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WHOSE WATER IS IT?

James E. Kundell

This summer, statewide water restrictions forced Georgians to realize the severity of almost three years of continuing drought. Lake levels sank, wells dried up, and other stresses on the water system began to show. In this article, environmental policy professor James Kundell—who is also science advisor to the Georgia General Assembly—discusses water allocation issues facing Georgia and identifies options for effectively addressing them.

When it comes to water, Georgia always has been lucky. This is because it receives an average of 50 inches of rainfall per year; has 70,000 miles of streams and rivers; and in South Georgia, contains one of the world's most prolific groundwater systems. Yet, major water allocation issues are emerging in all parts of the state—from interstate concerns regarding the rivers that we share with Alabama and Florida to overdraft of the Upper Floridan aquifer along the coast, from instream flow concerns throughout Georgia to irrigation groundwater withdrawals in southwestern Georgia. All across the state there are signs that we are stressing our water system in ways not previously seen or experienced.

MAJOR ISSUES

There are four major water quantity issues currently at the forefront. First is apportioning water with neighboring states. The interstate concern with water use in the Apalachicola-Chattahoochee-Flint River Basin and the Alabama-Coosa-Talapoosa River Basin is significant because it affects the water supply for the Atlanta metro area. Also significant is that this conflict—between Alabama, Florida, and Georgia—resulted in the first water compacts among eastern states to be established in nearly three decades, and if the water allocation formula is adopted, will determine how water is to be apportioned among the states.

The second issue relates to the saltwater intrusion problems along the coast. Overuse of water from the Upper Floridan Aquifer has allowed saltwater to to seep into the supply system in Brunswick, Savannah, and Hilton Head Island. Like the water conflict on Georgia's western border, this issue is interstate in nature. South Carolina is concerned that the withdrawals from the Upper Floridan Aquifer in Savannah contribute to the saltwater intrusion occurring at the north end of Hilton Head Island. Although the focus of this issue is groundwater use in coastal Georgia, the policies adopted for that region could set the precedent for altering water alloca-

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tion mechanisms for both surface water and groundwater statewide.

Third, how much water must be kept in the streams to protect water quality and aquatic systems? The Environmental Protection Division of the state's Department of Natural Resources has historically used what is referred to as 7Q10 as the minimum—a statistical estimate of the lowest average stream flow expected to occur for seven consecutive days during a 10-year period and equates to approximately 10 percent of the normal flow. DNR's Wildlife Resources Division argued that this level was insufficient to protect aquatic life and proposed a higher minimum flow be maintained. But if more water is maintained in streams during times of shortage, less is available to meet offstream demands.

The fourth issue concerns how to allocate water to competing users within the state. Can those who hold water withdrawal permits sell or transfer some of their permitted allocation to other water users? Although water rights in the West can be bought and sold, water allocations in the East historically have not allowed water permit transfers. Also, if addressing the saltwater intrusion problem requires a cutback in groundwater usage, shifting to surface water is a major alternative. Based on that premise, a private corporation applied for surface water withdrawal permits from three coastal rivers (Savannah, Ogeechee, and Altamaha) with the intent of treating the water and selling it to others, rather than using it directly. If permits were issued for the millions of gallons that the company had hoped would be allowed, a large portion of the unpermitted water in the three rivers would have been allocated to this private corporation, raising the policy concern that this would create an unregulated monopoly with the potential for rate gouging.

ALLOCATION DECISIONS

So how should water allocations be decided? Historically, the decisions have been based principally on who requests the use of water first—a very workable concept if there is excess water. As demands approach or surpass available supply, however, other options may prove more beneficial.

One option is based on the willingness of water users to pay for it—a market approach. This allows water to be used for the highest market value purposes, determined by how much users are willing to pay. Another alternative is based on how water should be used within an area, a plan that would evolve from a deliberate public process. Georgia seems to be moving in this direction through the river basin management planning efforts of EPD and the water plans it requires in some regions of the state. It should be noted, however, that these approaches are not necessarily mutually exclusive of one another, but, depending on which approach is dominant, the results could vary considerably.

