



MASSACHUSETTS WATER RESOURCES AUTHORITY

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November 7, 2025

Todd Borci
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Whitney Fenwick
NPDES Section Chief
Massachusetts Department of Environmental Protection
100 Cambridge Street, Suite 900
Boston, MA 02114

RE: Massachusetts Water Resources Authority
Permit Number MA 0103284
Contingency Plan Threshold Exceedance: Summer *Pseudo-nitzschia*

Dear Mr. Borci and Ms. Fenwick:

In its outfall ambient monitoring program, the Massachusetts Water Resources Authority (“MWRA”) monitors levels of the alga genus *Pseudo-nitzschia*. Some *Pseudo-nitzschia* species produce domoic acid, the cause of amnesic shellfish poisoning (“ASP”). Reporting on seasonal average abundances of *Pseudo-nitzschia* near MWRA’s outfall (in the “nearfield”) is part of MWRA’s permit-attached Ambient Monitoring Plan¹ and Contingency Plan.² This letter is both a regulatory and public notification that the *Pseudo-nitzschia* results exceeded the Contingency Plan caution threshold for nearfield summer *Pseudo-nitzschia* in accordance with Part I.8.b (Contingency Plan) of the Deer Island Treatment Plant NPDES permit.

The Contingency Plan caution threshold for summer *Pseudo-nitzschia* is 41,300 cells/L. There is no warning threshold for this parameter. The Ambient Monitoring Plan defines the Contingency Plan summer season as the May to August period. MWRA has received all summer 2025 plankton results and calculated that the nearfield *Pseudo-nitzschia* average for the four summer surveys was 74,400 cells/L, over the threshold of 41,300 cells/L.

Based on observations at all MWRA stations and from state phytoplankton monitoring results available from New Hampshire, Massachusetts, and Rhode Island, elevated abundances of *Pseudo-nitzschia* were observed throughout the region during the summertime period. There have been no reports that these elevated abundances produced domoic acid or any resulting amnesic

¹ *Ambient Monitoring Plan for the Massachusetts Water Resources Authority Effluent Outfall Revision 2.1*. 2021. Boston: Massachusetts Water Resources Authority. Report 2021-08.
<https://www.mwra.com/harbor/enquad/pdf/2021-08.pdf>

² *Massachusetts Water Resources Authority Contingency Plan Revision 1*. 2001. Report 2001-ms-071.
<https://www.mwra.com/media/file/2001-5-contingency-plan-revision>

shellfish poisoning. No ASP-related shellfish closures were issued by any New England state. Preliminary review of the available data indicate these *Pseudo-nitzschia* abundances are not related to the outfall.

Background

Figure 1 shows MWRA monitoring stations in Massachusetts Bay. The outfall nearfield is a group of five stations (N01, N04, N07, N18, and N21) covering a 6 by 7.5 mile (10 by 12 kilometer) area centered on the outfall diffuser. Phytoplankton samples are not taken at station N21.³

The farfield stations (F06, F10, F13, and F15) south of the nearfield and the Stellwagen Basin station (F22) are farther from the outfall and not part of Contingency Plan threshold. However, they often can provide useful context for nearfield conditions. Station F23 is at the mouth of Boston Harbor. While this station is physically quite different from the others, it can also give useful context.

