2005

Maine Sea Grant Annual Report 2005

Maine Sea Grant

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This annual report summarizes the accomplishments and activities of the Maine Sea Grant Program from October 1, 2004 to September 30, 2005. We have organized the report by program areas: management, research, extension, education, and communications. The projects and activities in marine extension section are grouped according to our four theme areas: ecosystem health, coastal communities, fisheries, and aquaculture. If you have any questions about the Maine Sea Grant Program, please contact one of our staff members listed at the end of the report, or visit our Web site at: www.seagrant.umaine.edu.

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A MESSAGE FROM THE DIRECTOR

I recently read about a study that evaluated how our nation’s children spend their time in school, in the home, and at play. The disturbing finding was just how little time our youth spend in the outdoors connected to nature. Even playtime is dominated by indoor activities, mainly those involving a television, computer, or video games. An uncertain, yet troubling, consequence of this lack of contact with nature is the likelihood that, as this generation of tomorrow’s productive citizens develops, they will lack the sensitivities and sensibilities that come from being connected to our natural environment.

As we all go about our daily activities, rushing to-and-fro, sitting in traffic, and hurrying to our next task, this disconnection becomes a common fact of our lives. The fear is that, as we lose the connection to our natural environments, we may pay less attention to the many nature-based issues for which we have responsibilities.

Although Sea Grant is but one of the many research and education programs addressing issues in the natural coastal environment, we must play a role in connecting people to nature. Through our activities in schools and communities, we can provide opportunities for citizens to learn about coastal environments and related issues, and help to engage them in science and decision-making through stewardship and other participatory activities.

In this annual report, you will find many examples of Maine Sea Grant’s diverse research and education programs, which provide science to decision-makers; however, more importantly, they offer opportunities for our citizens, young and old, to participate in science-based learning. Not only does this remove some of the mystery from science, but it also helps to build a more educated citizenry that is connected to the natural processes that create and maintain our environment. This year’s annual report is organized to illustrate the individual, issue-based, projects that we conduct, while also demonstrating the interconnection of these issues along our coast. In this way, we show how members of the Marine Extension Team, communications staff, and researchers pool their expertise and resources to address the most pressing coastal issues facing the state. Four issue areas are described: community-based natural resource management, sustainable seafood, stewardship through citizen science, and planning for the future of coastal communities—each of which has an applied focus and provides ample opportunity to connect people to our coast.

In early 2006, Maine Sea Grant will hire an education coordinator to help deliver our programs to the formal education community and to help teachers find ways to reconnect our youth to the natural environments. Life is not a spectator sport; we hope that you too will make the time to walk your coast this coming year, and stay connected to the natural environment that we all cherish.
PROGRAM ELEMENTS

Management

In June 2005 Maine Sea Grant hosted the national Sea Grant Network for the biennial Sea Grant Week. The conference, titled “Rising to Tomorrow’s Coastal Challenges,” brought together Sea Grant professionals from around the country to learn together, network, and develop strategies for future programming. More than 300 attendees heard from a series of plenary speakers about critical coastal and ocean issues while enjoying Maine’s hospitality and beautiful scenery. It was our privilege and pleasure to host this event, and we feel we succeeded in providing a quality place for the Sea Grant Network to rise to our country’s many coastal challenges.

Maine Sea Grant’s management team includes: Director, Paul Anderson (who also serves as Extension Program Leader); the Associate Director for Outreach, Susan White; the Assistant Director for Research, Jim McCleave; and Fiscal Officer, Lynn Wardwell. This group meets regularly and continues to manage the program collaboratively, with decisions about staffing and project selection shared among the team.

Maine Sea Grant, in partnership with MIT Sea Grant and others, was successful in obtaining a National Strategic Initiative award from the National Sea Grant Office for a project in the Aquatic Nuisance Species Program. As part of this collaborative project, Maine Sea Grant will develop protocols and materials for training and recruiting members of the recreational diving community on how to identify and report the incidence of invasive species.

The University of Maine supported a proposal from the Marine Extension Team to purchase vessels for use in extension and research activities. With a $40,000 award from the research and development funds from the State of Maine, Maine Sea Grant was able to purchase four, 18-foot Lund workboats with trailers, which will be stationed along the coast to be used by MET members. We anticipate this to be a major contribution to our work in coastal communities for monitoring and applied research projects.

Beginning this year, Maine Sea Grant switched to a biennial call for proposals for Sea Grant-sponsored research. Up until now, Maine Sea Grant has conducted annual competitions for research funds, but we have found this to be inefficient, as the pool of available funds has remained constant and the cost of conducting research has increased. Although this limits our responsiveness, we hope that we will continue to attract high caliber proposals to address timely needs for scientific research.
Funding and budget

The overall funding for Maine Sea Grant in 2004-2005 was $1,713,778 with $1,059,909 in federal funds and $653,869 in non-federal matching funds (Figure 1). The federal award includes base funds, as well as Fisheries Extension Enhancement, Coastal Community Development, Smart Growth, and researcher ship time funds. Matching funds are derived from a combination of University of Maine resources (including the Maine Economic Improvement Funds and other University resources) and match provided by host institutions that received research awards from Maine Sea Grant.

Figure 2 shows the Maine Sea Grant budget for 2004-2005, indicating how federal funds and matching funds were allocated to various program elements. As indicated in the graphic, $619,396 (Research and Program Development) of these funds supported competitive research projects in 2004-2005. The balance of the program budgets covered extension/education ($250,417), communications ($190,123), management ($524,059), Coastal Community Development ($72,774), Marine Protected Area outreach work ($31,009), and researcher ship time ($26,000).
Research

Research sponsored by the Maine Sea Grant College Program focuses on themes identified in the current strategic plan: aquaculture, coastal communities, ecosystem health, and fisheries. We work with our Policy Advisory Committee to establish priorities and provide guidance to researchers. A panel of in-state stakeholders reviews preliminary proposals to ensure that Maine Sea Grant funds research that is relevant to the needs of Maine’s coastal communities, the state as a whole, and the Gulf of Maine region, whether the impacts are immediate or longer term. A review process for full proposals, including out-of-state peer reviewers and an out-of-state scientific panel, ensures that high quality research is supported.

Research in our program is accomplished in three ways, which are often interconnected: competitively awarded research grants from both Maine research funds and national solicitations; program development grants to investigators in the state and region (listed below); and research activities of members of the Sea Grant Marine Extension Team (MET), listed in the “External Grants” section of this report. All research includes an outreach component to ensure that results are available to industry, governmental and non-governmental entities, and other interested individuals.

Thirteen full research projects and several seed development projects were under way or were completed in 2005.

Full Research Projects

Aquaculture

A biosensor platform for detection of fish pathogens. Paul Millard, a chemical engineer, and Carol Kim, a molecular biologist, and their colleagues in the University of Maine Laboratory for Surface Science and Technology are developing electronic technologies to create inexpensive hybrid biosensors that can be used to detect microbial pathogens in marine finfish and shellfish. So-called “padlock probes” consist of segments of pathogen-specific RNA or DNA attached to gold or silicon-dioxide sensor surfaces. The probes can capture and copy minute amounts of RNA or DNA from a pathogen if it is present in a fish or shellfish. With preliminary funding from Sea Grant, the investigators have succeeded in developing padlock probes for two viruses, including infectious salmon anemia. Their techniques have shown promise and have led to further funding from the National Science Foundation and to collaboration with a Maine business.

