

Maine Sea Grant College Program

Annual Report 2007-2008

*Submitted to the Vice President for Research
at the University of Maine*

August 1, 2008



Maine Sea Grant College Program

Annual Report 2007-2008

Submitted to the Vice President for Research
at the University of Maine
August 1, 2008

Table of Contents

Introduction.....	1
Membership Determination	2
Collection of Return on Investment Data for Research Unit/Entire Unit and per FTE	2
Sponsored Research Activity	2
Total Grants/Contracts	2
Indirect Recovered.....	2
Peer-reviewed publications	3
Journals.....	3
Conference Proceedings.....	4
Other Publications	4
Book Chapters	4
Books.....	4
Editor for a Book	4
Feature Articles.....	4
Technical Reports	4
Presentations/Posters/Creative Shows	5
National and International Meetings.....	5
Lay Audiences	6
Revenue Generated.....	7
Summary of Accomplishments for the Year.....	8
Research Accomplishments	8
Program Development Accomplishments.....	11
Extension Accomplishments	12
Communications Accomplishments	17
Education Accomplishments.....	19
Program Management Accomplishments	20
Goals for Next Year.....	24
Challenges and Solutions.....	25
Long-term Priorities	26
Appendix A: Maine Sea Grant Publications and Media 2007-2008	27
Brochures, Reports, Guides, Fact Sheets	27
Media Placement	28
Unsolicited Press	30
Feature Articles	32

Maine Sea Grant Annual Report to the Vice President for Research February 1, 2007-January 31, 2008

I. Introduction

Maine Sea Grant continues to enhance the impact of its programming through the expansion of partnerships and collaborators locally, regionally, and nationally. By integrating functions program-wide and through the active engagement of citizens, scientists, and decision-makers in the planning and implementation of Sea Grant-sponsored research and education programming, we continue to be a highly relevant program.

In 2007, the program leadership charged the staff with developing mechanisms to engage their stakeholders and the science community to improve the integration of science into management and to add value to the Sea Grant investment. This will be a long-term, multi-faceted effort that began with the planning of a Maine Sea Grant symposium in April 2008. The symposium brought together Sea Grant-supported researchers and outreach staff to highlight the outcomes of their projects and to identify synergy and opportunities to add value to those efforts. Attended by approximately 80 people, including many partners, the overwhelming consensus was that it provided a great opportunity for networking and many new ideas were germinated. Staff will be analyzing the outcomes of the symposium during a planning retreat in the summer of 2008 that will result in an engagement plan for the Marine Extension Team and the outreach component of the program. Aligning extension staff with research projects, as well as developing more opportunities for similar interactions, will be discussed.

Marine Extension Team members are continually broadening their connections to the various sectors in Maine's coastal communities through engagement in issues of concern to the community. This is exemplified by the numerous boards and committees on which Sea Grant staff serve. In many cases, staff members are either in leadership positions with these committees, or they are at the front of the room facilitating or assisting with group process. The fact that Sea Grant staff members are actively sought for these kinds of roles is testimony to our skills and capabilities (see "Maine Sea Grant network covers the coast" in Accomplishments section, page 20).

While Maine Sea Grant and the Marine Extension Team continue to enhance their visibility and contribution to the state of Maine, we are also increasingly involved in regional and national initiatives. This includes planning exercises and advocacy work with the national Sea Grant Association, of which the Maine Sea Grant director is president; and through various planning activities in partnership with the National Sea Grant College Program. Two of Maine's Marine Extension Team members have been recruited to participate on two of the four national Focus Area Teams. This is a great opportunity for Maine's needs and experiences to be reflected in national planning efforts, and it also gives these two staff members the opportunity to provide leadership to their peer groups around the nation. Staff members also continue to collaborate with Sea Grant staff outside the state of Maine on outreach and education initiatives. In the

Northeast region, there are many efforts within the fisheries discipline where programming transcends state boundaries and collaborative approaches to convening and facilitating discussions is taking place. In addition, outreach staff members at Maine Sea Grant are working with the Oregon Sea Grant Program to develop and test a national model for an educational program on climate change.

Maine Sea Grant's management team has been working on a reorganization of administrative and management functions in the main office in Orono. Two staff members in key leadership positions are planning to retire, which has precipitated the need to assess the existing structure and to look for opportunities for efficient use of staff time and resources. With the imminent retirement of the part-time assistant director for research (fall 2008) and the planned retirement of the full-time associate director for outreach (summer 2009), the management team has developed a strategy to blend duties and is planning to hire from within the program to implement a new administrative structure. Under this scenario, the half-time science writer will become the full-time communications coordinator, and a new assistant director for extension and education will be created in 2009. It is likely that one of the current extension team members will become the assistant director through a competitive internal search.

II. Membership Determination (% funded by MEIF, E&G, MAFES)

Sea Grant Staffing	Number of Individuals	Number of FTEs (Sea Grant Award)	Number of FTEs (MEIF)	Additional MEIF	Coop Ext
Administrative	6	0.96	4.13	0.16	
Communications	2	0.69	0.23	0.08	
Extension	4	2.96	0.20	0.33	0.51
Education	1	0	0		0.14
Research	18	5.79			

III. Collection of ROI Data for Research Unit/Entire Unit and per FTE

a. Sponsored Research Activity (ORSP)

- i. Total Grants/Contracts
- ii. Indirect Recovered

Leveraged Funds

Project	Source	Award	Indirect	Amount	Years
Legal and Policy Tools for the Protection of Coastal Access in Maine and the Nation	Mississippi/Alabama Sea Grant Consortium - Law Center	\$25,625.00	\$7,578.00	\$33,203.00	1
Climate Variability and Coastal Community Resilience: Testing a National Model of State-based Outreach	NOAA Sectoral Applications Research Program	\$39,700.00	\$16,951.00	\$56,651.00	2
Investigation of Nearshore Migration of Atlantic Salmon in the Gulf of Maine	NOAA Fisheries	\$26,109.00	\$3,891.00	\$30,000.00	2

