

Appendix 7
Boston Harbor (Proper)
Assessment and Listing Decision Summary

Massachusetts Integrated List of Waters
for the Clean Water Act 2018/20 Reporting Cycle

Draft for Public Comment



Prepared by:
Massachusetts Department of Environmental Protection
Division of Watershed Management
Watershed Planning Program

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2018/20 Cycle Impairment Changes

Waterbody	AU_ID	2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
Boston Harbor	MA70-01	5	5	Fecal Coliform	R1_MA_2019_01	Changed
Boston Inner Harbor	MA70-02	5	5	Dissolved Oxygen		Removed
Boston Inner Harbor	MA70-02	5	5	Enterococcus	R1_MA_2019_01	Changed
Boston Inner Harbor	MA70-02	5	5	Fecal Coliform	R1_MA_2019_01	Changed
Dorchester Bay	MA70-03	5	5	Enterococcus	R1_MA_2019_01	Changed
Dorchester Bay	MA70-03	5	5	Fecal Coliform	R1_MA_2019_01	Changed
Hingham Bay	MA70-06	5	5	Fecal Coliform	R1_MA_2019_01	Changed
Hingham Bay	MA70-07	5	5	Estuarine Bioassessments		Added
Hingham Bay	MA70-07	5	5	Fecal Coliform	R1_MA_2019_01	Changed
Hull Bay	MA70-09	5	5	Estuarine Bioassessments		Added
Hull Bay	MA70-09	5	5	Fecal Coliform	R1_MA_2019_01	Changed
Pleasure Bay	MA70-11	5	5	Fecal Coliform	R1_MA_2019_01	Changed
Quincy Bay	MA70-04	5	5	Enterococcus	R1_MA_2019_01	Changed
Quincy Bay	MA70-04	5	5	Fecal Coliform	R1_MA_2019_01	Changed
Quincy Bay	MA70-05	5	5	Enterococcus	R1_MA_2019_01	Changed
Quincy Bay	MA70-05	5	5	Fecal Coliform	R1_MA_2019_01	Changed
Winthrop Bay	MA70-10	5	5	Enterococcus	R1_MA_2019_01	Changed
Winthrop Bay	MA70-10	5	5	Fecal Coliform	R1_MA_2019_01	Changed

Boston Harbor (MA70-01)

Location:	The area defined by a line from the southerly tip of Deer Island to Boston Lighthouse on Little Brewster Island, then south to Point Allerton; across Hull and West guts; across the mouths of Quincy and Dorchester bays, Boston Inner Harbor and Winthrop Bay (including President Roads and Nantasket Roads).
AU Type:	ESTUARY
AU Size:	18.6 SQUARE MILES
Classification/Qualifier:	SB: SFR

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Fecal Coliform	R1_MA_2019_01	Changed

Fish, other Aquatic Life and Wildlife Use: Fully Supporting (Alert)
<p>Benthic macroinvertebrate sampling (and sediment analysis) has been conducted in Boston Harbor since 1991. In 2018 Sediment Profile Imaging was conducted at 27 stations, including 22 recon sites and five traditional stations (T01, T02, T03, T05A (S. of Deer Island & W. of Long Island), and T06 (adjacent to W. side of Peddocks Island)). Overall, after wastewater/sludge discharges were eliminated, total benthic abundance trended downward, species richness trended upward, as did evenness and diversity, with all measures levelling off in recent years. It was concluded that recently observed trends, including reduction of indicators of organic enrichment and increases in species diversity in recent years are consistent with benthic habitat recovery. Between 2017 and 2018 decreases in mean total abundance of macroinvertebrates were observed at T01, T02 & T03; but at T05A & T06 there was an increase. This variability in abundance is consistent with observations of the dominant taxa and is considered to be related more to normal physical disturbances than organic stress. Abundances of the sewage tracer bacterium "<i>Clostridium perfringens</i>" (normalized to percent fines) during 2018, were generally low and comparable across all monitoring stations, especially when compared to historic data. Water from Boston Harbor was collected north of the treatment plant and Nantasket Ave, in the locality of Stony Beach for use as diluent in the Hull WWTP acute WET tests. Survival (48hr) of <i>M. beryllina</i> exposed to harbor water between May 2010 and February 2019 was >75% during these tests (n=36). No acute whole effluent toxicity to <i>M. beryllina</i> was detected on composite treated effluent samples from the Hull WWTP (NPDES # MA0101231) between May 2010 and February 2019 (n= 31 valid tests) with all LC50 >100% and ANOEC=100% effluent). The MassDEP Eelgrass Mapping Project documented an increase eelgrass bed habitat in Boston Harbor between 1995 and 2017 from 0.03 miles² to 0.30 miles², respectively. From 2009-2018 MWRA staff conducted <i>in-situ</i> monitoring at five sites in Boston Harbor (044, 048, 065, 106, 141) and nutrient sampling at two (106: Long Island, green can #17, 141: N. of Peddocks Island, near Hull Gut). Depth at 106 and 141 ranged from 3.2 to 20.3m and 4.0 to 18.3m, respectively. DO concentrations at all five sites ranged from 5.3 to 12.9 mg/L (n=2290 including both surface and bottom measurements), saturation ranged from 65 to 145%. There were two years (2013 and 2014) with saturations >125% in >10% samples (three sites in 2013, two sites in 2014) but little evidence in other years. Temperature was as high as 23.89°C (n=1102) and pH ranged from 6.70 to 8.29SU (n=2282). Chlorophyll a concentrations ranged from 0.13 to 12.80µg/L (average 3.18µg/L, n=942) with concentrations >10µg/L in spring and winter months at both surface and bottom (17 times overall but at no time >10% of measurements). The seasonal average total nitrogen concentrations were all below 0.4mg/L at both sites (overall average 0.251mg/L, n=471), with year-round averages ranging from 0.076 to 0.469mg/L. The Aquatic Life Use for Boston Harbor is assessed as Fully Supporting based on the increase in eelgrass bed habitat, improved benthic community (increased diversity/richness), good DO and low nutrient levels. The Alert Status associated with fin erosion, bent fin ray and flounder liver disease at Deer Island Flats will be carried forward due to a lack of recent data.</p>

2018/20 Delisted Impairment	Delisting Reason	Delisting Comment
Fecal Coliform	TMDL approved or established by EPA (4a)	Impairment covered under TMDL: Pathogen TMDL for the Boston Harbor, Weymouth-Weir, and Mystic Watersheds (Report CN 157.1, approved 11/21/2018, ATTAINS Action ID: R1_MA_2019_01)

Boston Inner Harbor (MA70-02)

Location:	From the Mystic and Chelsea rivers, Chelsea/Boston, to the line between Governors Island and Fort Independence, Boston (East Boston) (including Fort Point, Reserved and Little Mystic channels).
AU Type:	ESTUARY
AU Size:	2.56 SQUARE MILES
Classification/Qualifier:	SB(CSO): SFR

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Dissolved Oxygen		Removed
5	5	Enterococcus	R1_MA_2019_01	Changed
5	5	Fecal Coliform	R1_MA_2019_01	Changed