These major water issues relate to the state's responsibility to manage the resource in trust for the people under the public trust doctrine. Traditionally, these uses for water have included navigation, commerce, and in some instances, public sewer system operations and fishing. Recently, the public trust doctrine has been increasingly applied to the protection of natural resources. Although the courts have not ruled on the matter in Georgia, managing water resources under the public trust probably will require explicit direction by the legislature, or, absent that, by the courts.

RIPARIANISM

Although water law in the eastern United States is derived from English common law, it changed over time as it adapted to needs and conditions. It was not until the 1830s that water law emerged as a distinct legal category, with separate doctrines for groundwater and surface water based on their differing characteristics. Despite this, the right to use a water resource was based on ownership of land abutting, adjacent to, or overlying the

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water source. (The term "riparian" is a general descriptor for the eastern approach to water allocation policy.)

Under the natural flow theory of the riparian doctrine that first governed surface waters, all riparian landowners had a coequal right to make use of the resource. However, water withdrawal was limited to that used for domestic purposes, and withdrawals for any other usage were considered a violation of rights of people who lived downstream. These restrictions were compatible with the prevailing needs for water at the time, namely, uses that did not diminish stream flow. As new industries developed and population increased, the needs and uses for water changed as well. This was reflected as the natural flow theory evolved into the reasonable-use theory, which allowed for a reallocation of rights to non-domestic uses as well as to a wide number of offstream consumptive uses.

Although the term "reasonable use" is found in both groundwater and surface water doctrines, it had a different meaning in each application. In the case of groundwater, reasonable use allowed landowners broad discretion in the use of water, but it restricted the export of water beyond the overlying lands if that export resulted in harm to the land. The adoption of this rule was based, at least in part, on the fact that municipalities were pumping water from outlying lands to utilize within their jurisdictions. Nonetheless, reasonable use of groundwater meant that landowners could make unlimited withdrawals, even though it affected others negatively. In the case of surface water, reasonable use referred to the right to use the resource relative to reasonable use by other riparian landowners.

The impetus to develop new water policies today continues to be driven by these same forces. As the demand for water increases, demands that were once compatible come into conflict. Today, water uses that must be accommodated include agriculture, industry, public water supplies, recreation, transportation, and the protection of water levels sufficient to maintain and enhance ecological systems and protect water quality and water supply sources. These competing uses bring individual stakeholders as well as regions, states, and nations into conflict over common sources such as rivers and aquifers.

WATER MANAGEMENT

In an effort to address the inadequacies in water policy based on common law doctrines, recent changes in water law focused on establishing administrative permitting programs, which use limited duration permits to control water use and allocate it among competing users. Under administrative permitting, rights to use water derive not from ownership of associated land but from permits based on statutes and regulatiions.

States have taken two approaches to permitting: comprehensive permitting and selective permitting. Under the first type, all withdrawals above a certain threshold must be permitted. Under the second approach (also called targeted regulatory intervention), permits are required only for certain circumstances, types of water resources, or geographic areas. Water permit programs differ not only in the extent to which they replace riparian rights, but also in numerous characteristics such as

- permit duration;
- exemptions for certain categories of uses;
- whether they include groundwaters and/or surface waters;
- gallons-per-day level at which permitting is required;
- priorities of use during shortage;
- whether permits apply to actual use or capacity for use;
- whether permitting is coordinated with other regulations, such as those governing land use;
- the geographic scope of coverage; and
- regulations governing interbasin and interstate transfer of water.

All across the state there are signs that we are stressing our water system in ways not previously seen or experienced.

Exerpt from **"Connecting with the World: Georgia Enters the Third Millennium"**
by Suzanne A. Lindsay , *Georgia Business and Economic Conditions*, November-December 1999

Water Woes

Another very powerful force is affecting economic development statewide: the supply and purity of fresh water. The entire state will share this concern.

In the 1960s and '70s, the state's water supply was considered inexhaustible. Population growth, urban and commercial development, and much more pumping from the aquifers, now mean that Georgians must think carefully about how much water is available where and who uses how much of it. Water woes include droughts that already threaten surface sources and periodically limit non-essential uses in many metropolitan counties. Along the coast, salt water intrusion into aquifers threatens water quality and could limit growth. The decade-long "water wars" with Alabama and Florida over quality and flow through two shared river basins will be another complication. Seven years of negotiations under federal auspices have yet to produce a solution, and time is running out on a temporary three-state compact.

