

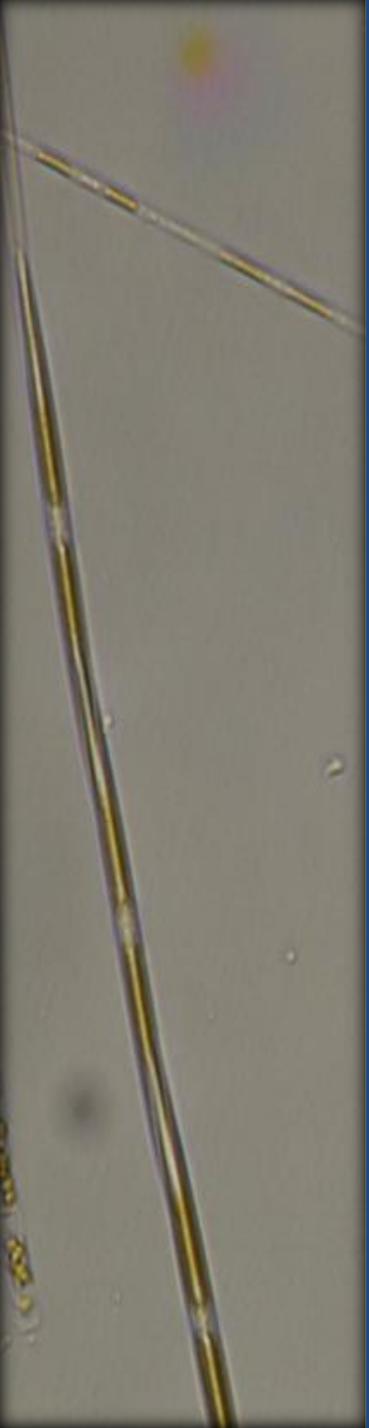


RIDEM

Short Term HAB Research Needs for Rhode Island

December 16, 2016

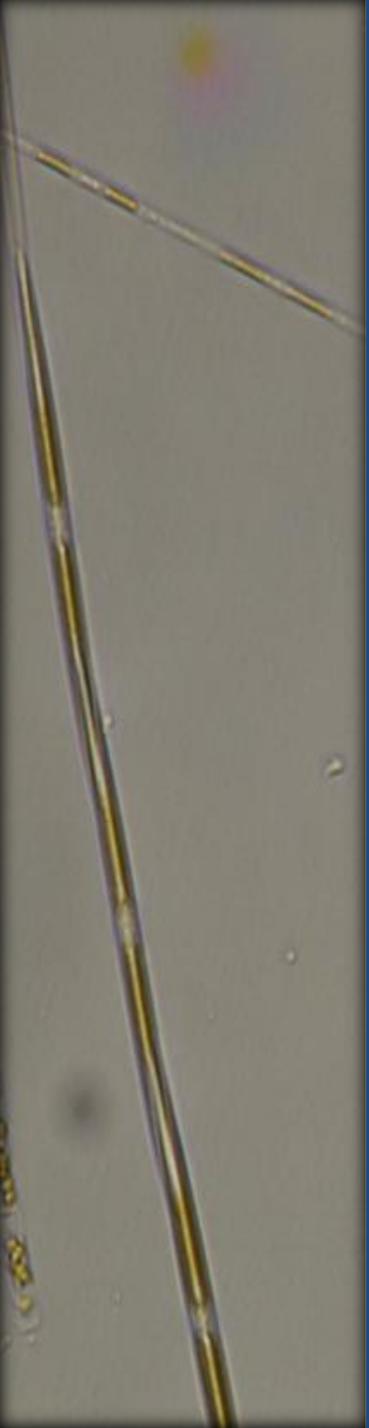
Coastal Institute Building, URI



Plankton Monitoring, ID and enumeration

Need: Complement State's HAB expertise and capacity to monitor plankton – especially off shore in RI Sound

- Tap into and/or build RI-based HAB expertise to assist State in predicting and evaluating HAB blooms and potential for toxicity
- Strengthen data sharing and reporting of bloom observations to DEM
- Review available regional bloom data (RI, MA, ME) to evaluate trends and identify any gaps in RI's proposed monitoring efforts.
- Look for opportunities to collaborate regionally on phytoplankton monitoring



Plankton Monitoring, ID and enumeration (cont'd)

- Augment State's limited capacity to collect plankton samples from offshore waters (in Rhode Island Sound)
- Plankton identification to species to determine if capable of producing toxin (SEM or genetic testing)
- Evaluate need and as necessary develop capability to detect Freshwater Cyanobacteria toxins (microcystins) in marine waters

Shellfish collection

Need: Very little capacity to collect shellfish samples from offshore waters (in Rhode Island Sound) and in other areas, collection can be time consuming

- Augment State's limited capacity to collect shellfish samples from offshore waters (in Rhode Island Sound)
- Establish network of sites at locations throughout State's approved waters supported by individuals (university scientists, aquaculture, dealers, shellfishers, etc.) willing to provide shellfish samples on short notice for toxin analyses

Toxin analysis (screening kits and analytical testing)

