis for development of a statewide water policy and a comprehensive statewide water management plan;
- The Governor's Office and the Permanent Joint Legislative Committee on Water Policy and Management should solicit water policy input and considerations from key stakeholders. Some work in this area is already underway and efforts by the Governor's Office and Joint Legislative Committee should be accelerated;
- Considering input from key stakeholders, the Governor's Office and the Permanent Joint Legislative Committee on Water Policy and Management should prepare draft policy statements and seek to reconcile them into a single policy statement;
- Identify the critical components, schedule, and costs to develop a statewide water management plan; and
- The Alabama Water Agencies Working Group should continue to be utilized in ongoing water policy and plan development.

CONCLUSION

It is the conclusion of the Alabama Water Agencies Working Group that maintaining the status quo with regard to water management in Alabama is an unwise option. There are many issues that must be addressed before comprehensive water policies and a statewide water management plan can be developed. The path forward will require commitment from the Executive and Legislative Branches of State government as well as key stakeholders to negotiate a workable solution.

APPENDIX

WATER ISSUE AREA SUMMARIES

Water Resources Management

Expanded Certificates of Use/ Permitting

Economic Development

Surface Water and Groundwater Availability

Drought Planning

Water Conservation and Water Reuse

Interbasin Transfers

Instream Flows

Interstate Coordination

Water Resources Data

Key Stakeholder Education and Outreach

Public Education and Outreach

WATER ISSUE AREA—WATER RESOURCES MANAGEMENT

Overview:

The Alabama Water Resources Act (“Act”) has created the statutory framework for the development of a water resources management plan for Alabama. The act *“establish(es) the Office of Water Resources and the Alabama Water Resources Commission and ... vest said office and commission with the power and responsibility to develop plans and strategies for the management of the waters of the state”* (*Code of Alabama §9-10B-2(5)*).

Long-term management of surface and groundwater requires recognition that water is a finite resource; that there is a connection between water quantity and water quality; and there is a need to protect both its future development and its ecological health. Management of water resources needs to be holistic across an entire watershed or drainage basin due to the interrelationship of the natural and human processes and activities that can impact each other, in some cases from a great distance. This includes both land and water resources, since land use can have significant impacts on water resources and related ecosystems.

The public trust doctrine and *parens patriae* doctrine provide states with an effective means of protecting the resources held in trust for the people of the state. While the public trust doctrine, with regard to water, appears to be embedded in Alabama law (*Code of Alabama, §9-10B-2*), a clear statement of State ownership of waters of the State would enhance the State’s ability to protect this resource, including groundwater, utilizing both of these doctrines.

In Senate Joint Resolution 16, signed May 8, 2012 by Governor Bentley, both houses of the Legislature concur "That waters of the state, as defined in the Alabama Water Resources Act, are a natural resource of the state and subject to the state's sovereign power to plan and manage the withdrawal and use of those waters, under law, in order to protect public health, safety, and welfare by promoting economic growth, mitigating the harmful effects of drought, resolving conflicts among competing water users, achieving balance between consumptive and non-consumptive uses of water, encouraging conservation, preventing significant degradation of natural environments, and enhancing the productivity of water-related activities."

Although this resolution does not resolve the legal issue of water ownership, it does make the clear statement of water stewardship responsibilities of the state with regards to protecting surface and groundwater resources, communicating this role to all affected parties, protecting and restoring public waters in the event of natural disasters, and planning and managing the water resource for future generations.

Considerations:

- It is not widely understood that Alabama’s water resources are owned by the State.
- Alabama lacks a statewide water resource planning process that provides for local planning input.
- Local land use decisions, which are largely unregulated, impact the State’s water resources.
- There currently exists no mechanism to protect water resources from over allocation and to address emergency situations such as drought.

- Statutory responsibility for various aspects of water resource management is spread across numerous state and federal agencies; reinforcing the need for close coordination and communication in programs and practices.
- Any statewide water resources management plan must address the need to plan and prepare for the impacts on the State's water resources from land use patterns, population growth, climate change, economic development, and hydrologic extremes (both floods and droughts).
- The lack of adequate state management actions will create a vacuum that poses a threat for a greater (and potentially conflicting) federal role in state water resource issues.
- Some fundamental issues must be resolved including the establishment of the geographic extent of the planning areas (i.e. watersheds, counties, regions, etc.); the delineation of roles between state and local entities; and the appropriate mechanisms or enhancements needed at the current time.

Legislation designating the appropriate local entities responsible for providing inputs to OWR in the development of a statewide water management plan and enhancements to the current OWR statute in order to achieve a statewide plan may be necessary.

Policy Options:

- Direct the Alabama Water Agencies Working Group to recommend components of a statewide water management plan, consistent with the Alabama Water Resources Act, that:
 - Provides for local planning;
 - Addresses the impacts on the State's water resources from water use, land use patterns, population growth, climate change, economic development, and hydrologic extremes (both floods and droughts);
 - Establishes the geographic extent of the water resource planning areas (i.e. watersheds, counties, regions, etc.);
 - Delineates the roles between state and local entities by reviewing options for local roles in water resources management activities including but not limited to Regional Planning Councils (RPCs), Watershed Management Authorities (WMA), Soil and Water Conservation Districts, Irrigation Districts, etc.;
 - Considers and incorporates, as appropriate, the recommendations for statewide water resources management from the October 1990 study of Alabama's water resources entitled, *Water for a Quality of Life*; and
 - Considers enhancements and/or additions to the Alabama Water Use Reporting Program.
- Involve the Alabama Water Resources Commission in the development of a statewide water resources management plan.

WATER ISSUE AREA—ENHANCED CERTIFICATES OF USE/PERMITTING

Overview:

The State has public trust obligations to protect its water resources and to provide for their prudent use and development. Currently, water withdrawals are managed through the Alabama Water Use Reporting Program. The Alabama Water Resources Act (specifically Code of Alabama, 1975 §§9-10B-19 and 20) and associated regulations (Alabama Administrative Rules 305-7-9 thru 12) establish the requirements for this program, including the criteria for Declaration of Beneficial Use applications and the issuance of Certificates of Use (COU) by OWR. Entities with a capacity to withdraw more than 100,000 gallons per day and all public water systems are required to obtain a COU. The COU places few requirements on the water user other than for the applicant to certify that the proposed water use will not interfere with an existing legal use of the water and is reasonable and beneficial. The process for issuance of a COU does not consider the cumulative impact of multiple withdrawals on surface or groundwater resources. The current system provides for annual reporting of withdrawal quantities; however, the COU neither modifies nor confers any additional legal rights to the applicant concerning the proposed use of water.

