



Massachusetts Water Resources Authority

Presentation to

Water Supply Citizens Advisory Committee

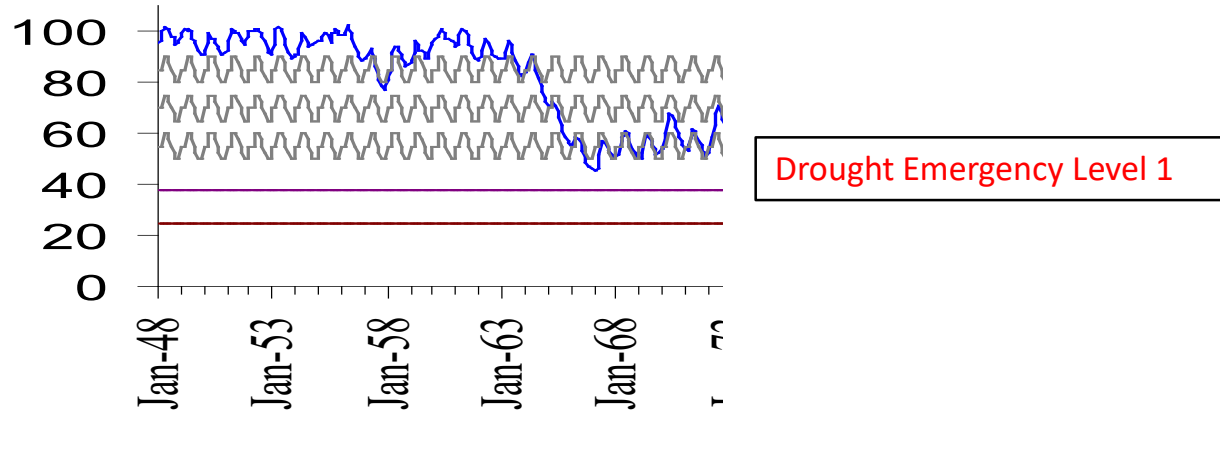
The Long View on MWRA Water Conservation Programs

Stephen Estes-Smargiassi
Director of Planning and Sustainability
February 11, 2025



Northeast Drought of 1960's Showed Vulnerability

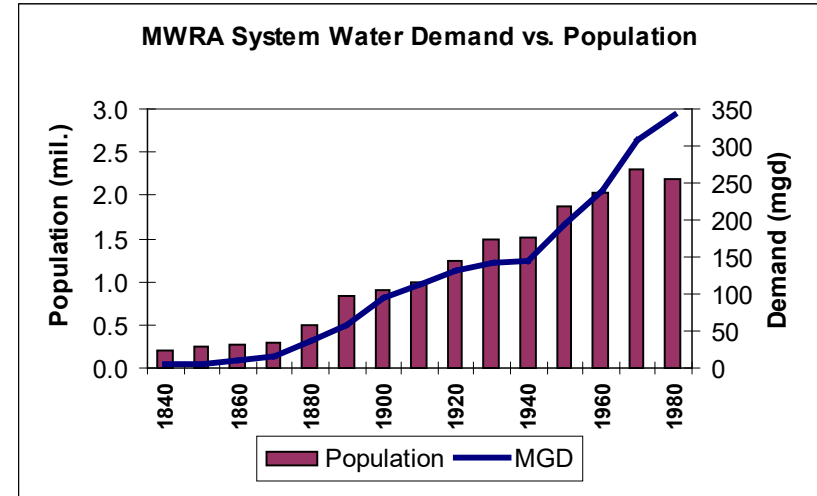
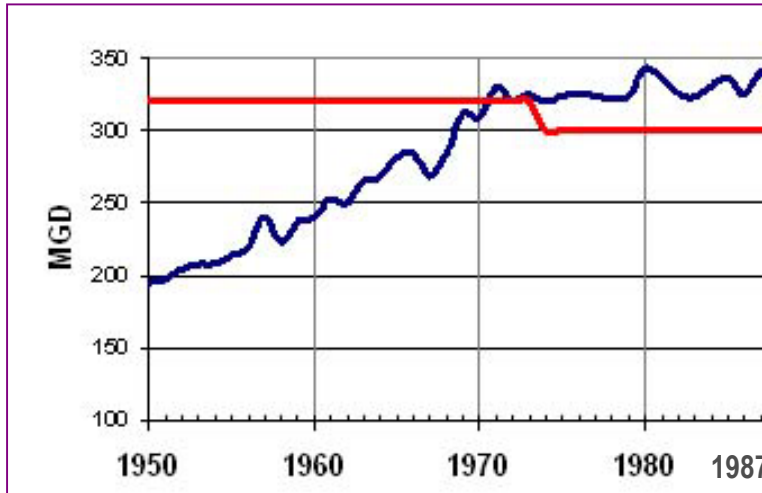
- Just 20 years after Quabbin was completed, the drought of the 1960s led some to believe that the source might not be sufficient to serve water needs in the decades to come
- Quabbin Reservoir reached a **historic low of 44%** in May 1967





