UNITED STATES DISTRICT COURT
for the
DISTRICT OF MASSACHUSETTS

UNITED STATES OF AMERICA, Plaintiff, v. METROPOLITAN DISTRICT COMMISSION, et al., Defendants.	CIVIL ACTION No. 85-0489-RGS
CONSERVATION LAW FOUNDATION OF NEW ENGLAND, INC., Plaintiff, v. METROPOLITAN DISTRICT COMMISSION, Defendants.	CIVIL ACTION No. 83-1614-RGS

MWRA BIANNUAL COMPLIANCE AND
PROGRESS REPORT AS OF JUNE 15, 2020

The Massachusetts Water Resources Authority (the "Authority") submits the following biannual compliance report for the period from December 16, 2019 to June 15, 2020, and supplementary compliance information in accordance

with the Court's order of December 23, 1985, and subsequent orders of the Court.

I. Schedule Seven

There were no scheduled activities for the past six-month period on the Court's Schedule Seven.

A. Progress Report

1. Combined Sewer Overflow Program

a. Performance Assessment of Long-Term CSO Control Plan

On April 30, 2020, the Authority submitted to the United States Environmental Protection Agency ("EPA") and the Massachusetts Department of Environmental Protection ("DEP") the fourth of a series of planned semiannual progress reports on the performance assessment of its $912 million approved Long-Term Combined Sewer Overflow (CSO) Control Plan (the "LTCP"). A copy of the report is attached as Exhibit A. The Authority also provided the report to the Boston Water and Sewer Commission ("BWSC") and the cities of Cambridge, Chelsea and Somerville (together, the "CSO communities"); the Charles River Watershed Association and the Mystic River Watershed Association; and posted it to the Authority's website. The fourth semiannual report describes the Authority's rainfall and CSO data collection program, calibration and utilization of the hydraulic model, calibrated model CSO predictions for rainfall in the metering period April 15, 2018 through December 31, 2019 and the Typical Year,

and site-specific investigations into overflows at certain regulators and outfalls. The following summarizes the key aspects of this work.

The Authority collected and analyzed rainfall data from July 1, 2019 through December 31, 2019. The rainfall data supported a comparison of the collection period storms to the Typical Year and the validation of measured CSO discharges. In addition, rainfall data input to the calibrated hydraulic model to produce storm-by-storm, model-predicted CSO discharges. Further, the Authority has continued to employ CSO metering technology at 36 potentially active CSO regulators, after removing temporary meters at 21 additional locations on March 1, 2019. Temporary meters at the 36 locations will remain in place and operational until June 30, 2020. After this date, the Authority will continue to collect, analyze and use data from permanent Authority and community meters and rainfall data to support ongoing site-specific investigations and the evaluation of potential system modifications that may improve CSO performance.

As reported to the Court in the MWRA Supplemental Progress Report as of February 14, 2020, in early 2020, the Authority completed a rigorous and detailed effort of recalibrating its hydraulic model using the extensive meter data collected in 2018. The Authority then updated the model to 2019 system conditions and verified the model's CSO predictions for 2019 rainfall against 2019 meter data. The Authority was then able to simulate the performance of

the system with Typical Year rainfall and compare current CSO performance with the LTCP goals.[1]

The 2019 model's Typical Year results provide an interim assessment of system performance against the LTCP levels of control. For each of the remaining active discharge locations, Exhibit B (using data from Table 4.2 in the April 30, 2020 semiannual progress report) compares Typical Year activation frequency and volume (as predicted by the Authority's 2019 system conditions model) to the respective LTCP levels of control. Activations and volumes that, according to the updated model, exceed the LTCP goals are shaded.

The 2019 Typical Year model results reinforce the accomplishments of the Authority and its member communities in their CSO control efforts over the past three decades. The Typical Year results from the updated model show that region-wide average annual CSO discharge volume has been reduced from 3.3 billion gallons in the late 1980's to 430 million gallons today, an 87% reduction, compared to the LTCP goal of 404 million gallons, which reflects an 88% reduction. However, despite the substantial reduction in CSO discharge volumes over the last several decades, there are certain regulators and outfalls where CSO discharge estimates from the new model, indicate higher CSO activity than the LTCP goals. The Authority continues to investigate these areas, in part using

[1] The Authority has completed calibration investigations noted in the Supplemental Progress Report as of February 14, 2020, for Outfall MWR003 on Alewife Brook.

the data collected from the temporary metering program since April 2018.[2] The Authority has closely coordinated the investigations with its CSO communities, which continue to provide important support. The investigations include identifying the current site-specific wastewater system conditions that, according to the updated model, may be contributing to the higher CSO activity. The Authority is evaluating and recommending maintenance protocols or system adjustments to further reduce CSO discharges. As documented in previous reports, certain maintenance and system adjustments have been implemented and incorporated into the hydraulic model. Additional system adjustments may be implemented by the Authority and the CSO communities during the performance assessment if determined to be effective for CSO control without causing adverse impacts (e.g., unacceptable wastewater levels in upstream or downstream systems).

Earlier this spring, BWSC substantially completed an extensive sediment cleaning contract involving the South Boston Interceptor – North Branch (SBI-NB) and tributary connecting sewers. The Authority is currently using post-cleaning meter data and the hydraulic model to evaluate how removal of the sediments has affected CSO discharges from the SBI-NB system to the Dorchester Brook Conduit, which discharges to the Fort Point Channel at Outfall BOS070.

[2] Section 5 of the April 30, 2020 semiannual progress report details the site-specific overflow activity investigations.

The following provides examples of the investigations that are also being conducted by the Authority and the CSO communities:

- In East Boston, BWSC has implemented a more aggressive program to inspect and clean nozzle restrictions in the connections between BWSC CSO regulators and the Authority's East Boston Branch Sewer. One of these nozzles – the nozzle at regulator RE003-12 related to Outfall BOS003 – has been found to be prone to plugging, which can impede the movement of flow into the Authority's interceptor and increase CSO discharges. At the same time, the Authority and BWSC are coordinating hydraulic model evaluations of the CSO benefits of replacing nozzle restrictions and moving forward with BWSC's phased East Boston sewer separation plans.
- The City of Cambridge is working to complete its partial sewer separation improvements that will reduce stormwater entering the City's and Authority's sewer systems - and are predicted to reduce CSO discharges from the Cottage Farm Facility.
- Lastly, the Authority is pursuing evaluations and potential design for repair or replacement of a leaking tide gate downstream of the Somerville Marginal Facility. Tidal waters leaking into the outfall pipe can consume some of the pipe's available storage volume, with the potential to shift a small amount of CSO discharge from Outfall MWR205 to Outfall SOM007A/MWR205A on the Upper Mystic River basin.

Further CSO mitigation projects that are required by the CSO variances for the Lower Charles River and the Alewife Brook/Upper Mystic River are discussed in the next section.

These investigations are important to ensuring hydraulic conditions and system operations that best mitigate or prevent CSOs. As explained in the attached semiannual report, there are some uncertainties that exist in the modeling, making model results approximations, although they are still useful. Many of the inputs to the model are themselves best estimates, including the parameters that define the hydraulic condition of pipes and structures (e.g., sediment levels, pipe roughness, and head losses at transitions). With respect to storm-by-storm modeling, the 20 rain gauges supporting the modeling effort provide a helpful, but not complete, characterization of the spatial variation of rainfall.

The Authority's hydraulic model has been utilized over the past three decades to track CSO performance as the Authority and the CSO communities constructed the LTCP projects. Over the years, the Authority has regularly made adjustments to the model to reflect changes in physical system conditions resulting from CSO project implementation efforts or improved system operations and understanding. However, during that time, a complete system review and full model recalibration had not been conducted. Model predictions over the years showed positive trends towards meeting the LTCP goals for volumes and activations, which have not changed since the updated agreement in 2006. In fact, as Exhibit C demonstrates, in 2017 and 2018 the model

predicted that for the sum of all of the volumes, and in several basins (Alewife Brook, Upper Mystic River, Upper Inner Harbor, Fort Point Channel, Reserved Channel, Back Bay Fens), the Authority was meeting established LTCP goals. The Authority's recent model calibration now signals some additional locations where volumes or activations are not predicted to be met.

Specifically, the Typical Year basin-by-basin summary graphs, found in Exhibit C, show how earlier versions of the model predicted CSO discharge volumes below LTCP goals for some receiving waters, where today, after extensive recalibration, the model predicts some of those levels to be higher. This change in model predictions and progress toward LTCP goals are also being tracked in the summary table found in Exhibit B, which includes the hydraulic model results for 1992 system conditions as well as 2019 system conditions before the recent hydraulic model calibration.

Despite these variations, water quality monitoring data to date demonstrate water quality improvements in-line with the Authority's CSO planning projections. Looking ahead, receiving water model simulations in the next year will be critical in demonstrating that the objectives of the LTCP have been satisfied for the CSO variance waters. The Authority expects that the results of the water quality assessment will demonstrate that the relative impact of the remaining CSO discharges are small. Site-specific investigations, maintenance, and system adjustments, however, will continue as the Authority and the CSO communities continue to comply with their NPDES permits and the CSO Nine Minimum Controls. As Exhibit C shows, despite the substantial

investments that have been made, more may be needed at certain locations in order for LTCP goals and, ultimately, state water quality standards to be met. As the Authority continues to evaluate these locations, consideration should be given to whether further investments in CSO mitigation will result in meaningful water quality improvements and whether emphasis on non-CSO contributions of pollution would be more cost-effective.

b. CSO Water Quality Standards Variances

On August 30, 2019, DEP issued CSO variances to Massachusetts Surface Water Quality Standards for the Lower Charles River/Charles Basin and the Alewife Brook/Upper Mystic River, each for five years to August 31, 2024.[3] US EPA Region 1 approved these variances on May 29, 2020. In less than a year's time since the Variances were issued, the Authority has made substantial progress on new conditions that were included in the Variances. The Authority and the communities have been consistent in their implementation of the Variance requirements since the first variance in 1998. Specific updates on efforts that are new or continuing since the last Court submittal are included below.

