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The High Cost & High Risk of Water Supply Reservoirs in the Southeast

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We all need clean water. Securing reliable supplies of clean water for today and the future is a critical concern for communities across the country, and particularly in the Southeast where communities are grappling with water scarcity issues more than ever before. In a regional landscape defined by recent extreme droughts and continued conflict over water supply—and in the context of public budgets stretched thin—many communities are challenged to find the best way forward.

The Southeast must find a way forward that will secure clean water supplies without bankrupting our communities, drying up downstream neighbors, and leaving ourselves vulnerable to extreme and prolonged drought. As we face an uncertain future, our communities deserve 21st-century solutions, not ones that rely on outdated models from yesteryear.

And yet, when searching for solutions to today's water supply challenges, many communities reach reflexively for dams and reservoirs. Many leaders perceive reservoirs as a historically proven way to secure new water, but looking in the rearview mirror is not the most prudent way to navigate the terrain ahead. The assumptions underlying new reservoir development—plentiful and predictable rainfall, uncontested access to the water flowing in the contributing rivers, federal largess or other substantial financial resources—are outdated. A variety of factors have moved reservoirs to the bottom of the list of water supply options for Southeastern communities.

The region has many more expedient, lower cost, lower-impact solutions at hand, and the risks inherent in new reservoir development in the region are becoming more and more apparent.

Communities are finding that financing expensive water projects can be the local government equivalent of buying more house than your family can afford. This **financial risk** can result in local governments going underwater with reservoir debt, leaving taxpayers and ratepayers saddled with a debt burden that prevents investment in other essential services.

Meanwhile, in an increasingly drought-stricken region, damming streams and rivers is less and less logical: if the water isn't going to be there to flow into a storage reservoir, it is of limited use. This **water resource risk** is further complicated by the competing demands of agriculture, energy production, population growth and the water needs of communities upstream and downstream throughout any given river basin.

While reservoirs have been an important water supply strategy in decades past, circumstances have changed. The financial and resource risks no longer justify their being the first choice for securing reliable, cost-effective clean water supplies. And while there is no one-size-fits-all water supply solution—no panacea—what is clear is that new dams and reservoirs should be the last, not the first, water supply option for communities.

In this report, we outline five financial and resource-related risks tied to the pursuit of water supply reservoirs, document the lessons learned in recent years from financially difficult projects, and offer five key recommendations for a more prudent path forward.

This report shines a spotlight on recent water supply reservoir projects in Georgia that provide cautionary tales of communities burdened by expense and debt, and leaving taxpayers and ratepayers scrambling to escape a seemingly bottomless money pit. One notable example is the new Hickory Log Creek Reservoir in Canton, Georgia, which quintupled in price to $100 million during its development.[i] Though built, as of this writing the project remains far from complete, as its sponsors lack authorization to use its water—and may even have to construct a pipeline which could add yet another $100 million to the project's cost.[ii] Meanwhile the City of Canton is scrambling to find a way to sell off its share in the reservoir to ease an unplanned-for financial strain. The reservoir's debt burden has prevented the town from addressing basic community needs such as paving streets and buying fire trucks.[iii]

Despite the warning signs at Hickory Log Creek and elsewhere, there are still a growing number of new reservoir proposals in Georgia and neighboring states. In Georgia alone, there are over 20 additional proposals currently on the drawing boards, including seven in which proponents have applied formally for federal and state permits to dam rivers and streams.

> Communities are finding that financing expensive water projects can be the local government equivalent of buying more house than your family can afford.

One example of a risky reservoir proposal is in the headwaters of the highly contested Chattahoochee River basin. There, Hall County, Georgia has proposed—at a $290 million early cost estimate—a 72.5 million-gallons-per-day (mgd) water supply/amenity reservoir on the site of the Glades farm.[iv] Elsewhere in Georgia, the recent statewide water planning process has yet again identified the main stem Flint River as the site for a massive reservoir. At the size described in some planning documents[v], this 390-mgd project could easily cost $4 billion.[vi] Collectively, Georgia reservoir proposals on the drawing boards could cost at least $10 billion in taxpayer and ratepayer dollars.[vii] Other Southeastern states, meanwhile, are gearing up to follow Georgia's path.

HICKORY LOG CREEK RESERVOIR—CANTON, GEORGIA
Photo by Ben Emanuel

These recent and proposed projects highlight the following five risks inherent in the pursuit of water supply from new reservoirs:

- Reservoirs are highly expensive, **racking up debt** for ratepayers and taxpayers.
- A reservoir's price tag is typically a **moving target**.
- Reservoir financing plans often rely on **inflated population growth projections**, ultimately leaving existing residents holding the bag.
- A reservoir is **weather-dependent infrastructure** and an evaporation pool.
- Reservoir water is a **contested resource** subject to competing demands in the river system.

We offer five key recommendations for local leaders who seek to reduce their communities' risks—both financial risks and closely linked water resource risks—in planning for enough clean water for the future:

- Optimize existing water infrastructure first.
- Plan for water use to decrease as a community grows.
- Pursue flexible water supply solutions.
- Demand accurate assessments of costs.
- Examine water availability to minimize resource risks.

As communities endeavor to find ways to secure water supplies, it is critical that decision-making add to a community's flexibility and resilience. The high-price, high-risk water supply reservoir strategy can leave a community financially vulnerable, tying up assets and leaving taxpayers and ratepayers on the hook without a guarantee that the water will be there when they need it. There is a more prudent and proven path to providing water supply and ensuring flexibility for the future, one rooted in stewardship of public dollars and natural resources both.

We all need clean water. As Southeastern communities move forward to develop strategies to meet tomorrow's needs, the communities that choose a prudent path will be better positioned—from both a financial and water resource perspective—to address the needs of today and the future.

Find this report and more resources online at **www.AmericanRivers.org/MoneyPit**

The Pursuit of Clean Water

Communities across the United States are struggling to secure reliable supplies of clean water for today and the future. In the Southeast, the challenges of water scarcity are on the rise as demands on the region's freshwater resources collide with increasing extremes in weather and tight public finances. These factors create a perfect storm and, taken together, require a new approach to developing water infrastructure and securing clean water supplies.

In seeking to address these challenges and ensure enough clean water for our communities, many leaders reach reflexively for reservoirs as a way to ensure water supply. Rather than reaching first for reservoirs, however, leaders should reach for them only as the last option on the list. In the Southeast, there still remain many other proven, lower-impact, lower-risk, more cost-effective and expedient options for securing water supply. There is still "low-hanging fruit" for communities to take advantage of *before* pursuing new high-risk reservoirs.

Some local government leaders have found recently that paying down the debt on a major engineering project like a new reservoir is beyond the financial capability of their communities. Borrowing large sums to finance projects, a community's leaders can all too easily dig a hole that burdens local taxpayers and water ratepayers with needless debt. Doing so ties a local government's hands, constraining its ability to deal responsibly with other essential needs and services. And it hurts local residents, whose water rates and taxes must pay back millions and millions in principal and interest. This **financial risk** inherent in reservoir-building can be the local government equivalent of buying more house than your family can afford.