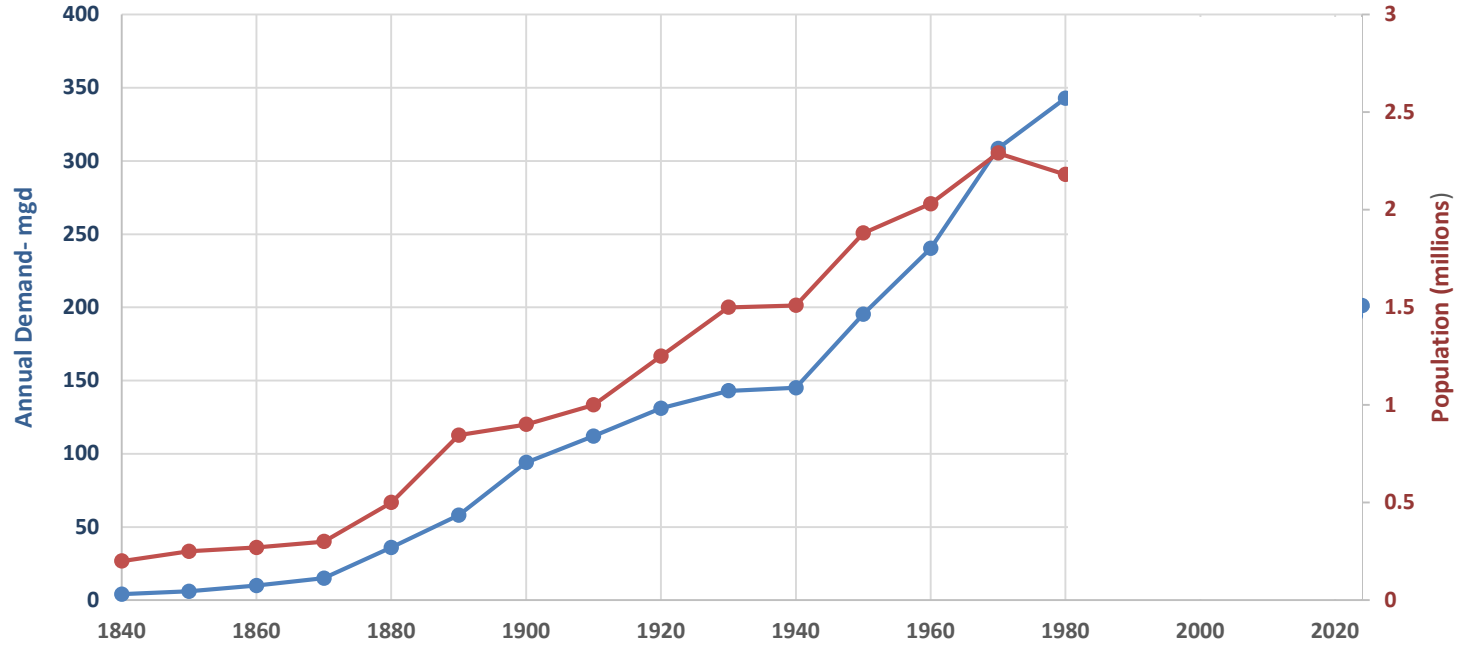
By the 1970's Demand Had Exceeded Safe Yield

- By the early 1970s, demand exceeded safe yield – and continued to do so for 20 years – growing faster than population





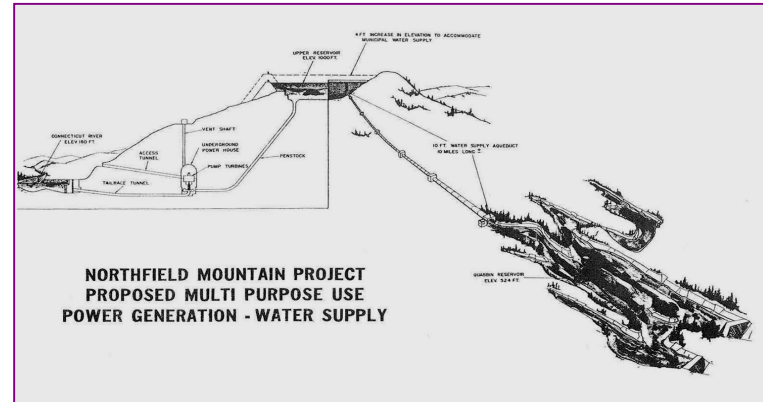
MWRA Long Term Demand and Population 1840 to 1980





Studies Were Underway for a New Source

- The Northfield Project was a proposal for skimming Connecticut River spring flood flows and diverting them into the Quabbin Reservoir, using a pumped-storage facility
- The measure was authorized by the legislature in both 1967 and 1970
- The extra storage was built into the Northfield Mountain power reservoir.





But, the Modern Environmental Era Began

- In the late 1970s came Earth Day and the rise of the environmental movement
- Citizen awareness and participation increased
- Founded as the Northfield Citizens Advisory Committee in 1977, the Water Supply Citizens Advisory Committee continues today
- MEPA established to open up decision-making
- Coalition forms against Connecticut River diversion and exploits Western Massachusetts resentment toward Boston
- State of Connecticut fights plan and threatens lawsuit



MWRA's Response

- When MWRA began operations in 1985, it's first step was to review the Long Range Water Supply Study begun by MDC that included diversion options of Connecticut, Merrimack and Sudbury Rivers
- In November 1986, the Board of Directors voted to try water conservation for a 3-year period to curb demand
- A number of initiatives were implemented



We Inherited A Lot Of Leaky, Old Pipes





A Lot Of Old and Leaky MWRA and Community Pipes





Obstacles to Water Conservation

- Initial Skepticism About Possibility of Long Term Success
 - Needed Long Term/ Year Round Savings
 - Most National Experience Had Been with Drought Management
 - “Just Build the River Diversion; We Know It Will Work!”
- Needed to Cross Institutional Boundaries – Watershed to Tap
 - MWRA is a wholesaler
 - Communities Own Most of the Infrastructure
 - Ultimately Individual Families and Businesses Use the Water
- Resource Allocation
 - Over Community 6000 miles of water pipeline to inspect for leaks
 - Over 800,000 residences and 5000 businesses to educate



Start With a Plan

- Make all of our consumers aware of reasons to change
- Explain various techniques to reduce water use
- Promptly respond to questions
- Facilitate the decision to change



Demand Management Strategy – Reservoir to Tap

WATER USE

	Problem	Response
Residential Toilet Shower Laundry Kitchen Tub & Sink Outdoor	→ Inefficient Fixtures Poor Water Habits	→ Retrofit Fixtures Public Education School Education Efficient Technology
Industrial Commercial Institutional Process Cooling Sanitary	→ Inefficient Fixtures Once Through Cooling Inefficient Process Use	→ Technical Assistance Water Audits Technology Transfer Training & Education
Unaccounted For Water Leakage Meter Errors Public Use Other	→ Leakage Meter Errors	→ Leak Survey & Repair Test/Replace Meters



