





***FY2016-FY2020 Strategic Business Plan***

October 17, 2018



## Business Plan Function

- A tool to guide staff in prioritizing initiatives over a five-year time frame
- States MWRA's mission and identifies core values
- Five key priorities with eighteen associated goals
- Available to the public on MWRA's website



# Annual Update to the Business Plan

- Initiatives are divided into two categories:
  - Core initiatives - Work that MWRA *must do* to meet its performance goals, regulatory requirements, and financial commitments
  - Special initiatives - Activities and projects to respond to emerging issues
- Provides an annual status report. Encourages staff to assess progress toward MWRA's goals. Identifies gaps in resources or changes in priorities



## Significant Accomplishments in FY18

- Launched a pilot program to provide lead testing in childcare facilities
- Progress made toward implementation of key water redundancy projects including:
  - Wachusett Aqueduct Pump Station
  - Northern Intermediate High Pipeline
  - Southern Extra High Pipeline
  - Metropolitan Tunnels
- Completion of construction on the Clinton phosphorous removal facility



## Significant Accomplishments in FY18

- Commencement of 3-year CSO Post-Construction Monitoring and Performance Assessment
- Incorporation of energy efficiency into new construction and rehabilitation projects, including solar, geothermal heating, hydro, LED lighting, and HVAC improvements
- Maintained strong credit ratings from Moody's, Standard & Poor's and Fitch





***MWRA's Outfall Monitoring Overview  
2017 Results***

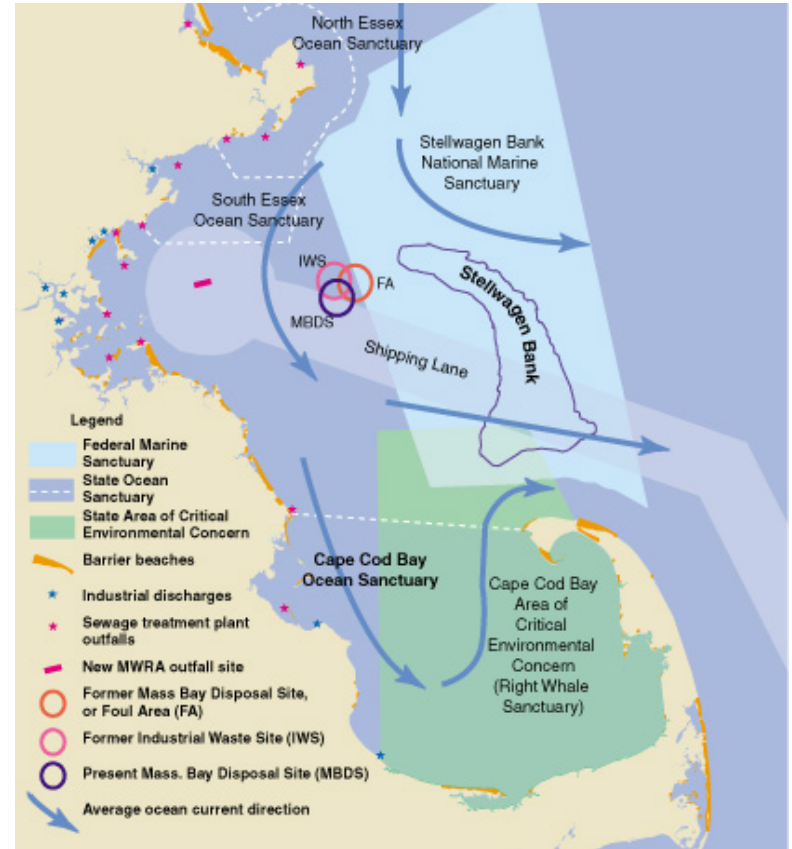
October 17, 2018





# MWRA Ambient Monitoring

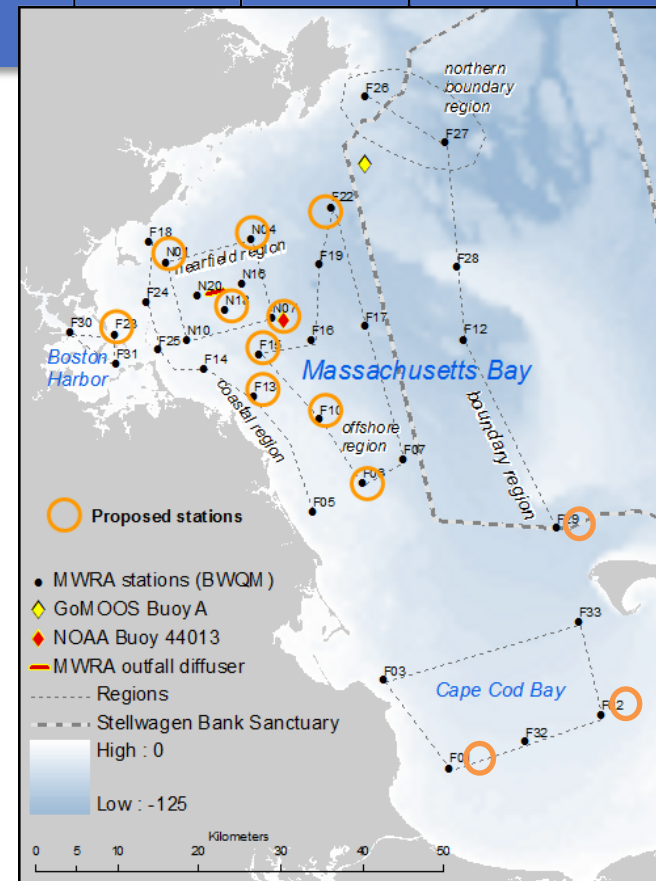
- Moving discharge from Boston Harbor initially caused environmental concerns.
- Comprehensive baseline monitoring required by regulators (1992-2000).
- Ambient monitoring required by DITP Permit (2000+).





