ARTICLE CASE

Stakeholders Reach Consensus in Troubled Waters: Apalachicola-Chattahoochee-Flint River Basin, Southeastern USA

KATHLEEN RUGEL

Independent Scholar and Writer, Georgia, USA
Email: kathleen.rugel@gmail.com

ABSTRACT Surface water and groundwater catchments rarely align with the boundaries of cities, states, or nations. More often, water runs through, over, and under man-made sociopolitical divisions, making the governance of transboundary waters a formidable task. Although much of the public conversation regarding the availability and management of shared waters may appear to be dire (e.g., reports of "water wars"), there are transboundary basin water management strategies across the globe which offer hope. These include the efforts of the Apalachicola-Chattahoochee-Flint Stakeholders (ACFS) in the southeastern United States, which may serve as a useful template for future conversations around the water sharing table. The Apalachicola-Chattahoochee-Flint Basin (ACF Basin) is a vital economic engine in the southeastern United States. The waters of the ACF are shared between three states—Alabama, Florida, and Georgia—and harbor some of the richest freshwater biodiversity in North America, including sturgeon, rock bass, madtom, sculpin, bass, darters, and the highest densities of freshwater mussels in the world. Many of these are species of concern or threatened or endangered species; therefore, water management strategies in multiple portions of the ACF must comply with habitat protection plans under the U.S. Environmental Protection Act of 1970 (https://www.enr.gov.nt.ca/en/environmental-protection-act). The ACFS was organized in 2009 in the hopes of overcoming a decades-long stalemate between Alabama, Florida, and Georgia, regarding the use of shared waters in the ACF Basin. Despite years of litigious relationships among these three states, the ACFS managed to bring a diverse and previously contentious set of water users to the table and build consensus on a shared water management plan for the entire ACF Basin. While the ACFS holds no regulatory power, they made more progress in breaking through existing distrust and deadlock than any previous efforts in this basin to date. In the end, they developed cooperation, respect, and a sustainable and adaptive water management plan which included input and buy-in from all identified water sectors in the ACF Basin. It is, therefore, a valuable exercise to examine the ACFS model and contemplate whether it contains exportable methodologies for other catchments challenged with managing transboundary waters. KEYWORDS transboundary water agreements, stakeholder-driven water management, consensus building, water resource management, Apalachicola-Chattahoochee-Flint River Basin

CASE EXAMINATION

Study Region

The Apalachicola-Chattahoochee-Flint (ACF) River Basin (figure 1) consists of 5.27 million hectares in the southeastern United States and lies within portions of the states of Alabama, Florida, and Georgia.[1] The Chattahoochee River, one of the three major river systems in this basin, has its headwaters in the mountains of northeastern Georgia. It flows southeast through the city of Atlanta, the largest metropolitan area in the ACF Basin and the capital of Georgia, then continues southeastward to form the border between Alabama and Georgia. It makes up 43% of ACF flows. The second major river system, the Flint River, begins just below Atlanta and runs southward through central and southwestern Georgia, contributing 42% of the flow in the ACF Basin. The Chattahoochee and the Flint converge at the Jim Woodruff Dam on the Florida–Georgia border where they become the Apalachicola River. The Apalachicola runs through the center of the Florida Panhandle and outputs into the Gulf of

