

First Quarter 2001 Contingency Plan Report on Ambient Monitoring September - December 2000

Note: This report was revised on November 8, 2001 to incorporate corrected threshold levels for *Phaeocystis* and *Pseudonitzschia*.

MWRA gathers data from the outfall location in Massachusetts Bay on various thresholds outlined in its Deer Island outfall discharge permit. This report shows relevant ambient monitoring results that became available in the previous quarter.

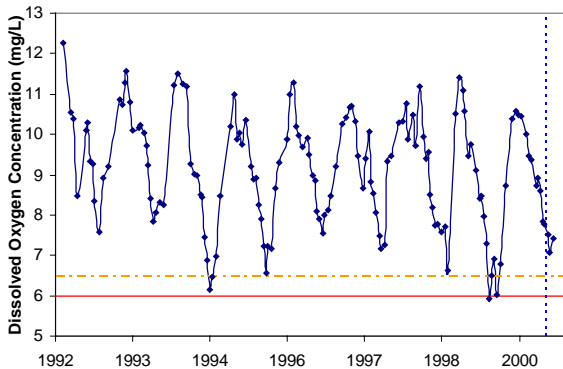
DISSOLVED OXYGEN

Measurements of dissolved oxygen (DO) concentration since the activation of the outfall tunnel have been above the caution level threshold of 6.5 mg/L. DO percent saturation readings since the outfall tunnel came on-line have been above the Contingency Plan threshold warning level of 75% for both nearfield and Stellwagen Basin monitoring areas, but fell below the caution level in early October 2000. For a full description of the threshold exceedance see <http://www.mwra.state.ma.us/harbor/html/ax111000.pdf>.

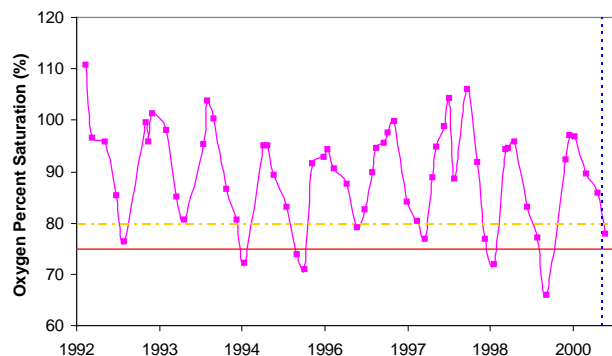
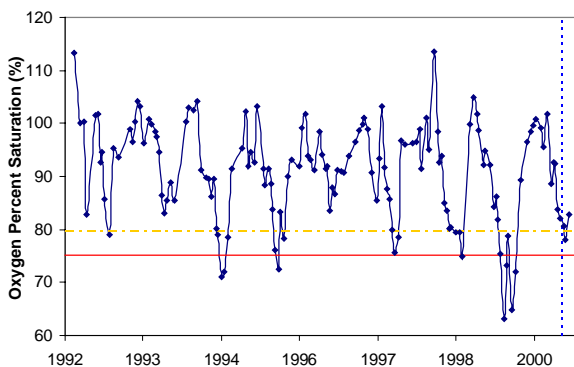
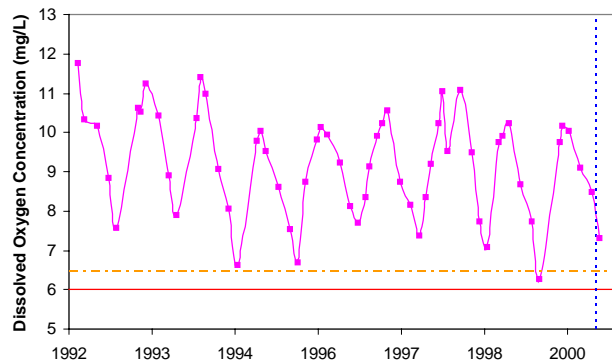
The concentration of dissolved oxygen (DO) in the water indicates the balance between production by algae and consumption by aquatic organisms and the decomposition of organic matter. Excessive organic matter may result in oxygen depletion, which may in turn adversely affect the aquatic ecosystem. The amount of oxygen that the water can hold is related to water temperature, salinity, and pressure; thus the percent saturation of dissolved oxygen is a measure that takes these factors into account. Monitoring locations for which there are DO thresholds include the "nearfield", the group of stations within about three miles from the outfall, and "Stellwagen Basin", a deep area nine miles east of the outfall. Thresholds apply to the part of the year when the water column is stratified, *i.e.* from June - October. The current reporting period for dissolved oxygen thresholds is Sept. 6 - Oct. 31, 2000 --from outfall start-up through the end of October. During this period there were three nearfield surveys and one combined nearfield/farfield survey.

The graphs include data since the start of the monitoring program in 1992, and reflect the natural fluctuation of DO and percent saturation, which is typically lowest in early fall.

NEARFIELD



STELLWAGEN BASIN



—●— nearfield survey mean
- - - caution level
— warning level
- - - outfall start-up (vertical line)

—●— Stellwagen Basin survey mean
— warning level

NUISANCE ALGAE

Nuisance algae levels in the first monitoring period since the outfall tunnel came on-line were well below thresholds. The current threshold reporting period for nuisance algae is Sept. - Dec. 2000 (six surveys).

Nuisance algal blooms are less predictable than the normal, beneficial algal blooms which produce food and oxygen; some blooms did occur during the baseline monitoring period. There is public concern that effluent nutrients could feed a red tide bloom in the vicinity of the new outfall, or otherwise increase the abundance of nuisance algae. Therefore, the Contingency Plan has thresholds for seasonal abundance of *Alexandrium*, *Phaeocystis pouchetii*, and *Pseudonitzschia*, which are triggered if the abundance of any of these becomes unusually high.

ALEXANDRIUM

Alexandrium tamarense typically may bloom during April to June and can cause paralytic shellfish poisoning, known as PSP or red tide; it has been periodically found in Massachusetts since the 1970s. *Alexandrium* has not been seen in abundances greater than 2 cells per liter in autumn samples since 1993. Toxicity is generally not found in shellfish until much higher cell counts are seen in the overlying waters.

| Autumn <i>Alexandrium</i> per-sample abundance (cells/l) | |
|--|-------|
| Range over baseline | 0-163 |
| caution threshold | 100 |
| Year 2000* | 0 |

* maximum of all samples collected between September 6, 2000 and December 31, 2000.

PHAEOCYSTIS

Phaeocystis pouchetii blooms usually occur during February to April but can occur at any time. Since 1992 this species has occurred only rarely in the autumn, and at very low levels. The species is not toxic, but individual cells can aggregate in gelatinous colonies that are poor food for zooplankton.

| Autumn <i>Phaeocystis</i> mean abundance (cells/l) | |
|--|---------|
| Range over baseline | 0-2,367 |
| caution threshold | 2,370* |
| Year 2000 | 0 |

*Corrected 11/01

PSEUDONITZSCHIA

Pseudonitzschia multiseries blooms can occur during November to March and produce domoic acid, which can cause a condition known as amnesic shellfish poisoning. The group of algae including the toxic species *Pseudonitzschia multiseries*, the closely related *Pseudonitzschia pungens*, and any unidentified *Pseudonitzschia* species was seen at relatively high numbers in the falls of 1993 and 1998.

| Autumn <i>Pseudonitzschia</i> mean abundance (cells/l) | |
|--|------------|
| Range over baseline | 267-24,300 |
| caution threshold | 24,600* |
| Year 2000 | 12,600 |

*Corrected 11/01