# Monitoring Plan Revisions

- Major programmatic reviews in 2003 and 2009-10 led to reduced Ambient Monitoring requirements
- Monitoring focuses on:
  - studies of effluent;
  - receiving water;
  - sediment quality;
  - fish and shellfish

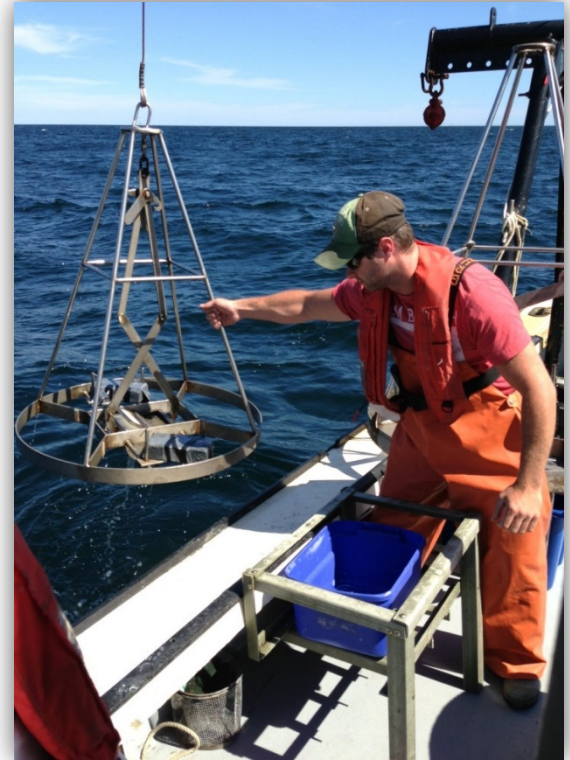


*Changes in 2010 reduced stations by more than half*



# Outfall Monitoring Overview 2017 Highlights

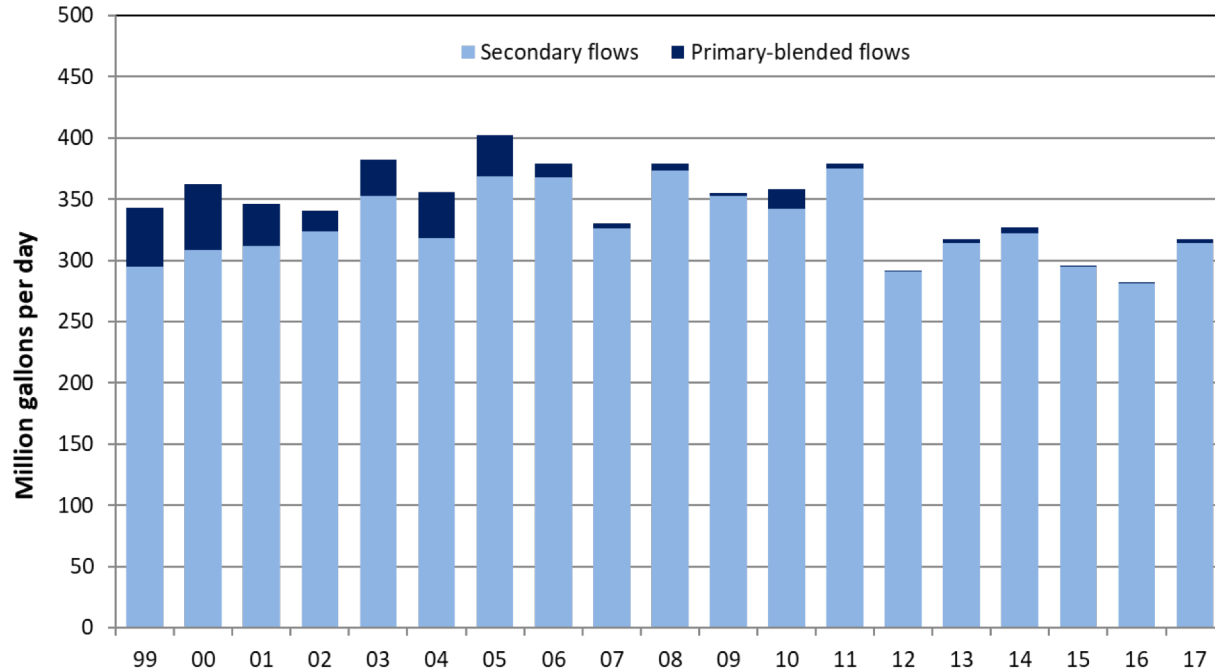
- Effluent quality (Platinum 11 award!)
- Outfall Monitoring
  - Water quality good year-round
  - Sediment animal communities were healthy, sediment contaminant concentrations were among the lowest measured.
  - Flounder health good