Specific Demand Management Programs

- MWRA's Operation WaterSense in 1990s **installed** 1.3 million water saving fixtures in approximately 350,000 households. 59% penetration
- Public Education Outreach - water conservation materials distributed at no cost
- A free one-time leak detection survey (1988-1990) of 6,085 miles of community pipes detected 30 MGD of water loss.
- In 1991, MWRA's leak detection regulations were put in place, requiring communities to complete leak detection surveys every two years. Communities may use MWRA's contractor
- Rehabilitation of MWRA and community distribution pipelines for water quality has added benefit of reduction of pipeline leakage
- Audits, pilots and facilitated outreach to institutional, commercial and industrial users



Program Approaches -- Look at Performance

- Evaluate efficiency and reliability
- Consider behavioral and use factors that can effect savings
- Determine the full costs--water, sewer, Energy
- Use a pragmatic metric - \$/gallon saved



Participation -- Be realistic

- Impact of motivational issues
- Short-term / long term problem
- Perception is Key:
 - equity,
 - benefits,
 - difficulty and
 - costs



The Message -- Keep it clear, simple, and positive

- Show credible, direct and personal benefits
- Show that the changes are easy to do
- Repeat the message consistently
- Get the support of local leaders



Develop Good Working Relationships: Make Everyone a Partner in Success

- Local Officials
- CEOs
- Business Leaders
- Community leaders
- Educators
- Community Activists



People generally remember :

- 10% of what they read
- 20% of what they see
- 50% of what they hear and see
- 70% of what they say
- 90% of what they say and do



Multimedia Approach

<u>Purpose</u>	<u>Technique</u>	<u>Distribution</u>
Make consumers Aware	Bill Stuffers Messages on Water Bills Brochures Displays Public Service Announcements Press Releases	Utilities direct mail Community centers Town halls, Libraries Special events Radio, TV, Cable Local Media
Respond to Questions	Fact Sheets FAQ's Newsletters Speakers Bureau Resources Network Customer Service Training	On Request Workshops Community Meetings WEB site Employee
Facilitate Decisions	Personal contact Independent, credible sources Partnerships Newsletters	Workshops Community Meetings Customer hotline



Use Pilot Programs to Test and Build Support

- **Domestic Device Retrofit Pilot**
 - Tried multiple distribution models
 - Selected direct install
 - Significantly greater savings, for modest increase in cost
- **Hotels, Colleges, Industrial Facilities**
 - Pilot, Then Publicize
- **Low Flow toilets**
 - Public building retrofit
 - State, then national code change
- **Reading, MA - Washer Study:**
 - 68 unit condominium complex
 - Replaced all washers and dryers
 - Monitored water and energy use
 - Saved: 44% water - 50% energy - 24% detergent





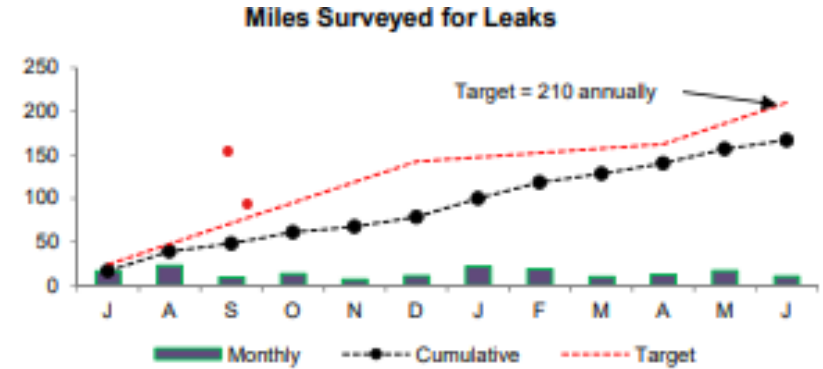
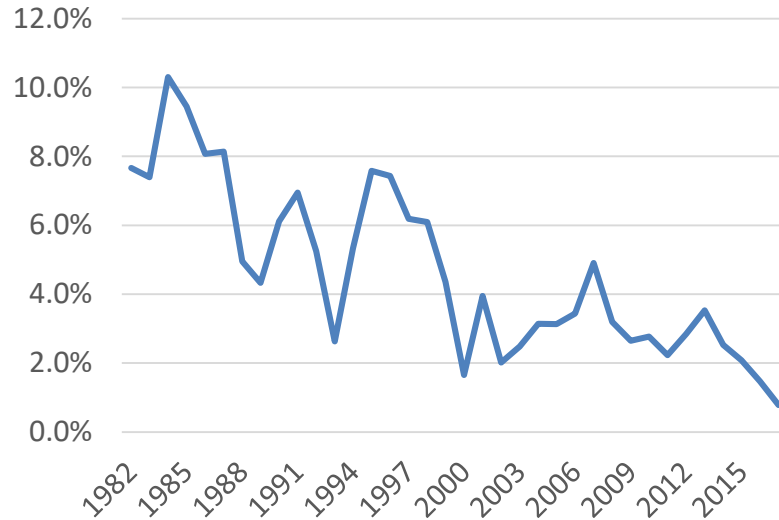
Initial System-wide Leak Detection – a Pilot of Sorts

- MWRA funded, and contracted for, leak detection of every community's pipes
 - Aggressive effort to ensure leaks repaired
 - Approximately 30 mgd of leaks identified and repaired.
- Long term requirement of detection every two years:
 - MWRA provided training on leak detection techniques
 - Developed on call program with MWRA procured contractors
 - Communities can use their own contractor or staff
 - Some are now doing annual inspections



