Rutgers/NOAA Cooperative Marine Education and Research Program

2005 and 2006 Annual Report And Statement of Program Direction

Bottlenose Dolphin Stock Identification

Photo courtesy of www.mmc.gov

Shellfish Habitat Research

Photo courtesy of www.photolib.noaa.gov

Student Internships

Kira Decanay 2005

Effects of Human Activities on the Oceans

(c) Wolcott Henry 2001

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HIGHLIGHTS FOR RUTGERS CMER PROGRAM 2005 - 2006

- **Funds available to the CMER Program from NMFS (i.e, Base Funds) were used to fund two new projects and one continuing project:**

    - **Summer Student Internships**
      Toward the goal of enhancing interactions between NOAA and the University; these undergraduate students receive training and conduct research experiments of value to the Northeast Fisheries Science Center.
    - **Effect of Habitat Alterations on Sand Ridges**
      This research will enhance ecosystem-based fishery management for the inner continental shelf, specifically addressing sand ridges as important habitats. The work will form the thesis research of one M.S. graduate student at Rutgers University.
    - **Essential Habitat of Hard Clams**
      This project addresses one of the priorities of NOAA and the State of New Jersey to define the Essential Fish Habitat (EFH) of commercial species. The work will form the thesis research of one M.S. graduate student at Rutgers University, and will also provide research opportunities for several undergraduate students.

- **Base funds (for new and continuing projects) in 2005 and 2006 totaled: $154,698**

- **Funds available to the CMER Program from external sources supported six new projects and four continuing projects:**

    - **Bluefish Research Along The Atlantic Coast**
      This large-scale project supports bluefish stock assessment research on a coast-wide scale. In addition, education and outreach efforts resulting from the emerging coast-wide bluefish stock assessment are supported. Thirteen graduate students were supported through this program in 2005 and 2006.
    - **Bottlenose Dolphin Stock Identification**
      This research, along with similar research along the coast, will provide the framework for policymakers to make precise decisions about the status and conservation management of the western Atlantic bottlenose dolphin population, which is currently in decline.

- **External funds (for new and continuing projects) in 2005 and 2006 totaled: $2,250,497**

- **CMER Funds supported 25 Students in various projects in 2005 and 2006.**

- **24 papers were published in 2005 and 2006 that resulted from CMER supported research.**

Executive Summary

The Rutgers/NOAA Cooperative Marine Education and Research (CMER) Program is now completing its thirteenth year. Established in 1993 under a Cooperative Agreement between Rutgers, The State University of New Jersey, and the National Oceanic and Atmospheric Administration (NOAA), the CMER Program combines university and agency expertise to address marine issues affecting the state, region, and nation. Base funds for the Rutgers/NOAA CMER Program are provided by NOAA through the National Marine Fisheries Service (NMFS), Northeast Fisheries Science Center (NEFSC). As of December 2006, cooperative projects funded with base funds through the Rutgers/NOAA CMER Program totaled $1,526,366 and supported thirty-six cooperative projects (Table 1). Eighteen faculty from seven University departments, twenty five students from six graduate programs, five post-doctoral fellows, and many undergraduate students have participated in the first thirteen years of base funded projects. Numerous NOAA scientists serve as co-principal investigators or advisors on these projects. Base funds available to the CMER Program in 2005/2006 were used to fund one continuing projects and three new projects.

Additional funds are contributed to the Rutgers/NOAA CMER Program from a variety of sources within and outside the NEFSC to support specific research projects. During the first thirteen years, the Rutgers/NOAA CMER program received over $11.3 million in external funds to support forty-five projects (Table 1). Additionally, twenty-one faculty, forty-one graduate students and five post-doctoral fellows have participated in CMER projects supported with external funding.

The program direction for base and external funded projects during 2005 and/or 2006 included: evaluating essential shellfish habitat of hard clams; evaluation of sand-ridges as important habitats; stock identification of Western Atlantic Bottlenose dolphins; harmful algal blooms; ecosystem based approaches to management of LME's; Bluefish/striped bass ecology and interactions; and field, laboratory, and modeling programs examining eutrophication in coastal ecosystems.

INTRODUCTION

The Rutgers/NOAA Cooperative Marine Education and Research (CMER) Program was established in early 1993 under the aegis of a cooperative agreement between Rutgers the State University of New Jersey and the National Oceanic and Atmospheric Administration (NOAA). The Rutgers Program joins cooperative programs established in 1989 at the University of Massachusetts and the University of Rhode Island. In 2000 a cooperative program was established in Virginia (Hampton University and Virginia Institute of Marine Sciences). All CMER Programs were built upon a long history of cooperation between NOAA and these institutions.

The Rutgers/NOAA CMER Program is intended to foster enhanced interactions between all elements of NOAA and the University; however, special emphasis is placed upon projects of mutual interest to the University and the Northeast Region (NER) of NOAA's National Marine Fisheries Service (NMFS). The proximity of these institutions offers enhanced opportunities for: (a) joint research involving faculty, students and NOAA personnel; (b) training opportunities for both students and federal employees; and (c) shared use of specialized facilities and equipment. The CMER Program combines university and agency expertise to address marine issues affecting the state, region, and nation.

Graduate research and education are at the core of the Rutgers/NOAA CMER Program. Eighteen faculty from seven University departments, over sixty students from eleven graduate programs at Rutgers University, plus a number of other universities, ten post-doctoral fellows, and many undergraduate students have participated in the first thirteen years of CMER funded projects.

The CMER program is a truly cooperative program with all parties contributing towards the objectives of the program. A coordinating committee, consisting of two University representatives and two NOAA representatives, determines program direction and funding priorities. A NOAA employee (Dr. Sybil Seitzinger) stationed on the Rutgers campus serves as Program Director. The Director has adjunct faculty status, conducts an active research program, and teaches and supervises undergraduate and graduate students. Dr. Seitzinger is a Visiting Professor at Rutgers and a member of the Graduate Oceanography Program faculty.

The Rutgers/NOAA CMER program has received continuous support from the NEFSC. The program has received a total of approximately $12.8 million during the first thirteen years from NEFSC and external sources. Base funding provided by the NEFSC has ranged from $44,792 to $153,000 per year for a total of $1,526,366 during the first thirteen years (Figure 1). In addition to base funds, the Rutgers/NOAA CMER program has received a total of $11,304,804 in external funding from sources inside and outside the NEFSC. External funding has ranged from $100,000 to $1,227,650 per year (Figure 1). Projects supported by base and external funds encompass a variety of topics including habitat studies, socioeconomics, education and training, fishery products, biology and life history, and studies of pollutants and their effects. Studies of

pollutant effects, biology and life history, and habitat account for over 80% of the projects (Figure 2) and over 90% of funding (Figure 3) in the Rutgers/NOAA CMER program to date.

Figure 1. Base and External Funds received by the Rutgers/NOAA CMER Program 1993-2006

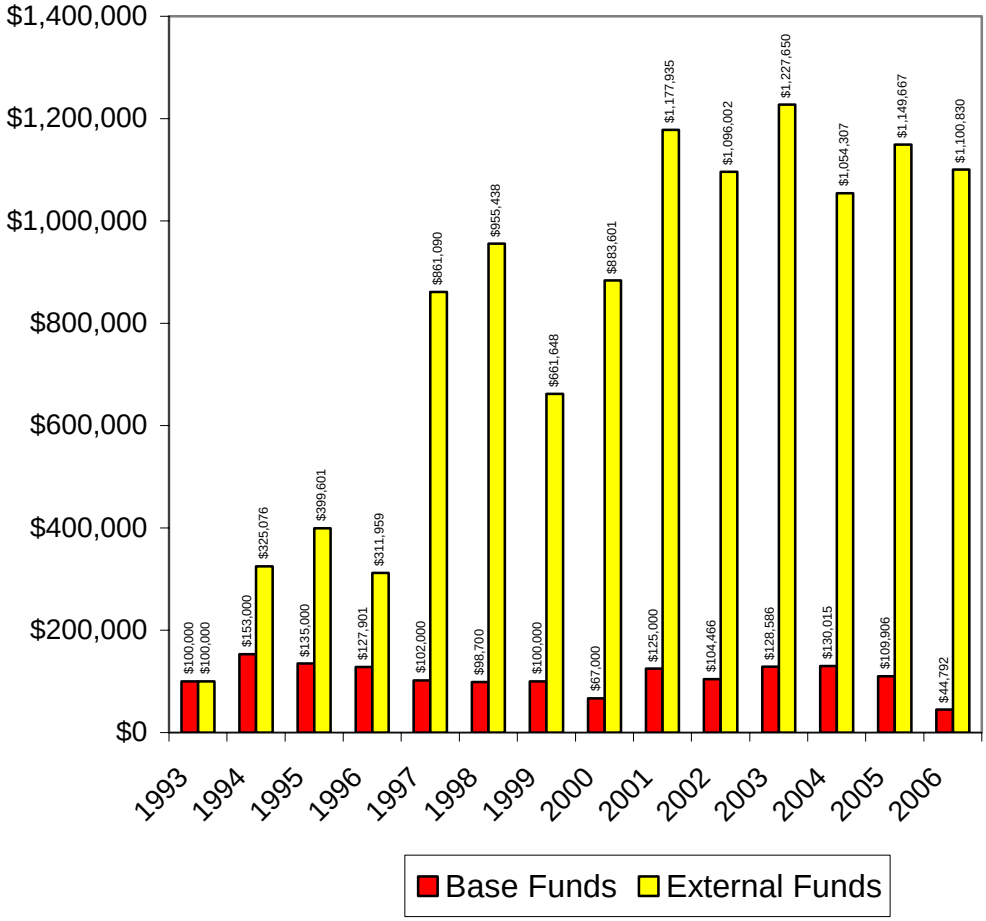


Figure 2. Number of Projects In Each Topic Addressed By the Rutgers/NOAA CMER Program 1993-2006

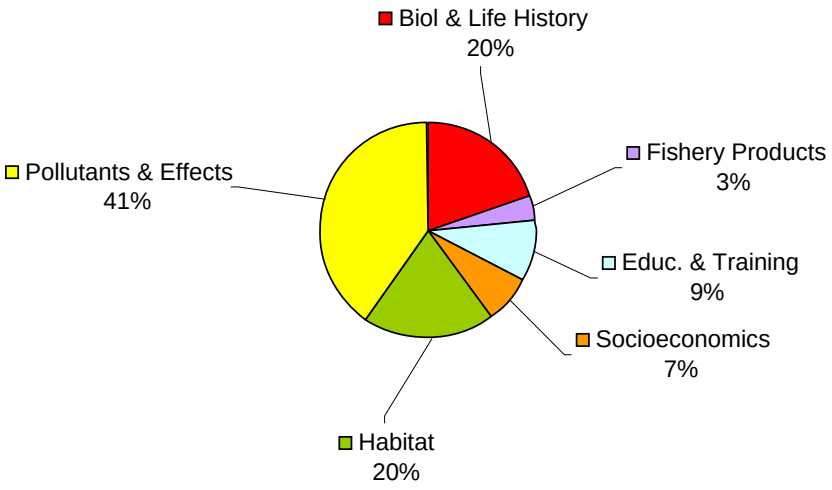
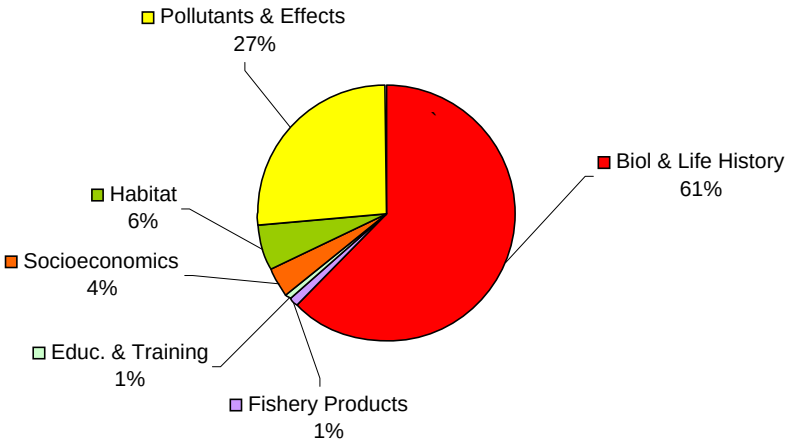


Figure 3. Relative Expenditures for Each Topic Addressed By the Rutgers/NOAA CMER Program 1993-2006



BASE FUNDED PROJECTS IN 2005 and 2006

Base funding for the CMER Program is provided by NOAA through the Northeast Fisheries Sciences Center. Continuing work under multi-year projects receives high priority for funding, given satisfactory performance in the preceding year. This policy helps to insure continuity of support to graduate students. A listing of students supported by the CMER Projects is provided in Table 2.

All projects involve a high degree of cooperation among University and NOAA personnel. This includes NOAA employees serving as student advisors, co-principal investigators, reviewing and approving program direction, sharing facilities, and providing guidance on reports, among others. A brief description of projects supported with 2005 and/or 2006 base funds follows.

PROJECTS SUPPORTED WITH 2005 and/or 2006 BASE FUNDING

05-02 and 06-02 Are Sand Ridges On The Inner Continental Shelf Essential Fish Habitat? Evaluating the Potential Effects of Habitat Alterations (Kenneth Able, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ)
Ecosystem-based fisheries management offers the possibility of incorporating biotic interactions (e.g. predation, competition) with habitat linkages into management of fisheries. This ecosystem-based approach may have particular value on the inner continental shelf, which serves as an important migration corridor, feeding and spawning area for many economically and ecologically important fishes. Within this inner shelf ecosystem, shoreface sand ridges (also called lumps and ridges by fishermen) are dominant habitats and important fishing areas. These habitats are also at risk due to plans for sand and gravel mining for beach nourishment. As a result of these conflicting interests, the objectives of this two-year student research program will 1) determine if the benthic fish assemblages and their biomass differs at and away from sand ridges and 2) evaluate if reproduction and feeding differ at and away from sand ridges. When these measures are integrated with visual determination of fishes spawning coloration and behavior (with in situ cameras) and passive acoustics (to determine sound production during spawning – a separate investigation), it will provide an evaluation of the functional significance of sand ridges and an important synthesis of linkages between these habitats and inner shelf ecosystems. As a result, this research will enhance ecosystem-based fishery management for the inner continental shelf.

05-04 CMER Research Experiences for Undergraduates (Michael DeLuca, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ)
This project supported three undergraduate interns in the summer of 2006. These interns were involved in research projects at the James J. Howard Laboratory. Each student completed a research project, the results of which were presented in a written report and in an oral presentation at both the NEFSC Lab and at Rutgers.

04-02 Evaluating Essential Shellfish Habitat (EFH) of Hard Clams, *Mercenaria mercenaria*, During Larval Settlement and Early Recruitment (Yr2) (Judith Grassle, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ)
Amphipod tube mats made by *Ampelisca spp*., known to clammers as tape mud, are a widespread bottom feature of several estuaries in the northeastern US. This habitat structure does not seem to be inimical to the settlement and recruitment of hard clams, *Mercenaria mercenaria*, and there is some evidence that the presence of these habitats may enhance larval settlement and/or the subsequent survival of recruits. This research addresses this issue in a typical urban estuary, Raritan Bay, New Jersey. A combination of frequent sampling of the benthos inside and outside tape mud habitats in the field, and larval settling experiments using different benthic habitat treatments in a large racetrack flume, will elucidate whether the apparent higher abundances of hard clams in tape mud habitats are due to increased larval settlement or to post-settlement processes. This project addresses one of the priorities of NOAA and the State of New Jersey to define the Essential Fish Habitat (EFH) of commercial species. The project will form the thesis research of one M.S. graduate student at Rutgers University, and will also provide research opportunities for several undergraduate students.

BASE PROJECTS BEING COMPLETED

03-03 Investigating Sea Scallop (*Placopecten magellanicus*) Population Dynamics Under a Management Strategy Featuring Closed Areas (John Quinlan, John Wilkin, Institute of Marine & Coastal Sciences- Rutgers University; Deborah Hart, NMFS, Woods Hole)
The institution of major closed areas for groundfish protection along the east coast of the United States represents a significant and important experiment in fisheries management. Arguably, these closures have had the largest impact on sea scallop (*Placopecten magellanicus*) population dynamics which form the base of the second most valuable fishery in the northeastern United States. A numbered modeling approach will be used to address the following questions concerning the protected areas on Georges Bank and in the Mid-Atlantic Bight: How well connected are the closed areas with each other and the open areas, and does the connectivity change with population structure or physical forcing? Are all closed areas equally valuable? Does a given area always operate as a source or sink region? How often is a given area dependent on ingressing recruits? Under which conditions is a given area self seeding and how often are those conditions present? Are there regions of the coast that are particularly robust in

terms of self seeding and which also act frequently as a source for remote areas? Is there an optimal spawning stock biomass and size structure and is it region dependent? Is it possible to create undesirable spatial structure in the population through management action? This project will use numerical modeling to explore these questions for sea scallops in Georges Bank and Mid-Atlantic Bight. A model will be used to explore scallop population dynamics in a spatially explicit context, with realistic drift and population size structures. This approach is not only achievable and important, but also perhaps the best test case for the application of biological and circulation models in fisheries management today.

01-05 Biotic Interactions Between Bluefish (*Pomatomus saltatrix*) and Associate Piscivorous Predators: Comparisons of Habitat Use, Movements, Diet and Growth (Kenneth W. Able, Rutgers Marine Field Station, Tuckerton, NJ and R. Christopher Chambers, NOAA/NMFS, James J. Howard Marine Sciences Laboratory, Highlands, NJ)
A developing consensus suggests that mortality occurring during the early life-history of fishes is critical to the subsequent contribution of a species to commercial and recreational fisheries and that it may be habitat-based. Bluefish are a priority species in recreational and commercial fisheries and basic ecological information is needed on the biotic factors effecting bluefish population dynamics. The objectives of this proposal are to address biotic interactions between young-of-the-year bluefish and associated predators (weakfish, striped bass, white perch, summer flounder, and others) with emphasis on predator-prey and competition dynamics are they relate to recruitment. This project is funded in part by the Rutgers Bluefish/Striped Bass Dynamics Research Program.

PROJECTS SUPPORTED WITH EXTRAMURAL FUNDING

In addition to the base funds provided by the Northeast Fisheries Science Center, funds were contributed from a variety of sources within and outside the NEFSC to Rutgers University for the following projects (Table 1). These projects were approved for inclusion in the Rutgers/NOAA CMER Program by the Coordinating Committee.

PROJECTS SUPPORTED IN 2005 AND/OR 2006 WITH EXTRAMURAL FUNDING

06-Ex1 Bluefish Research Along the Atlantic Coast (X) (Michael Kennish, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ)
The Institute of Marine and Coastal Sciences at Rutgers University and the National Marine Fisheries Service have supported studies to improve knowledge of the factors governing variability in bluefish populations, including potential competitive interactions between bluefish *(Pomatomus saltatrix)* and striped bass *(Morone saxatilis)*, prey community dynamics, and interactions with bluefish predators. This program was originally designed to address specific

questions related to interannual variability in bluefish distribution and abundance, thus leading to support for a variety of independent projects. As a result of recent workshops sponsored by this program, fishery managers, academic scientists, and the fishing industry have recommended that future research efforts be directed at an Atlantic coast-wide research program to support improved assessment of bluefish stocks. The Bluefish Steering Committee endorsed this approach.

The following projects and investigators have received funding under this project: "Estuarine and Coastal Dependency of Juvenile Bluefish in Maryland's Chesapeake Bay and Coastal Zone," David Secor and Edward Hourde, University of Maryland. "Estuarine Recruitment of Juvenile Bluefish During Winter," Frances Juanes, University of Massachusetts at Amherst." Winter distribution, ecology and energetics of young-of-the-year bluefish in the South Atlantic Bight," Thomas Lankford, University of North Carolina and Jeffrey T. Buckel, North Carolina State University. "Biotic Interactions between bluefish and associated Piscivorous predators: Comparisons of habitat use, movements and growth," Kenneth W. Able, Rutgers University. "Verifying the identification and contribution of spring and summer cohorts in Atlantic coast bluefish," David O. Conover, State University of New York at Stony Brook.

The work on this project has focused on public education and outreach in the following areas: continuing educational "Adopt a Fish" program for the (Able-Grothues) funded acoustic tagging of striped bass research; and development of fact sheets, a brochure, and public displays promoting the project goals and objectives, and translating the results from the PI-funded research; and maintenance and updating of www.Stripertracker.org and interactive website focused on Able-Grothues Acoustic Tagging of Striped Bass in the Mullica River – Great Bay Estuary. Funding from NEFSC.

05-Ex1 Bluefish Research Along the Atlantic Coast (IX) (Michael DeLuca, Institute of Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ)
The Institute of Marine and Coastal Sciences at Rutgers University and the National Marine Fisheries Service have supported studies to improve knowledge of the factors governing variability in bluefish populations, including potential competitive interactions between bluefish *(Pomatomus saltatrix)* and striped bass *(Morone saxatilis)*, prey community dynamics, and interactions with bluefish predators. This program was originally designed to address specific questions related to interannual variability in bluefish distribution and abundance, thus leading to support for a variety of independent projects. As a result of recent workshops sponsored by this program, fishery managers, academic scientists, and the fishing industry have recommended that future research efforts be directed at an Atlantic coast-wide research program to support improved assessment of bluefish stocks. The Bluefish Steering Committee endorsed this approach.

The following projects and investigators have received funding under this project: "Recruitment of Bluefish in the Middle and South Atlantic Bights: Effects of an Ovarian Nematode Prasite and Spatio-temporal Patterns of Juvenile Recreuitment," David O. Conover,

University of Maryland. "Recruitiment of Juvenile Bluefish at the Southern Rande of the North American Distribution," Francis Juanes, University of Massachusetts at Amherst. "Coastal Patterns of Juvenile Bluefish Recruitment in the Mid- and South Atlantic Bights," Thomas Lankford, University of North Carolina and Jeffrey T. Buckel, North Carolina State University. "Recruitment Dynamics of Bluefish *(Pomatomus Salatrix)* Coast-wide Patterns of Juvenile Recruitment," Kenneth W. Able, Rutgers University. "Coastal Patterns of Juvenile Recruitment in the Mid- and South Atlantic Bights: Delmarva," David Secor and Edward Hourde, University of Maryland.

05-Ex2 Western Atlantic Bottlenose Dolphins, *Tursiops truncates*, Stock Identification and Conservation Management in the Middle Atlantic Bight (Ken Able, Rutgers Marine Field Station, Tuckerton, NJ and Jacalyn L. Toth, Graduate Program in Ecology and Evolution Rutgers University, Tuckerton, NJ)

The overall objectives of this study are to determine the stock structure and migratory patterns of Western Atlantic Bottlenose Dolphins, *Tursiops truncates***,** in New Jersey. This coastal migratory stock suffered massive population decline and the Marine Mammal Protection Act (MMPA) has listed the stock as depleted (58 CFR 17789, 6 April 1993). Under this "depleted" status, the MMPA required precise stock definitions for the presumed "single" coastal migratory stock. This study will assess site fidelity, distribution, movement, and social organization of surveyed bottlenose dolphins in New Jersey's coastal Mid-Atlantic Bight, along with determining genetic stock structure and abundance of these animals. The anticipated results of this study will help answer the question concerning the existence of genetically distinct stocks of bottlenose dolphins in New Jersey. If two or more separate stocks exist, questions as to how each utilize coastal and/or estuarine habitat, as well physical and behavioral differences between stocks will be answered. The second major result of this study will be abundance estimates of the stocks through the "mark-recapture" analysis.

Beyond New Jersey, the results will be used in collaboration with similar stock identification efforts by the Southeast Fisheries Science Center (SEFSC) of the National Oceanic and Atmospheric Administration (NOAA) to clarify the complex relationships between and among management units, the geographic boundaries of each unit, the geographic and social relationships to animals that inhabit offshore or estuarine waters, and seasonal and annual movement patterns. Additional data including feeding ecology, stable isotopes and toxicological accumulation from blubber samples will be made available. This research, along with similar research along the coast, will provide the framework for policymakers to make precise decisions about the status and conservation management of the western Atlantic bottlenose dolphin population. Funding from NEFSC.