*Sediment sampling in Massachusetts Bay*



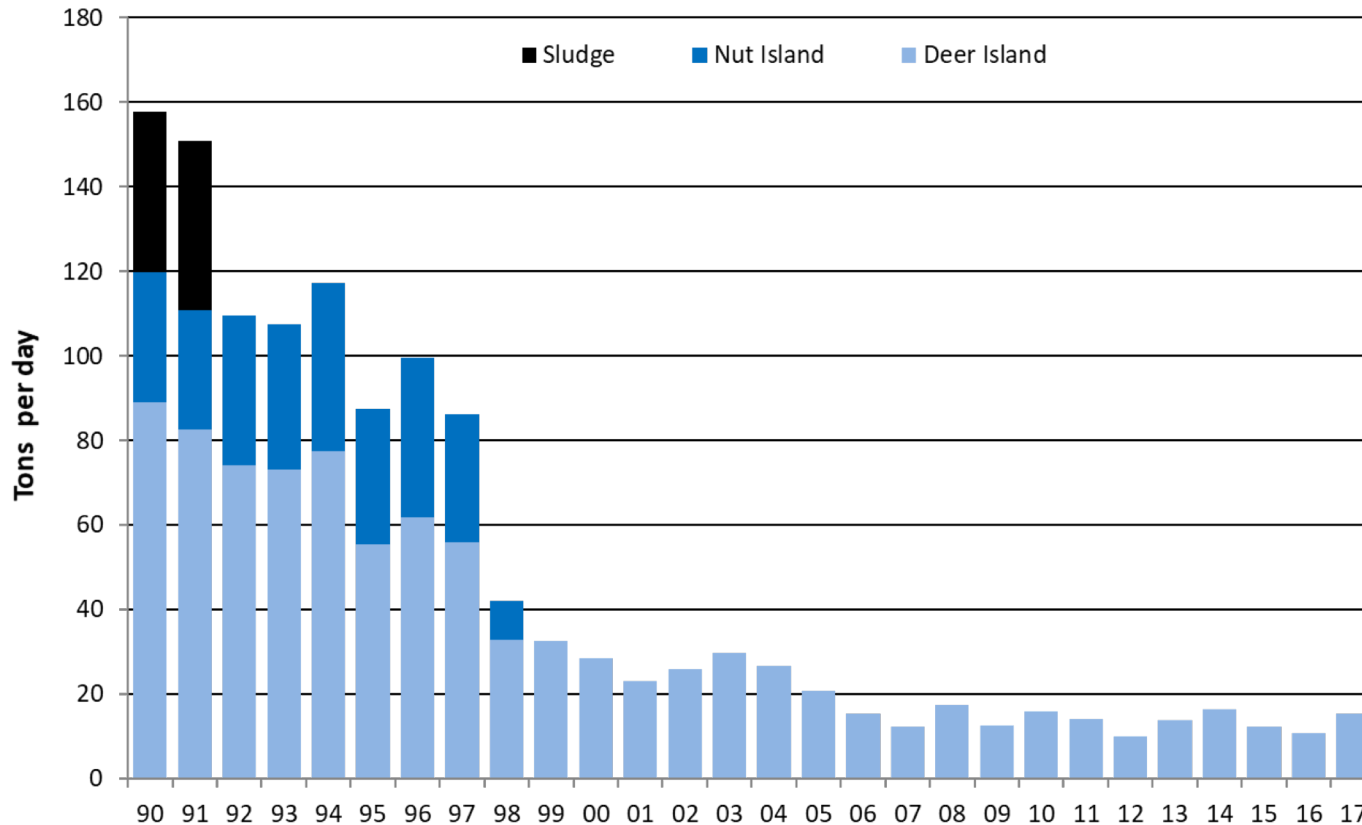
# 2017 had Average Rainfall but Almost No Blending



Average flow at Deer Island, 1999-2017

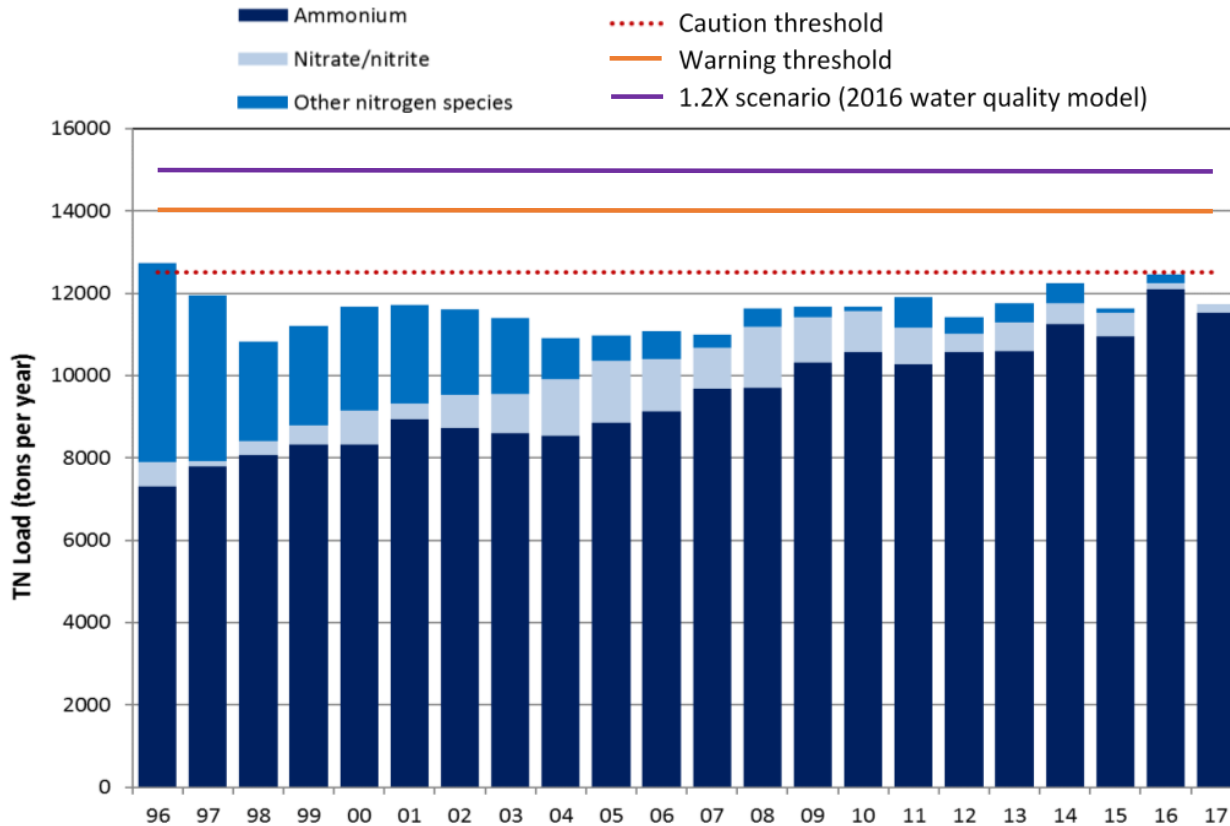


# Total Solids Discharged (Tons/Day), 1990-2017





# Effluent Nitrogen Levels





# Water Quality Monitoring: 2017 results

- No evidence of adverse outfall impact
- Plankton communities in 2017 normal, no large phytoplankton blooms observed
- Minor red tide bloom in 2017
- Dissolved oxygen levels remained normal