More comprehensive management of water withdrawals, including interbasin water transfers and other non-riparian uses, and enforcing instream flow standards through some type of permitting or enhanced COU program will require additional legislation.

The benefits of permitting water withdrawals, interbasin transfers, or establishing an enhanced COU program would include resolving legal issues associated with non-riparian uses, providing a mechanism to protect instream flow needs, improving the ability to monitor and enforce withdrawal provisions, protecting current users while providing a mechanism for accommodating future demands, strengthening the current administrative review and appeal process, developing a mechanism to facilitate drought or emergency response actions, and implementing water management recommendations associated with watershed level studies and assessments. A permitting program would allow both current and prospective water users to have a clear level of expectations and certainty with regards to the availability of the resource necessary for long-term planning and investments.

The intent of comprehensive water management is to protect the water resources under the State's public trust obligations and to provide for prudent use and development while keeping the regulatory burden to a minimum. It would allow both current and prospective water users to have a clear level of expectations and certainty with regards to the availability of the resource necessary for long-term planning and investments.

Considerations:

- Due to population growth, industrial growth, interstate water disputes and other factors greater demands are placed on finite water resources which, in the future, may result in water shortages.

- The Permanent Joint Legislative Committee on Water Policy and Management, as well as other water stakeholder groups, are considering and discussing whether water usage should be regulated in Alabama.
- If more formal management of water usage is to be undertaken, then legislation would be required.
- A more formal water management program will require new regulatory functions in state government and a mechanism to fund those functions.
- The management of water usage in Alabama is currently determined by riparian common law where non-riparian users have, at best, questionable rights to water.
- Riparian common law provides for little direct consideration or management of instream flows beyond the "reasonable use" requirement for water use.
- Current water users in Alabama are subject to uncertainty during times of water shortage because there is no method (other than riparian common law) to manage water usage.
- There is no oversight or plan for water allocations, future water use, and water management in Alabama.

Policy Options:

- Review the benefits, costs, and issues associated with establishing a more formal system for managing water withdrawals in the state.
- Determine the legal basis under which Alabama will manage its water resources.
- Any enhanced system for managing water should be part of a comprehensive statewide plan based on water quality, water quantity, instream flow, and water use data.

WATER ISSUE AREA—ECONOMIC DEVELOPMENT

Overview:

Alabama is blessed with both surface and groundwater resources that can provide the necessary water to support population growth, maintain our historical quality of life, and sustain our diverse natural resources. This availability of water is also critical for industry, agriculture, transportation, recreation, power generation, and tourism which drive economic health, growth, and job creation in Alabama. The identification of areas of the state where water resources are plentiful and available for these needs would assist the State in its industrial recruitment efforts by ensuring that water would be available for proposed uses.

In addition to the consumptive water needs for business and industry, there is a need to ensure that waterborne transportation remains a viable component in the state's intermodal transportation infrastructure. Although outside the direct focus of the Alabama Water Agencies Working Group's effort, navigation over Alabama's waterways provides a cost effective alternative to rail and trucking as a method of transporting goods and raw materials and a significant incentive for certain industries and locations. We encourage the appropriate support and investment in waterway and port facilities.

Some infrastructure investments (i.e. water treatment plants) can provide significant and long-term returns on investment to both local areas and the state's economy in general. Several state and federal funding programs exist to help meet water and wastewater infrastructure needs. Federal programs include the USDA Rural Development Program as well as the U.S. Army Corps of Engineers' Planning Assistance to the States Program. Another program provided under state law but never funded is the Water Supply Assistance Fund (*Code of Alabama*, §22-23A). There is no central clearinghouse available to disseminate information on the sources or application processes for obtaining funding.

Considerations:

- Accelerate Alabama is the economic development strategic plan for the state. It provides a broad-based strategic approach to ensure that state and local efforts to retain and recruit business and industry are consistent and coordinated. Related to water resources, it includes a component to address Alabama's perspectives on sustainable development.
- Water resource programs impact economic development in all sectors, including industry, agriculture, transportation, and recreation. In some cases, these uses are conflicting.
 - Industry – Industries use water in the manufacturing process, cooling purposes or transporting a product. Water for industrial use may be purchased from a public water supplier or be self-supplied.
 - Agriculture – Agriculture producers are highly dependent upon natural rainfall and only a small percentage of farming operations utilize irrigation systems. Additional funding or the development of economic incentives such as low-interest loans or tax credits may help encourage investments in irrigation infrastructure.

- Recreation – Fishing, paddling, and wildlife watching are recreational activities that account for a significant and growing tourism segment in Alabama.
- Navigation – Statewide economic development and trade enhancement vitally depend on competitive transportation alternatives. Efficient inland navigable waterways require adequate channel widths and depths, streamflows, maintenance provisions, and professional management to sustain a primary transportation infrastructure.
- In certain areas of the state, depending on availability, economic recruitment needs to focus on the water resources requirements to ensure that a potential client's water related needs would not jeopardize the availability or water quality capacity of existing users.
- Water resource programs need to be better used as tools for economic development and job creation opportunities in Alabama.
- Low-flow conditions due to drought or upstream withdrawals can be costly to water users by threatening water supply needs; the availability of navigation for raw materials and finished products; the assimilative capacity of streams in handling wastewater discharges; and the ability to use waters for cooling in industrial and power generation facilities.
- Economic development is dependent on adequate local and regional water supplies which can be costly and time consuming to develop. Proper planning of new water source development minimizes the need for new interbasin transfers and surface and groundwater withdrawals.
- Availability of treated wastewater for reuse could enhance economic development opportunities.

Policy Options:

- Any state water resources management plan should include policies and guidance for water resources development and reservoir planning programs. These policies should:
 - Be consistent with the Accelerate Alabama economic development strategic plan;
 - Encourage regional planning in water source development;
 - Encourage the exploration of public/private partnerships;
 - Identify potential reservoir sites, in conjunction with local authorities and planning agencies; and
 - Encourage the development of off-stream storage for water supply needs to minimize impacts to major rivers and streams.
- The Governor's Economic and Development strategic planning process should include consideration of water resources implications in any efforts to focus Alabama's business and industry recruiting efforts. This would be separate and distinct from the current site-specific coordination process currently in place for individual clients and projects.

