
WATER RESOURCES AUTHORITY
MASSACHUSETTS

Automated Vehicle Locator Tracking System Contract A606

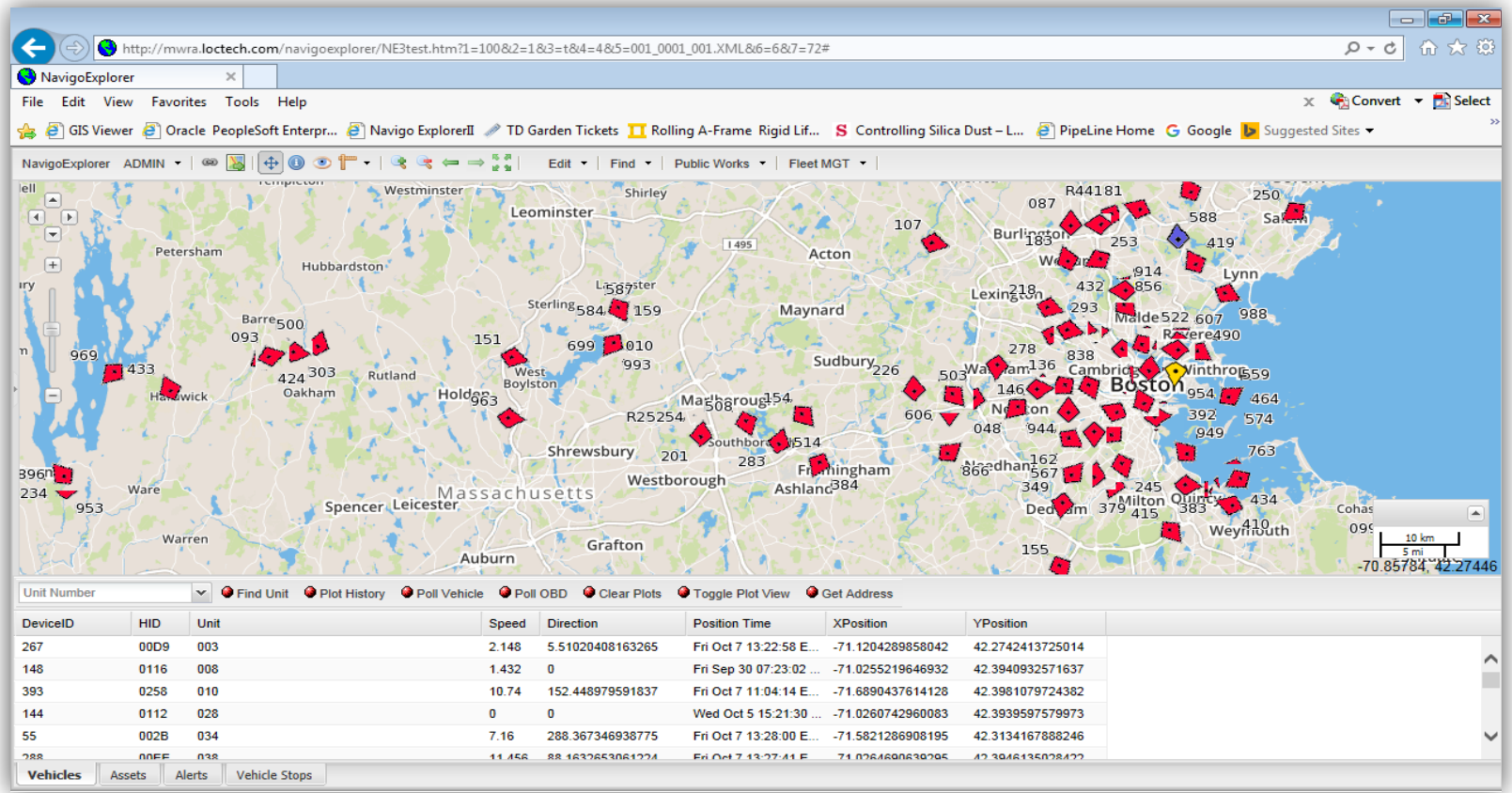
October 12, 2016

Automated Vehicle Location System

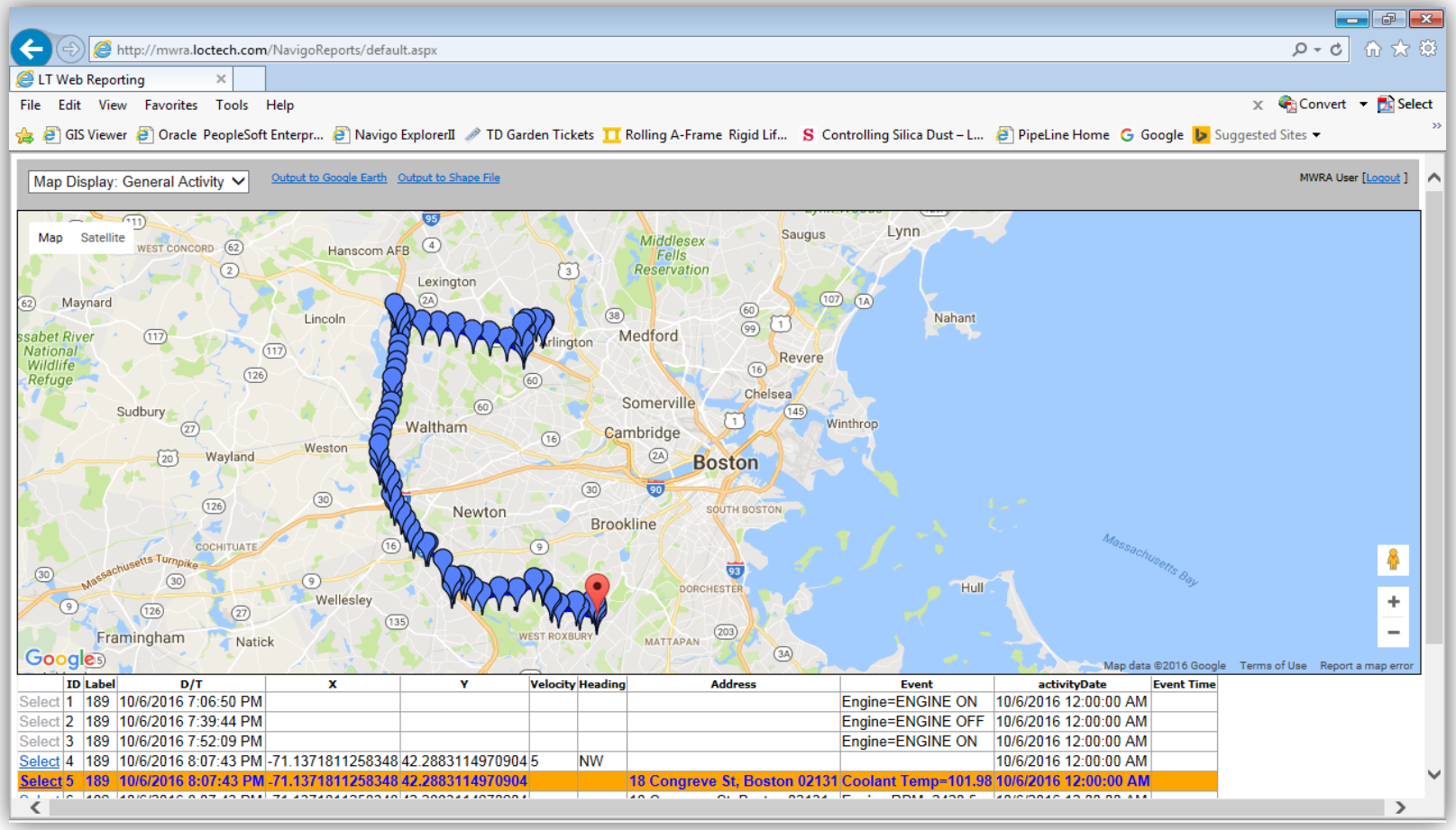
Automated Vehicle Location System - Uses

- The Automated Vehicle Location (AVL) system is used by MWRA managers and supervisors to monitor approximately 435 MWRA vehicles