The Variance requirements include the Alewife Brook Pump Station Optimization Evaluation Project, which the Authority commenced in April 2020, as well as the Somerville Marginal CSO Reduction Project Study and Preliminary

[3] DEP issued the Charles River variance to the Authority and the City of Cambridge and issued the Alewife Brook/Upper Mystic River variance to the Authority and the cities of Cambridge and Somerville.

Design and the CSO System Optimization evaluations for Alewife Brook and Lower Charles River Basin Project, both of which the Authority will commence by December 2020. On March 18, 2020, the Authority's Board of Directors approved a $1.4 million scope of work amendment to the CSO performance assessment contract with AECOM Technical Services, Inc. ("AECOM"), increasing the contract amount to $5.3 million, to support these Variance requirements as well as other CSO LTCP related efforts.

As part of this recently approved work, AECOM will develop technical memoranda with findings and recommendations for all three study areas identified above and conceptual level plans and cost estimates for those project elements requiring construction. The Alewife Brook Pump Station evaluations will include studying and testing the Authority's ability to maximize the enhanced pumping capacity at the recently rehabilitated station with operational adjustments that may reduce CSO activations and volumes at upstream CSO outfalls that discharge to the Alewife Brook. If model predictions indicate improved performance, the operational adjustments will be tested in field trials. For the Somerville Marginal CSO Facility project, AECOM will evaluate alternatives to reduce CSO discharge frequency and volumes at the facility, including relief of the dry weather connection from the City of Somerville's CSO regulator RE071 to the Authority's Somerville-Medford Branch Sewer and relocation of a 72-inch MassDOT I-93 storm drain line from upstream to downstream of the Somerville-Marginal facility. Lastly, AECOM will conduct system optimization evaluations at the remaining regulators tributary to CSO

outfalls discharging to the Alewife Brook and Charles River watersheds to determine possible improvements to further reduce CSOs. The CSO system optimization evaluations will include using the calibrated hydraulic model and coordinating technical evaluations of regulator adjustments with the cities of Cambridge and Somerville and BWSC. All three projects will culminate with reports that will document findings and recommendations.

AECOM is developing receiving water models to assess the impact of CSOs on water quality in the Charles River and Alewife Brook/Mystic River. The models will also provide information about impacts of stormwater and boundary conditions. Specifically, the models will predict resulting *Enterococcus* and *E. coli* counts during the 3-month and 1-year storms as well as the Typical Year. In the next two months, AECOM will submit a preliminary Model Development and Calibration Report to the Authority. In the meantime, as weather allows, Authority and community staff may collect additional stormwater and untreated CSO data, consistent with the DEP and EPA approved sampling plan, which supports model development. The Authority will begin reviewing early results of the receiving water modeling in February 2021 and, at that point, the Authority and its partners will have a firmer understanding of CSO versus non-CSO impacts to water quality. In the meantime, EPA and DEP have recently issued the Mystic River Watershed Alternative Total Maximum Daily Load (TMDL) Development for Phosphorus Management – Final Report. This TMDL study is aimed not at CSOs, but at stormwater management efforts in the watershed in order to reduce phosphorus loadings. The study acknowledges, however, that

stormwater controls will also achieve additional benefits such as reducing other pollutants, including bacteria. The reductions described in the TMDL study will be important complements to the decades of CSO work done by the Authority and the Communities in the Mystic River Watershed.

The variances also require MWRA to develop a subscriber-based CSO Alert Notification system available to the public and a public website with information about CSO discharges in the variance waters. The notification system and website must provide details about the discharge location and amount, timing, potential impacts, and public health advisories.

As part of this effort, the Authority is planning to expand the information on its website to include all CSOs permitted to MWRA. Since September 2016, the Authority has been reporting on activations at its CSO treatment facilities, as well as any overflows through BWSC outfalls associated with the Authority's CSO storage facilities at Little Mystic Channel (Outfall BOS019) and the South Boston beaches. The website will also include other information required by the variances, such as instructions for signing up for discharge alerts, a table that lists CSO activations, and links to the community and Authority websites with more information. The variances require completion of these notification programs by December 2020. Given the high importance of making this information available to the public, the Authority has prioritized the work and as of this filing is poised to launch the website and subscriber system well in advance of the deadline.

As is also required by the variances, on May 28, 2020 the Authority held, by remote participation, a public briefing on its CSO Post-Construction Monitoring and Performance Assessment. The briefing addressed the progress of the CSO performance assessment as reported in semiannual progress reports, including progress reports issued on October 31, 2019 and April 30, 2020, and provided opportunity for questions and comments. Approximately 40 people participated, and the briefing materials were made available on the Authority's webpage.

Future biannual compliance and progress reports will continue to describe the Authority's investigations and mitigation efforts and will summarize the latest hydraulic model and receiving water model predictions of Typical Year discharges and water quality impacts of remaining CSOs. As the Authority continues to coordinate with and update its state and federal partners on progress made, it will also continue to explore the various Clean Water Act tools that may offer regulatory certainty in the future. The Authority is working with other utilities across the country that are nearing or contemplating completion of CSO LTCPs to evaluate approaches to post-LTCP compliance with water quality standards. Options must acknowledge that even though a LTCP has been completed consistent with court ordered requirements, state water quality standards may not be met as a result of stormwater or other non-CSO contributions when only *de minimus* CSO discharges remain. The Authority is now a year and a half away from its final report to the Court, which will fully detail the outcome of its performance assessment. The Authority anticipates

that its December 2020 compliance and progress report will include ample detail to forecast whether the LTCP goals will be achieved at certain locations and the potential next steps to be taken by and with the regulatory agencies for those locations.

Finally, the Authority would be remiss in not addressing the fact that as of this filing the world is battling a global pandemic – the COVID-19 virus. The Authority's focus during these unprecedented times has been to continue to deliver safe drinking water, to collect and treat wastewater, and to maintain its regulatory and business functions, all while preserving the health and safety of its workforce. In response to the COVID-19 virus, the Authority implemented its pandemic plan, responded to pandemic related laws, orders and guidance, modified its work practices and schedules for field crews, and transitioned over 400 employees to telework as the rest of the Authority's 1150 employees have been operating as scaled-back crews on alternating work weeks. With employee health and safety as the top priority, the Authority has continued to operate its facilities without any impact to customer service and has continued to meet or exceed environmental requirements. As a result of its careful planning and preparation, early on the Authority was able to donate 6,000 N95 masks to the Massachusetts Emergency Management Agency for use by health care workers. The Authority has also worked closely with both EPA and DEP staff throughout the pandemic. The Authority has assisted EPA and DEP in the receipt and distribution of masks to other water and wastewater utilities around the Commonwealth. With respect to efforts related to implementation of its CSO

LTCP, there have been some challenges such as reduced ability to collect stormwater and untreated CSO outfall samples because of temporary staffing reductions and limitations on employees working closely in confined areas. Communities have also faced construction delays. Yet, overall, the Authority's progress has been largely unimpeded, and an update on its status and workforce will be provided in the next submittal to the Court.

Respectfully submitted,

/s/ Jonathan M. Ettinger

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Dated: June 18, 2020

CERTIFICATE OF SERVICE

I hereby certify that a true and accurate copy of this document, which was filed via the Court's ECF system, will be sent electronically by the ECF system to the registered participants as identified on the Notice of Electronic Filing (NEF) and electronic copies will be sent to those indicated as non-registered participants (excluding Lawrence Liebesman and Joseph McGovern, who no longer work at the U.S. Department of Justice) on June 18, 2020.

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Dated: June 18, 2020

Exhibit A:

http://www.mwra.com/cso/pcmpa-reports/04_070119-123119.pdf

EXHIBIT B

EXHIBIT B

PRELIMINARY TYPICAL YEAR MODEL SIMULATION RESULTS FOR BASELINE 1992 CONDITIONS, 2019 CONDITIONS AND LONG-TERM CSO CONTROL PLAN (LTCP)

