Water and Wastewater Service Pricing in Arizona:

2014-15 Rates Survey Results

This document details the results of a survey of drinking water and wastewater rates and rate structures conducted by the Water Infrastructure Finance Authority of Arizona and the Environmental Finance Center at the University of North Carolina, Chapel Hill in 2015. Rates and rate structures are analyzed for utilities throughout the State of Arizona. In addition to this report, the EFC produced comprehensive water and wastewater rate tables, rate sheets of individual utilities, and an interactive Rates Dashboard designed to allow the user to compare residential rates among groups of utilities and analyze the affordability of services and the extent to which the utilities are financially sustainable. To access these resources, please visit http://www.azwifa.gov and http://www.efc.sog.unc.edu.

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UNC ENVIRONMENTAL FINANCE CENTER

WIFA

About the Environmental Finance Center

The Environmental Finance Center (EFC) at the University of North Carolina (UNC), Chapel Hill is part of a network of university-based centers that work on environmental issues, including water resources, solid waste management, energy, and land conservation. The EFC at UNC partners with organizations across the United States to assist communities, provide training and policy analysis services, and disseminate tools and research on a variety of environmental finance and policy topics.

The Environmental Finance Center at the University of North Carolina, Chapel Hill is dedicated to enhancing the ability of governments to provide environmental programs and services in fair, effective, and financially sustainable ways.

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This report is a product of the Environmental Finance Center at the University of North Carolina, Chapel Hill. Findings, interpretations, and conclusions included in this report are those of the authors and do not necessarily reflect the views of EFC funders, the University of North Carolina, the School of Government, or those who provided review.

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Water and Wastewater Service Pricing in Arizona

SUMMARY

Purpose of the Report

Water and wastewater rate setting is one of a utility'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 support utility financial management and pricing efforts by providing a detailed survey of current statewide drinking water and wastewater pricing and financial trends. This report represents a collaborative effort between the Water Infrastructure Finance Authority of Arizona (WIFA) and the Environmental Finance Center (EFC) at the University of North Carolina at Chapel Hill.

In addition to this report, tables of each utility's rates and key components of their rate structures are available online at http://www.efc.sog.unc.edu. WIFA and the EFC are also pleased to offer a free interactive Arizona Water and Wastewater Rates Dashboard that combines utility financial, physical and customer characteristics with the capability of comparing and benchmarking rates among utilities that are similar in characteristics in various categories. The dashboard can be accessed at http://www.efc.sog.unc.edu/project/utility-financial-sustainability-and-rates-dashboards.

Five 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 many cases, when comparing two utilities, one utility's rate may be higher at 4,000 gallons, but lower at 8,000 gallons. Comparing rates among utilities is really just a starting point for a more in-depth analysis.

3. **MYTH: Pricing is simple.** Arizona utilities employ a tremendous variety of pricing structures. Utilities show wide variation in how they set base charges, design block structures, and calculate wastewater charges (i.e. with or without caps, based on monthly water use or winter water use, or not on water use at all). 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, many of the utilities using increasing block rate structures had the least effective pricing signals in the State of Arizona. Rather than focusing on rate structures alone, utilities should consider all aspects of pricing. Above conservation, utilities must determine if their rates are set to truly reflect their costs, and make sure that rates are not artificially low.

5. **MYTH: Water and wastewater services are cheap and affordable, or conversely, water is too expensive.** Both of these generalizations are common and both are equally mythic based on what actually occurs throughout the state. When determining the affordability of rates, utilities often focus on the average or median price for the average household across the state or an entire utility service area, but this practice can mask the financial reality for some households. The EFC's research shows that the price for water across the State of Arizona is relatively low compared to other parts of the country and compared to the price for other less essential consumer goods. However, there are still pockets across the state where the price of water and wastewater service poses a significant financial burden for lower income customers.

Survey Methodology

Rate sheets and annual financial reports were collected by WIFA and the EFC from water and wastewater utilities throughout the State of Arizona during the spring of 2015. Base charges, volumetric rates, and recurring surcharges that provide revenue to the water and/or wastewater enterprise funds are included in our analysis; taxation or charges for other services that do not provide revenue to the water and/or wastewater enterprise funds are excluded from our analysis. (For example, some Domestic Water Improvement Districts and Domestic Wastewater Improvement Districts pledge property tax revenues in addition to revenues from rates, in order to secure loans for their systems; revenue from taxation is not included in our analysis, for the sake of consistency across our comparative analyses.)

Over the course of this survey, approximately 393 water and wastewater utilities were contacted by WIFA via email or other means. (All of these utilities charge separate rates for water and/or wastewater services; systems that do not charge separate rates, such as including the cost of water service in a monthly rent payment or HOA fee, are not included in our survey group.) Through contacts with utilities and research of public data, WIFA obtained rate schedules and annual financial reports, which are public data, for 354 utilities (90 percent). These utilities provide services for more than 95 percent of the population served by all public community water systems in the state (as per the Safe Drinking Water Information System maintained by the U.S. Environmental Protection Agency and the State of Arizona). Table 1 describes the utilities that participated 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 392. Copies of the 392 rate structures of those participating utilities are available online at http://www.efc.sog.unc.edu/project/arizona-water-and-wastewater-rates-and-rate-structures.

Table 1: Participating Utilities in the Survey with Rates Data (Rates Effective April 2015)

Institutional Arrangement	Provides Water and Wastewater	Provides Water Only	Provides Wastewater Only	*Total*
Municipality	59	6	13	**78**
County/District	4	36	7	**47**
Authority	1	0	0	**1**
Not-for-Profit	0	19	0	**19**
For-Profit	19	170	11	**200**
Sanitary District	0	0	9	**9**
Total Number of Utilities	***83***	***231***	***40***	***354***
Number of Rate Structures	***89***	***260***	***43***	***392***

OVERVIEW OF RATES AND RATE STRUCTURES

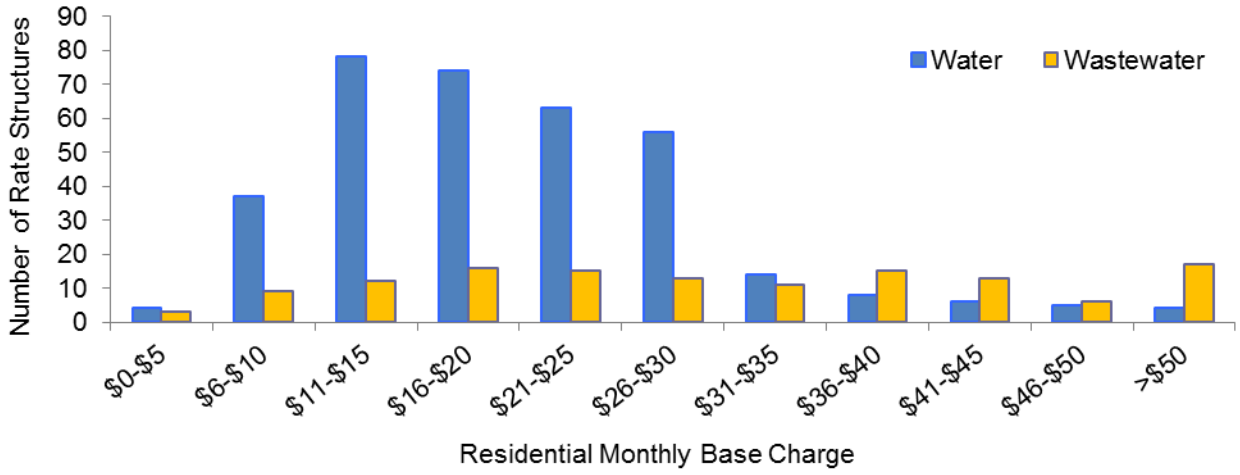
Utilities employ a range of rate structures to determine what their customers pay. Almost all utilities use a combination of base charges and variable charges in their rate structures. There is considerable variation in how these are calculated and how they are charged for different classes of customers.

Base Charges

Base charges contribute to revenue stability because they do not vary from month to month, regardless of consumption. Utilities have different philosophies about what this charge should cover with some using these charges to primarily recover customer service costs (meter reading and billing) and others using them to cover fixed costs including all or the majority of their debt service costs.

Figure 1 shows the range of residential base charges applied in all rate structures analyzed statewide. Base charges ranged from $4 to $79/month for water and $0 to $95/month for wastewater across the state. In general, wastewater base charges exceed water base charges. The median[1] base charges are presented in Table 2. The median base charge applied by utilities in 2015 is $18.80 per month for water and $29.50 per month for wastewater. For combined utilities, the median combined water and wastewater base charge is $45.77 per month.

Figure 1: Monthly Base Charges among 349 water and 132 wastewater rate structures



While nearly every rate structure (99 percent) has a base charge, their amounts vary by utility size as shown in Table 2. The largest utilities generally have smaller base charges than the smallest utilities, which may be a reflection of the fact that larger utilities have broader customer bases that

[1] Most of the statistics reported 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 often preferred over the average because averages are influenced by exceptionally high or low values whereas medians are not.

provide a more stable revenue stream and thus can charge lower base charges per customer. However, large utilities sometimes have base charges higher than medium sized utilities, and this may be a reflection of the fact that some large wastewater systems carry significant debt and may design base charges to cover all or significant portions of debt obligations. Smaller utilities may, on average, have less stable customer consumption and, therefore, decide to shift a greater portion of their operating costs into the base charge.

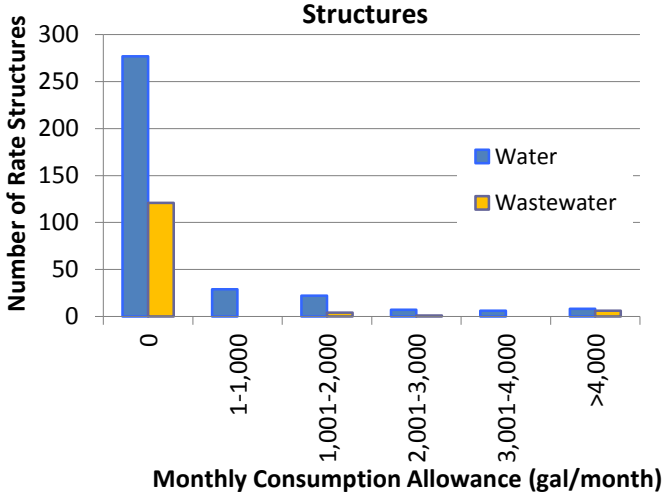
Table 2: Monthly Base Charges in Water and Wastewater Rate Structures, by Utility Size

	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
Statewide	***349***	***349***	***$18.80***	***132***	***130***	***$29.50***
By Service Population*						
1 – 999	159	159	$21.21	14	13	$31.45
1,000 – 2,499	57	57	$18.50	15	15	$27.60
2,500 – 4,999	34	34	$18.20	13	13	$25.91
5,000 – 9,999	22	22	$18.11	10	10	$29.63
10,000 – 24,999	27	27	$17.15	15	15	$27.17
25,000+	35	35	$14.19	31	31	$21.12

* Service population is estimated for 347 out of the 392 rate structures analyzed.

