

**2001 ANNUAL REPORT AND  
STATEMENT OF PROGRAM DIRECTION  
URI/NOAA CMER PROGRAM**

**UNIVERSITY OF RHODE ISLAND  
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*URI/NOAA Cooperative  
Marine Education and Research Program*

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**URI/NOAA Cooperative  
Marine Education and Research Program**

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**ANNUAL REPORT AND STATEMENT OF PROGRAM DIRECTION - 2001**

**EXECUTIVE SUMMARY**

Now in its thirteenth year, the URI/NOAA Cooperative Marine Education and Research (CMER) Program was established under the aegis of a cooperative agreement between the University of Rhode Island (URI) and the National Oceanic and Atmospheric Administration (NOAA). The CMER program was built upon a long history of cooperation between these institutions. The program offers enhanced opportunities to jointly accomplish NOAA mission-oriented research and University mandates in graduate education, research and outreach.

Through October 2001, cooperative projects supported by the URI/NOAA CMER Program have totaled 7.5 million dollars (Tables 1 and 2). The program receives base funding from the National Marine Fisheries Service (NMFS), Northeast Fisheries Science Center (NEFSC). Additional funds are contributed to the URI/NOAA CMER Program from a variety of sources within and outside NEFSC to support specific research projects.

Graduate education and research are at the core of the URI/NOAA CMER Program. Faculty and students in ten University departments have participated in CMER funded research projects, including more than 80 graduate students (Table 3). NOAA employees have taught numerous university courses, served as chairs and members of graduate student committees, and participated as co-principal investigators on numerous CMER funded projects. Other NOAA employees have taken a wide range of course offerings and have been awarded graduate degrees at the University.

URI/NOAA CMER Program funding has brought expertise in a broad range of disciplines, including marine biology, statistics, remote sensing, economics, natural resource science, molecular biology, engineering, political science, sociology and marketing, to bear on critical problems of marine science and resource management. In 2001 alone, the URI/NOAA CMER Program supported six research projects totaling \$722,279.

## **INTRODUCTION**

The Cooperative Marine Education and Research (CMER) Program was established in early 1989 under the aegis of a cooperative agreement between the University of Rhode Island (URI) and the National Oceanic and Atmospheric Administration (NOAA). The CMER program was built upon a long history of cooperation between these institutions. The CMER program is intended to foster enhanced interactions between all elements of NOAA and URI; 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. Now in its twelfth year, 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 URI/NOAA CMER Program. Faculty and students in ten University departments have participated in CMER funded research projects. The CMER program has provided partial support to more than 80 graduate students since 1989 (Table 3). More than half of these students have completed their degree programs. A partial list of students supported by the CMER program is provided in Table 4. Numerous student volunteers have participated in NOAA research cruises and assisted in research underway at NOAA laboratories.

The CMER program is a truly cooperative program with all parties contributing towards the objectives of the program. This cooperation can take many forms ranging from both URI and NOAA scientists serving as co-principal investigators, to sharing computing, laboratory and aquarium facilities, to exchange of data and specimens, to joint cruises. A coordinating committee, consisting of two University representatives and two NOAA representatives, determines program direction and funding priorities. Two NMFS employees, one with an adjunct faculty appointment, are stationed on the campus of URI in the Graduate School of Oceanography and the Department of Fisheries, Animal and Veterinary Science (Table 5). Several additional NEFSC scientists have adjunct faculty appointments at URI (Table 5). NOAA CMER staff have taught several university courses (Table 6), served as chairs and members of graduate student committees (Table 7), and participated as co-principal investigators on numerous CMER funded projects (Table 2).

As of October 2001 cooperative projects supported through the URI/NOAA CMER Program have totaled 7.5 million dollars (Table 1). A summary of URI/NOAA CMER projects funded since 1989 is provided in Table 2. These projects have involved a wide variety of disciplines and topic areas. About 41% of the projects have addressed aspects of the biology and life history of estuarine and marine organisms (Figure 1). Remote sensing research has accounted for 13% of the projects funded. Studies of the effects of contaminants on marine organisms, and fishery statistics and engineering have accounted for 8% and 14% of funded projects respectively. Resource economics and fisheries product development together made up 11% of funded projects. Ecosystem analysis accounted for 12% of the project. Partial listings of publications and presentations supported by the URI/NOAA CMER Program funding are provided in Appendices I and II to this annual report. Requests for reprints or information on individual research projects should be directed to the principal investigators.

Several URI/NOAA CMER Program projects have been jointly funded by other agencies, particularly the Sea Grant Program. Still other projects, initiated under the URI/NOAA CMER Program, have been continued and expanded with funding received directly from other agencies. In either case,

funds made available through the CMER program are leveraged to support a broad range of research into questions important to the effective management of marine resources.

### **PROJECTS SUPPORTED WITH 2001 BASE FUNDS**

Base funding for the CMER program is provided by NOAA through the Northeast Fisheries Science Center. In 2001, there were two continuing projects on base funding. Continuing work under multiyear projects receives the highest priority for funding, given satisfactory performance in the preceding year. This policy helps to insure continuity of support to graduate students.

Priorities for allocation of base funds are set by the URI/NOAA CMER Coordinating Committee, composed of the URI Dean of the Graduate School of Oceanography, the Director of the URI Agricultural Experiment Station, the Director of the Office of Science and Technology (NMFS), and the Science and Research Director of the Northeast Fisheries Science Center (NMFS). A listing of projects supported with 2001 base funds follows. Both are continuations of projects begun in 2000.

#### **“Market Information and Fisheries Management”**

Cathy R. Wessells, Resource Economics, URI

This project is intended to; (1) estimate wholesale demand for Northeastern groundfish species, taking into account the fact that groundfish products compete in an increasingly global market, (2) calculate changes in producer and consumer welfare as a result of changes in fisheries management policies, (3) analytically describe changes in consumption of fisheries products, and (4) utilize cointegration techniques to investigate the relationships between prices in different markets providing insight into how U.S. products compete with similar products from other countries.

#### **“The Use of Microsatellite DNA to Discriminate Stocks of Tautog”**

Terence M. Bradley, Fisheries, Animal and Veterinary Science, URI

Population structure of the tautog, a commercial and recreational species on the Atlantic coast, has not yet been determined. The lack of such information limits the ability of fisheries managers to develop effective plans for sustainable harvest of the resource. One of the more effective approaches for discrimination of stocks of fish is the analysis of microsatellite DNA. The principal investigators will develop DNA microsatellite markers to assess the population genetics of tautog. Tri- and tetranucleotide microsatellite markers will be obtained by construction and screening of a phage genomic library. Following validation of the markers, tissues will be collected from tautog at a variety of locations and assayed for microsatellite loci to provide information on population structure. The proposed research will provide the data and tools required for more effective management of tautog.

### **PROJECTS SUPPORTED WITH 2001 CONTRIBUTED FUNDS**

In addition to the base funds provided by the Northeast Fisheries Science Center, funds were contributed to the URI/NOAA CMER Program to support specific research projects. These funds come from a variety of sources within and outside the Northeast Fisheries Science Center. Many of the projects supported with contributed funds in 2001 were continuations or extensions of projects funded in previous years. All projects in this category were approved by the URI/NOAA CMER Program Coordinating Committee for inclusion in the Program.

**“US GLOBEC: Abundance and Distribution of Zooplankton on Georges Bank”**

Edward Durbin, Graduate School of Oceanography, URI

This is a continuation of a planned multiyear study of the underlying physical and biological processes that control the population dynamics of key target species, including cod and haddock larvae and the copepods *Calanus finmarchicus* and *Pseudocalanus* spp. The objective of the present project is to measure the distribution of zooplankton on Georges Bank and in adjacent waters during January to June of each year between 1995 and 1999. The investigators will continue to process samples from 1999 and earlier broad-scale cruises.

**“Maintenance, Archival, and Analysis of Western North Atlantic Right Whale Data”**

Robert Kenney, Graduate School of Oceanography, URI

The western North Atlantic stock of the right whale, *Balaena glacialis*, is one of the most endangered large whale populations in the world. Since 1986 researchers at several institutions have developed an extensive database on western North Atlantic right whales. This database is one of the most complete long-term records of right whale occurrence in the world. This invaluable scientific resource is important to understanding right whale ecology, and population dynamics, and to management of the right whale. The work to be completed includes continued maintenance of the archived database, incorporation and quality control of newly generated data, provision of data and data products to cooperating investigators and other interested researchers and agencies, and analyses based on the database for publication in the peer-reviewed scientific literature.

**“Habitat Enhancement For Lobsters In Narragansett Bay”**

J. Stanley Cobb, Biological Sciences, URI

The proposal details a five-year project to study the development of populations on six small rocky reefs created to enhance the habitat for lobsters in areas of Narragansett Bay. A critical component of the project is to culture, tag, and release larval lobsters into Narragansett Bay. In cooperation with NOAA scientists, the University investigators will study the development of populations on the newly created habitat. The investigators will continue to monitor density and other population parameters of lobsters on the reefs and to increase the number of hatchery-reared juveniles released.

**"North Cape Restoration Monitoring"**

Kathy Castro, Biological Sciences, URI

Jeremy Collie, Graduate School of Oceanography, URI

Allison DeLong, Graduate School of Oceanography, URI

The objective of this study is to assess the success of the release of v-notched female lobsters associated with the North Cape Restoration Project. The specific objective will be to determine total egg production of these released lobsters. This will be achieved through a tag-recapture program jointly conducted by the University of Rhode Island, RI Department of Environmental Management and the fishing industry. Tagging will be performed during the summer of 2001 and 2002. Sampling events to recapture tagged lobsters will be done during the late summer and fall.

