Filling the Water GAP

Conservation Successes and Missed Opportunities in Metro Atlanta

2012 UPDATE

CHATTAHOOCHEE RIVERKEEPER®

Keeping Watch Over Our Waters

Chattahoochee Riverkeeper

ABOUT CHATTAHOOCHEE RIVERKEEPER

Chattahoochee Riverkeeper (formerly Upper Chattahoochee Riverkeeper) is committed to the protection and stewardship of the Chattahoochee River basin and the restoration and preservation of its ecological health for the people and wildlife that depend upon it. Established in 1994, Chattahoochee Riverkeeper (CRK) is an environmental advocacy organization with more than 6,000 members and was the 11th licensed program in the international Waterkeeper Alliance, now close to 200 organizations. Visit www.chattahoochee.org.

ACKNOWLEDGEMENTS

We thank the local water utility leaders who not only gave us valuable information and insights but also are working to provide clean drinking water to metro Atlanta residents everyday: Corlette Banks (Fulton County Department of Public Works), Joe Basista (DeKalb County Department of Watershed Management), Yolanda Boazman (Atlanta Department of Watershed Management), Jennifer Carlile (Atlanta Department of Watershed Management), Alice Champagne (city of Roswell), Vicki Culbreth (city of Roswell), Jennifer Flowers (city of Gainesville), Pete Frost (Douglasville-Douglas County Water & Sewer Authority), Charles Lambert (DeKalb County Department of Watershed Management), Melinda Langston (Atlanta Department of Watershed Management), Michelle Lawrence (Fulton County Department of Public Works), Joey Leverette (city of Gainesville), Janet Liberman (city of Roswell), Jennifer McLaurin (Fulton County Department of Public Works), Heather Moody (Gwinnett County Department of Water Resources), Kathy Nguyen (Cobb County Water System), Mike Patton (Douglasville-Douglas County Water & Sewer Authority), Alicia Pennie (DeKalb County Department of Watershed Management), Tim Perkins (Forsyth County Water & Sewer), Kelly Randall (city of Gainesville), Jim Scarbrough (Gwinnett County Department of Water Resources), Kevin Smith (Forsyth County Water & Sewer), Brian Sterner (Gwinnett County Department of Water Resources), and Barbara Williams (Douglasville-Douglas County Water & Sewer Authority).

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FILLING THE WATER GAP

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We dedicate our report to James H. "Jim" Scarbrough.
We miss his kindness, humor, dedication and
water management expertise greatly.

CHATTAHOOCHEE RIVERKEEPER®

Keeping Watch Over Our Waters

A Publication of Chattahoochee Riverkeeper

By Laura Hartt, *CRK Water Policy Director*
lhartt@ucriverkeeper.org

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EXECUTIVE SUMMARY

In 2011, Chattahoochee Riverkeeper concluded that metro Atlanta could save as much as 160 million gallons of water per day (MGD) by investing in just three conservation measures: fixing system leaks, replacing outdated plumbing fixtures, and pricing water right. Since then, as our 2012 report reveals, the region has made some incremental progress in reducing water use. However, we can and should do more. Resolving the ongoing conflict with Alabama and Florida over allocation of Lake Lanier for water supply depends on our ability to show our downstream neighbors that we are doing all we can to conserve. Moreover, these measures are cheaper and more sustainable than the costly and destructive options proposed by state leaders for meeting our future water supply needs.

For our 2012 update we took another look at our three conservation measures as well as some new ones. We conclude that there is still at least 134 to 147 MGD of water supply available to metro Atlanta in the near term, based on the following:

- 8-16 MGD from loss reduction targeting *just four utilities*: city of Atlanta Watershed Department, DeKalb County Department of Watershed Management, Douglasville-Douglas County Water & Sewer Authority, and city of Gainesville;
- 29-34 MGD from retrofitting old homes with new plumbing fixtures through direct installation;
- 24 MGD from limiting the sale of clothes washers and dishwashers to Energy Star models;
- 27 MGD from more effective multi-tiered conservation pricing for residential customers;
- 19 MGD from multi-tiered conservation pricing for commercial customers; and
- 27 MGD from large-scale rainwater harvesting at homes and businesses.

A serious commitment to water reuse over the next decade could add another 100 to 252 MGD, bringing the **total potential water savings up to 234-399 MGD, enough water to serve 1.5 to 2.6 million people in the metro Atlanta region**.[1]

Implementation of these measures will require financial, institutional, and political support at both the regional and state level. In particular,

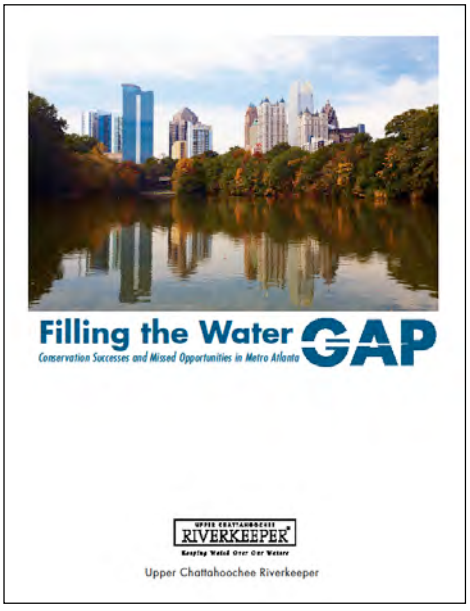
- The state should provide more **grants and zero-interest loans** to support local government efforts to repair leaks, retrofit old buildings with new plumbing fixtures, explore rainwater harvesting and reuse as options for reducing outdoor water demand, encourage more use of green infrastructure, and support other innovative water conservation projects.
- The state should adopt legislation to **expedite inventory replacement** of low-efficiency appliances (clothes washers, dishwashers) with efficient models and fund rebates for the purchase of water- and energy-efficient appliances.
- The state should require and set minimum standards for **landscaping and irrigation certification** to reduce outdoor water waste.

- During the mandated 2014 update of the region's water plan, the Metro North Georgia Water Planning District should require all local governments within its jurisdiction to adopt those conservation programs implemented successfully at the local level including **retrofit on reconnect** requirements, **low income assistance** for leak repairs and retrofits, **multi-family toilet rebates**, and **conservation pricing** for the commercial sector.
- Importantly, the Metro District must commit to **reassessing future water demands** based on the latest U.S. Census data, drought information, water conservation efforts, and employment outlook.

INTRODUCTION

Last year, Chattahoochee Riverkeeper (CRK) released "Filling the Water Gap: Conservation Successes and Missed Opportunities in Metro Atlanta."[2] In that report, we outlined local water conservation efforts within the 15-county metro Atlanta region. During our review, we discovered many success stories, singling four out for special recognition as "Best in Class":

1) City of Atlanta Department of Watershed Management: "Care and Conserve" Program
2) Cobb County Water System: Green Industry Partnership
3) DeKalb County Department of Watershed Management: Retrofitting Old Homes with Efficient Fixtures
4) Douglasville-Douglas County Water & Sewer Authority: Protecting its Primary Source of Water



In the past year, the legal landscape changed dramatically. In June 2011, the 11th Circuit for the U.S. Court of Appeals reversed a lower court decision, restoring metro Atlanta's access to Lake Lanier as a major source of water supply. [3] Relief was short-lived however, because also in June 2011, the region entered yet another drought which for some portions of Georgia may prove to be almost as severe as the one from 2006 to 2009.[4]

Other things have not changed. Local governments and some businesses continue to lead in efforts to conserve water in metro Atlanta while state conservation efforts remain minimal. For this 2012 update, we revisit the 2011 success stories and recommendations for areas of improvement and outline new successes and recommendations.

BEST IN CLASS (2012)

In 2011, after evaluating conservation programs across ten select utilities, we honored four local governments with "Best in Class" awards for their efforts. For CRK's 2012 "Best in Class" award, we chose to focus primarily on the private sector, honoring efforts to significantly reduce water use within the business community.

One initiative in particular may prove to yield significant water savings is the Better Buildings Challenge. In 2011, the Obama Administration chose Atlanta (along with Seattle and Los Angeles) as one of three pilot cities to participate in the Better Buildings Challenge (BBC). The BBC was launched to support private efforts to improve energy efficiency in commercial buildings. Nationally, the initiative could save $40 billion dollars annually in energy costs, while helping businesses grow and creating more jobs. To meet the challenge, the Mayor's Office of Sustainability has partnered with the U.S. Department of Energy, local businesses, and non-profits to upgrade Atlanta's 400-block downtown area, roughly 33 million square feet.[5]

Atlanta has targeted government (e.g., City Hall, Civic Center, Hartsfield-Jackson Atlanta International Airport), commercial (e.g., Georgia Dome, Georgia World Congress Center), hospital, and university buildings for improvement. In addition to improved energy efficiency in commercial buildings, by 2020 Atlanta has committed to

- reduce greenhouse gas emissions 25%;
- reduce, reuse, and recycle 90% of the city's residential waste;
- provide at least ten acres of green space per 1,000 residents and protection and restoration of tree canopy to 40% coverage; and
- provide local food within ten minutes of 75% of all residents.

Perhaps most impressive is Atlanta's further commitment to work with partners to reduce water use in government and non-government buildings 20% by 2020.

For our 2012 Best in Business Class Award we honor not only the city of Atlanta for its efforts as a BBC pilot city, but also two other businesses for a unique partnership that is achieving real water savings: Hartsfield-Jackson Atlanta International Airport and TOTO USA.

Beginning in 2008, the Airport partnered with TOTO to retrofit toilets and urinals throughout the airport. To date, they have retrofitted 630 toilets and 1,200 urinals with efficient flush valves, resulting in an annual savings of over 56 million gallons which already represents a 19% reduction in water use. The Airport has immediate plans to retrofit over 1,000 faucets with efficient models as well.

The Hartsfield-Jackson Atlanta International Airport is also committed to reduce energy consumption by 20% by 2020. A solar facility generates power for the rental car facility as well as airport shuttle buses. Composting on site generates methane gas that helps power other airport vehicles.[6]

As we reported in 2011, TOTO's water savings efforts extend well beyond their work with the Hartsfield-Jackson Atlanta International Airport. TOTO is one of the world's largest manufacturers of plumbing fixtures and a leader in developing popular and affordable efficiency toilets, urinals, faucets, and showerheads. In addition to the Airport, TOTO has partnered with the United Parcel Service (UPS) to purchase carbon offsets to mitigate for green house gases generated during transport of products and partnered with the Grand Hyatt in Buckhead to retrofit guest rooms with low flow toilets, saving over three million gallons of water each year.

Replacing old urinals with WaterSense or other high efficiency models (i.e., 0.5 gallons per flush) can save between 1.0 and 4.5 gallons per flush. The Hartsfield-Jackson Atlanta International Airport was able to reduce urinal water use by half, or more than 650,000 gallons each month, by switching to WaterSense models as depicted here. Photo courtesy of William L. Strang.

TOTO engages in a wide range of other best management practices including reusing grey water during plant operations in order to reduce reliance on treated drinking water, recycling imperfect china for use as the raw material to produce floor tile at Crossville tile, and purchasing green electricity from Georgia Power.[7]

For outstanding efforts to reduce water use within the business sector, we honor the city of Atlanta, Hartsfield-Jackson Atlanta International Airport, and TOTO USA as "Best in Class" for 2012.

