Massachusetts Water Resources Authority

5 Year Progress Report 2000-2004

Citizen Panel

ROBERT RUDDOCK is Executive Vice President - Governmental Affairs with Associated Industries of Massachusetts (AIM). He has more than 25 years of experience in the management of public policy issues and in government relations. His work has included the creation of the 1,100 member Energy and Environmental Council within AIM. Prior to AIM, he was the Senior Public Affairs Counsel at BMC Strategies, the Government Regulation Unit Director for the New England Foundation, and the Director of Metropolitan Affairs for the Greater Boston Chamber of Commerce. He is a member of the board of Massachusetts Supreme Judicial Court and the U.S. Supreme Court. He is a graduate of Fairfield University and Suffolk University Law School.

LAUREN A. LISS is in the Regulatory Department of Rubin and Rodman, where she practices in the areas of environmental law, land use, transportation, regulatory compliance and administrative law. Ms. Liss served as Commissioner of the Massachusetts Department of Environmental Protection from 1999 to 2003. Prior to that, she served as General Counsel and Deputy Secretary for Environment Policy of the Massachusetts Executive Office of Transportation and Construction. Ms. Liss holds a JD, cum laude, from B.U School Law, and an A.B., cum laude, from Bryn Mawr College. She is admitted to practice law in Massachusetts and Washington D.C.

KATHERINE HAYNES DUNPHY is the Chair of the MWRA Advisory Board and has been Milton's representative on the Advisory Board since 1994. Ms. Dunphy has been active in community organizations and town government for more than twenty-five years. As a member of the Milton Board of Selectmen from 1993 to 1999, she urged the establishment of a committee for capital planning for all town departments and was an advocate for rehabilitation of local water and sewer infrastructure. She is currently a member of the Capital Improvement Planning Committee and the Milton Village/Central Avenue Revitalization Committee. She has a B. A. in Physics from Manhattanville College.

MABRAY ANDREWS is a seasoned communicator, whose experience includes starting and staffing of information design and delivery groups, writing and illustrating print and on-line documentation, and creating and delivering speeches and presentations. He is currently employed as Technical Publications Manager at Harman Specialty Group. Mr. Andrews has also taken an active role in nonprofit and civic organizations. He served on the Building the Future Committee in Medford where he participated in developing a plan to build new schools across the city. He currently serves on the board of directors of the Boston Urban Music Project, and as trustee of the Kountze Scholarship Fund. He has a B.S. in Technical Communications from Northeastern University and is retired from the United States Air Force.

JOHN J. GALL, JR. is vice president of Camp Dresser & McKee. He is an environmental engineer with over 35 years of experience in the water and wastewater field, 25 of which have been with CDM. His primary focus is on the planning of facilities and the financing of public projects and he specializes in the conduct of large projects involving the integration of many technical and scientific disciplines. He has participated in major water and wastewater planning studies for the MWRA, Seattle, Hong Kong, Sydney, Australia, and the Water Authority of Jordan as well as for numerous communities in New England. He routinely assesses capital improvement plans and analyzes ability to pay, cost sharing, and cost allocation alternatives. Mr. Gall has a B.S. in Civil Engineering from Merrimack College.

Five-Year Report Panel

2004 Panel

Mabray Andrews
Ratepayer Representative

Katherine Haynes Dunphy
Chair, MWRA Advisory Board

John Gall, Jr.
Camp Dresser & McKee

Lauren A. Liss
Rubin and Rudman, LLP

Robert Ruddock
Associated Industries of Massachusetts

HONORABLE MITT ROMNEY
Governor

HONORABLE ROBERT E. TRAVAGLINI
Senate President

HONORABLE SALVATORE F. DIMASI
Speaker of the House

HONORABLE THERESE MURRAY
Chairman, Senate Ways and Means Committee

HONORABLE ROBERT A. DELEO
Chairman, House Ways and Means Committee

In its two-decade existence, MWRA has built an enviable record of accomplishment: it has constructed billions of dollars of facilities to repair, replace, and modernize an aging infrastructure, on time and within budget. It has put in place operational practices to minimize pollutant discharges to our waterways and to ensure safe and reliable drinking water.

Over the last five years alone, MWRA successfully concluded the $3.8 billion Boston Harbor Project, completed major components of a comprehensive $1.7 billion drinking water system program, reached consensus with litigation parties and project neighbors on a $300 million plan to clean up South Boston beaches, and witnessed the signing of landmark legislation to better protect the sources of MWRA's drinking water.

Today MWRA ratepayers see real public health and environmental results. This report documents those dramatic results that investment in infrastructure and attention to operation has brought, from drinking water quality that meets all federal and state drinking water standards, to a clean Boston Harbor with opportunities for public enjoyment.

Few appreciate the scope of investment required to sustain often buried and unseen water and wastewater infrastructure. Since its creation, MWRA has built more than $6 billion of essential new facilities, with another $1.6 billion planned for the near future. In addition to the new treatment plants, pump stations and tunnels, MWRA owns hundreds of miles of water and sewer pipes, which would cost almost $3 billion if they were built today. All totaled, the replacement value of MWRA's assets approaches the $12 billion mark.

But water and sewer service cannot be provided by the MWRA without its municipal community partners. Each community maintains sewer and water systems that connect with MWRA. In total, these amount to more than ten thousand miles of local pipelines plus ancillary facilities, with an enormous replacement value estimated to approach $10 billion. All these facilities must also be maintained and replaced at various intervals.

The previous Citizen Panel convened to assist in the 1995-1999 Progress Report noted that there would be increased pressure to curtail spending on maintenance in less prosperous times; they urged MWRA to continue to invest in maintenance. They were right and we can't emphasize this imperative enough: the job is not done and in a very real sense can never be completed. Adequate investment is required to avoid a repeat of the past, when neglect and deferral of proper maintenance and inadequate funding to MWRA's predecessor agency, the MDC, led to the failure of the regional wastewater system.

MWRA has incurred a huge amount of debt in playing catch-up, in undertaking long overdue improvements and maintenance. While the Authority must plan for proper maintenance expenditures, it cannot ignore the burden that rising rates put on area homeowners and business. Ever increasing water and sewer rates add to the costs of housing, and the costs of doing business locally. This makes the region less and less competitive compared to other areas of the country, and is one element that could serve to dampen the recovery of the local economy. Several opportunities for rates management will soon present themselves and the MWRA must take every advantage of these opportunities.

In the coming years, MWRA's investments must continue to deliver real public health and societal benefits. We applaud MWRA for devising a solution for control of combined sewer overflows in North Dorchester Bay, and at the same time questioning what is the appropriate and cost-effective level of investment elsewhere. In this same tradition, MWRA sought a waiver from filtration for treatment of its drinking water, suggesting that the excellent quality of its source reservoirs argued against filtration for filtration's sake and that money could be better spent on distribution system improvements. The Federal Court affirmed the MWRA's view in a 2001 decision, saving ratepayers hundreds of million of dollars. Going forward, it is appropriate for MWRA to continue to question new regulations and new policy, and to push back when the costs outweigh the benefits.

The state and other interested parties should partner with MWRA to define its role as a regional water supplier and steward of pristine water sources. Water conservation initiatives within the existing MWRA service area have resulted in a water supply abundance. While rich in water, the service area's rates are increasingly expensive. It is time for closer consideration as to whether or not extension of the MWRA service area might address a number of priorities - responding to water needs in water constrained areas where smart growth might occur, reducing withdrawals in the more stressed rivers of the Commonwealth, and expanding MWRA's rate base so that fixed costs, such as the costs of watershed protection, are shared amongst a greater number.

Finally, as the state's budgetary situation improves, cuts made to the Commonwealth's rate relief program should be fully restored. The reduction in rate relief affected many water and sewer departments throughout the state; it compelled MWRA to delay capital investments and to draw heavily on reserves. The state's economic outlook is improving at the same time that MWRA's rate outlook points to significant rate increases, suggesting that now is the perfect time to assist wastewater service providers in addressing critical infrastructure needs.

We hope you will consider our recommendations.

MABRAY ANDREWS

LAUREN A. LISS

KATHERINE HAYNES DUNPHY

ROBERT RUDDOCK

JOHN J. GALL, JR.

Massachusetts Water
Resources Authority
Charlestown Navy Yard
Building 39
Boston, MA 02129

On behalf of the Board of Directors and staff, I am pleased to submit the Massachusetts Water Resources Authority's Five-Year Progress Report 2000-2004 as required by Chapter 372 of the Acts of 1984, the MWRA's Enabling Act.

We are grateful to the members of the Citizen Panel for their careful assessment of our projects and programs. They provided invaluable guidance in the preparation of this report. Their assessment of our record of accomplishments is humbling. We also share their concerns for the future and agree that we must continue to find ways to manage the burden of ever increasing rates on our customers.

This report coincides with the 20th anniversary of MWRA's establishment in 1984 and provides a good opportunity to reflect on the incredible environmental and public health improvements accomplished by the MWRA over the last two decades. With the new treatment facilities on Deer Island complete, the clean-up of Boston Harbor has gained national acclaim as one of the greatest environmental success stories of our time. On the drinking water side, massive upgrades to water infrastructure, including a state-of-the-art ozone disinfection plant and covered storage tanks throughout the district, will help guarantee some of the best drinking water in the country for generations to come.

The success of the MWRA ultimately stems from the 38 individuals who have served and who are serving on the Board of Directors. From all walks of life, they have acted with integrity and have set high standards and expectations for themselves and MWRA staff. The strong oversight and guidance from the MWRA Advisory Board, representing the 60 communities we serve, has been instrumental in keeping the Authority on course. The MWRA has also enjoyed continued support from the 105 legislators who comprise the MWRA Legislative Caucus. Finally, the strong leadership and vision of my predecessors left the agency with a qualified staff of men and women capable of accomplishing the tasks at hand.

Of course, we have only been able to achieve the incredible accomplishments of the last 20 years by working together - with the communities we serve, with the legislature and local elected officials, with the designers and contractors who deliver the projects, and with others too numerous to count. It is only through these continued collaborations that we can meet the challenges of the next 20 years.

The 2.5 million people we serve bear a heavy financial burden for our success. The average ratepayer has seen water and sewer bills quadruple to pay the mortgage on the $6.7 billion in capital projects built by MWRA. In fact, the single largest challenge facing the MWRA is the management of rate increases in an era of greatly reduced state assistance. While we have dramatically reduced our staffing and cut spending to keep our FY2005 budget below the amount MWRA spent in FY1999, the pressure on the rates driven by debt service is intense. We must continue to work with the MWRA Advisory Board and the legislature to have the much-needed debt service assistance program fully restored.

It is unlikely that the authors of the MWRA's enabling act could have envisioned such a profound, positive impact on the quality of life for the 2.5 million people in the MWRA service area. We have been enormously successful in meeting our mandates over the last 20 years and are grateful for the help and support we have received.

FREDERICK A. LASKEY
EXECUTIVE DIRECTOR

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SPECIAL SECTION

>>>History of the MWRA

The Water and Sewer Systems

When Boston area cities and towns first faced the problems of clean water sources and sewage disposal in the 1600s, their methods were primitive. But by 1795 wooden pipes delivered water from Jamaica Pond to Boston. By the late 1840s, however, Jamaica Pond was too small and too polluted to provide water to Boston's 50,000 residents.

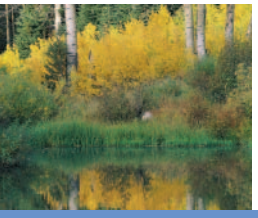
And so, the pattern of moving continually westward in search of larger water sources began - from the 2-billion gallon Lake Cochituate in 1848, to the 19-billion gallon Sudbury Reservoir in 1878, to the 65-billion gallon Wachusett Reservoir in 1908, to the 412-billion gallon Quabbin Reservoir in 1939.

The construction of the Quabbin Reservoir was the last major investment in the water system and no plans were in place for upgrades to carry the system into the next century.

Fortunately, the foundations laid by the early water engineers were able to provide the backbone of the system we run today.

Meanwhile, in 1884, the Boston Main Drainage System was constructed to divert sewage from 18 cities and towns to Moon Island where it was held for release with the outgoing tide. Then, the same forward-looking engineers that designed the water system began to tackle the problem of sewage disposal. By the early 1900s, a series of pipes and pumping stations transported the sewage into Boston Harbor. By 1919, however, sewage pollution forced the closure of several harbor clam beds.

In 1952, The Metropolitan District Commission (MDC) built the region's first primary wastewater treatment plant at Nut Island to handle the flows from the communities south of Boston and in 1968, another primary wastewater treatment plant was added on Deer Island to handle the rest of metropolitan Boston's sewage. By the early 1970s, both of the "new" treatment plants were obsolete, in disrepair and unable much of the time to provide an adequate level of treatment. The inability of the system to meet increased wastewater flows, combined with a less advanced level of treatment than required by the Clean Water Act of 1972, was a major cause of harbor pollution.



Wooden pipes carried water 5 miles from Jamaica Pond to Boston

1796

Boston Main Drainage System was constructed to divert sewage from 18 cities and towns to Moon Island where it was held for release with the outgoing tide

Sudbury River diverted; Sudbury Aqueduct carried water 18 miles to Boston

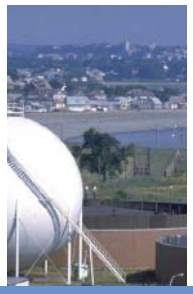
1884

Quabbin Reservoir constructed 65 miles from Boston

1939

First primary wastewater treatment plant built at Nut Island to handle the flows from the south shore

Primary wastewater treatment plant built on Deer Island to handle the metropolitan Boston sewage



1968

Legislature passed MWRA Enabling Act

1982

Cochituate Aqueduct carried water 14.5 miles from Lake Cochituate to Boston

Wachusett Reservoir constructed 38 miles from Boston

Metropolitan District Commission created

Hultman Aqueduct and Norumbega Reservoir constructed

Clean Water Act passed

Water Supply Citizen's Advisory Committee created

City of Quincy filed a civil suit against the MDC and other state agencies claiming that the Mass Clean Water Act had been violated as a result of discharges of untreated and partially treated sewage from Nut and Deer Islands

The Creation of the MWRA

In order to fulfill its mission of providing quality water and sewerage services to its communities, the MDC needed the ability to raise sufficient revenues to hire adequate staff, properly maintain plants and equipment, to finance major capital programs, and to develop operating budgets that were responsive to existing and future needs. Under the system that existed, it was impossible to achieve these goals.

In 1984, legislation was enacted to create the Massachusetts Water Resources Authority, an independent agency with the ability to raise its revenues from ratepayers, bond sales and grants. The primary mission was to modernize the area's water and sewer systems and clean up Boston Harbor. Other key elements included a huge capital program to repair and upgrade the systems, increased staff to improve operations and maintenance, promotion of water conservation, and planning for the future to meet growing demand. In compromise with central and western Massachusetts communities, the MDC retained watershed and reservoir management, but the MWRA covered the costs.

MWRA assumes responsibility for MDC water and sewer systems

Federal Judge A. David Mazzone ordered 13-year schedule for Boston Harbor Project


Judge sets 1999

Deer Island Wastewater Treatment Plant groundbreaking

1985 **1986** **1987** **1988** **1989**


First MWRA Board of Directors is sworn in


Adopted drinking water policy based on demand management and conservation

MWRA purchased Fore River Shipyard in Quincy as staging area for Deer Island construction; pelletizing facility site


Project Labor Agreement for Boston Harbor Project signed


Water demand dropped below safe yield for the first time in 20 years

20 Years of Progress

In the early years, MWRA faced a wide range of challenges as a start-up organization. Even though the new agency was charged with all the financing and construction responsibilities, most of the MDC employees it inherited were operations personnel. As a department of the Commonwealth, the MDC had administrative, financial and legal support available to it. Now the MWRA had to create a complete organizational structure and develop financial systems and policies for obtaining the goods and services it would need to complete projects.

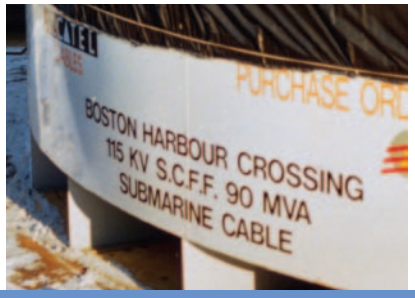
There was also the challenge of keeping the existing water and sewer facilities up and running while undergoing the process of planning, design and construction of major new facilities, particularly the new Deer Island Treatment Plant.