**CONTINUED PROJECTS**

### *Multi-Year Projects*

#### **“Phase II: A Narragansett Bay Cooperative Study Project”** (funded with contributed funds in FY 2000)

Candace Oviatt, Graduate School of Oceanography, URI  
Edward Durbin, Graduate School of Oceanography, URI  
Dana Kester, Graduate School of Oceanography, URI  
Peter August and Christopher Damon, Natural Resource Science, URI  
Ames Colt and Malia Schwartz, Sea Grant, Narragansett Bay Campus, URI  
Jack Mustard, Geological Sciences, Brown Univ.

This project is intended to; (1) document the physical and biological processes that control the productivity of Narragansett Bay, (2) create a central repository for this information, and (3) make this information available to managers and the public through literature and the world-wide web. The principle investigators will use in-situ measurements and satellite remote sensing to monitor temperature, plankton production and bio-optical properties of Narragansett Bay. The response of bottom-dwelling animals to changes in temperature and plankton production will be examined.

*Projects continued through 2001 on a no-cost extension.*

#### **“A Cooperative Proposal for Surveying and Monitoring the Economic Status of Northeast Fishing Vessels”**

John Gates, Resource Economics, URI

### **PROJECTS COMPLETED IN 2001**

Four projects supported with CMER funds were completed in 2001. Requests for reprints or information should be directed to the principal investigators.

#### **“Genomic Microsatellite DNA Fingerprinting of Cod Broodstock and Progeny”**

Terence Bradley, Fisheries, Animal and Veterinary Science, URI

While tank spawning is a preferred method for obtaining high quality embryos, it presents several problems related to determination of parents and relatedness of progeny and effective management of the broodstock. This project was undertaken to demonstrate the feasibility of using microsatellite DNA fingerprints to determine parentage of tank-spawned haddock. Following genetic identification of the broodstock, larvae and eggs were sampled to assess which individuals were spawning, the duration of spawning, the number of mates, relative fecundity and viability of offspring.

#### **“Metabolic Studies of Juvenile Cod and Haddock”**

David Bengtson, Fisheries, Animal and Veterinary Science, URI

The primary objective of this project was to collect metabolic (bioenergetic) data on Atlantic cod and haddock during the early, age-0 juvenile period (3 to 13 cm length). Efforts were focused on measuring the effects of temperature, body size and feeding level on basic parameters of the balanced energy budget. A second goal of the project was to investigate the bioenergetic basis for differences in growth rate, both between the two species and among individuals of the same species. In addition to providing new insight into growth processes in juvenile fishes, results of this study will be used to develop and parameterize bioenergetic models of juvenile growth.

## **“Recovery of Essential Fish Habitat and Estimation of Scallop Abundance on Northern Georges Bank”**

Jeremy Collie, Graduate School of Oceanography, URI

The objectives of this study were: 1) to monitor the recovery benthic communities in areas of Georges Bank closed to fishing, 2) to estimate the density and size distribution of scallops from still photographs of the sea bottom and 3) to investigate possible reasons for inconsistencies between population assessment models and survey-based estimates of scallop abundance. Gravel habitats on Georges Bank were found to be very sensitive to disturbance by mobile fishing gear. The most conspicuous effect of disturbance was removal of the three-dimensional cover provided by colonial epifauna. Recovery commenced within two years and continued through the 6 years studied. Benthic megafaunal production increased by 12-fold after closure to fishing.

### **PROGRAM DIRECTOR’S RESEARCH ACTIVITIES**

The program director’s research was supported in 2001 through several grants with University and NMFS co-investigators:

"Development of a Commercially Viable Aquaculture Industry in New England Based on Cod and Haddock" Sea Grant Program

Larry Buckley, URI/NOAA CMER Program

Terry Bradley, Department of Fisheries, Animal and Veterinary Sciences, URI

David Berlinsky, Department of Zoology and Center for Marine Biology, UNH

George Nardi and Chris Duffy, GreatBay Aquafarms

"Dispersive and Advective Influences on the Survival of Cod and Haddock Larvae on Georges Bank," NOAA/NSF GLOBEC Northwest Atlantic Georges Bank Program

R.G. Lough, J.P. Manning and E.M. Caldarone, NOAA/NMFS/NEFSC

L.J. Buckley, URI/NOAA CMER Program

L.S. Incze, Bigelow Laboratory of Ocean Sciences

"U.S. GLOBEC: Environmental Consequences of Tidal-Front Entrainment in Larval Fish Along the Southern Flank of Georges Bank," Coastal Ocean Program

R.G. Lough, J.P. Manning and E.M. Caldarone, NOAA/NMFS/NEFSC

L.J. Buckley, URI/NOAA CMER Program

L.S. Incze, Bigelow Laboratory of Ocean Sciences

D.W. Townsend, School of Marine Sciences, University of Maine

"Establishing Mortality Risks Associated with Starvation for Atlantic Cod Larvae using Molecular Markers and Cox Regression Models," National Science Foundation (NSF)

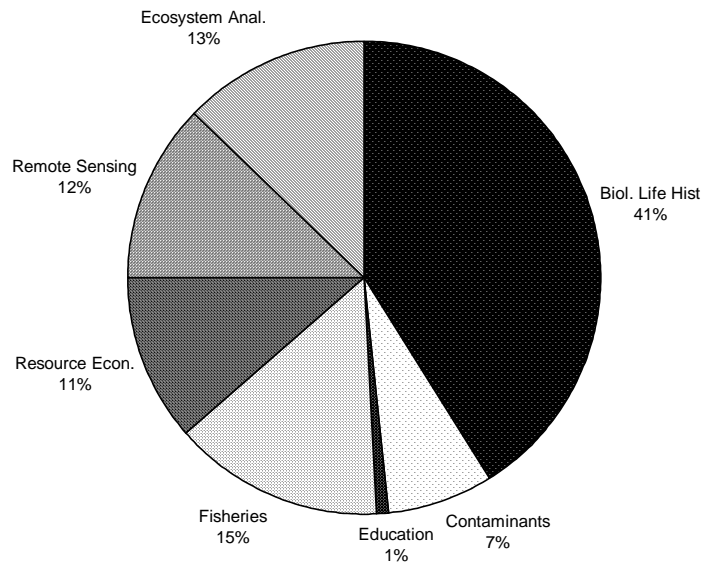
Tun Liang Ong,, Graduate School of Oceanography, URI

L.J. Buckley, URI/NOAA CMER Program

These projects provided support to a marine scientist, a graduate student, three marine research specialists and four undergraduate students.



Figure 1. CMER Program Topics



**Table 1. Funding for URI CMER Program (Thousands of Dollars)**

<b>Fiscal Year</b>	<b>Base</b>	<b>Contributed</b>	<b>Total</b>
89	100	22.5	122.5
90	100	363.4	463.4
91	85	442.3	527.3
92	50	380.9	430.9
93	76.6	151.4	228.0
94	105.0	430.0	535.0
95	89.4	610.6	700.0
96	92.8	651.0	743.8
97	106.6	904.2	1010.8
98	117.4	501.6	619.0
99	102.5	584.2	686.7
00	66.5	720.8	787.3
01	67.6	654.6	722.2
Total	1159.4	6417.5	7576.9

Departments represented:

- Department of Resource Economics
- Department of Experimental Statistics
- Department of Fisheries, Animal and Veterinary Science
- Graduate School of Oceanography
- Department of Natural Resource Science
- Department of Zoology
- Department of Pharmacognosy and Environmental Health
- Department of Electrical Engineering
- Department of Food Science & Nutrition
- Department of Ocean Engineering

