

**2004-2005 ANNUAL REPORT AND
STATEMENT OF PROGRAM DIRECTION
URI/NOAA CMER PROGRAM**

**UNIVERSITY OF RHODE ISLAND
GRADUATE SCHOOL OF OCEANOGRAPHY
SOUTH FERRY ROAD
NARRAGANSETT, RI 02882**

*URI/NOAA Cooperative
Marine Education and Research Program*

*Lawrence J. Buckley
Program Director
(401) 874-6671*

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URI/NOAA Cooperative
Marine Education and Research Program

ANNUAL REPORT AND STATEMENT OF PROGRAM DIRECTION 2004-2005

EXECUTIVE SUMMARY

Now in its sixteenth 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 December 2005, cooperative projects supported by the URI/NOAA CMER Program have totaled 9.6 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 90 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 2005 alone, the URI/NOAA CMER Program supported seven research projects totaling \$729,800.

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 fourteenth 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 90 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. The Program Director, a NMFS employee and Affiliated Professor at URI is stationed on the campus of URI in the Graduate School of Oceanography (Table 5). Several additional Northeast Fisheries Science Center (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 2005 cooperative projects supported through the URI/NOAA CMER Program have totaled 9.6 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 12% of the projects funded. Studies of the effects of contaminants on marine organisms, and fishery statistics and engineering have accounted for 7% and 15% of funded projects respectively. Resource economics and fisheries product development together made up 11% of funded projects. Ecosystem analysis accounted for 13% 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 BASE FUNDS

NOAA through the Northeast Fisheries Science Center provides base funding for the CMER program. In 2004, there were no continuing projects on base funding and two new projects were initiated. Both of the base funded projects begun in 2004 were continued in 2005. 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 (GSO), the Dean of the College of the Environment and Life Sciences (CELS), the Director of the Office of Science and Technology (NMFS), and the Science and Research Director (NMFS) or their designees. A listing of projects supported with 2004-2005 base funds follows.

FY-2005

‘Metabolism and growth of larval and early juvenile haddock’ (Year 2 of 2)

David Bengtson, Department of Fisheries and aquaculture, URI

This study will produce new information on the growth and metabolism of haddock by 1) measuring metabolic rates of larvae at three temperatures (4, 7, and 9°C), 2) determining the relationships between food consumption and growth of larvae at these temperatures and, 3) identifying any metabolic differences between fast- and slow-growing haddock in the early juvenile stage.

“Consequences of transferable days-at-sea on input substitution in the Northeast multispecies fishery: Experimental analysis of capital stuffing”

Christopher Anderson and Jon Sutinen, Department of Environmental and Natural Resource Economics, URI

This project will assess the extent to which input substitution (‘capital stuffing’) affects the efficiency of market transactions under a transferable days-at-sea (DAS) program, and how market volatility affects input limitations. The results will provide information on the risks to effective effort and efficiency that are introduced by trading DAS and help managers and stakeholders to craft complementary input restrictions that advance fishery-specific socioeconomic and biological objectives.

FY-2004

‘Metabolism and growth of larval and early juvenile haddock’ (Year 1 of 2)

David Bengtson, Department of Fisheries and aquaculture, URI

(See description above.)

“Economic aspects of transferable days-at-sea in the Northeast multispecies fishery: An experimental analysis” (This project was supported both base and contributed funds)

Christopher Anderson and Jon Sutinen, Department of Environmental and Natural Resource Economics, URI

This project systematically examines features of a transferable days-at-sea (DAS) program under consideration for the east coast herring fishery. The PIs will use controlled laboratory experiments, in which human subjects play the role of fishermen, to test hypotheses derived from an economic model of lease and permanent markets for DAS under a structured herring fishery. The results will provide information on the consequences of different market features and should result in better design of trading institutions to achieve fishery-specific bio- and socioeconomic objectives.

PROJECTS SUPPORTED WITH 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 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.