Sample Live Map View

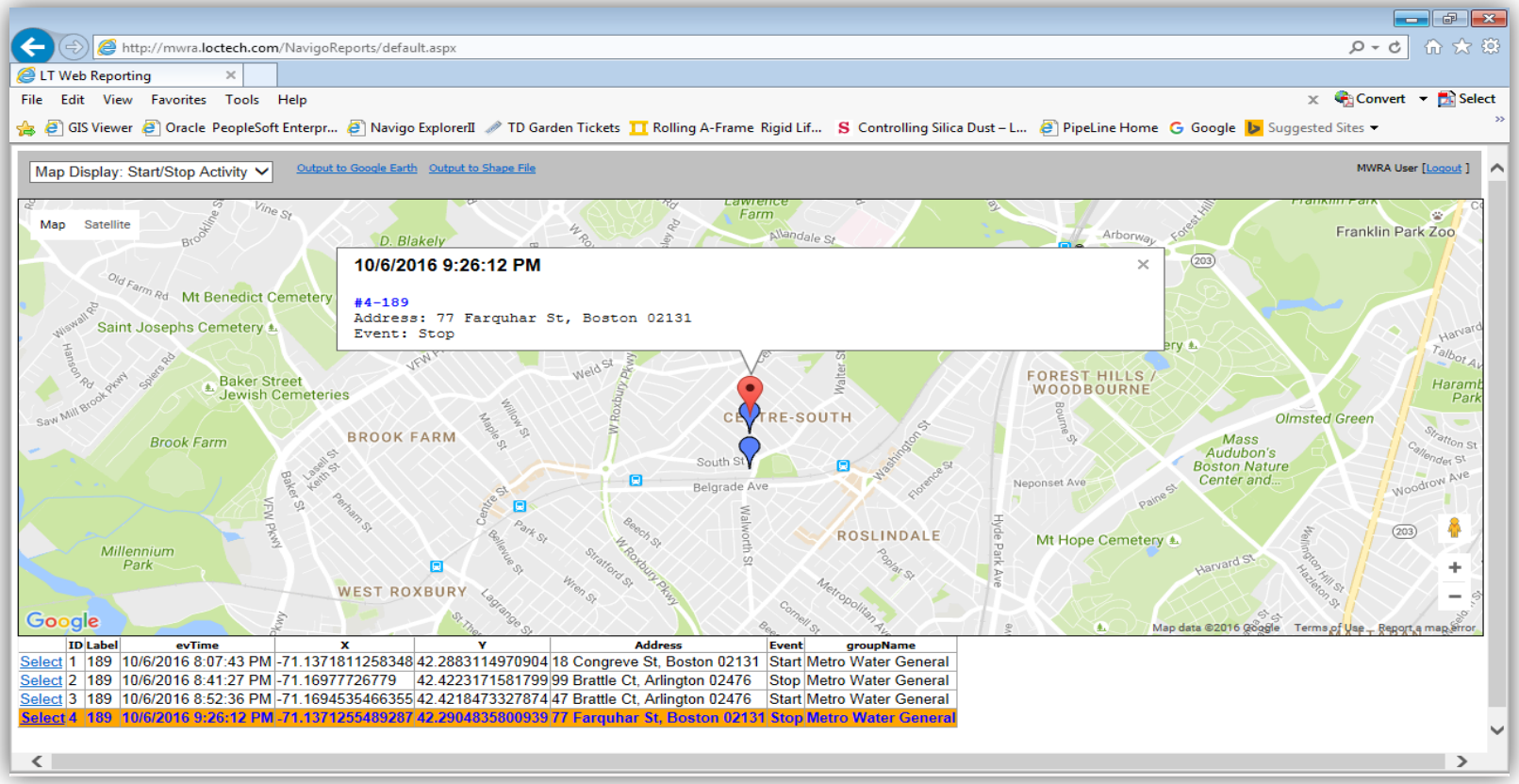


Sample Map Display of a Route Replay



	ID	Label	D/T	X	Y	Velocity	Heading	Address	Event	activityDate	Event Time
Select	1	189	10/6/2016 7:06:50 PM						Engine=ENGINE ON	10/6/2016 12:00:00 AM	
Select	2	189	10/6/2016 7:39:44 PM						Engine=ENGINE OFF	10/6/2016 12:00:00 AM	
Select	3	189	10/6/2016 7:52:09 PM						Engine=ENGINE ON	10/6/2016 12:00:00 AM	
Select	4	189	10/6/2016 8:07:43 PM	-71.1371811258348	42.2883114970904	5	NW			10/6/2016 12:00:00 AM	
Select	5	189	10/6/2016 8:07:43 PM	-71.1371811258348	42.2883114970904			18 Congreve St, Boston 02131	Coolant Temp=101.98	10/6/2016 12:00:00 AM	

Sample Live Map View for Locating Vehicles



	ID	Label	evTime	X	Y	Address	Event	groupName
Select	1	189	10/6/2016 8:07:43 PM	-71.1371811258348	42.2883114970904	18 Congreve St, Boston 02131	Start	Metro Water General
Select	2	189	10/6/2016 8:41:27 PM	-71.16977726779	42.4223171581799	99 Brattle Ct, Arlington 02476	Stop	Metro Water General
Select	3	189	10/6/2016 8:52:36 PM	-71.1694535466355	42.4218473327874	47 Brattle Ct, Arlington 02476	Start	Metro Water General
Select	4	189	10/6/2016 9:26:12 PM	-71.1371255489287	42.2904835800939	77 Farquhar St, Boston 02131	Stop	Metro Water General

Benefits of AVL Technology for MWRA

- Improve MWRA's emergency response capabilities
- Enhance vehicle maintenance through electronic engine diagnostics
- Increase driver and vehicle safety
- Improve work efficiencies/Reduce fuel costs
- Monitor compliance with MWRA Work Rules and Policies

Enhancements to Current AVL System

- Reports detailing odometer readings
- Fuel efficiency
- Accelerometer technology (detects sudden acceleration/hard breaking)
- Vehicle maintenance alerts
- Power failure warnings

Enhancements to Current AVL System

- Tamper alerts
- Single sign-on (one sign on to access both reports and live data)
- The ability to service the vehicle without removing the AVL hardware
- User customization features such as the ability for staff to create a geo-fence and add or, remove from and re-assign vehicles on the system

Who Uses It and How

OPERATIONS MANAGERS

- Monitor geofence entries and exits
- Monitor crew routes
- Conduct Monthly AVL audits on AVL usage and crew work orders
- Crew Audit Reports
- Provide feedback to crew supervisors

FLEET MANAGEMENT

- Engine Diagnostics
- Preventive Maintenance

Reporting and Analyses

REPORT AND ANALYZE TRENDS SUCH AS:

- Efficiencies
  - Fuel – Idling, Usage
  - Routes/Drive Times
- Schedules
  - Work Rules - Lunch Hours
  - Leave/Return Chelsea/Southborough
  - Leave/Return Time at Facilities
- Safety
  - Speeding
  - Accident Rate
  - Response Use

Procurement Approach

- RFQ/P Approach
- Thorough review of functionality needed at MWRA
- Live Product Demonstration
- Selected Vendor:
    - Networkfleet Inc. at $427,490
    - 3-year term with a an option to renew for two additional one year periods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Annual Industrial Waste Report
TRAC

October 12, 2016

Origin and History of the National Pretreatment Program

- Federal Water Pollution Control Act 1972 (Now known as the Clean Water Act)
- Legislation protecting surface water quality of the United States
- Established EPA to direct and implement regulations limiting pollutants discharged to surface waters of US (NPDES)
- Provided legal authority to establish National Pretreatment Program (June 1974) – to regulate industries that discharge to POTWs

Pretreatment Program Objectives

- Prevent pass through of pollutants into receiving waters
- Improve opportunities to recycle and reclaim municipal and industrial wastewaters and sludges
- Prevent interference with operation of treatment plant, including protecting worker health and safety
  - Inspections
  - Permitting
  - Monitoring
  - Enforcement

TRAC Organization and Staffing

- 43 staff involved in Inspecting and Permitting (17), Monitoring and Sampling (14), and Enforcing (10) MWRA Regulations

Industries; MBTA Commuter Rail; Mass DOT tunnels; Hypochlorite at CSO's; Municipal; Local Limits; Special Projects; and Emergencies

Elements of the Pretreatment Program

- Regulations and Local Limits
- Industrial Survey
- Inspections
- Permitting
- Monitoring
- Enforcement

Why an Industrial Waste Pretreatment Program is an Important Component of Operating Agencies Like MWRA

Kentucky Sewer Explosions in the 1980s

Pretreatment Program Activities 2016

The MWRA system has approximately 1200 permitted users 204 were Significant Industrial Users (SIUs)

- 900 Total Facility and gas/oil separator Inspections in FY15
- Over 270 Enforcement Actions for all Industries and separators
- Over 3500 monitoring actions in FY16 (sampling at industries, NPDES sampling at MWRA facilities, special projects and CSO Treatment studies)

TRAC Challenges, Opportunities and Initiatives

- Pending NPDES Permits – Local Limits
- Molybdenum
- Wipes- Flushable? And FOG (Fats. Oils and Grease)
- PIMS (Pretreatment Information Management System)
- Dental Amalgam Treatment Program