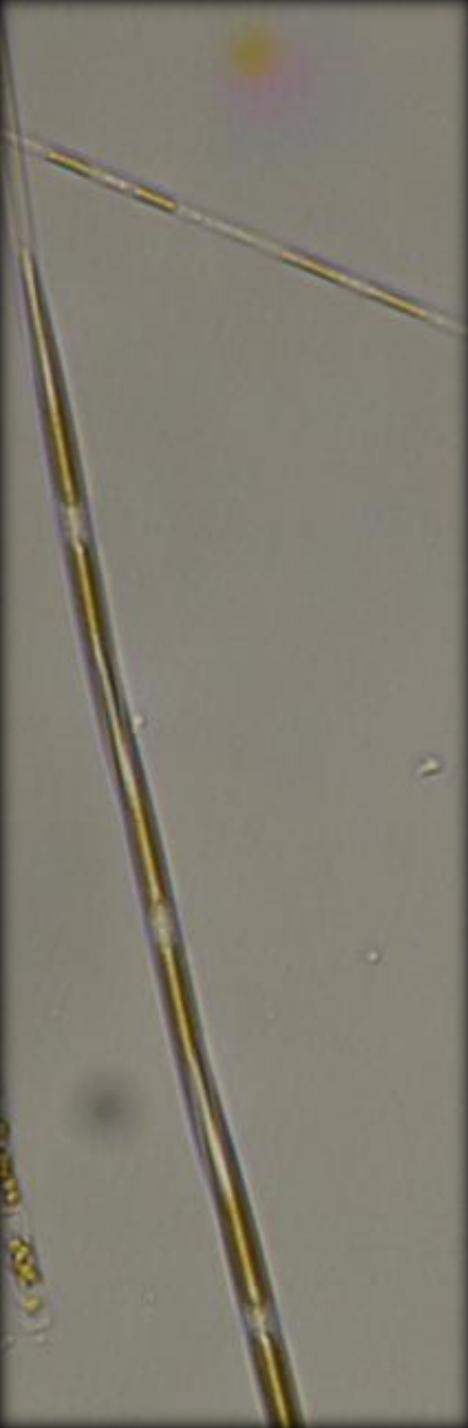
Need: State Health Lab, Rhode Island's sole FDA approved laboratory is currently working to bring ASP toxin (domoic acid) analysis on-line and is exploring analytical methods for other HAB toxins (PSP and DSP) (dependent upon funding made available)

- Explore feasibility of regional network of FDA approved laboratories for specific HAB toxin analyses
- Evaluate benefits of un-approved laboratory analysis as screening tool for DSP and ASP

Continued coordination with other states in our region

Need: Share expertise, knowledge and experiences addressing HAB

- List serves, conference calls, webinars, regional meetings



Longer Term HAB Research Needs for Rhode Island



Selected Findings from 2016 report, “Framing the Scientific Opportunities on Harmful Algal Blooms and California Fisheries Scientific Insights, Recommendations and Guidance for California” developed by working group of the Ocean Protection Council Science Advisory Team and California Ocean Science Trust

Phytoplankton growth and biomass accumulation (i.e., blooms) is a complex interplay of temperature, nutrient and light availability, and interactions with other organisms such as zooplankton grazers and bacteria. **Scientists are still working to understand the environmental drivers of HABs, including when events occur, physiological responses of phytoplankton, and the oceanographic conditions that lead to highly toxic bloom events rather than benign phytoplankton blooms (Anderson et al., 2015)."**



Selected Findings from 2016 CA report (continued)

In general, monitoring and HAB research are not well funded globally. By necessity, the standard approach most regions have taken is to characterize the effects of a massive bloom after it has already manifested. As such, **there are major gaps in our understanding of basic physiological characteristics and environmental drivers of key toxin-producing species, let alone how they respond to climate change and other stressors.** This has made it very difficult to identify the myriad factors that lead to blooms.



Summary of 2016 CA Recommendations for consideration in identifying RI's Long Term HAB Research Needs

1: Continue to build out a robust, cost-effective, and flexible monitoring program that can be responsive to future HAB events, and that considers impacted communities.”

2: Pursue efforts to better understand offshore bloom and bloom timelines”

3: Advance predictive modeling tools and better link models and model outputs to monitoring and management.”



Summary of 2016 CA Recommendations (continued)

4: Improve basic understanding of the ecophysiology of marine HAB species”

5: Improve understanding of how biotoxins move through food webs”

#6: Advance research on the relationship between HABs and human health.” (In particular chronic exposure to low domoic acid levels that do not produce outward signs of toxicity).”

Additional DEM identified longer term needs:

7: Develop information on economic impacts to local fishermen, aquaculturists, and shellfish markets from current and future HAB occurrences in RI state waters.

This information will be useful in case of prolonged closures that could precipitate the need for federal mitigation assistance. Additionally, this information will create the context for a cost benefit analysis to consider in combination with recommendation 1 above.

8: Identify future HAB plankton species of concern which may impact our area due to climate change, for use in a more robust and adaptable HAB monitoring program.