
WATER RESOURCES AUTHORITY
MASSACHUSETTS

Update on Invasive Aquatic Plant Management at MWRA Reservoirs

February 19, 2020

Aquatic Invasive Plants Under Control And Their Removal Methods

Eurasian milfoil (EWM)

Fanwort (FW)

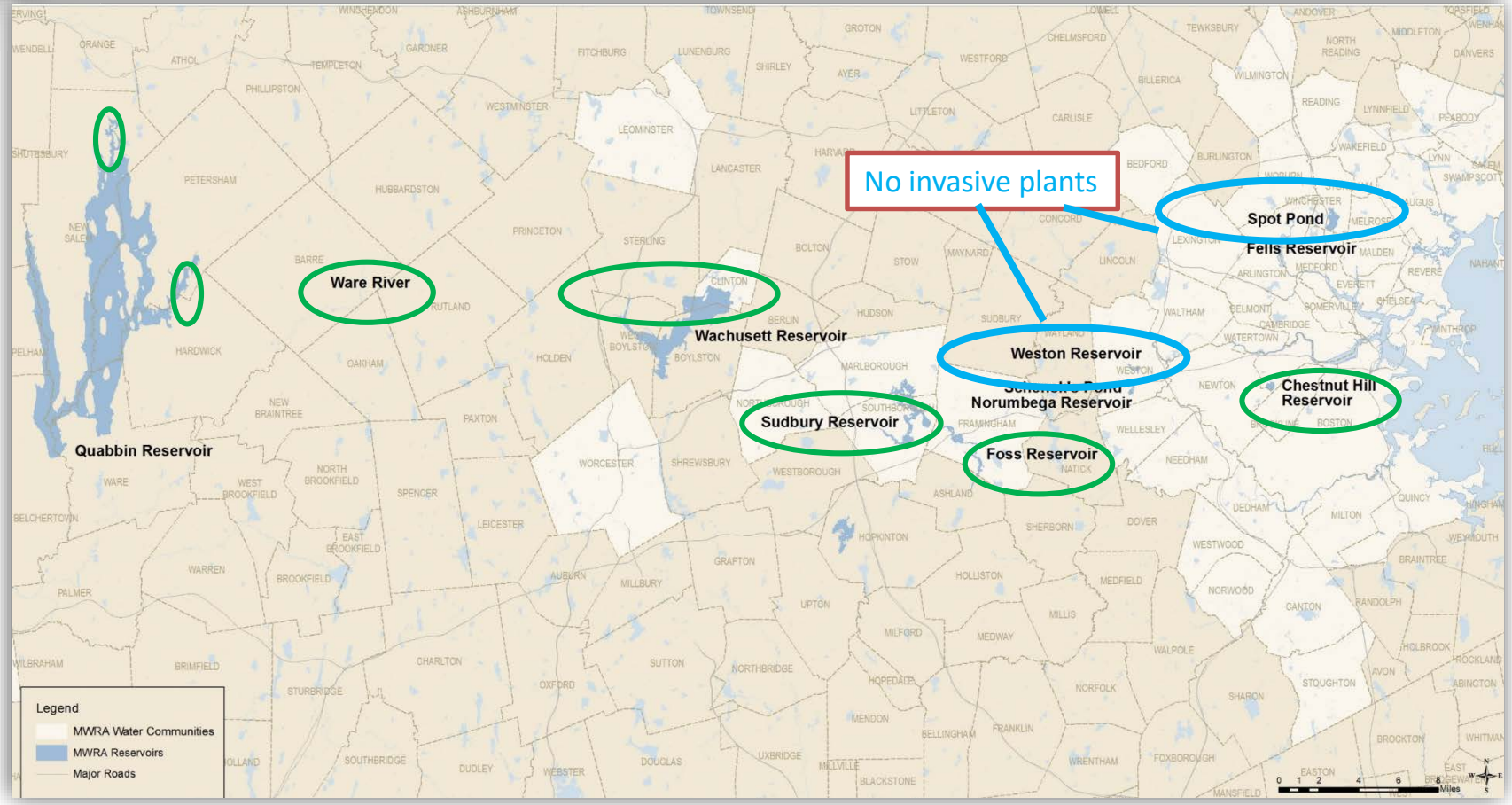
Water Chestnut (WC)

Variable milfoil (VLM)

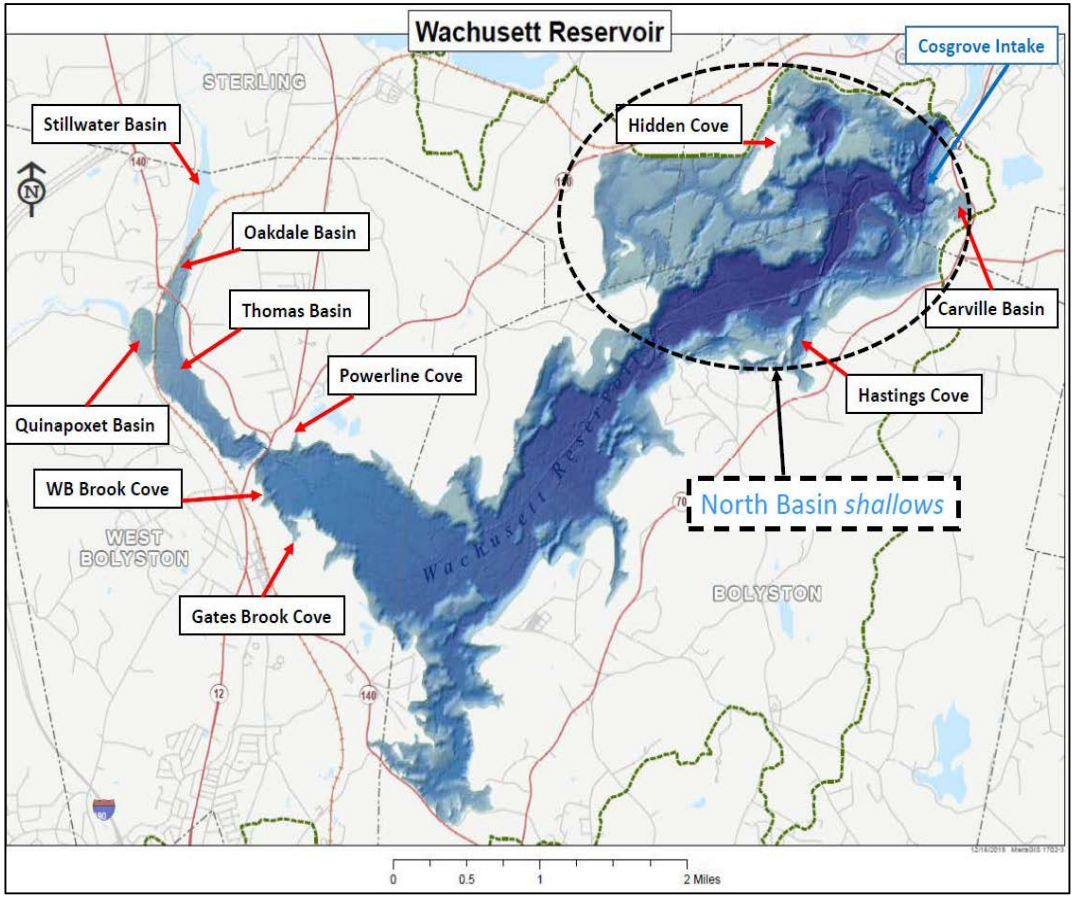
Control methods:

- Diver Assisted Suction Harvesting (EWM, VLM, FW)
- Diver Hand Harvesting (VLM)
- Manual Harvesting from Boat and Shoreline (WC)
- Winter Drawdown (EWM)
- Fragment Barriers (VLM, EWM, FW)

Where Invasive Plants Control Efforts Are Underway In MWRA System



Wachusett Reservoir Has The Heaviest Level Of Effort For Aquatic Invasive Plants Control



Annual Reservoirs-Wide Plan Survey

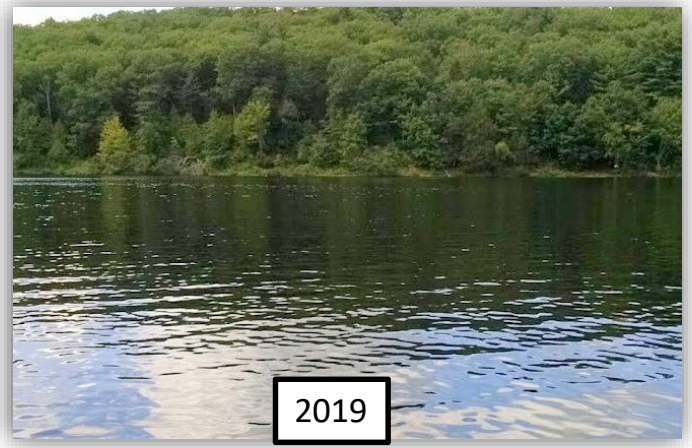
- Catalog plant communities; compare to prior year surveys
- Immediate notification of new aquatic invasives
- Identify new threats in geographic proximity

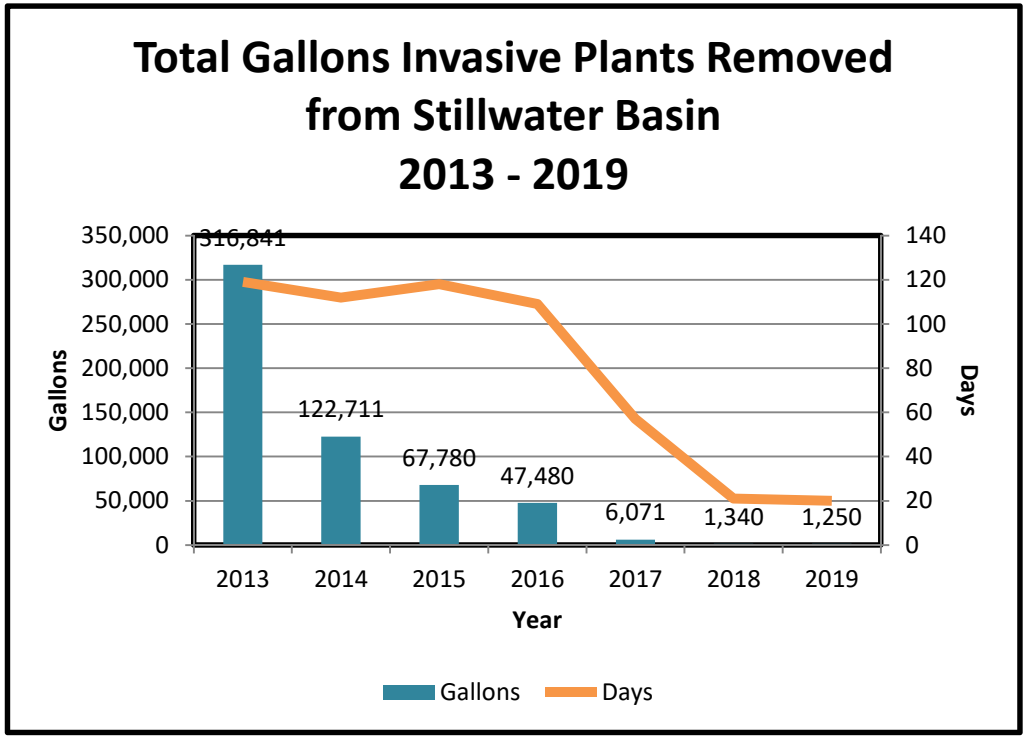
Wachusett Control Efforts By Diver Assisted Suction Harvesting (DASH)

Suctioned plants (EWM) emerge on screen

Suctioned plants Include roots

Stillwater Basin DASH Of Eurasian Milfoil



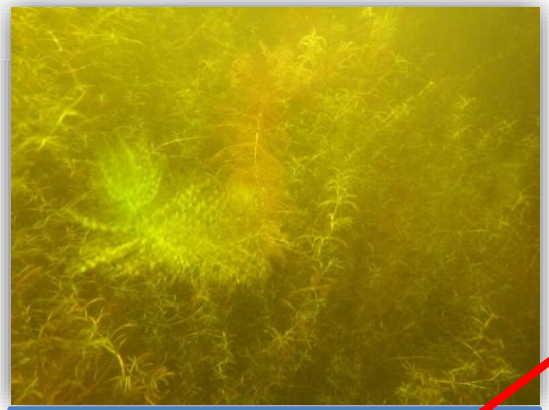


Wachusett Reservoir - Stillwater Basin Eurasian Milfoil 2019

Pre-harvest – June 24

Post-harvest – August 7

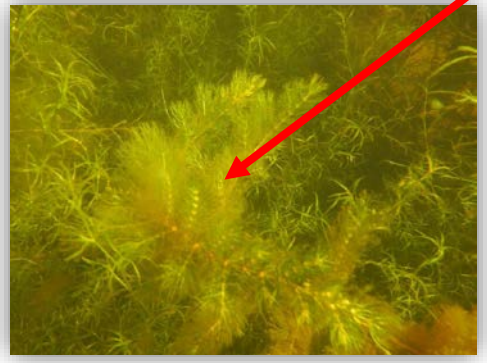
Native Plants Are Returning To Stillwater Basin In The Dash-Cleared Areas

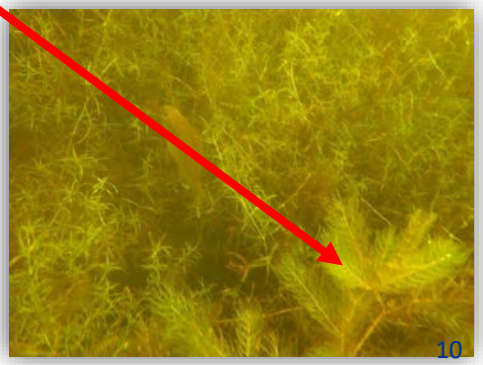


Native Urticularia (bladderwort) and native naiad

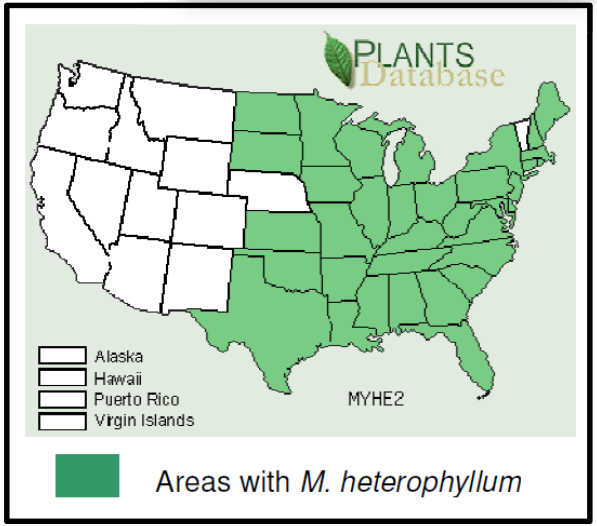
Its getting harder to find the invasive plants among abundant returned native plants

Native P. robbinsii (front), native Naiad (back)





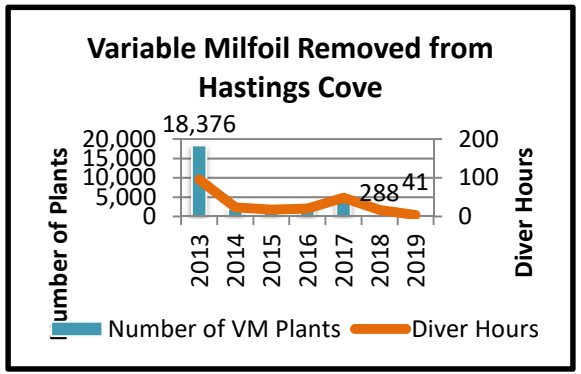
Variable Leaf Milfoil

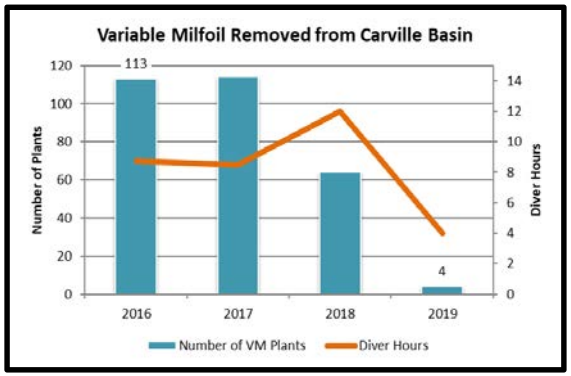


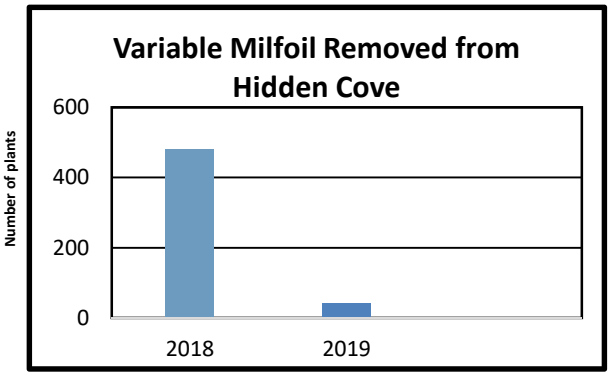
Locations of Variable Leaf Milfoil in MWRA system:

- Wachusett Reservoir:
  - Hastings Cove
  - Hidden Cove
  - Carville Basin
  - Quinapoxet Basin
- Quabbin Reservoir upstream settling basins
- Ware River/Shaft 8 Intake Pool

Wachusett Variable Leaf Milfoil Removal Efforts

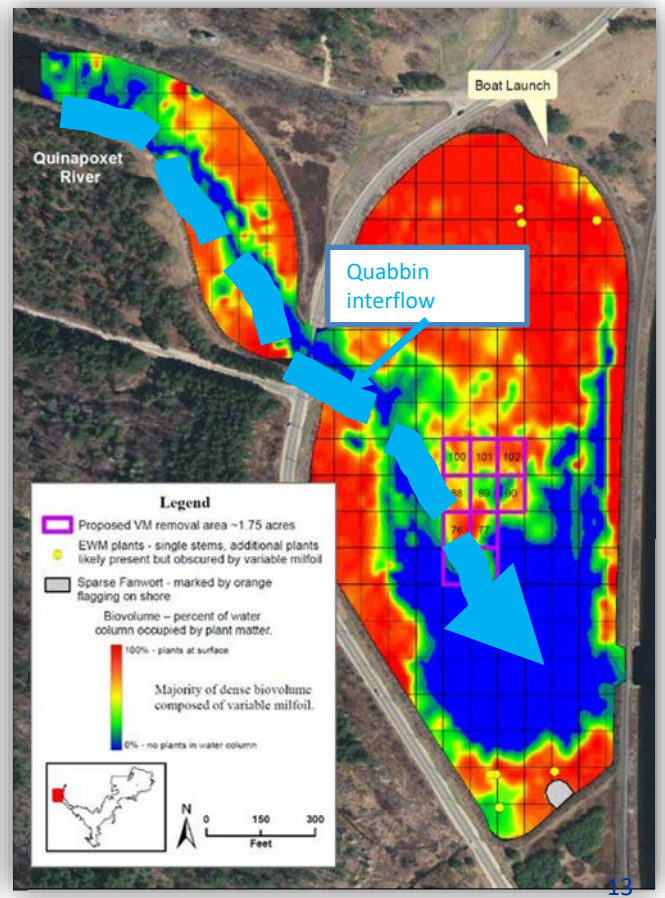




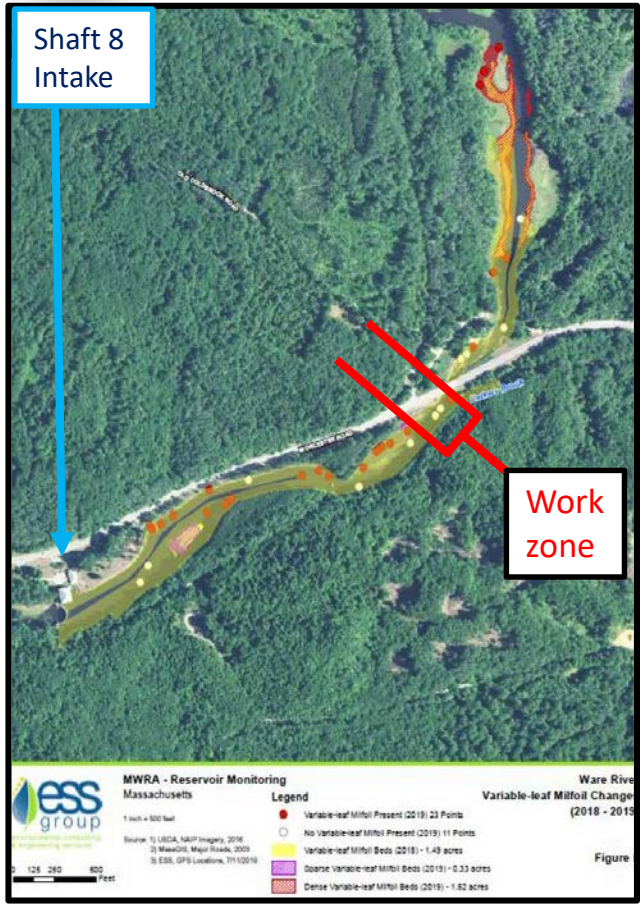


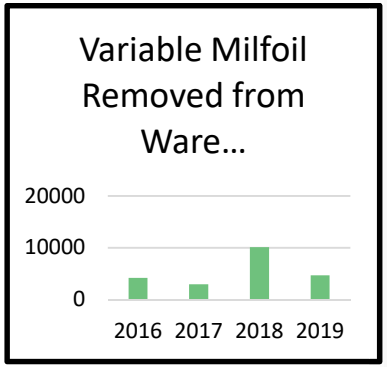
Quinapoxet Basin Variable Leaf Milfoil

Variable Milfoil



Ware River Shaft 8 Intake Pool Variable Leaf Milfoil Removal





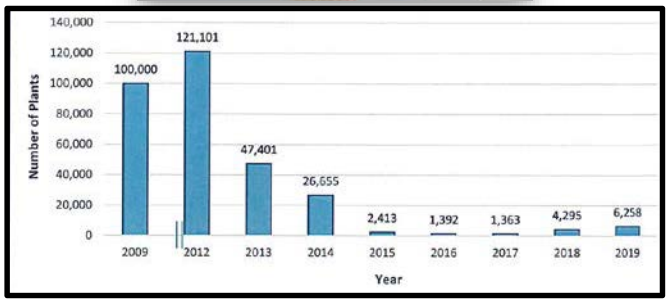
Dried-out Variable Milfoil on river bed manually removed down to roots