A minority of rate structures (21 percent of water and 8 percent of wastewater rate structures) includes a minimum amount of water consumption or wastewater volume with the base charge (i.e.: a consumption allowance), as shown in 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 the 72 water rate structures with consumption allowances, the median amount of allowance included with the base charge is 2,000 gallons per month while the median for 11 wastewater rate structures is 4,204 gallons per month.

Figure 2: Consumption Included with Base Charge for Residential Customers among 349 Water and 132 Wastewater Rate Structures



Variable Charges: Uniform, Increasing Block, Non-Volumetric, and Other Rate Structures

Figure 3 and Figure 4 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 rates, increasing block rates, and, on the wastewater side only, non-volumetric charges that are flat monthly bills not related to volumes. In a uniform rate structure, the rate at which water or wastewater is charged for each unit of use does not change as the customer uses more water. In an increasing block structure, the rate increases with greater water consumption. Other volumetric rate structures used in Arizona include decreasing block rates, a hybrid of increasing and decreasing blocks where rates increase or decrease for specific targeted blocks of consumption, seasonal rate structures, rates that are capped at a maximum billable consumption amount, and tiered flat fees.

Wastewater bills are either flat charges that do not vary from month to month, or calculated based on water use level in one of two ways. The more common method is to have wastewater bills for a billing period calculated based on the amount of metered water consumption during that period; however, several wastewater utilities studied use rate structures where the wastewater charge for a given period is not based on water use for that period, but rather is based on water consumed during low consumption periods (usually the winter). This is done to reflect the fact that much of the water used in summer months is for outdoor use and does not enter the wastewater system. Other utilities place a cap on residential wastewater consumption. For example, if a utility caps their 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 volume.

Figure 3: Residential Water Rate Structures (n=349)

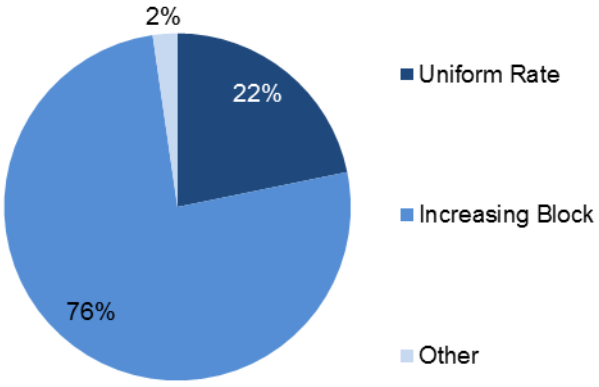
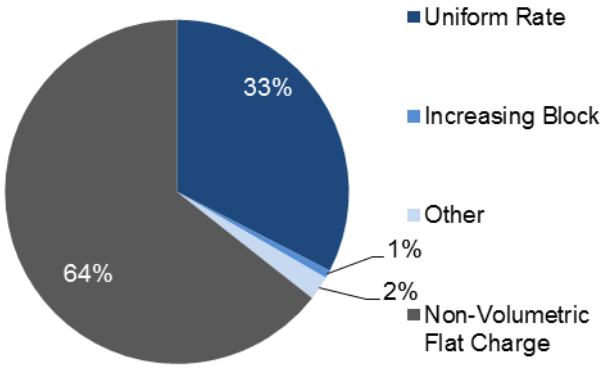
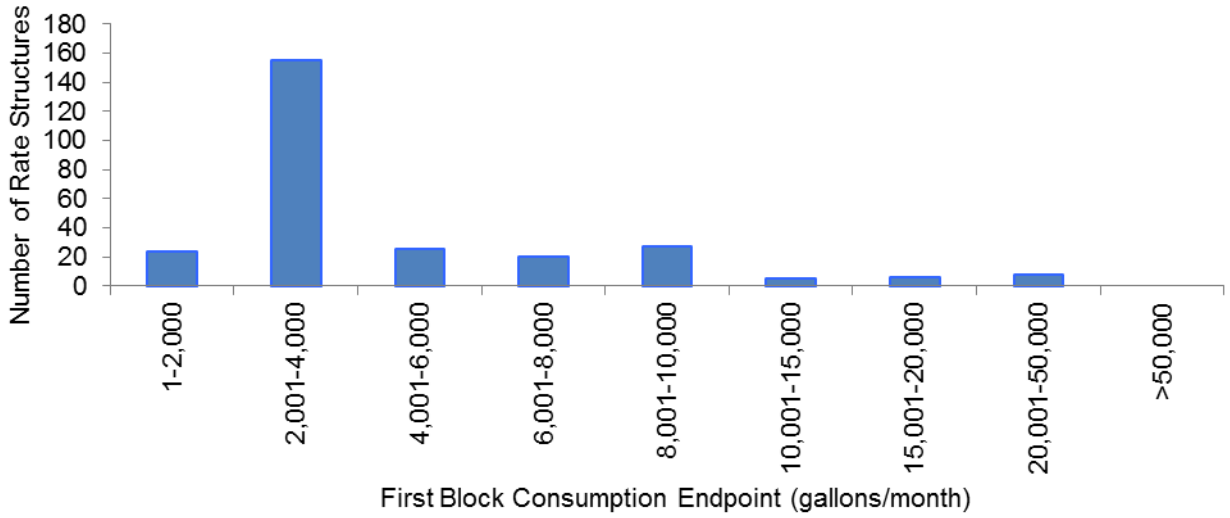


Figure 4: Residential Wastewater Rate Structures (n=132)



Utilities with block rate structures have to decide where to delineate the block – in other words, when the unit price of water changes. Figure 5 shows the various ranges of first block consumption endpoints for all water block rate structures, and the number of utilities applying endpoints within each range. After the endpoint, the customer starts paying more dollars per unit of water used.

Figure 5: Maximum Quantity in the First Block among 270 Water Residential Block Rate Structures



Many water and wastewater utilities use the same rate structure for residential, commercial, and industrial customers, but some have separate rates for different customer classes. In this survey, 28 percent of water utilities have a separate rate structure for their commercial customers, and a fraction of these utilities also has a separate structure that pertains to their industrial customers. On the wastewater side, 71 percent have a separate rate structure for their commercial customers. Utilities that do not have separate rate structures for non-residential customers will sometimes set their block structures in a way such that industries that are large users pay a different price (usually lower) than smaller users. This may account for the systems in Figure 5 that have blocks that begin at 20,000 gallons/month or higher. Information on the rate structures that pertain only to commercial customers is presented in Figure 6 and Figure 7.

Figure 6: Commercial-Specific Water Rate Structures (n=96)

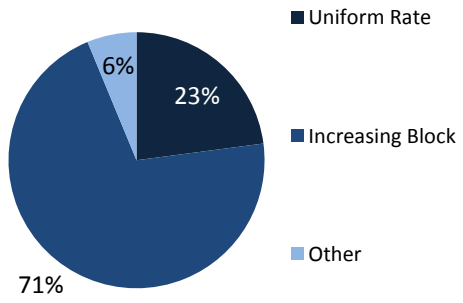
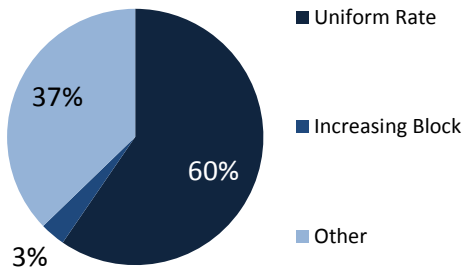


Figure 7: Commercial-Specific Wastewater Rate Structures (n=94)



An examination of rate structures over the range of typical residential consumption reveals that many increasing and decreasing block structures are effectively uniform below 15,000 gallons/month (shown in Figures Figure 9 and Figure 8). For example, whereas 265 of residential water rate structures are increasing block structures (Figure 3), only 251 actually apply increasing

rates within the first 15,000 gallons/month of consumption (Figure 9) – the other 14 rate structures have a first block that exceeds the range of typical residential use. Figures Figure 9 and Figure 8 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 26 percent of the water rate structures are uniform structures through 15,000 gallons/month, only 4 percent of all residential customers are served by these rate structures. The "other" category of rate structures includes seasonal block rates, non-volumetric fees, and tiered flat fees. As Figure 9 indicates, very few rate structures fit into this classification; one notable exception is the City of Phoenix, Arizona's most populous city. Phoenix has adopted water rates that vary by season, putting their rate structure in the "other" category. This explains why "other" rate structures are very few in number, but cover almost 30% of Arizona's total service population. Figure 8 shows that although non-volumetric flat rate structures are most common in Arizona, the majority of residential customers pay uniform rates for wastewater disposal.

Figure 8: Water Rate Structures Applicable to Residential Disposal up to 15,000 gallons/month (n=349)

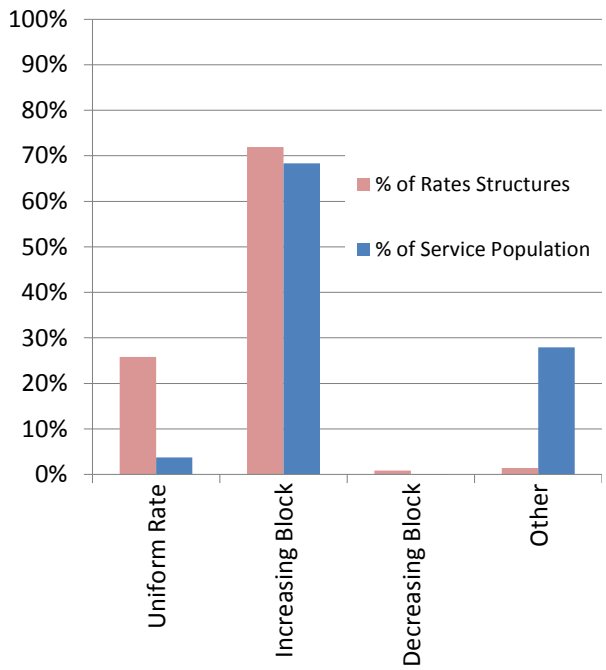
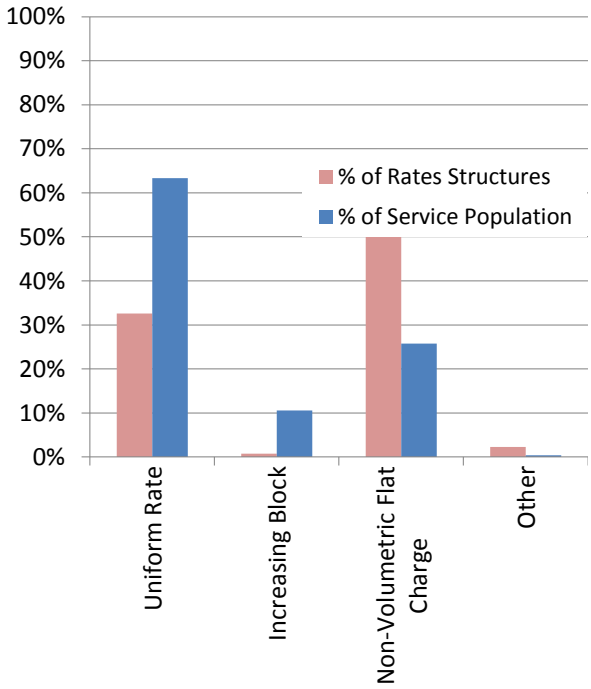


Figure 9: Wastewater Rate Structures Applicable to Residential Consumption up to 15,000 gallons/month (n=142)



WHAT UTILITIES CHARGE THEIR RESIDENTIAL CUSTOMERS

Monthly Bills by Volume

Figure 10 and Figure 11 show the amount utilities bill residential water and wastewater customers, respectively, for a range of volumes determined on a monthly basis.[2] These calculations include base charges, consumption allowances, volumetric rates, and any water service-related surcharges that apply every month on the base or volumetric charges. The colored bars highlight what the middle 80 percent (between the 10th and 90th percentile) of charges are among the rate structures statewide for the consumption spectrum. Utilities that charge below or above the colored bars are charging less than or more than 90 percent of all other rate structures in the sample, respectively.

