Cahaba River Society

Restoring and protecting the Cahaba River watershed and it's rich diversity of life.

November 1, 2012

Alabama Water Agencies Working Group:
Alabama Department of Agriculture and Industries
Alabama Department of Environmental Management
Alabama Department of Conservation and Natural Resources
Geological Survey of Alabama
The Office of Water Resources, A Division of ADECA

Regarding: Water Management Issues in Alabama: A Report to The Honorable Robert Bentley, Governor of Alabama

Dear Mr. Bennett Bearden, Chair of AWAWG,

The Cahaba River Society is a 501 (c) 3 non-profit river conservation group located in Birmingham, Alabama. Our mission is to restore and protect the Cahaba River watershed and its rich diversity of life. The diverse lives depending on the Cahaba include the 600,000 people and numerous businesses in the Birmingham Water Board service area relying on the Cahaba River as a major source of drinking water as well as its internationally significant diversity of freshwater wildlife.

We appreciate this opportunity to comment on the future of water management in Alabama. We offer our help as a resource in this effort to explore water management issues and to help find solutions to these complex problems. We are currently collaborating with the Alabama Department of Transportation's effort to incorporate post-construction stormwater management into highway design to protect and replenish water resources. We have trained about 1000 professionals in business and government about Low Impact Development to protect water resources, and we collaborate on and award successful water-smart development projects. We also are collaborating with many partners in education and promotion of water efficiency and the water-energy connection.

SUMMARY OF RECOMENDATIONS

The following is a summary of our comments and suggestions. A more thorough discussion follows below:

- AWAWG should integrate water supply management with stormwater management, energy use, and other aspects of natural resource protection.
- We urge AWAWG to promote Low Impact Development and

Green Infrastructure practices for managing stormwater, to replenish drinking water supplies and protect water quality.

- We recommend that AWAWG support adoption of clear regulations and codes that enable and promote graywater and wastewater reuse techniques, and also promote water efficiency technologies and investment, as these approaches will ease peak water demand and help serve growth most cost-effectively.
- AWAWG should engage as wide a range of stakeholders as is feasible.
- AWAWG should base policy on sound science and assure compliance with water management policies with viable enforcement procedures.
- We urge AWAWG to strongly consider **The American Society of Civil Engineers'** *Regulated Riparian Model Water Code* as a model for Alabama.
- We urge AWAWG to consider studying the Cahaba River watershed as an example of an important drinking water source with complex hydrological influences and interbasin transfers.

Alabama communities face at least three interrelated challenges: sustainable water management, environmentally sound development practices, and climate trends. We must meet these challenges if we are to realize our growth potential in a way that improves both economic and environmental health.

These are also the top challenges facing the globally-significant ecosystems and wildlife of our Alabama rivers and streams. Fortunately, the solutions that will conserve freshwater for wildlife will also help restore and protect watersheds for human needs to facilitate economic growth and keep the cost of drinking water supplies affordable.

At this stage of human civic development, it seems we would have figured out how to manage a resource as basic as water. However, in the past, urban design and management have typically compartmentalized the many aspects of water supply and demand, leading to water waste, cost inefficiencies, and unnecessary degradation.

To address these challenges, many innovators in water management recommend interconnecting management of urban drinking water supply, stormwater and wastewater management systems, and the natural water resources they both rely on and impact. Stormwater and wastewater reuse, stormwater infiltration for groundwater recharge, drinking water efficiency and reuse, energy efficiency and the water-energy connection, and green infrastructure are essential techniques that link together components of the urban water system in ways that reduce costs and environmental impacts and create beautiful and successful communities.

Practical, achievable solutions are available to address these complex, interconnected problems. These solutions also help businesses, institutions and communities conserve energy, save money, and adapt to climate impacts. Encouraging the adoption of practical water management solutions should be an important goal of improved statewide water management policy.

THE ENERGY-WATER CONNECTION AND CLIMATE

Climate trends are impacting current water use. Water use decisions also impact energy use, climate trends and climate resilience.

Urban development typically alters watershed hydrology, reducing the availability of drinking water supplies during drought and worsening flooding in wet weather (more below). Climate projections for the southeast indicate we may see both wetter 'wet' periods (including more intense deluges) and, at other times, dryer and more protracted drought periods. One urgent reason to rethink water system design is to increase our climate resilience – our ability to adapt to these impacts.

