This survey was funded by GEFA. Additional support came from the Georgia Association of Water Professionals, the Georgia Municipal Association, the Georgia Department of Natural Resources' Environmental Protection Division, the Georgia Department of Community Affairs, the Association County Commissioners of Georgia, the Georgia Rural Water Association, and the US Environmental Protection Agency.

Water and Wastewater Rates and Rate Structures in Georgia

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Environmental Finance Center at UNC

September 2016

Click on any of the following questions:

Tools for Comparisons
- How many and which utilities and types of rates are analyzed in this report?
- Where can I find tools and tables I can use to help me evaluate our rates?

Four Myths about Rates
- Myth #1: Higher rates are bad.
- Myth #2: Comparing rates is simple.
- Myth #3: Pricing is simple.
- Myth #4: Promoting conservation requires increasing block rate structures.

Current Rate Structure Designs
- What are the utilities' base charges, and consumption allowances?
- What are the most common rate structure types in Georgia?
- How do rate structures differ between commercial and residential customers?
- How do rate structures differ between indoor and irrigation/outdoor rates?
- For block rate structures, how much consumption is included in the first block?
- How much do utilities charge per 1,000 gallons near the average consumption level?

Current Rates
- How much is charged for residential consumption?
- How much is charged for commercial consumption?
- How much is charged for residential irrigation water?
- How do rates differ based on utility size, utility type or river basin?
- How do rates differ for customers inside or outside municipal boundaries?

Rates Changes Over Time
- How often do utilities change their rates?
- How have residential rate structures changed in recent years?

Affordability
- What does the average Georgian pay for water and/or wastewater service?
- How affordable are utility rates in Georgia?

Promoting Conservation
- What can utilities do with rates to encourage conservation?
  Click to download guidelines for promoting conservation through rate structures

Financial Sustainability
- Are utilities financially self-sufficient in Georgia?
- Are rates reflective of full cost pricing in the state?

Water and Wastewater Rates and Rate Structures in Georgia
September 2016

This report details the results of a survey of water, wastewater and residential irrigation rates and rate structures current as of July 2016 conducted by the Georgia Environmental Finance Authority and the Environmental Finance Center at the UNC School of Government. Rates and rate structures are analyzed for 465 water and wastewater utilities throughout the State of Georgia. For more information, or to download tables of every rate structure and its computed bills, use the interactive Rates Dashboard designed to allow you to compare rates using multiple selection criteria, and to view rate sheets of individual utilities, please visit http://gefa.georgia.gov/ or http://www.efc.sog.unc.edu/project/georgia-water-and-wastewater-rates-and-rate-structures.

Any reference to tables, figures or subheadings, whether in the table of contents or within the text, are hyperlinked. Click on them to jump to the corresponding page.

Contents

Introduction

Water and wastewater rate setting is one of a local government's most important environmental and public health responsibilities. Water and wastewater rates ultimately determine how much revenue a community will have to maintain vital infrastructure. The purpose of this report is to help utilities in rate setting by providing an up-to-date, detailed survey of current statewide rate structures and trends. This report represents a collaborative effort between the Georgia Environmental Finance Authority (GEFA) and the Environmental Finance Center (EFC).

Over the course of this survey, 543 water and wastewater utilities were contacted by email, phone, letter, or fax, and 465 utilities (86 percent) responded by sending in their rate schedules. These participating utilities serve approximately 8.45 million Georgians and account for 97.2 percent of the population served by community water and wastewater systems in the state. Table 1 describes the utilities analyzed in this survey. For the first time, the survey includes "for-profit" or investor-owned utilities. Some utilities use more than one rate structure for different portions of their service areas, raising the total number of "rate structures" in our sample to 499. Copies of the 499 rate structures of participating utilities are available online at http://www.efc.sog.unc.edu/project/georgia-water-and-wastewater-rates-and-rate-structures.

Table 1: Number of Participating Utilities with Rates Data for FY 2015-16

Institutional Arrangement	Provides Water and Wastewater	Provides Water Only	Provides Wastewater Only	Total
Municipality	279	94	3	376
County/District	21	10	1	32
Authority	25	15	1	41
Consolidated Government	4	2	0	6
For-Profit	4	6	0	10
Total Number of Utilities	***333***	***127***	***5***	***465***
Number of Rate Structures	***347***	***145***	***7***	***499***

In addition to this report, tables of each utility's rates and key components of their rate structures are available from GEFA and the EFC. **It is important to stress that an examination of rates and rate structures only tells a part of the story.** Pressure to maintain low or relatively low rates has the potential to force utilities to run a deficit or avoid making necessary operational and capital expenditures. Ideally, rates should reflect the cost of providing service, which depends on diverse factors including size of treatment facilities, customer base, age of assets, type of water supply, and quality of receiving waters. Two neighboring utilities with similar customer bases may have very different costs that justify very different rate structures and rates. **Therefore, policy decisions drawn from the comparative information in this document should also consider many other factors such as age of system, geographic location, site-specific regulatory requirements, source of water, demand, and availability of resources.** A free, interactive Georgia Water and Wastewater Rates Dashboard that combines a utility's financial, physical, and customer characteristics with the capability of comparing rates among utilities that are similar in various categories is available on the web at http://www.efc.sog.unc.edu/reslib/item/georgia-water-and-wastewater-rates-dashboard.

Four Myths about Pricing

There are many oversimplifications and bits of "conventional wisdom" in the world of water finance and pricing which don't necessarily hold up under deeper investigation. Some of the myths dispelled by the analysis in this report include:

1. **MYTH: Higher rates are bad.** Higher rates often do not necessarily reflect poor or inefficient management. In fact, data show that some utilities with low rates do not generate sufficient revenue to properly maintain their system's assets, which could ultimately lead to long-term adverse cost and service impacts. Pressure to maintain low rates has the potential to force utilities to run a deficit or avoid making necessary operational and capital expenditures. Some utilities may have low rates because they have not re-examined their rate structures in many years, and their pricing structure may not support key finance and policy goals such as promoting conservation or maintaining affordability.

2. **MYTH: Comparing rates is simple.** An examination of rates and rate structures will only tell part of the story, and there are many different methods of comparing pricing. Ideally, rates should reflect the cost of providing service. Cost of service depends on diverse factors including geographic location, size of treatment facilities, customer base, age of assets, site-specific regulatory requirements, type of water supply, and quality of source water and receiving waters. Two neighboring utilities with similar customer bases may have very different costs that justify very different rate structures and rates. Therefore, policy decisions drawn from the comparative information should also consider the many other factors listed above. Furthermore, figuring out the most pertinent factors to compare can be a challenge. For example, the EFC's analysis revealed that in some cases, when comparing two utilities, one utility's rate may be higher than the other utility's rate for bills in the 0 to 4,000 gallon range, but lower at 5,000 to 10,000 gallon range, or vice versa. Comparing rates among utilities is really just a starting point for a more in-depth analysis.

3. **MYTH: Pricing is simple.** Georgia utilities employ a tremendous variety of pricing structures. Utilities show wide variation in how they set base charges and design block structures. Utilities have many design choices and should be thoughtful in customizing their rate structure to serve their specific needs as they evolve in time, rather than maintaining outdated rate structures or copying their neighbor's rate structure.

4. **MYTH: Promoting conservation requires increasing block rate structures.** Many utilities are facing water supply challenges and are looking for ways to use pricing structures to promote conservation. Many different types of pricing structures can be adopted to encourage conservation; some of these are quite complicated and some are very simple. Increasing block or increasing tier price structures are sometimes heralded as the solution to conservation rate setting, but the EFC's analysis clearly shows that some utilities with simpler rate structures (such as uniform rates) sent customers stronger conservation price signals than other utilities with increasing block structures. In fact, a significant minority of the utilities using increasing block rate structures had less effective conservation pricing signals than some utilities employing aggressive uniform rates. This is quite relevant to consider in light of the fact that the Water Stewardship Act of 2010 encourages Georgia utilities to examine their rates and rate structures and ensure that they are properly encouraging water conservation. Also, rather

than focusing on rate structures alone, utilities should consider all aspects of pricing. And above conservation, utilities must determine if their rates are set to truly reflect their costs, and make sure that rates are not artificially low.

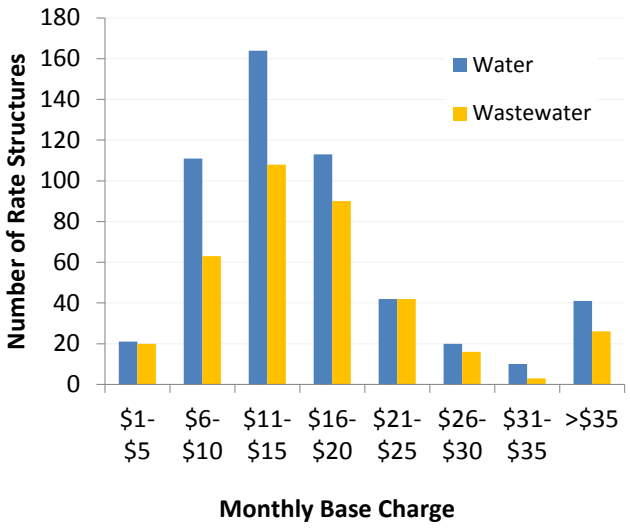
Overview of Rates and Rate Structures

Utilities employ a variety of rate structures to determine what their customers pay. Almost all use a combination of base charges and variable charges in their rate structures. There is considerable variation in how these are calculated and how they are assessed for different classes of customers.

Base Charges

Base charges contribute to revenue stability because they do not vary from month to month, regardless of consumption. However, high base charges can create affordability concerns, and can also make it difficult for a utility to encourage conservation. The number of residential rate structures with base charges and the range of these charges are shown in Figure 1. The median[1] residential base charges are presented in Table 2 by utility size. The median residential base charge applied by utilities in 2016 is $14.00 per month for water and $14.95 per month for wastewater. For combined utilities, the median combined water and wastewater base charge is $27.64 per month.

Figure 1: Monthly Base Charges for Residential Customers Among 492 Water and 349 Wastewater Rate Structures



[1] Most of the statistics cited in this report refer to *medians*. Exactly half of the rate structures in the sample have a value that is equal to or greater than (or equal to or lower than) the median value. The median is preferred over the average because averages are influenced by exceptionally high or low values whereas medians are not.

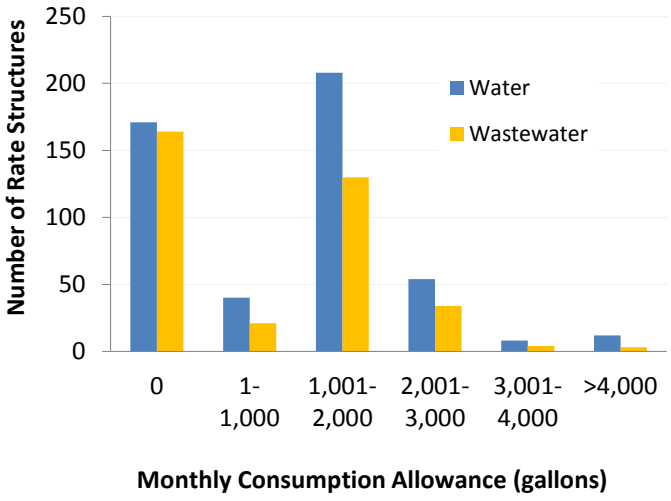
Table 2: Monthly Residential Base Charges in Water and Wastewater Rate Structures, by Utility Size

Size of Utility (Service Population)	Water Rate Structures			Wastewater Rate Structures		
	Total Number of Structures	Number with Base Charge	Median Base Charge	Total Number of Structures	Number with Base Charge	Median Base Charge
1 - 999	132	132	$15.00	50	50	$16.39
1,000 – 2,499	76	76	$14.00	61	61	$15.00
2,500 – 4,999	81	81	$12.69	71	70	$13.24
5,000 – 9,999	57	57	$13.67	52	51	$14.92
10,000 – 24,999	62	62	$12.63	56	55	$12.90
25,000+	54	54	$10.98	53	52	$11.43
Unknown service population	30	30	$26.84	10	10	$17.00
All Rate Structures	***492***	***492***	***$14.00***	***353***	***349***	***$14.95***

While every water utility and most wastewater systems have a base charge, their amounts vary by utility size. Often, including in previous Georgia surveys, larger utilities have lower base charges than smaller utilities, due to the stability of their larger revenue stream. In this year's survey, where service populations are known, this trend largely holds. Note that 29 of the 30 rate structures where service population is currently unknown are for-profit utilities (new to our rates survey in 2016), whose customers are typically more dispersed in Georgia.