04-Ex2 Brown Tide Blooms in Coastal Waters of New Jersey: Importance of Dissolved Organic Matter in Stimulating Growth (Sybil Seitzinger, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ and Pat Glibert, University of Maryland Center for Environmental Sciences)

Harmful algae blooms (HABs) occur in many coastal ecosystems in New Jersey, throughout the Mid-Atlantic, and around the world. HABs can be toxic to fish, shellfish and humans and/or indirectly disrupt the functioning of coastal ecosystems with severe environmental and economic consequences. It is known that many HAB species utilize dissolved organic nutrients (DON) in their growth, but it is not known specifically if attempts to control land-based (natural and anthropogenic) watershed sources of DON could be effective at controlling HABs. Brown tides, *Aureococcus anophagefferens*, is a common species in New Jersey waters. The objectives of this project are (1) relate the dissolved organic nutrients (DON) derived from specific NJ land use regions to the potential for Brown tide growth and production and (2) determine the role of different organic components to the production of Brown tides. Funding from Seagrant.

03-Ex6 Understanding the Changing Carbon, Nitrogen and Water Cycles in the Earth System (Berrien Moore, Institute of Earth, Oceans and Space, University of New Hampshire, Durham, New Hampshire; Sybil Seitzinger, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ; Charles Vorosmarty, Institute of Earth, Oceans and Space, University of New Hampshire, Durham, New Hampshire; and others)

Accurate predictions of the future climate and biogeochemistry of the Earth rely upon our ability to simulate the many complex interactions between ecosystems, the hydrosphere, and the atmosphere. These simulations must account for changes in forcing related to human activity and natural perturbations. This study focuses on the development of a global-scale integrated model of terrestrial and freshwater biogeochemical cycles (carbon, nitrogen and water) in the context of changes in land-use, atmospheric chemistry, and climate. This integrated model will be based on an array of existing models. Within this multi-disciplinary, multi-investigator project, Seitzinger will specifically be developing models to predict river transport of carbon and nitrogen from land-based sources to coastal systems. Funding from NASA.

01-Ex5 Biocomplexity: The Roles of Resources, Competition, and Predation in Microbial Degradation of Organic Matter (Gary, Tahon, L.Young, Institute of Marine and Coastal Sciences, Rutgers University, New Brunswick, NJ; Sybil Seitzinger, Rutgers/NOAA CMER Program and many others)

The Biocomplexity project's goal is to investigate the roles of resources, competition and predation in the microbial degradation of organic matter. The project seeks to understand at a mechanistic (and thus quantitative) level what factors affect the activity of bacteria in natural systems. This problem is by its very nature 'complex' in that it deals with several levels of biological organization (individual, population and community) as well as micro-scale spatial heterogeneity of the environments in which bacteria function. The approach includes both modeling and empirical studies and considers both top-down and bottom-up controls on bacterial activity in estuarine sediments. The models will consider both biotic and abiotic processes, spatial heterogeneity, population dynamics, nutrient and organic substrate mass transfer, and

molecular dynamic simulations. Complexity will be built up from simple systems to more complex systems as indicated by coupling model predictions and experimental results. The interdisciplinary nature of this project and research team draws on the expertise encompassing ecology, engineering, environmental geochemistry and microbiology. The work will ultimately provide a unifying framework for understanding microbial degradation processes. Funding from NSF.

06-Ex2 Measuring and Modeling Nutrient Uptake in Florida Bay (Sybil Seitzinger, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ)
Nutrient availability and composition is a major controlling factor in determining microbial community composition and nutrient dynamics in Florida Bay. Specifically, blooms of cyanobacteria are associated with high organic:inorganic nitrogen composition; outbreaks of diatoms are associated with high inorganic:organic nitrogen; and heterotropic bacteria abundance is associated with high organic:inorganic phosphorus. These differeing nutrient composition ratios are a consequence of varying source inputs in different regions of Florida Bay. The modeling will be used to predict impacts of alterations in nutrient availability and composition, and to refine current understanding of bulk dissolved organic matter (DOM) bioavailability in Florida Bay by applying novel methodology in this project to the characterization of the DOM pools and their bioavailability. Seitzinger contributions to this project will be to provide a precise characterization of the DOM pool and the bioavailability of selected fractions within this pool using ESI-mass spectrometry. Funding from NOS/NCCOS/NOAA.

05-EX3 Research Coordination Network: Denitrification – Integrating Landscapes and Waterscapes (Sybil Seitzinger, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ)
Humans have dramatically altered the earth's nitrogen (N) cycle. Anthropogenic introduction of N into the biosphere now exceeds biological N_2-fixation in native terrestrial ecosystems, resulting in substantial negative human and environment health effects. Denitrification (microbial production of N_2 from reactive N) is the only process that permanently removes reactive N from the environment. Denitrification occurs in almost all terrestrial, freshwater, coastal and (some) oceanic ecosystems. Despite many denitrification studies, only a few locations have measurements adequate to quantify rates, or to understand factors controlling denitrification, at the ecosystem scale. Two major impediments are the analytical difficulty of quantifying N_2 production by denitrification and fragmentation of the highly diverse (ecosystem, methodological approach) denitrification research community. This lack of interdisciplinary exchange impedes spread of knowledge about denitrification and impedes applications of methodological advances across ecosystems.

The <u>overall goal</u> of this Denitrification RCN is to develop a coordinated network of denitrification scientists from a wide array of disciplines, from molecular biology to ecosystem science, and from soil science to oceanography. Through interdisciplinary exchange it will advance: quantification of denitrification rates; quantitative relationships between denitrification rates and controlling factors; and process-based models that can be used to scale-up site specific measurements to ecosystem, regional and global scales. Funding from NSF.

03-Ex5 Secondary and Regional Contributions to Organic PM: A Mechanistic Investigation of Organic PM in the Eastern and Southern United States (Barbara Turpin, Department of Environmental Science, Rutgers University; Sybil Seitzinger, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ and Ho-Jin Lim, Department of Environmental Science, Rutgers University)

Many locations across the United States will shortly be declared out of compliance with the National Ambient Air Quality Standards for fine particulates (PM2.5), and the effected states are now beginning to develop strategies (SIPs) to bring these areas into compliance. Development of effective SIPS for atmospheric fine particulate matter is complicated by the fact that PM2.5 is both emitted directly (primary) and formed in the atmosphere (secondary). In addition, the sources could be local (urban), they could be within the state, or they could be hundreds to thousands of kilometers away. This project addresses that hypothesis that atmospheric chemistry and transport models underestimate secondary organic carbon and the regional contribution to organic carbon in the eastern and southern United States because substantial organic PM is formed through heterogeneous processes (i.e., cloud processing) during regional transport. This project will provide critical scientific knowledge that is needed to accurately predict PM2.5 concentrations and identify effect air quality management strategies. Funding from US EPA.

05-Ex4 Promoting Ecosystem-based Approach to Fisheries Conservation and Management in Eutrophication – Filling Gaps by Nitrogen Loading Forecasts to LME's (Sybil Seitzinger, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ)

Excess nutrient inputs from land-based sources are causing considerable degradation of coastal ecosystems around the world. Global GIS based-models relating land use to nitrogen export by rivers to coastal systems have been developed under project #04-EX3. In the current project, two workshops were held to train scientists from developing countries and countries in economic transition from seven Large Marine Ecosystem regions (LME's) in the use of the nitrogen export model. Both current conditions and a scenario for the year 2030 were examined. Model predicted nitrogen export rates for all 64 LME's are also being developed. Funding from UNESCO – IO/GEF MSP.

04-Ex1 Bluefish Research Along the Atlantic Coast (VIII) (Michael DeLuca, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ)

The Institute of Marine and Coastal Sciences at Rutgers University and the National Marine Fisheries Service have supported studies to improve knowledge of the factors governing variability in bluefish populations, including potential competitive interactions between bluefish *(Pomatomus saltatrix)* and striped bass *(Morone saxatilis)*, prey community dynamics, and interactions with bluefish predators. This program was originally designed to address specific questions related to interannual variability in bluefish distribution and abundance, thus leading to support for a variety of independent projects. As a result of recent workshops sponsored by this program, fishery managers, academic scientists, and the fishing industry have recommended that future research efforts be directed at an Atlantic coast-wide research program to support

improved assessment of bluefish stocks. The Bluefish Steering Committee endorsed this approach.

The following projects and investigators have received funding under this project: "Acoustic Telemetry of Bluefish in Gulf of Maine and Middle Atlantic Bight Estuaries and in the Adjacent Coastal Ocean, Phase II," Thomas M. Grothues, Rutgers University. "Migration Dynamics of Striped Bass in the Middle Atlantic Bight Using Recent Advances in Telemetry Technology," Kenneth W. Able and Thomas M. Grothues, Rutgers University. "Estimating True Growth and Body Condition in Coastal Bluefish," Kyle Hartman, University of Maryland. "Recruitment of Juvenile Bluefish at the Southern Range of the North American Distribution," Frances Juanes, University of Massachusetts at Amherst. "Coastal Patterns of Juvenile Bluefish Recruitment in the Mid- and South Atlantic Bights," Thomas Lankford, University of North Carolina and Jeffrey T. Buckel, North Carolina State University. "Coastal Patterns of Juvenile Recruitment in the Mid- and South Atlantic Bights: Delmarva," David Secor and Edward Hourde, University of Maryland.

The work on this project has focused on public education and outreach in the following areas: educational "Adopt a Fish" program for the (Able-Grothues) funded acoustic tagging of striped bass research; and development of fact sheets, a brochure, and public displays promoting the project goals and objectives, and translating the results from the PI-funded research Funding from NEFSC.

04-Ex3 (03-Ex7) Development of Models Relating Land Use to Nutrient Inputs to Coastal Systems (Sybil Seitzinger, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ)

Humans have dramatically altered the Earth's nitrogen, phosphorus, carbon, and silica cycles. These changes have had both positive and negative effects on the Earth System and society. For example, the increased use of N and P fertilizers has made it possible to produce the food and energy necessary to support a large and growing human population. However, much of the increased N and P that is used on land is transported by rivers to coastal marine ecosystems, resulting in considerable environmental degradation (e.g., increased algal growth, alteration and loss of seagrass habitats, increase in extent and duration of anoxic and hypoxic water, harmful algal blooms, and coral reef degradation). Global NEWS is an international, interdisciplinary scientific workgroup focused on understanding the relationship between land-based human activity and coastal nutrient enrichment. The primary aim of Global NEWS is to develop and apply the next generation of spatially explicit, global models relating the spatial patterns of human activities and natural processes on land to nutrient export to coastal ecosystems. Current, past and plausible future scenarios are being examined. The results of this work will be made widely available to scientists through the IOC network, policy makers, and environmental managers around the world. Funding from UNESCO-IOC.

EXTRAMURAL PROJECTS BEING COMPLETED

03-Ex1 Bluefish/Striped Bass Interactions in the Mid-Atlantic Bight (VII) (Michael DeLuca, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ)

The Institute of Marine and Coastal Sciences at Rutgers University and the National Marine Fisheries Service have supported studies to improve knowledge of the factors governing variability in bluefish populations, including potential competitive interactions between bluefish (*Pomatomus saltatrix*) and striped bass (*Morone saxatilis*), prey community dynamics, and interactions with bluefish predators. Proposed efforts in 2003-2004 will be to organize a partnership in support of a coast-wide research program that responds to stock assessment needs. This will involve partnerships with management agencies (e.g., Southeast Fisheries Science Center and the South Atlantic Regional Fishery Management Council, Atlantic states Marine Fisheries Commission, Mid-Atlantic Regional Fishery Management Council), industry groups, and research institutions throughout the geographic range of bluefish along the east coast.

Keys to successful implementation of a coast-wide stock assessment for bluefish are the engagement of the stakeholder community in the development of goals and objectives for the program, consensus among all stakeholders on the design of the stock assessment and use of the data, establishment of partnerships that foster efficient data collection and use of resources, and, of course, additional funding. The redirection workshop has been organized to address these issues, and to guide future strategies for proposal solicitation and funding. Funding from NEFSC.

The following projects and investigators have received funding under this project: "Recruitment Dynamics of Bluefish *(Pomatomus Salatrix)* Coast-wide Patterns of Juvenile Recruitment," Kenneth W. Able, Rutgers University. "Migration Dynamics of Striped Bass in the Middle Atlantic Bight Using Recent Advances in Telemetry Technology," Kenneth W. Able and Thomas M. Grothues, Rutgers University. "Acoustic Telemetry of Bluefish in Gulf of Maine and Middle Atlantic Bight Estuaries and in the Adjacent Coastal Ocean, Phase II," Thomas M. Grothues, Rutgers University. "Development of a Spatial Dynamic Biophysical Fishery Model for Atlantic Coast Multispcecies Assessments: Interactions between Bluefish and Striped Bass," Lisa Klein, Jiangang Luo and Jerald Ault, University of Maryland. "Recruitment of Bluefish in the Middle and South Atlantic Bights: Effects of an Ovarian Nematode Prasite and Spatio-temporal Patterns of Juvenile Recreuitment," David O. Conover, State University of New York at Stony Brook. "Coastal Patterns of Juvenile Recruitment in the Mid- and South Atlantic Bights: Delmarva," David Secor and Edward Hourde, University of Maryland. "Predator-prey Interactions between Bluefish, *(Pomatomus Saltatrix)* and the Shortfin Mako, *(Isurus oxyrinchus,)* off the Northeast U.S. Coast," Cheryl Wilga, University of Rhode Island. "Exploring Uncertainty in the Bluefish Stock Assessment: Incorportaing Potential Changes in Distribution, Catchability, Selectivity, and Natural Mortality," Andrew Cooper, University of Maryland.

CMER-SPONSORED PRESENTATIONS (1993-2006):

Able, K. and R. Rowe. 1999. Essential Fish Habitat for Bluefish (*Pomatomus saltatrix*): Comparison of the Role of Ocean Beaches and Estuarine Habitats. IMCS/NMFS Bluefish Project Symposium, Mystic, CT, November. (CMER Project #97-Ex1)

Able, K. W. and P. M. Rowe. 2002. What is the role of ocean habitats for young-of-the-year bluefish? American Fisheries Society, Baltimore, Maryland. (CMER Project 01-EX3)

Able, K. W. 2003. Bluefish habitat. Presentation to the Bluefish Research Program, Maritime Institute of Technology, Linthicum Heights, Maryland. (CMER Project 01-EX3)

Aarbeau, S., R.C. Chambers, D. Witting, and K.W. Able. 1998. Effect of Relative Body Size and Temperature-Dependent Growth of Juvenile Summer Flounder on the Window of Vulnerability to Predation by Sevenspine Bay Shrimp. Flatfish Biology Conference, Mystic, CT. Paper. (CMER Project #97-04)

Barbeau, S., R.C. Chambers, D. Witting, and K.W. Able. 1999. Size-Specific Predation on Juvenile Summer Flounder, *Paralichthys dentatus*, and the Duration of the Window of Vulnerability. American Fisheries Society - Larval Fish Conference, Beaufort, NC. Paper. (CMER Project #97-04)

Barbeau, S., R.C. Chambers, D. Witting, and K.W. Able. 1999. Effect of Size-Dependent Predation and Temperature-Dependent Growth on Juvenile Summer Flounder Vulnerability to Benthic Invertebrate Predation. CMER Symposium, Falmouth MA. Paper. (CMER Project #97-04)

Bell, J.L. 1995. Molecular Approaches to Larval Bivalve Identification. 1995 Benthic Ecology Meeting, New Brunswick, NJ. Poster. (CMER Project #93-05)

Bell, J.L. 1995. Probe Development for Identification of Larval Bivalves. Molecular Approaches to Marine Ecology and Evolution, Keystone Symposium, Santa Fe, NM (organized by H.R. Lasker, M.A. Coffroth and E. Bermingham). Poster. (CMER Project #93-05)

Bell, J.L. 1996. Identification of Larvae of the Surfclam, *Spisula solidissima* From Plankton Samples. Sixth Science Symposium of the Northeast Fisheries Science Center, National Marine Fisheries Service, NOAA, Falmouth, MA. (CMER Project #93-05)

Bell, J.L. 1996. Species-Specific Identification of Larval Bivalves Using an 18S rRNA Probe and RFLP Analysis. Ocean Sciences Meeting, AGU/ASLO, San Diego, CA. (CMER Project #93-05)

Bevilacqua, R.A. 1998. Animal-Sediment Relationships in a Mid-Atlantic Estuarine System and Spatial Patterns of Benthic Community Structure in the Navesink River, New Jersey. (CMER Project #98-05)

Bosley, K.L. and S.C. Wainright. 1997. Turnover Rate of Nitrogen and Carbon in Juvenile Winter Flounder, *Pleuronectes americanus*, as Determined by Stable Isotope Ratios. 14th International Conference of the Estuarine Research Federation, Providence, RI. (CMER Project #96-05)

Bosley, K.L., D.A. Witting, R.C. Chambers, and S.C. Wainright. 1998. Ontogenetic Diet Shifts of Larval and Juvenile Flatfish: Estimating Turnover Rates with Stable-Isotope Ratios. NOAA/NMFS Flatfish Biology Conference, Mystic, CT. (CMER Project #96-05)

Bosley, K.L, D.A. Witting, R.C. Chambers, and S.C. Wainright. 1999. Ontogenetic Diet Shifts of Larval and Juvenile Fish: Estimating Turnover Rates with Stable Isotopes. 23rd Larval Fish Conference, Beaufort, NC. (CMER Project #96-05)

Branson, A., T. Lankford, J. Morley, and J. Buckel. 2006. Fish assemblage structure of surf-zone habitat at Wrightsville Beach, North Carolina. Contributed poster presentation, Annual Meeting of the American Society of Ichthyologists and Herpetologists, New Orleans, LA. (CMER Project #05-02)

Buckel, J.A. 2002. Factors influencing bluefish distribution and abundance. Duke University Marine Laboratory, Pivers Island, Beaufort, NC. (CMER Projects #99-EX1, #01-EX3, 02-Ex1)

Buckel, J.A. 2003. Factors Influencing Bluefish Distribution and Abundance: Competition and Overwinter Mortality. Department of Zoology, North Carolina State University, Raleigh, N.C and Department of Biology, East Carolinia University, Greenville, NC. (CMER Projects #99-EX1, #01-EX3, 02-Ex1)

Buckel, J.A. 2003. Trophic Ecology of Bluefish on the U.S. East Eoast: A Review. Rutgers University Bluefish/Striped Bass Research Workshop. Maritime Institute of Technology and Graduate Studies. Linthicum Heights, MD. (CMER Projects #99-EX1, #01-EX3, 02-Ex1)

Buckel, J. A. 2003. Factors influencing bluefish distribution and abundance: competition and overwinter mortality. Department of Zoology, North Carolina State University, Raleigh, NC. (Projects #99-EX1, #01-EX3, 02-Ex1).

Burak, W.R., A. D. M. Dove, and D. O. Conover. 2006. Effects of an ovarian nematode parasite (*Philometra saltatrix*) on bluefish reproductive potential. 136th Annual Meeting of the American Fisheries Society. Lake Placid, New York.

Burak, W. Nematode parasites (*Philometra*) in bluefish. Presented at the Bluefish Research Program Coordination Workshop at Rutgers University, February 23 and 24, 2005.

Callihan, J. L. and D. H. Secor. Ocean ecology of Mid-Atlantic juvenile bluefish. AFS Southern and Tidewater Division Meeting. Virginia Beach, Virginia. February 2005.

Callihan, Secor, and Houde. 2004. Ocean ecology of juvenile bluefish, Pomatomus saltatrix, in Maryland coastal waters. International Conference on Fish Otolith Research and Application. Townsville, Australia (CMER #02-Ex1).

Chant, R.J., M.C. Curran, K.W. Able, S.M. Glenn. 1996. Circulation in Little Egg Harbor and Its Role in Larval Winter Flounder Distributions: Preliminary Results. The Barnegat Bay Ecosystem Workshop. November 14, Toms River, NJ. (CMER Project #96-08)

Chant, R.J. 1997. Circulation Patterns in the Barnegat Bay/Little Egg Harbor/Great Bay Estuarine System. Institute of Marine and Coastal Sciences weekly seminar series, June 9. (CMER Project #96-08)

Chant, R.J. 1997. Low Frequency Circulation in a Multiple Inlet/Bay System. The Gordon Conference, June 8-12, Colby-Sayer College. (CMER Project #96-08)

Chant, R. J. 1998. Particle Trapping in a Stratified Flood Dominated Estuary. Woods Hole Oceanographic Institution, August. (CMER Project #97-03)

Chant, R.J. 1998. Particle Trapping in a Stratified Flood Dominated Estuary. National Marine Fishery Service, Sandy Hook, NJ, September. (CMER Project #97-03)

Chant, R.J. and A. Stoner. 1998. Particle Trapping in a Stratified Flood Dominated Estuary. Mid-Atlantic Bight Physical Oceanography and Meteorological meeting (MABPOM), St. Michaels, MD, October. (CMER Project #97-03)

Chant, R.J. 1998. Particle Trapping in a Stratified Flood Dominated Estuary. IMCS, Rutgers University, New Brunswick, NJ, December. (CMER Project #97-03)

Chant, R.J. 1999. Low Frequency Circulation in a Multiple Inlet/Bay System. Estuarine Research Foundation meeting, September 25-30, New Orleans. (CMER Project #97-03)

Chintala, M. and J.P. Grassle. 1995. Early Gametogenesis and Spawning in the Surfclam, *Spisula solidissima*. National Shellfisheries Association Meeting, San Diego, CA. (CMER Project #93-05)

Chintala, M. and J.P. Grassle. 1995. Recruitment Frequency and Growth of Surfclams, *Spisula solidissima*, in New Jersey Waters. Benthic Ecology Meeting, New Brunswick. (CMER Project #93-05)

Clarke, L., A.D.M. Dove, and D.O. Conover. 2003. Prevelance, intensity, and effect of the nematode Philometra saltatrix in the ovaries of bluefish. 2003 Annual AFS Meeting. Quebec City, Quebec, Canada (CMER Project #02-EX1).

Clarke. P. and F. Juanes. Examination of Winter Recruitment of Bluefish, *Pomatomus saltatrix*, into Northeastern Florida Estuaries. Poster presentation at the 133rd meeting of the American Fisheries Society, Quebec City, August 2003. (CMER Project #02-EX1).

