Contingency Plan Quarterly Report
on Ambient Monitoring Results
First Quarter 2022

MWRA gathers data near the outfall discharge location in Massachusetts Bay on various Contingency Plan thresholds related to its Deer Island Treatment Plant (DITP) NPDES discharge permit. This report shows ambient monitoring results for Contingency Plan thresholds that became available in January through March 2022. Previous Contingency Plan reports are available at http://www.mwra.state.ma.us/harbor/html/contingency.htm.

Included in the report are the results for 2021 mussel tissue contaminants and autumn nuisance algae abundances. There were no Contingency Plan threshold exceedances in this quarter.

FISH AND SHELLFISH

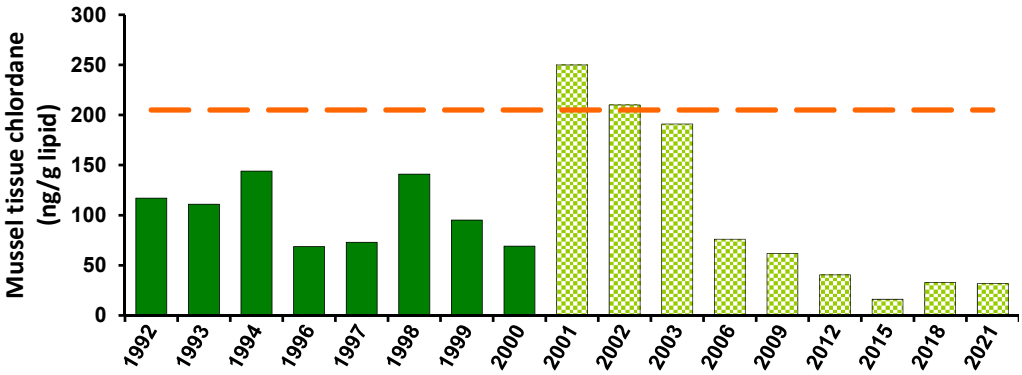
Mussel tissue chemistry – July - August 2021

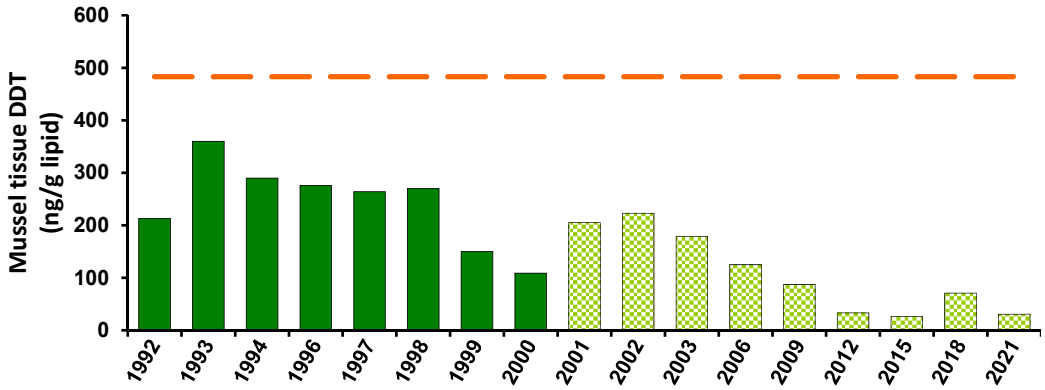
The tissue contamination thresholds are designed to evaluate the level of toxic chemicals in the edible tissues of fish and shellfish. Contaminants are measured in three species of seafood: winter flounder (*Pseudopleuronectes americanus*), lobster (*Homarus americanus*), and blue mussel (*Mytilus edulis*). For mercury and PCBs in the three species, caution and warning thresholds are set at 50% and 80% of the FDA action limits. The threshold for lead in mussels is based on an EPA risk assessment of lead in drinking water. The threshold values for chlordane, DDT, dieldrin, and PAHs are based on measurements taken during baseline years (1992-2000 for mussels and lobster, 1993-2000 for flounder) at the outfall site.

