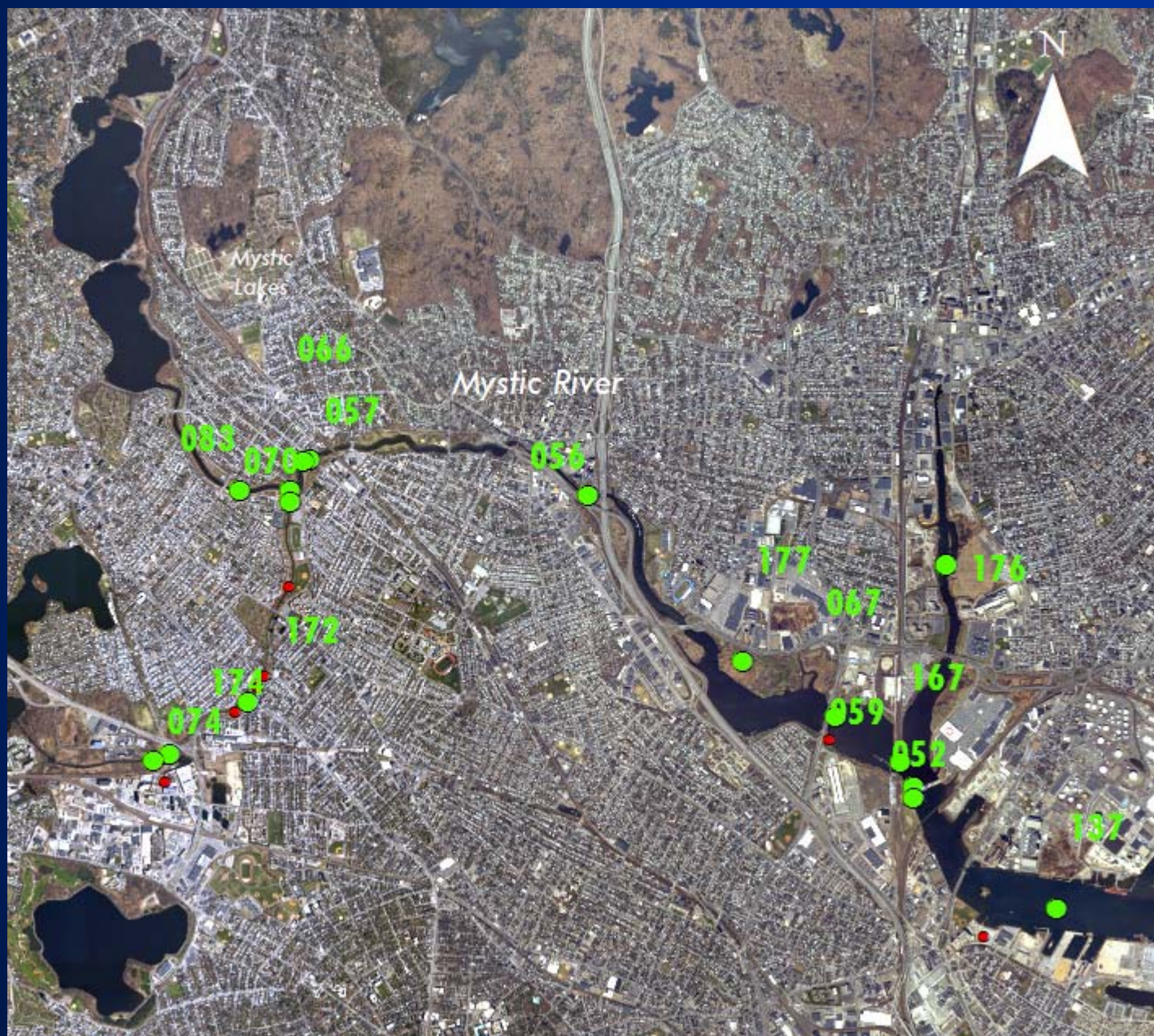


2009 MWRA Mystic River Receiving Water Monitoring

Kelly Coughlin
Massachusetts Water Resources Authority

Map of MWRA
sampling
locations in
Alewife Brook,
Mystic River
and Malden
River



MWRA's Mystic Monitoring Overview



- CSO monitoring program for bacteria has been ongoing since 1989; harbor monitoring expanded in 1993 to include year-round monitoring at select locations for eutrophication monitoring.
- Mystic is one of four regions monitored on a rotating basis, other regions are Charles, and Neponset Rivers, and harbor embayments; 45 locations total.
- 17 sampling locations in the Mystic area, with 20 - 25 visits per location per year.