Cole, M. and R. Lathrop. 2001. Spatial Relationships of Environmental and Sonar Backscatter-Derived Variables to Fish Abundance in the New York Bight. International Association for Landscape Ecology, US Chapter, 16th Annual Meeting, Tempe, AZ. (CMER Project #99-Ex2)

Conover, D.O. 2003. Stock Structure and Cohort Dynamics of Bluefish Along the U.S. Atlantic Coast. CMER/Bluefish Workshop, May 2003. (CMER Project #02-EX1)

Conover, D.O., P. Gaffney, and S. Thorrold. 1999. Recruitment of Spring- and Summer-Spawned Bluefish: Genetic Structure, Cohort Identification, and Relative Contribution to the Adult Stock. IMCS/NMFS Bluefish Project Symposium, Mystic, CT, November. (CMER Project #97-Ex1)

Cook, M. and C. Chambers. 1998. Temperature Effects on Age, Size, and Condition at Hatching in Windowpane, *Scophthalmus aquosus*. (CMER Project #97-08)

Cooper, K.R. and R.P. Brown. 1995. Toxic Effects of 2, 3, 7, 8-Tetrachlorodibenzo-p-dioxin (2, 3, 7, 8-TCDD) and Related Compounds (PCDD/PCDF) on Aquatic Invertebrate Species and Specific Studies on the Soft-Shell Clam, (*Mya arenaria*). DIOXIN '95 Edmonton, Canada. (CMER Project #93-08)

Cullen, J.T. and R.M. Sherrell. 1997. Marine Biogeochemical Cycling of Zinc: Importance of the Continental Shelf. Gordon Conference in Chemical Oceanography, Meriden, NH, August. (CMER Project #95-05)

Curran, M.C., R.J. Chant, K.W. Able, and S.M. Glenn. 1997. The Role of Estuarine Circulation Patterns in Regulating the Settlement of Juvenile Winter Flounder (*Pseudopleuronectes americanus*) in Coves Near Inlets. Benthic Ecology Meeting, April 3-6, Portland, ME. (CMER Project #96-08)

Curran, M.C., R.J. Chant, K.W. Able, and S.M. Glenn. 1997. The Role of Estuarine Circulation Patterns in Regulating the Settlement of Juvenile Winter Flounder (*Pseudopleuronectes americanus*) in Coves Near Inlets. American Society of Icthyologists and Herpitoligists, June, Seattle, WA. (CMER Project #96-08)

Curran, M.C., R. J. Chant, K.W. Able, and S.M. Glenn. 1997. The Role of Estuarine Circulation Patterns in Regulating the Settlement of Juvenile Winter Flounder (*Pseudopleuronectes americanus*) in Coves Near Inlets. International Council for the Exploration of the Sea, September 22-24, ME. (CMER Project #96-08)

Curran, C., R. Chant, S. Glenn, and K. Able. 1998. Evidence of Tidal Period Migration for Winter Flounder (*Pseudopleuronectes americanus*) in a Southern New Jersey Estuary. Flatfish Biology Workshop, Mystic, CT, December. (CMER Project #97-03)

Curran, C., R. Chant, S. Glenn, and K. Able. 1998. Vertical Migration of Winter Flounder Larvae as a Mechanism for Tidal Retention in a New Jersey Estuary. American Fisheries Society Larval Fish Conference. (CMER Project #97-03)

Curran, C., R. Chant, S. Glenn, and K. Able. 1998. Tidal Retention of Winter Flounder Larvae in the Vicinity of an Inlet: Evidence of Vertical Migration. Benthic Ecology Meeting. (CMER Project #97-03)

Drisco D. M. 2006. Spatial and Temporal Patterns of Bluefish (*Pomatomus saltatrix*) Recruitment, in the New York Bight. M.S. Thesis, Stony Brook University, August 2006. CMER 05-Ex1

Drisco D. M. and D. O. Conover. 2006. Relative habitat utilization of spring and summer-spawned cohorts of young-of-the-year Bluefish, in New York. American Fisheries Society Meeting. Lake Placid, New York. September 10 – 14, 2006. CMER 05-EX-1

Dunton, K. and D. O. Conover. 2006. Growth of bluefish under common garden conditions: comparing the spring and summer cohorts for evidence of genetic variation. American Fisheries Society Meeting. Lake Placid, New York. September 10 – 14, 2006. CMER 05-EX-1

Drisco, D. . Field surveys of bluefish in the Middle Atlantic Bight. Presented at the Bluefish Research Program Coordination Workshop at Rutgers University, February 23 and 24, 2005.

Field, M.P., R.M. Sherrell, J.T. Cullen, and F. Lindsay. 1999. Determination of Trace Metals in Suspended Marine Particles Using Sector Field Inductively Coupled Plasma Mass Spectrometry. European Winter Plasma Conference, Pau, France, January. (CMER Project #95-05)

Flores, F. 2001. An Experimental Evaluation of Water Temperature Influences Upon the Early Life Stages of Goosefish, *Lophius americanus*. Rutgers/NOAA CMER Undergraduate Research Intern presentation at IMCS, October. (CMER Project #01-04)

Fox, D. A. and K. W. Able. 2002. Biotic interactions between bluefish (*Pomatomus saltatrix*) and associated piscivorous predators in marsh creeks along Delaware Bay, New Jersey. American Fisheries Society, Baltimore, Maryland. (CMER Project 01-EX3)

Gregg, C.S., R.J. Chant, and J.P. Grassle. 1999. Modeling and Observational Studies of the Transport of Larval Bivalves Through a Tidal Inlet. Benthic Ecology Meeting, Baton Rouge, LA, March. (CMER Project #97-07)

Gregg, C.S., R. J. Chant, and J.P. Grassle. 1999. Effects of Asymmetrical Tides on Transport of Larval Bivalves Through a Tidal Inlet. Estuarine Research Foundation meeting, New Orleans, September 25-30. (CMER Project #97-07)

Grothues, T. M Feasibility of tagging bluefish. Presented at the Bluefish Research Program Coordination Workshop at Rutgers University, February 23 and 24, 2005.

Grothues, T. M. Oral Presentation. Which way did he go, George? Sandy Hook Seminar Series, NMFS Howard Laboratory, 4/13/2006. (CMER Project #04-Ex1)

Grothues, T. M. Oral Presentation. Going in new directions to understand fish movement. Tuckerton Seaport Lunch and Learn Seminar. Tuckerton, NJ, 6/25/2006. (CMER Project #04-Ex1)

Grothues, T. M. and K. W. Able. In review. Scaling acoustic telemetry of bluefish Pomatomus saltatrix in an estuarine observatory: detection and habitat use patterns. Submitted to Transactions of the American Fisheries Society. (CMER Project #04-Ex1)

Houde, E. and D. Secor. 1999. Comparison of Habitat Use by Juvenile Bluefish Between Chesapeake Sub-Estuaries and Maryland's Coastal Bays. IMCS/NMFS Bluefish Project Symposium, Mystic, CT, November. (CMER Project #97-Ex1)

Johnson, T. "Hey What About Us? Recreational Fishing as the Basis for Community." Paper presented at the annual meeting of the Society for Applied Anthropology, Portland, Oregon, March 19-23, 2003. (CMER Project #00-Ex2)

Jones, B., "Rebels With a Cause: How a Tradition of Rebellion Has Worked to Define the Fishing Community of Belford, NJ." Paper presented at the annual meeting of the Society for Applied Anthropology, Portland, Oregon, March 19-23, 2003. (CMER Project #00-Ex2)

Juanes, F., J. Buckel, F. Scharf, J. Cowan, Jr., and K. Rose. 1999. Impact of Prey Abundance and Size Structure on Growth of Spring- and Summer-Spawned Juvenile Bluefish in the Hudson River Estuary: An Individual-Based Modeling Approach. IMCS/NMFS Bluefish Project Symposium, Mystic, CT, November. (CMER Project #97-Ex1)

Lamarque, J., "Trusting Property: Public Trust and Private Real Estate in a Gentrifying Coastal Community." Paper presented at the annual meeting of the Society for Applied Anthropology, Portland, Oregon, March 19-23, 2003. (CMER Project #01-EX2)

Lamarque, J. and B. Jones. 2002. Fishing Communities in the Mid-Atlantic. Poster presented to the annual meeting of the American Anthropological Association, New Orleans, LA, November. (CMER Project #01-EX2)

Lankford, T. E. 2002. Current research on population dynamics of bluefish. Invited presentation, North Carolina Sea Grant Staff Meeting, Wilmington, NC. (CMER Project

01-EX3)

Lankford, T. E. 2002. Recruitment patterns in bluefish (*Pomatomus saltatrix*): the role of winter processes. Invited talk to Southeast Regional Fisheries Advisory Committee, North Carolina Division of Marine Fisheries, Raleigh, NC. (CMER Project 01-EX3)

Lankford, T. E. 2002. Winter ecology of young-of-the-year bluefish: implications for recruitment success. Invited seminar, American Fisheries Society Student Subsection, East Carolina University, Greenville, NC. (CMER Project 01-EX3)

Lathrop, R.G. and N. Senyk. 2000. Applying Landscape Concepts to the Seafloor: The New York Bight Seafloor Habitat Mapping Project. Proceedings 15th Annual Meeting of the U.S. Regional Association of the International Association of Landscape Ecology, Ft. Lauderdale, FL, April, (CMER Project #99-Ex2)

Li, D. and J. P. Grassle. 2006. Evaluating essential shellfish habitat (EFH) of hard clams, Mercenaria mercenaria, during larval settlement and early recruitment. Benthic Ecology Meeting, Quebec City, Canada. March, 2006. (CMER Project #04-02)

Liu, H. and K.R. Cooper. 1995. DNA Adduct Formation of 7, 12-Dimethylbenz (a) Anthracene in the Embryo of the Japanese Medaka (*Oryzias latipes*). Second SETAC World Congress, Vancouver, British Columbia. (CMER Project #93-08)

Longo, S. 1995. Society of Toxicology, Baltimore, MD. (CMER Project #93-08)

Ma, H., J.P. Grassle, and R.J. Chant. 2001. Spatial Surfclam Concentration During Summer Upwelling and Downwelling on the New Jersey Continental Shelf. Aquatic Sciences meeting (ASLO), Albuquerque, NM. (CMER Project #99-05)

Ma, H. and J.P. Grassle. 2001. Surfclam Larval Distribution and Settlement on the New Jersey Continental Shelf. Estuarine Research Federation 2001: An Estuarine Odyssey, St. Pete Beach, FL. (CMER Project #99-05)

Manoski, A., T. Grothues and K. Able.2006. Using acoustic telemetry to track bluefish (*Pomatomus saltatrix*) in the Great Bay/Mullica River Estuary. Poster presentation to the Research Internships in Ocean Sciences, 8/10/2006.

McCay, B.J. 2000. Sea Changes in Marine Fisheries Policy. Keynote Address for Topic 5, Social and Economic Dimensions of Fisheries, World Fisheries Congress III, Beijing, China, October 31-November 3. (CMER Project #98-Ex1)

McCay, B.J.. 2001. Fishing Communities. Social Science Workshop: Social & Economic Impacts of Input Controls, Social Science Advisory Committee, New England Fishery Management Council, Gloucester, MA, 5/23/2001. (CMER Project #01-EX2)

McCay, B.J. 2001. Privatization and the Commons in Natural Resources Management. Environmental Law Society, Boalt Hall School of Law, University of California, Berkeley, CA. (CMER Project #98-Ex1)

McCay, B.J. 2001. Property Rights, Ecosystem Management and the Commons. Institute national agronomique Paris-Grignon(INAPG), Uer Gretison du vivant et strategies patriomoniales, Paris, January 15-16. (CMER Project #98-Ex1)

McCay, B.J. 2002. Fisheries Management as a Community Matter, or, Comedies of the Commons. Fordham University Biology Seminar, September, New York City. (CMER Project #01-EX2)

McCay, B.J. 2002. Fishing Communities in Legal and Social Perspective. Ocean Law and Policy Conference, University of California, Berkeley, April. (CMER Project #01-EX2)

McCay, B.J. 2002. Moderator and Panelist. Lost at Sea: Commercial Fisheries in the Balance. Baltimore-To-Boston Regional Meeting, Society for Environmental Journalists, January, EOHSI, Rutgers University, Piscataway, NJ. (CMER Project #01-EX2)

McCay, B.J., B. Oles, B. Stoffle, E. Bochenek, K. St. Martin, G. Graziosi, T. Johnsoln, and J. Lamarque. 2002. Social Impact Assessment, Amendment 9, Squid, Atlantic Mackerel, and Butterfish FMP. A Report to the Mid-Atlantic Fishery Management Council. The Fisheries Project, Rutgers the State University, New Brunswick, New Jersey, June.(CMER Project #01-EX2)

McCay, B.J., D.C. Wilson, J. Lamarque, K. St. Martin, E. Bochenek, B. Stoffle, B. Oles, T. Johnson. 2002. Port and Community Profiles and Social Impact Assessment, Amendment 13 of the Surfclam and Ocean Quahog Fishery Management Plan. Report to the Mid-Atlantic Fishery Management Council. February. (CMER Project #01-EX2)

Morley, J. J.A. Buckel, and T.E. Lankford. 2002. Presented the paper, Winter Distribution, Ecology, and Energetics of Young-of-the-Year Bluefish in the South Atlantic Bight. Presented at the American Fisheries Society, Baltimore, Md. (CMER Projects #99-EX1, #01-EX3, 02-Ex1)

Morley, J. W., J. A. Buckel, and T. E. Lankford. 2002. Winter distribution, ecology and energetics of young-of-the-year bluefish in the South Atlantic Bight. Proceedings of the American Fisheries Society, Special Symposium on the Biology and Ecology of Bluefish, *Pomatomus saltatrix*, Washington, D.C. (CMER Project 01-EX3)

Morley, J. J.A. Buckel, and T.E. Lankford. 2003. Presented the paper, Winter distribution, ecology, and energetics of young-of-the-year bluefish in the South Atlantic Bight. Presented at the Southern Division of the American Fisheries Society, Wilmington, N.C. and at the American Fisheries Society, Quebec City, Canada. (CMER Projects #99-EX1, #01-EX3, 02-Ex1)

Morley, J., J. A. Buckel, and T. E. Lankford. 2003. Winter distribution, cohort structure, and energetics of young-of-the-year bluefish in the South Atlantic Bight. Paper presented at the American Fisheries Society, Quebec City, Canada. (CMER Project 01-EX3)

Moser, S., Clarke, L.M. and Conover, D.O. 2003. Recruitment of age-0 bluefish to the Hudson River: process, dynamics and effects on prey. Hudson River Environmental Society, Poughkeepsie, NY. (CMER Project #02-Ex1)

Murt, J. S., P. Clarke, and F. Juanes. 2006. Variation in winter estuarine habitat use by bluefish in northeastern Florida: implications for growth and condition. American Fisheries Society Annual Meeting, Lake Placid, New York. (CMER Project #04-EX1).

Neuman, M.J. and K.W. Able. 1994. Spatial and Temporal Patterns of Abundance of Larval and Juvenile Windowpane Flounder, (*Scophthalmus aquosus*), in an Estuarine/Inner Continental Shelf System. NOAA/NMFS Flatfish Biology Workshop in Mystic, CT. (CMER Project #93-01)

Neuman, M.J. and K.W. Able. 1996. Overwintering Mortality in Temperate Young-Of-the-Year Fishes. 76th Annual Meeting of the American Society of Ichthyologists and Herpetologists in New Orleans, Louisiana. (CMER Project #93-01)

Neuman, M.J. and K.W. Able. 1996. Patterns of Habitat Use by Early Life History Stages of Windowpane Flounder (*Scophthalmus aquosus*). 76th Annual Meeting of the American Society of Ichthyologists and Herpetologists in New Orleans, Louisiana. (CMER Project #93-01)

Neuman, M.J. and K.W. Able. 1996. Patterns of Habitat Use by Early Life History Stages of Windowpane Flounder (*Scophthalmus aquosus*). Third International Symposium on Flatfish Ecology at the Netherlands Institute for Sea Research (NIOZ), Texel, The Netherlands. Awarded best student oral presentation at the Symposium. (CMER Project #93-01)

Neuman, M.J. and K.W. Able. 1996. Diel and Tidal Patterns of Distribution of Young-Of-the-Year Windowpane, *Scophthalmus aquosus*. NOAA/NMFS Flatfish Biology Workshop, Mystic, Connecticut. (CMER Project #93-01)

Oles, B. "Fish Have Tails: Multi-local Dimensions of Mid Atlantic Fishing Communities." Paper presented at the annual meeting of the Society for Applied Anthropology, Portland, Oregon, March 19-23, 2003. (CMER Project #01-EX2)

Oles, B. 2002. Fishing Ground: The Challenge of Conducting Place-Based Social Impact Assessments Within an Occupational Community. Paper presented to the annual meeting of the American Anthropological Association, New Orleans, LA, November. (CMER Project #01-EX2)

Oliveri, C. 1994. DNF-Adduct Studies in *Fundulus heteroclitus* from New Jersey Coastal Waters. Society of Environmental Toxicologists and Chemists, Denver, CO. (CMER Project #93-08)

Oliveri, C. 1995. Toxicity of 2, 3, 7, 8-Tetrachlorodibenzo-p-dioxin to Embryos of the Fathead Minnow (*Pimephales promelas*). JGPT Student Symposium, Rutgers University. (CMER Project #93-08)

Oliveri, C. and K.R. Cooper. 1995. Comparative Toxicity in Developmental Stages of Fish From 2, 3, 7, 8-Tetrachlorodibenzo-p-dioxin. DIOXIN '95. Edmonton, Canada. (CMER Project #93-08)

Oliveri, C. and K.R. Cooper. 1995. Toxicity of 2, 3, 7, 8-Tetrachlorodibenzo-p-dioxin to Embryos of the Fathead Minnow (*Pimephales promelas*). Second SETAC World Congress, Vancouver, British Columbia. (CMER Project #93-08)

Olivieri, C. 1996. Toxicity of 2, 3, 7, 8-Tetrachlorodibenzo-p-Dioxin (TCDD) in Embryos and Larvae of the Fathead Minnow (*Pimephales promelas*). Department of Biochemistry and Microbiology Fermentation Seminar Series, Rutgers University. (CMER Project #93-08)

Powell, E.N., Bochenek, E.A. and King, S.E. Filling in the Gaps with Cooperative Research: Rutgers University's Supplemental Finfish Survey. Mid-Atlantic Fishery Management Council meeting, Alexandria, VA, January 22, 2004 (CMER Project #03-Ex2).

Price, M.K., P.J. Parks, and J.E. Kirkley. 1998. Sustaining the Atlantic Sea Scallop Fishery: An Economic Analysis of Days-At-Sea. Northeastern Agicultural and Resource Economics Association Annual Meeting, Cornell University, Ithaca, NY. (CMER Project #97-06)

Price, M.K., P.J. Parks, and J.E. Kirkley. 1998. Sustaining the Atlantic Sea Scallop Fishery: An Economic Analysis of Consolidating Days-At-Sea. Dept. of Agriculture, Food, and Resource Economics, Cook College, September. (CMER Project #97-06)

Price, M.K., P.J. Parks, and J.E. Kirkley. 1998. Sustaining the Atlantic Sea Scallop Fishery. Woods Hole Institution, December. (CMER Project #97-06)

Price, M.K., P.J. Parks, and J.E. Kirkley. 1999. Sustaining the Atlantic Sea Scallop Fishery: Viability in a Restricted Industry. American Agricultural Economics Association Annual Meeting, Nashville, TN. (CMER Project #97-06)

Price, M., P.J. Parks, and J.E. Kirkley. 1999. Sustaining the Atlantic Sea Scallop Fishery: An Economic Analysis of Consolidating Days-At-Sea. Selected paper presented at European Agricultural and Resource Economics Association 1999 Annual Meeting, June, Oslo. (CMER Project #98-04)

Price, M. and P.J. Parks. 2000. Sustaining the Atlantic Sea Scallop Fishery: Consolidation in a restricted industry. Selected paper presented at American Agricultural Economics Association 2000 Annual Meeting, July, Tampa, FL. (CMER Project #98-04)

Richards, A., M. Terceiro, and M. Fogarty. 1999. Empirical Modeling of Bluefish Population Fluctuations: Interactions Among Bluefish, Striped Bass and Forage Species. IMCS/NMFS Bluefish Project Symposium, Mystic, CT, November. (CMER Project #97-Ex1)

Rowe, P. M. and K. W. Able. 1999. Summer nearshore distribution of larval and pelagic juvenile bluefish (*Pomatomus saltatrix*) in relation to hydrography along the southern New Jersey coast. Larval Fish Conference, Beaufort, NC. (CMER Project 01-EX3)

Rowe, P. M. and K. W. Able. 1999. Are young-of-the-year bluefish (*Pomatomus saltatrix*) estuarine dependent? Annual Meeting, Estuarine Research Federation, New Orleans. (CMER Project #97-Ex1).

Rowe, P. and K. W. Able. 2000. Habitat use by juvenile bluefish: are ocean beaches important? 24th Annual Larval Fish Conference, AFS/ELHS, Gulf Shores, Alabama. (CMER Project #97-Ex1).

Rowe, P. M., T. M. Grothues, and K. W. Able. 2001. Fish assemblages of the southern New Jersey surf zone: a focus on habitat utilization by young-of-the-year. 25th Annual Larval Fish Conference, AFS/ELHS, Sandy Hook, New Jersey. (CMER Project #97-Ex1).

Rowe, P. M., K. W. Able, and M. J. Miller. 2002. Distribution, abundance and size of young-of-the-year bluefish (*Pomatomus saltatrix*) in ocean and estuarine habitats in southern New Jersey during 1999-2000. Rutgers University, Institute of Marine and Coastal Sciences , Jacques Cousteau NERR Technical Report #100-16. (CMER Project #97-Ex1)

Schnitz, A.R. and G.L. Taghon. 1996. Transfer of Benzo(A)pyrene From Two Invertebrate Prey Species to the Winter Flounder, *Pleuronectes americanus*. Poster presented at a meeting of the Society of Environmental Toxicology and Chemistry in Washington, DC. (CMER Project #94-03)

Schnitz, A.R. and G.L. Taghon. 1997. Vehicle-Specific Transfer of PAH Metabolites From Two Representative Prey Species to the Winter Flounder, *Pleuronectes americanus*. 18th Annual Meeting of the Society of Environmental Toxicology and Chemistry in Washington, DC. (CMER Project #94-03)

Secor, Takata, Bichy, and Houde. 2002. Neritic Habitat use by Young-of-the-Year Bluefish in Maryland Coastal Waters. American Fisheries Society Annual Conference. Baltimore. (CMER Project #02-Ex1)

Secor, D. 2002. Connectivity in marine fish populations. Departmental Seminar, Department of Biology. UNC Wilmington. (CMER Project #02-Ex1).

Secor, D. 2003. Migration and Seasonal Movement of Atlantic Bluefish, Bluefish Research Program Workshop. Baltimore. (CMER Project #02-Ex1).

Secor, D. H. 2006. (Plenary Presentation). Life-cycle portfolios in marine fishes. Man and the ocean: sustainable utilization and conservation of marine resources. University of Maryland.

Secor, D. H. and J. L. Callihan. Overview of 2004 field season for BlueCoast: DelMarVa. Rutgers University, Bluefish Research Coordination Workshop. February 2005.

Secor, D. H. 2005. Plenary talk. International Conference on Flatfish. Kyoto, Japan.

Secor, D. H. 2006. Plenary talk. Life Cycle Portfolios in Marine Fishes. Man and the Ocean: Sustainable Utilization and Conservation of Marine Resources.

Seitzinger, S.P. 2003. Presenter, American Society of Limnology and Oceanography conference (Hawaii, Febr. 2003)

Seitzinger, S.P. 2003. Invited series of scientific and public lectures, University of Texas, Marine Science Institute, Schweppe Lecture Series (Febr. 2003).

Seitzinger, S.P. 2003. Speaker, NJDEP Symposium on Harmful Algal Blooms (October 2003).

Seitzinger, S.P. 2003. Presenter, Estuarine Research Federation conference (Seattle, Wash.)

Senyk, N. 2000. Mapping Bottom Type as Part of the New York Bight Apex Habitat Mapping Project. New Jersey Academy of Science Annual Meeting, April. (CMER Project #99-Ex2)

Sherrell, R.M., P. Field, G. Hall, F. Smith, and D. Wiederin. 1996. Direct Aspiration of Chelating Micro-Bead Suspensions: Evaluation of ICP-MS Performance. 1996 Winter Conference on Plasma Spechtrochemistry, Ft. Lauderdale, FL, January. (CMER Project #95-05)

Sherrell, R.M. and M.P. Field. 1997. Spatial/Temporal Variability of Cu, Ni, Mn, Ba and Pb on the Inner Shelf Off Southern New Jersey. Gordon Conference in Chemical Oceanography, Meriden, NH, August. (CMER Project #95-05)

Sherrell, R.M. 1997. Trace Metal Dynamics Off Southern New Jersey: Seasonal Variations and Evidence of Pollutant, Input. Department of Environmental Sciences, Rutgers University, New Brunswick, NJ, November 7. (CMER Project #95-05)

Sherrell, R.M. 1998. Trace Metals and Phytoplankton: A Bicoastal View. SUNY, Stony Brook, March 12. (CMER Project #95-05)

Sherrell, R.M. and Draxler, A. 2004. Presentation at the Lobster Initiative Investigators meeting in Groton CT, 2004. (CMER Project #02-04)

Shrump, D. Jr. 2001. An Analysis of Size-Specific Prey Consumption by Young-Of-the-Year Weakfish, *Cynoscion regalis*, in the Hudson River. Rutgers/NOAA CMER Undergraduate Research Intern presentation at IMCS, October. (CMER Project #01-04)

Siclair, J. 2001. Response of YOY Flounder to Sediment Biogeochemicals. Rutgers/NOAA CMER Undergraduate Research Intern presentation at IMCS, August. (CMER Project #01-04).

