Massachusetts Water Resources Authority

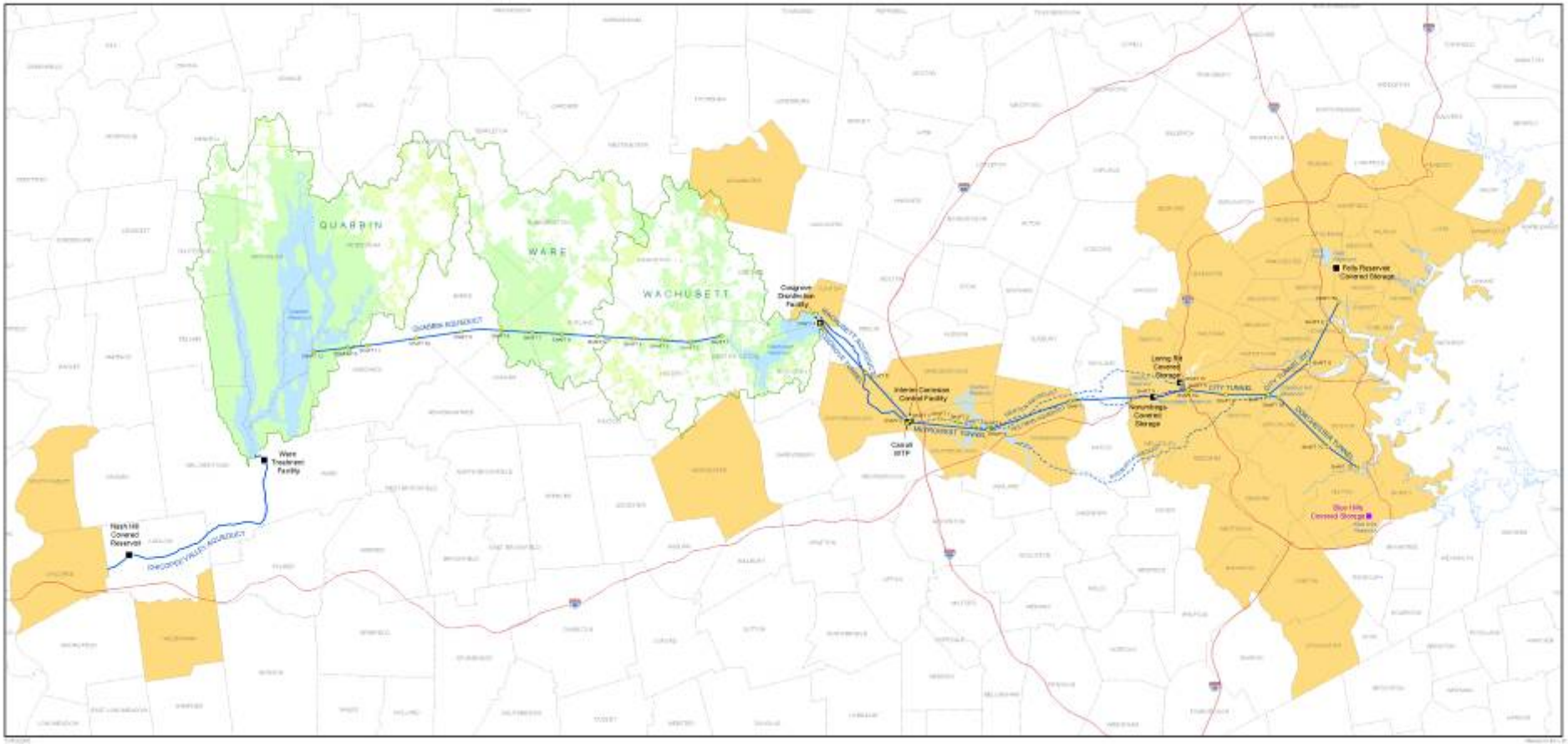
# *MWRA's Long-Range Water Supply Planning*

**May 2006**

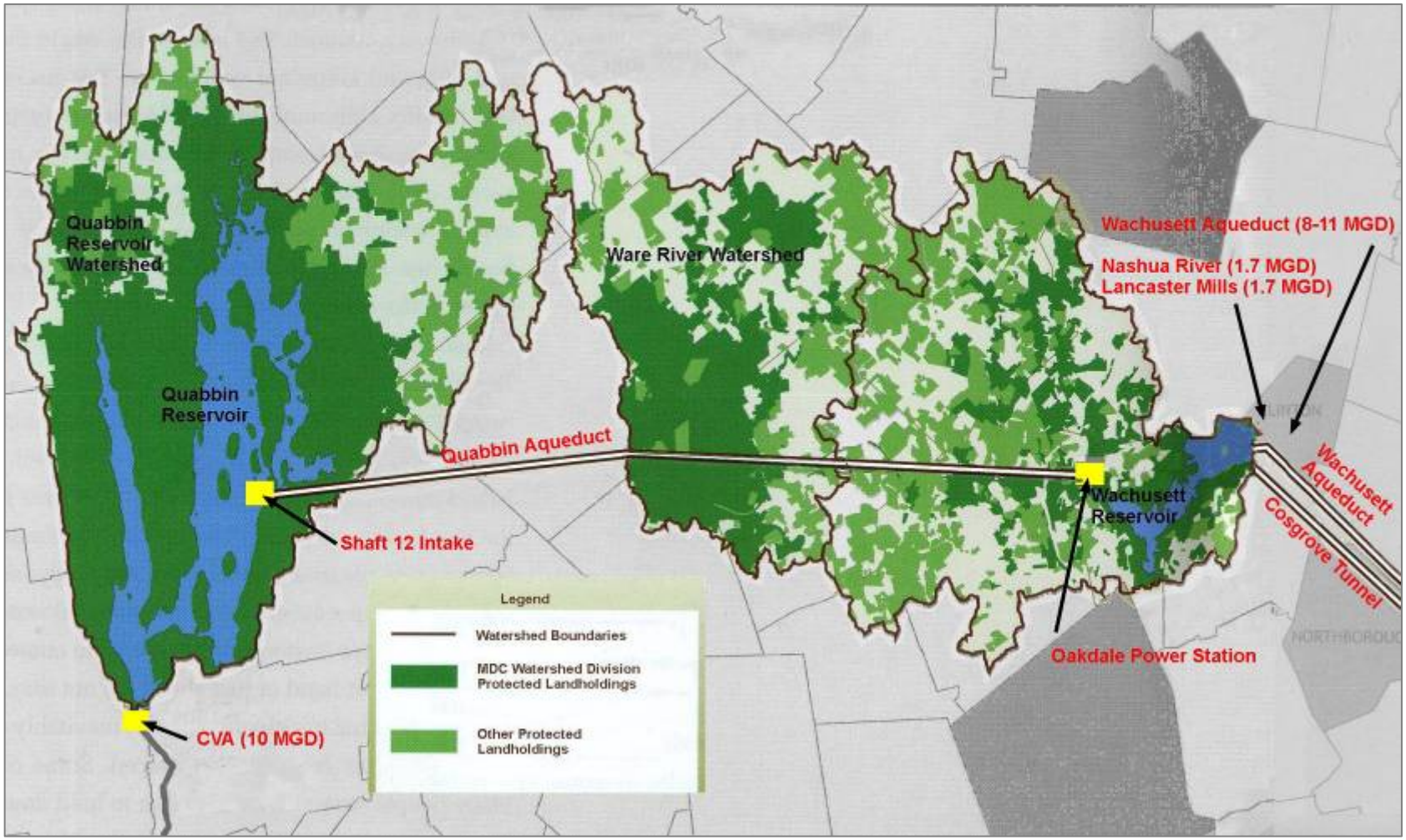
# Why Are We Here?

- Confluence of these dynamics:
  - MWRA has excess capacity because of conservation measures
  - MWRA's service area is surrounded by watersheds (or portions of watersheds) that are highly stressed
  - MWRA has a need for new sources of revenue as pressure on rates continues