Fish, other Aquatic Life and Wildlife Use: Fully Supporting (Alert)
<p>Benthic macroinvertebrate sampling (and sediment analysis) has been conducted in Boston Inner Harbor since 1991. In 2018 Sediment Profile Imaging was conducted at three stations, including two recon sites and one traditional station (C019- at the mouth of Fort Pt. Channel). Overall, the infauna assemblage is relatively “species poor” (average 20 species per collection 2004-2018) with comparatively lower abundance compared to the rest of the Harbor. However, it was noted that despite decreasing values in some recent years, diversity measures have remained among the highest observed to date. In addition, although <i>C. perfringens</i> counts (C019) have not remained consistently below historical averages, recent counts are generally lower than the 2007-2009 peak. Survival of <i>M. bahia</i> and <i>M. beryllina</i> exposed (48 hours or 7-day) to water collected from four sites in Boston Inner Harbor as part of whole effluent toxicity (WET) tests conducted for Gillette Co. (2013, 2014, 2016-2018), Logan Int. Airport (2008-2011), Logan Int. Airport Fire Training Facility (2017, 2019) and New England Aquarium (2010, 2012) were ≥93%. WET tests were also conducted for these facilities and the Boston Water and Sewer Commission (BWSC) CSO Outfall 215 and Prison Point CSO Treatment Facility Outfall 203. With only a few exceptions toxicity has not been detected. From 2009-2018 MWRA staff conducted <i>in-situ</i> monitoring at 10 sites in Boston Inner Harbor (014, 015, 018, 019, 022, 024, 075, 138, 154, 178) and nutrient sampling at two (024: Mouth of Inner Harbor, red buoy 10 and 138: Fort Point Channel mouth, off New England Aquarium). Depth at station 024 and 138 ranged from 4.1 to 18m and 6.2 to 18.3m, respectively. DO ranged from 1.3 to 16.5mg/L between 2009 and 2018 at the 10 sites sampled in Boston Inner Harbor (n=5639 including both surface and bottom measurements). However, in the last five years (2014 through 2018), only 24 of 2512 measurements (<0.01%) were <5.0mg/L, with all but four of these measurements in the two innermost Fort Point Channel sites (075: Fort Pt Channel, Broadway with 17 measurements (10 days) <5.0mg/L (minimum 3.7mg/L in the last five years) and 018: Fort Pt Channel, Summer St. with 3 measurements (3 days) <5.0mg/L (minimum 4.2mg/L). DO % saturation ranged from 17 to 184% (n=6539); 23 measurements were above 125% in the last five years (n=2512) (all in 2014 and 2015) with no measurements >125% in last three years (2016-2018). The maximum temperature was 26.43°C (June-September average 17.46°C, n=2857) and pH ranged from 6.15 to 8.66SU (six times <6.5 and once >8.3, n=5660). Chlorophyll <i>a</i> concentrations ranged from 0.13 to 21.3µg/ (average 3.57µg/L, n=946). There was a total of 18 measurements above 10µg/L (~2% of the samples with only six above 10µg/L in the last three years). The seasonal average total nitrogen concentrations were below 0.4mg/L at both sites (overall average 0.349mg/L, n=468), with year-round averages ranging from 0.150 to 0.883mg/L.</p> <p>The Aquatic Life Use of Boston Inner Harbor (MA70-02) is assessed as Fully Supporting based on the generally good water quality and fairly stable, although with lower species richness than other Boston Harbor monitoring locations, macroinvertebrate community. The Dissolved Oxygen impairment is being delisted (see additional</p>

information in removal comments). The alerts for occasional indications of enrichment (i.e., supersaturation, elevated chlorophyll a concentrations, slightly elevated total nitrogen concentration) are being removed based on the very few samples indicative of problems in the last three years (2016 through 2018). The alert for degraded sediment quality at the mouth of Fort Point Channel is being carried forward due to a lack of recent data and in acknowledgement of the relatively low macroinvertebrate species richness.

2018/20 Delisted Impairment	Delisting Reason	Delisting Comment
Dissolved Oxygen	Applicable WQS attained; based on new data	<p>The Dissolved Oxygen impairment in this Boston Inner Harbor AU (MA70-02) was identified in the 2012 reporting cycle based on the seasonally frequent and prolonged low dissolved oxygen conditions in the shallow inward-most area of the Fort Point Channel area of Boston Inner Harbor (minimum DO 2.01mg/L at site 075 Broadway (n= 280 samples collected by MRWA staff between 2002 and 2008 including both surface and bottom measurements) with ~21% of the measurements <5.0mg/L and half of them (n=30 measurements below 5.0mg/L) between 24 June and 9 October 2008. DO concentrations were much improved further seaward at the midway sampling location in Fort Point Channel near Summer Street and were good throughout the rest of the inner harbor area. Improved conditions have occurred since 2008 in the Fort Point Channel area which comprises 0.08mi² of the 2.56mi² Boston Inner Harbor AU (~3%). DO ranged from 1.3 to 16.5mg/L between 2009 and 2018 at the 10 sites sampled in Boston Inner Harbor (n=5639 including both surface and bottom measurements). Between 2014 and 2018, only 24 of 2512 DO measurements (<0.01%) at the 10 sites sampled in Boston Inner Harbor were <5.0mg/L, and all but four of these measurements were in the two innermost Fort Point Channel sites (most inward sampling location site 075 at Broadway and site 018 at Summer St). Between 2009 and 2018 the DO measurements at site 075 Broadway ranged from 1.3 to 15.7mg/L (n=663 including both surface and bottom measurements) with 99 measurements <5.0mg/L (~14.9% of 663 measurements). In the last five years however (between 2014 and 2018) only 17 measurements were <5.0mg/L (~7%, n= 250, minimum 3.7mg/L). None of the 17 low DO measurements were either frequent or prolonged occurring between one and three days in each year (10 total sampling days in the last five years). Slightly further seaward in Fort Point Channel, site 018 Summer St, between 2014 and 2018 there were only with three measurements <5.0mg/L (~1%, n= 269, minimum 4.2mg/L) that occurred on three days in 2018. Given the overwhelming evidence of good dissolved oxygen levels in Boston Inner Harbor and the improved DO conditions in Fort Point Channel area documented between 2014</p>

2018/20 Delisted Impairment	Delisting Reason	Delisting Comment
		and 2018 (no longer was there evidence of any frequent or prolonged low dissolved oxygen conditions), the Dissolved Oxygen impairment is being delisted.
Enterococcus	TMDL approved or established by EPA (4a)	Impairment covered under TMDL: Pathogen TMDL for the Boston Harbor, Weymouth-Weir, and Mystic Watersheds (Report CN 157.1, approved 11/21/2018, ATTAINS Action ID: R1_MA_2019_01)
Fecal Coliform	TMDL approved or established by EPA (4a)	Impairment covered under TMDL: Pathogen TMDL for the Boston Harbor, Weymouth-Weir, and Mystic Watersheds (Report CN 157.1, approved 11/21/2018, ATTAINS Action ID: R1_MA_2019_01)

Supporting Information for Delisted Impairments

Dissolved Oxygen

(MWRA, 2019) MWRA Water Quality Data 1989-2018

(MassDEP, Undated) Open file analysis of MWRA 2009-2018 water quality data

confirmSeg MA70-02

Site/Segment Lookup

Count of confirmSeg

StatID as Char	TARGET_LAT	TARGET_LON	LOC_DESC	Total	Map
014	42.3705	-71.0515	Inner Harbor, Charles River mouth, USCG base, near MWR203	2	014
015	42.383	-71.04517	Inner Harbor, confluence of Mystic River and Chelsea Creek	2	015
016	42.3765	-71.04517	Inner, off Charlestown Navy Yard	1	016
018	42.350591	-71.05163	Inner Harbor, Fort Point Channel, Summer St., near BOS064	1	018
019	42.358772	-71.04618	Inner Harbor, Fort Point Channel mouth, off New England Aquarium, near BOS060	2	019
022	42.342667	-71.02867	Inner Harbor, Reserved Channel, midchannel	1	022

024	42.344305	-71.00885	Inner Harbor, mouth of Inner Harbor, red buoy 10	2	024
075	42.344955	-71.05952	Inner Harbor, Fort Point Channel, Broadway, BOS070	1	075
138	42.359319	-71.04568	Inner Harbor, Fort Point Channel mouth, off New England Aquarium, near BOS060 (further offshore than location 019)	1	138
154	42.3545	-71.04917	Mid channel of Fort Point Channel	1	154
178	42.353708	-71.04994	Inner Harbor, Fort Point Channel, Moakley Bridge, upchannel side, near BOS062	1	178

Use?	TRUE
Temp Summer (J-S)	(All)
Final Segment Assignment	MA70-02
Class	(All)

Physical Sample Count						
Station ID	Date/time	Values				
		Conductance Count	Temp Count	DO mg/l Count	DO Sat Count	pH Count
014		470	471	467	467	467
015		479	481	479	479	479
018		697	698	693	693	693
019		499	500	495	495	495
022		482	483	480	480	480
024		1011	1013	1011	1011	1011
075		655	669	663	663	663
138		472	472	472	472	472

154	196	198	194	194	194
178	689	690	685	685	685
Grand Total	5650	5675	5639	5639	5639