Few of the smaller water reservoirs already authorized are complete. Communities near the state's existing large reservoirs will worry about keeping their withdrawal rights, providing enough water to attract industry and new residents, and preventing pollution from existing industries and homes. Some effects of "water woes" are indirect. For example, deepening the channel into the port of Savannah may harm nearby fresh-water and brackish marsh reserves. Many industries along the river also depend on a regular, substantial flow of fresh water that would be endangered if salt water moves upstream.

All of these questions and problems may be expected to continue well into Georgia's future. Assessing ecological impacts carefully, maintaining watersheds, preventing pollution from all sources, and emphasizing conservation and creative reuse all can help to deal with a true limit to growth in the Third Millennium.

Georgia and Florida are among ten states with comprehensive water permit programs. In these states, withdrawals of both groundwater and surface water exceeding a certain threshold (varies by state) must be permitted. Most permitting programs, however, exempt certain water uses, either to simplify administrative procedures or because a particular use is not significant. For example, small uses are generally exempt because of their limited impact. In addition, some states grant categorical exemptions for larger interests that they consider entitled to special status or of particular importance to the state. Exemptions may also at times be granted to those interests that prove particularly able to influence the political process.

Nonetheless, these exemptions impede the ability to accurately define existing water supplies; and make it difficult—if not impossible—to control conflicts that occur between unregulated users as well as those that occur between regulated and unregulated users. Categorical exemptions also compromise the ability to allocate water within the context of overall resource supply and limits. The exemption for agriculture is a good illustration, although Georgia eliminated its agricultural exemption in 1988.

ALTERNATIVES

Obviously, administering and enforcing water management programs is costly, so states continue to seek alternatives to these regulatory approaches. Market-based water rights transactions (already used extensively in the West) and user fees could be helpful in this part of the country. In fact, market-based plans have been applied successfully in restructuring water rates to en-

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Drought Bob

Drought is the stealth bomber of natural disasters. It sneaks up on you. It's subtle. It catches you frequently unaware, when your defenses are down. It doesn't come roaring at you like a tornado or hurricane. It doesn't grab hold of you and shake you to the bones like an earthquake. It doesn't spew forth telltale smoke and gases like a volcano. It just slowly, insidiously does its thing. And, it's devious. Most commonly, it sets the stage, leaving the havoc wreaking to others—it stresses organisms and systems so that other agents can play their role: fire, disease, insects, hunger.

Because it tends to skulk in the background of our consciousness—it is not an "in your face" type of natural disaster—drought doesn't make dramatic news. You don't see heros saving people from a roaring river; or heros digging through rubble to save victims of an earthquake. You may see them fighting wildfires but then that's a wildfire, not a drought. With a drought, the true heroes are those who persevere—those who conserve water, not because of watering restrictions or bans but because it's the thing to do. That is not the stuff of newspaper headlines and evening news.

Drought plays mind games with you. It may let a little rain fall to make you think it has gone away, but it hasn't; it continues; it lingers. But many people believe that if you get one rainfall, the drought is over, or at least they hope it's over.

Droughts are so subtle that we don't name them. We have Hurricane Floyd, the San Francisco earthquake, the Mount St. Helens eruption, but we don't have Drought Bob or Heather or Atlanta. Yet, the most expensive weather disaster in the history of the United States was not Hurricanes Andrew or Hugo or Floyd; it wasn't the Oklahoma City tornado; it was the drought of the late 1980s. That nameless drought is estimated to have cost the United States $39 to $40 billion. And, our current drought may surpass that.

To really bedazzle us, droughts may appear in different guises. They may appear in the form of less snow pack in the mountains or diminished aquifer-recharging winter rains. Nor do droughts affect us uniformly. In the Southeast, we are entering the twenty-eighth month of this drought. It effectively stopped raining in May 1998. In Georgia, we average about 50 inches of precipitation per year, but parts of the state are down almost that much during the drought. In a little over two years, some areas have missed nearly a year's worth of rain. Statewide we are over 20 inches below normal for the period.