Figure 10: Monthly-Equivalent Residential Water Bills by Consumption (n=349)

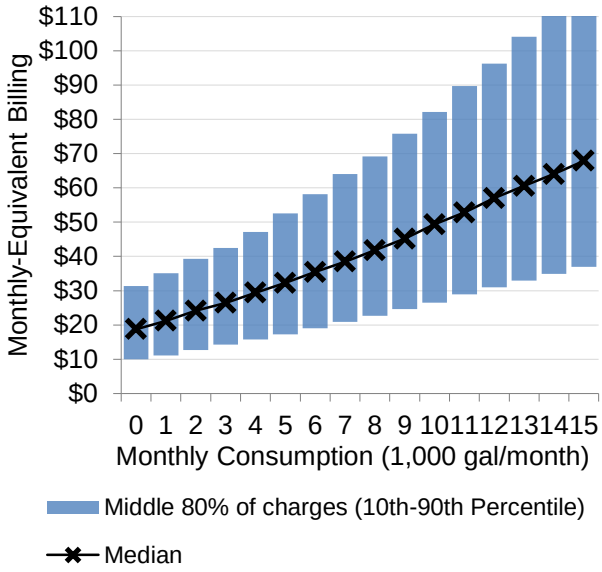
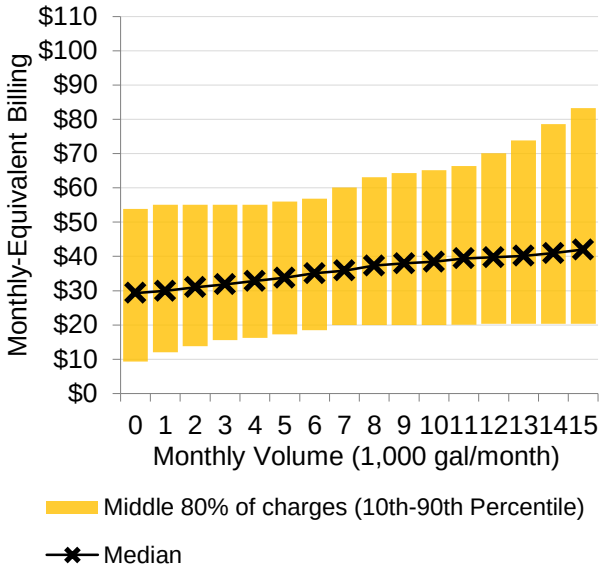


Figure 11: Monthly-Equivalent Residential Wastewater Bills by Volume Billed (n=132)



Determining a consumption point for rate comparisons

What a water and wastewater customer pays for service depends on their utility's pricing structure and the amount of services the customer uses. Water and wastewater pricing comparisons are often made focusing on one set consumption point (e.g. 7,000 or 10,000 gallons per month), but as Figure 10 and Figure 11 suggest, focusing on one consumption point can mask important variations in pricing, since the variation in utility pricing is much higher at higher consumption points than lower consumption points. Two utilities may be close to same price at 5,000 gallons, but radically different at 15,000 gallons per month.

[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.

Data from the Arizona Department of Water Resources indicate that average water use varies considerably across Arizona, with some utilities reporting residential accounts averaging as little as 5,000 or 6,000 gallons per month and others reporting in excess of 10,000 gallons per month based on per capita usage reporting.[3] The City of Phoenix has done extensive research on customer use and has found that even within a utility there is significant variation in usage among customers based on their outdoor watering habits, property attributes, plumbing fixtures and age of home. A relatively water efficient home in Phoenix that has an efficient residential irrigation system may use 9,000 gallons per month.[4]

The EFC's research throughout the country has consistently shown that households that do not have substantial outdoor watering use on average approximately 5,000 gallons per month. Typical household use in drier climates where households irrigate even small areas of land can be much greater. This report presents residential prices at varying consumption points with:

- 5,000 gallons per month serving as an indicator of basic water needs,
- 10,000 gallons per month serving as an indicator for the typical median water customer in many utilities across Arizona based on reported usage to the state,
- 7,500 gallons per month as the mid-point[5] for water use and that is consistent with data from past reports, and
- 5,000 gallons per month of billed wastewater usage as an indicator of a typical wastewater customer.

Statewide median water and wastewater rates

The median monthly water bill across all 349 water rate structures charged for zero gallons of water (effectively the base charge) is $18.80, $32.25 for 5,000 gallons, $40.25 for 7,500 gallons, and $49.37 for 10,000 gallons.

The median monthly wastewater bill among all 132 wastewater rate structures charged for a volume of zero gallons is $29.33, $33.78 for 5,000 gallons, $36.56 for 7,500 gallons, and $38.42 for 10,000 gallons. Median wastewater bills are higher than water bills at zero and 5,000 gallons per month, but are lower at 10,000 gallons.

Among the 89 utilities that offer both water and wastewater services, the range of combined water and wastewater bills for various levels of consumption is as follows. The median monthly combined bill for zero gallons is $24.18, $38.80 for 5,000 gallons, $55.93 for 7,500 gallons and $74.32 for 10,000 gallons.

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[3] Arizona Department of Water Resources, AMA Planning & Data Management Section, 2013 Annual Water Withdrawal & Use Reports.

[4] City of Phoenix Water Department.

[5] The model used in this survey to calculate household expenditures from the details of rate structures was designed to calculate the monthly price at even 1,000 gallon increments. Therefore, the monthly charges interpolated at the 7,500 gallon point are close approximations but not exact calculations of actual charges at that volume.

Calculating what individuals pay for combined water and wastewater services is difficult, as many utilities provide only water or wastewater service but not both. Some areas of the state receive water service from one provider and wastewater service from another provider, and in other areas, customers with one utility service may rely on a decentralized source (e.g. private wells or septic tanks) for the other service.

Observations of note

1) Economy of scale is evident for water services, but not as strong for wastewater services.

Table 3 shows that the median water bills among utilities serving different population sizes indicate an apparent economy of scale since larger utilities are generally charging lower water prices. Likewise, median wastewater bills are lower among utilities serving more than 5,000 people than among smaller utilities. However, the correlation between lower bills and higher service populations is not as strong with the wastewater bills as it is with water bills.

Table 3: Median Water and Wastewater Monthly Bills at 5,000 gallons/month, by Utility Size

	Water Rate Structures		Wastewater Rate Structures	
	Total Number of Structures	Median Monthly Bill at 5,000 gal/mo.	Total Number of Structures	Median Monthly Bill at 5,000 gal/mo.
All Rate Structures	***349***	***$32.25***	***132***	***$33.78***
By Service Population*				
1 – 999	159	$35.80	14	$33.29
1,000 – 2,499	57	$31.00	15	$29.50
2,500 – 4,999	34	$29.36	13	$34.00
5,000 – 9,999	22	$30.50	10	$33.41
10,000 – 24,999	27	$28.76	15	$29.97
25,000+	35	$24.10	31	$31.00

* Service population is estimated for 347 out of the 392 water/wastewater rate structures analyzed.

2) Differences in rates charged by utility type are difficult to distinguish due to various factors.

Table 4 shows that municipal utilities generally have lower water and wastewater bills (based only on rates, not property taxes; this is the approach taken throughout this report) than other service providers (except for Sanitary Districts and one Authority, which have lower wastewater charges), 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, for-profit water utilities, whose rates are regulated by the Arizona Corporation Commission, are somewhat higher than municipal rates, and Domestic Water Improvement Districts, established by counties in Arizona, are significantly higher. We also note that median bills of for-profit wastewater utilities are

significantly higher than those of municipal utilities; however, the size of these utilities makes direct comparisons problematic, as municipal systems tend to be much larger than for-profit and other types of systems.

Table 4: Median Water and Wastewater Monthly Bills at 5,000 gallons/month, by Utility Type

	Water Rate Structures		Wastewater Rate Structures	
	Total Number of Structures	Median Monthly Bill at 5,000 gal/mo.	Total Number of Structures	Median Monthly Bill at 5,000 gal/mo.
All Rate Structures	***349***	***$32.25***	***132***	***$33.78***
By Utility Type				
Municipality	69	$26.45	73	$29.50
County/District	43	$41.13	11	$37.50
Authority	1	$28.00	1	$14.82
Not-For-Profit	19	$36.35	0	--
For-Profit	217	$32.50	38	$42.00
Sanitary District	0	--	9	$25.00

3) High water users will pay more if served by a smaller utility than a larger utility.

The variation among the price charged to customers by different sized utilities and different types of utilities depends on the amount of service used by the customers. Table 5 presents the variation for water service bills at different consumption points. Customers that use larger amounts of water (10,000 gallons) and are served by small utilities pay much more than those served by large utilities ($19.80/month difference in the median). The difference is significantly less for customers who use less water.

Table 5: Median Water Monthly Bills at 0, 5,000, and 10,000 gallons/month, by Utility Size

	Total Number of Structures	Median Water Monthly Bill at 0 gal/mo.	Median Water Monthly Bill at 5,000 gal/mo.	Median Water Monthly Bill at 10,000 gal/mo.
All Rate Structures	***349***	***$18.80***	***$32.25***	***$49.37***
By Service Population*				
1 – 999	159	$21.21	$35.80	$54.88
1,000 – 2,499	57	$18.50	$31.00	$49.10
2,500 – 4,999	34	$18.20	$29.36	$44.21
5,000 – 9,999	22	$18.11	$30.50	$43.20
10,000 – 24,999	27	$17.15	$28.76	$40.64
25,000+	35	$14.19	$24.10	$35.08

* Service population is estimated for 334 out of the 349 water rate structures analyzed.