Leak Detection Works – Much tighter MWRA system

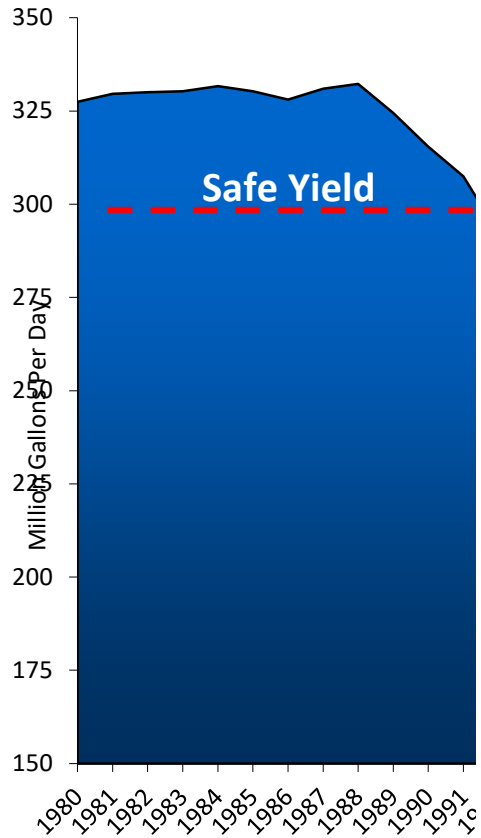
MWRA Unaccounted For Use Declines Substantially



During June FY23, 9.98 miles of water mains were inspected. The total inspected for the fiscal year to date is 166.86.