MWRA's Mystic Monitoring Overview

- Sampling is year-round but most intensive in warm weather months, samples are collected with a small boat or from shore
- All samples are analyzed at MWRA's Deer Island laboratory
- Scheduling is random with respect to wet or dry weather
- Three locations sampled year-round from bridges/shore: downstream of the Mystic Lakes (083), downstream of Alewife Brook (066) and at the Amelia Earhart dam (167). The remainder are sampled April through December by boat.



Measurements

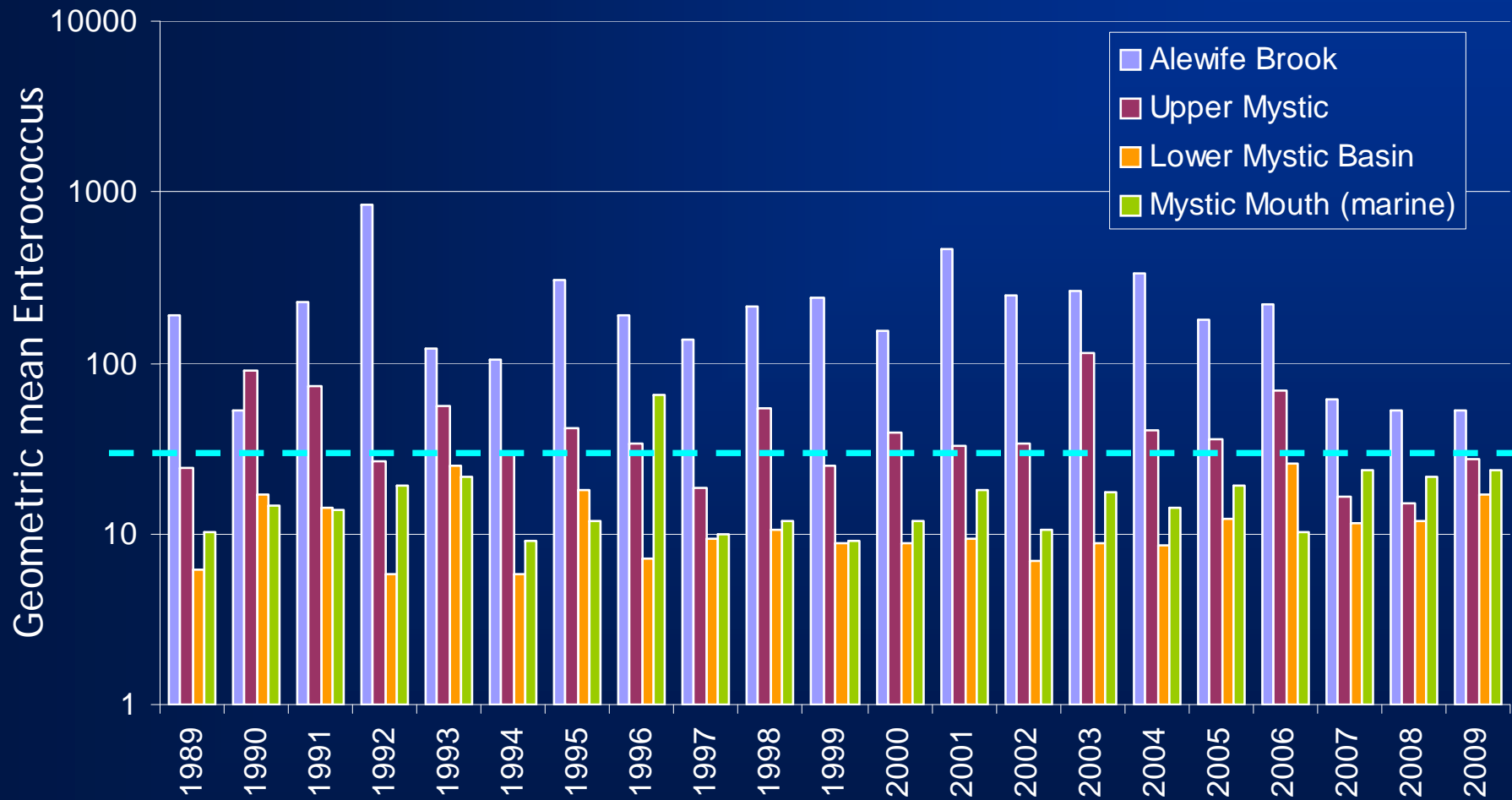
- Indicator bacteria: *Enterococcus*, *E. coli* and fecal coliform (marine only)
- Secchi disk depth
- Physical parameters (dissolved oxygen, temperature, conductivity, pH, turbidity)