Quabbin – Deployment Of Fragment Barriers At Settling Ponds For Variable Leaf Milfoil

Sudbury Reservoir - Water Chestnut 2008 To Present

In 2008, dense mats and mature plants with many nuts required mechanical control

Today, control efforts = hand removal by boat of scattered small plants



Foss Reservoir – Winter Drawdown For Eurasian Milfoil Control

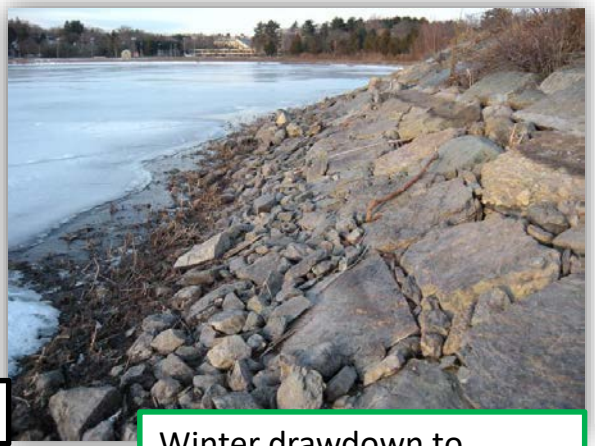
Live Eurasian Milfoil underwater

Small test hole to check freeze depth

Dead, frozen Eurasian Milfoil

Chestnut Hill Reservoir – Dual Approach Has Resulted In Reduction Of Aquatic Invasive Plants

Recently exposed Eurasian Milfoil



Winter drawdown to freeze and desiccate plants and roots.

Mechanical harvest of dense Eurasian Milfoil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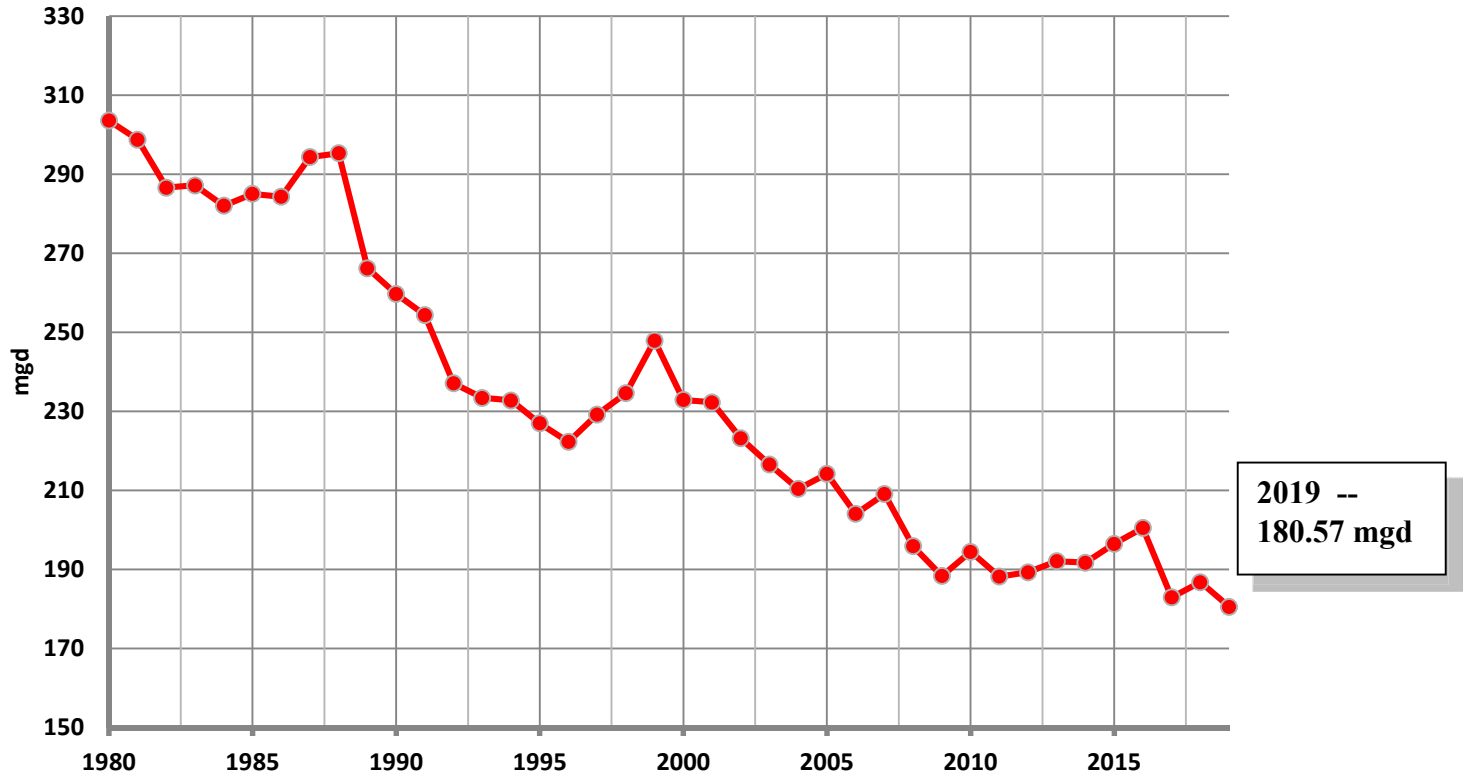
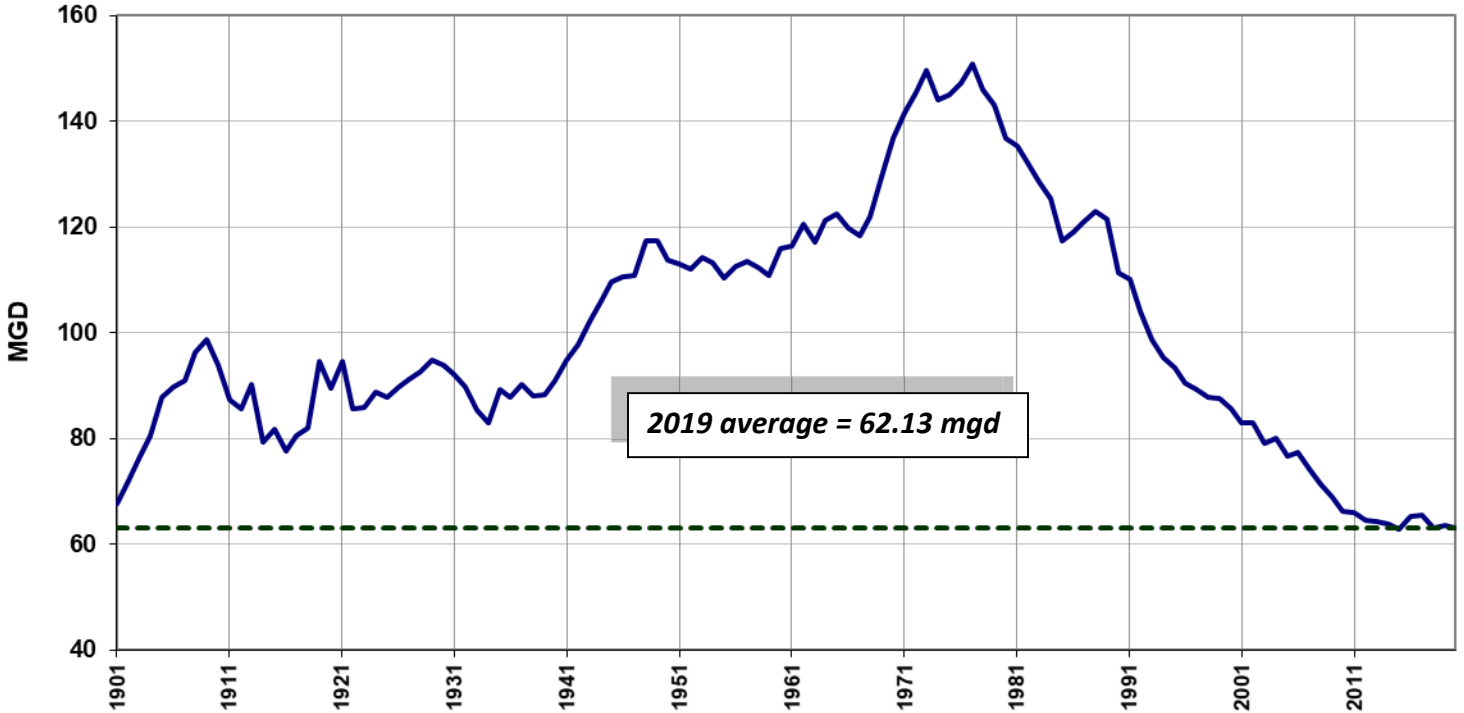
Report on 2019 Water Use Trends and Reservoir Status

February 19, 2020

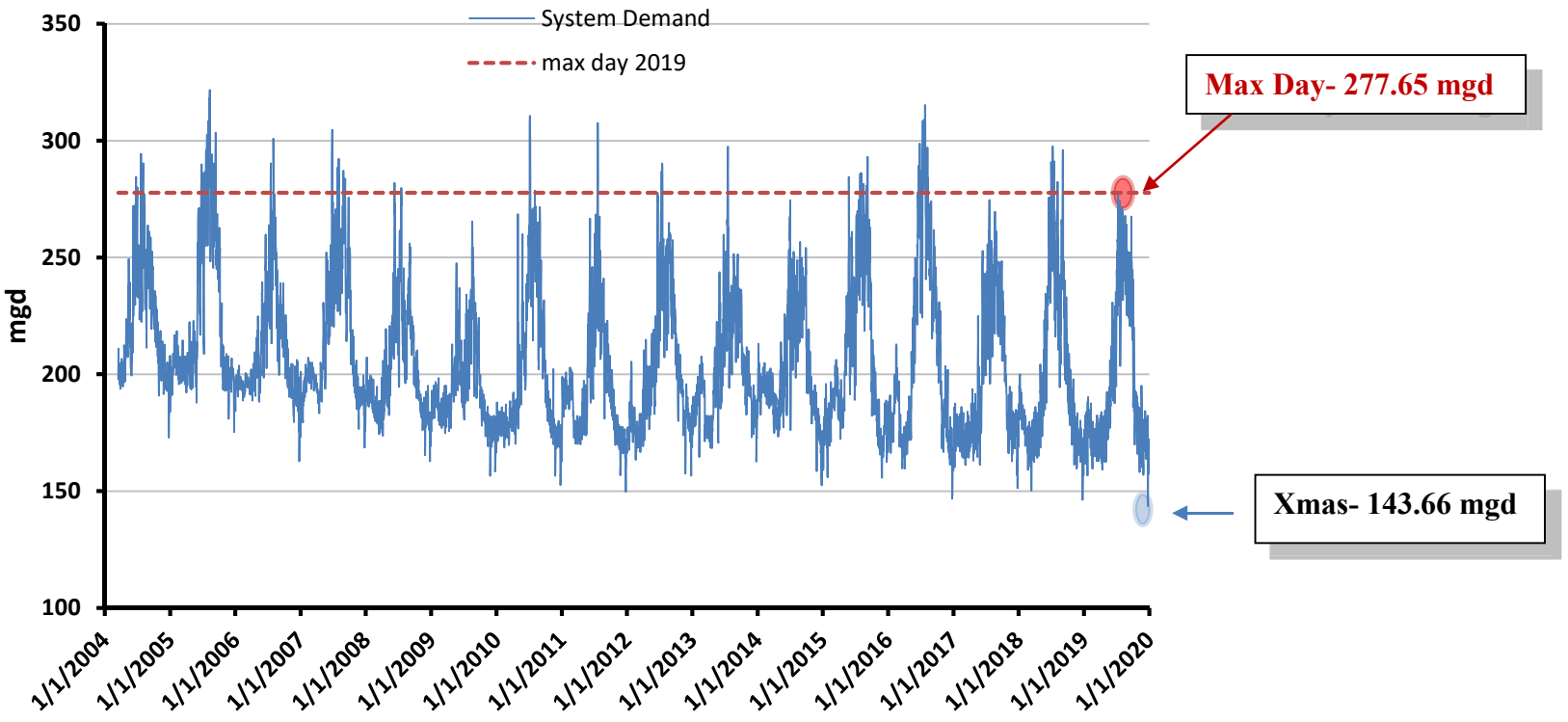
Total Consumption by MWRA Communities (1980 to 2019)



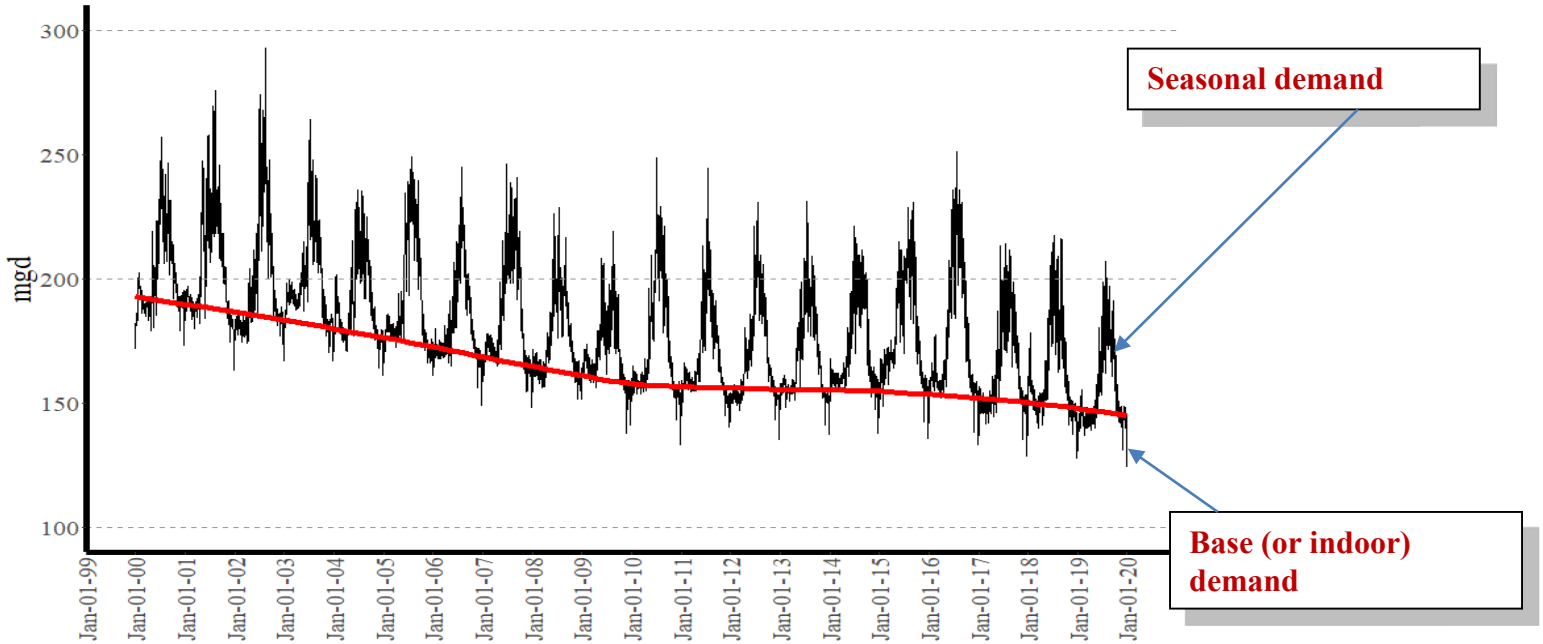
Boston Water Use (1900 to 2019)