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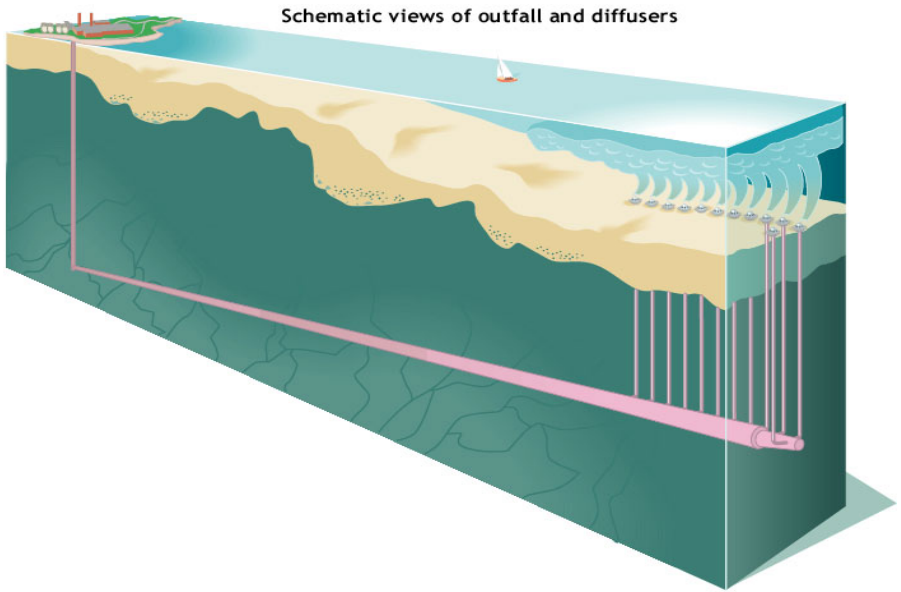
MWRA's Outfall Monitoring Overview 2015 Results

October 12, 2016

MWRA Ambient Monitoring

- Moving discharge from Boston Harbor initially caused environmental concerns
- Comprehensive baseline monitoring required by regulators (1992-2000)
- Ambient monitoring required by DITP Permit (2000+)
- Major programmatic reviews in 2003 and 2009-10 led to reduced Ambient Monitoring requirements
- Monitoring focuses on studies of effluent, receiving water, sediment quality, and fish and shellfish

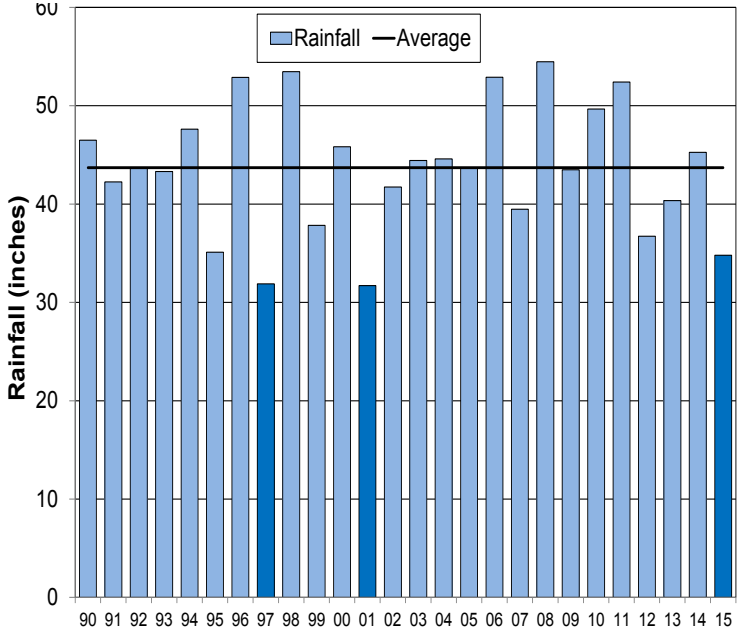


Outfall Monitoring Overview 2015 Highlights

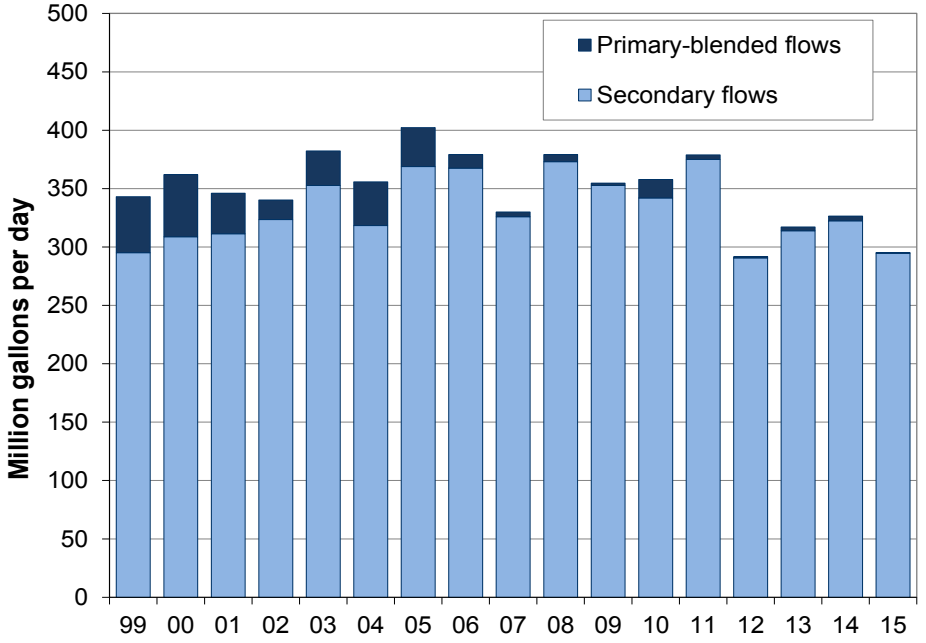
- Effluent quality (Platinum 9 award!)
- Outfall Monitoring
  - Water quality good year-round
  - Sediment animal communities were healthy
  - Tissue contaminants low