Use? TRUE

Dissolved Oxygen Check for >5mg/l

Count of >5 DO Check		Surface or Bottom >5 DO Check		S Total		B Total		Grand Total	Is the DO at surface OR bottom too low? (>=5mg/l = ok)
Final Segment Assignment	Station ID	High	Low	High	Low	High	Low		
MA70-02	014	234	1	235	225	7	232	467	Ok
	015	242		242	234	3	237	479	Ok
	018	345	3	348	331	14	345	693	Ok
	019	248		248	247		247	495	Ok
	022	242		242	235	3	238	480	Ok
	024	511		511	500		500	1011	Ok
	075	283	57	340	281	42	323	663	Too High
	138	236		236	236		236	472	Ok
	154	97		97	97		97	194	Ok
	178	343	1	344	332	9	341	685	Ok
Grand Total		2781	62	2843	2718	78	2796	5639	Ok

Yellow highlights are Fort Point Channel sampling locations

Use? TRUE

Dissolved Oxygen Check for >5mg/l by Year

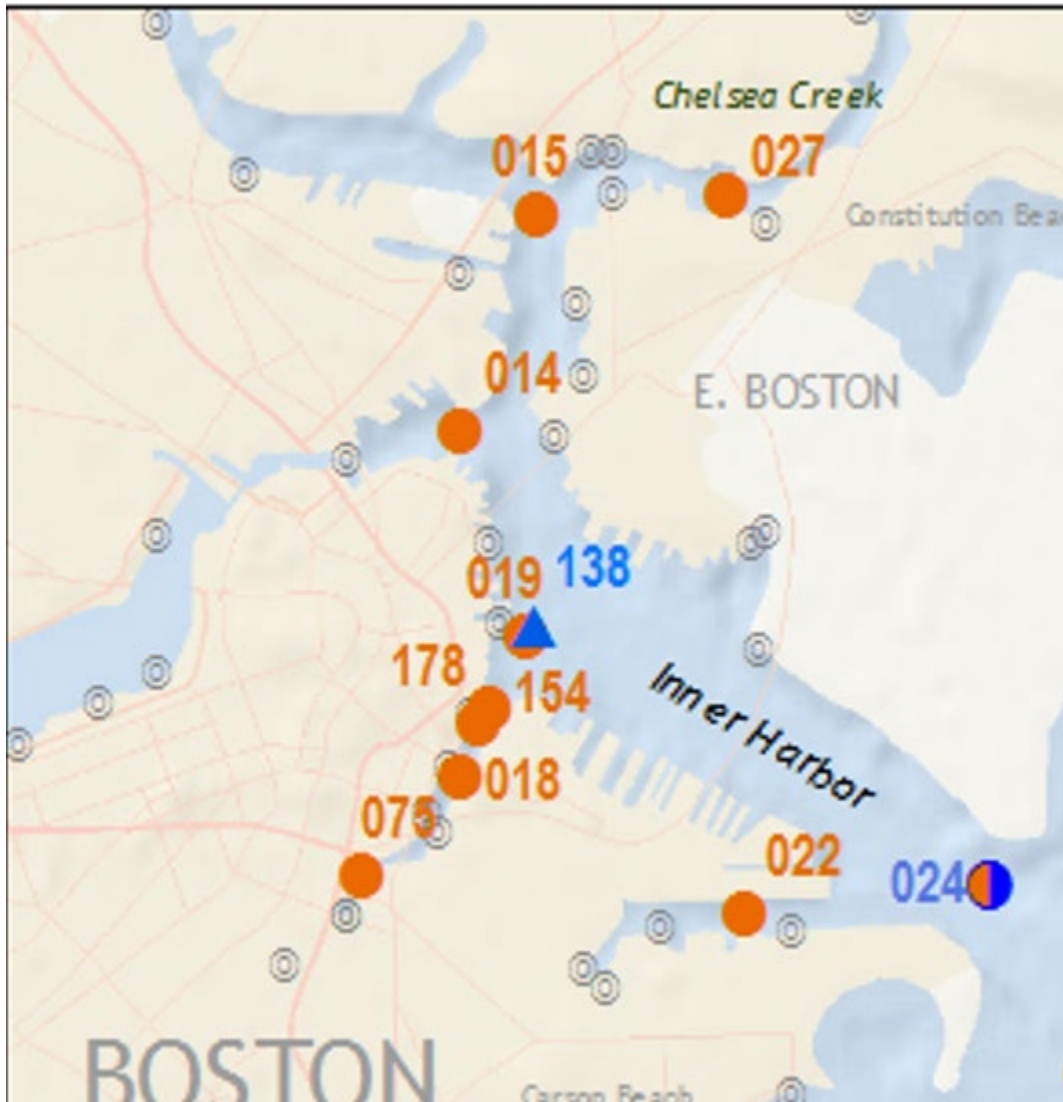
Final Segment Assignment	Station ID	Date/time	Surface or Bottom	>5 DO Check				Grand Total	Do Check		
			S	Low	S Total	B	High			Low	B Total
MA70-02	014	2009	21			21	21		21	42	Ok
		2010	19			19	18	1	19	38	Ok
		2011	25			25	22	1	23	48	Ok
		2012	21			21	21		21	42	Ok
		2013	22	1		23	21	2	23	46	Ok
		2014	20			20	20		20	40	Ok
		2015	20			20	16	3	19	39	Too High
		2016	30			30	30		30	60	Ok
		2017	31			31	31		31	62	Ok
		2018	25			25	25		25	50	Ok
015	015	2009	21			21	21		21	42	Ok
		2010	18			18	18		18	36	Ok
		2011	25			25	23		23	48	Ok
		2012	28			28	27		27	55	Ok
		2013	23			23	20	3	23	46	Too High
		2014	20			20	20		20	40	Ok
		2015	21			21	19		19	40	Ok
		2016	30			30	30		30	60	Ok
2017	31			31	31		31	62	Ok		

018	2018	25		25	25		25	50	Ok
	2009	48		48	41	4	45	93	Ok
	2010	47	1	48	46	3	49	97	Ok
	2011	53		53	52	1	53	106	Ok
	2012	31	2	33	32	1	33	66	Ok
	2013	31		31	29	2	31	62	Ok
	2014	27		27	26		26	53	Ok
	2015	26		26	26		26	52	Ok
	2016	32		32	32		32	64	Ok
	2017	27		27	27		27	54	Ok
019	2018	23		23	20	3	23	46	Too High
	2009	32		32	32		32	64	Ok
	2010	21		21	21		21	42	Ok
	2011	26		26	24		24	50	Ok
	2012	21		21	21		21	42	Ok
	2013	23		23	23		23	46	Ok
	2014	20		20	20		20	40	Ok
	2015	20		20	20		20	40	Ok
	2016	29		29	30		30	59	Ok
	2017	31		31	31		31	62	Ok
022	2018	25		25	25		25	50	Ok
	2009	22		22	22		22	44	Ok
	2010	19		19	19		19	38	Ok
	2011	24		24	22		22	46	Ok
	2012	28		28	26	1	27	55	Ok
	2013	23		23	22	1	23	46	Ok
	2014	20		20	20		20	40	Ok
	2015	21		21	18	1	19	40	Ok

	2016	29		29	30		30	59	Ok
	2017	31		31	31		31	62	Ok
	2018	25		25	25		25	50	Ok
024	2009	60		60	54		54	114	Ok
	2010	53		53	52		52	105	Ok
	2011	57		57	55		55	112	Ok
	2012	52		52	51		51	103	Ok
	2013	47		47	47		47	94	Ok
	2014	44		44	44		44	88	Ok
	2015	44		44	42		42	86	Ok
	2016	53		53	53		53	106	Ok
	2017	55		55	55		55	110	Ok
	2018	46		46	47		47	93	Ok
075	2009	36	9	45	39	5	44	89	Too High
	2010	33	15	48	37	10	47	95	Too High
	2011	45	8	53	44	8	52	105	Too High
	2012	22	11	33	23	9	32	65	Too High
	2013	26	5	31	26	2	28	59	Too High
	2014	24	3	27	24	2	26	53	Too High
	2015	20	1	21	19	1	20	41	Ok
	2016	30	2	32	25	2	27	59	Ok
	2017	26	1	27	23	1	24	51	Ok
	2018	21	2	23	21	2	23	46	Ok
138	2009	24		24	24		24	48	Ok
	2010	24		24	24		24	48	Ok
	2011	24		24	24		24	48	Ok
	2012	24		24	24		24	48	Ok
	2013	24		24	24		24	48	Ok