FY-2005

“Maintenance, archival, and analysis of western north Atlantic right whale data: 2005-2008 continuation” (Year 1 of 3)

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. This activity has been supported through the URI/CMER Program since its inception in 1989. The project supported the continued maintenance of the archived database, and the incorporation and quality control of newly generated data. Data and data products are provided to cooperating investigators and other interested researchers and agencies. New analyses result in several publications in the peer-reviewed scientific literature. This project contributes to the management of endangered species.

“Narragansett Bay Window”

Candice Oviatt, Graduate School of Oceanography, URI

Jeremy Collie, Graduate School of Oceanography, URI

Larry Buckley, URI/NOAA CMER Program, Graduate School of Oceanography, URI

Peter August, Natural Resource Science, URI

Christopher Deacutis, Narragansett Bay Estuary Program, URI

The project will gather broad, comprehensive data on the state of Narragansett Bay - its waters, tides, creatures, plants and sediments, and the complex interplay among them all. The data collected by the project will help researchers look for answers to a wide variety of questions such as:

- How healthy is Narragansett Bay?
- Is pollution increasing or decreasing?
- Are fisheries management strategies working?
- Is the Bay getting warmer?
- Are dissolved oxygen levels adequate for Bay creatures?

“Documenting and understanding the behavioral interactions between cetaceans and trawl fishing gear in the western Atlantic”

Joseph DeAlteris, Department of Fisheries, CELS, URI

The proposal encompasses several objectives: (1) develop an inexpensive, robust camera system that can be effectively utilized by the fishing industry to attain video data from their fishing gear; (2) collaborate with the fishing industry and the NEFSC Observer Program by teaching fishermen and observers how to outfit trawl gear with cameras when they are fishing in areas with a higher probability of encountering protected species, collect data of on fish and cetacean behavior in the trawl month, and share that data with the fishermen; and (3) develop methodologies to quantitatively analyze video data of animal behavior so as to predict the likelihood of particular behaviors that result in interaction between fishing gear and the protected species.

“Identifying and profiling fishing communities in the Northeastern Region of the United States”

Richard Pollnac, Department of Sociology and Anthropology, URI

This project involves the creation of brief community profiles for use in the Human Environment sections of EISs and as part of the data for determining “fishing community” status under the MSA, with respect to the provisions of National Standard 8. Multivariate data reduction techniques (e.g., cluster analysis, principal component analysis, etc.) will be used to categorize the universe of coastal fishery related communities into groupings that will be useful in objective selection of candidates for profiling and/or more detailed investigation. Further analysis of profiled communities will be used to select representative profiled communities for future research testing aspects of the fishery social impact assessment models.

FY-2004

**“Maintenance, archival, and analysis of western north Atlantic right whale data”
(CMER 02-01C, year 3)**

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. This activity has been supported through the URI/CMER Program since its inception in 1989. The project supported the continued maintenance of the archived database, and the incorporation and quality control of newly generated data.

**“Population dynamics of the shortfin mako (*Isurus oxyrinchus*) in the northwest Atlantic: an examination of food habits, migration survival and population size”
(CMER 03-01C, year 2)**

Jeremy Collie, Graduate School of Oceanography, URI

This study will investigate important aspects of the population dynamics of the shortfin mako. Migration parameters will be estimated using tag-recapture and satellite tag data. Survival and population size will be estimated using tag-recapture, catch and logbook data. Results will provide data and parameter estimates that are essential inputs to stock assessments, and in setting management guidelines. This project will be the basis of a PhD thesis.

“Narragansett Bay Window”

Candice Oviatt, Graduate School of Oceanography, URI

Jeremy Collie, Graduate School of Oceanography, URI

Larry Buckley, Graduate School of Oceanography, URI

Peter August, Natural Resource Science, URI

Christopher Deacutis, Narragansett Bay Estuary Program, URI

The project will gather broad, comprehensive data on the state of Narragansett Bay - its waters, tides, creatures, plants and sediments, and the complex interplay among them all. The data collected by the project will help researchers look for answers to a wide variety of questions such as:

- How healthy is Narragansett Bay?
- Is pollution increasing or decreasing?
- Are fisheries management strategies working?
- Is the Bay getting warmer?
- Are dissolved oxygen levels adequate for Bay creatures?