Collecting water samples in Massachusetts Bay

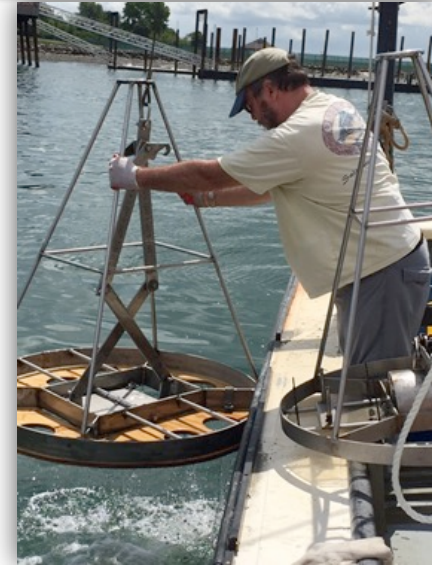


# Sediment Monitoring: 2017



Riser #2, June 2017

- Animal communities in sediments near outfall remained healthy.
- Oxygen penetration into Mass. Bay sediments deeper than before discharge moved.
- Rocky sea-floor communities remained diverse and lush.
- No Contingency Plan thresholds were exceeded

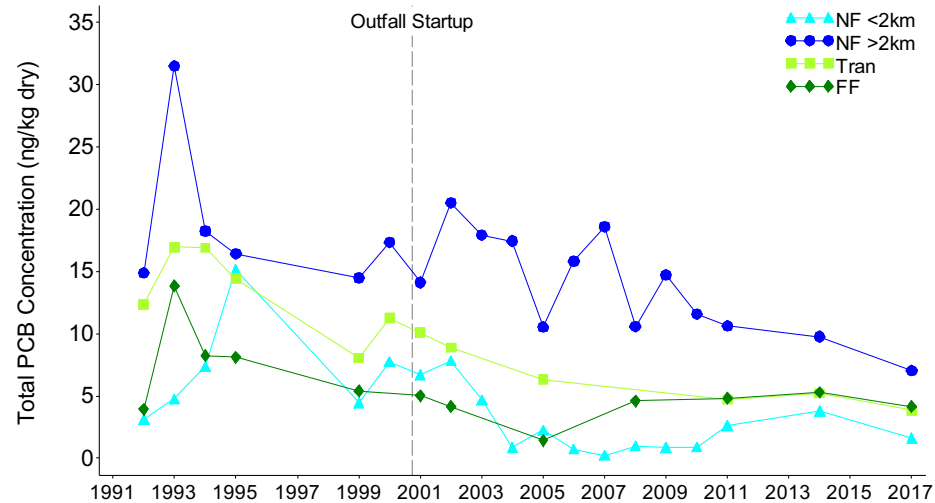


Collecting sediment samples in Boston Harbor





# Sediment Contaminant Concentrations in 2017 Were Among the Lowest Measured



- No samples within 2 km of outfall had concentrations indicating possible toxicity.
- 22 of 26 contaminants had lower average concentrations before the discharge moved.
- Concentrations of other 4 contaminants also low.



# Flounder Health In Boston Harbor And Near Outfall



- Diseased flounder were one cause of Boston Harbor being termed “Dirtiest in the Nation”
- Liver tumors were last observed in 2004
- Liver tumor precursors decreased substantially in Boston Harbor
- Tumor precursors decreasing near outfall as well