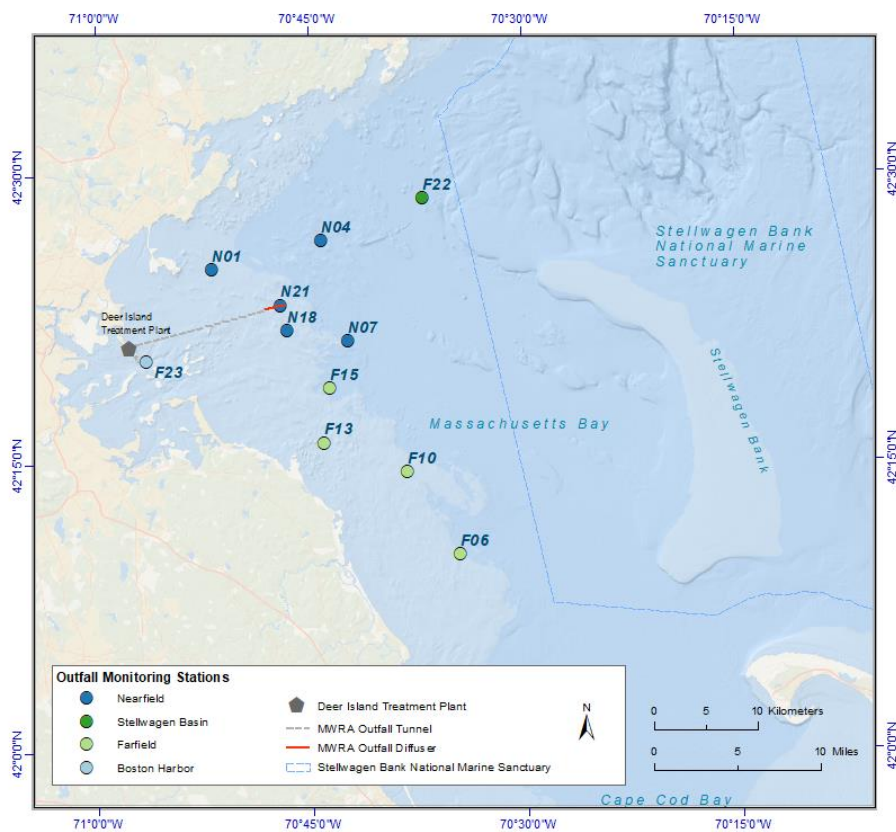


Figure 1. Map of outfall, nearfield, Stellwagen Basin, farfield, and harbor monitoring stations.

³ *Quality assurance project plan (QAPP) for water column monitoring 2024-2026: Tasks 4-8 and 11.* Boston: Massachusetts Water Resources Authority. Report 2024-02. 73p. <https://www.mwra.com/media/file/mass-bay-water-column-project-plan-2024-02>

Exceedance

The nearfield summer average *Pseudo-nitzschia* abundance is calculated by first adding together all species abundances within the *Pseudo-nitzschia* genus that were reported as two groups, *Pseudo-nitzschia* spp. with cell width < 3 µm (*P. delicatissima*) and *Pseudo-nitzschia* spp. with cell width > 3 µm (*P. pungens* / *P. seriata*). An average abundance for each station is taken from the samples collected at multiple depths at the station, and a survey average is taken using the nearfield stations. Finally, this nearfield average value from each of the four summer surveys (May, June, July, and August) are used to calculate a seasonal average. This exceedance was driven by high abundances in June. Survey averages in May, July and August were well below the seasonal threshold (Table 1).

The threshold is based on a similar calculation done for surveys prior to the diversion of the wastewater discharge to Massachusetts Bay; the threshold is based on the 95th percentile of the pre-diversion summer averages.

Table 1 shows the “survey average” nearfield *Pseudo-nitzschia* from each of the surveys in the summer season. Table 2 shows the overall nearfield summer *Pseudo-nitzschia* average compared to the Contingency Plan threshold.

SURVEY ID	SURVEY DATE	AVERAGE		NUMBER OF NEARFIELD STATIONS IN AVERAGE
		PSEUDO-NITZSCHIA ABUNDANCE (cells/L)	STANDARD DEVIATION	
WN254	May 13, 2025	2,020	3,610	4
WN255	June 17, 2025	287,000	46,000	4
WN256	July 22, 2025	8,900	5,420	4
WN257	August, 19, 2025	139	187	4

Table 1. Nearfield summer *Pseudo-nitzschia* abundances, by survey date.

SEASON	SUMMER AVERAGE			
	PSEUDO-NITZSCHIA ABUNDANCE (cells/L)	STANDARD DEVIATION	THRESHOLD (cells/L)	EXCEEDANCE (YES/NO)
Summer	74,400	128,000	41,300	Yes

Table 2. Nearfield summer *Pseudo-nitzschia* abundance compared to the threshold.