2012 BEST IN BUSINESS CLASS AWARD WINNERS

For significant efforts and firm commitments to reduce water use within the commercial sector, CRK recognizes the

City of Atlanta
Hartsfield-Jackson Atlanta International Airport
TOTO USA

CASE STUDIES

For this 2012 update of water conservation practices in metro Atlanta, we evaluated nine local water utilities and select commercial customers within their service areas. These select utilities all depend upon the Chattahoochee River and Lake Lanier for water supply:

- City of Atlanta Department of Watershed Management
- Cobb County Water System
- DeKalb County Department of Watershed Management
- Douglasville-Douglas County Water & Sewer Authority
- Forsyth County Water & Sewer
- Fulton County Department of Public Works
- City of Roswell
- City of Gainesville
- Gwinnett County Department of Water Resources

DATA & METHODS

For each of the nine utilities, we constructed a "Performance Dashboard" featuring the following information:

- Population Served as of 2011
- Population Change from 2000 to 2010
- Water Use in 2010
- Water Loss
- Conservation Pricing
- Toilet Rebates
- Reuse
- Rainwater Harvesting

Population Served as of 2011

These figures were taken from the Georgia rate survey and rate structure survey produced annually by the Georgia Environmental Finance Authority (GEFA).[8] Figures are irrespective of water supply source.

Population Change from 2000 to 2010

These figures are provided by the U.S. Census Bureau and with the exception of the Atlanta-Sandy Springs-Marietta metropolitan area are available only on a county-wide basis. [9]

Water Use in 2010

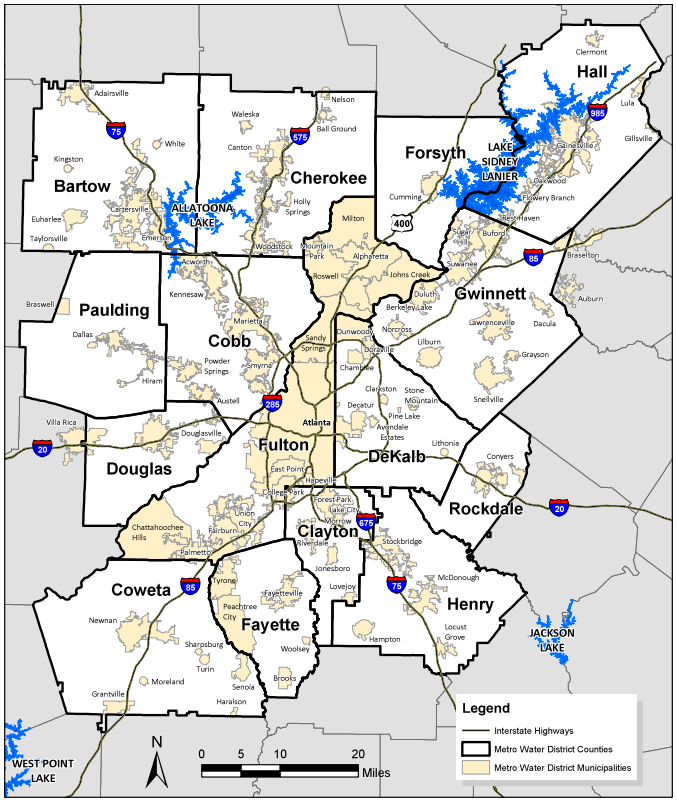


Image courtesy of the Metro North Georgia Water Planning District.

In our analysis, we identify the primary water supply source as well as three indicators of water use: average annual withdrawals (million gallons per day (MGD)), summer peak withdrawals (MGD), and single-family household use (gallons per household per day). Georgia's Environmental Protection Division provided us with 2010 water withdrawal data—data for 2011 and the beginning of 2012 remain unavailable as of September 2012. Single-family household use was reported by each water utility in the *2011 Metro Water District Plan Implementation*.[10]

Although average annual withdrawals may be a good indicator of general water use trends, summer peak withdrawals are much more useful for both water planning and environmental protection purposes because they reflect the maximum water withdrawn during summer months when rivers experience low flow conditions. Most irrigation occurs during the dry summer months, so high summer peak withdrawals suggest high outdoor water use.

Single-family household use is a metric that provides information about residential use. However, within the Metropolitan North Georgia Water Planning District (Metro District, above right), not all utilities distinguish between single-family and multi-family accounts or even between residential and commercial accounts.

FUTURE METRO ATLANTA WATER DEMAND

In 2009, the Metropolitan North Georgia Water Planning District (Metro District) projected future water demand out to 2035, relying on outdated data and invalid assumptions. As a result, those projections overstate the region's future water need.

Economic Forecasts

In 2009, the Metro District used a model to project 2035 water demand, assuming high population and employment growth.[11] Those projections ignored the last severe economic recession (December 2007-June 2009), from which the nation is still recovering.[12] In fact, between 2006 and 2010, the 15-county Metro District area *lost* more than 148,000 jobs.[13]

To reach the number of jobs forecasted in the Metro District's 2009 plan, the 15-county region would have to *add* more than 650,000 jobs by 2015, 1,270,000 jobs by 2025, and 1,918,000 jobs by 2035. That amounts to 32%, 62%, and 93% job growth, respectively!

Population Forecasts

The Metro District's water demand projections also are overly optimistic with respect to population growth. The latest U.S. Census data reveals a population of roughly 4.8 million in 2010 for the 15-county Metro District area. This estimate is approximately 200,000 (or 4%) *less* than the 2009 forecasts generated by the state based on the 2000 U.S. Census.[14]

To reach the population sizes forecasted in the Metro District's 2009 plan, the 15-county region would have to add more than 460,000 people by 2015, 1.45 million people by 2025, 2.66 million people by 2035, and 4.17 million people by 2050. That amounts to 10%, 30%, 55%, and 86% population growth, respectively.

Water Use

The Metro District's 2035 projections also used 2006 as the baseline year for estimating future water demand. Water use in 2006 then was "adjusted" upward on the presumption that use in 2006 was "unnaturally depressed" due to the drought.[15] In fact, the 2006 data preceded the drought and proved to be the second highest year of water use over a 17-year period.[16]

2010 data from Georgia's Environmental Protection Division (EPD)[17] shows that the total annual Chattahoochee water withdrawals for the nine utilities featured in our report have dropped to pre-drought levels. See Figure 1. Whether reduced water use is sustained in spite of our current drought remains an open question.

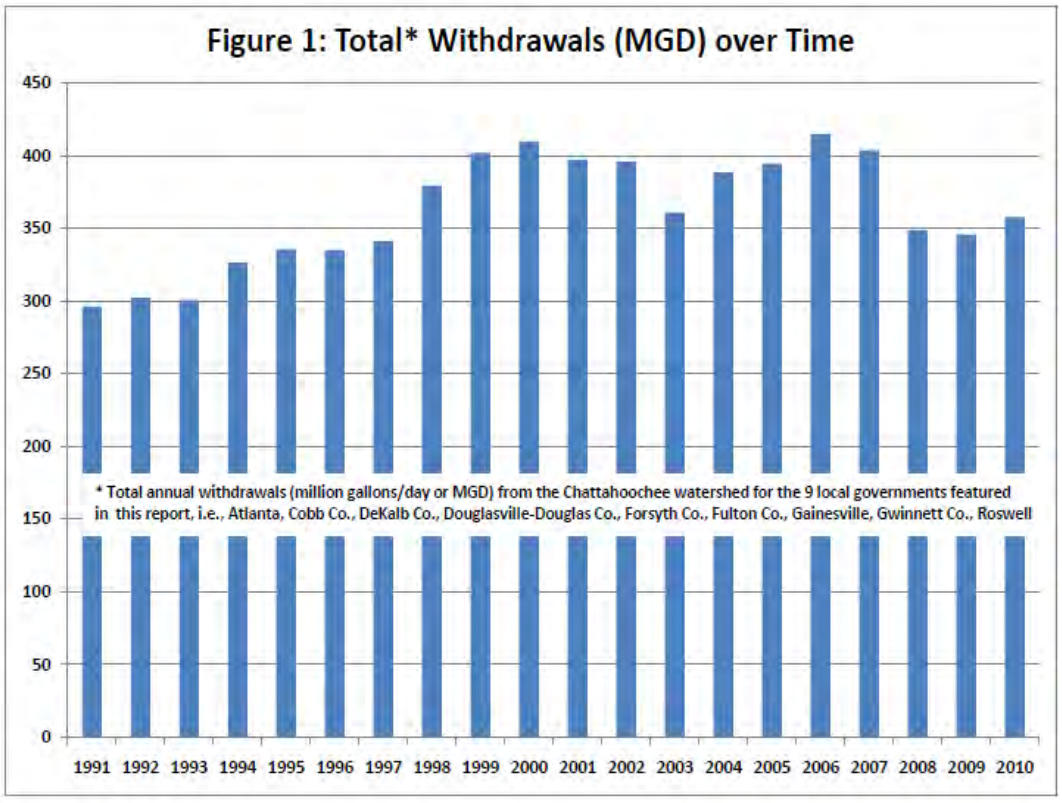
Conservation Savings Potential

Finally, the Metro District's 2035 water demand projections also underestimated the region's ability and commitment to reduce water use. The 2009 plan estimates that by 2035 the region will reduce water use 8% through water conservation efforts and an additional 5% simply due

to natural retrofitting in compliance with the latest plumbing code.[18] The Metro District estimates that the approved 2010 amendments to the plan will save an additional 23 million gallons of water day (MGD),[19] amounting to just slightly more than 2% of the region's projected 2035 water demand.[20] In other words, the Metro District estimates the region can reduce water use by only 15% by 2035.

For the nine utilities featured in this report, we see that water use already has declined by more than 14% since 2006. If this reduced water use is sustainable following our current drought, then greater water savings through conservation must be feasible.

Before the U.S. Army Corps of Engineers determines a future water allocation for metro Atlanta or the region contemplates any more expensive, unsustainable water supply projects, the Metro District must update its water demand projections using the most current and accurate data available.



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Water Loss

In June 2010, Georgia enacted the Water Stewardship Act. This legislation imposes additional, albeit modest, water conservation requirements on local governments throughout the state. Perhaps the most noteworthy is the requirement that all water utilities adopt a uniform, standardized method for assessing water loss. By March 2012, all water utilities serving more than 10,000 customers were required to complete and submit to the state an American Water Works Association (AWWA) water loss audit report. Smaller utilities (those serving more than 3,300 to 10,000 customers) have until March 2013 to complete their AWWA water loss audits.[21]

Figure 2: IWA/AWWA Apparent vs. Real Water Losses

Water Losses	Apparent Losses	Unauthorized Consumption
		Meter & Data Inaccuracies
	Real Losses	Leaks Along Mains
		Leaks Along Service Lines (before the meter)
		Leaks & Overflow at Storage

According to the International Water Association (IWA) and the AWWA, "water loss" consists of both "apparent losses" and "real losses." Apparent losses are perceived losses due to illegal water use, billing errors, and metering errors. Real losses are actual losses stemming from leaks in the distribution system. See Figure 2. Real water losses are typically reported as CARL or "current annual real water loss." Another metric is UARL or "unavoidable annual real loss." UARL estimates the theoretical lowest water loss possible assuming optimal pressure, main lengths, and service connections.[22]

The Infrastructure Leakage Index (ILI) takes the ratio of CARL to UARL as an indicator of how well real water losses are being managed with the current technology in place relative to what would be possible with an optimized system. Generally, the lower the ILI value, the more efficient the system is. For those utilities reporting low ILI values, water loss may be attributed to billing errors, metering errors, and illegal use rather than to actual leaks. As ILI increases, leaks tend to contribute relatively more to overall water loss.[23]

City of Atlanta repair crew out fixing leaky pipes. Photo courtesy of City of Atlanta's Department of Watershed Management.

