Summary Report of MWRA Demand Management Program Fiscal Year 2001

This report is organized into five sections, as follows:

1. Report Summary
2. Background and Long Range Water Supply Program
3. Ongoing MWRA Demand Management Programs
4. Demand Management Activities During Fiscal Year 2001
5. Demand Management Plans for Fiscal Year 2002

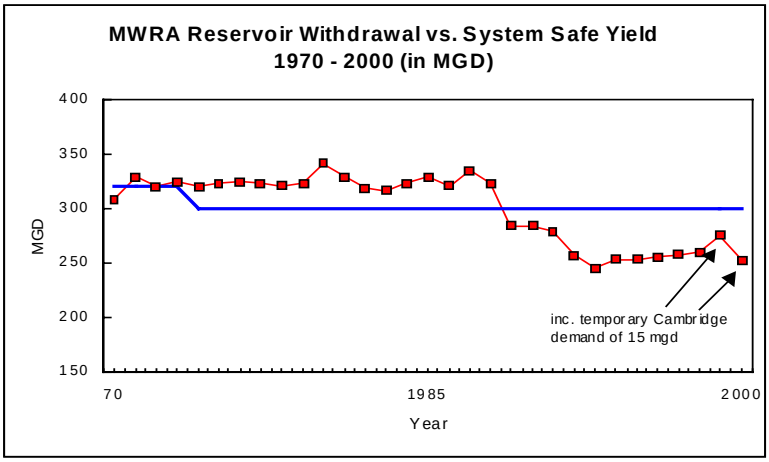
1. Report Summary

This report has been prepared to meet the requirements of MWRA's NPDES Permit MA0103284 - Part I, Item 10.c (page 14 of 32). The purpose of the demand management section (including water conservation) in MWRA's NPDES permit is to help maintain the dry day wastewater flow to the Deer Island Wastewater Treatment Plant below the 436 million gallons per day (mgd) permit limit.

MWRA has maintained the 365 calendar day running average dry day flow well below the 436 mgd limit and well below the 415 mgd trigger (see Part I, Item 10.a and 10.b). For fiscal year 2001 (ending June 30, 2001), the 365-calendar day running average dry day flow to the Deer Island Wastewater Treatment Plant was 323.5 mgd. The dry day flow is reported monthly by MWRA as part of the NPDES Operational Performance Summary.

MWRA continues to maintain effective water demand management programs for both the MWRA-owned distribution system, as well as member community-owned distribution systems. The effectiveness of MWRA's conservation efforts over the past year can be measured by the fact that baseline water demand (water withdrawal from MWRA reservoirs) continues to remain stable and comfortably below the system's safe yield of 300 mgd (see Figure 1, below).

Figure 1 – MWRA Reservoir Withdrawal



For calendar year 2000, water demand was 252 mgd, which included a 15 mgd temporary demand from Cambridge for the entire year (Cambridge was rebuilding its own water treatment plant during 2000-2001). Table 1 provides data on water use and wastewater generation over the most recent five-year period. The data on Water Demand represents the total water withdrawal from MWRA reservoirs. The data on Wholesale Water Sales represents water provided by MWRA to all 45 fully and partially supplied communities (a population of about 2.3 million). Total Wastewater Generation data represents the total flow to the Deer Island Treatment Facility from all 43-member sewer communities (a sewered population of about 1.96 million). The Dry Day Wastewater Generation data represents flow to the Deer Island Treatment Facility during only dry days as defined in MWRA's NPDES Permit.

Table 1 - MWRA Total Water Demand and Wastewater Generation

Calendar Year	Water Demand (Withdrawals)	Wholesale Water Sales	Total Wastewater Generation	Dry Day Wastewater Generation
1996	256 mgd	222 mgd	426 mgd	N/A
1997	258 mgd	226 mgd	353 mgd	N/A
1998	260 mgd	231 mgd	412 mgd	N/A
1999	276 mgd *	245 mgd	344 mgd	307 mgd
2000	252 mgd **	229 mgd	362 mgd	331 mgd

* Total withdrawals in 1999 were 276 mgd due to extremely hot/dry conditions and an additional (temporary) 15 mgd demand from Cambridge while it rebuilt its own water treatment plant.