**Table 2. Summary Of URI/CMER Funded Projects**

<u>FY</u>	<u>Short Title</u>	<u>Investigator</u>	<u>Amount</u>
1989	- Economic Analysis of US Market for Blue Mussels	Anderson <sup>a</sup> Brooks	20,000 <sup>B</sup>
	- Genetics of Gulf of Maine <u>Calanus</u> Populations	Kann Wishner <sup>b</sup>	20,000 <sup>B</sup>
	- Flow-through Sampler for Automated Plankton Analyzer	Jeffries <sup>b</sup> Berman <sup>c</sup>	30,000 <sup>B</sup>
	- Spring Bloom and <u>Calanus</u> Production in the Gulf of Maine	Durbin, Durbin <sup>b</sup> Green <sup>c</sup>	23,000 <sup>B</sup>
	- Trawl Selectivity and Survival of Cod-End Escapees	DeAlteris <sup>d</sup>	22,500 <sup>B</sup>
	- CD-ROM <i>Aquatic Sciences and Fisheries Abstract</i>	Sieburth	5,000 <sup>B</sup>
	- Applications of Satellite Remote Sensing Data	Cornillon <sup>b</sup> Armstrong <sup>c</sup>	39,000 <sup>B</sup>
	1990	- Genetics of Gulf of Maine <u>Calanus</u> Populations	Wishner <sup>b</sup> Kann <sup>b</sup>
- Integrated Program for Research on the Northern Right Whale		Winn <sup>b</sup> Kenney <sup>b</sup>	204,400 <sup>B</sup>
- Remote Sensing, Hydrographic Structure, and Zooplankton Production in the Gulf of Maine		Gifford, Durbin <sup>b</sup> Bisagni, Meise-Munns <sup>c</sup>	20,200 <sup>B</sup>
- Immune Response in Atlantic Salmon and Winter Flounder		Bodammer <sup>d</sup> Bradley <sup>d</sup>	18,600 <sup>B</sup>
- Economic Analysis of US Production for Blue Mussels		Anderson <sup>a</sup> Brooks	16,300 <sup>B</sup>
- Fisheries Law Enforcement		Sutinen <sup>a</sup>	6,500 <sup>B</sup>
- On-Line Access to In Situ Oceanographic Data Sets		Cornillon <sup>b</sup> Holloway	17,400 <sup>B</sup>
- National Eutrophication Experiment		Hinga, et al. <sup>b</sup>	121,000 <sup>C</sup>
1991	- Flow-Through Sampler for Automated Plankton Analyzer	Jeffries <sup>b</sup> Berman <sup>c</sup>	13,000 <sup>B</sup>
	- Immune Response in Atlantic Salmon and Winter Flounder	Bodammer <sup>d</sup> Bradley <sup>d</sup>	9,900 <sup>B</sup>
	- Spring Bloom and <u>Calanus</u> Production in the Gulf of Maine	Durbin, Durbin <sup>b</sup> Green <sup>c</sup>	17,500 <sup>B</sup>
	- Fish Stomach Evacuation Rates	Durbin, Durbin <sup>b</sup> Fogarty <sup>f</sup>	17,600 <sup>B</sup> (+5,000) <sup>*</sup>
	- Trawl Selectivity: Fish Behavior in the Vicinity of a Trawl	DeAlteris <sup>d</sup> Castro <sup>d</sup>	23,700 <sup>C</sup>
	- Remote Sensing, Hydrographic Structure, and Zooplankton Production in the Gulf of Maine	Gifford et al.	4,100 <sup>B</sup>
	- Geostatistical Estimates of Shellfish Abundance	Heltshe <sup>g</sup>	17,900 <sup>B</sup>

**Table 2. Cont.**

<u>FY</u>	<u>Short Title</u>	<u>Investigator</u>	<u>Amount</u>
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1991	-	Monitoring Economic Status of Otter Trawl and Scallop Vessels	Gates <sup>a</sup> Wang <sup>h</sup>	36,900 <sup>C</sup>
	-	Demersal Gillnet Fishery of the Gulf of Maine	DeAlteris <sup>d</sup>	20,000 <sup>C</sup>
	-	Integrated Program for Research on the Northern Right Whale	Winn <sup>b</sup> Kenney	188,000 <sup>C</sup>
	-	Applications of Satellite Remote Sensing Data	Cornillon <sup>b</sup> Armstrong <sup>c</sup>	45,000 <sup>C</sup>
	-	Coastal Wetland Mapping and Change Detection in the NE	August <sup>i</sup> LaBash, Golet <sup>j</sup> Civco <sup>j</sup>	32,500 <sup>C</sup>
	-	Student Research Training Program	Winn <sup>b</sup> Smith <sup>f</sup>	43,500 <sup>C</sup>
1992	-	Immune Response in Atlantic Salmon and Winter Flounder	Bodammer <sup>d</sup> Bradley	10,800 <sup>B</sup>
	-	National Eutrophication Experiment	Hinga <sup>g</sup>	68,000 <sup>C</sup>
	-	Integrated Program for Research on the Northern Right Whale	Winn <sup>b</sup> Kenney	188,600 <sup>C</sup>
	-	Student Research Training Program	Winn <sup>b</sup>	46,300 <sup>C</sup>
	-	Applications of Satellite Remote Sensing Data	Cornillon <sup>b</sup> Armstrong <sup>c</sup>	41,000 <sup>C</sup>
	-	Fish Stomach Evacuation Rates	Durbin et al.	26,400 <sup>B</sup>
	-	Genetics of Gulf of Maine <u>Calanus</u> Populations	Wishner <sup>b</sup> Kann	3,600 <sup>B</sup>
	-	Recruitment Strategies of Decapods	Cobb <sup>k</sup>	6,900 <sup>B</sup>
	-	Remote Sensing, Hydrographic Structure, and Zooplankton Production	Gifford et al.	2,500 <sup>B</sup>
-	Analysis of the NEFSC Shark Data Base	Heltshe <sup>g</sup> Casey <sup>c</sup>	37,000 <sup>C</sup>	
1993	-	Reproductive Success of Summer Flounder	Bengtson <sup>k</sup> Pereira <sup>l</sup>	12,967 <sup>B</sup>
	-	Diarrhetic Shellfish Poisoning	Maranda <sup>m</sup>	8,961 <sup>B</sup>
	-	Fish Stomach Evacuation Rates	Durbin et al.	26,951 <sup>B</sup>
	-	Effects of Scallop Dredging	Collie <sup>b</sup>	22,889 <sup>C</sup>
	-	Immune Response II	Bodammer <sup>d</sup>	12,184 <sup>B</sup>
	-	Decapods Recruitment	Cobb <sup>k</sup>	15,538 <sup>B</sup>
	-	Student Research Training Program	Winn <sup>b</sup>	59,119 <sup>C</sup>
	-	Right Whale Database	Winn <sup>b</sup> Kenney <sup>b</sup>	29,945 <sup>C</sup>
-	Applications of Satellite Remote Sensing Data	Cornillon <sup>b</sup> Armstrong <sup>c</sup>	49,000 <sup>C</sup>	

**Table 2. Cont.**

<u>FY</u>	<u>Short Title</u>	<u>Investigator</u>	<u>Amount</u>	
1994	- Harbor Porpoise Abundance	Heltshe <sup>g</sup>	20,614 <sup>BC</sup>	
	- Scallop Quality Evaluation	Pivarnik <sup>o</sup>	29,990 <sup>C</sup>	
	- Fish Stomach Evacuation Rates	Durbin et al.	30,342 <sup>B</sup>	
	- Bluefin Tuna Regulations	Swallow <sup>a</sup>	15,804 <sup>C</sup>	
	- Recruitment Strategies in Marine Decapods	Cobb <sup>k</sup>	14,415 <sup>B</sup>	
	- Student Research Training Program	Winn <sup>b</sup> Smith <sup>f</sup>	71,235 <sup>C</sup>	
	- Database Right Whale	Winn <sup>b</sup> Kenney <sup>b</sup>	36,445 <sup>C</sup>	
	- Oceanographic Remote Sensing	Cornillon <sup>b</sup> Armstrong <sup>c</sup>	40,250 <sup>C</sup>	
	- Temperature Monitoring Tag for Salmon	Recksiek <sup>d</sup> Daly <sup>n</sup> Fischer <sup>n</sup>	53,946 <sup>C</sup>	
	- Effect of Harvesting Gear Type	DeAlteris <sup>d</sup> Grogan	22,123 <sup>B</sup>	
	- Zooplankton Analysis Group Rates	Durbin <sup>b</sup> Durbin Busch <sup>c</sup>	200,000 <sup>B</sup>	
	1995	- Characterization of Mid-Atlantic Coastal Gillnet	DeAlteris <sup>d</sup> Lazar	41,050 <sup>C</sup>
		- Age Structure of Squid	Macy <sup>b</sup>	21,078 <sup>B</sup>
		- Quality Evaluation of Scallops	Pivarnik <sup>o</sup>	29,399 <sup>B</sup>
- Effects of Dredging on Benthic Megafauna of N. Georges Bank		Collie <sup>b</sup>	22,918 <sup>B</sup>	
- Recruitment Strategies of Decapods: Comparative Approach		Cobb <sup>k</sup>	15,000 <sup>B</sup>	
- Survey Methods for Harbor Porpoise		Heltshe <sup>g</sup>	22,522 <sup>C</sup>	
- Applications of Satellite Remote Sensing		Cornillon <sup>b</sup> Armstrong <sup>c</sup>	26,150 <sup>C</sup>	
- Engineering for Programmable Temperature Tag		Recksiek <sup>d</sup>	59,776 <sup>C</sup>	
- Development of Client and Server Libraries		Cornillon <sup>b</sup>	30,000 <sup>C</sup>	
- Student Research Training Program		Winn <sup>b</sup> Smith <sup>f</sup>	75,288 <sup>C</sup>	
- Broad-Scale Zooplankton on Georges Bank		Durbin <sup>b</sup>	300,000 <sup>C</sup>	
- Right Whale Database		Winn <sup>b</sup> Kenney <sup>b</sup>	55,828 <sup>C</sup>	
1996		- Maturity in Atlantic Cod and Summer Flounder	Specker <sup>bk</sup>	25,110 <sup>B</sup>
	- Distribution and Abundance of Hydroids	Sullivan <sup>b</sup> Klein-MacPhee <sup>b</sup>	20,701 <sup>B</sup>	
	- Effects of Dredging on Benthos	Collie <sup>b</sup>	46,917 <sup>B</sup>	
	- Ecological Investigation of Sachuest Point Salt Marsh	Rowman <sup>b</sup>	38,100 <sup>C</sup>	
	- Buoy System for Remote Tracking	Recksiek <sup>d</sup>	35,000 <sup>C</sup>	