# Focus On Nutrient Enrichment And Impacts

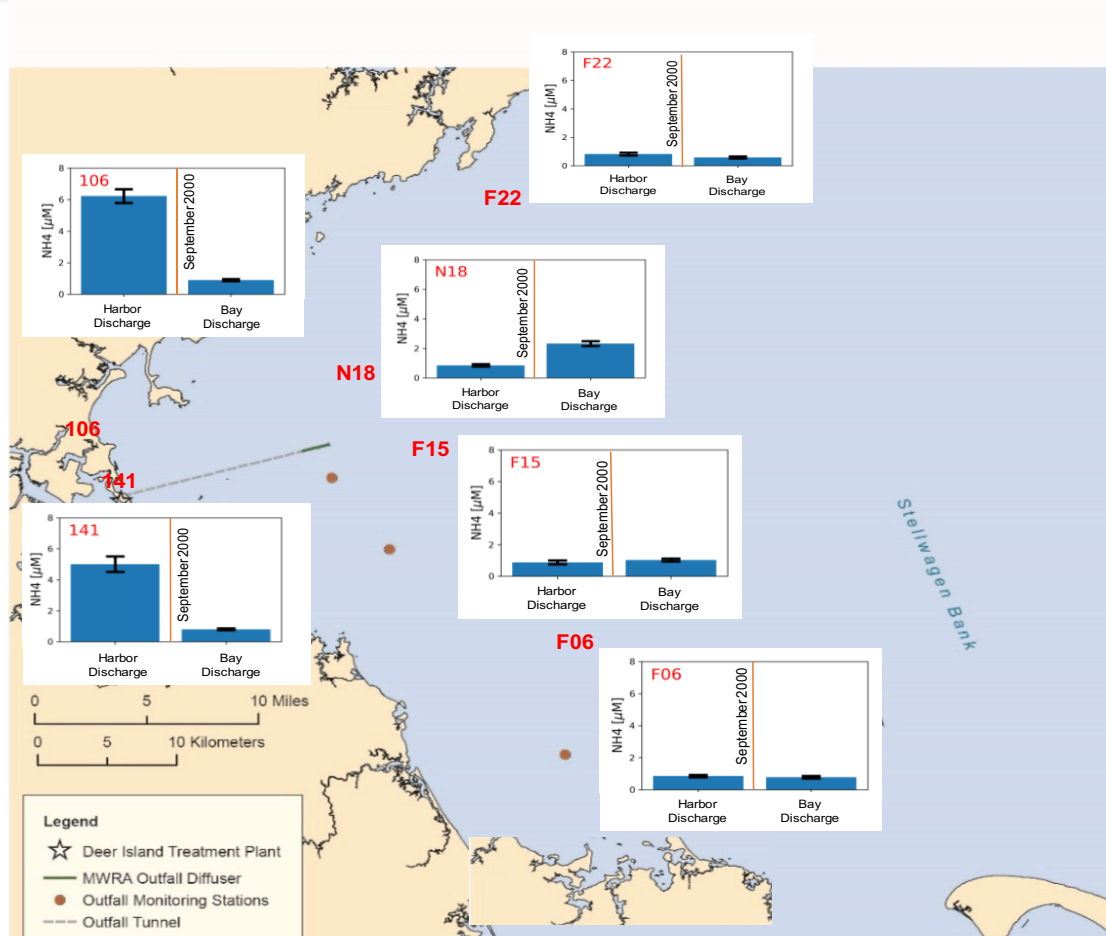
- Excess nutrients:
  - overstimulate marine algae;
  - lead to low dissolved oxygen;
  - harm important habitats.
- Key concern raised in the 1990s over moving the discharge.
- Data show recovery in Boston Harbor, no degradation in Massachusetts Bay.



Healthy Eelgrass Bed



# Nutrients in the Harbor and Bay

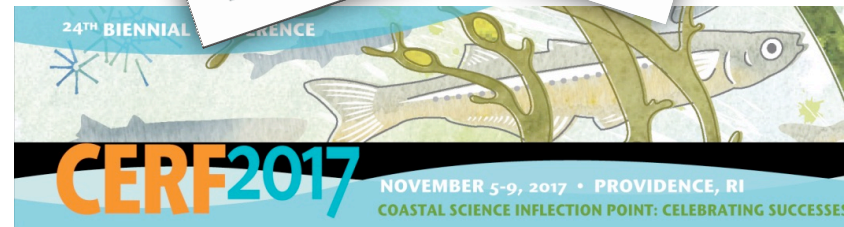




# Public Outreach

Recent efforts include:

- Presentations at industry, environmental science conferences, including CERF 2017, WEFTEC 2018
- Presentations and discussions at watershed associations, school groups, universities
- Development of brochure and mailer summarizing water quality





# Ambient Monitoring Symposium

- The Outfall Monitoring Science Advisory Panel (OMSAP) advises regulators on monitoring, supported by the Public Interest Advisory Committee (PIAC)
- OMSAP and PIAC hosting Symposium November 13 to review monitoring questions and identify questions not currently addressed.
- The Symposium will start a process of monitoring review and revision that will involve MWRA participation and input


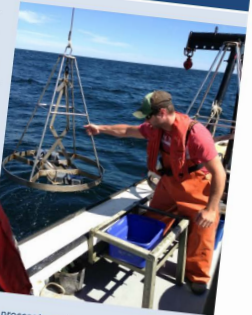
**- Save the Date -**

November 13, 2018  
Fort Point Channel Conference Room, Atlantic Wharf  
280 Congress St, Boston, MA 02210

**2300 Days at Sea:  
Monitoring the Impacts  
of the Massachusetts Bay Outfall**

**Over 30 years ago**, the Massachusetts Water Resources Authority was established to upgrade the Greater Metropolitan Boston wastewater treatment facility, which included moving wastewater treatment facility, which into Massachusetts Bay. At the time, the public and regulators were concerned that moving the outfall would transfer environmental degradation from Boston Harbor, dubbed the "Dirtiest Harbor in the Nation," to the cleaner waters of Massachusetts Bay.

To address these concerns, scientists and regulators oversaw the development of a monitoring program. These concerns—health, seafood safety, aesthetics, and ecosystem—were translated into questions that framed the monitoring program. Twenty-six years (and 2300 days at sea) later, the monitoring program has documented impacts from the outfall that are minor and within projections, and Boston Harbor appears to be recovering.



This workshop will kick off a process to review MWRA's existing monitoring program. We are seeking input from the public to evaluate whether the current questions are still relevant, and whether other emerging questions or threats related to the outfall discharge should be addressed by the monitoring program. Event information to follow. Please email [Judith Pederson at \[Judith.Pederson@mit.edu\]\(mailto:Judith.Pederson@mit.edu\)](mailto:Judith.Pederson@mit.edu) or [Diane Alicea at \[Diane.Alicea@mit.edu\]\(mailto:Diane.Alicea@mit.edu\)](mailto:Diane.Alicea@mit.edu) with questions.

This event is sponsored by:  
Massachusetts Department of Environmental Protection and U.S. Environmental Protection Agency  
with generous support from Save the Harbor/Save the Bay and MIT Sea Grant College Program.