4) **Purchase water systems that buy at least a portion of their water from another water system (either surface water or groundwater) charge the highest rates, followed by groundwater and then surface water.**

Table 6 shows the median water charge for 7,500 gallons/month based on the type of water supply. The costs of treating water are highly dependent on the type of water supply. In general, withdrawing and treating water from surface supplies costs more than withdrawing and treating groundwater; however, there are several factors in Arizona including the need to do supplemental treatment for Arsenic, that increase the cost of groundwater sources. In Arizona, the median price charged to customers by utilities relying on surface water is considerably lower than for groundwater systems. This could be due to the fact that surface water systems tend to be much larger than groundwater systems (average 132,381 people for surface water versus 7,041 people for groundwater systems in this survey sample). Table 6 also shows that utilities that purchase water unsurprisingly charge higher rates than utilities that treat their own water supplies, since purchase systems often must account for their own operational costs in addition to the costs of the supplier treating the water.

Table 6: Median Charge for 7,500 gallons/month for Water Systems Based on Type of Water Supply

	Water Rate Structures	
	Total Number of Structures	**Median Monthly Bill at 7,500 gal/mo.**
All Rate Structures	***349***	***$40.25***
By Water Supply Type		
Groundwater	290	$39.76
Surface Water	30	$33.43
Purchase*	15	$50.75

* "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.

Commercial Water and Wastewater Bills

Figure 12 and Figure 13 show the median monthly water and wastewater bills, respectively, for commercial customers at different levels of consumption and disposal.[6] The middle 80 percent of charges are also indicated. The median monthly bill for commercial customers consuming zero gallons (on a ¾" meter[7]) is $19.35 for water and $29.33 for wastewater. The median monthly bill for

[6] 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.

[7] 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 ¾" 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.

50,000 gallons/month is $201.10 for water and $102.30 for wastewater. The median bill for those consuming 500,000 gallons/month (on a 1½" or 2" meter) is $2,050.60 for water and $655.40 for wastewater. The variation in commercial bills across rate structures increases significantly as the consumption/disposal amount increases.

Figure 12: Monthly-Equivalent Commercial Water Bills by Consumption (n=349)

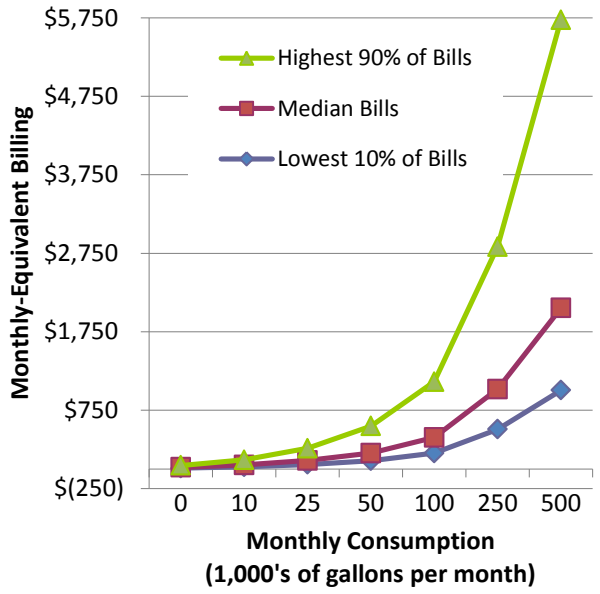
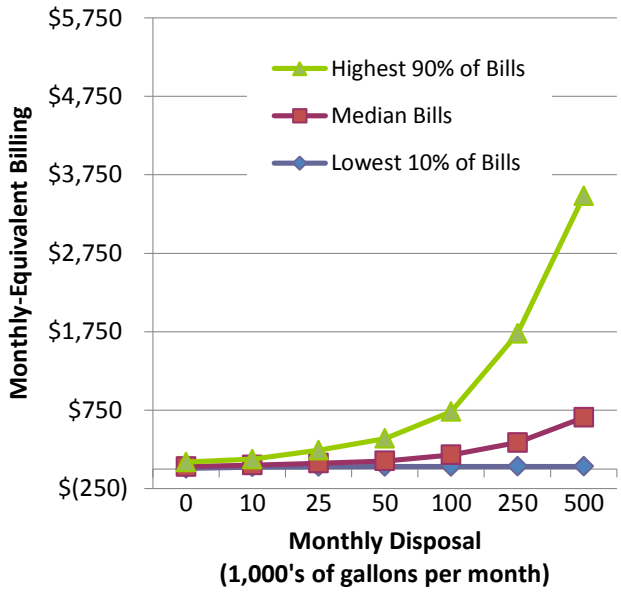


Figure 13: Monthly-Equivalent Commercial Wastewater Bills by Disposal (n=132)



Households Pay Less than the Reported Median or Average Charges across Utilities

Most large sample rate surveys focus on what utilities charge and present results in terms of the amount that the median utility charges (i.e. half charge more, half charge less) or the average amount charged by all utilities (i.e. adding all the charges together and dividing by number of utilities). The median charged by all utilities can differ from the average, sometimes significantly, based on the distribution of charges.

It is important to note that neither the median nor the average charged by all utilities is a good indicator of what "the average" Arizona resident pays, because the prices charged by small utilities are weighted as much as those charged by large utilities. Many more customers are served by larger utilities that, in general, have lower rates. Therefore, we used service population numbers from EPA's SDWIS database to calculate a weighted average customer water bill for comparison. In this survey, water rates were identified for the primary service areas of 298 utilities statewide that were matched with service population estimates. The median water charge among those utilities was $39.71 and the unweighted average water charge among them was $43.49 for 7,500 gallons of

water. However, based on a *population-weighted* average, the average water customer in Arizona actually pays $27.18 for 7,500 gallons.[8]What Utilities Charge by Watershed
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 Arizona's 10 major watersheds, displayed in Figure 14.

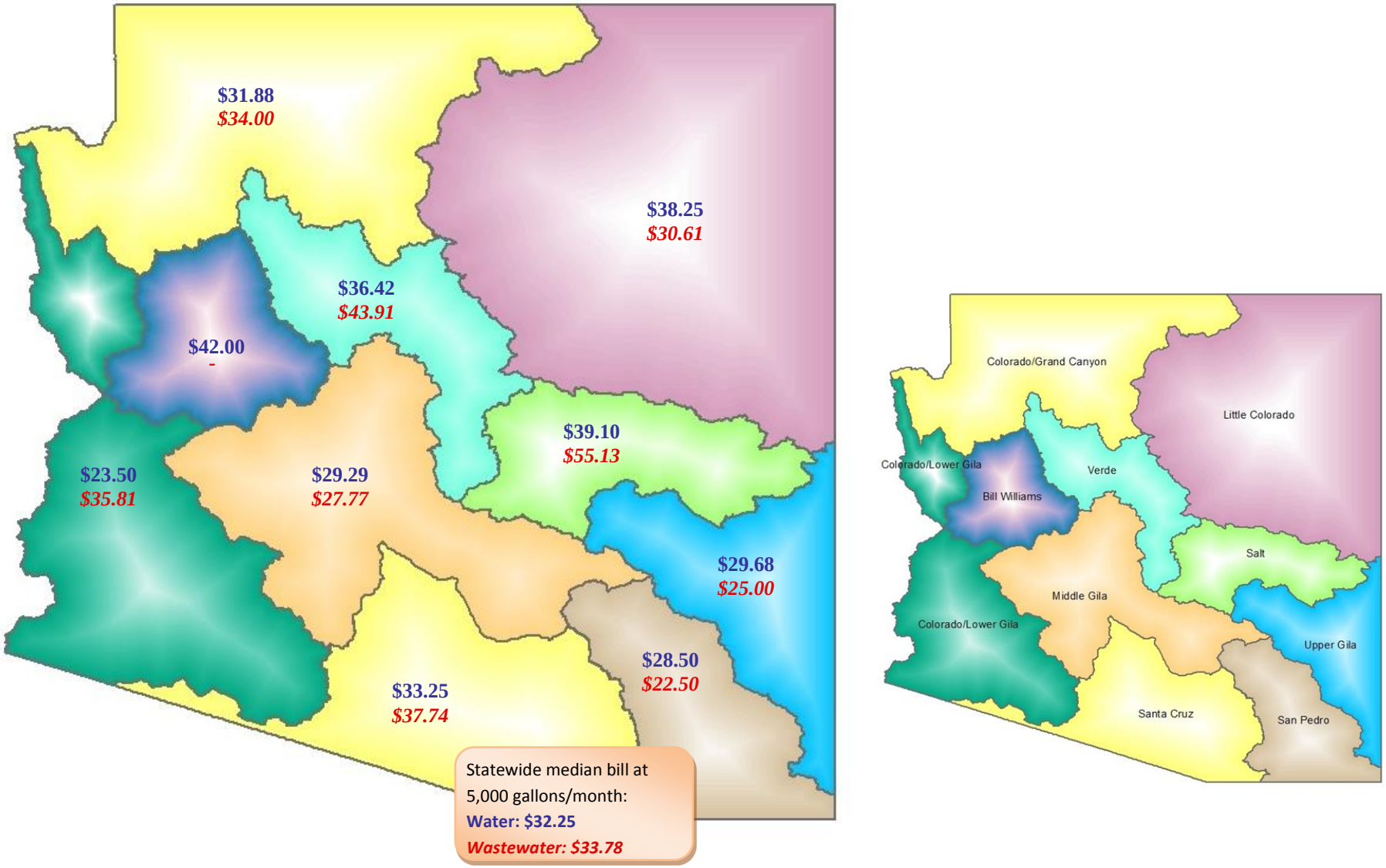
As summarized in Table 7, the highest median water charges in watersheds with a sample of 10 or more rate structures can be found in the Salt watershed, and the lowest median water charges are found in the Colorado/Lower Gila watershed. The highest median wastewater charges with a sample of 10 or more can be found in the Verde watershed. The lowest median wastewater charges can be found in the San Pedro watershed.

Table 7: Median Water and Wastewater Charges by Watershed at 5,000 Gallons per Month

	Water Rate Structures		Wastewater Rate Structures	
Utility Type	**Total Number of Structures**	**Median Monthly Bill at 5,000 gal/mo.**	**Total Number of Structures**	**Median Monthly Bill at 5,000 gal/mo.**
Bill Williams	3	$42.00	0	--
Colorado/Grand Canyon	22	$31.88	7	$34.00
Colorado/Lower Gila	37	$23.50	14	$35.81
Little Colorado	39	$38.25	16	$30.61
Middle Gila	76	$29.29	41	$27.77
Salt	10	$39.10	4	$55.13
San Pedro	28	$28.50	10	$22.50
Santa Cruz	65	$33.25	14	$37.74
Upper Gila	13	$29.68	5	$25.00
Verde	50	$36.42	18	$43.91

[8] This analysis could not be performed for wastewater bills due to lack of data on wastewater service population estimates.