In the dashboards *(pages 25-33),* we report real and apparent water losses each as a percentage of water supplied. We also include the ILIs.

In December 2010 the Metro District Governing Board approved a "real water loss" goal for utilities lying within the six counties (Cobb, DeKalb, Forsyth, Fulton, Gwinnett, Hall) directly impacted by the federal judicial ruling invalidating use of Lake Lanier for water supply. Under this requirement, those affected utilities must cut in half any "real water loss" exceeding 10% by 2025. Other utilities in the District have until 2035 to achieve the same water loss reduction.[24] Therefore, in our analysis all utilities except Douglasville-Douglas County Water and Sewer Authority (DDCWSA) must meet the 2025 deadline. DDCWSA has until 2035. We have included these water loss reduction goals in the dashboards as well.

Conservation Pricing

The goal of conservation pricing is to encourage customers to reduce water use; therefore, in order for conservation pricing to be effective, charges must be based primarily on the quantity of water consumed. Because water utilities rely on ratepayers for funding, a poorly-constructed rate structure may reduce the revenue available for infrastructure and leak repairs, staffing, and other conservation programs. However, a well-designed rate structure can encourage homes and businesses to conserve.

An inclining tiered-structure, consisting of three or four tiers, is optimal for encouraging reduced use. During peak periods when demand is highest, an optimal rate design will result in at least half the residential customers exceeding the first tier, 30% exceeding the third tier, and 10% exceeding the fourth tier when first implemented.[25]

In the dashboards (*pages 25-33*), we have included information regarding pricing structure for residential accounts, noting the number of blocks and how pricing changes when moving from one block to the next. We also include information on customer costs, both in terms of average billing and peak summer billing. These figures were taken from the Georgia Environmental Finance Authority (GEFA) 2011 rate survey. We used the default values of 5,000 gallons/month for winter use and 12,000 gallons/month for peak summer months. Cost estimates combine both sewer and water costs. We further note whether local governments have established conservation pricing for either commercial customers or irrigation. Ideally, irrigation rates should be at least double those for the first residential pricing block, and for each utility we have noted whether that is in fact the case.[26]

Toilet Rebates

Unless otherwise noted, we used data from the *2011 Metro Water District Plan Implementation Review*, which reflects rebate totals through June 2011. The Atlanta Department of Watershed Management, Forsyth County Department of Water and Sewer, Gwinnett County Department of Water Resources, and city of Roswell all participate in the toilet rebate program administered by the Metro District. This program provides a $100 rebate for the purchase and installation of a WaterSense toilet (1.28 gallons per flush or 1.28 gpf).[27]

Other utilities have chosen to implement their own rebate programs, albeit limited to single-family residential customers. The city of Gainesville offers $75 rebates while both Cobb County Water System and DeKalb County Department of Watershed Management offer $100 rebates for WaterSense toilets.[28]

The 2010 amendments to the Metro District's 2009 *Water Supply and Water Conservation Management Plan* extend the rebate program to multi-family, residential (apartments, townhomes, condominiums) customers.[29] Currently, the city of Atlanta offers a multi-family toilet rebate of $100 for WaterSense toilets to multi-family residential owners and managers on a first come, first served basis. Similar programs are pending later this year for Gainesville, Gwinnett County, and Cobb County.

Logo courtesy of U.S. Environmental Protection Agency.

Water Reuse

Reuse information was obtained from Metro District's 2009 *Water Supply and Water Conservation Management Plan* and supplemented with information provided by each utility.[30] We define reuse as the collection, treatment, and use of wastewater for either potable (i.e., drinkable) or non-potable purposes.

Purple pipes indicate treated wastewater transported for reuse purposes. Photo courtesy of Brown and Caldwell.

Rainwater Harvesting

We obtained information concerning rain barrel workshops and other rainwater harvesting outreach directly from each utility. All utilities participate in rain barrel workshops at some level.

Also, in 2011, the city of Atlanta enacted an ordinance to authorize single-family homeowners to harvest rainwater for indoor potable use. Although this ordinance has set a national precedent for rainwater harvesting on a larger scale, homeowners have yet to take advantage of it.

RESULTS & RECOMMENDATIONS

Our 2011 survey of local governments and businesses revealed some areas in need of improvement and led to three primary recommendations:

1) Fix System Leaks
2) Replace Outdated Plumbing Fixtures
3) Price Water Right

Our 2011 survey also led to several additional recommendations:

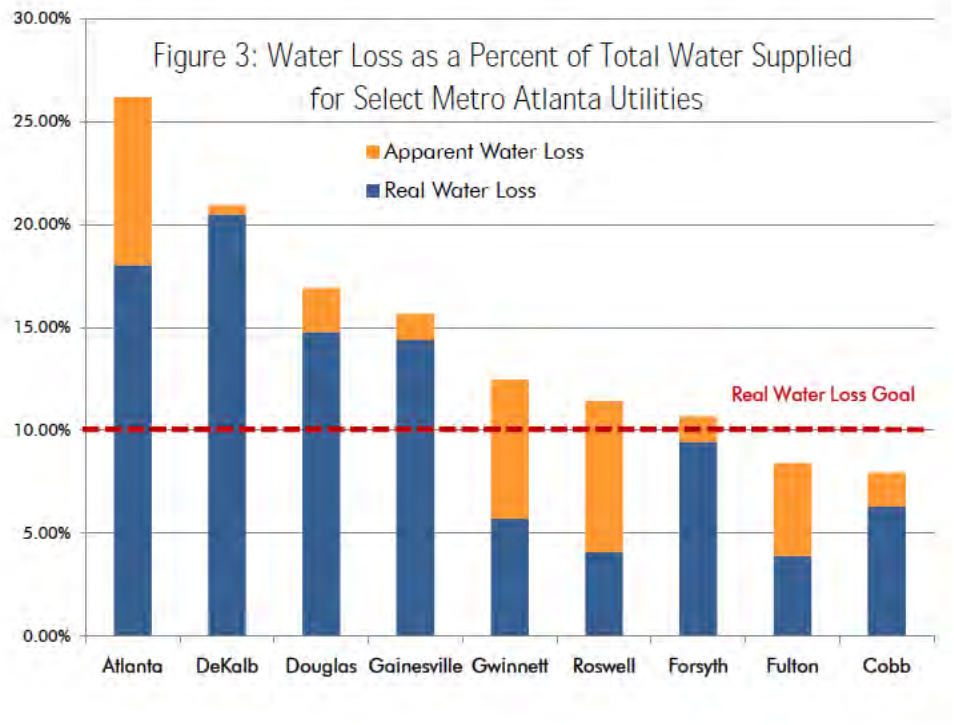
4) Reduce Outdoor Water Demand
5) Increase Reliance on Reuse
6) Promote Pervious Paving and Other Green Infrastructure
7) Invest in Energy Efficiency

For each of these seven measures, we provide updates and additional recommendations below.

1) Fix System Leaks

Under Georgia's Water Stewardship Act of 2010, large water utilities (i.e., those serving more than 10,000 customers) were required to submit their water loss audit reports to Georgia's Environmental Protection Division (EPD) by March 1, 2012. Many utilities across the state did not meet that deadline. EPD extended the deadline to March 31, then May 1, and finally May 31. The state now is in the process of securing a consultant to validate, compile, and analyze the results. Pending the state's release of its analysis of the audit results (date yet to be determined), we have conducted our own analysis of preliminary audit results provided to us directly by each water utility. **We emphasize that these results are preliminary and subject to change, pending the outcome of the state's analysis.**

Figure 3 shows apparent and real water loss as a percentage of total water supplied for each utility. Of the nine utilities we surveyed, only two reported *combined* water losses (real and apparent) below 10%: Fulton County Department of Public Works and Cobb County Water System. Five utilities had *real* water losses below 10%: Cobb County Water System (6.3%), Fulton County Department of Public Works (3.9%), Forsyth County Water & Sewer (9.4%), city of Roswell (4.1%), and Gwinnett County Department of Water Resources (5.7%).



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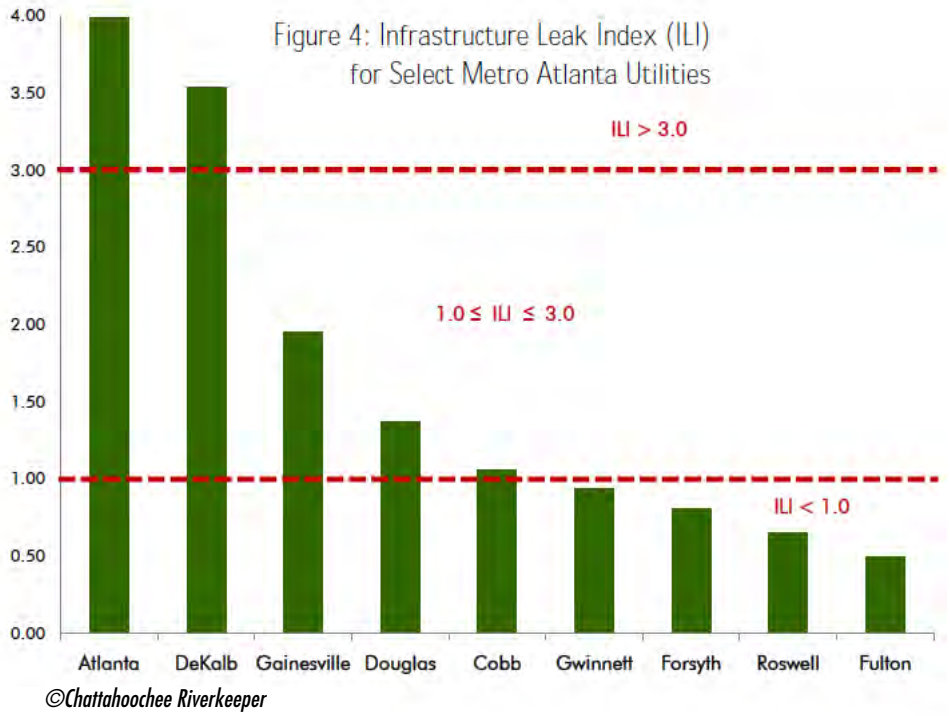
The remaining utilities had real water losses in excess of 10%: city of Gainesville (14.4%), DDCWSA (14.8%), DeKalb County Department of Watershed Management (20.5%), and city of Atlanta Department of Watershed Management (18%). Both DeKalb County and city of Atlanta had combined water losses in excess of 20%, or 20.9% and 26.2%, respectively.

Figure 4 displays the ILI for all nine utilities surveyed. Four utilities (Gwinnett County Department of Water Resources, Forsyth County Water & Sewer, city of Roswell, and Fulton County Department of Public Works) reported ILIs below 1.0. Three other utilities had ILIs falling between 1.0 and 3.0 (Cobb County Water System, DDCWSA, and city of Gainesville). Finally, two utilities had ILIs exceeding 3.0 (DeKalb County Department of Watershed Management and city of Atlanta Department of Watershed Management).



According to the AWWA, ILI values less than 1.0 indicate either a top performing system (i.e., few leaks) or flaws in the data. Data validity scores were fairly high for these particular utilities (ranging from 72 to 81 on a 100-point scale) suggesting that invalid data alone is probably not driving the low ILI values. Notably, Gwinnett County Department of Water Resources, Forsyth County Water & Sewer, city of Roswell, and Fulton County Department of Public Works are all relatively new systems, so low leakage rates seem likely.