	2014	24		24	24		24	48	Ok
	2015	23		23	23		23	46	Ok
	2016	23		23	23		23	46	Ok
	2017	24		24	24		24	48	Ok
	2018	22		22	22		22	44	Ok
154	2009	18		18	18		18	36	Ok
	2010	25		25	25		25	50	Ok
	2011	26		26	26		26	52	Ok
	2012	12		12	12		12	24	Ok
	2013	9		9	9		9	18	Ok
	2014	7		7	7		7	14	Ok
178	2009	48		48	44	2	46	94	Ok
	2010	49		49	48	1	49	98	Ok
	2011	53		53	50	3	53	106	Ok
	2012	32	1	33	31	2	33	66	Ok
	2013	31		31	30	1	31	62	Ok
	2014	27		27	26		26	53	Ok
	2015	21		21	21		21	42	Ok
	2016	32		32	32		32	64	Ok
	2017	27		27	27		27	54	Ok
	2018	23		23	23		23	46	Ok
Grand Total		2781	62	2843	2718	78	2796	5639	Ok

MRWA sampling locations in Boston Inner Harbor:



Use?	TRUE					
Temp Summer (J-S)	(All)					
Final Segment Assignment	MA70-02					
Class	(All)					
Dissolved Oxygen mg/L						
Values						
Station ID	Date/time	Surface or Bottom	Min	Max	Ave	Count
075	2009	S	3.3	15.4	7.4	45
		B	3.7	15.7	7.6	44
	2010	S	1.3	11.4	6.7	48
		B	2.3	11.1	7.0	47
	2011	S	3.1	13.0	7.0	53
		B	2.7	13.3	6.7	52
	2012	S	2.2	10.7	6.3	33
		B	2.7	10.8	6.5	32
	2013	S	4.5	10.2	7.3	31
		B	4.1	10.8	7.5	28
	2014	S	4.5	10.7	7.4	27
		B	4.3	10.2	7.3	26
	2015	S	4.1	11.0	7.5	21
		B	4.6	10.9	7.6	20
	2016	S	3.7	10.6	7.3	32
		B	4.7	10.6	7.2	27
	2017	S	4.8	10.2	7.6	27
		B	4.3	9.7	7.1	24
2018	S	4.0	11.3	7.3	23	
	B	3.8	11.0	6.8	23	
075 Total			1.3	15.7	7.1	663

Between 2009 and 2018 there were 99 of 663 measurements <5.0mg/L (~14.9%) but between 2014 and 2018 only 17 of 250 measurements <5.0mg/L (~7%).

Site 075 measurements less than 5.0mg/L in 2018

DEP segment	Station ID	Surface or Bottom	Date/time (EASTERN STAN	Depth of measurement (m)	Temperature (C)	Salinity (PSU)	Dissolved Oxygen (mg/L)
MA70-02	075	S	8/21/2018 8:14	0.1	21	21.94	4.58
MA70-02	075	S	8/31/2018 8:02	0.1	21.96	27.38	3.96
MA70-02	075	B	8/31/2018 8:02	1	21.99	28.06	3.77
MA70-02	075	B	8/21/2018 8:14	3.2	20.88	28.64	4.96

Site 075 measurements less than 5.0mg/L in 2017

DEP segment	Station ID	Surface or Bottom	Date/time (EASTERN	Depth of measurement (m)	Temperature (C)	Salinity (PSU)	Dissolved Oxygen (mg/L)
MA70-02	075	S	7/28/2017 9:31	0.1	18.64	28.55	4.75
MA70-02	075	B	7/28/2017 9:31	0.9	18.57	28.68	4.3

Site 075 measurements less than 5.0mg/L in 2016

DEP segment	Station ID	Surface or Bottom	Date/time (EASTERN S	Depth of measurement (m)	Temperature (C)	Salinity (PSU)	Dissolved Oxygen (mg/L)
MA70-02	075	S	8/8/2016 9:03	0.1	22.16	29.21	3.66
MA70-02	075	S	8/10/2016 9:03	0.1	21.22	30.88	4.82

DEP segment	Station ID	Surface or Bottom	Date/time (EASTERN S	Depth of measurement (m)	Temperature (C)	Salinity (PSU)	Dissolved Oxygen (mg/L)
MA70-02	075	B	9/22/2016 9:51	0.85	20.4	30.3	4.91
MA70-02	075	B	8/10/2016 9:03	1.1	21.17	31.63	4.67

Site 075 measurements less than 5.0mg/L in 2015

DEP segment	Station ID	Surface or Bottom	Date/time (EASTERN S	Depth of measurement (m)	Temperature (C)	Salinity (PSU)	Dissolved Oxygen (mg/L)
MA70-02	075	S	6/24/2015 9:16	0.1	16.69	25.14	4.11

DEP segment	Station ID	Surface or Bottom	Date/time (EASTERN S	Depth of measurement (m)	Temperature (C)	Salinity (PSU)	Dissolved Oxygen (mg/L)
MA70-02	075	B	6/24/2015 9:16	1.2	16.35	29.86	4.6

Site 075 measurements less than 5.0mg/L in 2014

DEP segment	Station ID	Surface or Bottom	Date/time (EASTERN S	Depth of measurement (m)	Temperature (C)	Salinity (PSU)	Dissolved Oxygen (mg/L)
MA70-02	075	S	10/1/2014 11:00	0.1	17.44	24.09	4.49
MA70-02	075	S	7/15/2014 8:00	0.1	17.39	26.31	4.83
MA70-02	075	S	9/30/2014 9:56	0.1	17.95	29.07	4.71

DEP segment	Station ID	Surface or Bottom	Date/time (EASTERN S	Depth of measurement (m)	Temperature (C)	Salinity (PSU)	Dissolved Oxygen (mg/L)
MA70-02	075	B	10/1/2014 11:00	1.2	18.18	29.69	4.28
MA70-02	075	B	9/30/2014 9:56	1.3	18.31	30.53	4.75

Site 018 measurements less than 5.0mg/L in 2018

DEP segment	Station ID	Surface or Bottom	Date/time (EASTERN S	Depth of measurement (m)	Temperature (C)	Salinity (PSU)	Dissolved Oxygen (mg/L)
MA70-02	018	B	8/24/2018 7:55	5.4	20.54	29.95	4.5
MA70-02	018	B	8/21/2018 7:50	7.8	19.72	30	4.73
MA70-02	018	B	9/5/2018 7:13	8.3	20.08	31.14	4.22

Site 014 measurements less than 5.0mg/L DO in 2015

DEP segment	Station ID	Surface or Bottom	Date/time (EASTERN S	Depth of measurement (m)	Temperature (C)	Salinity (PSU)	Dissolved Oxygen (mg/L)
MA70-02	014	B	7/14/2015 9:48	12.3	17.84	31.1	4.98
MA70-02	014	B	7/28/2015 10:05	11.7	19.27	31.14	4.05
MA70-02	014	B	7/27/2015 7:29	12.1	19.05	31.51	4.58

Site 022 measurements less than 5.0mg/L in 2015

DEP segment	Station ID	Surface or Bottom	Date/time (EASTERN S	Depth of measurement (m)	Temperature (C)	Salinity (PSU)	Dissolved Oxygen (mg/L)
MA70-02	022	B	7/27/2015 7:02	15.1	19.03	31.62	4.19

Use?	TRUE
Temp Summer (J-S)	(All)
Final Segment Assignment	MA70-02
Class	(All)

Dissolved Oxygen mg/L						
Station ID	Date/time	Surface or Bottom	Values			
			Min	Max	Ave	Count
014	2009	S	6.6	11.9	8.2	21
		B	5.0	9.9	7.0	21
	2010	S	6.9	9.9	8.2	19
		B	4.8	9.7	7.5	19
	2011	S	6.5	10.1	8.1	25
		B	4.9	8.8	7.0	23
	2012	S	6.3	12.2	7.9	21
		B	5.7	10.3	7.0	21
	2013	S	1.4	11.4	8.2	23
		B	1.4	11.0	7.3	23
	2014	S	6.7	10.5	8.3	20
		B	6.1	9.7	7.7	20
	2015	S	6.2	11.7	8.7	20
		B	4.1	10.3	7.1	19
	2016	S	6.6	11.2	8.5	30
		B	5.0	10.1	7.9	30
	2017	S	6.4	11.4	8.4	31
		B	5.9	10.1	7.8	31