2007 Omnibus Award (Yr 2 of NA06OAR4170108)	NOAA (Note: indirect report is what came directly to UMaine, not to other institutions via subcontract.)	\$1,005,000.00	\$289,371.00	\$1,294,371.00	1
Program Leadership Team	UMaine Cooperative Extension	\$4,500.00	n/a	\$4,500.00	1
Economic Contribution and Profile of Marine Recreational Fishing in the Cobscook Bay Region of Maine	UMaine Cooperative Extension	\$5,000.00	n/a	\$5,000.00	1
Aquatic Invaders in Maine	UMaine Cooperative Extension	\$7,015.00	n/a	\$7,015.00	1
		\$1,112,949.00	\$317,791.00	\$1,430,740.00	

b. Peer-Reviewed Publications

i. Journals

- Blouin, N., Xiugeng, F., Peng, J., Yarish, C. and Brawley, S.H., 2007. Seeding nets with neutral spores of the red alga *Porphyra umbilicalis* (L.) Kützting for use in integrated multi-trophic aquaculture (IMTA). *Aquaculture*, 270: 77-91.
- Ji, J. *et al.*, 2007. Influence of ocean freshening on shelf phytoplankton dynamics. *Geophysical Research Letters*, 34: 1-5.
- Kanaiwa, M., Chen, Y. and Wilson, C., 2008. Evaluating a seasonal, sex-specific size-structured stock assessment model for the American lobster, *Homarus americanus*. *Marine and Freshwater Research*, 59: 41-56.
- Kanwit, J.K., 2007. Tagging results from the 2000-2004 federal experimental fishery for Atlantic halibut (*Hippoglossus hippoglossus*) in the eastern Gulf of Maine. *Journal of Northwest Atlantic Fishery Science*, 38: 37-42.
- Maloy, A.P., Barber, B.J. and Boettcher, K.J., 2007. Use of the 16S-23S rDNA internal transcribed spacer of *Roseovarius crassostreae* for epizootological studies of juvenile oyster disease (JOD). *Diseases of Aquatic Organisms*, 76: 151-161.
- Maloy, A.P., Ford, S.E., Karney, R.C. and Boettcher, K.J., 2007. *Roseovarius crassostreae*, the etiological agent of Juvenile Oyster Disease (now to be known as *Roseovarius* oyster disease), in *Crassostrea virginica*. *Aquaculture*, 269: 71-83.
- Merritt, K.A. and Amirbahman, A., 2008. Methylmercury cycling in estuarine sediment pore waters (Penobscot River estuary, Maine, USA). *Limnology and Oceanography*, 53: 1064-1075.
- Panchang, V.G., Jeong, C. and Li, D., 2008. Wave climatology in coastal Maine for aquaculture and other applications. *Estuaries and Coasts*, 31: 289-299.
- Wilson, J., Yan, L. and Wilson, C., 2007. The precursors of governance in the Maine lobster fishery. *Proceedings of the National Academy of Sciences*, 104: 15212-15217.
- Zhang, Y. and Chen, Y., 2007. Modeling and evaluating ecosystem in 1980s and 1990s for American lobster (*Homarus americanus*) in the Gulf of Maine. *Ecological Modeling*, 203: 475-489.

ii. Conference Proceedings

Wilson, K.R., Kelley, J.T., and Belknap, D.F. 2007. *Salt pools as indicators of surface dynamism in north-temperate salt marsh environments*. Geological Society of America Abstracts with Programs, 39(2): 70.

Wilson, K.R., Kelley, J.T., and Belknap, D.F. 2007. *The role of salt pools in the dynamic surficial mosaic of north-temperate salt marsh environments*. Geological Society of America Abstracts with Programs, 39(6): 182.

c. Other Publications

- i. Book Chapters (0)
- ii. Books (0)
- iii. Editor for a Book (0)
- iv. Feature Articles**

Bisson, B. 2007. Old Town Elementary Students Get Hands-On Ecology Lessons, *The Penobscot Times*, October 18.

Morse, D. 2007. Bay Tender Shellfish Banks on Sea Scallops. *Fish Farming News*.

Schmitt, C. 2007. Uniting efforts to restore Eastern brook trout. *Natural Resources Year in Review 2006* (Reston, VA: National Park Service), December.

Schmitt, C. 2007. Where have all the herring gone? *Fishermen's Voice*, Vol. 12, No. 11, November.

Schmitt, C. 2007. Planning for the Penobscot. *Working Waterfront*, Vol. 20, No. 8, September.

Schmitt, C. 2007. Known Positions. *Working Waterfront*, Vol. 20, No. 7, August.

Schmitt, C. 2007. The Salters of Stanley Brook. *Friends of Acadia Journal*, Vol. 12, No. 1, Summer.

Schmitt, C. 2007. New system opens new vistas for lobster fanciers. *Wild Catch*, Vol. 2, No. 3, May/June.

Schmitt, C. 2007. Scallops Reseeding at Jonesport. *Fishermen's Voice*, Vol. 12, No. 5.

Schmitt, C. 2007. Despite their golden color, these still flourish in the cold water of the Gulf of Maine. *Wild Catch*, Vol. 2 No. 2, March/April.

Schmitt, C. 2007. Seaweed beyond sushi. *Maine Boats, Homes & Harbors*. Issue 93, March.

v. Technical Reports

Ebbin, S., and Pomeroy, R. 2008. An Evaluation of the Georges River Shellfish Management Committee: An Enduring Co-management Experiment. Research Summary January 2008. Department of Agriculture and Resource Economics, University of Connecticut Avery Point. Connecticut Sea Grant Publication CTSG-07-16. Groton: University of Connecticut.

Maine Healthy Beaches Program. Maine Healthy Beaches Program 2006 Report. MSG-E-07-01/NA06OAR417108. Orono, ME: Maine Sea Grant College Program.

- Slovinsky, P., and Dickson, S.M. 2008. Ogunquit Beach Current Survey of July 12, 2007. Maine Healthy Beaches Program Coastal Circulation Study. Augusta, ME: Maine Geological Survey.
- Slovinsky, P., and Dickson, S.M. 2008. Microbial Pollution Levels and Transport Pathways at Ogunquit Beach. Maine Healthy Beaches Program Oceanographic and Meteorological Study. Augusta, ME: Maine Geological Survey.
- Slovinsky, P., and Dickson, S.M. 2008. Kennebunk River Current Survey of August 9, 2007. Maine Healthy Beaches Program Coastal Circulation Study. Augusta, ME: Maine Geological Survey.
- USDA APHIS Veterinary Services, Maine Department of Marine Resources, and Maine Aquaculture Association. 2008. Infectious Salmon Anemia Program Standards, January 2008. Washington, DC: USDA.

