Presentation to the

South Shore Chamber of Commerce

MWRA System Expansion

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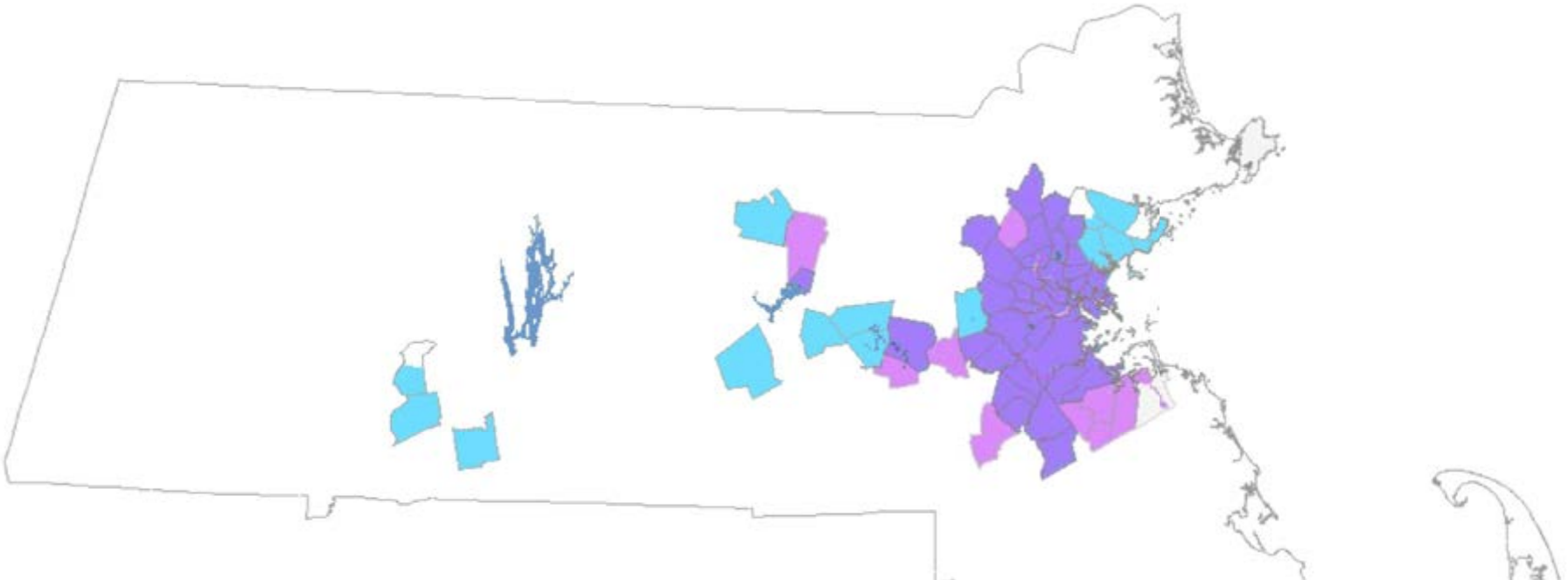
Executive Director

January 12, 2017

MWRA Service Area

- MWRA provides wholesale water and wastewater services to over 2.5 million customers in 61 communities
- On average, MWRA delivers an average of 200 million gallons per day to its water customers
- MWRA collects and treats an average of 350 million gallons of wastewater per day, with a peak capacity of 1.2 billion gallons



About the MWRA Water System

We Have One Of The World's Greatest Water Systems

Quabbin Reservoir

Storage:	412 billion gallons
Depth:	150 feet
Length:	17.9 miles
Width:	3 miles

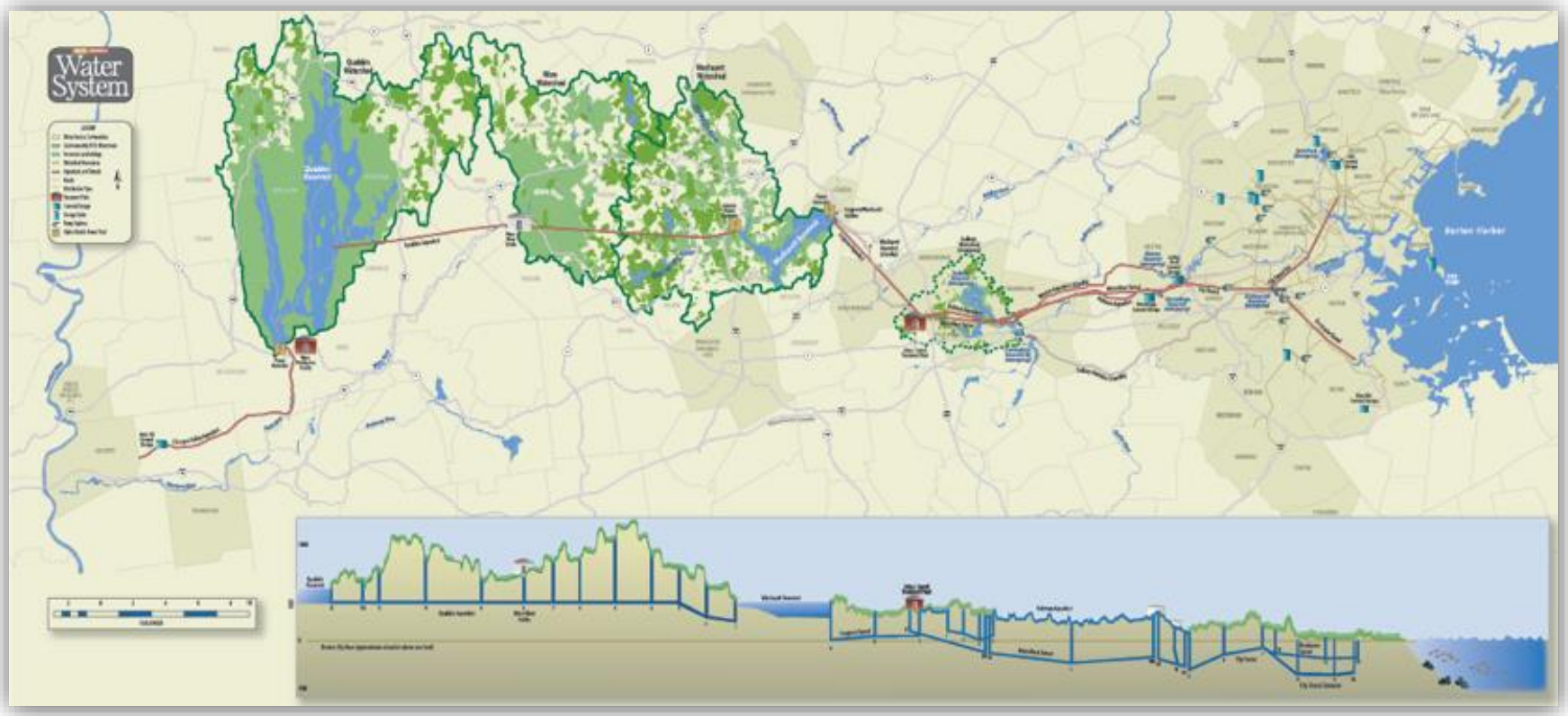
Wachusett Reservoir

Storage:	65 billion gallons
Depth:	129 feet
Length:	8.5 miles
Width:	1 mile

4

An Civil Engineering Marvel

- 102 miles of active transmission mains and tunnels (43 miles on standby)
- 284 miles of distribution mains with over 4,700 valves
- About 85% of the water is delivered by gravity
- 11 pump stations
- 5 years of storage

