# THE RATE-SETTING PROCESS:

## Lessons Learned from Massachusetts Water Suppliers' Experiences

Final Report / June 30th, 2018

RAFTELIS

WOODCOCK & ASSOCIATES, INC.
Utility Rates & Finance

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RAFTELIS

June 30th, 2018

Michelle Craddock
Watershed Ecologist
Department of Fish and Game, Division of Ecological Restoration
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Dear Ms. Craddock,

Raftelis, Woodcock & Associates, Inc., and Amy Vickers & Associates, Inc., are pleased to provide this report summarizing the results of our interviews with Massachusetts water suppliers regarding their rate-setting processes. This report describes the key findings of our interviews, with detail on their rate-setting processes and the political, technical, financial, managerial, and environmental challenges that they have dealt with. We hope the lessons gleaned from these interviews serve to improve drinking water management throughout the Commonwealth.

It has been a pleasure working with you and all other staff involved. Thank you for your efforts, insights, and support during the course of this study.

Sincerely,

**Dave Fox**
*Manager, Raftelis*

**Amy Vickers**
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# 1. Introduction

Raftelis, Woodcock & Associates Inc., and Amy Vickers & Associates, Inc., together the Project Team, were engaged in early 2018 by the Division of Ecological Restoration (DER, Massachusetts Department of Fish and Game) and the Department of Conservation and Recreation (DCR) to develop case studies that provide relevant and useful examples of the process Public Water Suppliers (PWS)/Water Districts have gone through to change rate structures to better balance multiple goals. The case studies highlight lessons learned from both successes and setbacks. They are intended to establish points of guidance for other suppliers engaged in the rate-setting process and help state agencies and the wider water management community understand which resources would be most helpful to suppliers undertaking rate-setting.

This project builds on the "Pricing" chapter of the *Massachusetts Water Conservation Standards* and seeks to be useful, in particular, to suppliers who are trying to restructure their rates to encourage water use efficiency and conservation, while meeting some or all of the following goals:

- Ensuring the long-term sustainability of water supplies through appropriate cost recovery
- Promoting equitable distribution of costs among rate payers
- Protecting affordability of water for essential needs

In August 2017, DER and DCR partnered to create and send out a survey to water suppliers with questions regarding their rate-setting experiences. More than 100 responses were garnered and summarized in a public document, which can be found at https://www.mass.gov/service-details/water-rates. The current project involved follow-up interviews with 7 of the 116 utilities to gain an in-depth understanding of their rate-setting process.

To establish case studies, the Project Team interviewed 7 water providers in Massachusetts. All interviews were done in person except for one, which was done over the phone due to interviewee time constraints. A list of prepared questions was brought to the interviews, probing all aspects of the water suppliers' rate-setting processes, governance structures, finances and financial planning efforts, rate structures, customer characteristics, outreach and communication efforts, and conservation initiatives. Please refer to Appendix A of this report for a full list of prepared interview questions. However, it should be noted that these questions were used as guidance for the conversations, which were free-flowing and generally focused on the aspects most salient to each utility.

The following sections describe the general characteristics of the water suppliers that were interviewed, followed by key lessons learned across all the interviews. The hope is that the lessons learned from this interview process can be used by other water suppliers to aid their operations and rate-setting processes. This report has also included a discussion of helpful resources currently used by the interviewed water suppliers, as well as resources they hope to use in the future to improve their rate-setting process. Lastly, the responses summarized in this report are not associated with any one utility to protect their frank feedback and confidential utility information.

# 2. Description of Interviewees

The seven water supply systems included in the report ranged in their system characteristics, which are summarized in Table 1. While every water system in the state has unique characteristics, the seven included in the report were selected using the initial outreach survey results, based on:

- Having expressed willingness to participate in follow-up interviews;
- Having reported being set back by some of the most common challenges in rate-setting; OR having reported overcoming some of these challenges;
- Having reported incentivizing water conservation as one of their rate-setting goals, because one key rate-setting challenge DER and DCR are hoping to help address is the challenge of establishing conservation-oriented rates while meeting all other revenue goals.

Specific water supply systems are not named in this document but location by county is given in Table 1 to represent the geographic extent of systems. The individual interviewees from the water suppliers ranged from politicians or appointed decision makers, department directors, superintendents, finance directors and treasurers, billing and information technology staff, engineers, and environmental analysts.

## Table 1 - Characteristics of Utilities Interviewed

| Water Supplier Location (County) | Estimated Population Served | Organizational Type | Last Budget | Residential Rate Structure | Who Approves Rates |
|---|---|---|---|---|---|
| Middlesex | 20,800 | Water District | $ 5,200,000 | Fixed charge plus inclining block volumetric rates | Water Commissioners |
| Middlesex | 7,400 | Town Department | $ 1,900,000 | Fixed charge plus inclining block volumetric rates | Water Commissioners |
| Bristol | 6,000 | Water District | $ 2,500,000 | Taxation, fixed charge, and inclining block volumetric rates | Select Board (who are also water commissioners) |
| Middlesex | 5,400 | Town Department | $ 1,200,000 | Fixed charge plus inclining block volumetric rates | Water Commissioners |
| Middlesex | 8,400 | Town Department | $ 3,000,000 | Fixed charge plus inclining block volumetric rates | Water Commissioners |
| Barnstable | 5,500 | Water District | $ 800,000 | Taxation, fixed charge, and inclining block volumetric rates | Water Commissioners |
| Hampden | 28,500 | Town Department | $ 4,400,000 | Fixed charge plus inclining block volumetric rates | Mayor |

