CASCADE WATER SERVICES
A Rate Study

INTRODUCTION

The City of Cascade, ID is a uniquely constructed city with a population of approximately 1,000 year-round permanent residents coupled with an additional mix of temporary and seasonal residents. This scenario, experienced by many municipalities economically dependent upon the seasonal outdoor recreation industry, can pose challenges as it pertains to fair utility billing practices. In the interest of best-serving all residents of Cascade including permanent, temporary, and seasonal residents, the city engaged Boise State University's Idaho Policy Institute (IPI) to conduct an examination of the current city water fee structure, identify gaps and discrepancies in payment versus usage and provide best practice and alternative fee structure recommendations.

EXECUTIVE SUMMARY

This report presents best practices for water service rate management related to the City of Cascade's budgetary needs, followed by a discussion of potential discrepancies in Cascade's current fee structure. By analyzing the sample data provided by Cascade, this report creates three alternative rate structure scenarios that the City could potentially adopt in order to increase revenue, provided that data for the entire city is represented by the sample data. This report concludes with a discussion of its limitations, as well as suggestions for practices that could enable more accurate analysis.

LEGAL PRECEDENT

The State of Idaho has recognized water as a public good that shall be equally distributed to various interests. This sets the stage to examine whether the residents of Cascade have been billed fairly and adequately for water consumption. The responsibility for equitable distribution of water resources and the appropriate processes to do so are outlined in Cascade Idaho City Code, Title 8, Chapter 3.

BEST PRACTICES

According to the Rural Community Assistance Partnership (RCAP), a water rate study should seek to ensure that rates meet a number of important criteria[1]:

- **Rates should cover all of the costs to produce, treat, store and distribute water to all customers**
- **Rates should be fair and equitable**
- **Rates should be transparent to users**
- **Rates should be based on accurate information**
- **Rates should be easy to administer**
- **Rates should have a short life span - they should be continuously re-evaluated and adjusted as part of the annual budget-development process**

Examining Current Rates and Rate Structures

Cities generally follow four water rate structures, which are summarized in Table 1.

Table 1. Rate Structure Comparisons

Fee Structure	**Uniform Flat Rate** Customers pay the same amount, regardless of the quantity of water used	**Single Block Rate** Customers are charged a constant price per gallon, regardless of the amount of water used	**Decreasing Block Rate** The price of water decreases as the amount used increases	**Increasing Block Rate** The price of water increases as the amount used increases
Pros	No expense for installing and reading meters	Easy to administer, cost to customer is in direct proportion to amount used	Attractive to large-volume users	Promotes water conservation and decreases wastewater treatment needs
Cons	Promotes high consumption and all users pay either too much or too little for what they use.	May discourage industries that use high water	Production costs may not decrease with gallons of water produced and small users may be subsidizing large users	Higher costs for high usage may discourage industry from locating in service area

Adapted from a table in the RCAP - "Formulate Great Rates" manual

According to the Association of Idaho Cities, Idaho cities are split roughly evenly between uniform flat rate structures and increasing block rate structures[2]. We found that Cascade employs a hybrid block/flat-rate fee structure, which charges customers a flat fee for the first 10,000 gallons of consumption a month, and charges a single block rate for each gallon consumed above 10,000, which is the same price per gallon as the flat fee.

We chose to compare Cascade's water fee structure to the cities of Idaho Falls and Ketchum, because Idaho Falls' system represents a common modification of the popular flat rate fee structure, while Ketchum's system represents the equally common increasing block rate structure, and both cities had high quality data available on their water rates. We also considered Mountain Home, due to their use of an EDU measurement system (defined below).

We also found in our research that when establishing water rates, rate levels across the customer population are more important than the way rates are structured. Different rate structures target specific types of water use, but the overall price level should be reflective of all costs regardless[3]. In conjunction with this principle, it is strongly recommended by both RCAP and the Idaho Rural Water Association (IRWA) that meters be installed and measured consistently, as meters are considered to be the "cash registers" of a water system.