Whether wetter or dryer, or both in turn, the southeast is becoming warmer and demands for water are increasing. Summer requirements for water needed for cooling and landscape irrigation determine peak drinking water demand. In Shelby County, AL for instance, average summer water use per customer is three times average winter water use, mainly due to landscape watering and air conditioning[1]. In Birmingham, summer landscape watering demands and the cooling water demands of major industries coincide, also causing a spike in demand. Summer peak demand then drives water supply planning and the perceived necessity to invest capital funds to develop new water supplies, which raises water bills for all residents and businesses. This strategy for adjusting to climate trends thus could significantly increase water costs. However, if our communities and water providers can become more efficient in our water use, we will be able to serve more residents and businesses with the water we already have, allowing growth with less capital investment and lower water costs.

The water-energy connection is a recent concept that is linking the two in sustainability design and management. It takes vast amounts of water to produce energy - 39% of total freshwater withdrawals in the US in 2000, equal to all water withdrawn to grow food. And it takes vast amounts of energy to treat, pump and heat water and wastewater for use in homes, businesses, and institutions - over 13% of total US energy use. When we save water we also save energy, and vice versa.[2]

OTHER URBAN WATER CHALLENGES

***Stormwater*:** Large amounts of water fall on our cities as a resource; rain. Stormwater infrastructure is expensive and can turn rain into a waste product that floods, pollutes, erodes, and is thrown away.

Typical development design and stormwater management unnecessarily threaten the water storage and cleansing capacity of watershed forests and lands and the quality,

[1] Shelby County Water Services, *pers. comm.*
[2] Learn more at: **http://www.rivernetwork.org/water-energy-nexus**.

supply, and cost of our drinking water. Conventionally designed hardscape stormwater systems concentrate the increased rain runoff from paving and roofs, prevent rain from recharging groundwater and drinking water sources, and cause pollution, flooding, erosion of tributaries and riverbanks. These effects reduce drinking water supplies and worsen water quality, leading to higher drinking water costs.

The City of Trussville in the upper Cahaba watershed provides an example. Trussville's municipal water supply relies on wells. The groundwater that feeds the wells is recharged by rain that falls on Trussville, not from some distant or ancient source. Trussville's economic success is paving over its own water supply. Groundwater also recharges the Cahaba River during dry periods. Conventional urban development is reducing the drinking water supply available to the Birmingham Water Works Board.

***Wastewater*:** The aim to reliably cleanse our wastes via large scale, centralized wastewater systems is plagued with problems. Stormwater inflow and deferred maintenance cause raw sewage overflows. The typical plan to attract new customer revenues is to expand the sewer system for greenfield growth, which can be inefficient and expensive to provide with sewer, other infrastructure, and public services. Large sewer systems cross watershed boundaries and dewater some watersheds while overloading pollutants in others. Increasingly expensive technologies are required to remove nutrients from wastewater, nutrients that could be a resource if wastewater were instead reused for landscape irrigation or if treatment byproducts were used to generate energy. In our region treated sewage is not typically utilized as a product that can return revenue to the sewer provider or save energy costs for the sewer system. In sum, we spend huge amounts of money to treat sewage and then throw it away.

SOME INTEGRATED WATER SOLUTIONS

Low Impact Development (LID) is a suite of innovative best practices that conserve and recreate natural hydrologic systems within development projects by percolating rain into the ground and capturing rain to reuse it, thereby reducing the volume of runoff and pollutants in it. **Green Infrastructure** (GI) recognizes and preserves the function of natural forests and waterways within developing areas to cost-effectively cleanse water and manage floods. LID and GI approaches allow development to recharge drinking water supplies, reduce the draw on municipal drinking water for uses such as irrigation, and reduce flooding and pollution. Typically, LID practices have proven to be less expensive than conventional stormwater engineering, a strong business case for their use. [3]

Water reuse recycles water in the urban water system and takes advantage of the resource many times. Why should expensive potable water be used for functions that don't require water treated to that level, such as landscape watering, flushing toilets, washing vehicles, and industrial production? Wastewater can be reused at a large scale

[3] Learn more at **www.crwa.org/blue.html**.

– piped and provided to customers for landscape irrigation or industrial production. Water can also be reused, at a lower cost, and at smaller scales. Graywater (such as from washing machines and showers), wastewater and stormwater can be reused in homes and businesses. For instance, McWane Pipe filtered the water it uses to make iron pipe, blended it with stormwater, and made more pipe. Cost-effective small- scale onsite sewage treatment systems can provide water for landscape irrigation and thereby reduce pollution in rivers. Stormwater can be reused in cooling towers, and cooling blowdown water, with proper technology, can be reused for landscape watering. Wastewater treatment byproducts can be used to generate energy, to help reduce the high energy costs of the treatment process.