Slater, J., T.E. Lankford and J.A. Buckel. 2002. Presented the paper, Winter Distribution, Ecology, and Energetics of Young-of-the-Year Bluefish in the South Atlantic Bight: Effects of Ration and Cohort of Origin on Survival. Presented at the American Fisheries Society, Baltimore, Md. (CMER Projects #99-EX1, #01-EX3, 02-Ex1)

Slater, J., T.E. Lankford and J.A. Buckel. 2003. Presented the paper, Winter Energetics of YOY Bluefish in the SAB: Effects of Ration and Cohort of Origin on Survival. Presented at the Southern Division of the American Fisheries Society, Wilmington, N.C. (CMER Projects #99-EX1, #01-EX3, 02-Ex1)

St. Martin, K. 2002. The Emergence of Community in Fisheries Policy: A New Challenge for Social Science. Presented at The American Anthropological Association Annual Meeting, New Orleans, LA, November 19-24, 2002. (CMER Project 01-Ex1)

St. Martin, K. 2003. The Globalization of Fisheries and the Conditions of Global Resistance. Presented at The Association of American Geographers 98th Annual Meeting, New Orleans, LA, March 5-8, 2003. (CMER Project 01-Ex1)

St. Martin, K. 2003. Re-Inserting Community and Re-Inhabiting the Commons: Constituting a Community Economy Discourse in Fisheries. Presented at Marxism and the World Stage, Amhert, MA, November 6-9, 2003. (CMER Project 01-Ex1)

St. Martin, K. 2003. Fixing the Commons. Presented at Political Ecology at Home, a conference organized by the Department of Geography, Rutgers University, New Brunswick, NJ, March 29, 2003. (CMER Project 01-02)

St. Martin, K. 2004. "Re-Mapping the Commons and Constituting a Community-based Economy: The Case of Fisheries." *International Association for the Study of Common Property (IASCP)*, Oaxaca, Mexico, August 9-13. (CMER Project 01-Ex1)

St. Martin, K. 2004 Speaker and participant at the "Spatial Planning for the Sustainable Management of the Seas" workshop hosted by the Maritime Institute at the University of Ghent. January 15-16, Ghent, Belgium. (CMER Project 01-02)

St. Martin, K..2004. International Council for the Exploration of the Sea (ICES), Working Group on Fisheries Systems (WGFS) member and workshop participant. April 26-30, Lowestoft, United Kingdom. (CMER Project 01-Ex1)

St. Martin, K. and T. Johnson. 2004. "Inventing Communities of Fishers in the Northeast U.S.: Emerging Methods for Fisheries Impact Assessment." *International Association for the Study of Common Property (IASCP)*, Oaxaca, Mexico, August 9-13. (CMER Project 01-Ex1)

Stoffle, B. and K. St. Martin. 2003. "It Can't Stand Alone: The Need for a Multidisciplinary Approach to the Study of Fishing Communities and the Development of Fishery Policy." Paper presented at the annual meeting of the Society for Applied Anthropology, Portland, Oregon, March 19-23, 2003. (CMER Project 00-Ex2)

Stoner, A.W. 1998. A Multidisciplinary Approach to Fishery Biology. South Florida Water Management Districut, West Palm Beach, FL, May. (CMER Project #99-06)

Stoner, A.W. 1998. Using Habitat Maps in Managing Natural Resources. The Conservancy of Southwest Florida, Naples, FL, November. (CMER Project #99-06)

Stoner, A.W. 1999. What is Critical Habitat? A Multidisciplinary Approach With Vertebrate and Invertebrate Species. Invited seminar: Alaska Fisheries Science Center, NMFS, Seattle, WA, May. (CMER Project #99-06)

Stoner, A.W., J.P. Manderson, B.A. Phelan, R.J. Chant, L.L. Stehlik, and A.J. Bejda. 1999. Considering the Ecosystem Context of Winter Flounder Nurseries. Flat Fish Symposium, Texel, The Netherlands, October. (CMER Project #99-06)

Takata and Secor. 2001. Broadscale habitat use of young-of-the-year bluefish (Pomatomus saltatrix) in Maryland nurseries. Estuarine Research Federation Conference, St. Pete Beach, FL. (CMER Project #02-Ex1)

Takata and Secor. 2002. Growth and cohort dynamics of juvenile bluefish in three Maryland nursery systems. American Fisheries Society Annual Conference. Baltimore. (CMER Project #02-Ex1)

Taylor, D. Cohort dynamics of summer-spawned bluefish as determined by length- frequency and otolith microstructure analysis. Presented at the Bluefish Research Program Coordination Workshop at Rutgers University, February 23 and 24, 2005.

Toth, J. 2006. "Sighting patterns of bottlenose dolphins in their northern range along the US Atlantic coast" New Jersey Outdoor Women's League, New Jersey (CMER Project #05-Ex2)

Vasslides, J. M. and K. W. Able. 2006. Are inner-continental shelf sand ridges essential fish habitat? American Fisheries Society Annual Meeting. Lake Placid, NY (CMER Project #. 05-02)

Weissberger, E.J. and Judith P. Grassle. 1996. Predator/Prey Relationships at the LEO-15 Site: the Effects on Surfclam Recruitment. Sixth Science Symposium of the Northeast Fisheries Science Center, National Marine Fisheries Service, NOAA, Falmouth, MA. (CMER Project #93-05)

Weissberger, E.J. 1998. Effects of Timing and Magnitude of Settlement on Recruitment of Surfclams: Insights from a Model. Benthic Ecology Meeting, March 12-15, Melbourne, FL. (CMER Project #93-05)

Weissberger, E.J. 2000. The Effects of Predation on the Recruitment of the Surfclam *Spisula solidissima*. Rider University Marine Science Colloquium, October 2, Lawrenceville, NJ. (CMER Project #93-05)

Wiedenman, J. and T. E. Essington. 2004. Evidence for density-dependent overwinter survival in bluefish, Pomatomus saltatrix, in the Northwest Atlantic. Oral presentation, American Fisheries Society Annual Meeting. (CMER Project 01-EX3)

Wilga, Cheryl, 2003. Impacts of predation on depressed fish stock symposium presentation at AFS annual meeting in August. (CMER Project #01-EX3)

Witting, D.A., K.L. Bosley, R.C. Chambers, and S. Wainright. 2000. Experimental Evaluation of Ontogenetic Diet Transitions in Summer Flounder, *Paralichthys dentatus*, Using Stable Isotopes as Diet Tracers. Flatfish Biology Conference, December 5-6, Mystic, CT. (CMER Project #99-08)

Yoder, C.C., T.E. Lankford, J.W. Morley, and J.A. Buckel. 2003. Reproductive status of spiny dogfish (Squalus acanthias) in southeastern North Carolina. Poster presented at the Southern Division of the American Fisheries Society, Wilmington, N.C. (CMER Projects #99-EX1, #01-EX3, 02-Ex1)

Zhang, H.-Z. and T.-C. Lee. 1995. A Novel Method for the Determination of Hexanal by NIR Reflectance Spectroscopy. 53rd Annual Meeting of the Institute of Food Technologists, California. (CMER Project #93-06)

Zhang, H.-Z. and T.-C. Lee. 1995. A Fast and Simple NIR Method to Determine Free Fatty Acid and its Application for Seafood Quality Assessment. International 9th World Congress of Food Science and Technology. Budapest, Hungary. (CMER Project #93-06)

Zhang, H.-Z. and T.-C. Lee. 1995. A Fast and Simple NIR Method to Determine FFA as Chemical Marker For Quality Assessment of Fish and Other Edible Oil. Chemical Markers for the Quality of Processed and Stored Food, Chicago. (CMER Project #93-06)

2006. Saltwater Anglers of Bergen Fishing Club. Rochelle Park, NJ, 8/15.

2006. Marine fishes of New Jersey: A habitat transect from marsh surface to benthopelagic. Presentation for MARE, JCNEER Education Center, NJ, 7/29.

2006. StriperTracker. COSEE-MA oversight meeting. JCNERR Eductaion Center, NJ, 7/10.

2006. StriperTracker. Jersey Coast Anglers Association Meeting. Toms River, NJ, 6/27.

2006. It came from the marsh! Where did it go? Eisenhower Middle School. Wyckoff, NJ, 5/17.

2006. Which way did he go, George? Sandy Hook Seminar Series, NMFS Howard Laboratory, 4/13.

2006. The Rutgers University StriperTracker Program. FatherTime. Keansburg, NJ, 2/25.

2006. Going in new directions to understand fish movement. Tuckerton Seaport Lunch and Learn Seminar. Tuckerton, NJ, 6/25.

2005 "The Rutgers University StriperTracker Program." Presentation to Absecon Bay Saltwater Sportsman's Club, Brigantine, NJ (March 14, 2005).

2005 "Striped bass habitat JCNERR." Presentation to New Jersey Outdoor Womens Leauge, New Brunswick, NJ (March 14, 2005).

CMER-SPONSORED PUBLICATIONS (1993-2006):

Able, K. W. and T. M. Grothues. In review. Diversity of striped bass (Morone saxatilis) estuarine movements: synoptic examination in a passive, gated listening array. Fisheries Bulletin.

Able, K. W. and T. M. Grothues.. In review. Approaches to understanding habitat dynamics of flatfishes: Advantages of Biotelemetry. Submitted to Journal of Sea Research

Able, K. W., P. Rowe, M. Burlas, and D. Byrne. 2003. Use of ocean and estuarine habitats by young-of-year bluefish (*Pomatomus saltatrix*) in the New York Bight. Fish. Bull.101: 201-214.

Altieri, K. E., A. G. Carlton, H. J. Lim, B. J. Turpin, and S. P. Seitzinger. 2006. Formation of oligomers in cloud processing: reactions of isoprene oxidation products. *Environmental Science and Technology*. 40: 4956-4960

Bell, J.L. and J.P. Grassle. 1997. Preparation of DNA from Numerous Individual Microscopic Organisms for PCR-Based Assays of Environmental Samples. BioTechn. 23: 584-588.

Bell, J.L. and J.P. Grassle. 1998. A DNA Probe for Identification of Larvae of the Commercial Surfclam (*Spisula solidissima*). Mol. Mar. Biol. Biotech. 7: 127-137.

Bosley, K.L., D.A. Whitting, R.C. Chambers, and S.C. Wainright. 2005. Tissue Turnover of Carbon and Nitrogen in Juvenile Fish, Estimated With Stable Isotope Ratios. Oecologia.

Bosley, K.L. and S.C. Wainright. 1999. Effects of Preservatives and Acidification on the Stable Isotope Ratios (^{15}N:^{14}N, ^{13}C:^{12}C) of Two Species of Marine Animals. Can. J. Fish Aquat. Sci. 56: 2181-2185.

Bosley, K.L., D.A. Witting, R.C. Chambers, and S.C. Wainright. 2002. Estimating Turnover Rates of Carbon and Nitrogen in Recently Metamorphosed Winter Flounder, *Pseudopleuronectes americanus*, With Stable Isotopes. Mar. Ecol. Prog. Ser. 236:233-240.

Breitburg, D., J. Sanders, C.G. Gilmour, C.A. Hatfield, R.W. Osman, G.F. Riedel, S.P. Seitzinger, and K.G. Sellner. 1999. Variability in Responses to Nutrient and Trace Elements, and Transmission of Stressor Effects through an estuarine food web. Limnol. Oceanogr. 44(3) part 2: 837-863.

Breitburg, D., S. Seitzinger, and J.Sanders. (Editors) 1999. Special Symposium Volume: Effects of Multiple Stressors in Freshwater and Marine Ecosystems. Limnol. Oceanogr. 44(3) part 2.

Cargnelli, L.M., S.J. Griesbach, and C.A. Zetlin. 1999. Northern Shortfin Squid, *Illex illecebrosus*, Life History and Habitat Characteristics. NOAA Technical Memorandum NMFS-NE-147, 21 pp.

Cargnelli, L.M., S.J. Griesbach, C. McBride, C.A. Zetlin, and W.W. Morse. 1999. Longfin Inshore Squid, *Loligo pealeii* Life History and Habitat Characteristics. NOAA Technical Memorandum NMFS-NE-146, 27 pp.

Carlton, A.G., B.J. Turpin, H. Lim, K.E. Altieri*, and S. Seitzinger. 2006. Link between isoprene and secondary organic aerosol (SOA): Pyruvic acid oxidation yields low volatility organic acids in clouds. Geophysical Research Letters 33: L06822 DOI 10.1029/2005GL025374.

Castro, M.S., C. Driscoll, T.E. Jordan, W. Reay, S. Seitzinger, R. Styles, W. Boynton, and J. Cable. 2000. Assessment of the Contribution Made by Atmospheric Nitrogen Deposition to the Total Nitrogen Load to Thirty-Four Estuaries on the Atlantic and Gulf Coasts of the United States. *In*: Valigura, R. (editor), Atmospheric Nitrogen Deposition in Coastal Water Bodies: An Atmospheric Perspective, Coastal and Estuarine Studies, volume 57, AGU Press.

Chant, R.J. 2001. Tidal and Subtidal Motion in a Multiple Inlet/Bay System. J. Coast. Res.. Special issue 31:102-114b.

Chant, R.J. and A. Stoner. 2001. Particle Trapping in a Stratified Flood-Dominated Estuary. J. Mar. Res. 59: 29-51.

Chant, R.J., M.C. Curran, K. Able, S. Glenn. 2000. Delivery of Winter Flounder (*Pseudopleuronectes americanus*) Larvae to Settlement Habitats in Coves Near Tidal Inlets. Est. and Coast. Shelf Sci. 51:529:541.

Chintala, M.M. and J.P. Grassle. 1995. Early Gametogenesis and Spawning in Juvenile Atlantic Surfclams, *Spisula solidissima* (Dillwyn, 1819). J. Shellfish Res. 14: 301-306.

Clarke, P. and F. Juanes. 2005. Winter recruitment of young-of-the-year bluefish, *Pomatomus saltatrix*, into a northeast Florida estuary. Submitted to Fishery Bulletin.

Clarke, L. M., A. D. M. Dove, and D. O. Conover. In review. Prevalence, intensity, and effect of the nematode, *Philometra saltatrix* in the ovaries of bluefish, *Pomatomus saltatrix*. Submitted to Fishery Bulletin

Conover, D.O., T. Gilmore, and S. B. Munch. 2003. Estimating the Relative Contribution of Spring and Summer-Spawned Cohorts to the Atlantic Coast Bluefish Stock. Trans. Amer. Fish. Soc..132 (6): 1117-1124

Cross, J.N. C.A. Zetlin, P.L. Berrien, D.L. Johnson, and C. McBride. 1999. Butterfish, *Peprilus triacanthus*, Life History and Habitat Characteristics. NOAA Technical Memorandum NMFS-NE-145, 42 pp.

Cullen, J.T., T. Lane, F.M.M. Morel, and R.M. Sherrell. 1999. Modulation of Cadmium Uptake in Phytoplankton by Seawater CO_2 Concentration. Nature 402: 165-167.

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Ma, H. 1997. Time Series Analyses of Meroplankton in Moored Pump Samples at LEO-15: The Relationship Between the Abundance of Surfclam Larvae and Nearshore Upwelling Events. Oceanography, M.S. Thesis. (CMER Project #93-05)

Ma, H. 2001. Physical Mechanisms and Temporal and Spatial Patchiness in Bivalve Larval Supply and Settlement on the Inner Shelf of the Mid-Atlantic Bight. Ph.D. Dissertation. (CMER Project #99-05)

Metzger, K.T. 1998. Trace-Metal-Phytoplankton Interactions on the New Jersey Inner Shelf. George H. Cook Honors thesis (undergraduate) (CMER Project #95-05).

Morley, James W. 2004. Overwintering Ecology of Young-of-the-Year Bluefish in Onslow Bay, North Carolina. M.S. Fisheries and Wildlife Sciences, graduated summer 2004, North Carolina State University, Raleigh, NC. (CMER Project # 01-EX3)

Neuman, M. 1999. Early Life History and Ecology of Windowpane, *Scophthalmus aquosus*, in the Middle Atlantic Bight: Ontogenetic Transitions During the First Year of Life in a Bimodal Spawner. Ecology & Evolution, Ph.D. Dissertation (CMER Project # 93-01).

Ng, Clare. 2006. Habitat use, site fidelity, and movement of adult striped bass in a southern New Jersey estuary based on acoustic telemetry. Rutgers University, Graduate Program in Ecology, Evolution, and Natural Resources.

Olivieri, C. 1996. Toxicity of 2-3-7-8 TCDD in Embryos and Larvae of the Fathead Minnow (*Pimephales promelas, rafinesque*). Environmental Sciences, Ph.D. Dissertation. (CMER Project #93-08)

Price, M.K. 1998. Sustaining the Atlantic Sea Scallop Fishery: Viability in a Restricted Industry. Master's Thesis. (CMER Project #97-06)

Probasco, P.G. 2000. Dissolved Nitrogen Gas, Ammonium and Nitrate Levels in Groundwater along the Millstone River. George H. Cook Honors Thesis. (CMER Project #96-Ex1)

Schnitz, A. 1997. Transfer of Benzo(a)pyrene from Two Invertebrate Prey Species to the Winter Flounder, *Pleuronectes americanus*. Environmental Sciences, Ph.D. Dissertation. (CMER Project #94-03)

Senyk, N. 2000. Mapping Bottom Type as Part of the New York Bight Apex Sea Floor Mapping Project. Cook College, Undergraduate Thesis, May 2001. (CMER Project #99-Ex2)

Slater, Joshua. 2004. Winter Energetics of Young-of-the-Year Bluefish (*Pomatomus saltatrix*): Effects of Ration and Cohort of Origin on Survival. M.S. Marine Science, graduated fall 2004, University of North Carolina, Wilmington, NC. (CMER Project 01-EX3)

Takata, Lynn. 2004. Recruitment of bluefish in Maryland estuarine and coastal habitats. University of Maryland. (CMER Project #02-Ex1).

Watts, S.I. 1997. Denitrification, Organic Matter Decomposition, and N Mineralization in Organic and Mineral Soils of Two Riparian Ecosystems. Ph.D. Dissertation. (CMER Project #94-Ex3)

Wiedenman, J. 2004. Evidence for density-dependent overwinter survival in bluefish, *Pomatomus saltatrix*, in the Northwest Atlantic. M.S. Thesis, University of Washington, School of Aquatic and Fishery Sciences. (CMER Project 01-EX3)

ADDITIONAL COOPERATIVE PARTICIPATION OF NOAA OR RUTGERS SCIENTISTS IN SEMINARS, WORKSHOPS AND MEETINGS, AND JOINT USE OF NOAA OR RUTGERS FACILITIES:

Aleta Hohn, leader of the Cetacean and Sea Turtle Team for NOAA/NMFS/SEFSC, oversees all aspects of Jacalyn Toth's (Rutgers Marine Research Station) project, Western Atlantic Bottlenose Dolphins, *Tursiops truncates* Stock Identification and Conservation Management in the Middle Atlantic Bight

Dr. J.P. Grassle (Institute of Marine and Coastal Sciences) participated in the 19th Northeast Regional Stock Assessment Review Committee (SARC), held at the NEFSC in Woods Hole in September 1994.

Dr. T.-C. Lee (Department of Food Science) participated in the NOAA sponsored workshop on Future Emphasis for Research on Atlantic Mackerel held in December 1994.

Dr. L. Kerkhof (Institute of Marine and Coastal Sciences) presented a seminar entitled Developing a specific growth rate assay for a marine bacterium at the James J. Howard Laboratory in November 1994.

Dr. C. Curran (Institute of Marine and Coastal Sciences) presented a seminar entitled Daily Rhythms, Hibernation and Starvation in the Cunner, *Tautogolabrus adspersus*, at the James J. Howard Laboratory1995.

Dr. K. Keating (Cook College) presented a seminar entitled Natural Products of Phytoplankton: Allelochemicals, Antibiotics (Biotoxins), Probiotics, at the James J. Howard Laboratory, 1995.

Mr. Kim (Environmental Science) spent 4 months during 1995 working with NOAA researchers at the James J. Howard Laboratory learning extraction techniques for lobster tissues.

Dr. C. Reimers (Institute of Marine and Coastal Sciences) used Howard Laboratory facilities to process samples during and after NOAA/NURP funded cruises in the New York Bight apex during the summer of 1995. Howard Laboratory scientists, Andrew Draxler and co-workers, participated in those cruises and made their laboratory space available for sample processing.

Dr. P. Rona (Institute of Marine and Coastal Sciences) presented a seminar entitled Drilling of a Sea Floor Hydrothermal Field, at the James J. Howard Laboratory, 1995.

Dr. K. Smith (Institute of Marine and Coastal Sciences) presented a seminar entitled Processes Regulating Habitat Use by Salt Marsh Nekton in a Southern New Jersey Estuary, at the James J. Howard Laboratory, 1995.

Dr. C. Chambers (NEFSC, James J. Howard Marine Sciences Laboratory, Highlands, NJ) presented a seminar entitled Early life history variation and recruitment processes in marine fishes, at the Institute of Marine and Coastal Sciences, Rutgers University, 1996.

Dr. J.T. Duffy (Rutgers University Marine Field Station) presented a seminar entitled Factors affecting the vital rates of the two sciaenids, the weakfish and the red drum: experiments in field enclosures, at the James J. Howard Laboratory, 1996.

Dr. S. Glenn (Institute of Marine and Coastal Sciences) presented a seminar entitled Observations and models of coastal upwelling off New Jersey, at the James J. Howard Laboratory, 1996.

Dr. R. Tucker (Ecopolicy Center, Rutgers University) presented a seminar entitled Policy Issues Related to Dioxin, at the James J. Howard Laboratory, 1996.

Mr. D. Witting (Institute of Marine and Coastal Sciences) presented a seminar entitled Ichthyoplankton community stability: Analysis of a 6-year data set from southern New Jersey, at the James J. Howard Laboratory, 1996.

Dr. Anthony Paulson (James J. Howard Marine Science Laboratory, Northeast Fisheries Science Center) presented a seminar entitled Distributions and modeling of trace metals in Puget Sound, at the Institute of Marine and Coastal Sciences, Rutgers University, 1997.

Dr. C. Reimers (Institute of Marine and Coastal Sciences) used Howard Laboratory facilities to process samples during and after NOAA/NURP funded cruises in the New York Bight apex during the summer of 1997.

Dr. Al Stoner (James J. Howard Marine Science Laboratory, Northeast Fisheries Science Center) presented a seminar entitled: The need for multidisiplinary approach to fisheries biology: An example from Bahamian seagrass meadow, at the Institute of Marine and Coastal Sciences, 1997.

Dr. Sam C. Wainright (Institute of Marine and Coastal Sciences) used the R/V Gloria Michelle for a field trip for the Biological Oceanography class (Spring 1996 and Spring 1997).

Dr. Jennifer Francis and Dr. Yuan Gao (Institute of Marine and Coastal Sciences) used Howard Laboratory office space for their research programs (1998-2006).

The Rutgers/NOAA CMER van was used by a number of Rutgers students and faculty for CMER-related projects (1994-2006).

Dr. Judith P. Grassle (Institute of Marine and Coastal Sciences) participated in the SAW-27/SARC held at the NEFSC in Woods Hole in June, 1998.

E.J. Weissberger and J.P. Grassle provided reports on Essential Fish Habitat for three bivalve species: *Arctica islandica, Placopecten magellanicus,* and *Spisula solidissima*. These reports were incorporated into the EHF reports developed by the NMFS/NEFC/James J. Howard Laboratory EHF reports, 1998.

Eric Simms (Institute of Marine and Coastal Sciences) organized the Bluefish Symposium at the Atlantic States Marine Fisheries Commission annual meeting in Mystic, CT, November 3, 1999.

Drs. Hilairy Hartnett and Robert Chant from Rutgers and Drs. Fabrizio, Despande, Noji and Meise from the J.J. Howard Laboratory submitted a five-year proposal to investigate multiple stressors in the Navesink River/Sandy Hook Estuary system.

David Secor. 2001. A Life in the breakers@ *Maryland Outdoors* Maryland Public TV show featuring research on bluefish in surf-zone habitats.

Drs. T.Noji, S.Seitzinger, J. Grassle and H.Hartnett worked to develop a new course entitled "Marine Ecosystems Research and Fisheries Management" to be offered at Rutgers University, through the Department of Oceanography and the Institute of Marine and Coastal Sciences, in the Spring of 2002. The course will provide opportunities for students with interests in fish, shellfish and fisheries management and policy to interact with experts from the NEFSC and the NMFS. Course given again in 2003.

Drs. Robert J. Chant and Fred Scharf presented Seasonal Patterns of Movement and Feeding By Bluefish in Relation to Prey Distributions and Estuarine Turbidity Fields at the 2002 American Fishery Society annual meeting.