Figure 14: Median Water and Wastewater Monthly Bills at 5,000 gallons/month, by Watershed



UTILITY CHARGES 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 a few cases in Arizona, utilities charge different rates for customers living inside or outside the boundary. Overall, 9 percent of water rate structures and 11 percent of wastewater rate structures specified different rates for customers living outside, and the vast majority were for municipal utilities. In fact, 39 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 1.30 times more than inside customers. For wastewater, the median ratio is 1.33. Most utilities with different outside rates charged less than double the inside charges, as shown in Figure 15. Figure 16 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 $39.59 compared to $72.25 for outside customers.

Figure 15: Ratio of Outside Residential Bills to Inside Bills at 5,000 gallons/month (n=349 water, n=132 wastewater)

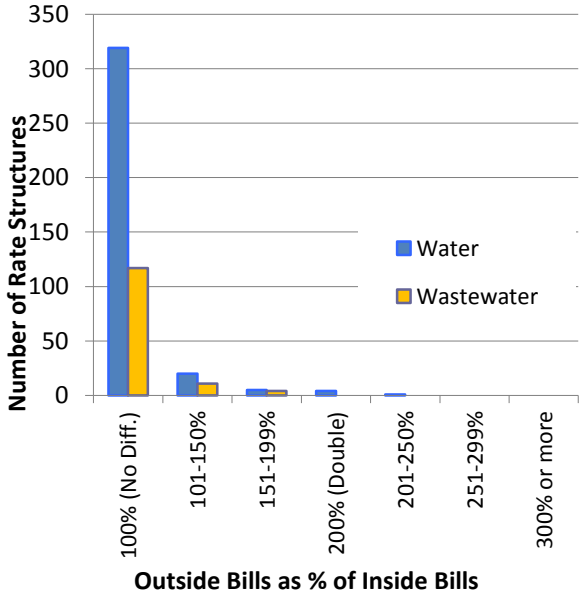
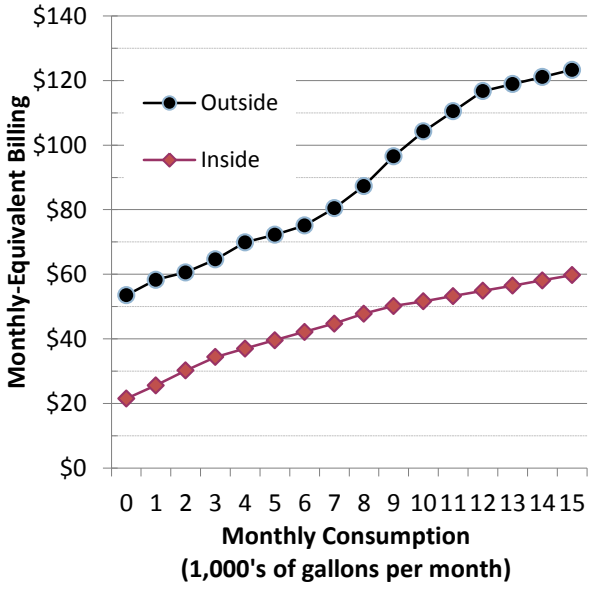


Figure 16: Median Combined Residential Water and Wastewater Bills for Rate Structures with Different Inside/Outside Rates (n=10)



There are at least two 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.

Historic Trends in What Utilities Charge

Comparing data from the current survey with the previous year's survey is based upon the utilities who responded each year, and their corresponding rate structures. If a given utility did not respond in a given year, no response was used. Table 8 allows for some trend analysis by presenting the results of this year's rate survey compared with results from last year's rate survey.

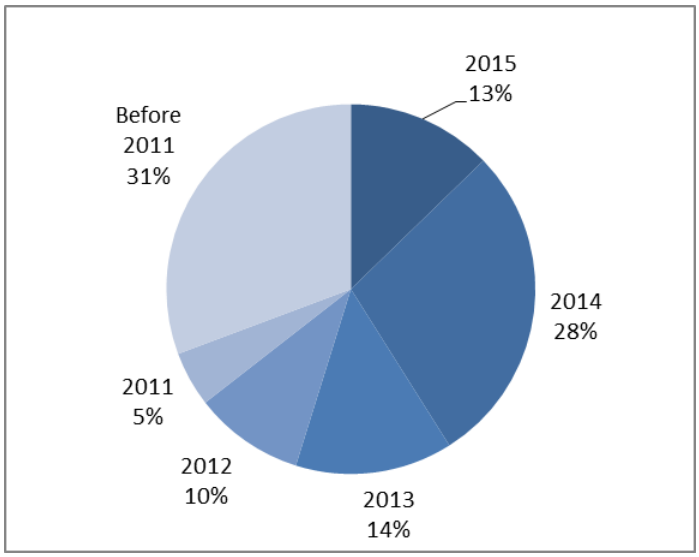
Table 8: Median and Average Utility Water and Wastewater Charges in Arizona in 2014 and 2015

	2014 Survey (373 utilities)	2015 Survey (354 utilities)
Median water charge for 7,500 gallons/month	$38.35	$40.25
Average water charge for 7,500 gallons/month	$41.45	$43.69
Median wastewater charge for 5,000 gallons/month	$31.98	$33.78
Average wastewater charge for 5,000 gallons/month	$34.95	$37.47

Many rate sheets include information concerning the effective date of current rates. This provides an interesting historic perspective on rate setting.

Figure 17 shows the calendar year in which the rate structures (current as of April, 2015) were first instated. While 55% of the rate structures were instated in the last three calendar years, a large number of utilities have not changed rates recently: out of 358 rate structures with a known effective date, 163 (46%) have not updated their rates in the last 5 years, and 50 (14%) have not updated rates in the last 15 years. Of the utilities that have made rate changes in the last 5 years, 63 percent of them were able to generate enough revenue to cover operating expenses; of the utilities that did not update rates in the last 15 years, only 45% of them had positive operating ratios.

Figure 17 In What Calendar Year were the Current (April 2015) Rate Structures First Instated? (n=290)



Changes in Rate Structures in the Last Year

In research in other states on water rates, the EFC has often seen movement away from decreasing block rate or uniform rate structures toward increasing block rate structures, driven by an interest in preserving water supplies by promoting water conservation and discouraging excessive or wasteful consumption. From 2014 to 2015 in Arizona, a similar trend is evident, as seen in Table 9.

This year's survey included 328 water rate structures and 121 wastewater rate structures that were also included in the 2014 survey. Out of the 328 water rate structures included in last year's rates survey, 12 changed in the last year, shown in Table 9. The majority of the changes were from uniform rates to increasing block structures; out of the 12 changing rate structures, 7 were uniform rate structures switching to increasing block. Among wastewater rate structures, 14 were changed between 2014 and 2015, out of the 119 surveyed both years.

Table 9: Changes to Water Rate Structures from June 2014 to April 2015

			Changed To			
			Increasing Block	Uniform Rate	Decreasing Block	Other
		TOTAL	***10***	***2***	***0***	***0***
Changed From	Increasing Block	***2***		2	0	0
	Uniform Rate	***7***	7		0	0
	Decreasing Block	***0***	0	0		0
	Other	***3***	3	0	0	

Changes in Residential Rates in the Last Year

Out of the 328 water and 121 wastewater rate structures included in last year's rates survey, residential rates were increased from last year for 26 percent of the water rate structures and 35 percent of wastewater rate structures, as shown in Figure 18.

Figure 18: Percent of Rate Structures that Increased Residential Rates in the Last Year

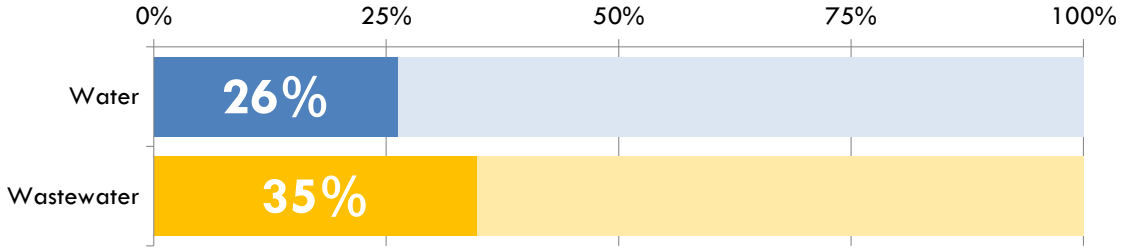


Figure 19 and Figure 20 show the residential monthly bill increase for customers that use 5,000 gallons/month among the 86 water and 42 wastewater rate structures that have raised rates in the last year. The median increase was $2.50/month for water (a 10.6 percent increase) and $1.84/month for wastewater (a 5.5 percent increase). Thirty-four of these rate structures (10% of total) increased their rates by more than 20% at the 5,000 gallons/month level; 12 utilities increased their rates by over 50%.

Figure 19: Increase in Residential Monthly Bills since Last Year for 5,000 gal/month among 86 Water and 42 Waste-water Rate Structures that Raised Rates

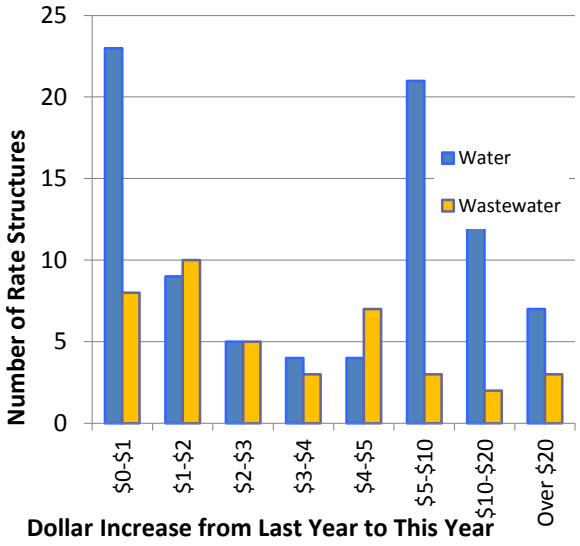
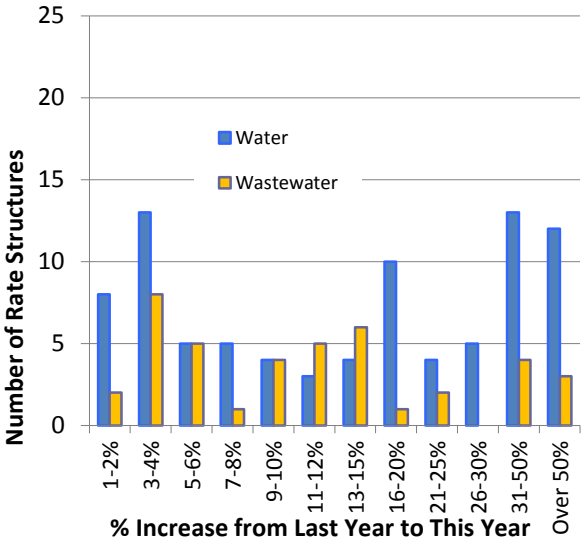


Figure 20: Percent Increase in Residential Monthly Bill Amount since Last Year for 5,000 gal/month among 86 Water and 42 Wastewater Rate Structures that Raised Rates



CONSERVATION PRICING SIGNALS

Different prices and pricing structures provide customers with different financial incentives to conserve or invest in water efficiency. A residential customer with a large lawn may be more likely to convert to a xeriscape low water lawn if they have to pay $20 per thousand gallons rather than if they pay $3 per thousand gallons. This report does not attempt to study the customer water use behavior associated with different prices, but the results of the survey do allow for the detailed presentation of actual pricing signals experienced by customers across the state. How they react to those signals depends on many factors including income, education, and housing attributes.