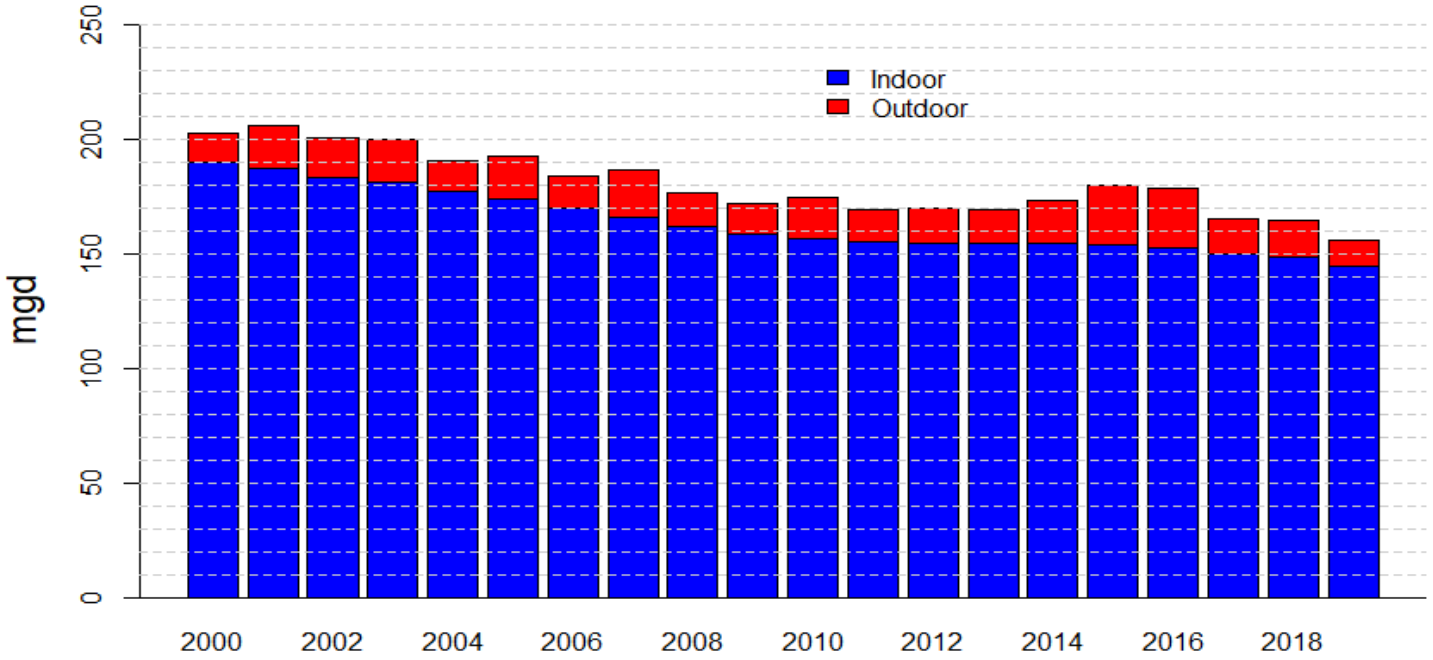
Daily System Demand



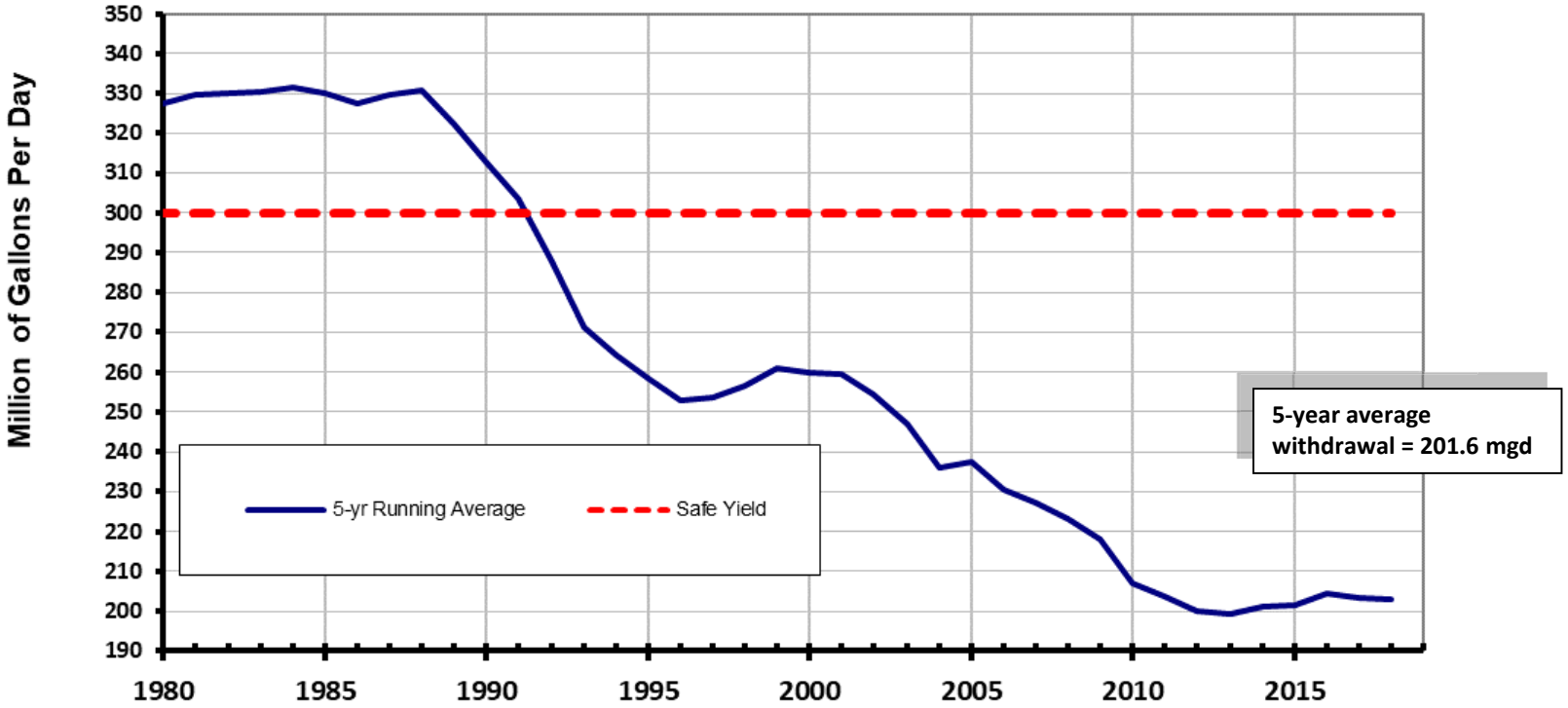
Fully Supplied Communities Demand (2000 to 2019)



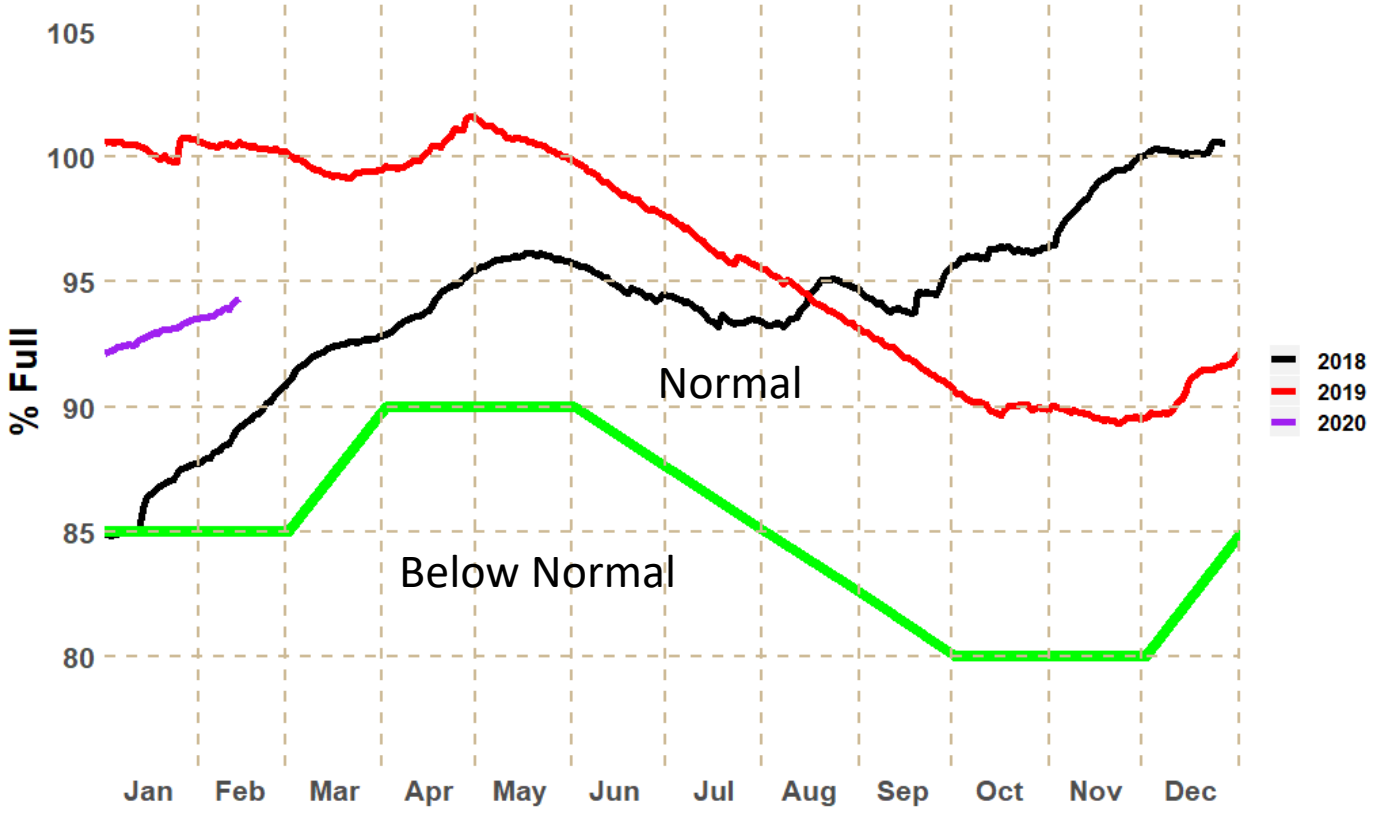
Fully Supplied Communities (Annual Base and Outdoor Use)



Reservoir Withdrawals – 5-Year Running Average



Quabbin Reservoir Volume

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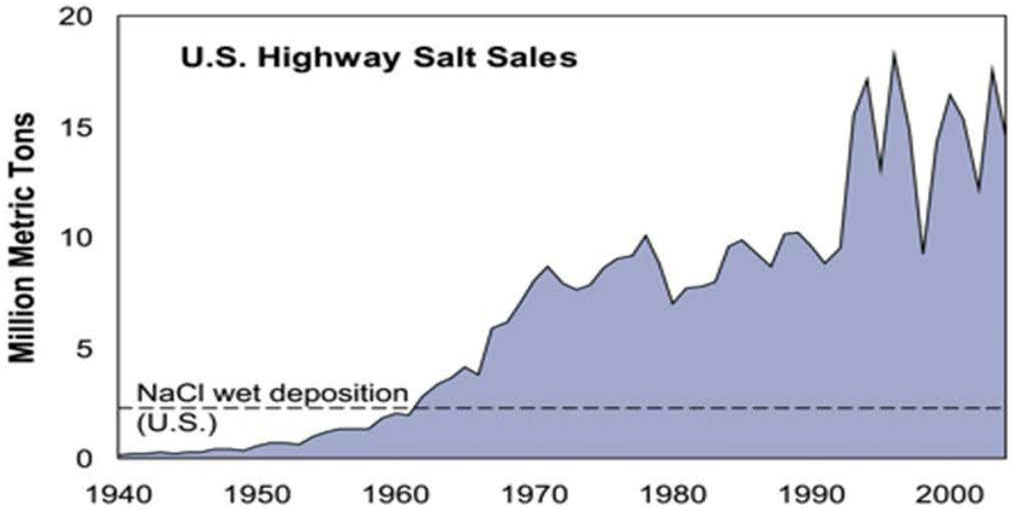
Chloride in MWRA Reservoirs and Steps to Mitigate Water Quality Impacts

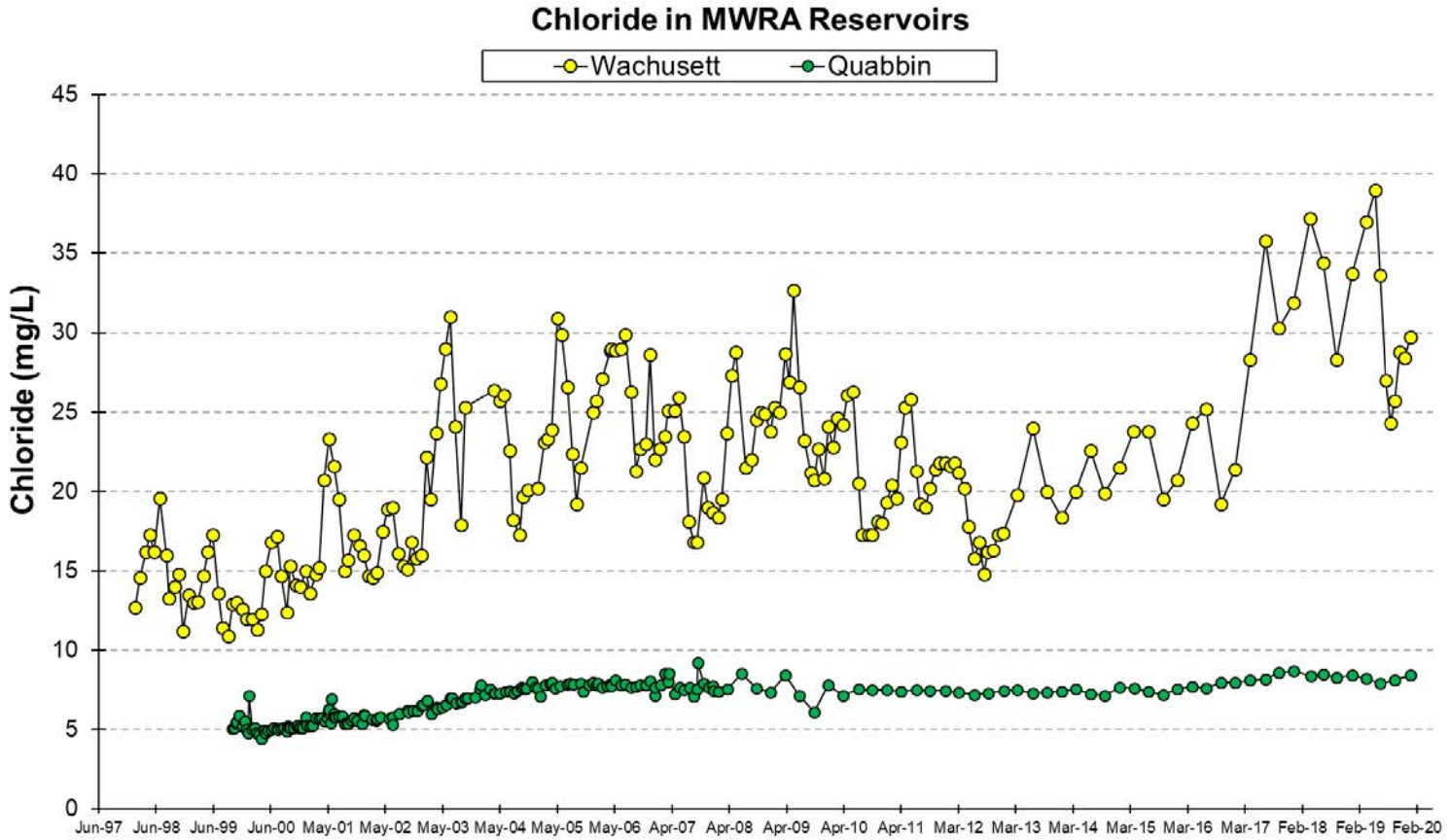
February 19, 2020

Background

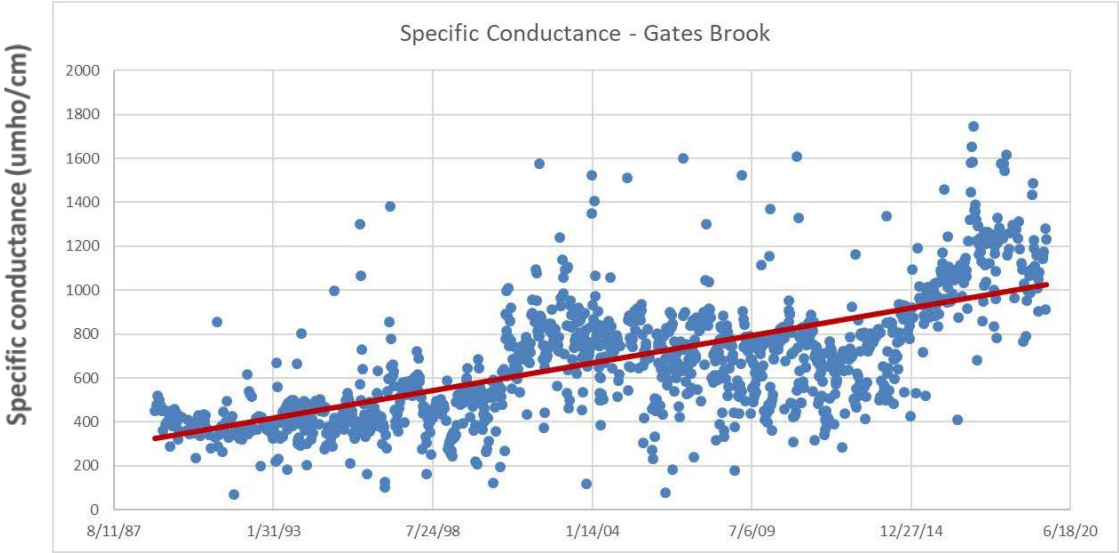
- Rising chloride concentrations observed throughout Northeast US
- Road salt run-off enters reservoirs through rivers, streams and aquifer
- Chlorides increase the corrosivity of water and threaten aquatic life



Rising Chloride Levels in MWRA Reservoirs

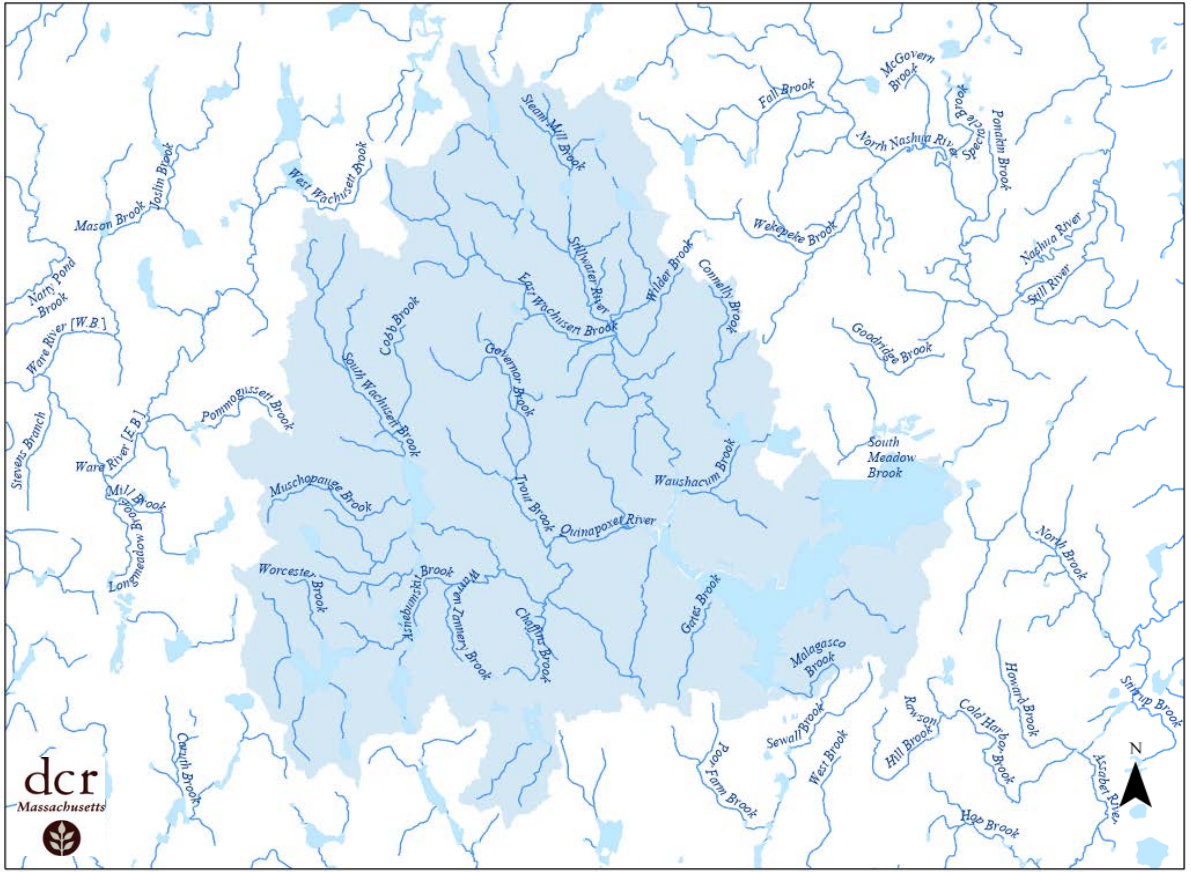


Specific Conductance In Watershed Tributary



- Documented increase in specific conductance (surrogate for chloride) in Wachusett tributaries
- Gates Brook has the highest concentrations

Wachusett Tributaries



Annual Salt Application – Wachusett Watershed

Town	Estimated Salt Use (tons)
Boylston	993
Holden	2,198
Paxton	301
Princeton	1,803
Rutland	947
Sterling	1,025
West Boylston	3,722
Worc/Clint/Leom	700
MassDOT	4,093
DCR DWSP	35
Parking lots	2,522
Total	**>18,000 tons***

*Source: DCR

Managing Chloride Inputs

- Proper salt application
  - In November, MWRA funded a one-day training for watershed community DPW Staff on best practices for salt application
  - Investigate grant opportunities to replace inefficient salt application equipment
- Research to predict road salt inputs and impacts
  - DCR/UMass Amherst collaboration
  - MWRA investigating corrosivity impacts on distribution system
  -