Further complicating the search for secure and reliable clean water supplies is that the Southeast is experiencing more frequent and extreme drought, and it is predicted that this trend will intensify in the region over time.[viii] This **water resource risk** is compounded by the competing demands of agriculture, energy production, population growth and upstream and downstream communities.

Today's strains on both public finances and water resources mean that the financial risks for communities building new reservoirs are grave and are growing. Over time, water supply reservoirs are becoming more expensive to develop, their costs more difficult to control. And yet, despite these warning signs, there is momentum across the region for this reckless reservoir boom to continue and for communities to continue down this path of significant financial and resource risk.

More than any other state in the region, Georgia has seen a boom in reservoir projects in recent years. Georgia communities have spent many millions on reservoirs, and projects presently on the drawing boards show a trend toward high costs and big risks. This is despite the warning signs from projects that have created financial problems for the towns, counties and water utilities sponsoring them—financial problems that have fallen on the residents, businesses, water ratepayers and local taxpayers in these communities.

Two recent projects in particular—Hickory Log Creek Reservoir and the proposed Hard Labor Creek Reservoir, both profiled in this report—stand out as stark cautionary tales for other communities considering their water supply options. These appear as warning flags in an emerging and ominous trend, with billions of dollars of public spending currently proposed for reservoirs throughout the Southeast.

In Georgia there are seven water supply reservoirs in the federal permitting process (two in the heavily contested Chattahoochee River basin near Atlanta), and twice as many concepts for new water supply reservoirs in various government planning documents.[ix] The state's recently completed regional water planning effort, for example, cites a need for additional reservoir storage throughout much of the state. Notably, some regional water plans include references to a 65-year-old proposal to dam the upper Flint River, dating back to a time long past when federal largesse helped build massive water projects. Described in more detail in a 2008 draft water plan, **this proposed 390-mgd main stem Flint River reservoir could have a price tag of $4 billion.**[x]

What would be the total combined cost of the new reservoirs proposed in Georgia? The chart below shows rough low-end and high-end likely costs for these projects. These figures are based on a general cost range for reservoirs from $4 million to $10 million per one million gallons per day yield, cited in a 2008 report for the Georgia Environmental Finance Authority.[xi]

Collectively the new water supply reservoirs proposed in Georgia could easily cost at least **$10 billion in taxpayer and ratepayer dollars.** And other states in the Southeast appear to be gearing up to follow Georgia's high-cost, high-risk path.

Table 1.1: Proposed Georgia Reservoirs—Projected Costs

Proposed Reservoir	**Location**	**Proposed Yield** (million gallons per day)	**Low-End Likely Cost** (at $4M per 1 mgd yield)	**High-End Likely Cost** (at $10M per 1 mgd yield)	**Published Cost Estimate** (million dollars, if available)
Hard Labor Creek	Walton County	42 mgd	$168M	$420M	$350M
Bear Creek - Newton County	Newton County	28 mgd	$112M	$280M	$63M
Bear Creek - South Fulton	Fulton County	16.4 mgd	$66M	$164M	$131M
Glades Reservoir	Hall County	72.5 mgd	$290M	$725M	$290.5M
Indian Creek	Carroll County	18 mgd	$72M	$180M	$99M
Parks Creek	Jefferson	4 mgd	$16M	$40M	—
Richland Creek	Paulding County	35 mgd	$140M	$350M	$86.4M
Russell Creek expansion	Dawson County	11.5 mgd	$46M	$115M	$30M
Calhoun Creek	Forsyth County	47.5 mgd	$190M	$475M	$156M
Etowah River basin reservoir	Fulton County	30 mgd	$120M	$300M	—
Flint River main stem	West-Central GA	390 mgd	$1,560M	$3,900M	—
Ocmulgee River basin reservoir	Henry County	13 mgd	$52M	$130M	—
Shoal Creek	Dawson County	100 mgd	$400M	$1,000M	$650M
Whitewater Creek	Fayetteville	4 mgd	$16M	$40M	—
"East of Gwinnett County" (generic)	Northeast GA	50 mgd	$200M	$500M	—
"Northwest of Forsyth Cty" (generic)	North Georgia	85 mgd	$340M	$850M	—
Sandy Creek	Coweta County	unknown	—	—	—
City of Auburn reservoir	Auburn	unknown	—	—	$7.5M
Bannister Creek	Forsyth County	unknown	—	—	—
Mulberry River	Braselton	unknown	—	—	—
Barrow County (site TBD)	Barrow County	unknown	—	—	—
Beach Creek	Haralson County	unknown	—	—	—
Collectively the new water supply reservoirs proposed in Georgia could easily cost at least $10 billion in taxpayer and ratepayer dollars. (Sources of figures appear in endnotes.)			**Total Low-End Likely Cost* $3.8 billion** *known yields only — actual figure higher	**Total High-End Likely Cost* $9.5 billion** *known yields only — actual figure higher	

There remains a strong trend toward pursuing water supply reservoirs across the Southeast. Georgia Governor Nathan Deal initiated a $300 million state taxpayer-financed fund to provide loans and grants for reservoirs in 2012[xii]. North Carolina has just two water supply reservoirs in the permitting process, but recently passed a law intended to streamline and facilitate the permitting of water supply reservoirs.[xiii] Lastly, the State of Alabama, which currently has no water supply reservoirs in the permitting process, has indicated that it would likely pursue expensive water supply reservoir infrastructure as a solution to the ongoing interstate water conflict in the region.[xiv]

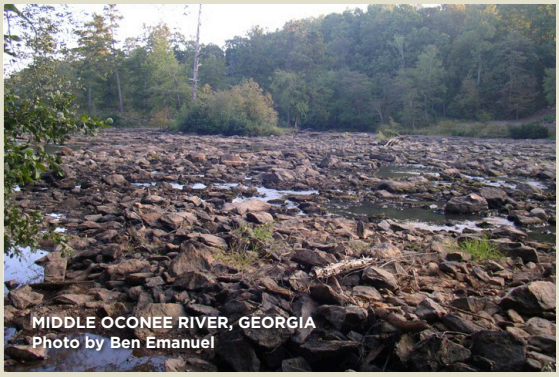
Southeastern communities, though, must tread cautiously, rather than turning immediately to expensive and risky infrastructure and engineering to meet the region's water challenges. There is a better path forward, through an approach rooted in prudence, flexibility and resilient water supply strategies. An honest assessment of a full range of water supply alternatives—and their costs to the public—is a must for a community considering its water supply options. Moreover, local leaders must decide whether to go down the path of significant debt, financial risk and resource risk—despite the dangers and lessons of recent reservoirs—or choose a more flexible, cost-effective, reliable alternative such as water efficiency, green infrastructure, reservoir reallocation and other proven lower-impact supplies.

How Reservoirs Damage Rivers and Streams

Reservoirs are created by damming healthy, free-flowing rivers and streams. Rivers and streams are naturally designed to flow, and dams disrupt the valuable natural functions of river systems. Few things have such a fundamental impact on a river system as a reservoir. Reservoirs block water flow and can harm clean water, fish and wildlife, and recreational opportunities.