d. Presentations/Posters/Creative Shows

i. National and International Meetings

- Anderson, P. 2007. *Access to the waterfront: Issues and solutions across the Nation*. Working Waterways & Waterfronts: A National Symposium on Water Access, May 9, Norfolk, VA.
- Chen, Y. 2008. *Testing biological reference points for the GOM lobster fishery*. Subset of ASMFC Lobster Stock Assessment Committee, Gulf of Maine Research Institute, January 14, Portland, ME.
- Grabowski, J.H. 2008. *Why are there so many lobsters in the Gulf of Maine?* University of North Carolina at Chapel Hill, Institute of Marine Sciences, January 18, Chapel Hill, NC.
- Grabowski, J.H. 2007. *Can lobsters and cod coexist in the Gulf of Maine?* Southern Maine Community College, October 23, South Portland, ME.
- Grabowski, J.H., Gaudette, J., Clesceri, E.J., and Yund, P.O. 2007. *The role of food limitation in lobster population dynamics throughout the Gulf of Maine*. 8th International Conference and Workshop on Lobster Biology and Management, September 23-28, Charlottetown, PEI, Canada.
- Gaudette, J., and Grabowski, J.H. 2007. *The effects of fishing effort on the abundance, density, and size distribution of lobsters in mid-coast Maine, USA*. 8th International Conference and Workshop on Lobster Biology and Management, September 23-28, Charlottetown, PEI, Canada.
- Grabowski, J.H., Clesceri, E.J., Baukus, A., Gaudette, J., and Yund, P.O. 2007. *Are we farming lobsters in the Gulf of Maine? Managing lobsters in the 21st century*. Guest Lecture, Underwater Research, Shoals Marine Lab, August 3, Appledore Island, ME.
- Kanwit, J.K., and Bartlett, C. 2007. *Application methods, retention rates and preliminary results for two types of electronic tags used to study Atlantic halibut (*Hippoglossus hippoglossus*) in the Gulf of Maine* (poster). The Second International Symposium on Tagging and Tracking Marine Fish with Electronic Devices, October 8-11, Palacio de Miramar, Donostia-San Sebastian, Spain.
- Lindsay, S., Chasse, J., Butler, R.A., Morrill, W., and Van Beneden, R.J. 2007. *Stage-specific effects of acute exposure to pesticides on the soft-shell clam, *Mya arenaria**. North Atlantic Chapter, Society of Environmental Toxicology and Chemistry, June, Bar Harbor, ME.

- Morse, D. 2007. *Trial of seabed fencing for wild stock enhancement of sea scallops (Placopecten magellanicus) in coastal Maine waters*. International Pectinid Workshop, May, Halifax NS, Canada.
- Morse, D. 2007. *The use of positively buoyant ground cables and sweep to reduce seabed contact and to enhance species selectivity* (poster). Northeast Consortium Annual Meeting.
- Townsend, D. 2007. *Oceanography of the Gulf of Maine (with Reference to Fisheries Issues)*. NOAA Northeast Consortium, Marine Research Education Program, Venue varied throughout New England.
- Van Beneden, R.J., Lindsay, S., Chasse, J., Butler, R.A., Morrill, W., and Gardner, G.R. 2008. *Stage-specific effects of acute exposure to pesticides on the soft-shell clam, Mya arenaria*. Aquatic Animal Models of Human Disease Conference, Duke University, January 31-February 3, Durham, NC.
- Wilson, K.R., Kelley, J.T., and Belknap, D.F. 2007. *Salt pools as indicators of surface dynamism in north-temperate salt marsh environments*. Geological Society of America Northeast Section Meeting, March 12-14, Durham, NH.
- Wilson, K.R., Kelley, J.T., and Belknap, D.F. 2007. *The role of salt pools in the dynamic surficial mosaic of north-temperate salt marsh environments*. Geological Society of America Annual Meeting, October 28-31, Denver, CO.
- Zhang, Y., Chen, Y., and Kanaiwa, M. 2007. *Developing and evaluating biological reference points for the Gulf of Maine American lobster fishery management*. 137th American Fisheries Society Annual Meeting, September 2-6, San Francisco, CA.

ii. Lay Audiences

- Anderson, P. 2007. *Review of Maine Department of Marine Resources Shellfish Program*. Joint Standing Committee on Marine Resources, November 19, Augusta, ME.
- Anderson, P. 2008. *Results of the peer review study of the DMR Shellfish Sanitation Program*. Joint Standing Committee on Marine Resources, January 16, Augusta, ME.
- Anderson, P. 2007. *Great Expectations: Does ecosystem-based management require a renaissance approach to scientific research?* University of Maine School of Marine Sciences, February 16, Orono, ME.
- Bartlett, C. 2007. *A collaborative effort to examine new strategies for managing closed bottom habitats for sea scallops*. Cobscook Bay Fishermen's Association, December 13, Eastport, ME.
- Bisson, B. 2007. *Dean John A. Knauss Marine Policy Fellowship Opportunity*, University of Maine School of Marine Sciences, February 12, Orono, ME.
- Bisson, B. 2007. Presentation to an 8th Grade Science Class on Marine Invasive Species Monitoring Efforts in Maine, James F. Doughty Middle School, June 5, Bangor, ME.
- Bisson, B. 2007. Presenter at the annual James F. Doughty Middle School Science Social, June 14, Bangor, ME.

Bisson, B. 2007. *Regional Marine Science Education Networking Opportunities*, presentation to the New England Ocean Science Education Collaborative (NEOSEC) Annual Meeting, July 22, Portland, ME.

Hoyt, S. 2007. *Maine's commercial fisheries: status and trends*. Tanglewood Elderhostel, June 25, July 23, August 31, Sept 19, Rockland, ME; Knox/Lincoln Soil and Water Conservation District Conservation Fair, September 26, Union, ME.

Maine Geological Survey. 2007. *State of Maine's Beaches*. Maine Beaches Conference, June, South Portland, ME.

McCleave, J. 2007. *In search of the Atlantic eels: biology and oceanography*. Friends of Merrymeeting Bay, Bowdoin College, May 9, Brunswick, ME.

Morse, D. 2007. *The use of positively buoyant ground cables and sweep to reduce seabed contact and to enhance species selectivity*. Maine Fishermen's Forum, February 29, Rockport, ME; Bycatch Symposium, May, Durham, NH.

Morse, D. 2007. *Oyster gardening*. Slow Food Oyster Nights, March and November, Portland, ME.

Springuel, N. 2007. *Images and voices from the Gulf of Maine: development, fisheries and issues along the edge of the Gulf*. Bar Harbor Whale Museum, August, Bar Harbor, ME.