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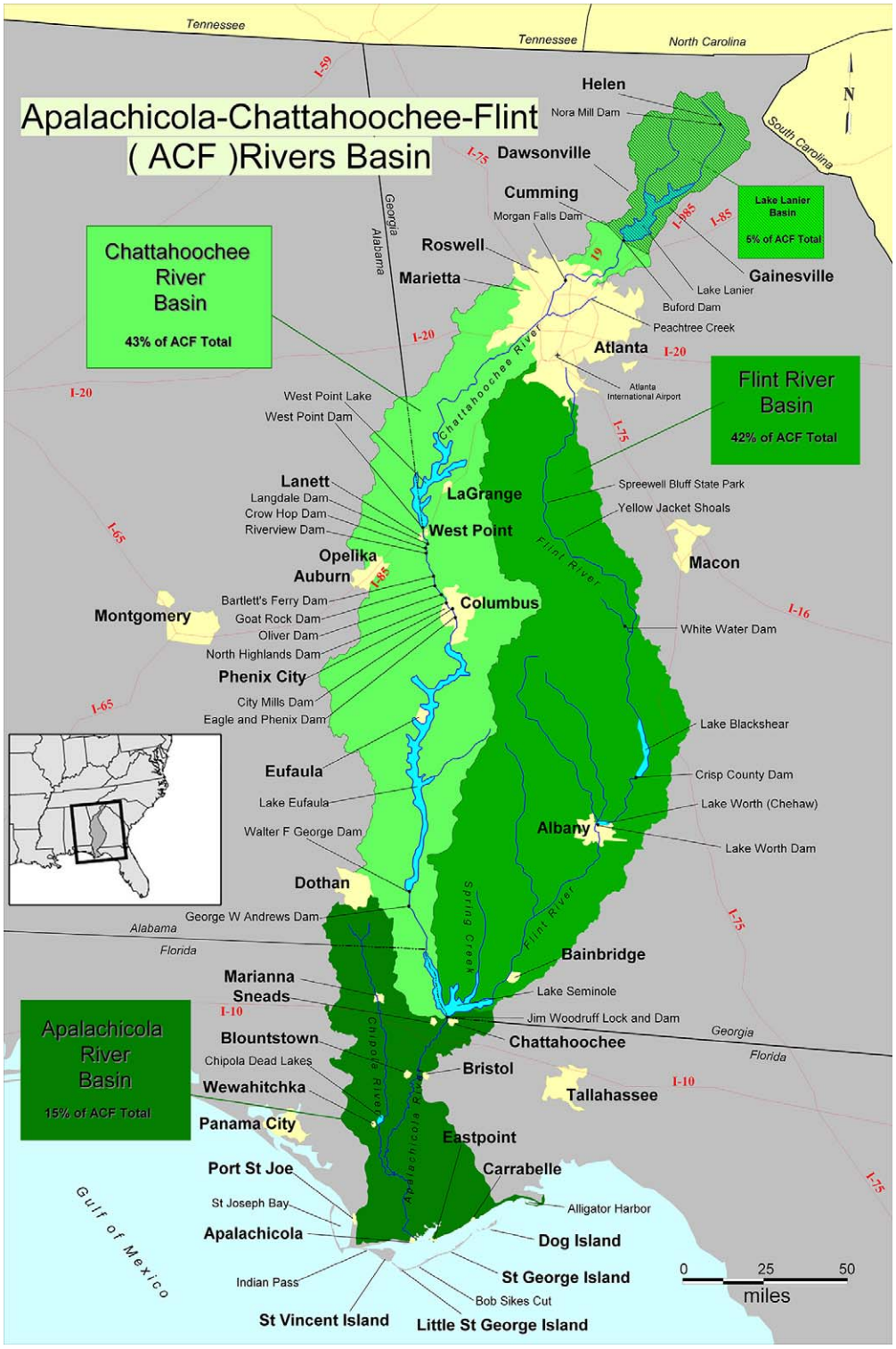

FIGURE 1. Apalachicola-Chattahoochee-Flint River Basin (permission of Roy Ogles).

Mexico at the Apalachicola Bay. It accounts for 15% of ACF flows.[2]

The Chattahoochee River moves through five major dams that are regulated by the U.S. Army Corps of Engineers (Corps). Along its route, the Chattahoochee supports industry, wastewater assimilation, recreation, and drinking water for Atlanta and the southeastern United States. Atlanta is one of the fastest growing municipalities

in the United States with close to 6 million people (https://www.census.gov/en.html, October 2019). It hosts the busiest airport in the world, Hartsfield–Jackson Atlanta International. Ninety-two percent of the population in the ACF Basin resides in Georgia, and 75% of that population lives in the Atlanta metro area. At its most southern reach (in southeastern Alabama), a nuclear power plant is highly dependent on adequate flow levels in the southern Chattahoochee to support crucial heating and cooling.