- The Governor should task the Inland Waterways and Intermodal Infrastructure Advisory Board to provide recommendations for water resource-related infrastructure projects that would provide direct benefits to economic recruiting efforts.
- Once water resource assessments are complete, OWR should ensure that water capacity and availability information is communicated to the State's industrial recruiters highlighting any areas where water resource problems may impact or deter the recruitment of industries.
- ADECA and ADEM should review federal and state water supply development funding programs (including state funded seed monies, i.e. the Water Supply Assistance Authority (*Code of Alabama*, 1975, §22-23A) and the Inland Waterways and Intermodal Infrastructure Fund (*Code of Alabama*, 1975, §41-23-123)) and develop recommendations to enhance and encourage long term infrastructure planning and regional cooperation in the development of new water sources.
- Protect existing water needs and promote the sustainable use of water in Alabama's growing agribusinesses and industries.
- ADECA should create an information clearinghouse on their web site to summarize sources of potential funding for new water source development, infrastructure improvements, or system expansions.

WATER ISSUE AREA—SURFACE WATER AND GROUNDWATER AVAILABILITY

Overview:

Water originates as precipitation and runs off the land surface through lakes and streams or infiltrates into aquifers that store and transmit water through the subsurface. Freshwater aquifers vary in depth from the land surface where groundwater is discharged from seeps and springs to more than 3,000 feet below the land surface. Water well production rates vary widely from a few gallons per minute in fractured rock aquifers to more than 5,000 gallons per minute in karst aquifers. Approximately 40 percent of public water supplies in Alabama originate from about 20 major aquifers.

Although average annual precipitation in Alabama is about 55 inches, annual groundwater recharge varies from 2 to about 12 inches. Most of the land surface of Alabama is contained in recharge areas where the surface geology consists of rocks or sediments with porosity and permeability that permits infiltration of precipitation into the subsurface. Groundwater/surface-water interaction is common in recharge areas where groundwater provides base flow, the sole source of discharge for streams during drought conditions. Base flow is the primary component of instream flow and supports biological processes and habitat, particularly during periods of drought. Conversely, streams contribute recharge to aquifers during high flow conditions.

Some aquifers yield saline water from depths that vary from near land surface in Tuscaloosa, Hale, Greene, Lowndes, and Clarke Counties to thousands of feet in many other parts of the state. Although not currently a wide spread problem, salt water intrusion can occur if excessive fresh groundwater is removed along Alabama's gulf coast. Due to concerns about salt water intrusion and protection of coastal aquifers, regulation of coastal groundwater production is an important component of an overall water conservation program. The Alabama Coastal Area Management Act (Ala. Code §§9-7-10 through 9-7-20) and the ADEM Coastal Program Rules (ADEM Admin. Code Div. 335-8) establish legislative policy and provide a regulatory framework, respectively, for protection of natural resources within the Alabama Coastal Area, which includes land, surface water, and groundwater shoreward from the continuous 10 feet land surface elevation contour in Mobile and Baldwin Counties.

ADEM Admin. Code R. 335-8-2-.09 provides a permitting mechanism for installation of new water wells or alteration of existing water wells that produce groundwater at rates of 50 gallons per minute or greater. This provision is applicable to any well in the coastal area and any well outside the coastal area with a 50-year capture zone that extends into the coastal area. The purpose of this rule is to protect the quality of groundwater resources, including adverse impacts from saltwater intrusion.

Surface water is abundant in most of Alabama and serves numerous functions including groundwater recharge, public, agricultural, and industrial water supplies, waste assimilation, navigation, and biological habitat and species sustainability. Unlike groundwater, Alabama shares most of its major streams with neighboring states and, thus, makes them potential subjects for interstate water disputes. Surface-water quality is impacted by point and nonpoint sources of pollution. Point sources include industrial and municipal wastewater discharge and confined animal feeding operations. Nonpoint sources include urban storm water runoff, erosion and

sedimentation, and excessive nutrient runoff. Maintenance of adequate instream flows is an essential component of a sustainable water future and quality of life for all of Alabama's citizens. Protection and prudent development is essential for sustainability of this vital resource. Surface-water protection is accomplished through sustainable water-use policies and effective water-quality regulations. Water quantity regulation is a state responsibility and must be based on sound scientific data and effective water-use policies. Water quality protection is a shared state\federal responsibility through enforcement of the Clean Water Act and other regulations.

Collection of water resource scientific data is an essential part of water policy development. Several data collection initiatives are on-going including water quality and biological assessments are conducted by the ADCNR, ADEM, and the GSA.

Considerations:

- Regulation of coastal groundwater production in Alabama is supported by ADEM's groundwater production regulatory regime to ensure protection of human health and potable sources of groundwater from saltwater intrusion in the Coastal Area.
- Groundwater recharge protection is accomplished through recognition, protection, and preservation of recharge areas where aquifers are at or near the land surface or are not overlain by relatively impermeable confining layers.
- Groundwater recharge rates are reduced where significant impermeable surfaces cover recharge areas, increasing runoff and reducing infiltration.
- Comprehensive knowledge of stratigraphy, geologic structure, and geochemistry is required to locate and properly develop groundwater sources. The GSA is currently conducting a statewide assessment of groundwater resources. These data will be used for groundwater development and protection and for future water resource policy development.
- Groundwater produced at excessive rates or by wells in too close proximity will cause severe water level declines.
- Groundwater-use data and analysis are essential components of aquifer protection and groundwater policy development.

State coordination and cooperation with the U.S. Geological Survey (USGS) to maintain an adequate real-time streamflow monitoring program is essential. Long-term reductions in federal funding have resulted in the loss of critical gaging stations and increased the burden on local and state funding to maintain gaging stations.

Policy Options:

- Current gaging stations (especially those with 30 or more years of record) should be maintained and additional stations should be installed in strategic watersheds. The USGS (or DOI) should be strongly encouraged by the Governor to adequately support this program with federal funding to leverage available state resources.
- Provide funding and support for scientific assessments and initiatives by Alabama's water agencies. This includes expansion of ADEM, ADCNR, and GSA assessments

of water quality and biological resources, GSA and OWR groundwater and surface-water assessments, and OWR water use assessments.