Budgeting Best Practices

The EPA identifies five recommended steps for asset management within water systems[4]:

1 **Involves an inventory of the current state of assets in the system - what is owned, what its condition is, what its value is, and what its useful life is.**

2 **Requires a calculation of sustainable levels of service - what level of service the consumers demand, what actual performance is, and what assets/equipment are capable of delivery.**

3 **Requires an identification of critical assets - what the costs of asset failure are, what repair costs are and what the probabilities of asset failure are.**

4 **Looks at minimum life cycle costs - lowest cost options for providing the highest level of service over time. This step encourages a shift from reactive to predictive maintenance by developing response plans for asset failure and repair or replacement.**

5 **Identifies long-term funding strategies, which include revising the rate structure, funding a dedicated reserve from current revenues and financing asset repair or replacement through borrowing or other financial assistance.**

These steps pave the way for the introduction of depreciation budgeting, which, in the case of water systems, generally requires payments representing the decline in asset value over time to be put into a reserve account in order to replace that asset when its predicted lifespan has ended. Neglecting to budget for depreciation can often lead to asset decay and budgetary shortages, as revenue and supporting rates have not been adjusted to reflect these costs.

One simple way to calculate depreciation for an asset is known as "straight line depreciation." Using this method, the purchase price of an asset (for example, $1000) is subtracted by the estimated salvage value of the asset after its lifespan has ended (for example, $200) to calculate the depreciable cost ($800). Depreciable cost can then be divided by the number of years that the asset is expected to remain productive (for example, 5 years), giving the annual depreciation cost of that asset ($800/5 years = $160 per year).

Meeting Costs

In order to find out if and when rates should be adjusted, the first part of a rate study requires an examination of current rate structures and levels in relation to cost. The purpose of this step is to find out whether current rates are consistently generating enough revenue to cover the true cost of operations, including the cost of emergency and preventative maintenance, as well as payments on long-term debt and funding for reserve accounts. If there is a discrepancy, water rates should be adjusted accordingly. This practice is known as "Full Cost Pricing."[5]

Using data from the most up-to-date water rate study document provided to us, we recorded Cascade's annual fixed expenses for water service provision as $143,754 and annual payments for bonds/loans and reserve accounts as $200,945, combining for a total annual cost of $344,699 for Cascade's water system. The budget that was provided to us indicated that Cascade's water rate revenue was insufficient to cover expenses, with a shortage of $18,267. Compared to the annual gallons of water sold (95,000,000) this shortage can be broken down as a $0.19 deficit in revenue per 1,000 gallons. This number assumes that the cost for all gallons pumped must be recovered in revenue from gallons sold, therefore rates must charge users through water sold for the 17% water loss between the amount of water pumped (113,995,690 gallons) and the amount of water sold.

Ensuring Equity

Ensuring equity, making sure that every customer pays their fair share according to the costs that they incur on the system, is among the most important common practices to consider when calculating water rates. The RCAP suggests that this can be done by establishing target revenue percentages for customers under established usage categories. Target revenue can be calculated as the percentage of customers at each usage level (compared to total number of customers) compared to the percentage of the average amount of total water that each usage level is responsible for. For example, if residential users consume 30% of water on average, and make up 50% of users on average, then these numbers can give an estimate of how much of the funding burden these users might be responsible for.

This technique is intended to spread the financial burden based on the usage of each customer category in comparison to other customers. According to Table 2, commercial users with 2 inch meters were responsible for 53.49% of consumption in 2017, while making up 20.94% of the population. These numbers can be interpreted differently, depending on whether Cascade would prefer to bill for services evenly across the population, or according to consumption. RCAP suggests calculating target revenue by adding the percentage of total population and the percentage of total consumption together for each category, and dividing by two, although this calculation may not meet individual city priorities. These figures have been included in Table 2.