# 3. Rate-setting Goals and Processes

## A. Rate-Setting Goals

Rate-setting processes of the water suppliers interviewed varied widely, from highly structured, multi-step processes to very informal, rapid processes. In terms of the impetus for the water suppliers engaging in a rate-setting process, the most common reason, by far, was financial sufficiency. To put this another way, water suppliers most commonly increase or change rates to fund annual revenue requirements, more specifically ever-growing capital improvements associated with aging and failing infrastructure as well as more stringent regulations. For some interviewees, financial sufficiency was the only impetus for engaging in a rate-setting process. For water suppliers that had goals in addition to financial sufficiency, the most frequently mentioned were revenue stability (typically achieved through higher fixed charges), conservation (typically attempted, although not necessarily achieved, through inclining block volumetric rates), customer affordability, and economic development (attractive rates to non-residential customers).

## B. Internal Rate Preparation Processes

All the interviewees' internal rate preparation processes had the same starting point: an analysis of revenue requirements. This analysis included a review of the last fiscal year's operations and maintenance (O&M) expenses in comparison with the budgeted amounts. In some cases, this review was done exclusively by the utility manager, but in one case this analysis included input from all executive staff members from the finance, engineering, and operations departments. If an expense exceeded or came in under budget, that deviation from the budget would be noted for the rate year in question. Based on principles of conservative financial management, many utility managers chose a slightly higher amount for each O&M item when compiling future revenue requirements, using market trends such as escalating equipment and energy costs to inform appropriate increases. Every utility also included other costs in their rate calculations, such as debt service payments and new infrastructure costs (Capital Improvement Programs). Only three of the seven utilities interviewed mentioned considering transfers to reserves to maintain a targeted amount of cash on hand.

The internal process of determining which projects should be included in the utility's Capital Improvement Plan (and thus funded through new water rates) varied highly among the utilities interviewed. One utility had an exhaustive wish-list of projects that it proposed to the water commissioners, with the expectation that only a small percentage of projects would be funded. By contrast, most other utilities had prioritized projects to make clear to water commissioners which projects must be funded with the new rates, and which ones could be delayed or sidelined if funding was limited.

All seven of the utilities described their internal rate processes as highly sensitive to the water rate governing body (water commission, select board, or mayor). They often prepared their rate requests according to what they predicted would be palatable.

Most utilities completed their most recent rate change without the help of consultants. However, four utilities had engaged a rate consultant for past rate-setting exercises, and one continued to use a consultant's computer-based financial model to calculate future rates.

## C. Rate Decision Processes

At a minimum, each utility's rate process included a presentation of the utility's revenue requirements and requested rate changes to the rate governing body, whether the mayor or the water commission. The shortest rate process garnered from the interviews included one initial meeting with the water commission to submit a rate change request, followed by one meeting a month later to vote on the change. By contrast, one utility had a longer process which included several rate options proposed at water commission meetings, then a public hearing and subsequent vote. All seven utilities hosted meetings that were open to the public but described minimal public participation in the rate-setting process. Two utilities had separate public hearings for water rates. Few utilities engaged in any significant public outreach before rate meetings, instead opting to explain the rate change after implementation.

Most utilities sought rate changes on an as-needed basis when the utility's financial status had changed. By contrast, one utility completed a rate study every 3 years, attempting to avoid frequently changing rates. Yet another had made slight changes to its volumetric charges but no change to its fixed charge in over 20 years.

# 4. Key Lessons Learned

Most water suppliers in Massachusetts share common challenges in their communities, such as aging infrastructure needing renewal and replacement, rising operating and maintenance costs, reductions in per capita consumption, political pressures or inactivity, increased regulations, and limited funding and staffing. Although water suppliers may not have control over the aforementioned challenges, suppliers may utilize various rate-setting tools and strategies to help achieve rates that meet their goals or pricing objectives despite these challenges. Below are key lessons learned from the water suppliers' rate-setting processes—drawing on both successes and setbacks experienced by interviewees—that offer valuable guidance and food for thought to any water supplier in Massachusetts. These lessons touch on themes of communication, long-term financial planning, governance, and use of data.

## A. Communication

Communication, both internally within the water utilities, and externally with customers and policy makers, was crucial for rate-setting success. Having open lines of communication established with stakeholders was often the difference between a successful and unsuccessful rate case.

### 1. Internal Communication

Water utilities are complex organizations that require the expertise of professionals from diverse fields, such as engineering, construction, operations, science, finance, administration, public policy and planning, public outreach, and more. When internal communication is poor—for instance, when field staff rarely interact with planners, or engineers create a renewal-and-replacement schedule without informing the finance department—the long-term financial success of the utility is jeopardized. To create rates and policies that finance the utility's vision for the future, staff members must have frequent internal lines of communication to articulate the utility's goals in a unified way. This lesson is illustrated below with examples of utilities with positive internal communication and others with communication roadblocks.