**Table 2. Cont.**

<u>FY</u>	<u>Short Title</u>	<u>Investigator</u>	<u>Amount</u>
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1996	-	Population Structure in Longfinned Squid	Macy <sup>b</sup>	24,356 <sup>B</sup>
	-	OPDB/DODS Server at NODC	Cornillon <sup>b</sup> Milkowski <sup>b</sup>	30,000 <sup>C</sup>
	-	Satellite Remote Sensing	Cornillon <sup>b</sup> Bisagni <sup>b</sup>	89,300 <sup>C</sup>
	-	US GLOBEC: Zooplankton Technical Group	Durbin <sup>b</sup>	230,000 <sup>C</sup>
	-	Right Whale Database	Kenny <sup>b</sup>	39,166 <sup>C</sup>
	-	Acoustic Tracking of Harbor Porpoises	Miller <sup>p</sup>	54,480 <sup>C</sup>
	-	Economic Analysis of North East Fishing Vessels	Gates <sup>a</sup>	75,000 <sup>C</sup>
	-	Marine Ecosystems: Visualization of Patterns and Trends	August <sup>i</sup>	60,000 <sup>C</sup>
1997	-	Recovery of Essential Fish Habitat on Georges Bank	Collie <sup>b</sup>	24,403 <sup>B</sup>
	-	Development of an Acoustic Tracking System for Harbor Porpoises	Miller <sup>p</sup>	20,766 <sup>B</sup>
	-	Feeding and Metabolic Studies of Juvenile Cod and Haddock	Bengtson <sup>d</sup> Peck <sup>b</sup> Oviatt <sup>b</sup>	30,702 <sup>B</sup>
	-	Maturity in Female Summer Flounder and Monkfish	Specker <sup>bk</sup>	30,762 <sup>B</sup>
	-	Right Whale Database	Kenny <sup>b</sup>	122,564 <sup>C</sup>
	-	Salmon Temperature Monitoring Tag	Recksiek <sup>d</sup> Fischer <sup>n</sup> Daly <sup>n</sup>	34,895 <sup>C</sup>
	-	Analysis of Recirculating Systems for Shellfish	Anderson <sup>a</sup>	24,507 <sup>C</sup>
	-	Assessment of Atlantic Bluefin Tuna Market	Anderson <sup>a</sup>	47,997 <sup>C</sup>
	-	Monitoring the Economic Status of NE Fishing Vessels	Gates <sup>a</sup>	74,806 <sup>C</sup>
	-	Oceanographic Remote Sensing	Cornillon <sup>b</sup> Wood <sup>c</sup>	23,301 <sup>C</sup>
	-	Habitat Enhancement for Lobsters	Cobb <sup>k</sup>	98,002 <sup>C</sup>
	-	US GLOBEC: Abundance of Zooplankton	Durbin <sup>b</sup>	150,000 <sup>C</sup>
	-	Winter Flounder Length Model	Collie <sup>b</sup> Meise <sup>f</sup>	40,853 <sup>C</sup>
	-	Narragansett Bay Tidal Model	Kincade <sup>b</sup>	10,000 <sup>C</sup>
	-	Benthic Chemistry	King, Quinn <sup>b</sup>	84,750 <sup>C</sup>
	-	Time-Series Monitoring	Kester <sup>b</sup>	104,777 <sup>C</sup>
	-	Bay Survey-Towed Body	Durbin, Oviatt <sup>b</sup>	87,725 <sup>C</sup>
1998	-	US GLOBEC: Abundance of Zooplankton	Durbin <sup>b</sup>	300,000 <sup>C</sup>
	-	Variability in Temperature Fronts	Cornillon <sup>b</sup> Bisagni	98,000 <sup>C</sup>

**Table 2. Cont.**

<u>FY</u>		<u>Short Title</u>	<u>Investigator</u>	<u>Amount</u>
1998	-	Harbor Porpoise Tracking System	Miller <sup>b</sup>	30,500 <sup>C</sup>
	-	Sachuest Point Restoration	Roman <sup>b</sup>	4,793 <sup>C</sup>

	-	Remote Sensing Laboratory	Cornillon <sup>b</sup> Wood <sup>c</sup>	23,301 <sup>C</sup>
	-	Active Acoustic Alarms Development	Miller <sup>b</sup>	45,000 <sup>C</sup>
	-	Atlantic Herring Management	Gates <sup>a</sup>	26,487 <sup>B</sup>
	-	Estimation of Scallop Abundance	Collie <sup>b</sup>	24,178 <sup>B</sup>
	-	DNA Fingerprinting of Cod Broodstock	Bradley <sup>d</sup>	30,164 <sup>B</sup>
	-	Metabolic Studies of Cod & Haddock	Bengtson <sup>d</sup> Peck, Oviatt <sup>b</sup>	36,585 <sup>B</sup>
1999	-	US GLOBEC: Abundance of zooplankton	Durbin <sup>b</sup>	300,000 <sup>C</sup>
	-	Variability and SST fronts	Cornillon <sup>b</sup> Bisagni <sup>q</sup>	32,000 <sup>C</sup>
	-	Monitoring Northeast Fishing Vessels	Gates <sup>a</sup>	60,183 <sup>C</sup>
	-	Estimation of Scallop Abundance	Collie <sup>b</sup>	24,972 <sup>C</sup>
	-	Atlantic Herring Management	Gates <sup>a</sup>	29,729 <sup>B</sup>
	-	DNA Fingerprinting of Cod Broodstock	Bradley <sup>d</sup>	34,839 <sup>B</sup>
	-	Metabolic Studies of Cod and Haddock	Bengtson <sup>d</sup> Peck, Oviatt <sup>b</sup>	37,947 <sup>B</sup>
	-	Habitat Enhancement for Lobsters	Cobb <sup>k</sup>	94,042 <sup>C</sup>
	-	Marine Mammals	Miller <sup>p</sup>	10,000 <sup>C</sup>
	-	Maintenance of Right Whale Data Base	Kenney <sup>b</sup>	39,965 <sup>C</sup>
	-	Remote Sensing Laboratory	Cornillon <sup>b</sup> Wood <sup>c</sup>	23,059 <sup>C</sup>
2000	-	Market Information and Fisheries Mgt.	Wessells <sup>a</sup>	30,000 <sup>B</sup>
	-	DNA Fingerprinting of Tautog	Bradley <sup>d</sup>	36,560 <sup>B</sup>
	-	US GLOBEC - Abundance of zooplankton	Durbin <sup>b</sup>	300,000 <sup>C</sup>
	-	Maintenance of Right Whale Data-Base	Kenney <sup>b</sup>	79,664 <sup>C</sup>
	-	Narragansett Bay Cooperative Study	Oviatt, Durbin <sup>b</sup> Kester <sup>b</sup> August, Damon <sup>i</sup> Colt, Schwartz <sup>f</sup> Mustard <sup>s</sup>	341,150 <sup>C</sup>
2001	-	Market Information and Fisheries Mgt.	Wessells <sup>a</sup>	29,985 <sup>B</sup>
	-	DNA Fingerprinting of Tautog	Bradley <sup>d</sup>	37,641 <sup>B</sup>
	-	US GLOBEC - Abundance of zooplankton	Durbin <sup>b</sup>	300,000 <sup>C</sup>
	-	Habitat Enhancement for Lobsters	Cobb <sup>k</sup>	40,450 <sup>C</sup>
	-	Maintenance of Right Whale Data-Base	Kenney <sup>b</sup>	84,905 <sup>C</sup>
	-	Northcape Restoration Monitoring	Castro <sup>d</sup> Collie, Delong <sup>b</sup>	229'298 <sup>C</sup>

B Base CMER Program funds

C Funds contributed to the CMER Program

\* Support for R/V Gloria Michelle

**Table 2. Cont.**

a	URI, Department of Resource Economics	l	NEFSC, Milford Laboratory
b	URI, Graduate School of Oceanography Sciences	m	URI, Dept. of Pharmacognosy and Environ. Health
c	NEFSC, Narragansett Laboratory	n	URI, Department of Electrical Engineering
d	URI, Department of Fish, Animal and Veterinary Science	o	URI, Department of Food Science and Nutrition
e	URI, Pell Marine Science Library	p	URI, Department of Ocean Engineering
f	NEFSC, Woods Hole Laboratory	q	UMass, Department of Physics
g	URI, Department of Computer Science Experimental Statistics	r	URI, Sea Grant
h	NER, Gloucester	s	Brown, Department of Geological Sciences
i	URI, Department of Natural Resource Science		
j	University of Connecticut		
k	URI, Department of Zoology		