- Establish groundwater regulations that are consistent with water policies and the statewide water resources management plan and includes:
 - Identification of priority groundwater uses;
 - Preservation and protection of aquifer recharge areas;
 - Determination of proper well spacing;
 - Maximum well production rates; and
 - Maximum aquifer water withdrawals.
- Develop a comprehensive scientific knowledge of Alabama groundwater to accomplish groundwater protection, prudent groundwater development, and future groundwater policy development.
- Provide funding and support for groundwater and streamflow monitoring in Alabama. This includes expansion and support of the state-wide, real-time groundwater level monitoring network currently being implemented by the GSA as well as state funding to match federal dollars for the USGS streamflow monitoring network.
- Ensure that the groundwater monitoring network is also monitoring groundwater quality where needed.
- Provide support for adequate protection of groundwater quality through ADEM's groundwater and drinking water protection programs.

WATER ISSUE AREA—DROUGHT PLANNING

Overview:

Since the early 1980's, all or portions of Alabama have experienced at least six major droughts. These droughts have been costly and have adversely impacted (both directly and indirectly) its citizens, industries, agriculture, and recreation in a variety of ways.

The State's drought response mechanisms are spread across several agencies and programs including public health, water supply, agriculture, water quality, habitat protection, and forestry. The State's primary drought coordination mechanism is housed in OWR. This drought coordination effort was initially created in 2002 and led to the publication of the first statewide drought plan in 2004. The process was recently enhanced by the issuance of Executive Order 19 on June 24, 2011. Under the Governor's direction, OWR chairs a process to collect information on drought conditions and impacts as well as receive inputs and recommendations from state and federal agencies and stakeholders. One of the key products from this process is the periodic release of a statewide drought declaration which provides county-level specific drought assessments. This process is used by the Governor to determine appropriate State response actions. It is important to note that these declarations provide only information and recommendations to local officials and water users. There is no authority to mandate or require any specific local response action.

Although closely coordinated under this process, there are other separate drought related activities that also take place. The Alabama Forestry Commission works directly with the Governor to address the protection of Alabama forests from wildfire during drought conditions through the issuance of open burning bans. ADEM is involved in issuing burn bans in areas where air quality would be adversely impacted. AEMA leads any state level response where public health is endangered through the loss or limitation of public water supplies. Also, in addition to state level activity, there are coordination processes used by the U.S. Army Corps of Engineers and Tennessee Valley Authority in assessing drought impacts on their reservoir system operations. Alabama Power Co., operating under its Federal Energy Regulatory Commission licenses on the Coosa, Tallapoosa and Warrior Rivers, also has drought operations coordination processes. Additionally, the United States Department of Agriculture's Drought



For Public Dissemination
Alabama Drought Declarations

In accordance with the Executive Order 19 and the Alabama Drought Management Plan, the ADECA Office of Water Resources (OWR), based on a review of current and anticipated conditions, has declared the following portions of the State of Alabama to be under the specified drought declaration levels.

Declaration Level	Description
Emergency	None
Warning	Regions 4, 6, 7 and 8 under the Alabama Drought Management Plan which includes the counties of: Autauga, Barbour, Bullock, Butler, Calhoun, Chambers, Chilton, Clay, Cleburne, Coffee, Conecuh, Coosa, Covington, Crenshaw, Dale, Elmore, Escambia, Geneva, Henry, Houston, Lee, Lowndes, Macon, Montgomery, Pike, Randolph, Russell, Talladega, and Tallapoosa
Watch	Regions 3 and 5 under the Alabama Drought Management Plan which includes the counties of: Blount, Cherokee, Choctaw, Clarke, Culverman, Dallas, Etowah, Jefferson, Marengo, Monroe, Shelby, St. Clair, Walker, Washington, Wilcox, and Winston
Advisory	None
None	Regions 1, 2 and 9 under the Alabama Drought Management Plan which includes the counties of: Baldwin, Bibb, Colbert, DeKalb, Fayette, Franklin, Greene, Hale, Jackson, Lamar, Lauderdale, Lawrence, Limestone, Madison, Marion, Marshall, Mobile, Morgan, Perry, Pickens, Sumter, and Tuscaloosa

Recent rains reduced drought conditions in many parts of the state. However, conditions in the southern and eastern portion of the state are still experiencing long-term rainfall and streamflow deficits that, in some cases, are approaching historical lows. Public water systems and other non-public and private water users should continue to monitor water conditions and review plans in the event that conditions worsen. The OWR will be monitoring conditions and will continue to provide updated notifications as needed.

For further information, please visit our web site at www.adeca.alabama.gov/water and follow the links to the Office of Water Resources. You may also reach our office by phone at (334) 242-5499, fax at (334) 242-0776, or e-mail at drought@adeca.alabama.gov.

Declaration process is used to provide financial and other federal assistance to agricultural producers impacted by drought.

Considerations:

- There is a need to establish a statutory drought planning mechanism in a state water management plan.
- The national drought map, known as the U.S. Drought Monitor, is being increasingly used to both reflect the extent of drought conditions in a local county or region and as a determining factor for many federal drought assistance and relief programs. It is vital that national authors of the map have accurate and timely information from individual states to ensure that conditions and impacts are correctly depicted.
- Alabama should have a permanent and sustained coordination process for the collection of information and assessment of both impacts and conditions in order to provide consistent input on behalf of the State into the federal drought monitoring process.
- Water conservation measures and priorities during periods of drought should be explicitly addressed in a comprehensive state water management plan.

Policy Options:

- Develop legislation to establish a statutory mechanism for drought monitoring, management, planning and response processes. These permanent mechanisms need to:
 - Provide for mandatory reductions in withdrawals upon order of the Governor;
 - Foster improved and sustained coordination among both state and federal agencies;
 - Ensure various programs are using consistent drought data and information;
 - Ensure drought data is uniformly collected;
 - Ensure impact information is centrally housed and available; and
 - Ensure that the Drought Management Plan is consistent with any statewide comprehensive water resources management plan.
- Require periodic review of the Alabama Drought Management Plan.
- Develop formal standard operating procedures describing the development of the Alabama portion of the U.S. Drought Monitor.
- Include a description of state-level efforts to promote water efficiency mechanisms such as water conservation and reuse in the State's Drought Management Plan.
- Coordinate potential legislation with the Permanent Joint Legislative Committee on Water Policy and Management's subcommittee on drought planning.