PROJECTS SUPPORTED ON NO-COST EXTENSIONS

Several projects continued through the period on no-cost extensions.

PROJECTS COMPLETED in 2004-2005

Several projects supported with CMER funds were completed in 2002-03. Requests for reprints or information should be directed to the principal investigators.

“The Use of Microsatellite DNA to Discriminate Stocks of Tautog” (CMER 00-02)

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 developed DNA microsatellite markers to assess the population genetics of tautog. Tri- and tetranucleotide microsatellite markers were obtained by construction and screening of a phage genomic library. Following validation of the markers, tissues were collected from tautog at a variety of locations and assayed for microsatellite loci to provide information on population structure. The research provided the data and tools required for more effective management of tautog.

"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 project was to assess the success of the release of v-notched female lobsters associated with the North Cape Restoration Project. This study included the investigation of v-notching and tagging of lobsters at various molt stages, the effects of double v-notching of lobsters, tagging lobsters with claw bands and analysis of v-notch retention. The study was unable to determine the full effect of v-notching on lobster populations because the tagging, conducted under a separate contract, was stopped due to a high mortality rate and other problems.

"Effects of water temperature on sand shrimp predation on winter flounder" (2 Years) (CMER 02-01C)

Jeremy Collie, Graduate School of Oceanography, URI

This project examined the effects of water temperature on the predator-prey relationship between sand shrimp and young-of-year (YOY) juvenile winter flounder. Respiration and bioenergetics studies were completed to estimate the consumption rate of *Crangon* for a range of temperatures. Laboratory experiments quantified the functional response of sand shrimp feeding on newly settled winter flounder. An immunoassay for winter flounder was developed and used to estimate predation rates by sand shrimp on YOY winter flounder in New England Estuaries.

"Quantifying predation rates of the ctenophore *Mnemiopsis leidyi* on fish eggs and larvae" (CMER 02-02C)

Barbara Sullivan and Grace Klein-MacPhee, Graduate School of Oceanography, URI

This was an intensive study of *in situ* predation by *M.leidyi* on fish eggs and larvae, targeting the peak period of fish spawning in Narragansett Bay. Key variables affecting predation rate were examined in both field and laboratory experiments including ctenophore size, temperature and prey density. Based on these results and refined estimates of ctenophore abundance, predation impact was evaluated for Narragansett Bay and other north temperate ecosystems where *M.leidyi* is abundant.

"A bioeconomic model for the New England multispecies fishery" (CMER 03-02C)

John Gates, Environmental and Natural Resources Economics, URI

This project will develop an extension of a mathematical programming model of the New England multispecies fishery and explore the usefulness of the rights based concept of “partial populations” (PP). Effort was concentrated on the herring fishery in part due to its greater simplicity and the PI’s involvement with the Fisheries Management Plan development for the Atlantic herring fishery.

**“Refinements to, and applications of, the URI/CoastWatch AVHRR-derived SST Archives”
(CMER 03-02C)**

Peter Cornillon, Graduate School of Oceanography, URI

This project was designed to support continued cooperative research and development between scientists at the NOAA/NMFS/NEFSC and URI in the field of remote sensing science. The principle objective was to facilitate the use and application of satellite-derived measurements in order to better describe and understand the marine environmental conditions off the northeast US.

**“Effects of weather on the performance of the NMFS NEFSC survey trawl”
(CMER 03-03C)**

Joseph DeAlteris, Department of Fisheries and Aquaculture, URI

The effect of weather (sea state) on the performance of the NEFSC Yankee 36 survey trawl was evaluated using several avenues of inquiry. A possible outcome of this research would be an operational guideline that provides an upper limit on weather conditions suitable for collection of fishery resource survey data due to compromised performance of the sampling trawl.