** Total withdrawals in 2000 were 252 mgd including an additional (temporary) 15 mgd demand from Cambridge.

2. Background and Long Range Water Supply Program

The Massachusetts Water Resources Authority, an independent public authority, was established through legislation in 1985 to provide wholesale water and sewer services to more than 2.5 million people in 61 cities and towns. Some of the Authority's goals, purposes and objectives relate directly to water demand management efforts, including:

- Efficient and economical operation of water delivery;
- Programs for leak detection for member communities; and,
- Repair, replacement, rehabilitation, modernization and extension of the delivery of water within the service area of the Authority.

From its inception, MWRA has made demand management/water conservation a high priority. In 1985, MWRA inherited a water system that had been exceeding its safe yield of 300 mgd for almost twenty years. In response to increasing water demand during the 60s, 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.

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 demand management programs of the LRWSP were meant to reduce water use and water losses throughout the service area. During the three-year trial program from 1987-1990, MWRA, along with significant help from its member communities, initiated demand management efforts that reduced average demand from 326 mgd in 1987 to 285 mgd by 1990 (see figure on page 1). 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 MWRA LRWSP was extended in 1990. A detailed discussion of the demand management activities developed from the LRWSP, covering the 1991 through 2000 period, was provided in the 2000 MWRA Demand Management Report. Copies of the 1987-1990 LRWSP reports are available from MWRA.

3. Ongoing MWRA Demand Management Programs

Long Range Planning

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 developed in the LRWSP are far reaching with respect to conservation. They were designed to make MWRA less reactive and stress more long-term thinking about water supply planning.

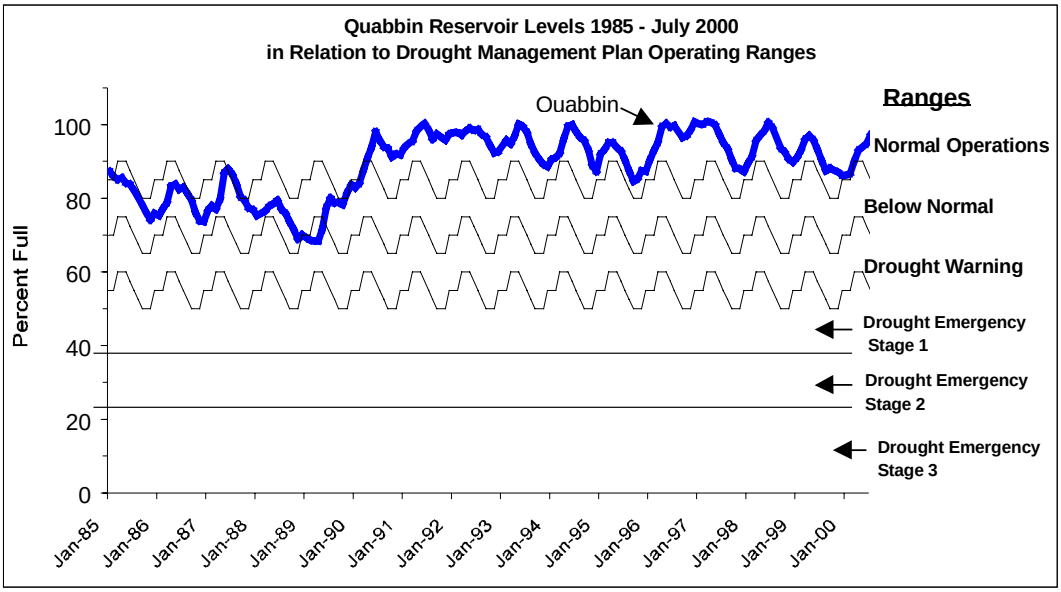
In the early 1990s, MWRA instituted a concept of water supply planning called Trigger Planning, which focuses on ways of dealing with future water problems. With this plan, the first step is to identify parameters (leading indicators) that can be monitored over time and act to "trigger" a response by 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 of water use reductions. The models were used to project what drought conservation measures could accomplish. The MWRA Drought Management Plan was 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. Table 2 provides an outline of the Drought Management Plan. Figure 2 shows that the water level in the Quabbin Reservoir has remained within the normal operating range since 1990.