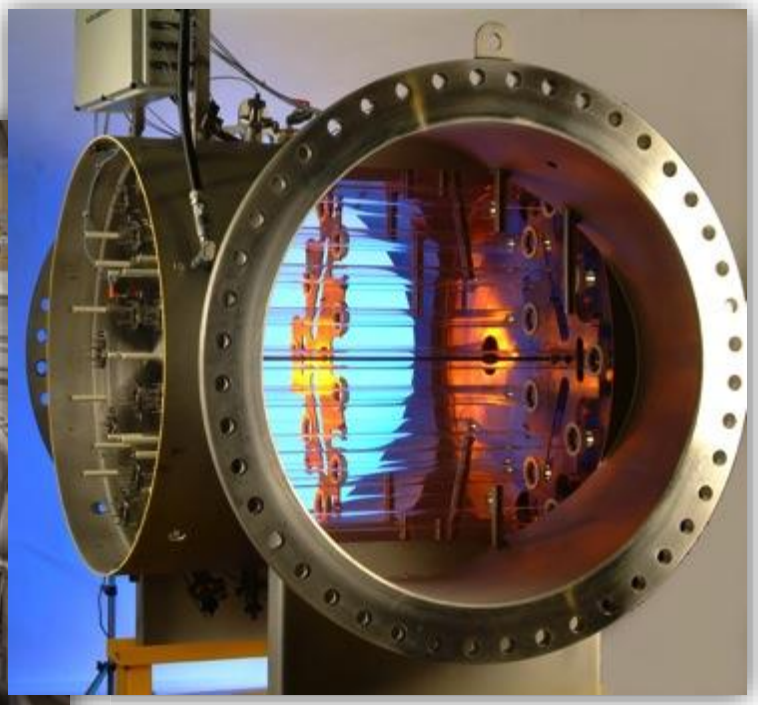


John J. Carroll Water Treatment Plant

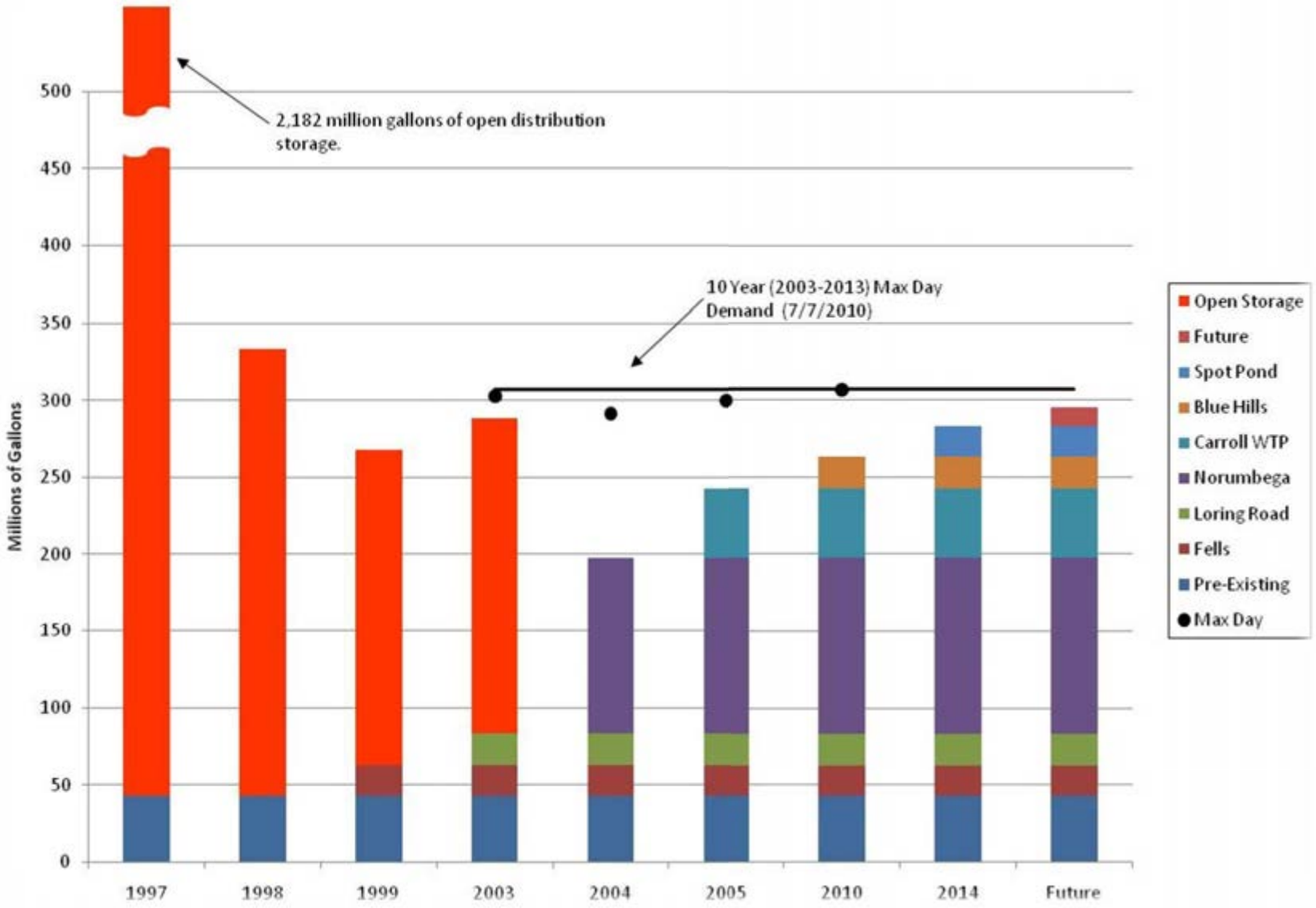
- Completed in July 2005
- Treatment Processes:
  - Ozonation for primary disinfection
  - Corrosion control
  - Chloramination for secondary disinfection
  - Fluoridation

Addition Of Ultraviolet Light Disinfection

- New regulations required that unfiltered systems must have two primary disinfectants, one of which must achieve *Cryptosporidium* inactivation
- UV facilities at the Carroll Treatment Plant came on-line in April 2014

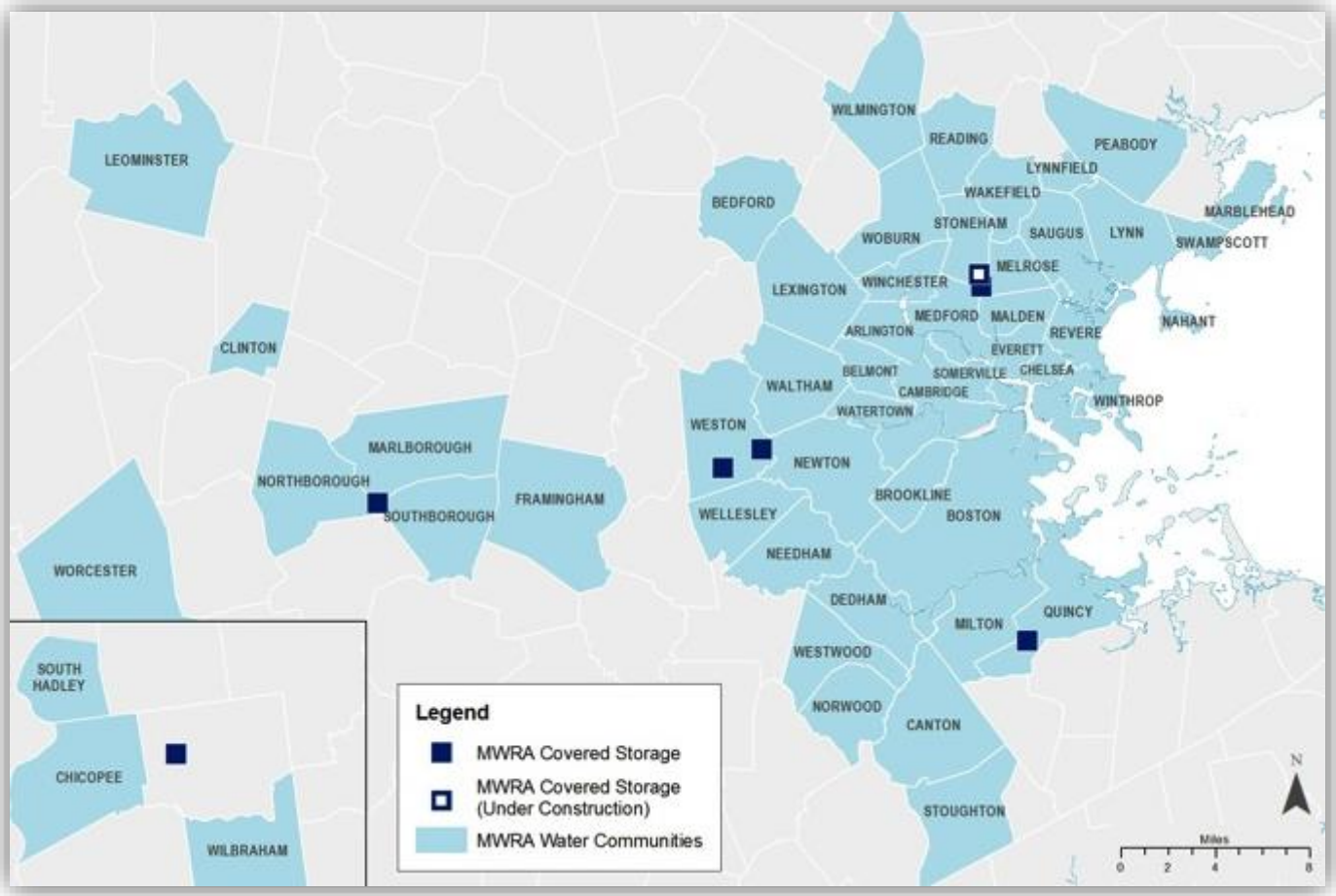


MWRA Metropolitan Area Storage Capacity Over Time



Covered Storage Projects

- MWRA has built seven new covered storage tanks to replace all open reservoirs



Norumbega Covered Storage Facility

- The tank was completed in May 2004
- It provides 115 million gallons of storage for metropolitan Boston

