

Summary Report of MWRA Demand Management Program 2000

The purpose of the water conservation section in MWRA's NPDES permit is to help maintain the flow to Deer Island Wastewater Treatment Plant below the 436 mgd permit limit.

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Section I: Introduction

From its inception, MWRA has made demand management and water conservation a top priority. Through its enabling act (Chapter 372 of the Laws of 1984), the new water utility was authorized to promote water conservation and environmental quality in managing its water system. The legislation gave MWRA the means to accomplish its water conservation goals including the ability to establish new regulations and also to rewrite community service agreements to promote water conservation. Over the past 15 years, MWRA's overarching theme for all of its water conservation activities has been the two-fold mission of water resource protection combined with helping consumers control their costs. With these two objectives in mind, MWRA has approached water conservation by designing and implementing programs that create permanent long term water savings.

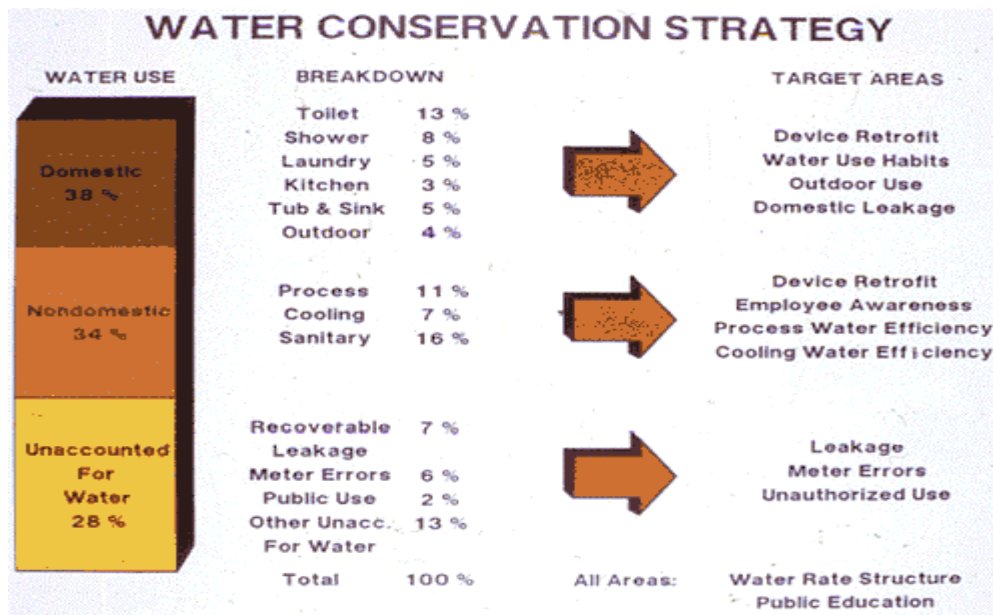
In 1985, MWRA inherited a water system that had been exceeding its safe yield of 300 million gallons per day (mgd) for almost twenty years. In response to increasing water demand during the 1960s, '70s and '80s, several water supply studies were undertaken by MWRA's predecessor agency, the Metropolitan District Commission. These studies, collectively called the Long Range Water Supply Study EIR 2020, projected the need for 70 mgd of additional supply by 2020 above a base demand of 340 mgd. They identified a series

of supply development options including a portion of the Connecticut River flow, as well as examining demand management options. In 1986, the MWRA Board of Directors, through a series of water policy decisions, opted to pursue demand management strategies rather than pursue options for increasing water supply. This commitment to demand management resulted in the implementation of a highly successful water conservation program that has been a role model for water conservation efforts both nationally and globally.

Section II: Long Range Water Supply Program

Following the commitment by the Board of Directors in 1986 to demand management, MWRA in 1987 developed and launched its Long Range Water Supply Program (LRWSP) with 30 different recommendations and programs costing tens of millions of dollars over a decade. The conservation programs of the LRWSP were meant to reduce water at every step of the water system, from the reservoir to the user. During the three-year trial program from 1987-1990, MWRA, along with significant help from its community water departments, initiated several demand management efforts which produced a dramatic drop in water demand. These programs focused on reducing “unaccounted-for-water” through leak detection and metering, demand management programs for residences and businesses, educational and public outreach, and planning for the future. In 1989, MWRA sponsored plumbing code changes which led to state legislation mandating the installation of 1.6 gallon/flush toilets for new construction and renovations. One year later, Massachusetts and 17 other states had adopted the use of water efficient toilets as the standard. The result of these conservation activities over the three-year period was a reduction of average demand from 326 mgd in 1987 to 285 mgd by 1990. This reduction put average demand below the water system’s safe yield of 300 mgd for the first time in over 20 years. With this success in reducing demand, the Long Range Water Supply Program was extended to a five year program with the goal of implementing conservation initiatives system-wide.¹

¹ Copies of the 1996 LRWSP are available from MWRA. Demand management was also a core theme presented in MWRA’s 20 year Waterworks System Master Plan drafted in 1993.



