

Rhode Island Shellfisherman's Association

Problem Statement

October 23, 2023

Special Legislative Commission To Study And Provide Recommendations On The Issues Relating To The Reduced Catch Of Quahogs In Narragansett Bay

Over the last decade Rhode Island quahog landings have precipitously **declined 56%** from a high of 902,998 pounds harvested in 2012 to landings last year of 397,442 pounds, as reported by NOAA Fisheries (<https://www.fisheries.noaa.gov/foss>) and shown in Figure 1, below. The Narragansett Bay quahog (*Mercenaria mercenaria*), like other molluscan shellfish such as oysters and mussels, are filter feeders and rely primarily on phytoplankton (microscopic algae) within the Bay as their food source. The abundance and distribution of phytoplankton is dependent upon nutrients and water temperature, among other factors. In particular, nitrogen is a limiting nutrient in marine waters and is a key element for the production of phytoplankton.

In August 2003 a massive fish kill occurred within Greenwich Bay due to anoxic (absence of dissolved oxygen) conditions. See RIDEM 2003. Among other factor, including warm water temperatures and poor tidal flushing, the low oxygen condition was driven by blooms of phytoplankton in response to an increase in nutrients, primarily nitrogen. As the phytoplankton died and settled to the Bay bottom, bacteria consumed the organic matter and severely depleted oxygen within the water column. The sight of millions of fish lying dead along the shores of Greenwich Bay galvanized public support to take regulatory action to reduce such episodes in the future. Hypoxic events have also been recorded over the years in the upper Narragansett Bay, especially in the Providence River.

The single largest source of nitrogen (N) to upper Narragansett Bay is from 11 Rhode Island and 6 Massachusetts municipal wastewater treatment facilities (WWTFs), which at the time of the RIDEM 2003 assessment, accounted for 66% of all nitrogen loading. In 2004 the General Assembly enacted legislation that required RIDEM to “implement measures to achieve an overall goal of reducing nitrogen loadings from wastewater treatment facilities by fifty percent (50%) by December 31, 2008.” See R.I. Gen. Laws § 46-12-2(f). To meet this goal RIDEM established a 5mg/L N wastewater effluent limit from May through October. The RI WWTFs first achieved the 50% summer nitrogen reduction goal during the 2012 summer season as shown in Figure 2. Between 2013 and 2016, the percent reduction of the nitrogen loads from the eleven RI and six MA WWTFs ranged from 62-73% when compared to the early 2000s (pre-nitrogen reduction) time period. See RIDEM 2017.

By 2012 RIDEM had substantially completed implementation of the nitrogen reduction goals, as mandated by state law, at regional WWTFs resulting in the load reductions noted above. The ecosystem response within the Bay has been a measurable decline in excess chlorophyll, a proxy for phytoplankton, and a substantial decline in hypoxia as shown in Figure 3, below. However, the significant declines in nitrogen, along with chlorophyll and hypoxia, since 2013 is coincident with a substantial decline (56%) in quahog landings over the same period (compare Figs. 1 and 3) . While there may be other factors influencing the decline of quahog production over the last decade, the shellfish industry contends that the substantial drop in quahog abundance within the Bay is primarily related to the implementation of state mandated nitrogen reduction limits at WWTFs.

While recognizing the important water quality improvement benefits to the Bay, we believe the implementation of nitrogen reduction management strategies has had an unintended and devastating consequence to the shellfish industry as reflected in quahog landing records over the last decade. In addition, many shellfishermen are reporting a severe reduction in quahog populations in the lower Bay (below Warwick Light). See Figure 4 for reference. Prior to implementation of the nitrogen reduction limits, quahogs were abundant in the lower Bay. Rhode Island shellfishermen argue that the RI nitrogen wastewater permit limits need to be modified, at the very least, to allow an increase of nitrogen during late winter and spring to promote phytoplankton blooms to sustain quahogs and increase their potential for reproduction. We believe that the 2004 state law implementing nitrogen reduction, while well intended, went too far in efforts to ameliorate problematic hypoxic events. Thus, Rhode Island shellfishermen are suffering the consequences of a strained resource and substantial reductions in quahog landings and income loss over the last decade.