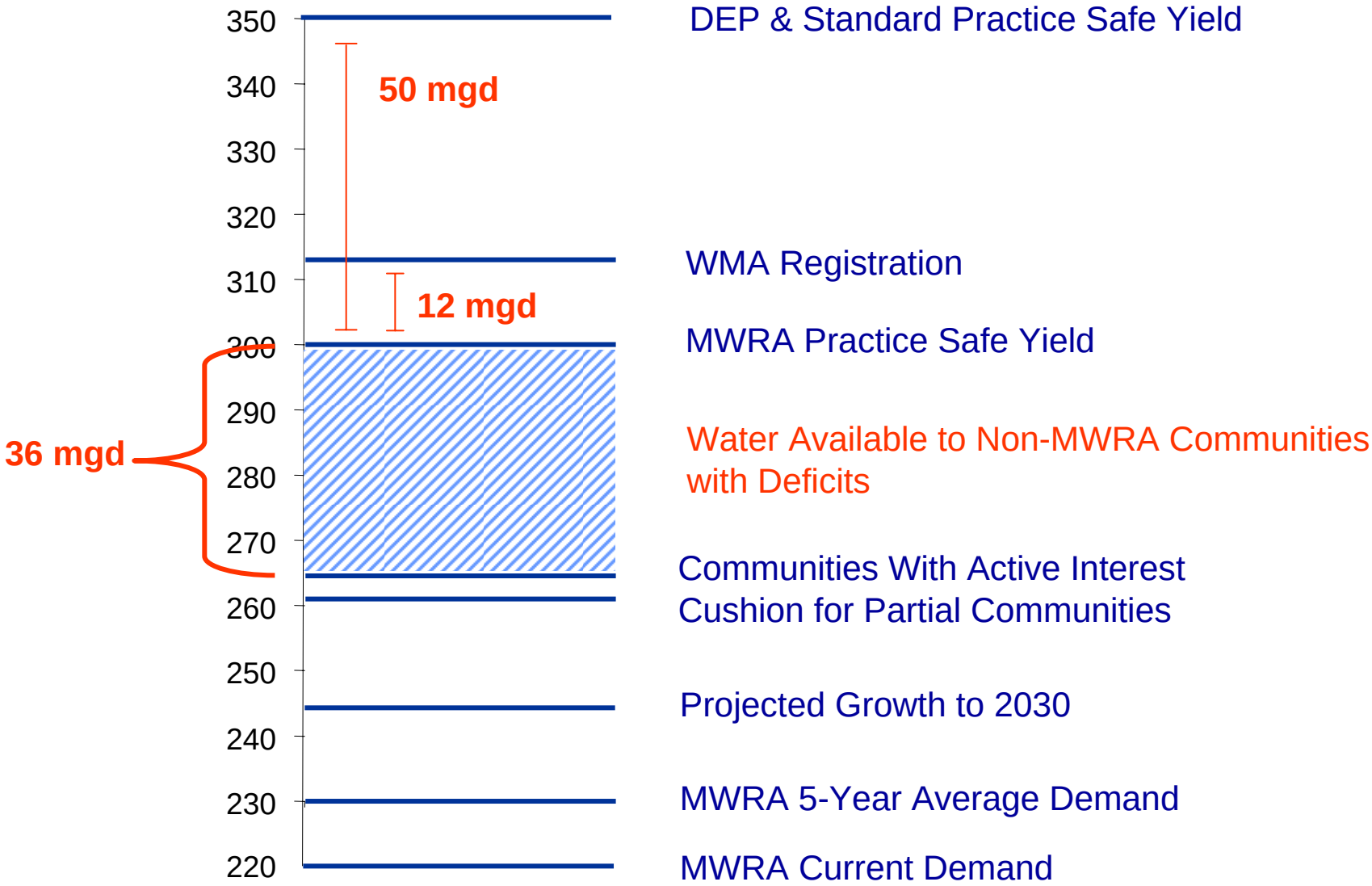
# MWRA's Water System



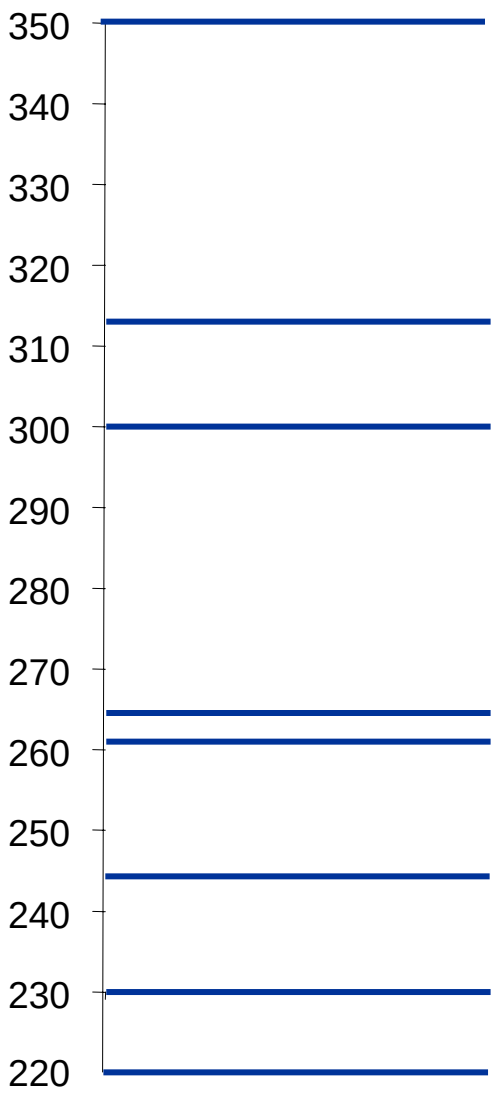
# The Watersheds



# Conservatively, We Have 36 MGD Available



# MWRA Current Demand




**DEP & Standard Practice Safe Yield**

**WMA Registration**

**MWRA Practice Safe Yield**

Water Available to Non-MWRA Communities with Deficits

Communities With Active Interest
Cushion for Partial Communities

Projected Growth to 2030

MWRA 5-Year Average Demand

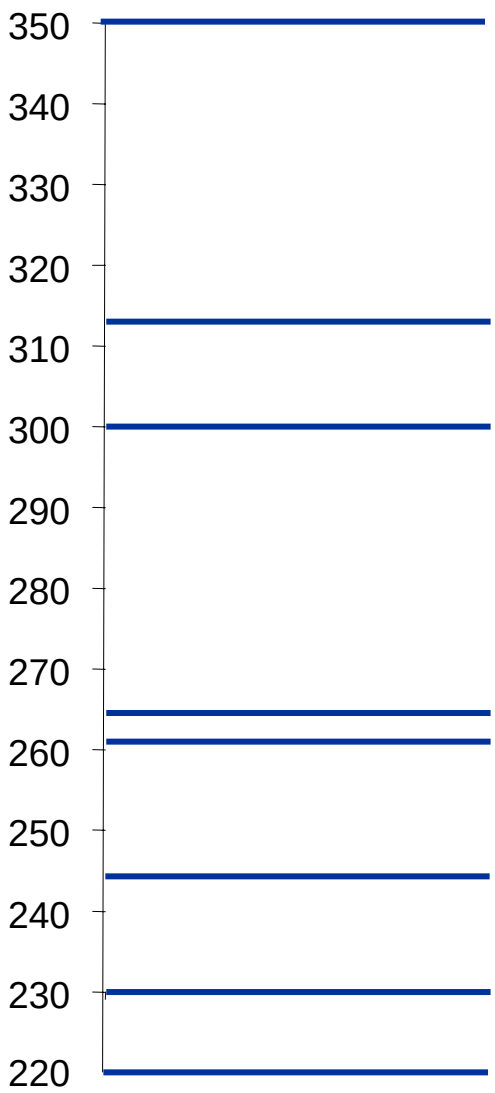
MWRA Current Demand

# “Safe Yield”

- DEP Safe Yield & Standard Engineering 355 mgd
- All Time Highest Usage 1980 342 mgd
- WSCAC 1984 318 mgd
- WMA Registration 312 mgd
- MWRA 300 mgd