One mechanism utilities can manipulate to send a strong pricing signal to encourage water conservation is the rate that customers pay at higher levels of consumption. Average residential consumption in Arizona is around 7,000 to 8,000 gallons/month; though a residence with little or no irrigation might be closer to 5,000 gallons/month. Seasonal use of water can raise consumption levels for some customers to 10,000 to 15,000 gallons/month, or more, and utilities can discourage excessive use by setting high prices for the next 1,000 gallons of water at those levels of consumption.

Among the 349 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 $3.00 per 1,000 gallons. Figure 21 shows the signficant variation in this signal across the state, with some utilities charging more than $10 per 1,000 gallons and others charging as little as $1 per 1,000 gallons.

Most of the wastewater rate structures are non-volumetric, providing no marginal price for an increase in volume from 5,000 to 6,000 gallons/month. In such rate structures, the customers will only receive a price signal to encourage conservation through the water bill alone, but the signal is diluted by the presence of a large, non-volumetric wastewater charge that does not change regardless of how much the customer cuts back on water use. Among the wastewater rate structures that are volume-based, the marginal wastewater price for the next 1,000 gallons of water volume is generally lower than that of the marginal water price.

Figure 21: Marginal Price for the Next 1,000 Gallons at 5,000 gallons/month for 349 Water and 132 Wastewater Rate Structures

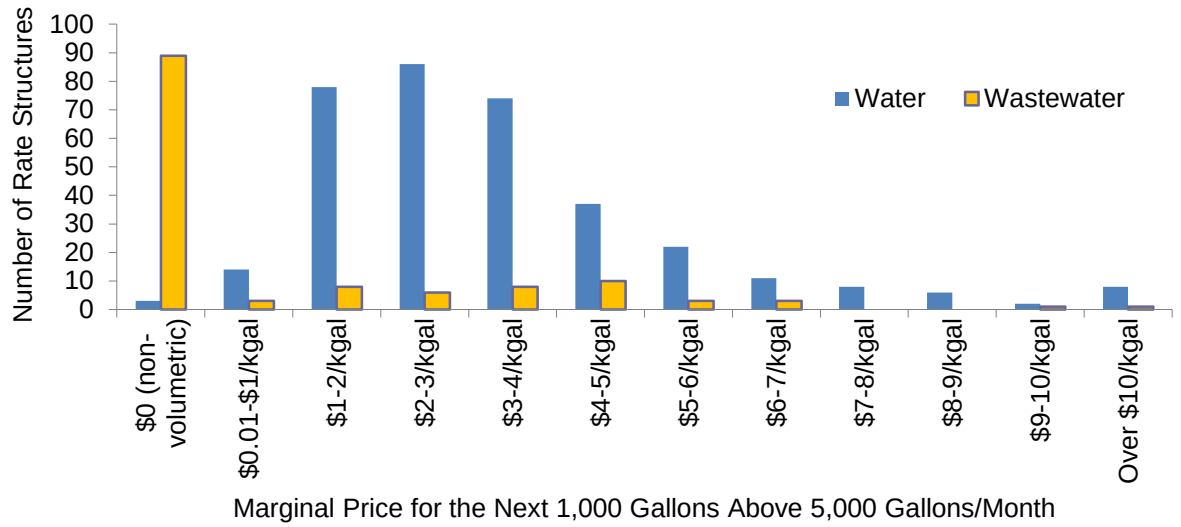
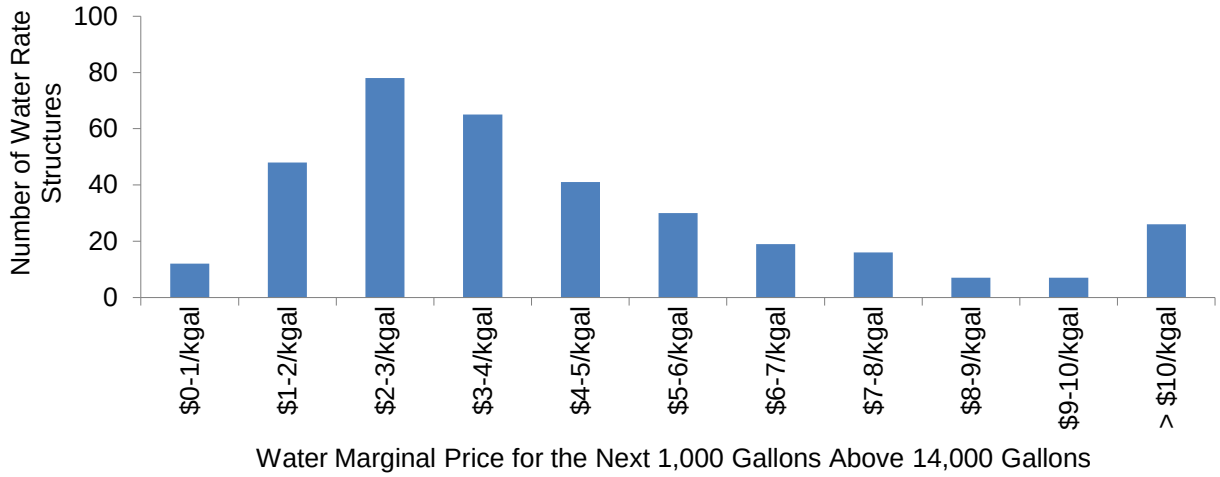


Figure 22 shows the water marginal price at 14,000 gallons per month. This can be thought of as the signal to someone who waters their lawn to reduce their outdoor water demand, as most residential irrigators use more than 10,000 gallons/month.

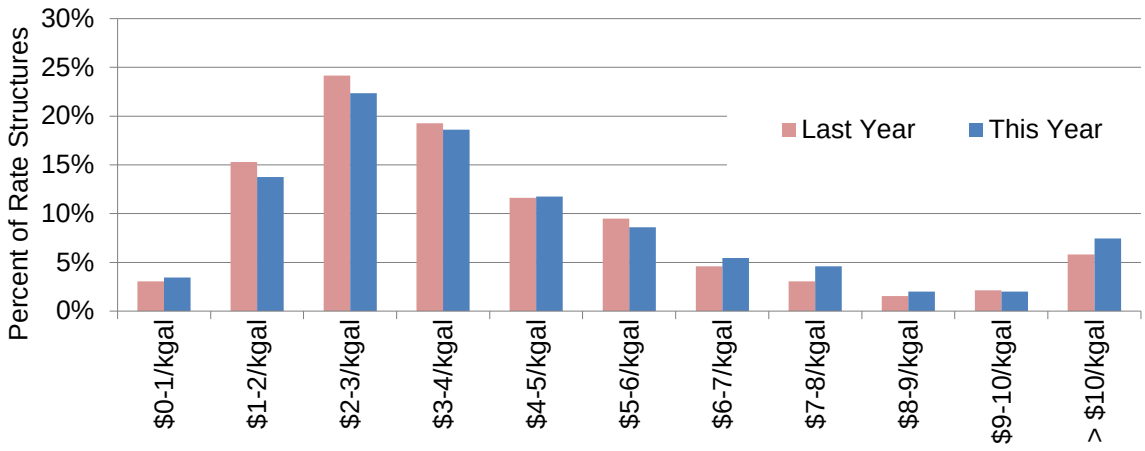
Figure 22: Water Marginal Price for the Next 1,000 Gallons at 14,000 gallons/month for 349 Water Rate Structures



Changes in Conservation Price Signals in the Last Year

Between this year and last year, many of Arizona's water utilities have begun shifting their high water use rates upwards. Out of the 328 water rate structures included in last year's survey, the price for the next 1,000 gallons at 10,000 gallons/month was raised for 73 rate structures (22 percent). The distribution of the prices for water for the next 1,000 gallons at that consumption is shown in Figure 23.

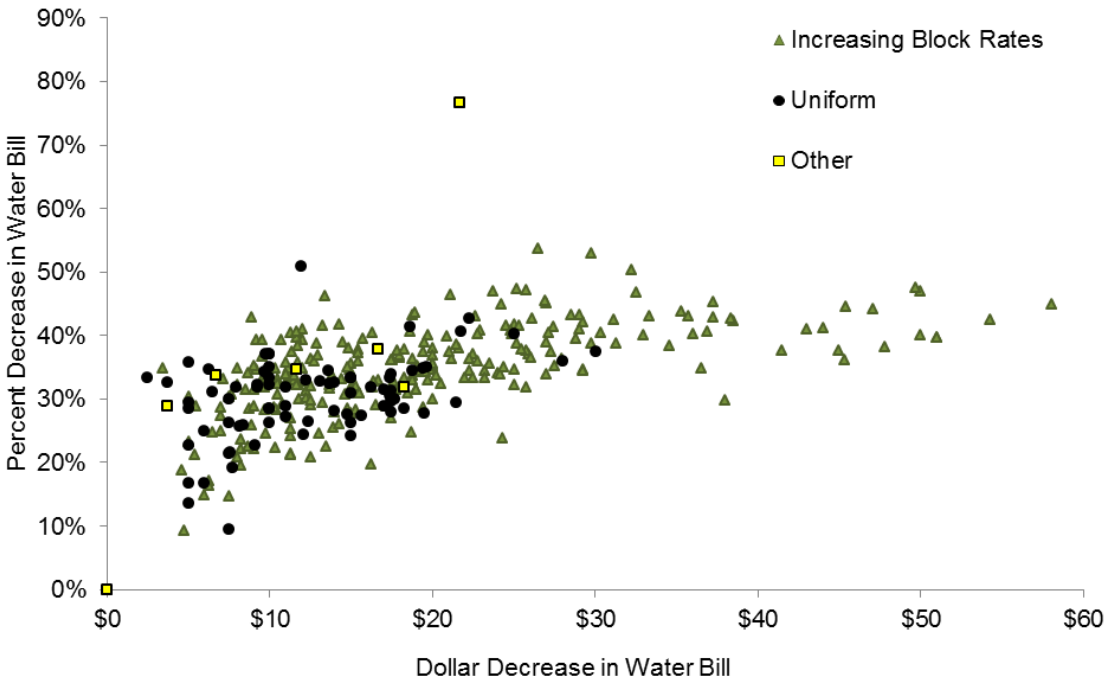
Figure 23: Price for Water for the Next 1,000 Gallons at 10,000 gal/month in 327 Water Rate Structures in 2014 and 349 Water Rate Structures in 2015



Finally, Figure 24 shows pricing signal 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 (slightly above average in Arizona) to 5,000 gallons (the average in many more humid regions of the country). The reduction in the monthly water bill acts as a price incentive to encourage conservation, and is measured both in terms of absolute bill savings and as a percentage of bill reduction.

