**Use of historic data to understand benthic community changes in Narragansett Bay.**

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Narragansett Bay, a small northeastern U.S. estuary, has been adversely impacted by eutrophication. Nitrogen loads in the bay have risen as human development has increased, and the Bay shows a distinct eutrophication gradient from the head of the bay to the mouth. Sewage treatments plants contribute approximately 50% of the nitrogen to the bay and most loading occurs at the head of the Bay near urban centers. In 2003, a large fish kill spurred the legislature to require sewage treatment plants to reduce their nitrogen loads to the Bay by 50% during the growing season. In order to understand the ecological implications, the U.S. EPA's Atlantic Ecology Division has been accumulating historical ecological data on the bay. Contemporary work has shown that the eutrophication gradient is reflected in the benthic invertebrate community. Although quantitative benthic invertebrate data have been collected in the bay since the 1950s, surveys have been done intermittently for various projects using different gear. For this study, we examined alternate ways of harmonizing and sub-setting data collected between the 1950s and mid 1980s to minimize these differences so that temporal trends could be observed. This should be helpful for not only this study but also have application to other estuaries where disparate historical data are available.

Impact Statement:

Historical data and information are needed to understand the potential of a system after restoration or decrease of anthropogenic loadings or other pressures. Unfortunately, historical data are often spatially and temporally sparse, and often are collected using different protocols and gears. Benthic invertebrate data collected between the 1950s and mid-1980s were harmonized to detect any underlying temporal signals. This should be helpful for not only the

Narragansett Bay but also have application to other estuaries where disparate historical data are available.