B.J. McCay 2002. NOAA sponsored Workshop on Social and economic measures of fishing community participation in fisheries. April. Silver Spring, MD. (CMER Project #01-EX2)

K. St. Martin. 2002. Invited participant in the Communities Workshop organized by the Office of Science and Technology of the National Oceanic and Atmospheric Administration, National (Par Marine Fisheries Service. April 23-25, Silver Spring, Maryland.

S. Seitzinger 2006 Chair and Organizer, Global Environmental Facility/Large Marine Ecosystems (GEF/LME) Nutrient Modeling International Training Workshop (UNESCO-IOC, Paris, France, January 2006)

S. Seitzinger. 2005. Participant, Large Marine Ecosystems Consultative Meeting is, France, July 2005)

S. Seitzinger. 2005. Member, Planning Committee, American Society of Limnology and Oceanography Meeting (Santiago de Compostela, Spain, Summer 2005)

S. Seitzinger. 2005. Co-convened session on Nutrients and River Run-off at IGBP Land-Ocean Interactions in the Coastal Zone (LOICZ) Inaugural Open Science Meeting (Egmond aan Zee, The Netherlands, June, 2005)

S. Seitzinger. 2004. Co-chair and Co-organizer, Workshop on Denitrification in Terrestrial and Aquatic Ecosystems: Towards an Integrated Global Perspective (Woods Hole, MA, Spring 2004)

S. Seitzinger. 2004. Participant, Community Surface Dynamics Modeling System Workshop (Minneapolis, MN, May 2004)

S. Seitzinger. 2004. Member, Science and Policy Program Committee, The Third International Nitrogen Conference (China, 2004) (2002-2004)

S. Seitzinger. 2004. Co-chair, Barnegat Bay Workshop (Rutgers University, NJ, April 2004)

S. Seitzinger. 2003. Chair and Organizer, Global Nutrient Export from Watersheds (Global NEWS) Workshop (UNESCO- IOC, Paris, France, March 2003)

S. Seitzinger. 2003. Participant, Global Water System Project, Open Science Conference (New Hampshire, October 2003)

S. Seitzinger. 2003. Speaker, NJDEP Symposium on Harmful Algal Blooms (October 2003)

S. Seitzinger. 2003. Participant, IGBP Third Congress (Banff, Canada, June 2003)

S. Seitzinger. 2003. Participant, Black Sea Environmental Program (BSERP) workshop (Sophia,Bulgaria, February. 2003)

S. Seitzinger. 2003. Participant, IGPB, OCEANS workgroup meeting (Paris, January 2003)

S. Seitzinger. 2002. Special Lecturer, International Conference in Support of European Water Policies – Sustainability of Aquatic Ecosystems (European Commission Joint Research Center, Ispra, Italy, Nov. 2002)

S. Seitzinger. 2002. Participant, European Union-US Workshop on Harmful Algal Blooms

(Trieste, Italy, Sept. 2002)

S. Seitzinger. 2002. Chair of Workgroup and Participant, Scientific Committee on Problems of the Environment (SCOPE), Element Interactions Project (Prague, Czech Republic, October 2002)

S. Seitzinger. 2002. Special Lecturer, International Conference in Support of European Water Policies – Sustainability of Aquatic Ecosystems (European Commission Joint Research Center, Ispra, Italy, Nov. 2002)

S. Seitzinger. 2002. Invited Participant, European Union-US Workshop on Harmful Algal Blooms (Trieste, Italy, Sept. 2002)

S. Seitzinger. 2002. Chair of Workgroup and Participant, Scientific Committee on Problems of the Environment (SCOPE), Element Interactions Project (Prague, Czech Republic, October 2002)

S. Seitzinger 2001 Steering Committee member, The Second International Nitrogen Conference (N2001) (2000-2001)

S. Seitzinger. 2003. Participant, IGPB, OCEANS meeting. Workgroup participant and presented Global NEWS modeling work. (Paris, January 2003).

S. Seitzinger. 2003. Participant, Black Sea Environmental Program (BSERP) workshop. Potential applications of our Global NEWS nutrient export modeling activity were presented. (Sophia, Bulgaria, Febr. 2003).

S. Seitzinger. 2003. Participant, IGBP Third Congress (Banff, Canada, June 2003)

S. Seitzinger. 2003. Participant, Global Water System Project, Open Science Conference (October 2003).

S. Seitzinger. 2001. Keynote speaker, Baltic Sea Science Congress 2001: Past, Present and Future – A Joint Venture (Stockholm, Sweden, November 2001)
John Quinlan (Institute of Marine and Coastal Sciences) utilized the NMFS van for transport of students to a class given by Tom Noji at the James J. Howard Laboratory, Highlands, NJ in May, 2003.

K. St. Martin, 2003. "Re-Inserting Community and Re-Inhabiting the Commons: Constituting a Community Economy Discourse in Fisheries." Presented at Marxism and the World Stage, Amhert, MA, November 6-9, 2003.

John Quinlan (Institute of Marine and Coastal Sciences) utilized the NMFS van for transport of students to a class given by Tom Noji at the James J. Howard Laboratory, Highlands, NJ in May, 2003.

Ken Able (Rutgers) and Dr. Russell Brown collaborated on data analysis of YOY fishes from the NMFS seasonal groundfish surveys 2004.

Judith Weis (Rutgers Newark) presented, "Behavioral Changes in Killifish in Polluted Environments: Biochemical Mechanisms and Ecological Consequences."" at NOAA Howard Laboratory 2004.

David Secor. 2004. Web: http://www.cbl.umces.edu/Research/Fisheries/FisheriesEco.html

COMPLETED PROJECTS FUNDED THROUGH THE RUTGERS/NOAA CMER PROGRAM (Base Funding 1993-2006)

Requests for reprints or information should be directed to the principal investigators.

04-06, 04-07, and 05-04 CMER Research Experiences for Undergraduates for 2004, 2005, & 2006 (Michael DeLuca, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ)
Funding for these project supported three undergraduate interns each in the summers of 2004, 2005, and 2006. The interns were involved in research projects at the James J. Howard Laboratory. Each student undertook a research project, the results of which were presented in a written report and in an oral presentation at both the NEFSC Lab and at Rutgers.

03-01 Effects of Trophic Transfer of Contaminants in Young of the Year Bluefish (Judith Weis, Department of Biological Sciences- Rutgers University, Newark, NJ*)*
Young of the year (YOY) bluefish (*Pomatomus saltatrix*) living in estuaries that are contaminated, may accumulate elevated levels of contaminants, primarily from their food. Trophic transfer is considered the most important route of uptake for animals higher on the trophic scale. These fish consume smaller forage fish such as mummichogs (*Fundulus heteroclitus*), silversides (*Menidia menidia*), menhaden (*Brevoortia tyrannus*), as well as shrimp (*Crangon* spp. and *Palaemonetes* spp). Some of these prey species may be much more contaminated with PCBs than others, and therefore transfer more of these toxic contaminants to the bluefish. It is also possible that the accumulation of toxicants in YOY bluefish may cause behavioral abnormalities. If there are impairments in their prey capture ability, their growth and ability to migrate and recruit into the adult population may also be affected. This study proposes to: (1) investigate the major food items in YOY bluefish in the Newark Bay estuary, and measure the PCB levels in them as well as the bluefish themselves, and (2) experimentally study the effects of consuming contaminated prey on the behavior of YOY bluefish from cleaner areas.

02-04 Manganese in Lobsters as an Indicator of Hypoxia-Induced Stress (Robert Sherrell and Andrew Draxler, Institute of Marine and Coastal Sciences- Rutgers University)
The goal of this study is to determine whether manganese (Mn) uptake in lobsters can be related to bottom water hypoxia through oxidation-reduction (redox) mediated sources in surface sediments. If so, Mn content in lobster tissue may serve as an indicator of recent exposure to

chemical stressors associate with low ambient oxygen levels, such as ammonium or hydrogen sulfide. As such, Mn could be a useful and simple means of determining the relationship between chemical exposures associated with bottom water hypoxia and vulnerability to disease or death in lobsters. The study builds on previous laboratory studies of the kinetics of Mn uptake and elimination by lobsters, but is the first of its kind to apply these principles to a spatial/temporal design in the context of lobster disease and death in Long Island Sound (an HAPC where the US lobster fishery lost 12 million lobsters in 1999). This metals study augments an ongoing NMFS field study to determine the relationship between the exposure of lobsters to the ambient chemical and biological environment of Long Island Sound and lobster health.

01-02 Spatial Dimensions of Fisheries and Their Implications for Property Rights Alternatives: A Case Study of Three Major Scalloping Areas (Kevin St. Martin, Department of Geography- Rutgers University, New Brunswick, NJ and Bonnie McCay, Department of Human Ecology- Rutgers University, New Brunswick, NJ)
Recent legislation necessitates a focus on "communities" and "ecosystems" in fisheries management. These concerns suggest a spatial understanding of fisheries across multiple scales and species. As management incorporates more spatial approaches, knowledge about the range of fishing activities in specific areas and the characteristics of who harvests in particular areas will be essential for successful implementation and social/economic impact analyses of fishing communities. These are key areas that Geographical Information Systems are uniquely suited to investigate. The research focuses on the scallop fishery to address general issues of increasingly spatial forms of management and the implications for potential property rights regimes. This is an excellent case study because the fishery is moving toward some form of 'area management' and the fishery is important to the both the New England and Mid-Atlantic regions.

02-03 The Effects of Bottom Roughness On Surf Clam (*Spisula*) Predation (Judith Grassle and Shannon Newby, Institute of Marine & Coastal Sciences- Rutgers University)
This research will examine the role played by bottom roughness elements (shell hash) on predation in recruitment success of the surfclam, *Spisula solidissima*. Areas of shell hash may provide refuge to small *S. solidissima* from omnivorous predators. Laboratory studies will be conducted in the annular flumes at Rutgers. Experiments to determine if habitat structure affects the predatory success of crustaceans will be conducted at different flow velocities. The experiments will also determine if a refuge density exists at which surfclams are less likely to be preyed upon and if that density is altered with the presence of habitat structure. This research will add to the understanding of key elements of the Essential Fish Habitat of surfclams and to factors affecting their recruitment.

00-01 Essential Fish Habitat for Young-Of-The-Year Goosefish (*Lophius americanus*) in the Middle Atlantic Bight (Kenneth W. Able, Rutgers Marine Field Station, Tuckerton, NJ and R. Christopher Chambers, NOAA/NMFS, James J. Howard Marine Sciences Laboratory, Highlands, NJ)
Goosefish ranks among the most valuable groundfish fisheries in the region and has the second highest value among all Atlantic finfish. However, there are considerable uncertainties in the status of the goosefish stock. This multi-year project is a collaboration between the fishing industry, Rutgers University scientists, and NMFS scientists to study the biology and habitat use of YOY goosefish in the Middle-Atlantic Bight. Larval size, size at settlement and distribution and abundance for YOY will be measured to determine critical components of their benthic habitat, and the role of predation (cannibalism).

99-05 Effects of Bottom Roughness on Surf Clam (*Spisula solidissima*) Larval Settlement and Recruitment (Judith P. Grassle and Shannon G. Newby, IMCS, Rutgers University)
This two-year project will examine factors affecting settlement of surf clam larvae. Laboratory studies will be conducted in the racetrack flume at Rutgers. After characterizing the flow fields over ripple beds and shell-hash in the flume, settlement patterns of surfclam larvae will be determined as a function of bottom roughness parameters. The results of these studies will then be compared to field measurements conducted at the LEO-15 site on the continental shelf off Tuckerton, NJ.

99-06 Fish Movements in the Dynamic Ecoscape of a Shallow Flood Dominated Estuary (Robert J. Chant, Institute of Marine and Coastal Sciences, Rutgers University and Allan Stoner, The James J. Howard Laboratory, NMFS)
This two-year project will examine aspects of the changing temporal and spatial structure of essential fish habitat by studying the relationships between the dynamic physical environment and movements by fishes in the Navesink River estuary. Turbidity in the estuary exhibits strong temporal (and spatial) patterns due to tidal circulation. The high turbidity areas are hypothesized to serve as a refuge for juvenile winter flounder, bluefish, and blue crabs from their predators. The approach combines time series measurements (tidal time scales) of turbidity, particle size distribution, temperature, salinity, dissolved oxygen and fish distribution (biotelemetry).

99-08 Ontogenetic Diet Shifts of Larval and Juvenile Flatfish: Validating the Use of Stable-Isotope Ratios to Track Changes in Feeding Behavior (Sam C. Wainright, Institute of Marine and Coastal Sciences, Rutgers University and Christopher Chambers, The James J. Howard Laboratory, NMFS)
This one year study will examine two critical periods in fish early life history: the transition from dependence on a maternal source of nutrition to exogenous sources of nutrition, and the transition from zooplanktivory to piscivory. Laboratory studies will be conducted at the Howard Lab. In the first set of studies, the isotopic signature (N and C) of winter flounder eggs will be determined, as will the isotopic signature of exogenous prey (rotifers). These will be followed throughout the winter flounder yolk-sac stage and through metamorphosis and settlement.

Summer flounder studies will be used to examine the dietary transition that occurs later in the early-life history of fish, namely the shift from zooplanktivory to piscivory, again using isotopically distinct prey (zooplankton). The effect of temperature on the time transitions in both of these life-history stages will be examined.

98-03 Selective Feeding in Post-Larval Winter Flounder (Oscar Schofield and Pat Shaheen, Institute of Marine and Coastal Sciences - Rutgers Univ. and Alan Stoner, NOAA/NMFS, J.J. Howard Lab)

This one-year project addresses the pelagic food resources of post-larval winter flounder. Recent studies have indicated that the relative composition of prey species in the guts of recently settled winter flounder differ from the relative abundance of the prey species (copepods) in the environment, indicating selective feeding. The proposed study had two major components: 1) a spring field study in which the copepod community and post-larval winter flounder gut contents were concurrently characterized and 2) a laboratory feeding study in which the relative abundance of *Acartia* and *Eurytemora* were experimentally manipulated.

98-04 Sustaining the Atlantic Sea Scallop Fishery: Simulating Policy and Management Options (Peter J. Parks/Michael K. Price, Department of Agricultural Economics and Marketing, Rutgers University)

This is for the second year of funding to expand CMER project 97-06 initiated last year. The overall objective of the first year was to develop an analytical framework to help quantify the necessary economic conditions for a sustainable Northeastern sea scallop fishery. The research proposed in the renewal proposal will use this framework to simulate changes in economic, biological or policy conditions, and expand the scope to potentially include the Northeastern scallop fishery.

97-03 Linkages Between Circulation and Distribution of Marine Organisms in a Shallow Well Mixed Estuary: An Observational Approach (Scott Glenn and Robert J. Chant, Institute of Marine and Coastal Sciences - Rutgers Univ.; Alan Stoner, NOAA/NMFS - Howard Lab)

Recent observations in the Navesink/Sandy Hook estuary indicate that the distribution of winter flounder and blue crabs appear to be associated with specific locations within the tidal flow field. Enhanced abundance of these species are found across a broad region of the estuary where several different habitat types occur. Preliminary observations indicate that these areas are regions of particulate organic material accumulation. This project investigated the physical properties (Glenn, Chant) influencing the distribution of fishery resource species (Stoner) in the Navesink by combining a description of the hydrodynamic properties of suspended particles within the estuary, the behavior of the organisms, and a detailed understanding of circulation.

97-04 Environmental Influences on Metamorphosis in Summer Flounder (*Paralichthys dentatus*) (Kenneth W. Able, Institute of Marine and Coastal Sciences - Rutgers Univ.; Chris Chambers, NOAA/NMFS - Howard Lab)
This project addresses the effect of the physiological and ecological challenges imposed during flatfish metamorphosis on recruitment success in summer flounder populations in the northern Middle Atlantic Bight. The hypothesis being tested is that stage duration, which is influenced by temperature, influences the rate of mortality through prolonged exposure to predators during metamorphosis and settlement of summer flounder. Laboratory experiments will manipulate stage duration by controlling temperature, and the resultant effects on survival during late larvae and metamorph stages will be determined, in the presence and absence of predation. The information from this project will clarify the role of winter temperatures on survival and subsequent recruitment of summer flounder to estuaries, which are in the northern part of their range in the Mid-Atlantic Bight.

97-06 Sustaining the Northeastern Sea Scallop Fishery: An Economic Analysis of Consolidating Days-At-Sea (Peter J. Parks and Michael K. Price, Agri. Econ. & Mktg. - Rutgers Univ.; Steve Edwards, NOAA/NMFS - Woods Hole Lab)
An analytical framework was developed to help quantify the necessary economic conditions for a sustainable Northeastern sea scallop fishery. The model can be used to: determine the relationship between days-at-sea (DAS) and average catch size; measure the sensitivity of operational costs to vessel size and capital equipment size; and provide quantitative recommendations for fishermen and regulators that may help sustain the fishery.

97-07 Physical Transport of Bivalve Larvae through a Tidal Inlet: Molecular Probe Applications (Judith P. Grassle, Institute of Marine and Coastal Sciences - Rutgers Univ.)
The flux of commercially important bivalve larvae (*Mercenaria* or *Mya*) through the tidal inlet of the mouth of Great Bay was studied using species-specific molecular probes that allow species level identification of transported larvae. This project was conducted in collaboration with an ongoing CMER project (Haidvogel and Chant, #96-08) in which water exchange between Great Bay/Little Egg Harbor and the coastal ocean is being investigated. Molecular probe techniques developed in this study could be applied to a range of habitats and to other commercially important bivalves.

96-05 Isotopic Turnover Rate and Marginal Growth Increment Validation for Young-of-the-Year Winter Flounder (Sam Wainright, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ; Beth Phelan, NOAA/NMFS, Northeast Fisheries Science Center - James J. Howard Laboratory, Highlands, NJ)
A concurrent NOAA/Coastal Ocean Program project examined habitat utilization and trophic linkages between juvenile fish and estuarine habitats in three Northeastern estuaries. A significant component of the study involved confining juvenile winter flounder in cages within different estuarine habitats, yielding habitat-specific growth rates. To establish trophic linkages, stable isotope ratios of tissue samples of the caged fish were measured and compared with stable isotope ratios of prey and vegetation. However, interpretation of the isotopic data requires

knowledge of the time required for a fish to acquire the isotopic "label" of its habitat, i.e., turnover time. This study examined the isotopic turnover time for winter flounder.

96-08 Development of a Hydrodynamic/Fishery Recruitment Model of Great Bay-Little Egg Harbor Estuarine System (Dale Haidvogel and Robert Chant, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ)
A three-dimensional numerical model with the immediate objective of assessing linkages between hydrodynamics and an identified settlement habit of winter flounder *Pseudopleuronectes americanus* in the Great Bay-Little Egg Harbor estuarine system was developed. Efforts focus on the interaction between larval behavior, secondary flows and dispersion in the vicinity of the settlement habitat. The work complemented an ongoing multi-year study of *P. Americanus* that involved scientists at both Rutgers (Ken Able, Sam Wainright) and the National Marine Fisheries (Ann Studholme, Anthony Calabrese) which was funded by NOAA/COP. Results from this work will aid in both the interpretation of sparse biological measurements and in the design of future field campaigns in the Great Bay-Little Egg Harbor Estuarine system. Furthermore, this work is the first step in developing a comprehensive model of fish recruitment processes in shallow estuarine systems.

96-11, 97-08, 98-05, and 99-10, 01-04, & 02-02 CMER Research Experiences for Undergraduates (Michael De Luca, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ)
Funding for these projects supported two summer undergraduate interns each year up to 2001 and three students in subsequent years. The interns were involved in research projects at the James J. Howard Laboratory. Each student undertook a research project, the results of which were presented in a written report and in an oral presentation at both the NEFSC Lab and at Rutgers.

95-05 Assimilation of Metals by Phytoplankton in the Mid-Atlantic Bight: Controls on Introduction to the Coastal Marine Food Web (Robert Sherrell, Institute of Marine and Coastal Sciences, Rutgers University, New Brunswick, NJ; Vincent Zdanowicz, NEFSC - James J. Howard Laboratory, Highlands, NJ)
Uptake of metals by phytoplankton is an important pathway for the introduction of potentially toxic elements into the marine food web. Environmental and physiological controls on the assimilation of dissolved metals, both nutrient and nonessential, have only recently begun to be understood in culture studies. This project combined remote sensing-targeted sampling, *in situ* size-fractionating filtration methods, and state-of-the-art ultra-trace analyses using recent developments of Inductively Coupled Plasma Mass Spectrometry (ICPMS) to examine assimilation of metals by phytoplankton in the Mid-Atlantic Bight. This project used facilities and analytical equipment at the Howard Laboratory, and was integrated with a UMASS CMER funded project.

94-03 Transfer of Xenobiotic Contaminants from Prey to Predator (Gary Taghon, Institute of Marine and Coastal Sciences, Rutgers University, New Brunswick, NJ)
The potential transfer of oil and oil components (e.g., polycyclic aromatic hydrocarbons - PAHs) through trophic levels and the effect this may have on the structure of the ecosystem were investigated. Experiments were conducted of *in vivo* metabolism and the biological fate and bio-transfer of a carcinogenic PAH in organisms inhabiting marine sediments (softshell clam, *Mya arenaria* and the sand worm, *Neanthes virens*) and in a predator (winter flounder, *Pleuronectes americanus*) on those organisms.

93-01 Life History and Ecology of the Windowpane Flounder (*Scophthalmus aquosus*) in the Mid-Atlantic Bight (Kenneth Able, Marine Field Station, Institute of Marine and Coastal Sciences, Rutgers University, Tuckerton, NJ; Wallace Morse, NEFSC, Howard Laboratory, Highlands, NJ)
The aim of this project was to better understand the life history and ecology of windowpane flounder in order to better manage this resource and contribute to our understanding of flatfishes in the northeastern U.S. The specific objectives of the project were to: 1) determine the patterns of metamorphosis and settlement during the first year of life in the Great Bay/Little Egg Harbor estuarine system; 2) identify the nursery habitats and patterns of distribution through space and time; and 3) compare life history characteristics in Mid-Atlantic Bight populations with those on Georges Bank.

93-05 Studies on Surf Clam (*Spisula solidissima*) Recruitment (Judith Grassle, Institute of Marine and Coastal Sciences, Rutgers University, New Brunswick, NJ)
This research effort focused on the causes of year-to-year variation in settlement and recruitment success in the surf clam. The temporal and spatial settlement patterns, size distributions, and growth rates of surfclams and their predators were investigated. The death assemblage was used to examine size-preference in predators. The relationship between surfclams and two of their major predators: the moon snail *Euspira heros* and the starfish *Asterias forbesi*, were examined with laboratory experiments. Predation rates, size selectivity, interactions between the two predators, and the possible role of dead surfclam valves as a refuge from predation were examined.

93-06 Identification of Major Chemical Compounds Relating to Quality Determination of Mackerel and Other Fatty Fish by a GC/MS Method; Development of a Novel Rapid and Nondestructive NIR Method to Determine these Compounds and Their Application to Fish Quality Assessment and Processing Improvement (Tung-Ching Lee, Department of Food Science, the Fisheries and Aquaculture TEX Center and the Center for Advanced Food Technology, Rutgers University, New Brunswick, NJ; Judith Krzynowek, NMFS, Gloucester Laboratory, MA)
Gas chromatography/mass spectrometry (GC/MS) and near infrared (NIR) technology, and sensory panel evaluation were used to identify major chemical compounds relating to quality deterioration of mackerel and other fatty fish. Novel rapid and nondestructive methods based on NIR technology were developed to determine these compounds as indicators of quality.

93-08 Evaluation of Toxicity of Dioxins, Furans, and PCBs on Commercially Important Species Inhabiting and Migrating Through the Newark Bay Systems (Keith Cooper, Claudia Olivieri, and Sharon Longo, Department of Biochemistry and Microbiology and Joint Program in Toxicology, Environmental Occupational Health Sciences Center, Rutgers University, New Brunswick, NJ; Sharon McLean, NMFS, Narragansett Laboratory, RI; Anne Studholme NEFSC, Howard Laboratory, NJ)
This effort addressed the hypothesis that the chlorinated pollutants specifically dioxins, furans, PCBs and PAHs present in the Newark/Raritan Bay Estuary are of sufficient levels to impact the fisheries of these areas. This research combined both field and laboratory studies to examine causal relationships between body burdens of these compounds and the impact on the fishery. Histological lesions, selected biomarkers and reproductive success were evaluated in relation to contaminant levels in important fish species.