Outfall	1992 SYSTEM CONDITIONS[1]		2019 SYSTEM CONDITIONS (Before Model Calibration)		2019 SYSTEM CONDITIONS (After Model Calibration)		LONG TERM CONTROL PLAN[2]	
	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
ALEWIFE BROOK								
CAM001	5	0.15	1	0.03	1	0.02	5	0.19
CAM002	11	2.73	0	0.00	0	0.00	4	0.69
MWR003	6	0.67	4	0.79	3	1.60	5	0.98
CAM004	20	8.19	Closed	N/A	Closed	N/A	Closed	N/A
CAM400	13	0.93	Closed	N/A	Closed	N/A	Closed	N/A
CAM401A	18	2.12	2	0.49	10	3.59	5	1.61
CAM401B			5	0.58	5	0.73	7	2.15
SOM001A	10	11.93	4	2.38	6	3.60	3	1.67
SOM001	0	0.00	Closed	N/A	Closed	N/A	Closed	N/A
SOM002	0	0.00	Closed	N/A	Closed	N/A	N/I[4]	N/I[4]
SOM002A	0	0.00	Closed	N/A	Closed	N/A	Closed	N/A
SOM003	0	0.00	Closed	N/A	Closed	N/A	Closed	N/A
SOM004	5	0.09	Closed	N/A	Closed	N/A	Closed	N/A
TOTAL		**26.81**		**4.27**		**9.54**		**7.29**
UPPER MYSTIC RIVER								
SOM007A/MWR205A	9	7.61	2	1.85	6	4.95	3	3.48
SOM006[4]	0	0.00	Closed	N/A	Closed	N/A	N/I[4]	N/I[4]
SOM007	3	0.06	Closed	N/A	Closed	N/A	Closed	N/A
TOTAL		**7.67**		**1.85**		**4.95**		**3.48**
MYSTIC/CHELSEA CONFLUENCE								
MWR205 (Somerville Marginal Facility)	33	120.37	22	67.91	39	109.63	39	60.58
BOS013	36	4.40	4	0.13	10	0.74	4	0.54
BOS014	20	4.91	4	0.45	8	1.45	0	0.00
BOS015	76	2.76	Closed	N/A	Closed	N/A	Closed	N/A
BOS017	49	7.16	0	0.00	6	0.32	1	0.02
CHE002	49	2.51	Closed	N/A	Closed	N/A	4	0.22
CHE003	39	3.39	0	0.00	0	0.00	3	0.04
CHE004	44	18.11	1	0.10	7	1.01	3	0.32
CHE008	35	22.35	7	1.83	11	3.81	0	0.00
TOTAL		**185.96**		**70.42**		**116.96**		**61.72**
UPPER INNER HARBOR								
BOS009	34	3.60	3	0.10	10	0.70	5	0.59
BOS010	48	11.83	6	0.46	7	0.77	4	0.72
BOS012	41	7.90	7	0.55	13	1.34	5	0.72
BOS019	107	4.48	1	0.20	1	0.09	2	0.58
BOS050	No Data		Closed	N/A	Closed	N/A	Closed	N/A
BOS052	0	0.00	Closed	N/A	Closed	N/A	Closed	N/A
BOS057	33	14.71	2	0.58	2	1.37	1	0.43
BOS058	17	0.29	Closed	N/A	Closed	N/A	Closed	N/A
BOS060	64	2.90	1	0.02	2	0.17	0	0.00
MWR203 (Prison Point)	28	261.85	17	239.18	17	241.71	17	243.00
TOTAL		**307.56**		**241.09**		**246.15**		**246.04**
LOWER INNER HARBOR								
BOS003	28	18.09	18	11.80	9	6.13	4	2.87
BOS004	34	3.43	5	0.28	2	0.06	5	1.84
BOS005	4	10.23	0	0.00	0	0.00	1	0.01
BOS006	17	1.21	Closed	N/A	Closed	N/A	4	0.24
BOS007	34	3.93	Closed	N/A	Closed	N/A	6	1.05
TOTAL		**36.89**		**12.08**		**6.19**		**6.01**
CONSTITUTION BEACH								
MWR207	24	4.00	Closed	N/A	Closed	N/A	Closed	N/A
TOTAL		**4.00**		**N/A**		**N/A**		**N/A**

EXHIBIT B

PRELIMINARY TYPICAL YEAR MODEL SIMULATION RESULTS FOR BASELINE 1992 CONDITIONS, 2019 CONDITIONS AND LONG-TERM CSO CONTROL PLAN (LTCP)

Outfall	1992 SYSTEM CONDITIONS[1]		2019 SYSTEM CONDITIONS (Before Model Calibration)		2019 SYSTEM CONDITIONS (After Model Calibration)		LONG TERM CONTROL PLAN[2]	
	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
FORT POINT CHANNEL								
BOS062	8	4.15	0	0.00	4	0.97	1	0.01
BOS064	14	0.99	1	0.02	0	0.00	0	0.00
BOS065	11	3.08	1	0.62	3	0.71	1	0.06
BOS068	4	0.62	0	0.00	0	0.00	0	0.00
BOS070	4	281.62						
BOS070/DBC			4	3.30	7	6.21	3	2.19
MWR215 (Union Park)			11	33.85	10	26.66	17	71.37
BOS070/RCC			0	0.00	0	0.00	2	0.26
BOS072	21	3.62	Closed	N/A	Closed	N/A	0	0.00
BOS073	23	4.73	0	0.00	0	0.00	0	0.00
TOTAL		**298.81**		**37.78**		**34.55**		**73.89**
RESERVED CHANNEL								
BOS076	65	65.94	6	1.19	2	0.22	3	0.91
BOS078	41	14.84	0	0.00	0	0.00	3	0.28
BOS079	18	2.10	0	0.00	0	0.00	1	0.04
BOS080	33	6.21	3	0.08	0	0.00	3	0.25
TOTAL		**89.09**		**1.27**		**0.22**		**1.48**
NORTHERN DORCHESTER BAY								
BOS081	13	0.32	0 / 25 year	N/A	0 / 25 year	N/A	0 / 25 year	N/A
BOS082	28	3.75	0 / 25 year	N/A	0 / 25 year	N/A	0 / 25 year	N/A
BOS083	14	1.05	Closed	N/A	Closed	N/A	0 / 25 year	N/A
BOS084	15	3.22	0 / 25 year	N/A	0 / 25 year	N/A	0 / 25 year	N/A
BOS085	12	1.31	0 / 25 year	N/A	0 / 25 year	N/A	0 / 25 year	N/A
BOS086	80	3.31	0 / 25 year	N/A	0 / 25 year	N/A	0 / 25 year	N/A
BOS087	9	1.27	Closed	N/A	Closed	N/A	Closed	N/A
TOTAL		**14.23**		**0.00**		**0.00**		**0.00**
SOUTHERN DORCHESTER BAY								
BOS088	0	0.00	Closed	N/A	Closed	N/A	Closed	N/A
BOS089 (Fox Pt.)	31	87.11	Closed	N/A	Closed	N/A	Closed	N/A
BOS090 (Commercial Pt.)	19	10.16	Closed	N/A	Closed	N/A	Closed	N/A
TOTAL		**97.27**		**0.00**		**0.00**		**0.00**
UPPER CHARLES								
BOS032	4	3.17	Closed	N/A	Closed	N/A	Closed	N/A
BOS033	7	0.26	Closed	N/A	Closed	N/A	Closed	N/A
CAM005	6	41.56	3	1.36	8	0.73	3	0.84
CAM007	1	0.81	2	0.25	1	0.82	1	0.03
CAM009	19	0.19	Closed	N/A	Closed	N/A	2	0.01
CAM011	1	0.07	Closed	N/A	Closed	N/A	0	0.00
TOTAL		**46.06**		**1.60**		**1.55**		**0.88**
LOWER CHARLES								
BOS028	4	0.02	Closed	N/A	Closed	N/A	Closed	N/A
BOS042	0	0.00	Closed	N/A	Closed	N/A	Closed	N/A
BOS049	1	0.01	Closed	N/A	Closed	N/A	Closed	N/A
CAM017	6	4.72	1	1.26	0	0.00	1	0.45
MWR010	16	0.08	0	0.00	0	0.00	0	0.00
MWR018	2	3.18	0	0.00	2	1.92	0	0.00
MWR019	2	1.32	0	0.00	2	0.56	0	0.00
MWR020	2	0.64	0	0.00	2	0.32	0	0.00
MWR021	2	0.50	Closed	N/A	Closed	N/A	Closed	N/A
MWR022	2	0.43	Closed	N/A	Closed	N/A	Closed	N/A
MWR201 (Cottage Farm)	18	214.10	3	10.50	4	12.36	2	6.30
MWR023	39	114.60	1	0.02	1	0.14	2	0.13
SOM010	18	3.38	Closed	N/A	Closed	N/A	Closed	N/A
TOTAL		**342.98**		**11.78**		**15.30**		**6.88**

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PRELIMINARY TYPICAL YEAR MODEL SIMULATION RESULTS FOR BASELINE 1992 CONDITIONS, 2019 CONDITIONS AND LONG-TERM CSO CONTROL PLAN (LTCP)

Outfall	1992 SYSTEM CONDITIONS[1]		2019 SYSTEM CONDITIONS (Before Model Calibration)		2019 SYSTEM CONDITIONS (After Model Calibration)		LONG TERM CONTROL PLAN[2]	
	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
NEPONSET RIVER								
BOS093	72	1.61	Closed	N/A	Closed	N/A	Closed	N/A
BOS095	11	5.37	Closed	N/A	Closed	N/A	Closed	N/A
TOTAL		**6.98**		**0.00**		**0.00**		**0.00**
BACK BAY FENS								
BOS046	2	5.25	1	1.57	0	0.00	2	5.38
TOTAL		**5.25**		**1.57**		**0.00**		**5.38**
Total Treated		**698**		**351**		**390**		**381**
Total Untreated		**759**		**29**		**40**		**23**
GRAND TOTAL		**1457**		**380**		**430**		**404**

(1) 1992 System Conditions include completion of Deer Island Fast-Track Improvements, upgrades to headworks and new Caruso and DeLauri pumping stations.