The Flint River traverses the southwestern portion of the ACF Basin (in central and southwestern Georgia). This region is mainly agricultural, producing peanuts, cotton, corn, wheat, and poultry. With only two minor impoundments (mostly used for power production and recreation), the Flint is one of only 40 rivers in the United States, which still flows unimpeded for 200 miles. While prized for its beauty, fishing, and outfitting, its lower reaches are heavily allocated for agricultural water use. The Lower Flint River Basin (LFRB) is intensively developed for irrigation supported by groundwater and surface water withdrawals. Agribusiness accounts for 34% of this region's economy.[3,4]

The Apalachicola Basin, in the southernmost part of the ACF Basin, is considered a global hot spot for biodiversity, boasting the highest species diversity of reptiles and amphibians in the United States and Canada.[5] Flowing southward from the Florida-Georgia line, the Apalachicola River spreads out across a wide floodplain of sloughs and backwaters which is foraged by 80% of the fish species in the region.[6,7] In 1983, the United Nations designated the Apalachicola Basin as a Biosphere Reserve.[8] Until recently, the Apalachicola Bay was a major producer of shellfish and shrimp, meeting 10% of oyster demand in the United States and 90% in Florida. Traditionally, most oyster harvesting in the Apalachicola Bay was done by a small number of generational oystermen (approximately 14 families) who brought in as much as 3 million pounds of oysters per year. In 2012, the oyster and shrimp populations in the Apalachicola Bay crashed, and harvesting has been closed or severely restricted to help protect remaining stocks (https://www.flseagrant.org/news/2012/12/oyster-collapse-apalachicola/).

Rainfall is relatively plentiful in most of the ACF Basin, approximately 1,270 mm annually. Evapotranspiration can remove 60–90% of those inputs, especially in the lower portions of the basin.[9] Rainfall application is unevenly distributed both temporally and spatially throughout the region. A range of precipitation extremes, from repeated cycles of drought to heavy downpours from summer thunderstorms, tropical depressions, and hurricanes, are common. Maximum temperatures may reach 38°C in the lower portions of the basin, while lows in northern Georgia can drop to −7°C (www.noaa.gov, October 11, 2019).

Geology in the northern portion of the ACF, where the Chattahoochee headwaters begin, consists of low-lying hills ("piedmont") at the base of the Appalachian Mountains. The hydrogeology in this region is crystalline rock, which limits drinking water sources to shallow fractured rock aquifers and surface waters fed by precipitation. Mid-basin, the land becomes a coastal plain underlain by beds of ancient marine sediments. An exceptionally productive carbonate aquifer, the Upper Floridan Aquifer, has developed under the southern portions of Georgia, Alabama, and Florida.[10] Groundwater and surface waters share a close hydraulic connection in this part of the ACF, and both are heavily allocated for agricultural irrigation.[11,12]

Water Planning Structure by State

In 2004, *Georgia* passed the Comprehensive Statewide Water Management Planning Act, which mandated the creation of a statewide water plan. The Comprehensive Statewide Water Management Plan, adopted in 2008, created 11 regional water councils to define solutions for water protection and management in each region.[13] Council boundaries do not follow the boundaries of the watersheds in Georgia, and state guidance for water council objectives does not explicitly include protection for freshwater environmental systems.

Florida is widely recognized for its regional water management structuring. The Florida Water Resources Act of 1972 codified water protection for both human and environmental use and formed five distinct water management districts to manage water use, water quality, flood control, and environmental protection under the Florida Department of Environmental Protection. The Florida water management districts are roughly divided along the five major river watersheds in Florida.

Alabama does not currently have a statewide water management plan. However, at the request of the Alabama governor, the Alabama Water Agencies Working Group has been convening since 2012 to assess and evaluate water use and requirements in Alabama on regional levels.

