



Title: Effects of modified nutrient conditions on phytoplankton in the Neuse River Estuary-Pamlico Sound

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Theme: Nutrient and Pesticide Management

Situation: The Neuse River Estuary-Pamlico Sound (NRE-PS), NC is a tractable system for measurement of ecosystem response to excess N-loading and to the legislatively mandated reductions. Understanding the changes in phytoplankton-nutrient relationships throughout both space and time in the estuary is essential for effective future management of the system as a whole. Information generated by this work is intended to provide empirical information for managers, decision makers and primary nutrient generators to facilitate improved decision making on all levels.

Objectives: Our objective was to strengthen the understanding of relationship between nutrient supply and phytoplankton productivity and growth in the NRE-PS. We compared phytoplankton community responses to nutrient manipulation in the NRE to that in PS. Our measurable objectives were the production of a scientific basis for projecting the need for, and effectiveness of, nutrient controls in the NRE-PS, conveying information on phytoplankton-nutrient relationships in the NRE-PS to decision makers and informing the public at large about the current status of the estuary.

Methods: We employed phytoplankton nutrient bioassays to assess changes in phytoplankton primary productivity (14C method), biomass (Chl a), and taxonomic composition (HPLC diagnostic photopigment analysis) resulting from modified nutrient conditions. We used ambient monitoring data from the NRE-PS to provide context for the manipulative experiments. Once analyzed, data were conveyed through scientific publications, meetings and symposia (both technical and not) and through several websites.

Partnerships: NC Department of Natural Resources and Community Development, Division of Water Quality (J. Sauber, J. Overton) and Weyerhaeuser Co., (M. Lebo) have been active partners assessing water quality in the NRE-PS including data analysis, monitoring, analytical work and project design.

Research: This research project incorporated both education and outreach through a variety of means. The education initiative of this project represented a concerted effort to include education and training in every component of the research. Our efforts not only focused on post-docs and graduate student training, but also on undergraduate and high school students. Outreach was pursued through a variety of meetings and symposia with targeted audiences (e.g. nutrient users, decision makers). Several websites conveyed the synthesized research results to both targeted and broader audiences.

Resources: This project took place in the context of several related projects on the NRE-PS and the adjacent watershed. We gained tremendous leverage in terms of availability of data for ecological context (monitoring of the ambient conditions in NRE-PS) and the quantity and nature of nutrient supplies from the adjacent watershed.

Results: The current outputs of this work are scientific manuscripts, training of graduate and undergraduate students in marine and environmental sciences and delivery of timely and topical information on the impacts of nutrients on phytoplankton in the NRE-PS to the relevant stakeholders. Our short-term outcomes have been enhanced knowledge about and awareness of the role of phytoplankton in the NRE-PS and the effects of changing nutrient regimes on the phytoplankton community. Medium-term outcomes have included informing water quality management decisions in the NRE-PS.



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