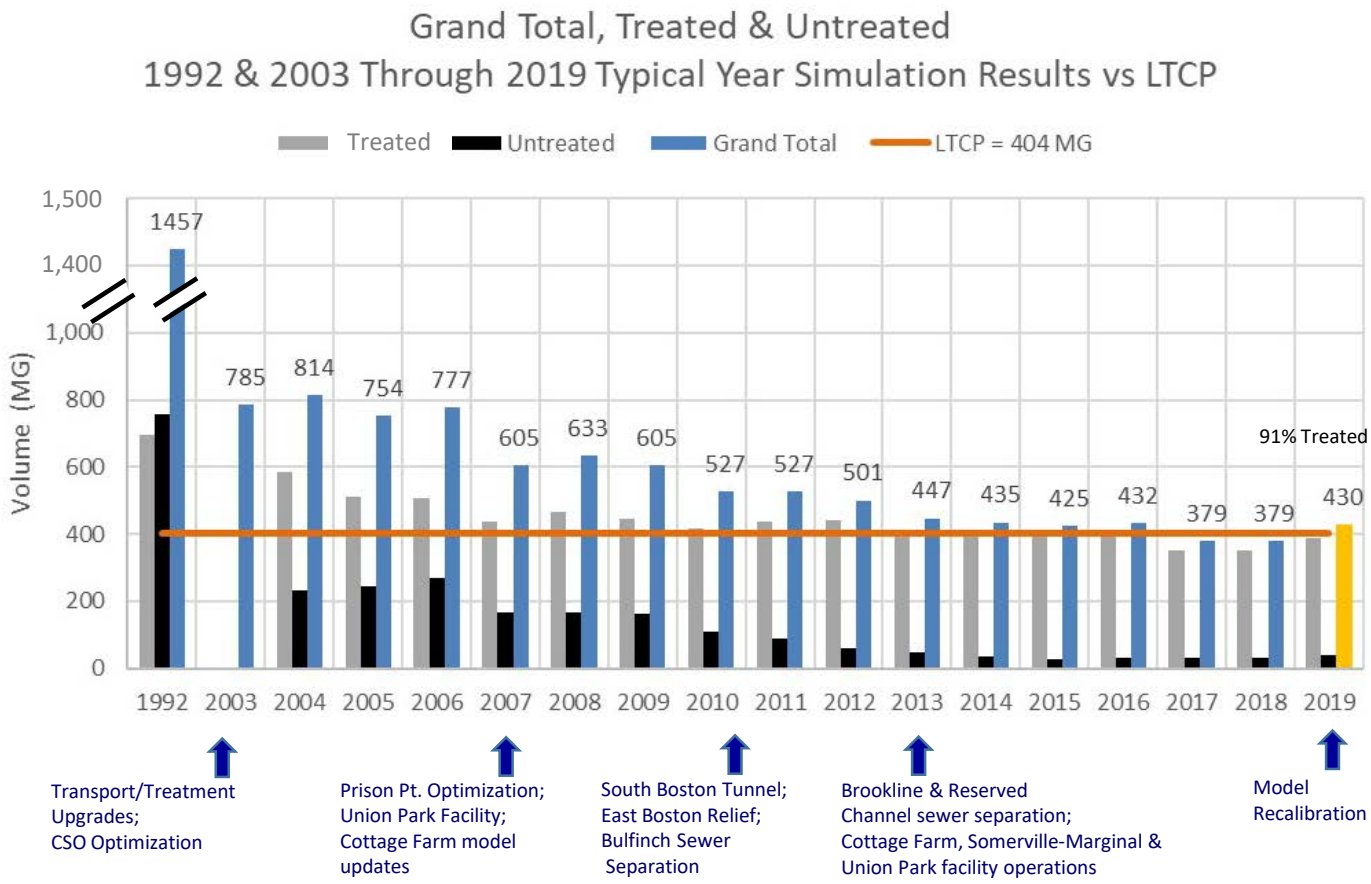
(2) From Exhibit B to Second Stipulation of the United States and the Massachusetts Water Resources Authority on Responsibility and Legal Liability for Combined Sewer Overflows, as amended by the Federal District Court on May 7, 2008 (the "Second CSO Stipulation").

(3) Not used.

(4) N/I: Outfall was closed by MWRA Long-Term Control Plan prior to 2006 and is not included in Exhibit B to the Second CSO Stipulation.

EXHIBIT C

EXHIBIT C: CSO VOLUME REDUCTION



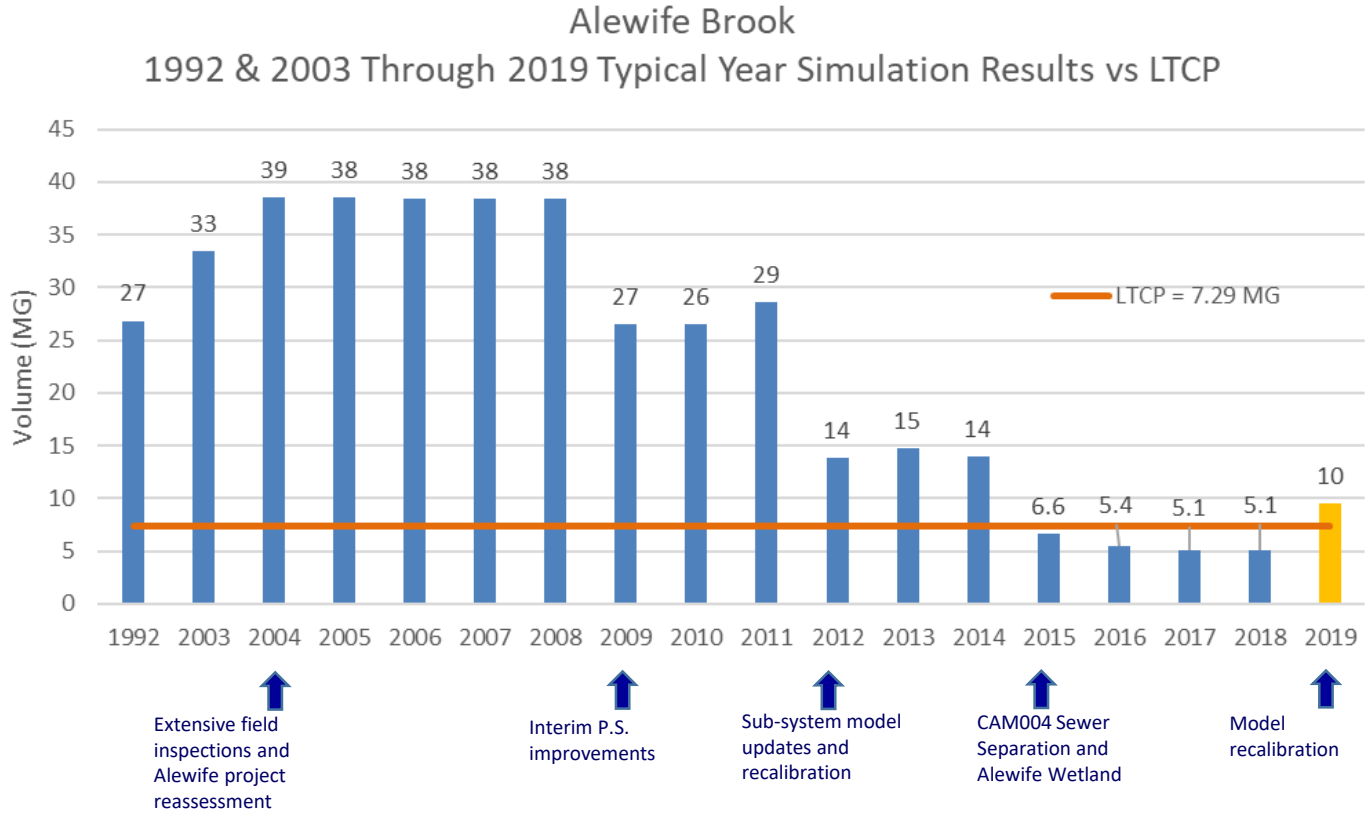
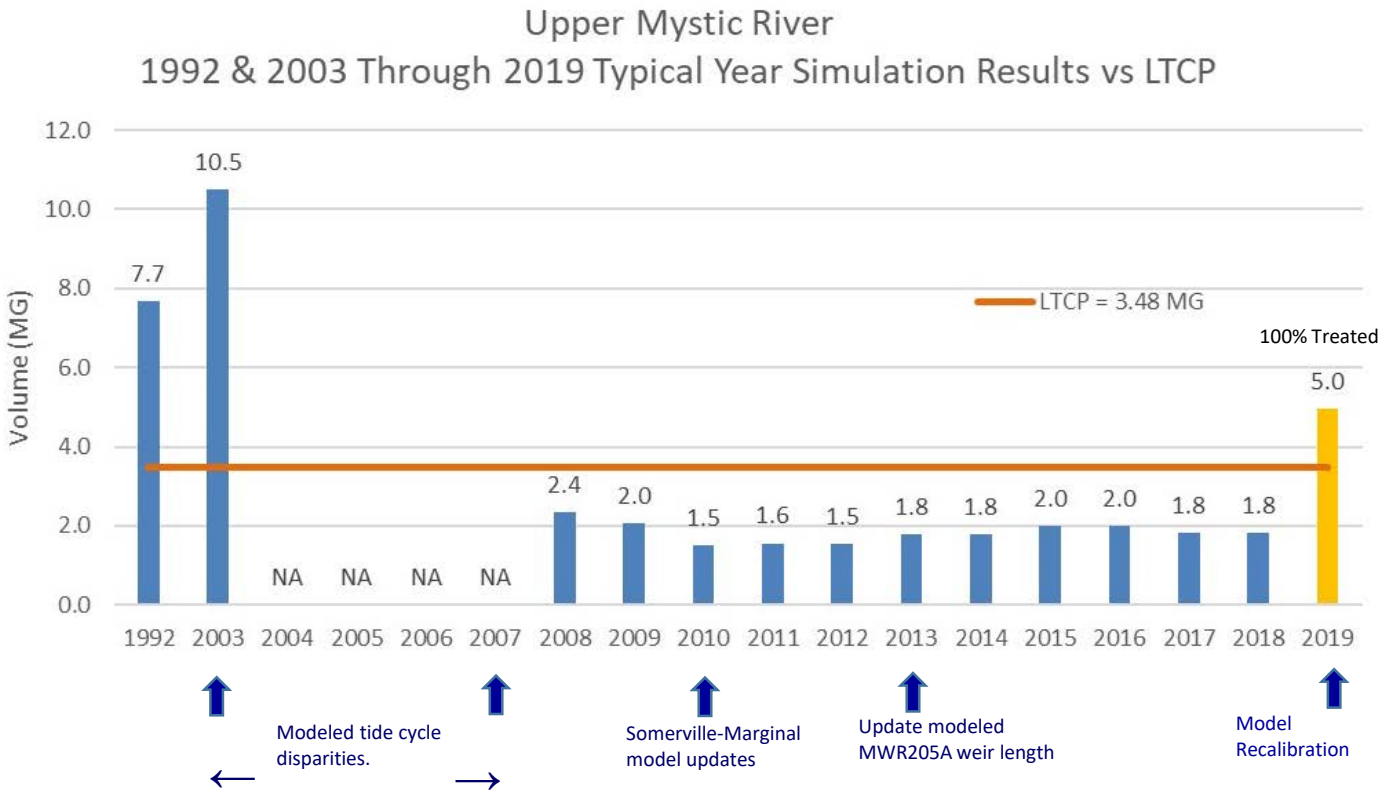
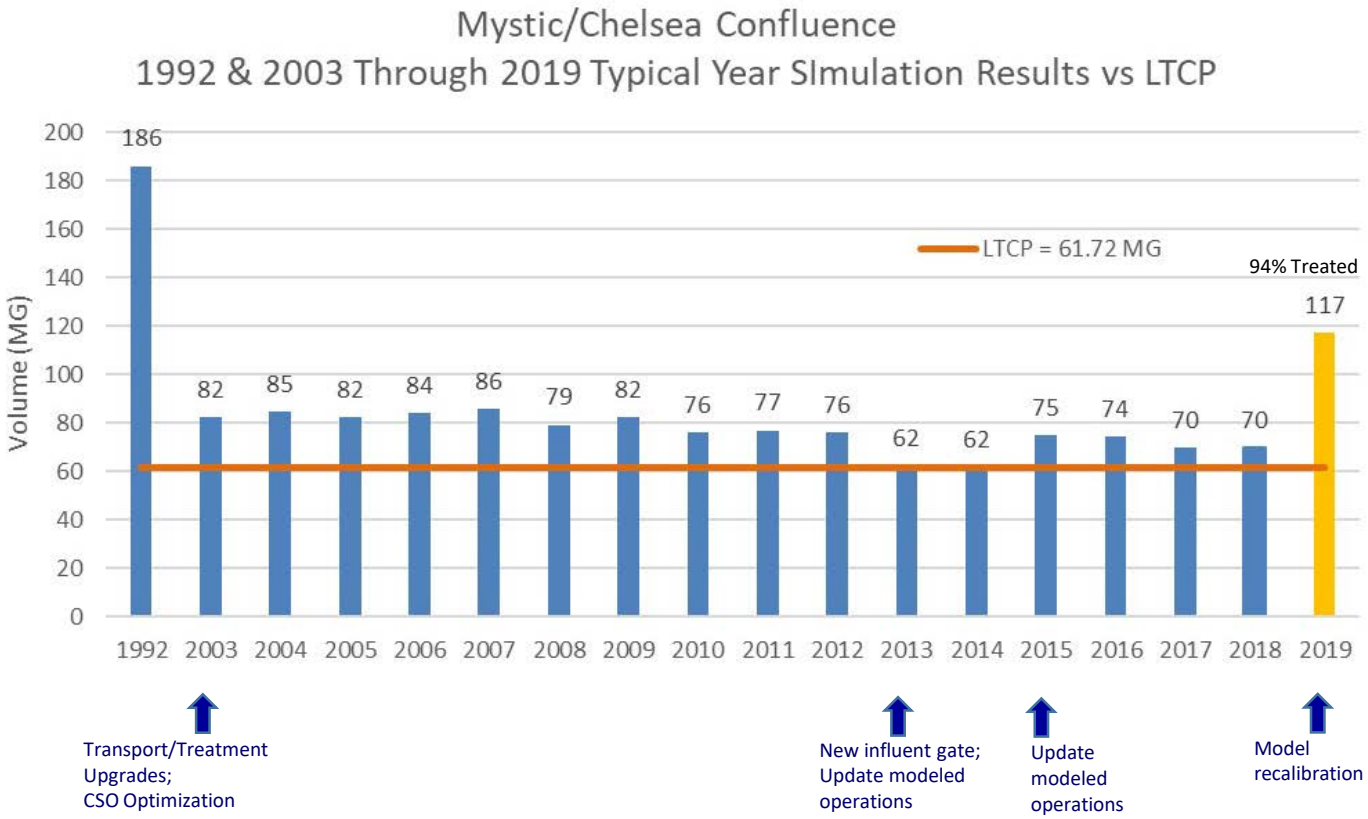


