

Final Report Summary

Assessment of the Effects of Bottom Water Temperature & Chemical Conditions, Sediment Temperature, Sedimentary Organic Matter (Type & Amount) on Release of Sulfide and Ammonia from Sediments in Long Island Sound: A Laboratory Study

The goal of this research was to investigate how certain factors in the environment of Western Long Island Sound interact to cause a release of ammonia and/or sulfides, at certain times of the year, from the sediments of WLIS. Factors investigated included: water & sediment temperature, initial water dissolved oxygen (DO) levels, addition of organic matter (plankton), sediment organic content, and the presence or absence of organisms in the sediments. The main findings of the project are as follows: 1. addition of fresh plankton is a significant influence on the release of both ammonia and sulfides from bottom sediments in WLIS. Addition of fresh plankton results in an increase in the release of ammonia from sediments while it results in a general decrease in sulfide release from bottom sediments. 2. The influence of bioturbating organisms on sulfide and ammonia release from WLIS sediments, while not significant ($\alpha < 0.10$), is present and varies with the other conditions present (i.e., DO, temperature, plankton). 3. The influence of water column DO content on ammonia and sulfide release from sediments is significant but it varies with other factors. 4. The influence of sediment locality on ammonia and sulfide release from sediments, while present, was not significant by itself. However, when taken with plankton, DO, and temperature, locality does exert a significant effect – especially upon sulfide release. Locality was selected as a proxy for organic carbon content. 5. The strongest and most consistent influence on ammonia and sulfide release from sediments under experimental conditions was temperature – both water column and sediment temperature. Sediment temperature consistently tracked water column temperature and ran, on average, 2°C higher than water column temperature. The results of this work demonstrate that temperature, dissolved oxygen, and the addition of plankton, such as happens during the Spring and Fall plankton blooms, all play a significant role in the release of sulfides and ammonia from WLIS sediments. Furthermore, the study suggests that sediment organic content further influences such release.