	2018	S	6.8	10.9	8.8	25
		B	5.7	10.3	8.0	25
014 Total			1.4	12.2	7.9	467
015	2009	S	7.2	11.6	9.1	21
		B	6.2	9.9	7.4	21
	2010	S	6.8	9.5	8.3	18
		B	5.7	9.8	7.7	18
	2011	S	7.2	14.3	8.8	25
		B	5.8	8.8	7.2	23
	2012	S	6.5	11.6	8.5	28
		B	6.2	10.0	7.2	27
	2013	S	7.2	12.4	9.2	23
		B	1.4	11.4	7.4	23
	2014	S	7.4	12.2	9.0	20
		B	5.0	9.8	7.7	20
	2015	S	6.6	12.7	9.3	21
		B	5.0	10.4	7.5	19
	2016	S	6.8	10.6	8.5	30
		B	5.8	10.0	7.9	30
	2017	S	6.6	11.7	8.6	31
		B	5.3	10.1	7.8	31
	2018	S	6.8	10.9	9.0	25
		B	5.8	10.4	8.2	25
015 Total			1.4	14.3	8.2	479
018	2009	S	6.1	16.5	9.1	48
		B	4.1	13.4	8.1	45
	2010	S	4.9	12.3	8.4	48
		B	3.8	11.5	8.1	49

	2011	S	5.1	13.3	8.0	53
		B	4.5	13.0	7.4	53
	2012	S	4.4	11.2	7.6	33
		B	4.8	10.7	7.2	33
	2013	S	5.6	11.8	8.7	31
		B	2.7	11.1	7.8	31
	2014	S	6.5	10.9	8.5	27
		B	5.6	10.3	7.8	26
	2015	S	6.0	12.9	8.2	26
		B	5.9	11.2	7.8	26
	2016	S	6.1	10.5	8.1	32
		B	5.9	10.6	7.7	32
	2017	S	6.0	10.9	8.1	27
		B	5.6	9.9	7.8	27
	2018	S	5.6	11.5	8.1	23
		B	4.2	10.3	7.0	23
018 Total			2.7	16.5	8.0	693
019	2009	S	6.9	13.1	8.6	32
		B	6.2	11.3	7.8	32
	2010	S	7.4	10.0	8.4	21
		B	6.5	9.9	8.1	21
	2011	S	6.3	11.2	8.4	26
		B	6.2	10.1	7.6	24
	2012	S	7.1	11.3	8.1	21
		B	6.3	10.0	7.4	21
	2013	S	6.9	11.9	8.7	23
		B	5.9	11.3	8.1	23
	2014	S	7.2	10.4	8.5	20

		B	6.7	10.0	8.1	20
	2015	S	6.5	11.7	8.9	20
		B	6.1	10.8	8.0	20
	2016	S	6.6	10.4	8.5	29
		B	6.3	10.4	8.2	30
	2017	S	6.8	11.0	8.5	31
		B	6.6	10.3	8.2	31
	2018	S	6.7	10.6	8.9	25
		B	6.2	10.6	8.5	25
019 Total			5.9	13.1	8.3	495
022	2009	S	6.8	10.8	8.6	22
		B	5.5	10.0	7.4	22
	2010	S	7.2	10.1	8.5	19
		B	6.1	9.9	8.0	19
	2011	S	7.3	11.3	8.6	24
		B	6.1	9.3	7.5	22
	2012	S	7.0	10.5	8.4	28
		B	4.8	9.9	7.1	27
	2013	S	7.3	12.0	9.0	23
		B	4.9	11.4	7.8	23
	2014	S	7.6	10.6	8.9	20
		B	6.3	10.1	7.9	20
	2015	S	6.7	11.6	9.1	21
		B	4.2	10.3	7.8	19
	2016	S	7.2	10.4	8.6	29
		B	5.4	10.3	8.1	30
	2017	S	6.7	10.9	8.5	31
		B	6.2	10.4	8.1	31

	2018	S	6.8	10.5	9.1	25
		B	6.4	10.5	8.6	25
022 Total			4.2	12.0	8.3	480
024	2009	S	7.1	11.8	9.0	60
		B	6.9	11.3	8.5	54
	2010	S	7.4	10.8	8.9	53
		B	7.2	10.6	8.8	52
	2011	S	7.0	11.5	8.9	57
		B	6.6	11.1	8.5	55
	2012	S	7.3	11.4	8.8	52
		B	7.0	10.9	8.6	51
	2013	S	7.2	12.7	9.4	47
		B	5.6	12.6	9.0	47
	2014	S	7.2	12.1	9.3	44
		B	7.2	12.1	9.3	44
	2015	S	6.9	12.3	9.3	44
		B	6.9	12.0	9.1	42
	2016	S	6.9	11.6	9.0	53
		B	6.9	11.7	9.0	53
	2017	S	7.0	11.3	8.9	55
		B	6.8	11.1	8.8	55
	2018	S	6.6	11.2	9.3	46
		B	6.7	10.9	9.1	47
024 Total			5.6	12.7	9.0	1011
075	2009	S	3.3	15.4	7.4	45
		B	3.7	15.7	7.6	44
	2010	S	1.3	11.4	6.7	48
		B	2.3	11.1	7.0	47

	2011	S	3.1	13.0	7.0	53
		B	2.7	13.3	6.7	52
	2012	S	2.2	10.7	6.3	33
		B	2.7	10.8	6.5	32
	2013	S	4.5	10.2	7.3	31
		B	4.1	10.8	7.5	28
	2014	S	4.5	10.7	7.4	27
		B	4.3	10.2	7.3	26
	2015	S	4.1	11.0	7.5	21
		B	4.6	10.9	7.6	20
	2016	S	3.7	10.6	7.3	32
		B	4.7	10.6	7.2	27
	2017	S	4.8	10.2	7.6	27
		B	4.3	9.7	7.1	24
	2018	S	4.0	11.3	7.3	23
		B	3.8	11.0	6.8	23
075 Total			1.3	15.7	7.1	663
138	2009	S	6.3	12.1	8.9	24
		B	6.3	11.7	8.5	24
	2010	S	6.6	11.5	9.0	24
		B	6.0	10.3	8.7	24
	2011	S	6.6	11.7	8.9	24
		B	5.6	11.1	8.4	24
	2012	S	6.7	11.2	9.0	24
		B	5.8	10.8	8.5	24
	2013	S	6.8	12.7	9.5	24
		B	6.1	12.1	9.0	24
	2014	S	6.5	11.9	9.6	24

		B	6.6	11.9	9.1	24
	2015	S	7.2	12.7	9.2	23
		B	6.5	12.1	8.9	23
	2016	S	6.7	11.5	9.5	23
		B	6.5	11.2	9.1	23
	2017	S	6.7	11.3	9.2	24
		B	6.2	11.0	8.7	24
	2018	S	6.5	11.5	9.5	22
		B	5.9	10.8	8.8	22
138 Total			5.6	12.7	9.0	472
154	2009	S	6.8	13.4	10.4	18
		B	7.0	13.4	10.3	18
	2010	S	5.5	13.0	9.1	25
		B	6.3	11.3	9.0	25
	2011	S	5.3	12.9	8.5	26
		B	5.7	12.6	8.3	26
	2012	S	5.4	11.2	9.2	12
		B	6.5	10.8	9.1	12
	2013	S	6.6	11.2	9.6	9
		B	6.9	10.9	9.4	9
	2014	S	7.0	10.7	9.6	7
		B	6.1	10.4	9.1	7
154 Total			5.3	13.4	9.2	194
178	2009	S	6.2	13.4	9.1	48
		B	3.4	13.7	8.1	46
	2010	S	5.5	12.6	8.7	49
		B	1.6	11.5	8.2	49
	2011	S	5.7	13.1	8.3	53

		B	2.9	12.8	7.4	53
2012		S	4.7	11.4	7.9	33
		B	1.8	10.6	7.1	33
2013		S	5.9	11.7	8.8	31
		B	4.7	11.1	8.0	31
2014		S	6.5	11.2	8.6	27
		B	5.7	10.5	7.9	26
2015		S	6.2	13.4	8.5	21
		B	6.2	11.5	7.9	21
2016		S	6.0	10.6	8.1	32
		B	5.8	10.7	7.8	32
2017		S	6.6	10.5	8.2	27
		B	6.2	10.0	8.0	27
2018		S	6.6	11.7	8.4	23
		B	5.2	10.6	7.4	23
178 Total			1.6	13.7	8.1	685
Grand Total			1.3	16.5	8.3	5639

Use? TRUE

Dissolved Oxygen Check for >4mg/l

Count of >4 DO Check		Surface or Bottom >4 DO Check		S Total		B Total		Grand Total
Final Segment Assignment	Station ID	High	Low	High	Low	High	Low	
								Is the DO at surface OR bottom too low?