The Boston Harbor Project

The first order of business was the siting and design of the new wastewater treatment facilities. Deer Island was chosen for the new secondary plant. This required the construction of a 5-mile tunnel between the Deer and Nut Islands to carry the South System flow to Deer Island for treatment. The old Nut Island plant was replaced by a headworks facility to screen the wastewater before it enters the tunnel.

In December 1991, the first major milestone was realized with the start-up of the facility in Quincy that converts sludge into fertilizer, ending the dumping of sludge into Boston Harbor. By 1995, the new primary treatment facilities on Deer Island were operational and the old plant was demolished. The first phase of secondary treatment began in 1997 and the final phase came on-line in 2000. Since September 2000, treated wastewater has been transported through the 9.5-mile outfall tunnel into the deeper waters of Massachusetts Bay.

Cross-harbor power cable installed at Deer Island



Ended sludge discharged into Boston Harbor; pelletizing facility in Quincy began operation

Began $1.7 billion Integrated Water Supply Improvement Progam

Legislature enacted sewer rate relief fund

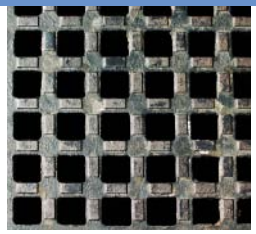
1990 **1991** **1992** **1993** **1994**

Water pipeline modernization program launched

MWRA required communities to perform leak detection

Caruso Pump Station completed

Clinton Wastewater Treatment Plant completed



DeLauri Pump Station completed

Wellesley Extension Sewer Replacement completed

Finally, in May 2002, the lands surrounding Deer Island were opened for public access. On almost any day of the year, people are out jogging, pushing strollers or just enjoying the breathtaking views of a cleaner, healthier Boston Harbor. MWRA has completed 14 of the 25 projects designed to reduce and treat combined sewer overflows into the Harbor and its tributaries, and progress is being made on the rest: seven are in construction and the remaining four are in the design or planning stage. When complete, the CSO Program will help to ensure that safe swimming and boating standards are met.

MWRA has also completed a number of projects to improve pumping reliability and transport capacity around the service area, including the Braintree-Weymouth Relief Facilities Project.

Water Conservation

When MWRA began operations in 1985, its first step was to review the Long Range Water Supply Study begun by MDC that included options such as diverting the Connecticut River. In November 1986, the Board of Directors voted to try water conservation. A number of initiatives - which took ten years and millions of dollars - were undertaken, including leak detection and repair, conservation retrofits, and public education and outreach. The average daily demand has dropped dramatically from

Primary treatment began at new Deer Island Treatment

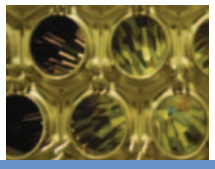
New Neponset Valley Relief Sewer came on line

Interim Corrosion Control Facility in Marlborough completed

Secondary treatment began at new Deer Island Treatment Plant

Spot Pond open reservoir taken out of service

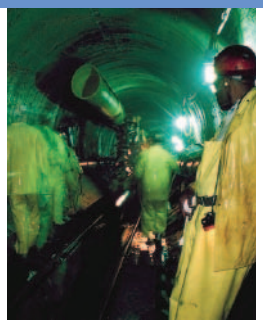
Board of Directors adopted ozonation as treatment technology for new Carroll Water Treatment Plant



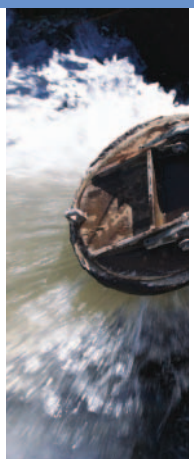
Public Access at Nut Island opened

1995 **1996** **1997** **1998** **1999**

Mining of Inter-Island Tunnel between Nut Island and Deer Island completed



MetroWest Water Supply Tunnel groundbreaking



Final approval received on CSO Facilities Plan and Environmental Impact Report

Nut Island Headworks completed, South System flows transferred from Nut Island for treatment at Deer Island

almost 350 million gallons in 1988 to 220 million gallons today. With this reduction in demand, MWRA avoided the costs of developing new sources and was able to scale back the size of new treatment facilities.

The Integrated Water Supply Program

In 1995, MWRA began the Integrated Water Supply Improvement Program to modernize the water system. The program includes a comprehensive watershed protection program, managed jointly with the Department of Conservation and Recreation (DCR, formerly the MDC); the 17.6-mile MetroWest Water Supply Tunnel, completed in 2003; five covered storage tanks, including the 115-million gallon Norumbega facility, brought on-line in phases and now complete; and a new, state-of-the-art ozone treatment plant finished in July 2005 to enhance the already excellent water quality and ensure compliance with state and federal regulations.

MWRA is also replacing or relining miles of water pipelines to improve the safety and reliability of the water system, as well as constructing upgrades to pumping facilities and monitoring systems.

Summing Up

Over the last 20 years, MWRA has completed $6 billion worth of upgrades to the water and sewer systems that have all but reversed the effects of neglect and underfunding of the preceding decades.

It's hard to imagine that some of the components of "new" Deer Island Treatment Plant have already been in service for over 10 years and that the 10-year Integrated Water Supply Improvement Program is complete with the start-up of the John J. Carroll Water Treatment Plant in the summer of 2005.

Now that the mega-projects have been completed, the really hard work begins - continuously operating and maintaining these critical facilities so that the water supply remains safe and secure and so that Boston Harbor never again earns the label "The Dirtiest Harbor in America."

And all of this, of course, has come at great expense to the ratepayers in the MWRA's customer communities. MWRA must continue to find ways to keep costs down and to ensure that every dollar spent provides tangible public health or environmental benefits.

Federal Judge Richard G. Sterns ruled MWRA does not have to build water filtration plant

9.5 mile Deer Island Effluent Outfall Tunnel put into service

MWRA was in compliance with the Lead and Copper Rule for the first time

MWRA staff from 9 field sites were consolidated into the new Chelsea Facility

Rehabilitation of Wachusett Aqueduct completed

Quincy Pump Facilities completed

Hultman Aqueduct and Norumbega Reservoir were taken off line

2000 2001 2002 2003 2004

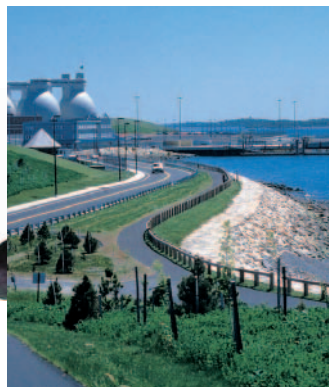
Braintree-Weymouth Relief Facilities groundbreaking

Old MDC Waterworks and Sewerage Divisions merged into Operations Division

Final site completion at Deer Island

Mining of MetroWest Water Supply Tunnel completed

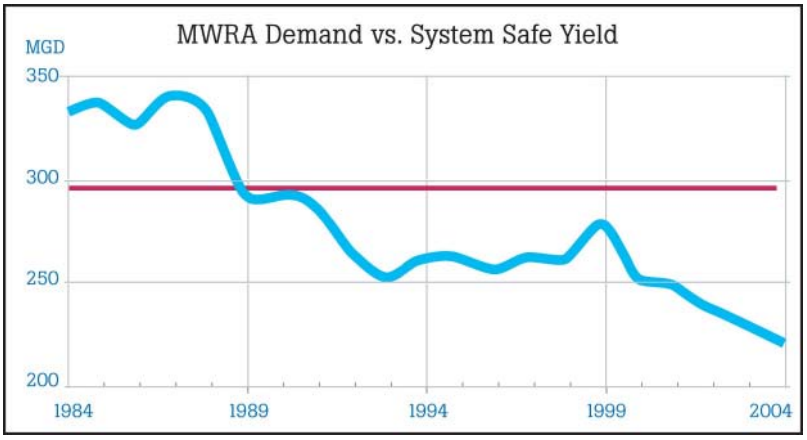
Public Access at Deer Island opened



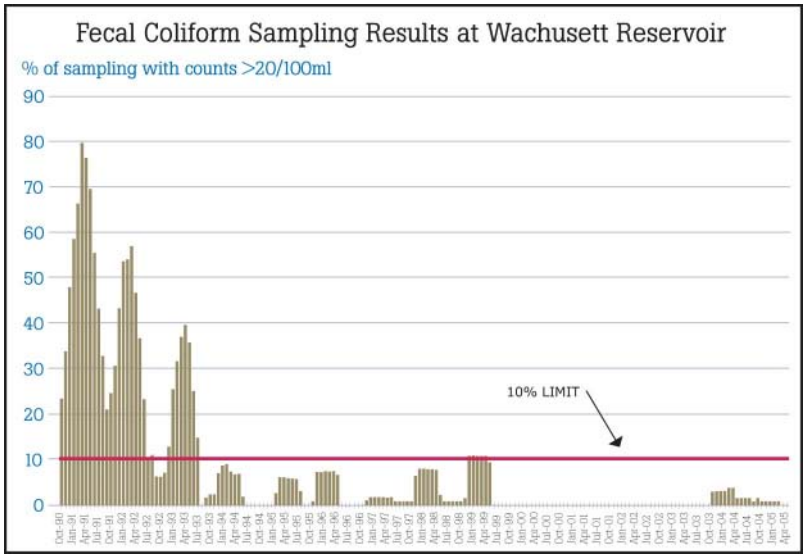
MetroWest Water Supply Tunnel put into service

The improvements MWRA has made to the water and sewer systems have resulted in measurable public health and environmental gains.

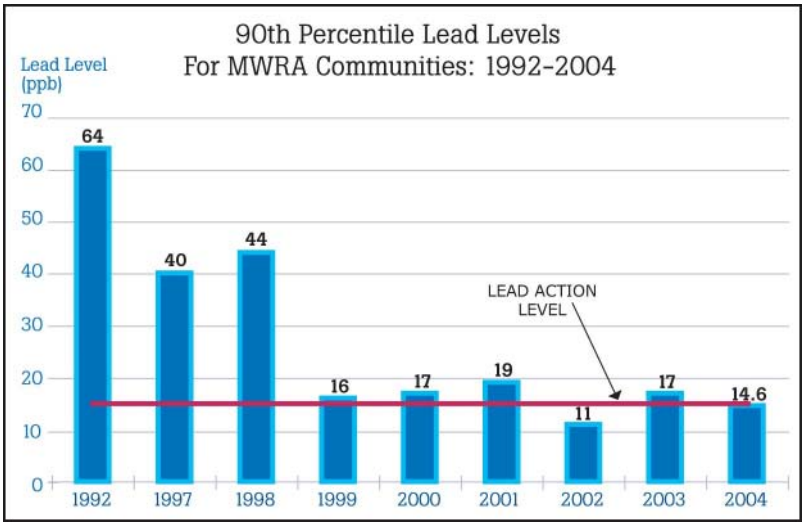
Since 1985, MWRA has undertaken a number of initiatives to conserve water including leak detection and repair, conservation retrofits, and public education and outreach. As a result, there has been a steady decline in water system demand - from 350 million gallons per day in 1988 to 220 million gallons per day today.



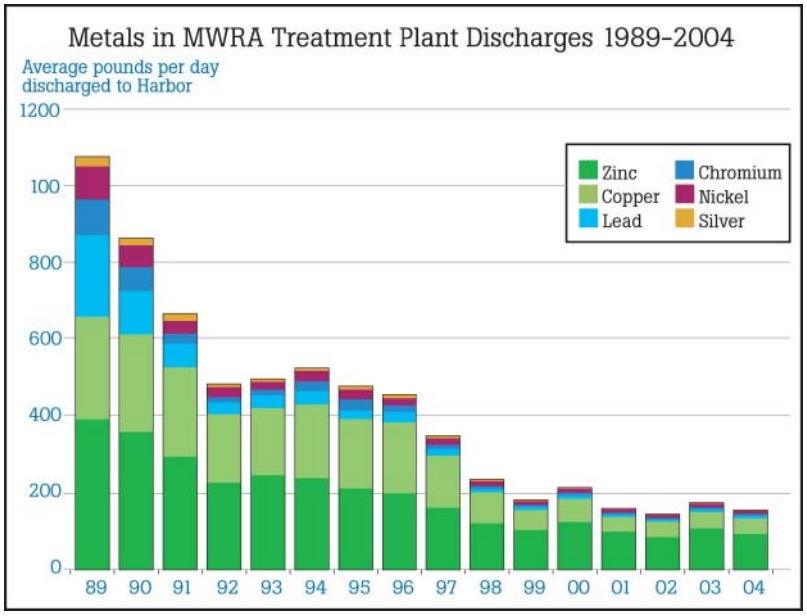
MWRA's source reservoirs' water quality continues to be excellent and meets all regulatory standards. A watershed protection program, already one of the most aggressive in the nation, was bolstered by the 2004 establishment of a Water Supply Protection Trust by the Legislature and Governor, and the development of a Memorandum of Understanding between MWRA and DCR that capitalized on the strengths of each agency in assuring watershed protection.



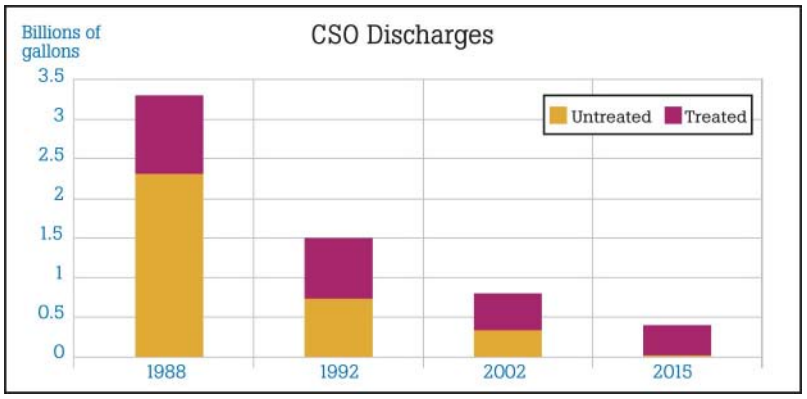
Interim treatment improvements improved water quality at the customer's tap. There were no outbreaks of waterborne illness attributable to drinking water, standards for disinfection of water more than met requirements, and fine-tuning of corrosion control reduced leaching of lead from service lines, to a point where MWRA, for most sampling rounds, meets regulatory standards for lead. With the new covered storage facilities, MetroWest Water Supply Tunnel and John J. Carroll Water Treatment Plant on-line, the water quality will only get better.



