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Water and Wastewater Rates and Rate Structures in Alabama

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This report details the results of a survey of water, wastewater and residential irrigation rates and rate structures current as of April 1, 2016, conducted by the Alabama Department of Environmental Management and the Environmental Finance Center at the School of Government, University of North Carolina at Chapel Hill. Rates and rate structures are analyzed for 448 water and wastewater utilities throughout the State of Alabama. 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://www.adem.state.al.us or http://www.efc.sog.unc.edu/project/alabama-water-and-wastewater-rates-and-rate-structures.

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Introduction

Water and sewer rate setting is one of a local government's most important environmental and public health responsibilities. Water and sewer 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 Alabama Department of Environmental Management (ADEM) and the Environmental Finance Center (EFC).

Over the course of this survey, approximately 540 water and wastewater utilities were contacted by ADEM by email, phone, letter, or fax, and 448 utilities (83 percent) responded by sending in their rate schedules. These utilities serve approximately 5.06 million Alabamans and account for over 90 percent of the population served by community water systems in the state. Table 1 describes the utilities analyzed in this survey. 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 471. Copies of the 471 rate structures of participating utilities are available online at http://www.efc.sog.unc.edu/project/alabama-water-and-wastewater-rates-and-rate-structures.

Table 1: Number of Participating Utilities with Rates Data for FY 2015-2016

Institutional Arrangement	Provides Water and Wastewater	Provides Water Only	Provides Wastewater Only	Total
Municipality	116	81	0	**197**
County/District	3	11	1	**15**
Authority	16	94	0	**110**
Not-For-Profit	64	55	2	**121**
For Profit	1	1	2	**4**
Other	0	1	0	**1**
Total Number of Utilities	**200**	**243**	**5**	**448**
Number of Rate Structures	***206***	***259***	***6***	***471***

In addition to this report, tables of each utility's rates and key components of their rate structures are available from ADEM 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 Alabama 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/project/alabama-water-and-wastewater-rates-and-rate-structures.

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 upon 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.** Alabama 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 Georiga 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 $18.38 per month for water and $15.00 per month for wastewater. For combined utilities, the median combined water and wastewater base charge is $33.13 per month.

Figure 1: Monthly Base Charges for Residential Customers Among 464 Water and 207 Wastewater Rate Structures

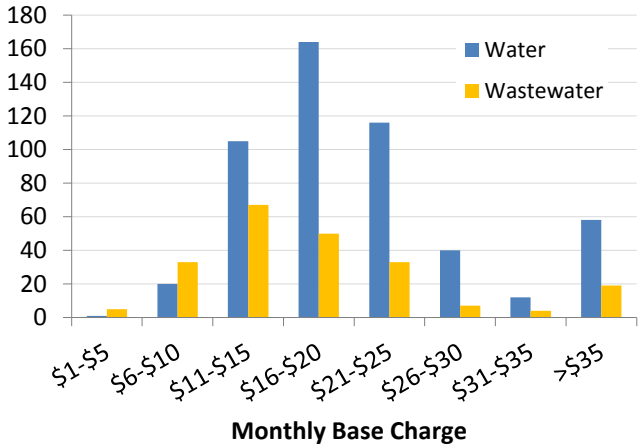


Table 2: Monthly Residential Base Charges in Water and Wastewater Rate Structures, by Utility Size

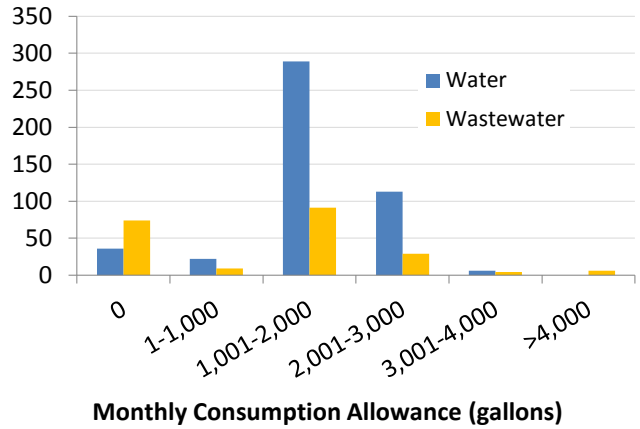
	Water Rate Structures			Wastewater Rate Structures		
Size of Utility (Service Population)	Total Number of Structures	Number with Base Charge	Median Base Charge	Total Number of Structures	Number with Base Charge	Median Base Charge
1 - 999	56	56	$20.00	16	16	$17.09
1,000 – 2,499	96	96	$19.81	32	31	$18.25
2,500 – 4,999	110	109	$18.18	57	55	$14.50
5,000 – 9,999	101	101	$18.51	46	46	$14.00
10,000 – 24,999	60	59	$17.95	37	35	$16.00
25,000+	42	42	$16.47	24	24	$15.77
All Rate Structures	***465***	***464***	***$18.38***	***212***	***207***	***$15.00***

While every water utility and all but five wastewater systems (98 percent) have a base charge, the base charge amount varys by utility size. Often, larger utilities have lower base charges than smaller utilities, due to the stability of their larger revenue stream. In this year's survey however, while this trend seems to exist for water rate structures, there was not a clear trend between the median base charge and the size of the utility for 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.

A large number of residential rate structures (93 percent of water and 67 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 1 percent of water and 5 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 465 Water and 212 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 461 water rate structures applied to commercial and non-residential customers, 99 (21 percent) vary the base charge by meter size. Similarly, of the 210 wastewater rate structures for commercial customers, 25 (12 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 in Table 3. For example, half of the commercial rate structures listed below assess base charges up to $60.87 per month for water for a 2" meter, and up to $130.20 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 Meter-Based Commercial Rate Structures					
	10%	25%	50%	75%	90%	100%
Water (n = 99)						
5/8"	$0.00	$11.50	$16.50	$21.03	$26.33	$50.00
3/4"	$0.00	$12.21	$17.00	$21.08	$26.90	$50.00
1"	$10.67	$17.50	$26.01	$35.13	$46.39	$175.00
1 1/2"	$14.25	$22.16	$33.69	$48.84	$76.15	$247.50
2"	$26.47	$38.34	$60.87	$91.26	$121.00	$398.50
3"	$37.20	$56.28	$89.05	$136.13	$224.50	$787.50
4"	$46.60	$68.90	$130.20	$228.13	$381.18	$1,571.57
6"	$46.60	$89.11	$176.00	$358.34	$761.24	$3,928.92
8"	$46.60	$89.11	$215.00	$551.15	$1,109.58	$3,928.92
10"	$46.60	$89.11	$215.00	$565.70	$1,228.76	$3,928.92
Wastewater (n = 25)						
5/8"	$9.51	$11.33	$14.81	$19.12	$25.22	$50.00
3/4"	$10.20	$11.91	$15.41	$20.00	$29.13	$50.00
1"	$14.27	$16.44	$22.66	$47.20	$58.56	$87.00
1 1/2"	$20.77	$27.85	$38.00	$57.91	$100.12	$174.00
2"	$32.07	$38.00	$55.00	$108.62	$164.50	$232.00
3"	$44.10	$67.00	$124.88	$178.02	$334.87	$459.38
4"	$49.42	$130.20	$183.31	$313.68	$592.77	$916.76
6"	$49.42	$162.72	$309.05	$552.30	$1,191.15	$1,657.82
8"	$49.42	$162.72	$366.62	$697.00	$1,405.85	$2,513.96
10"	$49.42	$162.72	$466.67	$697.00	$1,471.35	$3,363.38

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 Alabama 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.