**Table 3. CMER Grants Providing At Least Partial Student Support**

<u>CMER#</u>	<u>SHORT TITLE</u>	<u>STUDENTS SUPPORTED</u>
89-01	Market for Blue Mussels	P. Brooks (Ph.D., T <sup>1</sup> , C <sup>2</sup> )
90-09		
89-04	<u>Calanus</u> Genetics	L. Kann (Ph.D., T, C)
90-01		
92-07		
89-05	Automated Plankton Analyzer	G. Lambert (Post-Doc)
91-01		
89-08	Spring and <u>Calanus</u>	S. Larimer (Ph.D., C)
91-03		A. Thompson (MS, C)
89-09	Cod-End Escapees	D. Reifsteck (MS, C)
90-05	Research on Right Whale	B. Dorf (Ph.D., C)
		N. Burke (MS, C)
90-06	Gulf of Maine Zooplankton	P. Garrahan (MS, C)
91-06		
90-08	Immune Response	R. Carlson (MS, T, C)
91-02		
92-01		
90-12	Fisheries Law Enforcement	P. Lalleman (Ph.D., C)
91-04	Fish Evacuation Rates	P. Garrahan (MS, T, C)
92-06		J. Wunder (MS, T, C)
93-08		
91-05	Fish Behavior	J. Harris (MS, T, C)
91-07	Shellfish Abundance	M. Ecker (MS, T, C)
91-09	Economic Status	C. Glick (MS, C), P. Lalleman (Ph.D., C)
91-10	Gillnet Fishery	N. Lazar (MS, T, C)
91-13	Coastal Wetland Mapping	J. Hurd (MS UConn, T, C)
91-15	Eutrophication Experiment	B. Koop (Ph.D., C)
92-08	Decapod Recruitment	M. Clancy (Ph.D., T, C)
93-11		M. J. James (Ph.D., T, C)
94-11		B. Moravchik (MS, T, C)
		R. Rand (Ph.D., C)
95-11		D. Grote (Ph.D., T, D)
		C. Boyco (Ph.D.)
97-01C		B. Niedbalski (MS, T, C)
		T. Feehan (MS, C)
		N. Hobb (Ph.D.)
92-10	Shark Data Base	M. Pirri (MS, T, Ph.D., C)
		C. Belcher (MS, T, C)
91-14	Student Research Training	A. Verhulst (Ph.D., C)
92-04		R. Griffin (Ph.D., C)
93-12		N. Friday (Ph.D., C)
94-12		K. Vigness (MS, T, C)
95-17		
93-06	Success of Summer Flounder	T. Gleason (Ph.D., C)
93-07	Diarrhetic Shellfish	Christine Chan (Ph.D., C)
93-09	Effects of Scallop Dredging	G. Escanero (MS, T, C)
95-09		Tien-Shui Tsou (Ph.D., C)
96-09		J. Hermsen (Ph.D., C)
97-03		E. Hughes (MS, T, C)
98-05		
99-04C		
93-10	Immune Response II	L. Putnam (MS, D)
94-09	Tuna Angling Preference	K. Blake (MS, T, C)

**Table 3. Cont.**

<u>CMER#</u>	<u>SHORT TITLE</u>	<u>STUDENTS SUPPORTED</u>
95-13	Survey for Harbor Porpoise	B. Koloziej (MS,T,C) C. Wentworth (MS,T,C)
95-15 96-11C	Programmable Temperature Tag	Yang Chun (MS,T,C)  D. Hyun (MS,T,Ph.D.) S. Lee (Ph.D.)
97-02C 95-04	Quality Evaluation of Scallops	B. Watkins (BS,C) Y. Janelle (MS,T,C) Jaiming Ye (MS)
95-03 96-12	Squid Age Structure	R. Hein (Ph.D.,C)
96-22C 96-02	Ecosystems Visualization Abundance of Hydroids	C. Damon (MS,T,C) J. Williams (MS,T,Ph.D.)
96-18C 97-08C 98-01C 99-01C 00-01C	US GLOBEC: Zooplankton	A. Lapolla (MS,C) K. Collins (Ph.D.)  W. Saumweber (Ph.D.) Bronwynn Cahill (Ph.D.)
97-07C	Habitat Enhancement for Lobsters	K. Castro (Ph.D.) B. Murphy (MS) S. Robbins (MS)
99-08C 96-20C 97-05 98-03C 99-09C 96-21C	Harbor Porpoise Tracking  Fishing Vessel Economics	R. Gampert (MS,T,C) M. Langlais (BS,C) M. Zarnetske (MS,C) J. LaPorte (BS) P. Lallemand (Ph.D.) E. Gudmundsson (Ph.D.)
97-05C 99-03C 97-06 98-08 99-07 97-03C	Metabolic Studies of Cod/Haddock  Recirculating Systems for Shellfish	M. Peck (MS,T,Ph.D.,C)  G. Magnusson (Ph.D.) J. Martinez-Garmendia (Ph.D.)
97-04C	Assessment of Bluefin Tuna Market	M. Carroll (MS,T,C) Heng-Hung Kuo (MS, C)
97-06C 98-05C 99-11C 97-07	Remote Sensing Laboratory  Female Summer Flounder	T. Mavor (Post-Doc)  C. Casey (MS,C) B. Soffientino (Ph.D.) C. Martinez (MS,C) R. Merson (Ph.D.,C)
97-NB2 97-NB3	N. Bay Tidal Model Benthic Chemistry	W. Deleo (MS,T,C) E. Lacey (Ph.D.,C) C. Reddy (Ph.D.,C) P. Hartman (Ph.D.,C)
97-NB4	Time-series Monitoring	M. Swanson (MS,T,C) Lt. J. Andrews (MS,T,C) A. Magnuson (Ph.D.,C) Meg Scott (MS,C)

**Table 3. Cont.**

<u>CMER#</u>	<u>SHORT TITLE</u>	<u>STUDENTS SUPPORTED</u>
00-NB1		D.Bergondo (Ph.D.)
97-NB5	Bay Survey - Towed Body	C. Suchman (Ph.D.,C) C. Melrose (MS)
00-NB1		
98-07	Microsatellite DNA Fingerprinting	A. Choudury(Ph.D.,T)
99-06		
98-01	Atlantic Herring Management	Cho Jung-Hee (Ph.D.,C)
99-05		
98-04C	Salt Marsh Post-Restoration	S. Adamowicz (Ph.D.) K. Raposa (Ph.D.,T,C)
00-02	Discrimination of Tautog Populations	C.Blake (MS)
00-00	Market Information	Jung-Sam Lee (MS)
00-NB1	NB Winter Spring Bloom Intensity	G. Ellis (MS)
00-NB1	NB Temperatures and Properties	Hongwei Chen (MS) J. Fisher (Ph.D.)

<sup>1</sup>T - Thesis on topic supported by CMER

<sup>2</sup>C - Degree requirements completed

<sup>3</sup>D - Dropped Out

#### Table 4. CMER Supported Thesis and Dissertations

1992

Brooks, Priscilla M. 1992. The Northeast market for blue mussels: Consumer perceptions of seafood safety and the demand for mussels. Ph.D. Dissertation, Department of Research Economics, University of Rhode Island, Kingston, RI.

Carlson, Robert E. 1992. The effect of prolonged *in vivo* cortisol administration on the *in vitro* primary immune response of Atlantic salmon and winter flounder lymphocytes. MS Thesis, Department of Fisheries, Aquaculture and Pathology, University of Rhode Island, Kingston, RI.

Ecker, Mark 1992. Geostatistical estimates of scallop abundances. MS Thesis, Department of Statistics, University of Rhode Island, Kingston, RI.

Hurd, J. D. 1992. Coastal wetland mapping and change detection in the northeastern United States. MS Thesis, University of Connecticut, CT.

Lazar, Najih 1992. Analysis of the sink-gillnet fishery of the Gulf of Maine and adjacent waters. MS Thesis, Department of Fisheries, Aqua. and Veterinary Science, Univ. of Rhode Island, Kingston, RI.

1993

Kann, Lisa 1993. Zooplankton distribution in the Great South Channel and the genetic population structure of the copepod (*Calanus finmarchicus*) in the Gulf of Maine. Ph.D. Dissertation, Univ. of Rhode Island, Kingston, RI; 170 p.

1994

Belcher, Caroline 1994. Evaluation of longline surveys for producing population estimates of large coastal sharks. MS Thesis, Department of Statistics, University of Rhode Island, Kingston, RI.

Garrahan, Peter 1994. Gastric evacuation in Atlantic cod (*Gadus morhua*). MS Thesis, Graduate School of Oceanography, University of Rhode Island, Kingston, RI; 181 p.

1995

Clancy, M. 1995. Recruitment of the rock crab (*Cancer irroratus*): The influence of larval supply, settlement, and post-settlement processes to the benthic distribution pattern. Ph.D. Dissertation, Department of Biological Sciences, University of Rhode Island, Kingston, RI; 247 p.

Harris, Jessica 1995. Effects of selectivity of 14.0 and 15.2 CM square and diamond mesh codends on yellow tail flounder (*Pleuronectes ferrugineus*) and Atlantic cod (*Gadus morhua*). MS Thesis, Department of Fisheries, Aquaculture and Veterinary Science, University of Rhode Island, Kingston, RI; 88 p.

Wunder, Jennifer 1995. Gastric evacuation in winter skate (*Raja ocellata*). MS Thesis, Graduate School of Oceanography, University of Rhode Island, Kingston, RI; 148 p.

1996

Blake, Kevin S. 1996. Modeling preferences for regulatory options: A case study of the northeast recreational bluefin tuna fishermen. University of Rhode Island, Kingston, RI.

Griffin, Robert B. 1996. Community ecology of cetacean habitat. Graduate School of Oceanography, University of Rhode Island, Kingston, RI; 200 p.

James-Pirri, Mary Jane 1996. Growth and behavior during the settlement period of the American lobster (*Homarus americanus*). MS Thesis, Ph.D. Dissertation, Biological Sciences. Graduate School of Oceanogr., Univ. of Rhode Island, Kingston, RI; 167 p.

Kolodziej, Bruce 1996. Comparing two adaptive sampling schemes to estimate abundance of clumped individuals. MS Thesis, Department of Computer Science and Statistics, Univ. of Rhode Island, Kingston, RI.

Moravchik, Bruce 1996. The influence of space and density on postlarval settlement in the American lobster (*Homarus americanus*). MS Thesis, Zoology, Graduate School of Oceanogr., University of Rhode Island, Kingston, RI; 95 p.

Wentworth, Charles 1996. Estimating spatially clumped individuals using adaptive cluster sampling. MS Thesis, Department of Computer Science and Statistics, University of Rhode Island, Kingston, RI; 59 p.

