PUBLIC NOTICE REGARDING PROPOSED CHANGES TO THE AMBIENT MONITORING PLAN FOR THE MASSACHUSETTS WATER RESOURCES AUTHORITY EFFLUENT OUTFALL

Pursuant to Section 1.7.c. of its National Pollutant Discharge Elimination System permit, the Massachusetts Water Resources Authority (MWRA) has submitted a list of proposed changes to its Ambient Monitoring Plan for the Massachusetts Water Resources Authority Effluent Outfall to the U.S. Environmental Protection Agency (USEPA) and the Massachusetts Department of Environmental Protection (MassDEP), as follows:

These proposed changes to the 2004 Ambient Monitoring Plan (Revision 1) (MWRA 2004) plan are based on data collected and technical reports written since the monitoring began, including seventeen years of environmental monitoring (eight years of baseline monitoring and nine years of monitoring since relocation of the discharge into Massachusetts Bay began). The proposed monitoring plan revisions reflect that there are now many years of data answering many of the original monitoring questions and indicating that the outfall and Deer Island Wastewater Treatment plant are performing as well or better than predicted. Thus MWRA is proposing appropriate reductions in monitoring and a refocusing of its efforts.

Post-discharge relocation ambient monitoring data support the understanding that the outfall has had only limited effects on Massachusetts Bay while the ecosystem of Boston Harbor continues to dramatically improve. An abundance of scientific monitoring data support these changes; the data are summarized in the proposed AMP Revision 2, and documented in MWRA's many technical reports, as well as in the peer-reviewed scientific literature. This proposed monitoring plan, Revision 2, builds on the scientific understanding gained to appropriately shift the focus and scale of the monitoring.

The proposed changes to the plan were developed and reviewed during public meetings of the Outfall Monitoring Science Advisory Panel (OMSAP) in 2009, and were formally submitted to EPA and DEP October 23, 2009. OMSAP voted to recommend that the changes listed below be accepted. The list of proposed changes has been revised in response to comments received from state regulatory agencies, federal regulatory agencies, public interest groups, and OMSAP since October 23, 2009.

MWRA believes these revisions will provide a better-integrated and more focused program. In addition, it is estimated that the changes will save approximately $800,000 annually in monitoring costs. The remaining monitoring will be substantial, costing MWRA approximately $2 million annually. The changes are summarized below. The

entire Ambient Monitoring Plan Revision 2 is at
http://www.mwra.state.ma.us/harbor/html/whatsnew.htm

The Public Comment Period will close on August 20, 2010 at 5:00 PM. Comments on the Ambient Monitoring Plan for the MWRA Effluent Outfall, Revision 2 can be submitted via mail or email to:

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Updates to the monitoring plan

The results sections have been updated to reflect the findings since the outfall went online. A brief summary of observed pre- versus post-discharge differences is given. Exhaustive technical analyses, synthesis reports, and issues reports comprise more complete descriptions of results to date and are found in MWRA's library of technical reports on on-line at http://www.mwra.state.ma.us/harbor/enquad/trlist.html

Completed studies have been removed from the plan, e.g. plume tracking, sediment transport. The listing and description of other special studies have been updated.

Proposed changes to monitoring activities

This revised Ambient Monitoring Plan incorporates changes recommended by MWRA and presented for review by regulatory agencies and the public.

The proposed Ambient Monitoring Plan for the Massachusetts Water Resources Authority Effluent Outfall, Revision 2 incorporates the following changes (a more detailed list of the exact changes is at the end of this document).:

Effluent

1. Discontinue effluent floatables monitoring.
2. Change special study metals and organic chemicals sampling frequency from "weekly" to "4 times per month."