Table 2 - 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 fines
Drought Emergency Stage 1	38-60	10%	-Ban nonessential outdoor and municipal water use -Request more large user cutbacks
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

Figure 2 - Water Levels in the Quabbin Reservoir



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.

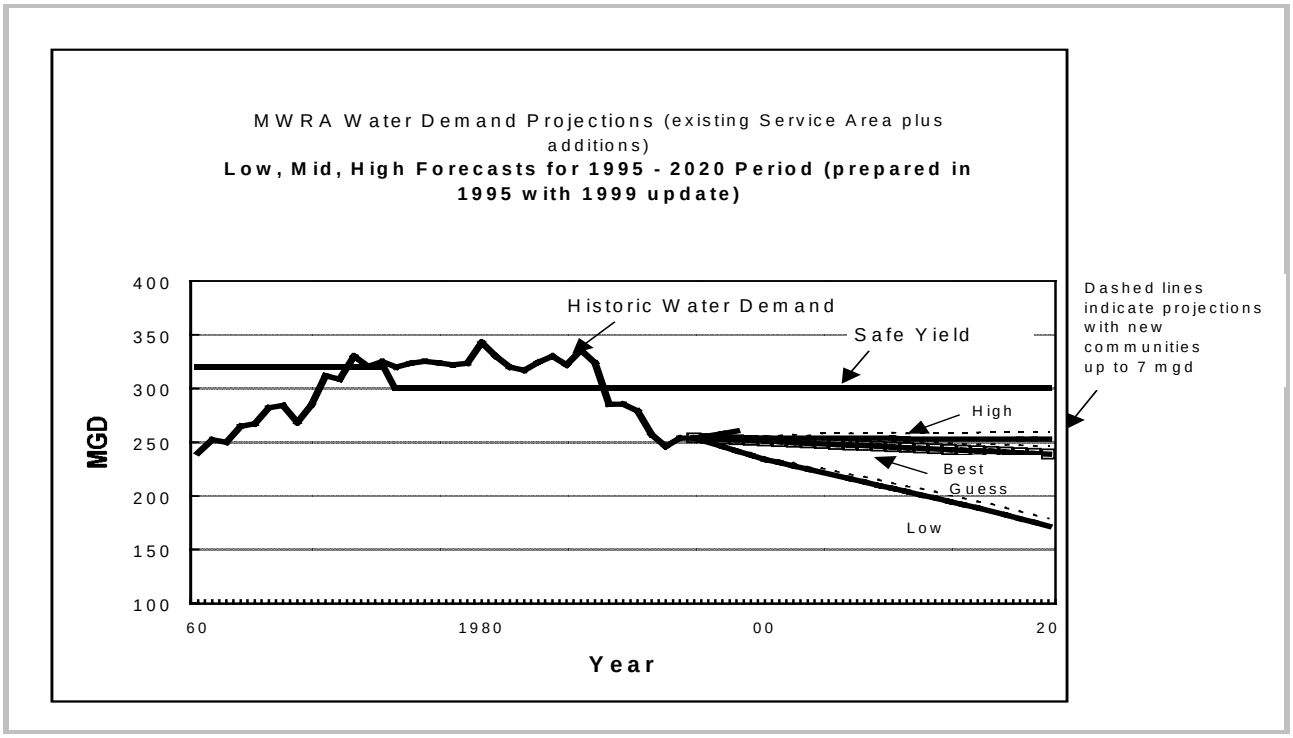
Other major components of MWRA's Trigger Planning efforts included periodic analysis of water use trends, economic and demographic conditions, building trends and preparation of demand projections. A water system database was developed to closely track a range of water use trends. In 1999, MWRA updated the demand forecast through 2020. Table 3 shows the seven factors reviewed and their outlook. Based on this review, a range of composite forecasts was made to assess the need for changes in demand management programs. The current outlook indicated that demand is at least as likely to decrease from current levels, as it is to remain stable or increase (see Figure 3).