Yang, Chun 1996. Design of a programmable temperature monitoring device for tagging small fish: A monolithic thermal sensor with digital data storage. MS Thesis, Electrical and Computer Engineering, University of Rhode Island, Kingston, RI.

#### 1997

Escanero, Gallo A. 1997. Effects of bottom fishing on the gravel-substratum benthic megafauna of Georges Bank. MS Thesis, Graduate School of Oceanography, Univ. of Rhode Island, Kingston, RI; 111 p.

Friday, Nancy, 1997. Evaluating photographic capture-recapture estimates of abundance of North Atlantic humpback whales. Ph.D. Dissertation, Grad. School of Oceanogr., Univ. of Rhode Island, Kingston, RI; 173 p.

Janelle, Yungdong 1997. Quality evaluation of domestic sea scallop (*Placopecten magellanicus*). MS Thesis, Food Science and Nutrition, University of Rhode Island, Kingston, RI; 109 p.

Lacey, Elizabeth M. 1997. Evaluation of simultaneously extracted metals-acid volatile sulfide (SEM-AVS) in lacustrine sediment (Lake Champlain), estuarine sediment (Narragansett Bay) and under laboratory conditions. Ph.D. Dissertation, Graduate School of Oceanogr., Univ. of Rhode Island, Kingston, RI; 226 p.

Swanson, Melissa 1997. Estuarine measurements of chlorophyll fluorescence with high temporal resolution. MS Thesis, Graduate School of Oceanogr., Univ. of Rhode Island, Kingston, RI; 104 p.

#### 1998

Carroll, Michael T. 1998. An assessment of the Atlantic bluefin tuna market: The economic implications for management. MS Thesis, Resource Economics, Univ. of Rhode Island, Kingston, RI.

Gampert, Robert 1998. Development of an acoustic tracking system for harbor porpoises (*Phocoena phocoena*) in the vicinity of gillnets. MS Thesis, Graduate School of Oceanogr., Univ. of Rhode Island, Kingston, RI; 154 p.

Niedbalski, Bonnie 1998. Size and timing of morphological metamorphosis in the American lobster (*Homarus americanus*). MS Thesis, Biological Sciences, Univ. of Rhode Island, Kingston, RI.

#### 1999

Hein, Richard 1999. Age, growth, and factors controlling post-settlement habitat use of juvenile French grunts (*Haemulon flavolineatum*) near Tobacco Caye, Belize, Central America. Ph.D. dissertation, Graduate School of Oceanogr., Univ. of Rhode Island, Kingston, RI.

Hughes, Edmund 1999. Spatial characteristics of Atlantic sea scallops (*Placopecten magellanicus*) on Northern Georges Bank". MS Thesis, Graduate School of Oceanogr., Univ. of Rhode Island, Kingston, RI.

Ward, Jessica A. 1999. Right whale (*Balaena glacialis*) south Atlantic bight habitat characterization and prediction using remotely sensed oceanographic data. MS Thesis, Graduate School of Oceanogr., Univ. of Rhode Island, Kingston, RI.

#### 2000

Raposa, Kenneth B. 2000. Nekton utilization of tidally restricted, restoring, and reference New England salt marshes. Ph.D. Dissertation, Graduate School of Oceanogr., Univ. of Rhode Island, Kingston, RI.

Cho, Jung-Hee 2000. Optimal exploitation of Atlantic herring stocks in the U.S.A.: Bioeconomic model for Atlantic herring. Ph.D. Dissertation, Dept. of Environmental and Natural Resource Economics, Univ. of Rhode Island, Kingston, RI.

2001

Peck, Myron 2001. Metabolic studies of juvenile cod, *gadus morhua*, and haddock, *melanogrammus aeglefinus*. Ph.D. Dissertation, Graduate School of Oceanogr., Univ. of Rhode Island, Kingston, RI.

Chen, Hongwei 2001. Optical properties and modeling of estuarine water with multispectral and hyperspectral data. MS Thesis, Brown University, Providence, RI.

2002

Hermesen, Jerome M. 2002. Effects of bottom fishing on the demersal megafauna and benthic productivity of Georges Bank. Ph.D. Dissertation, Graduate School of Oceanogr., Kingston, RI.

Ellis, Gregory 2002. An examination of the benthic macrofauna of Narragansett Bay and the possible implications of winter-spring bloom intensity on population size. MS Thesis, Graduate School of Oceanography, Univ. of Rhode Island, Kingston, RI.

## Table 5. URI/NOAA CMER PROGRAM STAFF AND ADJUNCT FACULTY

Stationed at URI

**Dr. Lawrence J. Buckley**

Director URI/NOAA CMER Program  
Affiliated Professor  
Marine Biochemist  
Graduate School of Oceanography  
Coastal Institute Building

**Alan Blott, John Kenney**

Fisheries Engineering  
Department of Fisheries, Animal and Veterinary Science  
College of Resource Development  
East Farm

Adjunct Faculty Stationed at NEFSC Laboratories

**Dr. Timothy Smith**

Fisheries Biologist / Adjunct Professor Oceanography  
NEFSC, Woods Hole Laboratory

**Dr. Kenneth Sherman**

Fisheries Biologist / Adjunct Professor Oceanography  
NEFSC, Narragansett Laboratory

**Dr. Steven Edwards**

Economist / Adjunct Professor Resource Economics

**Dr. Nancy Kohler**

Fisheries Biologist / Adjunct Professor Oceanography  
NEFSC, Narragansett Laboratory

**Table 6. Courses taught by URI/NOAA CMER PROGRAM Personnel**

<b>OCG 693V:</b>	<b>Fishery Oceanography</b> Fall 1993, 1995, 1997, 2001	Larry Buckley (with Dr. Jeremy Collie)
<b>ASP 487X:</b>	<b>Pathobiological Effects of Contaminants on Fish</b> Spring 1996	Joel Bodammer (with Dr. Richard Wolke)
<b>FST 392:</b>	<b>Anadromous Fish and Fish Passage</b> Spring 1996	Alan Blott
<b>OCG 693I:</b>	<b>Cetaceans: Population Dynamics and Assessments</b> Fall 1993, 1994	Tim Smith
<b>REN 426X:</b>	<b>Economics of Property Rights to Natural Resources</b> Fall 1993	Steven Edwards
<b>OCG 670:</b>	<b>Fish Population Dynamics</b> Spring 1990, 1991, 1992	Michael Fogarty
<b>OCG 694V:</b>	<b>Pollutants in the Marine Environment</b> Spring 1991	Garry Mayer
<b>ZOO 675:</b>	<b>Advanced Ecology Seminar</b> Fall 1991	Michael Fogarty (with Dr. Saran Twombly)
<b>ZOO 691:</b>	<b>Community Ecology</b> Spring 1990	Michael Fogarty (with Dr. Saran Twombly)

**Table 7. Participation on graduate committees by URI/NOAA CMER Program personnel since 1989.**

Dr. Joel E. Bodammer

Robert Carlson	Fisheries, Animal and Veterinary Sci., M.S. (major prof., C)
Laurie Putnam	Fisheries, Animal and Veterinary Sci., M.S. (major prof., D)
Pamela Haynes	Fisheries, Animal and Veterinary Sci., M.S. (major prof., D)
Robert Fuller	Fisheries, Animal and Veterinary Sci., M.S. (Dr. R.E. Wolke, major prof. C)

Dr. Michael J. Fogarty

Gustavo Bisbal	Zoology, Ph.D. (C)
Randy Camilio	Zoology, Ph.D. (D)
Margarida Castro	Oceanography, Ph.D. (C)
Michael Clancy	Zoology, Ph.D. (C)
Nancy Clancy	Zoology, Ph.D. (C)
Peter Garrahan	Oceanography, M.S. (C)
Tim Gleason	Zoology, Ph.D. (C)
Donna Johnson	Zoology, M.S. (major prof., C)
Abdellah Kinani	Fisheries, Animal and Veterinary Science, M.S. (C)
Nizha Saleh-Eddine	Fisheries, Animal and Veterinary Science, M.S. (C)
Najih Lazar	Fisheries, Animal and Veterinary Science, M.S. (C)



Edward Thier	Zoology, M.S. (C)
Kathleen Castro	Zoology, Ph.D.
Paul Spencer	GSO, Ph.D. (C)
Katherine Bisack	Fisheries, Animal and Veterinary Science, Ph.D. (C)

Dr. Lawrence J. Buckley

Einar Hjorleifsson	Oceanography, Ph.D. (C)
Karla Johanning	Zoology, Ph.D. (C)
Gustavo Bisbal	Oceanography, Ph.D. (C)
Melissa Wagner	Oceanography, M.S. (major prof., C)
Lisa Kann	Oceanography, Ph.D. (C)
Barbara Dorf	Oceanography Ph.D. (C)
Alex Schreiber	Zoology, Ph.D. (C)
Tien-Shiu Tsou	GSO, Ph.D. (C)
Liuae Huang	Zoology, Ph.D. (C)
William Michaels	GSO, Ph.D. (D)
Diane Nacci	Zoology, Ph.D. (C)
David Alves	FAVS, MS (C)
Bonnie Niedbalski	Zoology, Ph.D. (C)
Carla Johanna	Zoology, Ph.D. (C)
Mike Peck	GSO, Ph.D. (C)
Cathy Duffy	GSO, Ph.D. (C)
Catalina Martinez	GSO, MS (C)
Markis Koelbl	FAVS, MS (C)
Tarquin Dorrington	GSO, Ph.D.
Rebecca Jones	FAVS, MS
Arpita Choudury	FAVS, Ph.D.
Steven Gavlik	GSO, Ph.D.
Rachel Howell	FAVS, MS (C)
Mark Watson	FAVS, MS (C)
Julie Saint Andre	GSO, MS (major prof.)
Joseph Cofone	GSO, MS (C)
Jessica Henderson	FAVS, MS (C)
Jerome Hermsen	GSO, Ph.D. (C)
Janalyn Sanders	FAVS, MS