									(>=4mg/l = OK)
MA70-02	014	234	1	235	230	2	232	467	Ok
	015	242		242	236	1	237	479	Ok
	018	348		348	342	3	345	693	Ok
	019	248		248	247		247	495	Ok
	022	242		242	238		238	480	Ok
	024	511		511	500		500	1011	Ok
	075	314	26	340	309	14	323	663	Ok
	138	236		236	236		236	472	Ok
	154	97		97	97		97	194	Ok
	178	344		344	337	4	341	685	Ok
Grand Total		2816	27	2843	2772	24	2796	5639	Ok

Use? TRUE

Dissolved Oxygen Check for >4mg/l by Year

Count of >4 DO Check			Surface or Bottom		>4 DO Check		Grand Total			
Final Segment Assignment	Station ID	Date/time	S		S Total	B		B Total	Grand Total	
			High	Low		High	Low			
MA70-02	014	2009	21		21	21		21	42	Ok
		2010	19		19	19		19	38	Ok
		2011	25		25	23		23	48	Ok
		2012	21		21	21		21	42	Ok

	2013	22	1	23	21	2	23	46	Ok
	2014	20		20	20		20	40	Ok
	2015	20		20	19		19	39	Ok
	2016	30		30	30		30	60	Ok
	2017	31		31	31		31	62	Ok
	2018	25		25	25		25	50	Ok
015	2009	21		21	21		21	42	Ok
	2010	18		18	18		18	36	Ok
	2011	25		25	23		23	48	Ok
	2012	28		28	27		27	55	Ok
	2013	23		23	22	1	23	46	Ok
	2014	20		20	20		20	40	Ok
	2015	21		21	19		19	40	Ok
	2016	30		30	30		30	60	Ok
	2017	31		31	31		31	62	Ok
	2018	25		25	25		25	50	Ok
018	2009	48		48	45		45	93	Ok
	2010	48		48	48	1	49	97	Ok
	2011	53		53	53		53	106	Ok
	2012	33		33	33		33	66	Ok
	2013	31		31	29	2	31	62	Ok
	2014	27		27	26		26	53	Ok
	2015	26		26	26		26	52	Ok
	2016	32		32	32		32	64	Ok
	2017	27		27	27		27	54	Ok
	2018	23		23	23		23	46	Ok
019	2009	32		32	32		32	64	Ok
	2010	21		21	21		21	42	Ok

	2011	26	26	24	24	50	Ok
	2012	21	21	21	21	42	Ok
	2013	23	23	23	23	46	Ok
	2014	20	20	20	20	40	Ok
	2015	20	20	20	20	40	Ok
	2016	29	29	30	30	59	Ok
	2017	31	31	31	31	62	Ok
	2018	25	25	25	25	50	Ok
022	2009	22	22	22	22	44	Ok
	2010	19	19	19	19	38	Ok
	2011	24	24	22	22	46	Ok
	2012	28	28	27	27	55	Ok
	2013	23	23	23	23	46	Ok
	2014	20	20	20	20	40	Ok
	2015	21	21	19	19	40	Ok
	2016	29	29	30	30	59	Ok
	2017	31	31	31	31	62	Ok
	2018	25	25	25	25	50	Ok
024	2009	60	60	54	54	114	Ok
	2010	53	53	52	52	105	Ok
	2011	57	57	55	55	112	Ok
	2012	52	52	51	51	103	Ok
	2013	47	47	47	47	94	Ok
	2014	44	44	44	44	88	Ok
	2015	44	44	42	42	86	Ok
	2016	53	53	53	53	106	Ok
	2017	55	55	55	55	110	Ok
	2018	46	46	47	47	93	Ok

075	2009	40	5	45	42	2	44	89	Too High
	2010	40	8	48	44	3	47	95	Too High
	2011	50	3	53	49	3	52	105	Ok
	2012	25	8	33	27	5	32	65	Too High
	2013	31		31	28		28	59	Ok
	2014	27		27	26		26	53	Ok
	2015	21		21	20		20	41	Ok
	2016	31	1	32	27		27	59	Ok
	2017	27		27	24		24	51	Ok
	2018	22	1	23	22	1	23	46	Ok
138	2009	24		24	24		24	48	Ok
	2010	24		24	24		24	48	Ok
	2011	24		24	24		24	48	Ok
	2012	24		24	24		24	48	Ok
	2013	24		24	24		24	48	Ok
	2014	24		24	24		24	48	Ok
	2015	23		23	23		23	46	Ok
	2016	23		23	23		23	46	Ok
	2017	24		24	24		24	48	Ok
	2018	22		22	22		22	44	Ok
154	2009	18		18	18		18	36	Ok
	2010	25		25	25		25	50	Ok
	2011	26		26	26		26	52	Ok
	2012	12		12	12		12	24	Ok
	2013	9		9	9		9	18	Ok
	2014	7		7	7		7	14	Ok
178	2009	48		48	45	1	46	94	Ok
	2010	49		49	48	1	49	98	Ok

2011	53	53	52	1	53	106	Ok	
2012	33	33	32	1	33	66	Ok	
2013	31	31	31		31	62	Ok	
2014	27	27	26		26	53	Ok	
2015	21	21	21		21	42	Ok	
2016	32	32	32		32	64	Ok	
2017	27	27	27		27	54	Ok	
2018	23	23	23		23	46	Ok	
Grand Total	2816	27	2843	2772	24	2796	5639	Ok

Dorchester Bay (MA70-03)

Location:	From the mouth of the Neponset River, Boston/Quincy to the line between Head Island and the north side of Thompson Island and the line between the south point of Thompson Island, Boston and Chapel Rocks, Quincy.
AU Type:	ESTUARY
AU Size:	3.46 SQUARE MILES
Classification/Qualifier:	SB: SFR, CSO

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Enterococcus	R1_MA_2019_01	Changed
5	5	Fecal Coliform	R1_MA_2019_01	Changed

Fish, other Aquatic Life and Wildlife Use: Fully Supporting

Benthic macroinvertebrate sampling (and sediment analysis) has been conducted in Dorchester Bay since 1991. In 2018 Sediment Profile Imaging was conducted at six stations, including five reconnaissance and the one traditional station (T04-Savin Hill Cove). The site is in a depositional area and is characterized by fine-grained sediments comprised almost entirely silt and clay. Station T04 has consistently supported comparatively the lowest species richness during the 2011-2018 timeframe, with moderate total abundance and low species richness (dominated by *S. benedicti*). MWRA staff also noted that abundances of the sewage tracer bacterium "*Clostridium perfringens*" (normalized to percent fines) at T04 were variable from 2008 to 2018; but while showing a slight increase in 2018 from the previous year, were still low compared to historic data. No eelgrass bed habitat is present. From 2009 - 2018 MWRA staff conducted *in-situ* monitoring at seven sites in Dorchester Bay (033, 036, 038, 039, 040, 084, 140) and nutrient sampling at two (038: North Dorchester Bay, 140: South Dorchester Bay, near Columbia Point and Savin Hill Cove). Depth at 038 and 140 ranged from 1.5 to 9.0m and 2.2 to 12.3m, respectively. DO at all seven sites ranged from 3.3 to 15.2mg/L (n=3686 including both surface and bottom measurements) but was <5.0mg/L in only four samples (two surface and bottom) on 28 May 2009. Saturation was >125% in >10% of measurements at two sites (036 and 040) in 2013 and 2014 but otherwise good at all sites in all years. The maximum temperature was 25.7°C (n=3678) and pH ranged from 6.63 to 8.62 SU (n=3686, just once >8.3SU). Chlorophyll a concentrations ranged from 0.17 to 68.10µg/L (average 4.30µg/L, n=942) with concentrations >10µg/L in 2014 and 2015 at station 038 and between 2013 and 2016 at site 140. The seasonal average total nitrogen concentrations did not exceed 0.4mg/L in any year at station 038 but was slightly above 0.4mg/L at station 140 (maximum of 0.427mg/L) in 4 of the 10 sample years (2009, 2011, 2013, and 2017). The year-round total nitrogen averages ranged from 0.165 to 0.985mg/L (overall average 0.353mg/L (n=469). No additional data/information (impingement/entrainment) was available for the UMass Boston power plant in the vicinity of Columbia Point Peninsula/Savin Hill Cove.