Phytoplankton carrying capacity in the Damariscotta River estuary. The Damariscotta River is a prime region for aquaculture of eastern oysters (Crassostrea virginica) and blue mussels (Mytilus edulis). Twelve oyster farms in the Damariscotta lease about 100 acres of surface and bottom waters for aquaculture. Questions have arisen from growers, regulators, and environmental groups about the number of farms that the estuary can support. Key to predicting an estuary’s carrying capacity for shellfish cultivation is an understanding of the temporal and spatial characteristics of phytoplankton abundance and production and the factors controlling them, since both oysters and mussels depend on phytoplankton for food. Mary Jane Perry, a University of Maine biological oceanographer, and Christopher Davis of the Maine Aquaculture Innovation Center are attempting to understand environmental factors responsible for the high variability in phytoplankton biomass in the Damariscotta.
Coastal Communities

Assessment of clam management in Casco Bay. Soft-shell clams (Mya arenaria) are the basis of a $16 million annual fishery in Maine. The state has allowed municipalities to manage the clam resources under local ordinances since 1963, and local management has varied widely from town to town over time. With increased interest in decentralized fisheries management in Maine, the history of clam management makes a good case study. University of Maine economist Ralph Townsend is assessing the effectiveness of municipal-level management of soft-shell clams in Casco Bay. Using historical data and local knowledge to trace the evolution of management, Townsend will assess the sustainability, status, and landings of the resource under local management; conduct a cost-benefit analysis of local investment in clam flat restoration; and compare Casco Bay municipalities with others statewide.

Enhanced spore production for net-seeding of native New England Porphyra in integrated finfish/seaweed aquaculture. Susan Brawley and graduate student Nicolas Blouin from the University of Maine are studying the feasibility of using native species of the marine alga Porphyra spp. (known popularly as “nori” or “laver”) in sustainable, integrated mariculture. When grown on or near finfish farms, shellfish and sea vegetables such as Porphyra can utilize excess particulates and nutrients generated by the fish, potentially reducing negative environmental impacts from finfish aquaculture.

There are at least seven species of Porphyra that are native to the New England coast. Brawley’s investigation focuses on Porphyra umbilicalis, because it can reproduce asexually and thus is easier to culture. The investigators collaborated with Heritage Salmon (now Cooke Aquaculture) and Professor Xiugeng Fei and Dr. Peng Jiang from the Chinese Academy of Sciences in Qingdao to experiment with culture methods on a salmon lease site in Cobscook Bay in the summer of 2005. Thirty nets were seeded with Porphyra spores at the University of Maine Center for Cooperative Aquaculture Research and the nets were then transferred to rafts at different distances from finfish pens in Cobscook Bay. This pilot study was an important step in development of technology for growing P. umbilicalis in integrated mariculture, and fostered a strong university/industry partnership.

Sea vegetable culture can also provide a commercial benefit: Asian species of Porphyra represent a $2 billion industry in China, Japan, and Korea. Brawley and Blouin are collaborating with Maine Coast Sea Vegetables (Franklin, ME), the University of Maine’s Maine Marketplace Dining Services, and Professor Denise Skonberg from the Department of Food Science and Human Nutrition to develop a strong domestic market for Porphyra that goes beyond traditional Asian cuisine. Porphyra species are good sources of protein, vitamins and other nutrients. In December, Dining Services will hold a sea vegetable promotional day and serve dishes created by university chefs. Continuing Sea Grant-sponsored research will profile nutritional characteristics of P. umbilicalis in pilot mariculture projects, further develop culture techniques, and study the underlying basis for asexual versus sexual reproduction in P. umbilicalis.
**Ecosystem Health**

**Monitoring mercury fluxes in estuarine sediment porewaters using novel reactive membranes.** Aria Amirbahman and Karen Merritt from the University of Maine Department of Civil Engineering are field-testing methods for detecting mercury contamination in the Penobscot River estuary, where elevated mercury levels are the legacy of an upstream industrial source. Sediment porewaters provide a mechanism for transferring mercury into the water column or into organisms dwelling in the sediments. Amirbahman and Merritt are experimenting with various methods for sampling saturated sediments, including using small mercury-specific sensors made with chitosan membranes derived from crab-shell chitin. Their work, which is now continuing with funding from an EPA STAR fellowship and the National Science Foundation, is contributing to the broader assessment and remediation of the Penobscot River estuary.

**Monitoring of coastal dynamics at the Saco River mouth near jetty modifications and beach nourishment projects.** Daniel Belknap and Joseph Kelley from the University of Maine and Stephen Dickson from Maine Geological Survey are studying sand transport in Saco Bay, where a paired jetty system was constructed to stabilize the Saco River mouth tidal deltas to facilitate commercial navigation. The North Jetty, one of the largest along the East Coast, was enlarged based on the belief that sand was moving south into the estuary from beaches to the north. Previous research by this team, also supported by Sea Grant, showed that sand moves from the Saco River toward the north. The current project is detailing water currents and sediment transport in the river and bay, information which will be analyzed by the U.S. Army Corps of Engineers as they propose modifications to the jetty to reduce coastal erosion and property loss.

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**RESEARCH HIGHLIGHT**

**Wave predictions for the coastal Gulf of Maine.** Vijay Panchang, formerly of the University of Maine and the National Sea Grant Office, now at Texas A&M University at Galveston, and his colleagues have developed and implemented a 48-hour wave forecasting model for the Gulf of Maine and several smaller coastal areas within the Gulf. The wave model SWAN (Simulation of Waves in Nearshore) was used to simulate waves in selected coastal regions of the Gulf of Maine. NOAA already provides global wave and wind forecasts and hindcasts, but because the topography of the coastal Gulf of Maine sea floor is extremely complicated, a higher-resolution bathymetry was needed to accurately simulate nearshore waves in coastal embayments. Ocean wind and wave information provided by NOAA is entered into the SWAN model, which can both hindcast and forecast waves based on the NOAA predictions every twelve hours. The results are automatically archived and uploaded to Texas A&M University at Galveston Web site, (http://www.tamug.edu/mase/Wave_file/wave%20simulations.htm).

Charts based on the model runs show predicted wave heights (meters) and wave periods (seconds) as contours and false colors for Penobscot Bay, Machias Bay, Muscongus Bay, Pleasant Bay, and Saco Bay in Maine, as well as for Massachusetts Bay and Portsmouth Harbor, New Hampshire.
Assessing potential population-level effects of pesticide and herbicide toxicity to soft-shell clams in Maine. University of Maine marine scientists Rebecca Van Beneden and Sara Lindsay are investigating the toxicity to soft-shell clams (Mya arenaria) of three common biocides used in coastal environments in Maine. Populations of soft-shell clams in eastern Maine have declined substantially in the last decade for unknown reasons. It has been speculated that runoff into coastal waters of agricultural pesticides and herbicides may be a contributing factor. Hexazinone is a broad-spectrum herbicide used widely on blueberry fields in eastern Maine; imidan is an organophosphate insecticide known to be toxic to fishes; and 2,4-D is a widely used herbicide in agricultural and non-agricultural applications. The research team is investigating the effects of these chemicals on the growth, reproduction, and mortality of soft-shell clams. The results of these studies will be incorporated into a model of the life cycle of clams.