Water column

1. Reduce the total number of outfall monitoring stations sampled from 33 to 14, focusing the monitoring on the geographic area now known to have the possibility of being affected by the discharge. Reference stations are included, but most of the farther stations are removed. Comment is requested on whether station F15, F14, or a location intermediate between the two is most appropriate for monitoring the southward extent of the plume.
2. Monitor in Cape Cod Bay and Stellwagen Bank NMS at 3 stations, two depths, including *in situ* water quality parameters, water column chemistry, and plankton measurements. These stations will be sampled synoptically with the nearfield stations and reference stations (*i.e.* target the sampling to occur within 48 hours of sampling at the nearfield and reference stations)
3. Change survey schedule from 12 nearfield station surveys and 6 farfield station surveys annually to 9 surveys annually of 5 nearfield stations, 6 reference stations and 3 Cape Cod Bay-Stellwagen Bank National Marine Sanctuary stations. This design will enable MWRA to sample all stations during every survey, and to measure physical, chemical, and plankton parameters at all stations.[1] This will provide a synoptic picture of a broader area than was previously possible, facilitating data

[1] Plankton will not be measured at station N21 at the edge of the mixing zone because the other 4 nearfield stations will provide sufficient characterization of plankton in the nearfield.

interpretation. While the nearfield stations will be sampled less often than they are currently, reference stations will be visited more often than in the existing design.

4. Discontinue productivity measurements which have not found a substantial increase in outfall-related productivity.
5. Discontinue some water chemistry tests which have been rarely used in interpretive reporting.
6. Reduce frequency of net tow surveys for floatables, but do visual monitoring for floatables at the outfall site on each survey. Carry out two net tow surveys annually following blending events at Deer Island Treatment Plant.
7. MWRA has augmented the Gulf of Maine Ocean Observing System mooring off Cape Ann with instrumentation for continuous chlorophyll measurements. In addition, MWRA has added water quality instrumentation to the NOAA weather buoy 44013 southeast of the outfall. Thus, continuous water quality data are available in real time on the internet.

Seafloor

1. Reduce the number of soft-bottom community monitoring stations sampled annually from 16 or 17 (depending on if it is an even or odd year) to 13, and change the present design which samples alternating sets of stations each year to one in which a consistent group of stations is sampled every year. Nearfield, reference, and Stellwagen locations are included in the soft bottom community surveys. (Continue the cost-effective sediment profile imaging at the current 23 nearfield soft bottom stations.)
2. Reduce the sediment contaminant monitoring stations to the same 13 stations used for soft bottom community monitoring. Continue the existing schedule of sampling every third year.
3. Discontinue the annual sediment contaminant sampling at two nearfield stations. These stations will now be sampled every third year with the rest of the stations.
4. Modify the sampling frequency for the hard bottom study to every third year, with samples collected the same year as sediment contaminant studies. A hard bottom survey in a year when none is planned would be triggered if the 7-day mass loading for total suspended solids exceeds 180,000 pounds/day.
5. End the nutrient flux study which has answered its monitoring questions.

The proposed Ambient Monitoring Plan for the Massachusetts Water Resources Effluent Outfall Revision 2, MWRA Technical Report 2010-04 summarizes the data that support these changes. The report is available at http://www.mwra.state.ma.us/harbor/enquad/trlist.html; and upon request from MWRA. The report is also available at the following repository libraries:

MWRA Library
(Elizabeth Steele)
2 Griffin Way
Chelsea, MA

Hyannis Public Library
401 Main St
Hyannis, MA

LIST OF PROPOSED CHANGES TO MWRA'S EFFLUENT OUTFALL AMBIENT MONITORING PLAN

JULY 2010

1 EFFLUENT

1.1 Discontinue effluent floatables monitoring. Monitoring results show only low (parts per billion) levels of floatables.

1.2 Change special study contaminant sampling frequency from "weekly" to "4 times per month."

2 WATER COLUMN

2.1 **Reduce the total number of stations sampled from 33 to 14.** This change focuses the monitoring on the geographic area now known to have a possibility of being affected by the discharge. Reference stations are included, but most of the furthest stations are removed. ***Comment is requested for item 2.1.2 regarding whether the location of station F15 is the best location to monitor the extent of the plume south of the outfall. An alternative monitoring location for this purpose could be station F14, or a new station intermediate between F14 and F15 could be established (Figure 1).***

2.1.1 Delete the following stations: F03, F05, F07, F12, F14, F16, F17, F18, F19, F24, F25, F26, F27, F28, F30, F31, N10, N16, N20.