Rivers are nature's transportation systems, moving soils, plants and animals; building a reservoir essentially shuts down this movement. The creation of an unnaturally large pool means that sediments and nutrients critical for downstream areas settle out of the water and collect in the reservoir, the water loses oxygen that is critical for fish and wildlife, and the large pool changes the water's temperature, over-heating the surface and super-cooling the depths of the reservoir. The nutrients trapped in the reservoir can cause algal blooms that can threaten human health, clean drinking water supplies and wildlife.

Free-flowing, ecologically healthy rivers have flows that vary throughout seasons and years. This natural variation is critical to protecting and supporting the natural communities that live in and along the river. Reservoirs and the water withdrawals to fill reservoirs alter flows downstream, often decreasing the volume of water and changing the natural variability of flows. Evaporation from a reservoir's surface creates a permanent net loss of water to the river system, meaning there is less water for downstream needs.


MIDDLE OCONEE RIVER, GEORGIA
Photo by Ben Emanuel

Reservoirs and water withdrawals to fill reservoirs often decrease river flows downstream. In extreme drought, they can run rivers dry. Above: Middle Oconee River downstream of withdrawal for Bear Creek Reservoir—Athens, Georgia, October 2007.

Reservoirs destroy the rivers and streams they are built upon, and cause significant harm to the rest of the river system. On the other hand, free-flowing, ecologically healthy rivers provide many benefits to the environment, the economy and quality of life. They support fish and wildlife, generate economic benefits through recreation and tourism, provide natural flood control, and serve as an attraction for new businesses and residents. Healthy rivers are essential to ensuring water availability for communities at present and in the future.

Five Water Supply Reservoir Risks

The growing Southeast regional trend toward putting more and more of the public's money on the table for risky water supply reservoir ventures is a disturbing one for local residents, businesses and government leaders alike. Too many communities are investing too heavily in new reservoirs, rather than treating them as a last resort.

There are clear pitfalls in pursuing the reservoir path to secure water supply without exhausting other options first. Given the growing financial risk related to water supply reservoirs and their inflexibility in the face of the water resource challenges ahead, building dams should be the last option that communities reach for in order to address their water supply needs effectively—not the first. Detailed here are five key risks inherent in the pursuit of water supply from new dams and reservoirs:

1 | Reservoirs are highly expensive, racking up debt for ratepayers and taxpayers.

The cost per gallon of water from a reservoir can be significantly higher than the cost of other water supply strategies. Part of the reason for the high price tag is that a supply-side solution such as a reservoir requires additional infrastructure investments such as drinking water and wastewater treatment plants to make the reservoir and its water available for use. The reservoir alone has significant costs as well, including land acquisition, planning, permitting, construction, and mitigation.

Perhaps more important, financing a sizable capital project such as a reservoir requires a community to buy in up front by borrowing heavily, sometimes to the tune of hundreds of millions of dollars. Meanwhile, course corrections are very difficult once a community has committed financially to a reservoir-building path. A community can find itself going under water with reservoir debt if costs exceed its financial capabilities.

TABLE 2.1: Comparison of Initial Capital Costs of Water Supply Strategies

Type of supply	Cost range per 1 million gallons per day (mgd) yield
Reservoirs	$4 million - $10 million/ mgd[xv]
Water Reuse	$1.4 million - $11.2 million/ mgd[xvi]
Efficiency & Conservation	Up to $2.5 million/mgd[xvii]

Listed here is a selection of some of the highest-cost reservoir proposals in the Southeast today. These are real-world examples that every decision-maker considering a reservoir should be aware of. Notably, some of the projects would exceed even the high-end cost range for reservoirs cited in Table 2.1.

TABLE 2.2: The High Cost of Reservoir Water: Proposed Projects

Proposed Reservoir	Location	Yield	Projected Cost	Projected Cost per 1 mgd
Dawson Forest-Shoal Creek	Dawsonville, Georgia	80 mgd[xviii]	$650 million[xix]	$8.1 million/mgd
Hard Labor Creek	Walton County, Georgia	42 mgd	$350 million[xx]	$8.3 million/mgd
"C-51" Reservoir	West Palm Beach, Florida	185 mgd	Up to $1.05 billion[xxi]	Up to $5.7 million/mgd
Little River	Raleigh, North Carolina	13.7 mgd[xxii]	$263 million[xxiii]	$19.2 million/mgd

"This reservoir, as currently proposed, represents a significant expense on the part of Hall County and, as far as I can tell, there is limited comment on exactly who will pay this expense. ...I am concerned that this burden will fall on either Hall County taxpayers or City of Gainesville water customers."

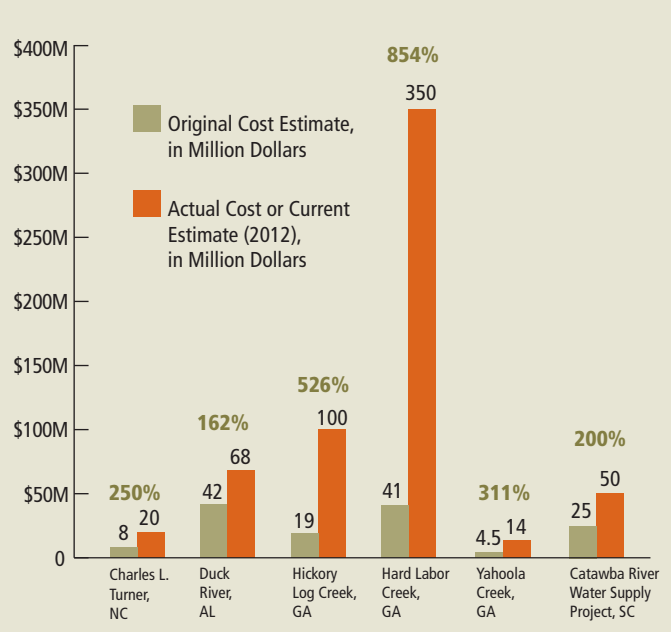
From a comment letter on the Glades Reservoir proposal to the U.S. Army Corps of Engineers from Oakwood, Georgia Mayor H. Lamar Scroggs — April 16, 2012

2 A reservoir's price tag is typically a moving target.

Steeply escalating costs are a hallmark of reservoir projects. Reservoir costs are difficult to contain, are typically under-estimated at the outset, and often climb upward—sometimes dramatically—throughout the development of a reservoir project. It is not uncommon for costs to increase several times over initial estimates. The true cost of building a reservoir is almost always a moving target for local decision-makers.

This pattern of uncontrolled cost escalation precludes real benefit-cost comparisons at the outset, stacking the deck against other water supply strategies that are in reality more cost-effective. Fiscally responsible planning is especially difficult for local leaders who choose the reservoir-building path.

Chart 2.1: Moving Targets



Costs have proven hard for local leaders to control in the case of many Southeastern reservoirs and reservoir proposals in recent years. Shown above are cases that are instructive for illustrating this "moving target" phenomenon. (Sources of figures appear in endnotes.)

WEST POINT LAKE, GEORGIA—FALL 2007
Photo by Georgia Water Coalition

3 Reservoir financing plans often rely on inflated population growth projections, ultimately leaving existing residents holding the bag.

Often water supply reservoirs are sold to communities as ventures that 'pay for themselves.' Local ratepayers and taxpayers pay the bills for new reservoirs, and when new ratepayers and taxpayers do not materialize, it is the existing population who is left to pay for the unnecessary expense.