Section III: 1991-1995 Program

During the next five years (1991-1995), the conservation programs initiated during the LRWSP's trial phase expanded greatly on all fronts. By targeting multiple categories of water use, MWRA attempted to alter the way in which water was used and valued. The leakage and water accounting programs focused on reducing the amount of water wasted in delivery and distribution and accurately accounting for all flows moving through the system. The demand management programs used a variety of methods to promote and facilitate implementation of cost-effective strategies to conserve water in the residential and the industrial sectors. The school education program provided water conservation education in the region's school. Lastly, the planning programs of the LRWSP were designed to give MWRA the tools and information needed to monitor water supply and to evaluate options in order to make timely decisions. The following section outlines the activities of the main components of the conservation program.

Leakage and Unaccounted-for-Water

With approximately 260 miles of MWRA pipes and 6000 miles of community pipes, one of the first conservation activities undertaken by MWRA was to reduce unaccounted-for-water system wide. Unaccounted-for-water is water that is withdrawn from the source but is not accounted for as sold or otherwise used. It includes leaks, unmetered uses and other losses.

MWRA addressed unaccounted-for-water on two fronts: the first goal was to reduce the amount of leaks and the second was to establish accurate accounting of water use. MWRA targeted the problem of leaks with two programs. The objective of the first program was to initiate a leak detection and repair program for MWRA pipes. By 1990, MWRA had found and repaired leaks on its pipes wasting over 5 mgd. To help assist communities identify leaks in their pipes, a second program provided a free one time leak detection survey of over 6000 miles of community water pipes to establish baseline data on recoverable leakage. MWRA surveyed 6085 miles of community pipes and detected 2,374 leaks representing 30 mgd of unaccounted-for-water. The pipe repairs were successfully completed by each community.

Based on these successes, MWRA developed leak detection regulations that went into effect in July, 1991. Under these regulations, communities were required to complete leak detection surveys of their entire distribution system at least every two years. In the first two years of the regulations, 93% of the communities' 6,300 miles of pipes were surveyed for leakage and 1,988 leaks were detected. Communities could accomplish the surveys in one of three ways: using their own crews, hiring their own contractor, or using MWRA's on-call task order contractor. MWRA provided assistance for each option. A series of training sessions on leak detection methods for community staff were held. MWRA also provided examples of effective contract specifications to ensure an adequate scope of services for community contract work, and developed a highly regarded task order contract system. MWRA provided high-quality leak detection firms and made them available on an "on-call" basis. Communities simply requested the services, and the cost was billed in the following year. As the value of the saved water often far exceeded the cost of leak detection, the work would often end up being essentially "free."

During this time, MWRA's leak detection program was established into a routine survey. All MWRA pipes were checked annually for leaks with repairs made promptly. Over the past ten years, in-house inspections have located on average 0.59 mgd of lost water each year.

Like the leak detection program, the metering and monitoring program targeted both MWRA and community systems. The goal of the metering project was to better track water use

which would also allow MWRA to more accurately and fairly charge its users for water. The MWRA metering program entailed repairing and replacing the 148 large revenue meters to ensure reliable, frequent readings. This project experienced some delays during the first three years of the LRWSP but was successfully completed over the next five years. By 1993, calibration and maintenance of the 148 meters in the metropolitan system became routine. For community systems, MWRA initially offered a program which provided meter testing and repair services through a contractor on a cost-reimbursement basis. Consequently, many MWRA communities began active meter replacement programs and large meter down-sizing programs.

Residential Demand Management

In 1988, MWRA embarked on a three-year demand management pilot program to test strategies for residential conservation. MWRA's goal focused on three areas: to educate consumers on the value of water, to get them to accept the installation of water saving fixtures and to change behavior around water use. Towards this goal, Operation Watersense was created which initially tested two methods to encourage home installation of water saving devices. In the pilot program, over 4600 homes participated through a direct installation of water-saving fixtures in selected communities. Another 2400 participants picked up water savings kits from MWRA's local depots. MWRA also included public housing and non-profit housing communities in its domestic water savings effort. Under the public housing component, 5000 water saving device kits were distributed to community development corporations and housing authorities.

An extensive statistical and financial review of the costs and water savings from the pilot program was conducted. After looking at the results of the program and comparing the water use of the 7,000 households retrofitted with water-saving devices to the water use of nonparticipating households, MWRA concluded that expanding this program system-wide would result in water savings of between 5 and 6 mgd. Of the two methods tested to distribute the water saving devices, the direct installation method achieved a 58% participation rate whereas the depot method achieved a 25% participation rate. Even though the cost per household was higher in the direct installation program, the cost per gallon of

water saved was lower because of higher installation rates. Based on this evaluation, MWRA decided that the most cost effective method for ensuring participation in the program was through direct installation. With these potential savings, Operation Watersense was expanded in 1990 and offered to the 730,000 households of the MWRA service area. Basic services included installation of water saving fixtures and a report to the customer of household leaks. A customer service line was also made available to report problems and schedule installation. Over the next three years, Operation Watersense teams installed 1.3 million water-saving fixtures in 348,871 households in 42 communities. These included both single family households and multi-family units. The program received strong support from municipal leaders, which helped to create awareness and foster support in the communities. Operation Watersense was completed on schedule and under budget.