Dr. Kenneth Sherman

Jim McKenna	Oceanography, Ph.D. (C)
Jerry Prezioso	Oceanography, MS (C)
John Kurland	Oceanography, Ph.D. (C)
Kevin Thomas	Oceanography, Ph.D. (C)
David Avery	Oceanography, Ph.D. (C)

Dr. Timothy Smith

Robert Griffin	Oceanography, Ph.D. (major prof., C)
Nancy Friday	Oceanography, Ph.D. (major prof., C)
Richard Petricig	Oceanography, Ph.D. (C)

Dr. Nancy Kohler

Michael Pirri	Statistics, MS
Carolyn Belcher	Statistics, MS (C)
Allison Ferreira	Marine Affairs, MS

C - degree requirements completed  
D - dropped out of program

## Appendix I. CMER Supported Publications

- August, P.V., R.D. Kenney, and T.P. Husband. 2001. "Mammals." In: P.V. August, L. Gould, R. Enser, and H. Ginsberg, eds. Vertebrates of Rhode Island: The Biota of Rhode Island, Volume 2. Kingston, RI: Rhode Island Natural History Survey.
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- Bisagni, J. J. and M. Sano. (In press) "Satellite observations of short time scale sea surface temperature variability on southern Georges Bank." Submitted for *Cont. Shelf Res.*, Narragansett, RI.
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Waring, G. T., C.P. Fairfield, C.M. Ruhsam and M. Sano. 1992. "Cetaceans associated with Gulf Stream features off the northeastern USA shelf." Mar. Mammal Comm., Ref. C, Narragansett, Rhode Island. ICES C. M. 1992/N:12: 29 p.

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Winn, H.E. 1992. "Right whale research in the western North Atlantic: History, status, and future." In: J. Hain, ed. The Right Whale in the Western North Atlantic: A Science and Management Workshop, 14-15 April 1992, Silver Spring, Maryland. Marine Mammal Investigation, Conservation and Utilization Division, NEFSC, NMFS, Woods Hole, MA. NEFSC Ref. Doc. 92-05:3-4.

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## Appendix II. Recent CMER Supported Presentations

Ashjian, C. "Input of *Calanus finmarchicus* into the Gulf of Maine through the Northeast Channel. TASC Symposium. Tromso, Norway. 1999.

Campbell, R., J.A. Runge, and E. Durbin. "Growth, molting, and egg production rates of *Calanus finmarchicus* on Georges Bank: evidence for food limitation." AGU/ASLO Ocean Sciences Mtg. San Diego, Feb. 1998.

Casey, C.S., B. Soffientino, C. Martinez, M. Terceiro, F. Almeida, and J. Specker. "Maturity status in female summer flounder: 1996-1997." Won best student paper presentation. American Fisheries Society, Southern New England Chapter. Woods Hole, MA, June 1997.

Casey, C.S., R.R. Merson, B. Soffientino, C. Martinez, M. Terceiro, F. Almeida, and J.L. Specker. "Length-at-maturity of summer flounder (*Paralichthys dentatus*)." Estuarine Research Federation. Providence, Rhode Island, October 1997.

Castro, K.M., J.S. Cobb, R.A. Wahle, and J. Catena. "Home for the homeless or just passing through?" American Fisheries Society Annual Mtg., Charlotte, N.C., Aug. 1999.

Castro, K.M., J.S. Cobb, R.A. Wahle, and J. Catena. "Progress on RI artificial reef project for lobsters." Narragansett Bay 2000 Summit. Jan. 2000.

Cho, Jung-Hee and J.M. Gates. "The benefits from Korean-Japanese cooperative management of transnational fishery resources." Proceedings, Korean-American Forum, Univ. of RI, RIAES Contribution No. 3747, June 1999.

Cho, Jung-Hee and J.M. Gates. "Environmental factors and natural resource stock: Atlantic herring case." Proceedings, International Institute of Fisheries Economics and Trade, Oregon State Univ., Corvallis, Oregon, 2000.

Cho, Jung-Hee, J.M. Gates, P. Logan, and A. Kitts. "The opportunity cost of ecosystem reserves for herring in the Northeast Large Marine Ecosystem." Proceedings, 1<sup>st</sup> Workshop on Social and Economic Dimensions of Large Marine Ecosystems, Alton Jones Campus, Univ. of RI, RIAES Contribution No. 3811, Feb. 2000.

Cobb, J.S. "Recruitment strategies in lobsters." Biology at Noon, Graduate School of Oceanography, University of Rhode Island, Narragansett, RI, Nov. 1997.

Cobb, J.S. and K.M. Castro. "An artificial reef for lobsters in Rhode Island, USA." Magdalen Islands, Canada, October 1997.

Cobb, J.S. "Oceanic processes in recruitment dynamics." Fifth International Workshop on Lobster Biology, Queenstown New Zealand, February 1997.

Cobb, J.S. "Decapod recruitment strategies: A comparison." Universidad Nacional Autonoma de Mexico, Estacion Puerto Morelos, Mexico, June 1997.

Cobb, J.S. and K.M. Castro. "The role of artificial reefs for lobster - enhancement or redistribution?" American Fisheries Society, Southern New England Chapter Mtg., Jan. 1998.

Cobb, J.S. "Early life history and recruitment strategies in lobsters." CEFAS Fisheries Laboratory, Lowestoft, England, June 1998.

Collie, J. "Scraping the bottom: Impacts of bottom fishing on benthic megafauna on Georges Bank." Danish Institute for Fisheries Research, Howard laboratory, Sandy Hook, NJ, December 1998 and Charlottenlund, Denmark, Oct. 1999.

Collie, J. "Studies in New England." Conference of Fishing Gear Effects on the Sea Floor of New England, Ashland, MA, May 1997.

Collie, J. "Impacts of bottom fishing on the benthic megafauna of a gravel habitat." Annual Mtg. of the Society for Conservation Biology, Victoria, B.C., June 1997 and NOAA CMER Symposium, Falmouth, MA, May 1999.

Collie, J.S., S.J. Hall, M.J. Kaiser, and I.R. Poiner. "Are fishing effects on shelf-sea benthos clear-cut?" American Fisheries Society, Alaska Chapter Annual Meeting, Fairbanks, AK, November 2000.

Collie, J.S. and P. Valentine. "Effects of bottom fishing on gravel habitats of Georges Bank." American Fisheries Society, Alaska Chapter Annual Meeting, Fairbanks, AK, November 2000.

Collie, J.S., S.J. Hall, M.J. Kaiser, and I.R. Poiner. "Effects of mobile fishing gear on shelf-sea benthos". 2nd Symposium and Marine Conservation Biology, San Francisco, CA., June 2001.

Cornillon, P., G. Flierl, J. Gallagher, G. Milkowski, and R. Nedovei. "Using matlab as a client interface to the distributed oceanographic data system." Fifth Scientific Mtg. of The Oceanography Society (TOS), Seattle, WA, April 1997.

Cornillon, P. "The distributed oceanographic data system: DODS current capabilities and development update." Fifth Scientific Mtg. of The Oceanography Society, Seattle, WA, April 1997.

Durbin, E.G., J. Runge, R. Campbell, P. Garrahan, M. Casas, T. Rotunno, S. Plourde. "Late Fall-early winter recruitment of *Calanus finmarchicus* on Georges Bank." AGO/ASLO Ocean Sciences Meeting, San Diego, Feb. 1996.

Durbin, E.G. "Zooplankton dynamics of the Gulf of Maine and Georges Bank region." Regional Association of the Gulf of Maine, Gulf of Maine Ecosystem Dynamics Scientific Workshop, St. Andrews, New Brunswick, Sept. 1996.

Durbin, E.G. "Abundance and distribution of *Calanus finmarchicus* on Georges Bank during 1995." TASC Annual Mtg., Copenhagen, January 1997.

Durbin, E.G., P. Garrahan, and M. Casas. "Abundance and distribution of zooplankton on Georges Bank during 1995." ASLO Aquatic Sciences Mtg., Santa Fe, NM, February 1997.

Durbin, E.G., R. Campbell, and J.A. Runge. "Food limitation of *Calanus finmarchicus* production rates on Georges Bank." AGU/ASLO Ocean Sciences Mtg. San Diego, Feb. 1998.

Durbin, E.G. "Life history patterns of *Calanus finmarchicus* in the NW Atlantic." TASC Symposium. Tromso, Norway. 1999.

Durbin, E.G., M.C. Casas, R.G. Campbell, M.A. Wagner, J.A. Runge, B. Niehoff. "Calanus finmarchicus abundance, egg production and growth rates in the Gulf of Maine during winter." Ocean Sciences 2000, San Antonio, TX. 2000.

Durbin, E., M. Casas, J. Pierson. "Interannual variability of *Calanus finmarchicus* on Georges Bank and in the Gulf of Maine: Results from the GLOBEC study." ASLO 2000, Copenhagen, 2000.

Fischer, G. and B.W. Watkins. "A programmable temperature monitoring device for tagging small fish." Sensor and Surface Technology (SST) Seminar, University of Rhode Island, Kingston, RI, Mar. 1997.

