



MASSACHUSETTS WATER RESOURCES AUTHORITY

Deer Island
33 Tafts Avenue
Boston, MA 02128

Frederick A. Laskey
Executive Director

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July 31, 2025

Water Technical Unit
OES04-SMR
USEPA REGION 1 - New England
5 Post Office Square, Suite 100
Boston, MA 02109-3912

David Boyer, NPDES Section Chief
Division of Watershed Management
Department of Environmental Protection
100 Cambridge Street, 9th Fl.
Boston, Massachusetts 02114

RE: Massachusetts Water Resources Authority
NPDES Permit Number MA0103284

Dear USEPA and MassDEP:

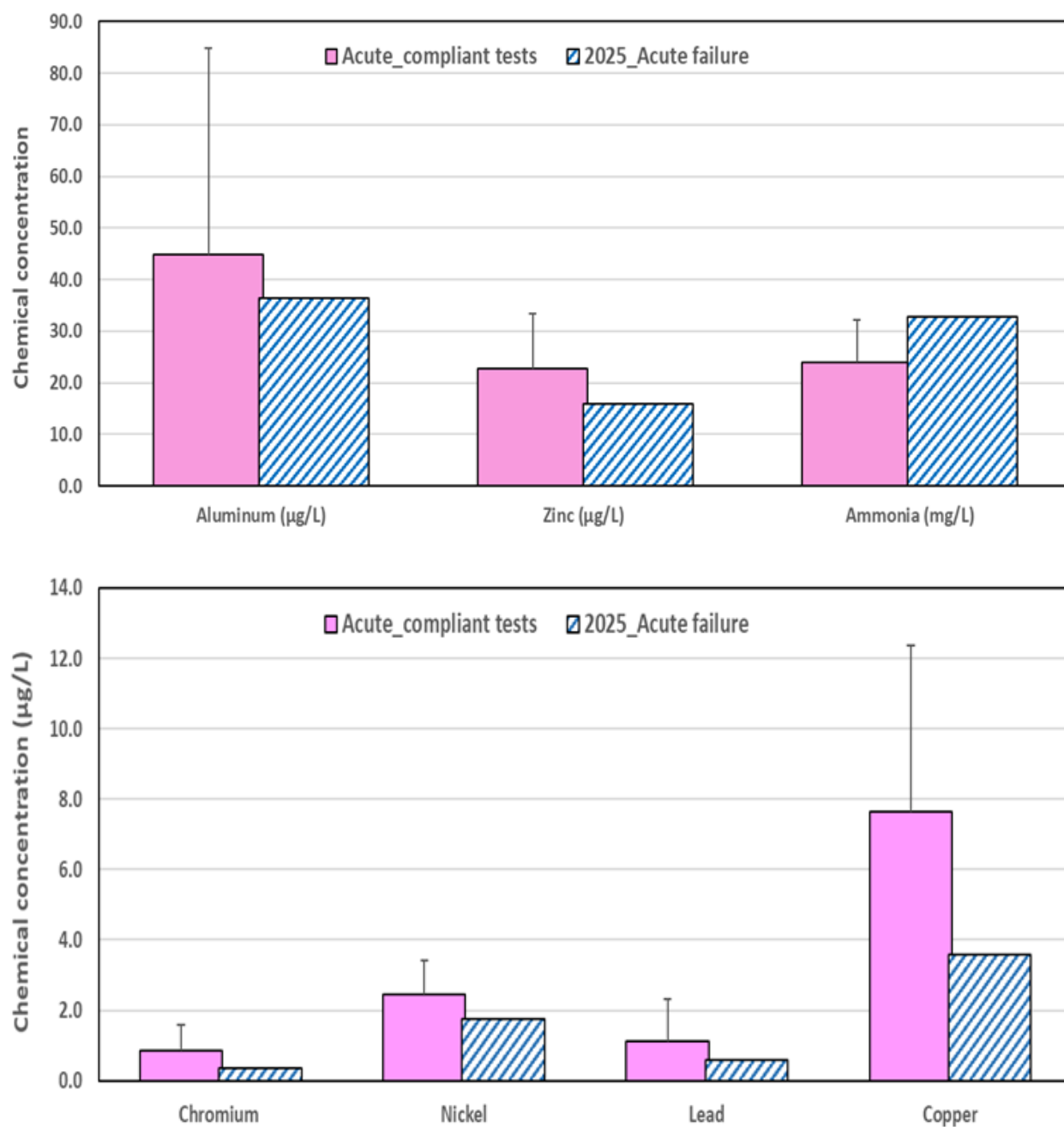
Enclosed please find the June toxicity Discharge Monitoring Reports (DMRs) for MWRA's Deer Island Treatment Plant (T01T) and for our Cottage Farm (C01T), Prison Point (C03T), and Somerville Marginal (C05T) combined sewer overflow facilities and the Somerville Marginal overflow structure (C25T).