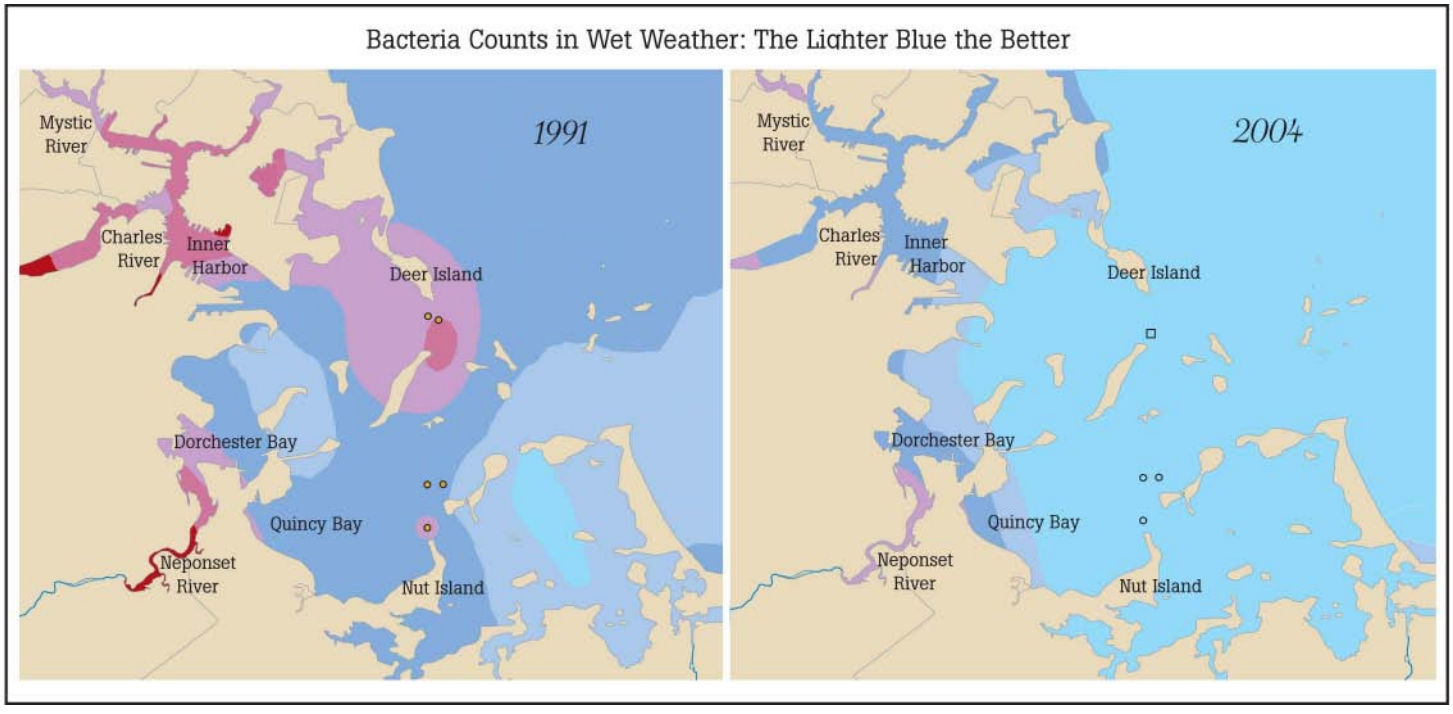
A decade of environmental monitoring data shows both obvious and subtle changes in Boston Harbor's water, sediment and marine life. Marked improvements track implementation of various phases of the Boston Harbor Project. With the new outfall tunnel and completion of the last battery of secondary treatment in 2001 and upgrades of CSO facilities, bacteria levels in the harbor declined, water clarity improved, and harmful nutrient levels decreased to levels essentially typical of a natural estuary.



Beach closings attributable to combined sewer overflows (CSOs) have been reduced, and beaches in Boston Harbor are generally swimmable. Progress continues on the CSO Control Program: to date, 21 CSO outlets have been closed and overflow volumes have been reduced by 70%. Of the remaining flow, 60% is treated. When the Program is complete, 95% of the remaining flows will be treated.



The transformation of "The Dirtiest Harbor in America" to the centerpiece of metropolitan Boston is widely recognized as one of the nation's greatest environmental achievements.



>>> In celebration of the MWRA's 20th Anniversary, we would like to recognize all of the men and women who have worked for the MWRA over the years and helped to achieve all of the successes we have enjoyed so far. To all of you, thank you for a job well done.

"We would also like to recognize the employees listed here who have been with the agency from the beginning – whether they transferred over from the MDC in 1985 or whether they joined the MWRA that year to work on the important projects that lay ahead."

Stephen Abner
Paul Addivinola
Nancy Aftosmes
Gregory Alessandro
James Andon
Edward Arcese
William Austin
John Balfour
Richard Barbarisi
George Barras
Corinne Barrett
Patrick Barrett
Timothy Barry
M. Altaf Bhatti
Terry Bickford
Grace Bigornia Vitale
Robert Billotte
J. James Burns
Richard Burns
William Burns
Joseph Bussone
Brian Callely
Dennis Capraro
Philip Carbone
James Carey
Edward Carpman
Frank Cascarano
Brian Cashman
Funmei Chang
David Ciano
Richard Cipriano
David Codair
James Collins
Matthew Condon
Walter Connors
William Coughlin
John Cunningham
Daniel Cushing
Robert DeChellis
Joseph Del Greco
Michael DelPrete
Charles Demeo
Thomas Derosier
Richard Desmond
David DiBona
Timothy D'Ortona
Stephen Dwyer
Viviane Edward
Anthony Errichetti
Lafleur Etienne
John Farino
Kevin Feeley
Michael Ferro
Paul Flaherty
Mark Forti
Guy Foss
Thomas Fulkerson
Edward Gallagher
Gary Garrity
Lettie Genovitch
Rocco Giovanniello
Peter Gogan
Robert Gorham
George Goros
William Graham
Peter Green
David Hale
Alan Hanscombe
David Harnett
Thomas Harrow
Eric Holman
Robert Holthaus
Joseph Jamilowski
Lisa Jenkins
Lee Jensen
Robert Johnson
Frank Kay
Paul Kelley
Gerard Kelly
Marcis Kempe
James King
Richard Krumpus
Randolph Lahey
Christine Lane
William Lane
Daniel Leary
William Lewey
Dennis Linehan
Brian Littlefield
David Lombard
Charles Lombardi
Edward Luongo
James MacPherson
William Magnell
Richard Mandell
Ronald Maxwell
Joseph McCarty
John McDonough
Robert McGee
Sean McGillicuddy
James McMahon
Nancy McSweeney
James Mele
Glenn Merlini
Lawrence Mininclerl
Joseph Monestere
George Morano
Robert Moses
Patrick Moynihan
William Mueller
Andrea Murphy
John Norton
Kevin O'Brien
Joseph O'Donnell
Charles Olsen
James Padova
Deborah Palmer
Albert Parker
Kenneth Perry
Salvatore Pinto
Paul Polito
James Polk
Keith Portell
Michelle Potts
John Powers
Julian Rainey
Eric Renda
Alfred Renrick
John Riccio
George Riley
Gino Rizzo
Steve Rocke
Charles Ronayne
Thomas Rosado
David Rota
Romeo Rovinelli
Flora Sanders
Walter Schultz
Samuel Sclafani
John Shdeed
William Sheehan
William Slattery
Russell Smith
William Smith
Carmine Sorrentino
Herbert Spencer
Richard Staples
Mark Sullivan
Carol Swirbalus
Scott Tamagna
Paul Teneriello
Vincent Thompson
Richard Tobin
Richard Trubiano
John Vetere
Gerald Walsh
Michael Walsh
James Waterman
Kenneth Witkowski
Vivienne Wright
William Young
Gordon Yu

CHAPTER 1

>>> Progress On Major Projects

From 2000 to 2004, MWRA spent $1.4 billion on major capital improvements in the service area, transforming the MWRA water and sewer system and creating legacy projects that will serve member communities for decades to come.

New wastewater and drinking water facilities were constructed to comply with federal and state environmental and public health regulations, new infrastructure was created to improve the reliability of the drinking water transmission system, and security improvements were made in the wake of the events of September 11, 2001.

In 2000, modernized wastewater treatment facilities at the Deer Island Treatment Plant were completed and treatment plant discharges to Boston Harbor ended with the opening of the new 9.5 mile Deer Island outfall tunnel in September of that year. In 2003, the completion of the MetroWest Water Supply Tunnel meant that for the first time in history, the metropolitan area was not dependent on one pipeline to carry water east from the Wachusett Reservoir to serve 2 million people in greater Boston. In 2004, water system customers received a new level of drinking water protection when the Norumbega Reservoir Covered Storage facility in Weston was placed in service.

Throughout the five-year timeframe of this report, MWRA maintained its track record of meeting project delivery schedules and regulatory compliance milestones. As part of its cost management program, MWRA considered project alternatives during conceptual planning, invited independent review and assessment of both designs and consultant performance and closely managed construction progress. The agency's internal audit staff routinely reviewed consultant disclosure statements, project documentation and invoices.

Modernizing Wastewater Collection and Treatment

Completing the Deer Island Treatment Plant

With the completion of the last phase of secondary wastewater treatment facilities at the Deer Island Treatment Plant, MWRA met the final milestone in the $3.8 billion, federally mandated Boston Harbor Project. The Deer Island plant is the second largest wastewater treatment facility in the country, second only to Detroit, with the capacity to treat more than 1.2 billion gallons of wastewater a day. It is the centerpiece of MWRA's efforts to revitalize Boston Harbor and the linchpin of MWRA's wastewater system.

Milestones of the Boston Harbor Project achieved in the 2000-2004 period included:

- Completion of final construction work to modernize facilities along the Fore River in Quincy that convert sewage sludge into 33,000 dry tons of fertilizer annually.
- Completion of the 9.5 mile effluent outfall tunnel. The tunnel transports treated effluent from Deer Island into the deeper waters of Massachusetts Bay, discharging treated wastewater through 55 diffusers spaced along the last 1.5 miles of tunnel.
- Completion of final site work on Deer Island in November 2001.
- Opening of 60 acres of public access land on Deer Island in 2002 as part of the Boston Harbor Islands National Park Area.

Deer Island Public Access Area

The MWRA Board of Directors voted to name the park surrounding Deer Island after the late Judge A. David Mazzone, the driving force behind the Boston Harbor Project

The Boston Harbor Project is one component of the regional wastewater management initiatives that MWRA has undertaken to adequately collect, transport, and treat virtually all combined sewer overflow (CSO) discharges, and to reduce risk of sewer collapses.

Deer Island Public Access opening

Managing Combined Sewer Overflows

Over the past five years, MWRA has continued to devote significant attention to reducing overflows of combined stormwater and sewage into local water bodies that occur during heavy rains. These overflows are a legacy of the original design of combined pipe systems in Boston, Cambridge, Somerville, and Chelsea to carry both stormwater and sewage flows together, rather than in separate pipes. Flows can more than triple during heavy rains, sewers can become overloaded, and built-in CSO outlets act as relief points letting excess flow leave the system into the nearest body of water.

MWRA's $747 million CSO Program consists of 25 site-specific projects, including sewer separation, interceptor improvements, new CSO treatment facilities, upgraded CSO treatment facilities, and storage facilities. More than 50 CSO milestones were incorporated into a Court Order. To date, over $250 million has been spent on planning, design, and construction to reach program goals.

The CSO Program includes both MWRA and community managed projects in the CSO communities. Between 2000-2004, the Boston Water and Sewer Commission, with funding by MWRA for design and construction costs, continued to make construction progress on the sewer separation projects it is implementing to minimize CSO discharges in South Dorchester Bay, Stony Brook and East Boston. Similarly, Cambridge completed environmental assessment reviews for the Cambridge/Alewife Brook sewer separation project, allowing CSO control for Alewife Brook to move forward. MWRA worked with both Boston Water and Sewer Commission (BWSC) and Cambridge to conduct water quality and CSO control evaluations required by Charles River and Alewife Brook Variances issued by the Department of Environmental Protection (DEP).

As of 2004, 14 projects have been completed, seven are in construction, and remaining projects are in the planning or design phase. CSO projects in design include the North Dorchester Bay Conduit, Reserved Channel Conduit, and Reserved Channel CSO facility that comprise the South Boston CSO Plan. For years a solution to CSOs in South Boston was elusive. Work was suspended in 2000 due to community opposition. In 2004, after a three-year assessment, MWRA filed a plan that effectively eliminates CSO discharges to Dorchester Bay and reduces stormwater discharges to one event a year. The plan was accepted by the parties to the litigation, the community, and environmental groups. The plan also satisfies a stormwater control commitment in the Court Order, with the important caveat that stormwater control elsewhere in the service area is not the responsibility of MWRA.

Other progress toward CSO control during 2000-2004 included:

- Federal Court approval of a revised plan that now calls for sewer separation in the Fort Point Channel area. The project, currently in design, will provide greater pollutant removal and cost substantially less than the earlier plan.
- Engineering reassessments, water quality studies, and regulatory reviews for Alewife Brook and Charles River to determine the most appropriate approaches to complete projects and attain CSO goals.
- Construction completion on the first contract for the East Boston Relief Project.
- Commencement of construction on Union Park Detention Treatment Facility.

Pleasure Bay

Fixing Interceptors And Pump Stations

Interceptors and pump stations collect the wastewater from community collection systems and transport flow to the Deer Island Treatment Plant. Over the last five years, MWRA has undertaken major projects to extend, enlarge, and rehabilitate large sewer interceptors and pump stations, projects necessitated by the system's aging facilities (60% of MWRA's sewers are over 50-years old; 33% are over 100-years old) and/or have inadequate capacity. Increasing capacity eliminates the discharge of untreated sewage during dry weather and increases the volume of flow that reaches Deer Island, reducing the risk of sewage overflows and back-ups to protect homes, rivers, and wetlands. MWRA spent about $380 million through the end of FY2004 on interceptor and pump station improvements.

Braintree-Weymouth Relief Facilities Project

The largest of the current interceptor projects is the Braintree-Weymouth Relief Facilities Project. The $227 million project includes a deep rock tunnel and surface facilities (pipelines and pump stations) that are transforming the way that wastewater generated by six South Shore communities is conveyed to sewer treatment and processing facilities. Braintree-Weymouth Relief Facilities are providing capacity for peak sewage flow from Braintree, Weymouth, Holbrook, Hingham, Randolph and sections of Quincy. This increased capacity reduces surcharging and maximizes the flow that reaches Deer Island for treatment.

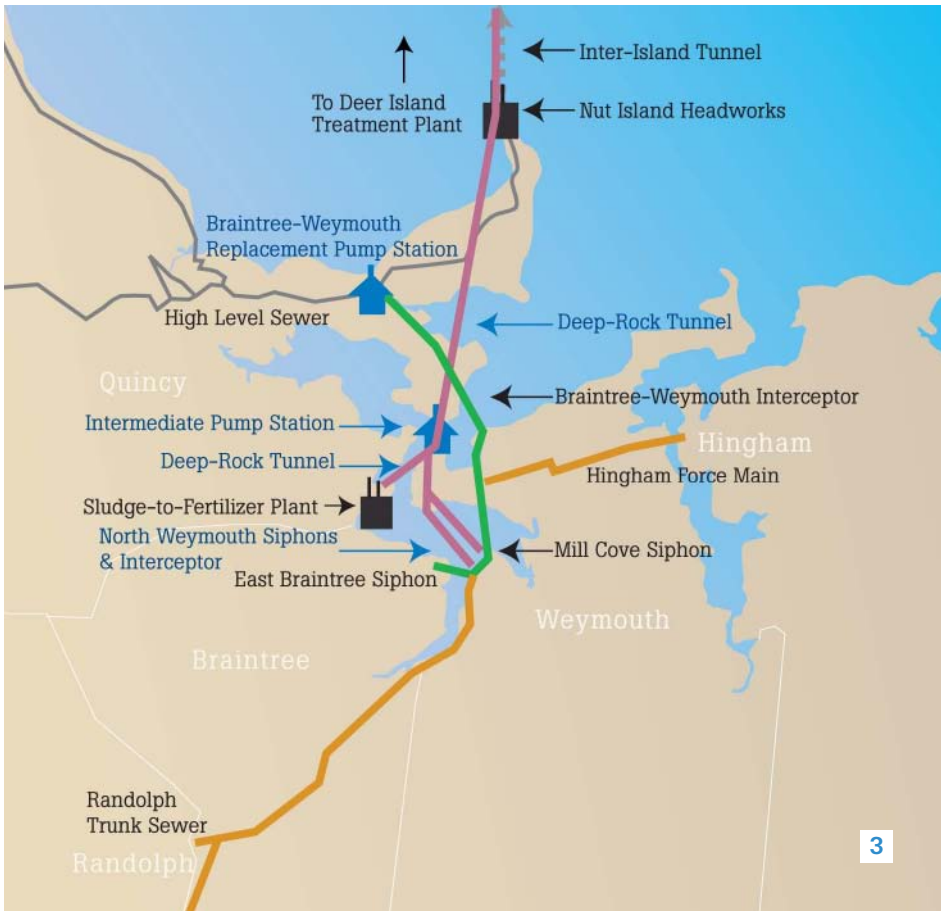
Sewage surcharges and backups are associated with sewer facilities that can't accommodate all of their flow due to community growth, the age or insufficient size of the sewers, and/or the entry of non-sewage flows into sewers. The Braintree-Weymouth Relief Facilities Project has increased the Braintree-Weymouth system's peak flow capacity by approximately 19 million gallons per day and streamlined the route that wastewater takes from these communities to the Nut Island Headworks and the Deer Island Treatment Plant. The project is being completed in accordance with an Administrative Consent Order from the Commonwealth's Department of Environmental Protection. All contracts required under the Order are now completed and operational.

Over the last five years, other major projects to add interceptor and/or pumping capacity and repair or replace existing sewers have been completed or were underway. These projects include the Framingham Extension Relief Sewer, Quincy Pump Facilities, Upper Neponset Valley Sewer System, Neponset Valley Relief Sewer, West Roxbury Tunnel, and South System Relief Project.