# Monitoring Confirms Harbor is recovering, Massachusetts Bay Is Healthy









***Thermal and Hyrdo Power Plant Maintenance  
Contract S578***

October 17, 2018



# Contract S578 Summary

- Inspect, maintain and repair steam generation / heating systems and hydroelectric turbines at the following facilities:

## **Deer Island Treatment Plant:**

- Two 700 Horsepower High Pressure Boilers
- 18 MW Steam Turbine Generator
- 1.2 MW Backpressure Steam Turbine Generator
- Two 1.0 MW Hydroelectric Turbine Generators

## **Other Facilities:**

- **Oakdale Power Station:** 3.5 MW hydroelectric Turbine
- **Cosgrove Intake Facility:** Two 1.2 MW Hydroelectric Turbines
- **Loring Road Covered Storage Facility:** 200 KW Hydroelectric Turbine



## Economic Benefit

**Equipment maintained under this contract provide operational and economic benefit:**

Deer Island Steam System – Thermal & Electrical                      \$17.5 million

Water System Hydro-electric    \$0.5 million



# Scheduled Work - Deer Island Steam Generation



## High Pressure Boilers:

- In service since 1998
- Annual Routine Maintenance
- Annual State Required Inspections



## 1.2 MW Back Pressure Steam Turbine Generator:

- In service since 2011
- Annual Routine Maintenance

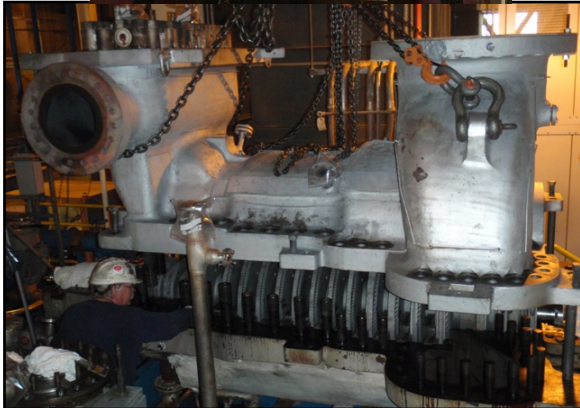


# Scheduled Work - Deer Island Steam Generation (continued)



## 18 MW Steam Turbine Generator:

- In service since 1997
- Annual Routine Maintenance
- Major overhaul required (\$2.2 M)
- Rebuild trip throttle valve



Trip Throttle Valve



# Scheduled Work - Deer Island Hydroelectric Turbines



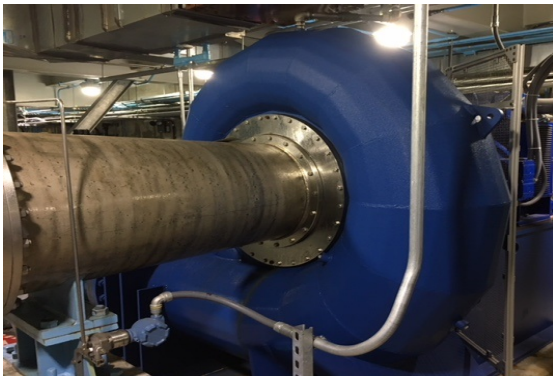
- In service since 1997
- Annual Routine Maintenance



# Scheduled Work – Water System Facilities



Woodward Governor at Oakdale Power Station



## Oakdale Power Station

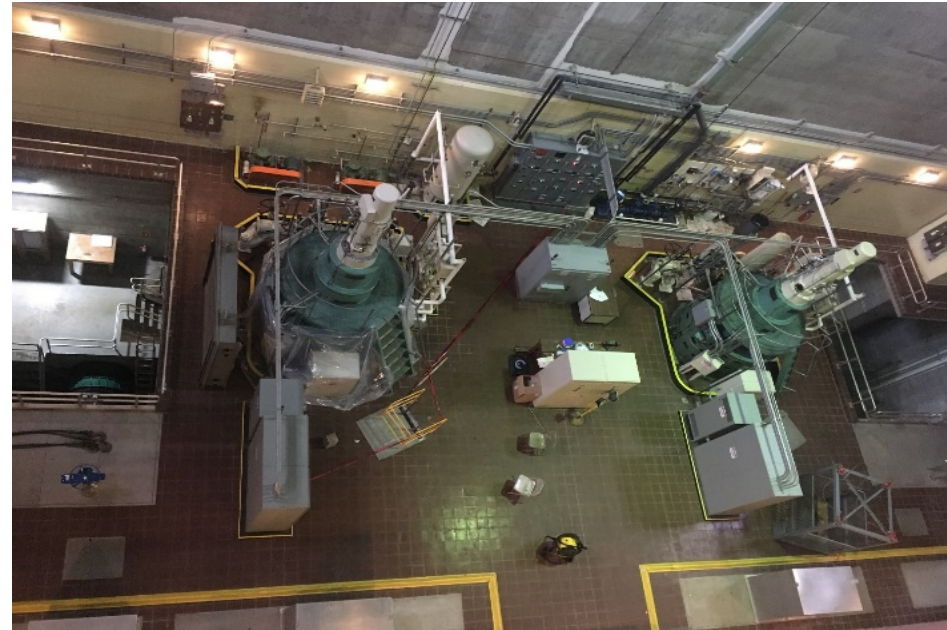
- In service since 1940s
- Annual Routine Maintenance
- Replace existing Woodward Governor with new digital unit
- Inspection and overhaul of turbine's 48-inch pressure relief valve

## Loring Road Covered Storage Facility:

- In service since 2011
- Annual Routine Maintenance



# Scheduled Work – Water System Facilities (cont.)



## Cosgrove Intake Facility:

- In service since 1960s
- Inspection & overhaul of Woodward governor
- Inspection and overhaul of turbine's 48-inch pressure regulating valve
- Dry ice cleaning of turbine generator





# Contract S578 Procurement Summary

- Advertised and bid in accordance with Chapter 149 of the Massachusetts General laws
- Two Bids Received:
  - IPC Lydon, LLC: \$7,961,150
  - O'Connor Corporation \$9,850,611
- Based on bid evaluation, IPC Lydon, LLC was found to be the lowest responsible and eligible bidder.