Table 2. Population and Consumption Comparisons

Meter Size	3/4"	1"	1.5"	2"	Subtotals
Commercial	62	32	17	23	134
Usage	5,155,415	5,935,905	10,703,000	22,295,537	44,089,857
Percentage of Total Population	9.69%	5.00%	2.66%	3.59%	20.94%
Percentage of Total Consumption	6.25%	7.20%	12.99%	27.05%	53.49%
Suggested Target Revenue	7.97%	6.10%	7.83%	15.32%	37.22%
Residential	481	24	1	0	506
Usage	35,944,820	2,261,827	126,000	0	38,332,647
Percentage of Total Population	75.16%	3.75%	0.16%	0.00%	79.07%
Percentage of Total Consumption	43.61%	2.74%	0.15%	0.00%	46.50%
Suggested Target Revenue	59.39%	3.25%	0.16%	0.00%	62.79%
Total Users	543	56	18	23	640
Usage	41,100,235	8,197,732	10,829,000	22,295,537	82,422,504
Percentage of Total Population	84.85%	8.75%	2.82%	3.59%	100.00%
Percentage of Total Consumption	49.86%	9.94%	13.14%	27.05%	100.00%
Suggested Target Revenue	67.36%	9.35%	7.99%	15.32%	100.00%

Our user data did not include the months of Jan-Mar and Nov-Dec, and thus consumption during these months is unaccounted for in this table.

In order to develop more equitable cost sharing between individual users, cities may also use Equivalent Dwelling Units (EDUs) to calculate rates more equitably across groups of users with comparable usage rates. One EDU is meant to represent the average usage of one single family home, which can be multiplied to compare the consumption of different user groups. For example, the city of Mountain Home, Idaho assigns 1.0 EDU to each residential home, 2.0 EDUs to each restaurant, and 0.5 EDUs for each campsite in an RV park[6] . Relevant to the purposes of our study, Mountain Home also assigns 1.0 EDU to each trailer unit within an RV park, and to each unit within a mobile home or trailer park.

However, these rates may not stay constant. Mountain Home audits the accounts of commercial users every three years in order to ensure that their actual consumption is consistent with their EDU rates, and adjusts billing and EDU rates accordingly.

METHODOLOGY

Averages

We decided to calculate average cost spent on water for the permanent residential, seasonal residential, and Leisure Time RV Park categories by dividing the average total charges for water services in each category by average water consumption. The seasonal and permanent residential averages were across the sample groups we were given, while the Leisure Time average was calculated across multiple years, from 2014 to 2017. This calculation was also made for each individual residential user, and for each year recorded for Leisure Time. In the end we had both average and individual cost per gallon for water for each of our three user categories. These figures were multiplied by 1,000 to get cost per 1000 gallons.

EDU Calculations

We also decided to calculate a Cascade-specific EDU measure. Because an EDU is intended to represent the average consumption of one residential unit, or family, we took the average consumption for the permanent residential user category, which was 181,333 gallons per year, and used that number as an EDU to compare our three user categories. This number is significantly higher than the standard EDU as defined in the IRWA-provided EDU table, which is noted as 7,000 gallons of consumption per month, or 84,000 gallons yearly. In order to account for this difference, we made our EDU-based calculations using both figures for comparison.

Table 3. EDU Comparisons

EDU Comparison	EDU = 84,000 gals/year		EDU = 181,333 gals/year	
	Average EDUs per Unit/Year	Average Cost per EDU	Average EDUs per Unit/Year	Average Cost per EDU
Permanent Residential	2.16	$295.84	1	$557.10
Seasonal Residential	0.32	$1,910.98	0.15	$4,125.28
Leisure Time RV Park (2014-2017	53.45	$274.17	24.76	$591.85
Leisure Time RV Park (2017)	46.76	$306.02	21.66	$660.82

After making our average and EDU-based calculations, we estimated what Cascade's water fees would look like across user categories if the city maintained its current block/flat-rate structure, if the city switched to a unit/EDU-based fee structure similar to Idaho Falls' system, or if the city switched to an increasing block structure similar to Ketchum's system.