Fisheries

Developing a Bayesian stock assessment framework for the American lobster (Homarus americanus). Yong Chen, a population dynamicist from the University of Maine, is the lead investigator in the development of a new stock assessment model for the Gulf of Maine lobster fishery, the most valuable commercial fishery in Maine. Previous models have repeatedly led to the conclusion that the resource is overfished, yet landings continue at sustained high levels. The new Bayesian assessment model developed by Chen and his team will be adopted by the Atlantic States Marine Fisheries Commission (ASMFC) at the time of the next stock assessment. The ASMFC Lobster Stock Assessment Peer Review Committee reached the following conclusion about the team’s model: “The best way to move forward and improve the modeling of American lobster is to transition in the next assessment cycle to the new size-structured model...The new model provides a better foundation to implement these changes...The size-structured model is now on par with similar state-of-the-science models worldwide and in the U.S. to provide quantitative management advice for valuable fisheries.”

RESEARCH HIGHLIGHT

Population structure of sea scallops, Placopecten magellanicus, in two coastal embayments in Maine. Paul Rawson and graduate student Erin Owen have a three-pronged approach for examining sea scallop populations along the coast of Maine. First, they will use population analyses and DNA techniques to find out if the scallop populations in different geographic areas (Cobscook and Penobscot Bays, Gulf of Maine, Bay of Fundy) are genetically distinct from each other. Second, the researchers will investigate if the geochemical signature, or fingerprint, of larval scallop shells accurately reflects the temperature and salinity of ambient seawater. If so, the geochemical composition of larval scallop shells collected from Cobscook and Penobscot bays will be determined to reconstruct trajectories of larval dispersal. Third, Rawson and Owen will measure the settlement of early juvenile scallops, called spat, to determine whether larval settlement patterns differ significantly between Cobscook and Penobscot bays, and whether variation in juvenile sea scallop growth and survival in these bays is due to genetic divergence or variation in habitat quality.
The effects of herring bait on lobster population dynamics and the benthic community. Jonathan Grabowski and Erika Clesceri from the Gulf of Maine Research Institute are investigating whether the use of Atlantic herring (*Clupea harengus*) as lobster bait is providing nutrition for the lobsters. To determine whether fishermen are “farming” lobsters by feeding them herring, the marine biologists will determine the amount of herring consumed by lobsters, the proportion of lobster tissue derived from herring bait, the amount of growth attributable to bait, and the effect of discarded bait on the benthic community. Comparisons are also being made between fished and seasonally closed areas of coastal Maine.

Environmental controls on shrimp recruitment dynamics. Northern shrimp (*Pandalus borealis*) are economically valuable, but their populations vary widely from year to year because they are at the southern end of their geographic range in the Gulf of Maine. What is the relationship between the distribution of larval northern shrimp, and physical and biological oceanographic features? Preliminary results of a study by David Townsend (University of Maine), Lewis Incze (University of Southern Maine), and Daniel Schick (Maine Department of Marine Resources) show that shrimp larvae in spring are most abundant within 10-20 km of shore, and that egg-bearing females are most abundant in winter. It also seems that shrimp larvae from western coastal Maine are transported, in part, toward Massachusetts Bay by the Western Maine Coastal Current.

An agent-based model of the Maine lobster fishery. Lobster distribution varies from area to area based on the bottom type, depth, geographical orientation (important for settlement) and, most importantly, the history of recent fishing in the area. Furthermore, in the same area, the catchability of lobsters changes from season to season because of differences in water temperature. As a result, lobstermen continually improve strategies for where and when to move their traps. University of Maine researchers James Wilson, David Hiebeler, and Yong Chen developed an innovative way to model how fishermen develop different sets of fishing strategies based on environmental and social conditions. Their results may lead to a better understanding of what has worked in the Maine lobster fishery, where effective stewardship is partly a result of group fishing territories.
Program Development Projects

The Maine Sea Grant Program has a modest pool of funds reserved for program development. Most of these funds are used for small research awards to help scientists prove a concept or collect preliminary data that can then be used to develop full research proposals to Sea Grant or other funding agencies. These funds are also available for conference and travel support, as well as for other types of programming that is consistent with Maine Sea Grant’s mission. Although there is no formal request for proposals and these funds are generally available throughout the year, the Maine Sea Grant Program has recently established a protocol that provides more organizational guidance in the use of these limited funds. For example, proposals submitted to the program via the Project Proposal Form (available at www.seagrant.umaine.edu) are received throughout the year, but are evaluated on three scheduled decision points: June 1, October 1, and February 1. This allows the program to ensure that this type of funding is available throughout the year for issues that require an urgent response. The program allocates these funds in a manner similar to the general Sea Grant budget as follows: research – 50%; extension / education – 30%; workshops / conferences – 10%; and other – 10%.

Research and Education Projects

Beal, B. Investigating the Efficacy of Lobster Nurseries for Stock Enhancement. $5,000. (University of Maine at Machias)
Supported a study to determine whether lobster growth and survival vary with different nursery culture practices and to what size lobsters can be reared in nursery cages in the field.

Brawley, S. Collaboration with Professor Fei Xingeng: Pilot Nori Farm. $5,000. (University of Maine)
Supported the travel of a Chinese scientist, renowned for integrated marine mariculture using algae, and his assistant to Maine to collaborate with Brawley on development of a pilot-scale farm for culturing nori, an edible seaweed.

Carmichael, R. Assessing the Potential for Successful Culture of the Atlantic Horseshoe Crab, Limulus polyphemus, in Maine. $5,500. (University of Maine at Machias)
Supported preliminary research to refine horseshoe crab aquaculture methods; to define the economic, ecologic, and educational implications of crab culture; and to assess the effects of culture on local crab populations.

deCharon, A. MITZI – Maine Intertidal Zone Investigation. $5,000. (Bigelow Laboratory for Ocean Sciences)
Supported development of a virtual, interactive rocky intertidal zone, allowing students to learn about species that reside in the intertidal zone and about patterns and processes that govern ecosystem structure in this habitat.

Hall, S. Diet, Nest Attendance and Foraging Areas of Arctic and Common Terns Breeding on Seal Island, NWR: Maine’s Largest Tern Colony. $5,900. (National Audubon Society)
Supported research aimed ultimately at determining the relationship between tern diets and locally important stocks of commercial fishes, especially Atlantic herring.
MacRae, J. *Microbial Fuel Cells to Accelerate Biodegradation Under Anaerobic Conditions: A Low-maintenance, Environmentally Friendly Approach to Sediment Bioremediation.* $2,000. (University of Maine)

Supported proof-of-concept research to determine feasibility of using microbial fuel cells to remediate sediments affected by aquaculture operations, oil spills, or nonpoint-source pollution.

Miller, S. *Sears Island Planning: Analysis of an Education, Recreation and Ecotourism Future.* $5,000. (Islesboro Islands Trust)

Supported comparative cost-benefit analysis of three levels of marine ecological, maritime historical, and recreational development of Sears Island, an undeveloped 940-acre island in Penobscot Bay.