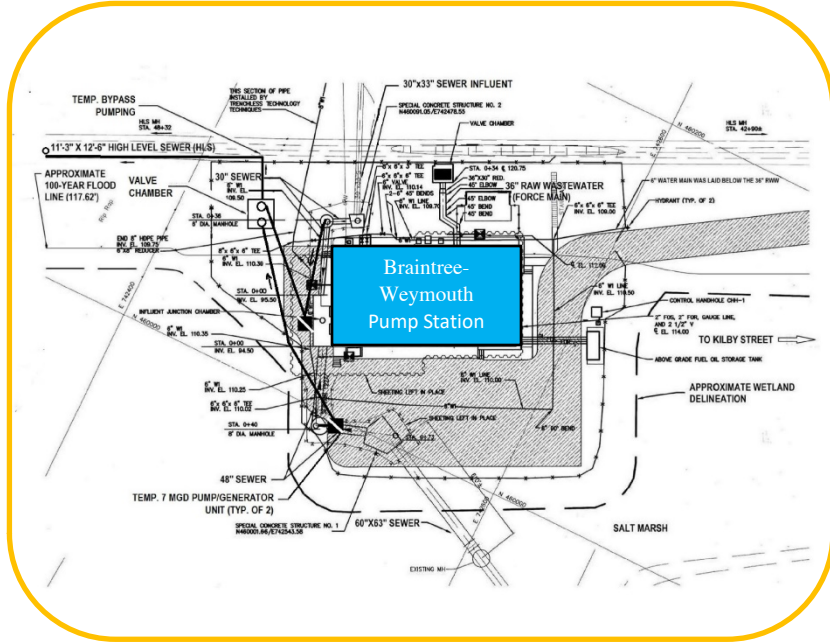


***Braintree-Weymouth  
Pump Station Improvements, ESDC  
Contract 7435***

October 17, 2018



# Project Location





## The project includes the following:

- Design grinding/screening improvements
- Evaluate and improve pump performance
- Improve pump removal
- Evaluate and improve Odor control
- Design SCADA Upgrades (Instrumentation, PLC, Graphics, etc.)



# Screening Operational and Maintenance Issues





# Pump Removal Issues





# Odor Control Issues







# Contract 7435 – Procurement

PROPOSER	FINAL RANKING	LEVEL OF EFFORT (HRS)	PROPOSED CONTRACT COST
Engineer's Estimate	-	11,036	\$1,860,000.00
Wright-Pierce	1	14,454	\$2,085,169.83
Hazen and Sawyer, PC	2	12,900	\$2,106,431.63



# 7435 Schedule and Award Summary

ITEM	START	DURATION	END
Design	Nov 2018	24 Months	Oct 2020
Construction	Nov 2020	24 Months	Oct 2022
Warranty	Nov 2022	12 Months	Oct 2023





***Remote Headworks Upgrade  
Contract 7206, Amendment 6***

October 17, 2018



## Amendment 6 – Work Includes:

### Additional Level of Effort for Construction Administration Services

- Requests for Information (RFIs)
  - Obstacles encountered during construction
  - Sequencing of work to keep facility fully operational
- Submittal Reviews
  - Budget and quantity of contracted submittals and resubmittals is nearly exceeded



## **Amendment 6 – Work Includes:**

### **Out of Scope Design**

- Reconfiguration of equipment layout
- SCADA High Performance Graphics

### **Design Associated with Unforeseen Conditions**

- Oil contamination discovered
- Evaluation and design for unstable walls
- Additional inspection for support of Channel 1 resurfacing
- Structural analysis for Section 37 water main and odor control foundation





## Amendment 6 – Engineering Work Summary

Additional Requests for Information	\$300,000
Additional Submittal Reviews	\$240,000
Improved Layout of Equipment on Lower Roof	\$60,000
High Performance Graphics	\$42,000
Out of Scope Evaluations and Design	<u>\$41,000</u>
	Total \$683,000





