

## Metabarcoding reveals diatom community composition is temperature dependent in a time series

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Diatoms are key phytoplankton in the marine environment, contributing 40-50% of primary production. Diatom contributions to the biological pump can significantly vary by species due to morphological differences, thus elucidating patterns of species composition is an ecologically relevant task. Here, we used metabarcoding to investigate diatom diversity and its environmental drivers using six years of monthly surface water samples from the plankton time series in Narragansett Bay (NB), where diatoms dominate phytoplankton biomass. To validate the metabarcoding approach, results were compared to microscopy data obtained from the same time series. Overall, metabarcoding revealed the presence of 22 genera not previously observed with microscopy. Many of the newly-identified genera occurred frequently and were comprised of small diatoms missed with microscopy. Their frequent occurrence suggests they may be more important contributors to phytoplankton communities than previously recognized. Diatom community composition was highly repeatable among years with a strong seasonal pattern correlated with temperature and dissolved inorganic nitrogen. The time series approach enabled us to discern temporal patterns of diatom composition at the ASV level. Together, these results suggest that shifts in diatom diversity and potentially ecosystem function in NB may occur both in response to continued ocean warming and water quality management policies.