PROGRAM DIRECTOR’S RESEARCH ACTIVITIES

The program director’s research was supported in 2004 through grants with University and NMFS co-investigators:

“Development of Atlantic Cod (*Gadus morhua*) and Haddock (*Melanogrammus aeglefinus*) for offshore aquaculture in the US” NOAA Cooperative Institute for New England Mariculture and Fisheries (CINEMar), Open Ocean Aquaculture Demonstration Project

Larry Buckley, URI/NOAA CMER Program

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

George Nardi and Chris Duffy, Great Bay Aquafarms, Newington, NH

“Development of haddock for offshore aquaculture in the US: Broodstock development and juvenile production” NOAA Cooperative Institute for New England Mariculture and Fisheries (CINEMar), Open Ocean Aquaculture Demonstration Project.

Larry Buckley, URI/NOAA CMER Program

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

David Berlinsky, Dept. of Zoology, UNH

**“Stock structure and length-based models of Narragansett Bay winter flounder”
(part of the Narragansett Bay Window project)**

Jeremy Collie URI, GSO

Larry Buckley URI/NOAA CMER Program

These projects provided support to two marine research specialists, a part time biologist and two undergraduate students.

Figure 1. CMER Topics

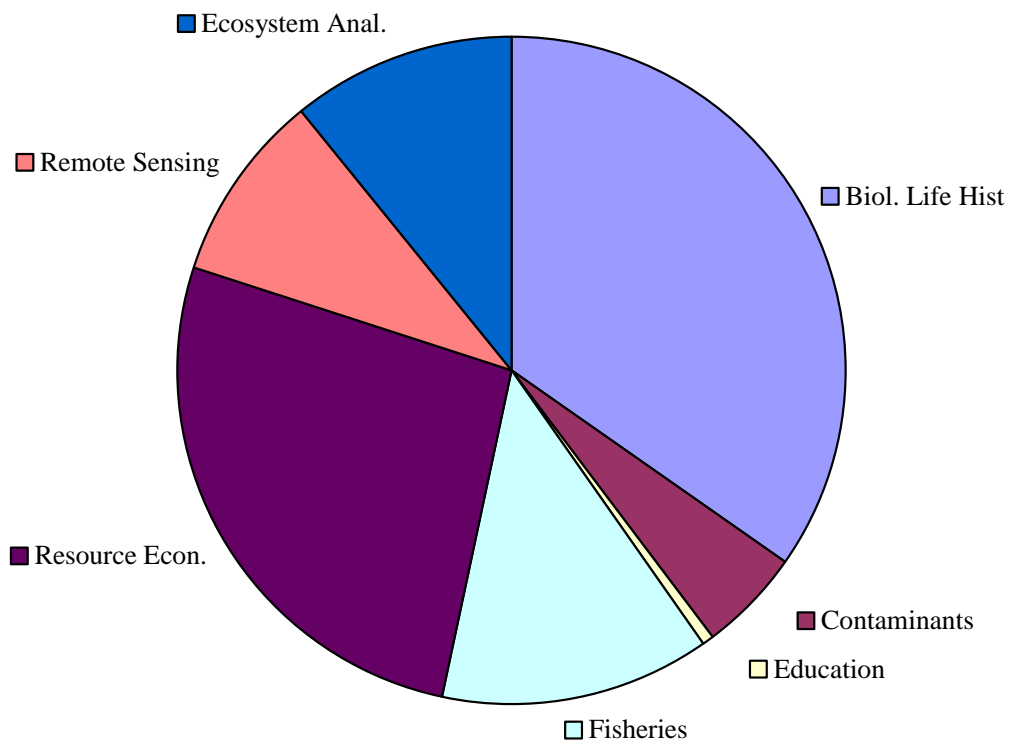


Table 1. Funding for URI CMER Program (Thousands of Dollars)

Fiscal Year	Base	Contributed	Total
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	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
02	69.0	89.0	158.0
03	36.9	341.6	378.5
04	73.9	610.7	684.6
05	73.4	656.4	729.8
Total	1,412.6	8,115.2	9,527.8

Departments represented:

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

Table 2. Cont.