The Aquatic Life Use of Dorchester Bay (MA70-03) is assessed as Fully Supporting due to the generally good water quality and fairly stable, although with lower species richness than other Boston Harbor monitoring locations, macroinvertebrate community. The alert for degraded sediment quality is being carried forward due to a lack of recent data and in acknowledgement of the relatively low macroinvertebrate species richness in the bay.

2018/20 Delisted Impairment	Delisting Reason	Delisting Comment
Enterococcus	TMDL approved or established by EPA (4a)	Impairment covered under TMDL: Pathogen TMDL for the Boston Harbor, Weymouth-Weir, and Mystic Watersheds (Report CN 157.1, approved 11/21/2018, ATTAINS Action ID: R1_MA_2019_01)
Fecal Coliform	TMDL approved or established by EPA (4a)	Impairment covered under TMDL: Pathogen TMDL for the Boston Harbor, Weymouth-Weir, and Mystic Watersheds (Report CN 157.1, approved 11/21/2018, ATTAINS Action ID: R1_MA_2019_01)

Hingham Bay (MA70-06)

Location:	The area north of the mouth of the Weymouth Fore River extending on the west along the line between Nut Island and the south point of West Head, and on the east side along a line from Prince Head just east of Pig Rock to the mouth of the Weymouth Fore River (midway between Lower Neck and Manot Beach), Quincy.
AU Type:	ESTUARY
AU Size:	0.96 SQUARE MILES
Classification/Qualifier:	SB: SFR

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Fecal Coliform	R1_MA_2019_01	Changed

Fish, other Aquatic Life and Wildlife Use: Fully Supporting
<p>Between 2009 and 2018 MWRA staff conducted <i>in-situ</i> monitoring at one station (080: Hingham Bay, Quincy Yacht Club - red nun #2) in this Hingham Bay AU (MA70-06). Depth at this site ranged from 1.5 to 12.7m. Dissolved oxygen (DO) was good ranging from 5.3 and 12.4mg/L (n=439, including both surface and bottom measurements). DO% saturation ranged from 66.3 to 134.2% and was slightly elevated (>125%) on only five days (8 of 439 measurements). The maximum temperature measured was 22.7°C (n=256) and pH ranged from 7.2 to 8.2SU (n=439).</p> <p>The Aquatic Life Use for this Hingham Bay AU (MA70-06) is assessed as Fully Supporting based on the <i>in-situ</i> sampling data conducted by MRWA staff between 2009 and 2018 that were indicative of generally good conditions.</p>

2018/20 Delisted Impairment	Delisting Reason	Delisting Comment
Fecal Coliform	TMDL approved or established by EPA (4a)	Impairment covered under TMDL: Pathogen TMDL for the Boston Harbor, Weymouth-Weir, and Mystic Watersheds (Report CN 157.1, approved 11/21/2018, ATTAINS Action ID: R1_MA_2019_01)

Hingham Bay (MA70-07)

Location:	The area defined between Peddocks Island and Windmill Point; from Windmill Point southeast to Bumkin Island; from Bumkin Island southeast to Sunset Point; from Sunset Point across the mouth of the Weir River to Worlds End; from Worlds End across the mouth of Hingham Harbor to Crow Point; from Beach Lane, Hingham across the mouth of the Weymouth Back River to Lower Neck; and from Lower Neck midway across the mouth of the Weymouth Fore River.
AU Type:	ESTUARY
AU Size:	4.8 SQUARE MILES
Classification/Qualifier:	SB: SFR

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Estuarine Bioassessments		Added
5	5	Fecal Coliform	R1_MA_2019_01	Changed

Fish, other Aquatic Life and Wildlife Use: Not Supporting
<p>Benthic macroinvertebrate sampling (and sediment analysis) has been conducted in Boston Harbor since 1991. In 2018 Sediment Profile Imaging was conducted at 12 reconnaissance stations and one traditional station (T08-just Northwest of Bumpkin Island adjacent to Hull Bay), in this Hingham Bay AU (MA70-07). Sediments at this site consisted primarily of sand and gravel. This site was generally found to be one of the most species-rich stations in Boston Harbor from 2011 through 2018. Between 2017 and 2018 there was a decrease in mean total abundance of macroinvertebrates though was within the range observed in recent years. It was also noted that the variability in abundance, consistent with observations of the dominant taxa, were related more to normal physical disturbances than organic stress. MWRA also noted that abundances of the sewage tracer bacterium "<i>Clostridium perfringens</i>" at T08 were variable from 2008 to 2018; but while showing a peak in 2016 (an artifact of normalizing the counts by percent fine sediments), overall concentrations have remained lower during the past decade than those reported during the 1990s. Eelgrass is considered a sentinel species for embayment health. In 1995 MassDEP's Eelgrass Mapping Project found that ~5.6% of this Hingham Bay AU (MA70-07) had eelgrass bed habitat (~0.04923mi²). In 2013 the size of eelgrass beds was less (0.00434mi²), despite a small rebound in 2007 but no eelgrass bed habitat was documented in 2017. From 2009-2018 MWRA staff conducted <i>in-situ</i> monitoring and nutrient sampling at one station (site 124: Crow Point Flats) within this Hingham Bay AU (MA70-07). Depth ranged from 0.1 to 7.5m. DO was good (range 7.1 to 13.2mg/L (n=348, including both surface and bottom measurements). DO% saturation ranged from 80.1 to 132%, rarely above >125% (one day each in April 2013 and July 2014). The maximum temperature was 22.73°C (n=122) and pH ranged from 7.5 to 8.2SU (n=348). Chlorophyll <i>a</i> concentrations ranged from 0.58 to 16.0µg/L (average 3.99µg/L, n=348) with concentrations >10µg/L in >10% of measurements in 2017 only (in both surface and bottom samples). Seasonal average total nitrogen concentrations were all below 0.4mg/L (overall average 0.25mg/L (n=173) with year-round averages ranging from 0.154 to 0.385mg/L.</p> <p>The Aquatic Life Use for this Hingham Bay AU (MA70-07) is assessed as Not Supporting due the complete loss of eelgrass bed habitat between 1995 and 2017 so the Estuarine Bioassessments Impairment is being added. The former alert for eelgrass bed habitat loss is no longer needed. The other benthic and water quality data collected by MRWA between 2009 and 2018 were indicative of generally good conditions.</p>

2018/20 Delisted Impairment	Delisting Reason	Delisting Comment
Fecal Coliform	TMDL approved or established by EPA (4a)	Impairment covered under TMDL: Pathogen TMDL for the Boston Harbor, Weymouth-Weir, and Mystic Watersheds (Report CN 157.1, approved 11/21/2018, ATTAINS Action ID: R1_MA_2019_01)

Hull Bay (MA70-09)

Location:	The area defined east of a line from Windmill Point, Hull to Bumkin Island, Hull and from Bumkin Island to Sunset Point, Hull.
AU Type:	ESTUARY
AU Size:	2.48 SQUARE MILES
Classification/Qualifier:	SB: SFR

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Estuarine Bioassessments		Added
5	5	Fecal Coliform	R1_MA_2019_01	Changed

Fish, other Aquatic Life and Wildlife Use: Not Supporting
Eelgrass is considered a sentinel species for embayment health. In 1995 MassDEP’s Eelgrass Mapping Project found that ~0.6% of Hull Bay had eelgrass bed habitat (~0.01162mi ²). In 2013 the size of eelgrass beds was less (~0.00017mi ²), despite a small rebound in 2007 but no eelgrass bed habitat was documented in 2017. The Aquatic Life Use for Hull Bay is assessed as Not Supporting due the complete loss of eelgrass bed habitat between 1995 and 2017 so the Estuarine Bioassessments Impairment is being added. The former alert for eelgrass bed habitat loss is no longer needed.

2018/20 Delisted Impairment	Delisting Reason	Delisting Comment
Fecal Coliform	TMDL approved or established by EPA (4a)	Impairment covered under TMDL: Pathogen TMDL for the Boston Harbor, Weymouth-Weir, and Mystic Watersheds (Report CN 157.1, approved 11/21/2018, ATTAINS Action ID: R1_MA_2019_01)

Pleasure Bay (MA70-11)

Location:	A semi-enclosed bay, the flow restricted through two channels between Castle and Head islands, Boston.
AU Type:	ESTUARY
AU Size:	0.22 SQUARE MILES
Classification/Qualifier:	SB: SFR

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Fecal Coliform	R1_MA_2019_01	Changed

Fish, other Aquatic Life and Wildlife Use: Not Assessed
No data are available to assess the Aquatic Life Use for Pleasure Bay, so it is Not Assessed.