Discussion

These summer *Pseudo-nitzschia* abundances represent the first exceedance of this threshold in the 25 years of monitoring since the outfall came online (Figure 2).

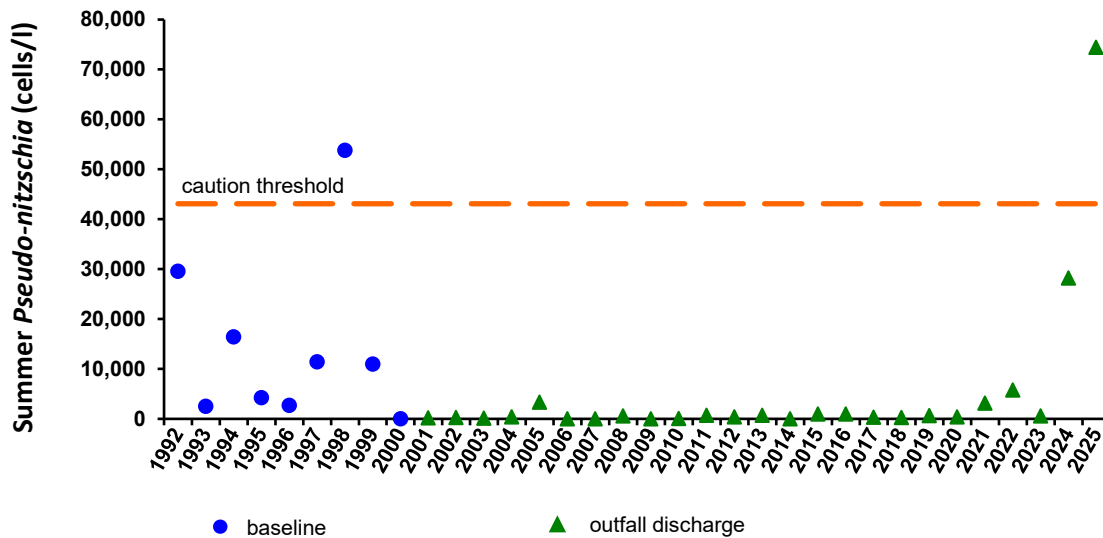


Figure 2. Nearfield summer *Pseudo-nitzschia*, 1992-2025. The orange dashed line is the Contingency Plan threshold of 41,300 cells/L, set at the 95th percentile of the baseline (pre-discharge) summer average.

Figure 3 shows preliminary results for the summer 2025 maximum *Pseudo-nitzschia* abundance at each individual station in the MWRA monitoring area, as well as the three stations in Cape Cod Bay monitored by the Center of Coastal Studies (Provincetown, MA). Results from the April survey in which no *Pseudo-nitzschia* was observed is also presented. Data are not yet available for the Cape Cod Bay stations from the August survey.

Pseudo-nitzschia was first observed on the May survey in relatively low abundances. Abundances peaked in June, with stations over 100,000 cells/L throughout Massachusetts Bay and Boston Harbor. Abundances did not exceed 100,000 cells/L in Cape Cod Bay. Abundances quickly declined in July and August.

