

Understanding harmful algal blooms of *Pseudo-nitzschia* in Narragansett Bay, Rhode Island

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In 2016-2017 in Narragansett Bay (NB), Rhode Island, USA, shellfish harvesting closed for the first time due to the presence of domoic acid (DA), a neurotoxin produced by diatoms within the *Pseudo-nitzschia* (*P-n*) genus. This was surprising because *P-n* have been consistently observed for more than 50 years in the Narragansett Bay Long-Term Plankton Time Series (NBPTS) without a closure incident. Following these toxic events, the Jenkins and Bertin labs began a weekly time series of genetic and DA sampling at multiple sites in Narragansett Bay to monitor and better understand the underlying causes of these emerging harmful algal blooms (HABs). We had two hypotheses for the initiation of these toxic events: (1) Resident species within NB increased their toxin production due to environmental changes, and (2) New toxigenic species were introduced to NB. We have since demonstrated support for both hypotheses. A comparison of DA production and environmental parameters showed that higher DA was observed during periods of low nitrogen in NB. Recent genetic work revealed that the high toxin-producing species *P. australis* was not present in NB until just before the 2017 shellfish harvest closure but has persisted in NB in subsequent years. Additionally, *P-n* abundance and DA production have shown seasonal patterns in NB, with peaks in the summer and fall months. Further work is necessary to understand the molecular pathways through which DA is produced in various species, the role that plankton-associated bacteria may play in the upregulation of DA production, and other factors that influence the frequency and intensity of toxic events.