2018/20 Delisted Impairment	Delisting Reason	Delisting Comment
Fecal Coliform	TMDL approved or established by EPA (4a)	Impairment covered under TMDL: Pathogen TMDL for the Boston Harbor, Weymouth-Weir, and Mystic Watersheds (Report CN 157.1, approved 11/21/2018, ATTAINS Action ID: R1_MA_2019_01)

Quincy Bay (MA70-04)

Location:	From Bromfield Street near the Wollaston Yacht Club, northeast to N42 17.3 W71 00.1, then southeast to Houghs Neck near Sea Street and Peterson Road (formerly referred to as the "Willows"), Quincy.
AU Type:	ESTUARY
AU Size:	1.52 SQUARE MILES
Classification/Qualifier:	SA: SFO

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Enterococcus	R1_MA_2019_01	Changed
5	5	Fecal Coliform	R1_MA_2019_01	Changed

Fish, other Aquatic Life and Wildlife Use: Fully Supporting
<p>From 2009 – 2018 MWRA staff conducted <i>in-situ</i> monitoring at one station (047: Wollaston Beach, off storm drains 7 and 8 at Sachem St). in this Quincy Bay AU (MA70-04). Depth ranged from 0.1m to 4.5m. Dissolved oxygen concentrations ranged between 4.91 and 13.21mg/L (n=421, including both surface and bottom measurements) with only one measurement below 5mg/L. DO% saturation was rarely above 125% (once in 2011 and 2018 and twice in 2013). The maximum temperature was 27.1°C (n=242) and pH ranged from 7.21 to 8.22SU (n=421).</p> <p>The Aquatic Life Use of this Quincy Bay AU (MA70-04) is assessed as Fully Supporting based on the generally good water quality conditions documented by MRWA between 2009 and 2018.</p>

2018/20 Delisted Impairment	Delisting Reason	Delisting Comment
Enterococcus	TMDL approved or established by EPA (4a)	Impairment covered under TMDL: Pathogen TMDL for the Boston Harbor, Weymouth-Weir, and Mystic Watersheds (Report CN 157.1, approved 11/21/2018, ATTAINS Action ID: R1_MA_2019_01)
Fecal Coliform	TMDL approved or established by EPA (4a)	Impairment covered under TMDL: Pathogen TMDL for the Boston Harbor, Weymouth-Weir, and Mystic Watersheds (Report CN 157.1, approved 11/21/2018, ATTAINS Action ID: R1_MA_2019_01)

Quincy Bay (MA70-05)

Location:	Quincy Bay, north of the class SA waters (segment MA70-04), Quincy to the line between Moon Head and Nut Island, Quincy.
AU Type:	ESTUARY
AU Size:	4.41 SQUARE MILES
Classification/Qualifier:	SB: SFR

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Enterococcus	R1_MA_2019_01	Changed
5	5	Fecal Coliform	R1_MA_2019_01	Changed

Fish, other Aquatic Life and Wildlife Use: Fully Supporting
<p>Benthic macroinvertebrate sampling (and sediment analysis) has been conducted in Boston Harbor since 1991. In 2018 Sediment Profile Imaging was conducted at seven stations, including six reconnaissance and one traditional station (T07) in this Quincy Bay AU (MA70-05). Sediment at this site was comprised of nearly equal proportions of sand and silt-clay. This site has typically supported low infaunal abundance (compared to other areas in the harbor) and from 2017 to 2018 a decrease in mean total abundance was observed. Species richness, which reached unusual peaks in 2013 and 2016, exhibited typical species richness in 2018. Variability in abundance from year to year is considered to be related more to normal physical disturbances than organic stress. Abundances of the sewage tracer bacterium <i>Clostridium perfringens</i> (normalized to percent fines) at T07 during 2018, were generally low when compared to historic data. From 2009-2018 MWRA staff conducted <i>in-situ</i> and nutrient monitoring at one site in this Quincy Bay AU (MA70-05) (139: Off Hangmans Island). Depth ranged from 0.1 to 7m. Dissolved oxygen concentrations ranged from 6.7 to 12.6mg/L (n=468, including both surface and bottom measurements) with saturations ranging from 79.9 to 133.3% (rarely above 125%). The maximum temperature was 22.98°C (n=158) and pH ranged from 7.4 to 8.3 SU (n=468). Chlorophyll <i>a</i> concentration ranged between 0.24 and 16.5µg/L (n=471, overall average 3.37µg/L, summer average 3.47µg/L) and were infrequently >10µg/L (exception 2017 with three surface measurements above 10µg/L representing slightly >10% of the samples). The seasonal average total nitrogen concentrations were all below 0.4mg/L (range 0.209 to 0.278mg/L, n= 197), with an overall year-round average of 0.252mg/L (n=234).</p> <p>The Aquatic Life Use of this Quincy Bay AU (MA70-05) is assessed as Fully Supporting based on the MRWA 2008 – 2018 monitoring data indicative of a fairly stable benthic community and good water quality conditions.</p>

2018/20 Delisted Impairment	Delisting Reason	Delisting Comment
Enterococcus	TMDL approved or established by EPA (4a)	Impairment covered under TMDL: Pathogen TMDL for the Boston Harbor, Weymouth-Weir, and Mystic Watersheds (Report CN 157.1, approved 11/21/2018, ATTAINS Action ID: R1_MA_2019_01)
Fecal Coliform	TMDL approved or established by EPA (4a)	Impairment covered under TMDL: Pathogen TMDL for the Boston Harbor, Weymouth-Weir, and Mystic Watersheds (Report CN 157.1, approved 11/21/2018, ATTAINS Action ID: R1_MA_2019_01)

Winthrop Bay (MA70-10)

Location:	From the tidal flats at Coleridge Street, Boston (East Boston) to a line between Logan International Airport and Point Shirley, Boston/Winthrop.
AU Type:	ESTUARY
AU Size:	1.65 SQUARE MILES
Classification/Qualifier:	SB: SFR

2016 AU Category	2018/20 AU Category	Impairment	ATTAINS Action ID	Impairment Change Summary
5	5	Enterococcus	R1_MA_2019_01	Changed
5	5	Fecal Coliform	R1_MA_2019_01	Changed

Fish, other Aquatic Life and Wildlife Use: Fully Supporting
<p>One modified acute and chronic whole effluent toxicity test using <i>Menidia beryllina</i> was conducted on a grab sample from the Logan International Airport (NPDES # MA0000787, Outfall 001B) during a wet weather deicing episode in April 2011. The test results were as follows: LC₅₀ 100%, ANOEC and CNOEC 25% effluent. From 2009 – 2018 MWRA staff conducted <i>in-situ</i> monitoring at one site in Winthrop Bay (130 at Green Can #1 - in channel between Snake Island and Logan International Airport). Depth ranged from 3.5 to 11.5m. Dissolved oxygen concentrations ranged between 6.6 and 12.4mg/L (n=439, including both surface and bottom measurements). Saturations were occasionally slightly above 125% (but only in a few sampling events in 2013, 2014 and 2018, ~2% samples). The maximum temperature was 23.8°C (n=254) and pH ranged from 6.7 to 8.3 SU (n=432). The Aquatic Life Use for Winthrop Bay is assessed as Fully Supporting based on the generally good water quality conditions documented by MRWA between 2009 and 2018.</p>

2018/20 Delisted Impairment	Delisting Reason	Delisting Comment
Enterococcus	TMDL approved or established by EPA (4a)	Impairment covered under TMDL: Pathogen TMDL for the Boston Harbor, Weymouth-Weir, and Mystic Watersheds (Report CN 157.1, approved 11/21/2018, ATTAINS Action ID: R1_MA_2019_01)
Fecal Coliform	TMDL approved or established by EPA (4a)	Impairment covered under TMDL: Pathogen TMDL for the Boston Harbor, Weymouth-Weir, and Mystic Watersheds (Report CN 157.1, approved 11/21/2018, ATTAINS Action ID: R1_MA_2019_01)

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