Blue Hills Covered Storage Tanks

MetroWest Water Supply Tunnel

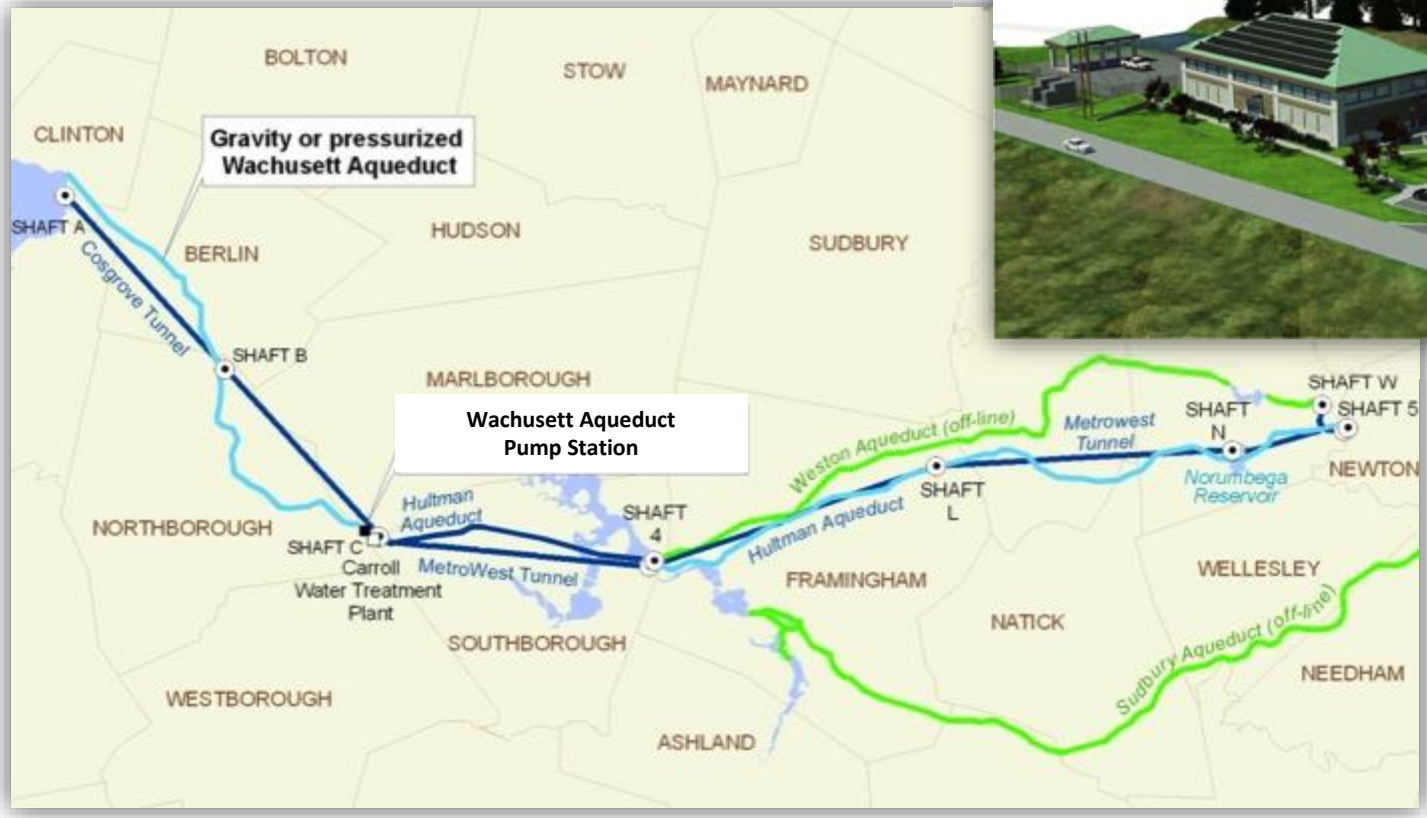
- The MetroWest Water Supply Tunnel was brought on-line in November 2003
- By March 2004, the Tunnel was being fully utilized allowing the shutdown of the Hultman Aqueduct for repair

Hultman Aqueduct Rehabilitation

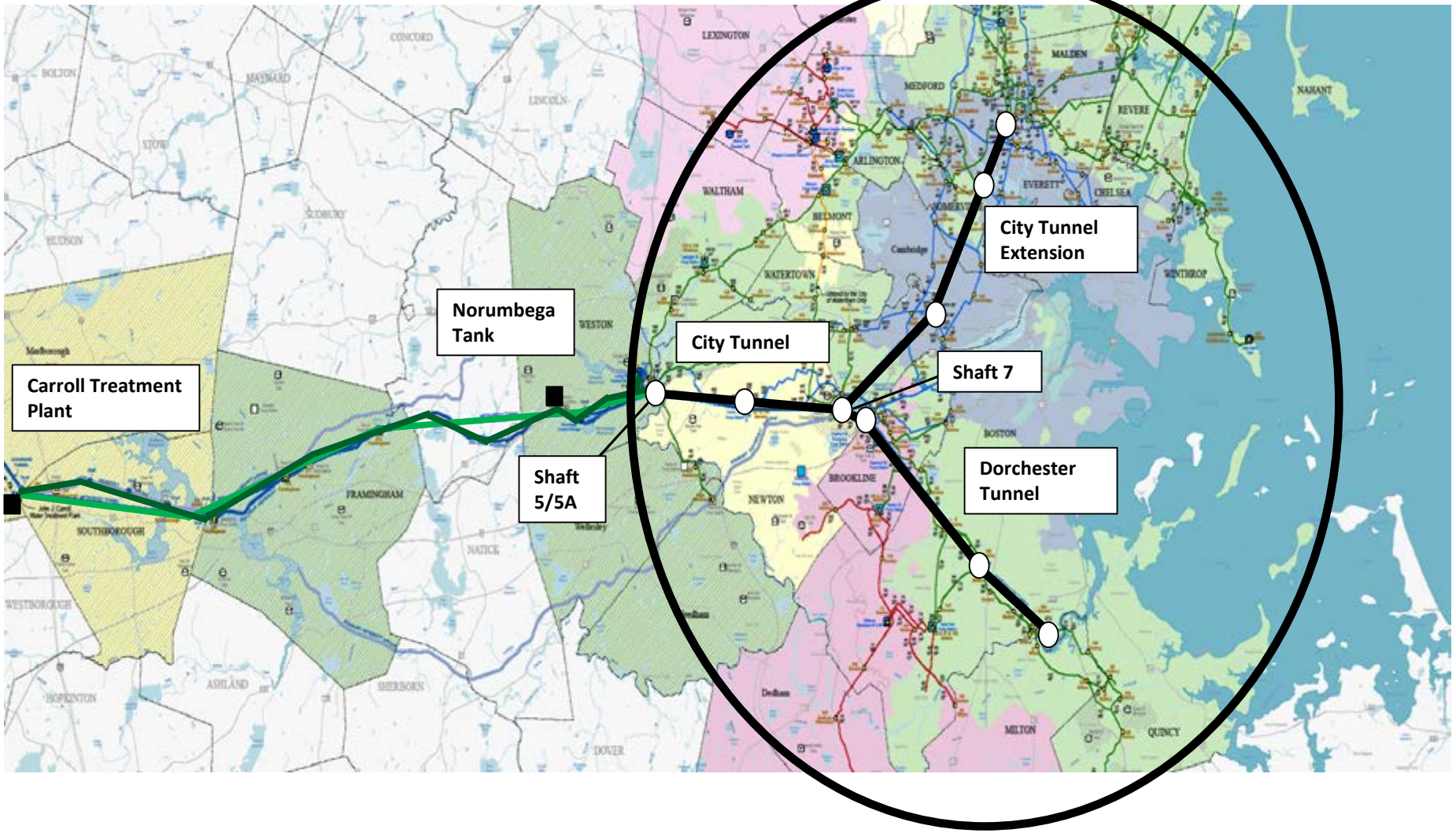
- Since 2013, for the first time since originally planned in the 1930s, the Metropolitan Water System has redundancy for the Hultman Aqueduct from Marlborough to Weston

New Wachusett Aqueduct Pump Station Under Construction

- Will provide redundancy for the Cosgrove Tunnel, from the Wachusett Reservoir to the Carroll Treatment Plant