2.1.2 Include the following stations: F06, F10, F13, F15, F22, F23, N01, N04, N07, N18, N21 (Figure 1, Table 1).

2.1.3 Sample three stations in Cape Cod Bay-Stellwagen Bank National Marine Sanctuary: F01, F02, F29 (Figure 1, Table 2). Parameters will include *in situ* water quality, water column chemistry, and plankton measurements, sampled 9 times annually at two depths. Sample these stations synoptically with the nearfield and reference monitoring stations (within 48 hours).

Figure 1 Map of proposed water column monitoring stations,

Comment is requested on whether station F15, station F14, or a location intermediate between the two stations is most appropriate for monitoring the southward extent of the plume.

Table 1 List of proposed water column monitoring stations and purpose for monitoring

STATION ID	WATER DEPTH (M)	LOCATION DESCRIPTION RELATIVE TO OUTFALL	PURPOSE
F22	80	17 km NE	Northern reference station Gulf of Maine influence Regional physical forcing relates to nearfield DO Link between buoy and sampling data "Upstream" sentinel station in winter-spring
N04	50	7.1 km NE	Evaluate extent of plume northeast
N01	31	6.3 km NW	Evaluate extent of plume northwest
N21	35	60 m	Evaluate water quality at ZID Close to outfall Ammonium signature Primary "impact" station for comparison to other stations
N18	27	2.5 km S	Close to outfall Ammonium signature Primary "impact" station for comparison to other stations
N07	50	7 km SE	Near NOAA buoy MWRA instruments-data comparison
F23	25	12 km E	Boston Harbor
F15	38	9 km S	Evaluate southward extent of plume
F13	25	14 km S	Near coastal (model, *Alexandrium*)
F10	33	20 km S	Furthest expected southern expression of effluent plume
F06	33	29 km SE	Southern reference station

Table 2 Proposed Cape Cod Bay-Stellwagen Bank NMS monitoring stations

STATION ID	WATER DEPTH (M)	LOCATION DESCRIPTION RELATIVE TO OUTFALL	PURPOSE
F29	65	50 km SE	Evaluate nutrients and plankton in Stellwagen Bank National Marine Sanctuary
F02	32	70 km SE	Evaluate nutrients and plankton in Cape Cod Bay
F01	26	66 km SE	

2.2 Change survey schedule from 12 nearfield station surveys and 6 farfield station surveys annually to 9 surveys annually that include the five nearfield, six reference stations and 3 Cape Cod Bay-Stellwagen stations (Table 3). Unlike the existing design where different stations are sampled at different frequencies and for different parameters, all stations will be sampled synoptically during every survey, and water quality, chemistry, and plankton will be measured at all locations (except plankton will not be measured at N21). This will provide a synoptic picture of a wider geographic area than was previously possible, facilitating data interpretation and enabling scientists to better discriminate between regional changes and potential outfall-related changes. Monitor the Cape Cod Bay-Stellwagen Bank NMS stations synoptically (within 48 hours) with the nearfield and reference monitoring stations.

Table 3 Proposed list of water column survey dates

WHEN	TARGET WEEK	ORIGINAL SURVEY NUMBER	PURPOSE
Early February	6	1	Nutrient conditions near start of spring bloom
March	12	3	Spring bloom
Early April	15	4	Capture *Phaeocystis* bloom. Late winter/spring bloom nutrients
Mid-May	20	6	Nutrient/water column conditions at end of winter-spring, *Alexandrium*
Mid-June	25	7	Early summer stratification and nutrients. Mid-late red tide season.
Mid-July	30	9	Mid-summer stratification and nutrients
Mid-August	34	11	Mid-summer stratification and nutrients
September	36	12	Nutrients, etc. prior to overturn.
Late October	43	14	Mid-fall bloom nutrients, DO minima, etc.