In many reservoir financing plans, inflated population growth projections—indicating new water customers—are used to demonstrate additional anticipated revenue to pay for the new reservoir. If future growth and associated revenue forecasts are over-estimated, then existing ratepayers and taxpayers will be the ones left responsible for the cost of the reservoir and the water they don't need. Water utilities are forced to increase water rates to cover the cost of the water. Any financing plan that depends on new growth is at best a gamble for existing residents.

4 A reservoir is weather-dependent infrastructure and an evaporation pool.

Building a reservoir does not make more water. A reservoir simply holds back water that would otherwise flow to another community downstream. Impounding that water, in fact, causes the river system to suffer a net loss in water supply due to evaporation. Here in the Southeast we lose on average roughly 1 million gallons of water per acre of reservoir to evaporation each year.[xxiv]

To take just one example, the proposed 850-acre Glades Reservoir in Hall County, Georgia would evaporate more than 1 billion gallons of water per year from the Chattahoochee River system. It is worth keeping in mind, too, that evaporation rates are at their highest in the summer months when rivers run lower—and when both river systems and communities can least afford to lose the water.

Moreover, a reservoir's reliability depends on the weather—specifically, rain falling in the right place at the right time. A storage reservoir is not very useful if there's not enough water to fill it. Pumped-storage arrangements, in which pumps pull water from rivers for storage in reservoirs on tributary streams, are increasingly common but are no panacea: many still depend on rivers that are increasingly strained for water supply.

There is simply a limit to the role that large-scale water storage can play in providing water supply in the Southeast. A reservoir is inflexible infrastructure, fixed in place and ill-suited to adapt to varied weather or more frequent and extreme droughts.

Who Wins? Who Loses?

Given the significant financial risk and resource risk associated with building new water supply reservoirs—and the cheaper, faster and more reliable alternatives at hand—it's logical to ask why so many projects move forward if they don't pencil out. In reality, many projects don't benefit taxpayers or ratepayers and don't make for good public policy, but instead gain steam because private interests stand to benefit. When it comes to reservoirs, these interests all too often involve real estate development on the land around a reservoir, as well as the planning and construction of the reservoir itself, a long and complex multi-year process in which delays and hidden costs can easily crop up. Various other private interests might also see opportunities for profit in a public spending project on the scale of a water supply reservoir, but short-term benefit to private interests must not be allowed to obscure the serious and significant long-term costs to communities that are a sure bet with these projects.

5 Reservoir water is a contested resource subject to competing demands in the river system.

Reservoirs are vulnerable to the often conflicting demands people place upon rivers. Damming a river or stream does not magically create new water. Rather, it impounds and holds water that otherwise would be available for a variety of other uses throughout the river system.

Given that in the Southeast water is a public resource subject to reasonable use by all who share in access to it, downstream communities often raise concerns or object to water supply reservoirs that may impair flow to their community. With concern over water scarcity presently on the rise in the Southeast, many communities and stakeholders are increasingly wary of any actions upstream that may affect water supply. Downstream communities may raise concerns, initiate lawsuits or take other recourse to ensure healthy river flows in their own communities, delaying or derailing a new reservoir project. This type of upstream-downstream conflict has engendered not only the tri-state water war between Alabama, Florida and Georgia over existing federal reservoirs, but has also led the State of Alabama to oppose new reservoirs in the upper Coosa River basin in Georgia.[xxv]

Debt to Nowhere: Proposed Hard Labor Creek Reservoir

WHERE: Walton County, GA; Oconee—Altamaha River Basin

WHO: Walton County and Oconee County

SIZE: Approximately 1,400 acres surface area[xxvi]

YIELD: 42 mgd[xxvii]

COST: $350 million[xxviii]

Originally conceived in Walton County, 50 miles east of Atlanta, in the 1990s, the proposal for a 1,400-acre, 42-mgd reservoir on Hard Labor Creek mostly remains just that—a proposal—but it has already been a very costly one. Existing debt plus interest and other expenditures to date total more than $130 million.[xxix]

Estimates of the project's cost have grown dramatically in the past decade. Hard Labor Creek reservoir planners estimated its total cost at $41 million in 2002, when the Walton County Water & Sewer Authority took on $5 million in debt for early work on the project.[xxx] Just five years later, the cost estimate had risen to more than $350 million—more than eight times the size of the 2002 estimate.[xxxi]

In 2008, the project's partners took on $60 million in debt toward financing the project. At that time, Hard Labor officials planned to borrow nearly $120 million more by 2012.[xxxii] The fact that they haven't done so bodes ill for the project itself, but so far it has saved local residents and businesses from an even bigger financial hit than they've already taken. The 2008 bond sale has brought on nearly $3 million in annual interest payments for the two counties—a number that will climb in just a few years when principal payments begin.[xxxiii]

The financing plan for Hard Labor hinges in part on new water customers moving into Walton County and neighboring Oconee County, paying off the project's debt through their water bills. Officials projected population growth, however, at rates that were too high, and the financing plan for the project has suffered as a consequence.

Since that very high level of growth hasn't materialized, the project's progress has slowed dramatically. The project is now open-ended; there is no estimated completion date. As of early 2012, roughly 65 percent of the land needed had been acquired.[xxxiv] Having postponed the planned 2009 and 2012 bond issues indefinitely, reservoir planners took to calling the project "shovel-ready." Meanwhile, both counties have raised water rates on existing customers in part to make debt service payments for the proposed reservoir.[xxxv]

In 2012, Hard Labor's proponents applied for $32 million in state taxpayer funds through the newly created Governor's Water Supply Program to try to salvage the foundering project. Barring such a bailout, local residents and businesses in the two counties are left holding the bag for a reservoir that doesn't exist.

Under Water with Reservoir Debt: Hickory Log Creek Reservoir

WHERE: Canton, GA; Etowah River basin, part of the Alabama-Coosa-Tallapoosa River basin

WHO: Sponsors are City of Canton; Cobb County-Marietta Water Authority (CCMWA)

SIZE: Approx. 410 acres surface area[xxxvi]

YIELD: 44 mgd[xxxvii]

COST: Approx. $100 million and counting[xxxviii]

Built but not yet delivering water, the Hickory Log Creek Reservoir is a stark example of reservoir debt overwhelming a community. Debt for the reservoir has so strained finances for the small City of Canton that 2011 found the city unable to buy two fire trucks and re-pave streets,[xxxix] and struggling to determine how to pay for needed upgrades at its drinking water treatment plant and sewer system.[xl]

Local leaders in Canton, with a population around 10,000 people and even fewer water customers, initiated the Hickory Log project on their town's outskirts and signed on for a 25 percent share of the reservoir's water and 25 percent of its costs. They expected to pay 25 percent of a $20 million project, but rather than $20 million, the total to date has come out closer to $100 million.