Harbor/Bay icing, March 2015

2015 Was a Very Dry Year With Almost No Blending

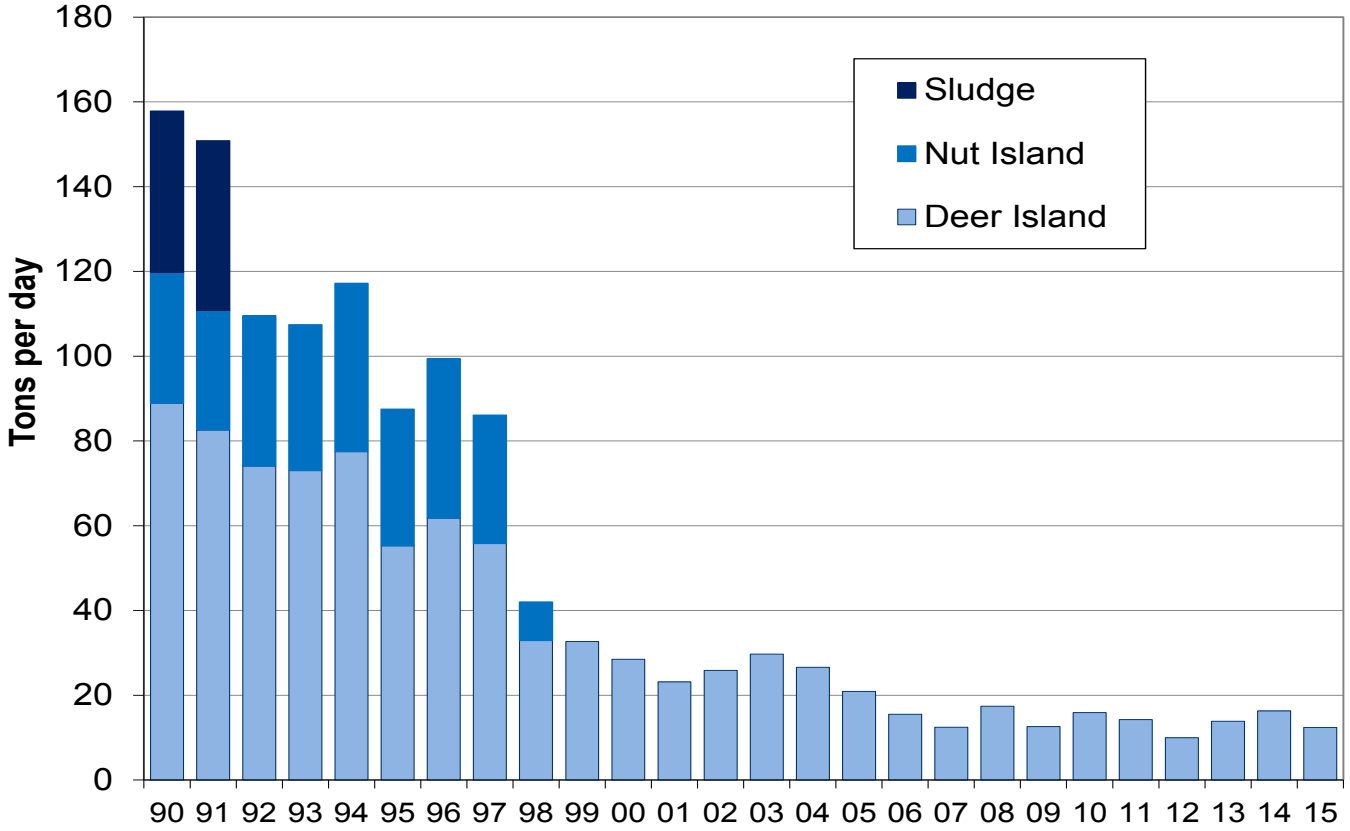


Boston rainfall, 1990-2015



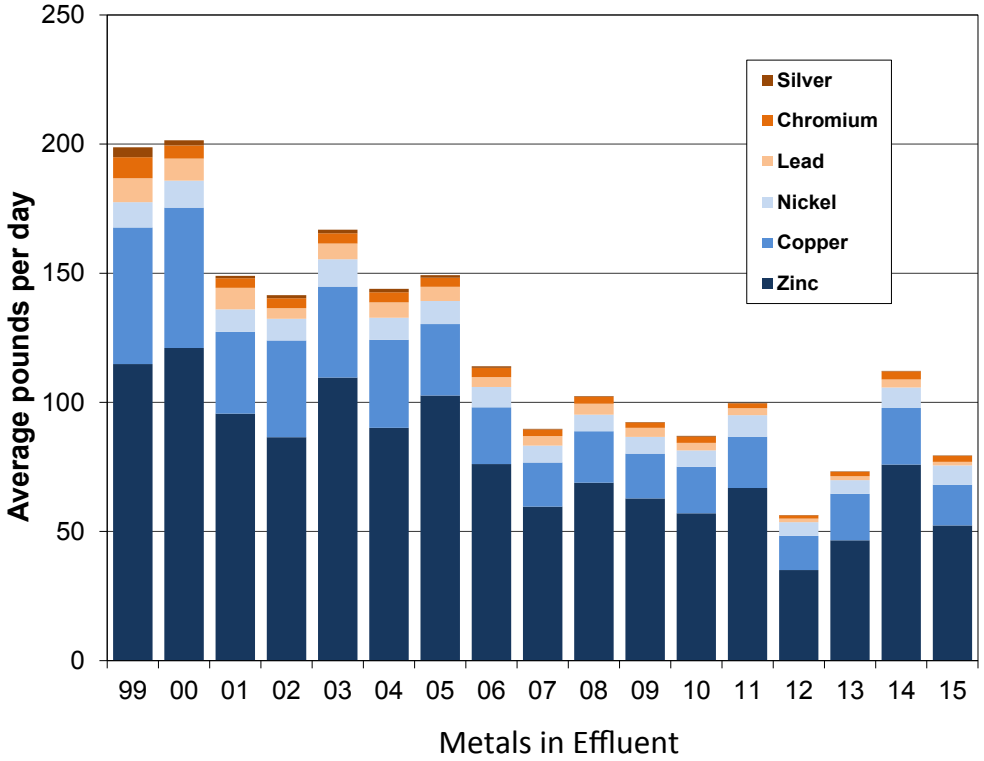
Average flow at DITP, 1999-2015

Total Solids Discharged (tons/day), 1990-2015



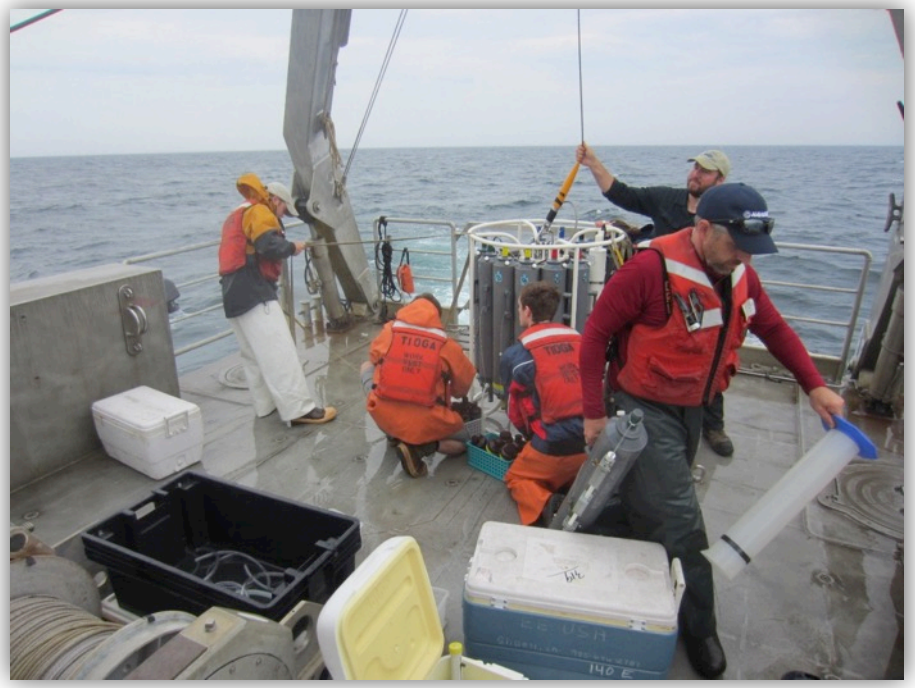
Contaminants in DITP Effluent, 2015

- Metals remained low in 2015
- Organic contaminants (not shown) are also effectively removed by source control, secondary treatment



Water Quality Monitoring 2015 Results

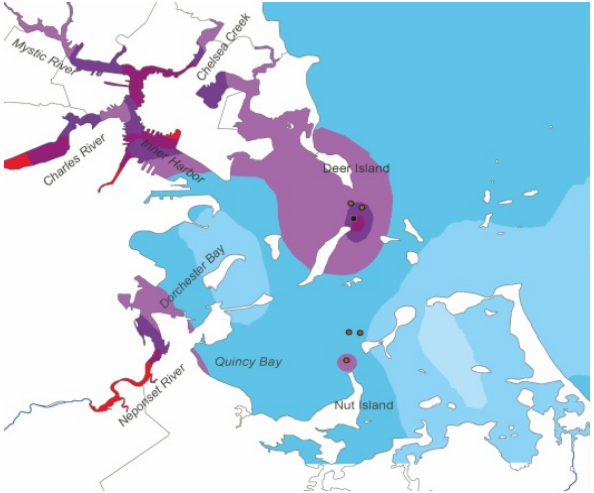
- No evidence of adverse outfall impact
- Dissolved oxygen in bottom waters stayed at healthy levels all year
- No red tide bloom in 2015
- Low abundances of a nuisance algae in May resulted in Contingency Plan threshold exceedance
- Surface and bottom waters were colder than average in winter and early spring, which delayed plankton growth



Collecting water samples in Massachusetts Bay

Boston Harbor Bacterial Water Quality

Prior to Boston Harbor projects (1989-1991)



Geometric mean (colonies/100 mL)

Sampled during rainfall
>=0.2 inches within 24 hours

- active treatment outfall
- closed treatment outfall
- active NITP sludge outfall
- closed NITP sludge outfall

Most Boston Harbor projects complete (post-2007)

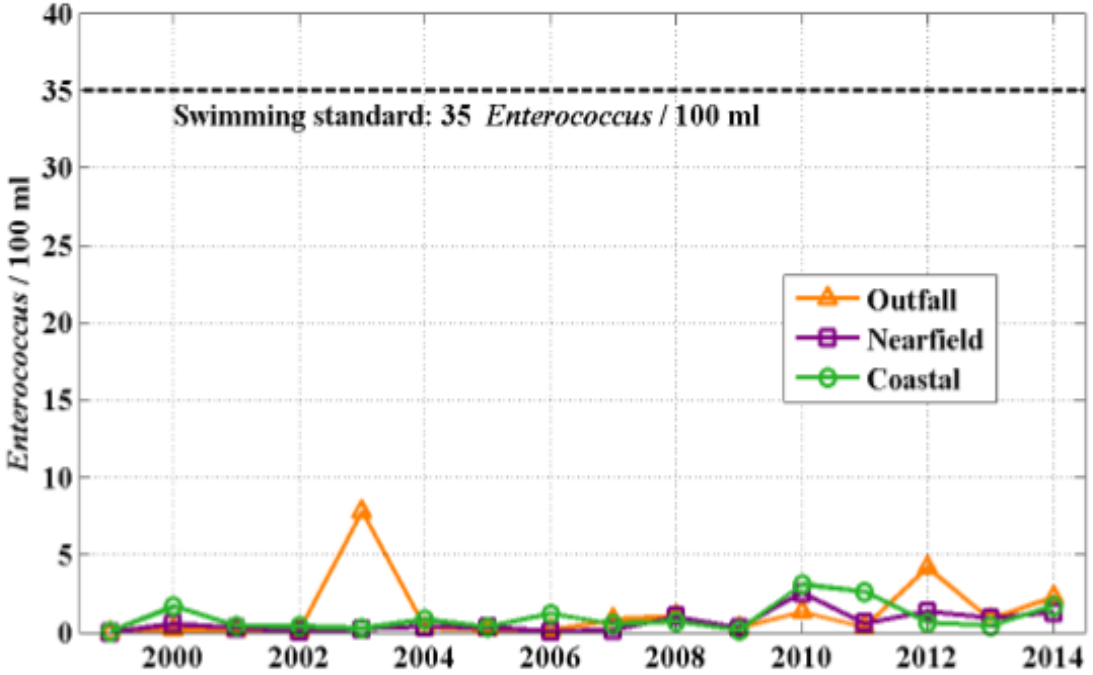
Geometric mean (colonies/100 mL)

