

Progress on OSOM-CoSiNE for Coupled Simulations of Narragansett Bay Hydrodynamics and Ecology

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An implementation of the Regional Ocean Modeling System (ROMS), the Ocean State Ocean Model (OSOM), has recently been coupled with the Carbon, Silicate, Nitrogen Ecosystem (CoSiNE) model in order to provide realistic simulations of the hydrography, circulation and lower trophic level ecology in the Narragansett Bay (NB) region.

The CoSiNE model is a complex lower trophic level (phytoplankton and zooplankton) ecosystem model with 15 state variables, including 4 nutrients. Using all available nutrient observations, the initial focus was the development of time series of nutrient concentrations in the rivers and wastewater treatment plants that discharge into NB. With forcing from these time series, the coupled OSOM/CoSiNE model has been run for a full year (2006). This simulation is presently being compared with historical observations of chlorophyll and dissolved oxygen from the Narragansett Bay Fixed Site Monitoring Network (NBFSMN) and with nutrient data from the GSO Plankton Time Series station with the objective of optimizing the various biological rate parameters in CoSiNE.

The simulations from OSOM-CoSiNE will ultimately be used to address a number of questions related to the ecology of NB, such as the effects of intrusions of nutrient enriched deep coastal water into NB and the influence of managed reductions in anthropogenic nutrient inputs on summertime hypoxia in the Bay.