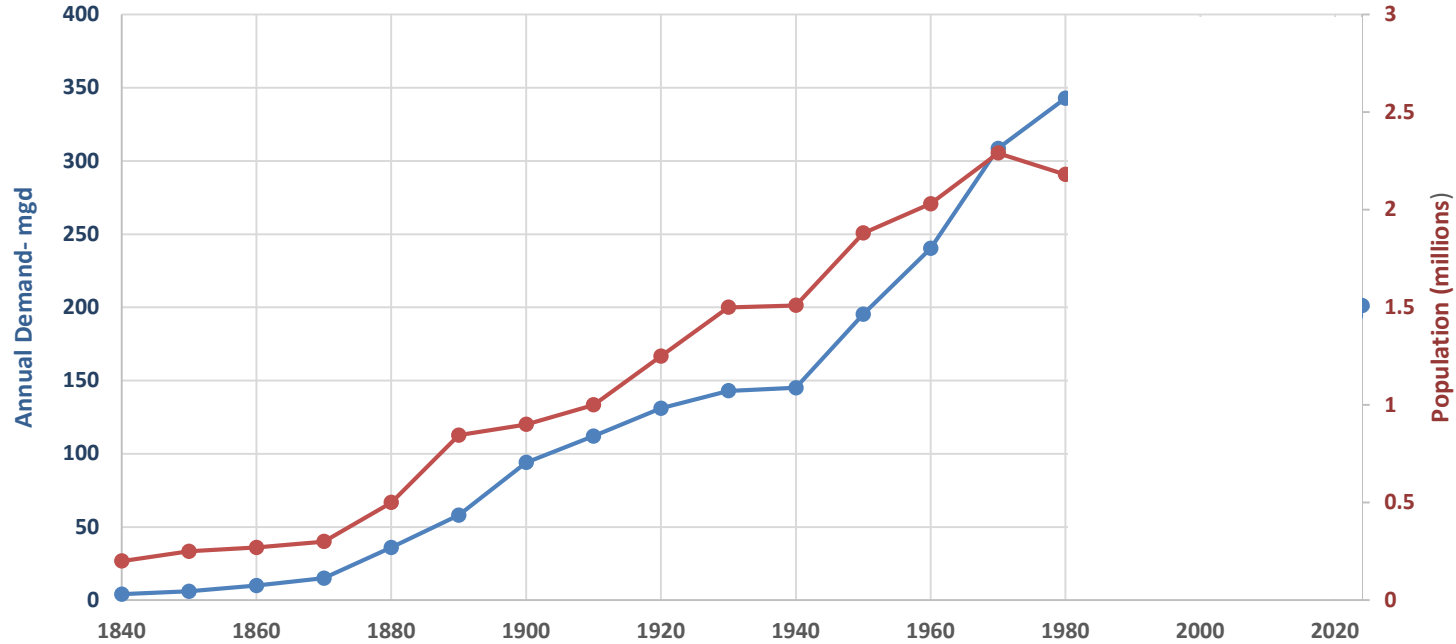


Water Conservation Worked



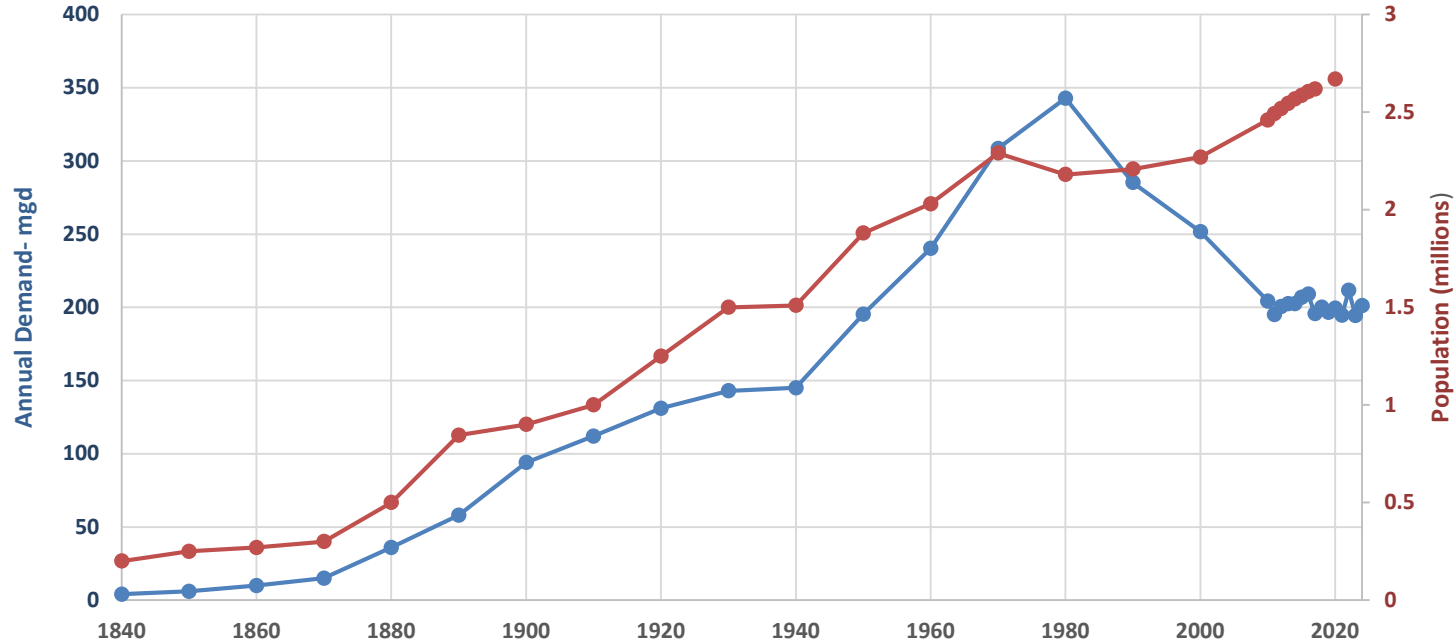


MWRA Long Term Demand and Population 1840 to 1980



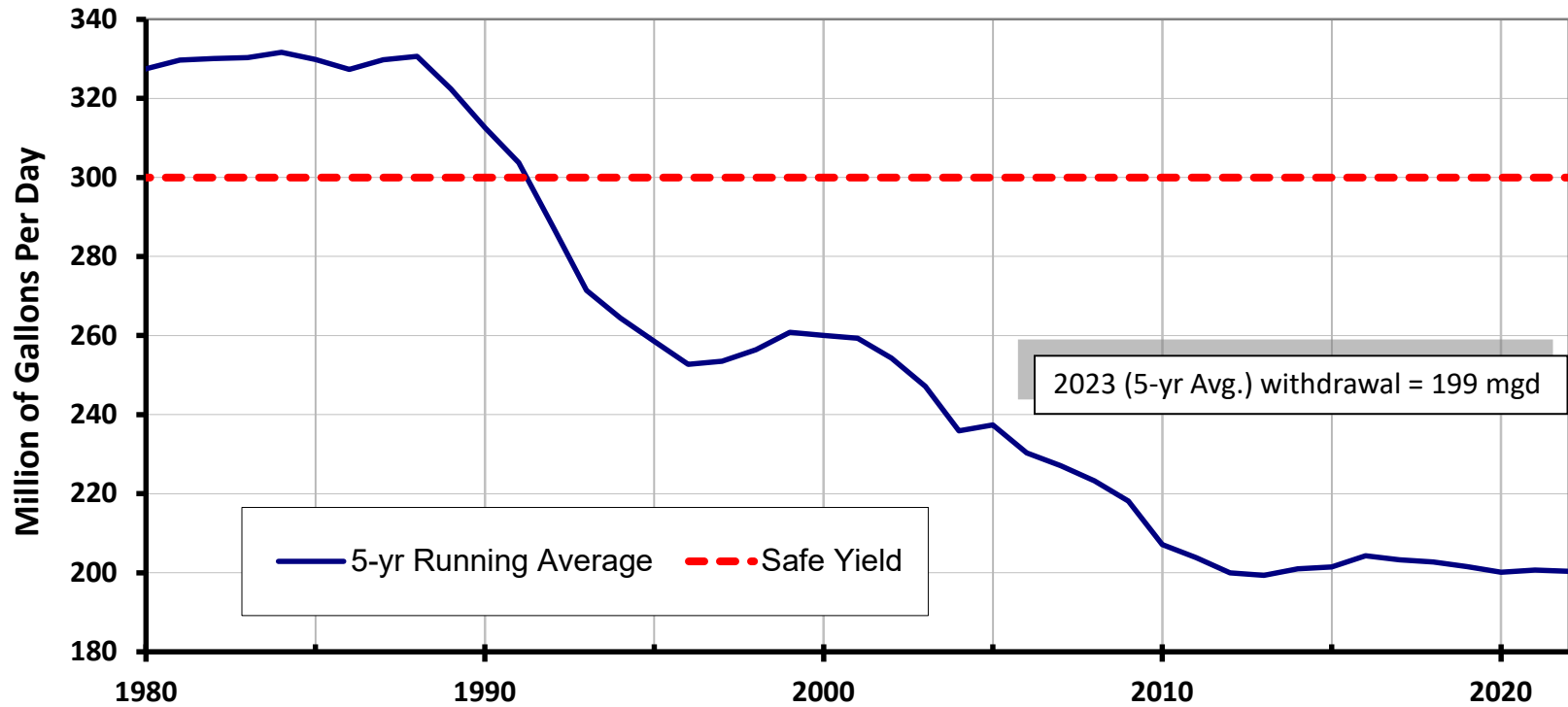