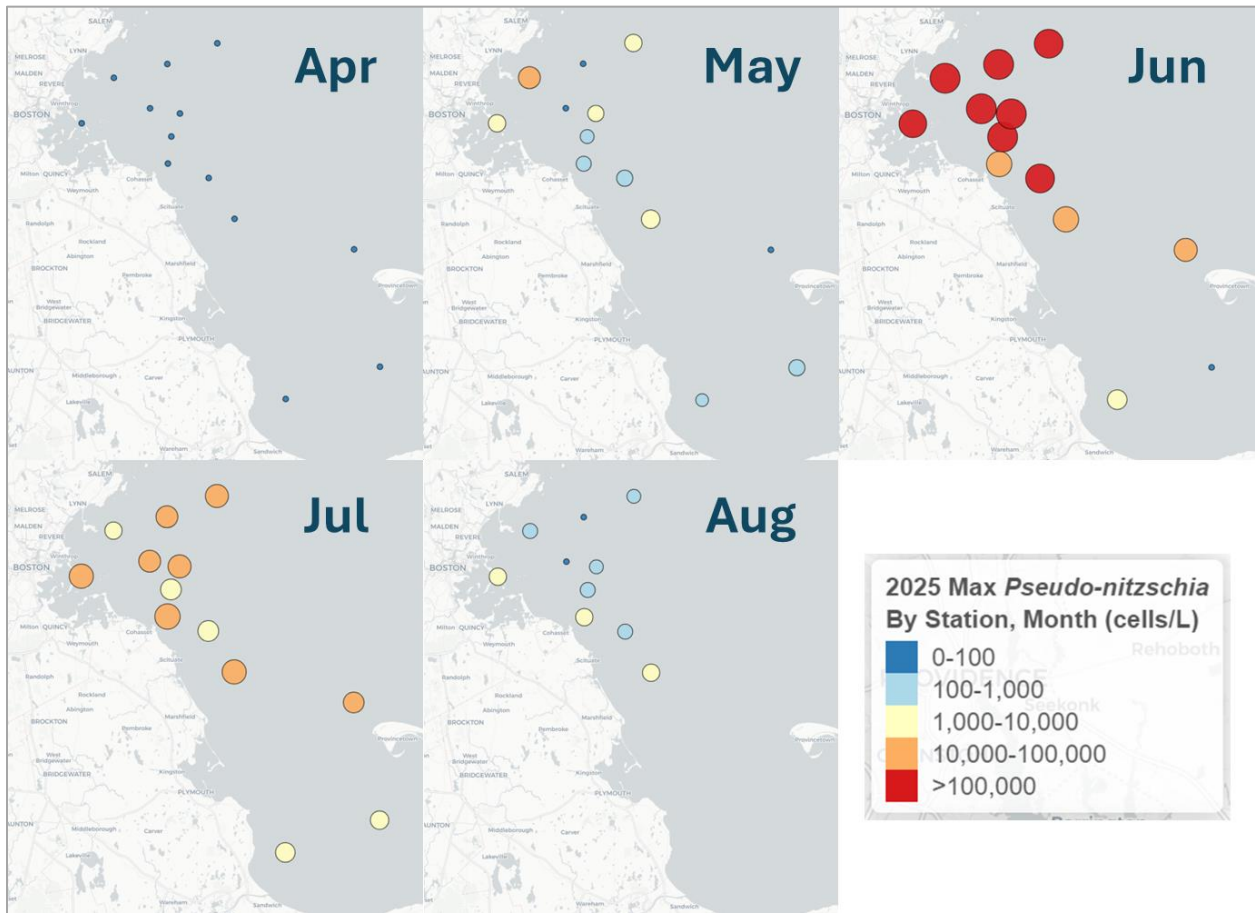


Figure 3. Maximum *Pseudo-nitzschia* abundance by station April through August. Currently, there are no August data available for the Cape Cod Bay stations.

MWRA’s consultants perform quantitative abundance counts of phytoplankton species. Beginning in 2023, *Pseudo-nitzschia* counts were split further into small and large cells delineated at a cell width of 3 μm . While many *Pseudo-nitzschia* species can produce domoic acid, those with cell widths $> 3 \mu\text{m}$ (e.g., *Pseudo-nitzschia australis*) are known to have higher potential to produce domoic acid than smaller species. *P. australis* was the primary cause of record domoic acid concentrations and shellfishery closures in the northern Gulf of Maine in 2016.⁴ During the peak *Pseudo-nitzschia* abundances observed in June 2025, nearly all identified organisms were of the small width group, indicating a lower likelihood of toxin production (Figure 4).

⁴ Clark S, Hubbard KA, McGillicuddy DJ Jr, Ralston DK, Shankar S. Investigating *Pseudo-nitzschia australis* introduction to the Gulf of Maine with observations and models. Cont Shelf Res. 2021.

