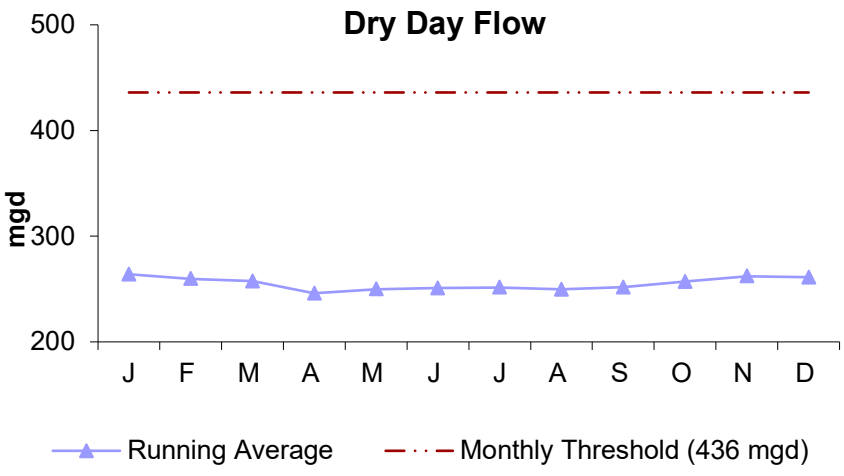
Deer Island Effluent Monitoring
4th Quarter 2025

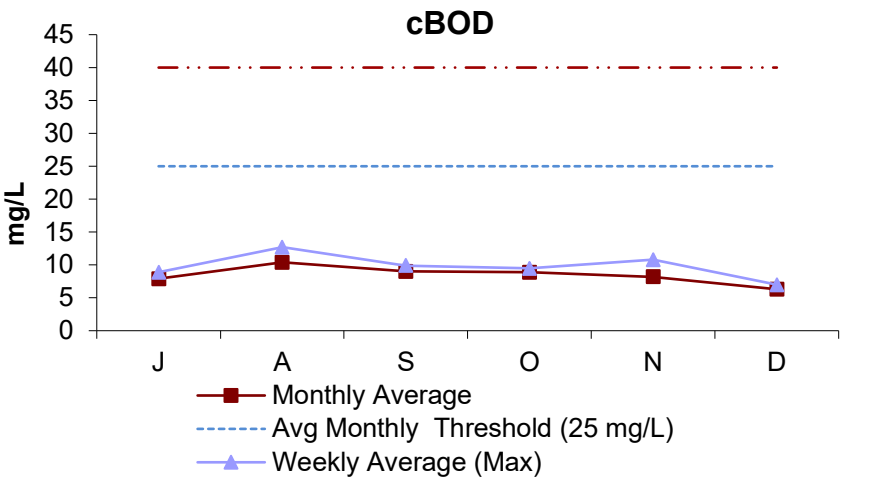
Effluent Characteristics	*Units*	*Threshold**	*Threshold Exceedance*
Dry Day Flow (365 Day Average)	mgd	436	0
cBOD: Monthly Avg	mg/L	25	0
Weekly Avg	mg/L	40	0
TSS: Monthly Avg	mg/L	30	0
Weekly Avg	mg/L	45	0
TCR: Monthly Avg	ug/L	456	0
Daily Avg	ug/L	631	0
Fecal Coliform	col/100mL	14000	0
pH: Minimum	SU	6.0	0
Maximum	SU	9.0	0
PCB Aroclors	ug/L	0.000045	0
Total Nitrogen: Caution Level	mtons/year	12500	0
Warning Level	mtons/year	14000	0
Acute Toxicity: Mysid Shrimp	%	≥50	1
Acute Toxicity: Inland Silverside	%	≥50	0
Chronic Toxicity: Inland Silverside	%	≥1.5	0
Chronic Toxicity: Sea Urchin	%	≥1.5	0
Oil and Grease, Petroleum Origin (Weekly)	mg/L	15	0
Plant Performance: Caution Level	# of violations/ year	5	0
Warning Level	% noncompliance	5	1