"Water Wars"

The unexpected population growth in the southeastern U.S. corridor has placed heavy demands on water resources in this region. In the past 60 years, Atlanta grew from less than 1.5 million residents in 1960 to its present population of nearly 6 million people and is expected to reach 8.6 million by 2050 (https://atlantaregional.org/news/press-releases/metro-atlanta-population). During this time, the introduction of center pivot systems was doubling irrigated acreage in the LFRB.[14] Around 1980, a series of droughts began to threaten surface water availability in the upper portion of the ACF Basin, causing a drop in the standing level of Lake Lanier, a federally managed reservoir on the Chattahoochee River north of Atlanta.

The city of Atlanta petitioned the Corps in 1990 to request a portion of Lake Lanier be held in storage to provide drinking water for the growing metropolitan area. Previously, the waters of Lake Lanier had not been explicitly sanctioned for this use. To date, the Corps mainly managed this reservoir for navigation, power, and recreation and apportioned its flow equally between Alabama, Georgia, and Florida. When Atlanta requested greater amounts of water upstream, users in the lower ACF anticipated a loss of water to serve their downstream sectors. Some immediate concerns included the challenge of maintaining sufficient flows on the lower Chattahoochee for nuclear power intakes at the southeastern Alabama border, as well as adequate fresh water to preserve the ecological and economic health of the Apalachicola River basin, floodplain, and bay.

Decreased freshwater flows in the Apalachicola Bay, as well as low nutrient inputs and increasing salinity (all flow-driven parameters), threaten the estuaries where oysters, shrimp, sturgeon, and other marine species develop. In addition, surveys had shown over 4 million trees died in the Apalachicola floodplain since the 1970s, mainly Ogeechee tupelo used for regional honey production.[15] Some downstream users believed this was the result of too much water being used by the city of Atlanta. Others felt increases in irrigation in the LFRB were lowering the flows into the Apalachicola. In addition, the presence of federally endangered Gulf Sturgeon below the Jim Woodruff Dam (where the Chattahoochee and Flint converge, and the Apalachicola River begins) mandated that a minimum of 5,000 cubic feet per second must flow over the dam to support sturgeon spawning.

In 1990, a series of lawsuits ensued over how the waters of the ACF should be managed.[16] First, Alabama sued the Corps to prevent it from holding water in storage (in Lake Lanier) to provide drinking water for Atlanta. Then, in 2000, Georgia sued the Corps for interfering in its water use (*not* holding the water in Lake Lanier). The same year, southern electric companies brought suit against the Corps, claiming its mismanagement of the reservoirs on the Chattahoochee was inflating prices set by hydropower companies who provided power to the electric companies. Multiple minor lawsuits were spawned, including complaints of violations of the federal Environmental Protection Act and the National Environmental Policy Act.

In 2003, the courts eventually stayed much of this litigation, requesting the states work together to form a tristate compact to manage the apportionment of the ACF waters between themselves. When those attempts failed around 2004, the lawsuits were reactivated. A series of rejections, dismissals, appeals, and reversals followed.

Apalachicola-Chattahoochee-Flint Stakeholders

Dissatisfaction, distrust, and litigious stalemates prevailed for decades over the allocation of water between sectors, regions, and the three states within the ACF. In 2008, within this contentious climate, several individuals who lived and worked with water in different parts of the ACF decided to sit down and talk to one another in an attempt to address the lack of effective mechanisms to resolve this impasse.

Following some initial informal gatherings, a larger, more inclusive group of water users was invited to come together in Albany, Georgia, in 2009, to discuss how to resolve the intractable water issues in the ACF Basin. Attendants at the meeting spanned a wide range of stakeholders from within the ACF, including farmers, industrial and municipal leaders, power companies, anglers and oystermen, utility companies, lawyers, economists, scientists, federal and state water resource managers (including the Corps), regulators, environmental and conservancy groups, fish and game agencies, and outfitters.

This nascent group ultimately became known as the Apalachicola-Chattahoochee-Flint Stakeholders (ACFS). From their first meeting, the ACFS agreed that consensus was critical to the success of building a sustainable and evenhanded water management plan for the ACF Basin.