WATER ISSUE AREA—WATER CONSERVATION AND WATER REUSE

Overview:

Water conservation is the reducing, reusing, and recycling of water to prevent waste and use water as efficiently as possible in order to protect water resources for current and future generations. It plays a significant role in preserving water quality and reducing water loss and water waste. Water conservation can be undertaken in residential, commercial, and industrial applications, and can have a beneficial impact on meeting the challenges of water usage in the State by preserving the State's public drinking water supplies, and delaying the need to find additional sources of water. Water usage has a major impact on the State's water bodies, recreational activities, and economy but water conservation can help ease the problems caused by excessive water usage. Water conservation not only reduces the amount of water needed for treatment in public water systems but also conserves the energy required to treat and distribute water and preserves the habitats of local wildlife and migrating waterfowl. Changing weather patterns make water conservation especially important in drought situations.

Water conservation can include anything from fixing a leak, turning off water when not in use, using rain barrels to collect rainwater for watering a garden, to reusing non-potable water for agricultural and industrial needs and using drip irrigation on farms.

Water reuse is just one component to be considered as part of an overall water conservation program. Reuse of wastewater is a valid option to conserve valuable water resources, reduce overall water treatment costs, and reduce the release of pollutants into streams and rivers. With the development of water reuse regulations by ADEM, statewide water policies, and a comprehensive water resources management plan that incorporate water conservation, the State can encourage water conservation and further advance water reuse in residential, agricultural and industrial applications and develop strategies and measures, both voluntary and mandatory, to address droughts and emergency situations.

The opportunities for water reuse are as follows:

- Urban reuse—the irrigation of public parks, schoolyards, highway medians, and residential landscapes, as well as fire protection and toilet flushing in commercial and industrial buildings.
- Agricultural reuse—irrigation of non-food crops such as commercial nurseries and pasturelands. High-quality reclaimed water may be used to irrigate food crops.
- Recreational/Aesthetic reuse—ponds and lakes such as those found in residential developments or public parks and irrigation of golf courses or public ballparks.
- Environmental reuse—creating artificial wetlands, enhancing natural wetlands, and sustaining stream flows.
- Industrial reuse—process or make-up water and cooling water and other nonprocess uses such as dust suppressant on industrial access roads.

Considerations:

- A tension exists within public water systems between the need to conserve water and a financial model predominantly based on water sales.

- There is no state system or standard for measuring water efficiency among public water systems.
- Citizens and stakeholders have varying levels of knowledge about the need for water conservation and the development of an educational outreach program should take this variation into account.
- The successful integration of voluntary water conservation measures is dependent on whether citizens and stakeholders support and implement the policy.
- The public's perception of water reuse may be less receptive if they believe the recycled water is from a common public waste source.
- ADEM is currently developing water reuse regulations. In the interim, ADEM has utilized the National Pollutant Discharge Elimination System (NPDES) wastewater permitting program as the mechanism to allow water reuse.

Policy Options:

- A statewide water management plan should contain components that:
 - Promote water conservation and efficiency for public utilities;
 - Set methods to measure conservation and efficiency;
 - Educate stakeholders and the public regarding the benefits of water conservation and overcomes negative perceptions of water reuse;
 - Require advanced treatment standards of wastewater for water reuse;
 - Direct the adoption of water reuse regulations; and
 - Set localized voluntary and mandatory water conservation measures during times of drought through the State's Drought Management Plan.

WATER ISSUE AREA—INTERBASIN TRANSFERS

Overview:

A fundamental aspect of watershed management is that water is used and reused as it moves downstream or through a watershed for a multitude of both ecological and human related purposes. An interbasin transfer (IBT) involves the removal of water from that cycle and can be defined as the withdrawal, diversion, or pumping of water from one watershed to another. These transfers are normally the result of a manmade conveyance scheme and not some natural process.

Although the term is primarily used in reference to the transfer of surface waters involving raw or potable water it can also be applied in regard to the transfer of wastewater return discharges. Additionally, the concept can be applied to the transfers of groundwater from one watershed to another.

A fundamental component in defining the scope of an interbasin transfer is defining the geographic extent (or size) of the referenced watersheds. There is a standard numerical and naming convention for classifying watersheds called hydrologic unit codes (HUCs) that have been established by the states and federal government. The maps on this page (Figures 1 – 3) show the delineations of these basins at the four digit, six digit and eight digit HUC levels.

The smallest resolution currently available is at the 12 digit level. In each instance the movement of water from one HUC to another could be considered an IBT. This establishment of the size of the basins is one of the two major aspects of any IBT management concept; the other involves setting the threshold or *de minimis* amount, below which IBTs would not be monitored or managed.

Considerations:

- A number of IBTs currently exist in Alabama and have existed for many years. Specific numbers are not known since there is no monitoring or reporting requirement. The exact number would also depend on the size of the basin defined.
- There is limited case law directly addressing the subject of interbasin transfers in Alabama. However, in a letter dated April 29, 2004, vetoing the Marshall County IBT local legislation (HB596), the legal advisor to former Governor Riley asserted the illegality of some IBTs under existing Alabama law.
- IBTs can be problematic in that they contribute to unsustainable growth (e.g. Atlanta) as greater quantities of water from outside watersheds are required for expanded consumption and future demands.
- IBTs can create permanent and significant detrimental impacts to water quantity and water quality.



Figure 1 - 4 Digit HUC Watershed



Figure 2- 6 Digit HUC Watershed



Figure 3- 8 Digit HUC Watershed

- Alabama has enacted eight local legislative acts banning IBTs in eight North Alabama counties including; Colbert (Act 2006-373), Jackson (Act 2006-115), Lauderdale (Act 2007-252), Lawrence (Act 2006-606) Limestone (Act 2006-361), Madison (Act 2006-341), Marshall (Act 2005-176), and Morgan (Act 2006-603) Counties. These bills all have common language that will be superseded by statewide IBT policy, once established.
- Many states, including most in the southeast, have recognized the need to manage and control interbasin transfers. These include Arkansas (ACA §15-22-304), Florida (Consumptive Use Permits, FL Stat. §373.219; IBT of Groundwater, FL Stat. §373.2295), Georgia (OCGA §12-5-31), North Carolina (General Statute G.S. §143-215.22I), South Carolina (Title 49, Chapter 21), and Tennessee (Tenn. Code Ann. §69-7-201 et seq.).