Eutrophication monitoring also includes:

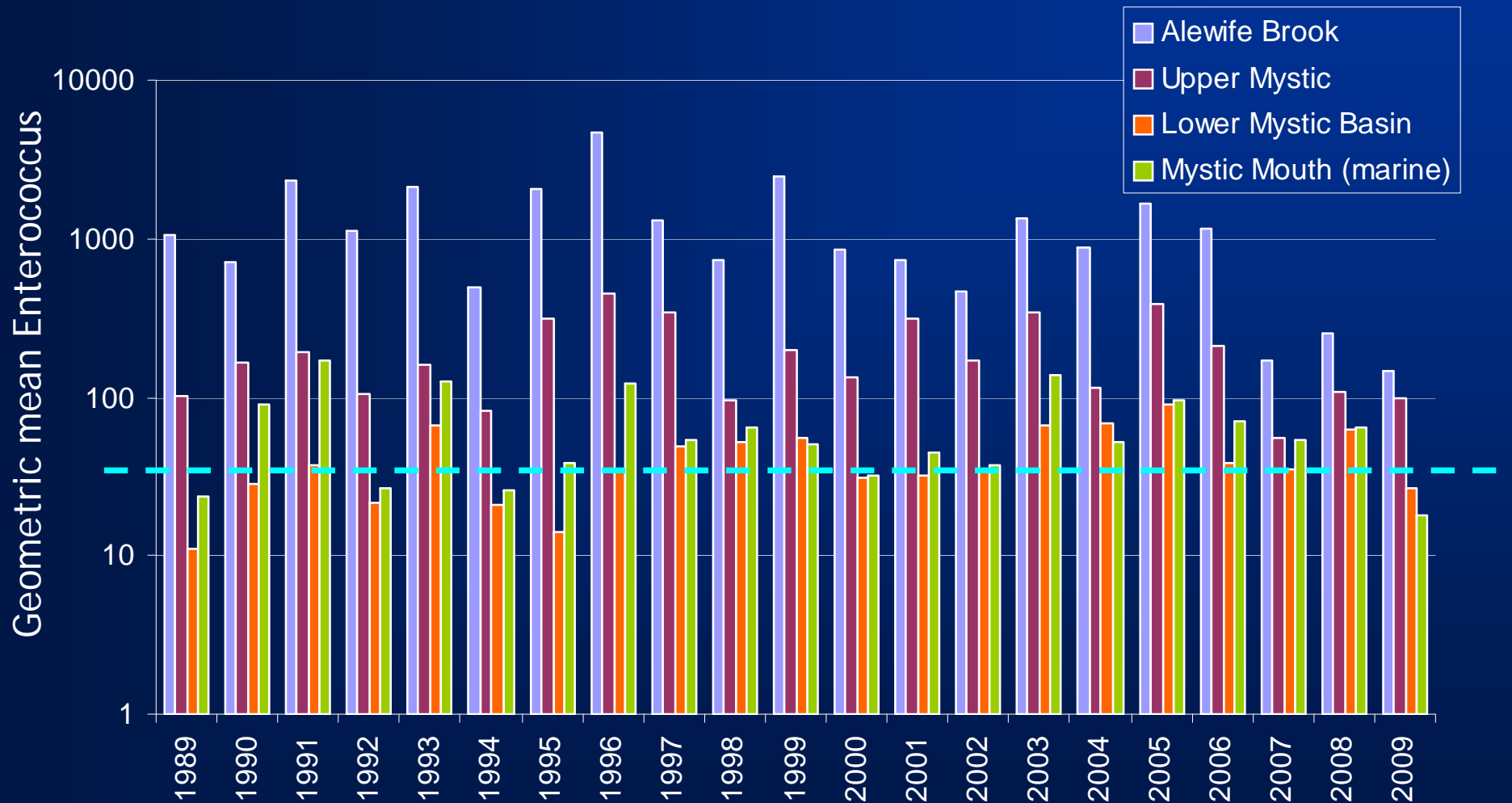
- Chlorophyll and phaeophytin
- Dissolved nutrients (ammonium, phosphate, nitrate/nitrite)
- Total nitrogen, total phosphorus, silicate