ILI values ranging from 1.0 to 3.0 are more typical. Three utilities fell within this range (city of Gainesville, DDCWSA, and Cobb County Water System). Cobb County's ILI just barely exceeded 1.0, suggesting their system is close to peak performance. The ILIs for Gainesville and DDCWSA were below 2.0, suggesting both utilities have some work to do to reduce real water loss.

Both the city of Atlanta Department of Watershed Management and DeKalb County Department of Watershed Management had ILIs in excess of 3.0, which suggest high leakage relative to apparent losses. Both these systems are among the oldest of the ones we surveyed, and declining infrastructure is an ongoing and expensive concern. Both utilities will have to overcome financial and institutional challenges in order to reduce their real water losses appreciably.

Based on our calculations and focusing on just the nine utilities we surveyed, cutting in half any real water loss exceeding 10% could save more than 8 MGD, while achieving 10% or less water loss could save more than 16 MGD.[31]

2012 RECOMMENDATIONS

- During the 2014 plan update, the Metro District should require all utilities to set more rigorous water loss reduction goals and timelines for achieving these goals, e.g., 10% or less real water loss by 2025.
- During these tough economic times during which local governments are loath to incur more debt, Georgia Environmental Finance Authority (GEFA) should provide more grants and zero-interest loans to help local governments repair their leaky infrastructure.

2) Replace Outdated Plumbing Fixtures

Retrofitting old-fashioned plumbing fixtures with new efficient ones can secure significant water savings. For example, WaterSense fixtures can yield the following reductions in water use:

- toilets (1.28 gallons/flush): 6,900 gallons per person per toilet per year
- faucets : 200 gallons per person per fixture each year
- showerheads: 900 gallons per person per fixture per year

Retrofitting is also an effective means of detecting and repairing leaks, where each leaky toilet can waste up to 73,000 gallons of water in a year and each leaky faucet can waste up to 3,000 gallons annually.[32]

In 2011, we honored two local governments for innovative programs that focused on retrofitting outdated plumbing in older homes and businesses: the city of Atlanta's "Care and Conserve" program and DeKalb County's ordinance requiring retrofitting on water service reconnection. We are pleased to report that both programs remain active.

In the case of "Care and Conserve," a low-income assistance program to help customers offset the cost of retrofitting outdated plumbing and fixing household leaks, Atlanta plans to spend $1.6 million next year on this program, a substantial increase from the $300,000 million budgeted last year. The Care and Conserve program receives funding from multiple sources, including Community Development Block Grants from Housing and Urban Development (HUD) and revenue generated from cell tower leases on Department of Watershed Management properties. In 2011, Atlanta partnered with Utility Service Partners, who offer water and sewer line warranty plans to Atlanta water customers at a discount. Ten percent of each warranty purchased is donated to the Care and Conserve program. Future plans include developing a mechanism to allow customers the option of donating to the program when they pay their water bills. [33]

With respect to DeKalb County's retrofit ordinance, the recent economic downturn has slowed the rate at which residential and commercial properties are turning over. Nonetheless, the county remains committed to enforcing the ordinance, which requires new water account holders to certify that they have replaced inefficient plumbing fixtures with

efficient ones if their property predates 1993. Since 2008, the county has inspected over 7,400 homes, with 275 more inspections pending.[34]

At least twice the Metro District Governing Board considered, but then rejected, a proposal requiring local governments to implement a retrofit on reconnect ordinance or policy as an additional condition for receiving state water withdrawal and wastewater discharge permits. In 2010, Atlanta considered a similar ordinance which never made it out of committee because of opposition from the real estate sector, which viewed the ordinance as a point of sale mandate alleging it would slow already sluggish home sales. The lack of political will to implement this measure on a regional scale is disappointing, given there are still well over half a million homes across the Metro District predating 1993 in need of plumbing upgrades.[35]

Beginning this year, some of the local governments directly impacted by the 2009 court decision invalidating access to Lake Lanier for drinking water are implementing a new Metro District requirement: toilet rebates for multi-family, residential customers.[36] Three local governments have begun developing their rebate program already: city of Atlanta, city of Gainesville, and Cobb County.[37] Although the city of Gainesville and Cobb County programs are only just underway, Atlanta's program has been in place since October 2010 and has already yielded some significant water savings. Since its inception in October 2010, Atlanta has provided $253,600 in rebates for 2,536 toilets, saving 26.5 million gallons of water annually while preventing 63.4 tons of porcelain from reaching landfills due to mandatory recycling requirements.[38]

Atlanta works with two end-use recyclers, Patterson Services and Stephens MDS, that crush toilet porcelain for reuse in road paving, landscaping, and countertops. Photo ©iStockphoto.com/J. Montgomery Brown.

All of these measures rely on mandates or incentives to induce retrofitting. Another option that has not been given serious consideration by the Metro District is direct installation of efficient plumbing fixtures. In 2011, the Metro District estimated there were 615,000 homes in metro Atlanta predating 1993 still in need of retrofits. If we assume a 2% rate of retrofit, over 600,000 homes in metro Atlanta remain in need of retrofits. A direct installation of just one toilet in each of these homes could yield as much as 29.5 MGD in water savings. Installing a single faucet and showerhead along with the single toilet could yield an additional 4.7 MGD.[39]

In order to maximize potential water savings by replacing outdated plumbing fixtures, we make the following recommendations:

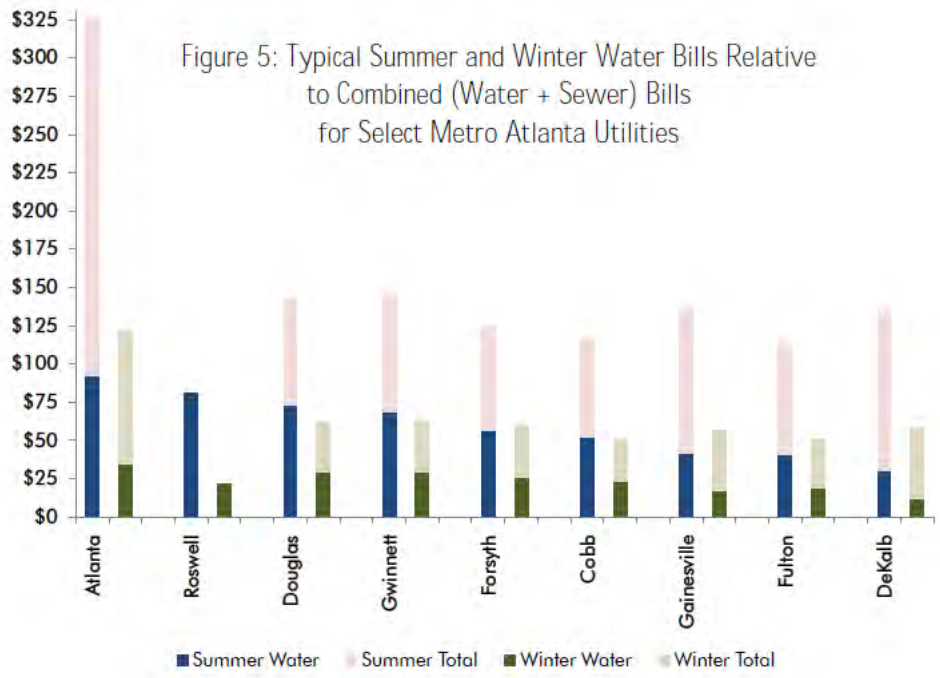
2012 RECOMMENDATIONS

- All Metro local governments should adopt low income assistance programs similar to Atlanta's "Care and Conserve" program.
- During the 2014 plan update, the Metro District should require all local governments to enact a retrofit on reconnect ordinance applicable to new residential and commercial customers.
- During the 2014 update, the Metro District should examine the costs and benefits of a district-wide direct installation program that would expedite retrofitting for current customers.
- During the 2014 update, the Metro District should make the multi-family toilet rebate program a district-wide requirement and provide all local governments with institutional support to administer the program.
- During these tough economic times during which local governments are loath to incur more debt, GEFA should provide more grants and zero-interest loans to help local governments retrofit pre-1993 buildings with efficient plumbing fixtures.

3) Price Water Right

Because each utility's pricing structure is unique, and because data are lacking with respect to how water use has changed in response to changes made to the pricing structure, this metric is difficult to evaluate. What we can say is that although monthly bills may vary somewhat across the Metro District, the city of Atlanta's rates remain high, virtually double any other utility's rates (Figure 5).

As we noted in our 2011 report, high water rates coupled with a tiered pricing structure means Atlanta's businesses continue to lead the way in saving money by saving water. Unfortunately, most other jurisdictions not only fail to price water effectively, but also do not impose a tiered pricing structure on commercial customers to help incentivize reduced use. As the water loss audits reveal, the need to "price water right" in order to finance repairs for leaky infrastructure is greater than ever, and commercial customers should help shoulder the cost of infrastructure repair.



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2012 RECOMMENDATIONS

- During the 2014 plan update, the Metro District should require all local utilities to impose a multi-tiered, conservation pricing structure on commercial customers.
- During the 2014 plan update, the Metro District should require all utilities to evaluate the efficacy of their current conservation pricing structure for residential customers and adjust the pricing structure as needed to secure additional water savings.

4) Reduce Outdoor Water Use

Georgia's 2010 Water Stewardship Act imposed a partial ban on daytime watering. Unfortunately, the Act contains so many exceptions they appear to virtually undo any benefits.[40] Nonetheless, local governments have found other ways to encourage customers to reduce reliance on treated drinking water while still meeting outdoor watering needs.

Take for example rainwater harvesting. Virtually all local governments we surveyed offered workshops to demonstrate how to assemble rain barrels and explain their water savings benefits. A rain barrel can save the average household 1,300 gallons of water during the summer, amounting to 40% of total household water use.[41] In our 2011 report, we noted several innovative rainwater harvesting projects which are helping to reduce outdoor water demand (e.g., Atlanta Golf Club, Enota Multiple Intelligences Academy, Sweetwater Creek State Park, Weatherford Place).

Some local governments and businesses also are exploring rainwater harvesting as a way to reduce indoor water demand. For example, in September of 2011, Atlanta's City Council

passed an ordinance that permits rainwater harvesting for indoor potable uses (e.g. showering, dishwashing). This ordinance was among the first in the nation and is serving as a model for other local governments across the country. Stonehurst Place, a local bed and breakfast inn, was the inspiration for this ordinance and is proposing to take rainwater harvesting to the next level. Upon completion, Stonehurst will collect rainwater from its rooftop and store it underground for irrigation as well as reuse indoors. Some of that rainwater will pass through a six-step purification process before getting piped indoors for use during clotheswashing, dishwashing, and bathing. Once that indoor water is used, the resulting grey water is collected, filtered, treated, and then used once again to flush toilets. Finally, energy needs are fulfilled using solar power.[42]

Chattahoochee Riverkeeper partners with local governments, schools, churches, and clubs to offer rain barrel workshops to show people how to use recycled 60-gallon syrup drums donated by the Coca-Cola Company to harvest rainwater. Photo courtesy of Bonny Putney.