■ The drought has kindled forest fires that have burned thousands of acres and closed interstates because of smoke-reduced visibility. It has caused sinkholes to swallow houses. It has cost farmers their crops and forced them to sell livestock prematurely and at lower prices.

■ The drought has resulted in loss of pulp and timber production—through fire, dying trees, and lack of growth. It has stressed urban and suburban trees, lawns, and shrubs—and the people who nurture them.

■ The drought has caused wells to go dry. It has forced a reduction in hydroelectric power production and resulted in increased power bills to pay for the electricity purchased from other sources. It has cramped water-based recreation activities. It has hampered navigation. It has caused the loss of wetlands, destroying habitat for many species.

■ The drought may cause rivers, streams, and reservoirs to go dry, due to limited rainfall and increased withdrawals to meet our growing demands for water for public supply, industrial uses, and irrigation.

To make matters worse, this drought is

coupled with higher temperatures. The "dog days" of summer came early this year, producing the warmest spring on record in the U.S., and the decade of the '90s was the warmest decade on record, resulting in higher evaporation loss and less usable water than the precipitation figures alone would suggest.

In the Southeast, we're faced with a double whammy. On one hand, we have the combined effects of El Nino and La Nina producing unusual weather conditions and, on the other hand, we have our normal Bermuda High, which causes storms from the Gulf of Mexico to bypass us and head to the Northeast.

Governors across the country have sought drought relief (appealing to Washington if not Mother Nature), having all or portions of their states declared disaster areas. All of Georgia has been declared a disaster area by the Secretary of Agriculture, we have statewide restrictions on outdoor watering for the first time ever, and the Georgia Emergency Management Agency is gearing up to provide aid to communities which have water supply problems.

Isn't it a classic example of a "rock and a hard place"when you hope you get hit by a hurricane in order to gain drought relief? But, increasingly, that is where we are. We're quickly reaching the point of believing that stormwater is better than no water at all.

In the past six years, Georgia has experienced a 500-year flood, a 100-year flood, and what is shaping up to be our worst drought on record. Together these weather events should serve as a wake-up call. We don't know if they are aberrations or indicators of more erratic future weather patterns. But, whatever they are, they send a clear signal that we should put in place policies and programs that will better prepare us to deal with the "Water World" of the future, whatever it may be. ■

Based on James Kundell's presentation given at the National Conference of State Legislatures annual meeting in Chicago on July 16, 2000.

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courage conservation. Water rates can be designed to have an increasing, decreasing, or uniform rate structure. In a decreasing rate structure, the cost of each unit of water decreases as consumption increases. In a uniform rate structure, costs remain uniform regardless of the amount used. In an increasing rate structure, the unit price of water increases as consumption increases.

Increasing rate structures are designed to create a monetary incentive for water conservation. When water prices increase, consumption declines; however, the decline in use usually occurs more slowly than the rise in rates, resulting in increased revenue per unit of water. Therefore, increasing rates have the potential to decrease consumption while increasing revenue. In addition, by decreasing demand, higher rates can help to eliminate or delay the need to increase the capacity of water facilities.

One problem with measuring the effectiveness of increasing rate structures has been that they often occur simultaneously with other water conservation measures. In 1991, a study was begun in Spalding County, Georgia, to isolate the effects of increasing rate structures through their adoption, independent of any other conservation efforts. When decreasing rate figures for the years 1989-1990 were compared with increasing rate figures for the years 1991-1993, a 5 percent drop in per capita use was detected under the increasing rate structure.

As of 1990, the Southeast had the highest regional percentage of increasing rate use, with 25 percent of systems using this rate structure. In a 1992 survey of Georgia, it was estimated that 51 percent of the state's systems used a uniform rate structure, 33 percent used a declining rate structure, 9 percent still used a flat or unmetered rate, and 7 percent used an increasing rate structure. The Atlanta Regional Commission has suggested that water suppliers employ at least a uniform rate structure; and in addition, they recommended seasonal surcharges to offset the increase in consumption that results from the seasonal use of outdoor irrigation systems.

Although changes in rate structure can affect conservation and provide additional revenue, the revenue generated goes to the service provider (i.e., local government, water authority, or private provider). These funds

do not suppport state administrative efforts. In recent years, states and the federal government have experimented with user and permit fees as the means for tying the cost of administering a program to those benefiting from it.