Figure 3: Residential Water Rate Structures (n=465)

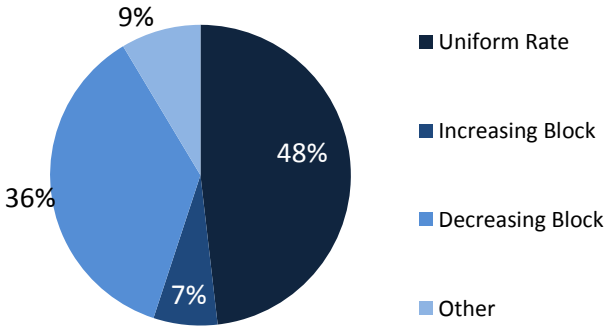
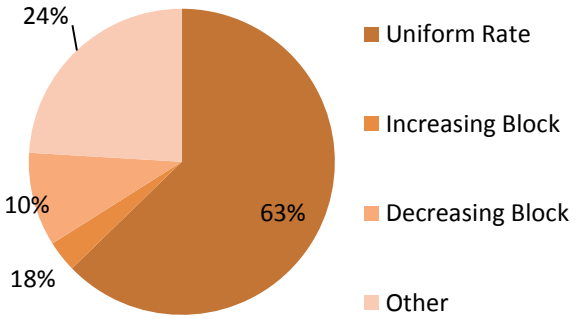


Figure 4: Residential Sewer Rate Structures (n=212)



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, 43 percent of water utilities have a separate rate structure for their commercial customers, and a small fraction of these utilities also has a separate structure that pertains to their industrial customers. On the wastewater side, 52 percent have a separate rate structure for their commercial customers. The percentages of all utilities that use each rate structure for commercial users (whether or not a separate rate structure is used) are similar to those for residential structures. The pattern is different when looking at only those utilities that use a separate commercial rate structure. Information on the rate structures that pertain only to commercial customers is presented in Figure 5 and Figure 6. More details on commercial rates are available on page 15.

Figure 5: Commercial-Specific Water Rate Structures (n=198)

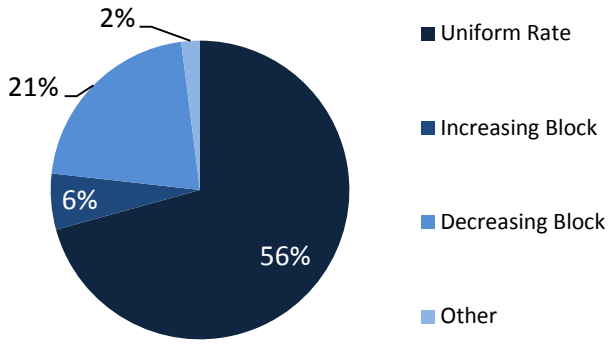
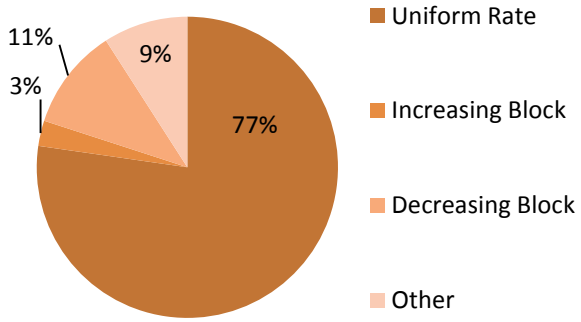


Figure 6: Commercial-Specific Wastewater Rate Structures (n=110)



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 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 240 Water and 39 Wastewater Residential Block Rate Structures

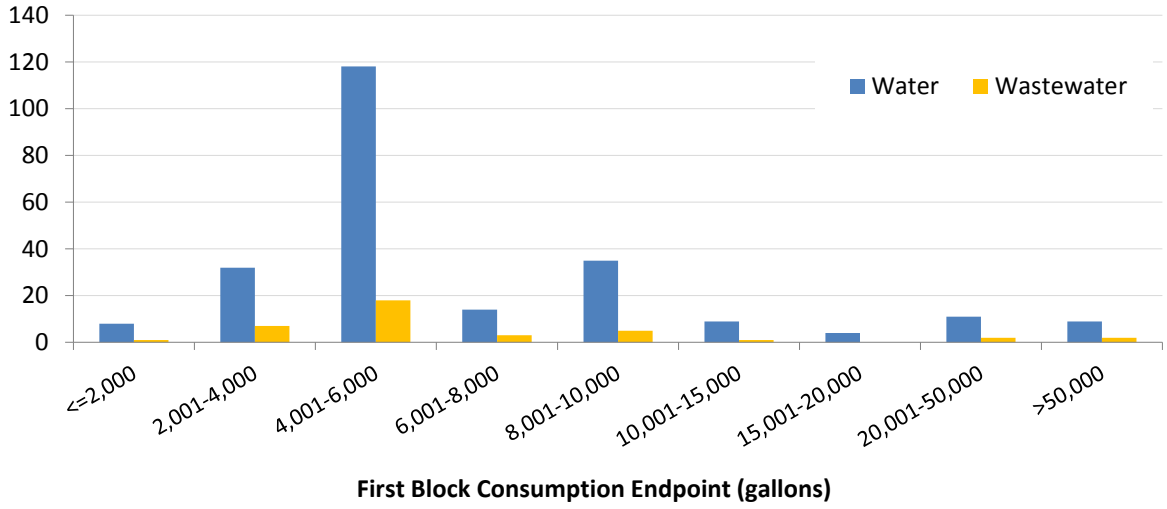


Figure 8 and Figure 9 also show the percent of the population served under each rate structure applicable to consumption/disposal levels of up to 15,000 gallons/month. While 7 percent of the water rate structures are increasing block structures through 15,000 gallons/month, 24 percent of all residential customers are served by these rate structures, indicating that such rate structures are likely favored more by larger utilities at this time. Figure 9 shows that the vast 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 = 465)

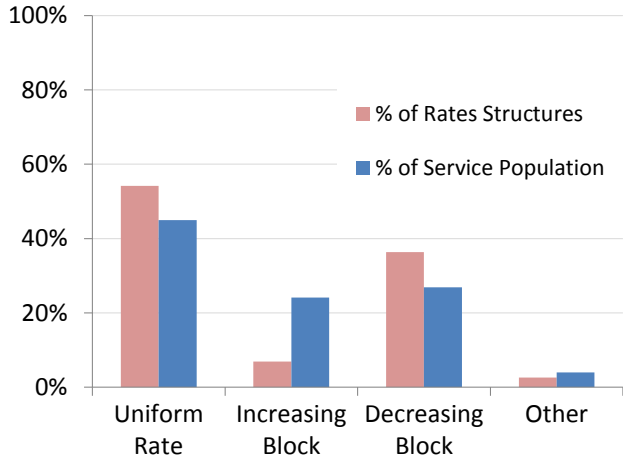
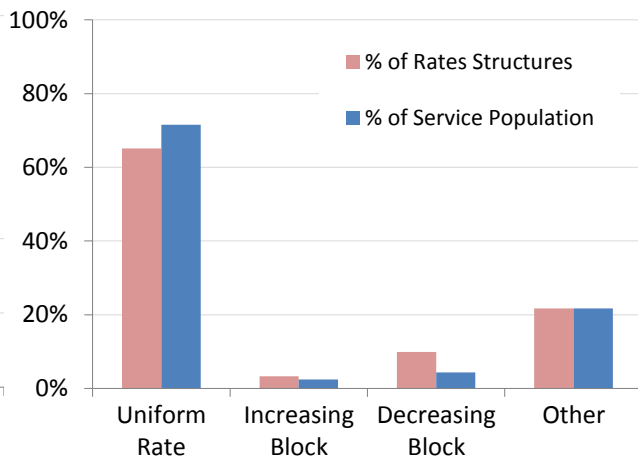


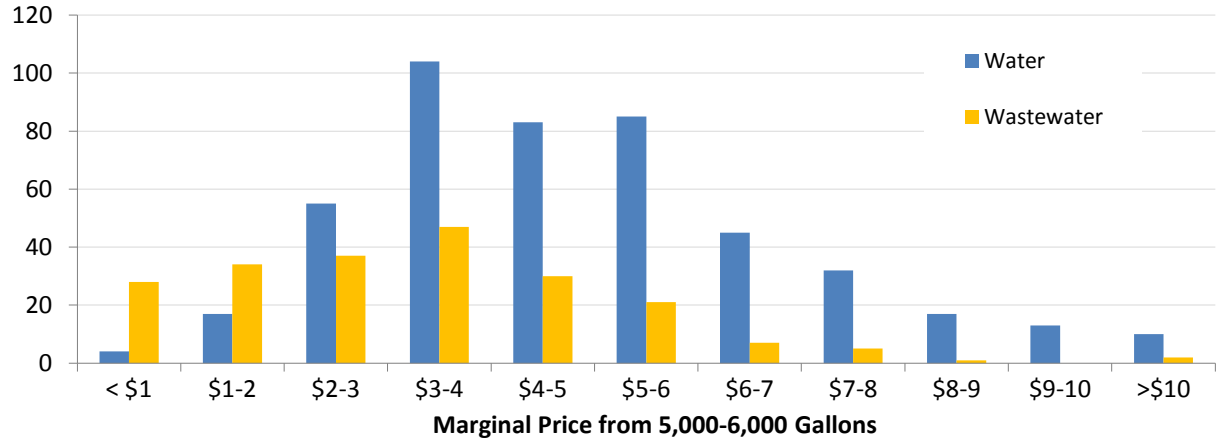
Figure 9: Wastewater Rate Structures Applicable to Residential Disposal up to 15,000 gallons/month (n = 212)



Residential customers in the Southeast typically consume an average of 4,000 to 5,000 gallons/month. Among the 465 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 $4.75 per 1,000 gallons – 50 percent of the water rate structures have a price that is between $3.50 and $6.06 per 1,000 gallons. Changes in rate structures since last year are shown on page 8, and changes in rates are shown on page 12.