Table 3 - 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	-24

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.

Figure 3 – make its own page



During a period of hot weather in early June 1999, when portions of the MWRA transmission and distribution system were off-line for rehabilitation 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.

While MWRA encourages all member communities to control demand, 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 MWRA/community contracts.

MWRA's policy "Admission of New Community to Waterworks System" was adopted in June 1997. This policy establishes stringent admission criteria, formalizes the review and approval process (including MWRA, MWRA Advisory Board, MEPA, Water Resources Commission, DEP, General Court, and the Governor), and establishes an entrance fee. Copies of this policy are available from MWRA.

Leak Detection and Repair of MWRA Distribution System

One of the first conservation activities undertaken by MWRA was to reduce water lost through leaks from the 260-mile Authority-owned distribution system. The MWRA initiated a leak detection and repair program in 1987 and, by 1990, found and repaired leaks allowing more than 5 mgd of water loss. During the early 1990s, MWRA's leak detection and repair program was established into a routine survey performed by MWRA personnel. All MWRA distribution pipes are checked annually for leaks with repairs made promptly. Over the past ten years, in-house inspections and repairs have eliminated on average 0.59 mgd of lost water each year.

Rehabilitation and Replacement of MWRA Distribution System and Covered Storage

Rehabilitation (cleaning and lining), sliplining, and/or replacement of the up to 120-year-old distribution pipelines in the MWRA system are critical elements of MWRA's Integrated Water Supply Improvement Program. While these capital-intensive projects are primarily intended to improve water quality and system reliability, reduction of pipeline leakage is an additional benefit. MWRA has established a Business Plan Strategy to rehabilitate 7 to 10 miles of distribution pipeline each year. In addition, MWRA's construction of covered storage facilities at Spot Pond, Fells, and Nash Hill will reduce water loss through evaporation from existing open reservoirs.

Leak Detection and Repair of Member Community Distribution Systems

To help communities identify leaks in their local distribution systems, a program providing a free one-time leak detection survey was establish during 1988 to 1990. This program established baseline data on recoverable leakage in the service area. MWRA surveyed 6085 miles of community pipes and detected 2,374 leaks representing 30 mgd of water loss. Each community successfully completed the pipe repairs.

MWRA extended its once through survey in member community systems to include a follow-up survey of areas where leaks had been repaired. These follow-up surveys first determined if the original leak had been successfully repaired, and second, if any background leakage may have been hidden by the original leak. This follow-up project located an additional 0.7 mgd of water loss.

Based on these successes, MWRA developed leak detection regulations that went into effect in July 1991. Under these regulations, communities are required to complete a leak detection survey of their entire distribution system at least once every two years. Communities can accomplish the survey in one of three ways: (1) using their own crews, (2) hiring their own contractor, or (3) using MWRA's on-call task order contractor. MWRA provides assistance for each option. Training sessions on leak detection methods for community staff have been held periodically. MWRA also has provided examples of effective contract specifications to ensure an adequate scope of services for community contract work. MWRA's task order contract provides high quality leak detection firms on an "on-call" basis. Communities simply request the services, and the costs are billed to the community in the following year. Leak detection/repair work is generally cost effective as the value of the saved water often far exceeds the cost of the leak detection/repair work.

Table 4 shows the history of the last ten years of leak detection on community pipes.