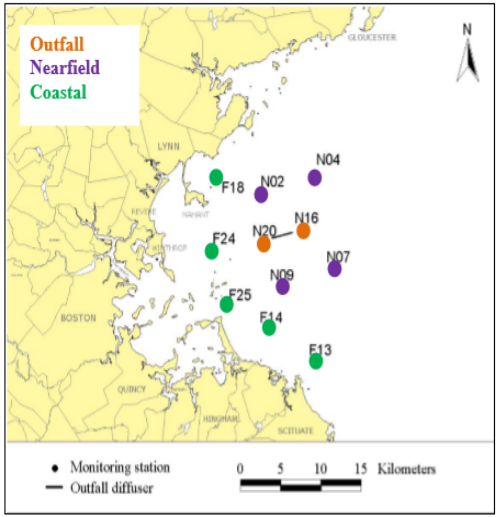
Sampled during rainfall
>=0.2 inches within 24 hours

Blue contours meet swimming standard, red-purple contours exceed swimming standard

- 0 - 5
- 5 - 10
- 10 - 35

Massachusetts Bay Bacterial Water Quality



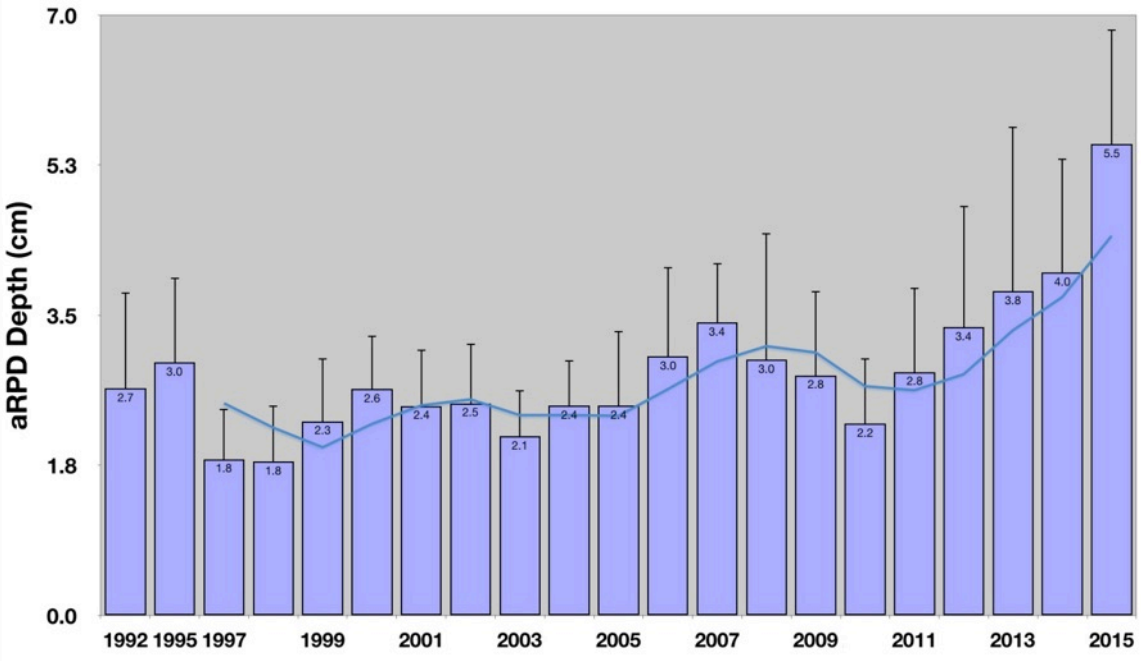


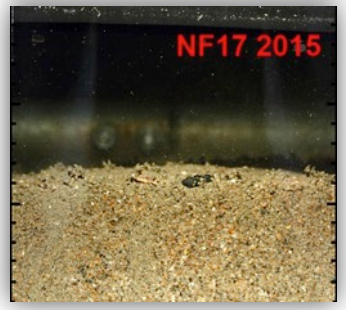
Sediment Monitoring in Boston Harbor and Massachusetts Bay

Collecting sediment profile images in Mass. Bay

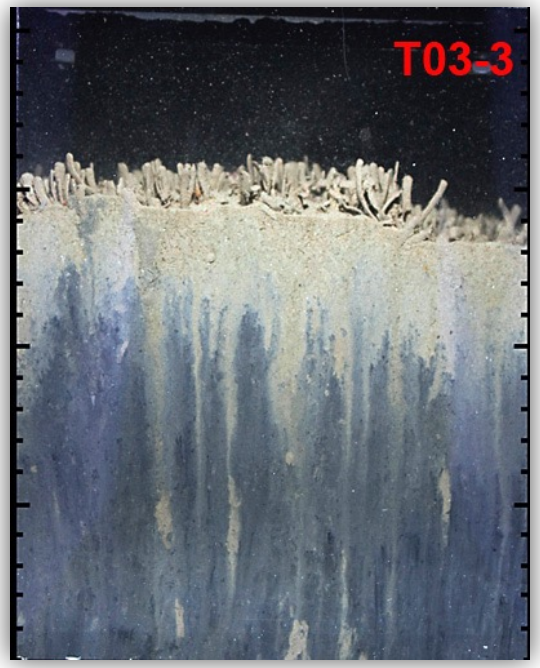
Collecting sediment samples off Deer Island