According to the Southeast Rainwater Harvesting Systems Association (SERHSA), rainwater harvesting on a large scale has the potential to provide 27 MGD of water for both indoor and outdoor uses by 2016.[43] Whether on a large or a small scale, reducing reliance on our drinking water system not only saves water but also saves energy that is no longer needed to treat and transport water from treatment plants to homes and businesses. Moreover, rainwater harvesting helps reduce the stress we put on our stormwater systems, alleviating runoff and keeping our streets safer and streams cleaner.

In 2011, we honored Cobb County Water System for its simple, yet effective campaign targeting outdoor water use. Cobb County's "Give 'em an inch…Grow a yard!" campaign continues to deliver a basic message to water customers: plants and lawns only need one-inch of water per week. During the 2007 drought, this campaign helped reduce Cobb County's per capita water use by 7%. In response to our current drought, Cobb County has now partnered with the Georgia Green Industry Association and the Georgia Urban Agriculture Council in order to broaden the campaign by reaching out to landscapers, nurseries, and irrigators.

In our 2011 report, we also noted the voluntary commitment of Georgia's golf course superintendents to reduce water use substantially through a wide array of best management practices. These partnerships remain strong and since 2003, water withdrawals by Chattahoochee golf courses averages well under 1.0 MGD annually for all courses combined.[44]

Cobb County continues to promote other best management practices by offering training and licensing workshops for professional landscapers and irrigators.[45]

2012 RECOMMENDATIONS

- State and local governments should provide financial and regulatory incentives (e.g., stormwater fee waivers) for increasing rainwater harvesting for outdoor use.
- State and local governments should evaluate the potential of rainwater harvesting for non-potable indoor use (e.g., institutional toilets).
- GEFA should provide grants and interest-free loans to support innovative rainwater harvesting projects.
- The state should require and set minimum standards for landscaping and irrigation certification.

5) Increase Reliance on Reuse

Water reuse involves the collection and treatment of wastewater, which is then available to help offset demands on our drinking water systems. Reuse water should be distinguished from gray water, the latter of which may include wastewater from baths, showers, sinks, and clothes washers. Gray water may be used for non-potable purposes such as irrigation and flushing toilets with little or no treatment.

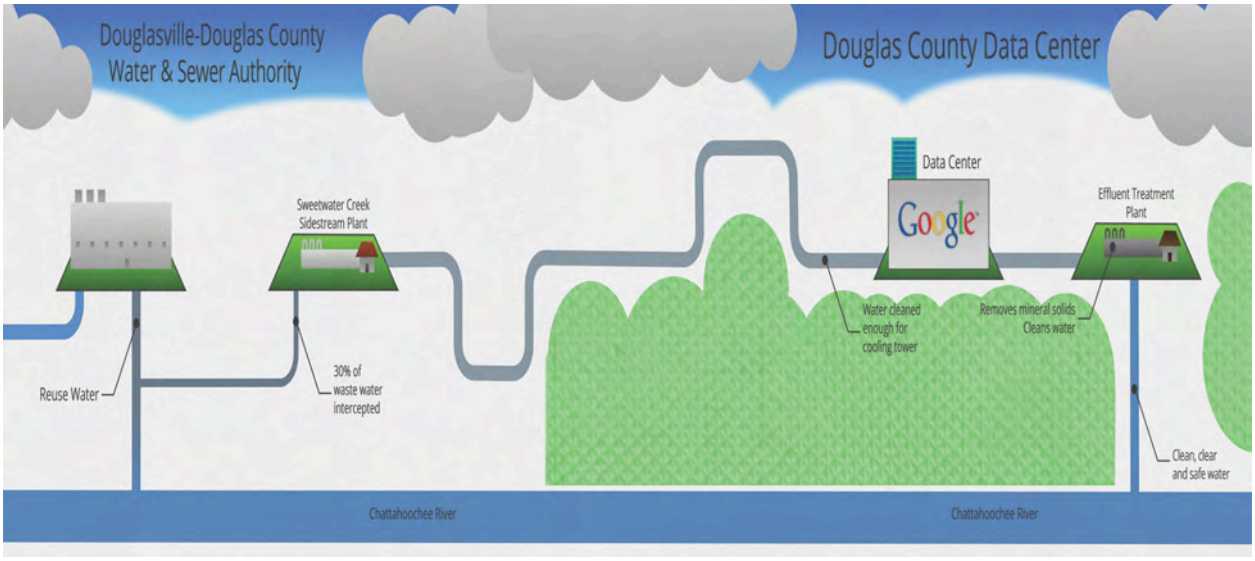
Reuse water consists of treated wastewater that can be used for potable (i.e., drinkable) and non-potable purposes, depending on the level of treatment. In 2011, we showcased several local governments and businesses that rely on reuse to help reduce their water demand, including Fulton County's Johns Creek Environmental Campus and Gwinnett County's F. Wayne Hill Water Resources Center. Forsyth County also has an active reuse program. With a capacity of 2.5 MGD, the Fowler Water Reclamation Facility currently serves nineteen facilities in south Forsyth County, including schools, golf clubs, and parks.[46] Potential reuse for Fulton County, Gwinnett County, and Forsyth County is 87.5 MGD, but only 20.6 MGD of treated wastewater are used currently for potable and non-potable purposes, including irrigation, drinking water, and lake level augmentation.[47]

At least two other local governments have begun to explore reuse as an option for meeting their water supply needs. DeKalb County has initiated a feasibility study to evaluate the extent to which reuse may help limit interbasin transfers of water out of the Chattahoochee to the Ocmulgee, while the city of Atlanta is considering an ambitious reuse project that would use treated wastewater for outdoor irrigation of parks, golf courses, and schools lying along the Beltline.

Some local businesses also look to reuse as a means of saving water and money. In our 2011 report we highlighted water recycling by Manheim, which has reduced water consumption at its auto reconditioning center by 60%. Similarly, we reported that the Cartersville Anheuser-Busch has reduced water use at its beer brewery by 15% through water reclamation and reuse within its facility.

Consider also Alcon in Johns Creek, an eye product manufacturing facility built in 1996. This facility was expected to reach full capacity by 2002 and require Chattahoochee withdrawals of nearly two million gallons of water a day to operate. However, the state would only permit half that amount. Alcon invested $2.2 million to construct an onsite conservation and recycling system which has reduced consumption of treated drinking water by nearly 80% while saving half a million dollars *annually*.

Another example is the Google Data Center in Douglas County. Rather than use treated drinking water to help cool its facility, Google invested $17 million in a wastewater treatment plant to intercept and treat wastewater collected by Douglasville-Douglas County Water and Sewer Authority. Every day the Google-funded Sweetwater Creek Sidestream Plant diverts approximately 1.0 MGD of treated wastewater to the data center. Any water that is not evaporated during cooling is treated and returned to the Chattahoochee.



Google uses treated wastewater provided by Douglasville-Douglas County Water and Sewer Authority to cool its data center. The remaining cooling effluent is treated again and then discharged back into the Chattahoochee River. Diagram courtesy of Google.

In spite of these success stories, enthusiasm for reuse as a means of meeting future water supply needs remains lacking. Georgia EPD gave the Metro District a 2035 goal to reuse 10% of water withdrawn, which equates to about 100 MGD. According to the Metro District, they have met this goal: currently District utilities are reusing 16% of their treated wastewater, or over 100 MGD. By 2035, the District estimates that percentage will increase to 26% or approximately 263 MGD.[48] The Governor's Contingency Task Force estimated that as much as 252 MGD is possible through indirect potable reuse in six metro Atlanta counties alone.[49] Clearly, reuse is a water supply option that merits further exploration.

2012 RECOMMENDATIONS

- All Metro local governments should conduct a feasibility study to explore the potential benefits and detriments of relying on reuse to reduce outdoor water demand.
- During the 2014 update, the Metro District should assess the degree to which reuse projects may help meet future water demand.

6) Promote Pervious Paving and Other Green Infrastructure

Hard surfaces including parking lots, roads, sidewalks, and buildings pose an ongoing threat to water quality and availability. Hard surfaces increase stormwater runoff, polluting our rivers by sending sediment-laden water rapidly downstream. Hard surfaces also impede our ability to store water locally underground as baseflow; baseflow is needed especially during the dry summer months to help augment our rivers and lakes. One cost-effective way to enhance groundwater infiltration and protect water quality is to forego traditional paving in favor of pervious or porous paving.

In our 2011 report, we highlighted several local businesses (Stone Mountain Park, Weatherford Place, Gwinnett Environmental & Heritage Center, Sweetwater Creek State Park) that employ pervious or porous paving at their facilities. In Appendix B we provide more information on the costs of installation and maintenance as well as provide some resources for those who are interested in this best management practice.

As we did in 2011, we again emphasize the benefits of using natural features to help augment our water supply by reducing rapid stormwater runoff and enhancing groundwater infiltration. These features include riparian buffers, wetlands, and even green spaces. They are relatively inexpensive, sustainable, and provide a myriad of additional benefits including water filtration, wastewater assimilation, flood control, recreation, and habitat for fish and wildlife. Water management does not typically focus on these measures as a means of augmenting water supply; nonetheless, investing in "green infrastructure" can help us meet our future water supply needs.

Local governments such as Roswell, Gwinnett County, DeKalb County, and Douglasville-Douglas County have formed utilities to manage stormwater more effectively. We strongly recommend that other local governments follow suit and either form their utilities and impose fees on customers based on impervious surface coverage in order to manage stormwater better or offer credits or waivers for reducing impervious surfaces.

2012 RECOMMENDATIONS

- State and local governments should provide financial and regulatory incentives (e.g., stormwater fee waivers, expedited permit review) for increasing use of pervious paving and other green infrastructure.
- During the 2014 plan update, the Metro District should add pervious paving to its list of options for compliance with the green infrastructure requirement within the District's Watershed Management Plan.

7) Invest in Energy Efficiency

Nearly half of all surface water withdrawn in Georgia—2.7 billion gallons a day—is used to cool thermoelectric power plants.[50] A significant portion of the water withdrawn is evaporated while keeping these plants cool; in fact, 35-40% of the water withdrawn to cool the two coal-fired plants along the Chattahoochee River between Atlanta and West Point Lake is lost to evaporation.[51] Therefore, reducing energy demand and increasing energy efficiency has the additional benefit of reducing water use.

Last May, Better Buildings Challenge partners including the city of Atlanta, Atlanta Gas Light, and Central Atlanta Progress marked completion of energy upgrades at the Civic Center. Photo courtesy of Central Atlanta Progress.

In spite of the obvious water savings benefits associated with improved energy efficiency, Georgia's Water Stewardship Act of 2010 included only one measure: after July 1, 2012, all new commercial and industrial construction must install high-efficiency cooling systems if applicable. This measure should generate at least 5.4 MGD in water savings for metro Atlanta.[52]

Last year we also reported that the state had suspended the fall tax holiday, which would have exempted energy and water efficient appliances and fixtures from sales tax. Fortunately, the state legislature has reinstated the holiday for 2012 and 2013.[53] This October holiday exempts Energy Star and Water Sense certified products, including dishwashers, clothes washers, refrigerators, air conditioners, ceiling fans, fluorescent light bulbs, programmable thermostats, toilets, urinals, showerheads, and faucets from sales tax.