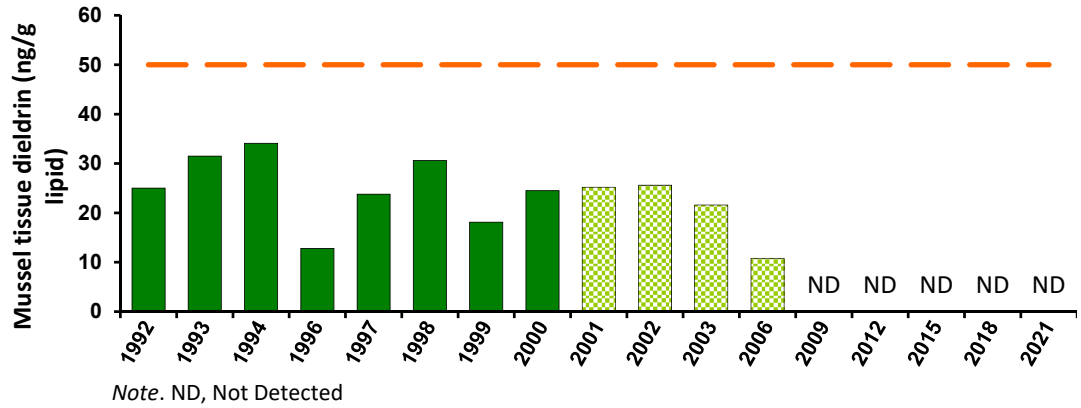
The mussel tissue contaminant results are included in this report. Results for winter flounder and lobster were reported in the previous quarterly reports.

In 2021, mussels were collected from the outfall site after being deployed at the site for 60 days from June 29 to August 30. Eight composite samples of mussel soft tissue (25 mussels in each composite) were analyzed for the contaminant mean concentrations. There were no exceedances of mussel tissue contamination thresholds in 2021; all contaminants were well below threshold levels.

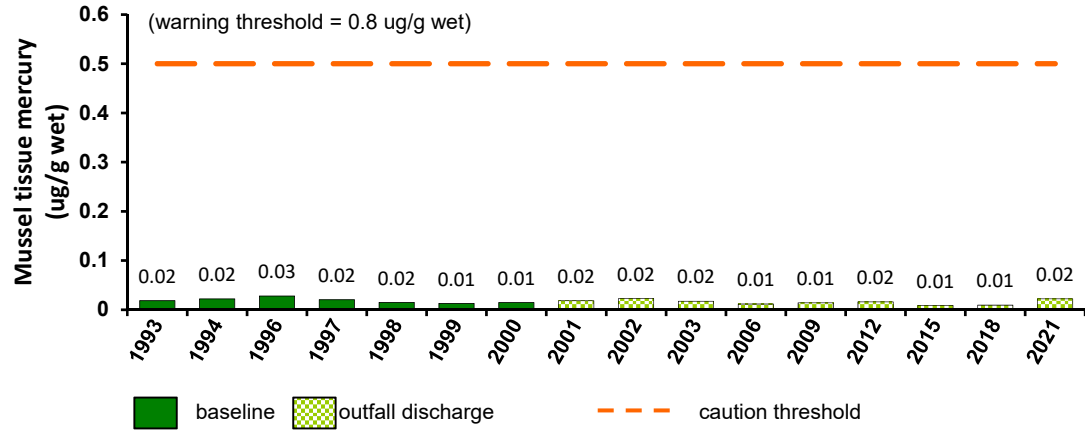
Mussel tissue contaminant tests have been performed every three years since 2003. In 2021, concentrations of chlordane, DDT, PAHs and PCB in mussel tissues remained very low. Mussel tissue mercury and lead concentrations in 2021 were also well below threshold levels, and within the range seen both before and after the outfall was relocated offshore. Dieldrin was not detected, as has been the case since 2009 (Figure 1).