The average price for wastewater is generally lower than for water in Alabama. Among the 212 wastewater rate structures in the sample, the median wastewater price for the next 1,000 gallons at 5,000 gallons/month is $3.25 per 1,000 gallons – 50 percent of the wastewater rate structures have a price that is between $2.00 and $4.34 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 465 Water and 212 Wastewater Rate Structures



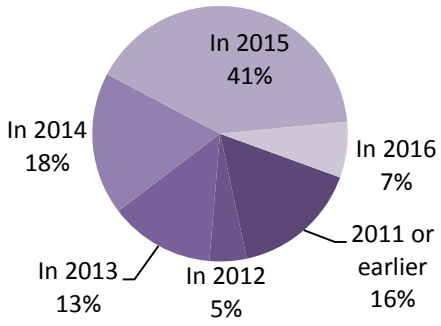
Among the 206 combined water and wastewater rate structures, the median combined price for the next 1,000 gallons is $7.45 per 1,000 gallons – 50 percent of the combined rate structures have a price that is between $5.60 and $9.40 per 1,000 gallons.

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 465 water rate structures, only 14 (3 percent) had a unique rate structure for residential irrigation meters. Most, 9 out of 14, use a uniform or an increasing block rate structure.

Changes in Residential Rate Structures in the Last Year

Almost half of Alabama utilities actively evaluate and modify their rate structures every one or two years. The calendar year in which each of the 394 rate structures active as of January 2014 (from utilities responding to this year's rates survey) were first put into effect is shown in Figure 11. The figure shows that 48 percent of the current rate structures were made effective since January 2015, and 66 percent have changed their rates in the last three years. Only 16 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=255)



The trend amongst Alabama utilities in recent years has been to move away from decreasing block rate structures to either uniform or increasing block structures. This trend is likely driven by an interest in preserving water supplies by promoting water conservation and discouraging excessive or wasteful consumption.

This year's survey included 465 water rate structures and 395 wastewater rate structures that were also included in the 2014 survey. Out of the 395 water rate structures included in 2014's rates survey, 25 changed to a new type of rate structure in the last year, shown in Table 4. Most of the changes were from decreasing blocks changing to uniform rates, and uniform rates changing to increasing block rate structures. Only 13 wastewater rate structures were changed between 2015 and 2016, out of the 395 surveyed in both years. An analysis of how much rates have increased in the past year is shown on page 12.

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

			Changed To			
Changed From			Increasing Block	Uniform Rate	Decreasing Block	Other
		TOTAL	***5***	***12***	***5***	***3***
	Increasing Block	***2***		1	0	1
	Uniform Rate	***5***	2		2	1
	Decreasing Block	***15***	3	11		1
	Other	***3***	0	0	3	

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=465)

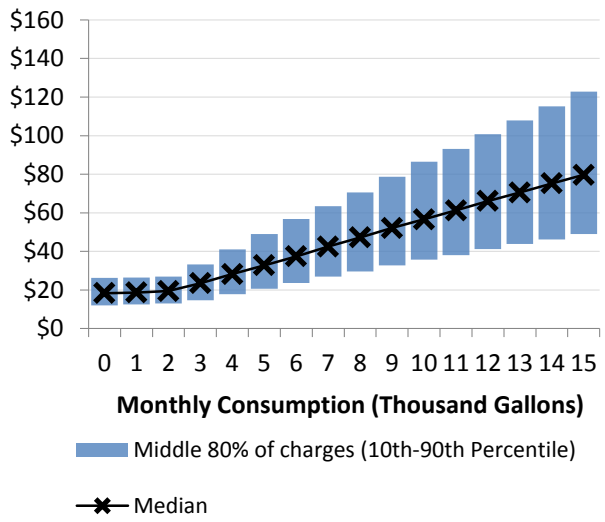
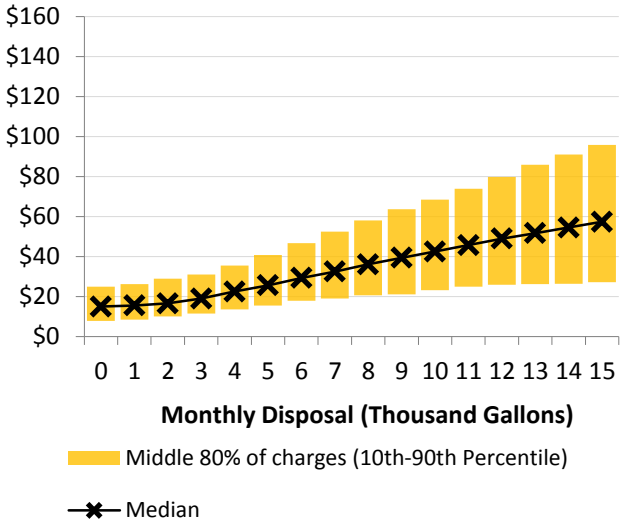


Figure 13: Monthly-Equivalent Residential Wastewater Bills by Disposal (n=212)



The median monthly amount charged for zero gallons of water is $18.36, $32.80 for 5,000 gallons, and $56.56 for 10,000 gallons. As a point of comparison, a gallon of potable water at a major grocery retailer is approximately $1.20, while the median bill for 5,000 gallons of tap water is approximately $0.0066 per gallon, or 183 times cheaper. In Alabamae, drinking water bills are generally higher than wastewater bills. The median monthly wastewater bill for customers disposing zero gallons is $15.00, $25.60 for 5,000 gallons, and $42.45 for 10,000 gallons.

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 $32.97, $56.65 for 5,000 gallons, and $94.15 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.

Figure 14: Monthly-Equivalent Residential Combined Water and Wastewater Bills by Consumption (n=206)

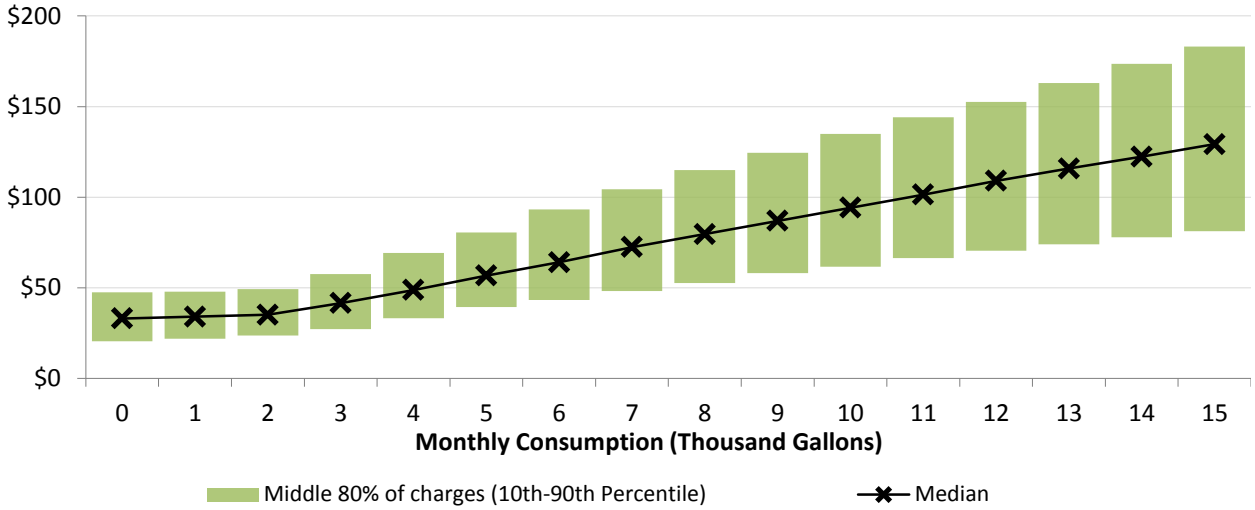


Table 5 shows that the median water bills among different size classes of utilities indicate an apparent economy of scale that can be observed when looking at utilities above 5,000 customers. However, median sewer bills among different size classes of utilities are roughly the same below 10,000 customers; i.e., there is no apparent economy of scale in this size range. It is unclear why there is such a large spike in median bill amounts for sewer utilities at the 25,000 and above service population. One possible explanation for this is that larger utilities are more aggressively preparing for future capital expenses, and therefore need higher rates.

