

MY GROUP IS READY FOR WATER CONSERVATION. NOW WHAT?

Katherine Atteberry¹, Maeneen Klein², Bill Maddaus³, Michelle Maddaus³

AUTHORS: ¹ Jacobs Engineering Group, 6801 Governors Lake Parkway, Norcross, Georgia 30071 678.333.0647. ² Charlotte-Mecklenburg Utilities/ Catawba-Wataree Water Management Group, 5100 Brookshire Boulevard, Charlotte, North Carolina 28216 704.336.7600. ³ Maddaus Water Management 105 Zephyr Place, Danville, California 94526 925.831.0194.

REFERENCE: *Proceedings of the 2011 Georgia Water Resources Conference*, held April 11–13, 2011, at the University of Georgia.

Abstract. Water conservation has historically been viewed as something important to western states with arid climates and limited water resources. However, the importance of water conservation is changing nationwide and it is time for the east coast to become more proactive. The Catawba-Wataree Water Management Group (CWWMG) recognized the need for conservation as part of its mission to identify, fund and manage projects that help extend and enhance the capacity of the Catawba-Wataree River. In order to determine the best approach for its 18 member organizations, the CWWMG selected Jordan, Jones & Goulding and Maddaus Water Management to conduct a benchmarking survey of current water demand management programs across the United States. This survey was completed in the fall of 2009 and included 28 water utilities in eleven states representing over 40,000,000 people.

This paper has been adapted from the project report, *Catawba-Wataree Water Management Group Benchmarking Survey of Current Successful Water Demand Management Programs*, and reviews the methodology and results of the benchmarking survey for current demand management programs. It also provides insight into questions that a utility may ask about current trends when designing a local water conservation program, such as:

- What are current industry trends and innovative ideas in water conservation?
- What types of programs will lead to a successful water conservation effort for my utility?
- What are reasonable conservation goals for my new program and how would they be measured?
- How much will this new program cost and how should that be incorporated into the budget?

When considering the legislative changes on the horizon for water utilities in North Carolina, this paper can provide some ideas for proactive utilities about water conservation practices that have been tested nationwide for over a decade. This will be your opportunity to learn from the successes and failures of 28 leaders in demand management, and shape those lessons into a successful water conservation program of your own.

INTRODUCTION

The Catawba-Wataree Water Management Group (CWWMG) is a non-profit group comprised of 18 member organizations that manage water resources in the 4,750 square-mile Catawba River drainage area in North and South Carolina. Incorporated in 2007, the CWWMG was organized to identify, fund and manage projects that help extend and enhance the capacity of the Catawba-Wataree River to meet water supply needs, while maintaining the ecological health of the waterway. The CWWMG recognized the need for conservation as part of its five-year water management strategy and selected Jordan, Jones & Goulding and Maddaus Water Management (Consulting Team) to conduct a benchmarking survey of current water demand management programs across the United States, in order to determine the best regional approach for its member organizations. This survey was completed in the fall of 2009 and included 28 water utilities in eleven states, representing approximately 40,000,000 water users.

SURVEY METHODOLOGY

The Survey Team worked with the CWWMG to develop a list of nationwide leaders in water demand management. Agencies in the Western United States were chosen because of their established conservation programs, while agencies in the Southeast were included in the survey group because of their similarity with the CWWMG in location and water supply conditions. The final survey group contained the following 28 agencies:

- City of Phoenix, AZ
- City of Tucson, AZ
- Metropolitan Water District of Southern CA
- East Bay Municipal Utilities District, CA
- City of San Diego, CA
- San Francisco Public Utilities Commission, CA
- Marin Municipal Water District, CA
- LA Department of Water and Power, CA
- City of Santa Barbara, CA
- Boulder Stormwater and Flood Management, CO
- Denver Water Department, CO
- South Florida Water Management District

- Tampa Bay Water District, FL
- City of Atlanta, GA
- Metropolitan North Georgia Water Planning District
- Cobb County Water System, GA
- City of Savannah, GA
- Southern Nevada Water Authority
- Orange Water and Sewer Authority, NC
- Town of Cary Public Works and Utilities, NC
- Raleigh Water Resources, NC
- Greensboro Water Resources, NC
- Portland Water Bureau, OR
- Spartanburg Water, SC
- City of Austin Water Utility, TX
- San Antonio Water System (SAWS), TX
- Tacoma Water, WA
- Seattle Public Utilities, WA

In order to gather information that would describe various programs' levels of success and potential applicability in the Catawba-Wataree River Basin, the final survey had seven questions with up to 14 parts to each question. The survey included simple, check-box questions to distinguish agency characteristics such as use of ground water sources, surface water sources or both. The survey also included questions requiring detailed answers, such as descriptions of public education programs for water conservation.