Springuel, N. 2007. Natural history lectures/ship naturalist. A Prairie Home Companion (National Public Radio) chartered cruises.

Springuel, N. 2007. *Maine Sea Grant*. College of the Atlantic, September, Bar Harbor, ME.

Springuel, N. 2007. *Conversations through the ism prism*. WERU Community Radio, August 7, Orland, ME.

Stancioff, E. 2007. *Lincolntown Special Study in the Ducktrap River and Beach Area*. Lincolntown Select Board Meeting, Lincolntown, ME.

Stancioff, E. 2007. *Summary of Kennebec River Enterococci and Fluorometry Study*, Wells National Estuarine Research Reserve, October 31, Wells, ME.

- IV. Number of Spin-Out Companies (0)
- V. Number of Patents and Other Forms of Intellectual Property (0)
- VI. Number of Jobs Funded (0)
- VII. Revenue Generated**

Revenue		
Production of "Access to the Waterfront: Issues and Solutions Across the Nation"	Hawaii Sea Grant	\$2,500.00
2007 New England Farmed Fish Health Management Workshop	New Brunswick Salmon Growers Association	\$100.00
2007 Maine Beaches Conference	Surfrider's Foundation	\$500.00
2007 Maine Beaches Conference	SOS Maine	\$1,000.00
2007 Maine Beaches Conference	Maine Coastal Program	\$2,500.00

2007 Maine Beaches Conference	WNERR	\$500.00
2007 Maine Beaches Conference	Maine Geological Survey	\$100.00
Wild Catch Articles	Wild Catch Magazine	\$1,432.00
Climate Variability and Coastal Community Resilience: Testing a National Model of State-based Outreach	Maine Coastal Program	\$5,000.00
"Life Between the Tides" Royalties	Tilbury House	\$429.89
Capacity-building Support for the Taunton Bay Pilot Project	Coastside Bio Resources	\$200.00
		\$14,261.89

VIII. Summary of Accomplishments for the Year

RESEARCH ACCOMPLISHMENTS

Bloodworm (*Glycera dibranchiata*) and soft-shell clam harvesting compatible. In Maine, many people make their living digging clams and worms from tidal mudflats. Commercial harvesting of bloodworms alone is a \$7.5 million dollar industry, with 269 metric tons of worms harvested in 2004. The effects of bloodworm harvest on other species in the mudflat (such as clams), and on the mudflat itself, are not known. Researchers documented patterns of bloodworm digging on heavily dug flats in midcoast Maine, using a combination of aerial photography and GIS to quantify the frequency and timing of digging. **Accomplishments:** The study showed that bloodworm density on intertidal flats varies independently of harvesting pressure, and bloodworm size has not changed significantly over several decades, such that management now has a time-series basis for decisions. Bloodworm harvesting does not significantly increase clam mortality, so both species can be harvested on the same flat. A report will be issued to the Maine Department of Marine Resources detailing the patterns of habitat use by bloodworm harvesters and a time-series of baseline data on bloodworm abundance and size.

Methods developed for seeding finfish aquaculture nets with native seaweed spores. Growing sea vegetables (marine macroalgae, seaweed) in concert with finfish aquaculture can mitigate nutrient over-enrichment that can occur near fish farms. Sea vegetables benefit from polyculture with finfish because they need the nutrients released by farms in the form of uneaten food and excreted waste. Researchers experimented with methods for growing native Maine seaweeds, *Porphyra* spp. (also known as nori) to improve the economic feasibility of integrated mariculture. **Impacts:** Techniques were developed for seeding aquaculture nets with the spores of a native Maine species of red alga, *Porphyra umbilicus*, to start the growth of nori. Technological methods for seeding aquaculture nets with asexual spores of this alga for use in integrated multi-trophic aquaculture were published.

New model can predict future change in salt marshes: Salt marsh pannes (shallow depressions) and pools are important aquatic habitat in northern New England, providing protected nursery sites for fish, crustaceans, and other invertebrates, as well as open water and food for waterfowl. However, the origins and geological evolution of these landscape features are not well understood. Researchers determined whether pannes are increasing in size and frequency in several marshes along the Maine coast by analyzing cores of marsh peat for rates of change, including sea level rise, and comparing them to historic photographs and maps. **Impacts:** Researchers constructed predictive models for salt marsh development and evolution in response to accelerating sea level rise. The results will help inform coastal residents, who rely on marshes for flood protection and coastal fisheries, and wildlife managers about the evolution of Maine's salt marshes, and how they may change in the future.

New tool for assessing lobster stocks developed. The American lobster supports the most valuable commercial fishery in the northeastern U.S., and the fishery is critical to the Maine economy. Landings have increased steadily since the early 1970s, and fishing effort is intense and increasing throughout the species' range. Current stock assessment methods suggest that the Gulf of Maine stock is overexploited and vulnerable to collapse. Yet other studies and field observations suggest otherwise. This project developed biomass-based and mortality-based biological reference points to determine if the lobster fishery was being overfished. **Impacts:** Preliminary results derived from this study were presented to the Atlantic States Marine Fisheries Commission and the Maine Department of Marine Resources. The Committee has explicitly expressed that they will consider the results derived from this study when they determine the choice of biological reference points. The final results derived from this project will have significant impacts on the selection of biological references for the determination of the status of lobster fisheries, and they will be used to monitor the health of lobster stocks.

Lobsters thrive on herring bait. Several thousand tons of herring bait are used in the nearshore waters of Maine's coast to support the lobster fishery. In the past two decades, lobster landings have increased dramatically, reaching levels twice the historic average. Determining what environmental factors are driving these high landings is important to sustaining coastal communities that rely on the lobster fishery as a significant part of the local economy. Researchers assessed the effects of herring bait on lobster diet and tissue production, and assessed lobster growth by using stomach content analysis, stable nitrogen isotope analysis, and mark-recapture experiments. They found that using Atlantic herring as bait for American lobsters, enhances lobster growth and productivity, establishing the interactions between population dynamics and fisheries for herring and lobsters. Given that lobsters traditionally have been managed as a single species rather than as an integral component of the ecosystem, this modeling effort is an important step in the ongoing transition to an ecosystem approach to fisheries management. **Impacts:** 1) This project achieved an important goal of fostering meaningful collaborations between fishermen and scientists, which subsequently broadened researchers' ability to disseminate the results to interested stakeholders throughout the coast of Maine and New Brunswick, Canada. 2) Results from this project were incorporated in another Sea Grant-

supported project to develop an ecosystem model of the American lobster population dynamics.