Managing Chloride Inputs

Increased monitoring of chloride inputs in reservoir

- DCR to install real-time data loggers across the watershed
- DCR to track chloride inputs from ground water and tributaries
- MWRA will continue routine sampling for chlorides in raw and finished water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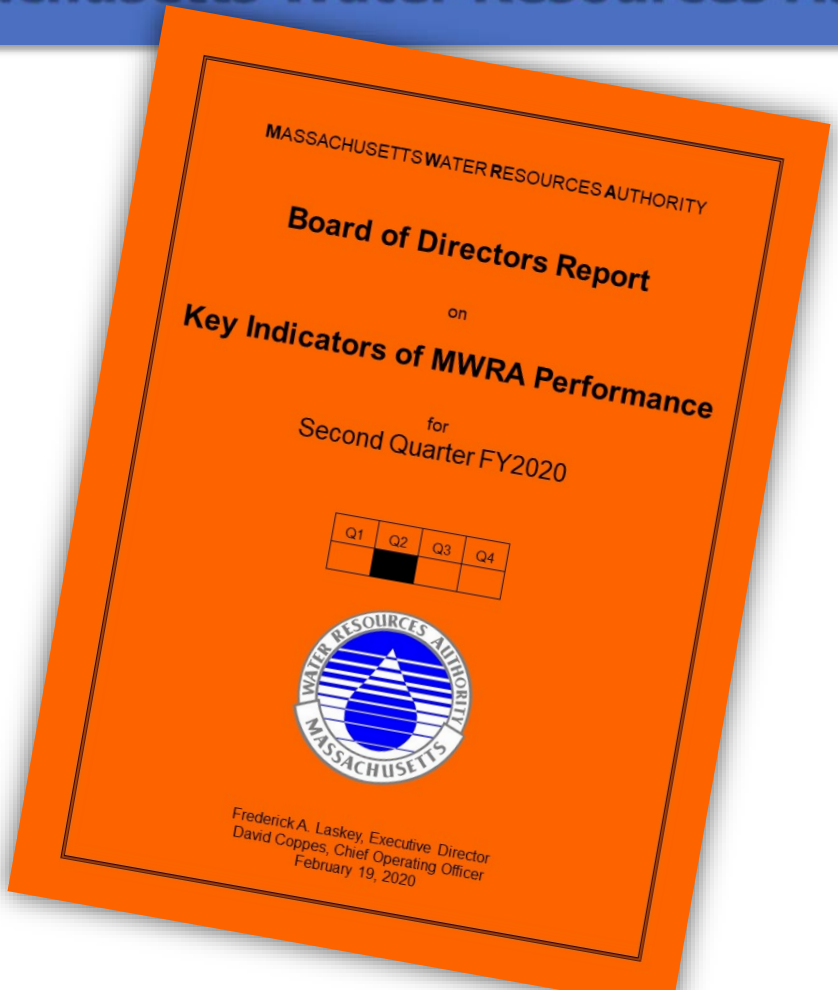
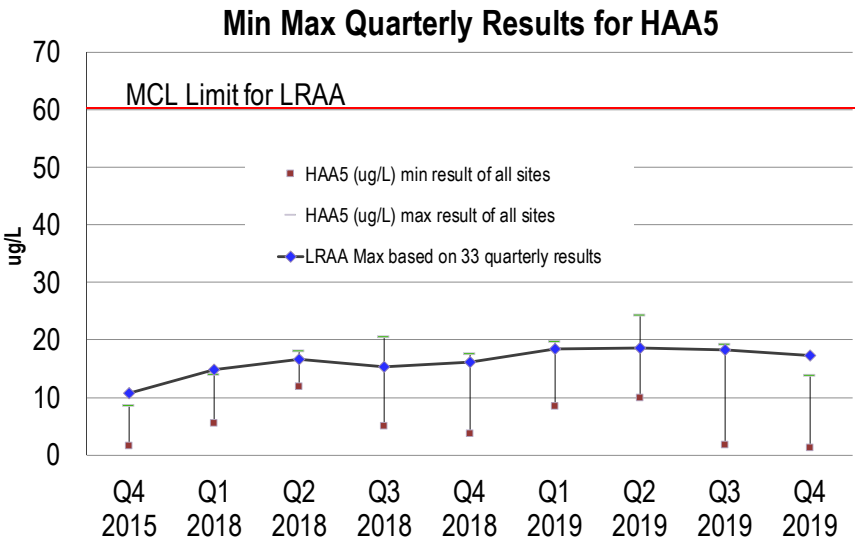
Massachusetts Water Resources Authority

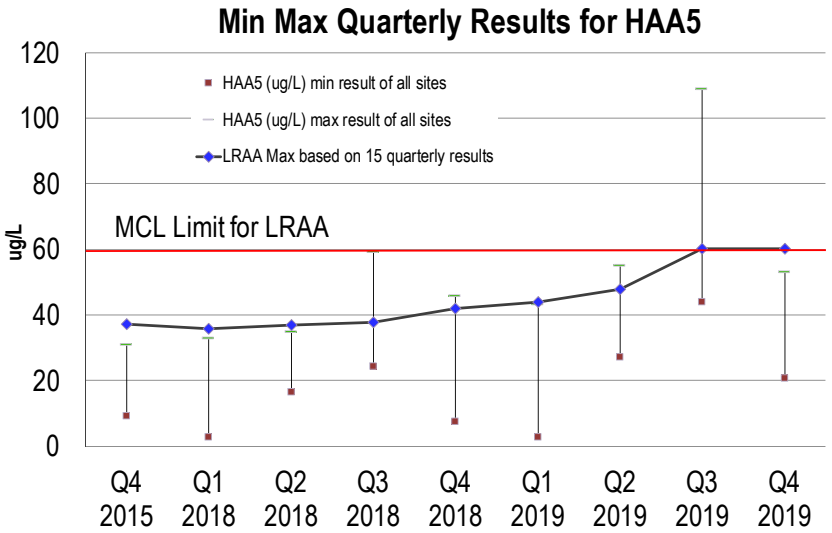


Disinfection Byproducts Levels

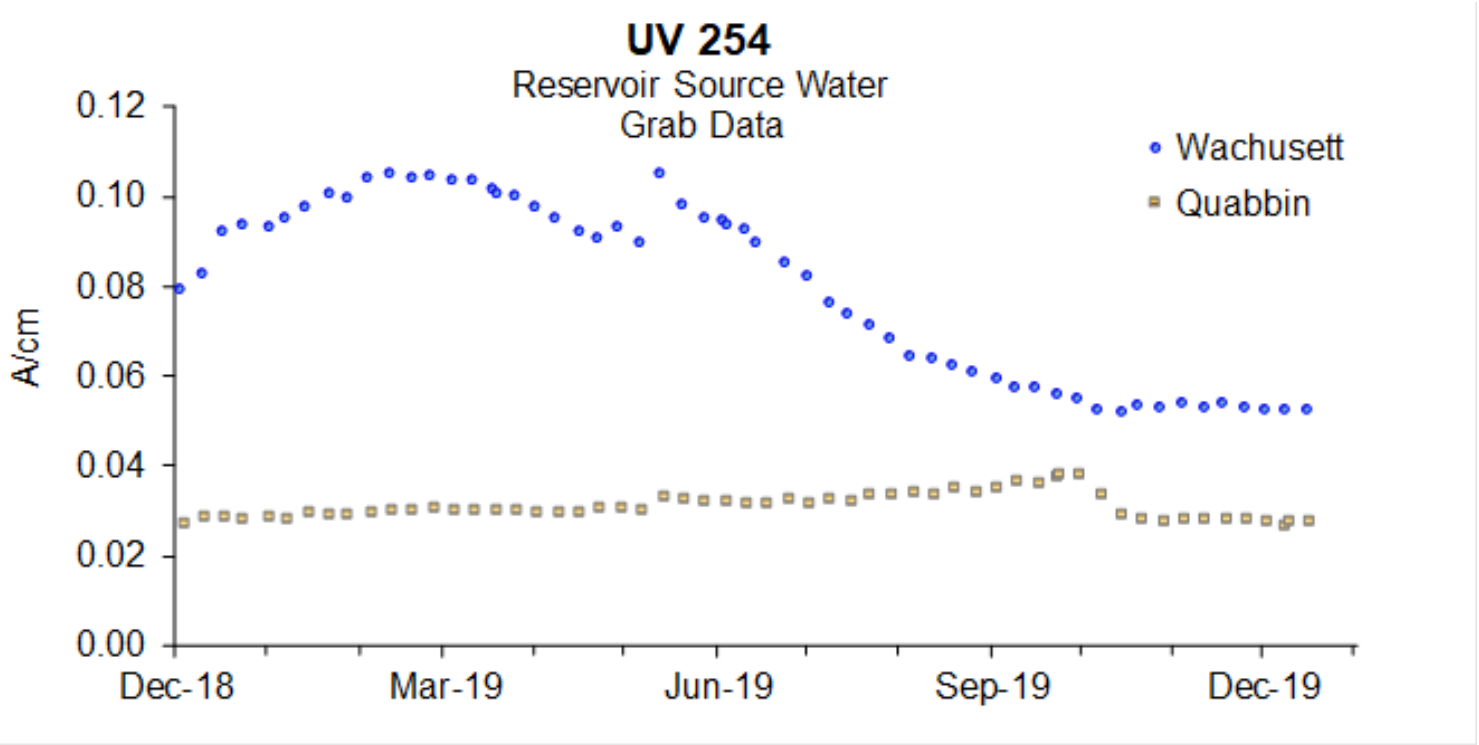
Metro Boston Levels



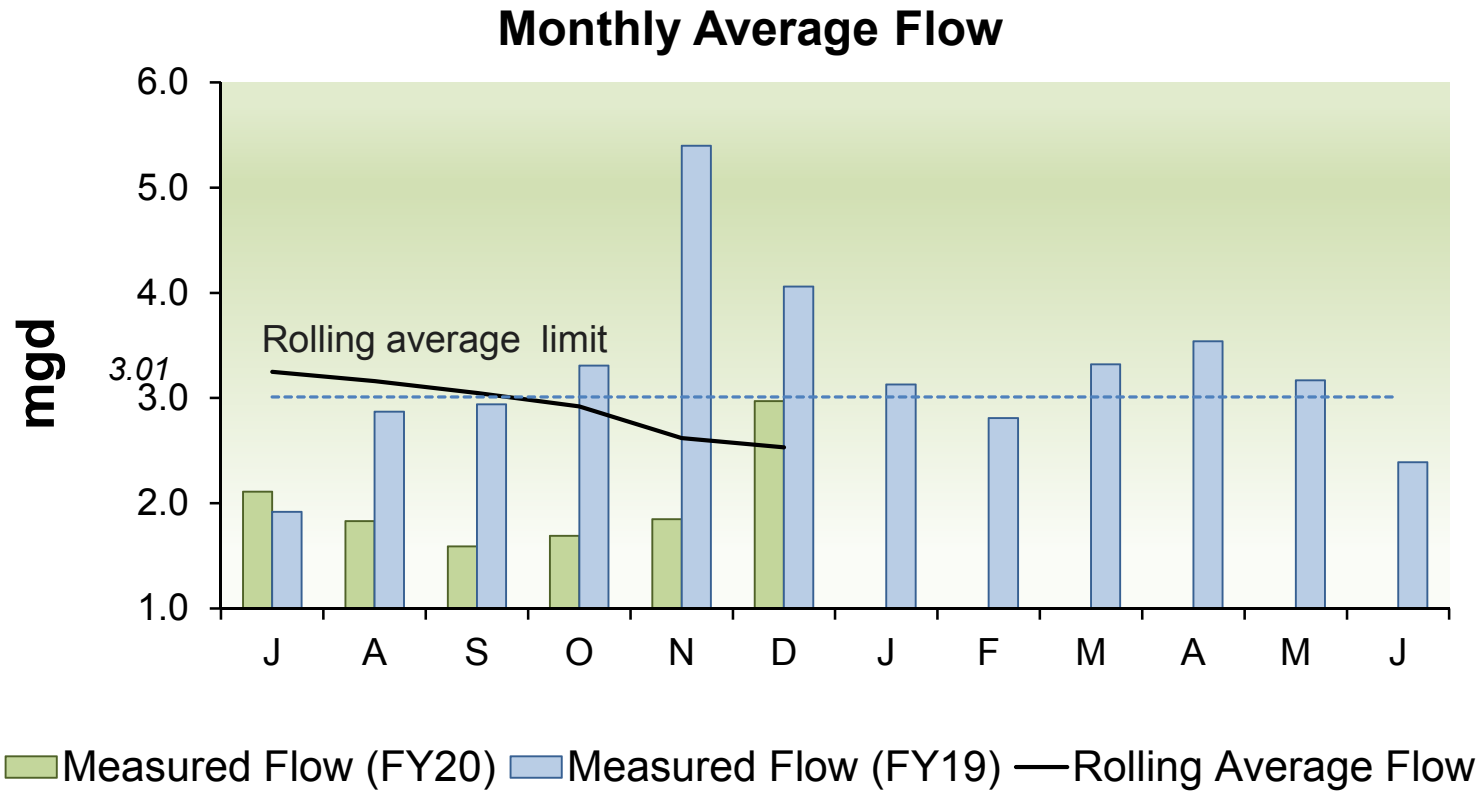
CVA Results



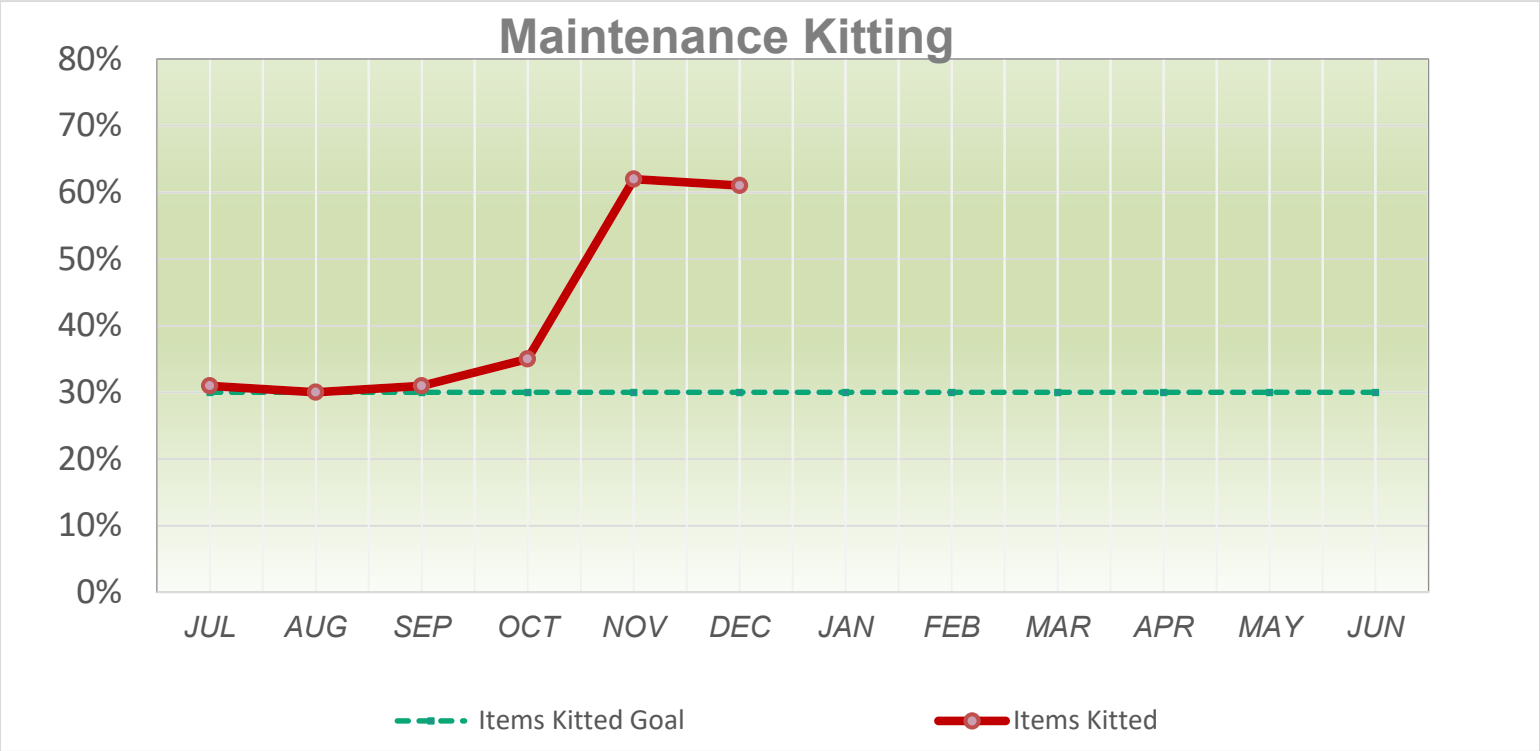
Natural Organic Mater Levels in Reservoirs



Clinton Wastewater Treatment Plant NPDES Flow Compliance



Maintenance Kitting



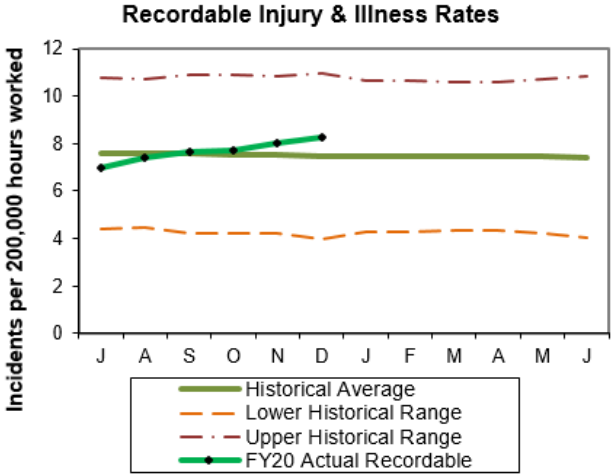
Occupational Health and Safety at MWRA

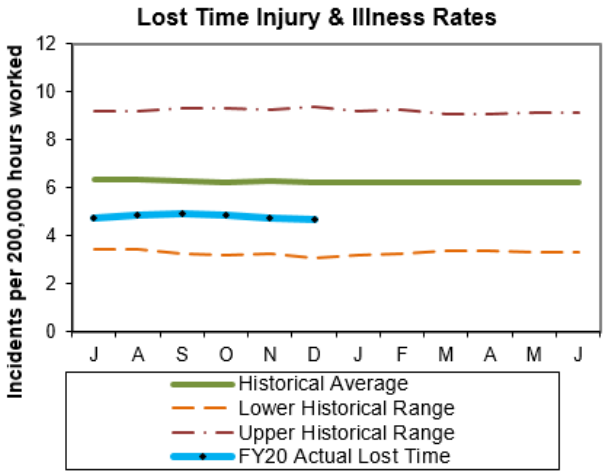
February 19, 2020

Worker Safety Reporting- 2nd Quarter FY20

WORKPLACE SAFETY

2nd Quarter - FY20





- OSHA safety for public sector employees – February 1, 2019
- Strictly adhering to recordkeeping regulations likely to cause an increase in recorded injuries and illnesses as compared to previous years, but not necessarily an increase in injuries
- Differences in the Workman's Comp Standards account for some of the differences
- The rise on the chart should start to stabilize as new data replaces old data
- One bad month or one good month can affect the chart

Regulation Changes -February 1, 2019

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DEPARTMENT OF LABOR STANDARDS

OSHA Safety for Public Sector Employees
Highlights of Updated Law G.L. c. 149, § 6 ½

- Increased requirements on injury reporting and record keeping
  - Emphasis on accident reporting and investigation
- Incident investigations internal to MWRA and potentially DLS
  - Incident Investigation with Root Cause analysis followed by corrective actions
- Implement Corrective Actions
  - Follow through with corrective actions and develop tool box talks to create a learning moment

New Requirement- Injury Tracking For OSHA

How does OSHA define a recordable injury or illness?

- Any work related fatality
- Injury that results in loss of consciousness
- Days away from work
- Restricted work, or job transfer

- Medical treatment beyond first aid
- Chronic irreversible diseases
- Cancer
- Cracked teeth or bones
- Punctured eardrums

New Requirement- Injury Tracking For OSHA

Why are we seeing an increase in recorded injuries while following OSHA?

- Lost time is any work related injury requiring a day or more away from work to recover
  - Workman's Comp is Lost time after 5 days away
- New medical info days to years later can require an injury to be recorded
  - Cases where surgery is delayed or treatment plans are not working become recordable
- Employee is given a prescription strength medication while at the emergency room
  - Prescription strength medication is considered more than First Aid. If a medicine is given at the time of visit or if a prescription is written and not filled, the case is still recordable

Injury Reporting- OSHA 300 Log

OSHA's Form 300 (Rev. 01/2004)

Log of Work-Related Injuries and Illnesses

Attention: This form contains information relating to employee health and must be used in a manner that protects the confidentiality of employees to the extent possible while the information is being used for occupational safety and health purposes.

Year 2019

U.S. Department of Labor
Occupational Safety and Health Administration

You must record information about every work-related injury or illness that involves loss of consciousness, restricted work activity or job transfer, days away from work or medical treatment beyond first aid. You must also record significant work-related injuries that are diagnosed by a physician or licensed health care professional. You must also record work-related injuries and illnesses that meet any of the specific recording criteria listed in 29 CFR 1904.8 through 1904.12. Feel free to use two lines for a single case if you need to. You must complete an injury and illness incident report (OSHA 301) or equivalent form for each injury or illness recorded on this form. If you're not sure whether a case is recordable, call your local OSHA office for help.