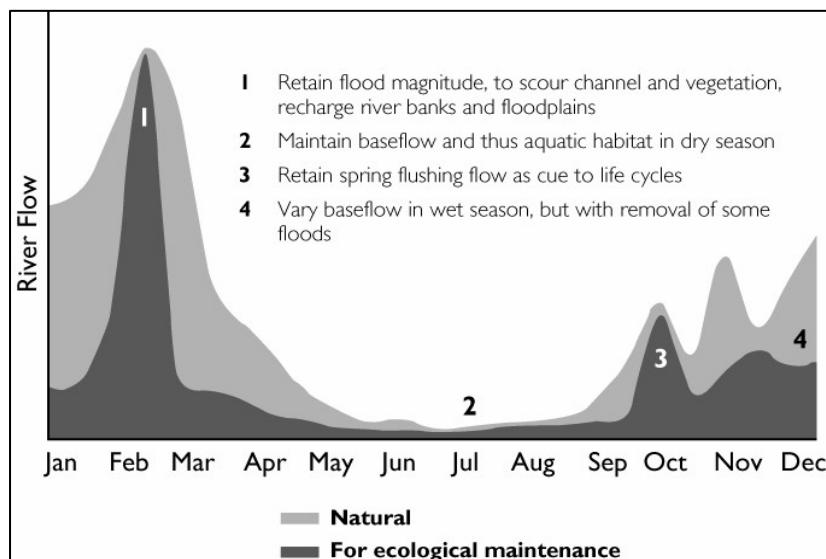
Policy Options:

- Define IBTs based on an established watershed size.
- OWR and ADEM should work jointly to identify and summarize current interbasin transfers (locations and amounts) once the applicable watershed size is defined.
- Allow existing IBTs to continue but require periodic reporting.
- Establish specific criteria for new or expanded IBTs to ensure that they are reasonable and beneficial to the State.
- Establish a regulatory program for all IBTs which includes objective evaluations of all other practical alternatives to the interbasin transfer.

WATER ISSUE AREA—INSTREAM FLOWS

Overview:

Water scientists and aquatic biologists agree that natural stream flow and all of its variations through seasonal flood events, low flows in summer, and high flows in late winter and spring (inter and intra-annual natural flow variability) are significant controlling variables in nature recharging groundwater aquifers, creating and maintaining aquatic habitat, supporting fish and wildlife populations, and maintaining acceptable water-quality conditions (see figure below).



With increasing population growth and associated water needs in Alabama, and the regions' susceptibility to extreme drought conditions, there exists a real threat in the future of depleting surface and groundwater supplies through excessive use and altering instream flows to the point that fish and wildlife populations will likely be diminished and wetland/riparian areas significantly degraded.

All states surrounding Alabama (Mississippi, Tennessee, Georgia, and Florida) have

addressed the issue of instream flow management through either law or adopted policy, however Alabama has not addressed this issue either politically or legally. Instream flow prescriptions for ecological maintenance have been implemented on some main river channels, usually through negotiated site-specific flow requirements for large utility projects. The regulated riparian regime of permits and licenses is standard for some eastern states and requires adaptive elements, like instream flow requirements, for effective management of water uses and supply across watersheds and whole basins. Water legislation and its implementation vary widely from state to state, and there are few standard methods for linking flow quantity and duration to maintaining functional stream ecology, riparian areas, and floodplain habitats while considering state and local water needs and requirements. Federal environmental legislation such as the Clean Water Act, Endangered Species Act, and National Environmental Policy Act often play a major role in protecting instream flows in river and stream reaches but in a very indirect manner. Some state agencies in the southeastern U.S., including Alabama, have taken the approach of using the Public Trust Doctrine through their state conservation and environmental agencies to protect instream flows, however, the full extent of inter and intra-annual flow variability is not considered in these negotiated instream flow requirements.

The Alabama Department of Conservation and Natural Resources has trustee powers and duties established in 1939 (*Code of Alabama*, 1975, §9-2-2). That statute states, "The general functions and duties shall be as follows; To protect, conserve and increase the wildlife of the state and to administer all laws relating to wildlife and the protection, conservation and increase thereof." Maintaining ecologically significant instream flows is fundamental to fulfilling the trustee resource conservation requirements of the Department. The public trust doctrine provides

an indirect means of protecting flow-dependent fish and wildlife resources held in trust for the people of the state. But while the public trust doctrine regarding water appears to be embedded in Alabama law (*Code of Alabama*, 1975, §9-10B-2), clear policies and laws of water ownership and the need to maintain balanced, natural flow variability is needed to strengthen and enhance the State's ability to manage water resources.

Considerations:

- Maintaining sufficient instream flows is fundamental to the regulated riparian system and Alabama has no policy or law addressing instream flow protection.
- Under Alabama's current management regime for water withdrawals, the ability to implement and enforce specific withdrawal limits or specify instream flow protections could be complex and cumbersome. Enforcement of such an implementation would require a multi-agency coordination process with clearly defined agency responsibilities working around common and well defined water management objectives and goals.
- Static minimum instream flows, as implemented in some states, versus variable instream flows, do not reflect the natural inter- and intra-annual flow variability to which most aquatic and riparian ecosystems are adapted. Disruption or modification of the natural flow patterns puts these ecosystems at risk.
- The science of instream flow is maturing within the context of regulated riparian systems and there is inadequate research for Alabama streams relating instream flows to biological condition, habitat quality, and ecological functions.

Policy Options:

- Provide support and resources for investigations into the instream flow needs of Alabama's aquatic ecosystems and for evaluating the utility of existing flow tools for management and regulatory purposes.
- Begin a process to define an acceptable framework for implementing instream flows into a statewide water management plan.
- Adopt instream flows as a required component of any water allocation process that is likely to be implemented in the future.
- Adopt a unified instream flow policy or legislation at the state level to provide a mechanism for better agency coordination and management of water resources. A statewide policy concerning instream flows should serve as one cornerstone to a comprehensive, realistic, and economically balanced water management plan.

WATER ISSUE AREA—INTERSTATE COORDINATION ISSUES

Overview:

Various aspects of water resources touch numerous state and local agencies including but not limited to: OWR, ADEM, ADCNR, GSA, Alabama Department of Agriculture and Industries, Alabama Emergency Management Agency, Regional Planning Councils/Commissions, Soil and Water Conservation Districts, etc. In addition, various federal agencies have some jurisdiction or interest in the waters of Alabama including the U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, Tennessee Valley Authority, U.S. Fish and Wildlife Service, Natural Resources Conservation Service, and the U.S. Geological Survey.