DISCREPANCIES IN CURRENT SYSTEM

Cost Per 1000 Gallons

When permanent residents and Leisure Time residents are compared by average cost paid per 1,000 gallons, we find that Leisure Time paid an average of $3.26 per 1000 gallons from 2014 to 2017, while permanent residential users paid an average of $3.52 in 2017. In 2017 alone, Leisure Time spent $3.64 per 1,000 gallons. According to these numbers, Leisure Time appears to pay a comparable rate to the average permanent resident in Cascade. These numbers break down similarly when converted to cost per EDU, with Leisure Time spending an average of $591.85 per EDU (as calculated by average residential consumption) compared to the average total cost of $557.10 for permanent residents.

Using this same measure, we also found that seasonal residents pay significantly more, in fact many times more, per 1,000 gallons than both permanent residents and Leisure Time, although they pay less in total costs. This discrepancy is a result of base charges and improvement charges making up a larger part of the bill than consumption charges.

Table 4. User Category Comparisons

User Category Comparisons	Permanent Residential	Seasonal Residential	Leisure Time (2014-2017 Avg.)	Leisure Time (2017 Only)
Average Consumption	181,333	32,167	4,490,000	3,928,000
Average Cost	$557.10	$449.83	$14,378.55	$14,310.30
Average Cost per 1000 Gallons	$3.07	$13.98	$3.20	$3.64

Within user categories, variation is also present. As a result of base/improvement charges making up a higher portion of total charges than consumption fees, we found that both permanent and seasonal residents paid less per gallon as their consumption went up. Their total charges did increase, but not in increments high enough to keep consumption costs even. In Table 5, for example, a permanent resident that consumed 106,000 gallons in a year ended up paying $5.15 per 1000 gallons, while a permanent resident that consumed 205,000 gallons ended up paying $2.93 per gallon - nearly half the cost when measured by consumption. Seasonal residents showed significant variation as well, with the lowest consuming seasonal resident (10,000 gals) paying more than $46 dollars per 1000 gallons consumed - a significantly higher rate than those consuming more.

Table 5. Permanent and Residential Consumer Summaries

Permanent Residents	Water Usage	Consumption Charges	Fixed Charges	Total Charges	Price per 1,000 Gals
1119001	205,000	$177.95	$423.60	$601.55	$2.93
3307001	202,000	$90.00	$423.60	$513.60	$2.54
1059501	327,000	$193.50	$423.60	$617.10	$1.89
1004003	106,000	$122.25	$423.60	$545.85	$5.15
2242001	133,000	$120.00	$423.60	$543.60	$4.09
1048501	115,000	$97.50	$423.60	$521.10	$4.53
Seasonal Residents					
2187001	41,000	$90.00	$423.60	$513.60	$12.53
1152002	39,000	$42.93	$365.94	$408.87	$10.48
338003	10,000	$66.65	$394.37	$461.02	$46.10
3321501	19,000	$45.56	$370.28	$415.84	$21.89

Data for two of the six seasonal residents in our sample was incomplete, so we were unable to use it in our calculations.

Defining Equity

Because we lacked data on total water consumption and maintenance costs per user category, we were unable to conduct an analysis on the exact equity of Cascade's current rate structure - for example, we are unable to say for certain whether higher consumption and/or larger meters are definitively connected to increased or decreased maintenance costs for the city of Cascade. As a result, we are unable to say whether the observed discrepancies above are equitable or not, concerning cost distribution. As mentioned in our discussion of fee structures, different cities often come to different conclusions about fair rate distributions, and each conclusion can lead to its own pros and cons. Therefore, the following models are only meant to serve as alternatives, rather than recommendations. Each alternative affects equity and revenue differently.