In our 2011 report, we recognized energy efficient innovations for several metro Atlanta businesses, including Manheim, Philips Arena, TOTO, and Weatherford Place. A relatively new initiative, the Better Buildings Challenge (BBC), has begun to yield additional energy savings within Atlanta's business sector. As noted earlier, in order to participate in the BBC, Atlanta businesses must commit to reducing energy and water use 20% by 2020. In just three years, the BBC pilot facility, Atlanta Civic Center, has reduced energy use 25%. Through major improvements to its heating, cooling, and lighting systems, the Center has saved $93,000 in utility costs over the past six months with an annual savings of $200,000 anticipated.[54]

2012 RECOMMENDATIONS

- The state should provide rebates for the purchase of Energy Star and WaterSense appliances.
- The state should adopt legislation phasing in the replacement of low-efficiency appliance inventory (i.e., clothes washers and dishwashers) with Energy Star models.
- The state should set minimum water and energy efficiency requirements for power plants.

CONCLUSION

The Chattahoochee River is the most heavily-used water resource in Georgia. The ability of the river system to satisfy growing and competing demands simply depends on our ability to share. In the absence of good stewardship, our downstream neighbors have little incentive to work with us to finalize an equitable water sharing agreement for the entire Apalachicola-Chattahoochee-Flint river basin, placing our future water security at risk. Many local governments in metro Atlanta have taken the lead by implementing effective conservation measures such as those outlined in this report. It is up to our state leaders to take further action by supporting and building upon these local successes.

Atlanta Department of Watershed Management

PERFORMANCE DASHBOARD

POPULATION	
Population Served (2011)[55]	650,000
City Population Change (2000 to 2010)[56]	0.8%
WATER USE	
Primary Source	Chattahoochee River
Annual average withdrawal (MGD)[57]	84.1 (2010) 2.2% increase from 2009
Monthly peak withdrawal (MGD)[58]	98.7 (2010) 4.2% increase from 2009
Single-family household winter use (gallons/month)[59]	5,173 (2011) 34.6% increase from 2010
WATER LOSS (2012)[60]	
AWWA audit data validity score	58
Apparent water loss	8.1%
Real water loss	18.0%
ILI	3.99
Real water loss goal (2025)[61]	14.0%
CONSERVATION PRICING[62]	
Residential	3 increasing blocks
Winter monthly water bill/combined water & sewer bill (assuming 5,000 gallons/month)	$34.54/$121.98
Summer monthly water bill/combined water & sewer bill (assuming 12,000 gallons/month)	$92.18/$326.45
Commercial	3 increasing blocks
OTHER	
Single-family toilet rebates (Sept. 2011)[63]	5,197 (1.28 gpf)/ 5,597 (1.6 gpf)
Multi-family toilet rebates (May 2012)[63]	2,536 (1.28 gpf)
Reuse[64]	No current reuse program; however, the city is exploring the feasibility of a reuse loop along the Beltline to provide irrigation water for several golf courses and 30 city parks as well as water to flush toilets in new homes and businesses constructed along the Beltline.
Rainwater harvesting[65]	Since 2009, Atlanta has hosted 12 rain barrel workshops, with 130 participants and 159 (55-gallon) rain barrels distributed. In 2011, the city led the nation by enacting an ordinance authorizing single-family homeowners to harvest rainwater for indoor potable use.

Cobb County Water System

PERFORMANCE DASHBOARD

POPULATION	
Population Served (2011)[55]	533,000
Total County Population Change (2000 to 2010)[56]	13%
WATER USE	
Primary Source	Chattahoochee River
Annual average withdrawal (MGD)[57]	43.3 (2010) 0.7% decrease from 2009
Monthly peak withdrawal (MGD)[58]	49.4 (2010) 3.9% decrease from 2009
Single-family household winter use (gallons/month)[59]	5,040 (2011) 4.9% decrease from 2010
WATER LOSS (2011)[60]	
AWWA audit data validity score	74
Apparent water loss	1.7%
Real water loss	6.3%
ILI	1.06
Real water loss goal (2025)[61]	<10%
CONSERVATION PRICING[62]	
Residential	5 increasing blocks
Winter monthly water bill/combined water & sewer bill (assuming 5,000 gallons/month)	$23.71/$50.21
Summer monthly water bill/combined water & sewer bill (assuming 12,000 gallons/month)	$52.48/$116.08
Commercial	uniform block
OTHER	
Single-family toilet rebates (Sept. 2011)[63]	7,237 (1.28 gpf)/ 9,896 (1.6 gpf)
Reuse[64]	No current reuse program in the Chattahoochee basin; however, the Northwest Water Reclamation Facility (Coosa River Basin) provides 2 MGD of treated wastewater for irrigation of the Cobblestone Golf Course and the Acworth Sports complex.
Rainwater harvesting[65]	Cobb County hosts an annual rain barrel decorating contest: "Rain Barrel of Fun." Each year, 15 public elementary schools decorate 15 barrels. To date, more than 50 schools and hundreds of students have participated. Cobb County also offers its customers an online video and do-it-yourself rain barrel guide.[66]

DeKalb County Department of Watershed Management

PERFORMANCE DASHBOARD

POPULATION	
Population Served (2011)[55]	670,000
Total County Population Change (2000 to 2010)[56]	3.9%
WATER USE	
Primary Source	Chattahoochee River
Annual average withdrawal (MGD)[57]	74.9 (2010) 1.4% increase from 2009
Monthly peak withdrawal (MGD)[58]	87.6 (2010) 2.1% increase from 2009
Single-family household winter use[59]	Not Available
WATER LOSS (2011)[60]	
AWWA audit data validity score	72
Apparent water loss	0.5%
Real water loss	20.5%
ILI	3.54
Real water loss goal (2025)[61]	15.2%
CONSERVATION PRICING[62]	
Residential	4 increasing blocks
Winter monthly water bill/combined water & sewer bill (assuming 5,000 gallons/month)	$12.00/$58.49
Summer monthly water bill/combined water & sewer bill (assuming 12,000 gallons/month)	$30.03/$134.55
Commercial	4 increasing block
OTHER	
Single-family toilet rebates (Sept. 2011)[63]	10,419 (1.28 gpf)/ 5,457 (1.6 gpf)
Reuse[64]	No current reuse program; however, DeKalb County is exploring the feasibility of reuse as a means of capping future interbasin transfers of water out of the Chattahoochee basin into the Ocmulgee basin.
Rainwater harvesting[65]	Over the past 18 months, DeKalb County has hosted three rain barrel workshops, with 38 participants and 46 (55-gallon) rain barrels distributed.

Douglasville-Douglas County Water & Sewer Authority

PERFORMANCE DASHBOARD

POPULATION	
Population Served (2010)[55]	108,027
Total County Population Change (2000 to 2010)[56]	43.6%
WATER USE	
Primary Source	Dog River & Bear Creek (Chattahoochee tributaries)
Annual average withdrawal (MGD)[57]	11.9 (2010) 13.3% increase from 2009
Monthly peak withdrawal (MGD)[58]	12.6 (2010) 3.3% increase from 2009
Single-family household winter use (gallons/month)[59]	4,449 (2011) 0.3% increase from 2010
WATER LOSS (2011)[60]	
AWWA audit data validity score	71
Apparent water loss	2.1%
Real water loss	14.8%
ILI	1.37
Real water loss goal (2035)[61]	12.4%
CONSERVATION PRICING[62]	
Residential	3 increasing blocks
Winter monthly water bill/combined water & sewer bill (assuming 5,000 gallons/month)	$29.70/$61.55
Summer monthly water bill/combined water & sewer bill (assuming 12,000 gallons/month)	$72.99/$142.25
Commercial	3 increasing blocks
OTHER	
Single-family toilet rebates (Sept. 2011)[63]	2,275 (1.28 gpf)/ 228 (1.6 gpf); Note: DDCWSA has suspended its rebate program
Reuse[64]	Douglasville-Douglas County diverts 6 MGD of treated wastewater to the base of Dog River Reservoir in order to augment stream flow below the dam.
Rainwater harvesting[65]	Douglasville-Douglas County has held two workshops, attended by 121 participants. Workshop participants learned how to construct rain barrels and landscape with drought tolerant plants.

Forsyth County Water & Sewer

PERFORMANCE DASHBOARD

POPULATION	
Population Served (2011)[55]	114,499
Total County Population Change (2000 to 2010)[56]	78.4%
WATER USE	
Primary Source	Lake Lanier (Chattahoochee River)
Annual average withdrawal (MGD)[57]	7.8 (2010) 25.8% increase from 2009
Monthly peak withdrawal (MGD) [58]	10.4 (2010) 3.7% decrease from 2009
Single-family household winter use (gallons/month)[59]	4,800 (2011) 4.3% increase from 2010
WATER LOSS (2011)[60]	
AWWA audit data validity score	81
Apparent water loss	1.3%
Real water loss	9.4%
ILI	0.81
Real water loss goal (2025)[61]	Eliminate all unaccounted for water loss
CONSERVATION PRICING[62]	
Residential	5 increasing blocks
Winter monthly water bill/combined water & sewer bill (assuming 5,000 gallons/month)	$25.60/$59.80
Summer monthly water bill/combined water & sewer bill (assuming 12,000 gallons/month)	$56.18/$124.26
Commercial	uniform block
Other	
Single-family toilet rebates (Sept. 2011)[63]	131 (1.28 gpf)/ 80 (1.6 gpf)
Reuse[64]	The Fowler Water Reclamation Facility provides treated wastewater for irrigation of a high school, two public parks, and a golf course.
Rainwater harvesting[65]	Since 2008, Forsyth County has hosted 22 rain barrel workshops, with 324 participants and 280 (55-gallon) rain barrels distributed.

Fulton County Department of Public Works

PERFORMANCE DASHBOARD

POPULATION	
Population Served (2011)[55]	172,533
Total County Population Change (2000 to 2010)[56]	12.8%
WATER USE	
Primary Source	Chattahoochee River
Annual average withdrawal (MGD)[57]	40.1 (2010) 8.1% increase from 2009
Monthly peak withdrawal (MGD)[58]	52.8 (2010) 1.1% decrease from 2009
Single-family household winter use (gallons/month)[59]	11,127 (2011) 13.3% increase from 2010
WATER LOSS (2011)[60]	
AWWA audit data validity score	81
Apparent water loss	4.5%
Real water loss	3.9%
ILI	0.5
Real water loss goal (2025)[61]	Achieve minimum losses possible
CONSERVATION PRICING[62]	
Residential	3 increasing blocks (seasonal)
Winter monthly water bill/combined water & sewer bill (assuming 5,000 gallons/month)	$18.55/$50.70
Summer monthly water bill/combined water & sewer bill (assuming 12,000 gallons/month)	$40.81/$113.14
Commercial	uniform block
OTHER	
Single-family toilet rebates (Sept. 2011)[63]	1,342 (1.28 gpf)/ 1,154 (1.6 gpf)
Reuse[64]	Cauley Creek Plant provides 5 MGD of treated wastewater for golf course irrigation; Johns Creek Environmental Campus has an additional 17 MGD of treated wastewater available for reuse, but no customers yet.
Rainwater harvesting[65]	Since 2007, Fulton County has hosted 21 rain barrel workshops, with 950 (55-gallon) rain barrels distributed.