COMPLETED PROJECTS FUNDED THROUGH THE RUTGERS/NOAA CMER PROGRAM (External Funding 1993-2006)

03-Ex3 Workshop on N_2 Production from Denitrification and 03-Ex4 Workshop on Advanced Approaches to Quantify Denitrification (E. Davidson, Woods Hole Research Center, Woods Hole, Massachusetts and Sybil Seitzinger, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ)
Eutrophication is a major environmental problem in coastal ecosystems around the world. Increased nitrogen loading from land-based sources is a major cause of this eutrophication. Therefore, understanding processes that remove nitrogen, both within watersheds before it reaches the coastal zone or within coastal and marine systems, is important to the development of management strategies to control eutrophication. A major sink for nitrogen in terrestrial and aquatic systems is denitrification, the reduction of nitrate to N_2 gas by bacteria. Quantifying denitrification has been a major challenge in any ecosystem. This workshop brings together terrestrial, freshwater and marine scientists to: 1) evaluate the state of our knowledge of denitrification rates in a wide range of terrestrial and aquatic ecosystems, 2) compare methodologies that have been adopted by different scientific disciplines, with the expectation that collaboration across disciplines could yield methodological advances, and 3) chart out the current weaknesses and the actions needed to address those weaknesses for an improved global assessment of where, when, and how much reactive N is converted to N_2 in the biosphere.
Funding from NSF.

02-Ex1 Bluefish/Striped Bass Interactions in the Mid-Atlantic Bight (VI) (Michael DeLuca, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ)
Participants at prior bluefish workshops expressed an interest in shifting the existing program from a theme-based series of projects to a more focused approach on understanding bluefish dynamics over a large spatial scale, as determined by management and fishing community needs. In response, Rutgers sponsored a dedicated session at the 2002 national meeting of the American Fisheries Society to present a coastwide strategy for bluefish stock assessment to researchers and

fishery managers/regulators. Select Bluefish Program PIs and fishery managers reviewed the draft strategy and endorsed the concept of a scientific workshop to develop the framework for program redirection with participation from academic, legislative, management/regulatory, industry, and commercial and recreational fishing representatives.

One project, entitled, "Migration dynamics of striped bass in the middle Atlantic bight using recent advances in telemetry technology," was initiated to incorporate a biological component into a Long-term Ecosystem Observatory (LEO-15). Ken Able and Tom Grothues at Rutgers University received support to install monitoring buoys to track striped bass with acoustic tags. Information is expected to enhance understanding of habitat use and migratory patterns of this species in association with an existing array of samplers and sensors that collect physical-chemical information. A website (stripertracker.org), adopt-a-fish program, and science education initiatives complement this study.

These projects were in their second year of two-year funding: "Coastal dependency of juvenile bluefish in the Middle Atlantic Bight," David Secor and Ed Houde, University of Maryland; "Verifying the identification and contribution of spring and summer cohorts in Atlantic coast bluefish," David Conover, SUNY, Stony Brook; "Exploring uncertainty in the bluefish stock assessment: incorporating potential changes in distribution, catchability, selectivity, and natural mortality," Andrew Cooper, University of New Hampshire; Estuarine recruitment of juvenile bluefish during winter," Francis Juanes, University of Massachusetts at Amherst; "Development of a spatial dynamic biophysical fishery model for Atlantic Coast multispecies assessments: interactions between bluefish and striped bass," Lisa Kline and Geoff White, Atlantic States Marine Fisheries Commission, Jiangang Luo and Jerald Ault, University of Miami, Kyle Hartman, West Virginia University. "Age-specific trophic interactions of bluefish in the mainstem Chesapeake Bay," James Gartland, College of William and Mary was funded as a one-year pilot project and "Biotic interactions between bluefish and associated piscivorous predators: Comparisons of habitat use, movements, diet and growth," Ken Able, Rutgers University is in its final year. Funding from NEFSC.

01-Ex1 Recreational Fisheries and National Standard 8 (Kevin St. Martin, Department of Geography- Rutgers University, New Brunswick, NJ)

National Standard 8 of the Magnuson-Stevens Fishery Management Act is one of several new federal level standards that must be considered by regional fisheries management councils when producing or adjusting Fisheries Management Plans (FMP's). This initiative introduced 'communities' into the federal regimen of fisheries management as objects/units for data collection, social/economic impact analysis and regulatory impact considerations. The Northeast with its large and growing recreational fisheries sector is well suited as a test case for this study. NMFS survey data, on-site interviews and GIS for spatial analysis will be used to develop a social science protocol/methodology for establishing the economic an social significance of recreational fishing to communities. The protocol will incorporate methods for assessing the economic and social impacts of regulations (e.g. FMP's) on fishing communities. Such a protocol should reflect and contribute to current statutory definitions of fishing communities as well as provide guidance to the Northeast region. Funding from NEFSC.

01-Ex4 Chemical Composition and Bioavailability of Dissolved Organic Nitrogen in Atmospheric Wet Deposition from Urban and Rural New Jersey Sites (Sybil Seitzinger, Rutgers/NOAA CMER Program, Institute of Marine and Coastal Sciences, Rutgers University, New Brunswick, NJ and Monica Mazurek, Institute of Marine and Coastal Sciences, Rutgers University, New Brunswick, NJ)
The overall goal of the proposed research is to identify the current and potentially future processes (natural and anthropogenic) and technologies that are major contributors to atmospherically deposited organic-N compounds and to assess the effect of these specific chemicals on receptor ecosystems. Specific objectives of this project are to: 1) Characterize the chemical composition of total dissolved N, both inorganic and organic nitrogen in atmospheric deposition 2) begin to identify sources of organic nitrogen in atmospheric deposition at those sites, 3) identify which of the compounds, and therefore which potential sources are bioavailable and thus contributing to ecological changes in ecosystems. This work will ultimately provide information that can be linked to the decision making needs of environmental managers. Funding by NJ Department of Environmental Protection.

00-Ex1 Model Development and Chemical Characterization of Bioavailable Nitrogen Loading to Coastal Ecosystems (Sybil Seitzinger, Rutgers/NOAA CMER Program, Institute of Marine and Coastal Sciences, Rutgers University, New Brunswick, NJ and Monica Mazurek, Institute of Marine and Coastal Sciences, Rutgers University, New Brunswick, NJ)
The overall goal of the proposed research is to provide new tools for environmental managers to more accurately assess the consequences of various development and nutrient management scenarios on coastal eutrophication. Specific objectives of this project are to: 1) develop a model to predict bioavailable N inputs to estuaries that accounts for bioavailable dissolved organic-N (DON) and inorganic-N inputs as a function of land use, 2) apply the model to a number of estuarine watersheds in New Jersey and throughout the east coast of the US, 3) further develop new analytical methodologies for chemically characterizing DON in natural and pollutant sources, and 4) apply those analytical methods to begin to characterize the bioavailable and refractory components of the DON from the non-point and point sources. Funding by NJ Sea Grant.

01-Ex3 Bluefish/Striped Bass Interactions in the Mid-Atlantic Bight V (Michael DeLuca, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ)
A planning workshop for the Bluefish-Striped Bass Dynamics Research Program was held at Rutgers University. Representatives from academe, industry, state and federal government, and regional fishery management councils gathered to review the results of program research efforts to date, and discuss how the program can continue to address and support the needs of the management community effectively. In response to management needs, three thematic areas for future program research were identified as a result of the workshop: historical information synthesis, basic demographic information, and ecological information needs. Stock assessment also remains a high priority area for future research.

Projects funded during this grant period included: "Potential competitive interactions in two pelagic piscivores: effects of striped bass on size- and number-impaired bluefish groups," Jeffrey

A. Buckel , North Carolina State University; "Population ecology of western North Atlantic bluefish: A review," David O. Conover and Stephan B. Munch, Marine Sciences Research Center State University of New York at Stony Brook; "Winter distribution, ecology and energetics of young-of-the-year bluefish in the South Atlantic Bight," Thomas Lankford, North Carolina State University; "The Reproductive Biology of Bluefish in the Middle and South Atlantic Bights," Christian Reiss, Cynthia Jones and Brian Wells, Old Dominion University; "Neritic Habitat use by Young-of-the-Year Bluefish in Maryland Coastal Waters," Secor, D.H., L. Takata, J. Bichy, and E.D. Houde, Chesapeake Biological Laboratory, University of Maryland Center for Environmental Science; "Predator-prey interactions between bluefish, *Pomatomous saltatrix*, and shortfin mako, *Isurus oxyrinchus*, and other pelagic sharks off the northeast U.S. coast," Cheryl Wilga, University of Rhode Island; and "Identifying crucial life stages of bluefish (*Pomatomous saltatrix*): A synthetic modeling approach," Timothy Essington, State University of New York at Stony Brook. Funding from NEFSC.

99-Ex1 Bluefish/Striped Bass Interactions in the Mid-Atlantic Bight III, IV (Michael DeLuca, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ)

Research efforts continued to address the factors governing the apparent decline in bluefish abundance along the Atlantic coast. Four projects received continuation funding and one new project received support. These were: "Modeling Bluefish Fluctuations: Interactions among Bluefish, Striped Bass, and Forage Fish," Anne Richards, National Marine Fisheries Service; "Comparison of Habitat Use by Juvenile Bluefish between Chesapeake Bay Sub-estuaries and Maryland's Coastal Bays," David Secor and Ed Houde, Chesapeake Biological Lab, U. Maryland; "Habitat Use by Young-of-the-Year Bluefish: Are Ocean Beaches Important?," Ken Able and Philip Rowe, Institute of Marine and Coastal Sciences, Rutgers University; "Recruitment of Spring and Summer-Spawned Bluefish: Genetic Structure, Cohort Identification, and Relative Contribution to the Adult Stock," David Conover, Marine Sciences Research Center, SUNY-Stony Brook; and "Impact of prey abundance and size-structure on growth of spring- and summer-spawned juvenile bluefish in the Hudson River estuary: an individual-based modeling approach," Francis Juanes, U. Massachusetts-Amherst. Funding from NEFSC.

02-Ex4 Biotechnological Investigations-Ocean Margins Program (BI-OMP); Geochemical Rate/RNA Integration Study (GRIST): A Pilot Field Experiment for Inter-Calibration of Biogeochemical Flux and Nucleic Acid Measurements. (Lee Kerkhof, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ; Sybil P. Seitzinger and Hilairy Hartnett, Rutgers/NOAA CMER Program, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ, and H. Hartnett)

In this pilot study, several important biogeochemical processes (e.g., primary production, bacterial production, DOM production/uptake, N-assimilation, and N redox cycling) in water column and sediment samples will be monitored concurrently with the molecular approaches to assess how the flux measurements and conventional approaches can be enhanced using gene-based methodologies. Although the simultaneous measurement of carbon and nitrogen cycling processes has occurred infrequently, the concurrent measurement of the expression of carbon and nitrogen cycling genes has never before been attempted. Furthermore, a coordinated field

experiment with simultaneous monitoring of geochemical processes and gene products has never been tried. We plan an integrated field experiment to assess the different biogeochemical measurements and molecular based approaches to focus on how the combination of the flux determinations and the knowledge of the active players will help us better understand regulation and response in overall system performance to different environmental parameters. S. Seitzinger and H. Hartnett will primarily be involved in the denitrification studies.

03-Ex2 - Development of a Supplemental Finfish Survey Targeting Mid-Atlantic Migratory Species (Eric Powell, Institute of Marine and Coastal Sciences- Haskin Shellfish Research Laboratory - Rutgers University, Port Norris, NJ)

The constant goal of developing ways to improve estimates of stock abundance includes seeking ways to augment survey data to improve the underlying database supporting abundance estimates. One target of survey augmentation should be the development of ways to better evaluate how seasonal migration of fish in the Mid-Atlantic influences stock abundance estimates. Species such as squid, scup, and summer flounder move inshore and upcoast during the late spring as the water warms and then move downcoast and offshore in the late fall as the water cools. The goal of this project is to supplement the survey database with information on the migratory behavior of recreationally and commercially important species by developing a supplemental survey program. The steps to project completion are: (a) conduct a planning workshop to design a supplemental survey; (b) carry out the supplemental survey over one migratory season; (c) collaborative data analysis and reporting of survey results; (d) conduct a retrospective workshop to develop recommendations for the design and (e) implementation of a continuing data collection program. CMER funds supported one supplemental survey cruise.

01-Ex2 Fishing Communities of the Mid-Atlantic (Bonnie McCay, Department of Human Ecology- Rutgers University, New Brunswick, NJ)

We propose the creation of social, cultural and economic profiles for the fishing communities of the Mid-Atlantic region of the United States. The goal is to provide information that can be used to assess the impacts of changes in the regulatory environment on fisheries and fishing communities. The project builds on previous work by McCay and Cieri, profiling the fishing ports of the Mid-Atlantic state, and on recently completed work by Madeleine Hall-Arber and others which develops more detailed information for New England states, on the major fishing communities. The work will help the state and federal agencies and fishery management councils develop and implement appropriate fishery management plans and to meet legal requirements for fishery impact and social impact analyses including NEPA, RIR, Small Business Administration and National Standards of the Magnuson-Stevens Fishery Conservation and Management Act.

99-Ex2 Bottom Habitat Classification and Mapping of the New York Bight (Richard G. Lathrop, Ecology, Evolution and Natural Resources - Rutgers Univ., New Brunswick, NJ)

The fishery resources of coastal marine habitats are among the most diverse and economically valuable along the East Coast. The diversity, quality, and extent of coastal marine habitats are important determinants of distribution, abundance and diversity of fishery resources. This project will develop and test strategies for remotely mapping the benthic habitats of commercial

fish species and investigate the influence of sea floor geology and sea floor disturbance on the distribution, abundance and diversity of fishery resources. Recent high resolution geologic mapping of the sea floor of the New York Bight region provides a new, detailed regional framework for defining sea floor habitats.

98-Ex1 Costs of Surf Clamming and Ocean Quohogging (Bonnie McCay, - Department of Human Ecology - Rutgers University, New Brunswick, NJ)

This project is an extension of 96-Ex2 on the costs and earning of the "for hire" charter and party boat fisheries of Maine, New Jersey, and New York. The current project moves from the charter and party boats to the boats engaged in catching surfclams and ocean quahogs (SCOQ), most of which come primarily from Mid-Atlantic ports. The economic analyses of this project will contribute to assessing the extent to which the SCOQ ITQ fishery management regime addresses National Standards 4 (no discrimination between residents of different States) and 8 (importance of fishery resources to fishing communities) of the Magnuson-Stevens Fishery Management and Conservation Act. Funding from NMFS NEFSC.

98-Ex3 Sensors for Direct Observation for use in Stock Assessment (W. Wakefield, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ; W. Overholtz and W. Gabriel, NOAA/NMFS, Woods Hole, MA)

This project will initiate development and application of sensors and capabilities of direct observation (e.g., video imaging systems) for use in conjunction with various gears used in stock assessment (acoustics, trawls, and dredges). Specifically it will include a preliminary effort for a self-contained, high-resolution time-lapse video camera system.

This system does not require armored conducting wire, is rather simple and flexible and can be used in a variety of applications to evaluate gear and record direct observations of fish behavior and fish habitat. Many of the main components (e.g., video cameras and lights) may also be used as elements in other future video systems. Funding from NEFSC.

98-Ex4 Chemical Composition and Bioavailability of Dissolved Organic Nitrogen in Atmospheric Deposition (S. Seitzinger, Rutgers/NOAA CMER Program, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ and Monica Mazurek, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ)

Humans have dramatically altered the Earth's nitrogen (N) cycle by doubling the natural rate of N-fixation and causing atmospheric N deposition rates to increase by three to more than ten fold compared to pre-industrial times. Atmospheric deposition is a major source of nitrogen to many ecosystems: up to 70% of the N inputs to estuarine and coastal marine systems are attributed to atmospheric sources. Marked changes in both terrestrial and aquatic ecosystems are occurring as a result of increased nitrogen (N) deposition from anthropogenic sources. Currently, approximately 80% of the atmospherically deposited N is anthropogenic. To date, most studies of the magnitude, sources and effects of atmospherically deposited N have only considered inorganic N. However, a considerable portion (20 to 85%) of N in rainwater is in the form of organic-N, and almost nothing is known of the chemical composition, sources or ecosystem

effects of the bulk of that organic-N. The objectives of this three-year study are to: 1) characterize the chemical composition of dissolved organic nitrogen (DON) in atmospheric deposition in a relatively perturbed site in the Northeastern U.S.; 2) determine how much of the total DON in rainwater is biologically available to coastal plankton communities; and 3) characterize the chemical composition of the DON compound classes that are bio-available and thus contributing to ecological changes in receiving ecosystems. Funding from NSF.

98-Ex5 An Initiative to Gain a Regional Perspective on Coastal Eutrophication (Sybil P. Seitzinger, Rutgers/NOAA CMER Program, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ and Tracy N. Wiegner, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ)
The primary objective of this 1 year development project is to strengthen the relationship among Sea Grant funded research teams from New York to Georgia working on issues surrounding coastal eutrophication. The project brought together Sea Grant funded researchers from New Jersey (Dr. Sybil Seitzinger), Maryland (Dr. Patricia Glibert), Georgia (Dr. Deborah Bronk), and New York (Dr. Julie LaRoche) to begin addressing the contribution of organic nitrogen to coastal eutrophication on a regional scale. Specifically, the team will begin collecting information on the quantity and biological availability of the organic molecules from a variety of rivers throughout the east coast of the United States. Funding from NJ Sea Grant Development Fund.

98-Ex6 Barnegat Bay National Estuary Program Data Synthesis (Sybil Seitzinger, Rutgers/NOAA CMER Program, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ; R. Lathrop, Ecology, Evolution & Natural Resources - Rutgers University, New Brunswick, NJ; K.Hunchak-Kariouk, R. Nicholson, and R.E. Hickman, USGS, Water Resources Division, Trenton, NJ)
As part of the Barnegat Bay National Estuary Program, a synthesis of existing information on pollution inputs, land and bay use changes and human activities in the Barnegat Bay watershed region was conducted. This is a joint effort between Rutgers University and the USGS. Funding from the Barnegat Bay NEP.

97-Ex1, 98-Ex2 Bluefish/Striped Bass Interactions in the Mid-Atlantic Bight I, II (Michael DeLuca, Frederick Grassle and Kenneth Able, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ
Recently, Congress expressed concern with the decline in abundance of bluefish stocks along the Atlantic coast. This decline has been attributed to a variety of factors ranging from competition with other species to dwindling forage species and unusual migratory pathways. Rutgers University is administering a collaborative effort with NMFS scientists to address concerns with the status of bluefish stocks. A workshop was held to prioritize research areas, a call for proposals was issued, and four research projects were funded that address the decline of Atlantic bluefish stocks, including: "Empirical Modeling of Bluefish Population Fluctuations: Interactions among Bluefish, Striped Bass and Forage Species," Anne Richards, University of Maryland; “System Recruitment of Young-of-the Year Bluefish: Patterns, Pulses and Processes

in the Chesapeake Bay Estuarine System," Ed Houde, University of Maryland Center for Environmental Science; "Influence of Coastal Oceanography on Habitat Use and Recruitment Success of Bluefish (*Pomatomus saltrix*) in New Jersey," Ken Able, Rutgers University Marine Field Station; "Recruitment of Spring- and Summer-Spawned Bluefish: Genetic Structure, Cohort Identification, and Relative Contribution to the Adult Stock," David Conover, Florida State University.

97-Ex2 Essential Fish Habitat (Judith P. Grassle and Waldo W. Wakefield, Institute of Marine and Coastal Sciences; Richard G. Lathrop, Ecology, Evolution and Natural Resources - Rutgers University, New Brunswick, NJ; Jeffrey Cross and Anne Studholme, NOAA/NMFS - Howard Lab)

The recent reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act (also known as the Sustainable Fisheries Act (SFA)) requires that essential fish habitat (EFH) be identified and described for each species or species assemblage covered by a Fisheries Management Plan (FMP). All Fishery Management Councils are required to submit FMP amendments to implement EFH by October 1998. Responsibility for supporting the New England Fishery Management Council (NEFMC) and Mid Atlantic Fishery Management Council (MAFMC) rests with the Northeast Regional Office and Northeast Fisheries Science Center. The Howard Laboratory at Sandy Hook prepared information on the life history and habitat requirements for species managed by the NEFMC and the MAFMC; the information will be used by the Council/NMFS EFH Teams to write the EFH amendments. The current study was conducted cooperatively between Rutgers University and the Howard Laboratory to develop EFH reports for the following species: Atlantic sea scallop, surf clam, ocean quahog, squid, mackerel, and butterfish. Funding by NEFSC.

97-Ex3 Denitrification and Microbial Dynamics in Continental Shelf Sediments: An Annual Study (Sybil P. Seitzinger, Rutgers/NOAA CMER Program and Lee Kerkhof, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ)

Nearly 50% of the global marine primary production occurs in continental margin waters, supporting a rich marine fisheries. Nitrogen is an important element controlling this primary production. Processes that affect the availability of nitrogen will likely have a direct impact on the primary productivity within the continental shelf ecosystem, and ultimately influence the associated marine fisheries. Denitrification in continental shelf sediments is important because it can decrease the amount of nitrogen for phytoplankton in the overlying waters. According to current estimates, up to 50% of the total nitrogen input to the oceans is removed from the system through denitrification in continental shelf sediments. However, few direct measurements of denitrification in shelf sediments exist. In the current study methods developed with CMER 96-Ex1 will be used to: 1) assess seasonal variability in denitrification rates at 3 sites on the continental shelf at LEO-15; 2) assess microbial population dynamics on a seasonal basis at the same 3 sites; and 3) investigate physical/chemical/and biological mechanisms/factors controlling denitrification and microbial population dynamics in the continental shelf. The results of this study will provide critical information needed for local and ocean scale N models, global models of nitrous oxide (N_2O), and the overall contribution of denitrification in continental shelf

sediments as a global marine N sink. Funding from NOAA/Mid-Atlantic Bight, National Undersea Research Program.

97-Ex4 Estuarine Eutrophication: Seasonal Cycle of the Contribution of Dissolved Organic Nitrogen from Non-Point and Point Sources (Sybil Seitzinger, Rutgers/NOAA CMER Program, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ; Monica A. Mazurek, Institute of Marine and Coastal Sciences - Rutgers University; Robert W. Sanders, Temple University, Department of Biology Philadelphia, PA)
This project is evaluating the seasonal differences in the contribution to estuarine eutrophication of dissolved organic nitrogen (DON) from non-point and point sources. DON is a major source of pollutant related N to coastal waters. However, the biological availability of DON in various non-point and point sources, and thus its contribution to eutrophication has received little attention. Traditionally, DON has been considered to be refractory. This project is a continuation of CMER 95-Ex1 in which summer studies of the biological availability of dissolved organic nitrogen in specific non-point and point sources of pollution to estuarine ecosystems were studied. In the current study, the seasonal differences in the bioavailability of DON from various pollutant sources are being examined. Sources included in the study are urban storm water runoff, agricultural runoff, as well as natural sources from forested watersheds. The results of these studies will be made available to state and regional managers for use in the development of nutrient reduction plans and eutrophication models. Funding by NOAA, New Jersey Sea Grant.

96-Ex1 Denitrification and Microbial Dynamics in Continental Shelf Sediments: Use of *In Situ* Methods (Sybil P. Seitzinger and Lee Kerkhof, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ)
Nearly 50% of the global marine primary production occurs in continental margin waters, supporting a rich marine fisheries. Nitrogen is an important element controlling this primary production. Processes that affect the availability of nitrogen will likely have a direct impact on the primary productivity within the continental shelf ecosystem, and ultimately influence the associated marine fisheries. Denitrification in continental shelf sediments is important because it can decrease the amount of nitrogen for phytoplankton in the overlying waters. According to current estimates, up to 50% of the total nitrogen input to the oceans is removed through denitrification in continental shelf sediments. However, few direct measurements of denitrification in shelf sediments exist. In the current study a new, high sensitivity method for measuring *in situ* rates of denitrification in continental shelf sediments was developed and the first direct denitrification measurements in Atlantic shelf sediments were made. The preliminary measurements strongly support the original hypothesis that denitrification in shelf sediments is a major removal term for N on both a local, as well as global, scale. In addition, molecular techniques (PCR/probing of nitrous oxide reductase genes) to examine the dynamics of bacterial populations capable of denitrification were developed. The results of this study provided information necessary to begin evaluation of the contribution of denitrification as a global marine N sink. Funding from NOAA/Mid-Atlantic Bight, National Undersea Research Program.