ALTERNATIVES

Current Rate Adjusted for Expense

If Cascade kept its current rate structure, but increased its water consumption rates to make up for the immediate $0.19 per 1000 gallon revenue shortage, then the flat fee for consumption up to 10,000 gallons a month would increase by $1.90 to a total of $9.40 (a 25.33% increase), while the per gallon rate beyond 10,000 gallons a month would increase by 0.00019 cents per gallon to a total of 0.00094 cents per gallon (an increase by the same percentage). Future rate adjustments could be made using the same method. Table 6 below illustrates how this change would be reflected in estimated average yearly costs for each user category, provided that none of the fixed fees change.

Note that despite the equal adjustment in consumption costs across user categories, actual cost increases differ as a whole (see comparison column), due to the ratio of consumption costs to fixed costs that each user category pays. Overall, this adjustment would address Cascade's revenue shortage, because the needed funds are charged per gallon provided, as long as the shortage per gallon remains the same. If revenue demands change, this method can be used to further adjust rates.

Table 6. Comparison of Current Rate Before and After Adjustment

Current Rate Structure Adjusted for Expense	Averages Before Adjustment				Averages After Adjustment				Comparison
	Consumption Cost	Fixed Cost	Total Cost	Price per 1000 Gals	Consumption Cost	Fixed Cost	Total Cost	Price per 1000 Gals	Cost Increase
Permanent Residential	$133.50	$423.60	$557.10	$3.52	$167.32	$423.60	$590.92	$3.72	6.07%
Seasonal Residential	$61.29	$388.55	$449.84	$22.75	$76.81	$388.55	$465.36	$23.53	3.45%
Leisure Time RV Park (2014-2017 Avg.)	$2,659.50	$11,719.05	$14,378.55	$3.26	$3,333.24	$11,719.05	$15,052.29	$3.42	4.69%
Leisure Time RV Park (2017 Only)	$2,449.50	$11,860.80	$14,310.30	$3.64	$3,070.04	$11,860.80	$14,930.84	$3.80	4.34%

Figures calculated by increasing water consumption charges by 25.3333% for each user/year, and repeating earlier calculations.

Flat Rate - Idaho Falls

Idaho Falls, Mountain Home and McCall all use a flat rate water fee system, none of which differentiate between seasonal and permanent residents. Therefore, for the purposes of this alternative, we have combined both permanent and seasonal residents into one category. Table 7 shows how a modified flat rate would affect total costs for the sample consumers, and Table 8 shows how revenues would look from the entire population of Cascade. We estimated that Leisure Time had 149 units based on the number of in-park model homes supplied to us by the city.

Table 7. Sample Calculations Under a Flat-Rate Fee Structure

Sample Calculations	Number of Units	Cost per Unit	Total Cost Per Year	Percent Change
Leisure Time	149	$232.80	$34,687.20	141.24%
Residents	10	$364.20	$3,642.00	-27.66%

Table 8. Population Calculations Under a Flat-Rate Fee Structure

Population Calculations	Number of Units	Revenue per Unit/Year	Revenue Per Year	Percent of Total Revenue
Base Commercial Units	80	$461.40	$36,912.00	8.31%
Large Commercial Units	182	$1,146.60	$208,681.20	46.95%
Residents	546	$364.20	$198,853.20	44.74%
Total	808	$1,972.20	$444,446.40	100.00%

For this alternative, we had the basic data that we needed to calculate total revenue impact from the entire Cascade population, as well as from the sample that we were given. We used resident, base commercial and large commercial unit numbers from the most up-to-date water study supplied to us by Cascade. Charges for base commercial units and large commercial units were taken from Idaho Falls. As Table 8 demonstrates, a flat rate based on Idaho Falls water rate calculations, which are similar to fee structures in Mountain Home and McCall, would yield a significantly higher return for the city from Leisure Time and meet expenses, while charging residents less on average. These same calculations could be used to estimate the effect that different flat rates might have on the overall budget.