Establishment name MASS WATER RESOURCES

City _____ State _____

Identify the person			Describe the case			Classify the case (Using these categories, Check ONLY the most serious result for each case)				Enter the number of days the injured or ill worker was:		Check the injury column or choose one type of illness:					
(A) Case No.	(B) Employee Name	(C) Job Title	(D) Date of injury or onset of illness	(E) Where the event occurred (e.g. Loading dock north end)	(F) Describe injury or illness, parts of the body affected, and object/substance that directly injured or made person ill (e.g. Second degree burns on right forearm from acetylene torch)	Death (G)	Days away from work (H)	Remained at work: Job transfer or restriction (I)	Remained at work: Other recordable cases (J)	Away from work (days) (K)	On job transfer or restriction (days) (L)	(M) Injury (1)	Skin Disorder (2)	Respiratory Condition (3)	Poisoning (4)	Hearing loss (5)	All other Illnesses (6)
2019 - 1	PRIVACY CASE	O&M SPECIALIST	2019-01-04	Deer Island Treatment Plant 100 Tafts Avenue Winthrop MA 02152	ACCIDENTAL DISCHARGE OF SODIUM HYPOCHLORITE		Y			10		Y					
2019 - 2	PRIVACY CASE	PLUMBING SUPERVISOR	2019-01-08	Southborough Plumbing shop	LOWERING THE RIDGED PIPE GROOVER FROM LOFT AREA TO LOWER LEVEL. EE FELT A PUL L/POF IN LOWER STOMACH AREA ABOVE BELLY BUTTON.		Y			124	0	Y					
2019 - 3	PRIVACY CASE	AREA MGR	2019-01-08	Deer Island	IW WAS MAKING ROUNDS TO CHECK FOR ANY HEATING ISSUES IN THE DIGESTER STAIRWAYS MOD-1 & MOD-3. NEXT DAY HE FELT PAIN IN L LEG AND LOWER BACK. ICED LOWER BACK AND TOOK ALEVE. NEXT DAY, PAIN DOUBLED.		Y			180	0	Y					
2019 - 5	PRIVACY CASE	SR INSTRUMENT TECH	2019-01-08	Roadway site NTBOI	EE HURT BACK LIFTING A MANHOLE COVER.		Y			115	0	Y					
2019 - 4	PRIVACY CASE	CHEMIST III	2019-01-10	Deer Island	WHILE OPENING METAL FRAME DOOR, DOOR HANDLE CONTAINED A BURR/METAL SHARD WHICH ENTERED FINGER TIP.				Y	0	0	Y					
2019 - 6	PRIVACY CASE	MICROBIOLOGIST I	2019-01-16	Chelsea lab	WHILE REMOVING FLASK OF LIQUID FROM AUTOCLAVE, LIQUID OVERFLOWED AND SATURATED HEAT RESISTANT GLOVE.		Y			11	0	Y					
2019 - 7	PRIVACY CASE	OMC LABORER	2019-01-17	New Neponset Pump Station Canton	EE WAS HIT IN THE HEAD BY A DOOR.		Y			6	0	Y					
2019 - 10	PRIVACY CASE	OPERATOR	2019-01-21	Hayes Pump Station	FACILITIES WERE NOT SANDED AND HAD THICK ICE BUILD UP ON PAVEMENT. EE SLIPPED, LOST HER BALANCE AND HURT HER BACK.				Y	0	0	Y					
						(G)	(H)	(I)	(J)	(K)	(L)	Injury (1)	Skin Disorder (2)	Respiratory Condition (3)	Poisoning (4)	Hearing loss (5)	All other Illnesses (6)

Public reporting burden for this collection of information is estimated to average 14 minutes per response, including time to review the instructions, search and gather the data needed, and complete and review the collection of information. Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number. If you have any comments about these estimates or any aspects of this data collection, contact: US Department of Labor, OSHA Office of Statistics, Room N-3644, 200 Constitution Ave, NW, Washington, DC 20210. Do not send the completed forms to this office.

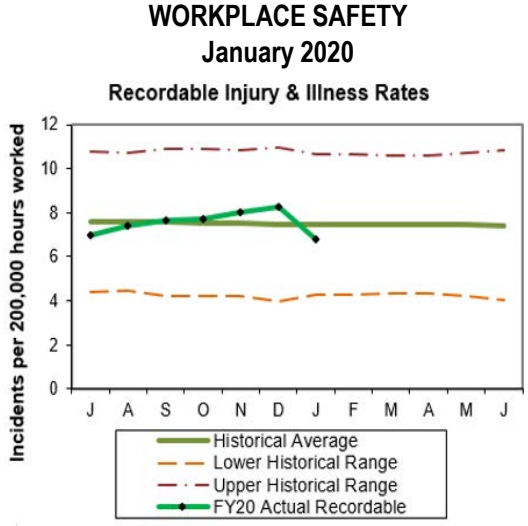
Be sure to transfer these totals to the Summary page (Form 300A) before you post it.

Page 1 of 10

- ✓ Investigate
- ✓ Learn
- ✓ Trend
- ✓ Correct

Safety Focus Areas

Culture	Safety Training	Audits/Inspection	Investigations
Employee engagement Management commitment Safety committees Follow policy and procedures See Something/ Say Something	Provide skills needed Invest the time Constantly evaluate needs Future incident prevention Toolbox talks	Facility walks Job safety reviews Employee concerns Internal audit	Injury investigation Near miss investigation Develop Corrective Actions Follow through with fixes Share with employees Review injury trends




WATER RESOURCES AUTHORITY
MASSACHUSETTS

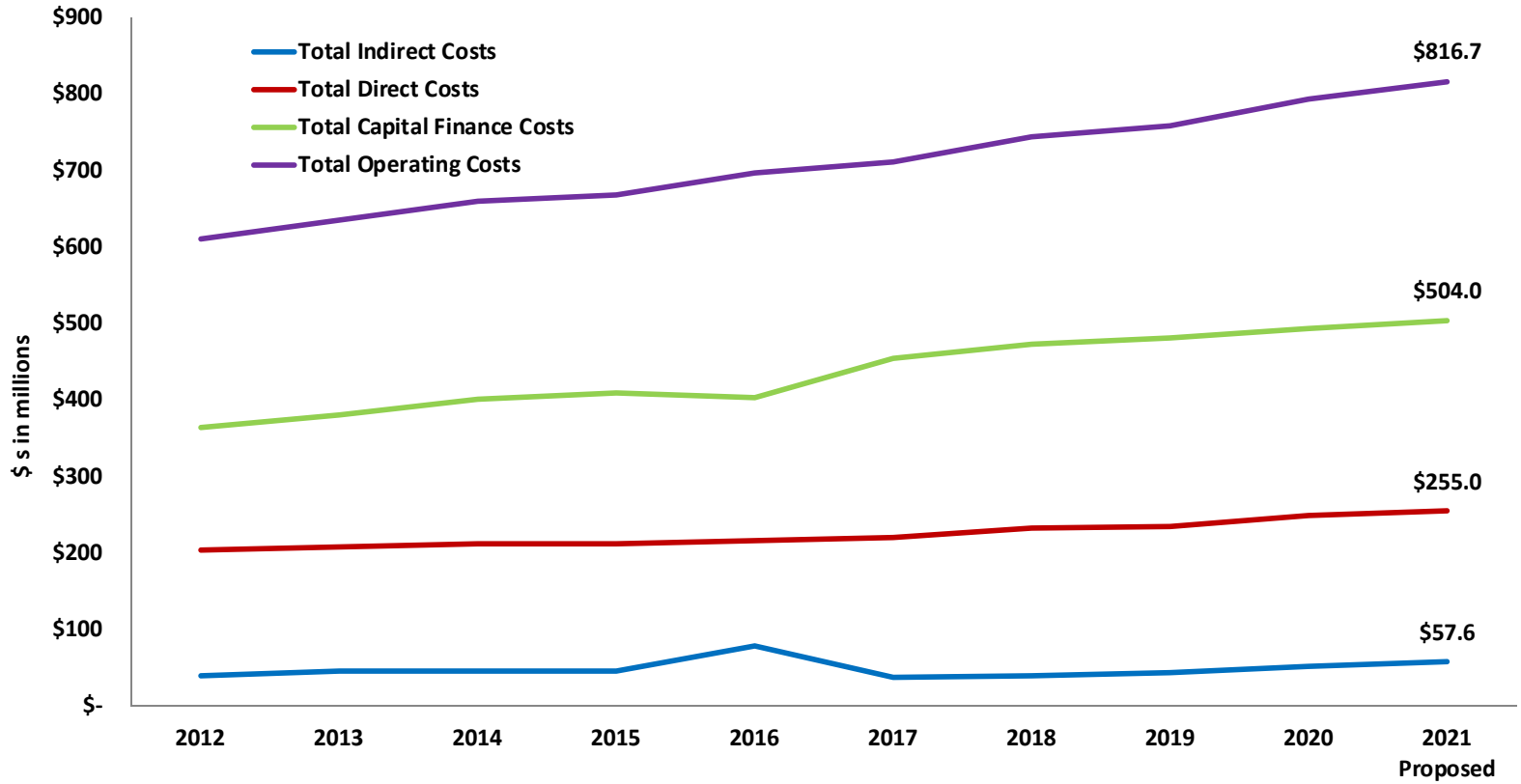
MWRA Fiscal Year 2021
Proposed Current Expense Budget

February 19, 2020

FY21 Proposed CEB

Objective: *Sustainable and predictable assessments by applying a multi-year rates management strategy.*

Historical Budgeted Spending



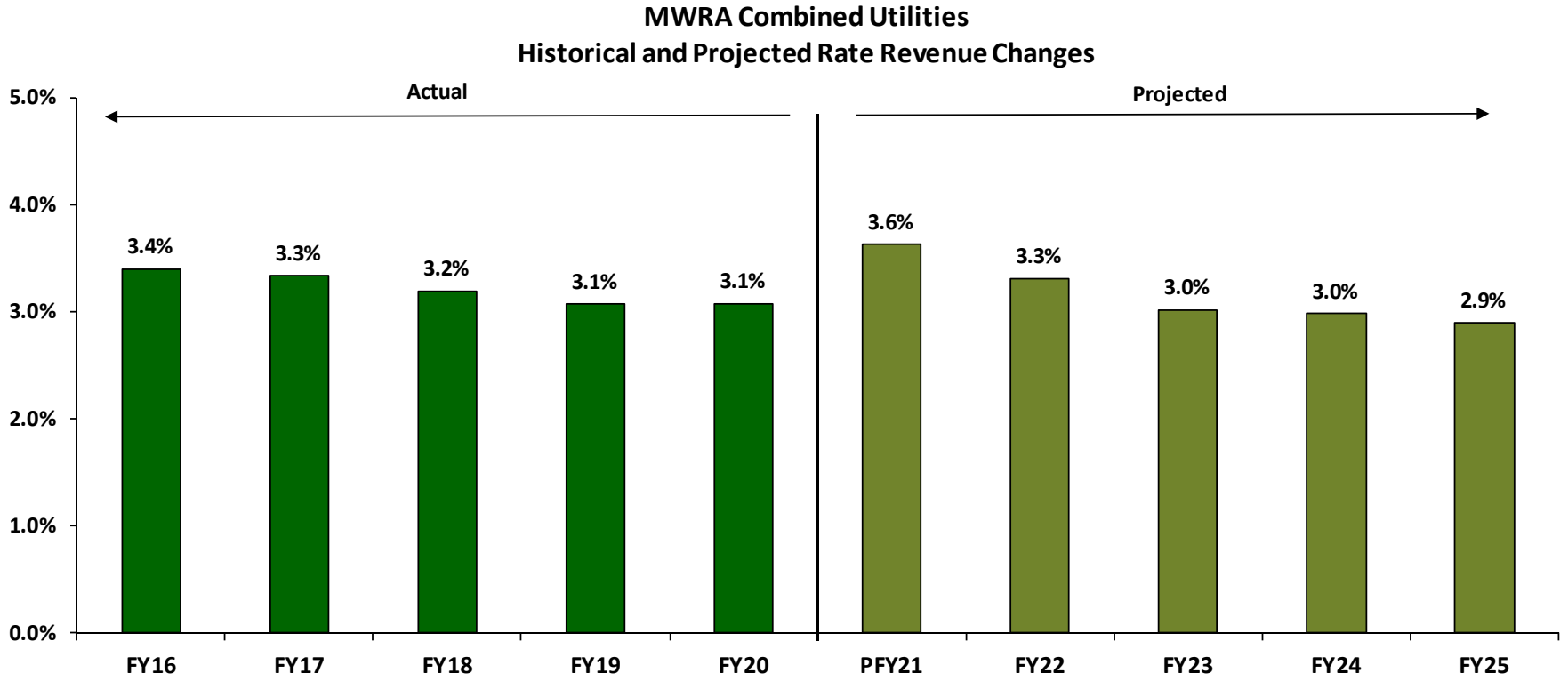
Budget Drivers For Multi-Year Planning

- Capital Finance Expenses
- Existing Expenses and Revenue – Inflation, Changes
- Long-Term Liabilities

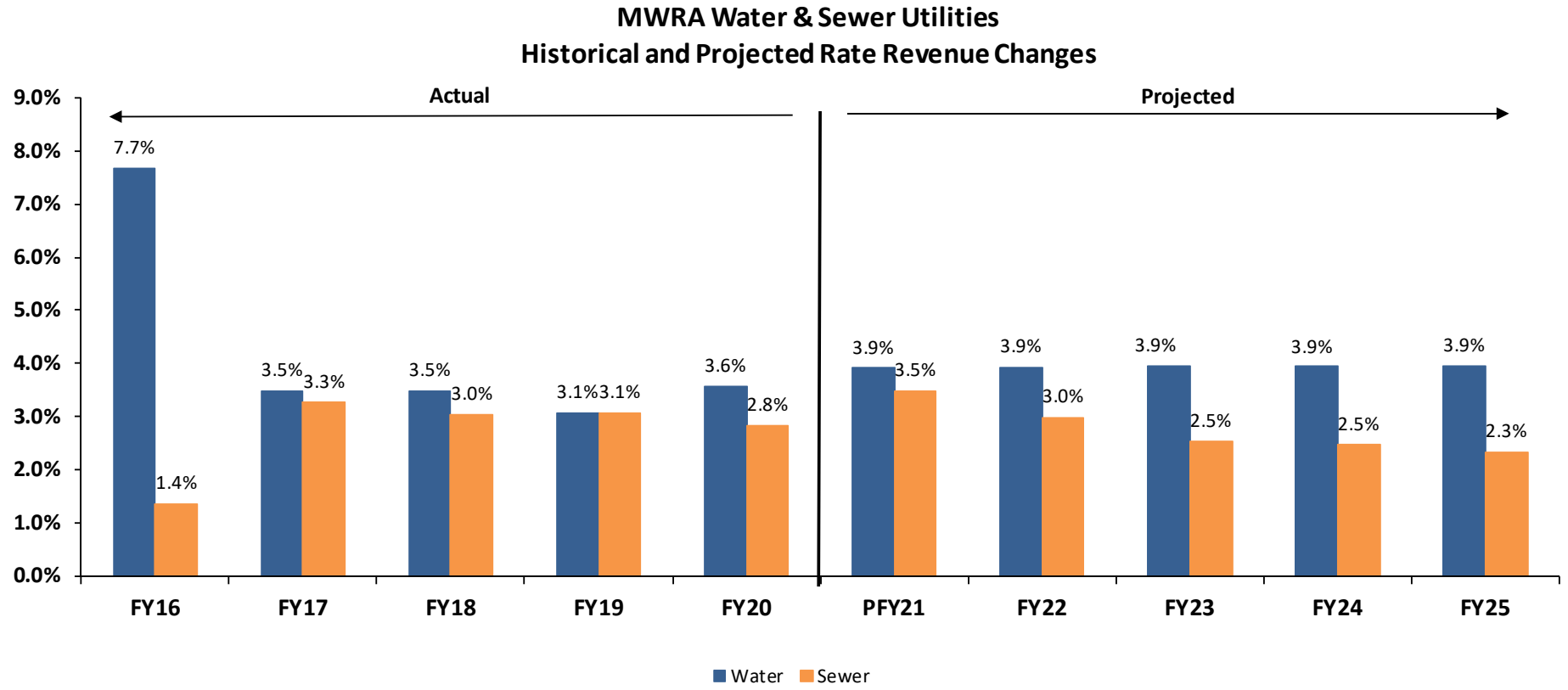
Ways to address the Debt Service challenge

- Defeasance
- Refundings
- Use of Reserves
  - Rate Stabilization Fund
  - Bond Redemption Fund
- Tactical Issuance – Repayment Structure
- Control Capital Spending
- Strategic Use of Current Revenue/Capital Funding

Actual and Forecasted Rate Revenue Changes



Actual and Forecasted Rate Revenue Changes by Utility



CEB Budget Structure

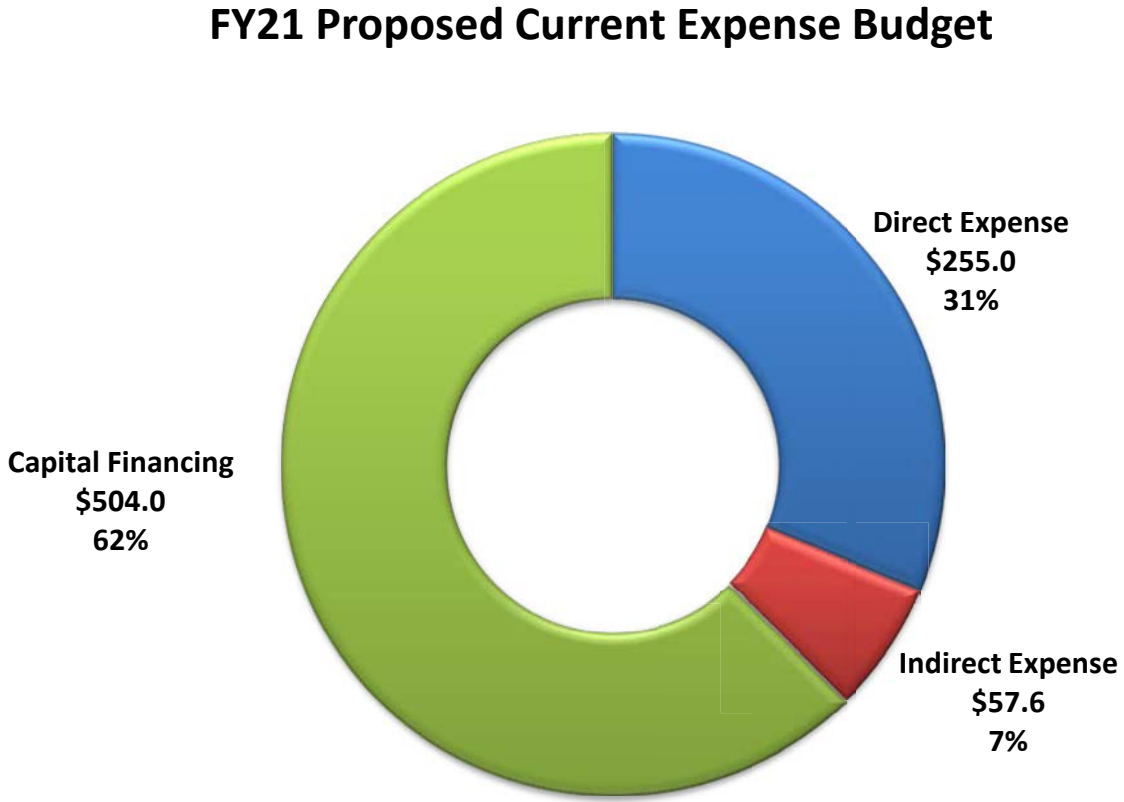
- Direct Expenses
- Indirect Expenses
- Capital Finance Expenses
- Non-Rate Revenue
- Rate Revenue