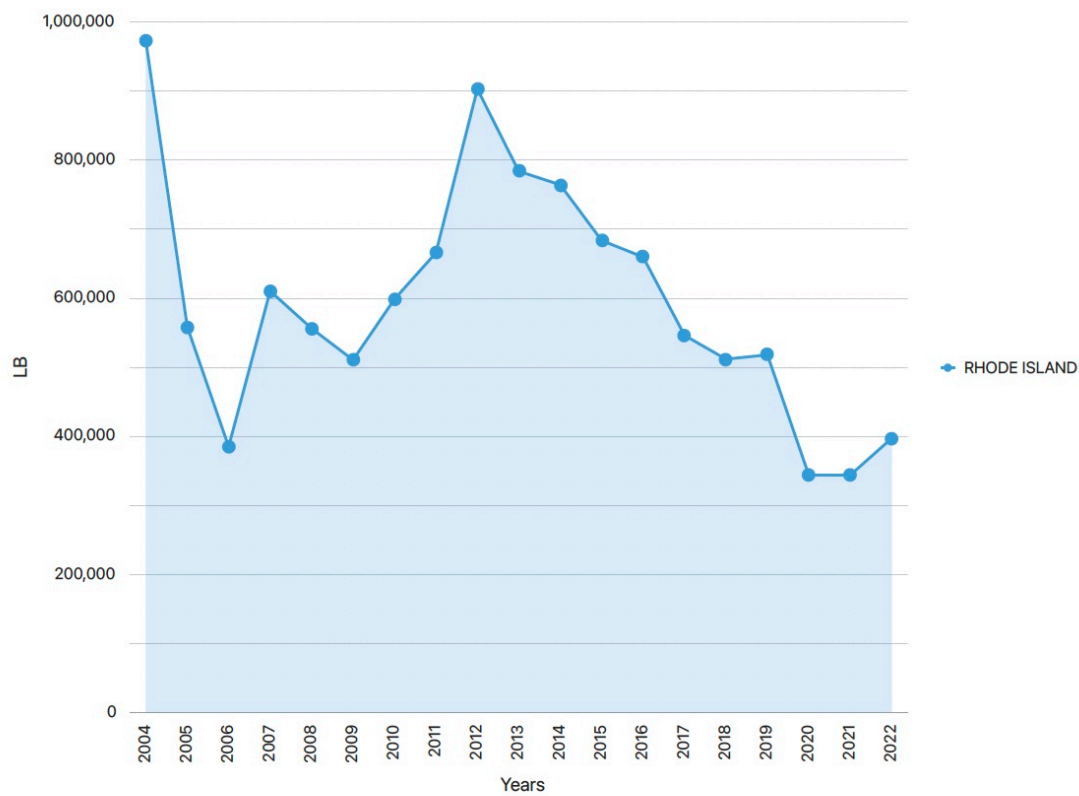
We recommend that R.I. Gen. Laws § 46-12-2 be amended to allow for a more flexible nitrogen management strategy for Narragansett Bay, to include the modification of RI WWTF permit limits allowing for an increase in nitrogen concentrations in wastewater effluent to sustain quahogs while also being protective of water quality to limit hypoxic events. Further, there is a need for General Assembly, RIDEM Office of Water Resources and the Division of Marine Fisheries, RI wastewater treatment facilities, academic institutions, and the shellfish industry to collaborate quickly in resolving the nitrogen loading dilemma to develop an abundant, healthy and sustainable quahog biomass within Narragansett Bay.

REFERENCES

RIDEM, 2003. The Greenwich Bay Fish Kill - August 2003, Causes, Impacts and Responses. <https://www.nbep.org/technical-resources>

RIDEM, 2017. Major Wastewater Pollutant Reduction Efforts in RI Since Meeting Secondary Treatment Standards. RIDEM Office of Water Resources. <https://dem.ri.gov/sites/g/files/xkgbur861/files/programs/benviron/water/quality/pdf/fs-wwtfpollredes.pdf>

Landings Chart



Selected Parameters

2022,2021,2020,2019,2018,2017,2016,2015,2014,2013,2012,2011,2010,2009,2008,2007,2006,2005,2004
RI
Clam, Quahog, Northern

Figure 1. Rhode Island quahog landings 2004 through 2022. Source NOAA Fisheries (<https://www.fisheries.noaa.gov/foss>)