Sediments in Massachusetts Bay Remain Healthy





Harbor Sediment Communities Recover From Pollution

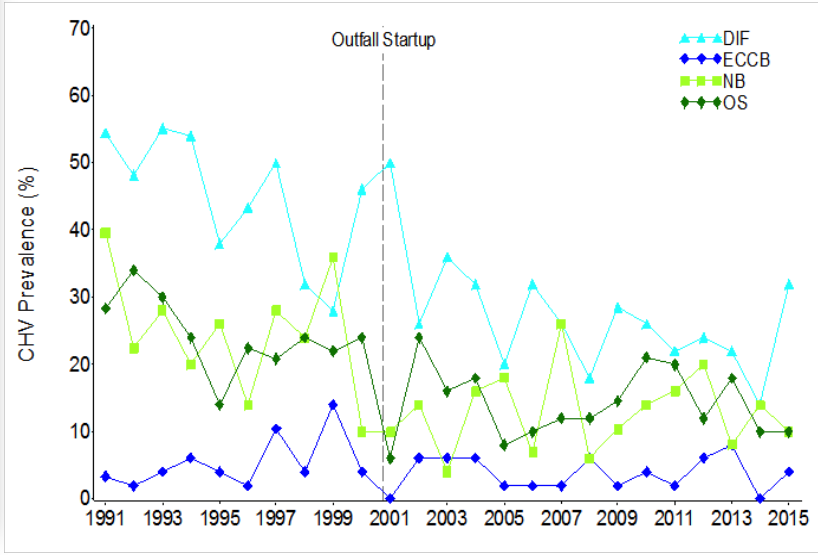


Off Long Island

Deer Island Flats

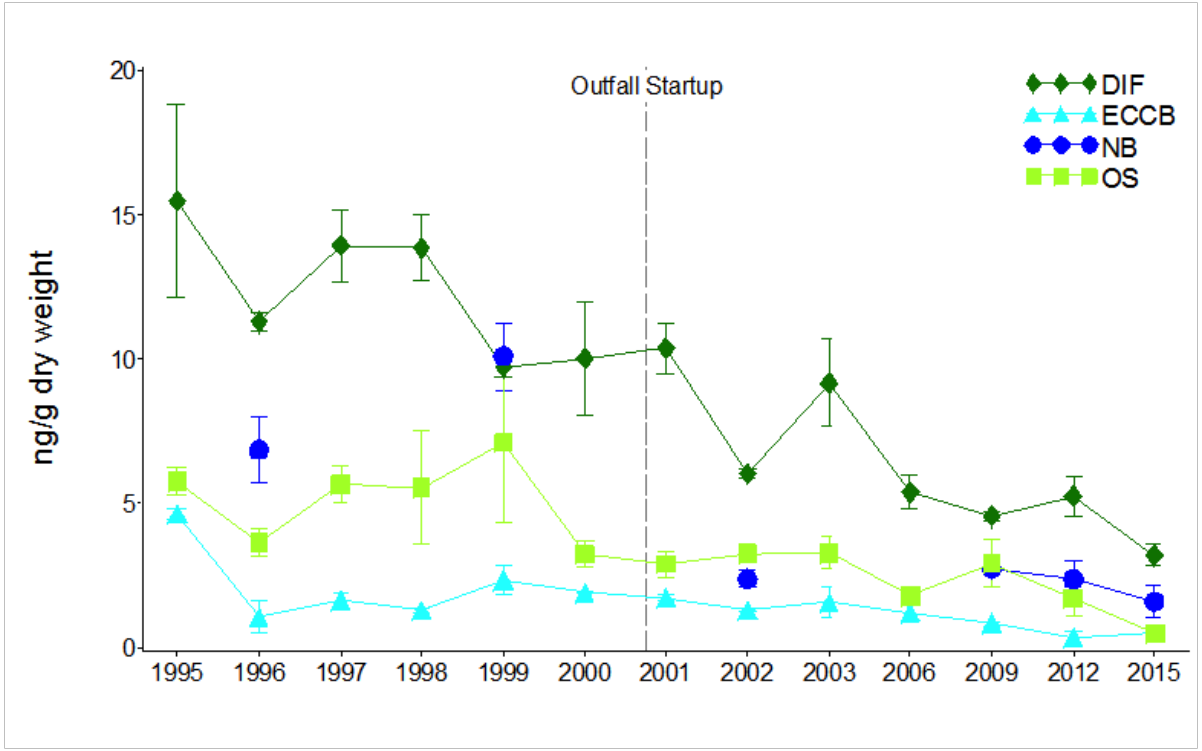
Fish and Shellfish Monitoring

Flounder Health in Boston Harbor



- Diseased flounder were one cause of Boston Harbor being termed “Dirtiest in the Nation”
- Liver tumors were last observed in 2004
- Prevalence of liver tumor precursors has decreased substantially in Boston Harbor
- Tumor precursors are decreasing near outfall as well; 2015 levels were the lowest yet observed

Chlordane in Flounder Filet



Ambient Monitoring Confirms That Massachusetts Bay is Healthy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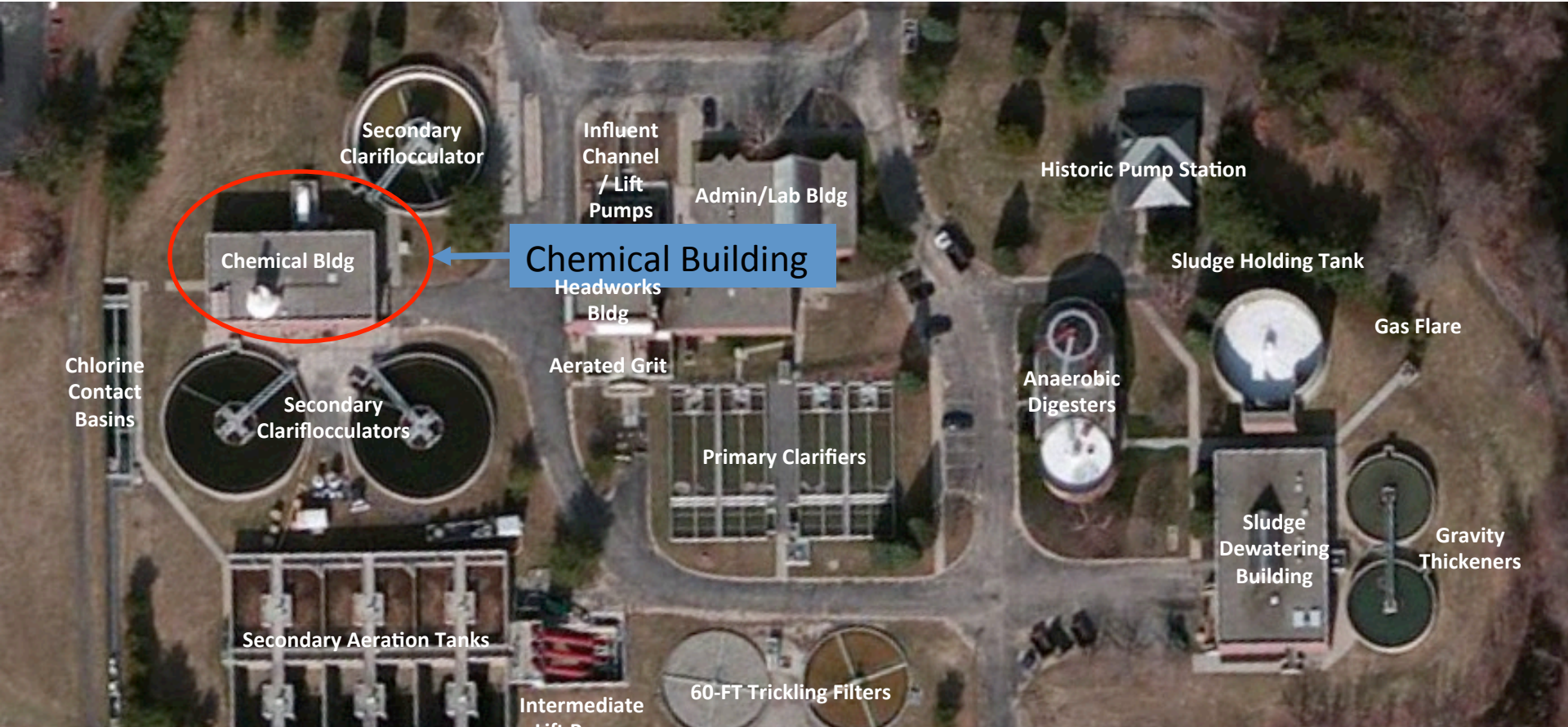
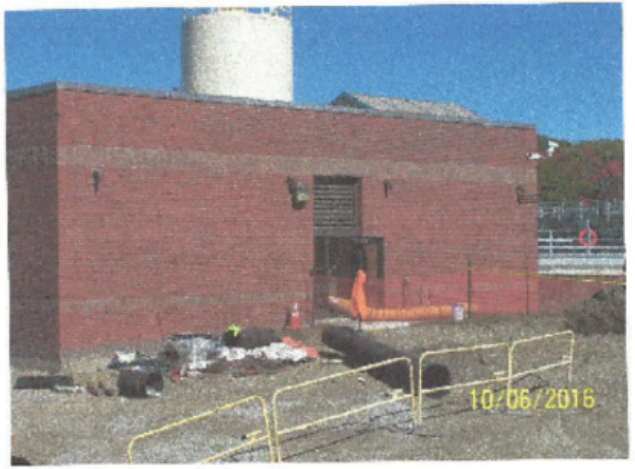
Chemical Incident at the Clinton Wastewater Treatment Plant

October 12, 2016


Secondary Clariflocculator
Influent Channel / Lift Pumps
Admin/Lab Bldg
Historic Pump Station
Chemical Bldg
Chemical Building
Sludge Holding Tank
Headworks Bldg
Gas Flare
Chlorine Contact Basins
Aerated Grit
Anaerobic Digesters
Secondary Clariflocculators
Primary Clarifiers
Sludge Dewatering Building
Gravity Thickeners
Secondary Aeration Tanks
Intermediate
60-FT Trickling Filters