A large number of residential rate structures (65 percent of water and 55 percent of wastewater rate structures) include a minimum amount of water consumption or wastewater disposal with their base charges (see Figure 2). For these utilities, the variable portion of the rate structure only takes effect when a customer uses more than the minimum included in the base charge. Thus, all customers of these utilities who consume or dispose of an amount up to the minimum allocation would receive the same bill, which is equal to the base charge. For both water and wastewater utilities, the median amount of allowance included with the base charge is 2,000 gallons per month. Only 4 percent of water and 2 percent of wastewater utilities include more than 3,000 gallons/month with the base charge.

Figure 2: Consumption included with Base Charge for Residential Customers Among 492 Water and 349 Wastewater Rate Structures



A large number of utilities vary the base charges by the customer's water meter size in order to distinguish large commercial and industrial users from residential and small commercial customers. Of the 492 water rate structures applied to commercial and non-residential customers, 104 (21 percent) vary the base charge by meter size. Similarly, of the 344 wastewater rate structures for commercial customers, 73 (21 percent) vary the base charge

by the water meter size. The range of meter-size-related base charges used by this subset of utilities is shown below in Table 3. For example, half of the commercial rate structures listed below assess base charges up to $58.09 per month for water for a 2" meter, and up to $137.90 for a 4" meter.

Table 3: Maximum Monthly Base Charge Applied to Commercial Customers by Utilities Whose Base Charges Vary by Meter Size

	Percentage of Rate Structures with Base Charges up to the Dollar Amount Listed					
	10%	25%	50%	75%	90%	100%
Water (n = 104)	**Base Charge Amounts**					
5/8"	$4.18	$8.53	$14.57	$19.07	$27.90	$45.00
3/4"	$4.18	$8.53	$14.57	$19.07	$27.90	$45.00
1"	$8.80	$12.97	$21.00	$33.28	$47.70	$75.00
1 1/2"	$13.30	$21.75	$38.64	$59.03	$87.61	$148.00
2"	$22.68	$33.75	$58.09	$100.34	$145.47	$210.00
3"	$33.59	$54.40	$99.03	$188.84	$308.18	$578.60
4"	$40.39	$75.00	$137.90	$296.13	$489.82	$599.50
6"	$44.44	$99.39	$209.25	$422.49	$672.70	$1,323.33
8"	$46.20	$106.50	$290.20	$560.93	$916.43	$2,352.90
10"	$47.34	$106.50	$281.50	$602.57	$1,088.20	$3,676.23
Wastewater (n = 73)						
5/8"	$6.06	$10.02	$15.64	$21.00	$30.54	$67.00
3/4"	$6.06	$10.02	$15.64	$21.00	$30.54	$67.00
1"	$10.46	$15.62	$25.12	$38.12	$59.59	$113.00
1 1/2"	$15.00	$22.97	$39.83	$60.00	$99.20	$237.00
2"	$20.34	$39.88	$63.75	$96.00	$169.30	$386.00
3"	$30.60	$57.00	$99.39	$181.89	$319.68	$763.51
4"	$45.87	$75.00	$155.30	$277.50	$554.90	$1,326.93
6"	$51.22	$97.89	$214.00	$469.14	$990.77	$2,460.00
8"	$51.22	$100.00	$284.00	$651.96	$1,319.14	$2,460.00
10"	$51.22	$100.00	$300.47	$739.50	$1,326.93	$2,780.79

Variable Charges: Uniform, Increasing Block, Decreasing Block, and Other Rate Structures

Figure 3 through Figure 6 present information on water and wastewater rate structures for "inside" customers, those who live within a utility's political jurisdiction or municipal boundaries. The three most common rate structures are uniform, increasing block, and decreasing block. In a uniform rate structure, the rate at which water/wastewater is charged does not change as the customer uses more water. In an increasing block structure, the rate increases with greater water consumption. This structure is often employed by utilities that want to encourage conservation. In a decreasing block structure, water rates decrease as consumption rises. This structure might be used to encourage economic development. Other rate structures used in Georgia include a hybrid of increasing and decreasing blocks where rates increase or decrease for specific targeted blocks of consumption, seasonal rate structures applying different rates at different times of the year, uniform rates that are capped at a maximum billable consumption amount, tiered flat fees, and a block rate structure that charges all consumption at the rate of the last used block. Seasonal uniform rate structures support conservation, especially for those utilities

that experience large seasonal consumption changes (e.g. tourist locations). Wastewater bills are almost always calculated based on the amount of metered water consumption. However, a fraction of wastewater utilities use rate structures with a cap on residential wastewater consumption. For example, if a utility caps its wastewater bill at 20,000 gallons, a customer that uses 25,000 gallons of water will only be charged for 20,000 gallons of wastewater disposal.

Most water and wastewater utilities use the same rate structure for residential, commercial, and industrial customers, but some have separate rate structures. In this survey, 45 percent of water utilities have a separate rate structure for their commercial customers, and a small fraction of these utilities also have a separate structure that pertains to their industrial customers. On the wastewater side, 49 percent have a separate rate structure for their commercial customers. The distribution of rate structure types used for commercial-specific rate structures (when the commercial rate structure is unique) shows a different pattern than shown in Figure 3 and Figure **4** for residential rate structures. Information on the unique rate structures pertaining to commercial customers is presented in Figure 5 and Figure 6. More details on commercial rates are available on page 17.

Figure 3: Residential Water Rate Structures (n=492)

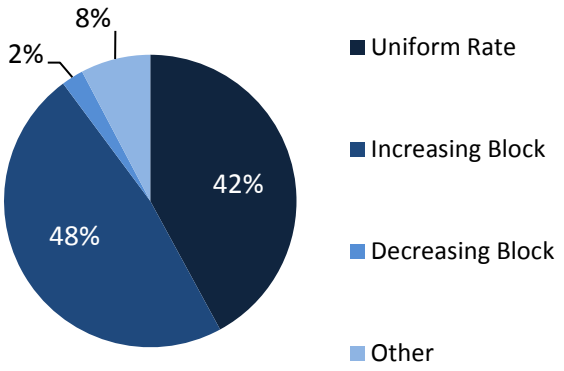


Figure 4: Residential Wastewater Rate Structures (n=353)

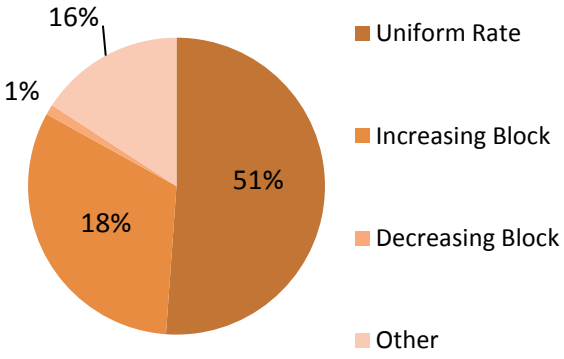


Figure 5: Commercial-Specific Water Rate Structures (n=221)

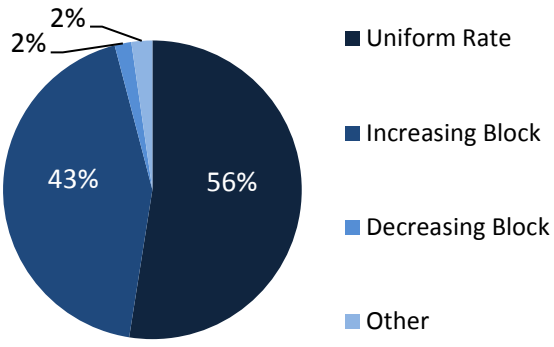
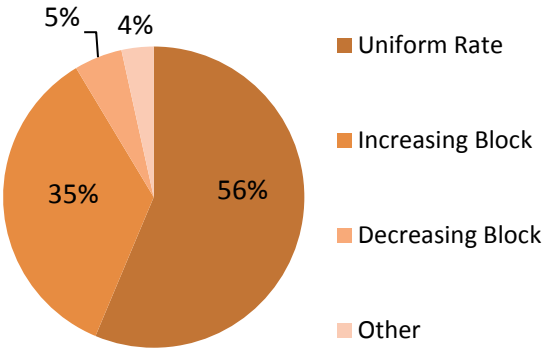


Figure 6: Commercial-Specific Wastewater Rate Structures (n=174)



While some utilities design separate rate structures for commercial users, other utilities use only one rate structure but design the blocks so that they inherently distinguish residential use from that of large commercial customers. A common practice is to set the first block high enough so that essentially all residential consumption is charged one rate (which is equivalent to a uniform rate for these customers) while most large commercial customers will typically exceed the first block, thus paying an increasing or decreasing block rate. Figure 7 below shows how many rate structures include various amounts of consumption and disposal in the first block of their residential block rate structure.

Figure 7: Maximum Quantity in the First Block Among 274 Water and 146 Wastewater Residential Block Rate Structures

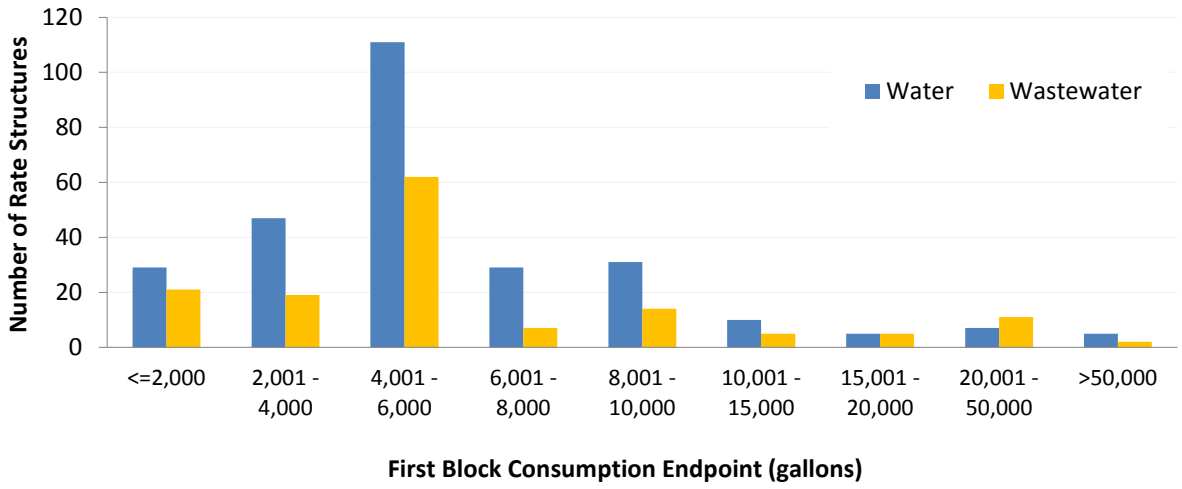


Figure 8 and Figure 9 (see next page) also show the percent of the population served under each rate structure applicable to consumption/disposal levels of up to 15,000 gallons/month. While only 48 percent of the water rate structures are increasing block structures through 15,000 gallons/month, 83 percent of all residential customers are served by these rate structures. Figure 9 shows that the majority of residential customers pay uniform rates for wastewater disposal.