The project's history has been marked by unexpected escalations in cost. Estimates of land and easement costs reportedly skyrocketed more than seven-fold over the course of the project, and the City of Canton has had no choice but to raise its residents' water rates in part to pay for the reservoir.[xli]

HICKORY LOG CREEK RESERVOIR—CANTON, GEORGIA
Photo by Joeff Davis

At construction's end the Mayor and city councilors in Canton have sought to give up their share of the reservoir's water rather than continue to carry the debt that the city took on for Hickory Log's development and construction, though this too has proved challenging.[xlii] Meanwhile, as of mid-2012 the reservoir is not even operating yet—a prolonged delay due in part to the reservoir's being caught up in a long-running interstate water conflict between Georgia and Alabama[xliii] which has left the Cobb County-Marietta Water Authority contemplating spending another $100 million on a pipeline to make use of Hickory Log's water if it can't gain authorization for its share of Hickory Log's supply in the manner originally planned.[xliv] And until they can get out of the deal, residents in the small city of Canton are locked into paying $1.7 million per year on a reservoir they cannot use, don't need and can't afford.[xlv]

Recommendations for a Prudent Path Forward

Recent cases across the Southeast demonstrate the tremendous financial risks of building new reservoirs. Financial liabilities like those of Canton, Georgia and Walton County, Georgia will only increase if the region continues on the same path. It is critical that local governments and water systems remain financially healthy while providing clean water for residents, businesses and economic development in the years ahead. There is a better way.

A better way forward is rooted in prudence, flexibility and resilient water supply strategies. Specific solutions must fit the fiscal and natural resources of the community, but the key is to pursue strategies that don't mortgage a community's financial health by investing in high-risk, high-cost water supply ventures.

In fact, keeping water supply costs in check gains even more critical importance when looking ahead: Communities across the country increasingly realize that bills are soon coming due to repair crumbling water, wastewater and stormwater infrastructure that has suffered from decades of under-investment. In other words, the cost of having plentiful clean water will almost certainly go up in the decades ahead, in order to reflect water's true value and to maintain healthy water systems. Communities that avoid over-spending now for water supply projects will be better prepared to meet this ubiquitous and mounting challenge.

Critical to prudent planning for future water supply are a full understanding of the real scope of future water demand, an awareness of the strategies available that have secured water supplies for other communities while keeping them financially solvent, and the pursuit of options that are flexible and allow for course corrections to adapt to resource constraints.

Following are five key recommendations for local leaders who seek to reduce their communities' risks—both financial risks and closely linked water resource risks—in planning for enough clean water for the future.

Recommendation 1: Optimize Existing Water Infrastructure First.

Existing water system infrastructure holds the greatest potential for lowest-cost and lowest-risk new supplies in almost any community. Maximizing the value of existing investments before making a major new public investment in a reservoir is common sense. More important, it is a far less risky path: less likely to spark conflicts with other water users and easier to implement in an incremental fashion, rather than taking on significant debt all at once for a major capacity expansion.

Water Efficiency

Communities across the country and the Southeast have successfully and cost-effectively secured additional water supply through water efficiency. Treating water efficiency as water supply requires 1) performing comprehensive strategic planning tailored to the specific water utility in order to identify the most cost-effective programs that will secure a specified amount of water; 2) setting water saving goals and investing funds in efficiency to get results—albeit significantly less than what is needed for a reservoir; and 3) aggressively implementing the programs to secure savings. With a financial and programmatic commitment, communities yield real savings that translate into water supplies that provide for population increases and river flows for downstream communities.

Water efficiency is reliable. Once infrastructure is replaced—once a leak is fixed or a homeowner installs more efficient plumbing fixtures—from then on it takes less water to do the same amount of work. The reduced demand of a more efficient water system translates into new water supply. A community that chooses to create new water supply through efficiency will be able to count on that savings when drought arrives as that increment of water is no longer needed. The water provider is not on the hook for that increment of water and does not need to create new capacity for it. In this way, water efficiency is a far more reliable supply source than stored water that is subject to drought or the needs of other communities.

Water efficiency is flexible. A community can implement water efficiency programs aggressively to ratchet down demand quickly if needed. Or, it can implement them at a slow and steady pace, as in Seattle's 1-percent-per-year reduction program, which provided more than enough water for new residents while reducing total water use. The pace at which a community implements and invests in water efficiency programs can be adjusted to meet its changing needs over time as compared with the all-or-nothing approach of building a reservoir.

Potable Water Reuse

Indirect potable water reuse is an under-utilized and readily available source of water supply. In contrast to non-potable water reuse, which is often used for irrigation and is highly consumptive, indirect potable reuse can come close to a closed-loop system with little loss and little need for augmentation. With indirect potable reuse, highly treated municipal wastewater is discharged to the environment upstream of a water withdrawal with the intent of augmenting drinking water supplies. Many private corporations are moving toward closed-loop water systems to secure their water supplies and reduce their risks in the face of water shortages. Similarly, municipal indirect potable reuse can displace the need for "new" potable water to be secured. Notably, while costs are still high, the costs and levels of energy consumption related to water recycling are declining as the technology gains wider acceptance. Moreover, using reuse water as source water reduces resource risk as the water has already been secured.

Interconnections

Often reservoir proposals arise from an interest in addressing a water system's peak water use, or "drought-proofing" a community's water supply. However, the cost of building a reservoir to provide water supply for the five days per year when water use peaks, or for when the five-year drought hits, can be prohibitively high.

A more cost-effective option for "bridging" across periods of drought can exist in the form of water system interconnections. Interconnections simply link two or more water systems together; with this infrastructure in place, water utilities can exchange water only when it's needed.

Water Reuse in Clayton County, Georgia

HUIE WETLANDS—CLAYTON COUNTY, GEORGIA
Photo by Clayton County Water Authority

When impending water shortages threatened many southeastern communities in the drought of 2007-2008, the standout exception to the crisis was Clayton County, Georgia. Located on the south side of the Metro Atlanta area, the county employs an innovative water recycling system that filters treated wastewater through a series of constructed wetlands. The system helped Clayton County maintain an abundant water supply in a critical time: at the height of the drought the county had eight months' supply, as compared to the scant 90 days' supply available to other area communities dependent on nearby Lake Lanier.[xlvi] Beyond just treating wastewater in an innovative and sustainable manner, Clayton County's water reuse system ensures a secure and reliable water supply for the community.

System interconnections can be a way to secure water supply, especially for relatively brief periods of time, without additional reservoirs, and at significantly lower expense and with shorter timelines. Interconnections provide flexibility in addressing peak usage and drought's challenges, since they can be tapped more readily than many other infrastructure sources.

Interconnections also provide for more flexibility financially: While there might be the need for an initial outlay of funds to connect delivery pipes, the purchase of the water can be structured in such a way to allow for fluctuations in use so that a community is only paying for the water it uses when it uses it, rather than paying for the high price of a reservoir regardless of whether its water is used.

Repurposing or Reallocation of Existing Reservoir Storage

Many existing reservoirs serve multiple purposes such as flood control, water supply, hydropower generation, navigation, and water quality. Each purpose has a specified "allocation," or amount of water or storage space designated in the reservoir. These allocations can be adjusted. For instance, flooding often can be managed effectively by restoring and reconnecting a floodplain to the river upstream of the reservoir. With the floodplain upstream of the reservoir absorbing significant quantities of water, as floodplains are naturally designed to do, and taking the pressure off of a reservoir downstream, the space that was once allocated for flood control in the reservoir can then be allocated for water supply. In many cases this approach is a feasible, more cost-effective option for securing water supply.