The residential demand management program included a broad-based public information outreach campaign to raise awareness in the community of water as a valuable, limited resource. The public information program used a multimedia approach to capture the interest of the consumer and provide economical and practical ways to conserve water. Materials were tailored to different audiences and different situations. Print materials were developed for use as bill inserts by water departments and for distribution to customers at local events. Other outreach methods included public service advertising in radio and television, bus and subway posters, and a telephone hotline (242-SAVE). During the system-wide Watersense program, residents also received program information in their water bills and over 600,000 pieces of literature were printed and distributed.

MWRA also targeted outreach activities geographically by working with community leaders, CEO's and other interested individuals to develop cooperative conservation plans and activities. Community activities consisted of environmental events, town days, and presentations to community groups. Local print and cable media provided coverage of the events showing the participation of community leaders. More than 1,800 civic organizations and businesses helped promote the program.

Demand Management for Industrial, Commercial and Institutional Users

The same philosophy driving MWRA's domestic conservation program was also applied to the non-domestic water sector. Targeting users, including hospitals, industries and other commercial buildings, the objective for these conservation efforts was to tailor strategies that could be implemented for each specific user. This included water-saving technologies, a water audit program, and numerous workshops to provide general conservation information and technical assistance. By 1990, nineteen audits had been completed and another 15 were underway. The changes recommended from these initial audits represented 0.7 mgd in water savings.

Over the next five years, MWRA continued to expand its conservation efforts in the nondomestic sector with its Industrial, Commercial & Institutional (ICI) water management program. The industrial conservation program was designed to promote changes in the way water is used in industries, business, offices and institutions through identifying practical and cost-effective techniques to conserve water. Water audits targeted at different types of facilities provided the initial information for the program. The knowledge gained from the water audits was then shared with other similar users through workshops and guidance materials. MWRA hired technical assistance consultants to conduct the water audits, provide training and conduct workshops. With each consulting firm having its own area of expertise, MWRA was able to provide technical assistance to meet the needs of different types of facilities.

One group MWRA targeted in its industrial conservation program was health care institutions. MWRA provided technical assistance to a variety of health care facilities including hospitals by surveying their water use and making recommendations for water saving investments. With typical per capita water use in hospitals ranging between 40 gallons and 350 gallons per day, MWRA recognized the huge potential for water and cost savings for these institutions. For example, in 1991, Norwood Hospital used 51.2 million gallons of water. MWRA conducted a water audit and found that the institution could save millions of gallons of water. MWRA found that a \$19,500 investment to eliminate seal and cooling water on medical air compressors and removing a vacuum pump would result in an

annual water reduction of 8.5 million gallons. This and other water saving projects were implemented by the hospital. Three years later, its water use came down to 36.6 million gallons. More information about this water audit and others are available on MWRA's website at <http://www.mwra.state.ma.us/water/html/indust.htm>.

A second industrial program with conservation impacts is MWRA's Incentive and Other Charges Program. MWRA has local limits for several pollutants of concern. These are Molybdenum, Mercury, Copper, Lead and PCBs. Since 1993, MWRA has issued permits to sewer users with the dual objective of reducing pollutant levels in the sewer system and reimbursing the costs for regulating sewer users. The program is designed such that a company can reduce its permit fee by reducing its use of pollutants and the volume of its industrial discharge, which creates an incentive for both less pollution and water conservation. The annual permitting charge for FY 2000 ranged from \$100 to \$1,430, and is expected to increase slightly next year to between \$135 and \$1,880.

Educational Outreach

A third major component of the LRWSP focused on water conservation education and public outreach. Fixing leaky pipes and installing water saving devices are essential to improving water savings throughout the system, but a long-term commitment to water conservation necessitates community awareness and support. The school education program was designed to provide a science-based curriculum and to promote water conservation awareness for young people. MWRA's approach used a four step process: educational curriculum development, testing, wide-spread teacher training and continual follow-up and support to educators. Educational materials were designed for students from the elementary level to the high school level. Within the first three years of the demand management program, this curriculum was used in 39 of 46 cities and towns MWRA serves. Additionally, MWRA staff conducted dozens of teacher training workshops annually reaching hundreds of teachers.

Along with teaching curriculum and teacher training workshops, the education program created an annual student poster contest and writing contest. In 1993, 3,800 students submitted posters on water conservation and 1,500 essays were submitted on the Boston Harbor Project. These activities reached a total of more than 20,000 students during the year.

Along with a counterpart wastewater education program, the school program for water was conducted in both water and sewer communities.

Planning for the Future

Lastly, long range planning was recognized as essential to ensure that MWRA could meet the water needs of its user communities long into the 21st Century. The management and planning programs of the LRWSP are the most far reaching with respect to conservation. They were designed to make MWRA less reactive and stress more long-term thinking about water supply planning.