*Net of 31 million gallons of required releases*

# MWRA Current Demand

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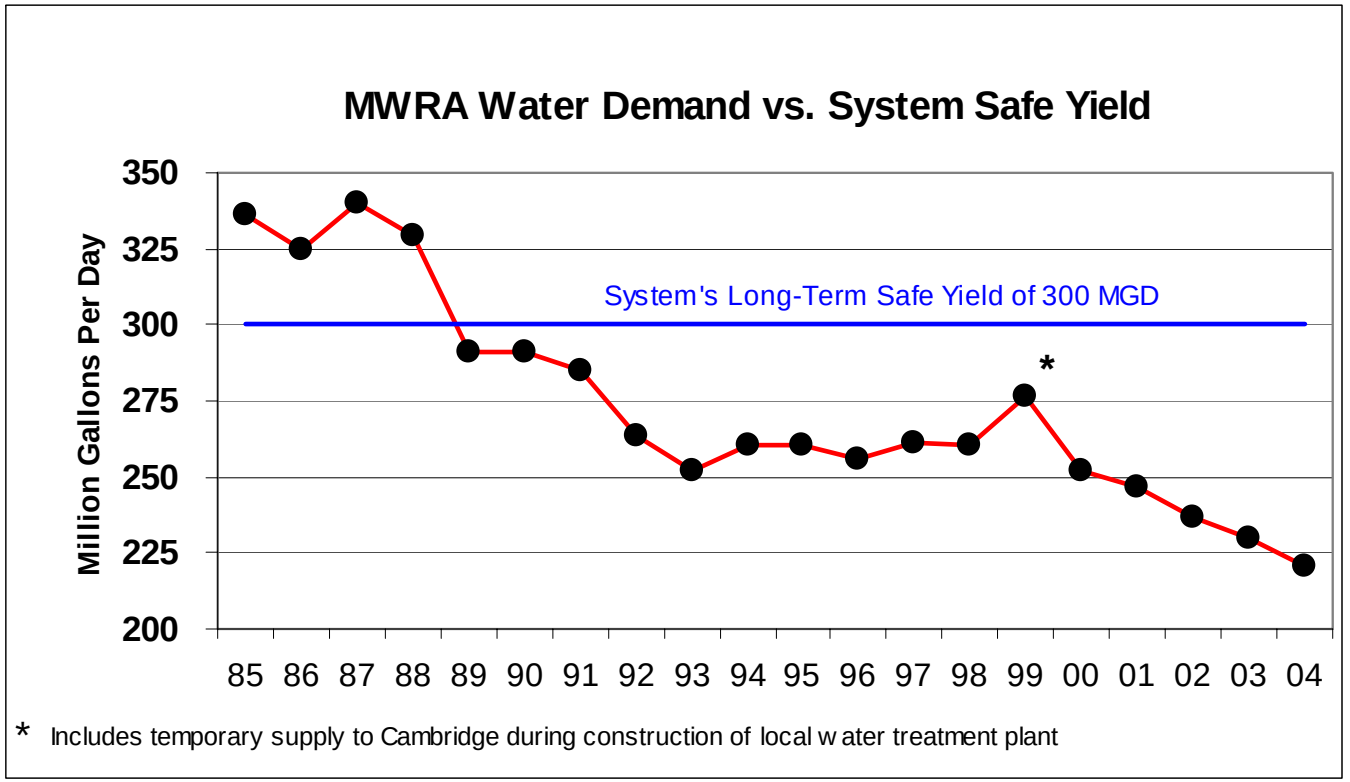
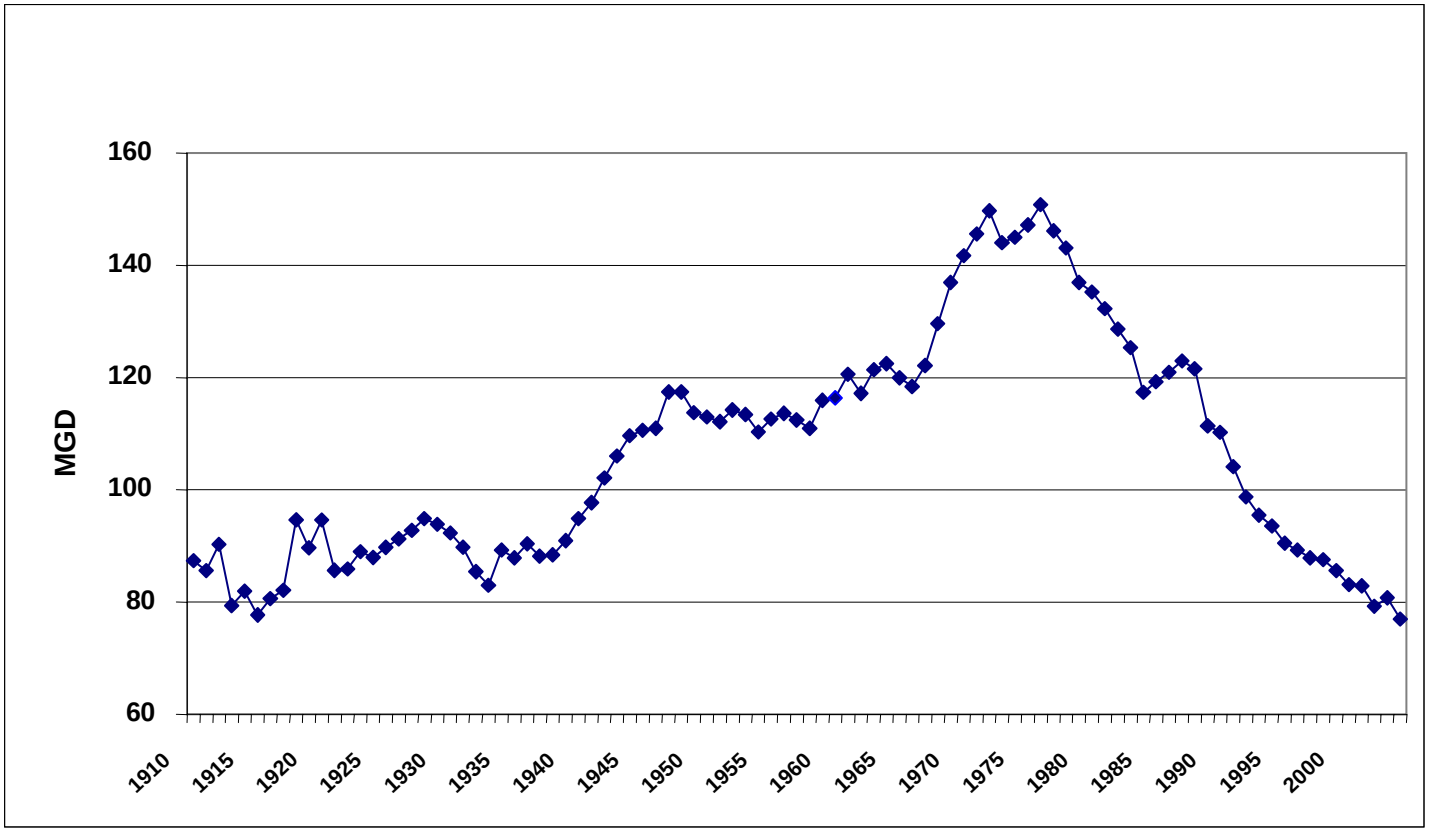
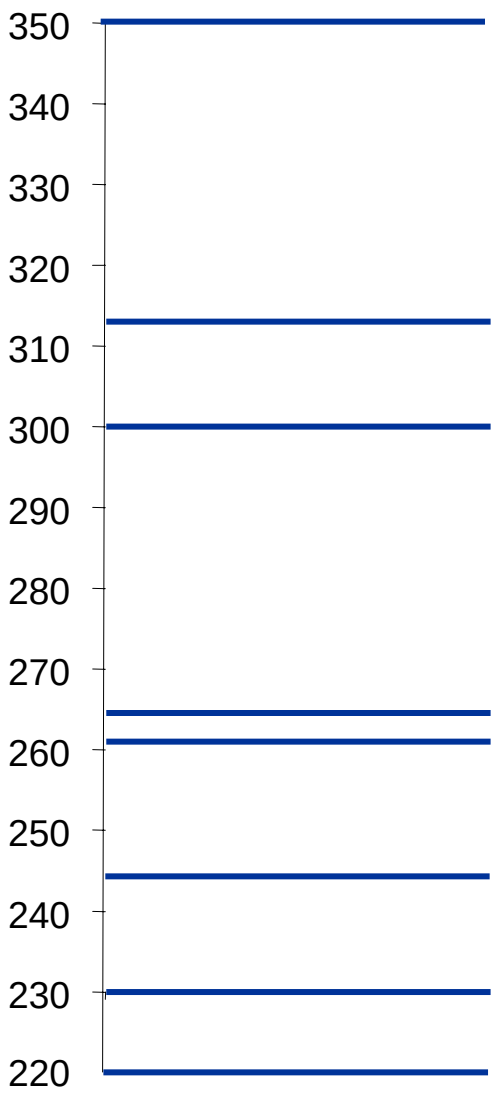


# City of Boston Water Demand 1910 - 2004



# Projected Growth to 2030

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**Projected Growth to 2030**

MWRA 5-Year Average Demand

MWRA Current Demand

# A Conservative Look At Demand: What the Future Holds

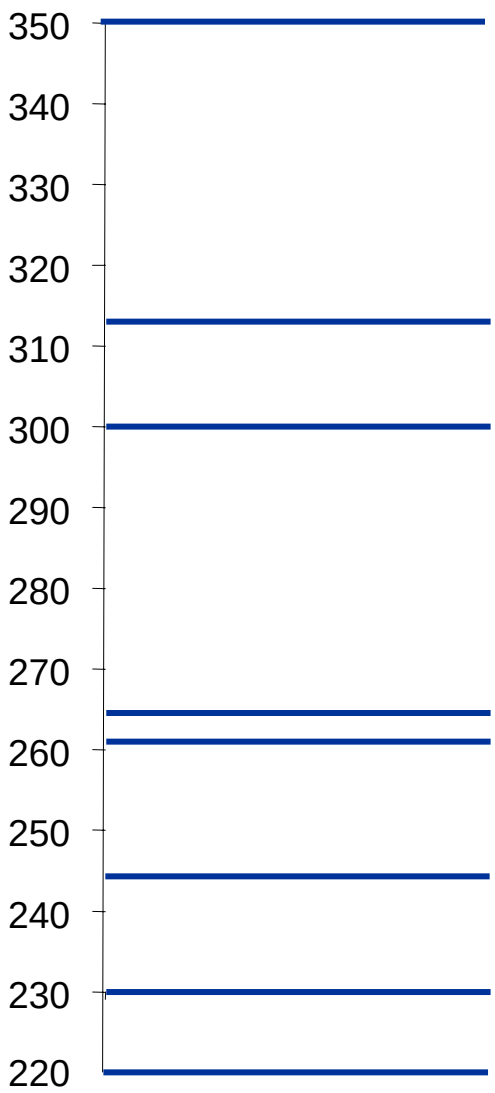
**Based on 2030 projections** (using MAPC and Pioneer Valley Regional Planning Commission employment and population projections)

230 mgd - baseline (5 year average for existing service area now)
+ 3.5 mgd from new communities now pursuing MWRA admission
+12.3 mgd from new population and employment through 2030
**245.8 mgd**

**Based on EOEA Build-out analysis:**

230 mgd - baseline (5 year average for existing service area now)
+ 3.5 mgd from new communities now pursuing MWRA admission
+24.8 mgd from new population and employment at build-out
**258.3 mgd**

# Cushion for Partially-Supplied Communities

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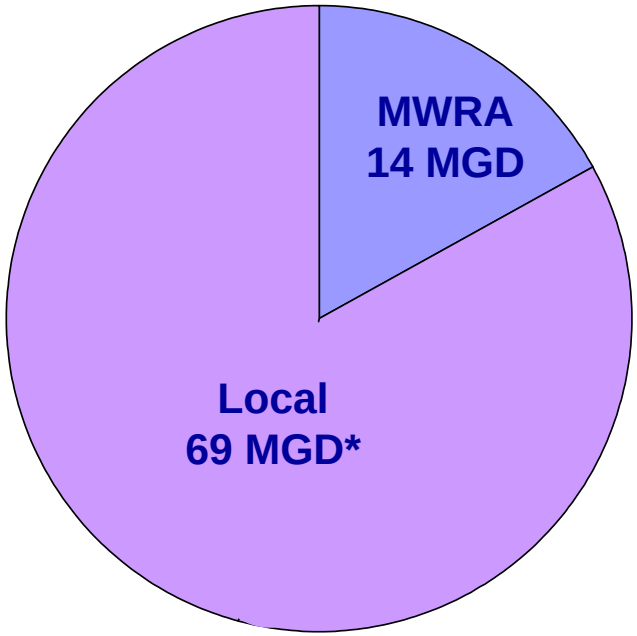
MWRA 5-Year Average Demand