Figure 8: Water Rate Structures Applicable to Residential Consumption up to 15,000 gallons/month (n = 492)

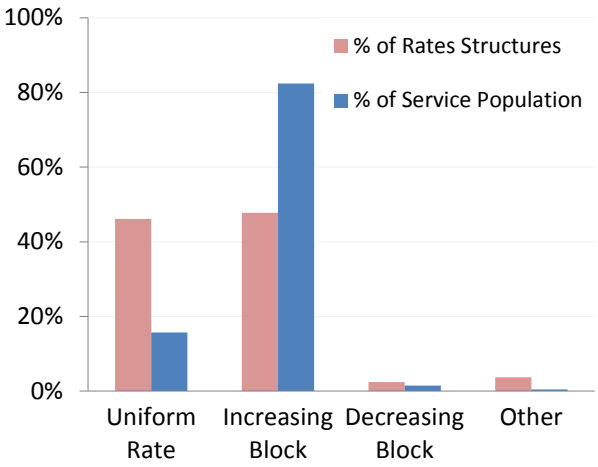
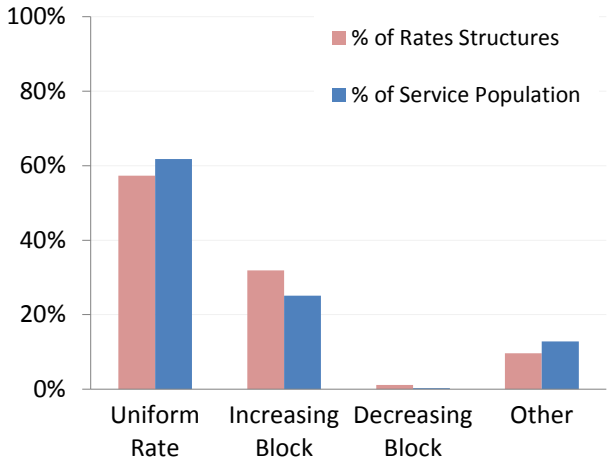


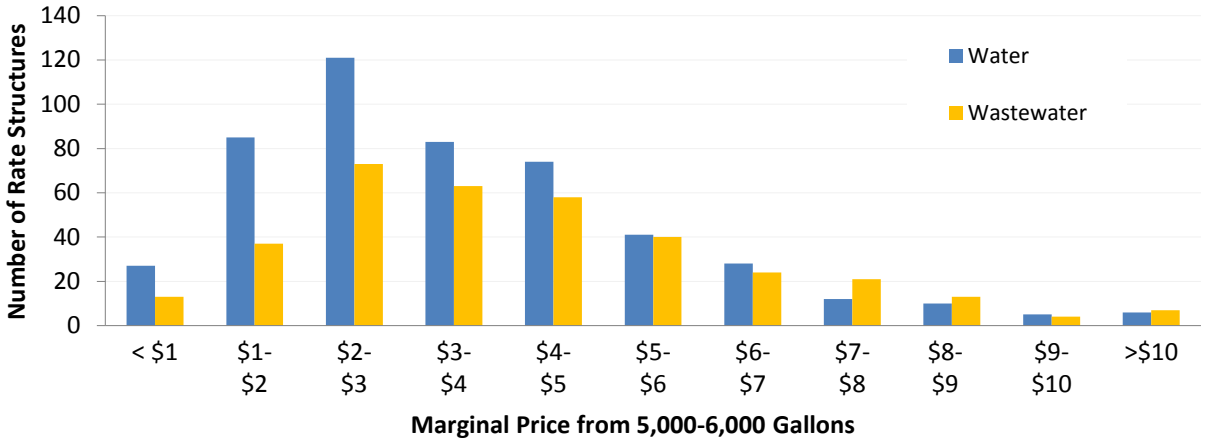
Figure 9: Wastewater Rate Structures Applicable to Residential Disposal up to 15,000 gallons/month (n = 353)



Residential customers in the Southeast consume an average of 4,000 to 5,000 gallons/month. Among the 492 water rate structures in the sample, the median price for the next 1,000 gallons (not including base charges) at the consumption level of 5,000 gallons/month is $3.20 per 1,000 gallons – 50 percent of the water rate structures have a price that is between $2.20 and $4.83 per 1,000 gallons. Changes in rate structures since last year are shown on page 9, and changes in rates are shown on page 13.

The price for wastewater is higher. Among the 353 residential wastewater rate structures in the sample, the median wastewater price for the next 1,000 gallons at 5,000 gallons/month is $3.90 per 1,000 gallons – 50 percent of the wastewater rate structures have a price that is between $2.65 and $5.53 per 1,000 gallons. The range of water and wastewater prices for the next 1,000 gallons at the 5,000 gallons/month consumption level is shown on Figure 10.

Figure 10: Price for the Next 1,000 Gallons at 5,000 gallons/month for 492 Water and 353 Wastewater Residential Rate Structures



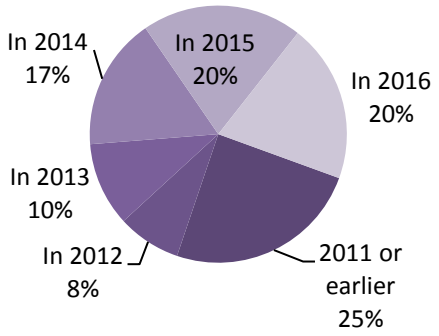
Among the 346 combined residential water and wastewater rate structures, the median combined price for the next 1,000 gallons is $7.41 per 1,000 gallons – 50 percent of the combined rate structures have a price that is between $5.05 and $10.50 per 1,000 gallons.

Some utilities provide the option to residential customers to install separate irrigation meters to supply their outdoor water usage. In some cases, the utilities have created a separate, unique rate structure specifically for these irrigation meters. In our sample of 492 water rate structures, only 56 (11 percent) had a unique rate structure for residential irrigation meters. Almost all, 53 out of 56, use a uniform or an increasing block rate structure. Read more about irrigation rates, and how they compare to standard rates, on page 17.

Changes in Residential Rate Structures in the Last Year

Most Georgia utilities actively evaluate and modify their rate structures every one or two years. The calendar year when sampled rate structures were first put into effect is shown in Figure 11 for each of the 426 rate structures in this sample (these are utilities active as of July 2016 that responded to this year's rates survey for which information about the effective date is available). The figure shows that 40 percent of the current rate structures have been made effective since January 2015, and 57 percent have changed their rates in the last three years. 31.5 percent of water utilities and 30.6 percent of wastewater utilities have raised their rates since the last rate survey. Only 25 percent of the rate structures were instated prior to 2011 (at least five years ago).

Figure 11: In What Calendar Year Were the Current Rate Structures First Instated? (n=426)



The trend amongst Georgia utilities for many years has been to move away from decreasing block rate structures to either uniform or increasing block structures. This trend is largely driven by an interest in preserving water supplies by promoting water conservation and discouraging excessive or wasteful consumption. The trend is in keeping with the state's encouragement of using conservation-oriented rates and rate structures, as put forth in the Water Stewardship Act.

This year's survey included 413 water rate structures and 310 wastewater rate structures that were also included in the 2015 survey. Out of the 413 water rate structures included in last year's rates survey, 8 changed to a new type of rate structure, shown in Table 4. Most of the changes were from uniform rate structures changing to increasing block rate structures. 10 wastewater rate structures were changed between January 2015 and July 2016, out of the 310 surveyed in both years. An analysis of how much rates have increased since last year's survey is shown on page 13.

Table 4: Changes to Water Rate Structures from January 2015 to July 2016

Changed From		Changed To				
		Total	Increasing Block	Uniform Rate	Decreasing Block	Other
		6	2	0	0	
Increasing Block	1		1	0	0	
Uniform Rate	5	5		0	0	
Decreasing Block	1	1	0		0	
Other	1	0	1	0		

What Utilities Charge Their Customers

Residential Water and Wastewater Bills

Figure 12 and Figure 13 show the median amount that utilities bill their residential water and wastewater customers, respectively, for a range of consumption/disposal amounts on a monthly basis[2]. These calculations include base charges and consumption allowances. The colored bars highlight what the middle 80 percent of utilities charge (between the 10th and 90th percentile) across the consumption spectrum.

Figure 12: Monthly-Equivalent Residential Water Bills by Consumption (n=492)

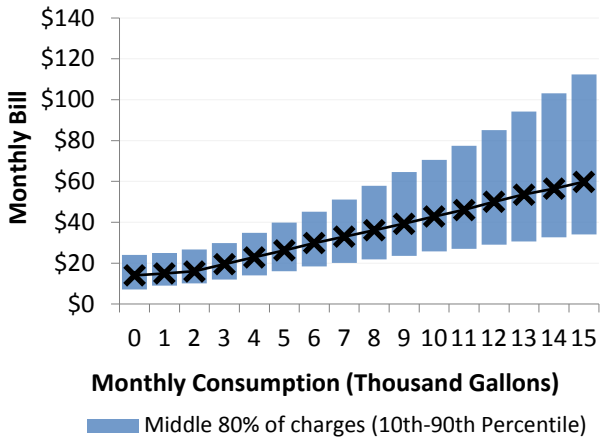
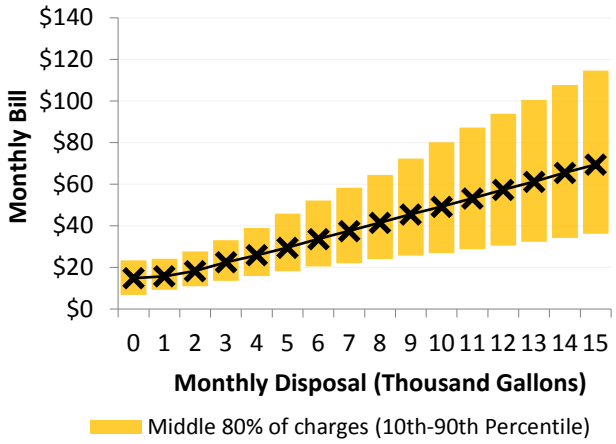


Figure 13: Monthly-Equivalent Residential Wastewater Bills by Disposal (n=353)



The median monthly amount charged for zero gallons of water is $14.00, $26.25 for 5,000 gallons, and $43.00 for 10,000 gallons. As a point of comparison, a gallon of potable water at a major grocery retailer is approximately $1.00, while the median bill for 5,000 gallons of tap water is approximately $0.0053 per gallon, or 190 times cheaper. Wastewater bills are generally higher than water bills. The median monthly wastewater bill for customers disposing zero gallons is $14.86, $29.71 for 5,000 gallons, and $49.35 for 10,000 gallons.

[2] For utilities that bill on a non-monthly basis (bi-monthly or quarterly), charges have been calculated and presented on a monthly basis to allow for accurate comparison.

The range of combined water and wastewater bills for various usage levels is shown on Figure 14. The median monthly combined bill for zero gallons is $27.46, $55.93 for 5,000 gallons, and $93.88 for 10,000 gallons.