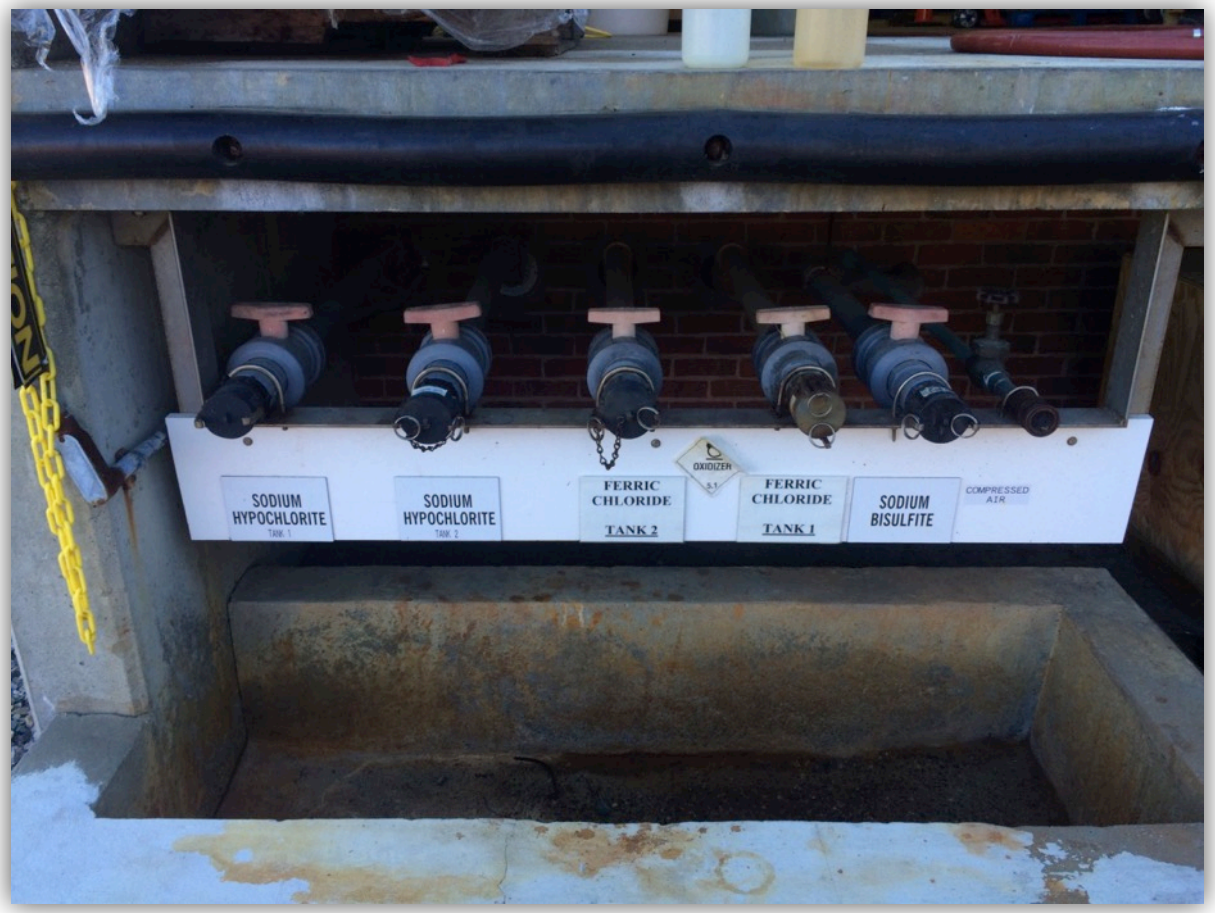
Clinton Chemical Building

Chemical Building fill station at the north wall



Chemical Building pressure release/vents at the south end

Chemical Delivery Station



Sodium Hypochlorite Pressure Relief Valve

Ferric Chloride Storage Tanks & Containment Area

Chemical Delivery Station – Lessons Learned: Locks Installed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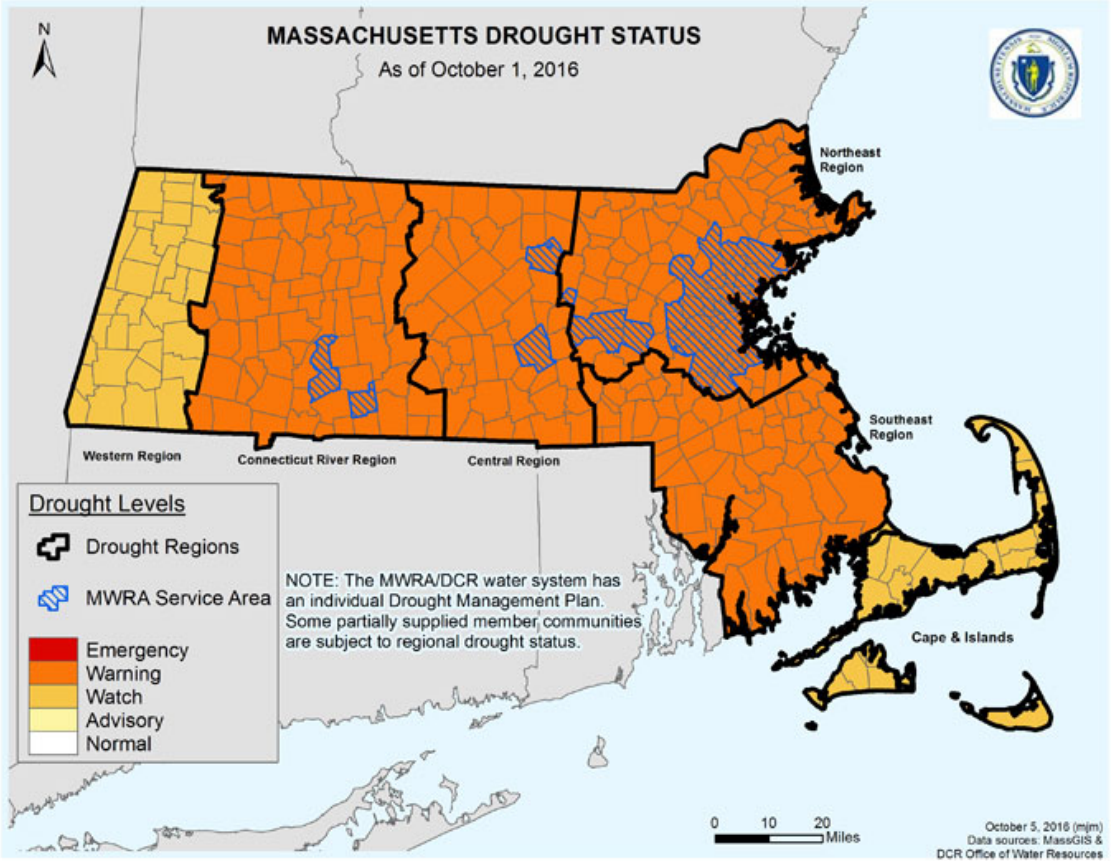
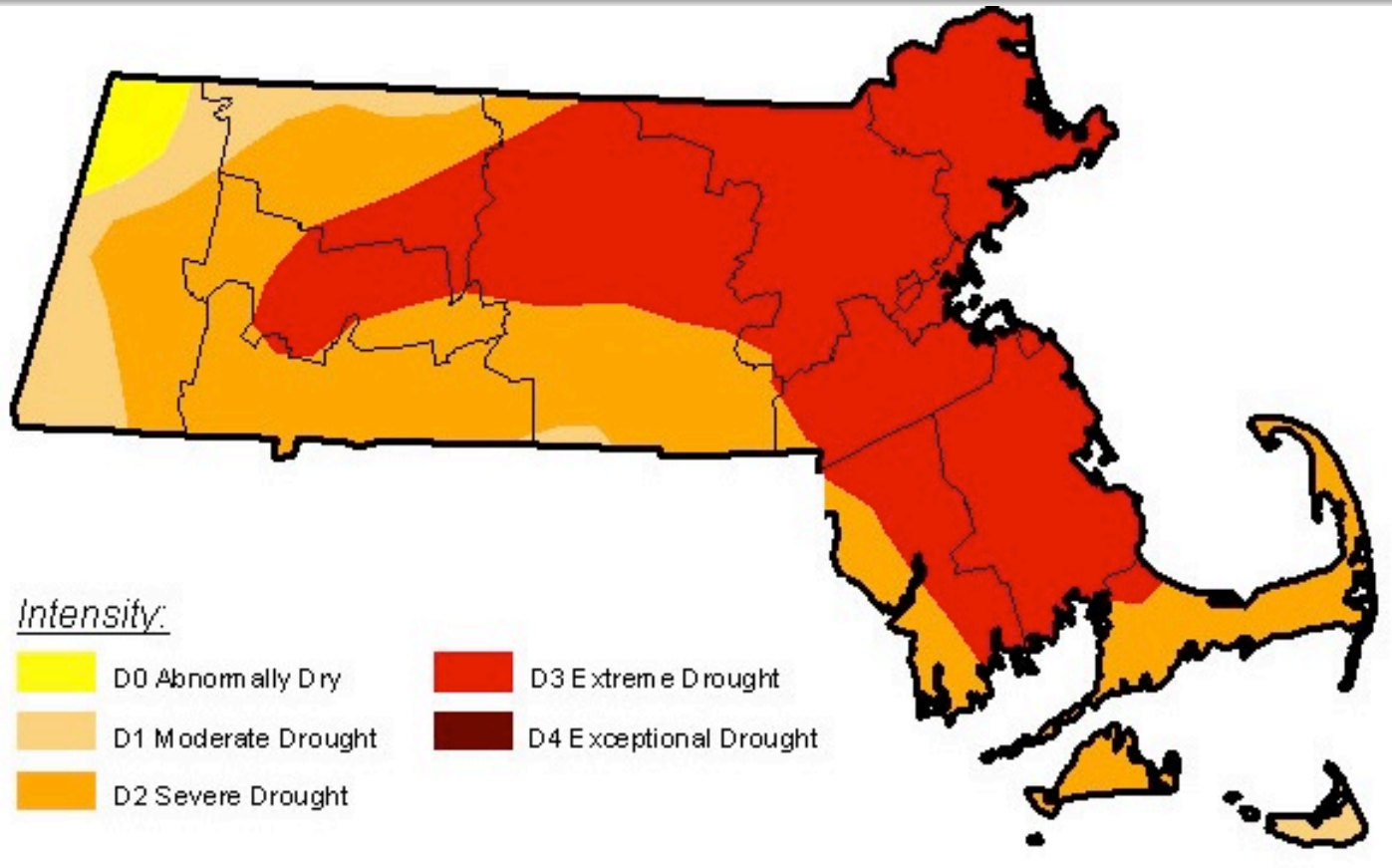
Reservoir and Drought Status Update