Additionally, MWRA is working with its member communities to help control and reduce inflow and infiltration (I/I) of groundwater (which uses up capacity in MWRA's interceptor systems) and to promote efficient operation and maintenance of local sewer systems. MWRA has a comprehensive I/I Reduction Plan, and the I/I Local Financial Assistance Program is a key element. MWRA provides grants and interest-free loans to sewer communities for pipeline replacement, inflow source removal, planning, sewer rehabilitation construction, and engineering design. More than $90 million has been distributed to fund 230 local projects, with more than $46 million expended in the 2000-2004 period. In 2004, the program was extended through FY2010, with additional funding from MWRA.

Union Park CSO Facility

Braintree-Weymouth Intermediate Pump Station



Major MWRA Interceptor and Pump Station Projects

PROJECT	STATUS
Braintree-Weymouth Relief Facilities are reducing I/I and surcharging, and providing capacity for peak sewage flow from Braintree, Weymouth, Holbrook, Hingham, Randolph and sections of Quincy. The $227 million project included a deep rock tunel and surface facilities (pipelines and pump stations) and is being completed in accordance with a DEP Administrative Consent Order.	Construction of the four contracts for the relief facilities were completed by 2004, including the deep rock tunnel, the Intermediate Pump Station, the North Weymouth Interceptor, and the Fore River Siphons. The relief facilities were put into service in December 2004.
Cummingsville Branch Sewer, an $8 million sewer interceptor repair and replacement project, will serve Burlington, Woburn and Winchester.	Agreement with Winchester executed in 2002. The construction contract for the replacement sewer was advertised and bid in 2004.
Framingham Extension Relief Sewer project included construction of new interceptors and pump stations and rehabilitation of an old interceptor to meet capacity demands in Framingham, Ashland, and Natick. The $48 million project was constructed in accordance with a DEP/EPA Administrative Consent Order.	The fifth and final construction contract was completed in 2004. This project is an integral part of the MWRA program to control odor in Framingham, Natick, and Wellesley.
Upper Neponset Valley Sewer System includes installation of 25,000 feet of new sewers to reduce overflows in West Roxbury and Newton. The $40 million project will serve West Roxbury, Brookline, Newton and a small portion of Dedham.	The first contract, with 16,5000 feet of sewers, reached 100% design and was bid and advertised in 2004.
Quincy Pump Facilities Project included $26 million to construct three new pump stations (Quincy, Squantum, and Hough's Neck) and rehabilitate three force mains that were corroded and that constrained flow.	The final contract, the Squantum Pump Station, was completed in September 2003, completing the project.

Improving Drinking Water Quality and System Reliability

Over the last five years, MWRA continued progress on the $1.7 billion Integrated Water Supply Improvement Program to improve the quality of drinking water and ensure the reliability of the regional water system. The Program includes watershed protection and new facilities for treatment, transmission and covered water distribution storage consistent with federal and state Safe Drinking Water Act (SDWA) requirements. An Administrative Consent Order issued by the Department of Environmental Protection set project schedules.

Watershed protection remains the first step to assure that the water MWRA delivers is safe and reliable. Watershed protection measures include land acquisition of critical parcels, sewering to improve tributary water quality, public access controls around the reservoirs, development regulations, and

Emergency Operation Center at Chelsea Facility

water quality monitoring and research programs.

In 2004, MWRA and the Department of Conservation and Recreation (DCR) developed and executed a Memorandum of Understanding that assigns management and control of important water related functions to MWRA and strengthens DCR's ability to manage the land side of watershed protection functions. Also in 2004, legislation establishing a Water Supply Protection Trust was passed to provide an "off budget" funding alternative for watershed protection programs already paid for by MWRA ratepayers. The efforts of the Executive Office of Environmental Affairs, the MWRA Legislative Caucus, and the MWRA Advisory Board were instrumental in this effort. While the Trust remains a work in progress, it does provide the framework for a substantial improvement in the operation of the critically important watershed systems.

Modernizing Treatment Facilities

The Safe Drinking Water Act and Amendments require modern water treatment as well as high quality source water. The new John J. Carroll Water Treatment Plant in Marlborough will treat the water for customers in 41 communities in the metropolitan Boston area. The state-of-the-art, 405 million gallon per day (mgd) plant includes integrated security and safety systems. Construction of the plant started in 2000 and reached substantial completion by late 2004. After an extended period of testing and start-up, the plant was brought on line in July 2005.

The treatment process at the new plant uses ozone for the first stage of disinfection and a mixture of chlorine and ammonia for the second disinfection stage. With the completion of the plant, existing disinfection facilities at various MWRA locations will become back-up systems. These changes, along with other improvements, mean that MWRA will be able to reduce the amount of chlorine used in the water treatment process.

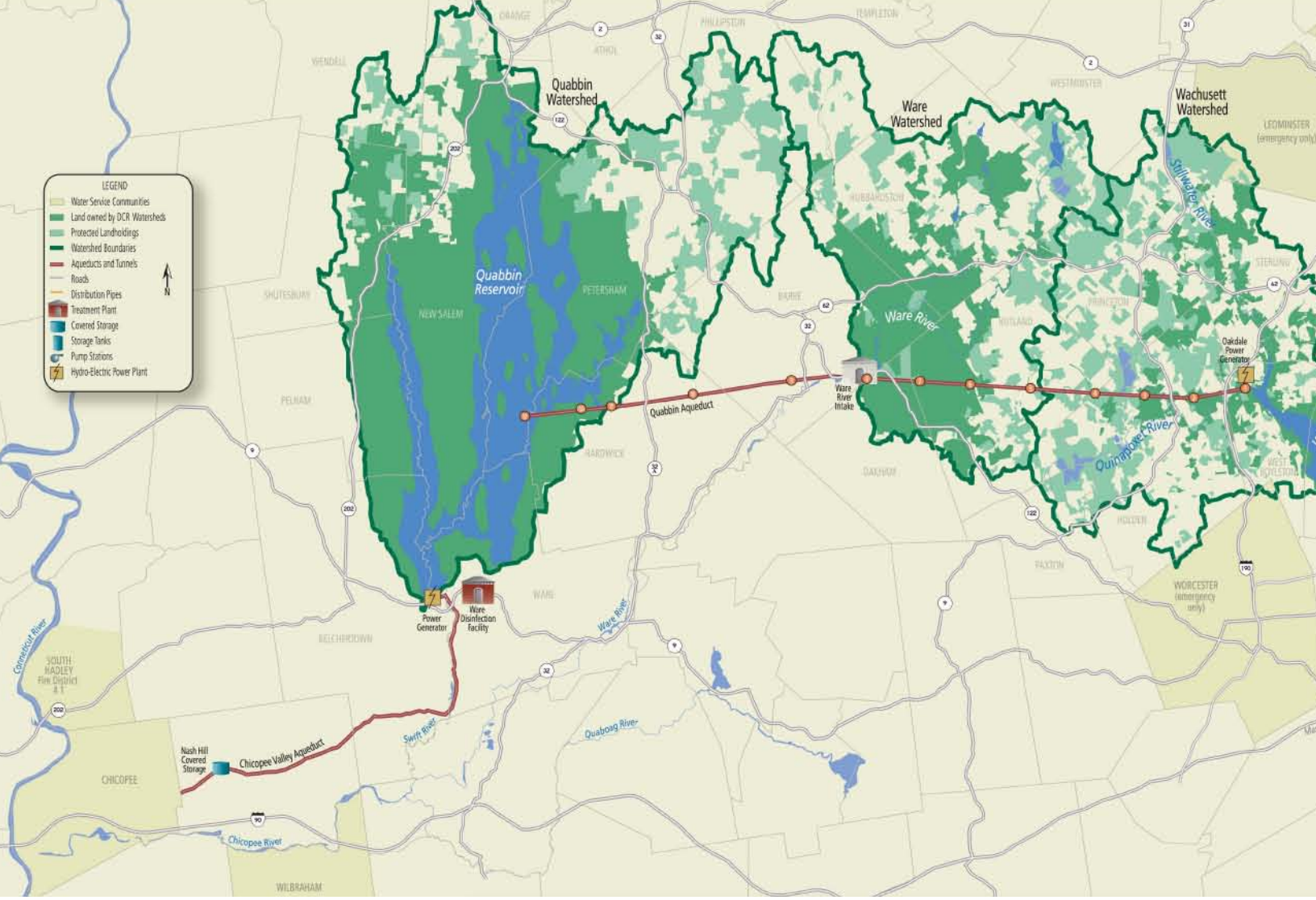
The new plant ensures compliance with state and federal regulations, improves drinking water clarity, and taste and odor control, results in a large reduction in chlorine disinfection by-products and provides strong protection against microbes and viruses.

The treatment plant has been designed with the flexibility to accommodate additional treatment processes, such as filtration. In 2000, Federal Judge Richard G. Stearns found that MWRA met the criteria for filtration avoidance and found that ozonation was a sound alternative to filtration. However, MWRA recognizes that changing technology and public health policy may lead to the consideration of treatment enhancements in the future.

Similarly, the 22-mgd Quabbin/Ware Disinfection Facility was completed in 2000 and now serves the Chicopee Valley Aqueduct (CVA) communities in the central part of the state.

MWRA is currently evaluating Ultra Violet Disinfection (UV) for both the Carroll and Quabbin/Ware water treatment plants to meet upcoming regulations that will require by 2012 two forms of first stage disinfection facilities to provide flexibility to incorporate further state-of-the-art treatment to provide increased protection.

John J. Carroll and the new John J. Carroll Water Treatment Plant in Marlborough



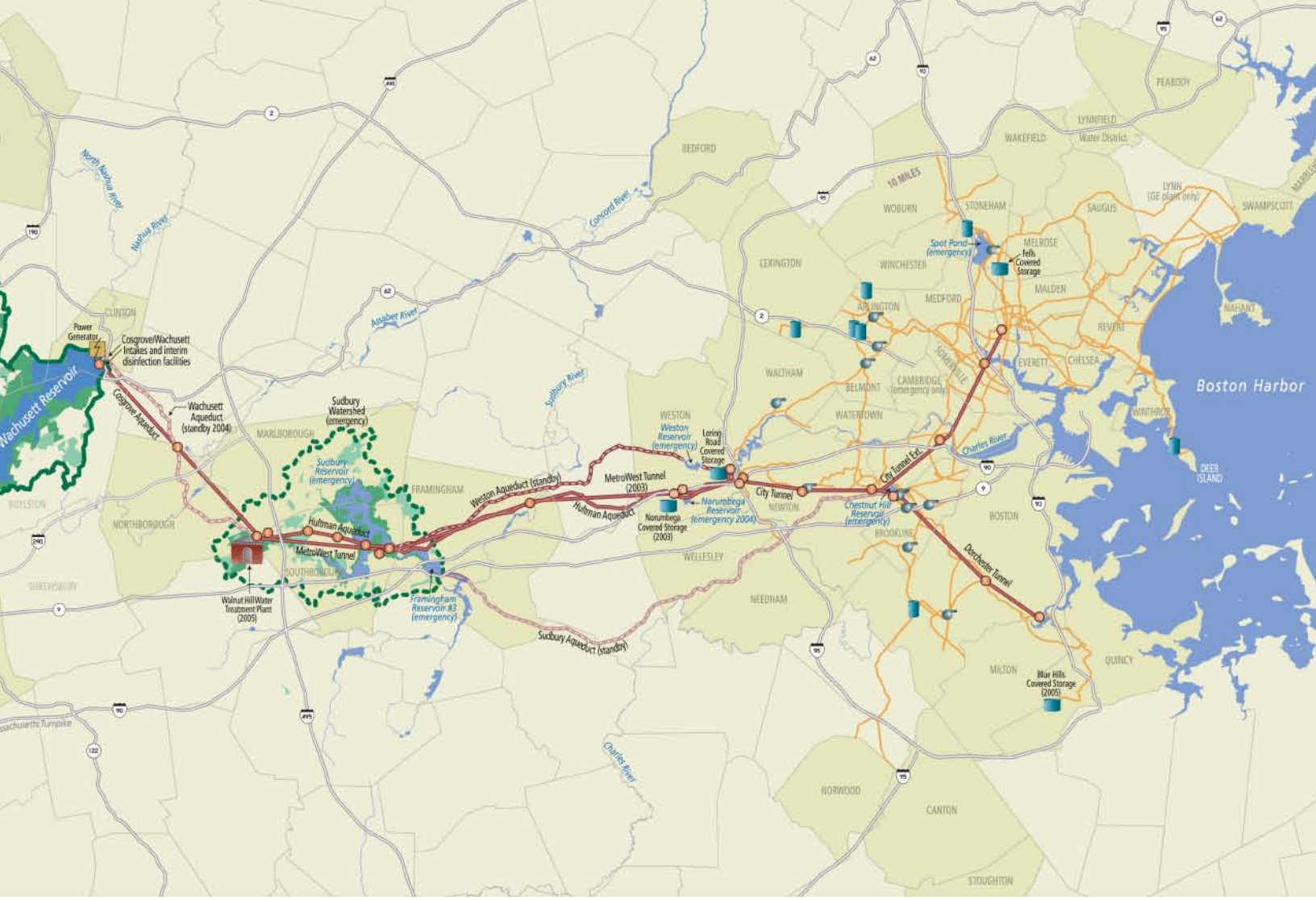
Nash Hill Covered Storage Tanks

Providing Transmission Redundancy

Delivery of MWRA water depends on a system of tunnels and aqueducts that transports water from Quabbin and Wachusett Reservoirs to distribution reservoirs in metropolitan Boston, and from there, to MWRA's 275-mile pipeline network. Since the 1940s, the Hultman had served as the sole means of transport of water for a critical leg of the MWRA transmission system. The Hultman could not be taken out of service for rehabilitation and its failure would have caused near complete interruption of Boston's water supply. Long-overdue redundancy was finally provided to MWRA's transmission system when the 17.6 mile, 14-foot finished diameter MetroWest Water Supply Tunnel was placed in service in 2003, on time and some $35 million under its original $700 million budget.

At the same time that tunnel construction was underway, other elements of the water transmission system were upgraded to prepare for the new water treatment plant and the addition of the new tunnel to carry the water east. To finish these preparations, several other projects were underway or completed in the past five years, including upgrades of the Cosgrove and Wachusett Intakes and the rehabilitation of the century-old Wachusett Aqueduct. These renovations provide additional measures of redundancy for MWRA's water system.

Redundancy is also being addressed for the CVA communities, which are dependent



on a sole MWRA pipeline. Like the Hultman Aqueduct prior to completion of the MetroWest Tunnel, the CVA cannot be taken out of service for routine maintenance or repair. As of December 2004, design is nearly complete and environmental assessment and permitting is well underway to construct parallel pipelines to the CVA.

Building Covered Distribution Reservoirs

Distribution storage reservoirs hold water to provide a reserve for hours of the day when demand is high; distribution reservoirs also provide an emergency water source. Historically, all distribution storage in the MWRA system was provided in open reservoirs. Since open distribution reservoirs do not comply with the Safe Drinking Water Act and are more susceptible to contamination, MWRA has phased out its active open distribution reservoirs and is constructing 280 million gallons of covered distribution storage. Construction of the Loring Road, Walnut Hill and Norumbega storage tanks was completed in 2001, 2003, and 2004, respectively.

With a storage capacity of 115 million gallons, the Norumbega facility in Weston provides distribution storage and hydraulic control for most of the water supplied to the Boston area and is the largest covered storage facility in the country. The new $95 million below-ground facility replaced the "open" Norumbega Reservoir. MWRA used a "design/build" construction procurement for the project.

Two additional covered storage tanks are planned at Blue Hills in Quincy and in the Stoneham area. Between 2000-2003, the Blue Hills Covered Storage project advanced through the preliminary design and environmental review process, and received a variance from the Wetlands Protection Act. In 2003, one party, despite the project's long list of supporters and overriding public interest and benefits, appealed the wetland variance. Currently, MWRA is awaiting the outcome of court proceedings at the same time that it is readying the project for a design/build

procurement.