Rajakaruna, N. *Metalliferous Plants of the Callahan Mine: Plant Diversity, Heavy Metal Tolerance, and Potential for Phytoremediation.* $5,600. (College of the Atlantic)

Supported preliminary research to determine the plant species composition at the Callahan Mine, an EPA Superfund site, and to determine the potential to remediate heavy metal contamination of soils by uptake into plant tissues.

Robbins, S. *Comparison Between Fishing Community of Stonington-Deer Isle (Maine) and Small Iceland Fishing Communities.* $1,500. (Independent Fisherman)

Provided travel for fishermen and students from a coastal Maine community to compare their fishing economy with that of an island nation, Iceland, which is heavily dependent economically on Atlantic cod.

Seeley, R. *Assembling the History of a Marine Invasive Species in Maine: Water Temperature as a Predictor of Green Crab (Carcinus maenas) Outbreaks from 1956 to 2005.* $2,500. (Cornell University)

Supported time-series analysis of invasive green crabs over 30 years in relation to coastal sea-surface temperature, to test hypotheses that crab abundance is greater during warmer years, especially in eastern Maine.

Snyder R. *Mapping Maine’s Working Waterfronts.* $5,000. (Island Institute)

Supported a comprehensive inventory of Maine’s working waterfronts and enabled stakeholders to identify critical working waterfront infrastructure.

Townsend, R. *Graduate Student Support for Research Comparing the Management and Biology of Lobster Fisheries in Multiple Countries.* $5,000. (University of Maine)

Funded a portion of travel for a graduate student to visit lobster management officials and lobster fishers in New Zealand and Australia for comparison with lobster management in Maine and maritime Canada.
**Conference/ Publication Support**

Castro, K. *Proceedings: Lobsters as Model Organisms for Interfacing Behavior, Ecology, and Fisheries*. $1,000. (Rhode Island Sea Grant)

Partially funded publication of the proceedings of a lobster symposium held at the University of Rhode Island.

Couture, D. *Biotoxin Meeting*. $500. (Maine Dept. of Marine Resources)

Supported a two-day meeting of U.S. and Canadian scientists and managers to update their knowledge of recent harmful algal blooms.

DeVoe, R. *7th International Conference on Shellfish Restoration*. $500. (South Carolina Sea Grant)

Provided support for a conference where scientists, resource managers, users, community leaders, and citizens exchanged information on ecology and exploitation of shellfish resources and shared approaches to coastal ecosystem restoration.

Hoyt, S. *Learning from the Canadians: An Interactive Regional Workshop on Improving Sea Urchin Management in Maine*. $3,000. (University of Maine Cooperative Extension)

Supported transfer of knowledge of east- and west-coast Canadian sea urchin research and management to the Maine urchin industry, Sea Urchin Zone Councils, and the Department of Marine Resources.

Neal, B. *Science and Policy for Maine Groundfish*. $1,500. (Island Institute)

Supported a one-day workshop on relevant research on groundfish, especially Atlantic cod, and implications for management and conservation in Maine.

Olsen, V. *ISSC Conference*. $1,400. (Shellfish dealer)

Supported the travel of a soft-shell clam industry member to the Interstate Shellfish Sanitation Conference, where she sits on several committees representing Maine’s clam industry.

Vadas, R. *Northeastern Naturalist Special Issue, Ecosystem Modeling in Cobscook Bay, Maine: A Boreal, Macrotidal Estuary*. $1,000. (University of Maine)

Supported publication of 17 papers in a special issue of *Northeastern Naturalist*, presenting the latest scientific information on Cobscook Bay, including sediment distribution, nutrient supply, plant and algal production, biodiversity, and circulation and ecosystem modeling.
Marine Extension

Maine’s Marine Extension Team (MET), a collaboration of University of Maine Cooperative Extension and Sea Grant, includes our Sea Grant extension associates, four Cooperative Extension faculty and professional members, and the marine extension program leader. The team works with resource users and communities to address problems and respond to opportunities in ecosystem health, coastal communities, aquaculture, and fisheries. By providing a balanced approach to facilitation and building collaborations, MET staff help decision-makers and stakeholders identify information needs and foster opportunities to fill those data gaps.

Marine extension staff members are an important link between the state’s marine scientists and information users. Working with the University and other marine science institutions in the state, MET members disseminate research results to address the needs of coastal communities. In addition to providing scientific information, the MET conducts outreach programs and facilitates discussions to obtain input from the state’s citizens. Through these processes, communities and other stakeholders gain the capacity to make informed decisions about the management of coastal and marine resources.

In the past year, this dynamic team has been involved in projects that run the gamut. We have organized them by four crosscutting issue areas—community-based natural resource management, sustainable seafood, citizen-science stewardship, and coastal community planning. These issue areas incorporate the four theme areas listed above but represent more accurately the way the team works. Members with expertise in different theme areas join together to address issues that are most important to the state and region. These activities are discussed in the “Response to Coastal Issues” section.

Extension member Dana Morse (left) discusses aquaculture techniques with the Penobscot Bay stewards. Photo by Catherine Schmitt.
Education

After many years of not having an education coordinator on staff, Maine Sea Grant created a position and is in the process of hiring an education coordinator who will be on board in early 2006. Members of the MET also conduct many formal and informal educational programs and have valuable connections with teachers and students throughout the state. Many team members conduct programming in the K-12 environment either by visiting classrooms, hosting students and teachers in field locations, or conducting teacher training workshops. The plan for the new education coordinator is to build systems that will enable more contact with students and teachers and to formulate program content so that it fits into curricula in ways that conform to national and state learning standards, while exposing students to the many exciting themes that are represented in our coastal communities.

A few projects of the past year are highlighted in the following paragraphs.

Training teachers in invasive species monitoring:

MET members were on the steering committee, taught classes, and made presentations at Bowdoin College’s Coastal Science Institute on marine and aquatic invasive species last summer. Eight middle school science teachers were introduced to laboratory and field techniques that would help them and their students to identify, monitor, and trace the spread of non-native introduced species. The curriculum for the institute was designed to meet state and national learning standards and was informed by recommendations of the U.S. Commission on Ocean Policy outlining ocean education. A second institute on invasive species is planned for summer 2006.

Highlighting careers in marine aquaculture:

In January 2005, a member of the MET hosted a group of students participating in the Career Aspirations Program at Calais High School in eastern Maine to discuss general employment requirements in the fields of marine research and education and highlight local marine studies conducted by University of Maine scientists. The students also toured the USDA Animal and Plant Health Inspection Service (APHIS) diagnostic lab in Eastport and learned about professional careers associated with disease control in marine aquaculture. Interested students were invited to participate in future marine field studies.

Pilot testing watershed curriculum:

In 2004, MET staff worked with a Kittery Middle School teacher to develop the curriculum unit, "Coastal Connections: Field, Lab, and Classroom Experiences Focusing on Coastal Watershed Study in Maine." The unit was pilot tested by teachers at schools in Kittery and Wells during the past year. Teachers provided assessments of the unit, which will now be used to make final revisions to the lessons. The unit will be published in 2006 and distributed to middle school science teachers and curriculum coordinators in coastal counties throughout the state.
Communications

Many communications activities during the last year have supported the work of the Marine Extension Team (MET). Communications staff worked closely with the 10 MET members to deliver technical information in many different written formats. This included developing fact sheets, project reports, and guides; contributing to local and national publications; and writing and distributing press releases, brochures, and other informational materials.