Figure 24 shows that there are some utilities that reward customers substantially both in terms of dollars and bill reduction percentage for making this reduction, whereas other utilities provide relatively little incentive. Interestingly, while some increasing block rate structures clearly send very high conservation pricing signals, there are many 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 $4.00 per thousand gallons even if the utility has an increasing block rate structure. It is 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. Of course utilities raise rates for many reasons not strictly limited to encouraging water conservation. These reasons may include, for example, nominal increases in operating costs or the need to save up for a major capital project.

Figure 24: Reductions in the Water Bill for Decreasing Consumption from 10,000 to 5,000 Gallons/Month



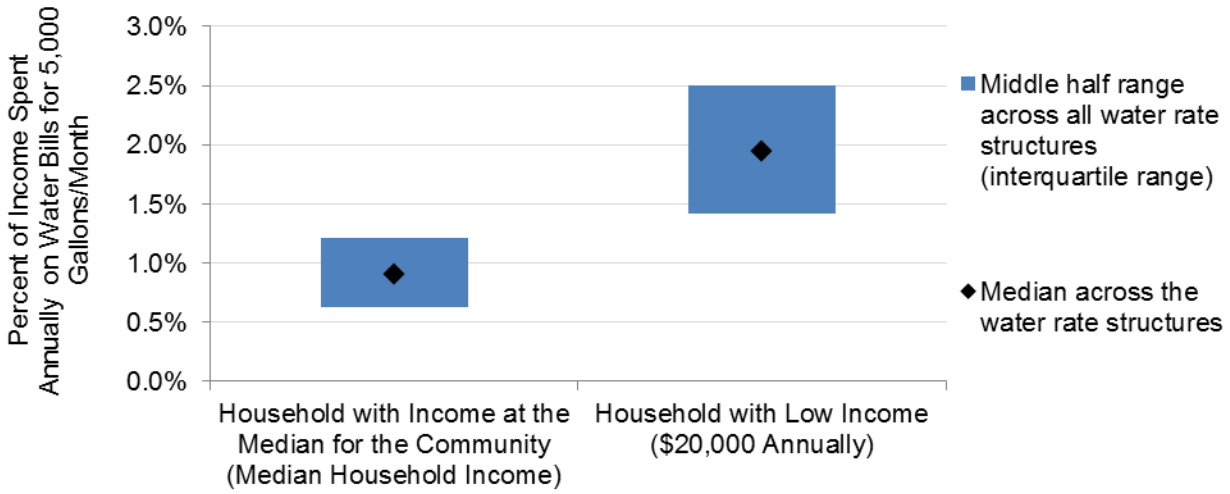
WHAT IS THE FINANCIAL IMPACT ON CUSTOMERS?

How much a residential customer would have to spend annually on water bills, relative to their household income,[9] is a commonly used metric to assess the affordability of rates. There are many versions of this metric, which divides annual bills at one consumption point by the household income level of interest. The most common metric is to divide the annual bill at near the average residential consumption level by the median household income of the community ("percent MHI"). The first bar in Figure 25 displays this metric, using 5,000 gallons/month to approximate the basic indoor demand (winter average) of residential customers in Arizona. This metric has numerous 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 would spend less than 0.6% 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 1.2% of their income. Figure 25 also shows what percentage of income a household that makes $20,000 per year would pay for the same volume of water. Not surprisingly, the water 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 water prices that place a greater burden on lower

[9] The local community's income data can be obtained from the U.S. Census Bureau.

income customers. Figure 25 displays financial impacts for customers that use relatively low amount 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.

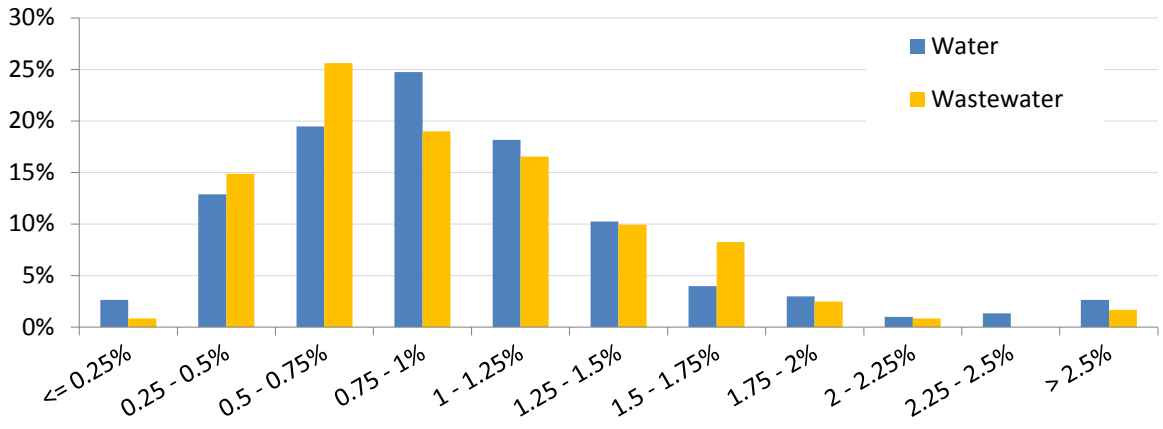
Figure 25: How Much a Residential Customer Would Spend of their Household Income on Water Bills at 5,000 Gallons/Month (n=349)



Compared to the 2013 (the latest available from the U.S. Census Bureau at the time of publication of this report) median household incomes of the communities served by the water and wastewater utilities in this survey, annual bills for 5,000 gallons/month range from less than 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 1.25% MHI, with a median of 0.91% MHI across all utilities. Wastewater rates are slightly lower, with the majority of wastewater rates falling between 0.5% and 1.25% MHI, and a median of 0.85% MHI across the utilities. For combined water and wastewater bills at 5,000 gallons/month, half of the utilities charge more than 1.07% MHI.

While there is no single target for affordability, even in terms of percent MHI, it is worth noting that, currently, five percent of utilities in Arizona charge more than 2.5% MHI for combined water and wastewater at 5,000 gallons/month, which is on the high side of the data distribution for the state.

Figure 26: Annual Bills for 5,000 Gallons/Month as a Percent of the Serviced Community's 2013 Median Household Income (n=303 for Water, n=121 for Wastewater)



RECLAIMED WATER IN ARIZONA: OVERVIEW AND ANALYSIS

Thirty-five water and wastewater utilities in this survey are suppliers of treated wastewater, commonly referred to as *reclaimed water*. Reclaimed water is considered non-potable, but may be used in a wide variety of beneficial agricultural, landscaping, and commercial applications. Arizona is one of the few states in the U.S. that makes extensive use of reclaimed water. According to the Arizona Department of Environmental Quality, 90% of water reuse in the U.S occurs in Arizona, California, Texas, and Florida. Wastewater treatment plants and end-users are issued permits to distribute or use reclaimed water of varying quality. ADEQ reports that for end-users, over 70% of permits were issued for A+ or A class water (on a water quality scale from A+ to C). Class A+ and A reclaimed water has a large number of uses, including irrigation (e.g. of sports fields or commercial landscapes), groundwater aquifer recharge, industrial uses, power generation, and environmental restoration (e.g. of riparian habitats).[10] Specific end-use examples of reclaimed water include the City of Flagstaff selling reclaimed water for snowmaking,[11] and the City of Scottsdale selling water to golf courses for irrigating the courses.[12] The ten member cities of the Arizona Municipal Water Users Association (AMWUA) reclaim nearly 100 percent of the wastewater they treat, to A+ tertiary levels.[13] One of the most unique uses thereof is for the Palo Verde Nuclear Generating Station (PVNGS), believed to be currently the only nuclear plant in the world cooled with reclaimed wastewater. Five of the AMWUA cities are contracted to provide up to 80,000 acre-feet of reclaimed water annually to PVNGS.[14]

[10] Arizona Department of Environmental Quality (2011). Wastewater Treatment and Reclaimed Water Reuse: Past and Present.
[11] http://www.azcentral.com/news/articles/20130129arizona-snowbowl-snowmaking-gets-ok.html
[12] http://www.scottsdaleaz.gov/Page8406.aspx
[13] https://amwua.wordpress.com/2015/02/16/recycling-paper-plastic-and-now-water/
[14] http://www.usbr.gov/lc/region/programs/crbstudy/MovingForward/Phase1Report/App3B.pdf

The reclaimed water rate structures in this survey group go by a variety of different labels: private wastewater companies commonly refer to reclaimed water as "effluent," while municipalities commonly use other terms such as reclaimed, recycled, or reuse water. However, some utilities may offer unique rates for water that is non-potable but not reclaimed. The City of Peoria, for instance, lists rates for "reclaimed" water and "non-potable" water. In this case, "non-potable" refers to raw groundwater that is untreated. Several utilities offer various other types of non-potable water, including raw surface water and untreated canal water from the Central Arizona Project (CAP). This study specifically analyzes rates for treated wastewater that is resold to customers as an alternative to paying for (typically more expensive) potable water supplies. It should also be noted that direct potable reuse of reclaimed water (treating wastewater to be safe for drinking and then delivered directly to customers without an environmental buffer) is very rare in the United States, and Arizona state law does not currently allow direct potable reuse. Further useful definitions and technical details of reclaimed or recycled water in Arizona can be found at this excellent AMWUA blog post: https://amwua.wordpress.com/2015/02/16/recycling-paper-plastic-and-now-water/.

Figure 27 shows what types of utilities published unique reclaimed water rates. Municipalities and for-profit companies represent the largest proportion of reclaimed water suppliers in the state. Typically, the for-profits that supply reclaimed water are wastewater-only companies selling effluent in bulk to customers. Wastewater treatment facilities can potentially avoid significant expense by selling their treated effluent to nearby end-users instead of transporting it distances (sometimes long distances) to surface discharge points or investing in costly groundwater recharge infrastructure. In a docketed rate case with the Arizona Corporation Commission, Verde Santa Fe Wastewater Company cited several benefits of selling reclaimed water to end-users, including an additional revenue stream for the utility, eliminating the need to purchase a direct well injection facility to dispose of the wastewater, and helping the end-user (a golf course) conserve groundwater supplies.[15]

Utilities usually sell reclaimed water at very low prices; the median charge per 1,000 gallons is only $0.77 per 1,000 gallons. Some utilities will even offer effluent for free from company standpipes, or sell at "market rate," which is whatever price the customer is willing to pay for the water. Municipalities, on the other hand, usually sell reclaimed water at higher prices than for-profits (although still at lower prices than potable water). The median volumetric charge for reclaimed water offered by municipalities is $1.67 per thousand gallons. Many municipalities also have base charges associated with their reclaimed water rates, and the City of Flagstaff has even developed an increasing block structure for their reclaimed water supply.

[15] From Arizona Corporation Commission docket number SW-03437A-13-0292.