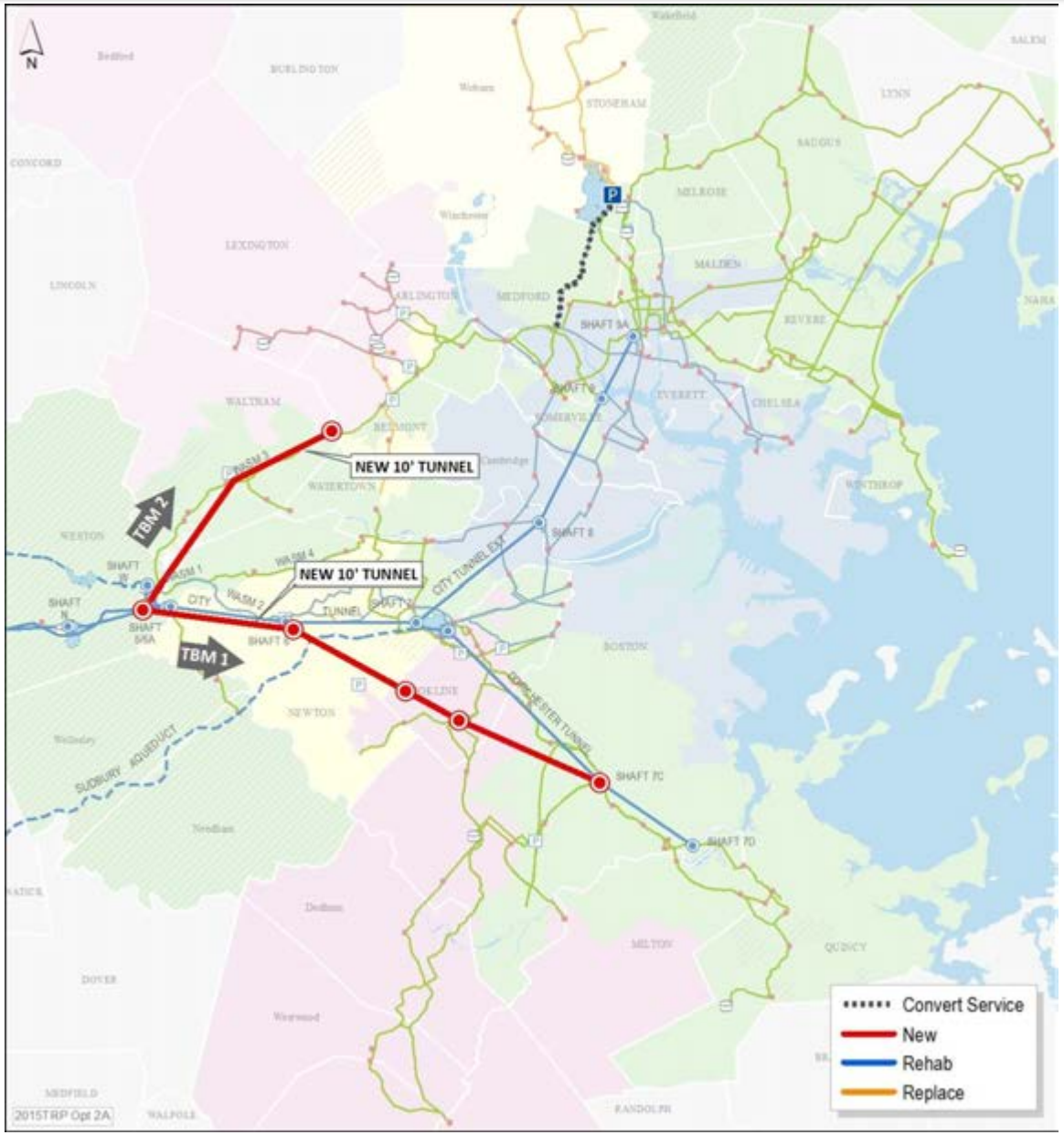


But There Is More To Do



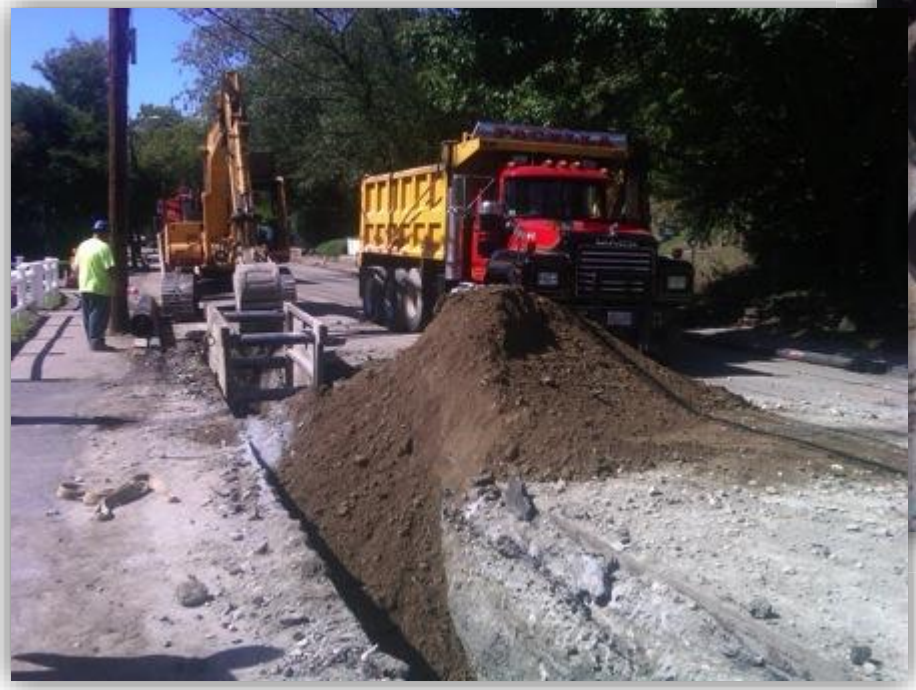
Long-Term Redundancy For The Metropolitan Tunnel System

- **Two Tunnel Option Preferred**
- Time to Complete: 17 - 23 years
- Tunnels begin in the Mass Pike/Route 128 vicinity
- Northern Tunnel 4.5 miles, connects to mid-point of WASM 3 in Waltham/Belmont area
- Southern Tunnel 9.5 miles, connects to Shaft 7C and southern surface mains