Table 9. Flat Rate Costs Compared to Current Rate Costs

Comparison of Current and Flat Rate Structures	Total Costs Before Adjustment	Total Costs with Adjusted Flat Rate	Total Increase
Leisure Time RV Park (2014-2017 Avg.)	$14,378.55	$34,687.20	141.24%
All Residents	$5,141.93	$3,642.00	-29.17%
Total	$19,520.48	$38,329.20	96.35%

Block Rate - Ketchum

If Cascade changed its rate structure to an increasing block structure, like the structure that Ketchum uses, users with lower consumption would be charged less overall, while users with higher consumption would be charged more. This structure is commonly used when cities want to encourage water conservation. Table 10 demonstrates the charge breakdown for each user category according to Ketchum's current block structure, with Cascade's current base charges, and charges per 1,000 gallons adjusted to meet Cascade's revenue demands.

Table 10. Average Cost Breakdown by User Category Under Block Rate

Average Residential Consumption							
Block	0- 1000 (Base)	1,000 - 8,000	8,001 - 65,000	65,001 - 120,000	120,001 +	Monthly Total	Yearly Total
Charge Per 1,000	$12.23	$1.25	$2.25	$3.50	$5.50		
Gallons in Block	1,000.00	7,000.00	7,111.11	0.00	0.00	15,111.11	181,333.32
Charge Per Block	$12.23	$6.09	$12.37	$0.00	$0.00	$30.69	$368.28

Average Seasonal Consumption							
Block	0- 1000 (Base)	1,000 - 8,000	8,001 - 65,000	65,001 - 120,000	120,001 +	Monthly Total	Yearly Total
Charge Per 1,000	$12.23	$1.25	$2.25	$3.50	$5.50		
Gallons in Block	1,000.00	1,680.55	0.00	0.00	0.00	2,680.55	32,166.60
Charge Per Block	$12.23	$6.09	$0.00	$0.00	$0.00	$18.32	$219.84

Leisure Time Consumption (2014-2017 Average)							
Block	0- 1000 (Base)	1,000 - 8,000	8,001 - 65,000	65,001 - 120,000	120,001 +	Monthly Total	Yearly Total
Charge Per 1,000	$12.23	$1.25	$2.25	$3.50	$5.50		
Gallons in Block	1,000.00	7,000.00	56,999.00	54,999.00	254,168.67	374,166.67	4,490,000.04
Charge Per Block	$12.23	$6.09	$128.25	$192.50	$1,397.93	$1,736.99	$20,843.90

Average monthly consumption was calculated by dividing yearly consumption by 12.

According to Table 11, permanent and seasonal residents would be charged less under a block rate structure, while high consumption commercial users such as Leisure Time would be charged more, at an increasing degree as consumption increases. When all consumption across all three categories is compared with total cost across all three categories, we find that user charges per thousand gallons increase under a block rate structure by roughly $1.25.

Table 11. Current Rate Compared to Block Rate Costs

Yearly Cost Per 1000 Gallon Comparison	Current Rate Cost Per 1000 Gallons	Block Rate Cost Per 1000 Gallons	Percent Change
Permanent Residential	$3.52	$2.03	-42.30%
Seasonal Residential	$22.75	$6.83	-69.96%
Leisure Time RV Park	$3.26	$4.64	42.40%
All Consumption Combined	$3.27	$4.56	39.30%

With the data that was provided to us on total consumption per meter size for seven months in 2017, we were able to estimate the impact that this structure would have on revenue for the entire population. However, if the ratio of residential users to commercial users and/or low consumers to high consumers is different, or becomes different, than what is presented in our data, then this number could change, and rates would need to be recalculated to reflect expenses. Table 12 shows expected yearly revenue for each user category. Table 12 is broken down by meter size because this rate structure does not differentiate between different types of consumers, only different levels of consumption.