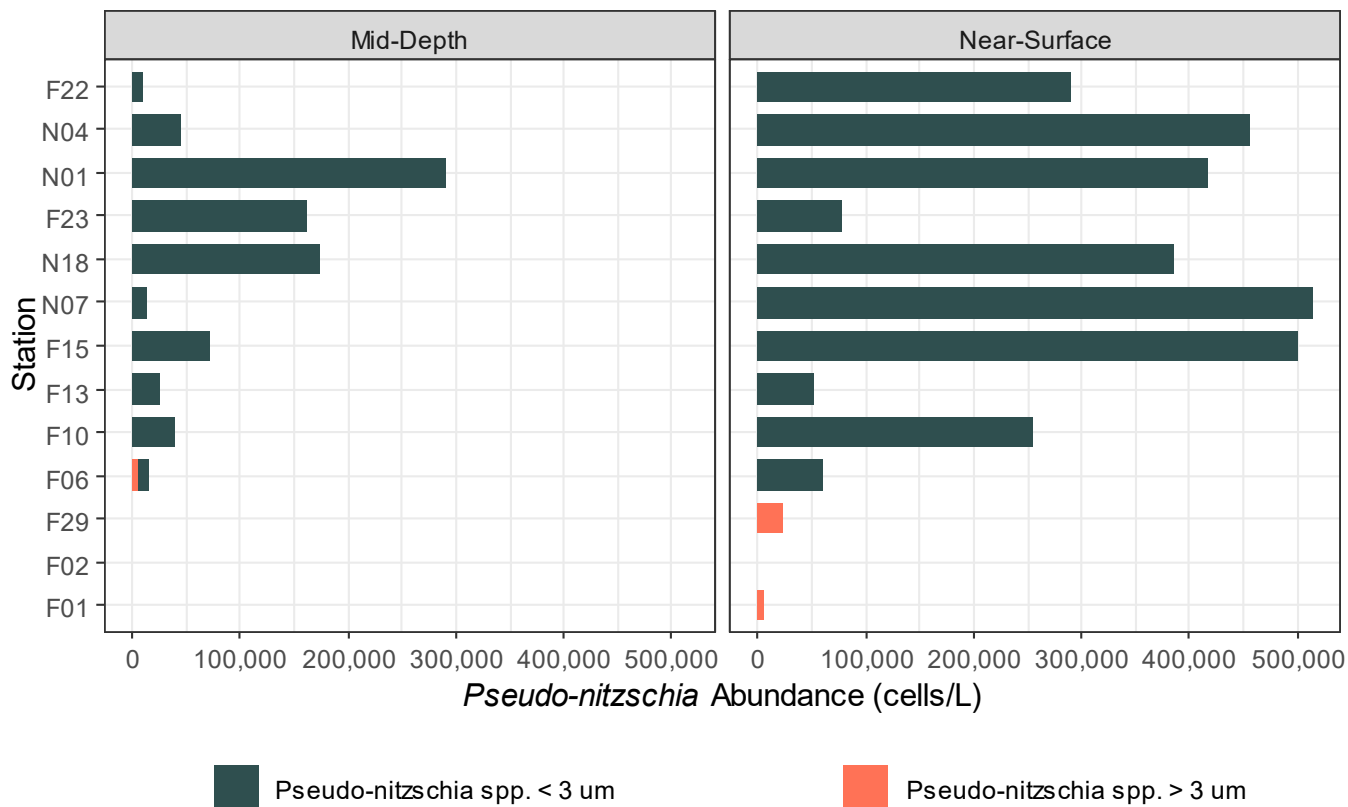


Figure 4. *Pseudo-nitzschia* abundances sampled June 17, 2025 (survey WN255) by station, depth sampled, and cell size group. Samples are taken at two depths on Massachusetts Bay surveys, and near-surface only on Cape Cod Bay surveys. Stations arranged roughly north to south. Small width cells with lower toxin production potential were dominant in all samples, with only 3 samples containing *Pseudo-nitzschia* > 3 μm wide.

Elevated abundances of *Pseudo-nitzschia* were not exclusive to the MWRA monitoring area. New Hampshire Department of Environmental Services (DES) monitoring in Hampton Harbor showed counts over 10,000 cells/L beginning in early June and persisting through early July. Rhode Island Department of Environmental Management reported elevated *Pseudo-nitzschia* abundances over 20,000 cells/L across Upper Narragansett Bay, the lower Providence River, Greenwich Bay, Mt. Hope Bay, and the upper East and West Passages from early to mid-June. Satellite imagery from June shows elevated chlorophyll *a* throughout the Gulf of Maine (Figure 5). Despite these elevated abundances, there have been no reports of positive toxin results for domoic acid and no ASP-related shellfish closures.