MWRA Current Demand

# What Can Be Expected From Local Sources?

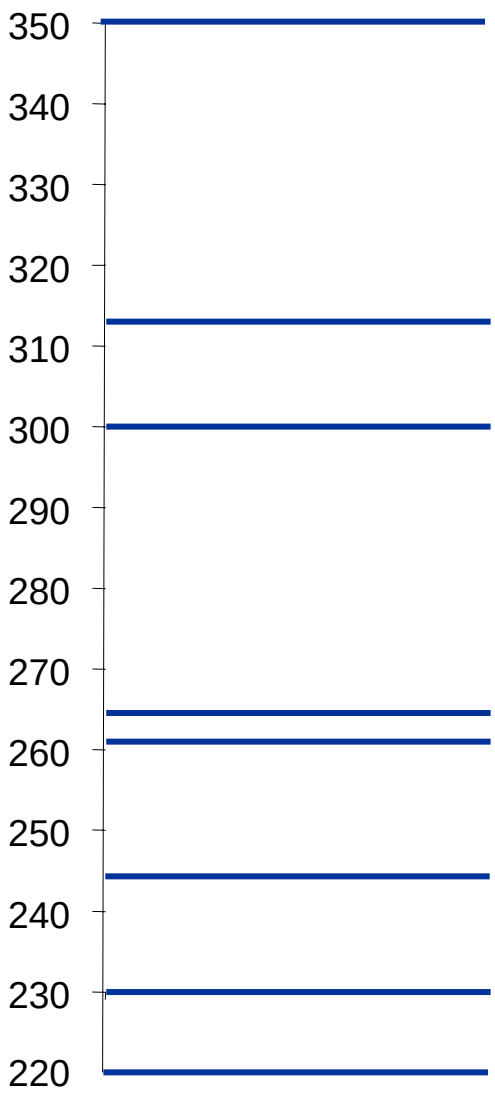
- MWRA typically provides 14 mgd of water to 12 partially supplied communities to supplement 31 mgd in local sources
- Cambridge, Worcester and Leominster only use MWRA in an emergency, typically relying on 38 mgd in local sources




* *"Cushion for partial communities" assumes 25% of local sources*

| | Local | MWRA |
|---|---|---|
| Cambridge | 15.0 | 0 |
| Canton | 0.2 | 2.3 |
| Bedford | 0.3 | 2.1 |
| Leominster | 4.7 | 0 |
| Lynn | 10.6 | 0.2 |
| Marlborough | 1.6 | 3.7 |
| Needham | 2.7 | 0.4 |
| Northborough | 0.0 | 0.9 |
| Peabody | 5.3 | 0.6 |
| Stoughton | 0.2 | 2.4 |
| Wakefield | 0.3 | 1.8 |
| Wellesley | 2.5 | 0.5 |
| Winchester | 1.2 | 1.0 |
| Woburn | 2.9 | 2.2 |
| Worcester | 23.6 | 0 |

# Communities With Active Interest

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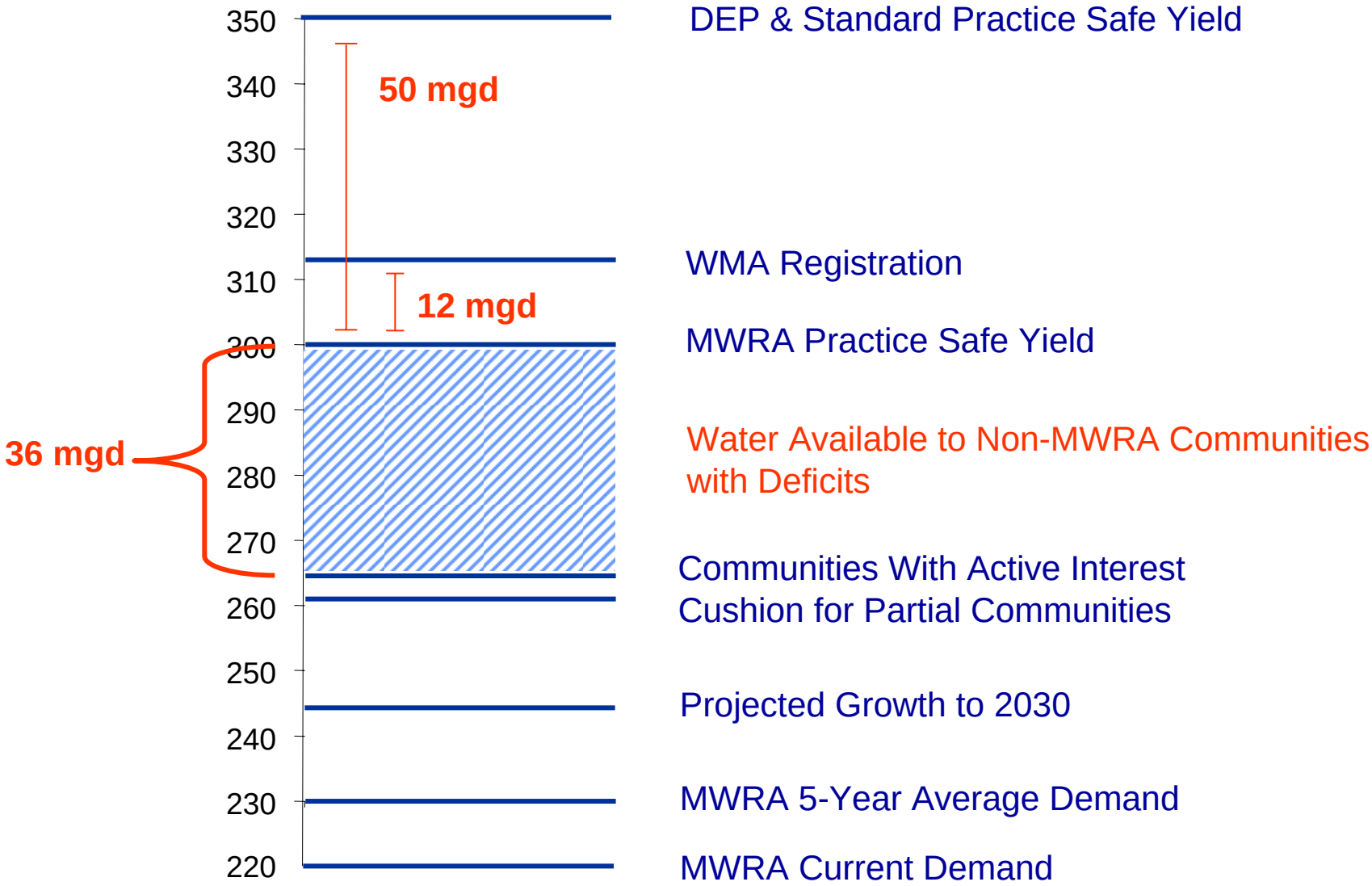
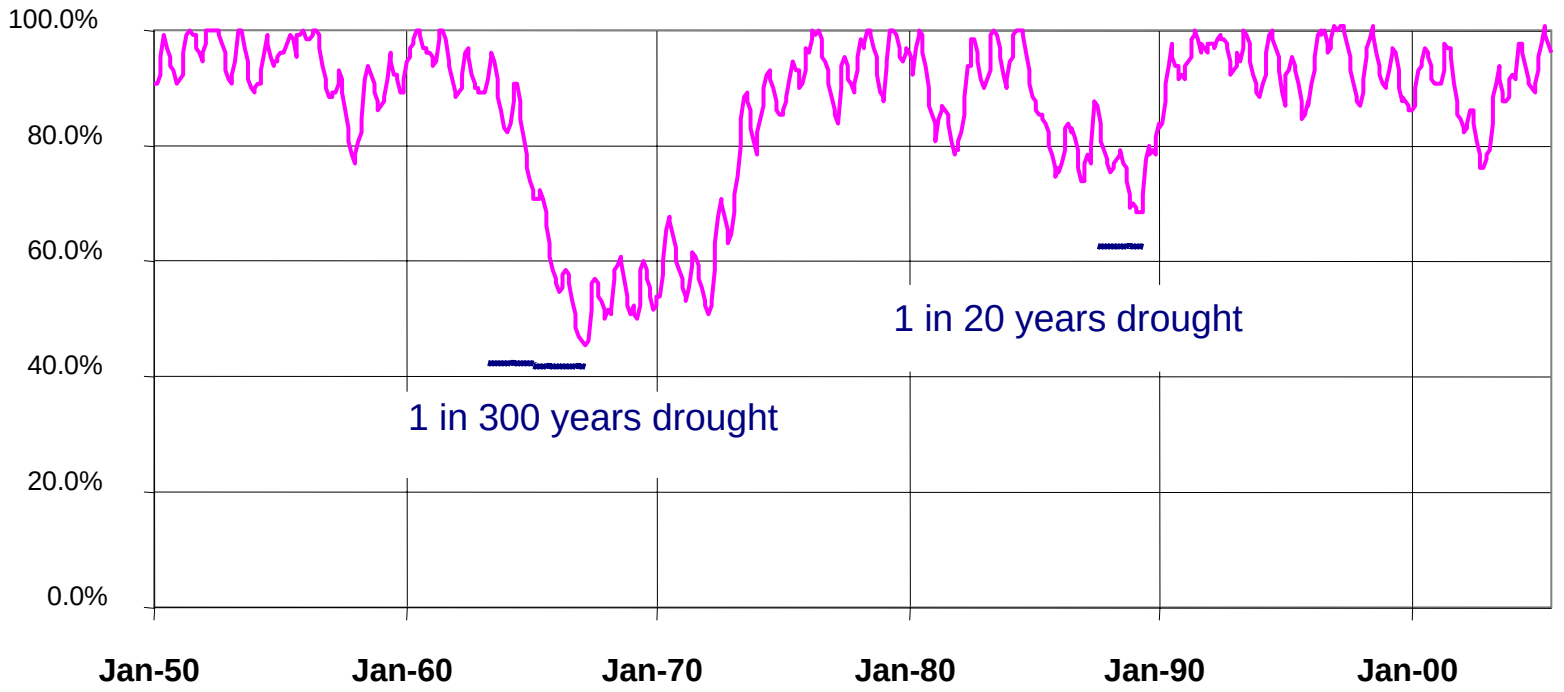
# Potential Connections to MWRA Water System: Active Interest