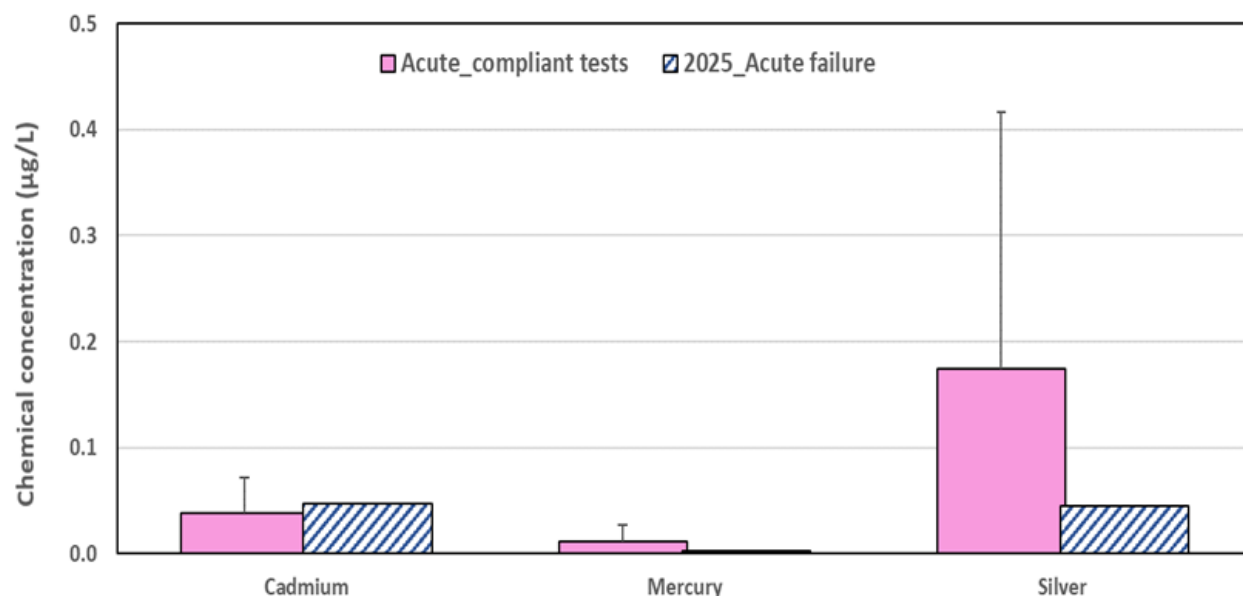
- Deer Island - T01T Discharged, toxicity samples taken
- Cottage Farm - C01T No discharge
- Prison Point - C03T Discharged, toxicity samples not required for this period
- Somerville Marginal - C05T Discharged, toxicity samples not required for this period
- Somerville Marginal Relief - C25T Discharged, toxicity samples not required for this period

The Deer Island acute toxicity test for the inland silverside (*Menidia beryllina*) had a $LC_{50} = 42.6\%$ effluent concentration which is lower than the required minimum 50% effluent limitation in the permit. In addition to this DMR submission, and consistent with the Contingency Plan provisions in Part I.8.a of the permit, MWRA sent a notification letter to the EPA on July 25, 2025. This was within (5) days after the result of that exceedance became available.