ATTACHMENT A

FY21 Proposed Budget vs. FY20 Approved Budget

TOTAL MWRA	FY19 Actuals	FY20 Approved Budget	FY21 Proposed Budget	Change FY21 Proposed Budget vs FY20 Approved Budget	
				$	%
EXPENSES					
WAGES AND SALARIES	$ 102,331,904	$ 109,953,483	$ 113,673,999	$ 3,720,516	3.4%
OVERTIME	5,208,556	4,898,965	5,079,296	180,331	3.7%
FRINGE BENEFITS	19,982,221	21,717,533	22,492,274	774,741	3.6%
WORKERS' COMPENSATION	2,717,568	2,354,256	2,476,655	122,399	5.2%
CHEMICALS	10,891,948	11,811,222	12,182,677	371,455	3.1%
ENERGY AND UTILITIES	24,446,278	24,454,796	25,541,081	1,086,285	4.4%
MAINTENANCE	30,650,570	32,726,954	32,618,569	(108,385)	-0.3%
TRAINING AND MEETINGS	499,836	504,394	505,264	870	0.2%
PROFESSIONAL SERVICES	6,194,703	8,295,315	8,377,283	81,968	1.0%
OTHER MATERIALS	6,987,854	6,867,239	7,091,071	223,832	3.3%
OTHER SERVICES	23,769,299	24,683,370	24,975,119	291,749	1.2%
TOTAL DIRECT EXPENSES	**$ 233,680,737**	**$ 248,267,527**	**$ 255,013,288**	**$ 6,745,760**	**2.7%**
INSURANCE	$ 2,748,983	$ 2,611,222	$ 3,059,218	$ 447,996	17.2%
WATERSHED/PILOT/DEBT	23,411,908	26,833,600	26,331,209	(502,391)	-1.9%
HEEC PAYMENT	1,191,990	4,429,316	7,215,200	2,785,884	62.9%
MITIGATION	1,614,263	1,654,618	1,692,344	37,726	2.3%
ADDITIONS TO RESERVES	1,881,797	2,094,284	2,283,728	189,444	9.0%
RETIREMENT FUND	7,000,000	7,315,000	11,000,000	3,685,000	50.4%
POSTEMPLOYMENT BENEFITS	5,574,152	5,962,457	6,065,490	103,033	1.7%
TOTAL INDIRECT EXPENSES	**$ 43,423,093**	**$ 50,900,497**	**$ 57,647,189**	**$ 6,746,692**	**13.3%**
STATE REVOLVING FUND	$ 84,227,800	$ 92,797,295	$ 97,811,162	$ 5,013,867	5.4%
SENIOR DEBT	287,497,793	202,299,609	273,795,833	71,496,224	35.3%
SUBORDINATE DEBT	84,788,872	169,609,844	96,339,599	(73,270,245)	-43.2%
LOCAL WATER PIPELINE CP	2,540,172	5,846,827	5,686,864	(159,963)	-2.7%
CURRENT REVENUE/CAPITAL	14,200,000	15,200,000	16,200,000	1,000,000	6.6%
CAPITAL LEASE	3,217,060	3,217,060	3,217,060	-	0.0%
DEBT PREPAYMENT	7,100,000	5,000,000	10,961,000	5,961,000	119.2%
DEBT SERVICE ASSISTANCE	(1,834,965)	(890,239)	-	890,239	-100.0%
TOTAL DEBT SERVICE	**$ 481,736,731**	**$ 493,080,395**	**$ 504,011,517**	**$ 10,931,122**	**2.2%**
TOTAL EXPENSES	**$ 758,840,561**	**$ 792,248,420**	**$ 816,671,994**	**$ 24,423,575**	**3.1%**
REVENUE & INCOME					
RATE REVENUE	$ 739,042,200	$ 761,767,000	$ 789,386,000	$ 27,619,000	3.6%
OTHER USER CHARGES	9,346,469	9,216,425	9,188,728	(27,697)	-0.3%
OTHER REVENUE	6,947,076	5,761,022	5,935,482	174,460	3.0%
RATE STABILIZATION	-	-	-	-	0.0%
INVESTMENT INCOME	16,985,523	15,503,973	12,161,784	(3,342,189)	-21.6%
TOTAL REVENUE & INCOME	**$ 772,321,268**	**$ 792,248,420**	**$ 816,671,994**	**$ 24,423,574**	**3.1%**
Rate Revenue Increase over FY20			**3.63%**		

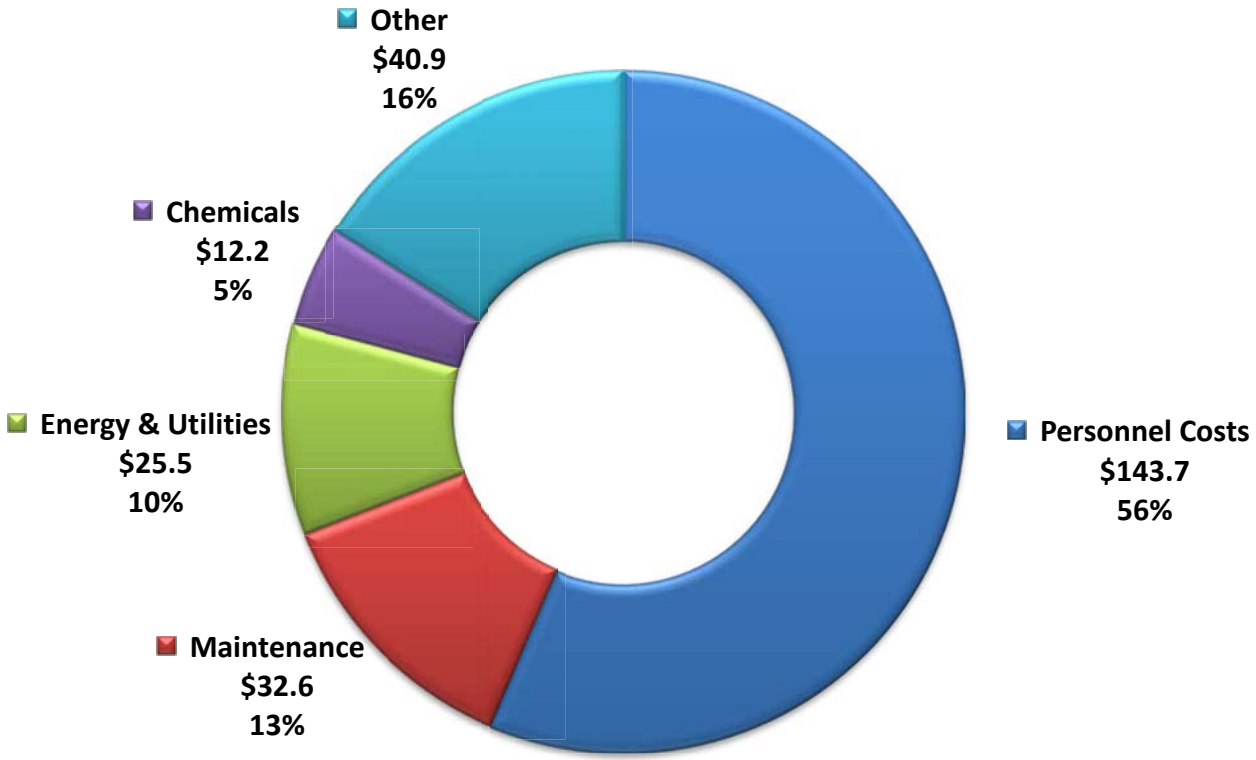
FY21 Proposed Current Expense Budget (CEB)



CEB Budget Highlights – Direct Expenses

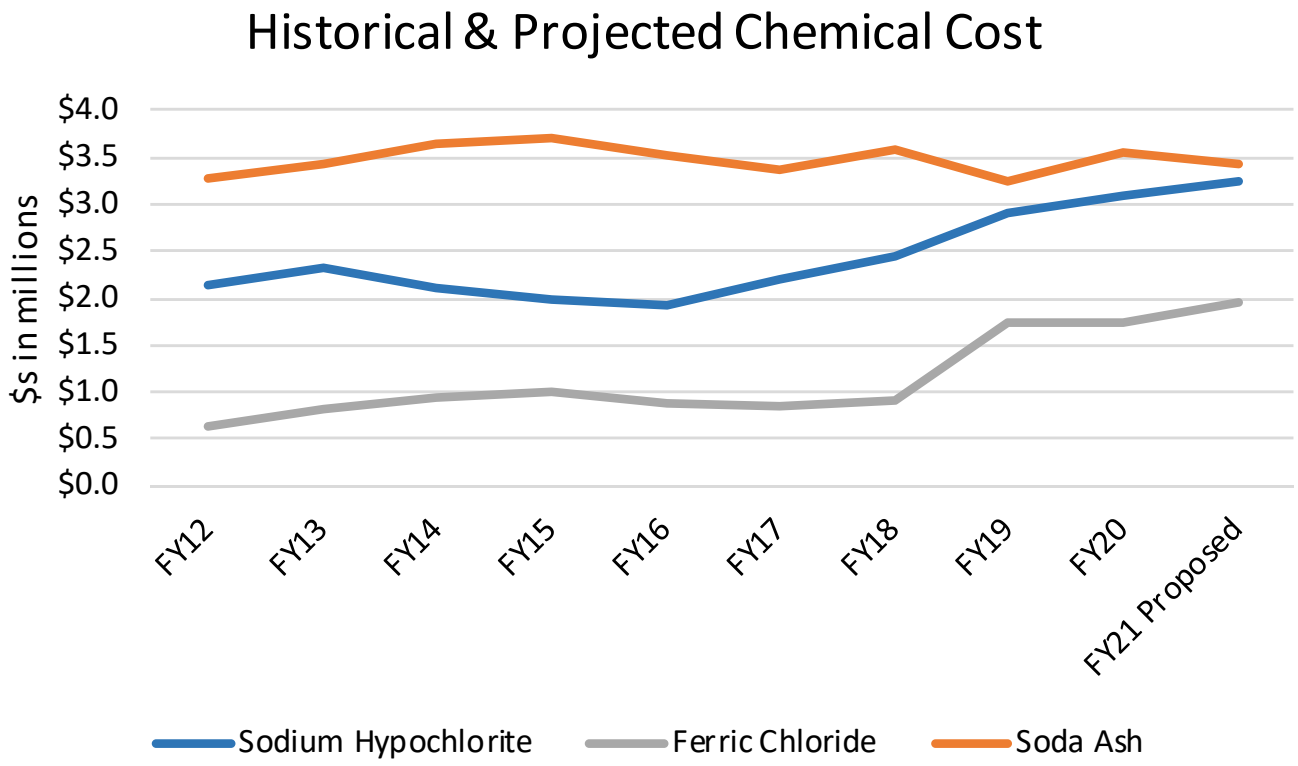
Direct Category

($s in millions)



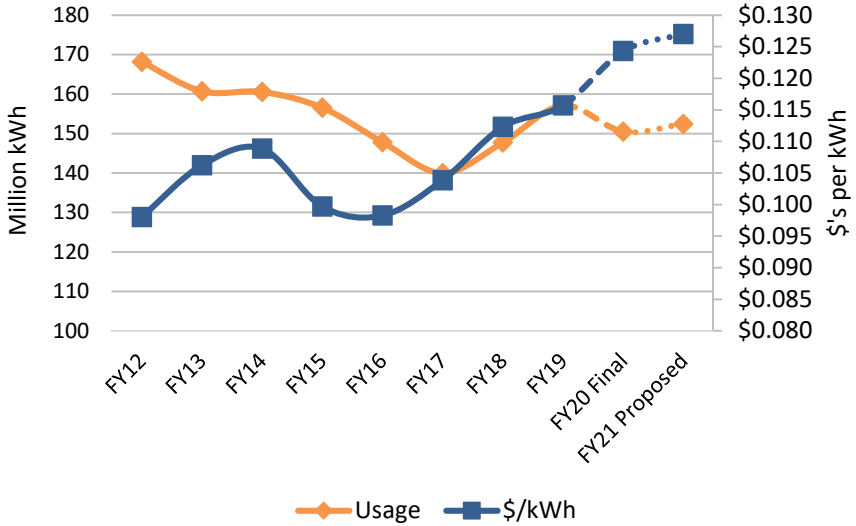
- Personnel Costs: Increase of $4.8 million or 3.5% over FY20. FY21 includes 5 additional positions for the Tunnel Redundancy Program and a 6% increase to Health Insurance premiums.
- Maintenance: Decrease of $0.1 million or 0.3% from FY20. Operations maintenance is essentially level-funded in FY21 (increase of 0.4% over FY20).
- Utilities: Increase of $1.1 million or 4.4% over FY20, driven by increases to Electricity and Diesel Fuel.
- Chemicals: Increase of $0.4 million or 3.1% over FY20 driven by increases to Ferric Chloride and Sodium Hypochlorite, partially offset by a decrease to Soda Ash.

Chemicals

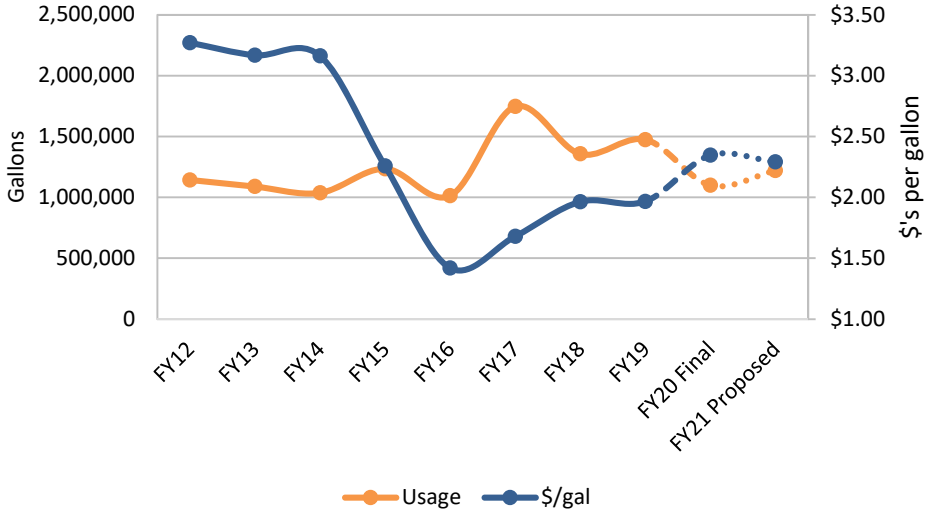

Historical & Projected Chemical Cost
$s in millions
$4.0
$3.5
$3.0
$2.5
$2.0
$1.5
$1.0
$0.5
$0.0
FY12
FY13
FY14
FY15
FY16
FY17
FY18
FY19
FY20
FY21 Proposed
Sodium Hypochlorite
Ferric Chloride
Soda Ash

Utilities

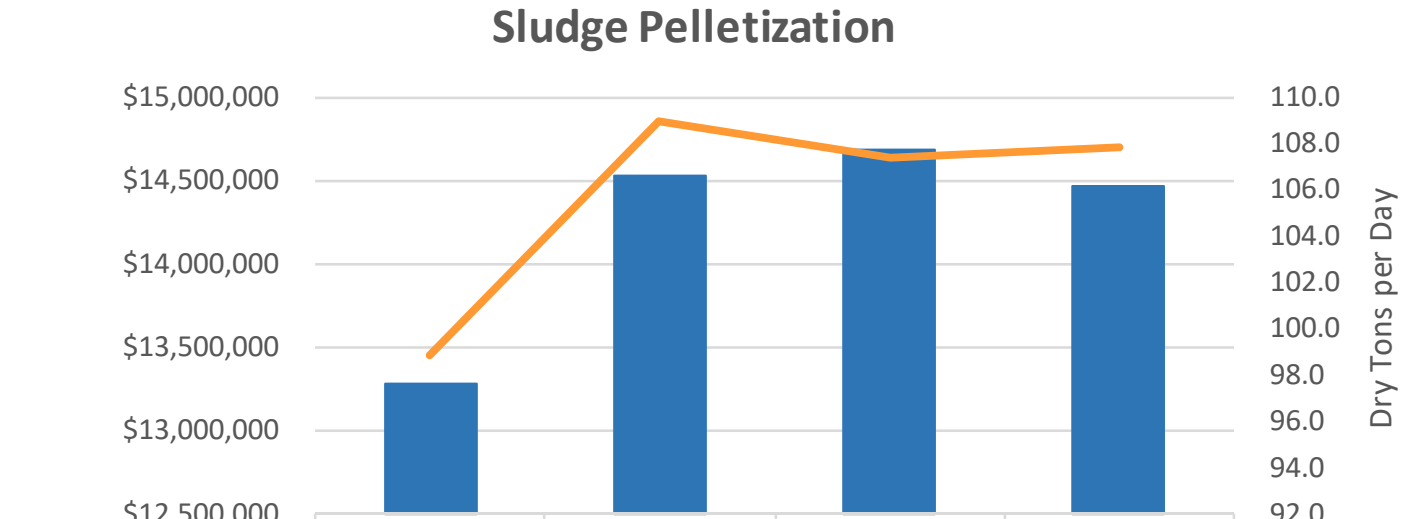
Electricity



Diesel Fuel

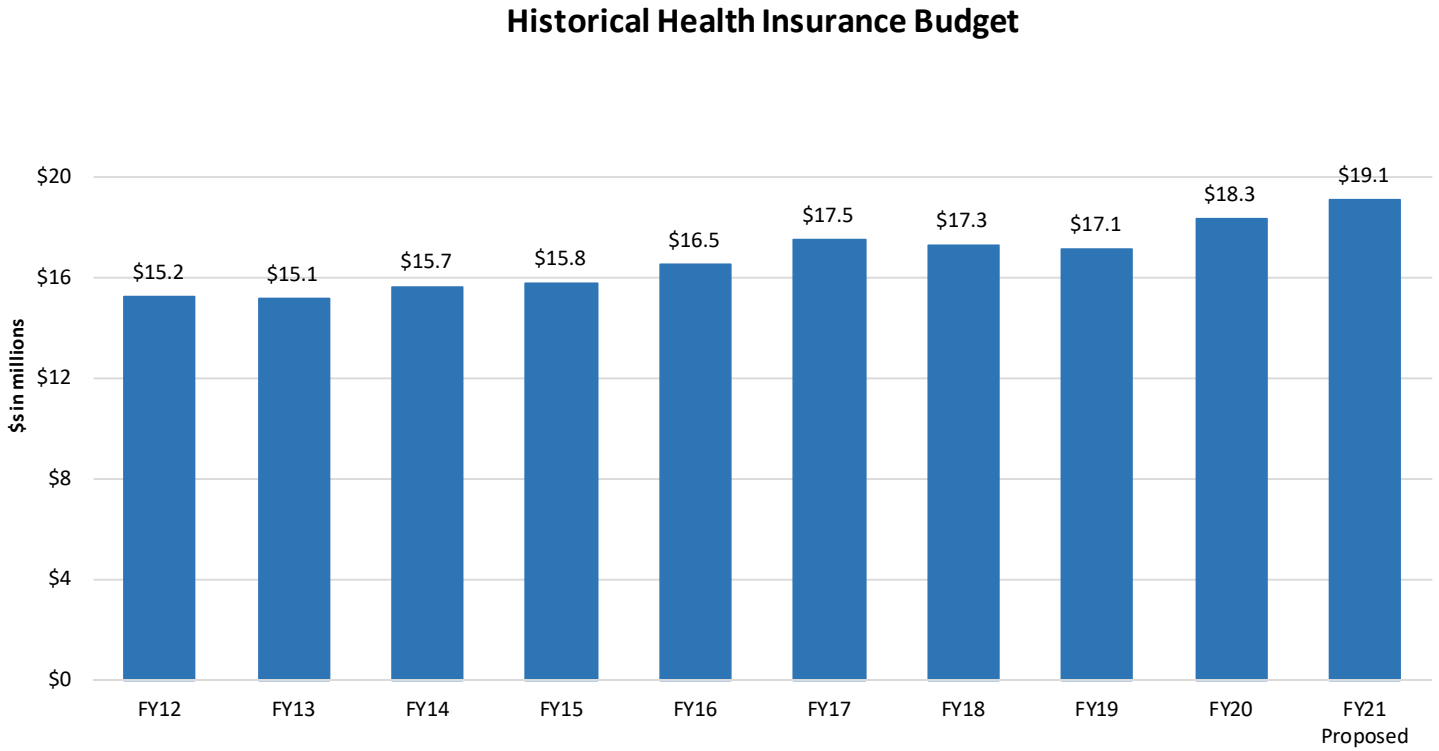


Sludge Pelletization



	FY19 Budget	FY19 Actual	FY20 Budget	FY21 Proposed
Cost	$13,292,288	$14,536,875	$14,695,197	$14,465,681
Dry Tons Per Day	98.9	109.0	107.4	107.9