Data collection for the 28 survey agencies was conducted via the internet, phone calls and electronically submitted survey forms. Multiple attempts were made to contact all 28 agencies via phone and/or email. Partial surveys were accepted in instances where full surveys could not be completed. Overall, the response rate was excellent, with partially completed surveys from all of the agencies and full surveys completed for 15 agencies.

The same survey (distributed to the 28 survey agencies) was emailed to the CWWMG for members to complete independently and return to the consulting team. This information was used to create a summary of current CWWMG demand management programs and provide a point of reference for potential demand management programs that were recommended to CWWMG member organizations.

SURVEY RESULTS AND DISCUSSION

The survey data was divided into the following key program areas for analysis and discussion:

- Number of programs / ordinances
- Water tariff structures and water reuse systems
- Total per capita water use
- Conservation budget per capita

- Number of staff working on conservation programs
- Conservation water savings goals
- Types of conservation programs
- Conservation incentives
- Outdoor conservation programs
- Audits and additional conservation programs
- Number of program participants

Programs and Ordinances. Survey results showed that agencies conducted a wide variety of water conservation programs ranging from public education and outdoor water use initiatives to audits and rebates. The number of programs offered by surveyed agencies ranged from two to 19, which gave an average of approximately nine programs per agency. There was an inverse relationship between average annual precipitation and number of water conservation programs (as precipitation increased, programs decreased). Agencies in regions with an average annual precipitation of 25 inches or less had an average of 11 programs. However, agencies in regions with an average annual precipitation of 25.1 inches or more had an average of 7 programs. Beyond average annual precipitation, most of the survey participants were located in the "sun belt," which stretches from coast to coast along the southern United States with large populations living in urban areas. Other survey participants tended to have lower populations, possibly less pressure on water resources, and therefore fewer conservation programs at this time.

Additionally, many of the surveyed agencies use city ordinances to enforce water conservation. In this report, an ordinance is defined as a statute that is enforced by the local government, such as rain sensor requirements, regardless of drought conditions. The range of conservation ordinances among surveyed agencies is between zero and two, which gave an average of approximately one half per agency or a median of zero ordinances per agency.

Water Tariff Structures and Water Reuse Systems.

Potable water use can be offset by motivating water customers to reduce their water use through water tariff structures or providing an alternative water supply with water reuse systems. Twenty of the surveyed agencies offer a tiered rate structure or an increasing/inclining block structure, and Raleigh Water Resources (North Carolina) plans to implement an inclining block rate structure in 2010. Both types of rate structures include a rate increase for higher discretionary water use, which can offset high potable water demand.

Another way for a water provider to offset the sale of potable water is through a water reuse system. Nineteen of the surveyed agencies have water reuse

programs. For example, eastern agencies like Cobb County Water System (Georgia) have one wastewater treatment facility for water reuse that is only large enough to supply large facilities like golf courses, government buildings and parks. In contrast, the City of Tucson (Arizona) and other agencies (typically in chronically water-short areas) have entire water reuse systems available for irrigation to residential and commercial customers.

Total Per Capita Water Use. Per capita water use is defined as the service area population divided by the total water use. While overall per capita use can be an interesting and helpful way to make some comparisons among agencies, it is important to remember that the numbers can also be deceptive. Per capita water use can be impacted by many factors, including variations caused by regional weather patterns, businesses or industry supplied by public providers, or commuter populations that do not reflect the impact of water conservation measures. These factors cannot be captured by a single per capita figure, but can provide a starting place for comparison. The 24 agencies that provided data for this portion of the survey had a range of gross per capita water use of 97 to 274 gallons per capita per day (gpcd). The national average overall per capita water use is 160 gpcd; 17 agencies were below the national average, and seven were higher than average (California Urban Water Conservation Council, 2001).

Conservation Budget per Capita. Agency tracking of conservation budgets may include operations, staff, or material costs, or may be comprised of all three items. When possible, the same budget parameters were gathered across the agencies surveyed. Each budget depends greatly on program implementation. For most agencies, detailed cost reports for each conservation program were either not offered or only available for internal use. Conservation budgets also vary greatly because of different service area sizes, and were converted to dollars (\$) per capita to allow comparisons between agencies. Among survey participants, the range of per capita conservation spending is \$0.98 to \$4.36, with the exception of Marin Municipal Water District, which is \$14 per capita.

Number of Staff Working on Conservation Programs. Another way to evaluate the depth of a conservation program is to review the number of conservation staff dedicated to program success. The range of full-time staff working on conservation is from 1 to 33. Converted to a number of employees per 100,000 population served, the range is 0.0 to 3.3 with the exception of Marin Municipal Water District, which is 8.4.