| Applicant | Applicable Policy | MWRA Withdrawal | Status |
|---|---|---|---|
| Wilmington | New Community | 1-1.5 mgd (average) | SEIR/CWRMP anticipated to be submitted in 2006 |
| Weymouth Naval Air Station<br>Tri-Town Development Corp | New Community/ Local Body | 1.4 mgd | MEPA NPC identified MWRA as preferred option<br>EIR in preparation |
| Leggs Hill/<br>North Shore YMCA<br>Salem/Marblehead | Water Straddle | . 018 mgd | Application to MWRA this Spring |
| **Total Proposed Withdrawals** | | **2 .418 –2.918 mgd** | |

# Conservatively, We Have 36 MGD Available



# Quabbin Reservoir Level (% Full)



# MWRA' s Estimates of Potential Supplemental Demand

| | |
|---|---|
| Hingham/Hull | 1.3 |
| Sharon | 0.2 |
| **Total** | **1.5** |

| | |
|---|---|
| Lynnfield Centre Water District | 0.5 |
| Salem Beverly | 0.7 |
| Ipswich | 0.2 |
| Wenham | 0.1 |
| Topsfield | 0.1 |
| Danvers/Middleton | 0.8 |
| Reading | 1.4 |
| **Total** | **3.8** |

| | |
|---|---|
| Ashland | 0.9 |
| Holliston | 0.2 |
| Hopkinton | 0.8 |
| Medway | 0.2 |
| Milford Water Co. | 0.3 |
| Franklin | 0.7 |
| **Total** | **3.1** |

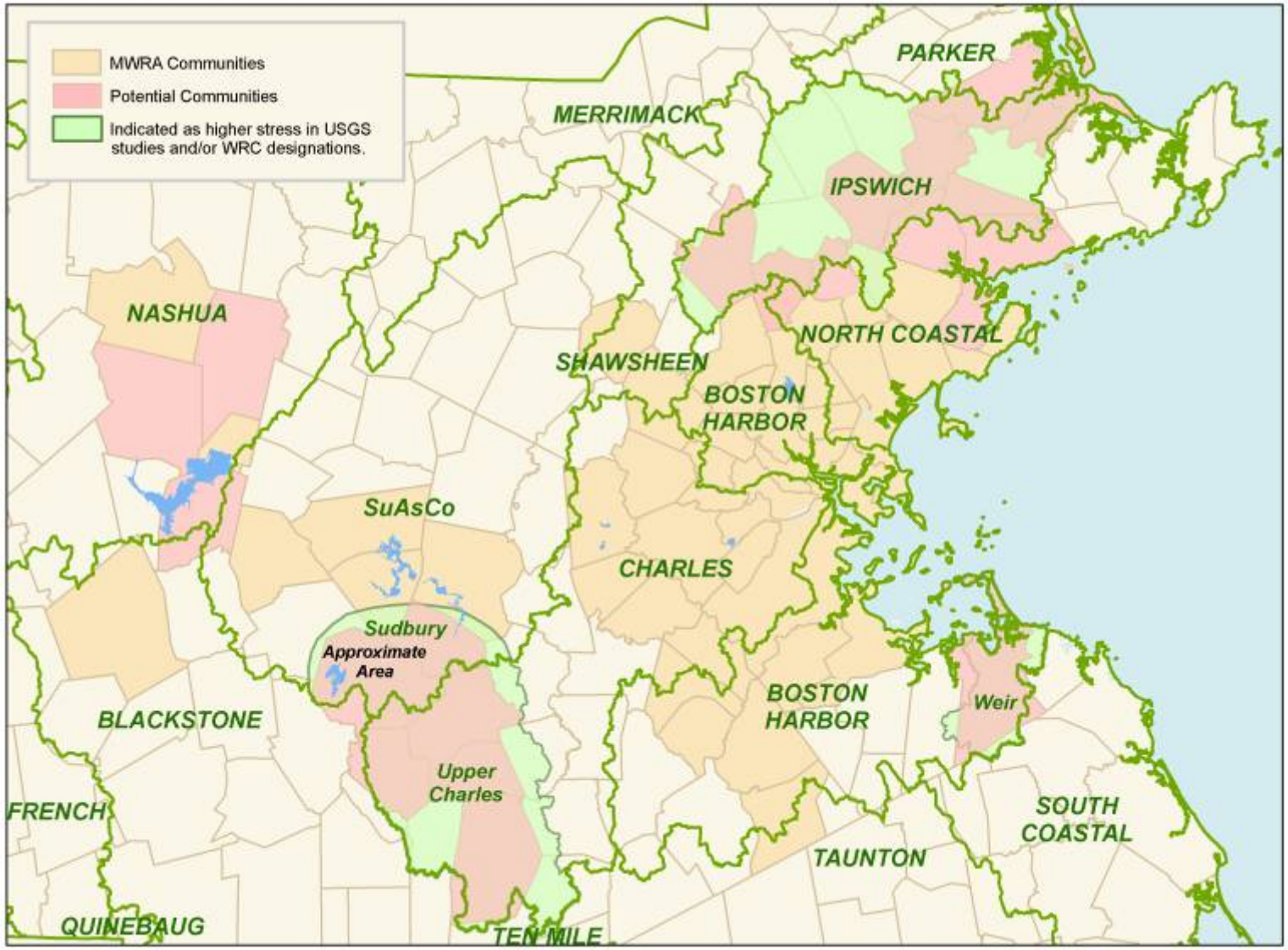
| | |
|---|---|
| Lancaster | 0.2 |
| Sterling | 0.9 |
| West Boylston | 0.5 |
| Boylston | 0.1 |
| South Hadley | 0.5 |
| **Total** | **2.2** |

**Grand Total** **10.6 mgd**

# MWRA Water Service Area and Basins

# MWRA Water Service Area and Stressed Areas

# MWRA Water Service Area and Potential System Expansion



# Conservation Indices

| Community | Conservation Indices | |
|---|---|---|
| | Residential Per Capita | Unaccounted For Water |
| Sharon | 63 | 14 |
| Salem/Beverly | 69 | 8 |
| Ispwich | 52 | 7 |
| Wenham | 72 | 14 |
| Topsfield | 53 | 7 |
| Danvers/Middleton | 56 | 7 |
| Reading | 59 | 10 |
| Franklin | 64 | 7 |
| Holliston | 72 | 15 |
| Medway | 60 | 11 |
| Milford | 63 | 21 |
| Ashland | 77 | 37 |
| Hopkinton | 75 | 14 |
| Boylston | 49 | 18 |
| Lancaster | 67 | 21 |
| West Boylston | 68 | 20 |
| South Hadley Fire District 2 | 63 | |
| Hingham/Hull* | Data Suspect | |

# Other Characteristics of the Potential MWRA Communities

- The overwhelming majority is already conserving. Given the location of growth and the nature of water withdrawals, concerns over low flow and river stress may persist, even where conservation is practiced
- Communities that join MWRA would be required to maintain conservation and leak detection programs now in place
- Communities would benefit from MWRA's leak detection programs and conservation efforts
- Communities might also benefit from MWRA's technical assistance on infiltration/inflow reduction to also help reduce export of groundwater out of basins

## The Many Hurdles of Joining the System

- Prior to application to MWRA and the MWRA Advisory Board, a number of approvals must first be obtained, including:
  - Local Community
  - MEPA Review
  - Water Resources Commission Review under Interbasin Transfer Act
  - Legislature
  - Governor
  - MWRA Advisory Board
  - MWRA Board of Directors

# The Many Hurdles of Joining the System

MWRA must find that the safe yield of the watershed system, on the advice of the DCR, is sufficient to meet the projected demand

MWRA must find that no existing or potential source for the community has been abandoned, unless the Department of Environmental Protection has declared that the source is unfit for drinking and cannot be economically restored

MWRA must find that a water management plan has been adopted by the community and approved by the Water Resources Commission

MWRA must find that effective demand management measures have been developed by the community, including the establishment of lead detection and other appropriate system rehabilitation programs

MWRA must find that a local source feasible for development has not been identified by either the community or DEP

MWRA must find that a water use survey has been completed which identifies all users within the community that consume in excess of twenty million gallons per year

MWRA must find that any expansion of the MWRA water service system shall strive for:

- no negative impact on the interests of the current user communities; no negative impacts on water quality;
- no negative impact on the hydraulic performance of the MWRA water system; no negative impact on the environment or on the interests of the watershed communities; and, shall attempt to achieve economic benefit for existing user communities