For those communities that receive water on a contract basis, MWRA policy requires that each community have aggressive demand management programs in place, protect and use any local water resources, and provide for specific peak and average flow limitations. Detailed regulations were promulgated in 1989 governing all existing and new community contracts.

In the early 1990s, MWRA instituted a concept of water supply planning called Trigger Planning, which focuses on ways of dealing with future water problems. With this plan, the first step is to identify parameters (leading indicators) that can be monitored over time and act to “trigger” a response by the agency. The second step is to analyze what can be done in advance to reduce the time for implementation of projects.

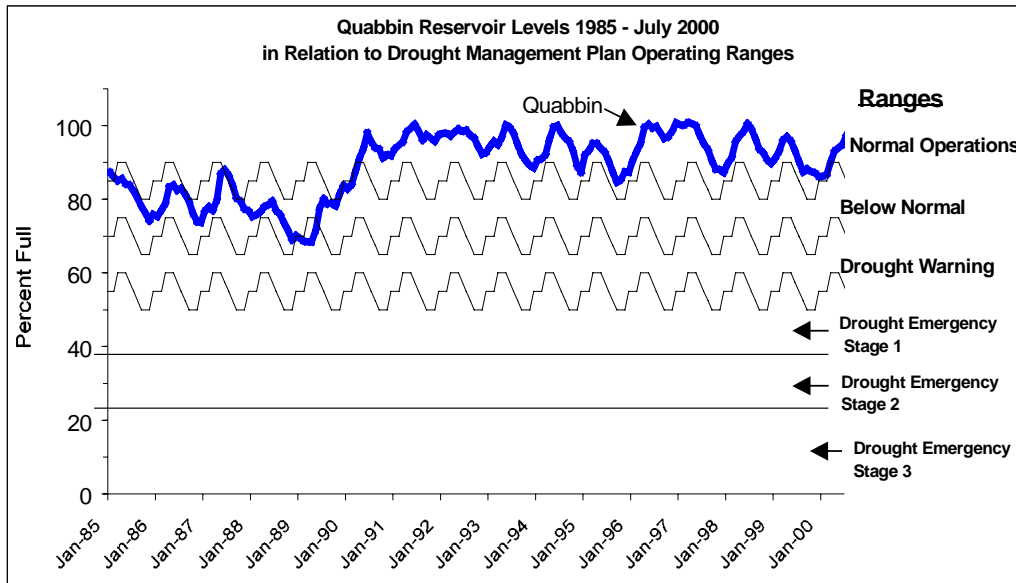
In addition to long range planning, the need for a short term response plan, a drought management plan, was made clear after two years of below average precipitation and overuse of the Quabbin-Ware-Wachusett system led to a potential drought warning in the 1988-1989 period. To prepare for a future drought, MWRA made two forecasting models. The first model predicts future reservoir elevations based on precipitation and runoff estimates. The second model was used to test the effects of various combinations in water use reductions. The models were used to show communities what drought conservation measures could accomplish.

The MWRA Drought Management Plan was carefully reviewed and approved by the state Department of Environmental Protection in 1989. The Drought Management Plan provided the ability to respond to any future drought. Shortly thereafter, precipitation returned to normal and the reservoirs rose back to normal. MWRA also played a major role in completing the National Study of Water Management During Drought, prepared by the US Army Corps of Engineers in 1994. The MWRA system was used as a case study, additional modeling and analytical tools were developed, and a more sophisticated series of performance measures were created to supplement the traditional safe yield indicator.

MWRA Drought Management Plan

Stage	Trigger Range Quabbin % full	Target Water Use Reduction	MWRA Response Measures
Normal Operation	80-100	0	None
Below Normal	65-90	Previous year's system use	-Advise local officials and media -Distribute MWRA materials -Repair leaks -Rehabilitate meters
Drought Warning	50-75	5%	-Identify drought coordinator -Restrict outdoor water use -Request voluntary cuts -Activate water bank -Enforce through fine
Drought Emergency Stage 1	38-60	10%	-Ban nonessential outdoor and municipal water use -Request more large user
Drought Emergency Stage 2	25-38	15%	-Increase meter reading -Establish mandatory rationing/enforcement -Distribute info. materials -Modify Rate Structures -Moratorium on new connections
Drought Emergency Stage 3	Below 25	30%	-Revise rationing for 30% reduction -Continue distribution of materials -implement emergency sources or interconnections

Other major components of MWRA's Trigger Planning efforts included frequent analysis of water use trends, economic and demographic conditions, building trends and preparation of demand projections. A water system database was developed to closely track a range of water use trends.