Figure 14: Monthly-Equivalent Residential Combined Water and Wastewater Bills by Consumption (n=346)

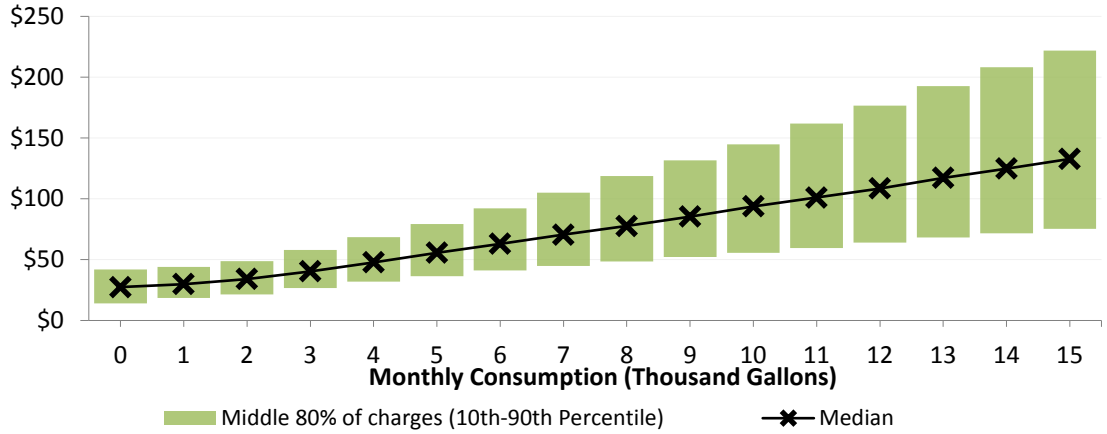


Table 5 shows that water and wastewater bills are generally lower among the smaller utilities. This is counterintuitive, because large utilities are, theoretically, able to spread their fixed costs across a larger customer base. One possible explanation for this is that larger utilities are more aggressively preparing for future capital expenses, and therefore need higher rates. In the same table below, the "unknown service population" utilities are typically for-profit utilities. Though we do not know the service populations for these for-profit utilities at this time, most are likely to be smaller utilities, as they often serve individual subdivisions, presumably outside of municipal corporate limits. Since the Public Service Commission in Georgia does not regulate the rates of water or wastewater utilities, some of the relevant data, particularly for for-profit utilities, is not readily available. Table 6 shows that municipal utilities generally have lower water and wastewater bills than other service providers, possibly because the high population density for municipal utilities translates into lower per customer costs (and therefore bills) for distribution and collection. Conversely, county and consolidated government utilities, as well as for-profit utilities, whose customers are typically more dispersed, have the highest water bills.

Table 5: Median Residential Water and Wastewater Monthly Bills at 5,000 gallons/month, by Utility Size

Utility Size (Service Population)	Water Rate Structures		Wastewater Rate Structures	
	Number of Rate Structures	Median 5,000 gallons/month Monthly Bill	Number of Rate Structures	Median 5,000 gallons/month Monthly Bill
1 – 999	132	$24.75	50	$26.40
1,000 – 2,499	76	$23.95	61	$29.25
2,500 – 4,999	81	$25.46	71	$28.47
5,000 – 9,999	57	$26.00	52	$29.87
10,000 – 24,999	62	$28.10	56	$31.09
25,000+	54	$27.40	53	$34.47
Unknown service population	30	$34.88	10	$35.75
All Rate Structures	***492***	***$26.25***	***353***	***$29.71***

Table 6: Median Residential Water and Wastewater Monthly Bills at 5,000 gallons/month, by Utility Type

Utility Type	Water Rate Structures		Wastewater Rate Structures	
	Number of Rate Structures	Median 5,000 gallons/month Monthly Bill	Number of Rate Structures	Median 5,000 gallons/month Monthly Bill
Municipality	374	$24.37	285	$28.17
County/District	33	$32.52	22	$38.15
Authority	49	$33.40	32	$34.02
Consolidated Government	7	$28.61	5	$36.10
For-profit	29	$34.00	9	$35.75
All Rate Structures	***492***	***$26.25***	***353***	***$29.71***

Table 7 shows the median water charge for 5,000 gallons/month based on the water supply source. The costs of purchase water systems (those that buy at least a portion of their water from another water system), on average, are significantly higher than those of groundwater or surface water systems. Among those last two categories, systems treating their own water are clearly dependent on the source of water. In general, in Georgia, withdrawing and treating water from surface supplies costs more than withdrawing and treating groundwater. This is despite the fact that surface water systems tend to be much larger than groundwater systems. As for the purchase water systems charging higher median bills, this may be unsurprising because these systems must account for their own operational costs in addition to the costs of the supplier treating the water. Some utilities use groundwater that is directly influenced by surface water, meaning that while technically the water source is groundwater, it must be treated by the utility as surface water under federal regulations. For the purposes of this survey, these utilities are classified as surface water. Georgia's geography means that most of the utilities below the Fall Line[3] use ground water as their source, while utilities north of the Fall Line tend to use surface water as their main source.

Table 7: Median Charge for 5,000 gallons/month for Water Systems Based on Type of Water Supply

	Water Rate Structures		
	Total Number of Structures	Median Monthly Water Bill at 5,000 gal/mo	Median Service Population
All Rate Structures	***455***	***$26.00***	***2,947***
By Water Supply Type			
Groundwater	273	$22.61	1,384
Surface Water	99	$29.00	13,996
Purchase*	83	$32.73	6,357

* "Purchase systems" are those that buy at least a portion of their water from another water system, which could be either surface water or groundwater.

[3] The "Fall Line" is the geological feature that is the boundary between the Piedmont and Coastal Plain.

Changes in Residential Rates Over Time

Out of the 413 water and 310 wastewater rate structures included in last year's rates survey, residential rates were increased from last year for roughly 31 percent of both water and wastewater rate structures, as shown below in Figure 15.

Figure 15: Percent of Rate Structures that Increased Residential Rates in the Last Year

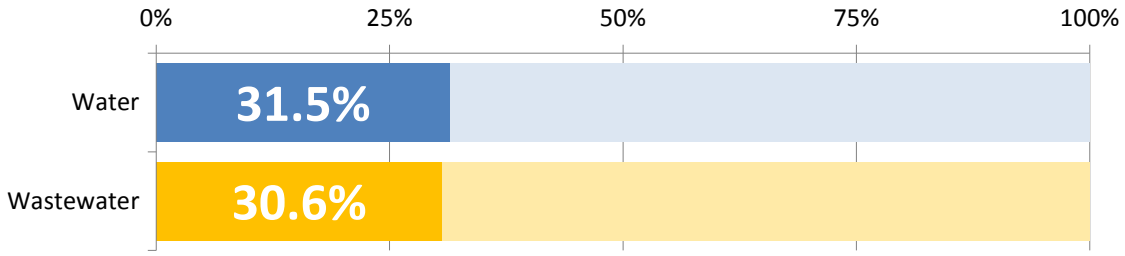


Figure 16 and Figure 17 show the residential monthly bill increase for customers that use 5,000 gallons/month among the 130 water and 95 wastewater rate structures that have raised rates in the last year. The median increase was $1.43/month for water (a 5.5 percent increase) and $1.50/month for wastewater (a 5.0 percent increase).

Figure 16: Increase in Residential Monthly Bill Amount Since Last Year for 5,000 gallons/month among 130 Water and 95 Wastewater Rate Structures that Raised Rates

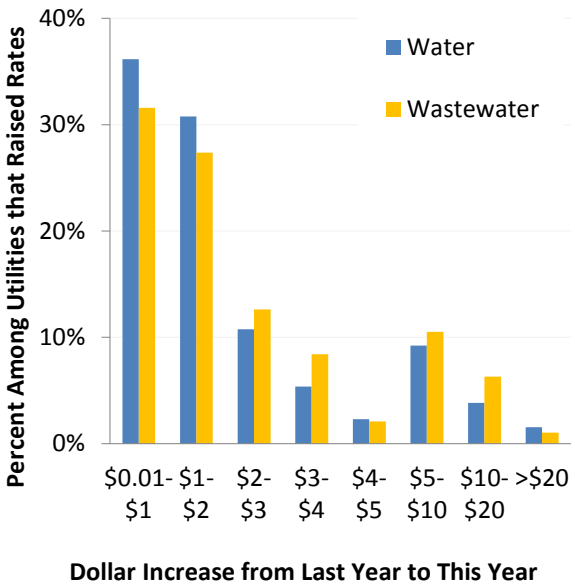
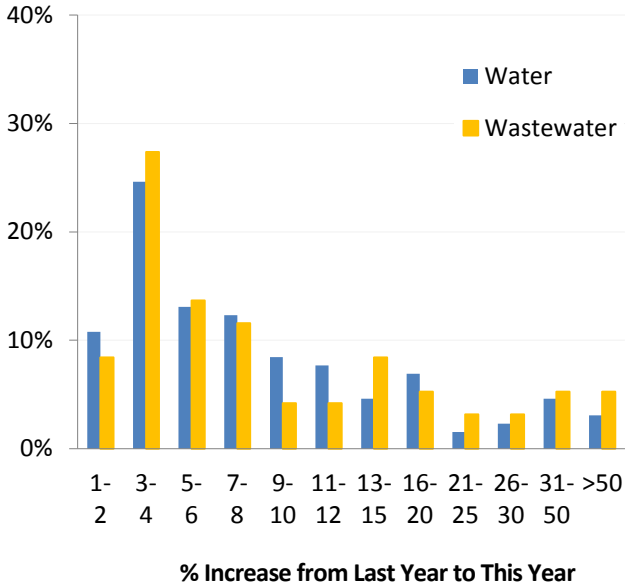
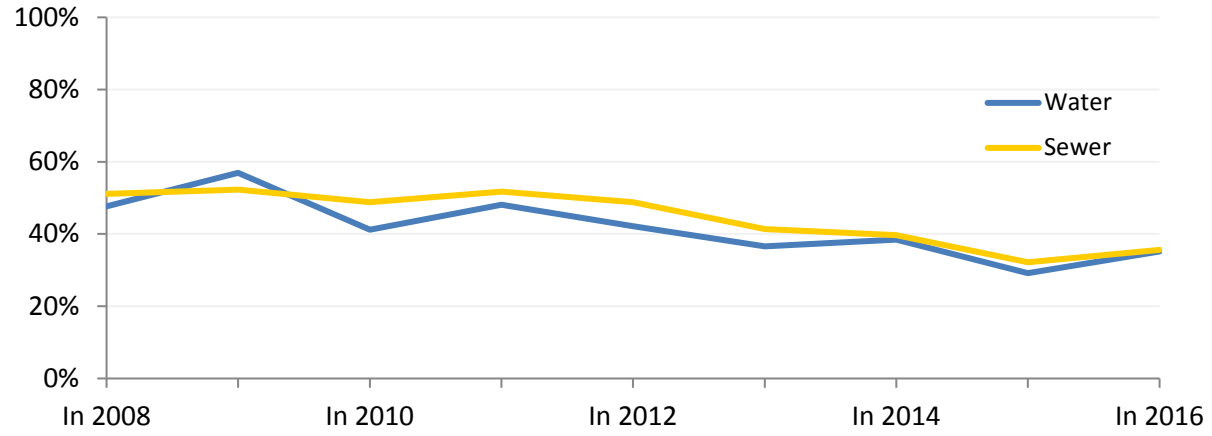


Figure 17: Percent Increase in Residential Monthly Bills Since Last Year for 5,000 gallons/month among 130 Water and 95 Wastewater Rate Structures that Raised Rates



Among utilities that have provided rates data every single year since 2007, usually slightly less than half raised rates from one year to the next, as shown in Figure 18. Since 2008, the number of water and wastewater rate structures changing year by year has generally been decreasing, with a spike in 2009. For the 196 wastewater utilities we have rates for every year, the same trend is seen, albeit with less volatility than in water rates.