EXHIBIT C: CSO VOLUME REDUCTION





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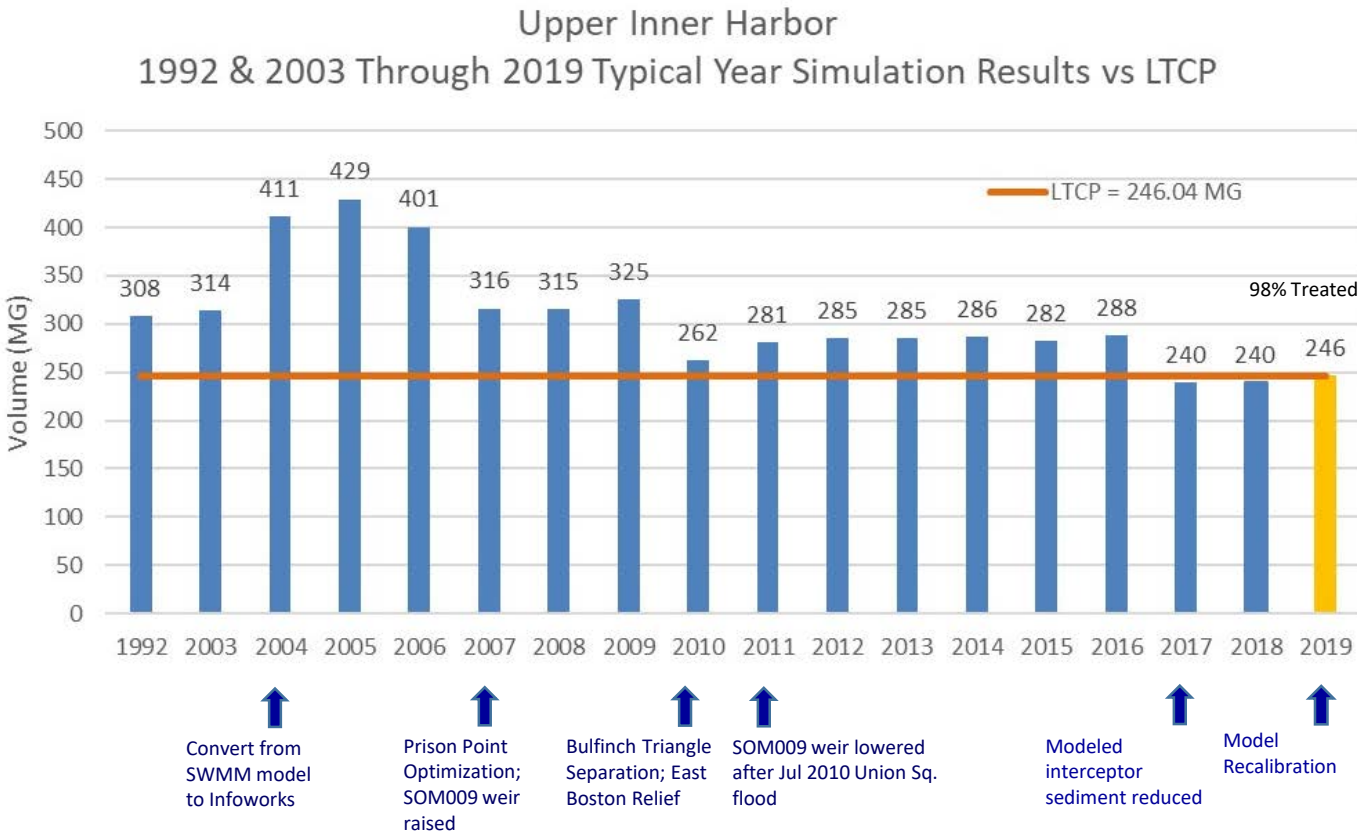