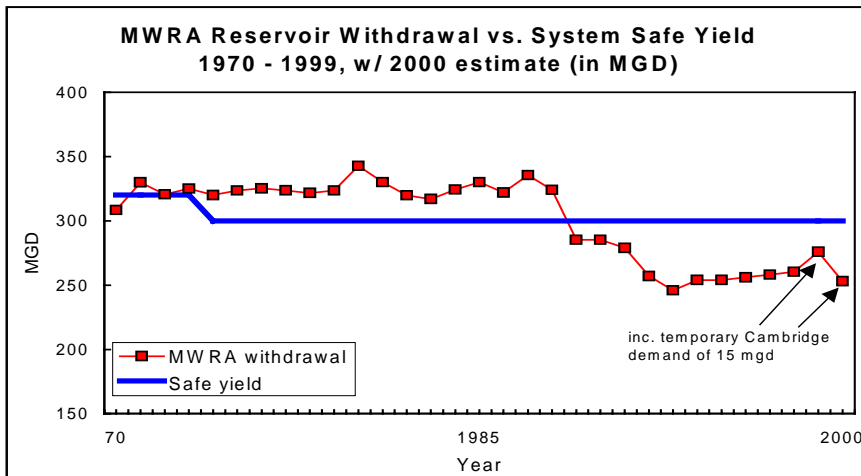


Role of Water Supply Citizens Advisory Committee

MWRA's decision to pursue water conservation rather than look for additional sources of water was strongly advocated by the Water Supply Citizens Advisory Committee (WSCAC). This unique citizen's group was formed in 1977 to review a proposed river diversion plan to supply water to the metropolitan Boston area. From its beginning, the group has been a strong supporter of water conservation measures. It helped formulate the water conservation language in MWRA's enabling act legislation. In 1986, WSCAC encouraged MWRA to pursue demand management rather than look for new water. During the late 1980s and early 1990s, the citizen's group took a lead role promoting trigger planning and drought planning. With its long commitment to the water supply system, WSCAC continues to provide invaluable and independent citizen input on MWRA's policies and programs, while voicing public support of source protection and conservation. MWRA provides funding for WSCAC staff and office expenses as well as travel reimbursement.

Summary

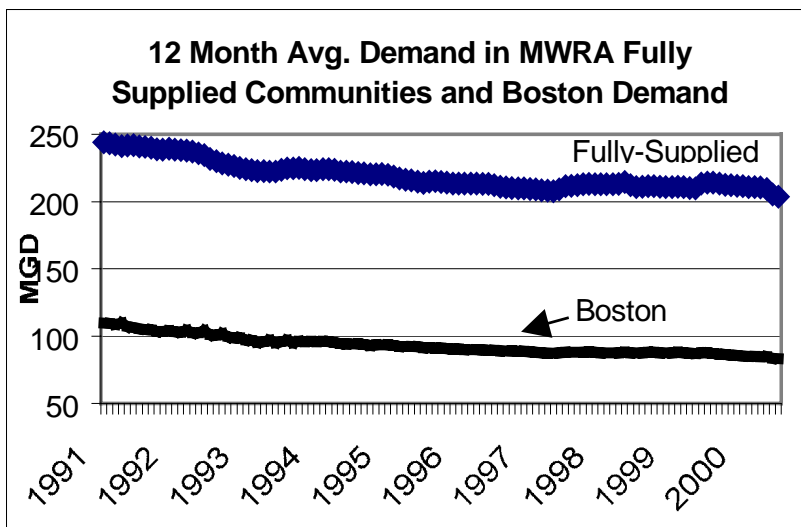
The system wide extension of the conservation programs in the Long Range Water Supply Program from 1990 to 1995 decreased water demand even further. With leaks plugged, meters monitored and a water conservation ethic firmly in place, water demand came down to approximately 250 mgd by 1996. By focusing on creating permanent savings in each of the areas targeted in the conservation programs, MWRA's average demand was now comfortably under the system's safe yield.



Section IV: Programming During 1996-1999 Period

After its 1991-1995 success in targeting water conservation efforts in the areas of unaccounted-for-water, demand management programs, education and public outreach, and planning for the future, MWRA continued its conservation efforts and shifted some focus to target other areas that could benefit from its experience with the Long Range Water Supply Program.

In addition to the direct impact of MWRA conservation programs, changes in the external environment contributed to this focus shift. From 1980 to the present, regional population has been relatively stable, rising only slightly, and regional employment has risen moderately. Other economic indicators such as power consumption are up. Nonetheless, total water demand is down.



Although overall employment in metropolitan Boston has been up, employment in the water-intensive industrial sector is down. From 1980 to 1990, employment in the industrial sector of metro Boston dropped by 66,000 jobs. By 1997, employment in the sector decreased another 33,000, with industrial water use accounting for less than eight percent of total demand. For those industries in MWRA’s service area, higher water and sewer costs created incentives for instituting water saving practices and investing in water saving technologies. MWRA also found that conservation initiatives were being picked up by firms who offered water conservation consulting and financing that MWRA was not able to provide. With these changes taking place, MWRA began to scale back its industrial conservation program.