Table 4 - 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
7/99-6/01	6650	928	9.25

Rehabilitation and Replacement of Member Community Distribution Systems

MWRA implemented the pilot Water Infrastructure Rehabilitation Financial Assistance Program in 1997-1999. This program provided $30 million in 25 percent grants and 75 percent interest-free loans to member water communities for water system rehabilitation projects. Local projects implemented through this program resulted in the replacement of over 22,000 water meters and rehabilitation of over 80 miles of distribution pipeline. Water loss from both pipeline and valve leakage was reduced.

In November 1999, MWRA approved 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 the successful two-year grant/loan "pilot" program. 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 Community Technical Assistance Program which provides consulting

services on a task order-basis. Communities reimburse MWRA for the cost of these task-orders in the fiscal year following completion of the services.

Water Metering and Monitoring

The goal of the water metering project was to better track water use that would allow MWRA to more accurately and fairly charge its users for water. The MWRA metering project, completed in 1993, entailed repairing and replacing the 148 large revenue meters to ensure accurate and reliable meter readings. Following completion of the metering project, routine calibration and maintenance of the 148 revenue meters in the metropolitan system was instituted. MWRA analyzes nighttime low flow data and historical trends from the revenue meters for member communities to help them identify potential water leakage.

MWRA also maintains meters at water withdrawal points at its reservoirs. These meters also undergo routine calibrations.

For community systems to "jump start" improved metering, MWRA initially offered a program that provided meter testing and repair services through a contractor on a cost-reimbursement basis. Consequently, many MWRA member communities began active meter replacement programs and large meter downsizing programs.

Residential Water Conservation Fixtures/Conservation Outreach

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 participation rates. Based on this evaluation, MWRA decided that the most cost-effective method for ensuring participation in an expanded program was through direct installation.

In 1990 an expanded program was initiated, Operation Watersense was 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. This work included both single family households and multi-family units. In addition, about 13,000 households received more than 86,000 fixtures at pickup depots held at the conclusion of field operations in each community. The program received strong support from municipal leaders, which helped to create awareness and foster support in the communities.

Following the completion of Operation Watersense, MWRA continues to provide low-flow device kits to communities and individual customers at no cost. Member communities can distribute the water-saving fixtures to retail customers.

Public Education and Information Distribution

As a component of MWRA's residential demand management program (Operation Watersense), the Authority initiated a broad-based public information outreach campaign to raise awareness in the community of water as a valuable, limited resource. This program was designed to compliment the distribution and installation of water saving fixtures. 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 on radio and television, bus and subway posters, and establishment of a dedicated informational telephone hotline (242-SAVE). During the system-wide Operation Watersense program, over 600,000 pieces of public education literature were printed and distributed.

Following the completion of Operation Watersense, MWRA continues to provide public education material to communities at no cost. Member communities then distribute the water conservation information to retail customers. During the period of 1995-2000, 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. In 2000 alone, the MWRA provided the City of Boston 90,000 bill inserts for distribution to their retail customers. MWRA has also maintained the dedicated informational telephone line (242-SAVE) to allow community representatives and the public easy access to MWRA staff as a technical resource.

Beginning in 1999, MWRA began new conservation outreach activities specifically focused on outdoor water use. Several new items, including a lawn and garden fact sheet, a poster, a handbook on irrigation controllers, and rain gauges were distributed to retail customers through local water departments. The fact sheet information has also been included on the MWRA web site. During the first year of this targeted program, 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 statewide goals and policies for outdoor water use.

MWRA has also targeted outreach activities geographically by working with community leaders, CEO's and other interested individuals to develop cooperative conservation plans and activities. MWRA staff have made presentations and set-up informational booths at community activities

such as environmental events, town days, and community group meetings. More than 1,800 civic organizations and businesses have helped promote the water conservation program. Local print and cable media have also provided coverage of events showing the participation of community leaders.