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

Table 2. Cont.

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

Table 2. Cont.

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

Table 2. Cont.

<u>FY</u> _	<u>Short Title</u>	<u>Investigator</u>	<u>Amount</u>
1998	- Harbor Porpoise Tracking System	Miller ^b	30,500 ^C
	- Sachuest Point Restoration	Roman ^b	4,793 ^C
	- Remote Sensing Laboratory	Cornillon ^b	23,301 ^C
		Wood ^c	
	- Active Acoustic Alarms Development	Miller ^b	45,000 ^C
	- Atlantic Herring Management	Gates ^a	26,487 ^B
	- Estimation of Scallop Abundance	Collie ^b	24,178 ^B
	- DNA Fingerprinting of Cod Broodstock	Bradley ^d	30,164 ^B
- Metabolic Studies of Cod & Haddock	Bengtson ^d	36,585 ^B	
	Peck, Oviatt ^b		
1999	- US GLOBEC: Abundance of zooplankton	Durbin ^b	300,000 ^C
	- Variability and SST fronts	Cornillon ^b	32,000 ^C
		Bisagni ^q	
	- Monitoring Northeast Fishing Vessels	Gates ^a	60,183 ^C
	- Estimation of Scallop Abundance	Collie ^b	24,972 ^C
	- Atlantic Herring Management	Gates ^a	29,729 ^B
	- DNA Fingerprinting of Cod Broodstock	Bradley ^d	34,839 ^B
	- Metabolic Studies of Cod and Haddock	Bengtson ^d	37,947 ^B
		Peck, Oviatt ^b	
	- Habitat Enhancement for Lobsters	Cobb ^k	94,042 ^C
	- Marine Mammals	Miller ^p	10,000 ^C
- Maintenance of Right Whale Data Base	Kenney ^b	39,965 ^C	
- Remote Sensing Laboratory	Cornillon ^b	23,059 ^C	
	Wood ^c		
2000	- Market Information and Fisheries Mgt.	Wessells ^a	30,000 ^B
	- DNA Fingerprinting of Tautog	Bradley ^d	36,560 ^B
	- US GLOBEC - Abundance of zooplankton	Durbin ^b	300,000 ^C
	- Maintenance of Right Whale Data-Base	Kenney ^b	79,664 ^C
	- Narragansett Bay Cooperative Study	Oviatt, Durbin ^b	341,150 ^C
		Kester ^b	
	August, Damon ⁱ		
	Colt, Schwartz ^f		
	Mustard ^s		
2001	- Market Information and Fisheries Mgt.	Wessells ^a	29,985 ^B
	- DNA Fingerprinting of Tautog	Bradley ^d	37,641 ^B
	- US GLOBEC - Abundance of zooplankton	Durbin ^b	300,000 ^C
	- Habitat Enhancement for Lobsters	Cobb ^k	40,450 ^C
	- Maintenance of Right Whale Data-Base	Kenney ^b	84,905 ^C
	- Northcape Restoration Monitoring	Castro ^d	229'298 ^C
	Collie, Delong ^b		
2002	- Temperature and sand shrimp predation	Collie ^b	36,947 ^B
	- Ctenophore predation on fish eggs	Sullivan, MacPhee ^b	32,098 ^B
	- Maintenance of Right Whale Data-Base	Kenney ^b	89,393 ^C

Table 2. Cont.