** All levels are Warning Levels unless otherwise specified*

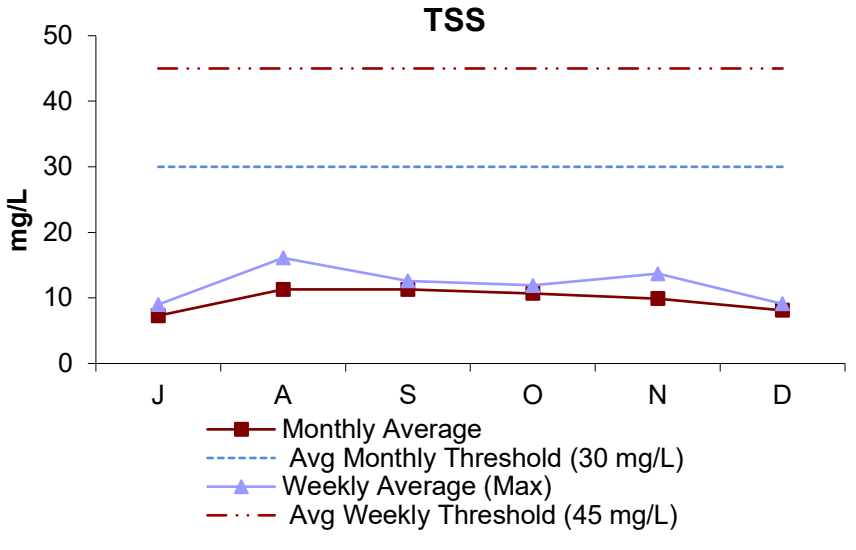
The December 2025 acute toxicity test for Mysid shrimp (Americamysis bahia) resulted in an LC50 of 2.0%, which is below the effluent limit of ≥50%. A review of operational conditions, effluent treatment processes, and wastewater chemistry is currently underway to identify potential factors contributing to the observed toxicity.



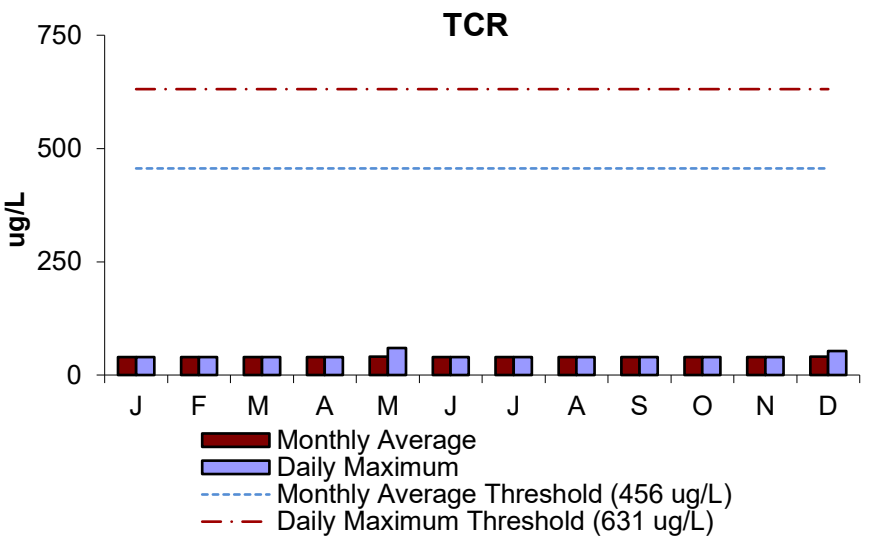
The dry day flow is calculated by averaging influent flow over the previous 365 days during dry weather. A dry day is defined as a day with < 0.09 inches of precipitation and no snow melt. In addition, the precipitation for the previous three days must be less than 0.3, 1.0, and 2.0 inches, respectively.



cBOD is a measure of the amount of dissolved oxygen required for the decomposition of organic materials in effluent. The weekly and monthly concentrations for the quarter were below threshold values. The 5-day cBOD percent removal range for the quarter was 90.4 - 93.5 .



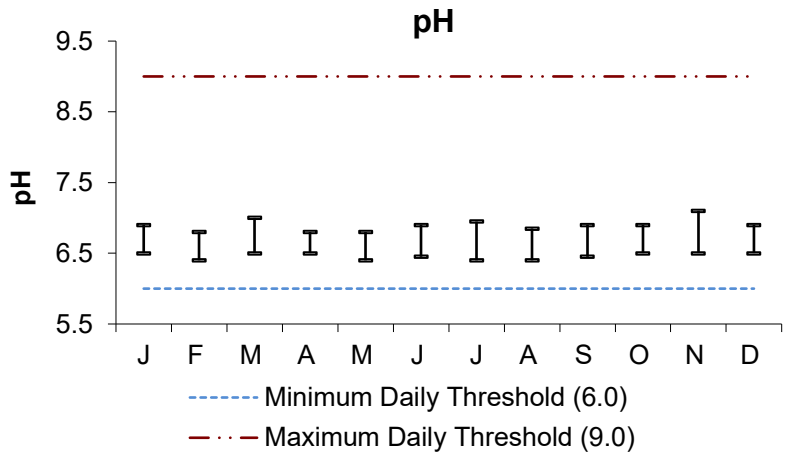
Total Suspended Solids is a measure of the amount of solids that remain suspended after treatment. The weekly and monthly concentrations for the quarter were below threshold values. The TSS percent removal range for the quarter was 88.4-91.6.



