Patterns of Phytoplankton Community Composition within Narragansett Bay

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Diatoms are important phytoplankton in the marine environment, contributing 40-50 percent of primary production. The diversity and distribution of diatom communities is important for understanding the ecosystem in Narragansett Bay (NBay). Traditional methods for quantifying species diversity can be difficult. We are using a combination of microscopy and high- throughput sequencing (HTS) to determine seasonal patterns of phytoplankton within NBay, using six years of weekly water column samples obtained from the NBay Plankton Time Series.

Our initial focus was on the diversity within the abundant diatom genus *Thalassiosira*. HTS revealed the presence of seven small and abundant species of *Thalassiosira* that had not been previously identified in the count data from the NBay Plankton Time Series. For example, *Thalassiosira pseudonana* has not been observed using microscopy since 1999, but the frequent occurrence of this species in the HTS results suggests that it could be an important contributor to phytoplankton communities than previously recognized. We are now expanding our investigation to assess species diversity across all diatoms during the six-year sampling period (2008-2014).

By combining HTS with microscopy, we aim to examine diatom diversity within NBay to elucidate seasonal, annual and inter-annual patterns of community composition. In addition, diversity data will be correlated with various environmental factors (eg. nutrients and temperature) to investigate how community patterns may shift over time due to changing environmental conditions.