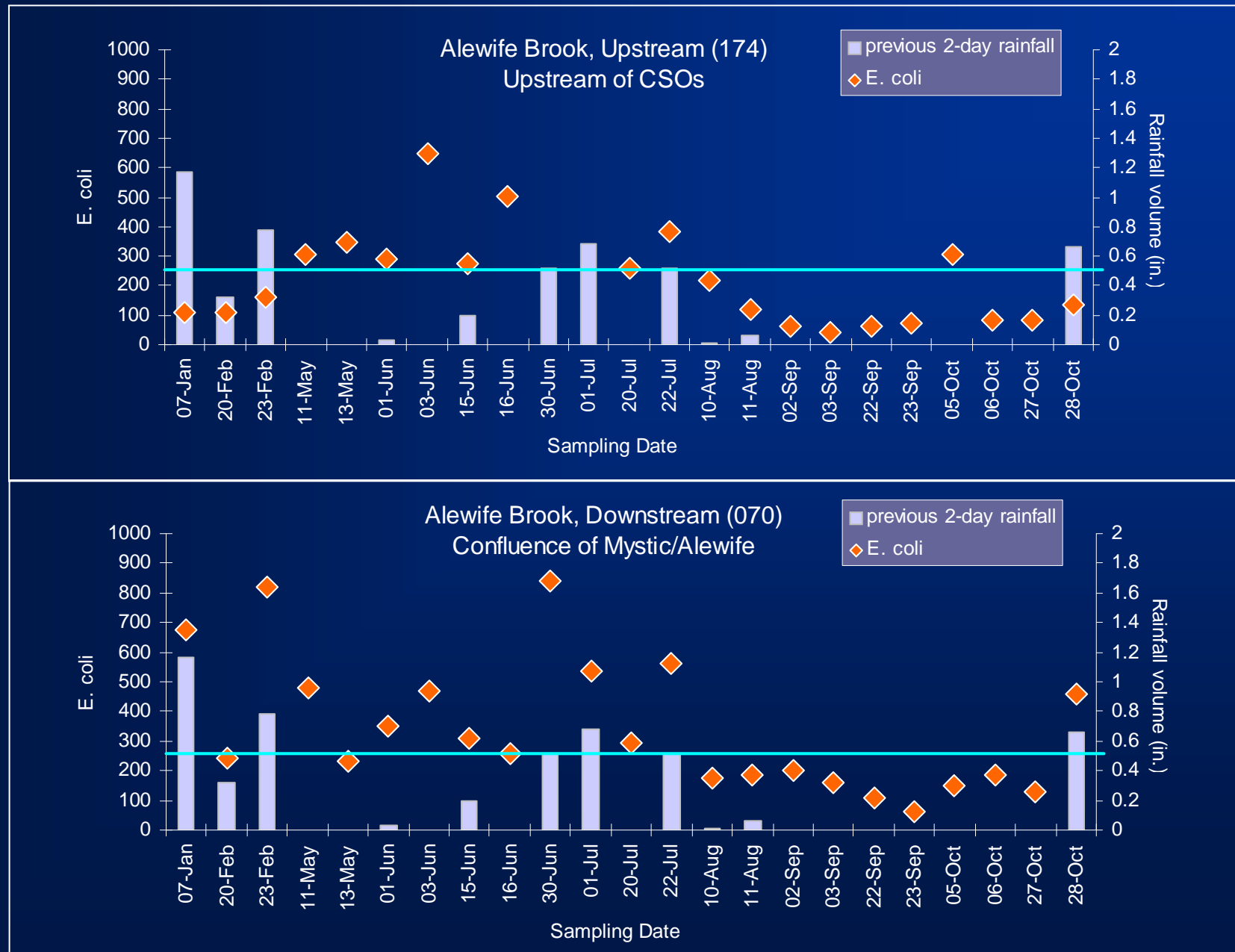
Bacterial water quality over time: dry weather