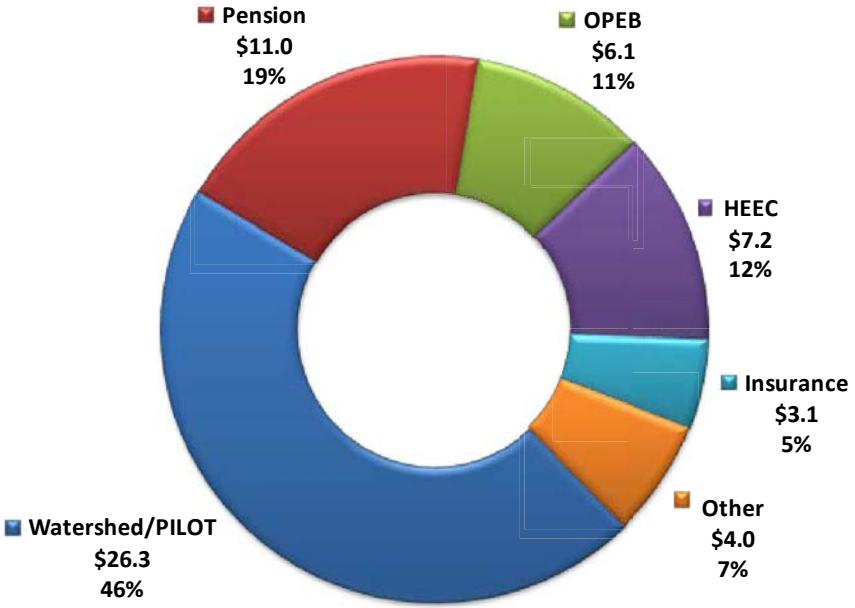
Health Insurance



CEB Budget Structure – Indirect Expenses

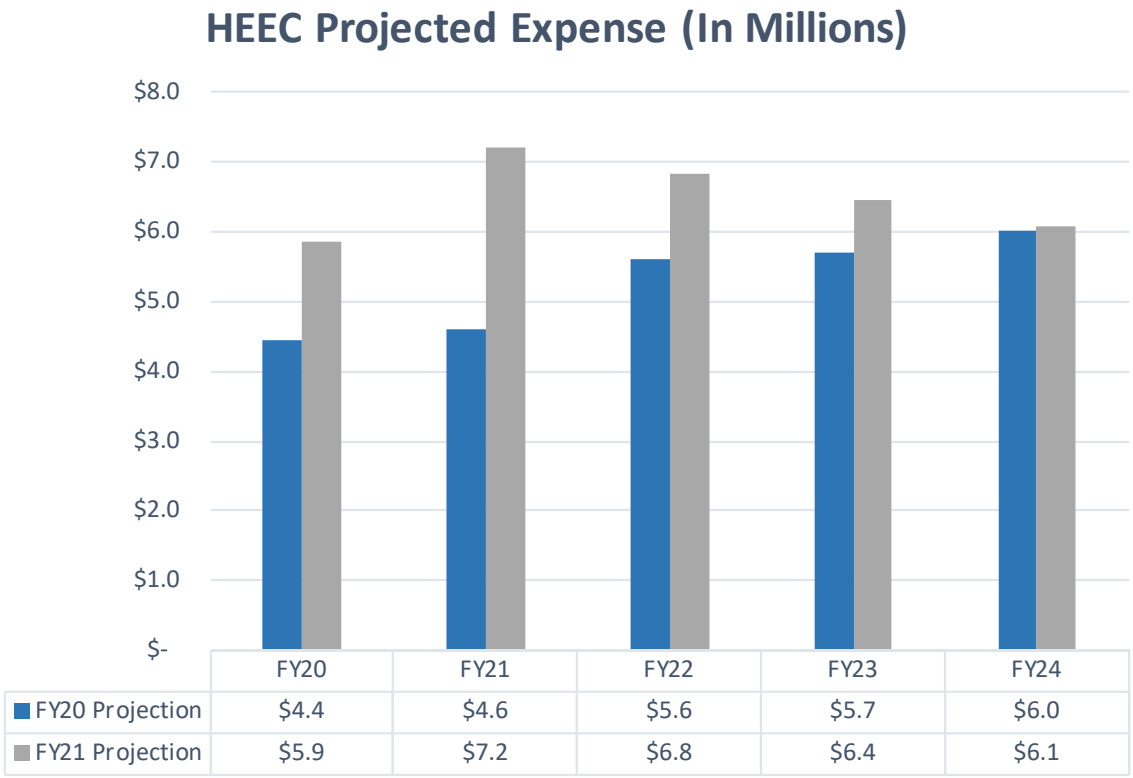
Indirect Expenses by Category

($s in millions)



- Watershed/PILOT: Decrease of $0.5 million or 1.9% from FY20. Assumes 7 FTE vacancy adjustment in FY21.
- Pension: Increase of $3.7 million or 50.4% over FY20. Per January 2018 actuarial valuation.
- HEEC: Increase of $2.8 million or 62.9% over FY20. Final costs to be determined by the DPU.
- OPEB: Increase of $0.1 million or 1.7% over FY20. Per January 2017 actuarial valuation.
- Insurance: Increase of $0.5 million or 17.2% over FY20. Premium increase of 20% based on market conditions. Claims based on 3 year average.

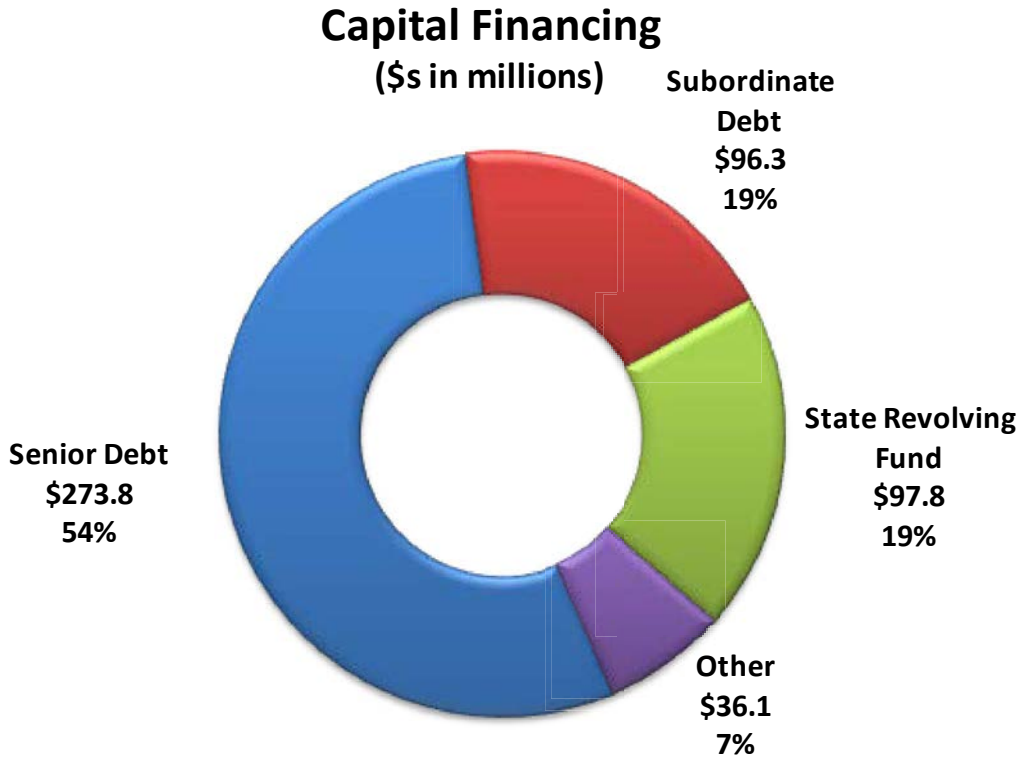
HEEC Cable



	FY20	FY21	FY22	FY23	FY24
FY20 Projection	$4.4	$4.6	$5.6	$5.7	$6.0
FY21 Projection	$5.9	$7.2	$6.8	$6.4	$6.1

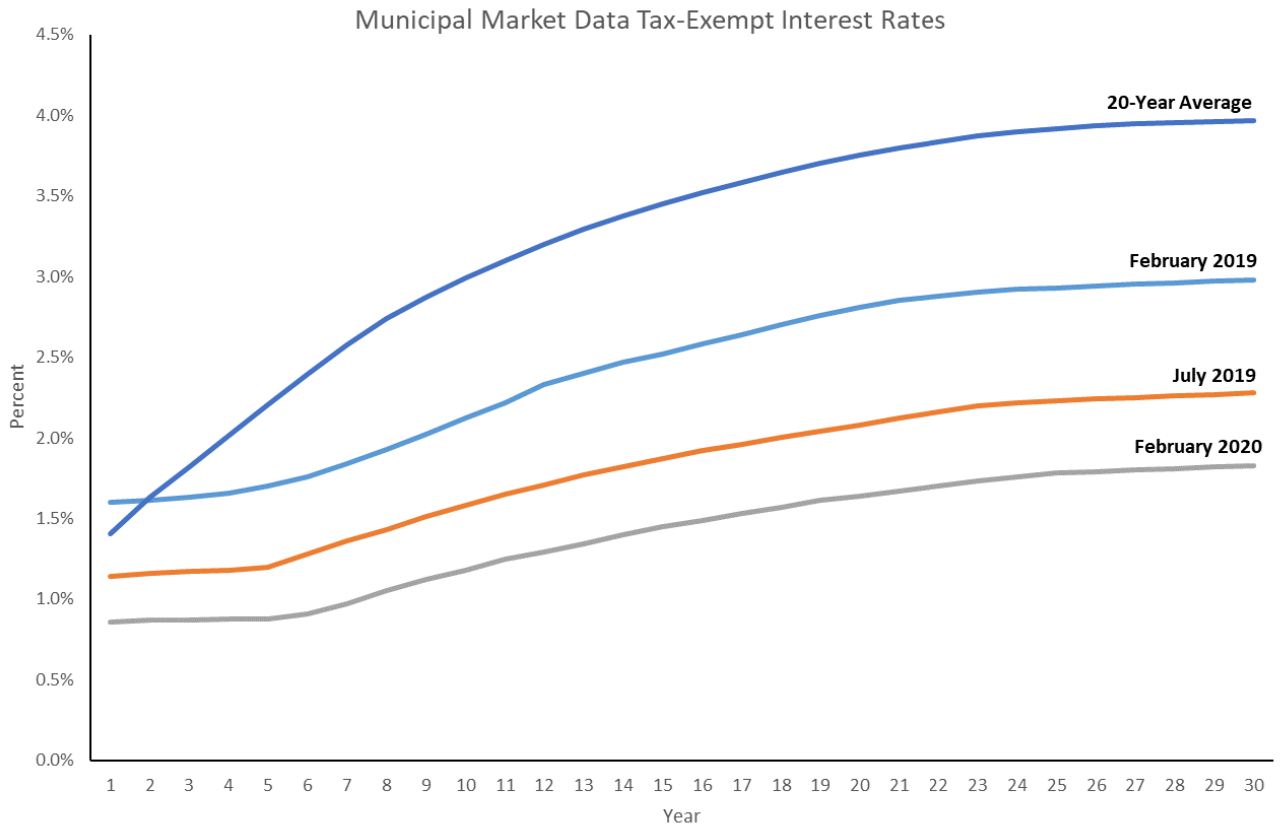
- FY20 Projection includes use of $6.5 million reserve between FY21-25.
- FY21 Projection does not include any use of the $6.5 million reserve between FY21-25.

CEB Budget Structure – Capital Finance Expenses



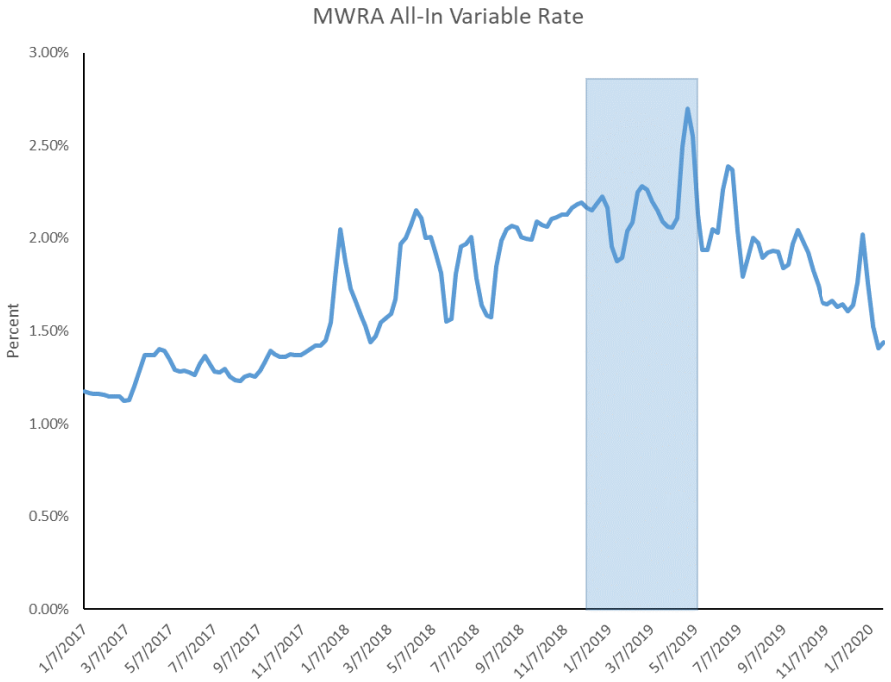
- Variable Rate Debt Assumption 3.50%
- Assumes $15.0 million defeasance in FY20 with target savings FY21-FY26
- $11.0 million prepayment of debt
- $16.2 million to Current Revenue for Capital
- No Debt Service Assistance

Long-Term Tax-Exempt Interest Rates

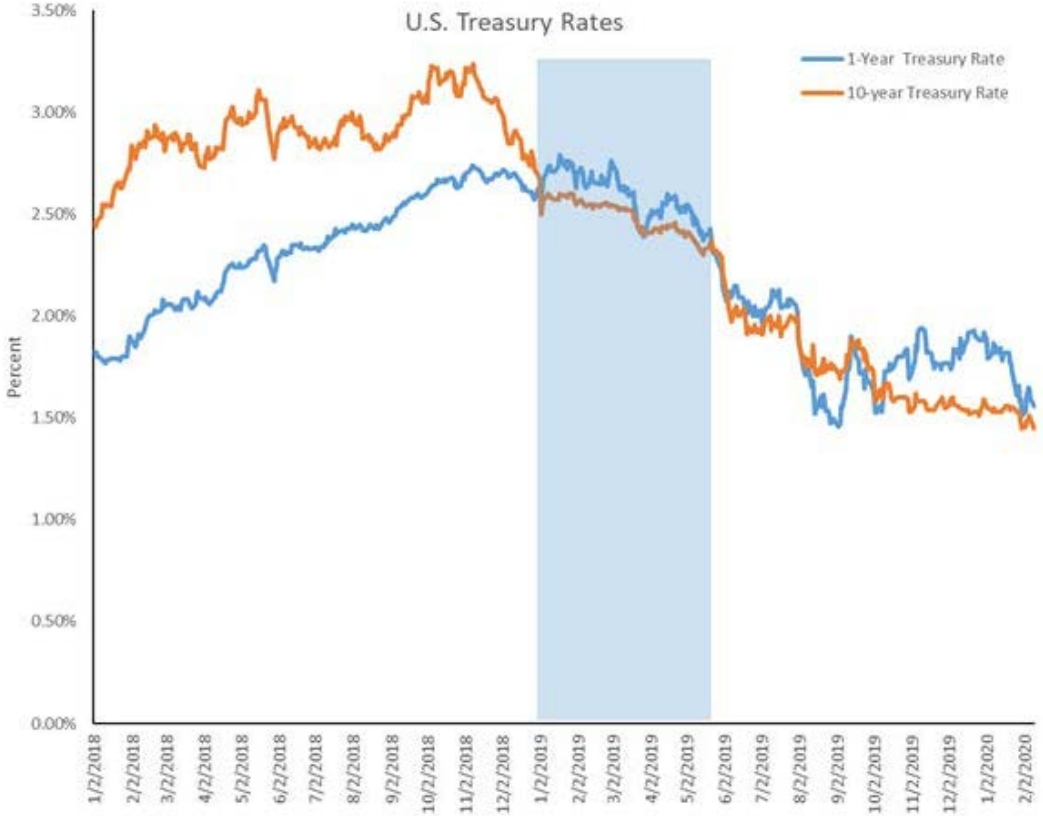


Short-Term Tax-Exempt Interest Rates

- Rates have experienced volatility with an overall downward trend.
- FY21 CEB assumes an all-in variable rate cost of 3.5%
- A 25 basis point change in variable rate debt is equal to $828,732 in FY21.



Taxable Interest Rates



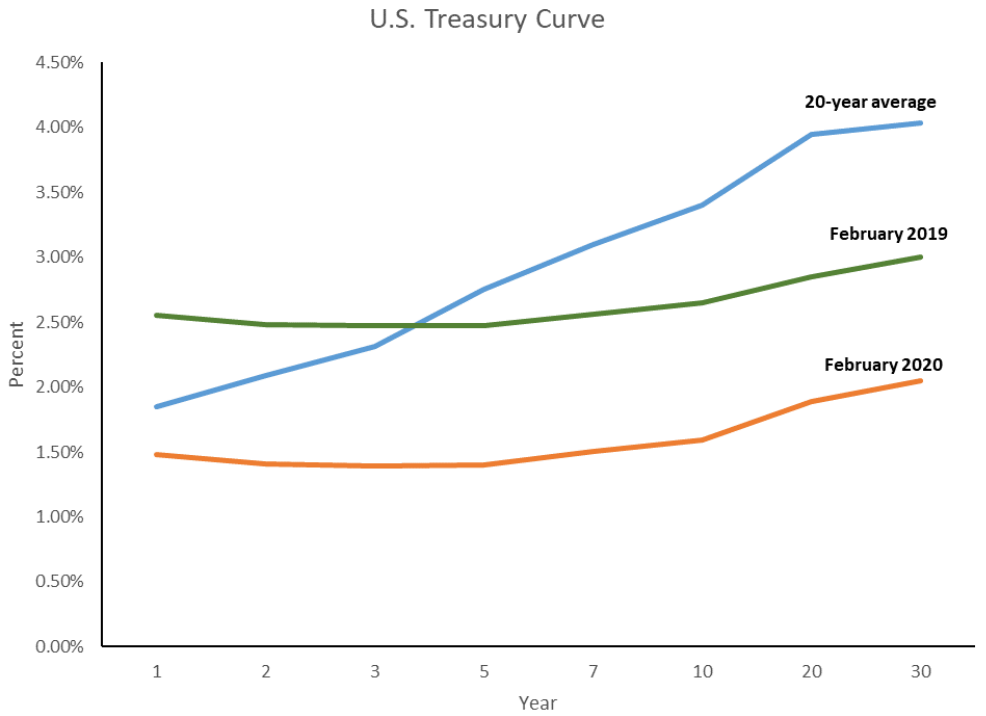
Long-Term Taxable Interest Rates

Benefit

- Low taxable rates allowed for 2019 Series F refunding ($4.7M savings in FY21).
- Low rates my allow for future taxable refundings for interest rate savings.