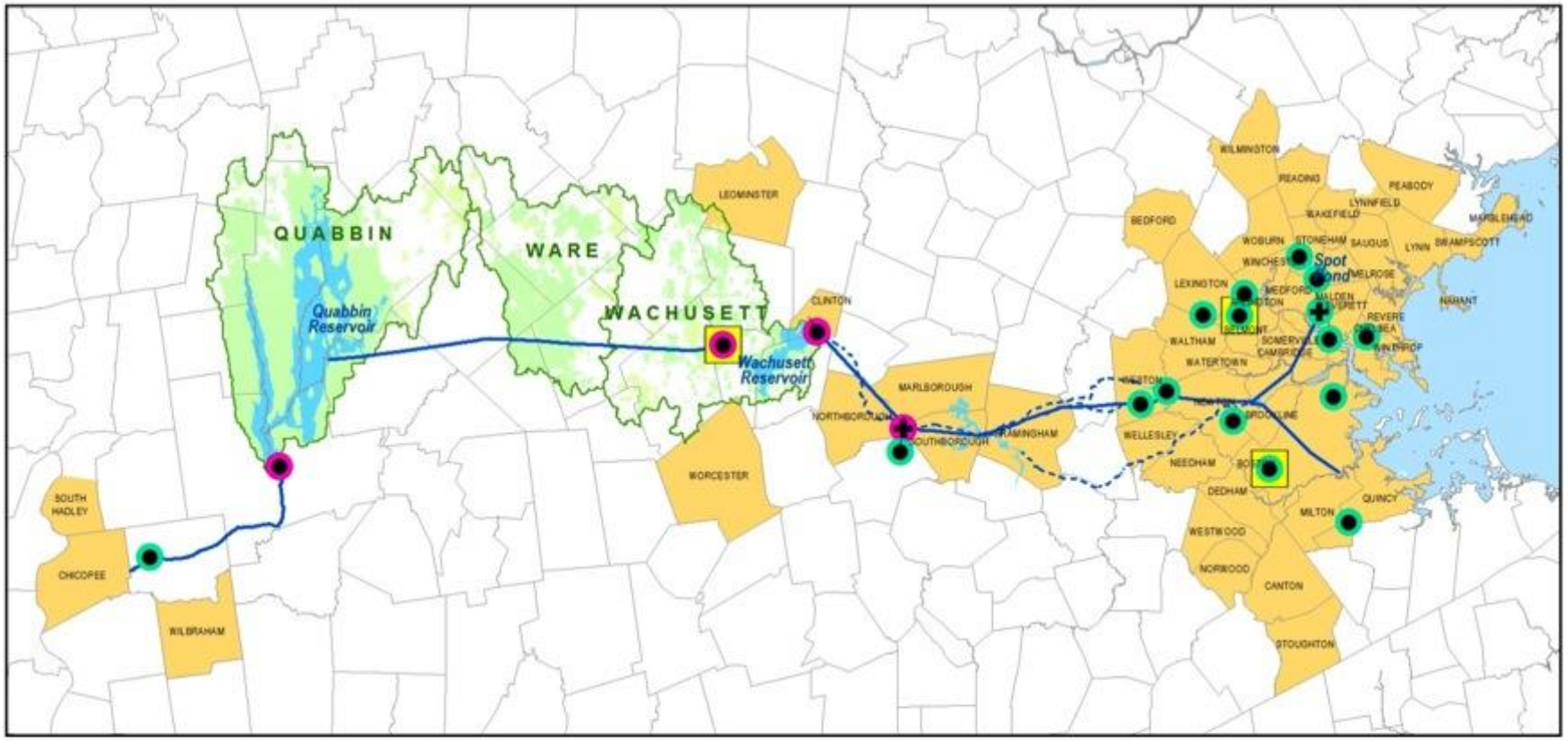


Water Pipeline Rehabbed Or Replaced

- 81 miles of MWRA-owned pipeline
- 474 miles of community-owned pipeline



State-Of-The-Art Monitoring System



s::can Parameters Monitored At 18 Locations

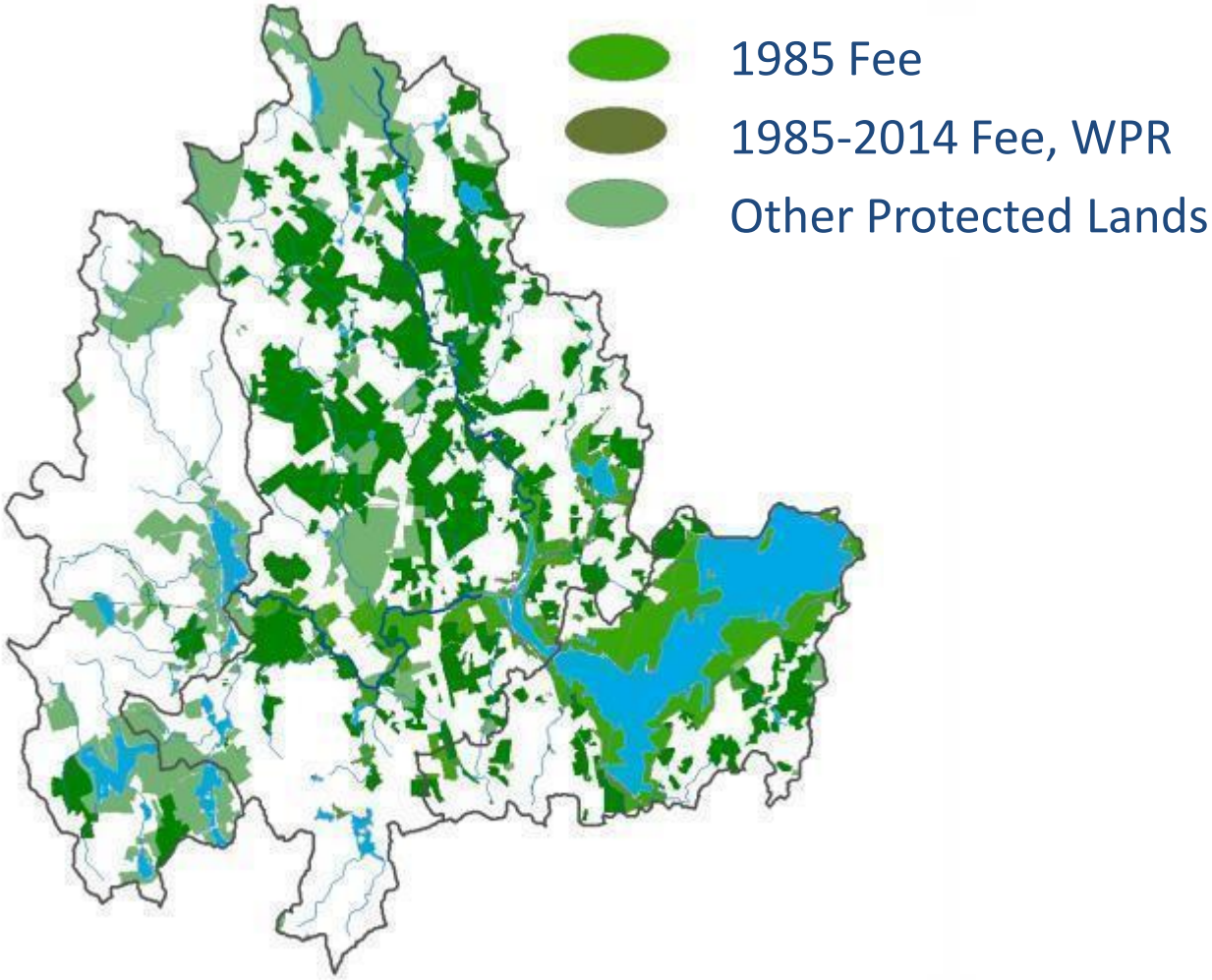
- pH
- Temperature
- Conductivity
- Turbidity
- Dissolved Organic Carbon
- Total Organic Carbon
- Nitrate-N
- UV 254
- Oxidation-Reduction Potential
- Monochloramine
- Free Chlorine
- Total Dissolved Solids

Investments In Watershed Protection

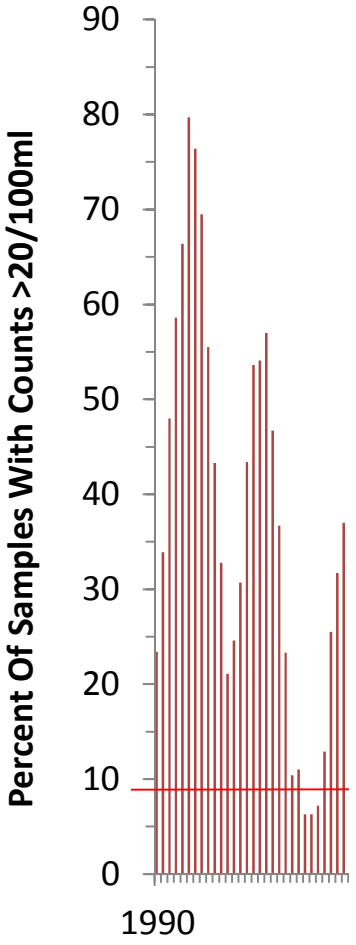
- Since 1985, $133 million has been invested in land preservation
- So well protected, the Safe Drinking Water Act requires only disinfection

Watershed	% of Watershed
Wachusett Reservoir	56%
Ware River	62%
Quabbin Reservoir	80%

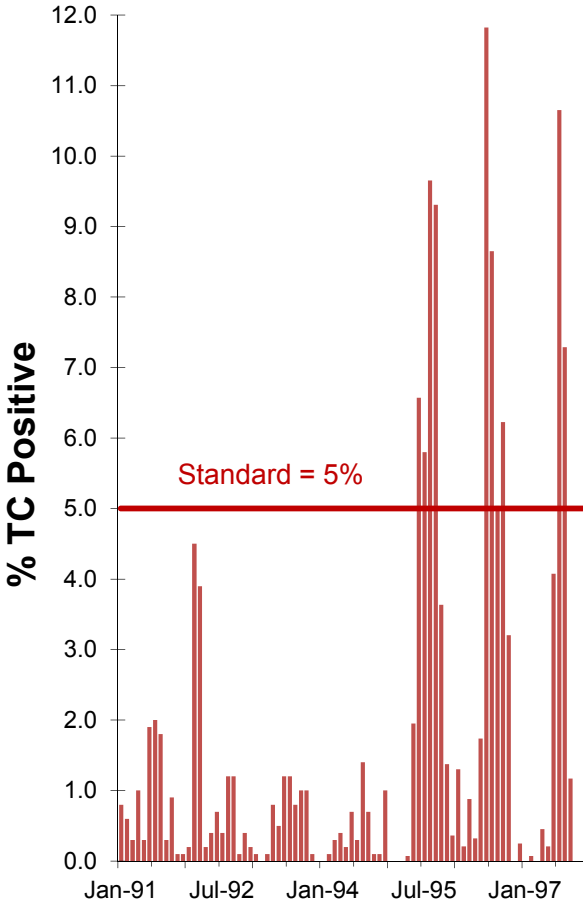
Wachusett Watershed Protected Land: 1985 - 2014



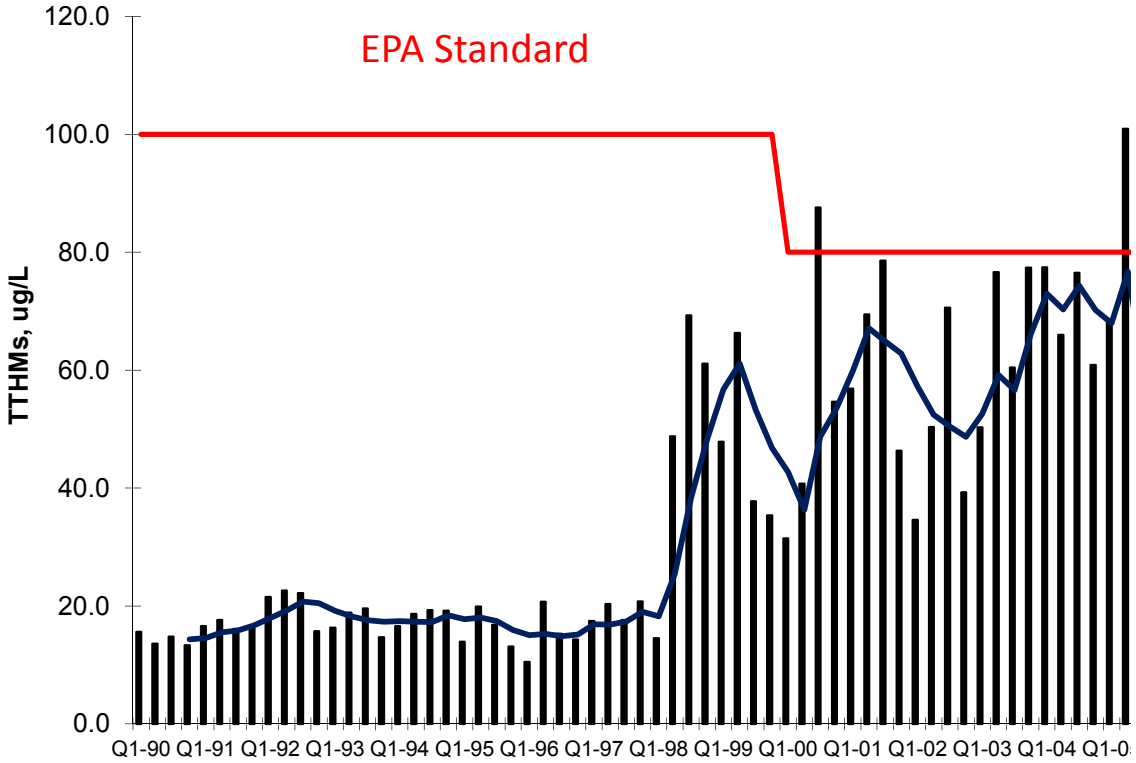
Fecal Coliform Sampling Results At Wachusett Reservoir



