**Title: [Changing ecosystem response to nitrogen load into Buzzards Bay, MA]**

Presenting author: [Shanna C. Williamson]

Primary author’s institutional affiliation: [Virginia Institute of Marine Science (VIMS)]

Coauthors: [Jennie E. Rheuban, Joseph E. Costa, David M. Glover, Scott C. Doney]

Presenting authors’ email address: [swilliamson@vims.edu]

To determine the interactions between nitrogen load, physical drivers, and water quality indicators, we estimated time-evolving nitrogen input to 28 estuaries within the Buzzards Bay, Massachusetts (USA) watershed from 1985-2013. Estimates were derived by combining parcel specific wastewater disposal, point source wastewater discharge, land use, and atmospheric nitrogen deposition data with a previously verified nitrogen loading model (NLM). Linear regression analysis was used to quantify temporal trends in individual data sets and characterize relationships between variables. The land-use data indicated that fractional coverage of impervious surfaces increased with time for all sub-watersheds at the expense of vegetation and agriculture land classes reflecting a growth in residential unit density. Nitrogen loads decreased with time for most watersheds on the western side of Buzzards Bay reflecting decreased atmospheric nitrogen deposition combined with management efforts to mitigate wastewater pollution. Increases in nitrogen sourced from wastewater, driven primarily by the development of on-site wastewater disposal, resulted in overall nitrogen load increases for most of Buzzards Bay’s eastern watersheds. An apparent shift in time was identified for the relationship between nitrogen load and mean summer in situ chlorophyll-a, which may be partially explained by climatic variables such as precipitation and water column temperature.