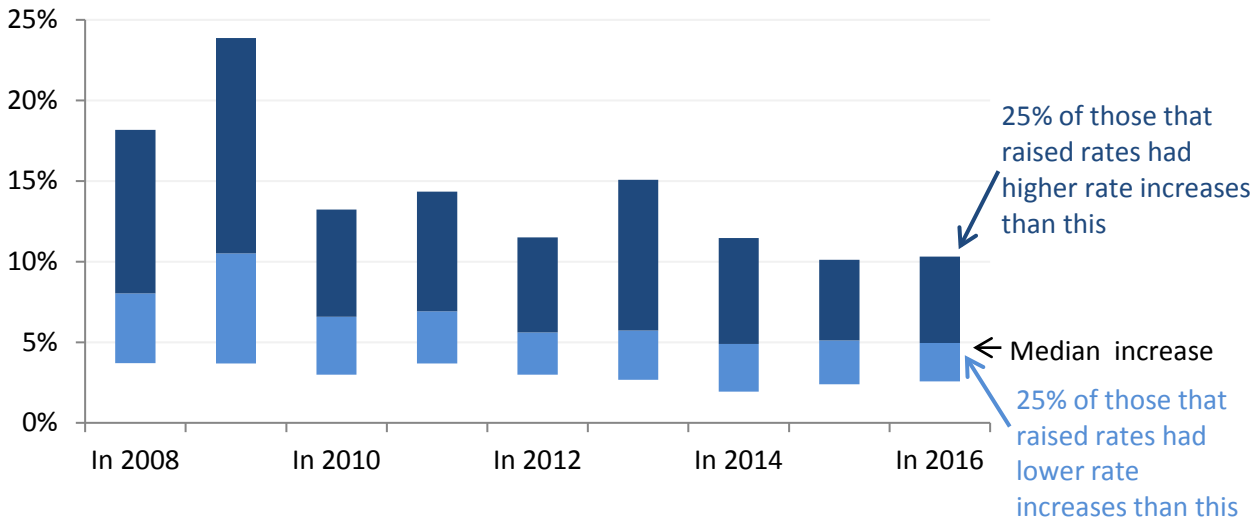
Figure 18: Percent of Utilities Changing Rates Since 2007 Among the Same 247 Water Utilities and 196 Wastewater Utilities



Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill.
Data Sources: Georgia Environmental Finance Authority and Environmental Finance Center's annual water & wastewater rates surveys.
The cohort of utilities is consistent across all years.

The effects of a drought in 2008 and 2009 affected the water market, as is shown in the magnitude of the rate increases adopted by these 247 water utilities, as shown in Figure 19. Once the drought subsided in 2010, water utilities were much less likely to increase rates by more than 10%, a trend which has continued through 2016.

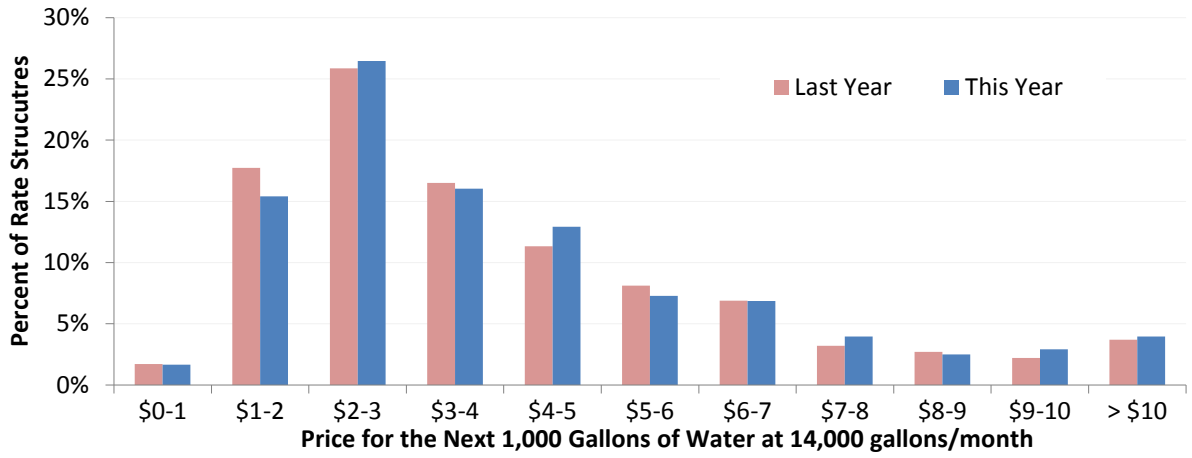
Figure 19: Percent Increase to the Water Bill at 5,000 Gallons/Month for Utilities that Raised Rates Amongst 247 Utilities in Georgia



Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill.
Data Sources: Georgia Environmental Finance Authority and Environmental Finance Center's annual water & wastewater rates surveys.
The cohort of utilities is consistent across all years. Only utilities that raised rates are analyzed in each year.

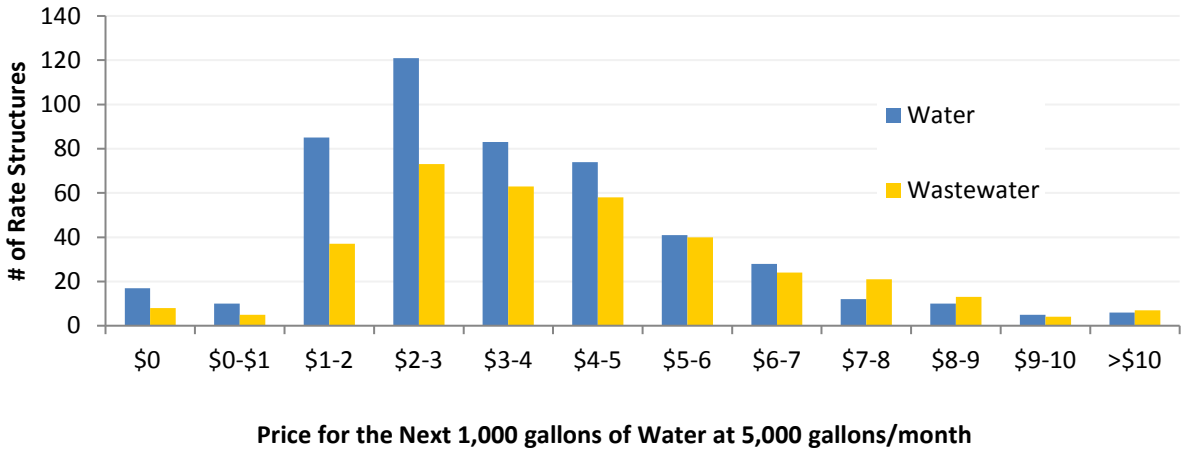
One of the mechanisms that utilities can utilize to send a strong pricing signal to encourage water conservation is the rate that customers pay at higher levels of consumption. Average residential consumption is around 5,000 gallons/month. Seasonal use of water can raise consumption levels for some customers to two or three times this amount, or more, and utilities can discourage excessive use by setting high prices for the next 1,000 gallons of water at that level of consumption. Out of the 413 water rate structures included in last year's survey, the price for the next 1,000 gallons at 14,000 gallons/month was raised for 120 rate structures (29 percent). The distribution of the prices for water for the next 1,000 gallons at that consumption level is shown in Figure 20 below. Utilities generally have shifted their high use water rates upwards.

Figure 20: Price for Water for the Next 1,000 Gallons at 14,000 gallons/month in 413 Water Rate Structures in FY2014-15 and 492 Water Rate Structures in FY2015-16



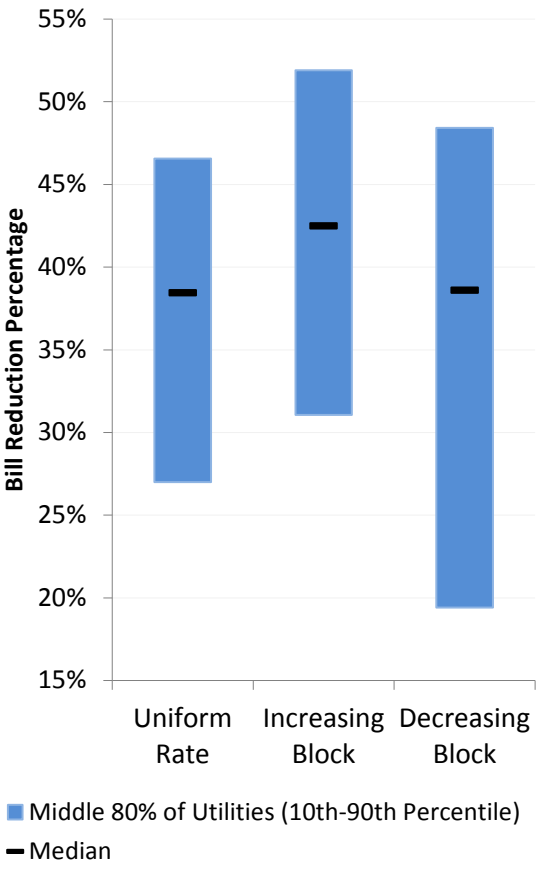
For households that use an average amount of water, the price per thousand gallons at the 5,000 gallon point is a good indicator of the relative size of the pricing signal they encounter. Among the 492 residential water rate structures in the sample this year, the median price for the next 1,000 gallons (not including base charges) at the consumption level of 5,000 gallons/month is $3.20 per 1,000 gallons. Figure 21 shows the significant variation in this signal across the state, with some utilities charging more than $10 per 1,000 gallons and others charging less than $1 per 1,000 gallons. Residential wastewater systems tend to be more expensive than water systems between 5,000 and 6,000 gallons/month, with a median of $3.90 per 1,000 gallons. If a utility feels the need to increase conservation price signaling, increasing the marginal price at 5,000 gallons/month rather than at 14,000 gallons/month is an effective method to encourage all customers to cut back, rather than just heavy users.

Figure 21: Marginal Price Change for Residential Water and Wastewater at 5,000 gallons/month for 492 Water Rate Structures and 353 Wastewater Rate Structures



Finally, Figure 22 at right shows price signaling in another format: the financial reward that a customer receives in terms of a reduction in their water bill when they halve their monthly water use from 10,000 gallons (well above average in Georgia) to 5,000 gallons (the average in Georgia). The reduction in the monthly water bill acts as a price incentive to encourage conservation for heavy users, and is measured both in terms of absolute bill savings and as a percentage of bill reduction. Figure 22 shows that there are some utilities that reward customers substantially in terms of bill reduction percentage for cutting back, whereas other utilities provide relatively little incentive. Interestingly, while some increasing block rate structures clearly send very high conservation pricing signals, there are also some increasing block rate structures that send a weaker pricing signal than some uniform rate structures. Put another way, a utility with a uniform rate structure that charges a high price for water, say $7.00 per thousand gallons, sends a significantly higher pricing signal than a utility that charges $3.00 per thousand gallons even if the utility has an increasing block rate structure. It can be possible to design a simple, uniform rate structure to incentivize water conservation as well as, or sometimes better than, many increasing block rate structures currently in use.

Figure 22: Reduction in Monthly Water Bill from 10,000 gallons/month to 5,000 gallons/month



Commercial Water and Wastewater Bills

Figure 23 and Figure 24 below show the median monthly water and wastewater bills, respectively, for commercial customers at different levels of consumption/disposal[4]. The middle 80 percent of charges also are indicated. The median monthly bill for commercial customers consuming zero gallons (on a 3/4" meter[5]) is $16.24 for water and $16.87 for wastewater. The median monthly bill for 50,000 gallons/month is $196.57 for water and $231.44 for wastewater. The median bill for those consuming 500,000 gallons/month (on a 1½" or 2" meter) is $1,843.42 for water and $2,169.37 for wastewater. The variation in commercial bills across rate structures increases significantly as the consumption/disposal amount increases.