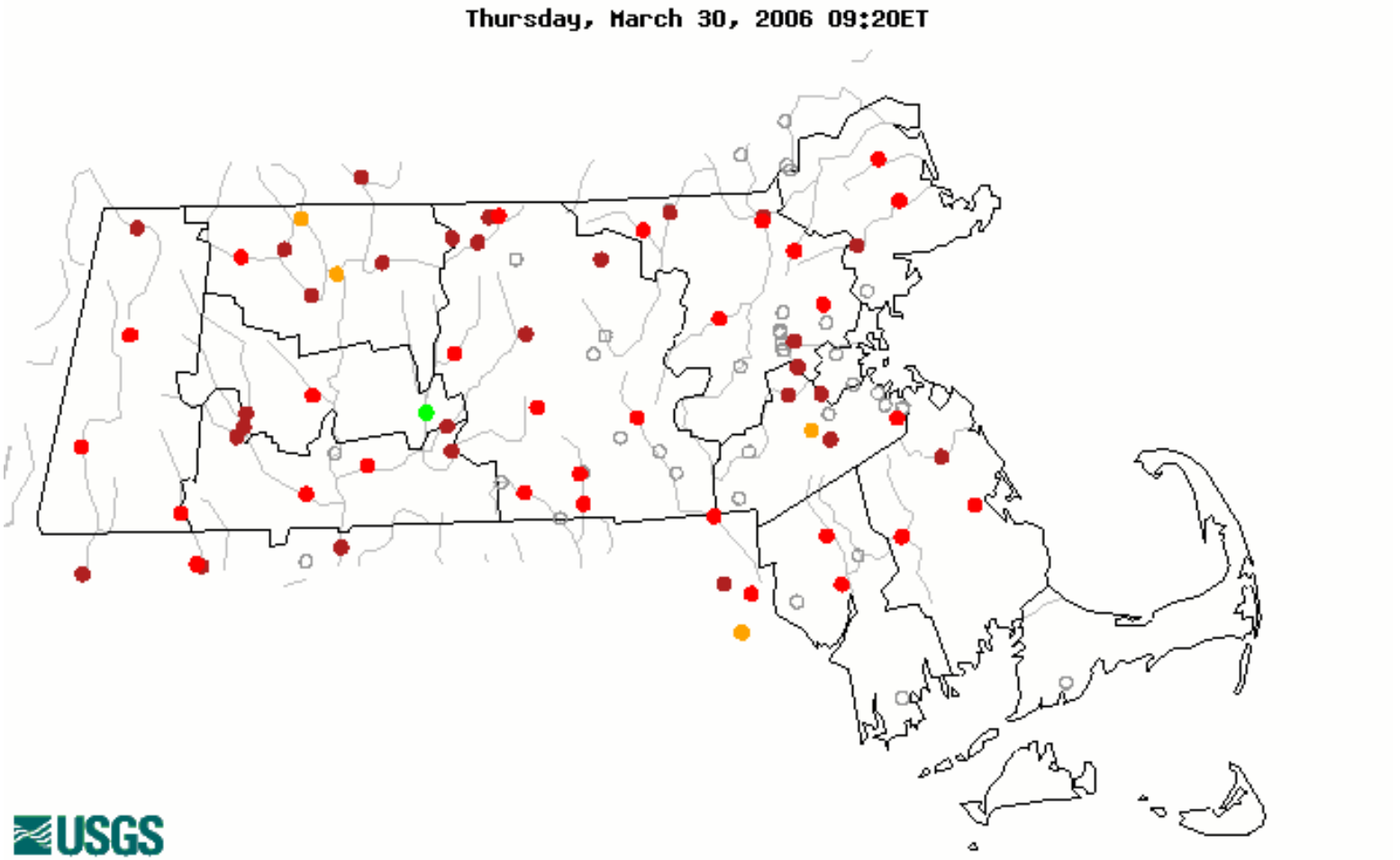
MWRA must find that the community has met all legal requirements for admission

Upon admission, the community will pay fair compensation for past investment in the MWRA waterworks system by existing user communities

# Which Communities are Not Included on MWRA's Preliminary List

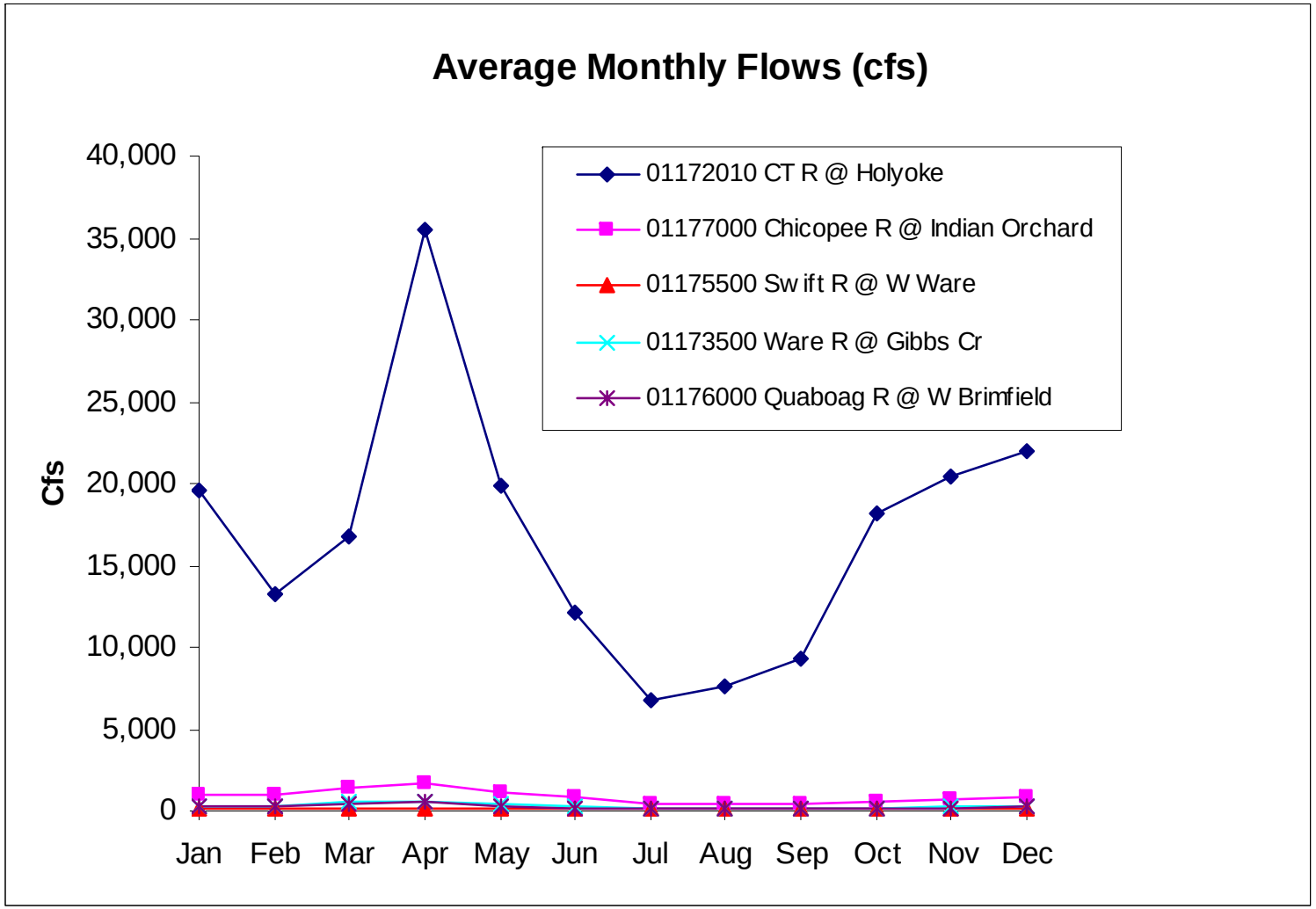
- Communities where factors such as distance and isolation from MWRA and other technical difficulties preclude MWRA service.
- Communities where there is little water supply distribution infrastructure
- Communities where there is the potential for reasonable conservation measures to fully address their future shortfalls or resolve existing river stress concerns