Fischer, G., J.C. Daly, C.W. Recksiek, K.D. Friedland, B. Watkins, S. Lee and D. Hyun. "A data logging device for fish habitat observation." Proc. of CMOC 1998. Hartford, CT. March 1998.

Fischer, G. and S. Lee. "Monolithic temperature sensors." URI Partnership for Sensor & Surface Technology, Seminar Series, Kingston, RI, Mar. 1999.

Garrahan, P., E. Durbin, and M. Casas. "Abundance and distribution of hydroids on Georges Bank, 1995-1997." AGU/ASLO Ocean Sciences Mtg. San Diego, Feb. 1998.

Gates, J.M. and P. Logan. "Fishery conservation and development permits for the Atlantic herring fishery." A proposal to the Atlantic States Marine Fisheries Commission Herring Technical Committee, RIAES Contribution No. 3613, 1998.

Hermesen, J.M., J.S. Collie, and P.C. Valentine. "Trapped on Georges Bank: impact of habitat disturbance on

epibenthic invertebrates." Poster received an 'honorable mention' at the Amer. Fish. Society, Hartford, CT, 1998 and ICES/SCOR Symposium on the Ecosystem Effects of Fishing, Montpellier, France, March 1999.

Hermesen, J.M. "Trapping epibenthic scavenging invertebrates on Georges Bank to investigate the effects of disturbance by mobile fishing gear." Student Seminar, Graduate School of Oceanography, University of Rhode Island, Narragansett, RI, Nov. 1999.

Hermesen, J.M., J.S. Collie, and P.C. Valentine. "Ecosystems effects of fishing." Poster presented at the ICES/SCOR Symposium, Montpellier, France, March 1999.

Hermesen, J.M., J.S. Collie, and P.C. Valentine. "Effects of mobile fishing gear on epibenthic scavenging invertebrates on Georges Bank." American Fisheries Society, Southern New England Chapter meeting, June 2001.

Irgoien, X., R.P. Harris, C. Rey, B. Hansen, E.G. Durbin, R.N. Head and R. Campbell. "On the determination of sex ratio in the genus *Calanus*." TASC Symposium. Tromso, Norway. 1999.

James-Pirri, M.J. Catena, C.T. Roman, K.B. Raposa, and S. Adamowicz. "Restoration of tidal flow to the Sachuest Point salt marsh, Middletown, Rhode Island -- Preliminary results." (Poster Presentation) 15th Biennial International Conference of the Estuarine Research Federation. New Orleans, Louisiana, Sept. 1999.

Kenney, R. "Right whale distribution and migratory patterns." Workshop on mitigating right whale mortalities from collisions with ships, New England Aquarium, Boston, MA, April 1997.

Kenney, R. "Right whales in the North Atlantic: Conserving the world's most endangered whale." Explorations: Living on the Edge seminar, URI Office of Marine Programs, Rhode Island Environmental Education Assn., and Rhode Island Geography Education Alliance, Narragansett, RI, Oct. 1997.

Kenney, R. "Preliminary predictive modeling of movement patterns of right whales in Cape Cod Bay" and "Right whales and global climate change." N. Atlantic Right Whale Consortium, N E Aqua., Boston, MA, November 1997.

Kenney, R. "A review of right whale habitat studies in the Great South Channel." Symposium and Workshop: Predicting Right Whale Distribution, National Marine Fisheries Service, NEFSC, Woods Hole, MA. October 1998.

Kenney, R. "Sightings-per-unit-effort (SPUE) analyses of right whale distributions off the southeastern United States." North Atlantic Right Whale Consortium Annual Mtg., Boston, MA. October 1998.

Kenney, R. "North Atlantic right whale calving success: Linkages to the North Atlantic Oscillation, oceanographic patterns, and prey availability." Fourteenth Biennial Conference on the Biology of Marine Mammals, Vancouver, BC, Canada. December 2001.

Klein-MacPhee, G., B.K. Sullivan, D. Van Keuren, E. Horgan, E. Klos. "Mortality of larval cod related to predation by the hydroid (*Clytia gracilis*) on Georges Bank." ICES CM 1997/T:03.

Macy, W. "Utility of statolith parameters to estimate age in *Loligo* squid." Recent Developments in Otolith Research, Bergen, Norway, June 1998.

Mavor, T.P. and J.J. Bisagni. "Tidal variability of SST frontal locations on Georges Bank, 1986-1989." Presentation and poster, 1997 U.S. GLOBEC Scientific Investigators' Mtg., Woods Hole, MA, July 1997.

Mavor, T.P. "Remote sensing applications to the Northwest Atlantic and Georges Bank Region." NSF sponsored workshop on Information Technologies for Spatial Analysis in Global Change Research. Boston, MA, Nov. 1997.

Mavor, T.P. and J.J. Bisagni. "Sea surface temperature fronts in the Georges Bank Region." Ocean Sciences Mtg., San Diego, CA, Feb. 1998.

Mavor, T.P. "Variability of sea surface temperature fronts in the Georges Bank Region." Center for Marine Science and Technology, University of Massachusetts, Dartmouth, MA, Feb. 1998.

- Menendez, J., K. Castro, B. Somers, T. Racine, and J. Catena. "Effects of V-notching and tagging on the American lobster (*Homarus americanus*) at various molt stages." AFS SNEC Meeting, January 2002.
- Merson, R.R., C.S. Casey, B. Soffientino, C. Martinez, M. Chandlee, and J.L. Specker. "Reproductive status of wild-caught female summer flounder." 6th International Symposium on Reproductive Physiology of Fish, Bergen, Norway, July 1999.
- Ohman, M.D., E. Durbin, and J.A. Runge. "Density dependence of instantaneous mortality rates of *Calanus finmarchicus* on Georges Bank." AGU/ASLO Ocean Sciences Mtg. San Diego, Feb. 1998.
- Ohman, M.D., K. Eiane, J.A. Runge, E.G. Durbin, and S.N. Wood. "TASCM-Trans-Atlantic studies of *Calanus finmarchicus* mortality: rates and reasons." TASC Symposium. Tromso, Norway. 1999.
- Oviatt, C. and G. Ellis. "Demise of the winter-spring bloom?" Estuarine Research Federation 16th Biennial Conference, St. Petersburg, FL., November 2001.
- Raposa, K.B. and C.T. Roman. "Quantifying nekton habitat use in three southern New England salt marshes undergoing restoration." Rhode Island Natural History Survey, 4th Annual Conference. Kingston, RI, Jan. 1998.
- Raposa, K.B., C.T. Roman, and S. Adamowicz. "Early ecological responses to restoration of a tidally restricted salt marsh (Sachuest Point, RI)." New England Estuarine Research Society. Halifax, Nova Scotia, Canada, May 1999.
- Raposa, K.B. and C.T. Roman. "Nekton utilization of New England salt marsh habitats under tidally restricted and restoring conditions." Estuarine Research Federation 15th Biennial Inter. Conf. New Orleans, LA, Sept. 1999.
- Roman, C.T., K.B. Raposa, S. Adamowicz, M. James-Pirri, and J. Catena. "Salt marsh restoration in Narragansett Bay: An example from Sachuest Point." Narragansett Bay 2000 Symposium. Narragansett, RI, Jan. 2000.
- Roman, C.T. "The hydrology and ecology of tide restricted marshes." Symposium on Restoration of Salt Marshes - Science and Management. Office of Long Island Sound Programs, Connecticut Dept. of Env. Protection. New London, CT, Jan. 1999.
- Runge, J., S. Plourde, and E. Durbin. "Spatial and temporal variation in *Calanus finmarchicus* recruitment on Georges Bank." TASC Annual Mtg., Copenhagen, January 1997.
- Runge, J., E.G. Durbin, S. Plourde, and Y. Gratton. "Spatial and temporal variation in egg production of *Calanus finmarchicus* on Georges Bank: Implications for the productivity of prey of cod and haddock larvae." ICES CM 1997/T:49.
- Runge, J. J. Quinlan, E.G. Durbin, L. Incze, G. Lough, J. Manning, D. Mountai, B. Niehoff, S. Plourde, and F. Werner. "The effect of spatial and temporal variations zooplankton concentrations on larval cod growth and survival on Georges Bank: a sensitivity analysis based on modeling and observations." ICES CM 2000/M.
- Runge, J., E.G. Durbin, S. Plourde, and Y. Gratton. "Spatial and temporal variation in egg production of *Calanus finmarchicus* on Georges Bank: Implications for the productivity of prey of cod and haddock larvae." AGU/ASLO Ocean Sciences Mtg. San Diego, Feb. 1998.
- Sullivan, B.K., J. Williams, D. Van Keuren, R.G. Lough, and J. Manning. 1997. "Abundance and distribution of planktonic hydroids with respect to larval fish and hydrographic features on Georges Bank." ICES CM 1997/T:02.
- Sullivan, B.K., G. Klein-MacPhee, J. Williams, D. Van Keuren, R.G. Lough, J. Manning. "Planktonic hydroids on Georges Bank (1993-1997): Hydrographic factors influencing abundance, distribution, and impacts on larval fish." AGU/ASLO Ocean Sciences Mtg. San Diego, Feb. 1998.
- Ullman, D., T.P. Mavor, J.J. Bisagni, and P. Cornillon. "Temporal variability in the strength and location of SST fronts on the continental shelf off the U.S. East Coast." Poster at the Gordon Research Conference on Coastal Ocean Circulation, New London, NH, June 1997.