The Massachusetts Plumbing Code is another example where external developments permitted MWRA to shift its focus in water conservation activities. MWRA was at the forefront of promoting water conservation through its support of changing plumbing code regulations in Massachusetts. In 1989, Massachusetts was the first in the nation to change the state plumbing code that led to the production and utilization of 1.6 gallon/flush toilets. National legislation instituting plumbing code regulations followed in 1994. As a result of this state and national legislation, large-scale changes in toilet fixtures began to take place throughout the MWRA service area. Each year in thousands of homes, older toilets are

replaced with new more efficient ones, yielding permanent long-term water use reductions without direct MWRA intervention.

With these changes in the external environment combined with the permanent savings achieved in the Long Range Water Supply Program, MWRA could begin to focus its conservation efforts on maintaining its baseline conservation objectives, greatly expanding pipeline rehabilitation programs in the MWRA and community systems and providing technical assistance to communities. Rehabilitation of the 60-120 year old pipelines in the MWRA and community systems, through replacement or cleaning/lining, is a critical element of MWRA's Integrated Water Supply Improvement Program to address water quality system reliability and leakage issues. Below is a list of the ongoing demand management activities during the 1996-1999 period, most of which are still continuing.

Leakage and Unaccounted-for-Water

- Continued implementation of bi-annual leak detection by communities in compliance with MWRA regulations.
- MWRA technical assistance to communities on leakage and unaccounted-for-water issues, including night-time flow analysis of MWRA meters.
- Continued annual surveys of MWRA pipelines.
- MWRA development of Local Water Infrastructure grant/loan program in 1997-1999 period, replacing over 22,000 meters and rehabilitating over 80 miles of pipe. Pipeline rehabilitation eliminates pipe, valve and joint leakage.
- Start of Metrowest Water Supply Tunnel construction to replace leaking Hultman Aqueduct.
- Removal of open distribution storage reservoirs (water loss areas) at Spot Pond, Fells, and Nash Hill.

Residential Conservation

- Continued on-demand distribution of thousands of low-flow device kits.
- Development and distribution of new home water conservation brochures and fact sheets.
- Toilet code revisions continued to result in large-scale change-outs of old toilets.
- Continuation of MWRA's 242-SAVE informational phone line.

Industrial/Commercial Demand Management

- Continued declines in ICI demand with advances in technology and rising water prices.
- Continued distribution of ICI program audit information and fact sheets.

- Continuation of MWRA flow based permit fees for regulated industrial discharge to sewer system.

Pricing

- Community use of inclining-block rate structures for over 80% of entire service area.
- Many communities using full-cost accounting systems for water/sewer operations.

Planning for the Future

- Trigger Planning tools and databases improved and maintained.
- Water supply protection efforts continued in MWRA partial-user communities.
- Completion of system expansion and policy with MWRA Advisory Board in 1996.
- Completion of water demand forecasts in 1996.

Section V: Previous Year's Program

Over the past year (FY00), MWRA has continued its traditional conservation efforts targeted in the 1996-1999 period.

Education Programs

MWRA's educational outreach programs are going strong. The water educational outreach program made 534 classroom visits and tours reaching over 12,000 students, while the sewer educational outreach program made 738 classroom visits reaching over 20,000 students. In one innovative educational program, MWRA has collaborated with the Boston Harbor Association (BHA) to teach high school students about environmental issues facing Boston Harbor. The program includes a classroom presentation and a speaker from the Boston community followed by a trip to the Deer Island Sewage Treatment Plant.

Residential and ICI Sectors

During the period of 1995-1999, MWRA with assistance of the local water departments distributed over one million bill inserts, fact sheets, and brochures by mail and through public outreach activities to residential customers in the service area. This past year, the city of Boston received 90,000 bill inserts for their customers. In addition, MWRA staff provided conservation information to several thousand customers through employer-sponsored events and other public events. MWRA provided 1,700 households with 7,800 water conservation fixtures in 1999, and last year distributed 3,900 fixtures to 1,291 households in the service

area. A 52-page **Guide to Water Management** which gives detailed information to help utility and facility managers reduce water use is available upon request and ICI facts sheets are available at MWRA's website (www.mwra.com).

Leakage and Unaccounted-for-Water

Efforts to reduce unaccounted-for-water have also continued. Leak detection and repair in MWRA pipes and community pipes is ongoing. Last year, MWRA detected 17 leaks accounting for 400,000 gallons of lost water in its own pipes, and 446 leaks in community pipes representing 5.2 mgd of lost water. The following chart shows the history of the last nine years of leak detection on community pipes.

MWRA Leak Detection on Community Pipes

Period	Miles Surveyed	Number of leaks	Estimated leakage-mgd
7/91-6/93	6227	1988	24.75
7/93-6/95	5924	1134	14.12
7/95-6/97	6013	1527	17.78
7/97-6/99	5924	1257	12.44
7/99-6/00*	2581	430	4.72
Total	26,687	6,336	73.81

*Only one year of a two year cycle.