<u>FY</u>	<u>Short Title</u>	<u>Investigator</u>	<u>Amount</u>
2003	- Temperature and sand shrimp predation	Collie ^b	36,947 ^B
	- Shortfin mako population dynamics	Collie ^b	44,465 ^C
	- Northern Right Whale archive	Kenney ^b	117,851 ^C
	- Bioeconomic model of NE fisheries	Gates ^a	55,322 ^C
	- URI/Coast Watch	Cornillon ^b	36,900 ^C
		Wood ^c	
	- Performance of survey trawl	DeAlteris ^d	87,041 ^C
	- Haddock Aquaculture	Buckley	152,620 ^C
2004	- Northern Right Whale archive	Kenney ^b	124,929 ^C
	- Shortfin mako population dynamics	Collie ^b	44,465 ^C
	- Narragansett Bay Cooperative Study	Oviatt ^b	206,000 ^C
		Collie, Buckley ^b	
		August ^f	
		Deacutis ^b	
	- Metabolism of fish larvae	Bengtson ^d	35,000 ^B
		Peck ^b	
- Economic analysis of transferable days at sea	Anderson, Sutinen ^a	121,970 ^{b,c}	
- Haddock Aquaculture	Buckley ^b	152,094 ^C	
	Bradley ^d		
2005	- Northern Right Whale archive	Kenney ^b	139,970 ^C
	- Narragansett Bay Cooperative Study	Oviatt ^b	413,232 ^C
		Collie, Buckley ^b	
		August ^f	
		Deacutis ^b	
	- Metabolism of fish larvae	Bengtson ^d	35,000 ^B
		Peck ^b	
	- Transferable days at sea input substitution	Anderson, Sutinen ^a	38,395 ^b
- Cetacean and turtle behavior	DeAlteris ^d	63,384 ^C	
- Fishing communities	Pollnac	39,820 ^C	

B Base CMER Program funds

C Funds contributed to the CMER Program

* Support for R/V Gloria Michelle

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 ¹ , C ²)
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.)
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.)
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.)
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,T,C) K. Collins (Ph.D.) W.Saumweber (Ph.D.) Bronwynn Cahill (Ph.D.) Catalina Martinez (MS) Mark Brush (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.) 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	Tim 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(MS, T., PhD.)
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, T., PhD.)
00-NB1	NB Winter Spring Bloom Intensity	G. Ellis (MS)
00-NB1	NB Temperatures and Properties	Hongwei Chen (MS) J. Fisher (Ph.D.)
02-01	Temperature and sand shrimp predation on winter flounder	D.L.Taylor (Ph.D.)
02-02	Ctenophore predation on fish	A. Allen (MS)

¹T - Thesis on topic supported by CMER

²C - Degree requirements completed

³ 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 in Residence
Marine Biochemist
Graduate School of Oceanography
Coastal Institute Building

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

Jay O'Reilly

Biologist / Adjunct Professor Oceanography
NEFSC, Narragansett Laboratory

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

OCG 693V:	Fishery Oceanography Fall 1993, 1995, 1997, 2001, 2003, 2005	Larry Buckley (with Dr. Jeremy Collie)
ASP 487X:	Pathobiological Effects of Contaminants on Fish Spring 1996	Joel Bodammer (with Dr. Richard Wolke)
FST 392:	Anadromous Fish and Fish Passage Spring 1996	Alan Blott
OCG 693I:	Cetaceans: Population Dynamics and Assessments Fall 1993, 1994	Tim Smith
REN 426X:	Economics of Property Rights to Natural Resources Fall 1993	Steven Edwards
OCG 670:	Fish Population Dynamics Spring 1990, 1991, 1992	Michael Fogarty
OCG 694V:	Pollutants in the Marine Environment Spring 1991	Garry Mayer
ZOO 675:	Advanced Ecology Seminar Fall 1991	Michael Fogarty (with Dr. Saran Twombly)
ZOO 691:	Community Ecology 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. (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)
Erling Otterlei	U Bergen, Ph.D. (C)
Tarquin Dorrington	GSO, Ph.D.
Rebecca Jones	FAVS, MS (C)
Arpita Choudury	FAVS, MS (C)
Steven Gavlik	GSO, Ph.D. (C)
Rachel Howell	FAVS, MS (C)
Mark Watson	FAVS, MS (C)
Julie Saint Andre	GSO, MS (major prof., D)
Joseph Cofone	GSO, MS (C)
Jessica Henderson	FAVS, MS (C)