School Education

A major component of MWRA's water conservation education and public outreach program focuses on promoting water conservation awareness for young people. The School Education program, initiated in 1993, is designed to provide a science-based curriculum using a four step process: educational curriculum development, testing, wide-spread teacher training and continual follow-up, and support to educators. Educational materials have been designed for students from the elementary level to the high school level. Within the first three years of the program, this curriculum was used in 39 of 46 cities and towns the MWRA serves. Additionally, MWRA staff conduct dozens of teacher training workshops annually reaching hundreds of teachers. Along with teaching curriculum and teacher training workshops, the School Education program has 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. The School Education activities have grown to include more than 20,000 student participants in the 1999/2000 school year. Along with a counterpart wastewater education program, the School Education program for water conservation is offered in both water and sewer member communities.

Industrial, Commercial, and Institutional Audits and New Technologies

Concurrent with the development of domestic conservation program (Operation Watersense) during the late 1980s, MWRA applied the same philosophy to the non-domestic water use sector. MWRA targeted hospitals, large commercial buildings, biotech, manufacturing, food processing, hotels, recreational facilities, universities, etc. to tailor water conservation strategies that could be implemented for a specific user. By the early 1990s, over thirty industrial, commercial, institutional water audits had been completed. The changes recommended from these initial audits represented 0.7 mgd in water savings. The knowledge gained from the water audits was then shared with other similar users through workshops and guidance materials. MWRA utilized technical assistance consultants to conduct the water audits, provide training, and conduct workshops.

During this program, MWRA worked extensively with health care institutions. MWRA found that typical per capita water use in hospitals ranging widely between 40 and 350 gallons per day. For example, in 1991 Norwood Hospital used 51.2 million gallons of water. MWRA conducted a water audit and found that a $19,500 investment to eliminate seal and cooling water on medical air compressors and removing a vacuum pump resulted 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.

MWRA has found that conservation initiatives for industrial, commercial, and institutional water users are widely available through consulting firms. With this availability, MWRA has scaled back its industrial, commercial, and institutional conservation program. MWRA has developed and offers at no cost a 52-page Guide To Water Management that contains detailed information

to help facility managers reduce overall water use. In addition, detailed fact sheets on industrial, commercial, and institutional water users are available at MWRA's web site at http://www.mwra.state.ma.us/water/html/indust.htm or by contacting MWRA staff directly. These include specifics on hospitals; schools, colleges and athletic facilities; restaurants; and commercial buildings.

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. 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/advertising campaign and rebate program to accomplish this goal. To create an incentive to invest in a TumbleWasher, which is slightly higher priced than a conventional washer, Massachusetts customers received a rebate of $75 in 2000. The $75 cash incentive has aided in the sale of these machines. In 2000, 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. The utility partners have 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 was a new program in the Town of Reading. This pilot program assessed water and energy savings from the installation and use of high efficiency clothes washers at a condominium complex. The pilot program was sponsored by Maytag Corporation and Boston Gas.

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 supplies. During the late 1980's and early 1990's, the citizen's group took a lead role promoting trigger and drought management 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.

Massachusetts Plumbing Code

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.

Technical Assistance Outside the Service Area

Building off its success with reducing water loss in its own communities, MWRA has begun assisting communities outside its service area with their leak detection efforts. At the request of the Ipswich River Water Supply Council, MWRA provided technical assistance to water departments that withdraw water from the Ipswich River in Essex County. Seven communities participated in this leak detection program and found over 0.8 mgd of water leaks. 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.

4. Demand Management Activities During Fiscal Year 2001

Long Range Planning

The existing drought management plan and demand forecast were not updated during FY01. Temporary water supply to the City of Cambridge was discontinued in the spring 2001 reducing demand by about 15 mgd. In addition, water releases down the Wachusett Aqueduct (6-8 mgd) were discontinued to facilitate rehabilitation of the Wachusett Aqueduct.