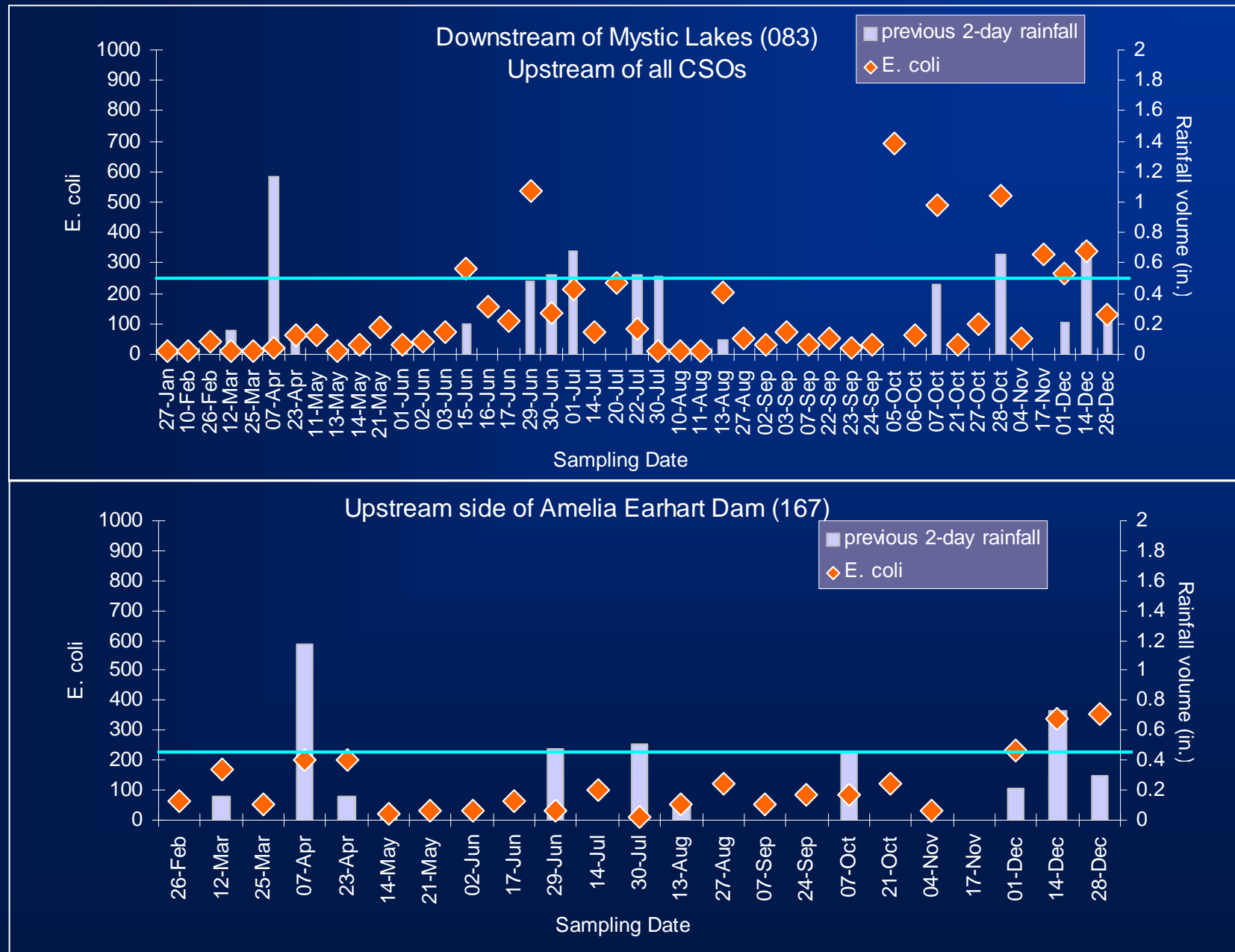
Bacterial water quality over time: wet weather