The mission of the ACFS, adopted at this first meeting, reads as follows:

> *The diverse users of the ACF Basin set out to cooperatively create sustainable solutions among stakeholders that balance economic, ecological, and social values in the sharing of this natural resource.*

Working together, the group identified 14 water interests, or sectors, specific to the ACF watershed, including water supply, water quality, seafood industry, thermo power, hydropower, historic and cultural, environment and conservation, farm and urban agriculture, industry and manufacturing, navigation, business and economic development, recreation, local government, and other.

Anyone who lives and works in the ACF may become a general member of the ACFS. Members are attracted by word of mouth and public announcement. Upon joining, each member declares their interest in the 14 identified water sectors mentioned above. General members represent their interests, institution, or constituency in meetings, working groups, and committees. Any general member can be voted to serve as a board member by 80% vote at annual ACFS board meetings. Board members represent the interests and concerns of the general membership and vote on issues at the annual meetings.

For the purposes of representation, the ACF Basin is partitioned into four subbasins: The Upper Chattahoochee, Middle/Lower Chattahoochee, Flint, and Apalachicola. Each of these four subbasins submits a ballot of names for 14 potential board members (one member for each water sector). A 56-member governing board represents all 14 water sectors equally within all four subbasins of the ACF. Two members are also chosen from each subbasin to serve on an eight-member executive committee. Attendance at meetings is open to voting and nonvoting members and all interested parties. Board members and committees work throughout the year, and the governing board convenes annually, rotating around the four subbasins. The ACFS organization is officially a nonprofit 501(c)(3), supported by membership dues and private donations.

A Decade of Dialogue

Following its formation and incorporation, the ACFS set about to gather available information on water quantity and quality, wastewater requirements, withdrawals and returns, river and reservoir levels, and current water usage throughout the ACF. All three states, water sectors, and subbasins contributed input. Regional institutions and experts processed and presented data sets and models to bring all members up to speed. Gaps in knowledge were identified and addressed. Other transboundary water management templates were discussed, sometimes aided by a facilitator. Models were updated, and flow scenarios were generated under varying water usage.

In addition to gathering and crunching data sets and producing models, the ACFS worked on building trust and understanding and healing relations between the water sectors. By continuously moving the annual meeting place, members were able to observe different areas and priorities around the ACF Basin. They also worked in smaller groups and committees between the annual meetings and began to develop relationships. They took field trips and witnessed for themselves how different sectors used water in each region. They went out on oyster boats, waded in streams, and paddled on rivers to see for themselves the challenges of protecting threatened ecosystems and livelihoods. They ate together, listened to one another, discussed their needs and values, and learned from one another about how water was crucial to each member's business, home, and culture. They did not always agree, but, with time, water discussions moved from "my water" versus "your water" to "our water."

After navigating through many meetings and sometimes tense discussions, cumulatively spanning over 27,000 voluntary hours, and despite ongoing court cases between two of the states, the ACFS unanimously agreed to adopt a sustainable water management plan (SWMP) in May 2015.[17] Although some misgivings remained, all stakeholders agreed the plan was better than anything in existence for equitably managing the shared waters of the ACF.

The main pillars of the ACFS Statewide Water Management Plan are (paraphrased) as follows:

- Create a tristate transboundary water institute to coordinate and support basin-level water management.
- Continue to identify and implement conservation and water-efficient measures and policies in all three states.
- The U.S. Corps of Engineers should adopt a suite of changes to storage and winter pool levels and pulse releases to manage the basin for benefits to all users, including the environment.

- Drought management, including predictive drought indicators, should be developed at local, state, and federal levels, and the responsibilities of water users should be explicit under drought conditions.
- Continue to gather information and research to support adaptive decision making in the ACF Basin.