In Georgia, user fees in the form of parking fees have been adopted for state parks. In addition, in an attempt to alleviate water pollution, a $1-per-tire disposal fee is attached to scrap tires to pay for the cost associated with cleaning up tire piles and ensuring that discarded tires are handled appropriately.

GEORGIA'S WATER RESOURCES

Georgia is at the forefront of eastern states in addressing water issues, principally because of its demographic and hydrological situation. The state is a water resources paradox. On one hand, it receives on average about 50 inches of precipitation each year, ranking it fifth among states in average annual rainfall. Even though most of this (about 70 percent) is returned to the atmosphere through evaporation and transpiration from plants, it still leaves about 15 inches to meet our needs. On the other hand, water problems are evident throughout the state. This paradox is not only the result of increasing water demands fueled by population and economic growth, but also the uneven distribution of water users and water resources.

Based on water resources, the state can be divided into two regions: North Georgia, characterized by greater dependence on surface water, and South Georgia, where larger users depend principally on groundwater. Of the two regions, North Georgia is more vulnerable to water problems. This is due to four factors:

- The major urban/industrial region of the state is in North Georgia and creates a high water demand.
- Limited groundwater is available because of the hard, compact, crystalline rock that underlies much of the area. Certainly, groundwater accounts for considerable water in the region, but its use is generally limited to individual wells and small water systems.
- Limited surface water is available because the small streams that support the region are formed in the region. Essentially, no streams flow into Georgia. They originate within or along the state's boundaries, primarily in North Georgia, and flow southward. In addition, a major river basin divide is located in metro Atlanta. Water falling to the north and west of that divide flows toward the Gulf of Mexico, and water falling to the south and east of the divide flows toward the Atlantic Ocean. The Chattahoochee Basin, which directly or indirectly provides drinking water for over half of Georgia's residents, is the smallest river basin providing most of the water supply for any major metropolitan region in the country.
- Limited natural storage of surface water exists in North Georgia because the area is geologically old and the natural barriers that would impede the flow of water have been eroded away. Consequently, there are no natural lakes in North Georgia; and the lakes that exist are manmade reservoirs. As a result of these factors, there is limited natural storage of either surface water or groundwater in this high water-use region.

South Georgia, by contrast, has large quantities of groundwater as well as larger rivers than those in the northern half of the state. The region depends, however, on the high quality and widespread availability of its groundwater. If too much groundwater is withdrawn from one place at one time, however, problems result either in the form of water level declines or salt water being drawn into the pumping zone.

WATER WARS

The term "water wars" applies to issues in two river basins: the Alabama-Coosa-Tallapoosa (ACT) in Alabama and Georgia, and the Apalachicola-Chattahoochee-Flint (ACF) in Alabama, Georgia, and Florida. Both of these basins originate in North Georgia and have a common boundary of approximately 233 miles. Both basins have undergone extensive water resource development in the form of multiple-purpose reservoirs by the U.S. Army Corps of Engineers and nonfederal interests, such as Georgia Power Company. There are 10 Corps reservoirs and 21 nonfederal reservoirs in these river basins.

Considerable growth in the Atlanta metropolitan area, which is located near the upper portion of both the ACF and ACT river basins in Georgia, has exacerbated the interstate controversy over water resource management. In June 1983, the governors of Alabama, Florida, and Georgia and the Corps of Engineers legally agreed to develop a water management system for the ACF basin. Around that time, in response to several North Georgia communities, the Corps proposed reallocation of storage in three reservoirs from hydropower to water supply. (Although state law determines how water is allocated to users, the Corps allocates water storage capacity in its reservoirs for different uses. Consequently, reallocation of water storage capacity in Lake Lanier, Lake Alatoona, and Carters Lake from hydropower to water supply would allow water to be released from the lake and used by communities downstream.)

In June 1990, the state of Alabama, concerned about the downstream and cumulative impacts of proposed and potential future water resource actions, filed a U.S. District Court suit challenging the adequacy of the Corps' environmental impact documentation that related to the proposed reallocations from federal reservoirs. Almost two years later, after lengthy negotiations, the three states and the Corps agreed to work together as equal partners to resolve the water resource issues. Finally in late 1996, two interstate compacts were drafted, one for each river basin. Signed into law in 1997, the ACT compact is between

Alabama and Georgia, and the ACF compact includes Alabama, Florida, and Georgia.