Coastwide wave prediction system has many users. On Maine's 3,000-mile coastline, surface waves may comprise the most energetic elements of the physical oceanography affecting coastal communities and habitats.

Information about wave conditions has many applications, including the safety of boat or ship operations, the transport of sediment or nutrients in the water, the siting of aquaculture activities, and coastal engineering. This project developed an atlas of the detailed fine-resolution wave climate in coastal Maine and a computerized wave prediction system for forecasting wave heights. **Impacts:** 1) Wave forecasts now cover all of coastal Maine, providing 48-hour forecasts of wave height, peak period, and wave direction on a publicly accessible Web site. 2) A module was added last year for wave-induced surface drift velocities, which NOAA oil spill forecasters requested and access as needed. 3) Surfers in Maine use the online forecasts to choose locations and times best suited for surfing.

Sea scallops, *Placopecten magellanicus*, in Cobscook Bay are unique. The coastal Maine sea scallop fishery is highly valued in fishing communities and supports a diverse group of fishermen, including off-season lobster fishermen and others who harvest multiple species throughout the year. It is distinct from other sea scallop fisheries because it is restricted to discrete inshore scallop beds, rather than the large, dense aggregations found elsewhere in the western Atlantic. In the past decade, the sea scallop catch in Maine has declined significantly, raising questions about the effectiveness of current scallop management. This study conducted a genetic survey of scallop populations, elemental fingerprinting of scallop spat, and field-based experiments to determine whether sea scallop populations in Cobscook and Penobscot bays are geographically distinct, separate stocks. Researchers discovered that scallop populations in Cobscook Bay, eastern Maine, are genetically distinct from populations in other Maine bays and on Georges Bank. **Impacts:** Data were provided to the Sea Scallop Advisory Board and the Maine Department of Marine Resources, establishing the genetic uniqueness of sea scallops in Cobscook Bay, which implies the need for local area management of that eastern Maine scallop population.

Pesticides are only one factor in soft-shell clam decline. Soft-shell clams are among the state's five most valuable fisheries, but recent population declines in eastern Maine have led to speculation that agricultural pesticides and herbicides might be a contributing factor. In laboratory toxicology experiments, the researchers exposed clams to several pesticides commonly used on fields and found in eastern Maine rivers. These data were used to build a matrix population model to determine potential population-level effects of pesticides and herbicides on soft-shell clams. **Impact:** Researchers found that none of the three pesticides and herbicides examined is solely responsible for the decline in the soft-shell clam population in eastern Maine. The decline is likely due to a mixture of stressors such as water temperature, predation, agrochemical exposure, and larval emigration. Both the stage of exposure and the specific chemical used are important in predicting effects

on soft-shell clams. Application of these pesticides at times when the sensitive larval stages are not present may minimize the impact on the clam population.

Agent-based model may help explain lobster population behavior. Maine's most valuable commercial fishery, the American lobster fishery, has experienced periodic boom and bust cycles that have dramatically affected the economies of many coastal communities. Although scientific models designed to guide lobster management have predicted a decline in the population, lobster landings (and the apparent population) continue to increase. Many anomalies exist in the behavior of the lobster population, over the past 50 years in particular, that accepted scientific models do not explain. Sea Grant-funded researchers used a new conceptual approach, complex adaptive systems theory and agent-based modeling, to develop a new model of the Maine American lobster (*Homarus americanus*) fishery. **Impact:** The model is a unique contribution to resource theory by introducing a new methodology that simulates learning and adaptation by individual fishers (agents) who interact with one another and with their environment. The model provides a greater analytical understanding of the circumstances that lead to the formation of social groups and the factors necessary for effective governance and conservation. The methodology is widely applicable to both human and natural systems in which individual agents learn and adapt to their environment.

Theses and dissertations

Jordaan, Adrian. 2006. Determining environmental drivers of fish community structure along the coast of Maine. Ph.D. in Marine Biology, University of Maine.

Wilson, Kristin R. 2006. Ecogeomorphology of salt pools of the Webhannet Estuary, Wells Maine, U.S.A. M.S. in Marine Biology, University of Maine.

Yan, Liyin. 2007. Agent-based modeling with classifier system: A new modeling tool to investigate the dynamics of social/ecological systems with particular reference to the Maine lobster fishery. Ph.D. (individualized), University of Maine.

PROGRAM DEVELOPMENT ACCOMPLISHMENTS

Mercury-contaminated marine sediments best left in place. University of Maine associate professor, Aria Amirbahman, measured pore-water distribution of the highly toxic methylmercury (MeHg) in the contaminated sediments within Frankfort Flats in the Penobscot estuary. **Outcomes:** MeHg production occurs about 2-8 cm below the sediment-water interface (SWI), but a significant decrease in pore-water MeHg concentration is observed in the vicinity of the SWI. Fortunately, this results in a lack of MeHg release into the overlying water column.

Tracking salt marsh evolution over time important in face of climate change. Western Carolina University professor, Benjamin Tanner, developed a method to identify salt panne deposits versus (low, intermediate, and high) marsh and intertidal sediments with a combination of carbon:nitrogen (C:N) ratios and total organic carbon (TOC)

plotted against one another. **Outcomes:** The carbon and nitrogen come largely from the decay of marsh plants and salt-panne algae. This type information aids historical reconstruction of the abundance and duration of salt panes, key features of natural marshes.

Gulf of Maine sea slugs do not produce anticancer compounds. University of Maine professor, Mary Rumpho, conducted experiments to determine if a Maine native sacoglossan mollusc (a sea slug) *Elysia chlorotica* or its algal food source, *Vaucheria litorea* produces anticancer compounds, including kahalalide derivatives. High-resolution biochemical methods were used to separate and analyze extracts from the sea slug and the alga. **Outcome:** None of the extracts were kahalalides. This supports the hypothesis that the compounds are bacteria derived and the cooler northern climates where Maine sea slugs reside prevent bacterial symbiotic associations.

Scientists get tips on successful communication with the media. Communications trainer Nancy Baron and Pulitzer prize-winning journalist Ken Weiss of the *Los Angeles Times* gave a behind-the-scenes look at how scientific research is covered in the press, the realities of reporting on science and environment, what it takes to get your message across, and practical advice for interacting with reporters. **Outcomes:** This seminar provided suggestions to students and faculty at the University of Maine for engaging with journalists to achieve positive, effective results. Approximately 75 people attended.