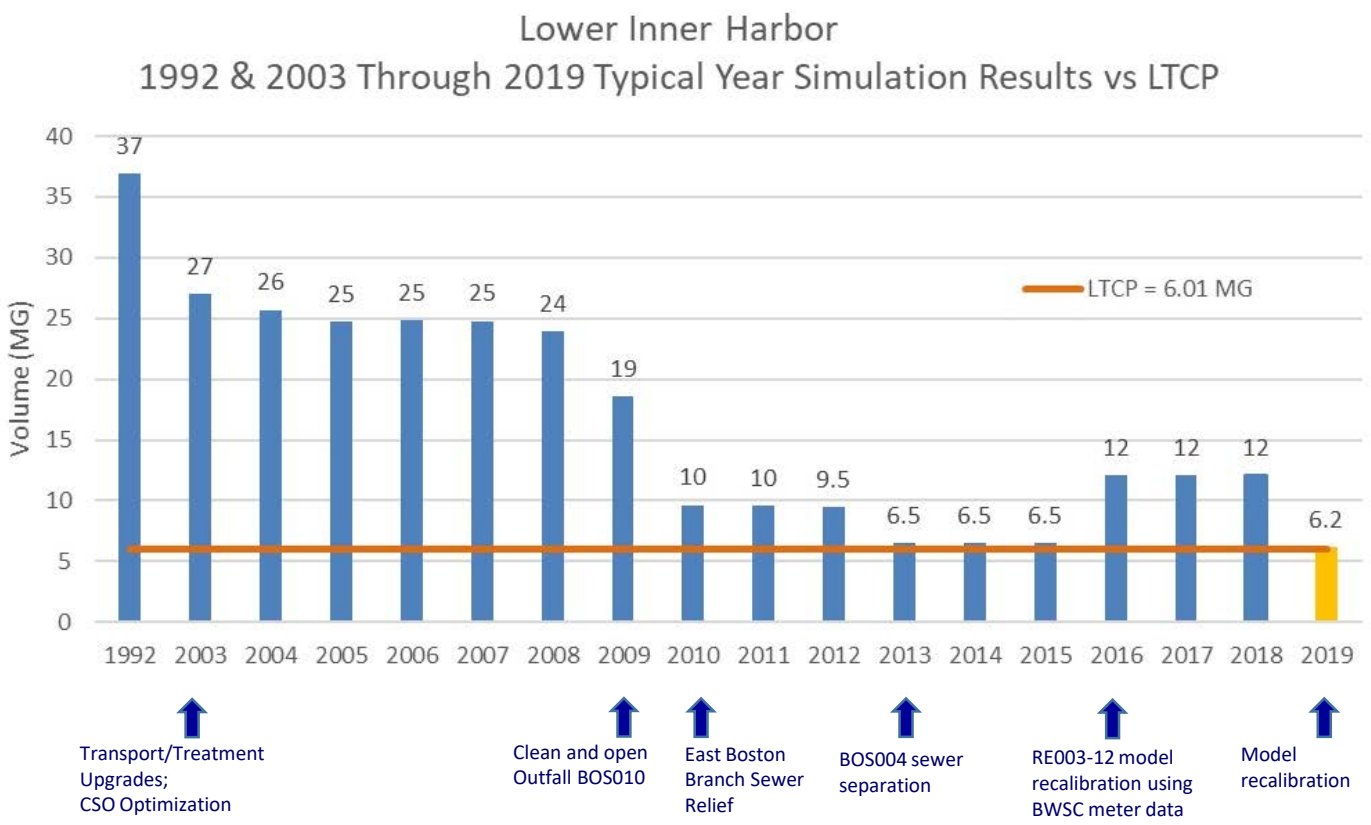

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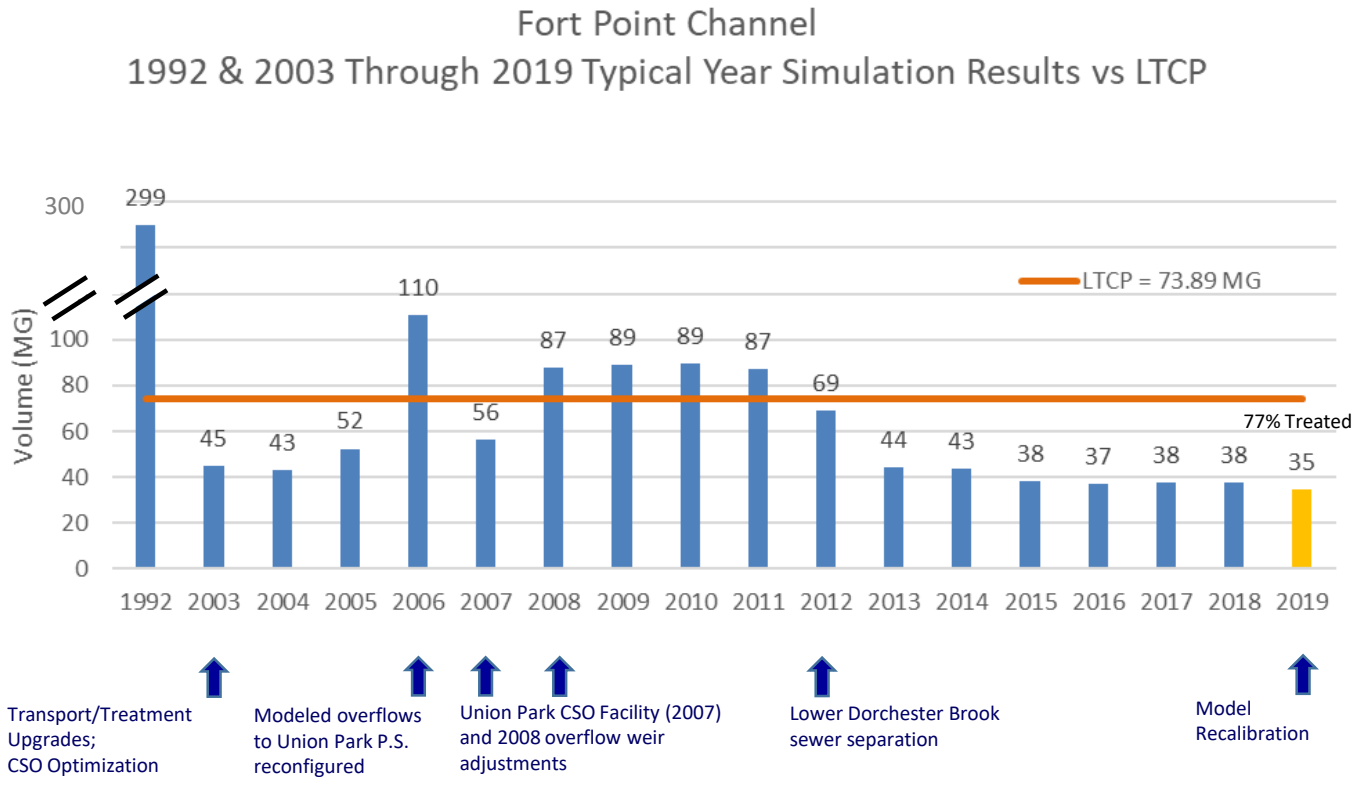