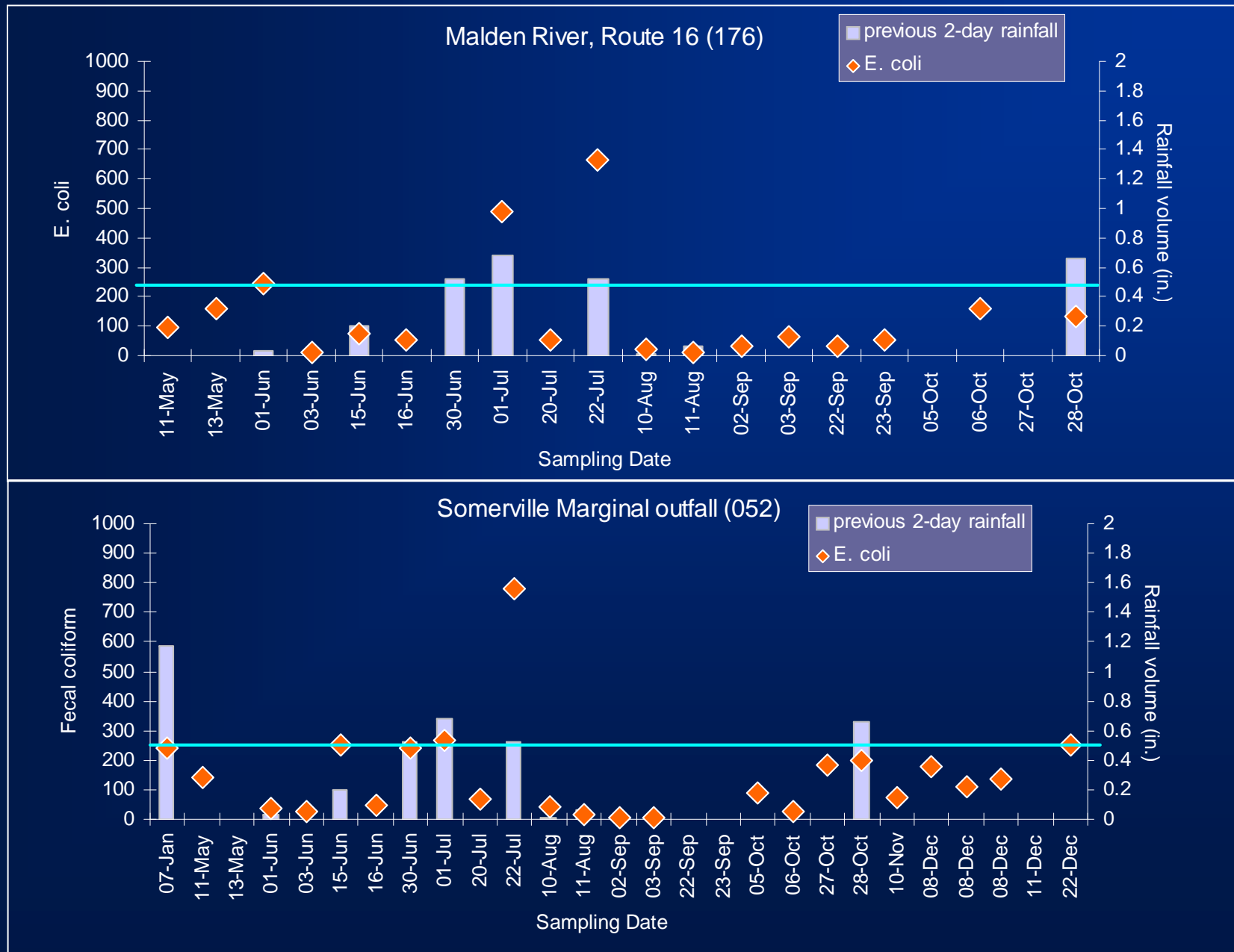
Bacterial Water Quality, selected locations: Alewife Brook



Bacterial Water Quality, selected locations: Mystic River



Bacterial Water Quality: Malden River and Somerville Marginal



Eutrophication Measures

- Water clarity in the basin area is relatively poor, with Secchi depth readings between 1.0 and 1.5 meters. Clarity is poorest downstream at the Malden R./Mystic confluence, with Secchi depths as low as 0.7 m in summer months. Secchi at upstream locations is relatively good, with visibility to the bottom at some locations.
- The Mystic has some of the highest ammonium levels MWRA measures in the Harbor. Concentrations reach 38 $\mu\text{mol/L}$ in February/March in the Upper Mystic. In midsummer, levels drop to 1 $\mu\text{mol/L}$ or less.
- Chlorophyll levels are also the highest in the Mystic of any area MWRA samples in the harbor. In midsummer 2009, chlorophyll concentrations reached 44 $\mu\text{g/L}$ at the Amelia Earhart dam. Upstream and mid-basin conditions are slightly better, with chlorophyll peaking at 28 $\mu\text{g/L}$ in July.