#### a. Case 1 – Positive Internal Communication

One utility stood out because of its excellent internal communication. When asked to bring all staff involved in rate-setting to the interview, five staff members attended (a significant portion of all employees). This inclusive approach stood in contrast to that of some other utilities, which viewed rate-setting as a task exclusive to one segment of the utility's operation, rather than as a collaborative initiative best suited to the whole team. The utility described how they work together to plan and set rates: the commissioners set financial policies for reserves, capital improvements, and conservative financial management; the finance department analyzes revenues required to meet financial goals; the IT manager analyzes billing data to forecast revenue; and the environmental manager analyzes how conservation measures would affect revenue. There were no internal stakeholders left out of the rate-setting process. This inclusive approach allowed for a unified front with common goals and initiatives. No action was taken in isolation: all actions were coordinated with the end goals in mind.

The result was approval of a crucial rate change that provided the utility with needed monies for debt service payments. The change was widely accepted by stakeholders, with less than a dozen customers submitting comments after the new rates went into effect. Most of these customers simply inquired about why the new fixed charge was put into place.

#### b. Case 2 – Communication Roadblocks

In a different utility, the water department director struggled to adequately determine and convey the utility's existing and future financial requirements, which ultimately resulted in a lack of buy-in for rate increases. In this instance, utility planning staff lacked the time and analytical know-how to develop and frame the critical content that needed to be communicated to municipal authorities, and they lacked open communication channels with these municipal authorities because of interpersonal difficulties. As a result, they were not able to garner support for financing critical capital improvements for the perpetuation of the water system. This failure in communication led to project funding being routinely rejected by municipal authorities, who, according to one staff member, simply responded by saying "we don't have money for that." Thus, a financing mechanism was not included in the annual budget supported by rates, and the approved rates left the utility with insufficient revenue for its infrastructure renewal and replacement schedule.

### 2. External Communication

In addition to the challenge of internal communication among the multiple utility departments that have a stake in ratemaking, utilities must communicate rate changes to external stakeholders such as customers, policy makers, and other community organizations. This is an area that has been identified as a historical weakness within the drinking water industry (as exemplified by the US Water Alliance's "Value of Water" campaign). The industry has typically focused on the engineering aspects of providing clean and reliable water, placing much less focus on public communication. A lack of attention paid to public relations has often led water suppliers to be invisible to the communities they serve, yet utilities can no longer afford to remain invisible due to the need to update aging infrastructure and communicate the rate increases needed to finance new capital projects. In contrast to prevailing industry failures with public communications, two interviewees provided outstanding examples of good external communication during the rate-setting process, described below.

#### a. Case 1 – Positive External Communication

The first example of positive external communication came from a new water manager who assumed leadership and soon found that the utility had been operating with a financial deficit and was overly leveraged. Under prior leadership, there was limited transparency about the utility's finances. Moreover, new leadership stated that "the revenue stream was not there to put any money back into the system." New management assessed the utility's financial status, then began to educate the board of commissioners ("this is where we are now, and this is where we want to be") on the utility's financial situation through monthly meetings, without immediately asking for an abrupt rate increase. After building rapport with the commissioners and a mutual understanding of the utility's finances over the course of several months, management proposed a multi-year plan for establishing financial viability through rate increases. This proposal was communicated to the commissioners,

the Select Board members, and at public hearings—and successfully passed. The utility staff believed that transparency and communication were the key drivers behind being able to successfully implement rates. Although the discussion and presentation of materials was not always an easy or comfortable exchange, the outcome was well worth the process.

In addition to education of the water commission, this utility was very proactive in its communication with customers. They employ an as-needed communications consultant to design mailers for customer distribution, informing them of recent utility news, projects that might temporarily affect their water service, or conservation measures to be implemented. They also conduct elementary school visits to educate children on the importance of water, maintain an active website with news and utility updates, and send out mass emails to customers when needed.

> This frequent communication helps build goodwill toward the utility and a general understanding of the resources and effort required to maintain a water system, all of which results in little pushback at hearings for much-needed rate increases.

Customers who are well-informed are much more likely to accept rate increases if they understand the need and rationale for the increase.

#### b. Case 2 – Positive External Communication

A second case of good external communication involved a water supplier that developed a routine rate-setting process that has consistently yielded the results that the utility needs to recover all its costs. The utility superintendent conducted a water rate meeting each quarter with the water and sewer commissioners, which also comprise the town select board. The utility staff provided a transparent and honest view of the utility's capital expenses and operating budget, which required small rate increases every year. The upcoming fiscal year's water rates are first discussed at a meeting in January and then generally approved by March, with no dissent from the commissioners. This was due in large part to the routine meetings and transparency, which avoided surprises and provided a sound rationale for establishing a foundation of financial viability for the utility.

## 3. Communication Points of Guidance

The interviews revealed several internal and external communication strategies that are relevant to the rate-setting process and may be helpful to other water utilities in Massachusetts. They include the following:

### a. Internal Communication Strategies

1. All-hands-on-deck meetings in which staff involved in the rate-setting process give status updates. This should include, at a minimum, leadership representatives, billing data and environmental analysts (to provide insights on customer characteristics), finance representatives (to establish revenue requirements), and customer service staff (to predict the impact rate changes might have on customers). The utility with the smoothest rate-setting process had these all-staff meetings well before a rate request

began, and iterated them as needed until all key internal stakeholders agreed with the rate changes to bring to the water commission.