DISCUSSION

Prior to the initiation of the ACFS, many interest groups had worked separately (at subbasin and state levels) on water issues throughout Alabama, Florida, and Georgia; however, little consideration was being given to the holistic management of the entire ACF Basin. Sub-catchments were understandably focused on one water sector or another. States were in various stages of evaluating and managing their own water use. As competition for limited water resources grew, some states pursued legal measures to resolve water disputes. Many stakeholders had developed distrust or blind resentment about who was to blame when water was scarce.

In this climate, the ACFS convened and have remained together for over a decade to pursue a completely stakeholder-driven evaluation of water issues in the ACF Basin, which included all 14 water interests in the basin. They emerged with a consensus-based water strategy to equitably allocate the shared waters of the ACF. This agreement, the ACFS SWMP, is now available to inform water resource management, structure, and policy throughout the ACF Basin.

Collective governance, which includes the input of public, private, and corporate stakeholders for creating resource management solutions, is well studied.[17,18] It is not uncommon for local, regional, state, and national governments and agencies to reach out to and engage with stakeholders to resolve conflict and build consensus over shared resources, including water. However, the ACFS organization was never convened by any agency or administration; rather, it was entirely orchestrated and is maintained by concerned citizens, all of whom live, work, and use water within the ACF Basin. It has no political affiliation and reports to no authority in any of the three states in which the ACF waters lie. It is purely stakeholder-driven.

The ACFS further formulated its stakeholder representation system to help override regionalism or overrepresentation of any set of water users within any portion of the basin. Obvious priorities for water use exist in certain parts of the ACF, for example, farming/irrigation in the LFRB, fisheries/oyster industries in the Apalachicola Bay region. Simply choosing a representative to speak for their regional interest would likely have continued the "us vs. them" mentality which had prevailed for years throughout the ACF.

To promote unity and underscore the interconnectedness of all regions of the basin, the ACFS went beyond the token presence of a representative from each water sector. Instead, board members from each of the 14 identified water sectors were elected from all four subbasins (Upper Chattahoochee, Middle and Lower Chattahoochee, Flint, and Apalachicola). To illustrate: the seafood sector would not only be represented by a board member from the Apalachicola subbasin (where seafood was of obvious interest), but a board member was also elected from within each of the other three subbasins to stand for the needs and concerns of the seafood sector. This might be a seafood courier or retailer who resided in one of the other upstream subbasins, with interest in or understanding of sales, distribution, or marketing of seafood. The recreational sector might be represented by a kayak maker in the Upper Chattahoochee, an outfitter in the Middle/Lower Chattahoochee, a float guide in the Flint, and so on. It should be reiterated that board members are committed to representing the concerns and interests of their sector (general membership) rather than their own organization, business, or personal interests.

Within this egalitarian representation, all board members are brought up to speed by general members on all issues around the basin. They disseminate information in a two-way fashion to their sectors, gather input from throughout their subbasins, and bring concerns back to the ACFS Board for discussion. In addition to the inclusiveness of a diverse and fair board of representatives, the priority of consensus is paramount, meaning that, ultimately, any board member has equal power to voice opinions or halt voting until consensus can be reached.

It is a testament to the dedication and tenacity of the ACFS that this organization continued to function in an atmosphere of ongoing litigation. In 2012, the Supreme Court of the United States (SCOTUS) ruled that the Corps could manage Lake Lanier to provide more drinking water for Atlanta residents. Then, in 2013, just as the SWMP was about to be adopted, Florida brought a suit

against Georgia in *State of Florida v. State of Georgia*. In its argument, Florida stated that Georgia's water consumption, particularly by farmers in the LFRB and the city of Atlanta, was negatively impacting ecosystems and economies in the Apalachicola Basin and Bay. Florida requested that the Court again rule to "divide the waters" of the ACF Basin equally ("equitable apportionment") between the states.[19] The plaintiff, in this case, was identified only as the "State of Florida"; therefore, it is not possible to determine precisely who or what drove the complaint, although it was conjectured to have been politically motivated.