Renewing Pipelines

Approximately 45% of MWRA's 275-mile pipeline network is comprised of unlined cast-iron steel or concrete pipes; the average age of MWRA's water pipes is about 80 years old. MWRA is undertaking a pipeline renewal program to replace unlined cast-iron steel or concrete pipes with structurally sound pipes to reduce the frequency of water main breaks, to increase the reliability of water flow and water pressure, and to improve water quality (older unlined pipes are conducive to bacteria growth and rust build-up on interior pipe walls). The pipeline renewal program is structured to either replace, clean or line six to seven miles each year.

At the same time that MWRA is improving its pipeline system, the agency continues to promote pipeline rehabilitation projects. The program goal is to better maintain water quality and ensure appropriate distribution system best management practices. Eligible projects include replacement of lead service connections, water main cleaning/lining, replacement of unlined water mains, looping of dead end mains, and engineering design and services.

MWRA's distribution network also includes ten active pump stations. Prior to 2000, extensive rehabilitation of the Gillis, Newton Street, Lexington Street, and Commonwealth Avenue pump stations was completed. In the 2000-2004 period, MWRA implemented fast track improvements and automated the Brattle Court, Reservoir Road, Hyde Park, Belmont and Spring Street pump stations, as well as made security

Major MWRA Water Pipeline Projects – Progress 2000-2004

PROJECT	STATUS
The Weston Aqueduct Supply Mains 1, 2, 3, and 4 includes multiple rehabilitation contracts totaling $114 million to improve the condition and capacity of 35+ miles of major supply lines that are 70–100 years old.	Project is 50% complete through 2004.
East-West Spot Pond Mains is a $61 million project to replace and rehabilitate two long supply mains which extend north from Chestnut Hill to Spot Pond, delivering water to Brighton, Boston, Chelsea, Medford, Malden, Somerville, Everett and Cambridge.	Project is 65% complete with major interconnection work complete in challenging urban locations. Approximately 65,000 feet of pipe has been rehabilitated or replaced.
Southern Spine Rehabilitation is a $61 million water main project to rehabilitate mains servicing Boston, Brookline, Milton, Quincy, Norwood and Canton.	Construction for two contracts for 4,300 feet of pipe commenced in June and November 2003. The project is 20% complete.
Boston Low Service Pipe and Valve Rehabilitation is a $24 million project of pipeline replacement, valve replacement, and cleaning and lining and selective abandonment of unneeded segments serving downtown Boston and surrounding areas.	Project was substantially completed in 2003.
Sluice Gate Rehabilitation and Valve Replacement involves $10 million in repairs to improve conditions of and access to sluice gates used to regulate the release of water from reservoirs and streams.	Construction for rehabilitation of historic gate houses and sluice gates commenced in September 2003 and was 75% complete in 2004.

CHAPTER 2

>>> Managing Operations

A Comprehensive Program to Maintain and Manage Assets

With $6.5 billion in capital assets, MWRA has consistently made maintenance of its facilities and pipelines one of its top priorities. Over the last five years, MWRA devoted a lot of attention to the following asset management practices described here as part of its agency-wide Facilities Asset Management Program.

> Reliability Centered Maintenance. RCM is a rigorous review of the design of each facility's systems, operational and maintenance strategies, and safety to focus maintenance where the greatest value is added. MWRA expects that, long-term, RCM will result in a preventive maintenance program that is less costly, more efficient, and more effective in maintaining system availability and long-term asset protection. First implemented on Deer Island in 1999, the RCM approach is being adopted for all MWRA equipment and infrastructure.

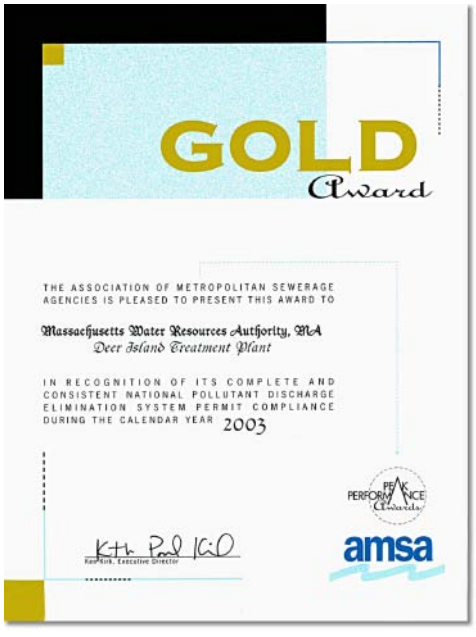
> Maintenance tasks completed by plant operators. MWRA executed agreements with its unions in 2002 to implement a competency-based Productivity Improvement Program for maintenance and operations functions across all MWRA facilities. Like other industries, MWRA has adopted a strategy of performing preventive maintenance. Making sure equipment is properly maintained avoids the cost and time of equipment failure. As of December 2004, the operations staff at the Deer Island Treatment Plant are completing 18% of all preventive maintenance work orders, an increase from 1% in March 2002. Annual cost savings on Deer Island are estimated at $290,000, equivalent to four full-time employees, including benefits.

> Condition monitoring. Since 2000, to proactively track and trend equipment operating condition, MWRA has implemented a number of condition monitoring technologies, including vibration, acoustic ultrasonic, infrared thermography, electrical testing, and oil analysis. By closely monitoring equipment health, catastrophic failures can be avoided, equipment downtime is minimized, and asset life can be extended. More than 75 staff at Deer Island have been trained on condition monitoring techniques. At the end of FY2004, predictive maintenance comprised 7% of all work orders, with 1,300 generated in that year alone.

MWRA pipe crew working in Medford

MWRA's efforts have not gone unrecognized. In 2002, the agency's Facilities Asset Management Program received the Operations Award from the Association of Metropolitan Sewerage Agencies. Moreover, results of a recent benchmarking study to identify industry best practices for asset and maintenance management work processes showed MWRA ranked first among utilities in the study group, including utilities the U.S. Government Accountability Office identified as being in the forefront of asset management.

The Deer Island Treatment Plant has an excellent environmental performance record as it relates to the quality of the treatment plant effluent it discharges from the harbor outfall tunnel, earning a Gold Award from the Association of Metropolitan Sewerage Agencies in 2003 and Silver Awards in 2001, 2002, and 2004.


GOLD
Award

THE ASSOCIATION OF METROPOLITAN SEWERAGE AGENCIES IS PLEASED TO PRESENT THIS AWARD TO

Massachusetts Water Resources Authority, MA
Deer Island Treatment Plant

IN RECOGNITION OF ITS COMPLETE AND CONSISTENT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT COMPLIANCE DURING THE CALENDAR YEAR 2003

PERFORMANCE Awards

amsa

High Quality Drinking Water

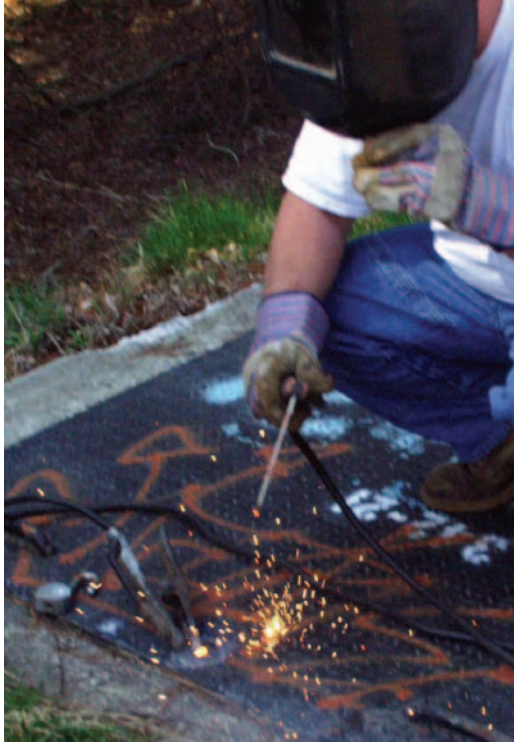
Health is truly the bottom line for the water supply, and MWRA's customers want and need to know that the water they use every day is safe. Over the last five years, MWRA has consistently met every drinking water standard except for lead. Lead is not in MWRA's source water but can enter through some types of household plumbing and, as a result, some homes in the MWRA service area may have higher levels of lead in their drinking water.

Since 1998, MWRA has published an annual water quality report, known as the Consumer Confidence Report, as required by U.S. Environmental Protection Agency (EPA). MWRA designed its report to be highly readable by the general public. The report provides answers to most of the questions consumers have about their drinking water - testing, detected contaminants, information about lead and watershed protection - and is available in a Spanish-language version, as well as on-line. Community water superintendents and others who wish more in-depth, technical data about water quality subscribe to MWRA's Monthly Water Quality Update.

As part of its overall program to improve and protect drinking water, MWRA has partnered with public health professionals on a series of projects. Since FY00, MWRA has funded programs of waterborne disease surveillance and outbreak monitoring with the Massachusetts Department of Public Health and the Boston Public Health Commission.

Protecting Our Drinking Water System in the Wake of September 11, 2001

The events of September 11, 2001 prompted a thorough reassessment of MWRA's security and emergency preparedness practices. Utilizing reports prepared by security experts, together with MWRA's knowledge of its own system, MWRA adopted and implemented an overall security strategy consisting of capital improvements and other physical security measures at reservoirs, aqueducts, water storage facilities, and water treatment facilities. Since September 11, 2001, MWRA has spent $6.6 million on physical security improvements, has received a direct $115,000 federal grant, and successfully competed for additional security grant funds awarded by the Commonwealth. MWRA security measures are wide-ranging:



(above) National Guard deployed to critical water facilities

(above left) Welding hatch covers

- At the reservoirs: National Guard deployment at key locations; purchase of and training exercises for emergency spill containment equipment; and addition of guardrails, fencing and jersey barriers. The open Norumbega Reservoir was taken off-line, the gaseous chlorine system was decommissioned and, for the first time in the history of the metropolitan water system, there were no open distribution reservoirs in the service area.
- At the aqueducts. A range of physical hardening measures have been taken, and gates and jersey barriers added throughout the system. By March 2004, the below ground MetroWest Tunnel was fully utilized, allowing the shutdown of the Hultman Aqueduct.
- At storage tanks. Physical hardening, gates, fencing, intrusion alarms, and cameras have been installed on a location-specific basis.
- At the new John J. Carroll Water Treatment Plant and other facilities, physical hardening, new security systems with cameras, and intrusion alarms. Improved water quality monitoring. New multi-parameter water quality sensors are being installed downstream of the most vulnerable sites.
- Emergency treatment plan. Three Mobile Disinfection Units were set up and are available to deliver high dosages of chlorine. Standard operating procedures have been developed and staff trained, field tests performed, and equipment mobilized.
- Emergency response planning. Agreement was reached with a railroad in December 2002 to provide EPA with information on potentially hazardous cargoes carried directly over the Wachusett Reservoir. MWRA prioritized the cargo list for risk assessment and prepared appropriate emergency response plans. More broadly for its water system, MWRA prepared a detailed Emergency Response Plan with 114 action plans for specific incidents at specific facilities. Since Plan certification by EPA in September 2003, MWRA has performed 14 drills. In 2004, MWRA upgraded its Emergency Operations Center in time for the Democratic National Convention.
- Protection against cyber attacks. MWRA put systems in place to receive instant security alerts from multiple sources and upgraded its firewall protection.
- Employee training and culture change. New identification badges were issued to all MWRA employees that can also be used for card access, contractor badges are issued to restrict access, and signs were posted at all facilities with a new hotline number encouraging reporting of unusual activities.

EPA (Environmental Protection Agency), Washington, D.C.

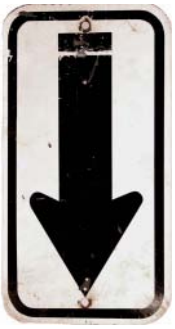
Working Together With Member Communities

MWRA's water and sewer system is physically connected to the local water and sewer systems of its member communities. MWRA and its communities also share a financial connection in that MWRA directly passes on the cost of running its operations to cities and towns. Because of these relationships, it is important that MWRA work closely with local city and town officials and their water and sewer superintendents.

The MWRA Advisory Board plays a pivotal role in ensuring that coordination between MWRA and its customer communities is in place. In particular, the Advisory Board Operations Committee offers a vital forum for MWRA to present system updates and receive member community feedback.

Since the events of September 11, 2001, MWRA has met often with member communities on security matters. Immediately after September 11, 2001, all MWRA water communities received a half-day briefing on MWRA actions, water quality and testing, and contingency planning for worst case scenarios. Follow-up meetings between MWRA staff and smaller groups of water communities were held to discuss details of community specific contingency plans and emergency response communication protocols. In May 2003, MWRA hosted informational meetings with communities to share the findings of its Vulnerability Assessment and offer advice and assistance for preparing their own assessments.

Over the last five years, other high-profile communication topics with the communities were drinking water quality, in light of the new water facilities MWRA was bringing on line; the new wastewater metering system MWRA began installing in 2004; and changes to the local financial assistance programs.



MWRA Water & Sewer Communities

Arlington	Clinton	Marlborough	Randolph	Waltham
Ashland	Dedham	Medford	Reading	Watertown
Bedford	Everett	Melrose	Revere	Wellesley
Belmont	Framingham	Milton	Saugus	Weston
Boston	Hingham	Nahant	Somerville	Westwood
Braintree	Holbrook	Natick	South Hadley	Weymouth
Brookline	Leominster	Needham	Southborough	Wilbraham
Burlington	Lexington	Newton	Stoneham	Wilmington
Cambridge	Lynn	Northborough	Stoughton	Winchester
Canton	Lynnfield	Norwood	Swampscott	Winthrop
Chelsea	Malden	Peabody	Wakefield	Woburn
Chicopee	Marblehead	Quincy	Walpole	Worcester

Community Financial Assistance Programs

MWRA's Infiltration/Inflow (I/I) Local Financial Program provides $181 million in grants and interest-free loans to MWRA sewer communities to perform local I/I reduction and sewer rehabilitation.

Eligible projects include:

- pipeline replacement
- public and private inflow source removal
- I/I reduction planning
- sewer rehabilitaion construction
- engineering services during construction

MWRA's Local Pipeline Assistance Program provides $250 million in interest-free loans ($25 million per year over a 10-year period) to MWRA water communities to perform local water main rehabilitation projects.

Eligible projects include:

- cleaning/lining of unlined water mains
- replacement of unlined water mains
- looping of dead end mains
- replacement of lead service lines
- engineering design
- engineering services during construction

CHAPTER 3

>>> Controlling Costs

Ensuring sustainable water and sewer rates has been and will continue to be MWRA's primary challenge. For the 2000-2004 period, community assessments continued to rise, although less than projected in the last five-year report.

Addressing the rates management challenge has required an array of cost-control measures and finance tools, as well as thoughtful consideration of MWRA operations by MWRA's Board of Directors and Advisory Board. Each year, MWRA must match current expenses with an equal amount of revenue. Today, member community assessments provide approximately 90% of MWRA revenues.

During the last five years, MWRA experienced significant change on both the expense and revenue sides of its $493 million budget (FY2005 final). As a result of strategies it pursued to decrease major components of its operating costs, MWRA has contained the growth in the day-to-day expenses - which totaled $173 million in FY04 - of running a large utility, even as it brought major new facilities on line.

At the same time, the biggest driver of MWRA's expense budget - debt service on the bonds that finance MWRA's past and ongoing capital improvements - continued to increase. In the early years, repayment of principal was pushed out to mitigate the full impact of rapid spending on the rates. Of the total $8 billion capital program, all but $1.8 billion has been financed. MWRA's debt service burden - the share of its budget which is devoted to principal and interest payments on its bonds - at 57% is one of the largest among water and wastewater utilities in the country, and will continue to increase to 65% by 2010.

MWRA's annual debt service expense, which totaled $272 million in FY2004, has traditionally been mitigated to some extent with debt service assistance and federal grants. But state and federal funding have sharply decreased in recent years, prompting community assessments to rise more steeply than would have otherwise been the case.

MWRA Rate Revenue Requirement, FY2000–FY2005 (millions)

	FY2000	FY2001	FY2002	FY2003	FY2004	FY2005
Sewer	$281.6	$283.2	$287.2	$304.2	$308.2	$311.2
Water	$82.1	$93.2	$102.3	$112.5	$123.1	$133.0
Total	$363.7	$376.3	$389.5	$416.7	$431.8	$444.3
% Increase	5.3%	3.5%	3.5%	6.9%	2.9%	2.9%
Estimated Household Charges (based on 90,000 gallons)						
Sewer	$441	$447	$456	$479	$515	$545
Water	$240	$246	$256	$297	$320	$342
Total	$681	$694	$712	$776	$835	$886

Tackling the issue head on, MWRA recently reassessed its capital program and downsized it by more than $500 million in December 2004. At the same time, MWRA and its Advisory Board have continued to press for additional debt service assistance.