Pipeline Rehabilitation

To help local communities improve their pipelines, MWRA instituted a new ten year \$250 million Local Pipeline Assistance Program established with the objectives of improving water quality and reducing water pipeline leakage. This program builds off a successful two-year grant/loan program during the 1997/99 period. In 1998, MWRA instituted the program which provided \$30 million in grant/loans for pipeline rehabilitation. By the end of the program in July 1999, over 22,663 meters were upgraded and 80 miles of pipeline rehabilitated. The Local Pipeline Assistance Program provides \$25 million of financial assistance annually in interest-free loans per year for community pipeline rehabilitation.

After five months, six communities are participating in the program. In communities requesting funding so far this year, some 13 miles of pipeline will be rehabilitated. In order to be eligible for funding, communities must meet certain baseline requirements in managing their distribution system. If a community needs assistance in meeting these baseline requirements, MWRA has available a technical assistance program which provides consulting services on a cost-reimbursement basis. To date, five communities have expressed interest in the program.

MWRA has also accelerated its own pipeline rehabilitation program in the past few years. MWRA has set a Business Plan Strategy to rehabilitate 7-10 miles of pipeline on average each year. Rehabilitation projects have stopped leakage throughout the system. One example was an estimated 1 mgd leak under the Charles River that was not detected by traditional equipment.

Drought Management and Peak Day Demand

During a period of hot weather in early June 1999, when portions of the MWRA transmission and distribution system were off-line and the city of Cambridge was temporarily taking water, peak demand in metropolitan Boston reached high rates and caused localized water pressure problems during early morning periods. MWRA requested residential customers to switch the timing of outdoor watering for the June-July period. By summer 2000, the transmission and distribution system conditions that led to the localized pressure problems in 1999 were resolved.

In spring 2000, MWRA was involved in the Massachusetts Drought Management Task Force's development of a state drought response plan. The plan outlines agency responsibilities during drought and sets drought stage triggers based on hydrologic conditions. The plan is regionally flexible; for example, small water systems may need water use restrictions during a short-term drought while the MWRA service area would avoid restrictions due to the large storage volumes in Wachusett and Quabbin Reservoirs. Only a long-term drought affecting Wachusett and Quabbin would lead to significant restrictions in

the MWRA area. The plan also retains responsibilities for MWRA's direct lines of communication with the service area communities and customers during a drought.

Clothes Washer Working Group

Another area where MWRA focused its energies was in promoting technologies that create water savings. Under the auspices of the nonprofit organization Northeast Energy Efficiency Partnerships, Inc. (NEEP), MWRA in partnership with several electricity and gas utilities in the northeast region joined a clothes washer working group (CWWG). This working group has developed a market transformation program for water efficient clothes washers with the goal of creating awareness and increasing demand for these appliances. The TumbleWash program is one example of this effort. TumbleWashers are horizontal axis or front-loading machines that operate on 35% less water and 50% less energy. The energy partners have invested several million dollars in a public relations campaign and a rebate program to accomplish this goal. To create an incentive to invest in a TumbleWasher, which is slightly higher priced than a conventional washer, customers can receive a rebate of \$75 in Massachusetts. The \$75 cash incentive has aided in the sale of these machines. This past year, 11,900 washers were sold. Since the inception of the program, a total of 57,240 washers have been sold in the northeast region, which includes 36,378 in Massachusetts. Last year, the utility partners integrated the TumbleWash program with the Energy Star Appliance program for even broader product recognition and support.

One offshoot of the working group's efforts is a new program in the town of Reading. Reading is participating in a TumbleWash pilot program to assess water and energy savings from the installation and use of clothes washers at a condominium complex. The pilot program is sponsored by the manufacturer, Maytag Corporation, and Boston Gas, a utility member of the Clothes Washer Working Group.

Outdoor Water Conservation

In the spring of this year, MWRA focused its conservation outreach on outdoor water use. Several items, including a lawn and garden fact sheet, a poster, a handbook on irrigation controllers, and rain gauges were distributed through local water departments. The fact sheet

information was also included on the web site. In all, 16,000 fact sheets, 500 posters, 700 handbooks, and 1,000 rain gauges were given out. As part of MWRA's continuing partnership with state water management officials, MWRA has participated in the work of an advisory group that meets regularly to develop state-wide goals and policies for outdoor water use for the cities and towns.

Assistance Outside the Service Area

Building off its success with reducing unaccounted-for-water in its own communities, MWRA has recently taken steps to help communities outside its service area with their leak detection efforts. This spring, MWRA provided technical assistance to the Ipswich River, North Coastal and Parker River Watersheds to help them implement a leak detection program. This program was originally offered in Essex County several years ago at the request of the Ipswich River Water Supply Council, which comprises representatives from water departments that withdraw water from the Ipswich River. Seven communities participated in the leak detection program and found out that over 800,000 gallons of water was leaking per day. Recognizing the importance of leak detection for comprehensive water conservation, MWRA is committed to sharing its wealth of experience to help other communities outside its service area institute leak detection programs.

Summary and Review of Effectiveness

The effectiveness of MWRA's conservation efforts over the past year can be measured by the fact that baseline water demand continues to remain stable despite strong economic growth in the service area. (See discussion in next section).