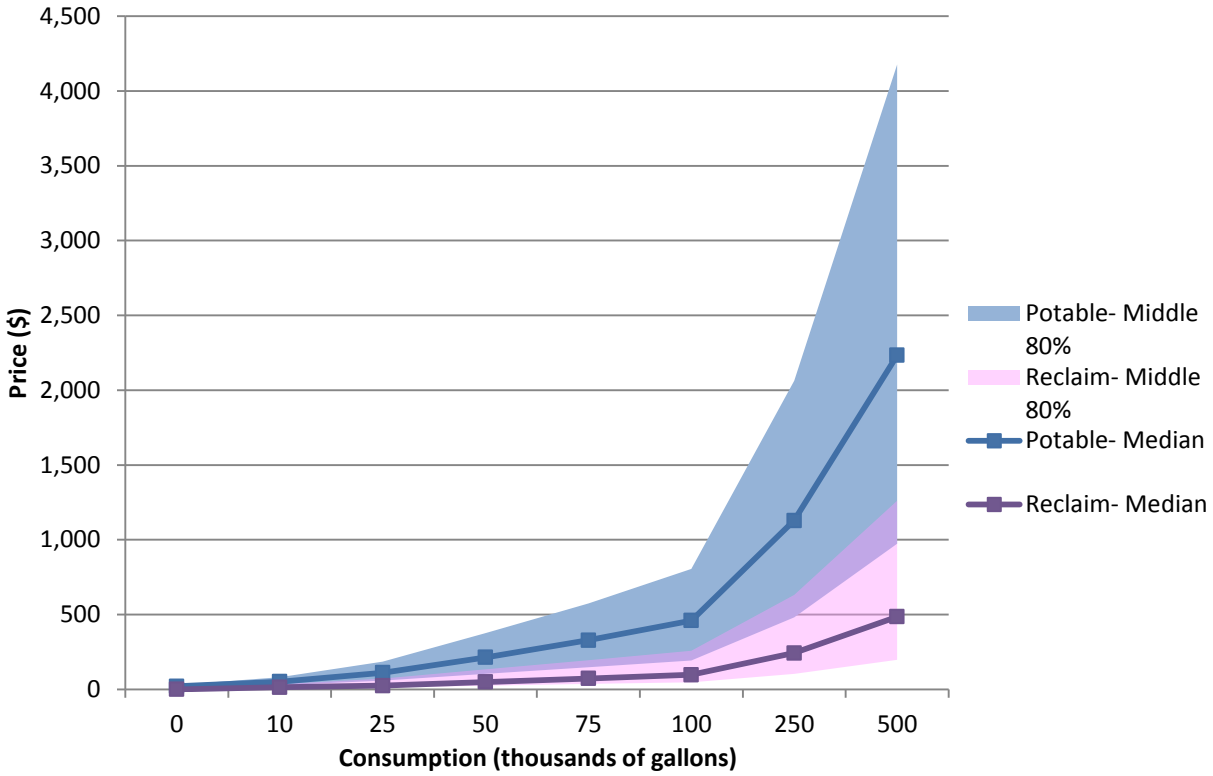
Figure 27: Reclaimed Water Rate Structures by Utility Type (n=35)

The median service population for the 12 municipalities with unique reclaimed water rates is 43,152; the total estimated service population for these utilities is 1,538,250. While the service populations of the 23 utilities with other ownership types are not known in every case, the 12 municipal utilities alone comprise a significant portion of the state's total population.

Overall, reclaimed water bills are significantly lower than bills for both residential irrigation and commercial water use. The median bill for residential irrigation at 5,000 gallons using reclaimed water is $6.53, compared to $30.25 for residential irrigation water. At 10,000 gallons of residential irrigation use, the reclaimed water bill is $13.68, compared to $48.33 for potable water. At 50,000 gallons of commercial use, the median bill for potable water is $214.00; the reclaimed water bill for equivalent usage is just $48.50. At 250,000 gallons of commercial use, the median potable water charge is $1,133.89; the median reclaimed water equivalent is only $242.50.

Figure 28 examines commercial water bills across a range of consumption amounts for potable water and reclaimed water. The blue and pink shaded areas represent the middle 80% of bill prices for potable commercial use and reclaimed commercial use, respectively. As the graph indicates, median reclaimed water bills are substantially cheaper than potable water bills across all consumption amounts. In addition, the middle 80% of potable water bills spreads across a much larger range of prices than the middle 80% of reclaimed water bills, especially at consumption amounts larger than 100,000 gallons. Thus, reclaimed water bills are not only cheaper than those of potable water, but also exhibit a greater degree of consistency in pricing.

Figure 28: Commercial Water Bills for Potable and Reclaimed Water by Consumption (n=33)



Research conducted thus far by the Environmental Finance Center has demonstrated that these several dozen public and private utilities in Arizona have developed rate structures for providing reclaimed water as a supplement or alternative to potable water resources. End-users can save money on water bills while conserving potable water; utilities can avoid costs of surface discharge and other forms of wastewater disposal by selling the effluent to nearby customers. The continued strategic importance of reclaimed water to utilities and end-users in Arizona warrants further statistical and descriptive research. Key areas of investigation could include the distribution of reclaimed water permits for utilities and customers, identifying and describing the most important end users of reclaimed water, and determining the current state of reclaimed water infrastructure and associated net cost savings for utilities and consumers.

For those seeking further details on reclaimed water billing for utilities in Arizona, the EFC has published a complete set of rate tables for all utilities in the survey group. The rate tables may be accessed at http://www.efc.sog.unc.edu/reslib/item/tables-water-and-sewer-rates-and-rate-structures-arizona-april-2015.

ARE PRICES COVERING ALL COSTS?

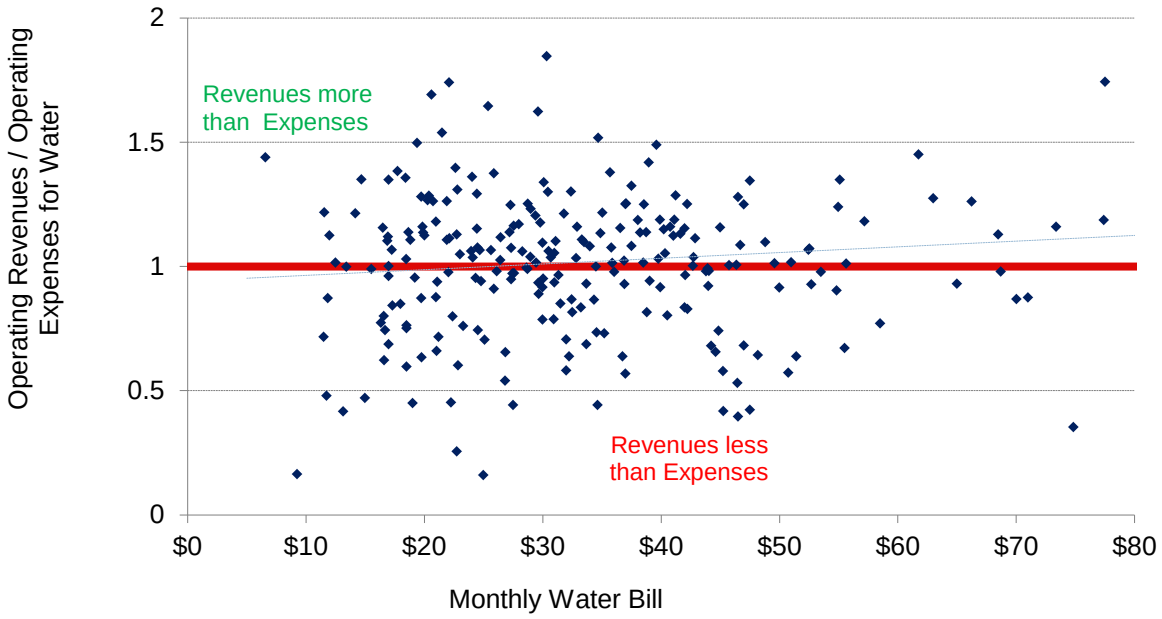
Most of this report focuses on how utility rates and rate structures compare to each other across the state, but the question that arguably deserves even more attention is how rates compare to costs for a single utility. This question is certainly critical to organizations such as WIFA that promote financial stewardship.

In truth, comparing rates across the State of Arizona or among specific utilities is complicated by the variation in the extent to which utilities charge the full cost of providing service. Rates that provide enough revenue to balance an annual budget do not necessarily provide enough revenue to cover long term capital and maintenance needs. The resulting prices in Arizona, and in many other states where the EFC has surveyed, end up being less than what would be needed to cover the full cost of service provision.

Figure 29 shows the monthly water or wastewater charge for 5,000 gallons in April 2015 plotted against the ratio of operating revenue to operating expenses from either Fiscal Year 2012, 2013 or 2014, based on the latest available data. This ratio helps determine whether an entity is operating at a financial loss, financial gain, or is breaking even. The ratio accounts for all operating expenses, including depreciation, but does not include direct capital expenditures or debt service payments. Financial data were obtained directly from utilities' audited financial statements.

Figure 29 shows that many water utilities are not covering their operating expenses, making it difficult or impossible to rehabilitate aging infrastructure, finance system improvements and expansion, and engage in proactive asset management. It is interesting to note that the water utilities that are operating at a financial loss are not always charging low water rates; even some utilities with high rates are operating at a financial loss. Nevertheless, water utilities that charged lower water rates in 2015 (to the left of the graph) were slightly more likely to operate under a financial loss (below the horizontal line on the graph), as indicated by the rising trend line.

Figure 29: Utilities with Higher Water Bills, on Average, Have Slightly Healthier Water Operating Ratios than those with Lower Bills (n=275)



While there may be compelling social and political reasons why a utility may choose not recover all their costs through their rates, transparent and accurate comparative information has the potential to provide policy makers with a more complete view of their situation. Studies like the one summarized in this report may lead to rate setting that better incorporates financial sustainability and that ultimately provides the revenues needed by utilities to protect the environment and their customers' public health.

ABOUT THIS REPORT

This report on water and wastewater rates and rate structures in Arizona was compiled by the Water Infrastructure Finance Authority of Arizona (WIFA) and the Environmental Finance Center (EFC) at the University of North Carolina at Chapel Hill. The source data (rate sheets and annual financial reports) were collected by WIFA and the EFC and data from these source documents were input into a database by the EFC for the purposes of creating this summary report, as well as the rates tables and online interactive dashboard tool. For reports and other information on water and wastewater rates in other states, including, in some cases, more in-depth analysis on the relationships between rates, rate structures, system characteristics and policies including cost-recovery, conservation, and affordability, please visit the EFC's website at http://www.efc.sog.unc.edu. In addition to survey results, you will also be able to access a free, interactive Rates Dashboard for Arizona, which facilitates rate comparisons among utilities and gives benchmarks for every rate structure in this survey.

Data entry of rates and financial data by the EFC was funded by WIFA, who also funded the summary report, rates tables, and online, interactive, rates dashboard tool.