MWRA Long Term Demand and Population 1840 to 2024





Reservoir Withdrawals Lowest Since 1950's





Boston's Usage Is At A 120-Year Low

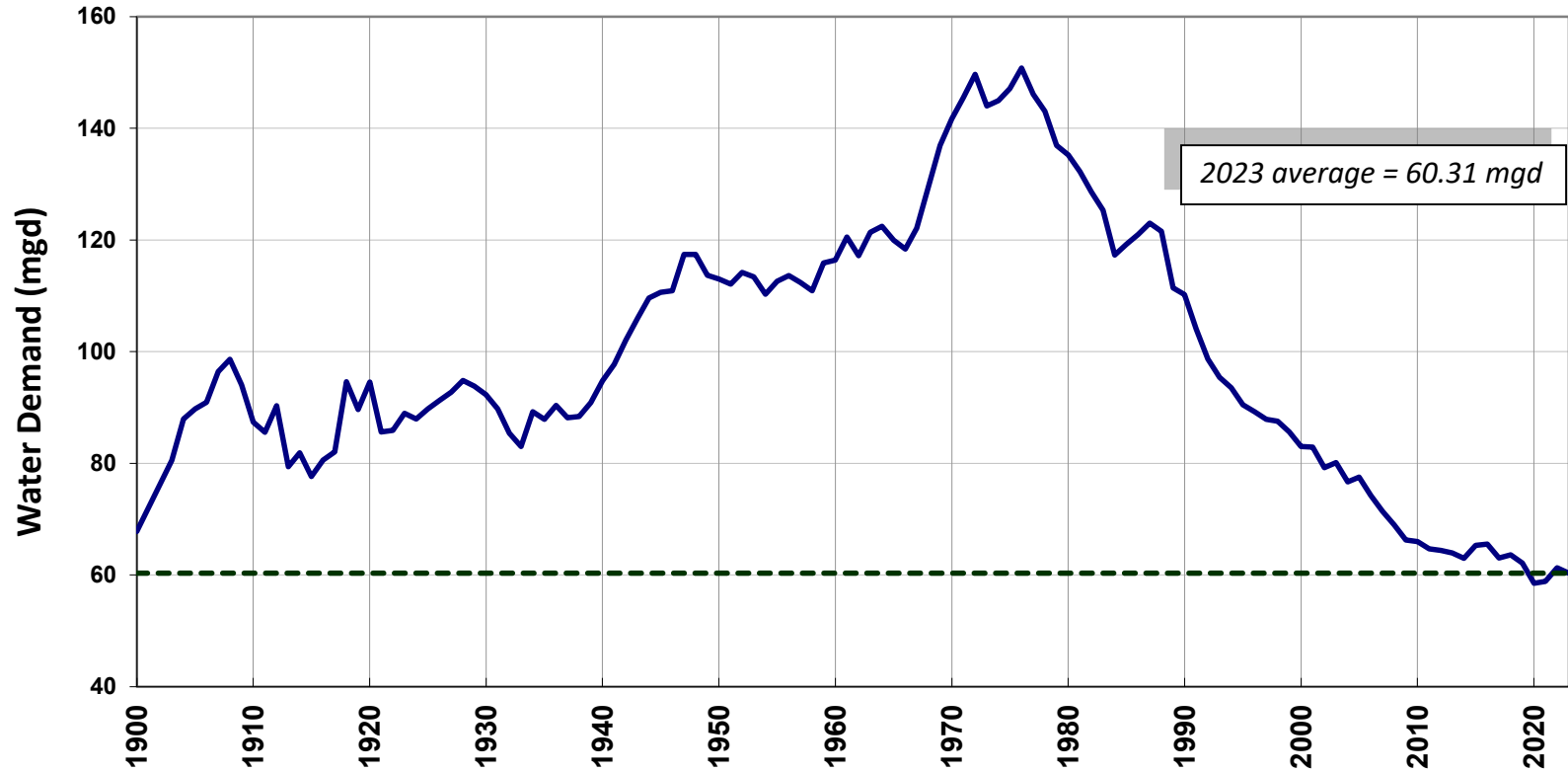
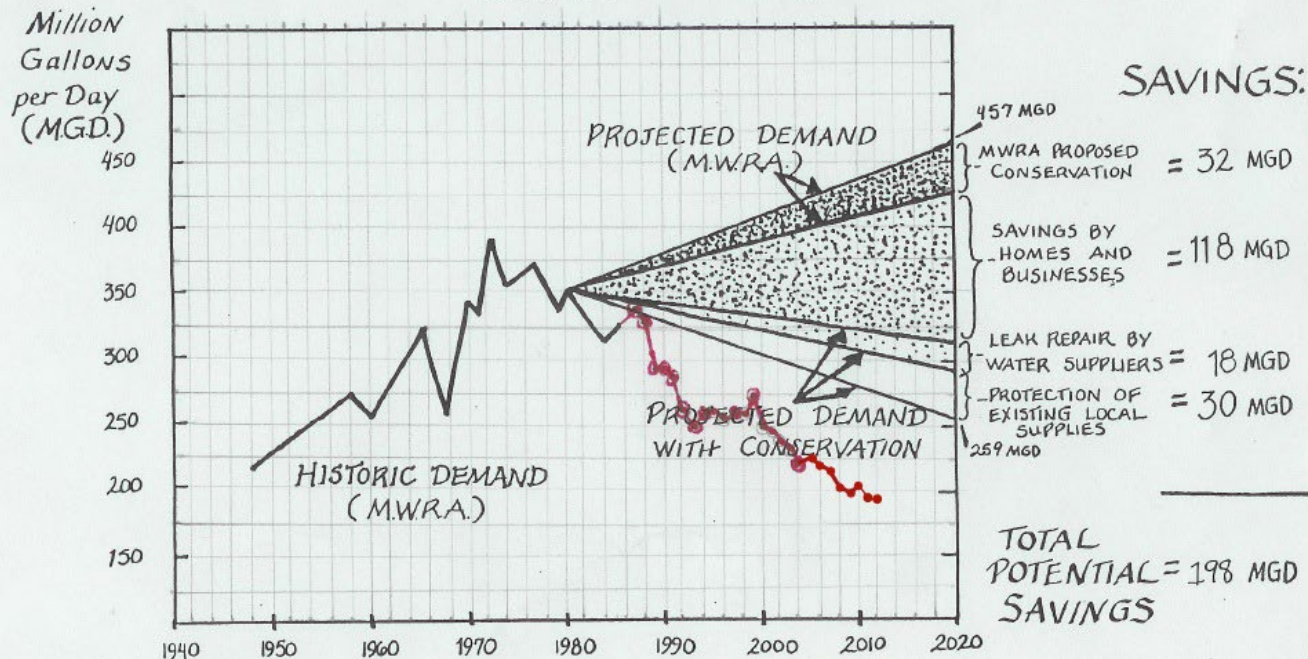