Toxicity samples were collected during the first week of June, on June 1-2, 3-4, and 5-6 using a 24-hour composite sampler. There were no operational upsets or significant process changes at DITP during that time. To determine if the observed acute toxicity was due to higher than usual concentrations of chemicals in the June 6 sample used to conduct the acute test, concentrations of chemicals in that sample were compared with historical averages of passed acute tests (using data from January 2000 - May 2025). Figure 1 shows that concentrations of water constituents in the June 6 sample were equal or lower than average historical values. This suggests that the *Menidia* acute toxicity may not be directly related to effluent toxicity.

Figure 1. Comparing chemical concentrations in the June 6 DITP effluent sample with historical averages of passed acute tests (Error bars = standard deviations)





DITP has been compliant with all effluent limits since 2006 and DITP has not previously failed any acute toxicity tests. All other permit effluent limits were met in the month of June, including for the other three toxicity tests. The next round of routine monthly toxicity sampling occurred during the first week of July. The acute assay conducted with effluent collected on July 6-7 appears to have yielded a preliminary $LC_{50} > 100\%$ for *Menidia* and $LC_{50} = 77.3\%$ for *Mysidopsis bahia* per discussion with the contract laboratory, indicating that the toxicity did not persist. MWRA will receive July's confirmed test results in a laboratory report in August after all contract laboratory QA/QC has been completed.

In addition to *Menidia* being used for one of the two acute tests, it is also required by the Permit for one of the two chronic toxicity tests. Considering this, the Permit allows for a Modified Acute toxicity test in which the acute toxicity for species survival can be reported from the first 48 hours of the chronic test. MWRA's contracted laboratory conducted a separate acute test from the chronic test rather than the combined test, but some insight into the toxicity can be gleaned from evaluation of survival during *Menidia* chronic testing. For the 48 hours after test initiation, there was 100% survival at 50% effluent concentration. The effluent present at that stage was from the sample collected June 1-2. At the end of the 7-day test using the 50% effluent concentration, the survival rate was 98%. On days 4, 5 and 6 (for 72 hours), the test was renewed with the sample collected on June 5-6. This June 5-6 sample was the same sample that resulted in the $LC_{50} = 42.6\%$ effluent acute toxicity exceedance. With nearly identical test conditions, it is perplexing that the same effluent sample resulted in significantly different survival rates. This may be indicative of the complex biological factors present during toxicity testing that could have impacted the acute toxicity result.

DITP's Massachusetts Bay outfall provides a high level of dilution. EPA has assigned the outfall a dilution factor of 70:1; dye studies of the outfall under stratified water column conditions, such as those that would be seen in June, indicate that dilution would be closer to 94:1.¹ These real

¹ Hunt CD, Mansfield AD, Mickelson MJ, Albro CS, Geyer WR, Roberts PJW. 2010. Plume tracking and dilution of effluent from the Boston sewage outfall. *Marine Environmental Research* (70): 150-161.

world dilutions are far greater than the roughly 50% dilution (42.6%) that the *Menidia* acute test indicated was toxic. Water column surveys as part of MWRA's ambient monitoring program occurred on June 3, 11, 17, and 25 with no adverse observations on a preliminary basis (the surveys on June 3, 11, and 25 were part of the *Alexandrium* Rapid Response Surveys and June 17 was a routine survey). Therefore, there is no reason to believe this toxicity test failure impacted Massachusetts Bay and the larger ecosystem.