2.3 Change certain water quality parameters. Some measurements have been used in data interpretation only infrequently if ever, therefore: **Drop measurements of dissolved organic carbon, particulate biogenic silica, and total suspended solids. Add gene probe measurements for *Alexandrium*** which is a faster and more accurate method to measure red tide. Tables 4 and 5 show the proposed list of tests to be conducted.

Table 4 Proposed water column parameters outfall nearfield and reference stations

ANALYTE	DEPTH	PARAMETER
Hydro profile	Downcast data continuous, with upcast data at any sampled depths	Temperature Salinity Dissolved oxygen Chlorophyll fluorescence Transmissometry Irradiance Depth of sensors
Water chemistry	Five depths. Surface, bottom, and three intermediate depths which includes the chlorophyll maximum	Ammonium Nitrate Nitrite Total dissolved nitrogen Particulate nitrogen Phosphate Total dissolved phosphorus Particulate phosphorus Silicate Particulate carbon
Alexandrium	Two depths.	Gene probe
Phytoplankton Zooplankton	Near surface Net tow for zooplankton. Plankton will not be measured at station N21 because nearfield plankton is adequately characterized by data collected at the other four nearfield stations.	Identification, enumeration

Table 5 Proposed water column parameters Cape Cod Bay and Stellwagen NMS

ANALYTE	DEPTH	PARAMETER
Hydro profile	Continuous downcast data from within 1m of surface to within 5m of bottom.	Temperature Salinity Dissolved oxygen Depth of sensor Chlorophyll fluorescence PAR (Photosynthetically Active Radiation)
Water chemistry	Two depths Near-surface and Near-bottom	Nitrate + nitrite Ammonium Phosphate Total nitrogen Total phosphorus Extracted chlorophyll
Phytoplankton Zooplankton	Near-surface Net tow	Identification and Enumeration

2.4 Discontinue productivity measurements. After nine years, these measurements have not found a substantial increase in outfall-related productivity. MWRA will compile and report on available Bays Eutrophication Model-data comparisons, and will evaluate and report on the BZ_pI_0 model and comparisons to measured productivity data.

2.5 Reduce the frequency of net tow surveys for floatables monitoring to two net tow surveys annually. Net tows will be conducted within 24 hours of the ending of blending events. MWRA will carry out chemical analyses for PCBs, PAHs, pesticides and mercury on samples of the fat particles which are collected in the net tows. After two years of wet-weather floatables monitoring (4 tows), MWRA will analyze and report on the data to determine if it is comparable to previous observations. After 4 tows, MWRA may submit a written request, along with the data analysis report, to EPA and MassDEP requesting an elimination of the net tows.

3 SEAFLOOR

3.1 Reduce the number of soft-bottom community monitoring stations sampled annually from 16 or 17 (depending on if it is an even or odd year) to 13, and change the present design which samples alternating sets of stations each year to one in which a consistent group of stations is sampled every year (Figures 2 and 3). Nearfield, reference, and Stellwagen locations are included in the soft-bottom community surveys. (Continue the cost-effective sediment profile imaging at the current 23 nearfield soft bottom stations.)

3.1.1 Delete the following 18 benthic stations: NF02, NF05, NF07, NF08, NF09, NF15, NF16, NF18, NF19, NF23, NF24, FF05, FF06, FF07, FF10, FF11, FF13, FF14.

3.1.2 Community analyses at the following 13 benthic stations: NF04, NF10, NF12, NF13, NF14, NF17, NF20, NF21, NF22, FF12, FF01A, FF04, FF09

3.2 Modify the sampling frequency for the hard bottom study from once per year to every third year with samples collected the same year as sediment contaminant studies. A responsive hard bottom survey in a year when none is planned would be triggered if the 7-day mass loading for total suspended solids exceeds 180,000 lbs/day.

3.3 End the nutrient flux study.

3.4 End the annual chemistry sampling at stations NF12 and NF17. (Continue the existing schedule of sampling every third year.)

3.5 Modify the chemistry sampling so that it is done at the remaining soft-bottom benthic stations (Figures 2 and 3).

3.5.1 Delete the following 18 chemistry stations: NF02, NF05, NF07, NF08, NF09, NF15, NF16, NF18, NF19, NF23, NF24, FF05, FF06, FF07, FF10, FF11, FF13, FF14.