Despite these litigations and the predictable disappointment and mistrust they produced between some of the stakeholders, the ACFS not only continued to convene but adopted and released the SWMP for the ACF Basin in 2015. It has become widely acknowledged as a comprehensive and inclusive plan that equitably integrates current science and the concerns of all water users in the ACF Basin, including the environment. It was read, referenced, and recommended as a resource by the first special master during the *FL v. GA* case (ultimately remanded) and further quoted in the supplemental briefs submitted to the second special master in charge of the remanded case. The second master returned a recommendation to SCOTUS in December 2019, stating that Florida had not sufficiently proven that harm to the Apalachicola Bay resulted from Georgia's management (or use) of water on either the Chattahoochee or Flint River. It further stated that such a ruling would negatively impact Georgia's economy (https://www.ca10.uscourts.gov/sites/default/files/SM142/670.pdf, https://www.scotusblog.com/case-files/cases/florida-v-georgia-2/). An appeal by Florida is anticipated.

Despite these ongoing challenges, the ACFS continues to hold regular meetings throughout the three states and adjust and adapt recommendations for how to manage the waters of the ACF Basin. Its efforts are supported by more than 100 individuals or groups. Since many members of the ACFS work in agencies, organizations, and businesses in various sectors within the three states, the understanding, trust, and consensus built within the ACFS process has helped to engender a climate of greater collaboration and information exchange at multiple resource levels throughout the ACF Basin.

The current priority of the ACFS is to work alongside local, regional, state, and federal agencies to increase predictive capacity and improve the preparation and management of drought in the ACF Basin (one of the pillars of the SWMP). Although the Corps has not updated its operating manual to adopt ACFS' Plan suggestions for adjusting reservoir management within the ACF, they were the first to encourage the formation of this stakeholder effort and remain at the table during the drafting of the ACF Drought Early Warning System.

CONCLUSION

Water policies, practices, and priorities in Alabama, Florida, and Georgia (in the southeastern United States) are widely divergent. For decades, managing the conjoined waters of the ACF Basin presented formidable challenges as it juxtaposed the divergent requirements, monitoring practices, funding cycles, and concerns of the governments, people, economies, and ecosystems of these states. Prior to the conception of the ACFS, water resource structuring within the ACF Basin had not successfully or comprehensively addressed all of these disparities at a basin-wide level nor had litigation succeeded in bringing ACF water users closer to a consensus on how to allocate these shared waters.

For over a decade, the ACFS has voluntarily gathered to share the task of collating and examining the best available water data on this basin, building trust and understanding, and ultimately adopting a comprehensive and adaptive water management strategy to address the current and future needs of the ACF Basin. Although this plan has not been codified, the ACFS created an exceptionally inclusive decision-making structure with which to move forward and beyond the existing deadlock to the fair and equitable allocation of the ACF waters. The methods of this stakeholder group, therefore, offer valuable transferable tools of consensus development and planning to regions where shared water resources are disputed by multiple sectors and priorities.

CASE STUDY QUESTIONS

1. How is the ecological and economic health of the southeastern United States inextricably tied together?
2. How does the overuse of water in one or more places in the basin threaten these interests?
3. The mission of the ACFS includes balancing "economic, ecological, and social values." Whose

social values are most important? How can they be balanced? Can they be compromised?

4. Can waters in transboundary basins be divided in a completely objective manner?
5. What standard would you use to compare the importance of the economy of Atlanta to the livelihood of the 14 families of oystermen in the Apalachicola Bay?
6. How would you explain to a stakeholder that water which runs to the ocean is not wasted?
7. Years of unproductive litigation failed to break the stalemate over allocation of shared ACF water resources, and poor attitudes and blame toward opposing water users were widespread but unproductive. What methods made the ACFS succeed where others failed?
8. What are the challenges of using these methods in other watersheds? Discuss this on sociopolitical and cultural levels.
9. How would water governance "by basin (ACF)" compare to the state-by-state governance that currently exists? What changes and challenges would ACF governance face?

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COMPETING INTERESTS

The author declares that no competing interests exist.

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SUPPLEMENTAL MATERIAL

Text S1. Teaching notes, suggested activities, photos, and links are submitted to enrich the use of this case study in a classroom setting.

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