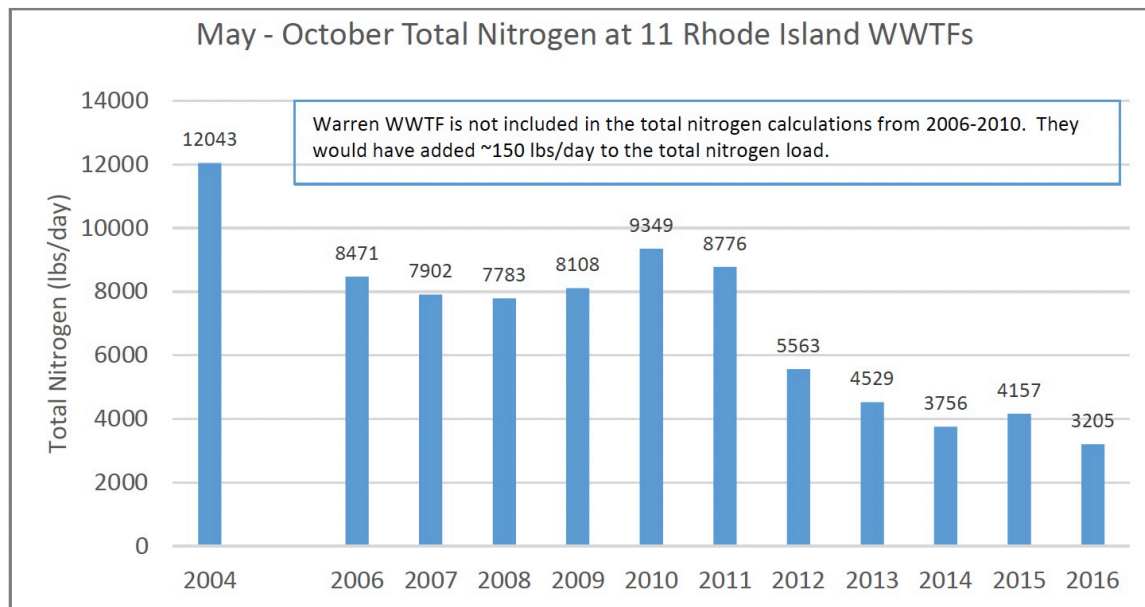


Figure 2. Nitrogen reduction at Rhode Island WWTFs. Source: RIDEM 2017.

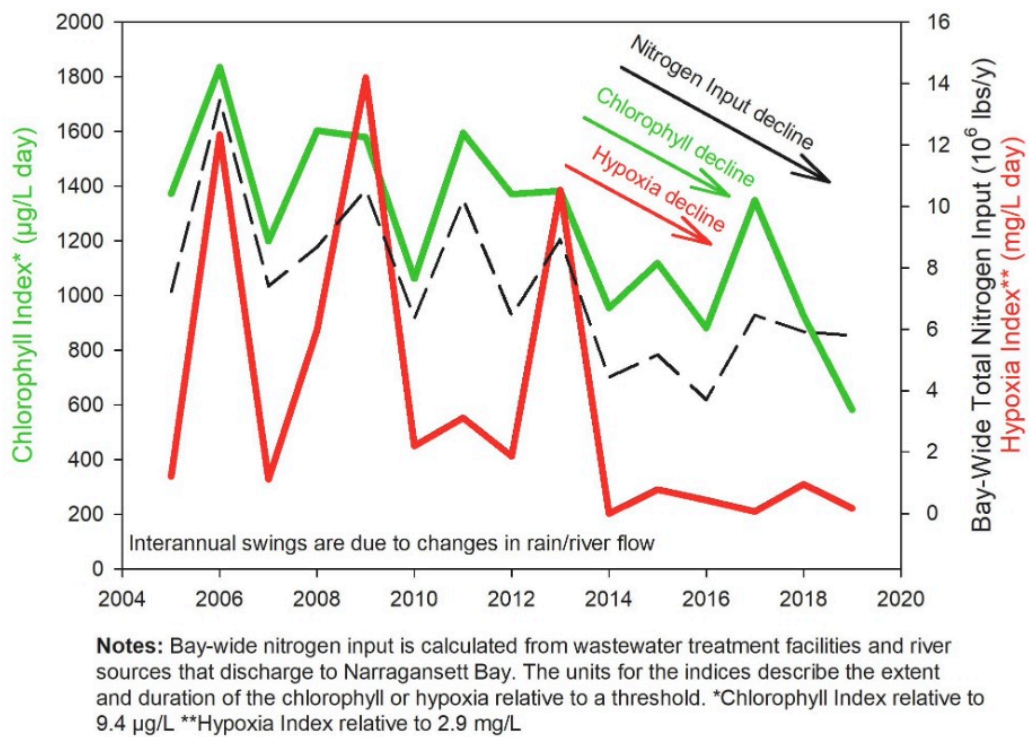


Figure 3. Narragansett Bay response to major nitrogen reduction from WWTFs. Source: <https://www.nbep.org/nbep-science>



Figure 4. Narragansett Bay shellfish harvesting areas. Source: RIDEM