3.5.2 Continue to sample the following 13 chemistry stations every third year: NF04, NF10, NF12, NF13, NF14, NF17, NF20, NF21, NF22, FF12, FF01A, FF04, FF09

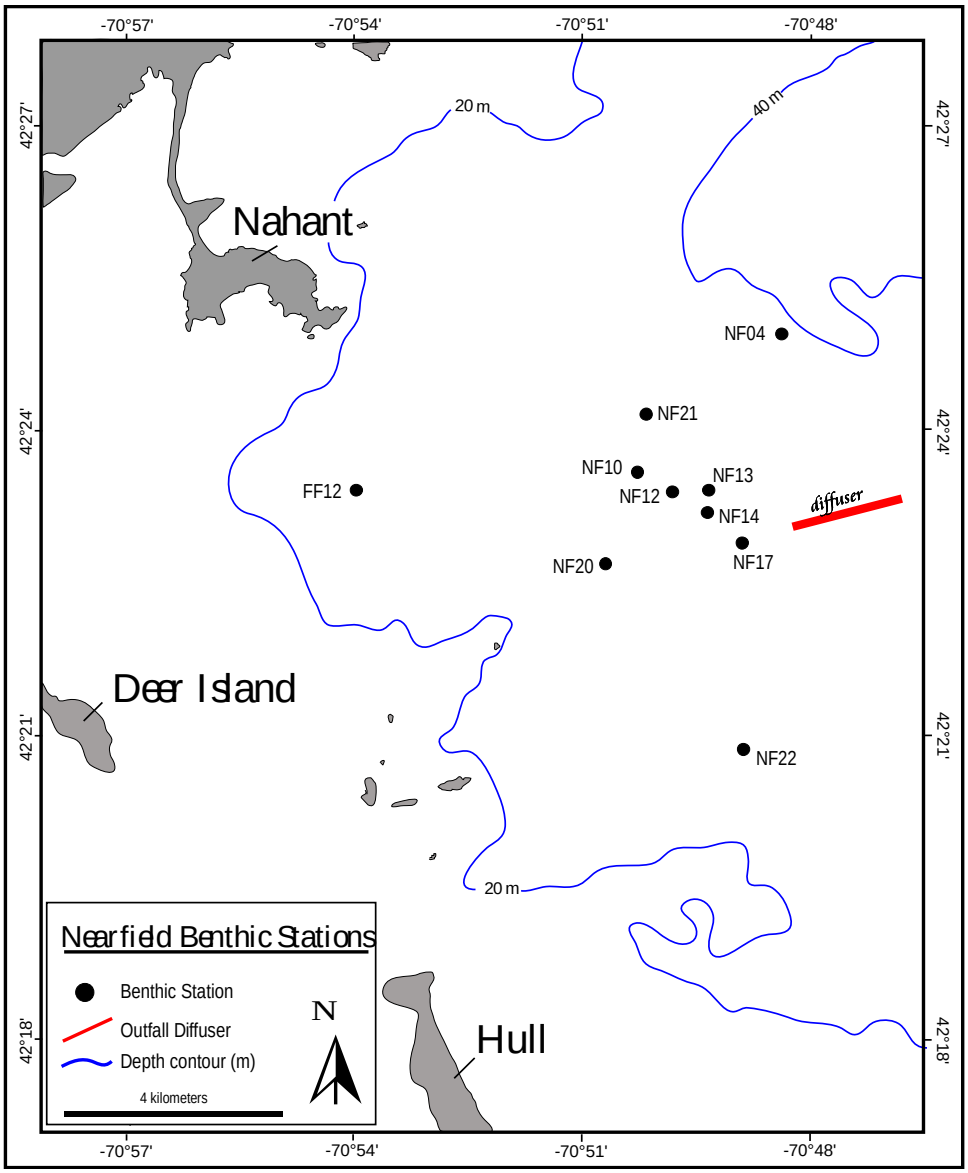

Figure 2 Proposed nearfield benthic sampling stations.