2. A clear internal prioritization agreed upon by the entire utility of which system improvement projects need to be funded, with a cost and specific time horizon. The prioritization should not be an all-inclusive wish list, but rather a realistic assessment of projects that could be funded at the current rates or with palatable increases. Two utilities stood out for their concise prioritization of urgent and non-urgent capital projects, which gave the water commissioners a clear decision regarding rates.

### b. External Communication Strategies

1. Frequent operational and financial status updates with the governing body that decides rates. These updates should address whether the utility is currently under or over budget, current revenue from water sales compared with the same period from previous years, projected revenue or shortfall by the end of the fiscal year, and projections of the utility's financial status in the next fiscal years. This strategy prevents surprises and builds momentum and buy-in for rate increases.
2. Frequent communication with customers and feedback from them on issues not only affecting their immediate water service, but also planned capital projects, conservation initiatives, public events, and of course, rate increases. Customer feedback should be obtained through a variety of methods to reach diverse audiences, and may include bill inserts, mailers, emails, electronic messages through billing programs, the use of social media, presentations (at schools, town meetings and water utility hearings), and public events. One utility was highly satisfied with the results of hiring a communications consultant on an as-needed basis, who aided public relations by designing attractive mailers, bill inserts, and utility graphics. These outreach efforts build goodwill towards rate increases and the utility in general.

## B. Financial Planning

The drinking water industry faces massive costs for large infrastructure such as water mains, treatment plants, holding tanks, transmission and distribution lines, and more. Many of these assets have a predictable life span (some assets last decades if not centuries) that water managers can use to plan for replacement and upgrades. If graphed, utility capital expenditures would show consistent low-level renewal and replacement costs punctuated by large peaks due to multi-million-dollar expenditures for major projects such as new treatment plants. The nature of these investments necessitates financial planning decades into the future. Many Massachusetts utilities place their focus on consistent expenditures and revenues until a significant event like an asset failure or replacement becomes necessary, along with millions of dollars in spending. The interviewed utilities provided examples of sound long-term financial planning as well as struggles to incorporate long-term needs into financial planning.

### 1. Proactive Financial Planning

One interviewed utility used a Microsoft Excel-based financial planning model in which the utility's operations and maintenance expenses, planned financing of capital improvements, debt service, water consumption and customer accounts, and miscellaneous revenues are projected decades into the future, but with detailed focus on the next several years. This model was developed by a consultant and customized for the utility's needs. The model allowed the utility to calculate rates needed under different revenue and cost scenarios, resulting in planned and adequate rate increases that will fund major infrastructure investments years in the future, allowing for sustainable utility operations and safe service to customers. Moreover, utility management could clearly and tangibly demonstrate the financial need for rate changes to commissioners and select board members, while adjusting rate scenarios as needed after receiving feedback from stakeholders. For example, the utility adjusted its financial plan using the computer model to keep rate increases below 10% per year–the threshold that the water commission deemed palatable. This criterion was met by appropriately tweaking the timing and financing mechanisms associated with capital improvements. Given this planning effort, the commission "always approves" the requested rate changes, and "there is virtually no customer pushback, because the needs are apparent."

### 2. Reactive Financial Planning

Another water supplier had not developed a long-term financial plan. Instead, its future finances hinged on politically charged rate hearings each year, often resulting in opposition to rate increases. The utility's planning horizon was not more than one fiscal year. At this utility, rate-setting attempts resulted in either significantly lower-than-necessary rate increases, or no rate increases at all.

Another utility also had no financial plan, leading the utility to use the same, or similar, rates for an extended period of time, despite the clear need for additional revenues. Rates did not reflect increased costs to serve customers currently, much less future costs, despite anticipated future growth that may necessitate the large capital expense of new source development. The public works and water department directors stated that "rates have gotten too political" and "we all know the reason why we're behind on finances," pointing to municipal officials who vote on water rates. However, during interviews with the leadership who decide the rates, leadership said that "if the utility managers give us a reasonable list of projects and rate increases needed to fund them, we'll approve them no problem." This underscored the need for a financial plan—as well as good lines of communication—so that the utility staff and the water rate body can assess the investment shortfall and decide on rate increases needed to fund them.

### 3. Financial Planning Points of Guidance

The following are some points of financial planning guidance derived from the interviews:

1. Utility managers should create short-term and long-term financial plans that include operations and maintenance expenses, debt service payments, reserve fund contributions, and capital improvement costs. Importantly, they should also predict revenues with educated forecasts of population growth and changing consumption patterns based on

historical data and current trends. Although the effects of external factors on utility finances can be uncertain, utilities can make educated guesses and update them as needed or when better information becomes available.

2. Utility managers should strive to have financial plans and rate-setting practices that recover the full cost of water service from each class of water user (e.g. residential, commercial, industrial). Not only does this assure equity among ratepayers, it helps managers identify which parts of the water system are most costly and assure funds for their maintenance and replacement.
3. Utilities should maintain reserve funds and contribute to them regularly to reduce the need for abrupt rate increases. One utility's financial plan budgeted $500,000 annually for system improvements, regardless of whether that amount would be spent or not. If this money was not spent during the year it was appropriated, it entered into a capital reserve fund, earmarked for future improvements.