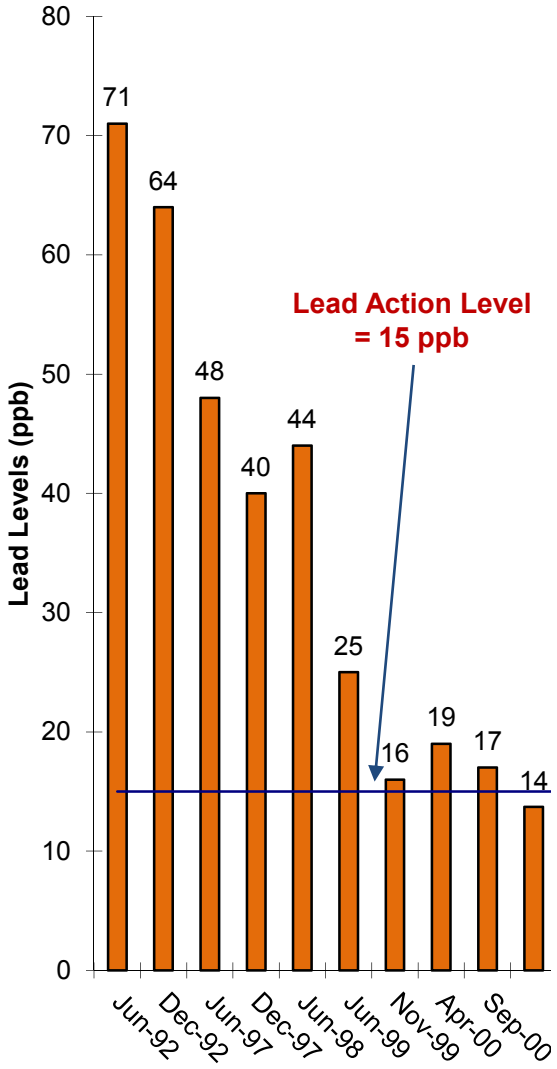
Community Total Coliform Rule Compliance



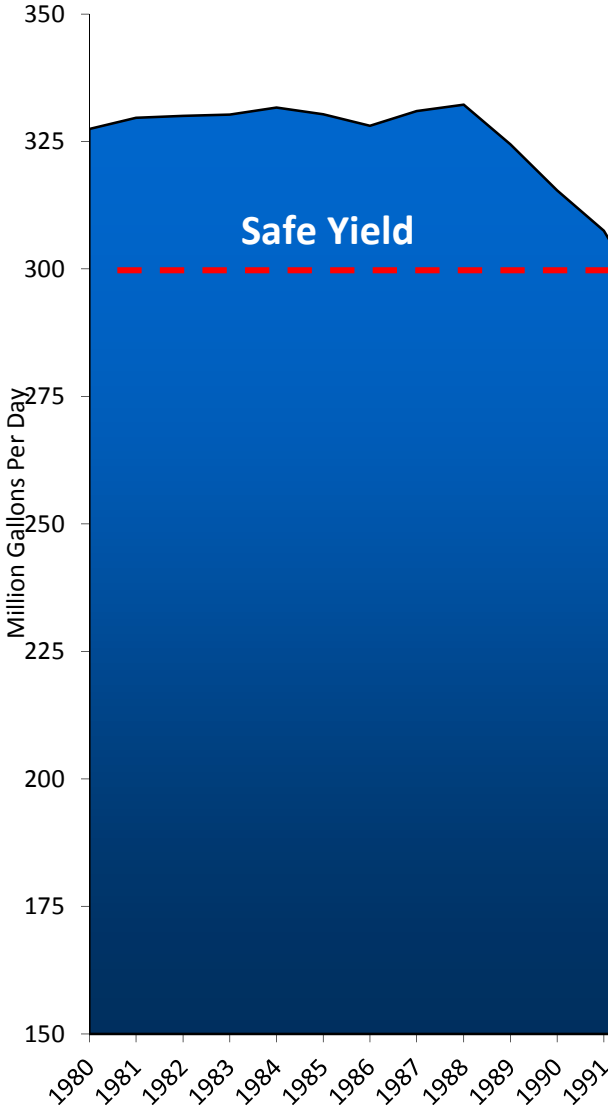
Disinfection By-Products



Lead Levels In MWRA Communities



Water Conservation Worked



"Best Drinking Water" In The Country


BOSTON Herald

www.bostonherald.com

WEDNESDAY, JUNE 11, 2014 • $1.00 ($1.50 OUTSIDE OF METRO BOSTON)

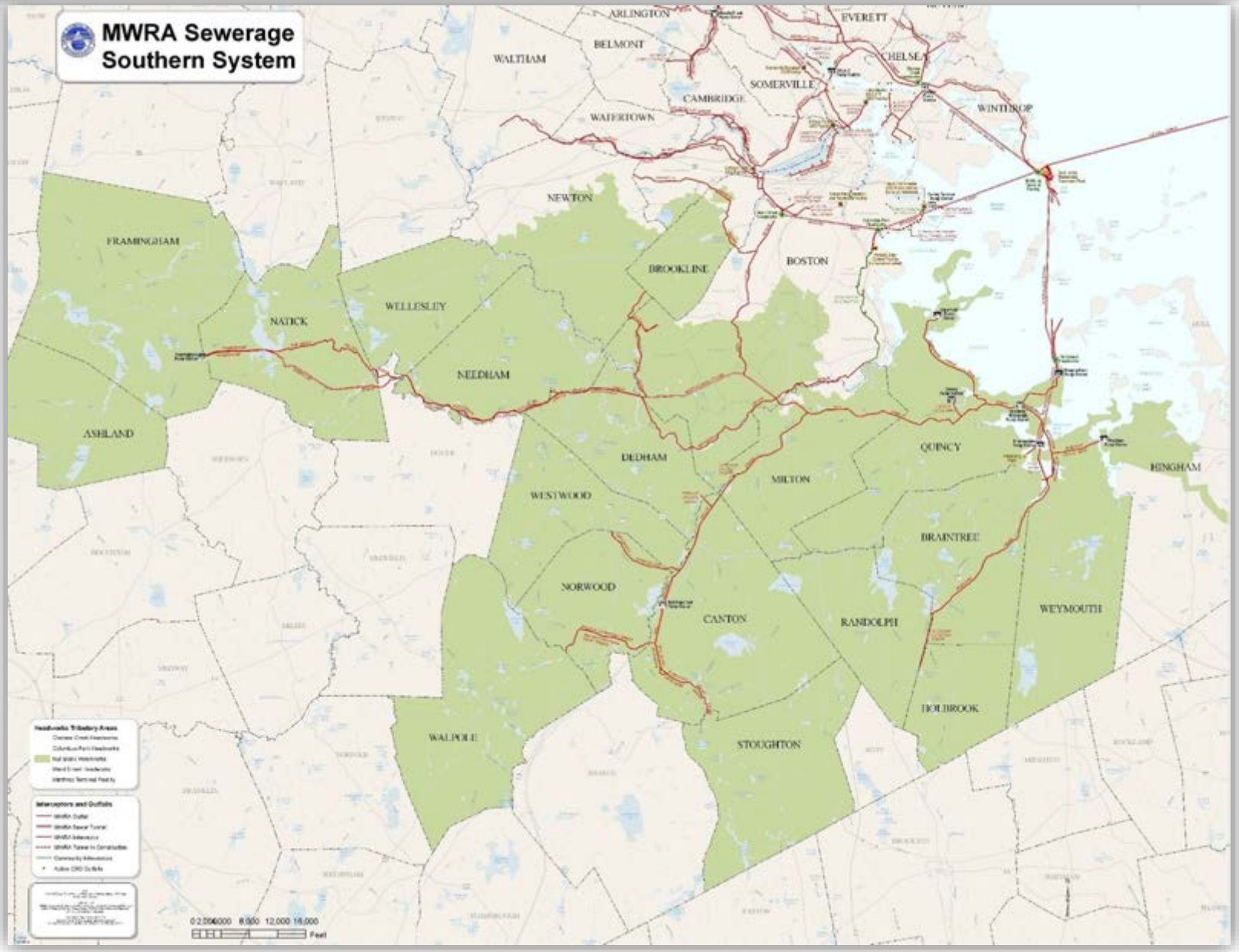
Hub's tap water deemed best in taste test