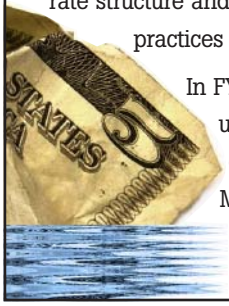
This chapter details MWRA's efforts over the last five years to control operating costs, manage its burgeoning debt, and set the stage for a future of sustainable rate increases.

What makes up a water and sewer bill?

Most communities' water and sewer rates include the costs of both MWRA's "wholesale" services – the storage and delivery of potable water to the community's distribution systems, and the collection, treatment, and disposal of wastewater from the community's collection system – and the community's "retail" water delivery and wastewater collection services for its customers.

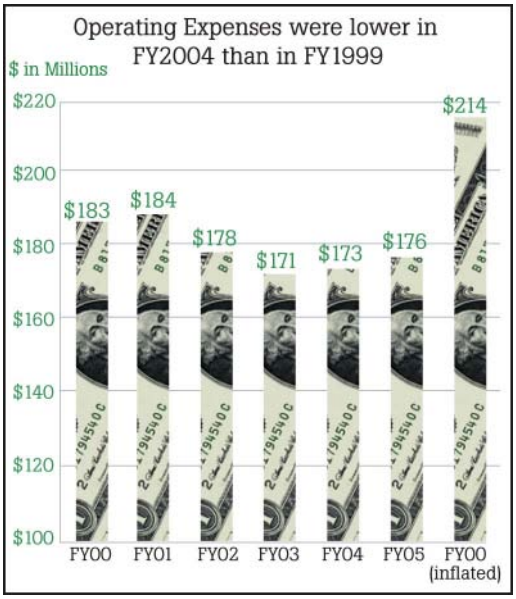
Community charges are developed under separate formulas that, for water delivery, use preceding year consumption and, for sewer services, use flow, population, and sewage strength.

MWRA's community charges typically represent approximately two thirds of the amount that communities bill their consumers, but the proportion varies considerably among communities. Each community has its own rate structure and accounting policies; community system maintenance practices also vary.



In FY2005, the average household charge (assuming high usage of 90,000 gallons) covering the MWRA and local costs in the 21 core communities that received both MWRA water and sewer service was $886. There is considerable variation between communities, from $674 in Everett to $1,453 in Belmont.

Reducing Operating Costs



Productivity Improvement Program

The objectives of the program include:

1. The increased efficiency and coordination and sharing of resources between operations and maintenance functions;
2. improvement in overall quality and productivity of work;
3. a team-based approach to the performance of maintenance functions;
4. increased number of classifications available to perform light maintenance;
5. consolidation of certain titles and job responsibilities into single classifications to increase effectiveness;
6. promotion of one-on-one training, skill-sharing and multiple skill development;
7. creation of roving operations and maintenance teams/crews:
8. reduction in overtime expenditures; and
9. implementation of a competency-based training approach to the development of new required skills.

MWRA has had a long-standing commitment to limit growth in direct (day-to-day) expenses to no more than 2.5% annually. Adjusting for inflation, direct operating expenses have declined from 1999 levels. Scaling back and retooling the workforce, consolidating space, and reducing expenses for chemicals, utilities and contract operations were critical strategies for MWRA in the last five years in getting costs to manageable levels.

A Smaller But More Effective Staff

In December 2004, 1,287 employees worked at MWRA, a 25.4 percent reduction from the staffing level of 1,713 people in FY1999. MWRA's workforce has been shrinking since 1997, and the current workforce level is consistent with agency-wide staffing targets developed in 2001 to reflect the changing nature of MWRA's work. Major construction projects were completed or well underway during the last five years, and annual capital spending in FY2004 reached its lowest level in 14 years. Given this backdrop, MWRA became more focused on operating and maintaining its increasingly newer facilities. The re-scaling of the workforce also reflects an evolution in how operations and maintenance tasks are being performed in MWRA facilities.

MWRA used a variety of strategies over the last five years to achieve its current workforce size and configuration.

> Reorganizations. In 2000, MWRA created the Operations Division, consolidating operations and maintenance staff into functional areas and creating organizational efficiencies across previously discrete Waterworks and Sewerage Divisions. In 2001, MWRA moved field staff from nine different locations to a new facility in Chelsea to improve daily work flow by pooling maintenance, certain operations, administrative functions and equipment storage. MWRA also unified its planning groups.

> Cross-functional flexibility in operations and maintenance. In 2002, MWRA executed agreements with the two unions representing operations and maintenance

staff to implement a competency-based Productivity Improvement Program for maintenance and operations functions across all MWRA facilities. The agreements required staff to complete a number of training courses and to obtain any needed licenses. Under the agreements, facility operators are required to perform a range of light maintenance tasks independently or as part of a team. These agreements have yielded greater flexibility in staff assignments, improved productivity, and produced savings. Annual cost savings on Deer Island are estimated at $290,000, equivalent to four full-time employees.

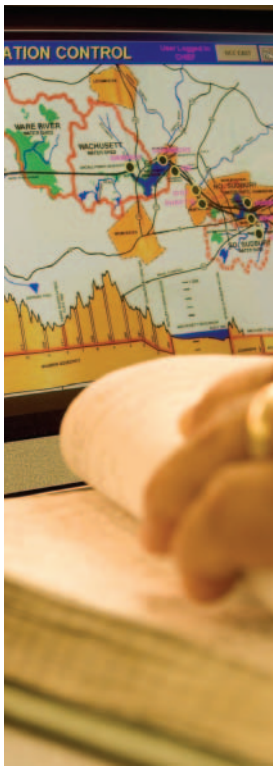
> Automated operations. MWRA is using state-of-the-art automation to move from operator-attended operations to unattended operations and has made significant progress in this regard over the last five years. Only two water facilities and eight sewer transport facilities are now staffed on a 24-hour basis. The other facilities are checked and operated as necessary by roving crews.

> Staffing reductions. MWRA has traditionally relied upon attrition to meet staffing targets. However, MWRA adopted Early Retirement Incentive Programs in 2002 and again in 2004 following the passage of state-wide legislation. A total of 204 staff participated in the program, providing both a benefit to employees who wanted to retire early and a gain to MWRA in accelerated staffing reductions. Backfilling of a limited number of positions was allowed. When state debt service assistance was eliminated mid-year in 2003, MWRA reduced staffing by an additional 50 positions.

Consolidation Of Facilities And Sale Of Surplus Property

The consolidation of staff from field locations into the Chelsea Facility allowed MWRA to vacate property at nine locations. MWRA also reduced its space needs at its Charlestown headquarters, from three buildings to one. In addition, where MWRA once owned 180 acres at the Fore River Shipyard in Quincy, MWRA reduced its acreage requirement to approximately 20 acres, sufficient for the operation of the residuals processing facility and construction staging for the Braintree-Weymouth Relief Facilities. As MWRA's space needs have been reduced, MWRA has pursued options for surplus property no longer required for MWRA functions. From 2000-2004, these efforts included surplusing the Chestnut Hill Waterworks, Glenwood Yard, and North Maintenance Yard property in FY2003; sale of a 12-acre parcel in Quincy in 2004; and Board approval in 2004 to surplus additional parcels in Quincy and acreage at the Hyde Park Pump Station.

In addition, in FY2003 MWRA executed an agreement with the former Metropolitan District Commission (now the Department of Conservation and Recreation) to give DCR care and some control of lands surrounding the Chestnut Hill Reservoir. A similar agreement was executed with Weston in FY2004, transferring maintenance of the Weston Reservoir to the Town. These partnerships free-up MWRA resources, as well as provide opportunities for passive recreation.



Working at Chelsea facility

Consolidation of staff to the Chelsea facility allowed MWRA to vacate property at nine locations and reduce space needs at the Charlestown headquarters

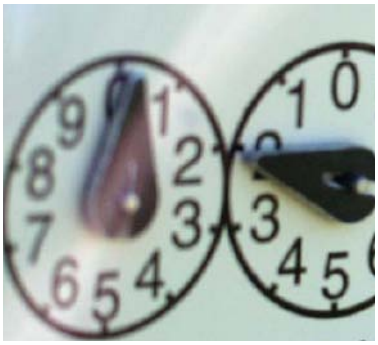
The Deer Island Energy Program

Self-generation. The Deer Island Treatment Plant was built with the capacity to generate power for use at the facility. Plant boilers burn gas from the plant digesters to produce steam for process and facility heating. Prior to the steam being used by the plant-wide heating loop, it is run through a steam turbine generator, where electricity is generated as a by-product. In addition, energy is recovered by the flow of wastewater as it drops from the plant into the outfall tunnel shaft through a 450 kilowatt hydroelectric facility that came on line in 2001. In FY2004 alone, self-generated electricity from these two sources reduced purchased power by 33.6 million kilowatt hours or $2.4 million, which represents approximately 21% of the plant's electrical energy requirements.

Deer Island is also able to self-generate electricity by running its two 26-megawatt combustion turbine generators (CTGs) and thereby reduce or eliminate its purchases from the power grid. Deer Island participates in the Price Response Program, administered by the not-for-profit Independent System Operators of New England (ISO-NE). The Program compensates energy users for monitoring and controlling their electrical consumption in response to or in anticipation of elevated market prices. In addition to the direct compensation MWRA receives from ISO-NE when Deer Island removes itself from the grid during so called price response events, MWRA also avoids the high market prices that typically occur during such events. In addition, a provision in Deer Island's FY2004 electricity supply contract allowed the supplier to resell Deer Island's fixed-priced base block of electricity at prevailing market prices, with MWRA realizing 95% of the resultant profit. In FY2004, the net result of this combined strategy was $424,000 in avoided electricity costs. MWRA received the 2004 ISO New England Demand Response Achievement Award for its significant contributions to the success of ISO-NE's Demand Response Programs.

Green power. Digester gas-derived electricity generated by the steam turbine qualifies as a renewable ("green") source of energy under the Massachusetts Renewable Portfolio Standards Program. This program prescribes that a minimum amount of power that must be supplied into the Massachusetts market be derived from renewable energy sources. Deer Island is awarded certificates for each megawatt-hour produced. Suppliers that do not meet the minimum requirement through their own sources can purchase certificates from generators such as Deer Island. Through an open bid process, MWRA sold more than 31,000 certificates in FY2004, netting $1.2 million of revenue.

Competitive Purchasing. Deer Island has been purchasing electricity from competitive suppliers since 2001. Energy market conditions are characterized by their volatility, and MWRA has sought to balance the ability to respond to changing conditions with maintaining a measure of budgetary predictability. During FY2004, MWRA saved more than $2.6 million dollars by purchasing electricity from a competitive power supplier as compared to the price of so-called default service from the local utility.



Process control improvements. Deer Island has also focused on demand-side energy management to reduce the quantity of power consumed in various wastewater treatment processes. For example, beginning in FY2002, MWRA was able to avoid $500,000 in annual electrical costs by optimizing the secondary treatment biological process.

Working at Deer Island lab

Reducing Utilities and Chemicals Expenses

Utilities and chemicals are two of MWRA's largest operating expense categories. In FY2004, $25 million, 15% of the year's direct expenses, was expended for utilities and chemicals used at MWRA facilities.

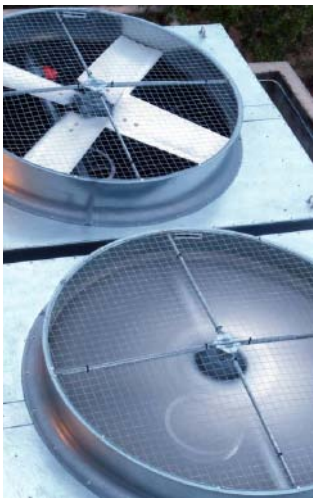
Strategies to both lower the purchase price of these commodities and utilize them efficiently have been a major focus for MWRA. Not only do MWRA initiatives save money, they are consistent with the State Sustainability Program's goals to reduce greenhouse emissions and fossil fuel use, decrease chemicals usage, and increase use of renewable resources.

The Deer Island Treatment Plant is among the top ten consumers of electricity in northeastern Massachusetts; its wastewater treatment processes account for nearly half of the FY2005 $19 million energy and utilities budget. Not surprisingly, Deer Island has been front and center in MWRA's energy cost savings and "green power" utilization efforts. Deer Island's energy efforts have yielded a total of $6.6 million in cost savings, avoided costs, and revenue in FY04 alone, earning it the 2004 Operations Award from the Association of Metropolitan Sewerage Agencies. Other significant MWRA energy initiatives over the last five years include installation of energy-efficient equipment at new or rehabilitated facilities, the start-up of refurbished hydroelectric facilities at the Wachusett Reservoir's Cosgrove Station, and a study of wind power generation at Deer Island.

On the chemicals side, the Deer Island plant accounted for $2.7 million of MWRA's $6.2 million in process chemicals expenses in FY2004. Deer Island's expenditures have dropped steadily each year for the past five years, reflecting operational enhancements at the plant including improved instrumentation, better process control, and more efficient chemical mixing and dilution in storage to reduce degradation. For example, usage of sodium hypochlorite, by far the most extensively used chemical on Deer Island, has declined since FY2000. This reduction also meant that Deer Island required 50% less of two other chemicals, sodium bisulfite and sodium hydroxide.

Using Contracted Services

Like private sector companies running complex facilities, MWRA has successfully used contracted services when and where cost-effective. Contracted and purchased services comprise the second largest component of MWRA direct expenses at 22%. Traditionally, MWRA relies on contractors to deliver a range of professional services (such as harbor and outfall monitoring and security services), ancillary services (such as the removal and disposal of grit and other waste products collected in



HVAC

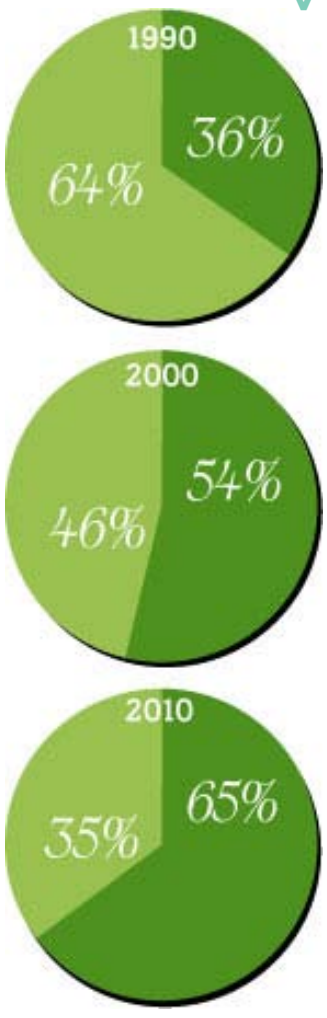
the wastewater stream that cannot be treated at MWRA's treatment facilities), and maintenance services. For example, in the maintenance area, MWRA uses contracts for specialized facilities and equipment at the Deer Island Treatment Plant, including the combustion turbine generators, centrifuges, oxygen plant, and computerized process control system, and HVAC services and other plant and machinery services at its facilities in general.

In particular, MWRA relies on contracted services for non-routine operations or unique situations. MWRA's largest contracted service by far is for the processing and disposal of wastewater treatment plant residuals.

Deer Island sludge - the residual solids that are a by-product of wastewater treatment - is processed and re-used as fertilizer. Residuals processing and marketing is a discrete and stand-alone function that MWRA has contracted out since 1991 using a series of short-term contracts. In February 2001, MWRA awarded a 15-year contract for residuals operations and marketing, taking advantage of changes in federal law that permit longer-term contracts for the operation and maintenance of publicly owned water and wastewater facilities. MWRA estimates savings over the life of the contract to be $95 million; the contract is ranked as one of the largest in the industry.

Lowering Capital Financing Expenses

Debt service as a percent of operating budget



MWRA's primary source of funds to finance the capital program is borrowing through the issuance of long-term revenue bonds. MWRA has approximately $5.1 billion in outstanding secured debt, including fixed-rate, variable-rate and State Revolving Fund debt.