Without question, entering into river basin compacts with our neighboring states has major significance for Georgia. Not only will it directly determine how the waters in the ACF and ACT systems are apportioned among the states, it will likely determine how we work with neighboring states regarding other shared water resources such as the Savannah River, which we share with South Carolina.

COASTAL SALTWATER INTRUSION

Concern over industrial and municipal groundwater use along Georgia's coast is not new. In fact, it was this concern that led to passage of the Ground Water Use Act of 1972, which established a permitting requirement for those users withdrawing in excess of 100,000 gallons of groundwater per day. Although this program has been in place for a quarter of a century, South Carolina and Georgia are trying to see what additional steps are necessary to prevent saltwater intrusions. South Carolina is concerned that heavy withdrawals in the Savannah area are contributing to the saltwater intrusion in the Upper Floridan Aquifer near Hilton Head Island. In addition to this threat, Brunswick has experienced salt water from a deeper zone moving up into the previous fresh water zone and contaminating wells.

To address these coastal area worries, the EPD established interim guidelines for groundwater management in the 24-county area of Georgia's southeast coast. Chief among the guidelines are pumping limits that stipulate that within Chatham (Savannah) and Glynn (Brunswick) counties and portions of Bryan and Effingham (suburban Savannah) counties, no additional Upper Floridan Aquifer withdrawals above current production levels will be allowed. Outside these capped areas, the strategy allows for a maximum increase of 36 million gallons per day in water use from places with minimal impact on intrusion. In Chatham County, pumping will be reduced by 10 million gallons per day through conservation and use of surface water to replace groundwater.

Obviously, the caps on pumped water affect the coastal region's four major pulp and paper companies (Georgia Pacific in Brunswick, Gilman Paper Company in St. Marys, ITT Rayonier in Jesup, and Union Camp in Savannah), so each has committed $500,000 per year to finance ongoing research that they hope will result in sustainable groundwater policies, which are slated to take effect by 2005.

When it became apprarent that new users would only be permitted to use surface water, a private company—The Savannah Group Water Services (TSG)—submitted permit applications to withdraw water from three rivers in the coastal area. They planned to treat it and then sell it to local community and industrial customers. The initial permit requests raised much public outcry, however, because the large amounts of water to be withdrawn would have tied up most of the available (presumably) surface water in the coastal region, more than is used by any single city or indisturial facility along the coast. The perception was that TSG was attempting to monopolize all the unallocated surface water in the three river basins, with the potential for rate gouging in the future.

Isn't it a classic example of being between a "rock and a hard place" when you hope you get hit by a hurricane in order to gain drought relief?

RECOMMENDATIONS

As the preceding discussion shows, Georgia is faced with significant water allocation issues. Thus it is crucial that the state's administrative powers review the current methods for allocating water to competing users within Georgia, and determine what additional measures are necessary, particularly in areas where water is already allocated to the limits the resource can tolerate.

As demands on this vital resource increase, the need for more precise information on the nature of the water resources, as well as on water usage and discharge, also increases. This will require additional monitoring, reporting, and resource analysis and the expanded capability to apply this information to support sound water policy decisions. Not only does this mean more precise accounting for agricultural water uses, it also means better data on natural limits and the resources capacity to provide water.

Further, we must think more about how we can use water effectively. This requires water resources planning. In addition to the EPD's river basin management plans, it is increasingly important for local governments to develop watershed management plans. Finally, it is vital for Georgians to think regionally in terms of water. River basins and watersheds do not recognize jurisdictional borders. Although our topography and geology do

not create natural regional features around which we could develop a regional water management approach, some form of regionalization might be beneficial for water management purposes. Not only would enabling legislation be necessary for this to occur, but that legislation must be flexible enough to meet the varying hydrologic, geographic, environmental, and socioeconomic conditions in different parts of the state.

Georgia is in a transition period. How we managed our water resources in the past will not be how we manage them in the future. To minimize the problems associated with this transition, it is important to approach water management issues thoughtfully, based on the best science we can generate, in order to effectively, equitably, and openly address the issues.