Despite intense pressures on utility finances from aging infrastructure, rising operating costs, and other factors, financial planning can help utility managers keep water rate percentage increases to the single digits per year, which was the hope of several of the utilities interviewed who sought to reduce rate shock to customers. With a plan, the utility managers can communicate financial needs clearly to decision makers and ratepayers and plan to programmatically raise rates to lessen rate shock.

The utilities who employed financial plans also used them as a key communication tool (as mentioned in Section A above) with their water commissioners.

> By transparently demonstrating the utility's financial need with tables and figures, some managers easily convinced commissioners that rate increases were necessary.

### Use of External Resources

The interviewees mentioned several external resources available to water utilities to aid in financial planning and rate-setting processes:

1. The University of North Carolina Environmental Finance Center's online tools to do basic financial planning of the effect of rate changes on their system's consumption and revenues (found at the following link: https://efc.sog.unc.edu/resource/massachusetts-water-and-wastewater-rates-dashboard).
2. Consultants for rate studies and long-term financial planning and continued use of consultant's Excel-based models for rate changes.
3. American Water Works Association (AWWA) manuals on financial management and general rate-setting practices (Manual M1), and developing rates for small water systems (Manual M54).

Additionally, a list of rate-setting tools and models was recently compiled and is listed in the Pricing chapter of the Massachusetts Water Conservation Standards.

## C. Governance Structure

The organizational structure of a water utility can enhance or limit its ability to carry out financial planning and change rates in its best interest. The governance structure of the utilities interviewed here ranged from water departments dependent on the public work departments (financially combined with other governmental functions), municipal water departments set up as enterprise funds, and water districts. These structures each had implications for the utility's finances and rate-setting process. This section describes some of these implications and reflects on ways utilities were able to increase their ability to control their financial planning and rate-setting, even when their structural autonomy was limited.

### 1. High Autonomy of Governance

One utility incorporated as a water district had an exceptional level of autonomy, which it harnessed for a smooth rate-setting process. It was able to hire employees, set policies and budgets, and approve expenditures with much more flexibility than other water utilities that function as municipal departments. One staff member said, "that's the advantage of being a District: we don't have layers of politics." Moreover, the finance director said, "as a finance guy, I like being a District – I can clearly see what our expenses and revenues are, with no subsidies or governmental transfers like might occur with a municipal water department." Having autonomy from municipal government also meant less political and financial upheaval: the town in which the district operates is in a less sustainable financial state than the water district, which has maintained its sound financial practices. The district does not transfer any of its revenues to the town for other municipal purposes, as some water departments in Massachusetts do. The district managers viewed their utility as a highly-controlled business and were able to plan rates without worrying about financial pressure from town administrators.

It is relevant to mention that the aforementioned utility, despite its separation from the town government, was nonetheless highly accountable and visible to its ratepayers through public hearings, communication efforts through the WaterSmart software package, bill inserts, and public education events.

All three of the water districts interviewed were satisfied with their financial independence and rate-setting processes. They also noted that they had the power to tax constituents if water revenues were to become insufficient to cover system costs. Two of three water districts subsidized large portions of their budgets through taxation currently, and one does not plan to use taxation but appreciated having the autonomy to do so as a last resort to raise revenues to needed levels.

In addition to water districts, the water utilities that demonstrated the most successful financial and rate-setting governance were municipal departments set up as enterprise funds. An enterprise fund is

a municipal financial mechanism for water utilities in Massachusetts in which all direct and indirect revenues and expenditures are segregated into a fund separate from all other governmental activities.

For several of the interviewees, the enterprise fund system was a way to seek financial autonomy when the water department is one of many municipal departments, or is a department combined with other functions such as sewer, electric, or public works. In those cases, water managers can find themselves fighting for limited resources and access to decision makers who value more visible, politically attractive municipal functions than the water department. One water department with a successful rate-setting process operated under an enterprise fund, which managers said aided the department's financial planning because revenues and costs were more easily isolated and forecasted independently from the municipality. Yet another water utility had been financially dependent on the public works department until the most recent fiscal year, when it became an enterprise fund and begun transitioning towards the greater autonomy common to enterprise funds. The utility managers were pleased that this autonomy allowed them to better calculate the true cost of service of water provision and thus propose water rates that help the utility reach financial self-sufficiency.

### 2. Low Autonomy of Governance

Of the seven water suppliers interviewed, three expressed frustration with the political limitations on their autonomy and felt that they had little access to decision makers, often because of layers of municipal hierarchy. Moreover, they stated that high-level municipal officials and commissioners are often very resistant to raise water rates because they fear voter backlash. One water department described itself as "having our hands tied" by political forces for years at a time when town officials resist rate increases to keep water cheap for their constituents. Another manager of a small utility described how there is "no political demand to raise rates." These utility leaders felt they did not have the personal relationships with rate governing board members or frequent access to them, and thus were isolated in their efforts.

One water department that was organizationally combined with other municipal functions overcame limits on its autonomy by taking pains to maintain direct lines of communication (highlighted in Section A) with commissioners and keep them informed of the utility's financial status and potential future revenue needs. This proactive communication served to close the gap represented by layers of organizational separation between those who request rate changes and those who vote on them. Being insistent on making the water department visible to decision makers was key to communicating the need for increased budgets and rates.

### 3. Points of Guidance for Overcoming Limited Autonomy

The interviews revealed several water suppliers that had strategies for successful rate-setting processes despite governance structures that limit autonomy.