Collaborative research with lobstermen links climate change and lobster dynamics. The Island Institute in Rockland, Maine, coordinated an assessment of climate change impacts on the Maine lobster fishery. They completed several months of research on fishermen's observations regarding trends in weather, climate, water temperature, runoff, and salinity in relation to lobster population dynamics. The project considered not only the effects on lobster biology, but also how climate change may influence lobstering communities. **Outcome:** The Institute soon will issue a report synthesizing findings of the fishermen's observations. The target audiences are fishing communities, scientists, and policymakers, including legislators, state and federal managers, and municipal officials.

World-class national marine education conference hosted in Portland. The Gulf of Maine Marine Education Association (GOMMEA) hosted the annual conference of the National Marine Educators Association in Portland, Maine, in July 2007. The conference was sold out. In addition, GOMMEA hosted the first meeting of a new Traditional Ecological Knowledge Committee, bringing native and first nations people together from as far away as Hawaii and as nearby as the Penobscot Nation. **Impact:** Rave reviews were received for the job GOMMEA did in hosting the conference.

EXTENSION ACCOMPLISHMENTS

Farmed fish health standards revised. Diseases such as infectious salmon anemia (ISA) have had major impacts on Maine's finfish aquaculture industry. The Infectious

Salmon Anemia Technical Board, which is chaired and facilitated by a Marine Extension Team (MET) member, completed a major revision of the ISA Program Standards in 2007. **Impact:** The standards are used by USDA APHIS Veterinary Services and Maine Department of Marine Resources (DMR) to manage ISA in Maine.

Sea Grant assists fishermen with enhancing scallop stocks. The sea scallop fishery, once a \$15 million per year industry in Maine with landings exceeding three million pounds, is in jeopardy of collapse. **Outcomes:** In 2007, University of Maine Cooperative Extension, Maine Sea Grant, and the Downeast Institute began assisting fishermen in eastern Maine with assessing the effects of closing selected bottom areas to fishing and enhancing the scallop populations in these areas. The project will enable fishermen and scientists to examine specific factors that influence growth and survival of this commercially important species and, if successful, will provide information to fishermen and resource managers on how to develop additional scallop beds along the Maine coast.

The Georges River serves as a model of cooperative fisheries management. As the fishing industry continues to decline amid ever-stricter regulations, fishermen and scientists are looking toward alternative management regimes as a way to maintain Maine's traditional fishing communities. The Georges River Clam Management Program is one example of such cooperative management, and in 2007 an MET member recruited a resource economist to evaluate the program's success. MET served as liaison between the clambers and the researchers, and helped with study design and implementation. **Impact:** The study, published in January 2008, found that the program has succeeded in balancing harvest and conservation mandates, that shellfish management has improved compared to prior management efforts, and that the program may serve as a model for other communities.

Maine Legislature endorses New England's first ecosystem and community-based inshore marine management pilot project. In March 2007, Maine Governor John Baldacci signed an Executive Order directing state agencies to follow up on a number of the recommendations in the Bay Management Study, including a new regulation creating the Taunton Bay Management Area, with management protocols for four commercial fisheries (mussel, scallop, urchin and kelp). MET facilitates a community-based advisory group of local conservationists, scientists, and users of the bay's commercial resources that now works directly with the state to improve the management of all marine resources in Taunton Bay. **Impact:** The Maine Legislature approved a change allowing management decisions made by this local board to be implemented relatively quickly by the Maine Department of Marine Resources.

Halibut research drives management changes. The MET has participated in Atlantic halibut (*Hippoglossus hippoglossus*) tagging studies since 2000. **Impacts:** In September 2007, information from a biological sampling, behavior, and migration study of Atlantic halibut in the Gulf of Maine contributed to changes in Rule Chapter 34.10(1)(B)(4)(b) for Atlantic Halibut Management, including an increase in the minimum harvestable size from 36 to 38 inches, and a repeal of a four-halibut per day limit. A tagging program for landed fish was also implemented as part of the rule change.

External review of the Department of Marine Resources Public Health Division improves shellfish management. Commercial shellfish harvesters, dissatisfied with the state's process to monitor water quality in shellfish growing areas, demanded a review of the Shellfish Sanitation Program. Maine Sea Grant was recruited (and named in the legislation of LD 1318) to facilitate the external review in 2007. **Impacts:** Legislation has been proposed to implement the study findings, including bills that would allow the use of private laboratories for the analysis of seawater, and reduce pollution from subsurface wastewater disposal systems in the coastal zone. A Shellfish Advisory Council was created that will result in stronger industry participation in management and more stability for an industry currently valued at more than \$12 million annually.

Economist assesses the value of marine recreational fishing in eastern Maine. Recreational fishing is an important nature-based tourism activity in Maine, where over 300,000 people go fishing along the coast each year. While MET has assisted NOAA and DMR with the Marine Recreational Fisheries Statistics Survey in previous years, the survey is insufficient to produce accurate estimates of the economic impacts or to fully understand the resources, infrastructure and markets supporting this tourism activity at the county level. **Outcome:** In 2007, MET partnered with economist Kevin Athearn at the University of Maine at Machias to estimate the economic contribution of saltwater angling in the Cobscook Bay region of Maine, gathering information on fishing effort, target species, angler demographics, trip characteristics, supporting infrastructure, and county-level expenditures. The goals of the study are to provide Washington County leaders with a greater understanding of the value of marine recreational fishing and related tourism activity to the regional economy.

Evaluating Maine's new working waterfront taxation program. With funding from University of Maine Cooperative Extension via a Program Leadership Team grant, Maine Sea Grant and members of the Working Waterfront Coalition conducted five regional workshops on Maine's new current use taxation program for working waterfronts in 2007. **Outcome:** Feedback from these workshops, such as concerns about the scope of the program, shifting tax burdens, and other issues, were reported to the Maine Legislature's Taxation Committee as part of the program's required biennial review.

Sea Grant report cited in federal bill text. As demonstrated by the current use taxation program, Maine has been a leader in addressing coastal access issues, and Sea Grant extension staff have traveled around the country to help other states grapple with a loss of working waterfront. Realizing that access conflicts were not unique to particular states, Maine Sea Grant partnered with Hawai'i Sea Grant to survey Sea Grant programs and other coastal zone management stakeholders on access issues faced by the nation's coastal communities. **Outcome:** Maine Sea Grant presented the resulting report, *Access to the Waterfront: Issues and Solutions Across the Nation*, in the opening day plenary session at a national working waterfront conference hosted by Virginia Sea Grant in May 2007. **Impact:** In July, U.S. Representative Tom Allen cited the report in a letter that accompanied his bill (H.R. 3223: Keep Our Waterfronts Working Act of 2007) that would amend the Coastal Zone Management Act of 1972 to establish a grant program to

ensure coastal access for commercial and recreational fishermen and other water-dependent, coastal-related businesses.