Note. ND, Not Detected



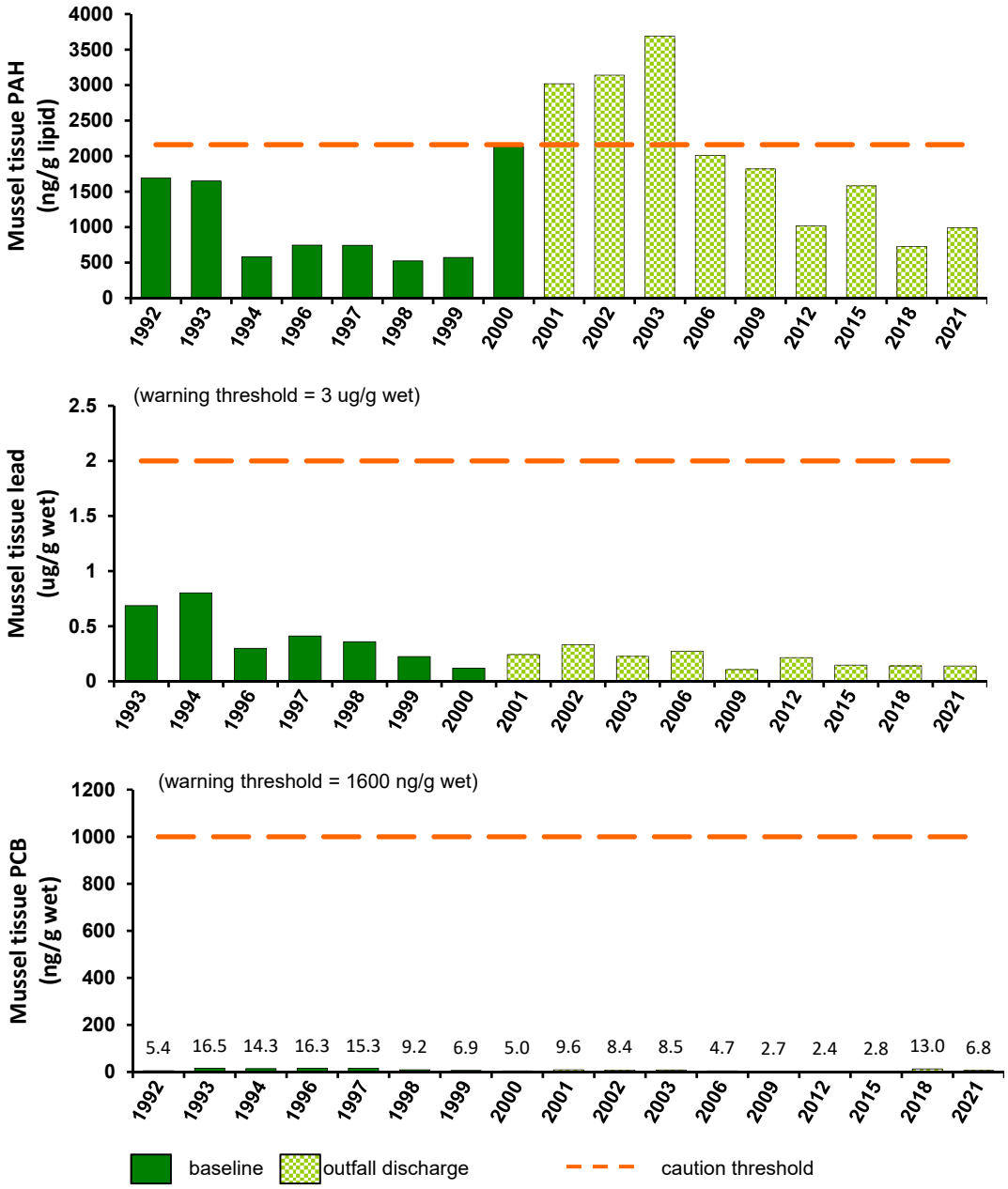


Figure 1. Tissue contaminants in mussels at outfall site (1992 – 2021)

NUISANCE ALGAE

ALEXANDRIUM – early November 2021[1]

The nuisance algae *Alexandrium catenella* ("*Alexandrium*") can cause paralytic shellfish poisoning (PSP, or "red tide") in Massachusetts Bay. MWRA measures *Alexandrium* abundance in its monitoring program, and checks observations of shellfish PSP toxicity from state fisheries agencies and other regional monitoring programs to keep track of the course of Gulf of Maine *Alexandrium* blooms.

No *Alexandrium* were observed in any of the samples from the early November survey, the only survey for which there are nuisance algae data not previously reported. The figures below compare nearfield *Alexandrium* data to the threshold for each sample collected through November 2021. Figure 2 includes data since the start of the monitoring program in 1992. Figure 3 shows data for 2021 only, which includes nine regular water column surveys and three rapid response surveys. Note the logarithmic scale for each graph.