Following are a few highlights of the recent past.

Publications

The Communications team produced a Lunar Calendar and Tide Table for the Coast of Maine to promote Maine Sea Grant and to inform the public about tides on the Maine coast. The wall calendar featured color wood block prints of Maine coastal scenes by local artists Kim and Philippe Villard, and thus the product helped to promote Maine coast artists and communities. The calendars were distributed in December 2004 as end-of-year gifts to colleagues and stakeholders and were in high demand.

Brochures

Building on the success of a brochure produced last year, Moosabec: The Downeast Fishing Community of Jonesport and Beals, another brochure was developed in 2005 for Harpswell, Maine, to promote understanding among newcomers and existing residents over traditional uses of land and water. Harpswell’s Working Waterfronts was designed to engage newcomers, developers, and realtors in helping to understand and protect the waterfront character of Harpswell’s various fishing villages. Plans are currently under way to develop a brochure about regional working waterfront issues in Washington County to help resolve coastal access issues.

Feature articles

Science writer Catherine Schmitt wrote a feature article about Sea Grant-funded research on horseshoe crab populations in Taunton Bay. The article, “Where One-eyed Giants Sleep: Unraveling the Mysterious Lives of the Northernmost Horseshoe Crabs,” appeared in the January issue of Northern Sky News and was later featured on the National Sea Grant Web site. Two other feature articles were published in the first half of 2005. A retrospective on the 30-year history of the Maine Fishermen’s Forum appeared in the March issue of Commercial Fisheries News, and an article on recreational island monitoring, a project of the Marine Extension Team, can be found in the summer issue of Friends of Acadia Journal.
Fact Sheets

This past year, a collaboration of organizations comprising the Maine Marine Invasive Species Working Group produced a fact sheet to increase public awareness of invasive species issues in the state. Maine Sea Grant Communications took the lead in producing the fact sheet, in collaboration with the Casco Bay Estuary Project. Three thousand copies of the fact sheet, titled *Maine’s Marine Invasion*, were printed in February 2005. After publication announcements were sent out, Maine Sea Grant received nearly 3,000 requests for copies of the fact sheet from a diversity of organizations and individuals. Additionally, we received 1,000 requests for copies via PDF. The document was included as a resource in a Casco Bay curriculum and distributed throughout the state.

Communications produced a *Research in Focus* fact sheet, *Selectivity Tests with Knotless Mesh in Trawl Codends in the Northeast Groundfish Fishery*, which was distributed to fishermen throughout the state and region. For the Marine Extension Team, Communications produced the first in a series of *Extension in Action* fact sheets, *Tracking Beach Erosion Could Help Management*.

Educational Kiosks

Current plans to remove two dams on the Penobscot River, which would open up 500 miles to sea-run fisheries and improve habitat and water quality, have created the opportunity to educate local communities about the Penobscot River watershed and heritage. In May 2005, Maine Sea Grant partnered with NOAA-Fisheries and the Senator George J. Mitchell Center for Environmental and Watershed Research to produce posters for two educational kiosks in the Penobscot River watershed. NOAA-Fisheries constructed the kiosks on the banks of Kenduskeag Stream in downtown Bangor and on the Penobscot River in downtown Bucksport.

With GIS and design support from the Mitchell Center, Sea Grant created two posters with information about the watersheds, their fisheries populations, and environmental history. Both posters were illustrated with maps of the watershed and historical photographs. The displays will change on a rotating basis. This activity also helped to strengthen our relationship with a fellow NOAA constituent and will likely lead to further collaboration on Penobscot River issues.
Web
The Maine Sea Grant information technology coordinator worked throughout 2005 to develop a communications database to track publications, press releases, exhibits, radio spots, and general Sea Grant press. The ultimate goal of the database is to provide information that can be used to evaluate Maine Sea Grant’s efforts to increase the program’s visibility. The IT coordinator also installed a search engine to make the entire Maine Sea Grant site searchable, as well as a new Web server.

Support materials
The Communications office produced all of the publications and developed a Web site for Sea Grant Week 2005, hosted by Maine Sea Grant at the Samoset Resort in Rockport on June 3-8. Printed materials included the program, banner, polo shirts, briefcases, notepads, and a poster. The information technology coordinator designed the conference Web site and continually updated it throughout the six months preceding the event.

Communications also supported the 2005 Maine Beaches Conference, The Draw of the Sea: Yesterday, Today, and Tomorrow, by producing the promotional flyer, program guide, T-shirts, banner, and revised beach profiling brochure.

Press Releases
Communications produced the following releases in 2005:

- New publication helps answer the question, “Who owns the beach?” – October 7, 2004
- Farmed fish health workshop celebrates thirteenth year—March 14, 2005
- New lobster model provides improved basis for management – May 4, 2005
- Sea kayak visibility studied—May 24, 2005
- Sand Dune Rules to be discussed at Maine Beaches Conference – August 12, 2005
RESPONSE TO COASTAL ISSUES

Community-based Natural Resource Management

In recent years, as two national commissions have reported on the state of the oceans, and single-species regulations to prevent overfishing have made headlines, ecosystem management has emerged as an alternative way to manage our ocean resources. In its 2003-2008 strategic plan, NOAA states that its first mission goal is to protect, restore, and manage the use of coastal and ocean resources through ecosystem-based management, as a way to attain long-term sustainability of public trust resources. The new focus on ecosystems is inherently a shift toward regional management, since marine resources ignore political boundaries. Sea Grant’s Marine Extension Team (MET) works at the interface among scientists, policymakers, and the public, helping to provide the knowledge, tools, and skills needed for ecosystem-based management.

Managing nearshore waters as community assets:

One example of local natural resource management is bay management, which considers nearshore coastal waters as a whole ecosystem—including ecological, economic, and cultural conditions—not as a collection of isolated species or uses. Maine Sea Grant is represented on the Bay Management Steering Committee, which is examining the application of bay management principles to aquaculture and other activities. The MET helped plan and facilitate five public meetings along Maine’s coast in the spring of 2005. The forums were designed to elicit feedback on the value of each particular bay to local communities, existing conflicts, and how to involve local and state officials, fishermen, environmental groups, business groups, recreational users and waterfront landowners as “managers” of a bay.

Frenchman Bay

MET members are working with communities on bay-related issues throughout the state. In Frenchman Bay, Sea Grant sponsored “The Ambassadors of the Bay,” a mini-expedition modeled after the 2002 Gulf of Maine Expedition, to educate participating paddlers about the multiple and sometimes conflicting issues facing the bay’s waters and shorelines. The group met with mussel farmers, clam diggers, and waterfront landowners. They heard about red tides from the Department of Marine Resources and about the complexities of land protection from conservation professionals. The expedition group then presented their findings about the state of the bay at a public meeting of neighbors and stakeholders.

Wells Bay

Wells Bay is located in York County, the fastest growing county in Maine, where an increasing year-round population must share resources with millions of summer visitors. MET facilitated a forum in southern Maine where participants shared their experiences with issues in the coastal areas and nearshore waters of the bay, identified specific sites where these issues are occurring, and discussed successes and challenges of current management efforts. Forum sponsors are using this input to draft a Wells Bay Management Plan that will be sent to forum participants, key stakeholders, and the public.