# Quabbin Storage and Required Releases Means the Swift has Water

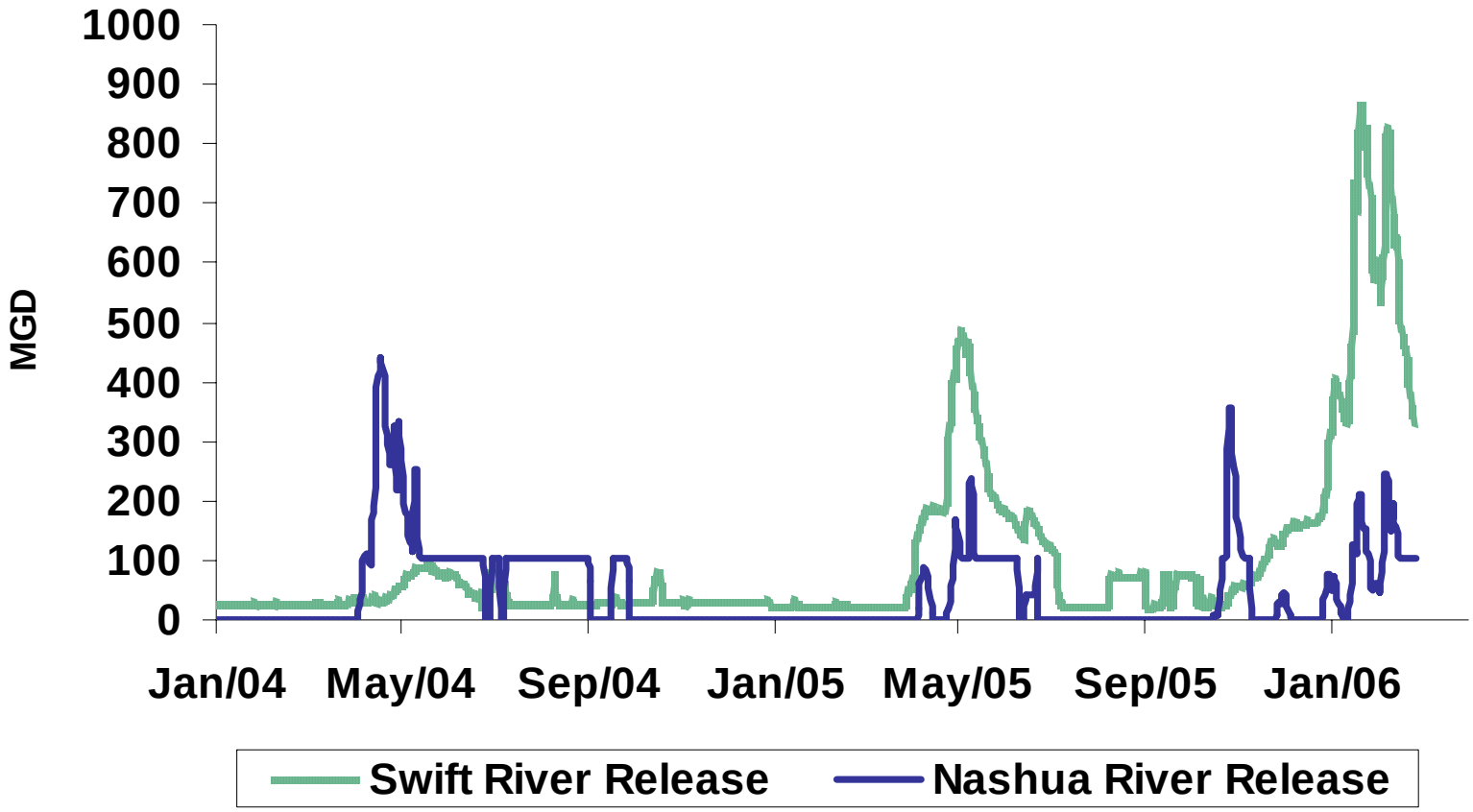



Orange is below normal and Red is very low.  Green is average flow.

# Swift River Flow Contribution



# River Releases



# Environmental Aspects of System Expansion

- In the summer, streamflows in Massachusetts's rivers largely consist of baseflow derived from adjacent aquifers and occasionally, releases from surface water storage

- The Ipswich River, Upper Charles River, Boston Harbor Basin, and SUASCO (Sudbury, Assabet, and Concord ) River basins are sources of water supply for partially supplied MWRA communities and communities beyond MWRA's water service area

- Most derive their water supply from ground water sources, where there is often little storage. Therefore, withdrawals for water supply in the summer exacerbate already naturally occurring low flows

- In contrast, MWRA's multi-year reservoirs capture spring flows to support summer withdrawals and to dampen year- to year variation in precipitation that might otherwise strain water resources

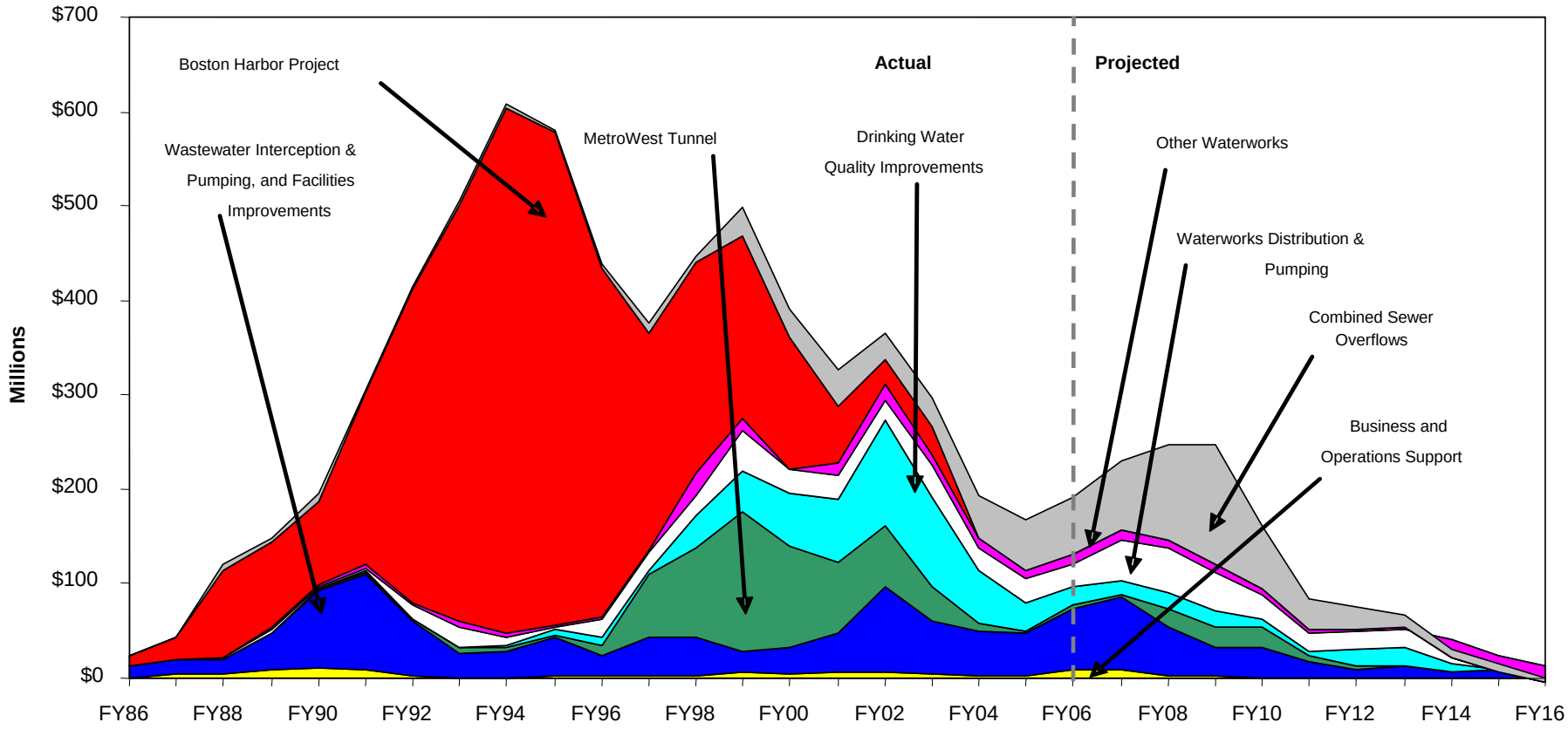
# Environmental Aspects of System Expansion

***"By properly coordinating the use of surface and groundwater supplies, optimum regional water resource development seems most likely to be assured."***

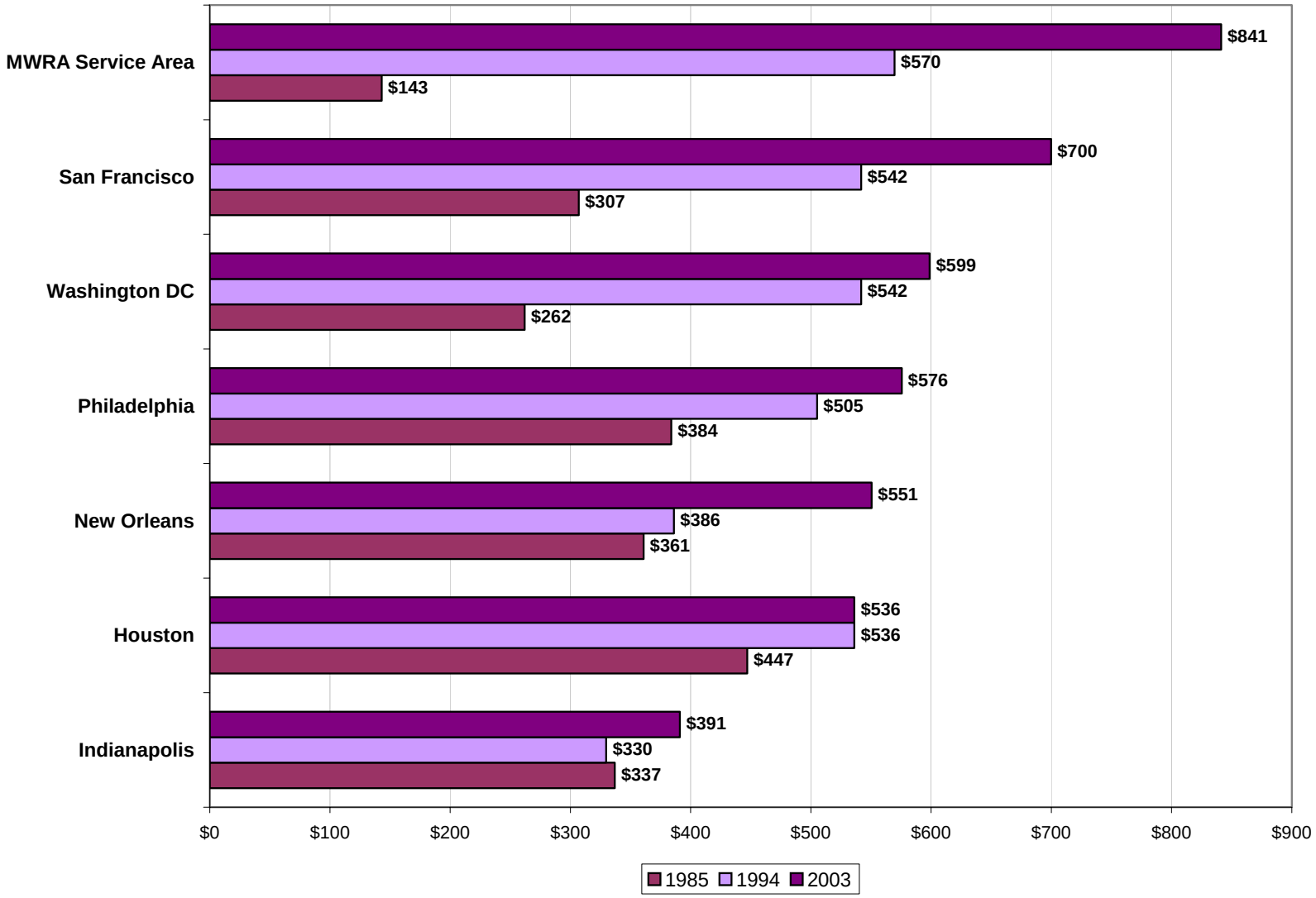
Source: Introduction to Hydrology, Warren Weissman