Table 6 shows that municipal utilities and non-profits (which are largely entities associated with municipalities) generally have lower water bills than other service providers, possibly because the population density is highest for municipal utilities, which translates into lower per customer costs (and therefore bills) for distribution and collection. Conversely, water utility authorities and county government utilities, which are typically more spread out, may have significantly higher water bills. Such a pattern is a bit less robust with sewer utilities, due to the small number of data points for the various utility types. However, the wastewater municipals and non-profits still exhibit lower median bills than the authorities.

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

	Water Rate Structures		Wastewater Rate Structures	
Utility Size (Service Population)	**Number of Rate Structures**	**Median 5,000 gallons/month Monthly Bill**	**Number of Rate Structures**	**Median 5,000 gallons/month Monthly Bill**
1 - 999	56	$33.93	16	$25.00
1,000 – 2,499	96	$34.10	32	$26.40
2,500 – 4,999	110	$32.34	57	$24.32
5,000 – 9,999	101	$33.80	46	$26.30
10,000 – 24,999	60	$32.45	37	$28.13
25,000+	42	$28.80	24	$35.04
All Rate Structures	***465***	***$32.80***	***212***	***$25.60***

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

	Water Rate Structures		Wastewater Rate Structures	
Utility Type	**Number of Rate Structures**	**Median 5,000 gallons/month Monthly Bill**	**Number of Rate Structures**	**Median 5,000 gallons/month Monthly Bill**
Municipality	197	$30.00	116	$25.40
County/District	14	$34.75	4	$23.75
Authority	110	$39.79	16	$34.08
Not-For-Profit	119	$31.70	66	$24.90
For Profit	2	$55.70	3	$40.71
Other	1	$32.06	0	--
All Rate Structures	***465***	***$32.80***	***212***	***$25.60***

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 Alabama, 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.

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	***441***	***$33.26***	***4,164***
By Water Supply Type			
Groundwater	210	$29.43	3,600
Surface Water	65	$35.25	21,363
Purchase*	166	$40.56	3,203

* "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.

Changes in Residential Rates Over Time

Out of the 394 water and 171 wastewater rate structures included in 2014's rates survey, residential rates were increased from 2014 for 56 percent of the water rate structures and 63 percent of wastewater rate structures, as shown in Figure 15.

Figure 15: Percent of Rate Structures that Increased Residential Rates Since 2014

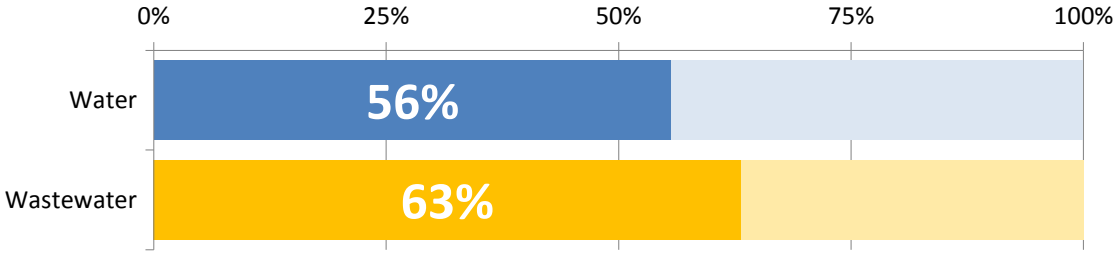


Figure 16 and Figure 17 show the residential monthly bill increase for customers that use 5,000 gallons/month among the 219 water and 108 wastewater rate structures that have raised rates since 2014. The median increase was $2.19/month for water (a 6.6 percent increase) and $2.26/month for wastewater (a 9.7 percent increase).

Figure 16: Increase in Residential Monthly Bill Amount Since Last Year for 5,000 gallons/month among 219 Water and 108 Wastewater Rate Structures that Raised Rates

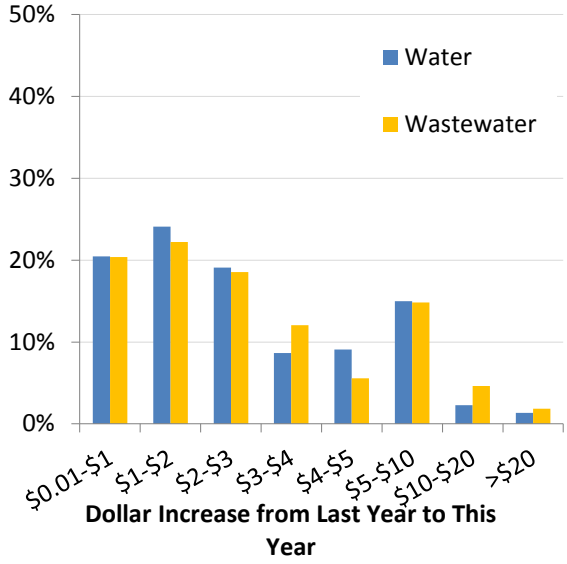
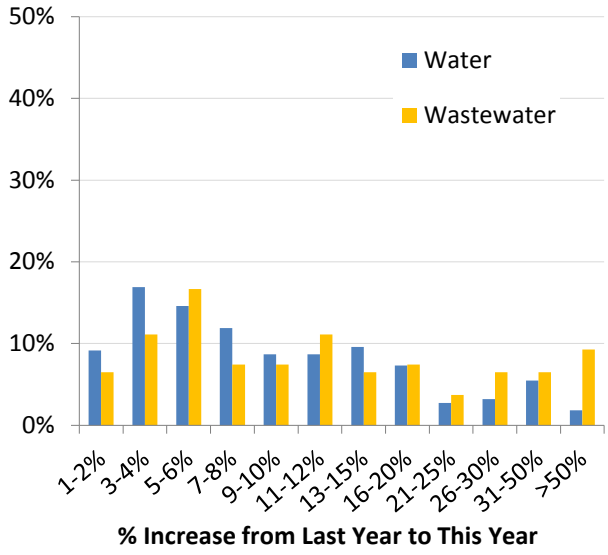
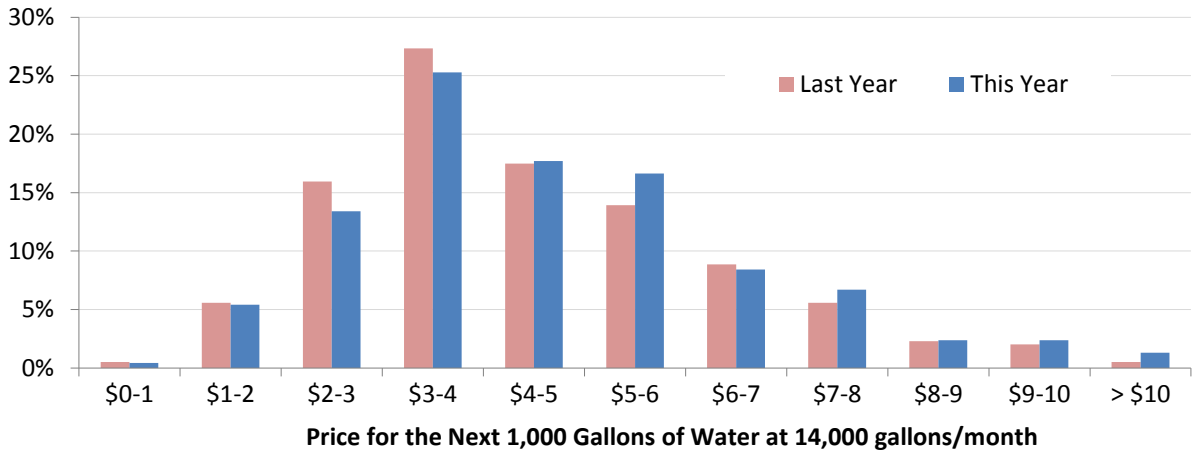