To learn more about these crucial issues, see the full research report titled "Whose Water Is It? Major Water Allocations Issues Facing Georgia," by James E. Kundell and Diana Tetens, published by the Carl Vinson Institute of Government at The University of Georgia.

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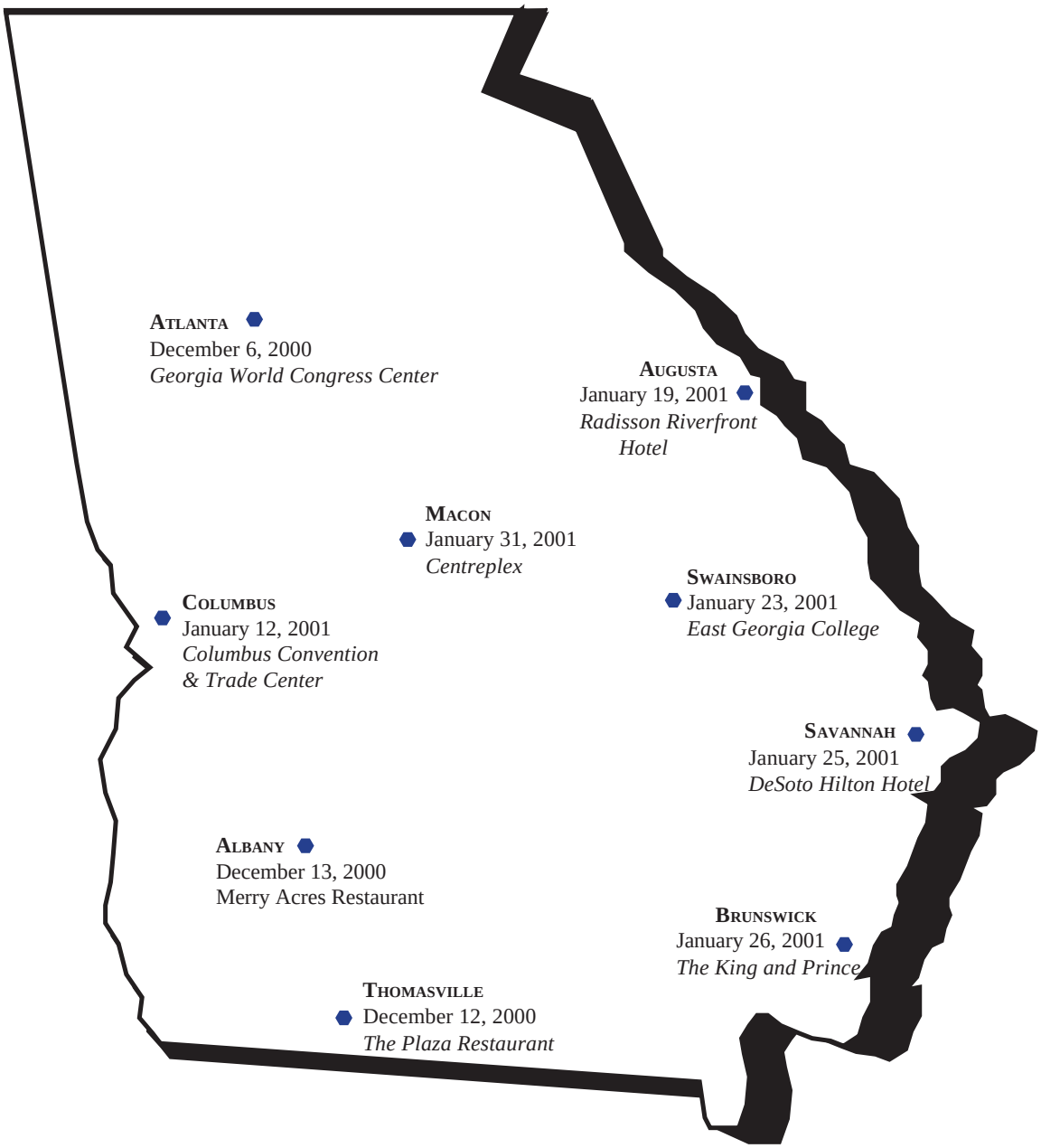

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