Figure 23: Monthly-Equivalent Commercial Water Bills by Consumption (n=492)

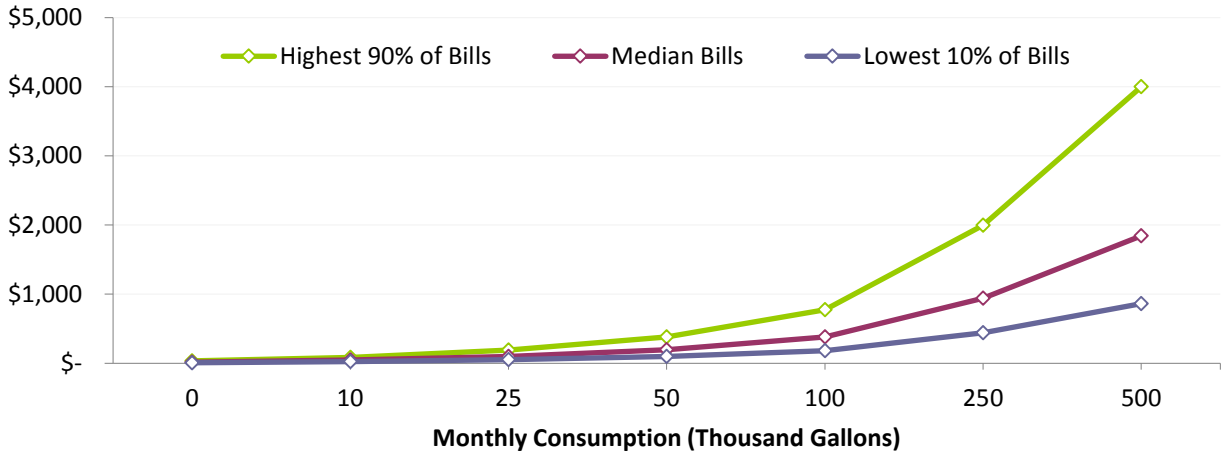
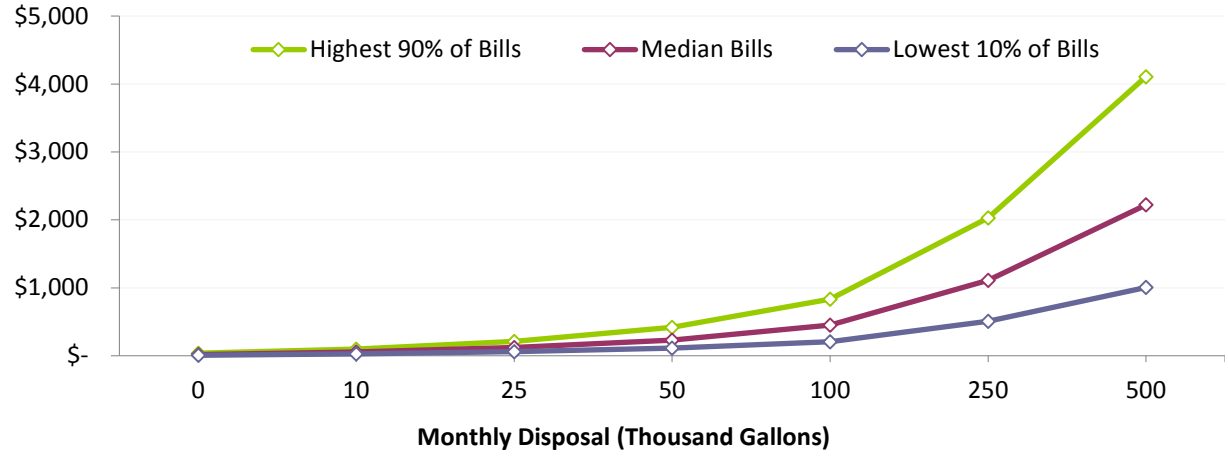


Figure 24: Monthly-Equivalent Commercial Wastewater Bills by Consumption (n=354)



[4] The residential rate structure is used to calculate the bills for commercial customers except for the utilities that specify different rates and rate structures for commercial or non-residential customers.

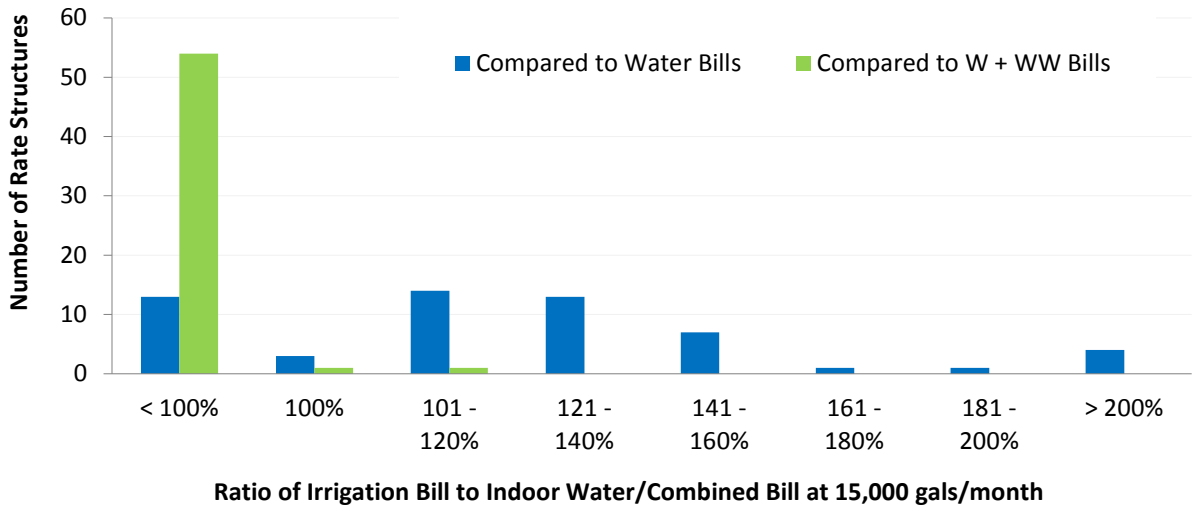
[5] Some utilities use different base charges for different meter sizes for customers. Bills for consumption or disposal of up to 100,000 gallons/month was computed assuming a 5/8" or 3/4" meter size, 250,000 gallons/month assuming a 1" meter size, and 500,000 gallons/month assuming a 1½" or 2" meter size. When applicable, the "next largest" meter size is used in calculating the bills when a utility does not utilize a specific meter size.

Irrigation Bills for Residential Customers

Residential customers that water their lawns, wash their cars, or otherwise use water outdoors frequently use much more water outdoors than they do indoors. An EFC study of customers in five cities in North Carolina shows that residents with irrigation meters tend to use, on average, two to seven times as much water outdoors in the summer months as they do indoors[6].

With such large volumes of water used outdoors, particularly in the summer months, some utilities have taken the opportunity to charge for water used through irrigation meters at a unique rate structure. In our survey, 56 rate structures included such unique rates. In Georgia, typically, irrigation rates are higher than the standard water rates, but less than the combined water and wastewater rates. The ratio of the irrigation water bill at 15,000 gallons/month to the residential (indoor) water or combined bill is shown below in Figure 25.

Figure 25: Comparing the Irrigation Bill to the (Indoor) Water and Wastewater Bills for Residential Customers at 15,000 gallons/month Among the 56 Unique Irrigation Rate Structures



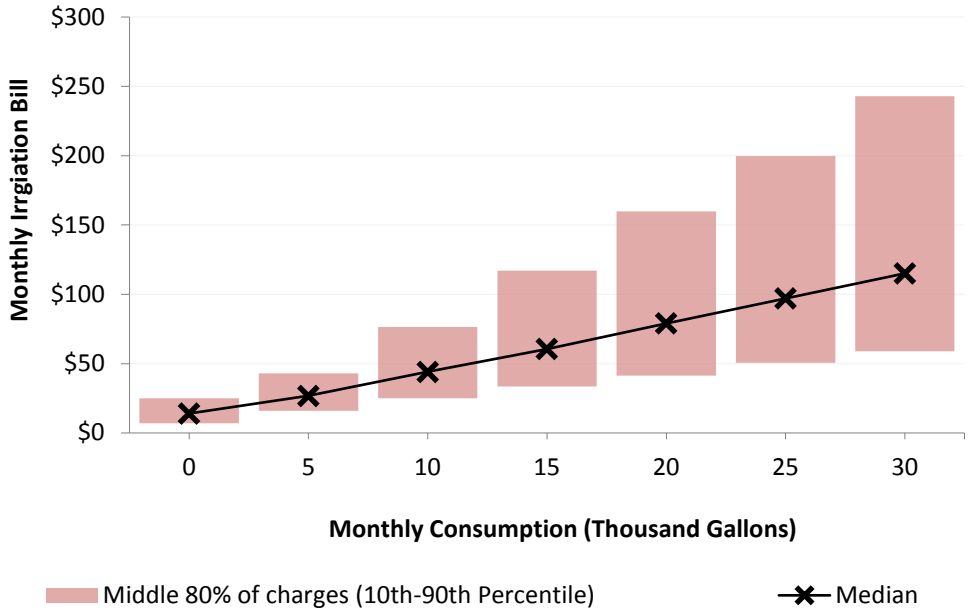
The irrigation bill for 15,000 gallons/month is higher than what the customer would have been charged under the standard water rate structure for that consumption amount in 40 out of the 56 rate structures (71 percent). However, 13 of the irrigation rate structures actually provide a price *discount* to customers for their outdoor water usage, which essentially discourages water conservation.

As shown in Figure 25 above, almost all of the irrigation rate structures provide residential customers with a price break compared to the combined water and wastewater charge for 15,000 gallons/month. This is logical, since outdoor water usually does not enter the sewer system after use, and therefore the utility does not encounter wastewater treatment costs for the water that flows through the irrigation meters.

[6] Tiger, M.W., Eskaf, S. & Hughes, J. (2011) "Implications of Residential Irrigation Metering for Customers' Expenditures and Demand." *JAWWA*, 103:12, 30-41.

Whether or not a utility has a unique rate structure for irrigation water, all utilities must evaluate carefully what they are charging for large consumption of water through their residential rate structures. The monthly-equivalent bills for all 492 rate structures in our sample are shown in **Error! Reference source not found.** for a consumption range that is typical of residential irrigation usage.

Figure 26: Monthly-Equivalent Bills for Irrigation Water Use by Residents, Including Irrigation Rates, by Consumption (n=492)



What Utilities Charge by River Basin

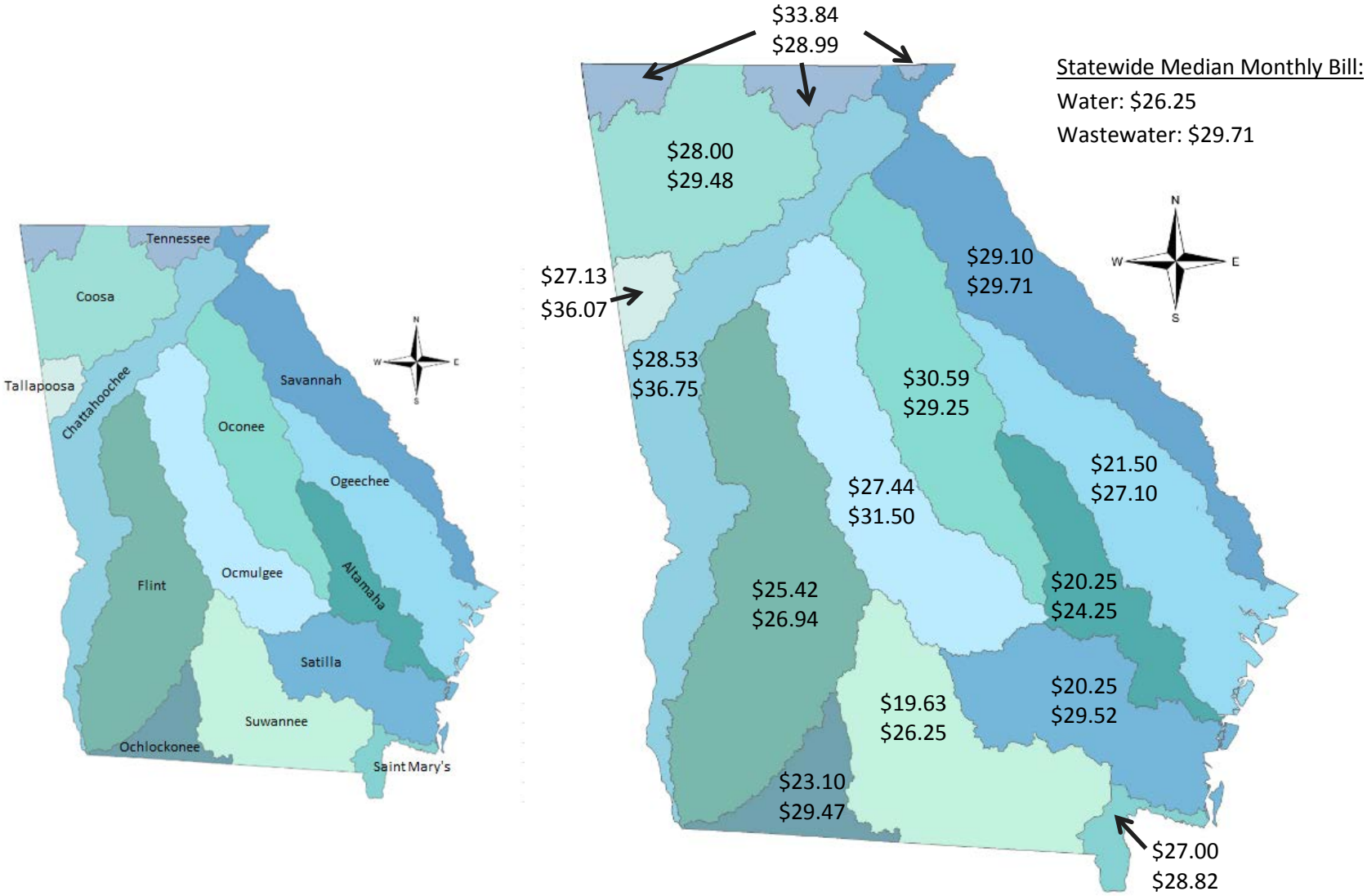
It is important to consider the operating environment when comparing rates among utilities. Source water quality and quantity can have a significant impact on the cost to produce water. Likewise, receiving water quality can have a major impact on the cost of wastewater treatment. In an attempt to consider these impacts, median water and wastewater bills for 5,000 gallons/month were calculated for each of Georgia's 14 major river basins, displayed in Figure 27.