Figure 17: Percent Increase in Residential Monthly Bills Since Last Year for 5,000 gallons/month among 219 Water and 108 Wastewater Rate Structures that Raised Rates



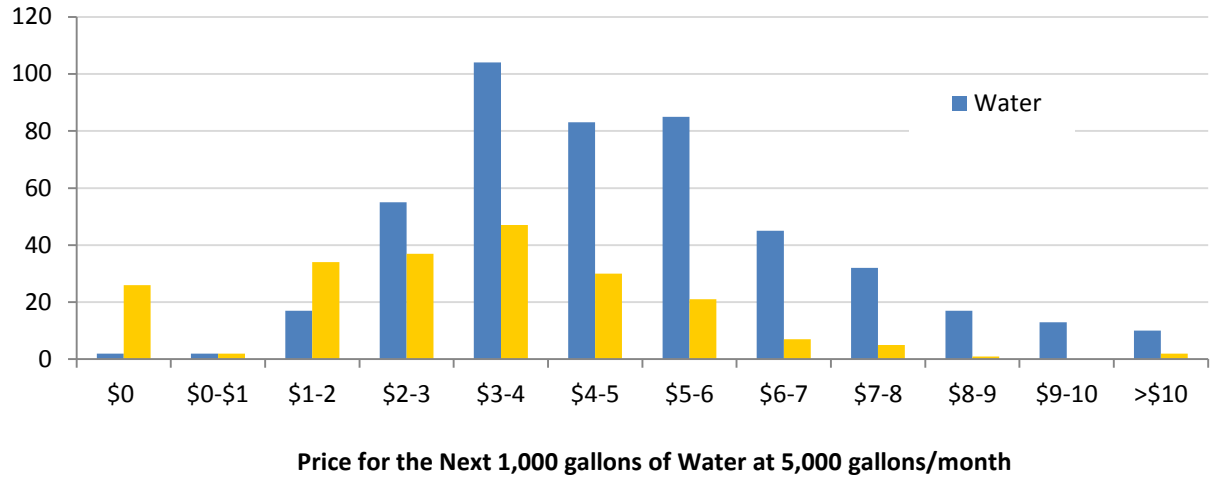
One of the mechanisms that utilities can utilize to send a strong pricing signal to encourage water conservation is the rate that customers pay at higher levels of consumption. Average residential consumption is around 5,000 gallons/month. Seasonal use of water can raise consumption levels for some customers 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 395 water rate structures included in the 2014 survey, the price for the next 1,000 gallons at 14,000 gallons/month was raised for 184 rate structures (40 percent). The distribution of the prices for water for the next 1,000 gallons at that consumption level is shown in Figure 18. Utilities generally have shifted their high use water rates upwards slightly.

Figure 18: Price for Water for the Next 1,000 Gallons at 14,000 gallons/month in 395 Water Rate Structures in FY2013-14 and 465 Water Rate Structures in FY2015-16



For households that do 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 465 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 $4.75 per 1,000 gallons. Figure 19 shows the significant variation in this signal across the state, with a few utilities charging more than $10 per 1,000 gallons, as well as a handful charging very low rates. Water systems tend to be more expensive than wastewater systems between 5,000 and 6,000 gallons/ month, with a median of $3.25 per 1,000 gallons for wastewater systems. This runs counter to our rate studies in some other southeastern states, which may indicate differeing rate-setting philosophies and/or underlying cost structures in Alabama. 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 – however, the ramifications for all customers, in terms of affordability of basic water and wastewater services, would have to be carefully assessed.

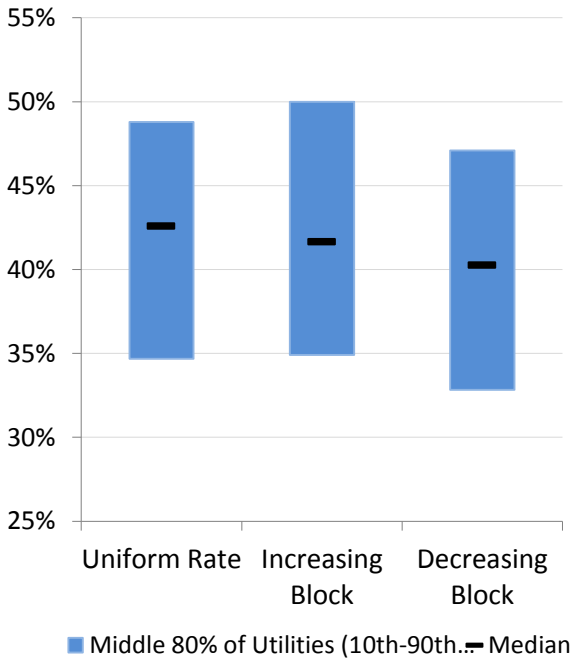
Figure 19: Marginal Price Change for Water and Wastewater at 5,000 gallons/month for 465 Water Utilities and 212 Wastewater utilities



Finally, Figure 20 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 Alabama) to 5,000 gallons (the approximate average in Alabama). 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 20 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 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 20: Reduction in Monthly Water Bill from 10,000 gallons/month to 5,000 gallons/month



Commercial Water and Wastewater Bills

Figure 21 and Figure 22 show the median monthly water and wastewater bills, respectively, for commercial customers at different levels of usage / disposal[3]. The middle 80 percent of charges also are indicated. The median monthly bill for commercial customers consuming zero gallons (on a 3/4" meter[4]) is $21.15 for water and $17.00 for wastewater. The median monthly bill for 50,000 gallons/month is $226.70 for water and $189.00 for wastewater. The median bill for those consuming 500,000 gallons/month (on a 1½" or 2" meter) is $2,008.50 for water and $1,752.13 for wastewater. The variation in commercial bills across rate structures increases significantly as the consumption/disposal amount increases.

Figure 21: Monthly-Equivalent Commercial Water Bills by Consumption (n=465)

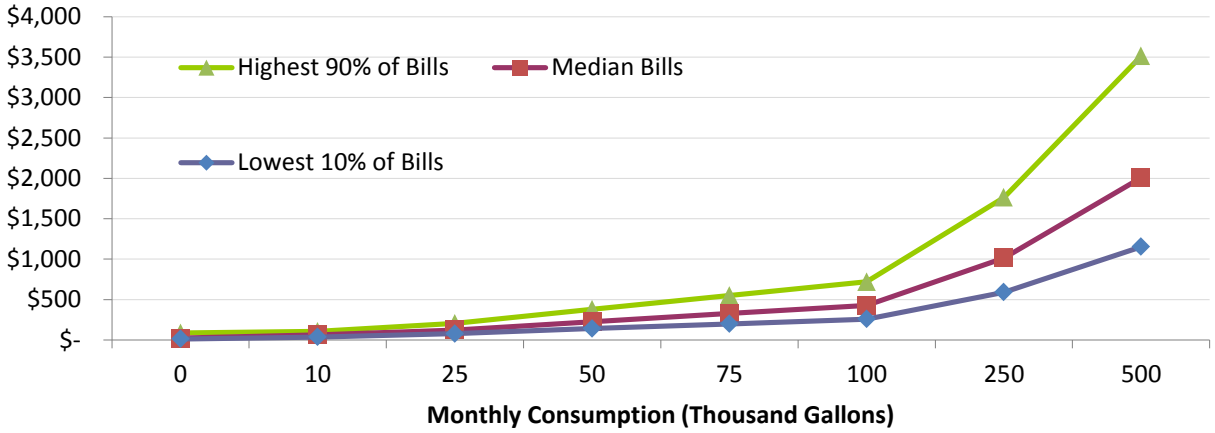
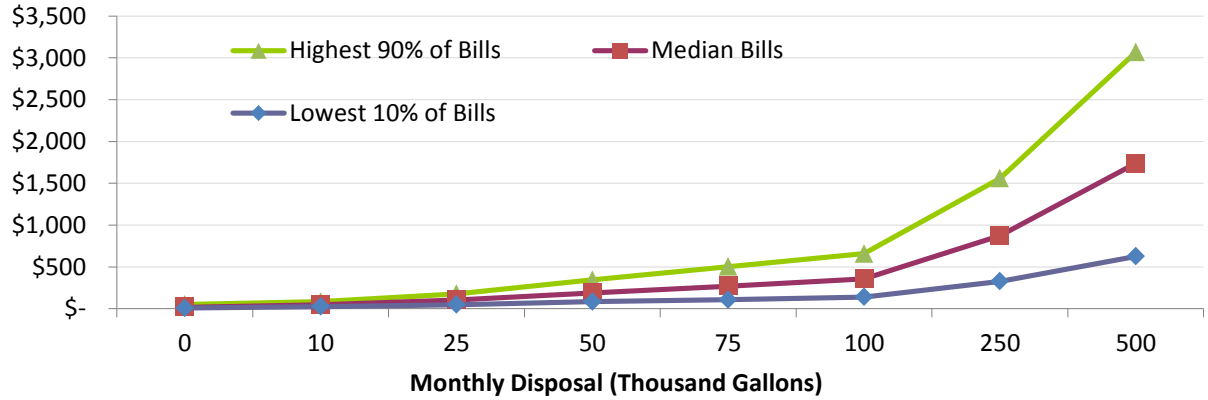