"The Ambassadors of the Bay" Photo by Natalie Springuel.
**Taunton Bay**

With help from the MET, Taunton Bay communities submitted one of two successful proposals to serve as a bay management pilot site. MET has been working with Friends of Taunton Bay since 2001, when a new, taller Route 1 bridge that would allow commercial shellfish draggers access to the bay for the first time prompted residents to force a five-year moratorium on dragging. The moratorium led to several actions, including a broad assessment of the bay to develop indicators for measuring ecological health. One of the bay’s indicators is the northernmost population of horseshoe crabs. An article about Sea Grant-sponsored horseshoe crab research in Taunton Bay, written by Maine Sea Grant’s science writer, was published in the January 2005 issue of *Northern Sky News*.

**Protecting marine areas for habitat, fisheries, and other uses:**

Somewhat inadvertently, the restriction on dragging in Taunton Bay provided a model marine protected area. Maine’s fishermen are anticipating changes to fisheries management as a result of Executive Order 13158, which calls for “strengthened or expanded” marine protected areas (MPAs) in U.S. waters. Yet it remains unclear how MPAs will be integrated with current natural resource management. Maine Sea Grant’s MPA fisheries extension program is responding to the need for establishing relationships, involving stakeholders to minimize conflict, and disseminating up-to-date information. In May, the New England Fisheries Management Council hosted two public and stakeholder workshops, which were facilitated by MET members. Goals of the workshops were to educate the public about habitat, fisheries and the science behind MPAs, and to receive public input from fisheries and other stakeholders on the content of a draft Council MPA policy. In June, MET presented at a meeting of marine professionals interested in identifying ways to organize a continued, open dialogue about marine protected areas in the state of Maine. Also, MET helped to conduct an inventory of marine managed areas in Maine based on national criteria.

**Integrating salt water into freshwater conference:**

Maine Sea Grant co-sponsored the 2005 Maine Water Conference, the primary annual meeting of water resources scientists, managers, and students in the state. The Sea Grant science writer served as co-chair of the conference and the Sea Grant director co-chaired a session new this year on estuaries. Due to record attendance and feedback from evaluations, Maine Sea Grant is partnering with several other agencies and organizations to plan the first Maine Coastal Waters Conference, which is scheduled for April 2006.
Sustainable Seafood

With the exception of lobsters, landings from Maine’s inshore fisheries are at record lows. Declining stocks of groundfish, scallops, and sea urchins are forcing many to leave these fisheries. The Marine Extension Team is uniquely positioned to respond to the need for maintaining a safe and plentiful seafood supply while also sustaining the traditional economies of our coastal communities. The MET’s efforts bring together experts, industry members, and managers to discuss ways to enhance fisheries, reduce bycatch, and integrate science and research into management.

Enhancing Maine’s scallop fishery:
The Marine Extension Team partnered with the Maine Department of Marine Resources to coordinate a workshop on scallop fishery enhancement strategies. Sponsored by the Maine Scallop Advisory Council through commercial license surcharges, the workshop invited experts to present topics ranging from wild spat collection and re-seeding methods to assessment techniques and policy implementation. Participants then collaborated on future directions for scallop population enhancement efforts in Maine, which the advisory council will work to develop over the coming year.

Exploring the industry’s role in sea urchin management:
Knowing that urchin draggers in Canada were successfully using closed areas to enhance sea urchin populations, Sea Grant and the Maine Sea Urchin Zone Council co-sponsored a workshop in April that brought Canadian urchin scientists and fishermen to share management strategies with fishermen and managers in Maine. Participants discussed the role of industry in sea urchin restoration and management efforts, and the possible formation of a legislative task force to further explore the issue.

Maintaining the harvest while reducing bycatch:
Even minor adjustments to fishing gear can reduce the numbers of juvenile fish and non-target species caught in nets. The challenge becomes how to reduce catches of small cod and haddock without reducing the catch of market-size fish. Fishermen Kelo Pinkham and the late Stanley Coffin had an idea for a trawl modification to reduce bycatch, and they partnered with the MET to test the method. The project was presented during the September 2005 annual meeting of the American Fisheries Society in Anchorage, Alaska, and research will continue in 2006 with funding from the Northeast Consortium.
Assisting researchers in Cobscook Bay:

Porphyra spp. is a marine macroalga, or seaweed, that is used to produce nori, thin sheets of dried seaweed used for seasoning or wrappers for sushi. There are several species of Porphyra native to Maine. MET is providing technical assistance to a Sea Grant-funded researcher, who is investigating the potential of integrating native Porphyra culture with established salmon aquaculture sites for both the production of a commercially valuable product and possible improvements to water quality.

Celebrating the 30th anniversary of the Maine Fishermen’s Forum:

2005 was the 30th year for the Maine Fishermen’s Forum. Sea Grant played a founding role in the early years of the forum, and continues to support the annual event. Maine Sea Grant’s director was the forum president, and members of the MET attended as participants and presenters. To commemorate the anniversary, Maine Sea Grant science writer wrote a retrospective history of the forum for Commercial Fisheries News.

Stewardship Through Citizen Science

With the intensive multiple uses of the coast, Maine’s citizens and community decision makers need quality-assured data and information in order to fully assess the impact of human activity on the coastal environment, and make management decisions that promote a healthy and sustainable Gulf of Maine. Trained volunteers engaged in monitoring programs can be a valuable source of information to their communities and state and federal agencies. In turn, the volunteers have a heightened awareness of local issues and can facilitate the local, voluntary adoption of best management practices, leading to measurable improvements in local water quality. In Maine, the MET works with a variety of partners to encourage citizen scientists and local stewardship while gaining valuable scientific information.

Preventing the spread of invasive species:

Invasive species affect native ecosystems by restructuring food webs, introducing new diseases, and competing with native species. While marine invasive species have not been a large problem in Maine in the past, they now threaten the health and productivity of the Gulf of Maine. At least 18 marine invasive species have been identified in southern Maine to date. Since eradication of marine invasive species once they take hold is often prohibitively expensive and in many cases impossible, rapid response and prevention are critical.

Following up on last year’s forum, the Maine Marine Invasive Species Working Group, Maine Sea Grant, and the Casco Bay Estuary Project created a fact sheet to increase public awareness of invasive species issues in the state. Sea Grant took the lead in writing, editing, and producing the fact sheet, Maine’s Marine Invasion, which contributed to a growing number of volunteer monitors scouring the coast for the first signs of invasive species.

In August 2005, nearly 20 scientists from around the country participated in a rapid survey of marine invasive species in Cobscook Bay. The three-day assessment identified the presence and location of non-native marine species, establishing a baseline against which future change can be measured. While relatively few invasives were found during the assessment, the invasive sea squirt Didemnum was discovered. This is the same species that now covers about 88 square miles on Georges Bank off the Massachusetts coast. Sea Grant helped to plan the assessment, coordinate on-site logistics, and provide technical field assistance.
Keeping Maine’s beaches safe for swimming:

The summer of 2005 was a challenging one for the Maine Healthy Coastal Beaches Program, which is coordinated by Maine Sea Grant and University of Maine Cooperative Extension. There are currently 47 beaches participating in the program, with 100 to 140 samples taken each week last summer. More than half of the beaches in southern Maine had bacteria scores that exceeded safe levels. Media reports of beach closures and pollution concerns motivated citizens to want to learn more, prompting numerous requests from residents and visitors for more information. The heightened interest coincided with the launch of a new public interface with the online database of beach water quality, which drew over 80,000 hits in July and August.