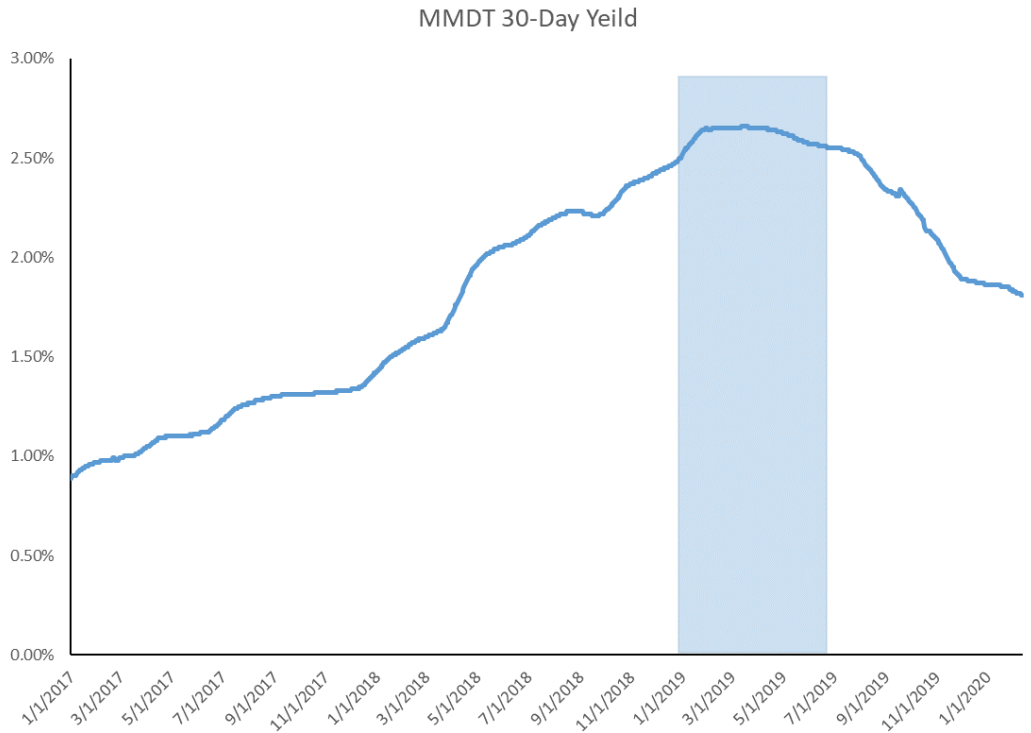
Risk

- MWRA had $88.1 million in long-term investments call during FY20 to date.
- Lower Reinvestment rates resulted in a $816,530 reduction to the FY21 projected investment income



Short-Term Taxable Interest Rates

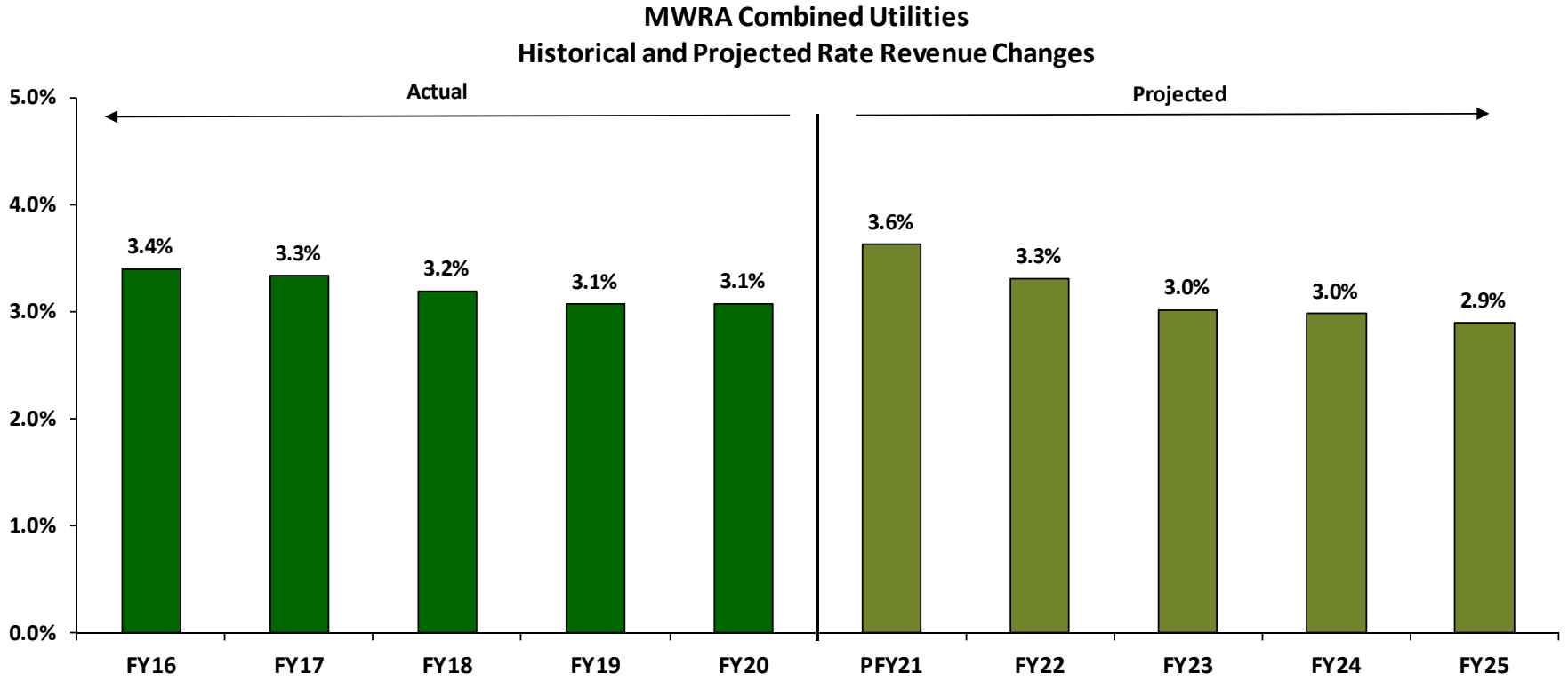
- Short-term interest rates decreased significantly during FY20.
- FY21 short-term interest income assumption is 1.50% .
- A 25 basis-points change has a $1,046,134 impact for FY21.



Rate Revenue Requirement $s in Millions

Category		FY21 Proposed
Direct Expenses	$	255.0
Indirect Expenses	$	57.6
Capital Financing	$	504.0
Total Expenditures	**$**	**816.7**
Non-Rate Revenue	$	27.3
Rate Revenue Requirement	$	789.4
Total Revenue	**$**	**816.7**
Rate Revenue Requirement		3.63%

Actual and Forecasted Rate Revenue Changes



FY21 Current Expense Budget Next Steps

- Transmit Proposed Budget to Advisory Board for 60 day review on February 19
- Public Hearing on April 14
- MWRA Board Hearing on May 27
- Staff will present Draft Final Budget on May 27
- Staff anticipate Budget adoption on June 24

Thank You


WATER RESOURCES AUTHORITY
MASSACHUSETTS

Fuel Storage and Day Tank System Replacement Gillis and Lexington Street Pumping Stations and Hayes Pump Station Contract 7554

February 19, 2020

This Project

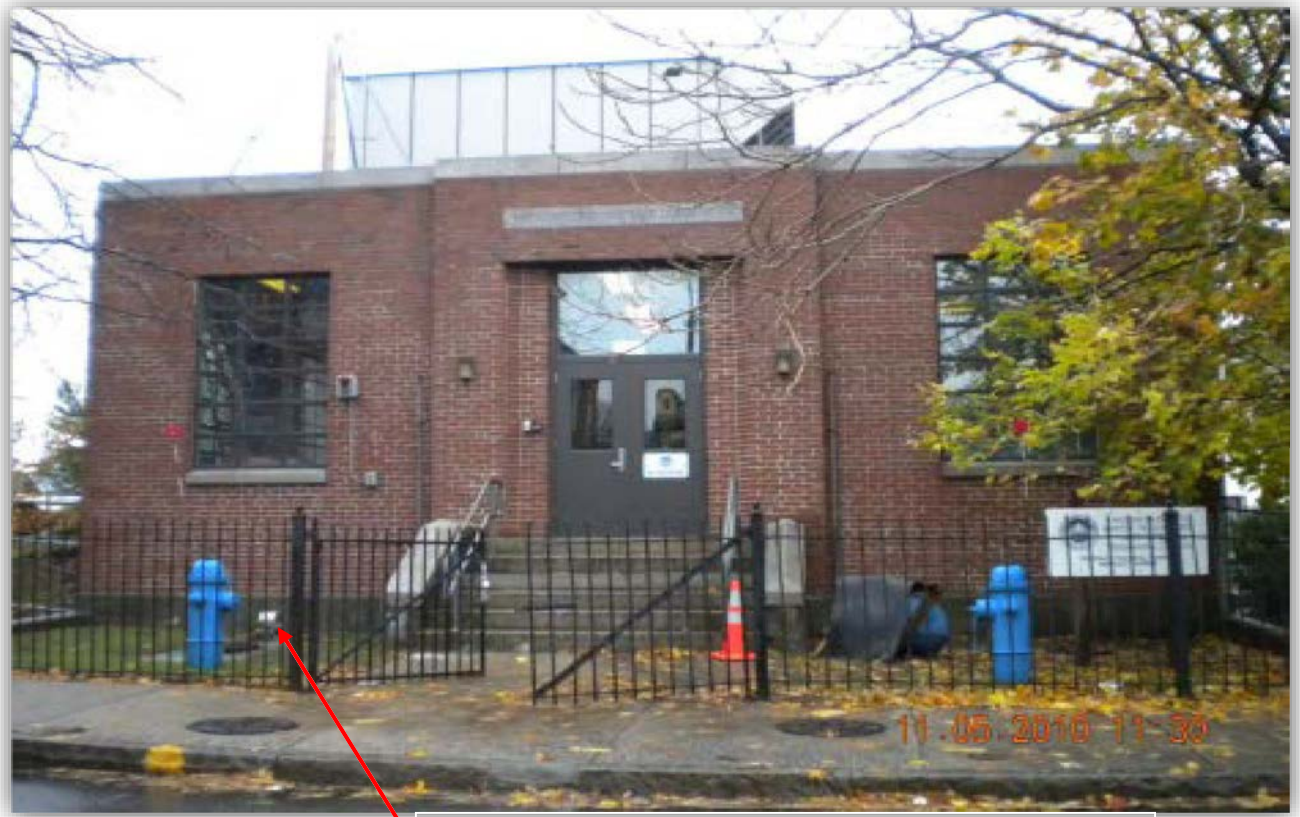
- Replace underground storage tanks
- Replace day tanks, fuel monitoring system, and fuel piping

Facility	Location	Existing Tank(s)	Type	Age
Gillis PS	Stoneham	2 @ 6,000 gallons	Double wall steel in vault	25 years
Hayes PS	Wakefield	1 @ 2,000 gallons	Single wall FRP in vault	33 years
Lexington Street PS	Waltham	1 @ 1,500 gallons	Double wall steel buried	29 years

Gillis Pumping Station

Hayes Pump Station

Lexington Street Pumping Station



1500 GALLON STEEL TANK, 29 YEARS OLD

Procurement Process

Bids Opened December 20, 2019	Bid Amount
NRC East Environmental Services, Inc.	**$1,432,799.00**
MECO Environmental Services, Inc.	$1,688,888.00
Engineer's Estimate	*$1,729,000.00*
IPC Lydon, LLC	$2,345,678.90

Construction duration 18.5 months


WATER RESOURCES AUTHORITY
MASSACHUSETTS

Oxygen Generation Facility Services, Deer Island Treatment Plant

February 19, 2020

Cryogenic Oxygen Generation Plant

- Critical to NPDES permit
- Significant Energy User
  - 11% of Deer Island electrical demand
- Complex and extensive instrumentation and controls
- Maintenance is Specialized
- Significant Level of effort
  - Over 800 Preventive Maintenance Work Orders per year

Cryo Facility Components Requiring Calibration And Service

4 Large Air Compressors (2 @ 2,000hp, 2 @ 2500 hp)

2 Molecular Sieves

2 Cold Boxes

1,000 Ton Liquid Oxygen Storage

Instrumentation & Controls

Main Air Compressor #1 Repair

- Overhaul needed
- Identified late in existing contract, just prior to bid opening
- Significant level of effort and time required
  - 6 months
  - $500,000 (pending negotiations)
- May need future change order to add funds

S587 Contract Award

Bidder	Amount
Solutionwerks	$2,220,450
Engineer's Estimate	*$2,224,950*

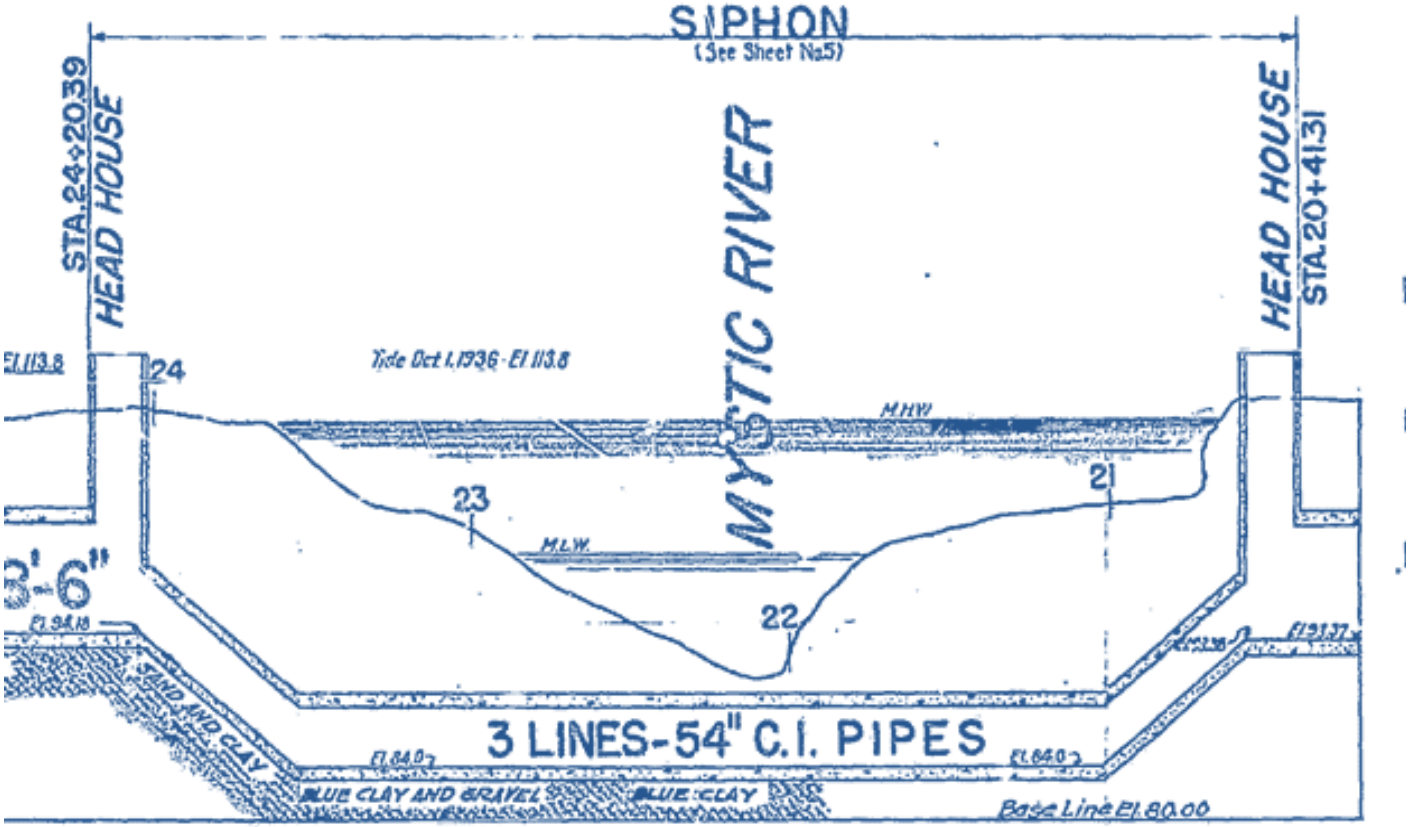
- 3-year contract


WATER RESOURCES AUTHORITY
MASSACHUSETTS

Siphon and Junction Structure Rehabilitation
Contract 6224

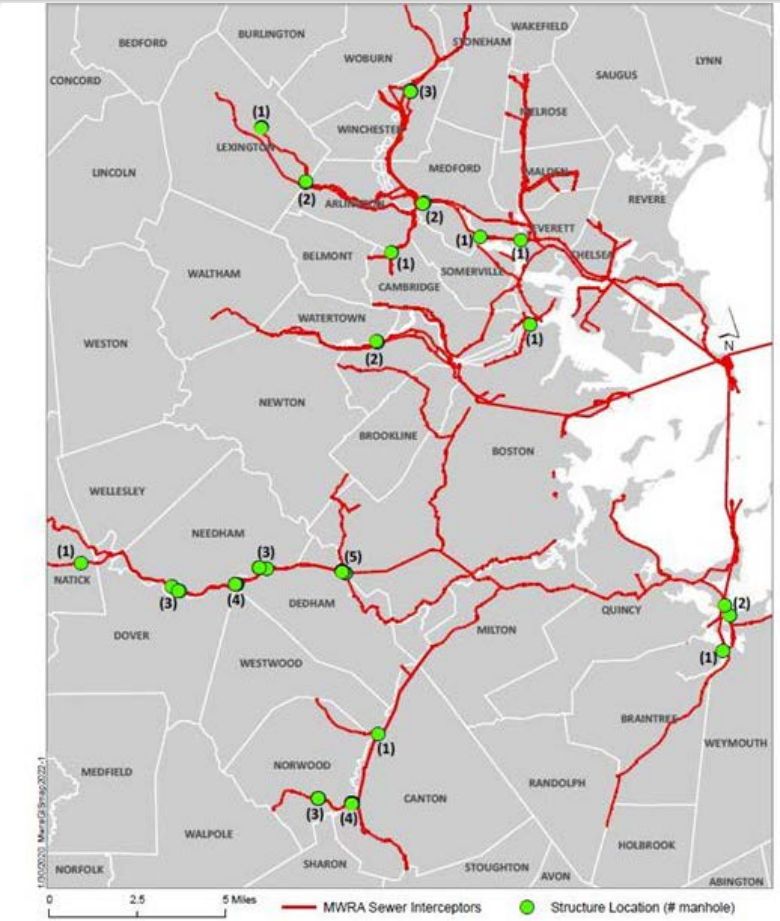
February 19, 2020

Typical Siphon Structure



Structure Locations

- 171 siphon and junction structures in MWRA system
- Prioritized based upon:
  - Internal and external structural condition
  - Access conditions
  - Flood protection (100 yr. storm + 2.5 feet)
- 41 structures Included in Phase 1
- Remaining structures to be addressed in future efforts



Project Purpose

- **Ensure long term system integrity and reliability**
- Provide flood protection (100-year storm + 2.5 feet)
- Reduce inflow into sewer system
- Improve ingress to structures (hatches, manholes, safety)
- Make structural repairs (interior and exterior)
- Improve access to structures
- Provide odor control as necessary

Example of Siphon Structure Improvements

Subject to Inflow (Dedham)

Existing Conditions (Medford)

Heavy Equipment Needed to Access

Interior Deterioration

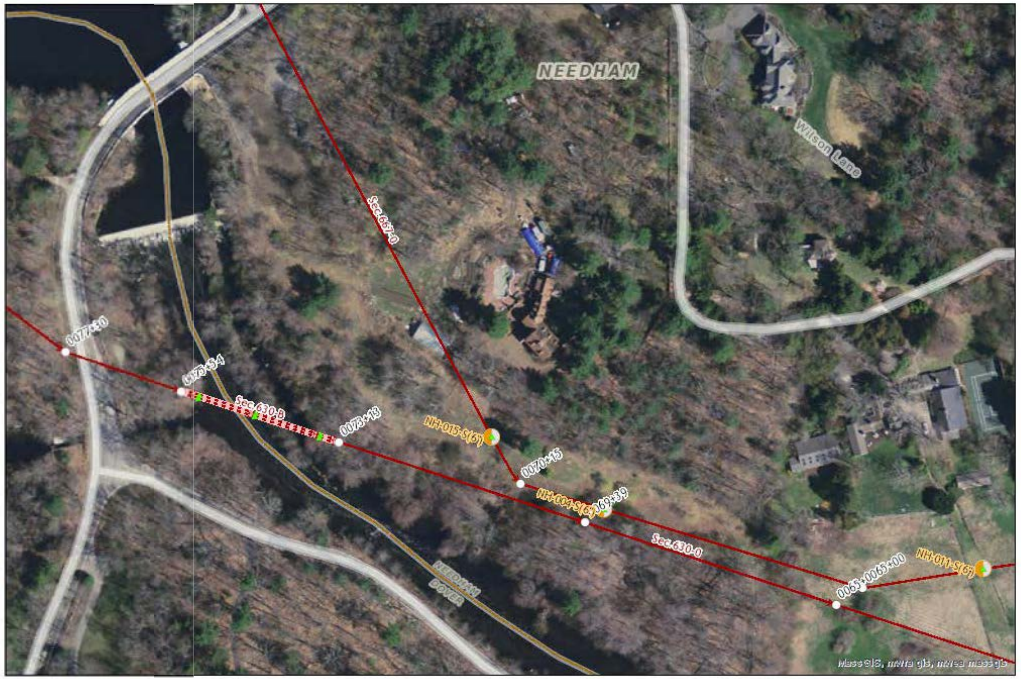
Deterioration of Structure Armoring

Braintree along Fore River

Dover along Charles River

Difficult Access (Everett)

Difficult Access (Needham)



Procurement Process

Proposer	Cost	Hours
Engineer's Estimate	*$2,124,850*	*13,669*
Kleinfelder	$2,854,552	20,651

- Total of 54 Months
  - Design: 24 Months
  - Construction: 18 Months
  - Warranty: 12 Months


WATER RESOURCES AUTHORITY
MASSACHUSETTS