Figure 22: Monthly-Equivalent Commercial Wastewater Bills by Consumption (n=212)



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

[4] 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.

What Utilities Charge by River Basin

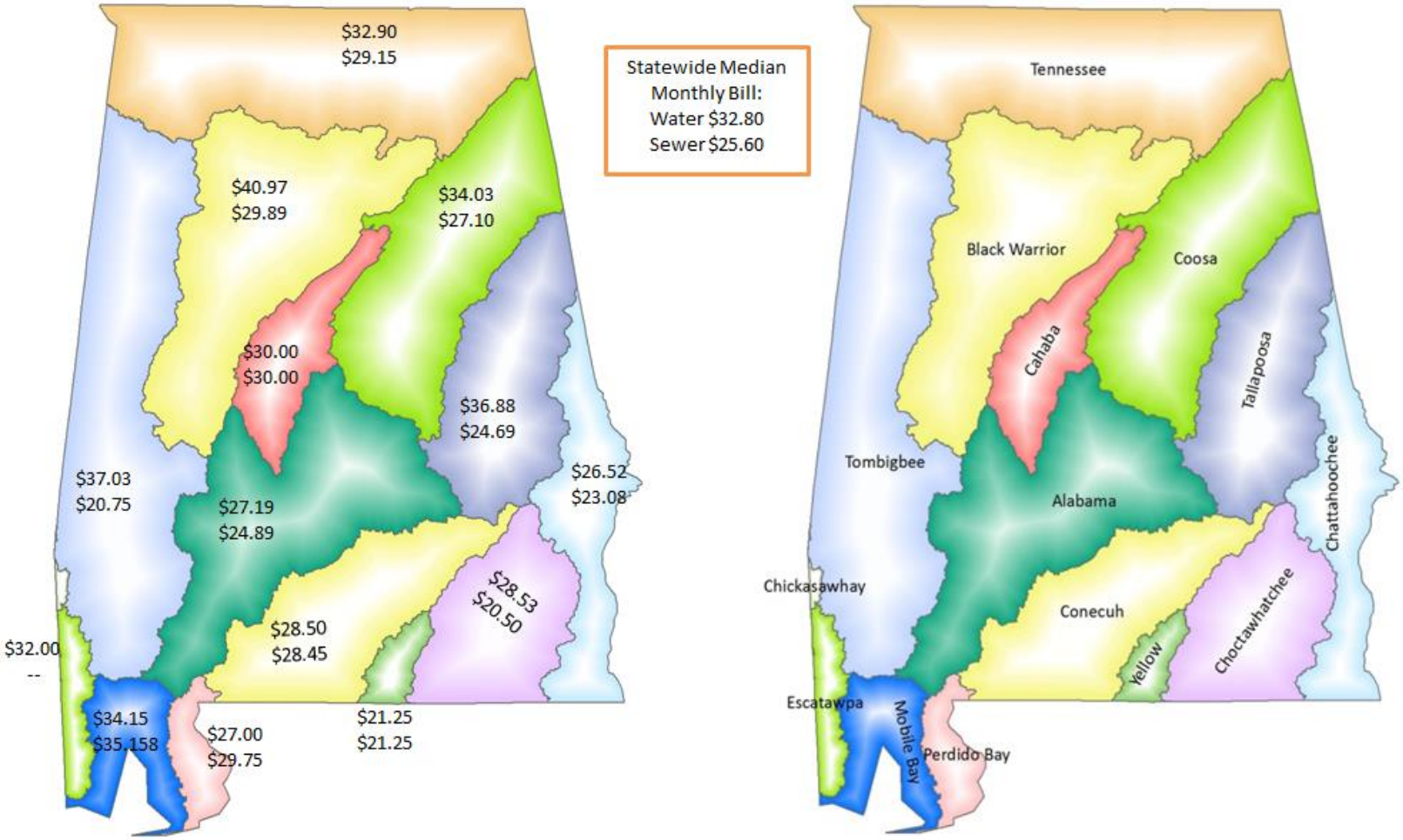
It is important to consider the operating environment when comparing rates among utilities. Source water quality and quantity can have a significant impact on the cost to produce water. Likewise, receiving water quality can have a major impact on the cost of wastewater treatment. In an attempt to consider these impacts, median water and wastewater bills for 5,000 gallons/month were calculated for each of Alabama's 14 major river basins, displayed in Figure 23.

As summarized 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 Black Warrior river basin, and the lowest median water charges are found in the Chattahoochee river basin. The highest median wastewater charges can be found in the Black Warrior river basin. The lowest median wastewater charges can be found in the Chactawhatchee river basin.

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

	Water Rate Structures		Sewer Rate Structures	
Utility Type	Total Number of Structures	Median Monthly Bill at 5,000 GPM	Total Number of Structures	Median Monthly Bill at 5,000 GPM
Alabama	29	$27.19	16	$24.89
Black Warrior	59	$40.97	24	$29.89
Cahaba	18	$30.00	9	$30.00
Chattahoochee	31	$26.52	13	$23.08
Choctawhatchee	41	$28.53	21	$20.50
Conecuh	38	$28.50	17	$28.45
Coosa	74	$34.03	33	$27.10
Escatawpa	2	$32.00	0	--
Mobile Bay	9	$34.15	5	$35.15
Perdido Bay	6	$37.00	3	$29.75
Tallapoosa	33	$36.88	13	$24.69
Tennessee	65	$32.90	33	$29.15
Tombigbee	56	$37.03	24	$20.75
Yellow	4	$21.25	1	$21.25

Figure 23: 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, 15 percent of water rate structures and 13 percent of wastewater rate structures specified different rates for customers living outside, and the majority (68%) were for municipal utilities. Twenty five 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 1.17 times more than inside customers. For wastewater, the median ratio is 1.22. Most utilities with different outside rates charged less than double the inside charges, as shown in Figure 24. Figure 25 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 $65.91 compared to $77.37 for outside customers.