Jerome Hermsen	GSO, Ph.D. (C)
Janalyn Sanders	FAVS, MS (C)
Steve Cadrin	FAVS, PH.D (C)
Jennie Mandeville	UNH, MS (C)
Jaques Zarate	FAVS, PH.D
Phil Edwards	FAVS, MS (C)
Jennifer Andrew	FAVS, MS
Jennifer McCarthy	UMass, DNRC, 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.

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 (C)
Carolyn Belcher	Statistics, MS (C)
Allison Ferreira	Marine Affairs, MS
Brian DeAngeles	FAVS, MS

Jay O'Reilly

Kim Whitman Hyde	Oceanography, Ph. D.
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C - degree requirements completed
D - dropped out of program

Appendix I. CMER Supported Publications

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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.

Bradley, M., C. LaBash, B. Somers, K. Castro. "Lobster migration and movement in Narragansett Bay, RI, USA" Poster Presentation. ESRI Conference. August 2002.

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, 1st 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.

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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.G., 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.

Durbin, E.G., M.Casas. "Interannual variability of zooplankton on Georges Bank and in the Gulf of Maine: Results from the GLOBEC study." 3rd International Zooplankton Production Symposium. Gijon, Spain. May, 2003

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.

Irigoien, 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.

Kenney, R. "Dolphins of southern New England." Part of a fund-raising event with a special presentation of *Dolphins*, Audubon Society of Rhode Island, Feinstein IMAX Theater, Providence, RI, February 2003.

Kenney, R., "Linking climate (ENSO & NAO) to North Atlantic right whale reproduction." Bowhead/Right Whale Comparative Health and Physiology Workshop, New England Aquarium, Boston, MA, March 2003.

- 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.
- Ohman, M.D., K. Eiane, E.G. Durbin, J.A. Runge, H.-J. Hirche. "A comparative study of *Calanus finmarchicus* mortality patterns in five localities in the North Atlantic." 3rd International Zooplankton Production Symposium. Gijon, Spain. May 2003.
- Oviatt, C. and G. Ellis. "Demise of the winter-spring bloom?" Estuarine Research Federation 16th Biennial Conference, St. Petersburg, FL., November 2001.
- Perry, R.I., H.P. Batchelder, S. Chiba, E.G. Durbin, W. Greve, D.L. Mackas, H.M. Verheye. "Identifying global asynchronies in marine zooplankton populations: issues and opportunities." 3rd International Zooplankton Production Symposium. Gijon, Spain. May, 2003.
- 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.
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- Runge, J. A., 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.A., F.E. Werner, E.G. Durbin, J.A. Quinlan, K. Pehrson-Edwards, R.G. Lough, L.J. Buckley, S. Plourde, M.D. Ohman. "The effect of spatial and temporal variation in zooplankton concentrations on larval cod growth on Georges Bank: A comparison of two years based on modeling and observations." 3rd International Zooplankton Production Symposium. Gijon, Spain. May, 2003.
- Somers, B. "Lobster studies in Rhode Island - Monitoring the North Cape Lobster Restoration Project 2002-2002" Poster Presentation. Fish Expo. October 2002.
- 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.
- Taylor, D.L. "Evidence of sand shrimp predation on juvenile winter flounder from three northwestern Atlantic estuaries" Southern New England Chapter American Fisheries Society Meetin, Bristol, RI. June 2002.
- Taylor, D.L. "Detecting juvenile flounder in the stomachs of invertebrate predators with the Quchterlony immunoassay." New England Estuarine Research Society Meeting, Bar Harbor, ME. May 2002.
- 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.