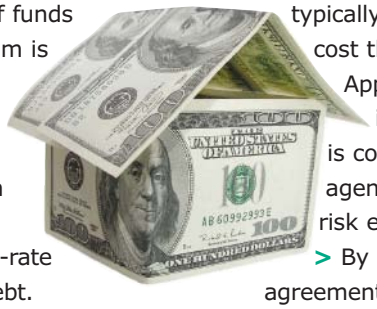
Because the expense of annual debt service payments (principal and interest) comprises the largest portion of MWRA's budget, MWRA does everything possible to reduce this expense. MWRA borrows capital funds at the lowest rate available while minimizing the risk associated with variable rate debt. The average cost (interest rate) of all MWRA debt is now 4.13%; five years ago, MWRA's debt cost was significantly higher, 4.72%.

MWRA achieved these interest cost savings in the following ways:

> By issuing bonds to fund ongoing capital projects or to refinance existing debt at times when interest rates are favorable. MWRA debt issues have consistently outperformed the 30-year Municipal Utility Interest Rate benchmark.

> By refunding debt as lower interest rates have declined over the past several years. To date, MWRA has refunded approximately $2.8 billion for a total net present value savings of $165 million.

> By issuing more variable rate debt, which typically carries a lower interest rate cost than fixed-rate debt. Approximately 11% of MWRA debt is now variable rate, a level that is consistent with bond rating agencies' standards for interest rate risk exposure.



> By entering into rate swap agreements, MWRA estimates that it has saved approximately $86.5 million to date over what it would have cost to issue fixed rate debt at those points in time.

> By maximizing the use of the State Revolving Fund (SRF) program, because its subsidized interest rates are the lowest available to MWRA. From FY2000 to FY2004, MWRA borrowed $410.4 million from the SRF; SRF debt currently comprises 13% of MWRA's debt portfolio.

MWRA has also done the following to mitigate or manage the impact of debt service costs on water and sewer rates:

> By better matching amortization schedules with the life of the asset that is being constructed. This practice has allowed MWRA to include more 40-year debt in its portfolio, which on an annual basis has a lower cost than 30-year debt. 11.5% of MWRA's portfolio is 40-year debt.

> By structuring or restructuring debt to vary annual repayment amounts so that debt service payments do not create spikes in water and sewer rates charged to MWRA's member communities.

Maintaining A Strong Credit Rating

Most recently, in March 2005, Fitch Ratings upgraded the bonds to AA from AA- and Moody's raised its rating to Aa2 from Aa3, citing financial management as MWRA's key strength. In addition, Standard and Poor's affirmed the MWRA's rating of AA stable. These upgrades coincided with a $400 million refunding that will save MWRA ratepayers about $20 million over the next 30 years. MWRA was previously upgraded in both FY2000 and FY2001.

Specific financial management factors prominently highlighted in MWRA's latest upgrade include its "ability to achieve positive operating results despite significant reductions in debt service assistance." In addition, Fitch Ratings noted that MWRA's "conservative financial practices and excellent long-term planning and project oversight and prioritization have again helped reduce the capital improvement plan." Both MWRA's response to cutbacks in debt service assistance and its management of its capital program reflect strategies to protect communities from unnecessary rate increases.

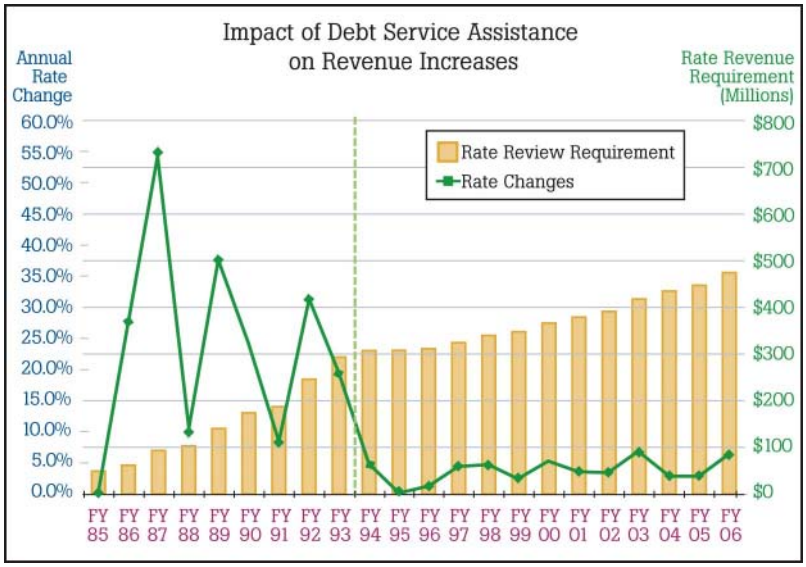
Rating Agency	FY1999	FY2000	FY2001	FY2002
Fitch IBCA	A+	AA-	AA-	AA
Moody's	A1	A1	Aa3	Aa2
Standard & Poor's	A	A+	AA	AA

A strong credit rating translates directly to a lower cost of borrowing

Responding To Cutbacks In Commonwealth Debt Service Assistance

Commonwealth debt service assistance provides funds to MWRA that would otherwise come from its ratepayers. Debt service assistance for MWRA was first appropriated in 1994; MWRA received $20 million, the equivalent of 20% of its annual debt service expense. The state's dollar commitment continued to increase over time as MWRA's debt burden grew - $46.5 million in FY2000, $51.3 million in FY2001, and $50.2 million in FY2002.

However, in mid-2003, debt service



assistance was completely eliminated. Rather than taking extreme measures, such as raiding reserve funds, threatening operations by slashing operating costs, or imposing a large mid-year rate increase, MWRA took a balanced approach in meeting the $47.2 million budget gap created by this loss in funding, using a combination of reserve funds, spending cuts and a reasonable rate increase to make up the shortfall. The following year, the Legislature restored some of the funding for ratepayer relief and MWRA received debt assistance for FY2004 ($4.1 million) and FY2005 ($8 million).

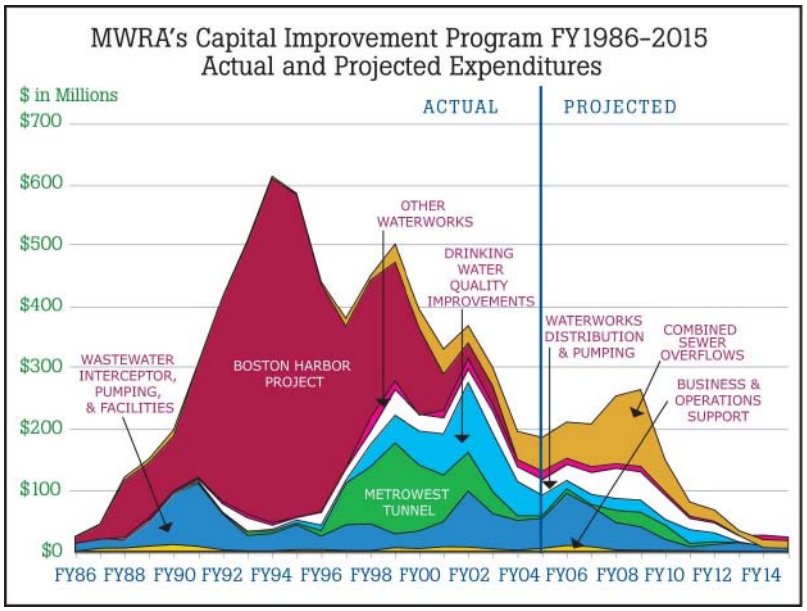
Re-Sizing The Capital Improvement Program

MWRA's Capital Improvement Program (CIP) has traditionally been a ten-year funding forecast of the capital needs of the water and wastewater system. In addition to annually earmarking funds for projects already underway, MWRA identified, evaluated and prioritized new projects for inclusion in the CIP. As part of the annual budget process, a three-year spending projection was approved by MWRA's Board of Directors after consideration of recommendations from the MWRA Advisory Board.

As part of MWRA's agenda to manage rate increases for its member communities, the need to set fixed funding parameters to guide future CIP spending emerged as a major discussion topic for MWRA management, its Board and Advisory Board. Ultimately, during the FY2001-2010 CIP process, MWRA's Board of Directors imposed a ten-year CIP spending cap of $2.3 billion. Mid-course actions in FY2003 to reduce expenses, led to the MWRA Board's adoption of a new five-year $1.3 billion CIP spending cap for the FY2004-2008 timeframe and some revisions to policies governing spending cap compliance. MWRA spending in both FY2004 and FY2005 has complied with cap requirements.

In December 2004, MWRA presented a Proposed FY2006-2013 CIP of $1.6 billion, equal to the spending level approved in FY2004 but reflecting a spending reduction of approximately $420 million as compared to the FY2005 CIP. This action recognized the burden on ratepayers of MWRA's high level of debt, the significant reduction in the amount of debt service assistance received from the Commonwealth, and the continued uncertainty regarding future debt service assistance. This budget accelerates spending on the CSO Program and reduces infrastructure spending in the FY2009-2013 timeframe.

Going forward, MWRA will be challenged by its need to balance system needs and regulatory requirements against limited capital resources. Building on an asset replacement analysis recently completed and a broader master planning process now underway, MWRA will develop a project prioritization process to reconcile needs with resources.



What is Debt Service Assistance?

In response to a growing public outcry against rising water and sewer rates, the legislature appropriated $20 million in debt service assistance to MWRA in FY1994. This amount was sufficient to offset 20% of MWRA's debt service for wastewater projects. By FY2002, the appropriation had grown to almost $53 million and included debt for the MetroWest Water Supply Tunnel. Debt service assistance was designed to offset revenues that would otherwise have to come directly from ratepayers.

CHAPTER 4

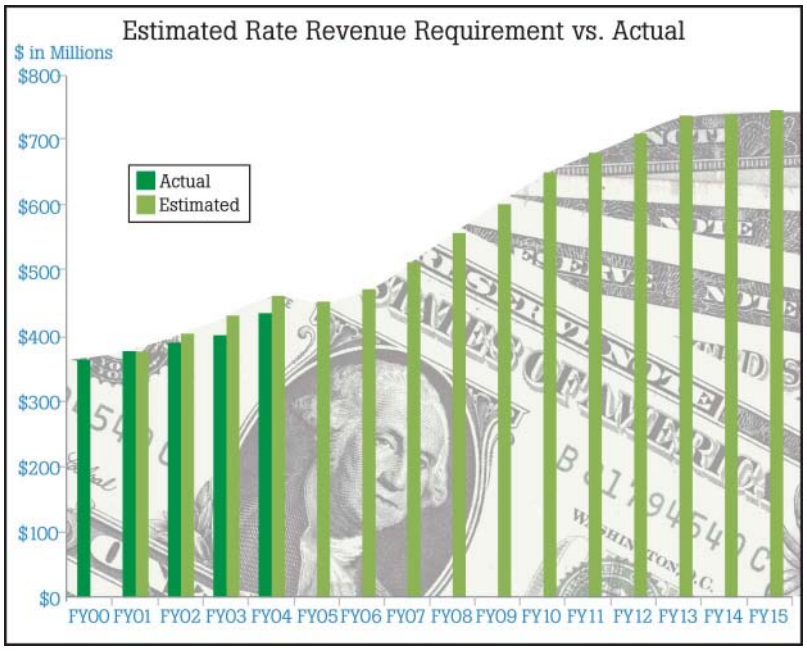
>>> Future Challenges

MWRA's success in the future will be determined by how MWRA's ratepayers, member communities and oversight bodies judge the agency's performance. To be effective, MWRA will need to continue to demonstrate strong results on a number of objectives:

- Real environmental and public health benefits from cost-effective expenditures.
- Safe and reliable water supply; vigilant protection of water.
- Reasonable and affordable rates.
- Effective working relationships with communities.
- Excellent maintenance of its facilities.
- On-time and on-budget project delivery with minimized neighborhood and service disruption.
- Well-managed operating and capital budgets.
- Proactive resource management and planning.

In striving for these results, MWRA will face myriad challenges. Emerging federal and state regulatory requirements for new facilities and operating procedures will need careful evaluation to determine the relationship between benefit and cost; regulations that are not cost-effective will need to be questioned. Investment in new water and wastewater facilities and infrastructure will need to be balanced with re-investment in the existing system. Sound operating and maintenance practices must be followed with an emphasis on cost-effectiveness. The Water Supply Protection Trust will need to evolve if its promise of improved oversight of critically important watershed protection activities is to be fully realized.

Managing community water and sewer rates to reasonable and affordable levels against projections showing that, without state debt service assistance, middle-to-high single-digit percentage increases may be unavoidable in the near-term, is the backdrop against which all other challenges must be met. This chapter will describe in some detail the dilemma posed by MWRA's rate increase scenario and steps that MWRA is taking to manage future rate increases.

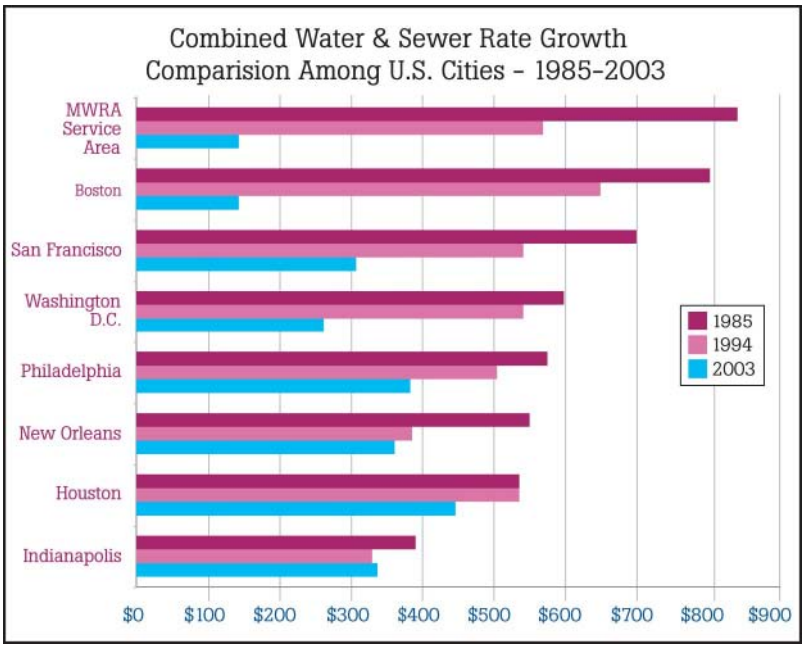


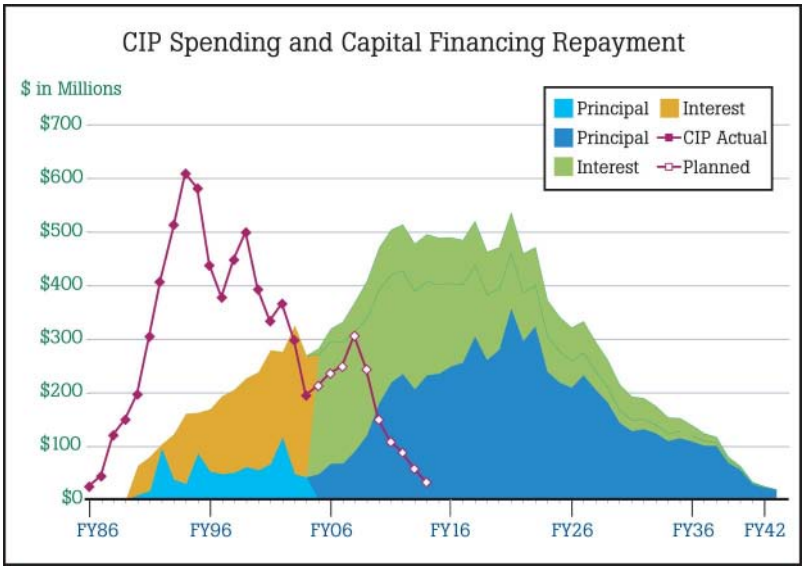
Navigating Through A Sea Of Debt

MWRA rate increases are inescapable, as the primary driver of the agency's expenses is its debt burden. Recognizing the need to reduce the overall debt burden, MWRA proposed a significantly down-sized Capital Imrovement Program for FY2006 - 2015, eliminating more than $600 million of projects planned for construction in out-years.

In FY2005, debt service payments on past investments comprised 58% of MWRA's total expenses. Debt service will continue to grow until 2010, when MWRA's total indebtedness will begin to decline. In the interim, the impact of financing assets built over the past years will collide with continued pressure on MWRA to spend funds on mandated projects and maintenance of the system.