Figure 24: Outside Residential Bills as a Percentage of the Inside Bills at 5,000 gallons/month (n=465 water, n=212 wastewater)

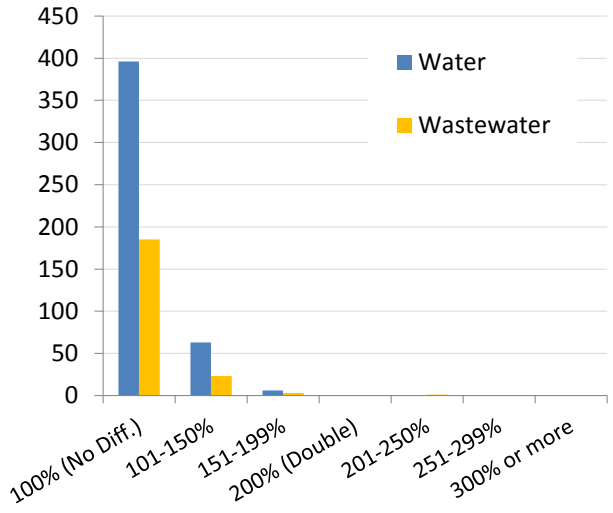
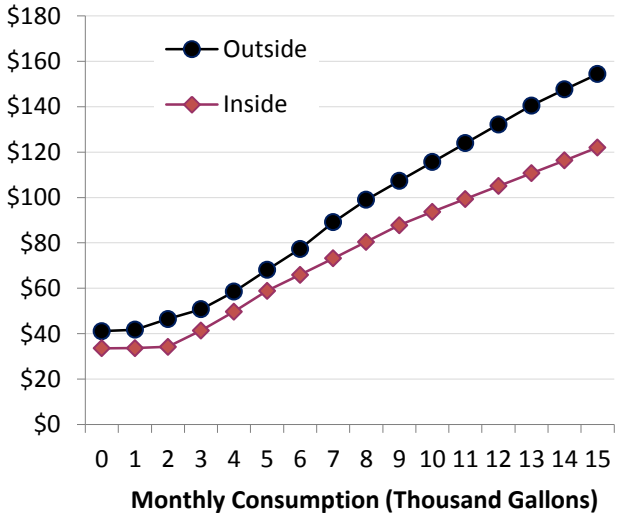


Figure 25: Median Combined Residential Water and Wastewater Bills for Rate Structures with Different Inside/Outside Rates (n=22)



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 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[5].

[5] AWWA (2012). *Principles of Water Rates, Fees, and Charges*. Manual of Water Supply Practices: M1. 6th Ed.

Affordability of Residential Rates

What the Average Alabaman 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 $32.80 for water and $25.60 for wastewater, using "inside" residential rates. This indicates that half of the 465 water rate structures in this sample charge more than $32.80 for water for 5,000 gallons/month, and half of the 202 wastewater rate structures charge more than $25.60 for wastewater. The utilities in this study serve about 5.06 million Alabamans. If we assume that everyone in this sample pays "inside" rates only, the average Alabman in this sample would be paying a weighted average[6] of $31.12 for water, $29.68 for wastewater or $64.58 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 Alabaman 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 24. Furthermore, some citizens may be paying a portion of their water bill through irrigation rates, making it impossible to accurately estimate what the average Alabaman actually pays for 5,000 gallons.

Annual Bills as a Percent of Household Income

Is the weighted average bill of $64.58 per month for combined water and wastewater for 5,000 gallons too high for most Alabamans? 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. For further comparison, the average price for a SEC football ticket to an in-conference matchup in 2015 was $72.38, $7.80 more than the weighted average monthly bill for combined water and wastewater. 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.

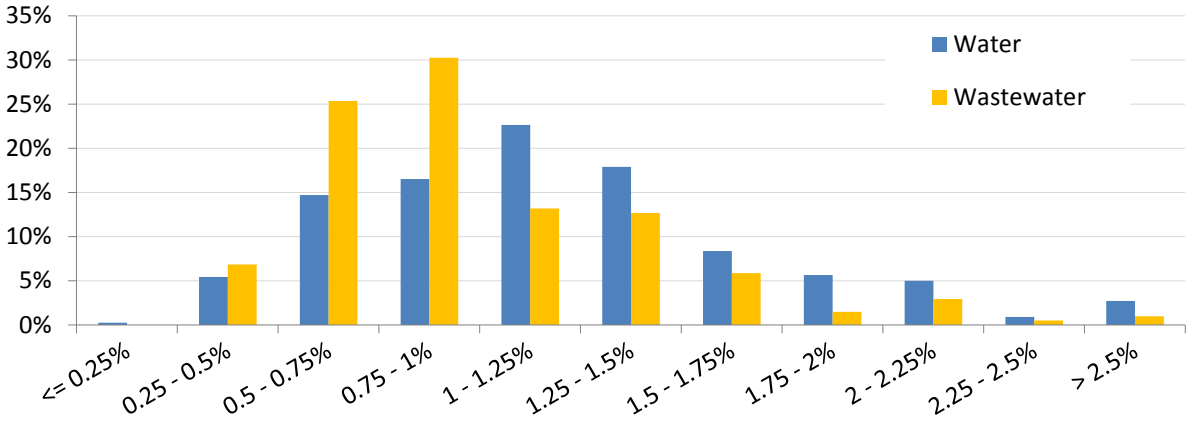
Affordability is very difficult to assess, and there is no one true, accurate measure for affordability. The most commonly used and most cited measure in the water industry is "percent MHI" – that is, calculating what a year's worth of water and wastewater bills for an average level of consumption (e.g. 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 the 442 water and 205 wastewater utilities in this survey, annual bills for 5,000 gallons/month range from under 0.25% MHI to over 2.5% MHI for each service, as shown in Figure 26. The majority of water rates fall between 0.5% and 1.5% MHI, with a median of 1.14% MHI across all utilities. Water rates are higher than wastewater rates, with the majority of water rates falling between 0.75% and 1.5% MHI, and a median for wastewater of 0.88% MHI across the sewer utilities. For combined water and wastewater bills at 5,000 gallons/month, half of the utilities charge more than 2.26% MHI.

There is no single target for affordability, even in terms of percent MHI. Currently, 37 percent of utilities in Alabama charge more than 2.5% MHI for combined water and wastewater at 5,000 gallons/month.

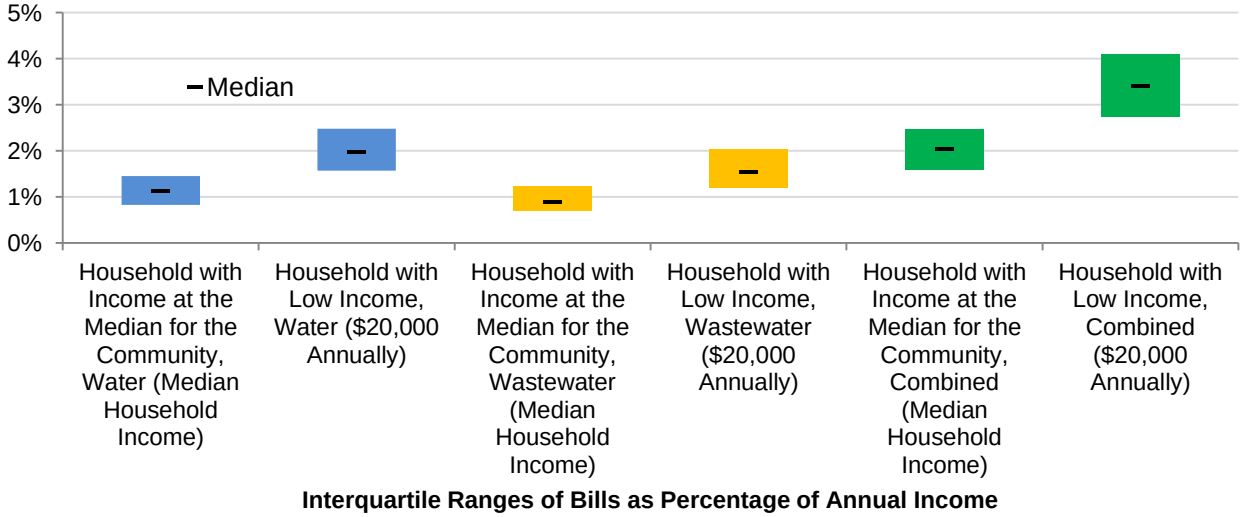
[6] The "weighted average bill" is the average bill being paid by customers, taking into account the different utility's rates and service populations, assuming that all of the customers are paying their utility's bill for 5,000 gallons/month.

Figure 26: Annual Bills for 5,000 gallons/month Consumption as a Percentage of the Serviced Community's 2014-Adjusted Median Household Income (n=442 water, n=205 wastewater)



The left-hand bars for each utility type (denoted by color) in Figure 27 show the interquartile range (25th-75th percentile) of water, wastewater, and combined system bills as a percent of MHI at 5,000 gallons/month. This metric has some shortcomings, but it does show variation in financial impact across the state. In a quarter of the utilities, customers making the MHI in their communities spend less than 0.82% of their income annually for 5,000 gallons/month of water, whereas in another quarter of the utilities, customers spend more than 1.45% of their income. Figure 27 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 27 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.