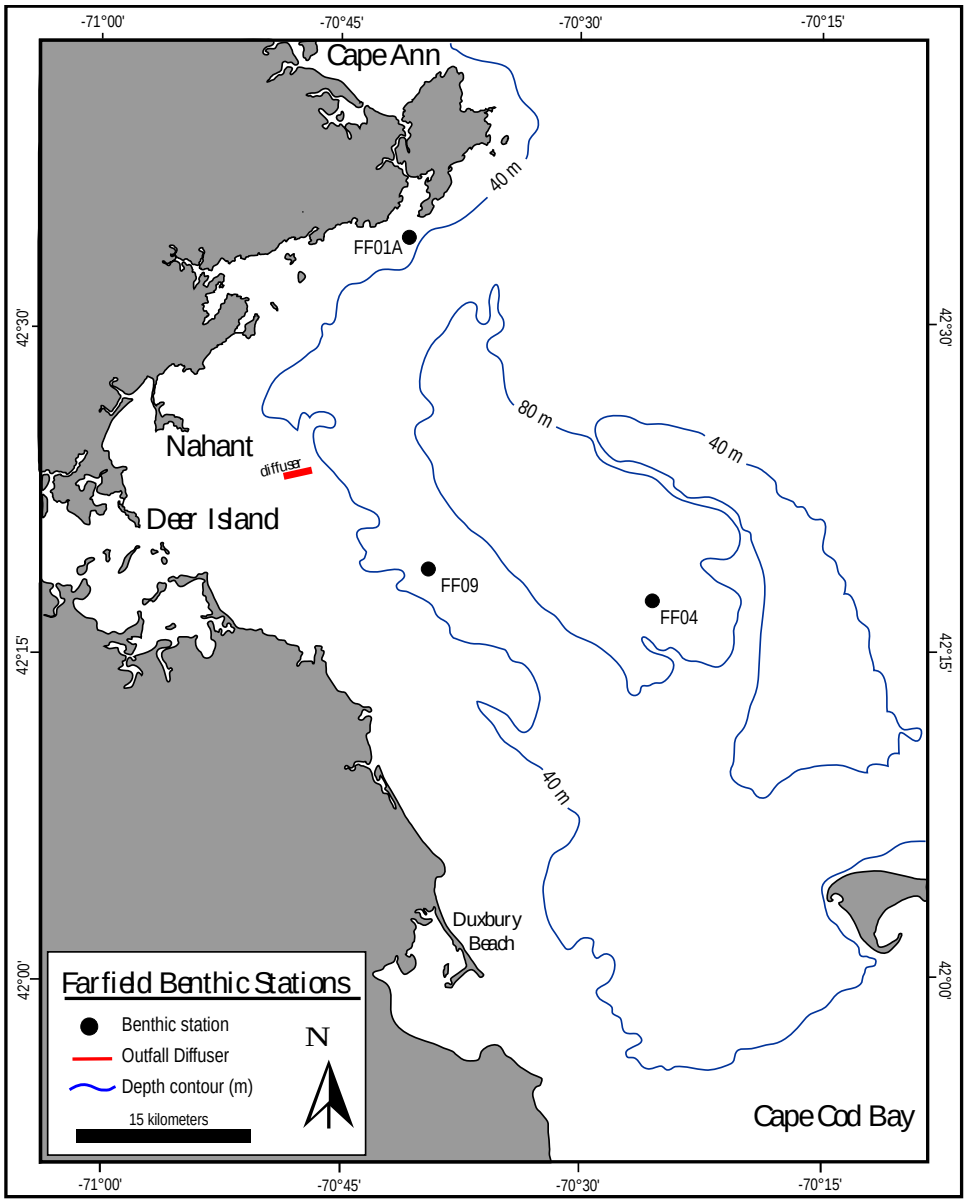

Figure 3 Proposed farfield reference benthic community stations

The entire Ambient Monitoring Plan Revision 2 is at
http://www.mwra.state.ma.us/harbor/html/whatsnew.htm

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