Similarly, gaining access to available water supply in an existing reservoir owned by another government unit or jurisdiction can be far more cost-effective than building a new reservoir. While it may come with a purchase cost, attaining access to this type of existing supply will likely be much lower in cost than building new supply infrastructure. In some cases, also, and under the right conditions, repurposing existing impoundments originally built for purposes other than water supply (for flood control, for example) can be more cost-effective and less environmentally damaging than building a new reservoir.

Falls Lake—Raleigh, North Carolina

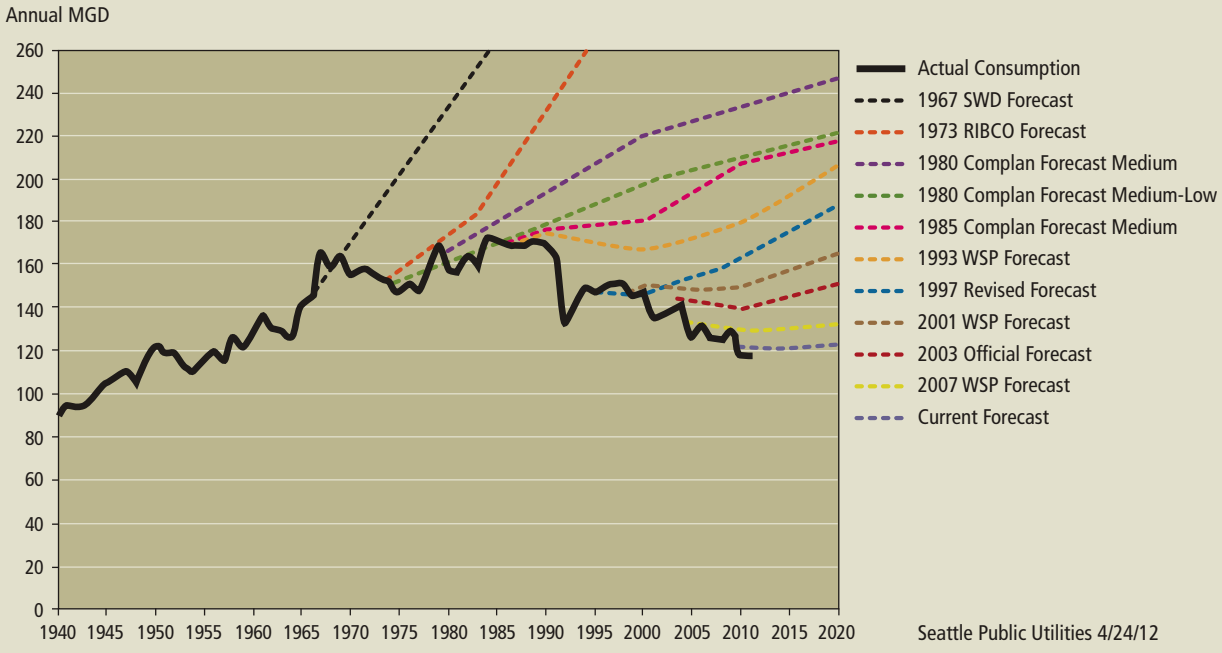
In Raleigh, North Carolina, the water system is examining the reallocation of impounded water in Falls Lake Reservoir as an alternative to building the proposed Little River Reservoir. Falls Lake has storage capacity allocated to sedimentation, flood control, water quality (via wastewater assimilation), and water supply, with a specified amount of water or storage space allotted for each purpose. If the purposes of water quality or flood control can be met without their current allocations, or with less of the stored water, then the remaining water could be reallocated for water supply. As of this writing, reallocation of water storage in Falls Lake is the most likely alternative to be pursued by the water system. Along with reduced demand in the Raleigh system due to investments in water efficiency, reallocation can provide more than the 13.7 mgd that the proposed Little River Reservoir is projected to provide.[xlvii]

Recommendation 2: Plan for Water Use to Decrease as a Community Grows.

Growing population does not necessarily equate to growth in water demand, especially when so many ways to ratchet down demand remain untapped here in the Southeast. Typically, water demand forecasts project an increase in water needs as population grows, which can be a self-fulfilling prophecy. However, such projections are not always reliable. For example, officials in Seattle, Washington have conducted 11 water demand forecasts since 1967, and actual demand has never in the past approached the forecast amount.

With increasing demand projections showing a need for more water, communities set themselves on a path to increase supplies. This can result in the development of unnecessary water infrastructure and the commitment to unnecessary and risky debt.

Chart 3.1: Actual Water Demand and Past Forecasts: Seattle Public Utilities



Communities can plan for decreased water consumption even as population increases. Through water efficiency, communities across the country have demonstrated that it is possible to reduce overall water consumption while population grows. For example, in Seattle total water consumption has declined by 52 mgd, or 30 percent, since 1990—down to levels used in the late 1950s—while population has increased 15 percent during those same years (see Chart 3.2). Meanwhile, Raleigh, North Carolina's service population grew by 30,000 customers between 2007 and 2011, at the same time that the city reduced demand by 2 percent.[xlviii] And water systems that are part of the South Florida Water Management District used 83 mgd less water in 2010 than in 2000, while population grew by 600,000 people over the same period.[xlix]

TABLE 3.1: Population and Water Demand

City	Year	Year	Decrease in Water Demand	Increase in Population
Raleigh, NC	2007	2011	2 percent	30,000
South Florida	2000	2010	9.5 percent	620,000
Seattle, WA	1990	2010	30 percent	200,000

Chart 3.2: Increasing Population and Decreasing Water Demand: Seattle

Since 1990, consumption has decreased about 30% while population has increased by 15%

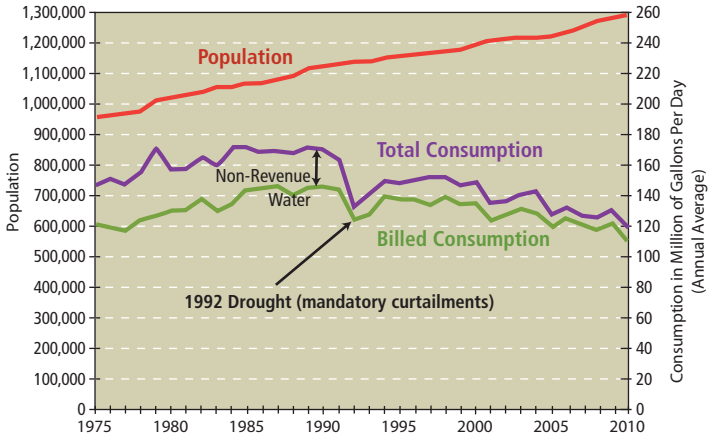
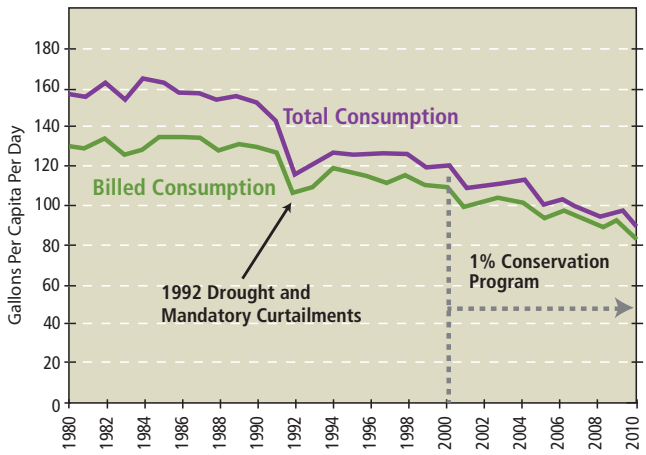


Chart 3.3 Decreasing Water Consumption per Person: Seattle—1980-2010



The prudent path is to incorporate aggressive water efficiency plans into demand projections before determining future needs. Not only can this reduce capital costs for any capacity expansions, or push expansions further into the future, it also helps a water system avoid spending for capacity that it doesn't need—for water that its customers don't need and for which they shouldn't have to pay. In this way the water utility avoids paying today for water it may not need for another 40 years, if at all.