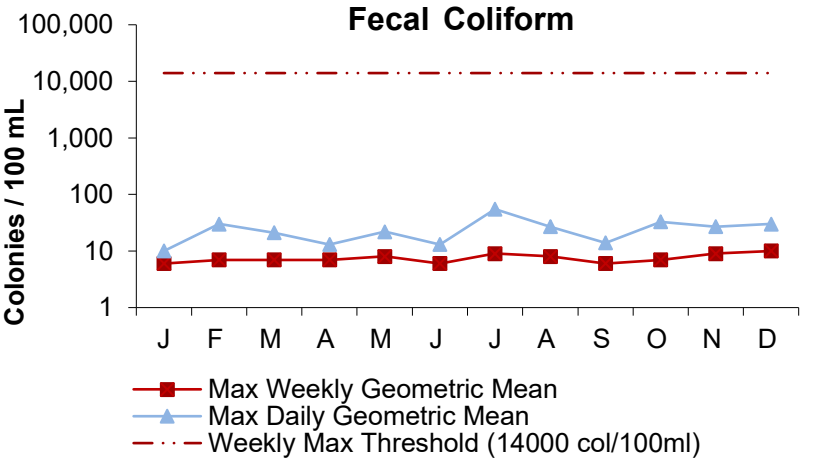
Total Chlorine Residual is the concentration of chlorine in the effluent as it leaves the treatment plant. Chlorine levels will drop off significantly as the effluent travels the length of the 9.5 mile outfall pipe. On this graph, we used the detection limit of 40 ug/L for values below detection.

Deer Island Effluent Monitoring

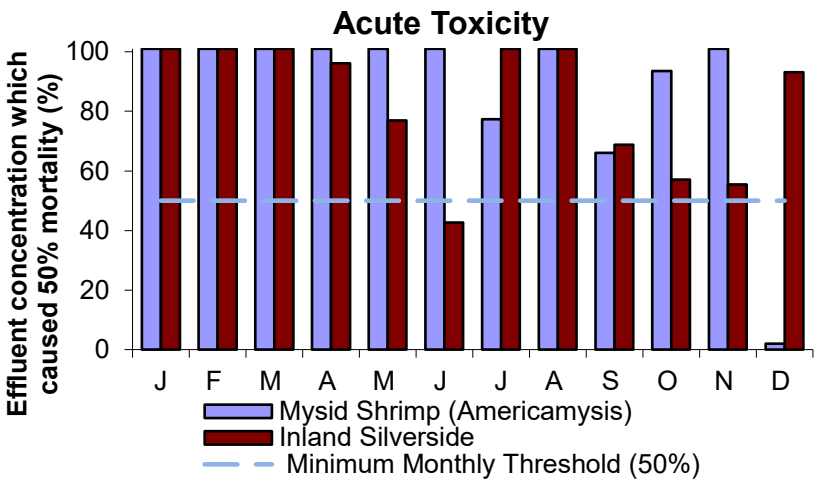
4th Quarter 2025



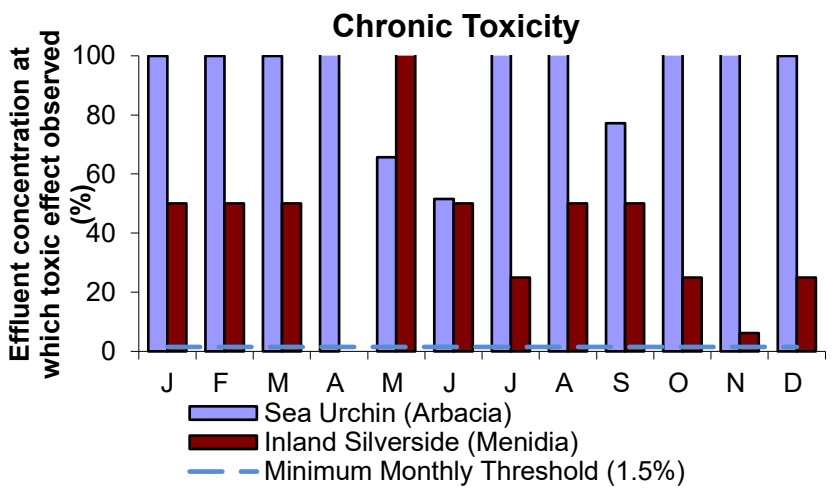
pH is a measure of alkalinity or acidity. The figure above plots the monthly range of pH measurements compared to permit limits. Fluctuations in effluent pH are unlikely to impact marine evironments, which have significant buffering capacity. Effluent pH tends to be at the lower end of the permit-required range due to the pure oxygen used in the activated sludge process. All pH measurements were within the threshold range for the quarter.



