BROWN

Linking Water Quality with Ecosystem Health in Narragansett Bay

To: All individuals interested in the health of Narragansett Bay and other coastal water bodies

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Abstract

Narragansett Bay, one of New England's largest estuaries, provides an array of benefits to people, including commercial and recreational fishing opportunities, recreational use, and protection from coastal storms. Clean waters contribute to all these benefits, and thus it is not surprising that water quality is monitored by a number of government and non-governmental organizations (NGOs). However, the spatial extent and resolution of available water quality data is highly variable. Monitoring programs were established based on individual goals and available resources, and those have evolved through time. Watershed Counts, as a cross cutting initiative of the Rhode Island Environmental Monitoring Collaborative, has the opportunity to catalyze a more comprehensive and standardized water quality monitoring program for the Bay that would benefit both policymakers and scientists alike.

The Challenge: **Limited Water Quality Data on Bay Health**

The water quality data synthesized by Watershed Counts includes information from multiple government and non-governmental organizations interested in the health of Narragansett Bay. The state, through the Department of Environmental Management (RI DEM), together with the Narragansett Bay Commission (NBC), the Narragansett Bay National Estuary Research Reserve System (NEERS), and the University of Rhode Island (URI), monitors a number of water quality stations (see figure, next page). The parameters sampled, geographic distribution, and temporal frequency and extent of these data vary considerably. **Please see the full report, dated 4.24.14, by K. Cortes for details at http://blogs.brown.edu/leslie-lab/.**

All organizations share an interest in monitoring the timing and locations of hypoxia in the bay, given its negative effects on fisheries, recreation, aesthetics, and the ecosystem, as highlighted by the 2003 Greenwich Bay Fish Kill. However, pathogens, trash, and chemical pollution also degrade water quality and impact the ability of the bay ecosystem to provide the ecosystem services that people value. Some data related to pathogens, trash, and chemical pollution – as well as nutrient data and other standard environmental variables – are already being collected, and could potentially be incorporated into Watershed Counts. Such a data integration effort would create a closer link between the environmental monitoring enterprise and the diverse benefits that the bay provides to citizens and visitors to Rhode Island, and facilitate both scientific and public education objectives.

Possible Solutions: **Communication, Coordination, & More Comprehensive Monitoring**

1. The Watershed Counts monitoring program relies on data provided by its partner organizations, including URI, NBC, & NEERS, as well as RI DEM itself. While these organizations collect many of the same data, formal protocols establishing sampling frequency or parameters have not been established. **Watershed Counts could enable more structured communication and coordination among these groups.**

2. Watershed Counts has done a great job of uniting varied organizations behind a single goal—assessing the health of the Narragansett Bay watershed. However, **more comprehensive and standardized monitoring would enable more integrated, ecosystem-based management of the Bay and the many benefits it provides to people.**

- By monitoring a greater number of stations – including stations in key areas like Greenwich Bay and the lower bay – partners will gain a more complete picture of bay health.
- By standardizing water quality measurements and linking them to key ecosystem services, the data would be more comparable and more useful for decision-making. The Ocean Health Index framework provides one model for making these connections (Halpern et al. 2012. *Nature* 488: 615-620). One of us (HL) was a member of the team that created the framework, and we have begun to explore how to tailor it to Narragansett Bay. Please contact us to learn more.

Narragansett Bay: Distribution & Ownership of Water Quality Monitoring Stations