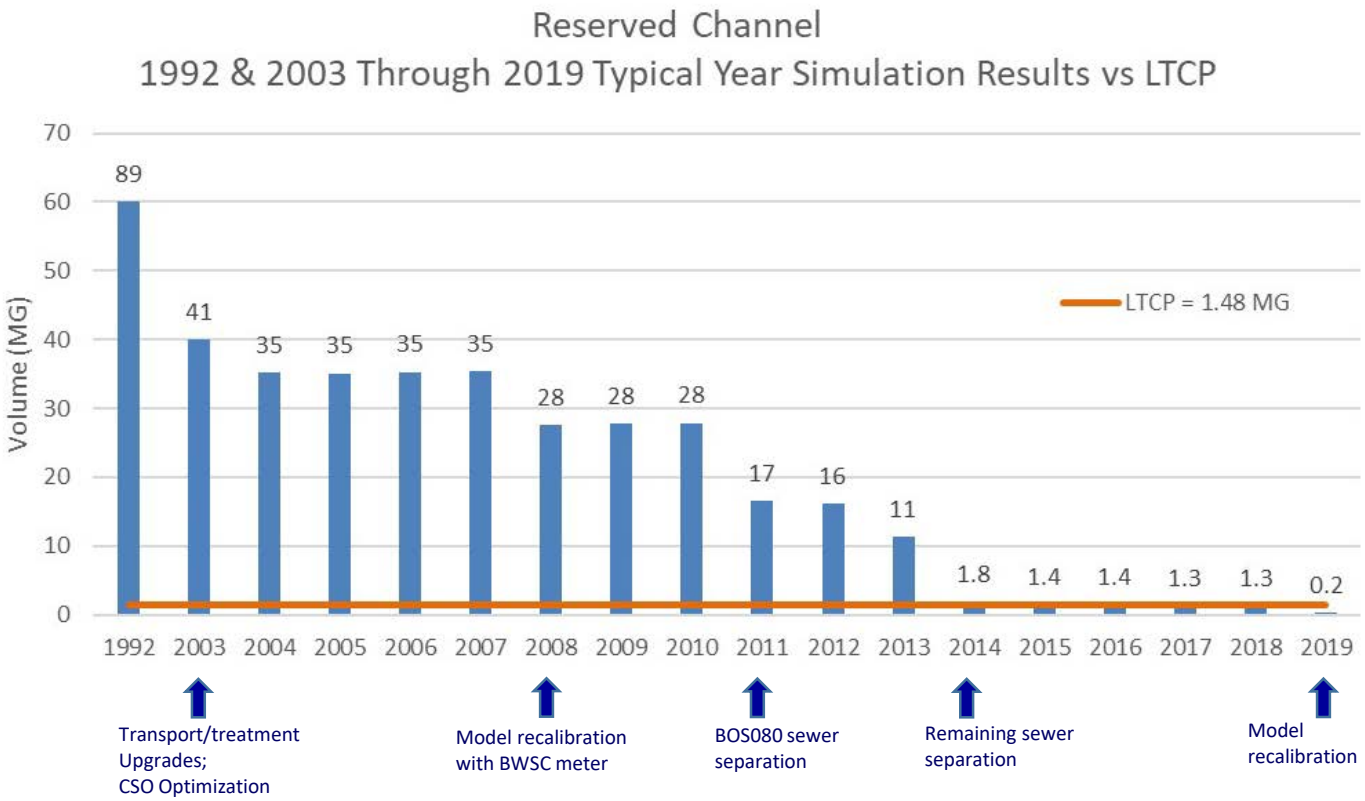

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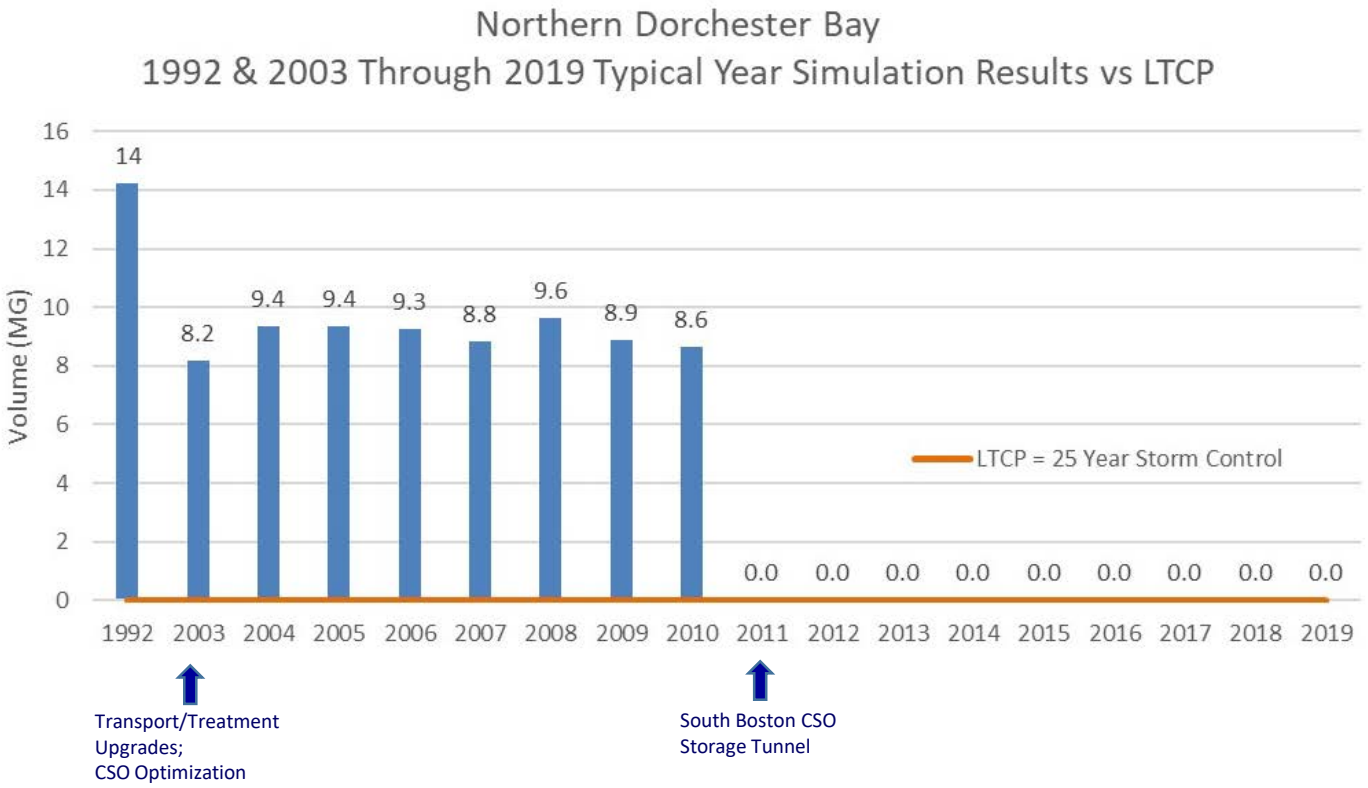

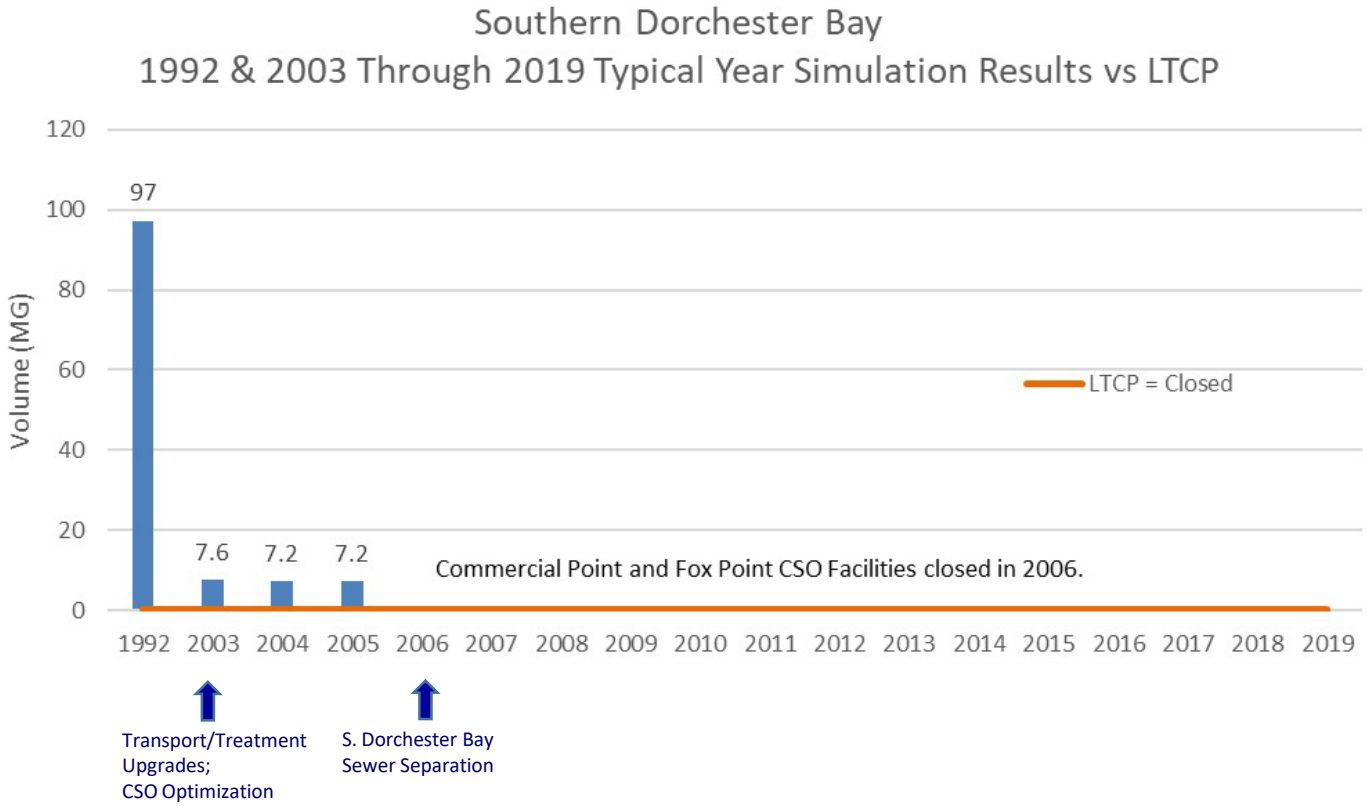

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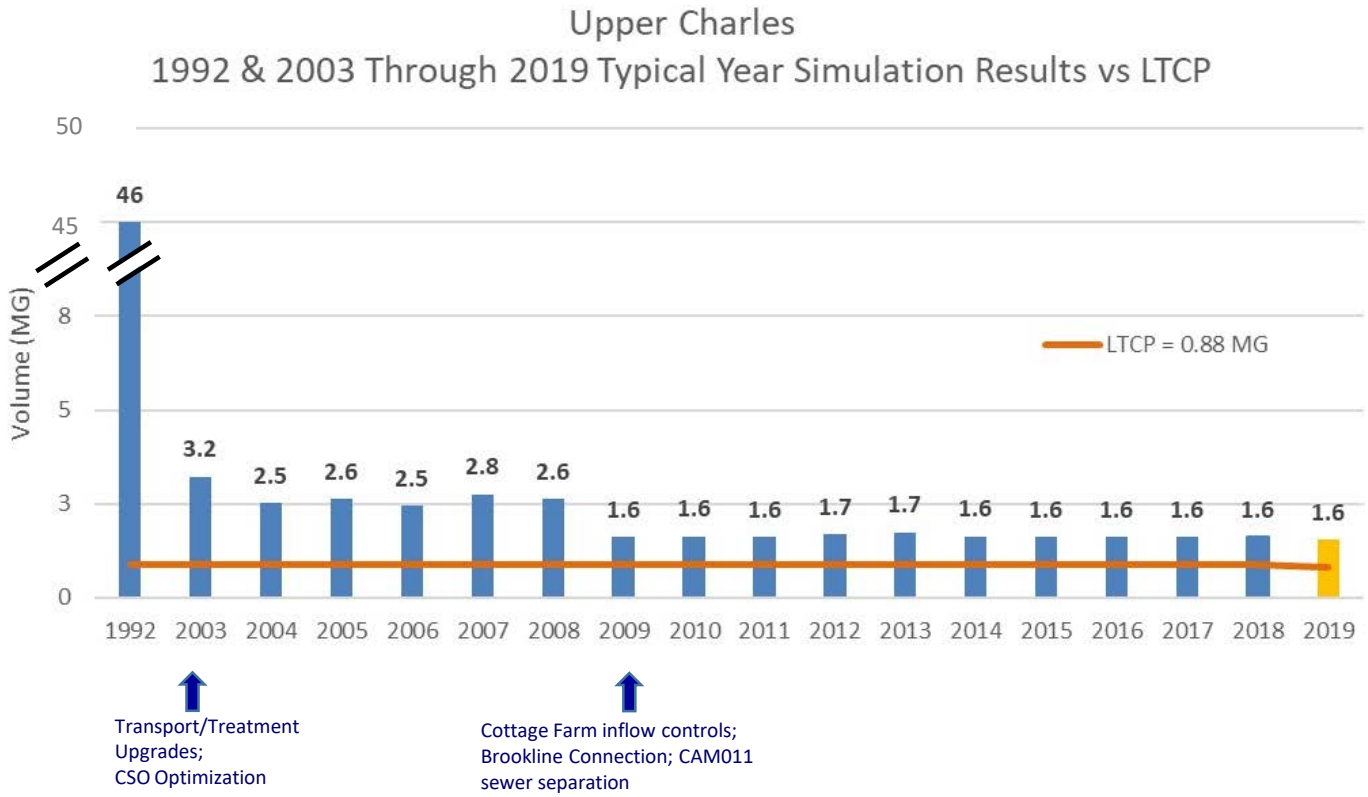