Recommendation 3: Pursue Flexible Water Supply Solutions.

Too often communities commit to significant all-or-nothing infrastructure investments which tie up critical capital resources and do not allow for course corrections when circumstances change. Changing economic and resource conditions require that communities move away from water supply planning based around presumptions of "certainty" and embrace systems with inherent flexibility. Communities need water infrastructure that is responsive to variable weather, development patterns and economic circumstances.

Water supply alternatives such as water efficiency, storage reallocation, indirect potable water reuse and enhanced water system interconnections have the potential to better address the water infrastructure challenges ahead because they can be deployed incrementally, at lower cost, and at lower financial risk.

Table 3.2: Proposed Reservoirs in Permitting — Georgia, North Carolina & South Carolina

Proposed Reservoir	Location	Proposed Yield (million gallons per day)	Current Available Cost Estimate (million dollars)	Low-End Likely Cost (at $4M per 1 mgd yield)	High-End Likely Cost (at $10M per 1 mgd yield)
Hard Labor Creek	Walton County	42 mgd	$350M	$168M	$420M
Bear Creek - Newton County	Newton County, GA	28 mgd	$63M	$112M	$280M
Bear Creek - South Fulton	Fulton County, GA	16.4 mgd	$131M	$66M	$164M
Catawba River Water Supply Project	Lancaster County, SC	Not available	$50M	—	—
First Broad River	Cleveland County, NC	Not available	$70M	—	—
Glades Reservoir	Hall County, GA	72.5 mgd	$290.5M	$290M	$725M
Indian Creek	Carroll County, GA	18 mgd	$99M	$72M	$180M
Little River	Wake County, NC	13.7 mgd	$263M	$55M	$137M
Parks Creek	Jefferson, GA	4 mgd	Not available	$16M	$40M
Richland Creek	Paulding County, GA	35 mgd	$86.4M	$140M	$350M
Russell Creek expansion	Dawson County, GA	11.5 mgd	$30M	$46M	$115M

Recommendation 4: Demand Accurate Assessments of Costs.

It is imperative that local leaders demand accurate depictions of water supply projects' costs in order to minimize risk and avoid over-extending the community's fiscal resources.

Reservoir proponents routinely underestimate projected costs at the outset. Worse than just making a reservoir appear more affordable than it is, this misrepresentation precludes accurate benefit-cost comparisons, stacking the deck against other water supply strategies. The decision-makers responsible for local spending should demand an accurate representation of a reservoir's cost before putting the public's money on the line.

Similarly, in the planning stages a reservoir's projected yield often appears rosy, with assumptions that the lake level will always produce full yield. This makes the proposal's benefit-cost ratio appear rosy too. In reality, many reservoirs are producing less than full yield much of the time due to constraints on water resource availability (see Recommendation 5 below). Critically, this means their benefit-cost ratios come out lower than projected.

Local leaders can check proposed project costs against an accepted cost range from $4 million to $10 million per one million gallons per day yield, cited in a 2008 report for the Georgia Environmental Finance Authority.[I] It is important to note that often, reservoir projects start out with a low-end cost estimate, and over the course of the project the price tag moves closer to the high-end estimate or even higher. In addition, Table 3.2 lists the reservoirs currently in the permitting process under Section 404 of the Clean Water Act across Georgia and the Carolinas, their current cost estimates where available, and both low-end and high-end cost projections for each proposal based on the cost range from $4 million to $10 million per one million gallons per day yield.

Recommendation 5: Examine Water Availability to Minimize Resource Risks.

Many rivers are running lower and drier. Stark images of reservoirs without water periodically captivate public attention. There are limits to how far our finite water supplies will stretch. The everyday water supply demands placed on our rivers by industry, agriculture, public water systems, and energy production, combined with extreme multi-year droughts, have pushed the supply-side solution of building new storage reservoirs to its limit in much of the Southeast.

When looking for reliable water supply solutions, local leaders should have a detailed understanding of current and projected water resource availability in the river basin, and associated resource risks, before pursuing a plan to impound river water. In many cases, the water is already over-allocated, with permits allowing for withdrawals much greater than the flow will provide. In states without water permitting, it is anybody's guess how much water is reliably available.

Any water availability assessment should take into account the multiple water supply needs for communities along the river and the critical environmental functions upstream and downstream throughout the entire river basin. Given the water quantity stresses affecting so many river systems throughout the Southeast, and because a reservoir's reliability depends on water inflows, building a new reservoir is a risky venture. Where our rivers are over-stressed for water supply, we run the risk of drying up and destroying the very natural resources on which we all depend.

Southeastern communities will likely continue to face myriad challenges in the years ahead. Keeping public finances in order and promoting a healthy economy are certainly among them. Securing enough clean water for residents and businesses will continue to be crucial, and compounding this challenge will be the greater extremes in weather—namely more frequent and extreme droughts and floods—projected in the coming years.[li]

The prudent path for communities is one that selects water supply solutions based on cost-effectiveness, flexibility in planning, and resilience in the face of extreme weather.

The prudent path for communities is one that selects water supply solutions based on cost-effectiveness, flexibility in planning, and resilience in the face of extreme weather. Communities should take the time to conduct a thorough analysis of the full range of their water supply options in order to identify and select those that are most cost-effective and resilient. Choosing a high-cost option like building a new reservoir, and passing those costs on to local businesses and residents, imposes an economic burden on the community that slows economic growth rather than spurring it upward.

Like businesses, communities are finding that flexibility is critical to operations and solvency. Projects that lock communities into debt far in advance of the anticipated need for the water take away flexibility in water system and community planning. Capital-intensive supply sources lead communities to take on significant debt for water that they don't need for decades—and may not ever need. A water system that has overextended itself to cover a potential need in the future may be unable to pay for existing needs today.

Across the country and throughout the Southeast, communities face urgent needs to repair and maintain their existing systems for drinking water, stormwater and sewage treatment. Nationwide, the bill for reinvestment in existing water infrastructure is estimated at billions or even trillions of dollars.[lii] If a water system lacks the credit to pay for needed repairs that arise, it can find itself in a vicious cycle of cost-covering in which the bills ultimately come back to local residents and businesses.