Three MWRA sewer-only communities (Reading, Stoughton, and Wilmington) are in the environmental review process seeking to receive supplemental water supply from MWRA. These communities would maintain their existing local water supplies. The potential demand from these communities is small, probably in the 2-3 mgd range. During the past year, MWRA has continued to work cooperatively with the proponent communities and reviewing agencies.

Leak Detection and Repair of MWRA Distribution System

Leak detection and repair efforts have continued. During FY01, MWRA inspected 266.5 miles of pipe and detected and repaired 13 leaks accounting for the saving of 0.5 mgd of lost water.

Rehabilitation and Replacement of MWRA Distribution System and Covered Storage

MWRA's Integrated Water Supply Improvement Program includes the Walnut Hill Water Treatment Plant, the MetroWest Water Supply Tunnel, covered storage facilities, and pipeline replacement and rehabilitation projects. Individual projects are detailed in MWRA's Capital Improvement Program (CIP). In the FY02-04 CIP, MWRA projects expenditures in excess of $1.8 billion to improve regional drinking water quality and for improvements to the Authority's water transmission, distribution, and pumping systems.

Leak Detection and Repair of Member Community Distribution Systems

During FY01, a total of 4069 miles of local water pipeline were surveyed for leaks. A total of 498 leaks were detected and repaired in community distribution systems, which accounted for 4.53 mgd of water savings.

Rehabilitation and Replacement of Member Community Distribution Systems

Quarterly funding distribution under the Local Pipeline Assistance Program began in August, 2000 (FY01). Through the first five quarterly funding distributions, $17.2 million has been distributed to fourteen communities for 32 projects. These projects have provided for a total of 17.9 miles of new lined water pipe and 22.4 miles of cleaning and lining of existing water pipe. MWRA staff continue to communicate through meetings and telephone contact on a regular basis with community staff to answer questions and provide assistance for participation in the program.

Water Metering and Monitoring

During FY01, MWRA continued its ongoing program for operation and maintenance of the water metering system. All meters received routine calibration on a regular schedule.

Residential Water Conservation Fixtures/Conservation Outreach

During FY01, MWRA continued its program to distribute household water savings devices. A total of 3,422 water saving fixtures (1,072 showerheads, 1,029 toilet dams, 1,321 faucet aerators) were distributed to 961 households. Requests from retail customers are generated through the water conservation hotline (617-242-SAVE) The majority of water savings kits were provided to the Boston Water and Sewer Commission for use in the City of Boston. Water saving kits were also distributed to the Marblehead and Norwood Water Departments.

MWRA staff met with the Reading Water Department to discuss plans for a water conservation program in that community. This was an initial meeting to explore a broad range of activities that could be incorporated into a comprehensive plan. Staff provided information on activities and resources. The Town of Reading has hired a consultant to further develop the plan and is moving forward on a request for proposals. MWRA has made available household water savings devices, as well as its collection of printed material for distribution to residents should the community wish to use them.

Public Education and Information Distribution

This past year, MWRA continued to target water conservation outreach to member communities including: water saving fixtures, household water leak prevention, low flow toilets, outdoor water conservation, etc. MWRA redesigned and printed 250,000 bill inserts and reprinted 30,000 fact sheets. Staff sent letters to 57 member communities (including sewer only communities) outlining the availability of these items and other free materials and water conservation kits. Communities were asked to return a request form indicating the quantities they needed. Most forms were returned promptly and follow-up telephone calls were made to communities who did not initially respond. About 60 percent of the member communities took

advantage of this offer. A copy of the letter and sample set of materials (contained in the MWRA Watercycle folder) is enclosed with this report. In all, 325,441 pieces of printed materials, 1,597 rain gauges, and 31,131 dye tablets were distributed to member community water departments.

Other related outreach activities were accomplished with the Town of Stoneham. Last fall MWRA staff assisted Stoneham in an outreach effort to address customer concerns over increases in their water and sewer bills. Articles were printed in local papers promoting the benefits of conservation and providing information on how to obtain an MWRA water conservation kit. This activity generated over 50 calls and a similar number of kits were distributed.