The routine monitoring that is part of the Maine Healthy Coastal Beaches Program helps communities to move from knowing that a water quality problem exists to actually being able to identify and remediate pollution sources. At Goose Rocks Beach in Kennebunkport, monitoring revealed consistently high levels of bacteria, leading to frequent beach closures. Town officials worked with the adjacent towns of Biddeford and Kennebunk and state agencies to support three simultaneous studies of the influence of tides in transporting pollutants from marsh areas to the swim beach. Preliminary results identified the locations of high bacteria scores, current directions of freshwater inputs, tidal influence on the beach, and possible septic system failures. Further investigations based on this work will assist the towns in developing remediation plans, and will serve as a model for the Maine Healthy Coastal Beaches Program.

EXTENSION HIGHLIGHT

Monitoring impacts of recreational use on Maine’s coastal islands:

In the summer of 2005, the Island Monitoring Task Force’s second field season, monitoring continued on Hell’s Half Acre, Bangs, and Long islands, and expanded to four other islands with help from College of the Atlantic students. Monitors streamlined methods for systematically documenting campsites, shoreline and intertidal zones, in order to identify appropriate measures of social and environmental change on Maine’s recreational islands. One goal of the island monitoring program is to help managers recognize when island conditions are deteriorating and develop strategies to address problem sites. An article on the island monitoring project authored by Maine Sea Grant’s science writer appeared in the summer issue of Friends of Acadia Journal.

Map prepared at College of the Atlantic GIS lab; cartography by Jodi Jacobs.

Monitoring on Steves Island. Photo by Natalie Springuel.
Changing perspectives of Maine’s changing coast:

Volunteer monitors of Maine’s shifting sands had the opportunity to compare notes in August, when 173 stakeholders participated in the fifth biennial Maine Beaches Conference. This year’s event focused on past, current, and future changes along the Maine coast, some of which are being documented by teams in the Beach Profiling program. The conference continued its legacy of addressing relevant topics and drawing a diverse crowd of managers, property owners, volunteer monitors, scientists, and recreational beach users. The majority of participants reported that they gained information from the event that they could apply at home or in their work.

Planning for the Future of Coastal Communities

Maine’s coastal communities are facing significant pressures as market forces shift population and economic activity. Traditional working waterfronts and access to the shore have been displaced by commercial and residential development. Community development approaches involving local residents in addressing desirable and undesirable change include: regional approaches to land use and community planning to combat sprawl; economic strategies to plan for jobs with livable wages and benefits; and policies that prevent the “hollowing out” of waterfront communities. In partnership with other state, regional, and local entities, MET is working to help communities implement strategies for positive change.

Identifying watershed management priorities in southern Maine:

Southern Maine is home to unique habitats which support the greatest biodiversity in the state; this same region is pressured by fast increasing population and development, an aging population, and loss of traditional working landscapes. Maine Sea Grant is working in several ways to help the region’s communities protect their resources while planning for growth.

The Little River, formed by the confluence of the Merriland River and Branch Brook in southern Maine, curves sinuously through salt marsh before emptying to the Gulf of Maine at Laudholm Beach. Currently, most of the riparian area in the watershed is undisturbed; however, at several locations human activities have the potential to degrade water quality. Maine Sea Grant, in coordination with the Coastal Training Program at the Wells National Estuarine Research Reserve, is helping the community find ways to implement high priority elements of the Merriland-Branch-Little River watershed management plan.

Our Future By Design is a regional planning process for the towns of Kittery, Eliot, York, and South Berwick (the KEYS region). Marine Extension staff helped to facilitate a community forum and working groups to address aspects of community quality of life and well-being. Recommendations that resulted from the process will be submitted to the state legislature as a pilot program for regional cooperation.

Creating a vision for Mount Desert Island:

The KEYS region visioning process is modeled after Mount Desert Island Tomorrow, a successful initiative to define a “preferred future” for Mount Desert Island. The island is facing significant pressures from traffic and congestion, housing for the core community workforce, and erosion of working waterfronts and farmland. Maine Sea Grant continues to be a part of MDI Tomorrow, which in the last year has worked with the Island Housing Trust to develop affordable housing opportunities in Somesville and Bar Harbor; created an educational “road show” about land use and smart growth strategies; and expanded
Informing newcomers about Maine’s working waterfronts:
As more people move to coastal areas, conflicts and misunderstanding can polarize “old” and “new” members of the community. In Harpswell, Maine Sea Grant worked with town representatives to develop the brochure, *Harpswell’s Working Waterfronts*, which was modeled after last year’s successful brochure for the Jonesport-Beals area, also produced by Maine Sea Grant. Plans are currently under way to develop another brochure about regional working waterfront issues for Washington County in eastern Maine to help resolve coastal access issues. These publications are designed to open the lines of communication with newcomers, developers, and realtors and to engage them in helping to understand and protect the waterfront character of coastal communities.

Defining sustainable tourism:
Tourism, with its affiliated services, is the state’s greatest economic engine providing jobs for thousands of Maine residents and great experiences for millions of visitors. As interest in nature and culture-based travel continues to grow, Maine will need to plan for a sustainable tourism future. Working in partnership with the Downeast RC&D’s Vacationland Resources Committee, Sea Grant helped to facilitate a meeting where Washington and Hancock County tourism businesses provided feedback on the state’s nature-based tourism plans. Sea Grant also assisted in planning for the United States’ first Ecotourism Conference, which took place in Bar Harbor, September 2005.

Nature-related tourism requires that the industry is educated and proficient in the flora and fauna of the local environments. Being aware of this, Garrison Keillor, host of the National Public Radio show *A Prairie Home Companion*, invited MET member Natalie Springuel and her husband Richard MacDonald to be the staff naturalists on a weeklong cruise. The August cruise began in Boston and stopped in Bar Harbor, Maine; Prince Edward Island; Cape Breton Island; and Halifax, Nova Scotia. Springuel and MacDonald conducted workshops on natural history topics throughout the cruise and answered questions from sunrise until long past sunset. The naturalists also appeared on the air for two episodes of the show.
MAINE SEA GRANT STAFF
BOARD/COMMITTEE PARTICIPATION 2005