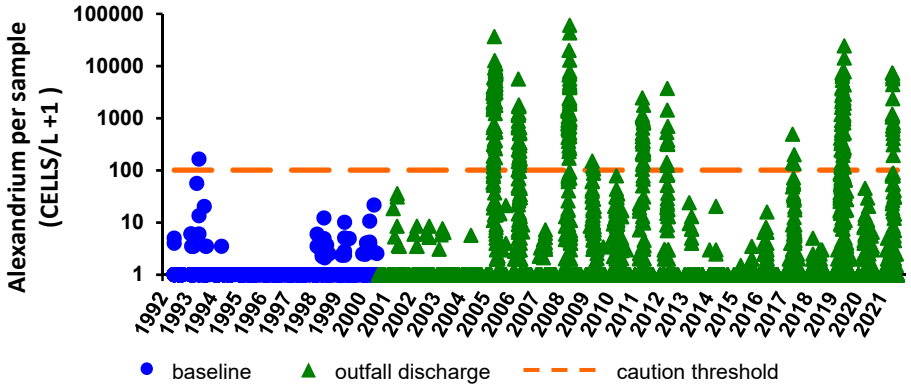


Figure 2. *Alexandrium* cell concentrations in Nearfield (1992-2021)

***Alexandrium* per-sample abundance (cells/liter)**	
Caution threshold	100
Early November 2021	0*
* maximum of all nearfield samples collected during early November survey 2021	

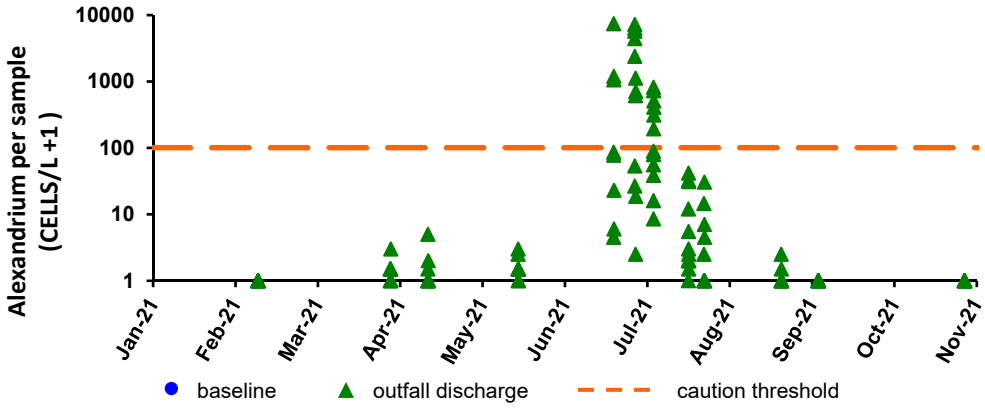


Figure 3. *Alexandrium* cell concentrations in Nearfield 2021

[1] Due to the late October nor'easter storm, the routine October water column survey in 2021 was delayed to early November.

***PSEUDO-NITZSCHIA* – autumn (September – early November) 2021**

There was no *Pseudo-nitzschia* threshold exceedance for autumn 2021. For *Pseudo-nitzschia* nuisance algae species, the caution level threshold values were derived from the 95th percentile of seasonal baseline means, and seasonal mean abundances at nearfield stations are compared against threshold values.

During autumn 2021, *Pseudo-nitzschia* was observed with low abundance in three samples from nearfield stations. The autumn mean abundance of 94 cells per liter was well below the caution level threshold of 27,500 cells per liter.

Figure 4 shows the *Pseudo-nitzschia* caution level threshold for autumn and the mean abundance data for that season from since the start of the monitoring program in 1992.