- MWRA's proposition:
  - By properly coordinating use of MWRA's multi-year reservoirs with groundwater withdrawals in stressed rivers (which often support high population densities), more optimum water resource planning can occur

# MWRA's Capital Improvement Program
# 1986 - 2016



# Combined Water & Sewer Rate Growth Comparison Among US Cities: 1985 to 2003



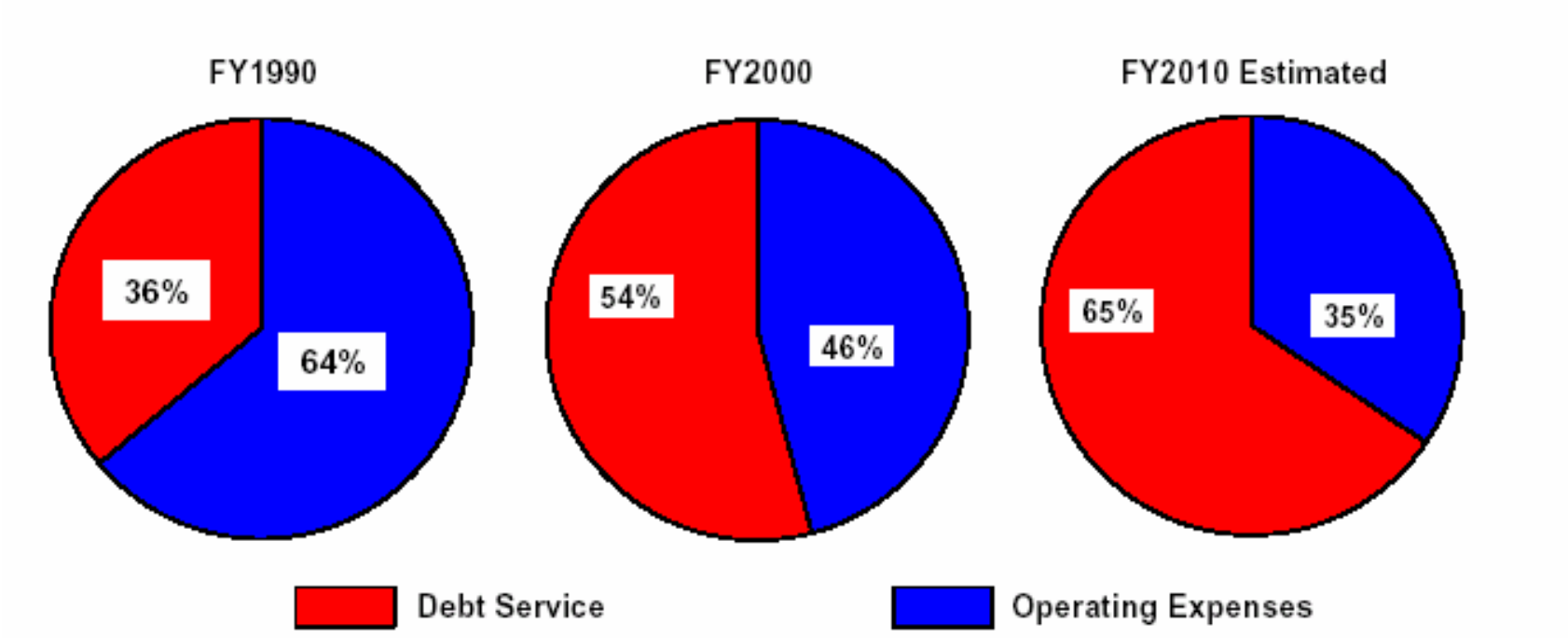
# FY2007 Proposed Budget

| FY06 Proposed | FY07 | FY08 | FY09 | FY10 | FY11 | FY12 | FY13 | FY14 | FY15 | FY16 |
|---|---|---|---|---|---|---|---|---|---|---|
| Rate Revenue Requirement | $518.5 | $563.5 | $612.2 | $665.4 | $700.2 | $730.7 | $759.2 | $763.2 | $770.6 | $759.1 |
| Rate Revenue Increase | 9.8% | 8.7% | 8.7% | 8.7% | 5.2% | 4.4% | 3.9% | 0.5% | 1.0% | -1.5% |

| Estimated Annual Household Charges | FY07 | FY08 | FY09 | FY10 | FY11 | FY12 | FY13 | FY14 | FY15 | FY16 |
|---|---|---|---|---|---|---|---|---|---|---|
| Based on 61,000 gallons (DEP weighted) | $675 | $726 | $780 | $840 | $883 | $923 | $962 | $1,012 | $1,035 | $1,041 |
| Based on 90,000 gallons | $996 | $1,071 | $1,152 | $1,239 | $1,303 | $1,362 | $1,420 | $1,446 | $1,478 | $1,487 |

# Impact of Debt Service on Annual Revenue Requirement

- Debt service as a percentage of total MWRA budget is increasing significantly



# Economic Impacts

- Entrance fee revenue = $5.2 million per 1 mgd (up-front payment/one-time impact)
- Hypothetically speaking, if 22 new communities joined in FY2007, using a total of 10 mgd
  - MWRA annual operating expenses would increase less than $1 million
  - 50 existing member communities would benefit because “rate base” is larger, water assessments would be lowered by 4.5% for a total savings to communities of $7 million per year

# Boston Globe Editorial - May 20, 2006

*"Handled correctly, a modest expansion could achieve both environmental and smart-growth goals."*

*"Both wildlife habitat and river recreation will benefit if the Ipswich and other stressed basins in Eastern Massachusetts get some relief."*

A16 **Editorial** SATURDAY, MAY 20, 2006

The Boston Globe

*Founded 1872*

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## WATER WISDOM

THANKS TO conservation and the repair of leaky pipes, the Massachusetts Water Resources Authority has enough reserve capacity to invite more towns and cities to join the 46 it now supplies. Bringing in new members would be a financial plus for the MWRA and for homeowners, who would benefit from new customers sharing the system's fixed costs. But any substantial expansion of MWRA service should meet environmental and smart-growth standards.

The safe yield for the system's two reservoirs, Quabbin and Wachusett, is about 300 million gallons per day. Last year, demand averaged 225.28 million gallons. In the bad old days of the 1990s, the state was using 340 million gallons, above safe yield, and had to choose between the diversion of Connecticut River water into Quabbin or conservation.

Wisely, it chose the latter and brought down consumption. Since then improvements in the water-supply system and waste-water treatment have pushed up rates. Recently, the MWRA board, sensitive to the pressure of those rates, has made it clear that it is receptive to an expansion of the service area that would draw up to about 10 million additional gallons per day.

Handled correctly, a modest expansion could achieve both environmental and smart-growth goals. By relying at least partially on MWRA water, North Shore communities could depend less on wells that draw from the same groundwater sources as the usually depleted Ipswich River. Both wildlife habitat and river recreation will benefit if the Ipswich and other stressed river basins in Eastern Massachusetts get some relief.

But state officials should also use water to advance the sustainable development principles that underlie the state's smart-growth strategy. A strong preference should be established for granting MWRA membership to towns planning to steer growth toward transit centers or redevelopment of built-up areas, and away from the state's vanishing open space. "We endorse the principles of smart growth," said Fred Laskey, the MWRA executive director. "How to implement it has to be figured out."

MWRA has scheduled an open forum for late in June to allow groups like the Metropolitan Area Planning Council, representatives of the river watershed associations, environmental activists, and others to offer their views. The MWRA expansion proposal could be a catalyst for the formation of a long-overdue policy to ensure that water distribution is in line with transportation decision-making and housing development in curbing the sprawl that squanders the two most basic natural resources: water and land.

**DEMAND FOR MWRA WATER**

Average daily demand in millions of gallons



SOURCE: Massachusetts Water Resources Authority

ED WIEDEMANN/GLOBE STAFF

# It's a Win - Win - Win

- Confluence of these dynamics:
  - MWRA has excess capacity because of conservation measures
  - MWRA's service area is surrounded by watersheds (or portions of watersheds) that are highly stressed
  - MWRA has a need for new sources of revenue as pressure on rates continues