Table 12. Total Yearly Revenues With Block Rate Structure

Block Rate Revenues	Count	Yearly Revenue	Percent of Total Revenue
3/4" Meters	543	$177,947.16	46.58%
1" Meters	56	$33,622.38	8.80%
1.5" Meters	18	$48,067.95	12.58%
2" Meters	23	$122,373.99	32.03%
Total	640	$382,011.48	100.00%

LIMITATIONS/FUTURE STEPS

As in any study there are typically limitations encountered during the process, and this study was no different. For example, our team ran into slight areas of confusion regarding data inconsistencies, defined and established user categories, maintenance budgeting, and the lack of an overall guide to effectively manage the City of Cascade's water. A major limitation that was encountered during our study was that of established user categories. As mentioned earlier in the report, city water management practices and structures typically fall under four categories: Uniform Flat Rates, Single Block Rates, Decreasing Block Rates, and Increasing Block Rates. Upon review, we discovered that the City of Cascade follows a Hybrid Block / Flat-Rate structure. These types of water management structures are somewhat uncommon, with a sizeable amount of cities adopting an Increasing Block Rate or a Flat Rate structure. Thus determining an optimal structure will ensure that the City of Cascade provides water to the citizens in an equitable manner.

Likewise, maintenance and revenue costs for the population were difficult to calculate with the data that we were given, so we were unable to estimate whether high consumers or low consumers make up a larger proportion of maintenance costs, or whether high consumers or low consumers (or commercial versus residential consumers) contributed more to revenue. We compensated for this by calculating suggested contributions, and noting the potential changes made under each alternative. The lack of information on the number of seasonal residents compared to permanent residents posed similar issues.

Another limitation discovered was that of inconsistent data collection over time. Data collection is vital for all city water systems. Data allows cities to make informed decisions in determining how much to charge customers, revising water fee structures, infrastructure needs, foreseeable infrastructure maintenance etc. A possible solution could be the development of a routine, monthly meter check, if one is not already being conducted. This will solve some problems and provide enhanced analytics with regards to water consumption, accurate user charges and ultimately water meter and infrastructure life expectancy. The ability to estimate and plan for infrastructure upkeep is vital in determining user fees and reducing the amount of "unplanned" maintenance and or emergencies. RCAP and the EPA both have water rate manuals online (referred to in this report) that include helpful suggestions for cities to determine what data can be collected in order to enhance decision making most effectively.

The last limitation encountered was that of a general review cycle of utility operations. According to Cascade Idaho City Code, Title 8, Chapter 3, the rate schedule shall be reviewed by the city council twice a year during the first meeting in May and November. This rate schedule review should be substantiated with metering data, infrastructure needs, operation costs etc. Many cities have adopted an approach from the American Society for Quality (ASQ), that incorporates a review cycle for utility management operations as whole.

Ultimately, effective water management practices will enhance the City of Cascade's infrastructure, improve performance, ensure equitable distribution of resources and become more resilient when dealing with future challenges. Challenges that may arise should be captured through a utility review or a continual improvement management framework which would serve as a preventative measure going forward.

FOOTNOTES

1. Rural Community Assistance Partnership. (2011). *Formulate Great Rates: The Guide to Conducting a Rate Study for a Water System.*
2. Association of Idaho Cities. (2017). *Municipal Utility Survey.*
3. Environmental Finance Center at University of North Carolina, Chapel Hill & Sierra Club, Lone Star Chapter. (2014). *Designing Water Rate Structures for Conservation & Revenue Stability,* by Mary Tiger, Jeff Hughes, and Shadi Eskaf.
4. United States Environmental Protection Agency. (2008). *Asset Management: A Best Practices Guide.*
5. United States Environmental Protection Agency. (2005). *Setting Small Drinking Water System Rates for a Sustainable Future.*
6. Mountain Home, Idaho City Code, 7-1D-1