96-Ex2 Effects of Fisheries Regulation on the Economic Viability of the Charter and Party Boat Fishing Industry in the Northeast Region of the U.S. (Bonnie McCay, Department of Human Ecology - Rutgers University, New Brunswick, NJ; S. Steinback, NMFS, Woods Hole, MA)

The Northeast Fisheries Science Center (NEFSC) of the National Marine Fisheries Service (NMFS) conducted an economic valuation study of marine recreational anglers in the Northeast region of the U.S. This CMER project was part of a cooperative project among the NEFSC and CMER institutions in the Northeast Region: University of Rhode Island, University of Massachusetts, and Rutgers the State University of New Jersey. Work on the recreational service industry (charter and party boats) is coordinated with work on two other poorly-documented sectors of the Northeast region's fisheries, the "hook" and the small trawler fisheries. The purpose of this cooperative project was to develop a data collection system that will become part of the core statistics collected through NMFS for use by NMFS and the cooperating universities for the assessment of fishery management issues and other fishery economics research needs. Specific objectives included the development of survey instruments to be tested in pilot surveys of the Northeast U.S. hook, small trawler, and recreational party and charter fleets, to compare and statistically validate various survey methods, to design the framework for a possible ongoing cost/earnings data base that will eventually encompass all Northeast fisheries of interest, and to begin building research tools based on these data.

95-Ex1 Estuarine Eutrophication: Contribution of Dissolved Organic Nitrogen from Non-Point and Point Sources (Sybil Seitzinger, Rutgers/NOAA CMER Program, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ; Renée Styles, Institute of Marine and Coastal Sciences - Rutgers University; Robert W. Sanders, Academy of Natural Sciences, Division of Environmental Research, Philadelphia, PA)

This project evaluated the contribution of dissolved organic nitrogen (DON) from non-point and point sources to estuarine eutrophication during summer. DON is a major source of pollutant related N to coastal waters. However, the biological availability of DON in various non-point and point sources, and thus its contribution to eutrophication, was not known. Traditionally, DON has been considered to be refractory. This project is a continuation of CMER 94-Ex1 in which DON in major rivers was investigated. In this project summer experiments were conducted to examine the biological availability of dissolved organic nitrogen in urban storm water runoff, agricultural runoff, as well as natural sources from forested watersheds. A substantial portion of the DON from all sources was found to be biologically available to estuarine organisms and resulted in stimulation of bacterial and phytoplankton production. The results have important implications for state and regional management plans and eutrophication models. Funding by NOAA, New Jersey Sea Grant.

95-Ex2 The Bioavailability of Dissolved Organic Nitrogen at the Ocean Boundary of Chesapeake Bay (Sybil Seitzinger, Rutgers/NOAA CMER Program, Institute of Marine and Coastal Sciences, Rutgers University, New Brunswick, NJ; Robert DeKorsey, Institute of Marine and Coastal Sciences, Rutgers University, New Brunswick, NJ; Robert W. Sanders, Academy of Natural Sciences, Division of Environmental Research, Philadelphia, PA)

Approximately 40% of the total tracked nitrogen loading to the Chesapeake Bay enters from ocean boundary bottom water, and approximately 90% of the N in ocean boundary bottom water is in the form of organic nitrogen. However, the biological availability of organic N in ocean boundary bottom water was not known; thus, its contribution to eutrophication was unknown. Traditionally, organic N has been considered to be refractory. This study examined the biological availability of organic nitrogen in ocean boundary bottom water and its ultimate contribution to phytoplankton production and eutrophication in the bay. The information was incorporated in eutrophication models of Chesapeake Bay. Funding provided by US Environmental Protection Agency, Chesapeake Bay Program.

95-Ex3 The Importance of Understanding Ecological Complexity to Predicting Effects of Multiple Stressors on Coastal Ecosystems (Denise Brietburg, Academy of Natural Sciences of Philadelphia, Benedict Estuarine Research Laboratory; Sybil Seitzinger, Rutgers/NOAA CMER Program, Institute of Marine and Coastal Sciences Rutgers University, New Brunswick, NJ; plus 15 other Principal Investigators from 7 institutions)

In order to understand the cumulative effects of numerous stressors on coastal ecosystems, the complexity of such systems must be recognized and dealt with. In this six-year study complexity is addressed by studying an estuarine system at multiple levels of organization. The experimental approach includes: 1) a multilevel large-scale experimental study of the effects of stressors on ecological processes within the estuary, 2) an examination of the relationships between land-use patterns, geology and the watershed loadings of stressors, 3) modeling of the ecological effects of stressors from the individual through the ecosystem level, including spatially explicit fisheries models, and 4) an economic evaluation of management practices. The principal classes of stressors that are being examined include inorganic toxins and high nutrient inputs. S. Seitzinger's portion of the project focuses on ecosystem level responses (benthic processes, whole-system primary production, respiration and net ecosystem metabolism). Funding by NOAA Coastal Ocean Program.

95-Ex4 An Evaluation of Shallow Water Drift Material in the Arthur Kill and Kill van Kull (Kenneth Able and Uwe Kils, Marine Field Station, Institute of Marine and Coastal Sciences - Rutgers University, Tuckerton, NJ; A. Studholme, NEFSC, James J. Howard Laboratory, Highlands, NJ; Gary Taghon, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ)

Throughout the New York Harbor, the removal of deteriorating piers, bulkheads, pilings, derelict vessels and other debris is the objective of a major drift removal program undertaken by the U.S. Army Corps of Engineers. Of special concern are shallow water structures in and around Arthur Kill and Kill van Kull, which are major sources of drift material. While these artificial structures can contribute to habitat degradation, alternatively they may serve to attract migratory and resident fish species, providing essential shelter, a critical factor for highly vulnerable early life

history stages. This program evaluated the role that these man-made structures play, particularly as nursery areas of juvenile fishes. Funding by U.S. Army Corps of Engineers.

94-Ex1 Role of Dissolved Organic Nitrogen in Estuarine Eutrophication (Sybil Seitzinger, Rutgers/NOAA CMER Program, Institute of Marine and Coastal Sciences, Rutgers University, New Brunswick, NJ; Robert W. Sanders, Academy of Natural Sciences, Division of Environmental Research, Philadelphia, PA)
This project was designed to evaluate the contribution to estuarine eutrophication of dissolved organic nitrogen (DON) transported to estuaries by polluted rivers. DON is a major source of pollutant related N to coastal waters. However, the biological availability of DON, and thus its contribution to eutrophication, was not known; traditionally, DON has been considered to be refractory. Inputs of DON from the Hudson and Delaware rivers were quantified and the extent to which the DON from these sources increases algal and microbial production was examined. The results of this study are being used to refine estuarine eutrophication models. Funding by NOAA, New Jersey Sea Grant.

94-Ex2 Inputs and Cycling of Nutrients in NY/NJ Harbor (Sybil Seitzinger, Rutgers/NOAA CMER Program, Institute of Marine and Coastal Sciences, Rutgers University, New Brunswick, NJ)
The role of sediments in nutrient, trace metal, and oxygen cycling throughout the New York/New Jersey Harbor ecosystem was examined. In addition, external inputs of nutrients (both inorganic and organic) from 41 different point sources were quantified. The biological availability of dissolved and particulate organics in those inputs were studied during spring and summer experiments. The results of this study were used in eutrophication models of the New York/New Jersey Harbor ecosystem. Funding by EPA National Estuaries Program in New York/New Jersey Harbor.

94-Ex-3 Mitigation of Non-point Pollution by Riparian Forest Buffers in Agricultural Watershed of the Mid-Atlantic Piedmont (Sybil Seitzinger, Rutgers/NOAA CMER Program, Institute of Marine and Coastal Sciences, Rutgers University, New Brunswick, NJ; Denis Newbold, Academy of Natural Sciences of Philadelphia; Susan Watts, Institute of Marine and Coastal Sciences, Rutgers University, Camden, NJ)
Buffer strips are used for non-point source nutrient removal, to reduce nutrient runoff from agricultural systems to aquatic ecosystems. Mechanisms responsible for nitrogen and phosphorus retention and removal in riparian buffer strips were examined. The rate of nitrogen removal by denitrification and the overall mass balances of nitrogen and phosphorus were quantified. Factors controlling nutrient removal/retention in the buffer strips were investigated. Both newly planted and mature forested buffer strips were included in this study. Funding by Chesapeake Research Consortium.

93-Ex1 Fish Recruitment in the Northeastern United States: The Role of Estuarine Habitats (Kenneth Able, Sam Wainright, Institute of Marine and Coastal Sciences - Rutgers University, New Brunswick, NJ; Anthony Calabrese, NEFSC, Milford Laboratory, Milford, CT; Anne Studholme, NMFS, James J. Howard Laboratory, Highlands, NJ)
A comprehensive approach was used to identify critical habitats in three northeastern estuaries and to access functional value as nursery areas for young-of-the-year fishes especially winter flounder (*Pleuronectes americanus*) and tautog (*Tautoga onitis*). This project was related to two CMER funded projects (93-01; 96-05). Funding by NOAA Coastal Ocean Program, Estuarine Habitat Research Program.

Table 1. Projects Supported Through Rutgers/NOAA CMER Program (Base Funding & External Funding 1993-2006):

Year	Project No.	Short Title	Investigator	Amount
1993	93-01	Windowpane Flounder Early Life History and Ecology	K. Able[1], W. Morse[2]	$25,041
	93-05	Surf Clam Recruitment	J. Grassle[3]	$17,032
	93-06	Mackerel Quality	T.C. Lee[4],J.Krzynowek[5]	$30,658
	93-08	Toxicity of Dioxins, Furans and PCBs	K Cooper[6], S. McLean[7], A.Studholme[2]	$27,269
	93-Ex1	Estuarine Habitats	K. Able[1], S. Wainright[3] A.Calabrese[8], A.Studholme[2]	$100,000
1994	93-01	Windowpane Flounder Early Life History and Ecology	K. Able[1], W. Morse[2]	$27,480
	93-05	Surf Clam Recruitment	J. Grassle[3]	$33,482
	93-06	Mackerel Quality	T.C. Lee[4],J.Krzynowek[5]	$36,164
	93-08	Toxicity of Dioxins, Furans and PCBs	K Cooper[6], S. McLean[7], A.Studholme[2]	$30,292
	94-03	Pollutant Transfer in an Estuarine Food Chain	G. Taghon[3]	$25,582 (2Yr.award)
	93-Ex1	Estuarine Habitats	K. Able[1],S. Wainright[3], A.Calabrese[8], A.Studholme[2]	$100,000
	94-Ex1	Eutrophication and Dissolved Organic Nitrogen	S. Seitzinger[9] R. Sanders[10]	$150,936
	94-Ex2	Inputs and Cycling of Nutrients in NY/NJ Harbor	S. Seitzinger[9]	$54,140
	94-Ex3	Nitrogen Removal in Riparian Buffer Strips	S. Seitzinger[9],S.Watts[11]	$20,000
1995	93-01	Windowpane Flounder Early Life History and Ecology	K. Able[1], W. Morse[2]	$26,909
	93-05	Surf Clam Recruitment	J. Grassle[3]	$30,731
	93-06	Mackerel Quality	T.C.Lee[4], J.Krzynowek[5]	$36,314
	95-05	Controls on Introduction of Trace Metals to Coastal Marine Food Web	R.Sherrell[3],V.Zdanowicz[2]	$41,046
	95-Ex1	Eutrophication and Dissolved Organic Nitrogen from Non-Point Sources	S. Seitzinger[9],R. Styles[3], R.W. Sanders[10]	$81,336
	95-Ex2	Organic Nitrogen Inputs in Chesapeake Bay Ocean Boundary Water	S. Seitzinger[9], R. DeKorsey[3],R.Sanders[10]	$55,000
	95-Ex3	Multiple Stressors and Ecological Complexity in Coastal Ecosystems	D. Breitburg[12] S. Seitzinger[9]	$24,165

Table 1. Projects Supported Through Rutgers/NOAA CMER Program (Base Funding & External Funding 1993-2006):

Year	Project No.	Short Title	Investigator	Amount
	95-Ex4	Evaluation of the Habitat Value of Man-made Structures in Urban Estuaries	K. Able[1],U. Kils[1], A.Studholme[2],G. Taghon[3]	$239,100
1996	95-05	Controls on Introduction of Trace Metals to Coastal Marine Food Web	R. Sherrell[3] V.Zdanowicz[2]	$28,917
	96-05	Isotopic Turnover Rate and Marginal Growth Increment Validation for Young-of-the-Year Winter Flounder	S. Wainright[3], B. Phelan[2]	$30,788
	96-08	Development of a Hydrodynamic/Fish Recruitment Model of Great Bay-Little Egg Harbor Estuarine System	D. Haidvogel[3], R. Chant[3]	$61,606 (2 Years)
	96-11	CMER Research Experiences for Undergraduates	M. De Luca[3]	$6,590
	95-Ex1	Eutrophication and Dissolved Organic Nitrogen from Non-Point Sources	S. Seitzinger[9],R. Styles[3], R.W. Sanders[10]	$84,510
	95-Ex3	Multiple Stressors and Ecological Complexity in Coastal Ecosystems	D. Breitburg[12] S. Seitzinger[9]	$32,656
	95-Ex4	Evaluation of the Habitat Value of Man-made Structures in Urban Estuaries	K. Able[1], U. Kils[1], A.Studholme[2],G. Taghon[3]	$65,450
	96-Ex1	Denitrification and Microbial Dynamics in Continental Shelf Sediments: Use of in situ Methods	S. Seitzinger[9], L. Kerkhof[3]	$69,343
	96-Ex2	Effects of Fisheries Regulation on the Economic Viability of the Charter and Party Boat Fishing Industry in the Northeast Region of the U.S.	B. McCay[13],S.Steinback[14]	$60,000
1997	97-03	Linkages between Circulation and Distribution of Marine Organisms in a Shallow Well Mixed Estuary: An Observational Approach	Scott Glenn[3] Robert J. Chant[3] Al Stoner[2]	$26,814
	97-04	Environmental Influences on Metamorphosis and Survival in Summer Flounder (*Paralichthys dentatus*)	Kenneth Able[1] Chris Chambers[2]	$24,938
	97-06	Sustaining the Atlantic Sea Scallop Fishery: An Economic Analysis of Consolidating Days-At-Sea	Peter Parks[15] Michael Price[15] James Kirkley[16] Steve Edwards[14]	$31,527
	97-07	Physical Transport of Bivalve Larvae through a Tidal Inlet: Molecular Probe Applications	Judith Grassle[3]	$10,905
	97-08	Research Experiences for Undergraduates – Summer 1998	Michael De Luca[3]	$7,816
	95-EX3	Multiple Stressors and Ecological Complexity in Coastal Ecosystems	D. Breitburg[12] S. Seitzinger[9]	$44,223
	96-EX2	Effects of Fisheries Regulation on the Economic Viability of the Charter and Party Boat Fishing Industry	Bonnie McCay[13] Scott Steinback[14]	$60,000
	97-EX1	Bluefish/Striped Bass Interactions in the Mid-Atlantic Bight - I	Michael DeLuca[3] F. Grassle[3] Kenneth Able[1] Sybil Seitzinger[9]	$442,000
	97-EX2	Essential Fish Habitat	Judith P. Grassle[3]	$73,000

Table 1. Projects Supported Through Rutgers/NOAA CMER Program (Base Funding & External Funding 1993-2006):

Year	Project No.	Short Title	Investigator	Amount
			Waldo Wakefield[3] Richard Lathrop[17] Jeff Cross[2] Anne Studholme[2]	
	97-EX3	Denitrification and Microbial Dynamics in Continental Shelf Sediments: An Annual Study	S. Seitzinger[9] L. Kerkhof[3]	$180,366
	97-EX4	Estuarine Eutrophication: Seasonal Cycle of the Contribution of Dissolved Organic Nitrogen from Non-Point and Point Sources	S. Seitzinger[9] R. Sanders[10]	$61,500
1998	97-04	Environmental Influences on Metamorphosis and Survival in Summer Flounder (*Paralichthys dentatus*)	Kenneth Able[1] Chris Chambers[2]	$25,942
	98-03	Selective Feeding in Post-Larval Winter Flounder	Oscar Schofield[3] Pat Shaheen[3]	$26,196
	98-04	Sustaining the Atlantic Sea Scallop Fishery	Peter Parks[15]	$38,030
	98-05	Research Experiences for Undergraduates	Michael De Luca[3]	$8,532
	95-EX3	Multiple Stressors and Ecological Complexity in Coastal Ecosystems	S. Seitzinger[9] D. Breitburg[12]	$33,508
	97-EX4	Estuarine Eutrophication: Seasonal Cycle of the Contribution of Dissolved Organic Nitrogen	S. Seitzinger[9] R. Sanders[10]	$61,500
	98-EX1	Costs of Surf Clamming and Ocean Quohogging	Bonnie McCay[13]	$60,000
	98-EX2	Bluefish/Striped Bass Interactions in the Mid-Atlantic Bight - II	M. De Luca[3]	$457,000
	98-EX3	Sensors for Direct Observation for use in Stock Assessment	W. Wakefield[3] W. Overholtz[14] W. Gabriel[14]	$15,791
	98-EX4	Composition and Bioavailability of Dissolved Organic Nitrogen in Atmospheric Deposition	S. Seitzinger[9] M. Mazurek[3]	$182,639
	98-EX5	An Initiative to Gain a Regional Perspective on Coastal Eutrophication	S. Seitzinger[9] T. Wiegner[3]	$5,000
	98-EX6	Barnegat Bay National Estuary Program Data Synthesis	Sybil Seitzinger[9] R. Lathrop[17] K.Hunchak-Kariouk[18] R. Nicholson[18] R.E. Hickman[18]	$140,000
1999	99-05	Effects of Bottom Roughness on Surf Clam (*Spisula Solidissima*) Larval Settlement and Recruitment	Judith P. Grassle[3] Shannon G. Newby[3]	$30,612
	99-06	Fish Movements in the Dynamic Ecoscape of a Shallow Flood Dominated Estuary	Robert J. Chant[3] Al Stoner[2]	$28,409

Table 1. Projects Supported Through Rutgers/NOAA CMER Program (Base Funding & External Funding 1993-2006):

Year	Project No.	Short Title	Investigator	Amount
	99-08	Use of Stable-Isotope Ratios to Track Changes in Feeding Behavior of Larval and Juvenile Flatfish	Sam Wainright[3] Keith Bosley[3] Chris Chambers[2]	$30,589
	99-10	Research Experiences for Undergraduates	Michael De Luca[3]	$10,390
	95-EX3	Multiple Stressors and Ecological Complexity in Coastal Ecosystems	S. Seitzinger[9] D. Breitburg[12]	$12,581
	97-EX4	Estuarine Eutrophication: Seasonal Cycle of the Contribution of Dissolved Organic Nitrogen	S. Seitzinger[9] M. Mazurek[3]	$61,500
	99-EX1	Bluefish/Striped Bass Interactions in the Mid-Atlantic Bight - III	M. De Luca[3]	$457,000
	99-Ex2	Bottom Habitat Classification and Mapping of the New York Bight	Richard Lathrop[17]	$30,000
	98-EX4	Composition and Bioavailability of Dissolved Organic Nitrogen in Atmospheric Deposition	S. Seitzinger[9] M. Mazurek[3]	$87,382
2000	99-05	Effects of Bottom Roughness on Surf Clam (*Spisula solidissima*) Larval Settlement and Recruitment	J. Grassle[3] S. Newby[3]	$30,136
	99-06	Fish Movements in the Dynamic Ecoscape of a Shallow Flood Dominated Estuary	R. Chant[3] A. Stoner[2]	$6,106 (plus $25,634 fr. 99-Ex1)
	99-10	CMER Research Experiences for Undergraduates	M. DeLuca[3]	$1,837
	00-01	Essential Fish Habitat for Young-of-the-Year Goosefish (*Lophius americanus*) in the Middle Atlantic Bight	K.W. Able[1] C. Chambers[2]	$28,921
	95-Ex3	The Importance of Understanding Ecological Complexity to Predicting Effects of Multiple Stressors on Coastal Systems	S. Seitzinger[9] D. Breitburg[12]	$5,303
	98-Ex4	Composition and Bioavilability of Dissolved Organic Nitrogen in Atmospheric Deposition	S. Seitzinger[9] M. Mazurek[3]	$29,980
	99-Ex1	Bluefish/Striped Bass Interactions in the Mid-Atlantic Bight - IV	M. DeLuca[3]	$550,000
	99-Ex2	Bottom Habitat Classification and Mapping of the New York Bight	R. Lathrop[17]	$30,000
	00-Ex1	Model Development and Chemical Characterization of Bioavailable Nitrogen Loading to Coastal Ecosystems	S. Seitzinger[9] M. Mazurek[3]	$61,605
2001	00-01	Essential Fish Habitat for Young-of-the-Year Goosefish (*Lophius americanus*) in the Middle Atlantic Bight	K. Able[1] C. Chambers[2]	$33,125
	01-02	Spatial Dimensions of Fisheries and Their Implications for Property Rights Alternatives: A Case Study of Three Major Scalloping Areas	K. St.Martin[19] B. McCay[13]	39,564
	01-04	CMER Research Experiences for Undergraduates	M. DeLuca[3]	$12,046
	01-05	Biotic interactions Between Bluefish and Associated Piscivorous Predators: A Comparison of Habitat Use, Movements, Distribution and Growth	K. Able[1]	$40,265
	01-EX3	Bluefish/Striped Bass Interactions in the Mid-Atlantic Bight - V	M. DeLuca[3]	$798,000

Table 1. Projects Supported Through Rutgers/NOAA CMER Program (Base Funding & External Funding 1993-2006):

Year	Project No.	Short Title	Investigator	Amount
	01-EX1	Recreational Fishing and National Standard 8	K. St.Martin[19] B. McCay[13] Peter Parks[15]	$75,000
	01-EX2	Fishing Communities of the Mid-Atlantic	B. McCay[13]	$100,000
	00-EX1	Model Development and Chemical Characterization of Bioavailable Nitrogen Loading to Coastal Ecosystems	S. Seitzinger[9] M. Mazurek[3]	$66,576
	01-EX4	Chemical Composition and Bioavailability of Dissolved Organic Nitrogen in Atmospheric Wet Deposition from Urban and Rural New Jersey Sites	S. Seitzinger[9] M. Mazurek[3]	$100,000
	01-EX5	Biocomplexity: The Roles of Resources, Competition and Predation in Microbial Degradation of Organic Matter.	G.Taghon[3], L. Young[20] S. Seitzinger[9] and others	$29,733 (Seitzinger portion only)
2002	02-02	CMER Research Experience for Undergraduates	M. DeLuca[4]	$15,640
	02-03	Effects of Bottom Roughness on Surf Clam (Spisula) Predation by Crustaceans	J. Grassle[1]	$31,967
	02-04	Manganese in Lobsters as an Indicator of Hypoxia-Induced Stress.	R. Sherrell[1]/A. Draxler[2]	$56,860
	01-EX5	Biocomplexity: The Roles of Resources, Competition and Predation in Microbial Degradation of Organic Matter.	G.Taghon[3], L. Young[20] S. Seitzinger[9] and others	$81,002 (Seitzinger portion only)
	02-EX1	Bluefish/Striped Bass Interactions in the Mid-Atlantic Bight - VI	M. DeLuca[4]	$827,000
	02-EX2	Chemical Composition and Bioavailability of Dissolved Organic Nitrogen in Atmospheric Wet Deposition from Urban and Rural New Jersey Sites	S. Seitzinger[9], H. Hartnett[3]	$100,000
	02-EX3	Continuing Studies: Model Development and Chemical Characterization of Bioavailable Nitrogen Loading to Coastal Ecosystems	S. Seitzinger[9], H. Hartnett[3]	$58,000
	02-EX4	Biotechnological Investigations/Ocean Margins Program	L. Kerkhof[3], S. Seitzinger[9], H. Hartnett[3] and others.	$30,000 (Seitzinger portion only)
2003	02-04	Manganese in Lobsters as an Indicator of Hypoxia-Induced Stress.	R. Sherrell[1]/A. Draxler[2]	$50,833
	03-01	Effects of Trophic Transfer of Contaminants in YOY Bluefish	J. Weiss[21]	$37,128
	03-03	Sea Scallop Population Dynamics Under a Management Strategy Featuring Closed Areas	J. Quinlan[3], Wilkin, Hart	$40,625
	01-EX5	Biocomplexity: The Roles of Resources, Competition and Predation in Microbial Degradation of Organic Matter.	G.Taghon[3], L. Young[20] S. Seitzinger[9] and others	$81,002 (Seitzinger portion only)
	02-EX2	Chemical Composition and Bioavailability of Dissolved Organic Nitrogen in Atmospheric Wet Deposition from Urban and Rural New Jersey Sites	S. Seitzinger[9], H. Hartnett[3]	$50,000
	02-EX3	Continuing Studies: Model Development and Chemical Characterization of Bioavailable Nitrogen Loading to Coastal Ecosystems	S. Seitzinger[9], H. Hartnett[3]	$58,000
	03-Ex1	Bluefish/Striped Bass Interactions in the Mid-Atlantic Bight – VII	M. DeLuca[3]	$821,600