FIGURE 2

HISTORIC MWRA/MDC WATER USE AND FUTURE REQUIREMENTS:

COMPARATIVE PROJECTIONS (MADE IN NOVEMBER, 1986)

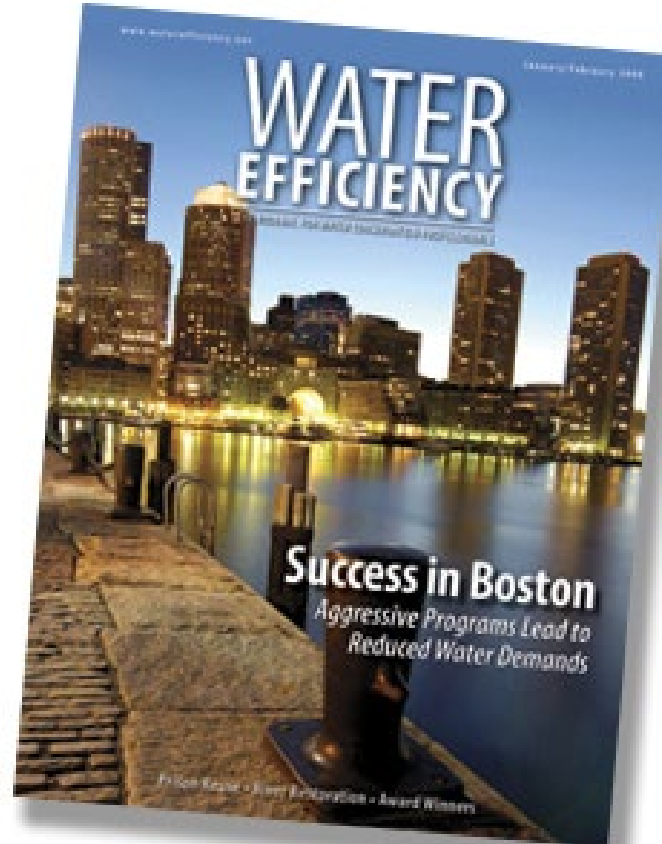


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November, 1986

●—● Actual Results



Did You know That There is a Magazine for Everything?