OWR has been charged with the role of coordinating federal, state, and local planning efforts involving the waters of the State. OWR actively participates in interstate water issues such as the water dispute between Alabama, Florida, and Georgia involving the Alabama-Coosa-Tallapoosa (ACT) and Apalachicola-Chattahoochee-Flint (ACF) River Basins (Water Wars). OWR provides technical support to the Governor and the Alabama legal team in the litigation between the states and participates in negotiations to determine how these interstate water resources will be shared.

In addition to the ACT and ACF River Basins, other shared basins with adjacent states include the Tennessee, Tombigbee, Choctawhatchee, Yellow, Blackwater, Escambia, Perdido, and Escatawpa River basins.

Considerations:

- Ensuring that Alabama protects and receives its equitable share of both surface and groundwater is very important to Alabama's population, economy, and environment for the present and in the future.
- Disagreements and conflicts over the shared use of interstate waters tend to develop over long periods of time and require continuous state agency involvement.
- In addition to the Water Wars, there are several, potentially contentious, issues involving other shared interstate water resources that include:
 - The increasing, and potentially conflicting, use of the Tennessee-Tombigbee Waterway for water supply;
 - The Georgia-Tennessee border issue in which Georgia proposes a change in their state line to include part of the Tennessee River;
 - Increasing pressure on the Tennessee River for water supply and other uses that impact upstream storage reservoirs in Georgia, North Carolina, Tennessee, and Virginia;
 - Concerns in Florida over water uses upstream of the Florida panhandle area affecting both surface-water and groundwater resources.

Policy Options:

- Agencies should support staff efforts to maintain relationships with peers in neighboring states to improve coordination of activities relating to shared interstate watersheds, and

maintain continuity and staff-level lines of communication if contentious issues arise between the states.

- The Governor should continue to support agency activities that involve shared water resources including:
 - The Tennessee Valley Water Supply Partnership;
 - Southern Instream Flow Network;
 - Discussions with Tennessee and Mississippi regarding use of the Tennessee-Tombigbee Waterway for water supply;
 - The National Integrated Drought Information System (NIDIS) initiative to develop a drought early warning system for the ACF River Basin;
 - The Gulf of Mexico Alliance; and
 - The Gulf Coast Ecosystem Restoration Task Force.
- In accordance with the Alabama Water Resources Act, establish a clearinghouse to update the Governor's office on a regular basis concerning interstate water issues. Alabama's water resource agencies should continue to inform OWR of potential issues involving interstate watersheds.

WATER ISSUE AREA—WATER RESOURCES DATA

Overview:

Complete and accurate water resources data is a necessary component of the water management process. Any attempt to manage waters of the state without complete and sound scientific information on surface and groundwater availability and quality, surface-groundwater interactions, precipitation patterns, water usage in the state, and instream flow needs of rivers and streams has great potential to slow and impede actions needed to deal effectively with drought, water distribution, water resource development, and can lead to economic hardship, degraded water resources, and a less certain water future for the state.

Alabama has for many years monitored groundwater levels throughout the state and this program at the Geological Survey of Alabama has recently been expanded to include more wells in different aquifer settings. This growing network of monitoring wells now allows the state to evaluate water production, impacts of climate on groundwater, land use effects, and salt water intrusion potential in coastal areas.

The Water Resource Assessments, Studies, Data Collection and Storage subcommittee of the Permanent Joint Legislative Committee on Water Policy and Management issued a final report in 2008 summarizing its findings. This subcommittee evaluated many topics related to water resource data, studies, and assessments and several recommendations were adopted by the legislature. These recommendations were grouped into five areas; water assessments, on-going statewide water assessment initiatives, data shortfalls, data storage and sharing technologies, and public access needs.

Considerations:

- Alabama's capacity for acquiring surface and groundwater data is less than desirable for implementing meaningful water management. The state does not operate continual surface water flow monitoring stations, instead relying on federal entities such as the U.S. Geological Survey (USGS), U.S. Army Corps of Engineers, and Tennessee Valley Authority for this function in many river basins.
- Recent closures of USGS streamflow monitoring sites in Alabama, and the threat of future closures, illustrates that water management in Alabama is vulnerable to political and economic uncertainties up to the national level.
- Collecting water resources data should be a cooperative effort between federal and state water agencies. However, interpretation of the data into assessments, determination of capacities, and calculation of allocations should be a state function exclusively.

Policy Options:

- A viable state water management process should be based on, and supported by, a robust and scientifically developed set of water resources data. Resources to support these efforts should be a priority in the budgeting process.
 - Recent work to expand the state's groundwater monitoring system should continue and be expanded to provide the needed coverage in all aquifers and should include the collection of groundwater quality data.

- The state's surface water assessment and monitoring capabilities should be expanded, particularly with regard to drought and flows resulting from compact negotiations with other states.
- Ensure that key stream flow gages remain active and are strategically located with respect to water quantity and water quality assessment needs.
- Conjunctive assessment of the state's surface and groundwater resources should be initiated and become central to the statewide water management process.
- Evaluate the status of Alabama's existing stream gage network needs by appropriate agencies and stakeholder groups and identify improvements and changes that are needed for supporting a statewide water management initiative.
- Provide resources and support for instream flow studies to evaluate existing flow tools and for determining an acceptable framework for implementing future instream flow requirements.
- Expand Alabama's rainfall monitoring network to accommodate the data needs of future water management. This activity should be coordinated through the State Climatologist and enhanced further by working with the Community Collaborative Rain, Hail, and Snow (CoCoRaHS) public network.
- Develop cost estimates for operating and maintaining the state's water data collection and reporting capability. Utilize the Water Resources Data Technical Advisory Committee established by the Permanent Joint Legislative Subcommittee on Water Policy and Management to communicate these needs and data results, and to make recommendations on needed enhancements in data collection efforts.
- Establish a water resources data clearinghouse accessible by the public via a web portal.
- Develop consistent and reliable data quality standards and protocols for the acquisition and management of water information. Apply these standards to all data collected and stored that is used to assess, monitor, and allocate water resources.

WATER ISSUE AREA—KEY STAKEHOLDER EDUCATION AND OUTREACH

Overview:

There are numerous entities that have a vested interest in pursuing the protection and preservation of Alabama's water resources. These entities, or key stakeholders, include local/state/federal agencies, industries, trade organizations, universities, watershed management authorities, public utilities and citizen-based environmental groups (see below). Each of these entities would be considered key stakeholders due to their work related to water resource protection and preservation.