1 2 3 4 5

(Boston, MA, 06/10/14) Water taste test at the American Water Works Association Annual Conference and Exposition at the Boston Convention and Exhibition Center. Judges for the contest were from left to right: Roy Desrochers from Woburn, MA., Peter Howe from New England Cable News, Matthew Tolcher from Norcross, Georgia and James Naylor from Fort Worth Texas.. Tuesday, June 10, 2014. Staff photo by Ted Fitzgerald

MWRA Sewer System Expansion

The South System



Old Nut Island Treatment Plant

- For 100 years, Nut Island was used as the point of discharge for South System wastewater flows

- Until 1998, about 100 million gallons of wastewater per day were discharged to the shallow waters of Quincy Bay with only primary treatment

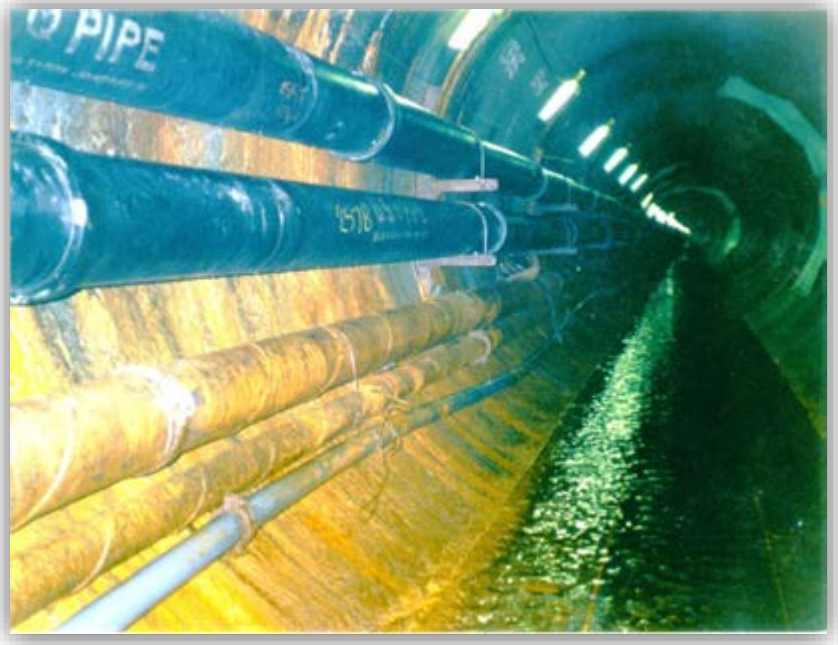
New Nut Island Headworks

- The Nut Island Headworks was put into service in 1998 and handles an average of 120 million gallons per day

- This screening facility provides preliminary treatment to wastewater flow before it enters the Inter-Island Tunnel for transport to Deer Island for primary and secondary treatment

Inter-Island Tunnel

- Completed in 1998, this 5-mile deep rock tunnel connects the southern sewer system from Quincy to Deer Island
- The maximum capacity of the tunnel is 400 million gallons per day
- The tunnel contains a pipeline that carries digested sludge back to Quincy to be processed into fertilizer pellets



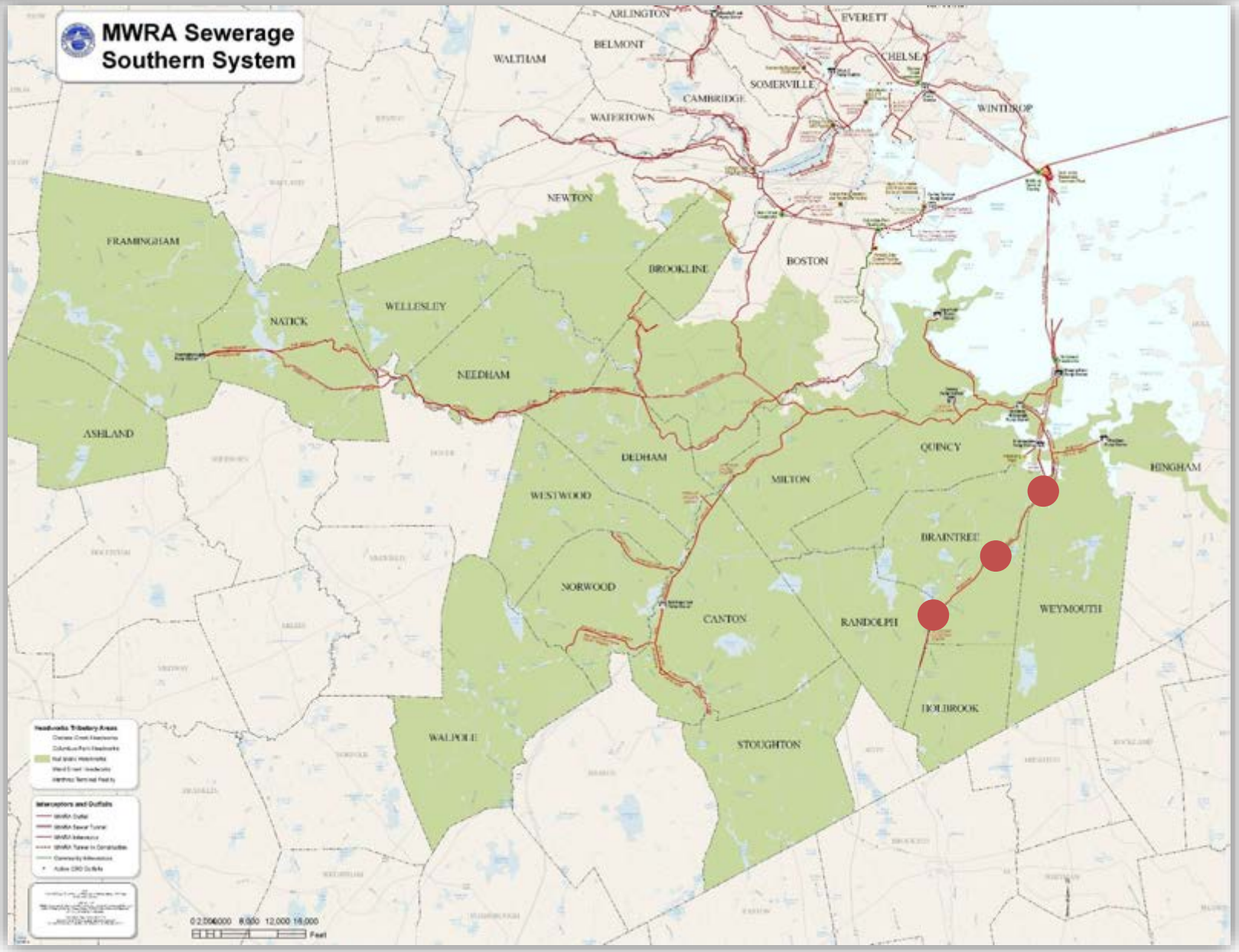
Braintree-Weymouth Relief Facilities Project

- The $232 million Braintree-Weymouth Relief Facilities Project expanded the sewer network that serves Braintree, Hingham, Holbrook, Randolph, Quincy and Weymouth

- This project increased the region's sewer system capacity by 19 million gallons, greatly reducing overflows and ensuring reliable sewer service

Braintree-Weymouth Relief Facilities Project

But The System Still Has Limitations And Overflows Still Occur In Heavy Rain Storms