Aquaculture Education and Research Center Board of Directors- Dana Morse
Bar Harbor Chamber of Commerce Sustainable Tourism Committee- Natalie Springuel
Bay Management Working Group- Paul Anderson
Maine’s Healthy Coastal Beaches Program Advisory Board- Esperanza Stancioff (chair), Keri Lindberg, Sarah Gladu
Coastal Conference 2006 Planning Committee- Paul Anderson
Cobscook Bay Fishermen’s Association- Chris Bartlett
Cobscook Bay Resource Center Board (chair)/ Executive Committee- Chris Bartlett
College of the Atlantic (trustee)- Ron Beard
Cove Brook Watershed Council (vice president)- Susan White
Data Assessment Team- Esperanza Stancioff
Downeast Institute for Applied Marine Sciences and Education, Board/Executive Committee- Chris Bartlett
Downeast Resource Conservation and Development, Vacationland Resource Committee- Natalie Springuel
Employee Assistance Program Advisory Council- Susan White
First U.S. Ecotourism Conference Local Planning Committee- Natalie Springuel
Friends of Medomak Watershed- Sarah Gladu
Georges River Shellfish Management Committee- Sherman Hoyt
Gulf of Maine Council on the Marine Environment, Habitat Monitoring Subcommittee- Tracy Hart
Gulf of Maine Council on the Marine Environment, Habitat Restoration Subcommittee- Kristen Whiting-Grant
Gulf of Maine Council on the Marine Environment and EPA, Indicators Workshop Steering and Planning Committee- Tracy Hart
Gulf of Maine Council on the Marine Environment, Sustainable Tourism Task Force- Natalie Springuel
Healthy Acadia Advisory Committee- Natalie Springuel
Herring Gut Learning Center Advisory Committee- Paul Anderson, Dana Morse
Island Monitoring Task Force (chair)- Natalie Springuel
KEYS (Kittery, Eliot, York, South Berwick) Coordinating Council- Kristen Whiting-Grant
Maine Aquaculture Innovation Center Board- Paul Anderson
Maine Association of Sea Kayak Guides and Instructors- Natalie Springuel
Maine Beaches Conference Steering Committee- Kristen Whiting-Grant, Esperanza Stancioff, Susan White
Maine Fishermen’s Forum Board (president)- Paul Anderson
Maine Island Trail Association Board of Trustees- Natalie Springuel
Maine Marine Area Characterization Working Group- Tracy Hart
Maine NEMO Advisory Board- Sarah Gladu, Esperanza Stancioff
Maine Phytoplankton Monitoring Program Advisory Board- Sarah Gladu, Esperanza Stancioff
Maine Sea Scallop Advisory Council- Chris Bartlett
Maine Sea Urchin Zone Council and Lobster Zone Council D (advisor)- Sherman Hoyt
Maine Shore Stewards Advisory Board- Esperanza Stancioff, Sarah Gladu, Kristen Whiting-Grant
Maine Soft-shell Clam Advisory Council- Sherman Hoyt
Maine Water Conference Planning Committee (co-chair)- Catherine Schmitt
Marine Invasive Species Working Group and Marine Invasive Species Research & Monitoring Subcommittee- Tracy Hart, Paul Anderson, Esperanza Stancioff
Mount Desert Island Water Quality Coalition, Survey Advisory Committee- Esperanza Stancioff
Muscongus Bay Project Steering Committee- Sherman Hoyt
New England Farmed Fish Health Management Workshop Planning Committee (chair)- Chris Bartlett
New England Regional National Ocean Sciences Bowl Coordinating Committee- Tracy Hart
NOAA Habitat Restoration Network- Kristen Whiting Grant
Northeast Aquaculture Conference and Expo (NACE) Planning Committee- Dana Morse
Northeast Consortium- Paul Anderson
Northwest Atlantic Marine Alliance Board of Trustees (chair)- Dana Morse
Orono Land Trust- Cheryl Daigle
Professional Employees Advisory Council- Susan White
Public Islands Management Plan Advisory Committee- Natalie Springuel
Sea Grant Association Board (president-elect)- Paul Anderson
Sea Grant Law Center Advisory Committee- Paul Anderson
Sears Island Plan Advisory Committee- Susan White
Stellwagen Bank National Marine Sanctuary Outreach & Education Working Group, Sanctuary Management Plan Review Process- Tracy Hart
Taunton Bay Management Outreach Committee- Natalie Springuel
University of Maine Cooperative Extension (UMCE) Plan of Work Task Force- Esperanza Stancioff
UMCE Faculty Policy Advisory Committee- Esperanza Stancioff
University of Maine Research Council- Paul Anderson
University of Maine School of Marine Sciences, Policy Advisory Committee- Paul Anderson
USDA Infectious Salmon Anemia Technical Board (chair)- Chris Bartlett
Washington County Community College, Adventure Recreation and Tourism Program Advisory Committee- Natalie Springuel
Washington County Community College, Waterfront Management Committee- Chris Bartlett
Wells National Estuarine Research Reserve (WNERR), Education Advisory Committee- Kristen Whiting-Grant
Working Waterfront Coalition- Natalie Springuel, Sherman Hoyt
WNERR Coastal Training Program Advisory Committee, Implementation Team- Kristen Whiting-Grant
SCIENTIFIC PUBLICATIONS

Peer-reviewed Journal Articles


GRADUATE STUDENTS

Theses


Fellowships

National Marine Fisheries Service-Sea Grant Graduate Fellowship in Population Dynamics

Michael Errigo, a University of Maine Ph.D. student, was awarded a joint three-year NMFS-Sea Grant fellowship to work on testing an American lobster stock assessment model developed by School of Marine Sciences faculty. The new model takes into account fish biology, harvesting effects, and mortality, reflecting the most up-to-date scientific methodology, information, and data from government agencies and the fishing industry. The product of more than four years of work, the model has been accepted by the Atlantic States Marine Fisheries Commission (ASMFC) as the basis for future population assessment of New England’s most valuable fishery.

Errigo’s research will identify potential problems in collecting fisheries information that may affect the quality of the model, which will lead to a better understanding of ecosystem dynamics.
EXTERNAL GRANT AWARDS

Many members of the Maine Sea Grant/ Cooperative Extension Marine Extension Team participate in projects that are funded externally. With funding levels basically flat and an ever-increasing budgetary obligation to staff salaries, it is important that MET members attract extramural funding to help support extension programming. Also, Maine Sea Grant administers grant programs for the Maine Oil Spill Advisory Committee (MOSAC) of the Maine Department of Environmental Protection. In the past year, our external grants include:

- Building on Promise: Continued Investigation in using a 4-seam Bottom Trawl to Improve Escapement of Small Haddock and Cod
  Northeast Consortium $65,749

- Collaborative Fisheries Management Program
  Surdna Foundation $90,000

- Collaborative Learning Strategies to Overcome Barriers to Science Translation in Coastal Watershed Management
  Wells National Estuarine Research Reserve/ CICEET $6,804

- Depot Brook Smart Development Project
  EPA Smart Growth $17,000

- Developing off-bottom trawling gear
  Northeast Consortium $7,192

- Maine Beaches Conference
  Maine Coastal Program ($5,000)
  Maine Geological Survey ($1,000)
  SOS Maine ($1000)
  WNERR ($300)
  $7,300

- Maine Department of Environmental Protection (MOSAC administrative fee) $12,500

- New England Farmed Fish Health Management Workshop
  Agricultural Research Service $5,000

- Program Leadership Team
  University of Maine Cooperative Extension $9,000

- Project Incubation
  Maine Aquaculture Innovation Center $7,000

- Structured Errors in Modeling Fishery Population Dynamics and in Stock Assessments
  NMFS/ Sea Grant Fellowship $31,667
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MAINE SEA GRANT
POLICY ADVISORY COMMITTEE

The Maine Sea Grant Policy Advisory Committee (PAC) meets three times per year and provides programmatic advice to the management team and helps develop policy, strategic planning documents, and program evaluation mechanisms. Currently, the PAC includes 26 members, representing research institutions, state agencies, non-governmental organizations, industry groups, and community-based organizations.

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