Water Pipelines Rehabbed Or Replaced – Quality and Quantity

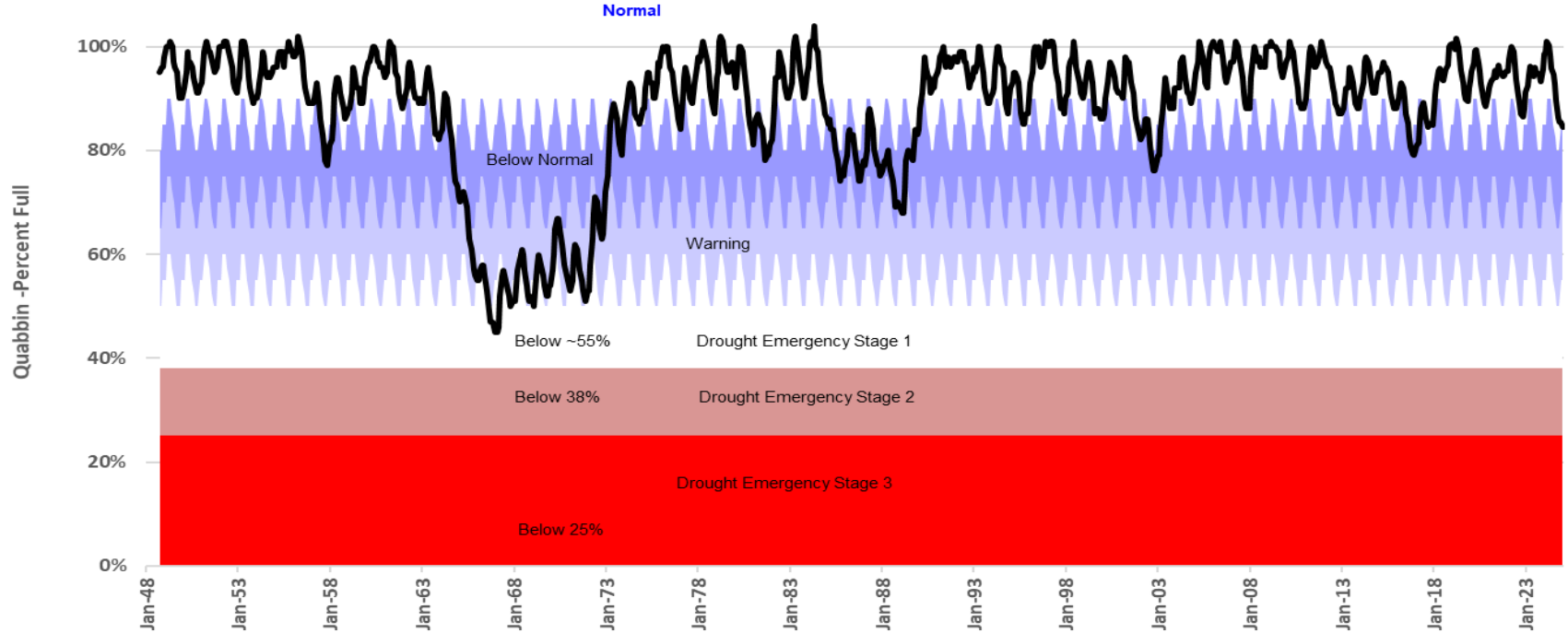




Some Current Events

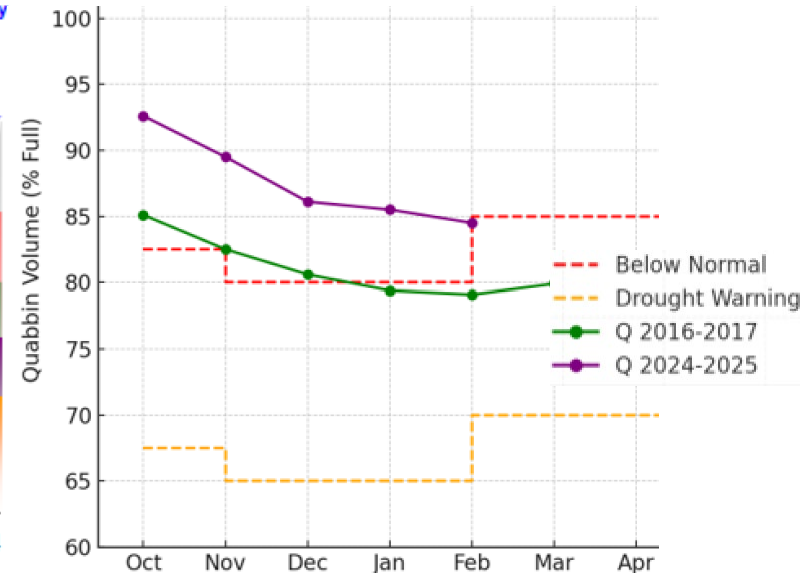
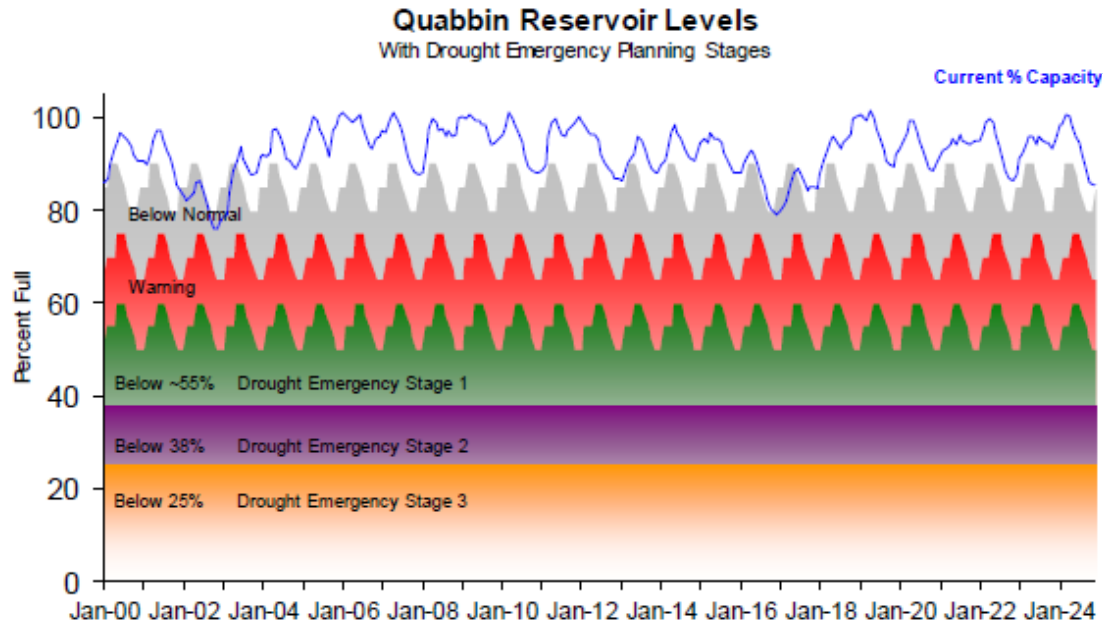


Quabbin's Levels and Drought Stages (1948 to 2024)





Current Conditions after a dry fall and winter



- Quabbin went down by 3.9 ft. and was at 85.5% capacity at the end of December – normal operating range
- On February 1st Quabbin levels dropped to below normal, with target rising to 85%



MWRA Drought Management Plan Stages

Stage	Target Water Use Reduction
Normal Operation Below Normal Drought Warning	0 Previous year's use (Voluntary) 5% (Primarily Voluntary)
Drought Emergency Stage 1 Stage 2 Stage 3	(Mandatory Restrictions) 10% 15% 30%

MWRA Drought Plan under review for spring submission under WMA



A Longer Look Forward



Climate change

Changes in Demand and Demand Variability

Changes in Supply

- Total yield

- Variability of Yield

- Affects on Safe Yield Determination

Substantial Analytical Effort with Water Research Foundation and, Stockholm Institute, and National Center for Atmospheric Research



Large Reservoir to Yield Ratio + More Precipitation = Plenty of High Quality Water





More High Quality Water Means We Can Help Our Neighbors

- Quabbin Reservoir Can Act as the Regional “Flywheel”
- Existing Partial Users May Use More in Dry Years, Less in Wet
- Adjacent Communities May Need Emergency Supply More Often
- Some Communities May Choose to Permanently Connect
- Improvements in Reliability and Environmental Effects



Demand Management works!

- Conservation has saved substantial capital investment
- Conservation avoided likely loss of opportunity to avoid filtration
- Conservation reduced size and cost of new infrastructure:
 - Carroll and Brutsch Water Treatment Plants
 - Cover storage facilities
 - MetroWest Tunnel
- Conservation allows MWRA to emit less greenhouse gases
- Conservation created opportunities to solve local source problems
- Conservation leaves more water in source basins
- Conservation built system resilience

Questions or Comments?

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Drink with Confidence

Flush with Pride

This presentation represents the opinions of the author and not necessarily those of the MWRA