1. Incorporation as a water district facilitates rate-making because of the financial independence and autonomy to operate and plan that districts have.
2. The enterprise fund mechanism can be a powerful way for municipal water utilities to separate revenues and expenditures from other departments. This separation facilitates financial planning and allows managers to calculate the true cost of service of water provision.
3. Frequent communication with the water rate governing body can help utility managers overcome limited budget autonomy and access to decision makers. Open lines of communication can be the key to successful rate-making in municipally-dependent utilities.

## D. Data Management and Analysis

The water rate-setting process can require many data inputs to properly project future revenues, utility costs, and customer behavior. For example, some data-driven questions that utility managers asked in the interviews were:

- "What will be the impact of adding another inclining volumetric tier to our rate structure and revenue stream?"
- "If we implement strict conservation measures, how will they affect our revenues?"
- "What will be the effect on revenues of switching to monthly billing from quarterly billing?"
- "Who are our large residential water users and what is driving their consumption?"

The ability to answer these questions through data collection and analysis practices varied widely across the utilities interviewed.

### 1. Sophisticated Data Management

One utility stood out for its embrace of data in its rate process. It used a detailed billing system from which consumption data from the past 20 years was downloaded to Microsoft Access or Excel and analyzed as needed. This data management approach helped predict consumption and revenues from volumetric charges and informed plans to buffer against reductions in consumption from drought, conservation pricing, or seasonal factors. This utility also subscribed to the WaterSmart software service which helped the utility pinpoint its large water users and their patterns. This software also allowed comparison of customer consumption to that of their neighbors as well as email and text message communication with customers about water restrictions and other utility news (water quality, billing information, etc.). The utility expressed satisfaction with the ability to communicate with users through the program when a customer's consumption pattern suggests they have a leak (unusually high but consistent night-time use), and thus reduce lost water. The utility has

harnessed its high-quality customer billing data to predict water consumption and revenues accurately, and confidently identified rate increases needed to cover any predicted revenue shortfall.

This same utility used its consumption data to identify the impact of conservation rates on their customer groups. New technologies can help water suppliers answer these questions in precise ways, better understand customer characteristics, and design rates and financial policies that achieve system goals.

Another utility used a holistic rate-setting model that included all relevant utility data inputs to properly calculate future rates. This model was designed for them by a rate consultant. Based in Excel, the model forecasted growth of both consumption and number of accounts for each customer class (residential, commercial, industrial, etc.), operations and maintenance expenses (labor, supplies, etc.), a best estimate of capital improvements over the next decade, and the required financing plan to pay for those capital improvements (such as new debt, cash, or reserve funds). This model took a long-term planning approach to look both backward and forward to best forecast what the necessary rate change would be. The utility manager used printouts of the Excel model at rate meetings with the water commissioners to convince them of the trends in costs and revenues that the utility is experiencing, and why rates must go up.

By inputting all cost and revenue data into a rate-setting model, this utility has successfully argued for rate increases each year and was satisfied that they were small but consistently in line with their costs and changing consumption predictions. As a result, the utility manager described their rate process as very smooth, saying "the commissioners always approve our rate requests." This underscores that good data analysis and presentation can go hand-in-hand with the communication strategies described in Section A.

### 2. Minimal Data Management

Other utility managers were not able to answer questions important to the rate-setting process because of a lack of data. These questions went unanswered due in part to quarterly and bi-annual meter reading practices (which mask when customers' water use peaks) and a lack of staff to evaluate available data. Several of the utilities interviewed had very old meters, producing infrequent consumption data, and no staff to download and analyze the data they had. This lack of data limited their ability to predict revenues from consumption and set rates accordingly.

Most of the water suppliers did some Excel-based data analyses of key rate inputs, but in a simplistic manner. For example, they summed their revenue requirements (operations and maintenance costs, debt service, etc.), forecasted their revenues based on last year's consumption, then looked at a uniform rate increase for all customer classes to meet any revenue gap. This method may work in a static, unchanging business environment, but can run into problems with unpredictable variables such as precipitation patterns and droughts, seasonal variation in consumption, population decreases in some places and growth in others, and declining consumption from water-efficient fixtures. These

complex variables have made planning revenues based on consumption more difficult than before – in decades past, utility managers could safely assume consumption (and revenues) would grow in tandem with population and with their operating costs. These trends are now decoupled and leave many utilities with stagnant or decreased consumption year after year. One utility expressed concern about using past fiscal year water sales to project for the next year while they are experiencing decreased per-capita residential consumption and a diminishing industrial customer base.

All of the utilities interviewed recognized the promise of water use data and its potential uses for rate-setting practices, but the majority of them were not currently implementing smart metering, detailed consumption tracking, monthly billing, comparative bills, or other data-intensive innovations. One reason mentioned was that these technologies are expensive, but utilities recognized that gradually replacing old meters with newer ones that provide frequent consumption reads would lead to more complete water usage profiles of their customers. Another barrier to adoption of data collection and analysis was simply lack of information. Several utilities were not familiar with the ability of utilities or rate consultants to run revenue and rate scenarios in Microsoft Excel or examine customer water usage through software packages.