The more flexibility that can be built into the operations of a water system, the better it is able to respond to changes and serve its community cost-effectively. If population growth slows, industrial use decreases, or for any reason water demand doesn't match projections, water supply options that can respond to these changes place a community in a better economic position.

After all, change is a constant. To minimize risks related to the availability of water resources, communities should select water supplies that are resilient in the face of extreme weather. Low-impact supplies rooted in efficiency are by far best suited to this task.

Proposed Reservoirs and their Projected Costs

The southeastern United States is witnessing a trend toward more reservoir projects that tie up finances of towns, burden taxpayers and water ratepayers, and remain vulnerable in the face of extreme weather.

There are many reservoirs currently in the proposal and development process throughout the Southeast. In Georgia, there is a reservoir boom taking place, including seven currently in the permitting process under Section 404 of the Clean Water Act as of this writing (see Table 3.2). By comparison, North Carolina has two in permitting, South Carolina has one, and Florida and Alabama have none.

Certain reservoir proposals in the Southeast—some already into the permitting process and some not—stand out and call for an examination of their costs due to the projects' scale and significance. The following three proposals are on the drawing boards across the Southeast:

Proposed Flint River Dams, Georgia

The Flint River originates south of Atlanta and flows 350 miles southwest to join the Chattahoochee River near the Georgia-Florida-Alabama state line. The Flint is one of 40 rivers nationwide that still flow undammed for more than 200 miles. The river and its healthy wetlands and floodplains are home to the unique shoal lily, shoal bass, Halloween darter, and 22 species of mussels. The Flint's lower stretches contain springs, seeps, and caves that are habitat for the endemic Georgia blind cave salamander and Dougherty plain cave crayfish.

But a number of proposals to dam the Flint River have been circulating in recent years. First conceived in the 1940s, these proposals were put to rest in the 1970s by then-Governor Jimmy Carter, but as concepts they have found new life in the 21st century.

Multiple water planning documents since 2008 have incorporated these major reservoir proposals, whose goals range from providing water supply to controlling river flows in order to meet flow targets set at the Florida-Georgia state line.

The 2011 Georgia Regional Water Plans for the Upper Flint, Middle Chattahoochee and Lower Flint-Ochlocknee river basins all call for additional water storage in the Flint River basin. The Upper Flint Regional Water Plan cites the need for 162,223 acre-feet or 52.86 billion gallons of storage with which to control river flows.[liii]

The July 2008 Preliminary Draft Water Supply & Water Conservation Management Plan released by the Metropolitan North Georgia Water Planning District identified the main stem Flint River as a potential water source for the Metro Atlanta area. The draft plan included two scenarios for major reservoirs near Molena, Georgia: a 160-mgd water supply reservoir and a larger 390-mgd multi-purpose reservoir on the Flint River to provide water supply, flood control, navigation, recreation and hydropower. The final District plan in 2009 did not include these Flint River dam proposals, as the interbasin transfer of water into the District from outside its boundaries was prohibited by statute as part of the creation of the District itself in 2001.

Although there are not cost estimates available for this major reservoir proposal, we can project its potential costs based on the cost-per-yield range cited in this report and employed by state agencies in Georgia. Without a doubt, the idea of damming the Flint River would come at an excessively high cost.

Projected Cost Range — Flint River dam proposals:

Low end—390 mgd x $4 million/mgd = $1.56 billion

High end—390 mgd x $10 million/mgd = $3.9 billion

On the scale of Lake Lanier, Lake Seminole or other large federal reservoirs, the Flint River dam proposals originated in the era of federal dam building—when the federal government paid the substantial costs of these massive projects. Without federal funds for these dams, communities will be left to secure the substantial funds on their own—a daunting prospect at best.

Proposed Glades Reservoir — Hall County, Georgia

In the headwaters of the highly contested Chattahoochee River basin (the water source for much of metro Atlanta), Hall County, Georgia has proposed the Glades Reservoir for the stated purpose of addressing projected increases in water demand to 100 mgd by 2060.[liv] This reservoir just upstream from Lake Lanier would pull as much as 108 million gallons of water per day from the Chattahoochee River,[lv] inundate 850 acres along Flat Creek,[lvi] a Chattahoochee tributary, and provide a maximum of 72.5 mgd in water supply. Hall County currently estimates the project's cost at $290.5 million, but this estimate does not include all of the costs of treating and distributing the water to users, especially given the project's complex engineering. This early estimate is likely to rise—perhaps dramatically—if the proposal moves forward.[lvii]

Based on the Hall County permit application, it is unclear what population this water supply reservoir would serve. Hall County itself does not operate a water system, and the local water provider, the City of Gainesville, has officially commented that it has no interest in the water from the reservoir, nor does Gainesville want its Cedar Creek reservoir used in the piping of Glades Reservoir water.[lviii] Without a clear population to serve, this reservoir would only serve as an amenity lake for a long-planned subdivision development using taxpayer money to fund private development.

Regardless of the stated purpose, the proposal is in a river basin fraught with conflict over river flows and water allocation. The conflict adds another element of risk to the proposal, as downstream interests such as the State of Alabama have indicated a commitment to oppose reservoir proposals in the highly contested river basins (such as the Chattahoochee) that flow from Georgia into Alabama and Florida.

Projected Cost Range -- Glades Reservoir proposal:

Low end—72.5 mgd x $4 million/mgd = $290 million

High end—72.5 mgd x $10 million/mgd = $725 million

The current published cost estimate of $290.5 million is at the low end of the accepted cost-per-yield range for reservoirs in Georgia, and will likely rise if the project moves forward.

Proposed Catawba River Water Supply Project, South Carolina

Lancaster County, South Carolina and Union County, North Carolina are partners in what is known as the Catawba River Water Supply Project (CRWSP)—a proposal to construct a reservoir on two tributaries of the Catawba River on the Lancaster County line not far south of Charlotte, North Carolina.

The 92-acre reservoir proposed by the Lancaster County Water & Sewer District near the Catawba River is currently moving forward as a purported contingency reservoir to address severe drought and new water management rules. However, the project's need is based on over-estimated water demand and a much larger water system expansion than is actually needed. Meanwhile, its estimated cost has more than doubled thus far in the planning stages, from $25 million to $50 million.[lvix]

Perhaps most important, Lancaster and Union counties have an opportunity to explore a host of cost-effective alternative water sources that would result in much lower costs to their customers. The counties can likely meet most of their supply needs through water conservation and efficiency measures, interconnections with neighboring water systems and tapping into an existing 3,112-acre reservoir known as Fishing Creek Lake. All of these alternatives would come at a much lower cost than building the proposed reservoir, which has a growing price tag that is currently a moving target.

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[xi] *Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs*, October 2008, MACTEC Engineering & Consulting Project No. 6110-08-0257, Prepared for Georgia Environmental Facilities Authority. Sect. 5.3.8.

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[xiii] North Carolina House Bill 609, 2011.

[xiv] State of Alabama Petition for a Writ of Certiorari. Feb. 13, 2012. pp. 23-24.

[xv] *Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs*, October 2008, MACTEC Engineering & Consulting Project No. 6110-08-0257, Prepared for Georgia Environmental Facilities Authority. Sect. 5.3.8

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