Conservation Water Savings Goals. Surveyed agencies varied greatly on their water conservation savings goals by how they were calculated (percentage vs. MGD reduction), reducing demand or use, and target year. The range of planned conservation savings calculated as a percentage varied from 7% to 22% of water use or demand. Other agencies set goals using annual water quantities, such as reducing water use to 88.08 MGD by 2009 or saving 37 MGD of potable water by the end of fiscal year 2013. The Denver Water Department has the highest percentage saving goal, although it is notable that Seattle Public Utilities intends to have the same total production in 2030 as it did in 2009.

Types of Conservation Programs. The 28 agencies surveyed offer a variety of conservation programs. Among those surveyed, programs with a residential focus were more common than commercial or multi-family programs. The three most common types of programs were:

- Public Education
- Outdoor/ Landscape Programs
- Rebate Programs for residential toilets

The majority of the agencies have public education programs. The next set of programs - offered by almost 90% of the agencies - includes outdoor/ landscape programs such as Xeriscaping, demonstration gardens, outdoor watering schedules and rain barrels. The rebate program for residential toilets was the third most common type of program, followed very closely by residential audits.

Conservation Incentives. Of the agencies surveyed, 21 offer some form of incentive program, which could include surveys, rebates or free low-flow devices. All 21 agencies offered at least one incentive program to residential customers, but only nine offered some type of incentive program to commercial customers. The City of San Diego had the largest offering of residential incentive programs, nine, and the Denver Water Department had the largest offering of commercial incentive programs, 12.

Outdoor Conservation Programs. Of the 28 agencies surveyed, 25 offer some form of outdoor conservation program (peak demand management measures), which could include demonstration gardens, rebate programs, irrigation plan review or internet resources. All 25 agencies offered some outdoor conservation programs or guidelines to customers, and 15 had outdoor watering regulations. Western agencies in the survey tended to rely more on outdoor conservation programs and guidelines instead of regulations; whereas, eastern agencies tended toward enforcement rather than voluntary programs.

Audits and Additional Conservation Programs. Of the 28 agencies surveyed, 17 offer audit programs (peak demand management measures), which include residential, commercial, indoor and/or outdoor audits. Additional programs that did not fit into another category were offered by ten agencies and ranged from meter replacement to new development programs.

Number of Program Participants. The agencies surveyed had a wide variety of program participation. While it is difficult to gauge true program impacts and participation, a ratio between available participation numbers and population of the service area can provide some insight. Based on the available data, it appears that a larger population in a service area can lead to a greater variety and expense of program offerings. Additionally, there does not seem to be a relationship between population and participation. The absence of this relationship could show that as long as a program is appropriately funded and promoted, participation can be just as high in a small community as it is in a large one.

CONCLUSIONS

The information in this report provides insight into some of the elements of a successful demand management program. Yet, the question may remain, "Now what?" A detailed answer for your agency will require both a technical analysis of water savings from specific conservation measures and a benefit-cost analysis of those measures. While such studies should be undertaken to properly identify, assess and develop your water conservation program, here are some preliminary recommendations and suggested next steps to get the process started:

1. Compile a thorough list of all reasonable conservation measures for further consideration.
2. Using this list, screen the measures to a reasonable number (no more than 20) for additional research about cost, water savings, benefit-cost information, and other key elements specific to each measure.
3. Analyze the short list of measures. Estimate water savings, benefits and costs through technical and economic analysis.
4. Use the results of the analysis to provide the foundation for a water conservation program that can be expanded or adapted over a period of time. Through this process many agencies initially start with programs discussed in this report, including tiered rate structures, public education initiatives, and leak detection programs. Each agency's need for water and the specific cost effectiveness of higher water savings will guide the incorporation

of additional measures into the foundation of the water conservation program.

5. Finally, set measurable water saving goals (such as per capita water use reduction) that are realistic and cost effective for your agency.

Through this survey, agencies can learn that successful water conservation programs tend to be unique and tailored to the agency's needs. Most agencies arrived at this point following a process similar to the five steps outlined above. More detail on the measure screening process and water savings and cost effectiveness analysis methodology can be found in the American Water Works Association publication *Water Conservation Programs - A Planning Manual M52*. In the end, the successful agencies used thoughtful analysis - with a hint of trial and error - to identify the appropriate balance of investment in water efficiency and development of new water supply sources to accommodate the future needs of their communities.

LITERATURE CITED

- California Urban Water Conservation Council and Maddaus Water Management (2001) *Impact of the National Plumbing Standards on Water Infrastructure Investments*; American Water Works Association: Denver, CO.
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