# Current Progress - Antenna Tower Foundation



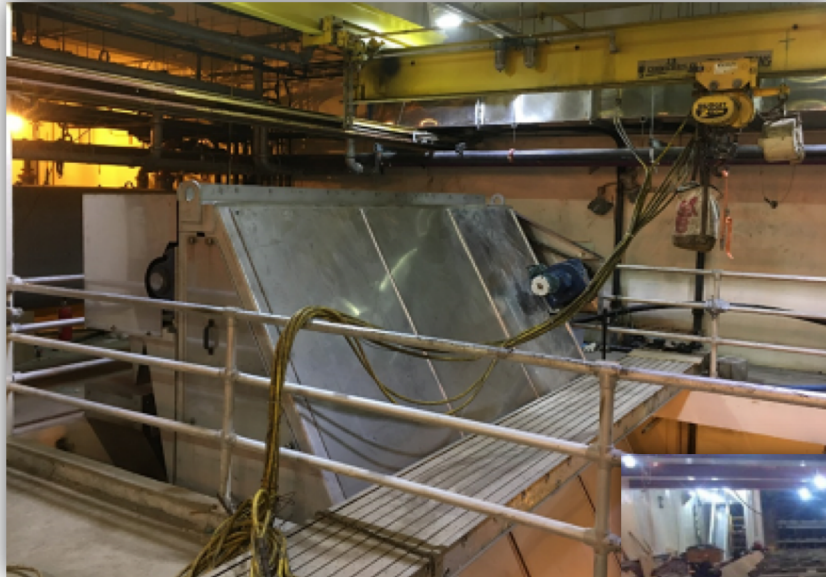


# Current Progress - Odor Control Equipment Foundations





# Current Progress - Channel 1 Screenings and Grit Handling Equipment





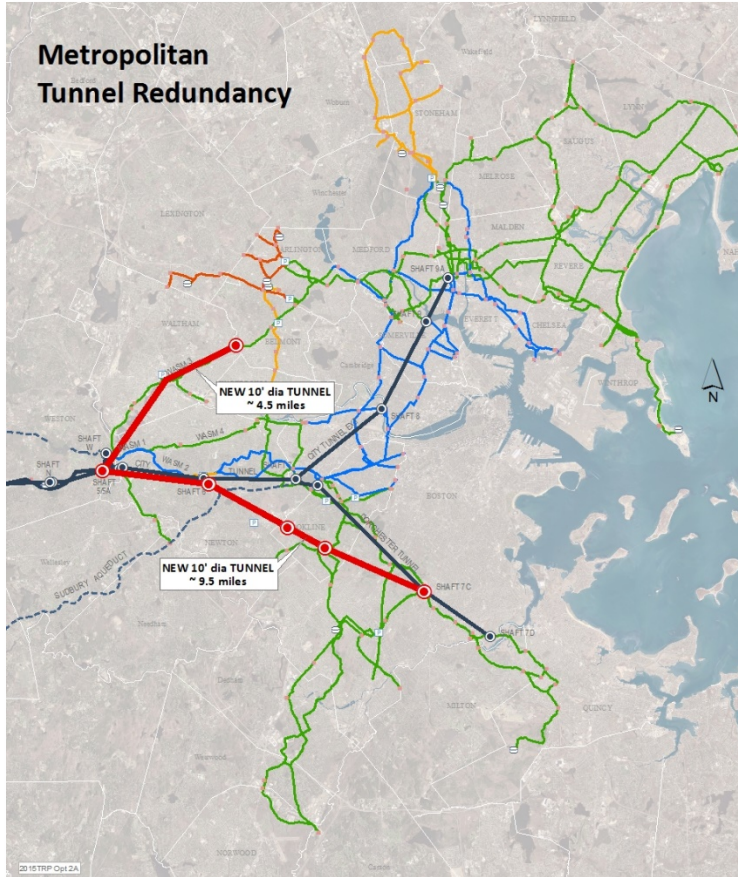


***Metropolitan Tunnel  
Redundancy Program Update***

October 17, 2018



# The Metropolitan Tunnel Redundancy Project



## The Tunnel Project Basics:

- ~ 14 miles of deep rock tunnel
  - ~4.5 mile to the north / WASM3
  - ~9.5 miles to Shaft 7C
- 10' finished diameter pressure tunnel
- 200' – 500' below ground (well into bedrock)



# Current Project Status

- Staff recommended and the Board approved two redundant tunnels (North and South)
- FY19 CIP Budget Categories
  - Preliminary Design/Phase 1 Geotech/MEPA Review
  - Final Design
  - Construction Management
  - Tunnel Construction
  - Surface Connections Construction
  - Administration, Legal and Public Outreach
- Identified the Need for Program-Wide Support Services



# Program-Wide Support Services

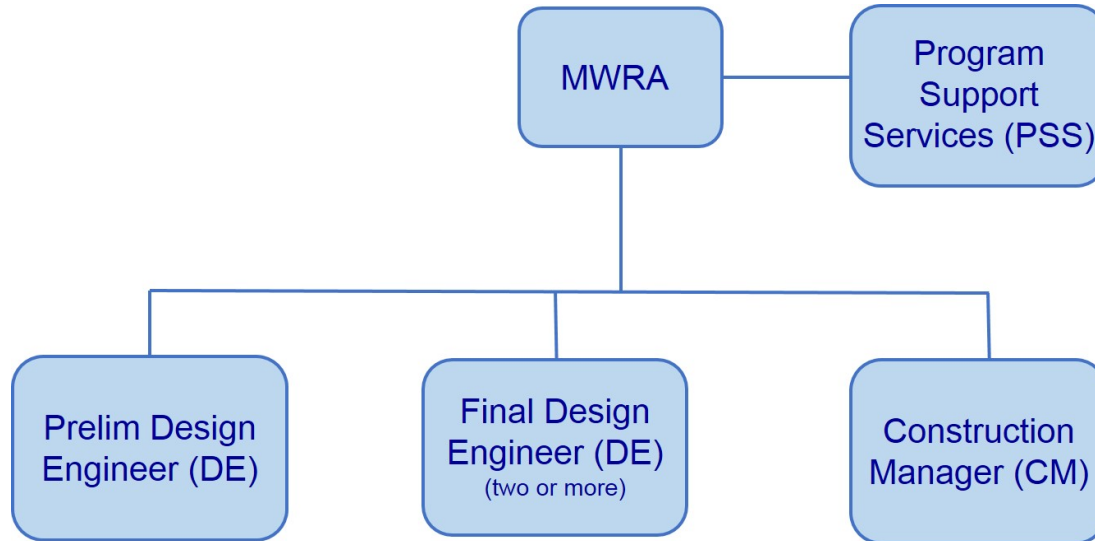
- Program-wide planning
- Risk management planning
- Quality management and health and safety planning
- Design criteria and standardization
- Work breakdown planning
- Procurement planning
- Construction package planning
- Critical path scheduling, and
- Budget planning and management







# Proposed Consultant Organization





# Planned Schedule

- Program Support Services
  - Issue RFQ/P: by early 2019
  - Notice to Proceed: by mid 2019
  
- Preliminary Design Engineering/MEPA Review
  - Issue RFQ: Mid 2019
  - Notice to Proceed: Early 2020