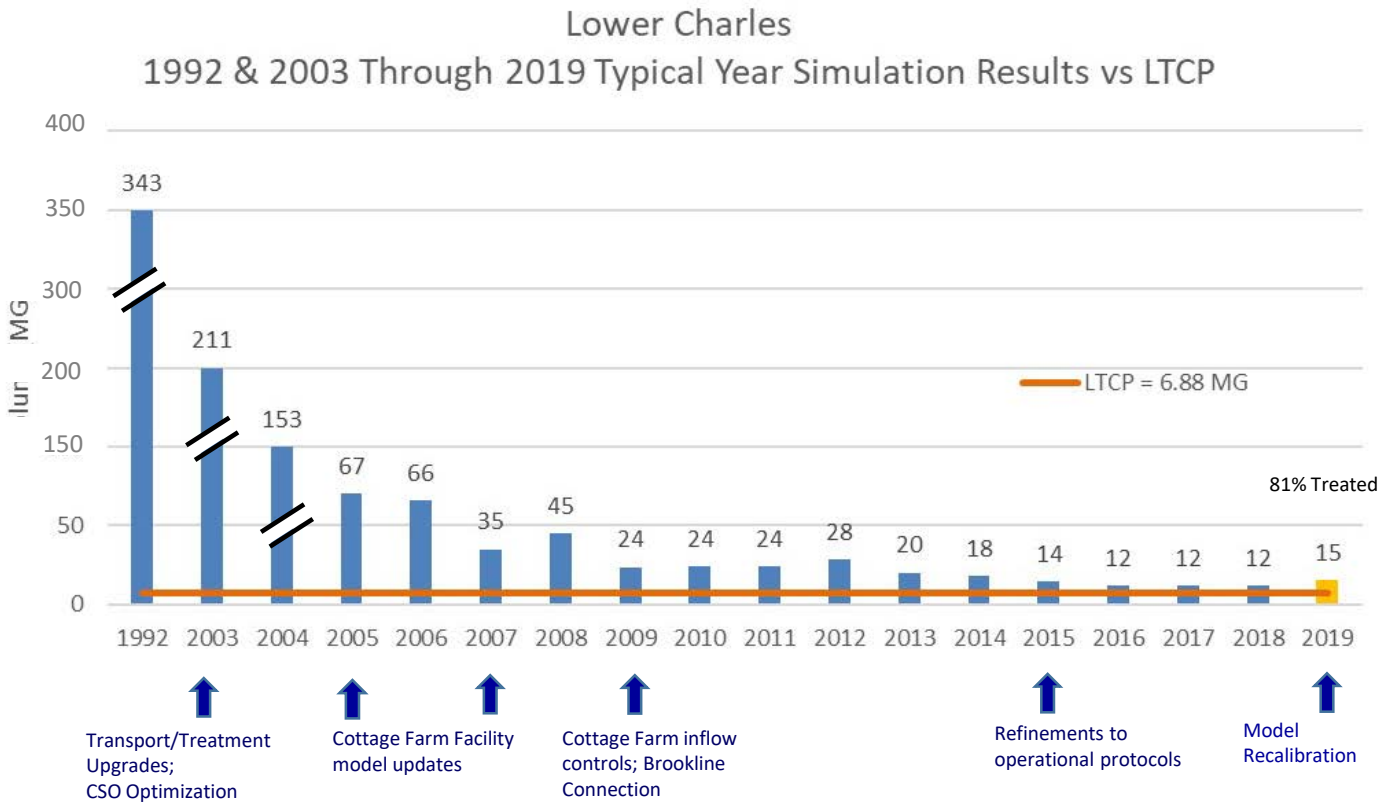

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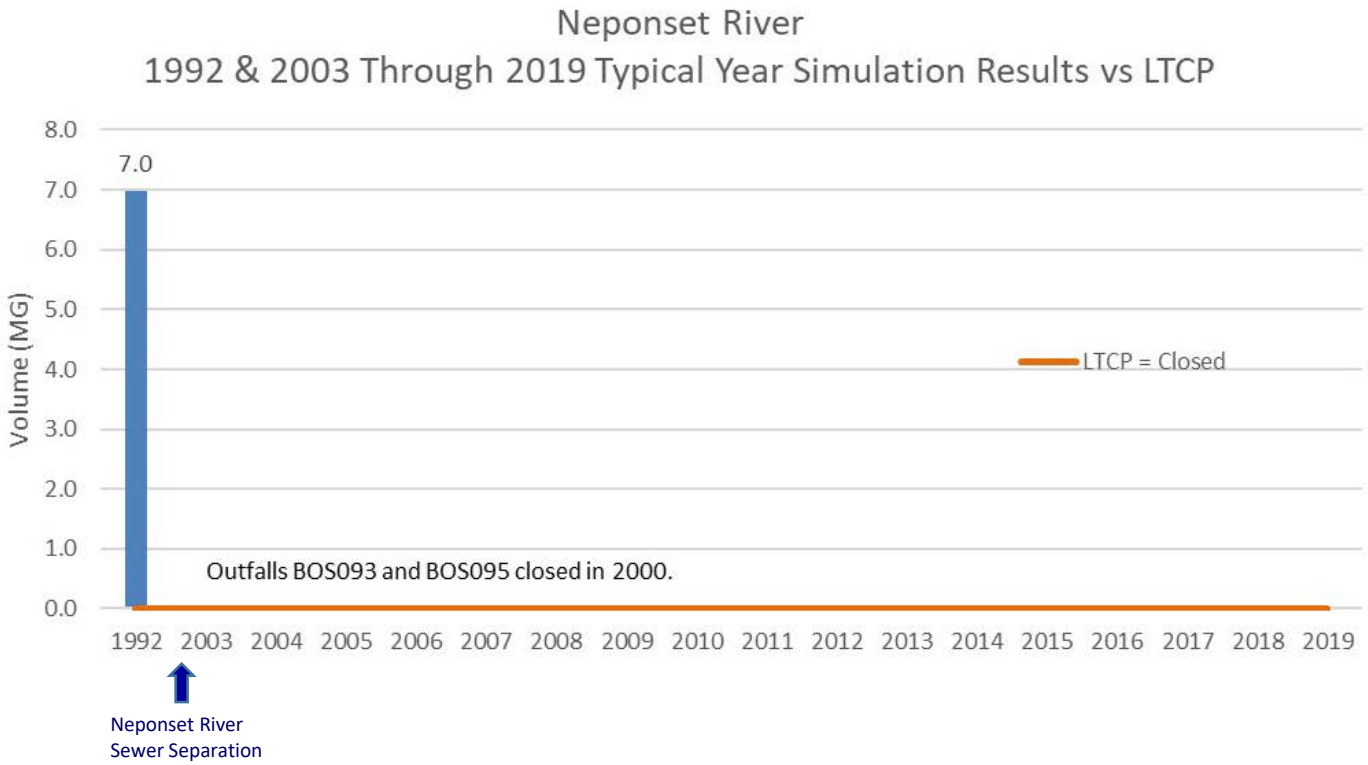

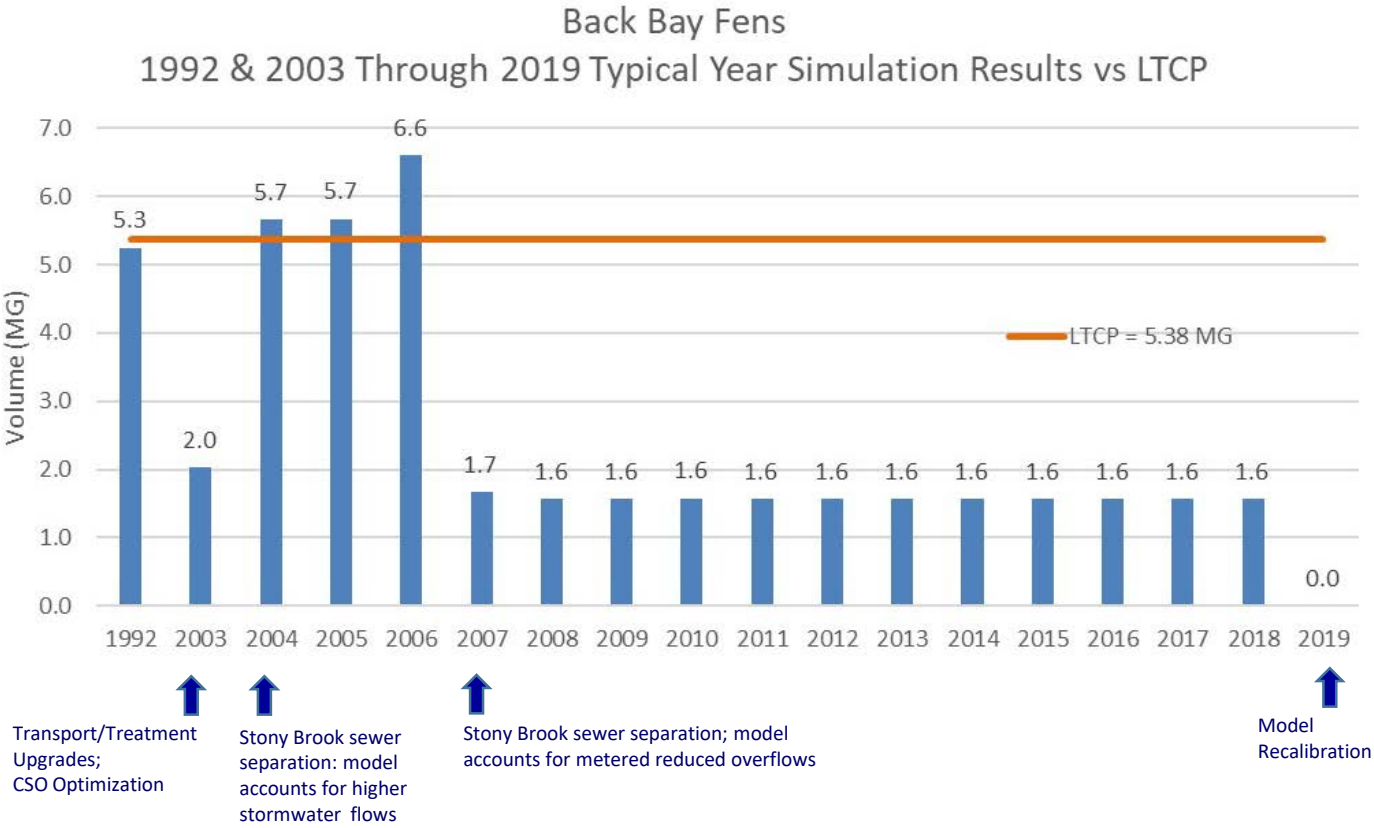

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