MWRA prepared demand projections in 1996 and found that water demand trends during the 1995-1999 period confirm that demand has remained stable and may be declining. With Cambridge leaving the system in late 2000 and wasted releases down the Wachusett Aqueduct (6-8 mgd) soon to be discontinued, several MWRA sewer-only communities (Reading, Stoughton, Wilmington) in stressed river basins are considering entering the

regulatory process to receive supplemental water supply from MWRA. The potential demand from these communities is small, probably in the 2-3 mgd range.

MWRA Total Water Demand

Year	Water Demand
1995	254 mgd
1996	256 mgd
1997	258 mgd
1998	260 mgd
1999	276 mgd
2000*	253 mgd

*Estimation based on first half of year. Total withdrawals in 1999 were 276 mgd due to extremely hot/dry conditions and the additional 15 mgd demand from Cambridge while it rebuilds its own water treatment plant.

Section VI: Next Year’s Water Conservation Plans

MWRA will focus its conservation efforts in FY01 in three broad areas: maintenance of its baseline demand management efforts, helping its consumers control their costs, and providing technical and financial assistance for community programs both inside and outside the service area. These efforts will occur while MWRA begins the consolidation of its waterworks and sewerage divisions into one Operating Division.

MWRA will continue to maintain its activities in traditional conservation programs. The educational outreach programs and the leak detection programs have long been established as essential components of demand management. MWRA will also continue to distribute water conservation kits and printed materials on water conservation to maintain public awareness and support for demand management.

To help consumers control their costs, MWRA will focus on a few areas for residential water conservation. Building off the success of the TumbleWash program, MWRA will continue

its collaboration with regional utilities and expand its water saving efforts to include other appliances such as dishwashers. Along with promoting these water savings investments, MWRA will focus on inexpensive ways to help the consumer save water around the home by making available educational materials on outdoor water use, low flow toilets, and washing machines. MWRA will expand its informational material to include an outdoor brochure and a clothes washer fact sheet. The low flow toilet fact sheet will also be updated with new rates information. Completed fact sheets will also be placed on the MWRA website.

One of the main goals in the upcoming year will be to provide ongoing help through technical assistance on a range of issues to MWRA communities and to communities outside the service area. MWRA will continue its technical assistance programs for leak detection and for pipeline rehabilitation. Another objective will be to assist communities with rates management issues. With wholesale water rates rising, many communities are also facing substantial increases in retail rates, which has led them to seek help from MWRA. For example, the city of Saugus has asked for suggestions on implementing a rates management strategy. MWRA will assist local officials with strategies to lessen the impact of rate increases by emphasizing conservation as a way to control costs. Activities will include participation in local events, press releases, distribution of water saving fixture kits, and presentations at schools and at community gatherings.

Another area where MWRA can offer assistance is with advice on demand management in the context of economic growth. For example, the communities along the I-495 Corridor are studying the impacts of economic growth on their water supply and have asked MWRA for information about its own demand management programs. The corridor consists of 27 towns and is the fastest growing region in Massachusetts. The current options for accommodating this new growth are to drill new wells and to expand the sewers, both of which will deplete groundwater. After a decade of experience implementing successful conservation programs, MWRA is in a strong position to offer this kind of technical assistance to communities in the future.

MWRA will be targeting the 14 sewer-only communities for additional conservation efforts by special mailings to make available information on how they may obtain conservation materials and fixture kits. Over the past five years, MWRA has worked to address the conservation needs of several of its sewer-only communities. For example, the town of Braintree housing authority recently asked MWRA for help managing water use at its facilities. In response, MWRA was able to give them 220 water conservation kits and 3,000 conservation brochures and fact sheets to distribute to all tenants.

Water Demand Outlook

MWRA staff periodically analyze each of the underlying factors affecting regional water demand and update water use estimates. The table below shows the seven factors reviewed and their current outlook. Based on this review, a range of composite forecasts can be made to assess the need for changes in demand management programs. The 2000 outlook continues to indicate that demand is at least as likely to decrease from current levels, as it is to remain stable or increase. With Cambridge reaching its own sources early in 2001, MWRA demand will likely be reduced to levels not experienced for over three decades.

MWRA Demand Forecasts through Year 2020

Factors in Withdrawals	Impact on Demand MGD Range	Impact on Demand Estimate
1. Service Area Population	0 to +5	+3
2. Service Area Employment	0 to +8	+4
3. Demand Response to New Price Increases	-50 to -10	-15
4. Partial User Local Sources		
-New Source Development	-4 to 0	-1
-Loss of Local Sources	0 to +4	-1
5. Community Leak Repair	-17 to -6	-10
6. Member Communities finding alternative supplies to Replace MWRA USE	-4 to 0	-1
7. MWRA system use	-11 to 0	-5
Range of total change	-86 to -1	-25

MWRA Water Demand Projections (existing Service Area plus additions)
 Low, Mid, High Forecasts for 1995 - 2020 Period (prepared in 1995 with 1999 update)