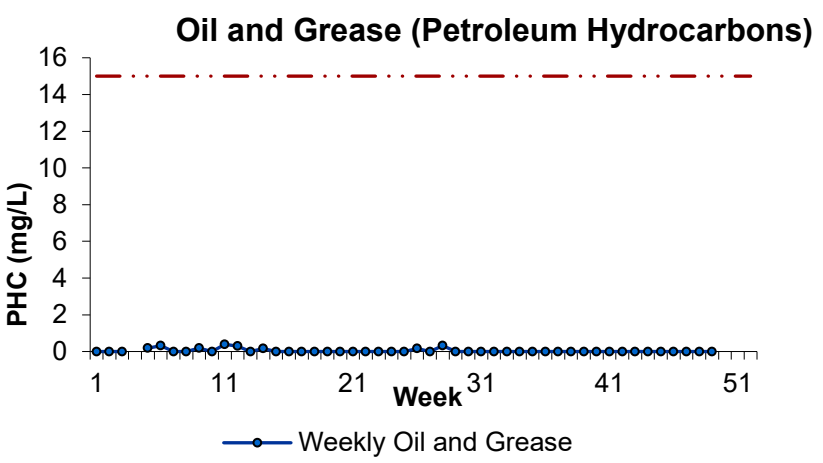
Fecal coliform is an indicator of the presence of pathogens. The levels of these bacteria after disinfection show how effectively the plant is inactivating disease-causing microorganisms. The Contingency Plan requires that the monthly geometric mean not exceed 14000 col/100mL. The monitoring results for the quarter were well below the threshold value.



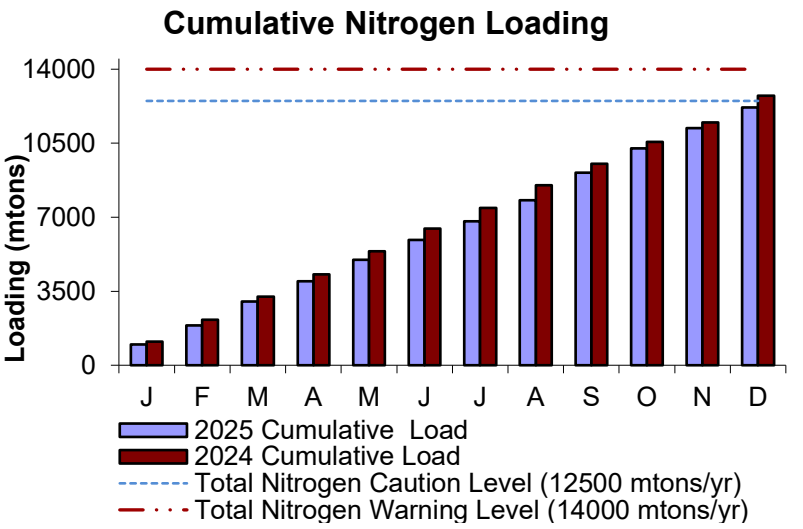
The acute toxicity test simulates the short-term toxic effects of pollutants in sewage effluent on marine animals. The test measures the concentration (percent) of effluent that kills half the test organisms within two days. The higher the concentration of effluent required, the less toxic the effluent. For permit compliance, the effluent concentration that causes mortality to mysid shrimp and inland silverside must be at least 50%. The threshold limit for Mysid shrimp was not met for December.



Typically, effects of chronic exposures differ from those of acute exposures. Because of this, chronic toxicity responses are not necessarily related to acute toxicity. The chronic toxicity test simulates the long-term toxic effects of pollutants in sewage effluent on marine animals. To meet permit limits, at least 1.5% of effluent must show no observed effect on the growth and reproduction of the test species. The threshold limits were met for the quarter.



This graph shows levels of petroleum hydrocarbons in the DITP effluent. Samples were collected 5-6 times a month during the quarter. The Contingency Plan Threshold warning level is 15 mg/L weekly average. Since PHCs are lighter than water, they rise to the surface and are easily collected as scum from the primary and secondary clarifiers at DITP.



Total nitrogen is not regulated under the permit, but the Contingency Plan requires it to be closely monitored because of its potential effects on Massachusetts Bay. Total nitrogen includes total Kjeldahl nitrogen, nitrate, and nitrite.