Table 1. Projects Supported Through Rutgers/NOAA CMER Program (Base Funding & External Funding 1993-2006):

Year	Project No.	Short Title	Investigator	Amount
	03-Ex2	Development of a Supplemental Finfish Survey Targeting Mid-Atlantic Migratory Species	E. Powell[22]	$50,084
	03-Ex3	Workshop on N_2 Production from Denitrification	E. Davidson[23] , S. Seitzinger[9]	$36,000
	03-Ex4	Workshop on Advanced Approaches to Quantify Denitrification	E. Davidson[23], S. Seitzinger[9]	$29,964
	03-Ex5	Secondary and Regional Contributions to Organic PM: A Mechanistic Investigation of Organic PM in the Eastern and Southern United States	Barbara Turpin[20], S. Seitzinger[9], and Ho-Jin Lim[20]	$35,000 (Seitzinger portion only)
	03-Ex6	Understanding the Changing Carbon, Nitrogen and Water Cycles in the Earth System	Berrien Moore[24] , S. Seitzinger[9] , Charles Vorosmarty[24], and others	$30,000 (Seitzinger portion only)
	03-Ex7	Development of Models Relating Land Use to Nutrient Inputs to Coastal Systems	S. Seitzinger[9]	$37,000
2004	03-01	Effects of Trophic Transfer of Contaminants in YOY Bluefish	J. Weiss[21]	$38,558
	03-03	Sea Scallop Population Dynamics Under a Management Strategy Featuring Closed Areas	J. Quinlan[3], Wilkin, Hart	$39,526
	04-02	Evaluating Essential Shellfish Habitat (EFH) of Hard Clams, *Mercenaria mercenaria*, during Larval Settlement and Early Recruitment	J. Grassle[3]	$36,931
	04-06	Research Experience for Undergraduates, Summer 2004	M. DeLuca[3]	$15,000
	01-EX5	Biocomplexity: The Roles of Resources, Competition and Predation in Microbial Degradation of Organic Matter.	G.Taghon[3], L. Young[20] S. Seitzinger[9] and others	$81,002 (Seitzinger portion only)
	03-Ex5	Secondary and Regional Contributions to Organic PM: A Mechanistic Investigation of Organic PM in the Eastern and Southern United States	Barbara Turpin[20], S. Seitzinger[9], and Ho-Jin Lim[20]	$35,000 (Seitzinger portion only)
	03-Ex6	Understanding the Changing Carbon, Nitrogen and Water Cycles in the Earth System	Berrien Moore[24] , S. Seitzinger[9] , Charles Vorosmarty[24], and others	$30,000 (Seitzinger portion only)
	04-Ex1	Bluefish/striped Bass Interactions in the Mid-Atlantic Bight VIII	M. DeLuca[3]	$789,976
	04-Ex2	Brown Tide Blooms in Coastal Waters of New Jersey Importance of Dissolved Organic Matter in Stimulating Growth	S. Seitzinger[9], P. Glibert	$81,329
	04-Ex3 (03-Ex7)	Development of Models Relating Land Use to Nutrient Inputs to Coastal Systems	S. Seitzinger[9]	$37,000
2005	04-02	Evaluating Essential Shellfish Habitat (EFH) of Hard Clams, *Mercenaria mercenaria*, During Larval Settlement and Early Recruitment (Yr2)	J. Grassle[3]	$47,039
	04-07	Research Experience for Undergraduates, Summer 2005	M. DeLuca[3]	$12,000
	05-02	Are Sand Ridges on the Inner Continental Shelf Essential Fish Habitat? Evaluating the Potential Effects of Habitat Alterations (Yr1)	K. Able[1]	$38,867
	05-04	Research Experience for Undergraduates, Summer 2006	M. DeLuca[3]	$12,000
	05-EX1	Bluefish Research Along the Atlantic Coast (Bluefish IX)	M. DeLuca[3]	$762,293
	05-EX2	Western Atlantic Bottlenose Dolphins, Tursiops truncatus Stock Identification and Conservation Management	K. Able[1]	$29,045

Table 1. Projects Supported Through Rutgers/NOAA CMER Program (Base Funding & External Funding 1993-2006):

Year	Project No.	Short Title	Investigator	Amount
		in the Middle Atlantic Bight		
	05-EX3	Research Coordination Network: Denitrification – Integrating Landscapes and Waterscapes	S. Seitzinger[9]	$100,000
	05-EX4	Promoting Ecosystem-based Approach to Fisheries Conservation and Management in Eutrophication – Filling Gaps by Nitrogen Loading Forecasts to LME's	S. Seitzinger, Kenneth Sherman	$75,000
	03-Ex5	Secondary and Regional Contributions to Organic PM: A Mechanistic Investigation of Organic PM in the Eastern and Southern United States	Barbara Turpin[20], S. Seitzinger[9], and Ho-Jin Lim[20]	$35,000 (Seitzinger portion only)
	03-Ex6	Understanding the Changing Carbon, Nitrogen and Water Cycles in the Earth System	Berrien Moore[24] , S. Seitzinger[9] , Charles Vorosmarty[24], and others	$30,000 (Seitzinger portion only)
	04-Ex2	Brown Tide Blooms in Coastal Waters of New Jersey Importance of Dissolved Organic Matter in Stimulating Growth	S. Seitzinger[9], P. Glibert	$81,329
	04-Ex3	Development of Models Relating Land Use to Nutrient Inputs to Coastal Systems	S. Seitzinger[9]	$37,000
2006	05-02	Are Sand Ridges on the inner Continental shelf essential fish habitat? Evaluating the potential effects of habitat alterations (Yr2)	K. Able[1]	$44,792
	03-Ex6	Understanding the Changing Carbon, Nitrogen and Water Cycles in the Earth System	Berrien Moore[24] , S. Seitzinger[9] , Charles Vorosmarty[24], and others	$20,250 (Seitzinger portion only)
	05-EX2	Western Atlantic Bottlenose Dolphins, Tursiops truncatus Stock Identification and Conservation Management in the Middle Atlantic Bight	K. Able[1]	$29,045
	05-EX3	Research Coordination Network: Denitrification – Integrating Landscapes and Waterscapes	S. Seitzinger[9]	$100,000
	05-EX4	Promoting Ecosystem-based Approach to Fisheries Conservation and Management in Eutrophication – Filling Gaps by Nitrogen Loading Forecasts to LME's	S. Seitzinger, Kenneth Sherman	$89,000
	06-Ex1	Bluefish Research Along the Atlantic Coast (Bluefish X)	M. Kennish[1]	$758,743
	06-Ex2	Measuring and Modeling Nutrient Uptake in Florida Bay	S. Seitzinger[9]	$59,000

[1]Rutgers University, Marine Field Station, Tuckerton, NJ
[2]NMFS, James J. Howard Laboratory, Highlands, NJ
[3]Rutgers University, Institute of Marine and Coastal Sciences, New Brunswick, NJ
[4]Rutgers University, Dept.of Food Science, the Fisheries and Aquaculture TEX Center and the Center for Advanced Food Technology, New Brunswick, NJ
[5]NMFS, Gloucester Laboratory, Gloucester, MA
[6]Rutgers University, Dept. of Biochemistry and Microbiology and Joint Program in Toxicology, Environmental Occupational Health Sciences Center, Piscataway, NJ
[7]NEFSC, Narragansett Laboratory, Narragansett, RI
[8]NMFS, Milford Laboratory, Milford, CT
[9]Rutgers/NOAA CMER Program, Institute of Marine and Coastal Sciences, New Brunswick, NJ
[10]Temple University, Department of Biology, Philadelphia, PA (formerly at Philadelphia Academy of Natural Sciences)
[11]Rutgers University, Environmental Sciences, Camden, NJ
[12]Philadelphia Academy of Natural Sciences, Benedict Estuarine Research Lab, St. Leonards, MD
[13]Rutgers University, Department of Human Ecology, New Brunswick, NJ
[14]NMFS, Woods Hole, MA
[15]Rutgers University, Department of Agricultural Economics and Marketing, New Brunswick, NJ
[16]College of William and Mary, Virginia Institute of Marine Science, School of Marine Science, Gloucester Point, VA
[17]Rutgers University, Ecology, Evolution & Natural Resources, New Brunswick, NJ
[18]USGS, Water Resources Division, Trenton, NJ
[19]Rutgers University, Department of Geography, New Brunswick, NJ
[20]Rutgers University, Environmental Sciences, New Brunswick, NJ

[21]Rutgers University, Biological Sciences, Newark, NJ
[22]Rutgers Haskin Shellfish Research Lab, Port Norris, NJ
[23]Woods Hole Research Center, Woods Hole, Mass
[24]Institute of Earth, Oceans, and Space, University of New Hampshire, Durham, NH

Table 2. Participation of Faculty and Students in CMER Projects (1993-2006):

Project No.	Short Title	Faculty (Department)	Student/Degree Sought/Program
93-01	Windowpane Flounder	K. Able[1]	Melissa Neuman/Ph.D. (1999) Ecology & Evolution
93-05	Surf Clam Recruitment	J. Grassle[1]	Marnita Chintala/M.S. (1997) Ecology & Evolution Eric Weissberger/Ph.D. (1998) Ecology & Evolution Hongguang Ma/M.S. (1997) & Ph.D. (2001) Oceanography Gregg Kessler/undergraduate Honors Student Pia Rivera/undergraduate Janice Bell/Post-doc
93-06	Mackerel Quality	T.C. Lee[2]	Hui-Zhen Zhang/Ph.D. Food Science H. Liu/M.S. (1995)
93-08	Toxicity of Dioxins, Furans and PCBs	K. Cooper[3]	Claudia Olivieri/Ph.D. (1996) Environmental Science S. Longo/M.S. (1995) Toxicology C.M. Chen/Ph.D. (1994) Toxicology M. Kim/Ph.D. (1998) Environmental Science
94-03	Pollutant Transfer	G. Taghon[1]	Ann Schnitz/Ph.D. (1997) Environmental Science
95-05	Assimilation of Metals	R. Sherrell[1]	Yuan Gao/Post-doc J. Cullen/Ph.D. (2001) Oceanography K. Metzger/B.S. (1998)
95-Ex3	Multiple Stressors	S. Seitzinger[7]	T. Wiegner/Ph.D. (2001) Oceanography A. Laursen/Post-doc
96-05	Isotopic Turnover Rate	S. Wainright[1]	Keith Bosley/M.S. (1997) Environmental Sci.
96-08	Hydrodynamic/Fish Recruitment Model	D. Haidvogel[1]	Robert Chant/Post-doc
97-03	Circulation and Distribution of Marine Organisms	S. Glenn[1]	Robert Chant/Post-doc Mary Carla Curran/Post-doc
97-04	Summer Flounder	K. Able[4]	Stephanie Barbeau/M.S., Ecology & Evolution
97-06	Sea Scallop Fishery	P. Parks[5]	Michael Price/M.S. (1998) Agric. Econ. & Mktg.
97-07	Physical Transport of Bivalve Larvae through a Tidal Inlet: Molecular Probe Applications	J.P. Grassle[1]	Chris Gregg/Ph.D. (2002) Oceanography
97-08	Research for Undergraduates	M. De Luca[1]	Geoffrey Bell/B.S. Michelle Walsh/B.S.
98-03	Winter Flounder	O. Schofield[1]	P. Shaheen/Ph.D., Oceanography
98-05	Research for Undergraduates	M. De Luca[1]	L. Annicchiarico/B.S. K. Tsakiris/B.S.
98-Ex1	Costs Surf-clamming	B. McCay[6]	J. O'Neil/non-degree, Human Ecology S. Brandt/Ph.D., Dept. of Agricultural & Resource Economics, University of California, Berkeley, Fall 2001
98-Ex4	Atmospheric Deposition	S. Seitzinger[7] M. Mazurek[1]	M. Deritter/B.S.
98-Ex5	Regional Eutrophication	S. Seitzinger[1]	T. Wiegner/Ph.D (2001) Oceanography
99-05	Surf Clam Larval Recruitment	J. Grassle[1]	S. Newby/Ph.D., Oceanography
99-06	Fish Movement Shallow Estuary	R. Chant[1]	R. Styles/Post-Doc J. Manderson/Graduate student, UMass Amherst C. Haldeman/Undergraduate, Oceanography

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Project No.	Short Title	**Faculty** (Department)	**Student/Degree Sought/Program**
			C. Esposito/Undergraduate, Oceanography
99-Ex2	Mapping Bottom Type as Part of the New York Bight Apex Sea Floor Mapping Project	R. Lathrop[8]	N. Senyk/Undergraduate Thesis, May 2001
00-01	Essential Fish Habitat for YOY Goosefish	K. Able[4] C. Chambers[10]	P. Clarke/Undergraduate
00-Ex2	Fishing Communities of the Mid-Atlantic	B. McCay[6] K. St. Martin[9]	J. Lamarque/Ph.D., Anthropology, Rutgers Univ. K. Albert,/Ph.D.Geography, Rutgers Univ. T. Johnson/Ph.D. Ecology and Evolution, Rutgers, Univ G. Graziosi,/Ph.D.Geography, Rutgers Univ. S. Baskind/Ph.D. Antropology, Rutgers Univ. S. Takahashi/Ph.D., Antrhopology, Rutgers Univ. K. Broskey/ Undergraduate, Rutgers Univ.
01-02	Spatial Dimensions of Fisheries and Property Rights Alternatives	K. St. Martin[9] B. McCay[6]	G. Graziosi/Ph.D. Dept. of Geography, Rutgers Univ.
01-04	Research Experience for Undergraduates	M. DeLuca[1]	D. Shrump/ Undergraduate, Rutgers Univ. F. Flores/Undergraduate, Rutgers Univ. J. Siclare/Undergraduate, St. Joseph's Univ. Philadelphia
01-Ex1	Recreational Fisheries and National Standard 8	K. St. Martin[9]	T. Johnson/Ph.D. Ecology and Evolution, Rutgers, Univ.
01-Ex3	Bluefish/Striped Bass Interactions in the Mid-Atlantic Bight V	Cynthia M. Jones[11] Christian s. Reiss[11]	Eric M. Robillard, MS Oceanography, Old Dominion Univ., Virginia. Grad. May 2005
01-Ex3	Bluefish/Striped Bass Interactions in the Mid-Atlantic Bight V	Cheryl Wilga[12]	Tony Wood, Ph.D. program Univ. Rhode Island Biological Oceanography, Grad. School of Oceanography
01-Ex3	Bluefish/Striped Bass Interactions in the Mid-Atlantic Bight V	Thomas Lankford [16] Jeffrey Buckel [17]	James W. Morley, M.S. Fisheries and Wildlife, N.C. State Univ., Joshua Slater, M.S. Marine Science 2004, UNC, Wilmington, N.C.
01-Ex3	Bluefish/Striped Bass Interactions in the Mid-Atlantic Bight V	Timothy Essington[18]	John Wiedenman, M.S. 2004, University of Washington, School of Aquatic and Fisher Science, Seattle, Washington.
02-02	Research Experience for Undergraduates	M. DeLuca[1]	Holly Jantz, Katie Kovitvongsa, and Kyle Kingman, Rutgers University
02-03	Effects of Bottom Roughness on Surf Clam (*Spisula*) predation by crustaceans	J. Grassle[1]	S. Newby/Ph.D., Oceanography, Rutgers University
02-04	Manganese in Lobsters as an indicator of hypoxia-induced stress.	R. Sherrell[1]/A. Draxler[10]	Michele LaVigne (special student, between undergrad and grad school), Rutgers, University Anne-Sophie Jimonet, Rutgers chem. major, grad. May 2004.
02-Ex1	Bluefish/Striped Bass Interactions in the Mid-Atlantic Bight VI	David Conover[13]	Lora Clarke, PhD; Amy Fenwick, M.S. program; John Maniscalco, K. Dutton, MS thesis (for 2005) MS. Program Stony Brook University
02-Ex1	Bluefish/Striped Bass Interactions in the Mid-Atlantic Bight VI	Francis Juanes[14]	Peter Clarke, M.S. Wildlife and Fisheries Conservation, U. Mass
02-Ex1	Bluefish/Striped Bass Interactions in the Mid-Atlantic Bight VI	David Secor[19]	Lynn Takata, M.S. 2004; Jody Callihan, current M.S. Student, University of Maryland
02-Ex2	Chemical Composition and Bioavailability of DON in Atmospheric Wet Deposition from Urban and Rural New Jersey Sites	S. Seitzinger[7]	Georgina Spyres, Post-Doc, Rutgers, University

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03-01	Effects of trophic transfer of contaminants in YOY bluefish	J. Weiss[15]	Allison Candelmo, Graduate student, Oceanography, Rutgers University
03-03	Sea Scallop Population Dynamics Under a Management Strategy Featuring Closed Areas	J. Quinlan[1]	Grant Law, PhD candidate, Oceanography, IMCS, Rutgers University
03-Ex1	Bluefish/Striped Bass Interactions in the Mid-Atlantic Bight – VII	M. DeLuca[3]	Clare Ng, Masters, Graduate Program in Ecology, Evolution, and Natural Resources, Rutgers University, Dana Rowles, Graduate program of Oceanography, Rutgers University, Fernando Fuentes, Undergraduate, Rutgers University, Alicia Manoski, Undergraduate, Rutgers University, Paide Roberts, Undergraduate, Rutgers University, and Rachel Sargent Undergraduate, Rutgers University, Jody Callihan, Masters, Graduate, University of Maryland, Ryan Woodland, PhD Candidate, University of Maryland, Tony Wood, PhD. Student, Graduate School of Oceanography, University of Rhode Island, Jocelyne Dolce, Undergraduate, Rutgers University, Mike Smith, Undergraduate, Rutgers University, Jason Ramsay, Undergraduate, Rutgers University
03-Ex5	Secondary and regional contributions to organic PM.	S. Seitzinger[7]	K. Altieri, Undergraduate, Rider University (2003) Graduate, PhD. Student Oceanography Rutgers University
03-Ex6	Understanding the Changing Carbon, Nitrogen and Water Cycles in the Earth System	Berrien Moore[24] , S. Seitzinger[9] , Charles Vorosmarty[24], and others	John Harrison, Post-Doc, Rutgers University Rosalynn Lee, Post-Doc, Rutgers University
03-Ex7 04-Ex7	Development of models relating land use to nutrient inputs to coastal systems	S. Seitzinger[7]	John Harrison, Post-Doc, Rutgers University Weihan Chan, Undergraduate, Rutgers University (2004) Rosalynn Lee, Post-Doc, Rutgers University
04-02	Evaluating essential shellfish habitat (EFH) of hard clams, *Mercenaria mercenaria*, during larval settlement and early recruitment	J. Grassle[1]	Di Li, an M.S. graduate student in the Ecology and Evolution Graduate Program, Rutgers University
04-06	Research experience for undergraduates, summer 2004	M. DeLuca[1]	Caroline Chu (Vince Guida, NOAA mentor) Mari Rosa (Chris Chambers, NOAA mentor) Nicole La Sota (Beth Phelan and John Manderson, NOAA mentors)
04-07	Research experience for undergraduates, summer 2005	M. DeLuca[1]	Lindsay Church (Chris Chambers, NOAA mentor) Kira Dacanay (John Quinlan/John Manderson NOAA Mentors) Greg Glassner (Vince Guida, NOAA mentor)
04-Ex1	Bluefish/striped Bass Interactions in the Mid-Atlantic Bight VIII	M. DeLuca[3]	Jody Callihan, Masters, Graduate, University of Maryland, Ryan Woodland, PhD Candidate, University of Maryland, John Murt Masters Graduate, Rutgers University, Alicia Manoski, Undergraduate , Rutgers University
04-Ex2	Brown Tide Blooms in Coastal Waters of New Jersey: Importance of Dissolved Organic Matter in Stimulating Growth	S. Seitzinger[7]	Rachel Sipler, PhD candidate, Oceanography, Rutgers University.Jean Paul Simjouw Post-Doc, Rutgers University
05-EX1	Bluefish Research Along the Atlantic Coast (Bluefish IX)	M. DeLuca[3]	Walter Burak, Masters, Graduate Program, Rutgers University, Damien Drisco, Masters, Graduate Program, Rutgers University, Santiago Salinas, Masters, Graduate Program, Rutgers University. John Murt, Masters

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			Graduate, Rutgers University, James W. Morley, PhD Candidate, Rutgers University, Adam Branson, Masters, Graduate Program, Rutgers University, Jody Callihan, Masters, Graduate, University of Maryland, Ryan Woodland, PhD Candidate, University of Maryland
05-Ex2	Bottlenose Dolphins Stock Assessment in the Mid-Atlantic Bight	K. Able[4]	Jacalyn Toth, Masters, Graduate Program in Ecology and Evolution, Rutgers University
05-Ex3	Research Coordination Network: Denitrification – Integrating Landscapes and Waterscapes	S. Seitzinger[7]	Rosalynn Lee Post-Doc, Rutgers University
05-04	Research experience for undergraduates, summer 2006	M. DeLuca[1]	Carla Scocchi (Chris Chambers, NOAA mentor) Lauren Rizzo (John Manderson, NOAA Mentor) Brittney Hunt (Vince Guida, NOAA mentor)
05-02	Are Sand Ridges on the inner Continental shelf essential fish habitat? Evaluating the potential effects of habitat alterations	K. Able[4]	James M. Vasslides, Masters, Graduate Program in Ecology and Evolution, Rutgers University
06-Ex2	Measuring and Modeling Nutrient Uptake in Florida Bay	S. Seitzinger[7]	R. Sipler, PhD Candidate, Rutgers University
05-Ex4	Promoting Ecosystem-based Approach to Fisheries Conservation and Management in Eutrophication – Filling Gaps by Nitrogen Loading Forecasts to LME's	S. Seitzinger[7]	Rosalynn Lee Post-Doc, Rutgers University
06-Ex1	Bluefish Research Along the Atlantic Coast (Bluefish X)	M. Kennish[1]	Walter Burak, Masters, Graduate Program, Rutgers University, Damien Drisco, Masters, Graduate Program, Rutgers University

[1] Rutgers University, Institute of Marine and Coastal Sciences
[2] Rutgers University, Department of Food Science
[3] Rutgers University, College of Pharmacy
[4] Rutgers Marine Field Station, Tuckerton
[5] Rutgers University, Department of Agri. Econ. & Mktg.
[6] Rutgers University, Human Ecology Department
[7] Rutgers/NOAA CMER Program, Institute of Marine and Coastal Sciences, New Brunswick, NJ
[8] Rutgers/Grant F. Walton Center for Remote Sensing & Spatial Analysis
[9] Rutgers University, Department of Geography, New Brunswick, NJ
[10] NMFS, James J. Howard Laboratory, Highlands, NJ
[11] Old Dominion University, Center for Quantitative Ecology, Va
[12] University of Rhode Island, Biological Sciences Department, Rhode Island
[13] Stony Brook University, Marine Sciences Department, Stony Brook, NY
[14] University of Massachusetts, Department of Natural Resources Conservation, Mass.
[15] Rutgers University, Biology Department, Newark, NJ
[16] University of North Carolina, Wilmington
[17] North Carolina State University
[18] University of Washington, School of Aquatic and Fishery Sciences, Seattle, Washington
[19] University of Maryland