Sanitary Sewer Overflows

Smelt Brook

MWRA Water System Expansion

Stressed Basins

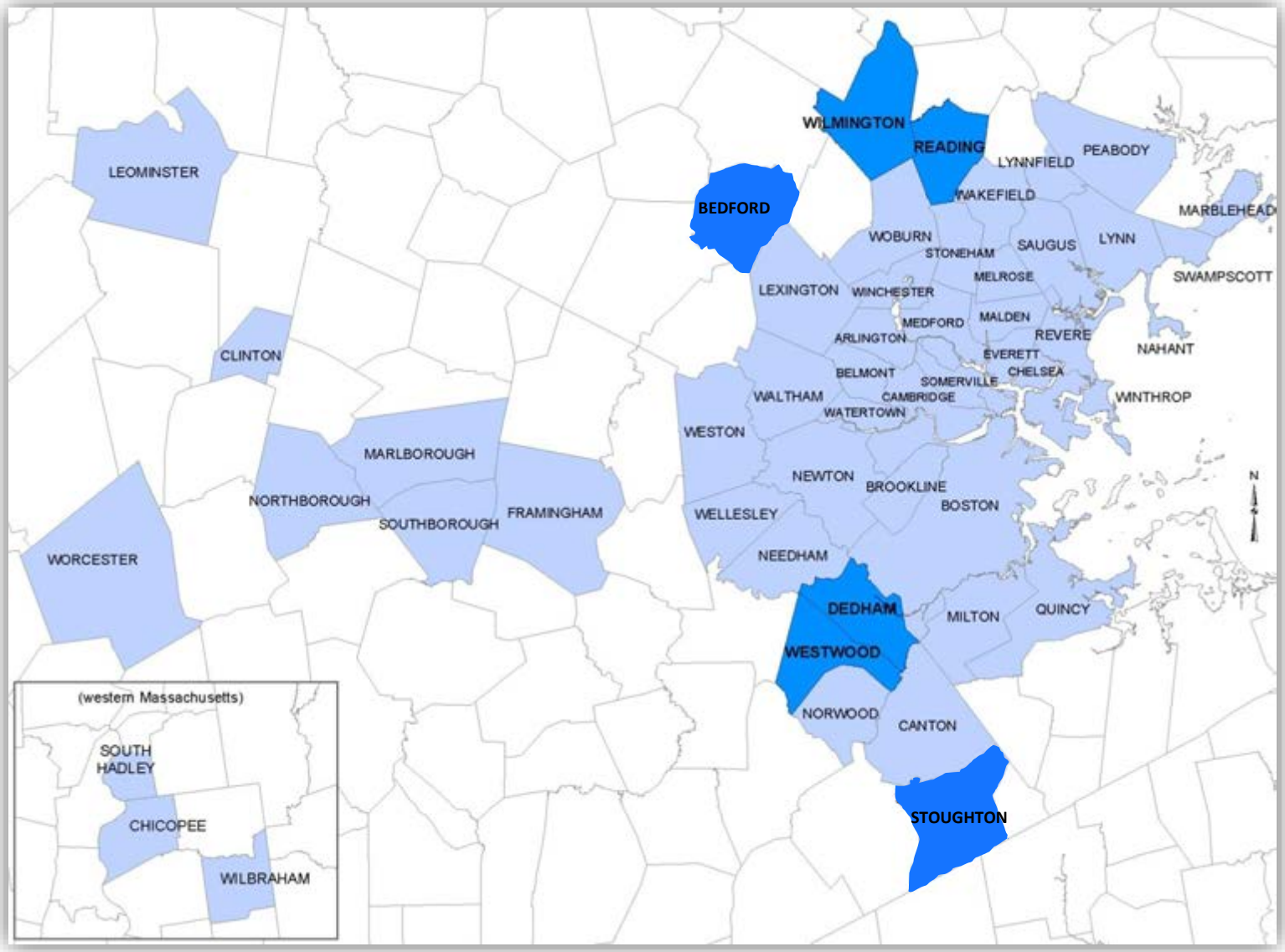
Joining The MWRA

- MWRA has a policy for new communities joining the water system

- Communities that have joined MWRA: Bedford, Stoughton, Dedham-Westwood Water District, Reading, and Wilmington. North Reading is on track to join soon

  - Addressed supply constraints
  - Addressed constraints of some communities whose wells were threatened by contamination
  - Provided less costly alternative to new treatment facilities (Reading)
  - Relieved stress caused by withdrawals in stressed river segments

Communities That Have Joined The MWRA System



The Process To Join The MWRA

- Under state statutes and regulations, the following approvals must be obtained:
  - Local Community or Water District Approval
  - Determination from DEP there are no viable local sources
  - MEPA Review
  - Interbasin Transfer Act Approval
  - Legislature
  - Governor
- After those approvals, an application is submitted for approval by:
  - MWRA Board of Directors
  - MWRA Advisory Board

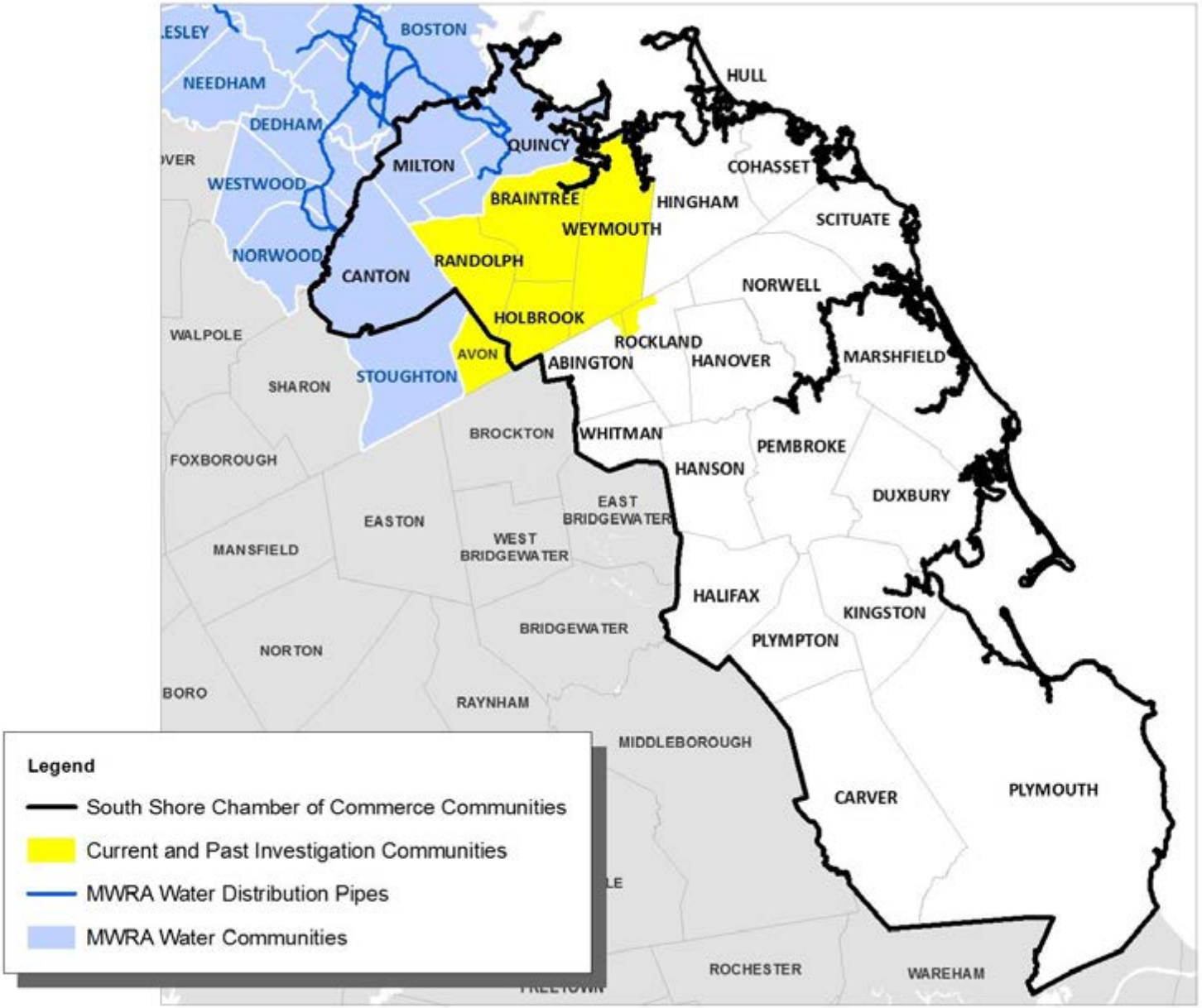
Entrance Fee

- Entrance fee is based on combination of average and peak use
- Entrance fee is approximately $5.1 million per 1 million gallons a day
- As an incentive for new communities to join, the MWRA Advisory Board recommended allowing the entrance fee to be repaid over 25 years with no interest, and a three-year grace period

How Water Rates Are Calculated

- MWRA's water rate methodology computes charges for water services on the basis of each community's metered water flows
- The MWRA annual water rate revenue requirement is allocated according to each community's prior year's water use relative to the system as a whole
- The FY2017 water rate is $3,471 per million gallons

South Shore Communities



A Regional Approach

- MWRA could provide about 9 million gallons a day to the south
- There are some interconnections between South Shore communities, as well as water sharing arrangements
- Existing interconnections may provide the basis for supplementing local sources with MWRA water, for “wheeling arrangements”
- Greater demand is more likely to warrant new pipeline construction, and a coordinated phased approach could yield the most efficient solution

Union Point

- MWRA was identified as the preferred long-term water supply solution for Union Point
- Union Point's current water supply is from Weymouth, but is exploring meeting interim needs by MWRA via wheeling
- Union Point full build-out water demand is approximately 3 million gallons per day and would require a 7-mile pipeline
- A new pipeline to Union Point may present opportunities for communities to the south

Discussion With Tri-Town

- For the past several years, MWRA has had discussions with the Tri-Town Water District (Braintree, Holbrook and Randolph) on joining the MWRA system

Criteria For MWRA Approval

- Safe yield of the watershed system is sufficient to meet the projected demand
- No existing or potential source for the community has been abandoned without DEP approval
- Local Water Supply Management Plan
- Effective demand management measures, including leak detection and other appropriate system rehabilitation programs
- A local source feasible for development has not been identified by either the community or DEP
- No negative impacts on current communities
- Upon admission, the community will pay fair compensation for past investment in the MWRA waterworks system by existing user communities (an entrance fee)

Services To MWRA Water Supply Communities

- Plentiful, high quality water without restrictions
- Technical assistance day-to-day operations, distribution system issues that arise, as well as emergency assistance (e.g., pipe breaks)
- Water quality testing and analysis
- Partnerships with local communities to address regulatory requirements (most recently, Emergency Response Plans)
- Water conservation education brochures and low flow fixtures at no cost
- Task order leak detection services through a low-bid contract that provides economies of scale