As summarized on the next page in Table 8, the highest median water charges in river basins with a sample of more than 10 rate structures can be found in the Tennessee river basin, and the lowest median water charges are found in the Suwannee river basin. The highest median wastewater charges can be found in the Chattahoochee river basin. The lowest median wastewater charges can be found in the Altamaha river basin.

Table 8: Median Water and Wastewater Charges by River Basin at 5,000 Gallons per Month

	Water Rate Structures		Wastewater Rate Structures	
River Basin	**Total Number of Structures**	**Median Monthly Bill at 5,000 GPM**	**Total Number of Structures**	**Median Monthly Bill at 5,000 GPM**
Altamaha	19	$20.25	13	$24.25
Chattahoochee	53	$28.53	42	$36.75
Coosa	39	$28.00	30	$29.48
Flint	71	$25.42	46	$26.94
Ochlockonee	13	$23.10	9	$29.47
Ocmulgee	49	$27.44	39	$31.50
Oconee	44	$30.59	31	$29.25
Ogeechee	43	$21.50	30	$27.10
Saint Mary's	3	$27.00	2	$28.82
Satilla	21	$20.25	16	$29.52
Savannah	67	$29.10	49	$29.71
Suwannee	36	$19.63	21	$26.25
Tallapoosa	11	$27.13	8	$36.07
Tennessee	23	$33.84	17	$28.99

Figure 27: Median Water and Wastewater Monthly Bills at 5,000 gallons/month, by River Basin



What Utilities Charge Outside their Political Boundaries (i.e. "Outside Rates")

All of the charges presented above refer to what utilities charge customers that live within their political boundaries. Municipal utilities often serve customers who live outside of city limits, and a handful of other utilities specify geographical boundaries within their service areas and identify their customers as residing "inside" and "outside" those boundaries. In many cases, utilities charge different rates for customers living inside or outside the boundary. Overall, 40 percent of water rate structures and 39 percent of wastewater rate structures specified different rates for customers living outside, and the vast majority were for municipal utilities. In fact, 52 percent of the rate structures from municipal utilities in the sample charged more for outside customers than for inside customers. At 5,000 gallons/month, outside customers who are charged a different rate than inside customers pay, at the median, a water bill that is 1.39 times more than inside customers. For wastewater, the median ratio is also 1.39. Most utilities with different outside rates charged less than double the inside charges, as shown in Figure 28. Figure 29 shows median charges for combined residential water and wastewater service for all utilities that have a separate rate schedule for outside customers for both water and wastewater service. For utilities that charge for both water and wastewater, the median combined bill charged to inside customers for 5,000 gallons/month is $57.40 compared to $81.25 for outside customers.

Figure 28: Outside Residential Bills as a Percentage of the Inside Bills at 5,000 gallons/month (n=492 water, n=353 wastewater)

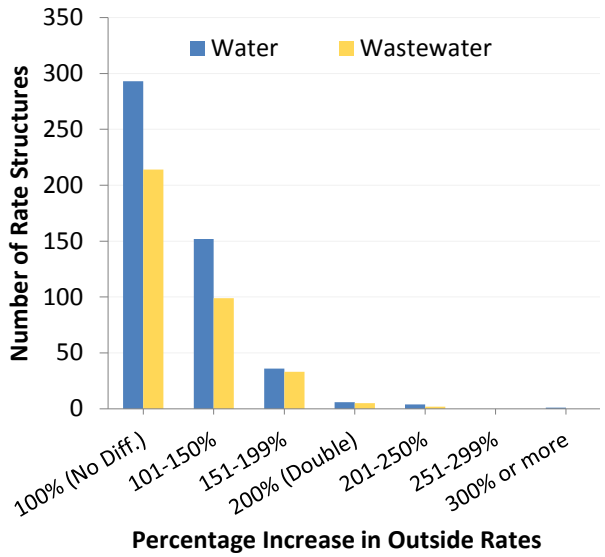
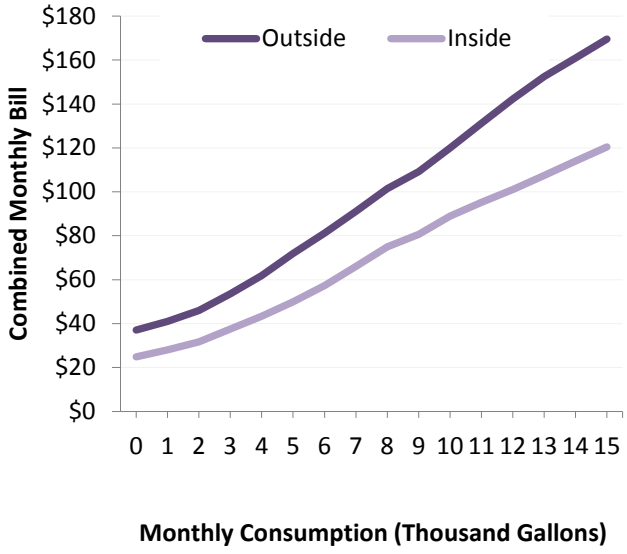


Figure 29: Median Combined Residential Water and Wastewater Bills for Rate Structures with Different Inside/Outside Rates (n=132)



There are at least three reasons why utilities might charge more for outside customers. First: for municipalities, higher outside charges might be part of managing growth and annexation. Second: for all utilities, outside customers are often inherently more expensive to serve because of lower densities and the fact that they reside farther, on average, from the water or wastewater treatment plant than inside customers. Extra costs for distribution and collection systems justify higher rates for outside customers. Third: inside customers, as citizens of the unit of local government that provides the utility service, bear more of the investment risks of owning and

operating a utility. They also bear more of the burden of financing and facilitating its operations through their local government unit[7].

Affordability of Residential Rates

What the Average Georgian Pays for 5,000 Gallons

The above figures and tables are useful in determining the range of rates that utilities across the state are currently charging. As mentioned above, the median price for 5,000 gallons/month across all the utilities is $26.25 for water and $29.71 for wastewater, using "inside" residential rates. This indicates that half of the 492 water rate structures in this sample charge more than $26.25 for water for 5,000 gallons/month, and half of 353 wastewater rate structures charge more than $29.71 for wastewater. The utilities in this study serve about 8.45 million Georgians. If we assume that everyone in this sample pays "inside" rates only, the average Georgian in this sample would be paying a weighted average[8] of $26.29 for water, $40.62 for wastewater or $66.37 for combined water and wastewater for 5,000 gallons/month. These numbers represent a good estimate of average bills across the population of the state. The actual average bill for a Georgian for 5,000 gallons is likely to be higher, however, since a substantial portion of the citizens are paying "outside" rates that are greater than "inside" rates as shown in Figure 28. Furthermore, some citizens may be paying a portion of their water bill through irrigation rates, making it impossible to accurately estimate what the average Georgian actually pays for 5,000 gallons.

Annual Bills as a Percent of Household Income

Is the weighted average bill of $66.37 per month for combined water and wastewater for 5,000 gallons too high for most Georgians? Compared to monthly electric bills, gas bills, grocery bills, and even discretionary bills such as cable TV bills or high-speed internet bills, water and wastewater bills usually make up a smaller portion of a household budget. Nevertheless, because citizens may not have an alternative to the water service they are currently receiving, and water service is necessary for public health, the issue of affordability of water and wastewater rates remains vital.

Affordability is very difficult to assess, and there is no one true, accurate measure for affordability. The most commonly used and most cited measure in the water industry is "percent MHI" – that is, calculating what a year's worth of water and wastewater bills for an average level of consumption (e.g. 5,000 gallons/month) is compared to the median household income (MHI) in the community served by the utility. This indicator is easy to calculate by simply using the calculated bill amount and the U.S. Census Bureau's median household income data from their latest 5-year American Community Survey estimates, available at http://factfinder2.census.gov. Each year, the US Census Bureau publishes a new estimate of MHI for each Census Place in the country.

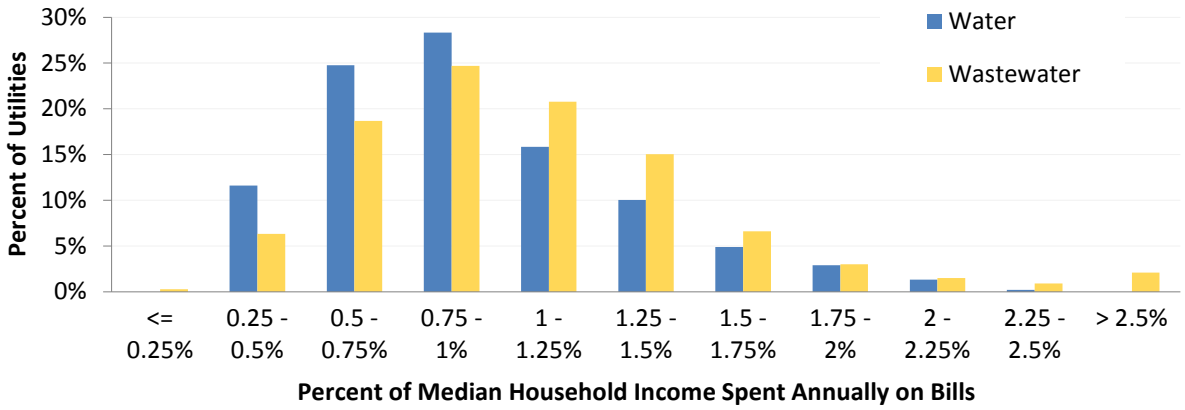
Compared to the 2014 median household incomes of the communities served by 448 water and 332 wastewater utilities in this survey, annual bills for 5,000 gallons/month range from 0.25% MHI to over 2.5% MHI for each service, as shown in Figure 30. The majority of water rates fall between 0.5% and 1.25% MHI, with a median of 0.86% MHI across all utilities. Wastewater rates are higher, with the majority of wastewater rates falling between

[7] AWWA (2012). *Principles of Water Rates, Fees, and Charges.* Manual of Water Supply Practices: M1. 6th Ed.
[8] The "weighted average bill" is the average bill being paid by customers, taking into account the different utility's rates and service populations, assuming that all of the customers are paying their utility's bill for 5,000 gallons/month.

0.5% and 1.5% MHI, and a median of 1.00% MHI across the utilities. For combined water and wastewater bills at 5,000 gallons/month, half of the utilities charge more than 1.85% MHI.