Water efficiency invests in infrastructure, fixtures and systems that stretch existing water supplies and meet needs of growing communities at least cost to ratepayers and the environment. Installing "Water Sense" toilets and faucets, designing homes to minimize the distance hot water must travel, retooling industrial production to reduce water use, installing drought-tolerant landscaping with drip irrigation and water sensors are examples. Through improved efficiency our water providers could perhaps delay or downsize costly projects such as the Birmingham Water Works Board's planned $380 million water supply expansion. More efficient water use would help serve essential needs during droughts. Saving water has a triple impact to save households, businesses, utilities and institutions money through lower water, sewer, and energy bills.

THE VALUE OF COLLABORATION

The Cahaba River Society is a partner within the Interfaith Environmental Initiative of Alabama (IEIA), which is a community-based network connecting leadership of faith, science, education, business, environment, energy and water provider, government and the arts sectors to learn together and encourage and inspire informed choices for care of creation (see below [4] for a list of partners). IEIA's underlying principles are collaborative. The focus of IEIA is energy and water conservation and efficiency in Alabama. By mentioning IEIA here, we are not speaking for IEIA, which does not take advocacy positions. We are relating what CRS has learned through IEIA.

Through the Cahaba River Society's participation in the open dialogue IEIA encourages, we have come to appreciate the challenges faced by both water users and water providers. We have come to better understand the economic complexity as well as the environmental complexity inherent in these problems. For example, the consumer advantages of wider adoption of water efficiency techniques must be weighed with the fiscal imperatives faced by water providers to maintain a viable business model. Improved water efficiency must be achieved together with improved fiscal stability and flexibility for water utility operating and capital revenues.

[4] **http://www.interfaithenvironmental.org/?p=1**

Similarly, changes to wastewater transport and treatment systems that may accompany greater water efficiency must be born in mind. Wastewater conveyance relies on immutable hydraulic principles; a minimum volume of water is required to successfully convey waste to the treatment facility. While we do not agree this fact necessarily obviates the need for wider adoption of water efficiency techniques, it is a reality that must be taken into account.

We note that some wastewater treatment facilities have installed methane recovery systems that can provide energy to power boilers needed for heating sewage and for sludge reduction processes. For example, Jefferson County Department of Environmental Services (JCDES) is currently in the process of adopting this innovation for their two largest facilities (the Village WWTP and the Valley WWTP) [5]. Mr. Daniel White, JCDES, notes that there are examples of methane harvesting at WWTPs being used to power electrical generators which, in turn, provides electricity for other purposes.

OTHER CONSIDERATIONS

Water Management Issues in Alabama (the Report) outlines a complex set of findings and policy options. Of those, we suggest the following elements and policies are fundamentally important and deserve particular emphasis.

A solid scientific basis for setting instream (i.e., environmental) flows is critical. Instream flows are carefully and cogently described in the Report. We urge the AWAWG to yield as much weight to these environmental needs as it gives to the many other competing needs. Protection of instream flows and Alabama's aquatic wildlife resources must not be considered secondary to the many other competing issues. We echo the need to "…provide funding and resources for instream flow investigations and for evaluating appropriate instream flow hydrologic tools." [6] as noted in the Report.

Strong water efficiency and conservation approaches must be adopted prior to consideration of new reservoir development or use of interbasin transfers to satisfy water supply needs. That is, new reservoir development should be proscribed until a thorough vetting of water efficiency and conservation approaches has occurred.

Development of a new reservoir is expensive and will be environmentally damaging. Interbasin transfers of water resources are also environmentally disruptive. As a solution to water supply needs, it is all too easy to overlook other less expensive, but equally viable solutions, and jump to a conclusion that building a new reservoir or that an interbasin transfer is warranted. We urge the AWAWG to establish a process that requires a thorough vetting of all other potential water supply solutions before allowing these potentially misguided and expensive 'solutions' to be adopted.

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[5] Daniel White, JCDES, *pers. comm.,* October 25, 2012.
[6] *Water Management Issues in Alabama.* See page 6.

A dependable enforcement system is essential for successfully managing water withdrawals. While any new regulatory program will meet with significant resistance, Alabama simply cannot prosper without adequate water resource management. The likelihood of a successful water management program without adequate enforcement capabilities is just too small.

Some interests may seek to be exempt from these regulations. We urge the AWAWG to resist allowing any significant water user to be exempt from these regulations. To allow exemptions would be quite unfair to others in our community, would unfairly tilt the playing field for businesses, and would compromise the essential goals of proper statewide water resources management.