City of Gainesville

PERFORMANCE DASHBOARD

POPULATION	
Population Served (2011)[55]	126,620
City Population Change (2000 to 2010)[56]	32.2%
WATER USE	
Primary Source	Lake Lanier (Chattahoochee River)
Annual average withdrawal (MGD)[57]	17.5 (2010) 5.4% increase from 2009
Monthly peak withdrawal (MGD)[58]	19.9 (2010) No change from 2009
Single-family household winter use (gallons/month)[59]	4,361 (2011) 0.2% increase from 2010
WATER LOSS (2011)[60]	
AWWA audit data validity score	77
Apparent water loss	1.3%
Real water loss	14.3%
ILI	1.95
Real water loss goal (2025)[61]	12.2%
CONSERVATION PRICING[62]	
Residential	3 increasing blocks
Winter monthly water bill/combined water & sewer bill (assuming 5,000 gallons/month)	$17.16/$57.32
Summer monthly water bill/combined water & sewer bill (assuming 12,000 gallons/month)	$41.94/$135.62
Commercial	3 increasing blocks
OTHER	
Single-family toilet rebates (Sept. 2011)[63]	226 (1.28 gpf)/ 924 (1.6 gpf)
Reuse[64]	No current reuse program
Rainwater harvesting[65]	Over three years, Gainesville has hosted more than 25 rain barrel workshops and distributed more than 350 rain barrels (55 gallon).

Gwinnett County Department of Water Resources

PERFORMANCE DASHBOARD

POPULATION	
Population Served (2011)[55]	749,722
Total County Population Change (2000 to 2010)[56]	36.9%
WATER USE	
Primary Source	Lake Lanier (Chattahoochee River)
Annual average withdrawal (MGD)[57]	75.5 (2010) 3.8% increase from 2009
Monthly peak withdrawal (MGD)[58]	86.7 (2010) 0.7% decrease from 2009
Single-family household winter use (gallons/month)[59]	5,330 (2011) 0.6% increase from 2010
WATER LOSS (2011)[60]	
AWWA audit data validity score	72
Apparent water loss	6.8%
Real water loss	5.7%
ILI	0.94
Real water loss goal (2025)[61]	<10%
CONSERVATION PRICING[62]	
Residential	3 increasing blocks
Winter monthly water bill/combined water & sewer bill (assuming 5,000 gallons/month)	$29.40/$63.85
Summer monthly water bill/combined water & sewer bill (assuming 12,000 gallons/month)	$68.82/$144.50
Commercial	uniform block
OTHER	
Single-family toilet rebates (Sept. 2011)[63]	5,993 (1.28 gpf)/ 2,935 (1.6 gpf)
Reuse[64]	Gwinnett F. Wayne Hill Water Resources Center returns 20 MGD of treated wastewater to the Chattahoochee; en route, 180 million gallons reused to irrigate golf courses, public parks, sports fields, and commercial landscaping.
Rainwater harvesting[65]	Since 2006, the Gwinnett Environmental & Heritage Center has hosted 17 rain barrel workshops, with 160 participants and 160 rain barrels distributed.

City of Roswell

PERFORMANCE DASHBOARD

POPULATION	
Population Served (2011)[55]	14,300
City Population Change (2000 to 2010)[56]	11.4%
WATER USE	
Primary Source	Big Creek (Chattahoochee tributary)
Annual average withdrawal (MGD)[57]	1.1 (2010) No change from 2009
Monthly peak withdrawal (MGD)[58]	1.2 (2010) No change from 2009
Single-family household winter use (gallons/month)[59]	8,597 (2011) no change from 2010
WATER LOSS (2011)[60]	
AWWA audit data validity score	74
Apparent water loss	7.3%
Real water loss	4.1%
ILI	0.65
Real water loss goal (2025)[61]	<10%
CONSERVATION PRICING[62]	
Residential	3 increasing block
Winter monthly water bill/combined water & sewer bill (assuming 5,000 gallons/month)	$22.00/not applicable
Summer monthly water bill/combined water & sewer bill (assuming 12,000 gallons/month)	$81.20/not applicable
Commercial	3 increasing block
OTHER	
Single-family toilet rebates (Sept. 2011)[63]	171 (1.28 gpf)/ 185 (1.6 gpf)
Reuse[64]	No current reuse program.
Rainwater harvesting[65]	Over the past four years, Roswell has hosted four workshops and distributed 750 rain barrels.

OUTDOOR WATER USE GUIDELINES

ALLOWED DAILY
BETWEEN 4PM AND 10AM

- Automated irrigation systems
- Hand watering (without a shut-off nozzle)
- Lawn sprinklers

ALLOWED ON ODD/EVEN SCHEDULE
EVEN: MON · WED · SAT ODD: TUES · THUR · SUN
NO HOURLY RESTRICTIONS

- Car washing at home
- Charity car washes
- Hosing driveways
- Outdoor cleaning
- Pressure washing by homeowner
- Topping-off pools

ALLOWED ANYTIME
BY ANYONE

- Commercial pressure washing
- Drip irrigation or soaker hose
- Food gardens
- Hand watering (with a shut-off nozzle)
- Hydroseeding
- Installation and maintenance of an irrigation system
- Irrigation of newly installed turf (for the first 30 days)
- Irrigation of public recreational turf areas
- Irrigation of plants for sale
- Irrigation of sports fields
- Water from a private well
- Water from an alternate source (grey water · rain water · condensate)

For direction on activities not covered in any category here call 770.419.6244.

Produced by the Cobb County Water System

6.11.2010
Effective Immediately

APPENDIX B

UPPER CHATTAHOOCHEE RIVERKEEPER®

Keeping Watch Over Our Waters

Pervious Pavement

Solutions for Sustainable Development

Porous Alternatives to Conventional Paving

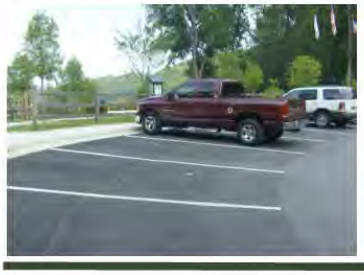
- **Pervious Concrete** is similar to conventional concrete, but with 15-20% open space to allow water to filter through the surface. Installation cost: 15-20% more than conventional concrete.
- **Porous Asphalt** relies on the same mixing and application process as conventional asphalt. No waterproofing sealants are needed. Installation cost: 10-15% more than conventional asphalt.
- **Permeable Interlocking Concrete Pavement (PICP)** funnels water between blocks of concrete into a basement layer of gravel and sand to drain away water. Installation cost: 3-4 times more than conventional concrete.
- **Grid Pavers** consist of recycled plastic or concrete with space between the pavers to collect water. Grass often grows between grid pavers. Installation cost: 4 times more than conventional concrete.

Overall Savings: Although installation is typically more expensive for pervious pavements, these surfaces lower management costs by increasing infiltration and eliminating the need for expensive ponds and drainage infrastructure to capture runoff, often making pervious pavements cheaper than conventional counterparts. Typical maintenance includes routine pressure washing or vacuuming.

Photo Courtesy of Interlocking Concrete Pavement Institute

Pervious materials have applications ranging from highway paving to patios and parking lots, such as this parking lot located in Stone Mountain Park. When installed properly, these materials are a durable and cost-effective system for effectively controlling stormwater runoff.

Porous asphalt used at a metro Atlanta area parking lot



Pervious Paving for Water Quality and Supply

Hard, impervious surfaces prevent water from seeping into the ground and rapidly transport pollutants to water resources. From 2001 to 2005, an average of 55 acres of land in metro Atlanta were converted to impervious surfaces each day (NRSAL, University of Georgia, http://narsal.uga.edu/projects/glut/data-stats/statewide-impervious-trends). Pervious paving solutions slow stormwater down and act as a natural filter for pollutants. Porous surfaces also increase the "baseflow," the water naturally stored in the ground that recharges lakes and streams during droughts.

EAST ATLANTA LIBRARY: HIGH PERFORMANCE & COST-EFFECTIVENESS

Above: EAL Pervious Concrete Lot
Below: Artist's Rendering

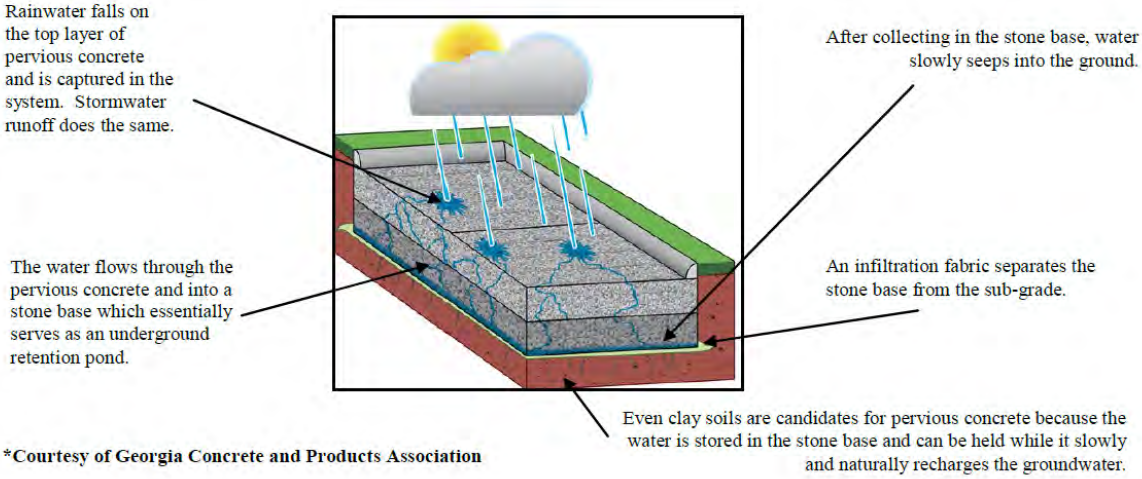
Located at 400 Flat Shoals Ave. in Atlanta, the pervious concrete parking lot at the East Atlanta Library (EAL) is a model of sustainability that demonstrates the highest performance standards. Constructed by Fulton County in 2004, the pervious concrete pavement continues to benefit the environment and contributes to the library's L.E.E.D. (Leadership in Energy and Environmental Design) certification.

The EAL parking lot consists of 10,000 square feet of 6" pervious concrete pavement designed to capture and infiltrate 5.2" of rain over a 24-hour period. The stormwater that falls on the pavement and roof is stored under the pervious concrete pavement in a ¾" (#57) stone base. A non-woven infiltration fabric was placed on the natural clay soil prior to the aggregate base.

The pervious concrete pavement at the EAL eliminated the need for traditional storm water piping, inlets, and detention ponds, providing first initial savings of $30,000 over a traditional asphalt parking lot. The long life span of concrete has provided the EAL years of maintenance free performance and has generated long-term savings. Infiltrating the stormwater on site decreases the load on Atlanta's overloaded infrastructure and will continue to save public funds for decades.

By keeping stormwater on-site, pervious concrete is particularly effective in capturing first flush pollutants. Pervious concrete eliminates heated runoff into sensitive waterways and mitigates the urban heat island effect.

A PERVIOUS CONCRETE PAVING SYSTEM COMMONLY FOUND IN GEORGIA



***Courtesy of Georgia Concrete and Products Association**

For more information, please visit **www.chattahoochee.org/no-time-to-waste-sustainability.php**

Upper Chattahoochee Riverkeeper (UCR) is a non-profit, 501(c)(3) environmental advocacy organization with the mission of protecting and preserving the Chattahoochee River system for the people and wildlife that depend upon it. 916 Joseph Lowery Blvd., Suite 3, Atlanta, GA 30318 — (404) 352-9828 — www.chattahoochee.org

September 2011

ENDNOTES

[1]Figure assumes an average of 151 gallons per person per day. Metro North Georgia Water Planning District, *Water Supply and Water Conservation Management Plan* (May 2009).

[2]CRK, *Filling the Water Gap: Conservation Successes and Missed Opportunities in Metro Atlanta*, (March 2011), available at http://www.ucriverkeeper.org/filling-the-water-gap-report.php.