## 3. Points of Guidance for Better Data Management

1. When completing a rate study, utility managers should use computer-based rate-setting models that include all relevant data inputs (revenue requirements, projected revenues, infrastructure funding plans, trends in population and consumption, etc.) with projections into the future. These models can be done in-house when expertise and time permits or can be done by a rate consultant.
2. Utilities should take monthly (or more frequent) meter readings of customer water consumption, and plan to replace old meters that cannot be read easily. This will facilitate consumption and revenue projections that inform rate studies.
3. Utility managers should perform in-house consumption analyses or use external software packages that clearly show customer water consumption trends, instead of depending on simplistic, uniform assumptions about consumption behavior.
4. To avoid financial shortfalls due to poor predictions of water consumption revenues, managers should perform multi-year (3-, 5-, or 10-year) analyses of historical consumption from billing data.

# 5. Key Findings Warranting Further Examination

## 1. Balancing Conservation and Revenue Needs

Although the interviews were primarily structured towards understanding the rate-setting process, conservation came to the forefront of the conversation in each interview early and often. Water managers are keenly aware of the potential revenue reductions associated with water conservation, as exemplified by the following quotes:

- "Water conservation is a balance because of the revenue stream challenge."
- "The water commissioners like revenues more than conservation."
- "Lots of revenue comes from lawn sprinkling."
- "At least half of summer irrigation users could cut their water use in half, [but] water commissioners like the revenue from irrigation demands."

Indeed, working to simultaneously meet revenue targets while reducing inefficient and wasteful water use is a complex dynamic. These comments from interviewees speak to the need to further examine how suppliers in Massachusetts can successfully incentivize water conservation while satisfying utility revenue requirements, perhaps using scheduled rate and fee increases and some of the innovative rate structures that have been more fully developed and used elsewhere in the country.

## 2. Water Demand Elasticity and the Effectiveness of Price Signals

All seven of the water suppliers interviewed in this study had inclining block volumetric rates and some form of a fixed charge, assessed monthly or quarterly. For most of the water systems interviewed, the impact of these rates on customer water use (demand elasticity) was uncertain, and for some the impact was reported as negligible. One supplier in an affluent community reported no change in consumption after the inclining block rate went into effect. Similarly, this utility manager saw no impact of seasonal rates on users. One utility manager said "Residential consumption is not very responsive to water rate changes due to the relative affluence of the community. Our customers want green lawns." This was a common refrain heard during interviews: affluent customers would pay whatever it costs to irrigate their property.

Another water supplier was convinced that their current rate structure was not sending the correct price signal to reduce water consumption. This utility's customer base paid for their water primarily through taxes, and the utility manager felt that their system worked against incentives to reduce demand: "The customer attitude is that they pay a lot for water as part of their taxes so they should be able to use as much as they want." Furthermore, the supplier stated, "Relying on tax revenue [to help fund the water system] is encouraging irrigation because [the tax assessment is] a flat fee and not an ascending rate." These comments and observations speak to the need to further examine

whether suppliers in Massachusetts can tap into and/or adapt the industry's rapidly expanding set of pricing tools to send stronger conservation signals through their rate structures (such as budget-based rates, excessive use charges, steeply tiered structures, meaningful seasonal surcharges, etc.). Further, when pricing tools are ineffective in driving down demand (e.g., in affluent communities with excessive irrigation usage), other incentives such as mandatory maximum 2-day per week watering restrictions need to be considered.

## 3. Rate-Setting Resources Requested by the Utilities

One goal of this study was to understand what resources water providers lacked during their rate-setting process. Some resources that water suppliers expressed interest in for future rate-setting practices were:

1. A rigorous study of the effects of conservation program measures and conservation rates on consumption and revenues, so as to better predict rate impacts and revenue needs
2. Benchmarking statistics on how a utility's average bills and consumption compare to others within the Commonwealth
3. Guidelines regarding the most cost-effective and feasible initiatives to meet the Massachusetts state water conservation standard of 65 gallons per capita per day for residential users
4. Conservation metrics to use in demand forecasting to avoid overestimating future demand
5. Resources for how to best communicate the value of water to decision makers and customers

# 6. Conclusions

Perhaps the most important factor contributing to water suppliers' successful rate-setting processes was frequent, strong, and efficient internal and external communication. Water suppliers who brought all relevant staff members to regular internal rate-setting meetings were generally more satisfied with their current revenue recovery and rate design results. Frequent internal communication meant few surprises and silos within the organizations, which resulted in full departments being on the same page and moving together as a unified front, leading to successful outcomes, according to the water providers.

Moreover, water suppliers who proactively and frequently engaged and updated both their customers and their governing body on the financial, regulatory, political, and capital infrastructure statuses of the utility were more likely to have a smooth rate approval process, due to general buy-in. The interviews often highlighted that although the financial truth may be hard to swallow, stakeholders prefer that utility managers be transparent about the utility's finances rather than being left in the dark about the why, when, and how of the utility's operations and costs. For example, customers are much more likely to accept an increase in rates if they understand that it is needed to pay for an integral treatment plant upgrade so that quality, safe, and consistent service can continue. Water providers should also engage in outreach efforts to prepare stakeholders for change, such as when rate increases will go into effect, and how customers will be affected. Common strategies include presenting how much an average customer's bill will increase after new rates go into effect. Some utilities have embraced innovative practices such as connecting their customer information system to a web portal, allowing customers to input their addresses and—based on average historic usage at that property—understand how a rate increase or rate structure change may affect them.