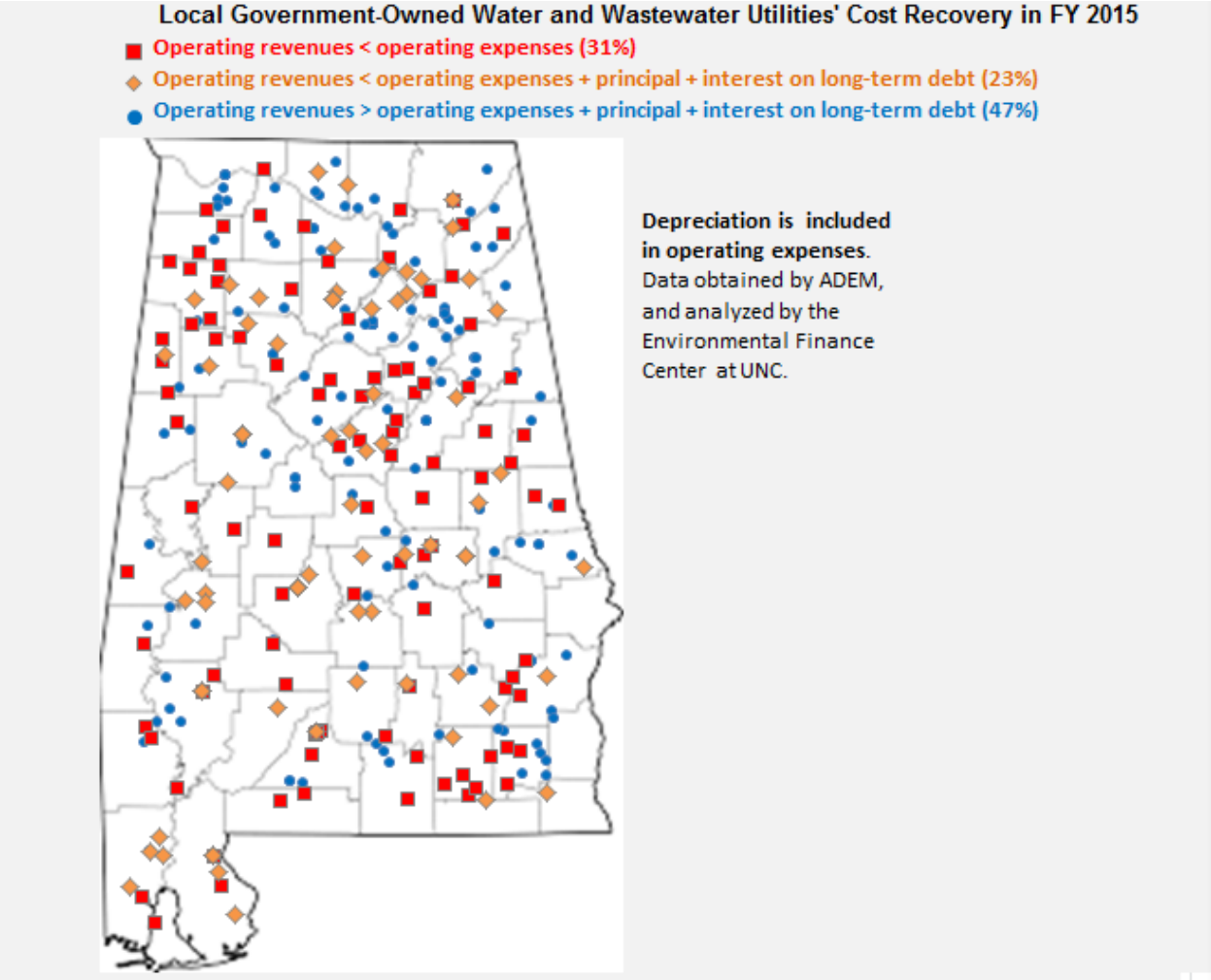
Figure 27: Percent of Annual Income spent on Utilities for Median Income Households and Low Income Households, amongst 464 Water Utilities, 212 Wastewater Utilities, and 206 Combined Utilities



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

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 FY2014-15, 31 percent of the 332 local government water and/or wastewater utilities in Alabama for which financial information was available 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.

Figure 28: Local Government-Owned Water and Wastewater Utilities' Cost Recovery in FY 2015 (n=332)



Another 23%, or 54% total, did not cover both depreciation-inclusive operating expenses and principal and interest payments on any long-term capital debt. With the above caveats in mind, it is still interesting to investigate what the sizes are of utilities that comprise the aforementioned 54% 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 shows that the 54% 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

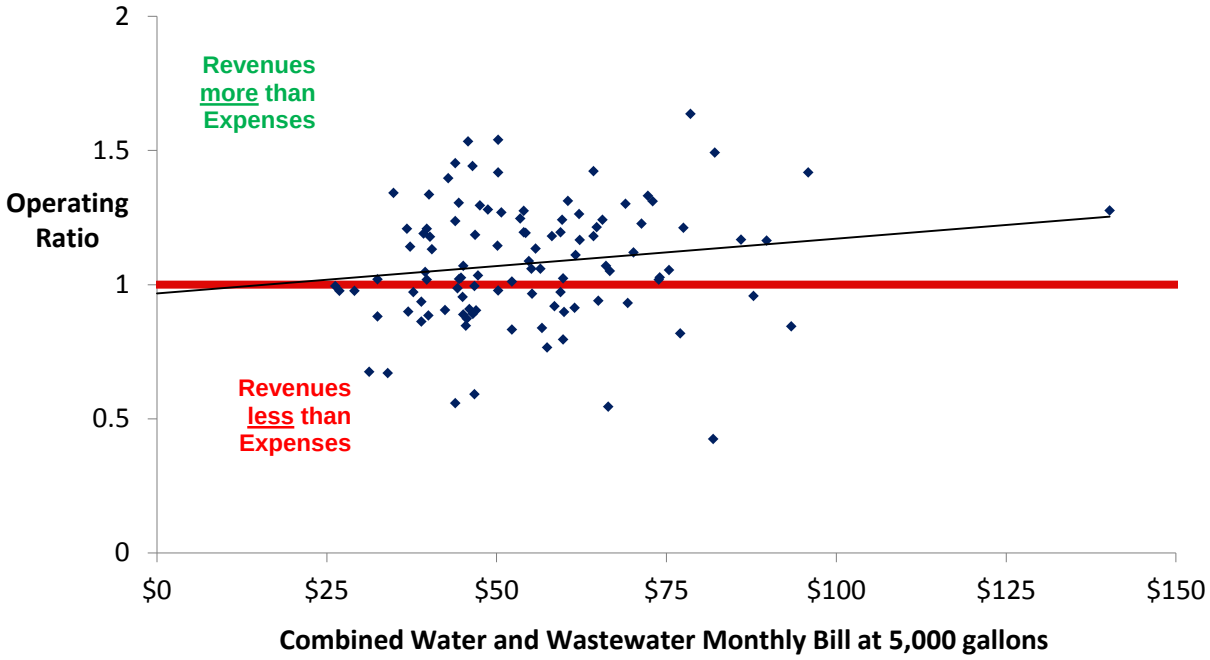
Number of Service Connections	Total # of Utilities	# of Utilities with O/R < 1.0	% of Total
< 1,000	116	61	53%
1,000 - 10,000	185	39	21%
> 10,000	31	3	10%
All Sizes	332	103	31%

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 29 shows rates from FY 2015-16 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, like rates data, were collected by the Alabama Department of Environmental Management, and then input into a data base and quality contolled by the Environmental Finance Center.

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 2015-16 (to the left of the graph), which resulted in operating at a financial loss (below the horizontal 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 AL Water and Wastewater Rates Dashboard at http://www.efc.sog.unc.edu/reslib/item/alabama-water-and-wastewater-rates-dashboard.

Figure 29: Combined Residential Bill in FY2015-16 for 5,000 gallons/month for Utilities with Reported DCA Data on Total Operating Revenues and Total Operating Expenses in FY2015-16 (n=106)



For advice on rate setting or more information on making appropriate rate comparisons, please contact David Tucker (drtucker@sog.unc.edu) at 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 sewer rates and rate structures in Alabama, compiled by the Alabama Department of Environmental Management (ADEM) 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.adem.state.al.us 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.