Southern Maine towns demonstrate financial commitment to Beach Profile

Monitoring Program. The challenge with innovative programs started with public monies is sustaining programs after funds are depleted. After a fundraising appeal conducted in 2007 to maintain support for the beach profile monitoring program and staff, all nine of the municipalities participating contributed a total of \$9,800, and coastal property owners contributed nearly \$4,000, exceeding the fundraising goal. **Outcomes:** These contributions are indicators of the commitment these stakeholders have made to the program, and to their belief in the validity of the data it provides. The participation of coastal property owners also indicates a dramatic evolution of the attitude of this group toward the monitoring program, which they did not widely welcome at its inception.

Volunteers' data applied to management decisions. In seven separate cases to date, the Maine Geological Survey has used data from the Southern Maine Beach Profile Monitoring Program to analyze and inform beach management decisions. For example, geologists used profiling data in their analysis of the Town of Scarborough's plans to rebuild a modified seawall at Higgins Beach that was damaged by the 2007 Patriots Day storm. The proposed structure would test a new aspect of the 2006 Coastal Sand Dune Rules (Maine Natural Resources Protection Act) that might allow seawalls to be rebuilt in a different design if it can be shown that the new design is less damaging to the beach and dunes. **Outcome:** By basing beach management decisions on actual data, Maine Geological Survey, National Weather Service, and municipalities reduce guesswork that may lead to costly mismanagement of the state's beaches.

Sea Grant coordinates investigation of Atlantic salmon in the Gulf of Maine. The National Marine Fisheries Service (Orono, ME, and Gloucester and Woods Hole, MA) asked Maine Sea Grant to facilitate and coordinate a series of workshops on nearshore migration of Atlantic salmon in the Gulf of Maine. The project will bring together fishery scientists and managers, biological oceanographers, physiologists, climatologists, meteorologists, and professionals from other disciplines in workgroup settings that will produce multidisciplinary syntheses and hopefully foster future collaboration.

Sea Grant provides legal tools for enhancing access to the Maine coast. A \$54,531 grant from the National Sea Grant Law Center enabled completion of a document that summarizes legal tools for enhancing and protecting public access to the waterfront. **Outcomes:** A legal team at the University of Maine School of Law found that traditional land management approaches are relevant to addressing Maine's waterfront access needs in the future. Though these tools are often overlooked in waterfront management, they could easily be tailored to meet specific access needs, for example using a conservation easement to ensure lobstermen have access to a shorefront land parcel.

Lincolnton conducts special study of the Ducktrap River and beach. Despite unsafe bacteria levels for recreational water users, the state had decided not to manage the Lincolnton Beach area due to lack of staff resources. Based on monitoring by the MET

and Maine Healthy Beaches Program, and the success of previous work in cleaning up contamination in local waters, the Town of Lincolnville decided to make Ducktrap Beach a priority recreational asset and a priority for management, and committed to working with the MET to identify contamination sources. **Outcome:** Town voters approved the plan, and the state has leased the 25-acre beach area to the town.

Notification program protects human health at public beaches. The Maine Healthy Beaches Program online database allows town and state park officials to retrieve monitoring results quickly, enabling effective communication about resampling decisions and timely beach closure notification. In 2007, an updated notification function increased the number of beach advisories over previous years, a reflection of more accurate condition assessment, resulting in increasing protection of public health. **Outcome:** Local level policies were changed in several towns to protect public health and tourism; one town implemented proactive rainfall-based management, a policy that is being considered by other towns.

Sea Grant responds to need for climate change-related information. Sea Grant's interest in addressing climate change took an unexpected turn in 2007, when a preliminary inventory of the various climate change-related efforts in the state became a full-fledged project at the request of the Environmental Funders Network. The network, which represents philanthropic entities with an emphasis on Maine's environment, requested that Sea Grant develop the inventory into a published catalog of climate change investment opportunities. **Outcome:** Sea Grant was asked to join the report-writing team at the University of Maine charged by Governor Baldacci with assessing the status and implications of global climate change for the state. Sea Grant is co-authoring the marine section of the report, editing the final document, and working with University of Maine Cooperative Extension to ensure that the report is relevant to natural resource users throughout Maine.

Sustainable tourism guide is used throughout the state. Last year, Maine Sea Grant produced a *Resource Guide to Sustainable Tourism in Downeast Maine and Southwest New Brunswick*. **Outcomes:** The guide has been used by the consultant hired by the state to implement a nature-based tourism initiative in the Downeast region, and other regions of the state also are using the guide as a model. The Bar Harbor Whale Museum used the guide to find green purchasing options, a Hancock County outfitter used the guide to find business planning resources, and the Bar Harbor Chamber of Commerce Sustainable Tourism Committee is using the guide to distribute sustainability information to Chamber members.

Sea Grant shares sustainable tourism expertise. Maine Sea Grant's leadership in the area of developing sustainable coastal tourism is supported by the numerous requests for assistance in 2007. **Outcomes:** The Maine Coastal Program asked Sea Grant to review the state's new tourism fact sheets; Sea Grant was invited to evaluate Nova Scotian seaside tourism businesses; Maine Handicapped Skiing asked for assistance in ways they could expand to the coast; Sea Grant serves on the advisory committee of Washington County Community College Adventure Recreation and Tourism; the Swedish Tourism

Research Institute asked for information on Downeast Maine's achievements in developing nature-based and cultural tourism; and the Maine Association of Sea Kayak Guides and Instructors asked for advice and help conducting research on legal options for hand-carry boat access management models throughout the country. Finally, Sea Grant is working with Cooperative Extension, CenTRO, and other University tourism programs to foster the University of Maine's Tourism Economic Development effort.

Wells residents create vision for the community's "Gateway" area. MET helped obtain EPA assistance to work with the town of Wells and the Maine Department of Transportation to create a vision for a busy intersection of Routes 1 and 109. Public input provided during a design workshop in 2007 led to a re-evaluation of the initial engineering design concepts that had been proposed for the intersection. **Outcomes:** Since the workshop, DOT has purchased key parcels in the vicinity of the intersection as proposed by the revised transportation design. Now, municipal officials, DOT staff, and potential developers will work together with key stakeholders identified during the community design process to finalize the transportation and community design plans implemented at the intersection.