Another key factor of rate-setting success that emerged from the interviews was having detailed short- and long-term financial plans to appropriately account for future changes in operations, infrastructure, and customer characteristics. Suppliers who engaged in rigorous financial planning avoided surprises and were more likely to adequately address potential revenue deficiencies through informed rate increases. Using a sophisticated, yet user-friendly Excel-based financial planning model allows water providers to update information as often as it is available and establish a living plan. When employed effectively, such planning tools help not only anticipate future needs, but also justify rate increases to both policy makers and customers. Although long-term financial planning was not very common among the water providers interviewed, with most providers operating on a year-to-year budget and rate schedule, those who developed multi-year financial plans expressed more confidence in their financial projections and their ability to communicate needs to stakeholders.

To appropriately establish and maintain a short- and long-term financial plan, a utility needs information regarding historical operating expenses, upcoming operating budgets, debt service payment schedules, capital improvement plans and financing mechanisms, reserve fund balances,

and customer usage and account data and characteristics. With these data, which are almost always available to a water supplier, a comprehensive financial plan can be established.

Effective data management and analysis emerged as another rate-setting success factor that closely intersects with – and can often underpin – both financial planning and communication. Most utilities interviewed did not do extensive data collection and analysis in preparation for rate changes, such as multi-year consumption and financial scenario analyses, and tended to look at only the previous year's budget and consumption, if at all, to predict costs and revenues. This trend of focusing on the previous year's data may have been due to the relatively small size of the utilities examined, as data management and analysis can be resource intensive. However, several utilities collected high-quality data on customer water consumption and cited these data as crucial for planning for future revenue deficiencies, as well as generating buy-in for requested rate increases from governing bodies and the public.

Most water providers have useful data available to them within their budgeting and customer information systems, but often lack the technical training to retrieve the data efficiently, or at all. More could be done to provide assistance to water utilities to enable them to efficiently access and utilize the vast amount of data already in existence within their systems. This investment of effort would arm water suppliers with data and analyses shown to be critical for successful rate-setting.

Water providers organized as water districts generally had more autonomy and demonstrated more flexibility to update and enact changes to their utility's operations, billing technologies, customer outreach, and conservation efforts. This flexibility, in turn, facilitated the rate-setting process through improved quality of data inputs (cost and consumption trends) and good communication with customers about rate changes. However, several utilities had successful rate-setting processes despite being part of a multi-purpose municipal department with several layers of budgetary and political limitations. These departmental utilities were often organized as an enterprise fund, which guarantees some financial and organizational independence from the rest of the city or town government. Others made very strategic use of strong communication with oversight boards and commissions to earn their trust and increase their decision-making flexibility.

The utilities interviewed in this study were well aware of the difficulty of balancing water conservation goals with reduced revenues from decreased consumption. Moreover, although all the utilities had some form of conservation-oriented water rates, they struggled to isolate the effect of their rates from other trends that affect consumption, such as water-efficient plumbing fixtures, changes in population, and seasonal fluctuations in water use. They expressed a desire to gather data to better determine the effect of conservation on consumption before pursuing it aggressively.

Finally, all of the interviewees viewed the rate-setting process as crucial to their financial goals and were open to all external advice, guidelines, and resources aimed at making it more successful. They recognized the importance of financially sufficient water rates to maintaining clean, reliable, high-quality drinking water service to their customers.

# Appendix A:
# Prepared Interview Questions

The following questions were prepared before the interviews and were used as the basis for the interviews with the water providers. However, some questions were omitted and others were added as the conversation flowed toward the most relevant aspects of each utility's rate-setting process.

- What were the key drivers leading you to consider revisions to your rates?
- How did you go about implementing the most recent rate change?
- What analyses were performed to support the rate change?
- What tools (e.g. published resources, rate consultants, etc.) did you utilize? Were these sufficient? Why or why not?
- Who were the key players involved in the rate-setting process? Were these the right people? Why or why not?
- What were the key goals of the proposed rate change?
- What elements did the proposed rate change entail (e.g. additional revenue, conservation inducing structures, fixed revenue enhancements, etc.)? How was it determined that these elements would meet your goals?
- To what extent is conservation a priority in your rate structure?
- How was the rate-setting process communicated to stakeholders, if at all?
- Did you encounter any champions or detractors? How did they help/hurt? How did you overcome your detractors?
- What process was necessary for approving the proposed rates? (e.g. hearings, publications, notices, etc.)
- What were the conclusions of the rate-setting process?
- Do you think the process was successful? Why or why not?
- Which goals (qualitative or quantitative) were accomplished or not accomplished, and how was success or failure measured?
- If new rates were implemented, how have stakeholders, specifically customers, responded to the new rates?
- If conservation was a goal of your new rates, how do you measure that goal and was it realized?
- What were your lessons learned, both positive and negative, from the totality of the rate-setting process?
- Which tools, resources, strategies or analyses helped the process?
- Which tools, resources, or analyses would have been helpful that you did not, or could not utilize?
- Can you think of specific assistance, resources, tools, or educational workshops that would be useful?
- When you enter into your next rate-setting process, which elements will you focus on or avoid? To ask this another way, what will you do the same and what will you do differently?