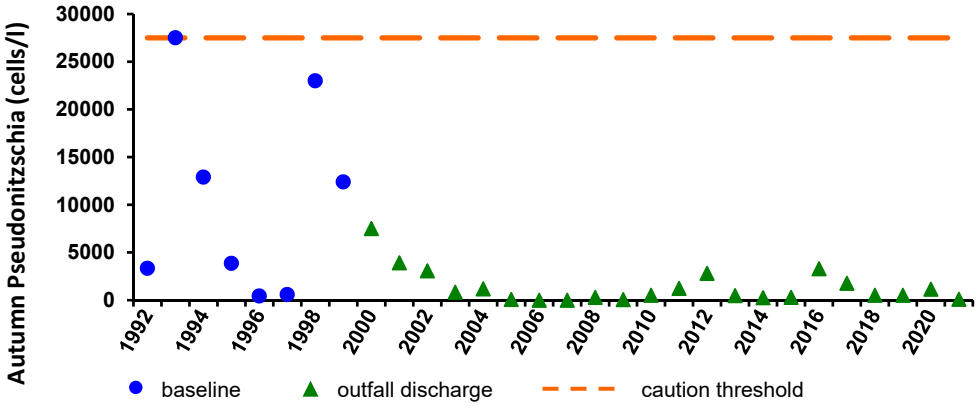


Figure 4. *Pseudo-nitzschia* cell concentrations in Nearfield (autumn 2021)

***PHAEOCYSTIS* – early November 2021**

In February 2017, EPA approved changes in the Contingency Plan to remove the threshold for the seasonal abundance of the nuisance alga *Phaeocystis pouchetii* in the nearfield water column. During bloom conditions, *Phaeocystis* can form large, gelatinous colonies, which may accumulate as foam as they disintegrate on beaches. Evaluations of prior threshold exceedances for this species have indicated that they resulted from natural fluctuations in Massachusetts Bay, do not represent degradation, were not a result of MWRA's discharge, and have not occurred in concentrations that would pose problems for recreation. MWRA agreed to continue to report each quarter on nearfield survey mean abundances of *Phaeocystis pouchetii* compared to its historical results.

Figure 5 shows the 2021 survey mean *Phaeocystis* results against the results from all prior years since 1992. Due to reductions in the number of surveys conducted each year, the historical results encompass more time-points than shown for the current year.

Survey mean *Phaeocystis* abundance from early November 2021 was zero, consistent with nearly all historical observations at this time of year.

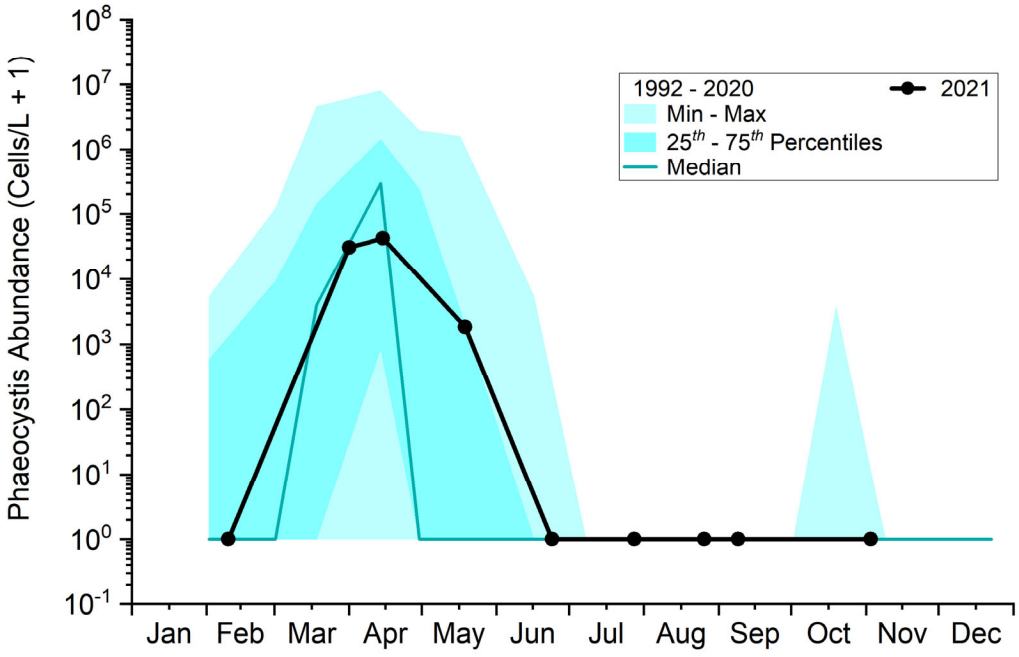


Figure 5. Nearfield Survey Mean abundance of *Phaeocystis* (1992 – 2021)