The foundations upon which these key stakeholders conduct their day-to-day activities vary as widely as the stakeholders themselves. Some have legal authority to support their work while others have the power of large memberships that have the ability to influence elected officials and decision makers. In addition, some key stakeholders focus more on water quantity issues while others focus on water quality issues. Nonetheless, key stakeholders play an active role in water resource management in Alabama.

In addition, many stakeholders have differing viewpoints on important water quality and water quantity issues and may advocate different approaches for achieving the protection of Alabama's water resources. Some key stakeholders have already developed "blueprints" and "agendas" describing their recommended approach to protect and preserve water resources.

Considerations:

- The large number of key stakeholders results in a wide-range of viewpoints regarding the protection/preservation of water resources in Alabama.
- Some stakeholders may be reluctant to participate in active discussions on water policy issues in the presence of other stakeholders because of differing viewpoints.
- Alabama's water resources impact so many different facets of peoples' lives that the development of an effective water management policy will benefit from the up-front participation of all key stakeholders.
- General public support for the implementation of a water management policy will be greatly enhanced if all key stakeholders voice general support for the water management policy.

Policy Options:

- Afford key stakeholders an opportunity to participate in the process of developing a comprehensive policy for the management of Alabama's water resources.
- Identify specific representatives to facilitate more effective and efficient communication between policy makers and the stakeholder groups. These distinct groups could include citizen-based environmental groups, universities, trade organizations, industrial sectors, and various local/state/federal agencies.

Key Stakeholders:

State Agencies/Educational Institutions

Alabama Attorney General
Alabama Cooperative Extension System
Alabama Department of Agriculture and Industries
Alabama Department of Conservation and Natural Resources
Alabama Department of Economic and Community Affairs – Office of Water Resources
Alabama Department of Environmental Management
Alabama Department of Public Health
Alabama Department of Tourism
Alabama Development Office
Alabama Forestry Commission
Alabama Governor's Office
Alabama Office of the State Climatologist
Alabama State Port Authority
Alabama Surface Mining Commission
Alabama Water Resources Commission
Choctawhatchee, Pea and Yellow Rivers Watershed Management Authority
Dauphin Island Sea Lab
Geological Survey of Alabama
Soil and Water Conservation Committee
State Universities

Federal Agencies

Federal Energy Regulatory Commission
National Oceanic and Atmospheric Administration
National Weather Service – Birmingham, Huntsville
Tennessee Valley Authority
US Army Corps of Engineers – Mobile District
US Department of Agriculture – Forest Service
US Department of Agriculture – Natural Resource Conservation Service
US Environmental Protection Agency
US Fish and Wildlife Service – Daphne Field Office
US Geological Survey – Alabama Water Science Center

Non-Governmental Organizations (NGOs)

Alabama Association of Conservation Districts
Alabama Association of County Commissioners
Alabama Association of Regional Councils
Alabama Catfish Producers Association
Alabama Cattlemen's Association
Alabama Clean Water Partnership
Alabama Environmental Council

Water Issue Area***Key Stakeholder Education and Outreach***

Alabama Farmers Federation
Alabama Fisheries Association
Alabama Home Builders Association
Alabama Petroleum Council
Alabama Poultry and Egg Association
Alabama Power Company
Alabama Pulp and Paper Council
Alabama Rivers Alliance
Alabama Rural Electric Association
Alabama Seafood Association
Alabama Sierra Club
Alabama Water Watch Association
Alabama Water Well Contractors Association, Inc.
Alabama Well Drillers Association
Alabama Wildlife Federation
American Dairy Association of Alabama, Inc.
American Water Works Association
B.A.S.S. Inc.
Business Council of Alabama
Cahaba River Society
Coal Association
Coalbed Methane Association
Coalition of Alabama Waterway Associations
Coosa-Alabama River Improvement Association
Ducks Unlimited
Farmers Home Administration
Home Owners and Boat Owners and Lake Resource Organizations (numerous groups)
League of Municipalities
Manufacture Alabama
PowerSouth Energy Cooperative
Public Water Utilities (i.e. Birmingham Water Works)
Riverkeepers, Inc. (Choctawhatchee, Black Warrior, Cahaba, Coosa, Tennessee, Mobile Bay)
Rural Water Association of Alabama
Southern Environmental Law Center
The Nature Conservancy
Tri-Rivers Waterway Development Association

WATER ISSUE AREA—PUBLIC EDUCATION AND OUTREACH

Overview:

The development of a comprehensive policy for the management of Alabama's water resources will require input from a wide-range of key stakeholders that offer expertise in several areas. Yet, the effective implementation of a comprehensive policy will rely on the support of the citizens of Alabama and ensuring those citizens understand the importance of the comprehensive policy. One of the keys to the long-term, effective management and sustainability of water resources is ensuring local citizens have a vested interest in protecting and preserving water resources at the local level.

An effective education and outreach campaign would need multiple components and would need to “target” multiple citizen groups. There are wide variations in how knowledgeable citizens are about water quality/quantity issues and how citizens utilize water resources. Many citizens understand water resources as they relate to fishing, swimming, skiing and other water sports but may not understand water resource issues related to water conservation, water reuse, wastewater treatment, industrial water usage, drinking water supplies, and the needs of aquatic organisms. Therefore, any public education and outreach campaign should consider a wide-range of issues during message development.

In addition, message delivery must be considered in order to reach large numbers of citizens in all socioeconomic groups. The traditional delivery methods of television, radio, and print media are available but internet and social media mechanisms must be considered as well.

Considerations:

- Citizens' must understand why there is a need for a comprehensive water policy and how they will benefit (recreationally/economically) from such policy.
- The development of an outreach campaign should account for the wide disparity in citizens' knowledge of water resources.
- Citizens' support of a comprehensive water policy is integral to the successful implementation of such policy.

Policy Options:

- Solicit the participation of key stakeholders and the public and target those individuals that already have an interest in protecting water resources.
- Develop a media campaign with media outlets and other advertising venues to target individuals who may not already have a foundational knowledge of water resources.
- Publicize and promote Alabama's vast water resources and the need to protect them for future generations to enjoy.
- Publicize and promote the varied recreational opportunities, abundant clean drinking water, economic development opportunities, and unique habitats supported by Alabama's water resources.
- Solicit the public's input into key decision-making processes.