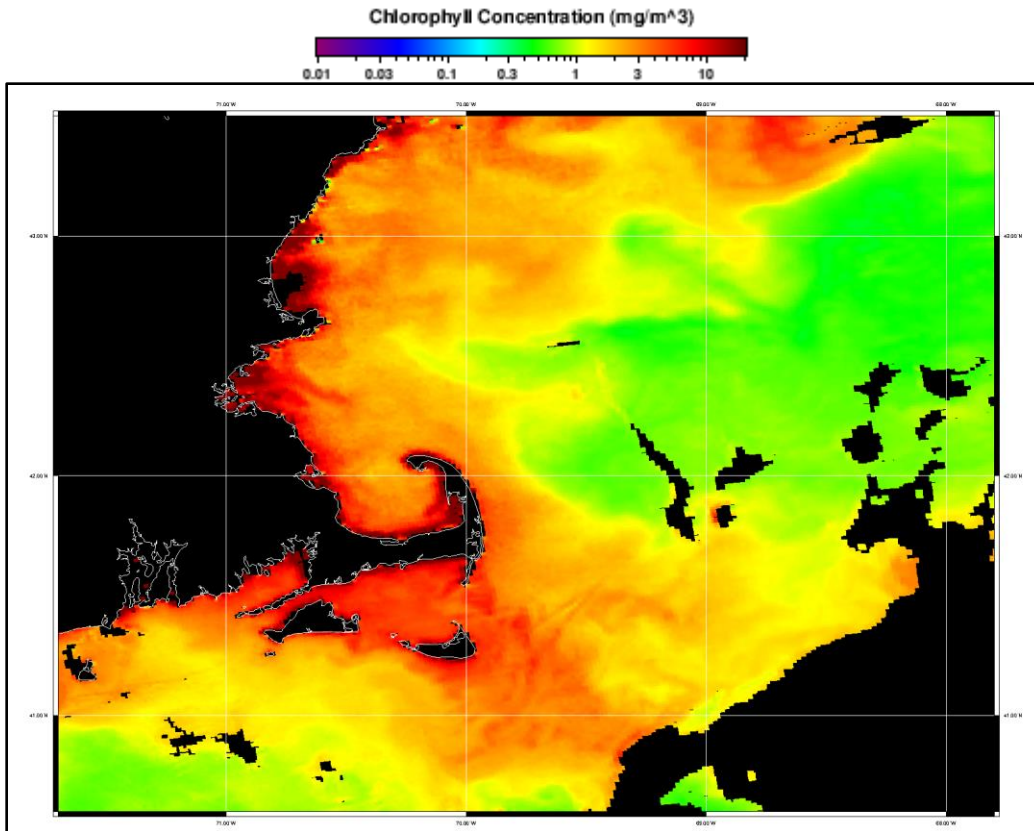


Figure 5. Preliminary satellite measurement of chlorophyll *a* (mg/m^3) from June 24, 2025. Credit: NASA/OB.DAAC.

Furthermore, MWRA has not observed any adverse environmental impacts as a result of these *Pseudo-nitzschia* abundances. MWRA has completed all Contingency Plan calculations for dissolved oxygen in 2025. There are no exceedances for dissolved oxygen in 2025.

Conclusion

The conclusion of our preliminary evaluation, is that the exceedance is not related to the outfall, based on the fact that *Pseudo-nitzschia* abundances were elevated throughout and beyond the MWRA study region. MWRA will continue to investigate these abundances, synthesizing results with all available monitoring data for 2025 as they become fully available.

MWRA will provide raw monitoring data upon request. If you have any questions regarding this matter, please email David Wu at David.Wu@mwra.com.

Sincerely,

Rebecca Weidman
Deputy Chief Operating Officer

Cc:

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