Stakeholder participation in decision-making is essential. While we appreciate this opportunity to comment on the Report, we also urge AWAWG to continue to seek substantive input from the widest possible range of stakeholders. We understand that stakeholder processes may be cumbersome, but we remain convinced that AWAWG and statewide water policy will benefit from stakeholder input.

Also, water management decisions must be focused at the watershed level to the maximum extent possible. We urge the AWAWG to seek ways to delegate decision-making to watershed-level stakeholder groups to the maximum extent practical.

The American Society of Civil Engineers has developed the *Regulated Riparian Model Water Code*. That document should be considered as a model for Alabama's water management system. At the very least, that document will likely provide good policy ideas for addressing the complex water management challenges Alabama is now deliberating.

Developing a multitude of small impoundments is a tempting, but potentially destructive, approach to water supply management. Some watershed management authorities, particularly in agricultural areas seeking irrigation resources, have relied on developing a significant number of small-scale water storage facilities. We agree that small impoundments may be a component in solving water supply dilemma if conducted at a prudent geographical scale. However, proposals for larger impoundments or especially numerous smaller ones should be carefully evaluated with respect to their potential hydrological impacts. Impoundments have both positive and negative impacts.

For example, a potential negative impact is associated with impoundments is the increased loss of water volume to evaporation. Staff with the Birmingham Water Works have estimated that the total volume of water available from the upper Cahaba River watershed for drinking water use could diminish by as much as 30% in the future due to a combination of increased evaporative losses from a proliferation of sediment control ponds and the increased stormwater runoff rates typically associated with urban development. Similar losses could be associated with a significant proliferation of small-

scale water storage facilities if those are not adequately studied in the larger hydrologic context.

Impoundment design is also of key importance to minimize downstream effects. An important but often overlooked impact is thermal pollution that occurs when overflows from impoundments are drawn strictly from the impoundment surface waters. Water at the surface of an impoundment can be significantly heated relative to the temperatures in shaded streams. Mixing surface water with water drawn from near or below the impoundment thermocline can ameliorate that problem if it is engineered correctly.

The Office of Water Resources has noted that the Cahaba River is an important source of drinking water and a refuge for important biological resources in need of particular attention regarding a study on water demand and supply. Unfortunately, current efforts to study the Cahaba River's fail to integrate the full range of potential impacts that will likely result from its current demands.

Examples of recent and ongoing Cahaba River studies include the following: The City of Trussville is conducting a flood study of major storm events in the upper Cahaba River watershed. The Alabama Department of Transportation (ALDOT) has modeled the sediment runoff that may be associated with highway construction in the upper Cahaba River watershed. However, the US EPA has recommended that potential stormwater runoff issues associated with the Northern Beltline be studied in greater detail than has thus far been provided by the current ALDOT modeling effort. The Birmingham Water Works is very interested in the long-term impacts of stormwater runoff and infiltration on water supply availability from the Cahaba River. All the local governments in the upper Cahaba River watershed will need to develop an improved understanding of stormwater impacts as they must address those as the main focus of their respective municipal separate storm water system (MS4) permits. We also believe that the existing FEMA flood maps underestimate updated estimates of 100-year flood event elevations by as much as six feet. With regard to interbasin transfers, significant volumes of partially treated or untreated wastewater are transferred from the Cahaba to the Black Warrior basin.

Unfortunately, none of these individual studies fully integrate the full range of demands and impacts that we know already exist or will be occurring in the future. We are very concerned that in the absence of a thorough, integrated hydrological assessment, the hydrologic changes that attend urban development in the Cahaba River watershed (enhanced rates and magnitude of stormwater runoff, the potential for increased drinking water supply demands, interbasin transfers of wastewater, higher peak flood elevations for major flooding events, increased evapotranspiration from stormwater detention facilities, and diminished base flows due to increased watershed imperviousness) will compromise the value of the Cahaba River as a drinking water resource and its biological integrity.

Therefore, the Cahaba River Society recommends the OWR, the GSA, and the ADCNR undertake an integrated hydrological study of the effects of urbanization on the Cahaba system and its sustainability for human and wildlife uses. We would greatly appreciate the opportunity to become partners with these agencies and many other interests in such a study.

Thank you for your thoughtful consideration of these comments.

Sincerely,

Beth K. Stewart
Executive Director

Randall C. Haddock, PhD
Field Director

CC: J. Brian Atkins, P.E., Division Director, Alabama Office of Water Resources, a division of the Alabama Department of Economic and Community Affairs