[3]In Re: MDL – 1824 Tri-State Water Rights Litigation, 644 F.3d 1160 (11th Cir. 2011).

[4]http://www.cpc.ncep.noaa.gov/products/expert_assessment/seasonal_drought.html.

[5]http://www4.eere.energy.gov/challenge/.

[6]M. Cheyne, Director of Asset Management and Sustainability, City of Atlanta Department of Aviation, *pers. comm.*

[7]W. Strang, Senior Vice President of Operations, TOTO USA, *pers. comm.*

[8]Georgia Environmental Financing Authority and the University of North Carolina Environmental Finance Center, 2011, available at http://www.efc.unc.edu/RatesDashboards/.

[9]U.S. Census Bureau, 2010, State and County Quick Facts, available at http://quickfacts.census.gov/qfd/index.html.

[10]Metro North Georgia Water Planning District, *2011 Metro Water District Plan Implementation Review* (Dec. 2011).

[11]Metro North Georgia Water Planning District, *Water Supply and Water Conservation Management Plan* (May 2009).

[12]Data from National Bureau of Economic Research, http://www.nber.org/.

[13]Data from U.S. Department of Labor, Bureau of Labor Statistics, http://www.bls.gov/data/.

[14]Data from the U.S. Census Bureau, http://2010.census.gov/2010census/.

[15]Metro North Georgia Water Planning District, *Water Supply and Water Conservation Management Plan* (May 2009).

[16]http://water.sam.usace.army.mil/Buford_Dam_Water_Supply_Analysis_23_Nov_08.pdf.

[17]Data provided by W. Zeng, Hydrological Unit, Georgia Environmental Protection Division (EPD) (May 2012). Note, according to EPD, 2011 and 2012 water use data is not yet available.

[18]Metro North Georgia Water Planning District, *Water Supply and Water Conservation Management Plan* (May 2009).

[19]K. Shorter (AECOM) Memorandum to P. Stevens (Metro North Georgia Water Planning District), *Additional Conservation Measure Analysis* (Aug. 2, 2010).

[20]Metro North Georgia Water Planning District, *Water Supply and Water Conservation Management Plan* (May 2009).

[21]Georgia Water Stewardship Act of 2010 (SB 370/ HB 1094). O.C.G.A. §12-5-4.

[22]American Water Works Association, W*ater Audits and Loss Control Programs* (M36) (3rd edition, 2009).

[23]American Water Works Association, W*ater Audits and Loss Control Programs* (M36) (3rd edition, 2009); Georgia Association of Water Professionals, *Georgia Water System Audits and Water Loss Control Manual* (Sept. 2011).

[24]Metro North Georgia Water Planning District, *Amendments to the Water Supply and Water Conservation Management Plan* (Dec. 2, 2010).

[25]For more information on conservation pricing, see http://www.allianceforwaterefficiency.org/.

[26]http://www.efc.unc.edu/RatesDashboards/.

[27]Metro North Georgia Water Planning District, *2011 Metro Water District Plan Implementation Review* (Dec. 2011). Limit is two toilet rebates per household.

[28]DeKalb County and Cobb County limit rebates to three per household. Gainesville has a limit of four rebates per household.

[29]Metro North Georgia Water Planning District, *Amendments to the Water Supply and Water Conservation Management Plan* (Dec. 2, 2010). Note the rebate is available to the building owner, not necessarily the building tenant.

[30]Metro North Georgia Water Planning District, *Water Supply and Water Conservation Management Plan* (May 2009).

[31]We assume that utilities currently with real water loss of < 10% (i.e., Cobb County Water System, Gwinnett County Department of Water Resources, Forsyth County Water & Sewer, City of Roswell, and Fulton County Department of Public Works) do not reduce water loss any further. Also assumes that the volume of water supplied remains constant; annual savings could increase if more water is provided.

[32]EPA WaterSense figures were generated by assuming the national average of 2.6 people/ household. EPA's water calculator is available here: http://www.epa.gov/watersense/our_water/be_the_change.html.

[33]M. Langston, Director of Water Conservation, City of Atlanta's Department of Watershed Management, *pers. comm*.

[34]C. Lambert, Deputy Director of Construction and Maintenance, DeKalb County's Department of Watershed Management, *pers. comm*.

[35]Last year, the Metro District estimated 615,000 homes in the region still contained old-fashioned plumbing. PolitiFact, *Water advocate says toilets could save nearly 50 million gallons daily*, Atlanta Journal Constitution (April 9, 2011).

[36]Although the 2009 court decision was reversed in June of 2011, the District has remained committed to this requirement which currently applies to most of the local governments in Cobb, DeKalb, Forsyth, Fulton, Gwinnett, and Hall counties. Exempt are Fulton County's Palmetto, College Park, and East Point because they do not withdraw from the Chattahoochee River.

[37]Note that in 2011, Douglasville-Douglas County Water and Sewer Authority (DDCWSA) received federal funding to offer single and multi-family toilet rebates. However, due to the lack of applications and apparent interest, DDCWSA has since suspended its toilet rebate program.

[38]J. Carlile, Environmental Program Manager, City of Atlanta's Department of Watershed Management, *pers. comm*.

[39]Calculations based on EPA WaterSense figures generated by assuming a national average of 2.6 people/ household. Maximum water savings for single toilet retrofit is 6,900 gallons per person per toilet per year; maximum savings for single showerhead and single faucet retrofit is 1,100 gallons per person per fixture per year. EPA's water calculator is available here: http://www.epa.gov/watersense/our_water/be_the_change.html.

[40]See "Outdoor Water Use Guidelines" in Appendix A.

[41]U.S. Environmental Protection Agency, http://www.epa.gov/greenhomes/ConserveWater.htm.

[42]http://www.stonehurstplace.com.

[43]See SERHSA's submission to the Georgia Water Supply Task Force (2012), available at http://www.serhsa.com/.

[44]Data provided by W. Zeng, Hydrological Unit, Georgia Environmental Protection Division (EPD) (May 2012). Note, according to EPD, 2011 and 2012 water use data is not yet available.

[45]K. Nguyen, Senior Project Manager, Cobb County Water System, *pers. comm*.

[46]T. Perkins, Director, Forsyth County Water & Sewer Department, *pers. comm*. Note, Cobb County also has a reuse program in the Etowah River basin, but because our report focuses on the Chattahoochee River basin we do not include their program in our calculations.

[47]Fulton County potential reuse is 15 MGD (John's Creek) and 5 MGD (Cauley Creek); currently none is reused. Gwinnett County potential reuse is 60 MGD; currently 20 MGD is reused. Metro North Georgia Water Planning District, 2011 Metro Water District Plan Implementation Review (Dec. 2011). Forsyth County potential reuse is 2.5 MGD; currently, slightly more than 600,000 gallons per day are used (T. Perkins,Director, Forsyth County Water & Sewer Department, *pers. comm.*). This adds up to 20.6 MGD of 87.5 total MGD possible for these three utilities alone. Note treated wastewater also may be used to augment river flows to help mitigate for impoundments upstream. For example, Douglasville-Douglas County Water and Sewer Authority diverts 6 MGD of treated wastewater from the South Central Wastewater Treatment Plant to the base of Dog River Reservoir in order to replenish river flows in Dog River.

[48]Metro North Georgia Water Planning District, *Water Supply and Water Conservation Management Plan* (May 2009).

[49]Water Contingency Planning Task Force, *Findings and Recommendations* (Dec. 2009), available at http://gov.georgia.gov/00/channel_modifieddate/0,2096,78006749_154453222,00.html.

[50]U.S. Geological Survey, *Water Use in Georgia by County for 2005; and Water-Use Trends, 1980-2005*, available at http://pubs.usgs.gov/fs/2009/3034/pdf/fs2009-3034.pdf.

[51]Georgia Power, *Consumption Reports* (2003-2011) (on file with UCR).Note these estimates do not include water loss due to evaporation from hydropower reservoirs, which may be substantial. See River Network's *Burning our Rivers: the Water Footprint of Electricity* (2012), available at http://www.rivernetwork.org/news/burning-our-rivers-water-footprint-electricity.

[52]Water Contingency Planning Task Force, *Findings and Recommendations* (Dec. 2009), available at http://gov.georgia.gov/00/channel_modifieddate/0,2096,78006749_154453222,00.html. Task Force figures represent savings from commercial buildings only.

[53]https://etax.dor.ga.gov/salestax/bulletins/5-1-12_Sales_Tax_Holiday_IB_05_02_2012.pdf.

[54]http://www.atlantabbc.com/projects.

[55]Georgia Environmental Financing Authority and the University of North Carolina Environmental Finance Center, 2011, available at http://www.efc.unc.edu/RatesDashboards/.

[56]U.S. Census Bureau, 2010, State and County Quick Facts, available at http://quickfacts.census.gov/qfd/index.html.

[57]Data for 2009 and 2010 average annual daily surface water withdrawals provided by Georgia Environmental Protection Division. Withdrawals are for the Chattahoochee River basin only.

[58]Data for 2009 and 2010 peak summer monthly surface water withdrawals provided by Georgia Environmental Protection Division. Withdrawals are for the Chattahoochee River basin only.

[59]The figure represents average gallons used per single-family household monthly or daily (as indicated) in the winter. Metro North Georgia Water Planning District, *2011 Metro Water District Plan Implementation Review* (Dec. 2011). Data do not distinguish between indoor and outdoor use. Also, not all utilities distinguish between residential and commercial accounts or between single-family and multi-family accounts. Average household sizes differed for each county, as reported in the 2010 Metrics Report.

[60]Each utility provided their American Water Works Association (AWWA) Water Audit Software Report to CRK. The AWWA software computes "data validity score," "apparent water loss," and the infrastructure leak index, or "ILI." CRK computed "real water loss" as the percentage of total water supplied that consisted of "current annual real loss" (CARL). The AWWA software computes CARL by taking total water loss and subtracting out apparent water loss. Data validity scores theoretically range from 0 to 100, where 100 is optimally reliable. Over time, these scores should increase in response to accumulation of more accurate information.

[61]The 2010 Metro District plan requires each local utility to assess "real water loss" and set a goal for reduction. Metro North Georgia Water Planning District, *Water Supply and Water Conservation Management Plan* (May 2009). For select utilities impacted by the federal judicial ruling, utilities must cut in half any "real water loss" exceeding 10% by 2025. For remaining utilities, the timeline for reducing excessive water loss is 2035.

[62]The table characterizes the pricing structure for both commercial and residential customers. The table also notes the average monthly winter (5,000 gallons/month) and summer (12,000 gallons/month) water bills. Finally, the table notes average monthly winter and summer total bills for water and sewer combined. Rate structure and water bill data are available at http://www.efc.unc.edu/RatesDashboards/.

[63]Data is current as of September 2011. Metro North Georgia Water Planning District, *2011 Metro Water District Plan Implementation Review* (Dec. 2011).

[64]Metro North Georgia Water Planning District, *2011 Metro Water District Plan Implementation Review* (Dec. 2011). Additional information provided by each individual utility.

[65]Rain barrel workshop information provided by each individual utility.

[66]http://watershed.cobbcountyga.gov/files/rainbarrels.htm.

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Cover Photo - Boy splashing in Centennial Olympic Park fountain. Atlanta, GA
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Chattahoochee Riverkeeper, Inc.
916 Joseph E. Lowery Blvd. NW, Suite 3
Atlanta, GA 30318-5280

404-352-9828

www.chattahoochee.org