In June 2001, MWRA staff attended the 13th annual Wellness Fair at State Street Bank in Quincy, MA. While the event had to be held indoors because of rain, attendance was good. MWRA distributed conservation brochures, rain gauges, and water conservation kits and answered various questions.

As part of MWRA's continuing partnership with state water management officials, MWRA has continued to participate in the work of an advisory group to develop statewide goals and policies for outdoor water use.

School Education

During the 2000/2001 school year, MWRA's School Educational outreach programs for water conservation made 1,025 classroom presentations reaching more than 24,000 students in pre-kindergarten through high school classes throughout the State. In addition to classroom visits, a number of teacher workshops were held including a joint event with the New England Water Environment Association whereby the MWRA hosted a teacher training at its Deer Island wastewater treatment plant. More than 80 educators from around the state spent part of the day touring the Deer Island facility and part of the day out on Boston Harbor aboard a marine vessel using scientific research equipment to measure characteristics of the water and sea floor. This year's poster and essay contest was held with more than 2000 students participating. An Award Ceremony was held at the John J. Moakley Courthouse to honor the winning students and their families.

Industrial, Commercial, and Institutional Audits and New Technologies

MWRA 52-page Guide To Water Management remains available at no cost. Selected case studies and audits for industrial, commercial, and institutional water users also remain available on the MWRA web page and can also be obtained by calling the water conservation hotline (617-242-SAVE).

Over the past year, MWRA has sustained its participation with the Northeast Energy Efficiency Partnership. The Partnership continues the Energy Star Appliance Program with great success. The energy partners continued the rebate program for high efficiency clothes washers. This year, the cash incentive was $50. In Massachusetts, a total of 44,062 high efficiency clothes washers have been sold to date under this cash incentive program.

Evidence of the substantial water and energy savings from the high efficiency appliances was documented last year through the Boston Washer Study conducted in Reading, Massachusetts. Under this pilot project, all the washers and dryers in a 68 unit condominium complex were replaced. Water and energy use, both before and after the equipment replacement, was monitored and analyzed. Results of the study indicated 44 percent water savings, 50 percent energy savings, and 24 percent detergent savings.

In May 2001, MWRA reduced it water use at the Deer Island Treatment Plant by about 1.2 mgd through a process change. In the scum collection/removal process, the use of potable water was discontinued and plant water (recycled effluent) was used in its place.

Water Supply Citizens Advisory Committee

During FY01, the Water Supply Citizens Advisory Committee has continued to strongly support MWRA's water conservation efforts. The committee has been active providing review and independent citizen input on water system expansion issues.

Massachusetts Plumbing Code/New Technologies

During FY01, no new work on changes to the Massachusetts State Plumbing Code was undertaken.

MWRA sent a letter to the US Department of Energy supporting proposed new washer efficiency standards. Standards were issued and, after a review by the Bush Administration, they were promulgated. By 2007, US standards will reach the more stringent standards currently employed by the utility programs in the Northeast.

Technical Assistance Outside the Service Area

During the spring 2001, MWRA provided technical assistance to the Ipswich River, North Coastal and Parker River Watersheds to help them implement a leak detection program. The new leak detection program is now underway with 14 municipalities under agreement to perform leak detection and two more scheduled over the next year.

5. Demand Management Plans for Fiscal Year 2002

During FY02, MWRA plans to continue its demand management efforts at a similar level as FY01. The Authority's long-range planning, leak detection, system rehabilitation, water conservation, educational outreach, and technical assistance programs have long been established as essential components of demand management.

During FY01, MWRA consolidated its Waterworks and Sewerage Divisions into one Operations Division. As part of this reorganization, the Community Support Program (in the Planning Department) was formed to centralize technical and financial assistance to both water and sewer member communities. Through efforts of the Community Support Program, MWRA will continue to work with sewer only communities to include them in water conservation activities and will also begin to include water only member communities in sewer related activities.