October 12, 2016

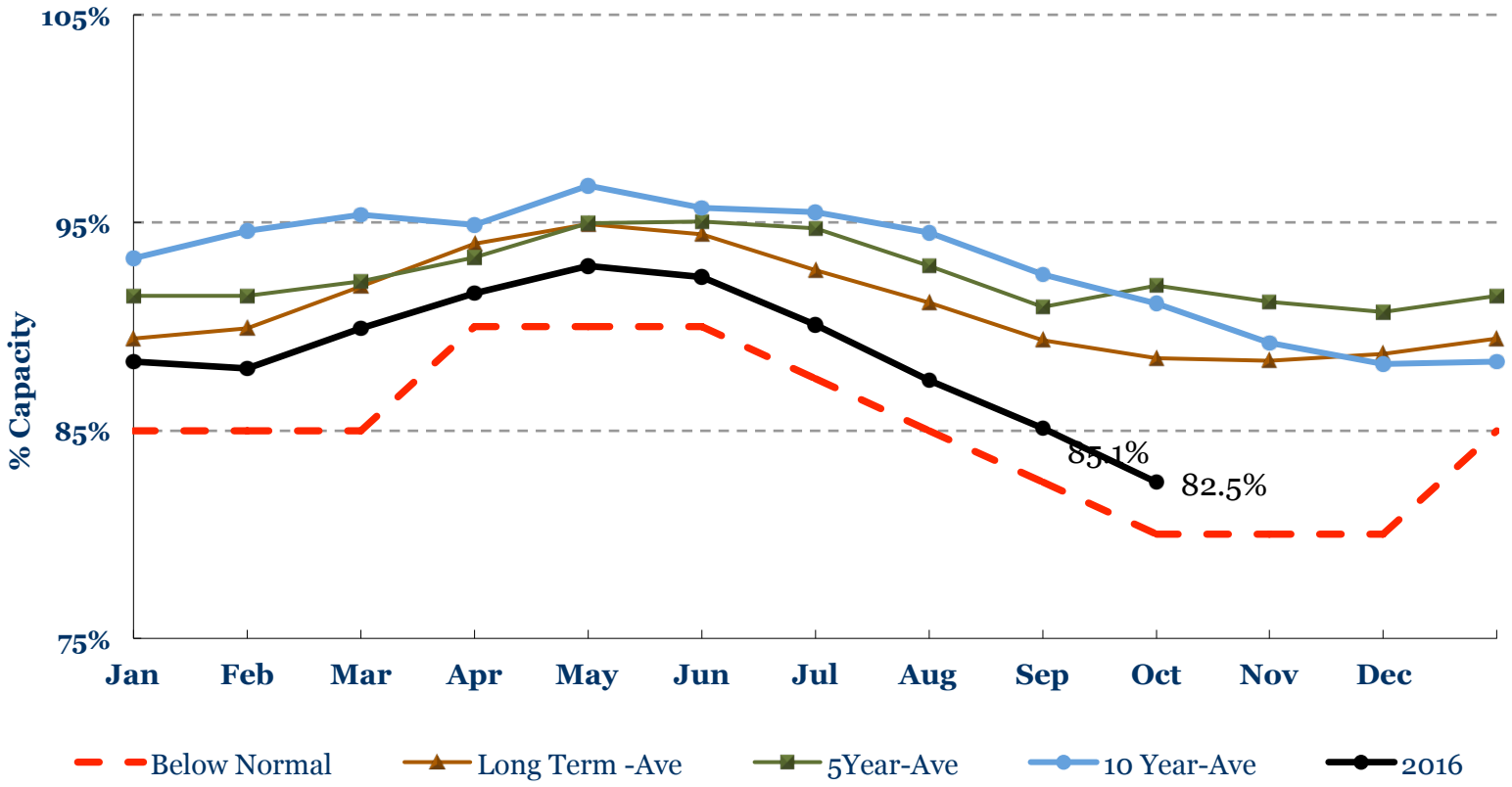
Massachusetts Drought Status Designations



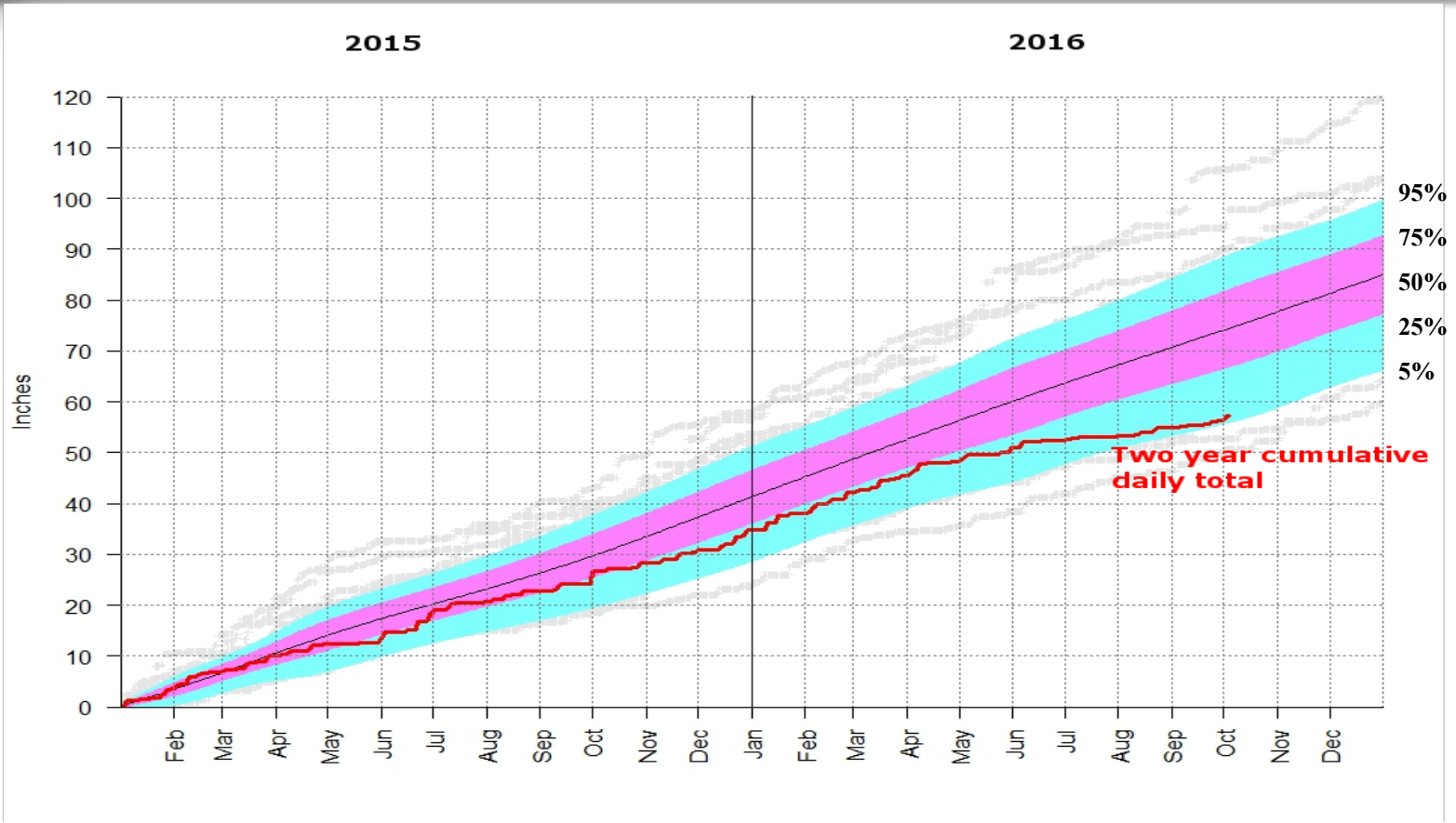
National Drought Mitigation Center Intensity Map October 4, 2016



Quabbin Reservoir Volume - First of the Month



It Has Continued To Be Dry



Status Looking Forward from October 1, 2016

	1-Month	3-Months	6-Months	12-Months
Median Yield	Normal	Normal	Normal	Normal
Dry (75th Percentile)	Normal	Normal	Below Normal	Normal
Driest (of Record)	Normal	Below Normal	Below Normal	Below Normal

MWRA Drought Management 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%

Drought Assistance

Partial Users or Emergency Customers Taking Water

- Peabody
- Cambridge
- Worcester
- Cherry Valley Water District
- Ashland

Anticipating Taking Water

- Lynn
- Burlington

Quabbin's Long-Term Track