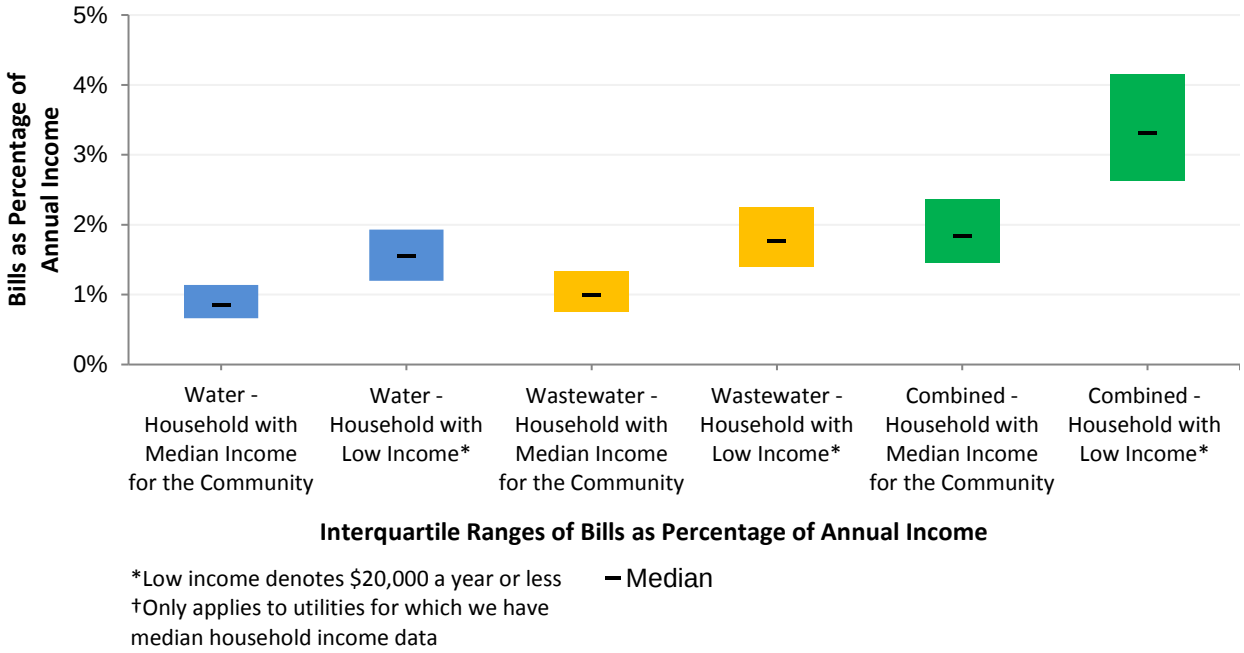
There is no single target for affordability, even in terms of percent MHI. Currently, 22 percent of utilities in Georgia charge more than 2.5% MHI for combined water and wastewater at 5,000 gallons/month.

Figure 30: Annual Bills for 5,000 gallons/month Consumption as a Percentage of the Serviced Community's 2014-Adjusted Median Household Income (n=448 water, n=332 wastewater)



The left-hand bars for each utility type (denoted by color) in Figure 31 (see next page) show the interquartile range (25th - 75th percentile) of water, wastewater, and combined system bills as a percent of MHI, using 5,000 gallons/month. This metric has some shortcomings, but it does show the variation in financial impact across the state. In a quarter of the utilities, customers making the median household income in their communities would spend less than 0.66% of their income annually for 5,000 gallons/month of water, whereas in another quarter of the utilities, those median household income customers would spend more than 1.14% of their income. Figure 31 also shows what percentage of income a household that makes $20,000 per year (near poverty threshold) would pay for the same volume of water, in the right-hand columns. Not surprisingly, the bills amount to greater percentages of this low household income level. This method of showing how two affordability metrics compare across the state shows that while there are some utilities that have customers at the median income paying relatively little, these communities still have prices that place a greater burden on lower income customers. Figure 31 displays financial impacts for customers that use relatively low amounts of water. Larger low-income families, or families that live in substandard housing stock with older appliances that are less water efficient, may end up paying an even higher percentage of their income for essential water service.

Figure 31: Percent of Annual Income spent on Utilities for Median Income Households and Low Income Households, amongst 461 Water Utilities, 343 Wastewater Utilities, and 336 Combined Utilities †



Do Prices Reflect the True Cost of Water Services in Georgia?

Comparing rates across the state or among specific utilities is further complicated by the variation in the extent to which utilities charge the full cost of providing service. For example, during FY2013-14, 44 percent of 440 local government water and/or wastewater utilities in Georgia did not generate enough revenue during the year to pay for their day-to-day operations and maintenance expenses **and** account for future capital costs by means of covering depreciation as part of their overall operating expenses. Depreciation, in this sense, is an accounting mechanism designed to model the reduction in the value of capital assets across time due to normal wear and tear. Hence in capital improvement planning (CIP), there is a corresponding need to budget for capital projects that reflect the full cost of replacement of an asset, and factoring in the non-cash "depreciation expense" from the use of depreciation schedules can be helpful in some situations. (Other potential cost factors, such as inflation, are also helpful to consider.) At the same time, utilities that already have a strong CIP in place and are funding their capital improvements through long-term debt, grants, cash savings, or some combination thereof, would not necessarily need to cover "depreciation expense" at the same time, as that would be duplicative.

With these caveats in mind, it is still interesting to investigate what the sizes are of utilities that comprise the aforementioned 44 percent with operating ratios (including depreciation in operating expenses) below 1.0. For example, amongst the smallest utilities (e.g. those with 1,000 or fewer service connections), access to capital may be more difficult than for larger utilities. Hence capital improvement strategies may be less likely to be funded by long term debt and more likely to be funded by cash. If so, bringing in enough revenue to cover depreciation expense, and putting that cash into a capital improvement fund until time to spend it on identified capital improvement projects, may be more sensible to track. Table 9 (see next page) shows that the 55% of utilities below 1.0 operating ratio do indeed skew disproportionately to the smaller sized utilities.

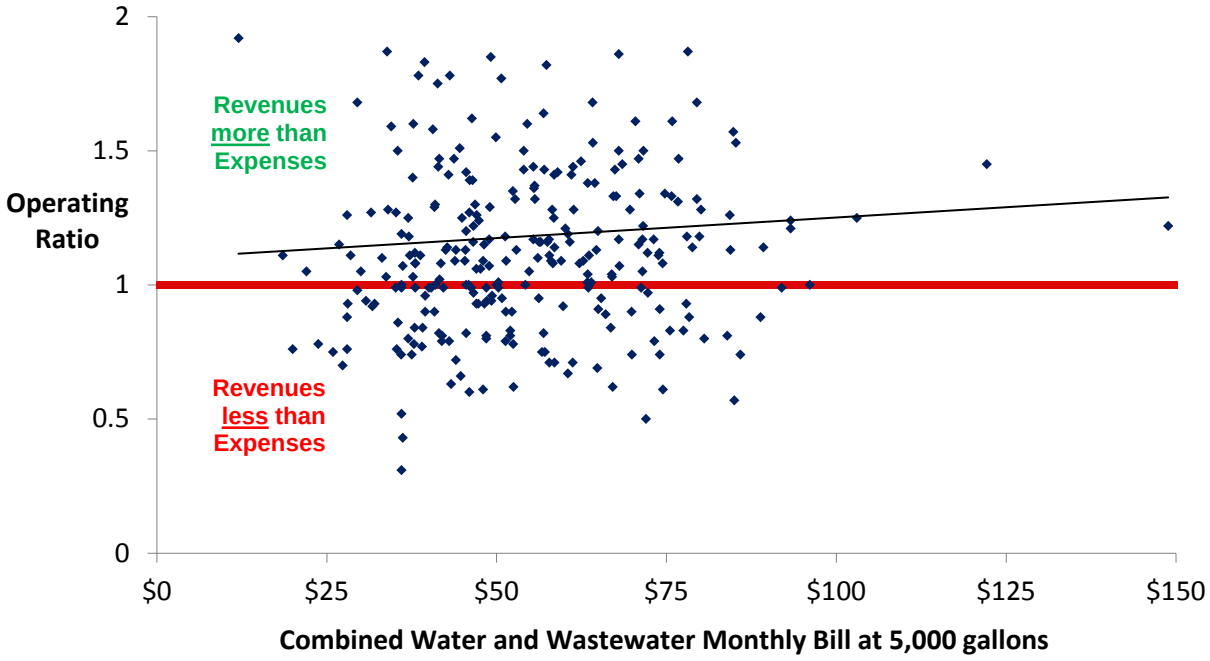
Table 9: Local Government Utilities with Operating Expenses (including Depreciation) Exceeding Operating Revenues, by Number of Service Connections

Number of Service Connections	Total # of Utilities	# of Utilities with Operating Expenses Exceeding Operating Revenues	% of Total
< 1,000	247	136	55%
1,000 - 10,000	162	55	34%
> 10,000	31	1	3%
All Sizes	**440**	**192**	**44%**

As mentioned above, rates that provide enough revenue to balance an annual budget do not necessarily provide enough revenue to cover long term capital and maintenance needs and many utilities charge much less than the full cost of service provision. Figure 32 (see next page) shows rates from FY 2013-14 in terms of combined water and wastewater charges for customers using 5,000 gallons/month plotted against the ratio of total operating revenues over total operating expenses (including depreciation) from the same fiscal year. This measure, often referred to as an operating ratio, helps identify if an entity is operating at a financial loss, financial gain, or is breaking even. Financial data were provided by the Department of Community Affairs through either the annual Report of Local Government Finances or through the Report of Registered Authority Finances. The figure shows that many utilities are not covering their total operating expenses, making it difficult or impossible to rehabilitate aging infrastructure, save for operating emergencies, finance system improvements and expansion, and engage in proactive asset management. It is interesting to note that the utilities that did not recover their operating expenses (operating at a financial loss) are not always charging low rates—even some utilities with high rates can be operating at a financial loss. Nevertheless, there are several utilities that charged low rates in FY 2013-14 (to the left of the graph), which resulted in operating at a financial loss (below the horizontal red line on the graph) in that fiscal year.

Operating ratio as calculated here may be a flawed measure, however, due to the distorting effects of book value depreciation. Due to inflation, older plants' assets that were purchased long ago have nominally cheaper prices than assets of plants that are newer. This makes older plants' depreciation expense smaller in comparison to the depreciation of a newer plant with the same types of assets. In turn, this means that the operating ratio seems higher (better) for older plants than for newer plants, due to the effect of inflation. Despite this, the measure maintains a level of intuitive power which makes it a useful tool for examining the ongoing capacity for the utility to bring in enough revenue to cover its operating costs. The performance of each utility on several financial indicators and benchmarks can be viewed in the GA Water and Wastewater Rates Dashboard at http://www.efc.sog.unc.edu/reslib/item/georgia-water-and-wastewater-rates-dashboard.

Figure 32: Combined Residential Bill in FY2013-14 for 5,000 gallons/month for Utilities with Reported DCA Data on Total Operating Revenues and Total Operating Expenses in FY2013-14 (n=278)



For advice on rate setting or more information on making appropriate rate comparisons, please contact Stacey Isaac Berahzer (berahzer@unc.edu) in the Georgia office of the Environmental Finance Center at the UNC School of Government.

About this Report

This report is one of a series of reports on water and wastewater rates and rate structures in Georgia, compiled by the Georgia Environmental Finance Authority (GEFA) and the Environmental Finance Center (EFC). For reports from previous years, including more in-depth analysis on the relationships between rates, rate structures, system characteristics and policies including cost-recovery, conservation, and affordability, please visit our websites at www.gefa.org and http://www.efc.sog.unc.edu. In addition to survey results, you will also be able to access free, interactive Rates Dashboards which facilitate rate comparisons among utilities and give benchmarks for every rate structure in this Survey.