^ In each annual budget cycle, MWRA projects rates for the coming 10 years.





Affordability Is A Major Concern

MWRA rate-setting, especially as impacted by the cost of unfunded federal mandates and court-ordered projects, is approached cautiously by MWRA and its oversight bodies. MWRA's estimates for future rate increases have heightened concerns about the affordability of MWRA's rates, and MWRA has taken steps to assure that this issue is taken into consideration by DEP and EPA as the scope of programs that respond to regulatory mandates are decided.

Regulatory-mandated projects still dominate the budget: of the proposed $1.6 billion of total spending in 2004-2013, almost 40% is for the CSO program, putting CSO controls at the heart of the affordability debate. At the MWRA Advisory Board's urging, MWRA commissioned a study to examine the impact of sewer rates on the MWRA service area. The study considered sewer rates as a component of basic living and "shelter costs" and found that between 1997 and 2003, increases in the cost of living in the MWRA service area outpaced increases in household income. The study further documented that shelter costs in the MWRA service area as a percentage of median household income imposed a larger economic burden relative to more than 90% of the 80 other metropolitan areas examined. Any further requirements for MWRA to implement CSO controls more expensive and extensive than those already assumed would exacerbate the significant economic burden that MWRA ratepayers already experience.

The 2004 Annual Infrastructure Consumer Report Card by Mass Insight Corporation reinforces the concern that affordability is increasingly an issue; this public opinion survey found that while the public would pay more for important water protection projects, less than half in the Boston area would be willing to pay more than $100 a year in additional water and sewer fees. However, without increased ratepayer relief or other fundamental changes in the rate base, rate increases will surpass this mark.

Just as sewer rates are a component of basic living and shelter costs, they are also a business cost and a baseline measure of economic competitiveness. High business costs are a pressing issue given that Massachusetts is emerging from recession more slowly than other parts of the nation.

A Long-Term Plan For System Investment Is Needed

Since its inception nearly 20 years ago, MWRA has undertaken an aggressive $6.3 billion capital program to construct new physical assets and rehabilitate or replace existing assets. Approximately $5 billion or 84% of all capital funds spent through 2003 was for new MWRA assets, while approximately $800 million or 13% was spent on rehabilitation or replacement. While the CSO Program will dominate spending in the FY2004-2013 timeframe, rehabilitation and replacement will become the largest component of CIP spending as newer

infrastructure ages and more attention is paid to older infrastructure that has experienced underinvestment.

Resources to meet system rehabilitation and maintenance needs are an increasing need at the same time that funding constraints continue to intensify. The average age of MWRA's 270-mile wastewater interceptor system is 70 years old, and the average age of the 350 miles of its water distribution system is 80 years. Even relatively newer infrastructure requires capital investment: components of the Deer Island Treatment Plant are already ten years old, and improvement and replacement of equipment is likewise required to ensure that the plant continues to operate efficiently and effectively.

MWRA has developed a preliminary rehabilitation/replacement cycle profile to better understand on a macro level the long-term financial and organizational implications for MWRA. As shown in the figure on the previous page, MWRA is expected to face reinvestment challenges in every decade over the next 40-years. This challenge is a function of both the scale of the MWRA's assets and the cyclical nature of the MWRA's investments. All told, the reinvestment planning estimate for the ten-year period beginning in FY2014 is $2 billion or $200 million per year. For the FY2024-2033 period and the FY2034-2043 period, the investment need is predicted to be $1.4 billion and $1.6 billion, respectively.

MWRA understands that addressing rehabilitation/replacement must be considered in the context of other needs, including regulatory requirements, system reliability and security, and in the larger context of rates management. With limited resources, determining how funds should be allocated between repair and reinvestment in existing infrastructure versus fulfillment of unfunded regulatory mandates becomes a critical task.

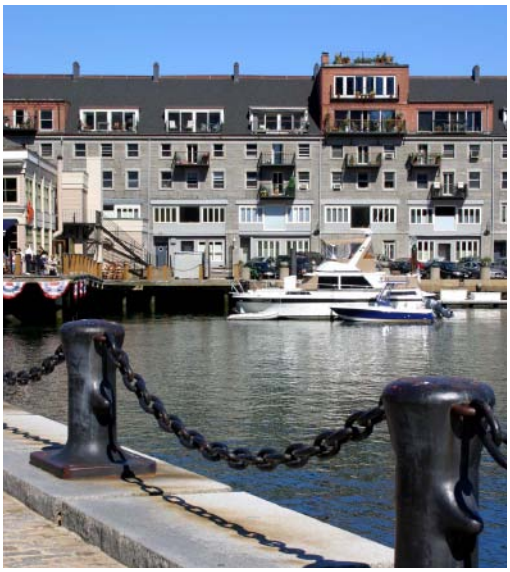
For the FY2006 CIP, MWRA deferred other crucial water and wastewater needs to meet current CSO requirements to limit increases in water and sewer rates. A master planning process is underway to determine where dollars should be spent first and to reevaluate the need, priority and schedule for projects, including those eliminated in the FY2006 CIP.

MWRA Must Guard Against Regulations That Do Not Produce Cost-Effective Benefits

MWRA faces far-reaching state and federal regulatory programs and evolving policy requirements that often defy simple solutions. MWRA is still charting its course through several key issues where consensus with regulators has not been reached.

> CSO Control Plan. MWRA has advocated a comprehensive approach for CSO control, one that considers the plan as the sum of its various project components. MWRA's control plan for North Dorchester Bay and

beaches will cost more than $300 million and includes stormwater management facilities, despite the fact that MWRA has no statutory or regulatory responsibility for managing separate stormwater. Once completed, the project would eliminate discharges to the beaches except in catastrophic storms. The North Dorchester Bay Plan advanced by MWRA was readily embraced by the Federal Court and incorporated into a Court-ordered schedule. However, in the Charles and Alewife Brook/Mystic River Basins, consensus has not yet been reached. The virtual elimination of CSOs, at a significant cost, would not result in significant improvements. In these basins, MWRA's priority is to gain regulatory acceptance of CSO controls that would result in infrequent CSO discharges, rather than complete elimination of CSOs at an additional cost of hundreds of millions of dollars. MWRA's challenge is to secure acknowledgment from neighbors, the parties in litigation, EPA, and DEP that the already proposed CSO controls are enough, and with this accord, proceed to implement the CSO controls.



- Deer Island Discharge Permit. In August 2005, MWRA's existing National Pollutant Discharge Elimination System (NPDES) Permit for Deer Island will expire. The NPDES permit, jointly issued by the EPA and DEP, established effluent limitations, as well as programmatic and operational requirements. MWRA's current NPDES permit is one of the most stringent in the nation; permit requirements reflect negotiations during the planning and construction of Deer Island and the outfall. At that time, uncertainties as to the plant and outfall's effects engendered unusually comprehensive and extensive monitoring and reporting requirements to assess the outfall's effects on the marine environment. In the last four years, numerical thresholds set for environmental parameters have not been exceeded and an abundance of peer-reviewed scientific reports and data points to the lack of adverse impacts of MWRA outfall on Massachusetts Bay. MWRA believes such findings have resolved uncertainties regarding the outfall effect and support the re-design and scaling down of the monitoring plan to lower costs to ratepayers. MWRA is also seeking changes to other permit components that have limited benefit but high associated costs. MWRA efforts to ensure that permit requirements are reasonable and supported by sound science will likely entail extensive negotiations with regulators.
- Water Resource Management. In 2004, the Massachusetts Executive Office of Environmental Affairs issued the Massachusetts Water Policy, setting out recommendations regarding planning, tools and strategies to promote efficient use of water, infrastructure maintenance, water supply development, and resource protection. The policy was borne from a concern that Massachusetts faces water resource management challenges regarding water quantity, quality and habitat. MWRA, both as a member of the regulated community due to its water withdrawals and wastewater discharges, as well as in

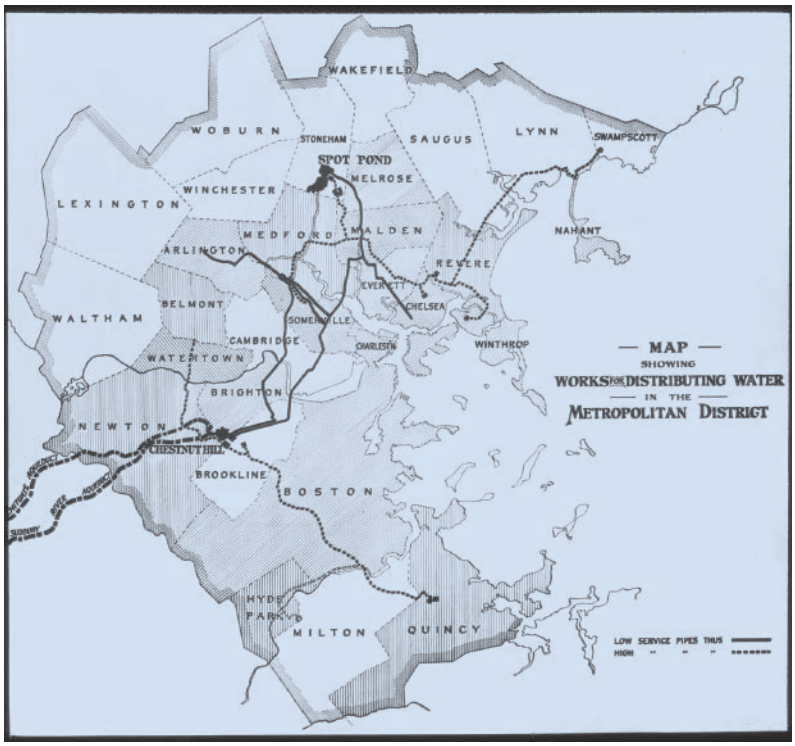
MWRA NPDES Permit Requires Unsually Extensive Monitoring

One example is the Contigency Plan that was incorporated into the permit. The Contingency Plan set numerical thresholds for environmental parameters that could indicate adverse outfall effects: there are more than 90 thresholds, including 22 treatment plant thresholds and 68 environmental thresholds, for which data is gathered, analyzed, and reported. The amount of work to comply with the Contigency Plan diverts staff and resources and on average, MWRA spends $2 million annually on monitoring and reporting.

its role as a regional water supplier, has a key interest in state water policy. Programs that MWRA has already undertaken - conservation initiatives, infiltration/inflow reduction programs, and an emphasis on maintenance - get at the heart of many of the policy's objectives. Still, more could be required if evolving state policy results in new standards and requirements. MWRA must attempt to ensure that new requirements do not create unfunded mandates or impose one-size-fits-all solutions that are impracticable or off-target for MWRA, its member communities, and ratepayers.

A Long Range Water Supply Vision Is Needed

MWRA service area communities have embraced conservation, leading to a significant drop in system demand. The current demand of approximately 220 mgd is well below the volume of water that MWRA's reservoirs can safely supply, even during periods of severe drought. Demand is expected to remain low, due to a combination of factors - conservation, response to price increases, and limited future population and low employment growth since the MWRA service area is largely built-out. At the same time that water demand in MWRA's urban core is dropping (and affordability concerns are increasing), there are communities at MWRA's periphery that have either experienced, or are projected to experience, water shortages.



Metropolitan Water District – 1895

Given the now ample margin of supply over demand, MWRA is well poised to supply these communities, either on a permanent or emergency basis, without adverse impact to existing communities or donor reservoir basins. Expanding the MWRA service area would spread out debt service and other fixed costs to a broader number of communities, reducing costs to the existing service communities. It would also assist those water short communities that are faced with the high costs and other impediments in developing new supplies.

MWRA carefully evaluates any requests from outside the service area to join the system or receive emergency water. Prior to admission to MWRA, though, other regulatory approvals must be obtained and obtaining those regulatory approvals can be particularly difficult. MWRA must work with neighboring communities, state agencies and watershed interests to assess where MWRA may fit in meeting future water needs, and then work to ensure that state water policy and regulation allows appropriate consideration of requests to join the MWRA. In short, it is time to consider how resources and costs can be better allocated.

PROJECT	CHALLENGES
South Boston CSO Recommended Plan 11,000 foot 17' foot diameter storage tunnel and related facilities, sewer separation, new storm drainage system; and dewatering pump station to virtually eliminate CSO discharges and minimize stormwater discharges to beaches.	Construction of large diameter soft ground tunnel and associated surface facilities in an urban area within public parklands and parkways. Implementation of innovative and complex controls to co-manage CSOs and stormwater with state-of-the-art real time data. Multitude of permits and arrangement with public property owners.
Upper Neponset Valley Sewer System 2.3 miles of sewer to be constructed underneath the heavily traveled tree-lined VFW Parkway.	Nighttime construction to mitigate traffic impacts and mitigation measures (for tree preservation, traffic, noise) make construction difficult and extend construction period. Addressing neighborhood concerns during the construction period.
Blue Hills Covered Storage 20 milllion gallon covered storage facility to be constructed in partial footprint of existing Reservoir. Enhancements/restoration of open water in remainder of reservoir footprint.	Securing wetland permit for project to proceed; permit appeal by one party has delayed project and threatened project's implementation. Minimizing disruption to adjacent park area during construction/integration of storage tank with adjacent land uses.
UV Treatment at Carroll Treatment Plant Addition of UV treatment processes to meet anticipated EPA requirements that require two primary disinfectants on unfiltered water.	UV disinfection treatment processes must be added while treatment plant is in operation. Since plant cannot be shut down, careful scheduling, coordination and restricted windows for accomplishing required work are required.
Rehabilitation of Water Transmission System Inspection and rehabilitation design of aging tunnels (Wachusett, Hultman, Quabbin Tunnel, City Tunnel, Southborough Tunnel).	Development of revised operating procedures to provide uninterrupted supply when key transmission links are taken out of service for repair to correct structural deficiencies.

Prior chapters describe engineering feats that have been accomplished by MWRA. While the next generation of projects is generally smaller in scale, these projects are still of substantial complexity to pose assorted construction, operational, and institutional challeges in their implementation.

Challenges Of Capital Projects To Be Constructed

Some upcoming capital projects are of substantial complexity and will pose a variety of construction and operational challenges in their implementation.

MWRA's Watershed Protection Partnership with the Commonwealth must be Strengthened

Watershed protection is the basis of MWRA's ability to provide high quality water and plays a prominent role in MWRA's compliance with federal and state drinking water regulations. In 2004, two mechanisms were put in place to facilitate watershed protection activities: the first, an MOU between MWRA and DCR providing for fiscal accountability and delineating responsibilities for watershed protection, and the second, the creation of a Water Supply Protection Trust to serve as a financing conduit for the flow of funds from MWRA to DCR for water supply protection activities. MWRA and DCR's working relationships have been enhanced, aided by new tools such as the development of annual work plans and progress reporting, as well as by the reallocation of responsibilities between the agencies to foster efficient and effective watershed protection and water quality maintenance.

However, expectations regarding DCR's budget have not been fully met and fiscal issues around the workings of the Water Supply Trust are still being ironed out. Given the stakes, these issues require speedy resolution.

There is No Silver Bullet

MWRA's past success was borne of its tangible results in improving the environment and protecting public health, its responsiveness to the member communities it serves, its working relationships with its oversight bodies, and its cost control program. The availability of financial assistance – federal grants, particularly in the early years; state debt service assistance, until recently a robust source; and the Commonwealth's SRF Program – all helped cushion the impact of rising rates on service area customers. Since the low-lying fruit has already been picked, MWRA will need to be particularly creative in setting future budgets. It must look for opportunities – however limited – to further reduce operating and capital spending, to identify new revenue sources, to refinance or restructure debt, and to get the most benefit from its reserve funds. It must continue to aggressively utilize low-cost borrowing opportunities, particularly the SRF, and continue to make the case for state debt service assistance in light of its enormous debt burden.

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Dedication

Although the MWRA's success over the last 20 years are the result of thousands of people working together, the MWRA respectfully dedicates this report to two individuals:

JUDGE A. DAVID MAZZONE, whose personal oversight of the Boston Harbor Project from beginning to end made his vision a reality–that one day Boston Harbor would be fully usable for all to enjoy;
and
JUDGE PAUL G. GARRITY, whose efforts early on helped to bring about the creation of the MWRA and began the clean-up of Boston Harbor.

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