Accordingly, MWRA is continuing to validate this acute toxicity result and investigate possible causes. MWRA will follow up as necessary. If you have questions or need additional information, please feel free to contact Maret Smolow at maret.smolow@mwra.com.

Sincerely,

Rebecca Weidman
Deputy Chief Operating Officer

cc: Katherine Greene, MWRA Library (DMRs only)
Timothy Pasakarnis, Cape Cod Commission (cover letter only)



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July 25, 2025

Todd Borci
EPA Region 1
5 Post Office Square, Suite 100
Mail Code ECAD4-4
Boston MA, 02109-3912

Whitney Fenwick, NPDES Section Chief
Division of Watershed Management
Department of Environmental Protection
100 Cambridge Street, 9th Fl.
Boston, Massachusetts 02114

RE: Massachusetts Water Resources Authority, NPDES Permit No. MA 0103284
Notification Pursuant to Part I.8. Contingency Plan

Dear Mr. Borci and Ms. Fenwick:

The referenced National Pollutant Discharge Elimination System Permit ("Permit") for the Massachusetts Water Resources Authority's ("MWRA") Deer Island Treatment Plant ("DITP") limits the outfall TO1 effluent to a LC_{50} effluent concentration of 50% or greater, on a monthly testing frequency. The LC_{50} (or acute toxicity) is the concentration of effluent in a sample that causes mortality to 50% of the test population. Further, Table 1-1 in Attachment O of the Permit defines the "Warning Level" for acute effluent toxicity testing as $LC_{50} < 50\%$ for shrimp (*Mysidopsis bahia*) and fish (*Menidia beryllina*), which is identical to the effluent limitation. The Contingency Plan provisions in Part I.8.a. of the Permit requires the monitoring result be reported within five (5) days after a result that exceeds a "Warning Level" becomes available.

Consistent with these NPDES Permit provisions, one of the four effluent toxicity tests that MWRA conducts every month is the *Menidia beryllina* (inland silverside minnow) acute test, which measures the 48-hour survival rate of the species across a series of effluent dilution levels in comparison to the species survival rate in control samples with no effluent present. On July 23, 2025, MWRA reviewed the results of its *Menidia* acute test that was performed on a sample collected on June 6, 2025. A result of 42.6% effluent concentration was reported for the LC_{50} and is lower than the required effluent limit of at least 50% effluent concentration. This result triggers a notification requirement under the Contingency Plan, as a Warning Level exceedance. This letter constitutes that notification.

During the first week of June, there were no operational upsets or significant changes at DITP. All other permit effluent limits were met in the month of June, including for the other three toxicity tests. DITP has been compliant with all effluent limits since 2006. DITP has not previously failed any acute toxicity tests.

DITP's Massachusetts Bay outfall provides a high level of dilution. The U.S. Environmental Protection Agency has assigned the outfall a dilution factor of 70:1; dye studies of the outfall under stratified water column conditions, such as those that would be seen in the month of June, indicate that dilution would be closer to 94:1.¹ These real world dilutions are far greater than the roughly 1:1 dilution (42.6%) that the *Menidia* acute test indicated was toxic. A routine water column survey as part of MWRA's ambient monitoring program occurred on June 17 with no adverse observations. Therefore, there is no reason to believe this toxicity test failure impacted Massachusetts Bay and the larger ecosystem.

Accordingly, MWRA is continuing to validate this acute toxicity result and investigate possible causes. MWRA will follow up as necessary. If you have any questions regarding this matter or would like to request any additional documentation, please email David Wu at David.Wu@mwra.com.

Sincerely,

Stephen Cullen
Deputy Chief Operating Officer, Operations

¹ Hunt CD, Mansfield AD, Mickelson MJ, Albro CS, Geyer WR, Roberts PJW. 2010. Plume tracking and dilution of effluent from the Boston sewage outfall. *Marine Environmental Research* (70): 150-161.

Cc:

Environmental Protection Agency, Region I

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Steve Wolf

National Marine Fisheries Service

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