Maine Solutions works to resolve community conflicts. Two MET members are working to demonstrate the value of collaborative governance and seek solutions to difficult issues. In 2007, Cooperative Extension's Maine Solutions program identified two pilot projects. **Outcomes:** In Thomaston, community and municipal stakeholders are creating a long-term plan for redeveloping Thomaston Academy and the Watts Bock. A declaration of cooperation has outlined a coordinated process for moving individual development ideas forward. Maine Solutions is now also partnering with Maine Maritime Academy's Tidal Energy Device Evaluation Center to gauge community issues and concerns regarding proposed tidal energy generation in the Bagaduce River.

COMMUNICATIONS ACCOMPLISHMENTS

Communications implements marketing plan. In order to increase awareness of Maine Sea Grant and the services and products we offer, we developed a marketing plan in 2006. **Outcome:** The communications team began implementing aspects of Maine Sea Grant's newly drafted plan, including a new display and program brochures that were distributed to state legislators, University of Maine administrators and faculty, and at a national tourism conference.

Articles featuring sea-run brook trout published in new stakeholder publications. Working closely with the National Park Service, communications staff wrote two articles on the sea-run brook trout of Mt. Desert Island ("Uniting Efforts to Restore Eastern Brook Trout" and "The Salters of Stanley Brook"). **Outcome:** These articles were featured in the NPS *Natural Resources Year in Review 2006* and the summer 2007 issue of *Friends of Acadia Journal*. Sea Grant has supported a diverse team of researchers who are looking at "salter" ecology and biology.

Publisher signs on to new book. In support of our mission to raise awareness of and increase appreciation for Maine's coastal environment, Maine Sea Grant communications staff contracted with Tilbury House (Gardiner, ME) to produce *A Coastal Companion: A Year in the Gulf of Maine from Cape Cod to Canada*. **Outcome:** MSG managed submissions of artwork and poetry, as well as wrote 150 pages of text for this general interest almanac published in 2008. By combining science, literature, and art, the book is expected to enable MSG to reach new and broader audiences

Article honoring NOAA makes front page. In recognition of the 200th anniversary of the Coast Survey, predecessor to the National Oceanic and Atmospheric Administration and Maine Sea Grant's parent agency, communications staff wrote an article about the history of the Coast Survey in Maine. "Known Positions" was published on the front page of the August edition of *The Working Waterfront*, a newspaper with a circulation of 40,000. **Impact:** The article was reprinted by Point of Beginning, an online newspaper for the surveying and construction industry, and distributed throughout the offices of NOAA.

Sea Grant stories reach new audiences. Maine Sea Grant communications staff work to write and publish articles in various media outlets, depending on the story and desired audience. In 2007, new audiences outside of Maine were reached with publication of an article about seaweed aquaculture in the February 2007 issue of *Maine Boats, Homes & Harbors* magazine (circulation 20,000). **Outcome:** As a result of this new partnership, the program was provided free display space at an annual boat show that attracts over 10,000 people, and collaboration with the magazine continued in 2008.

Communications program on the right track. A team of communications professionals outside the state reviewed the Maine Sea Grant Communications Proposal 2008-2012. **Outcome:** The review team gave the proposal a high rating. This very positive feedback gives communications staff the confidence that the program is going in the right direction.

Sea Grant receives much unsolicited press. As do all Sea Grant programs, Maine Sea Grant writes and distributes press releases to promote workshop and conferences, announce new publications and grants awarded, and publicize research results. Many of these show up in newspapers, newsletters, and journals. It is frequently more difficult to receive program recognition without distributing a press release. **Impact:** In the past year, the program was mentioned in 34 (as compared to 20 in 2006) articles that did not result from a press release. With nine Marine Extension Team members involved in programming all along the coast, word of our extensive activities has reached the media.

Web site visitors increase significantly in 2007. To measure the Maine Sea Grant Web site's impact on increasing program visibility and information flow, Web usage statistics from a four-month period (October 1, 2006 to January 31, 2007) were compared to the same period one year later (October 1, 2007 to January 31, 2008). **Impact:** The Web logs indicate a 13.40% rise in the number of "absolute unique visitors," or those users who have never been to the site before (3,820 in 2006-07, and 4,332 in 2007-08). The analysis

also indicated a 21.65% rise in the percentage of "new visitors," a measure of first visits by users within the selected date range.

EDUCATION ACCOMPLISHMENTS

Aquatic invasive species education and outreach helps detect new invasions early. Aquatic invasive species can alter habitat, crowd and prey upon native species, limit biodiversity, and have negative impacts on tourism, recreational uses, and commercially valuable species in Maine's marine waters, lakes, and ponds. Early detection, eradication, and careful monitoring are three of the most effective ways to limit and control new invasions. Maine Sea Grant's new and ongoing marine invasive species programs in this reporting period include a volunteer diver monitoring training program; development and implementation of a new K-12 education program focused on aquatic invasive species and biodiversity; and production of outreach materials on marine invasive species, targeted for a range of audiences. **Outcome:** Programs and materials have informed and engaged over 900 K-12 teachers and students and 50 recreational, commercial, and science divers in actively scouring Maine's shorelines and subtidal areas for new and existing aquatic invasive species, and reporting their findings to northeast regional Sea Grant programs, and the Maine Department of Marine Resources.

New K-12 pilot program provides a model for multidisciplinary watershed education and service learning. The Penobscot River Restoration Project is an unprecedented collaboration between state, federal, tribal, and non-governmental entities working together to restore 11 sea-run fish populations while maintaining hydropower production. To introduce this exciting project to K-12 teachers and students within the Penobscot River watershed and beyond, Maine Sea Grant worked with the University of Maine Senator George J. Mitchell Center and the Penobscot River Restoration Trust to develop and implement a new multidisciplinary education program, called the Penobscot River Watershed Education Program. Students learned about watershed and river restoration science, sea-run fish ecology, and cultural studies through five classroom and field-based curriculum units and interviewed community members, scientists, and industry and cultural history professionals in the watershed to develop educational posters for public kiosks along the Penobscot River. **Outcomes:** The Old Town Elementary School administration and 5th grade teachers (where the pilot program was tested) thought the program was so successful that they plan to offer it again during the 2008-2009 school year with their own funding. The City of Old Town supported the project by building two permanent kiosks to display the students' final project on the town's waterfront property. The program curriculum will be finalized and edited during the summer of 2008, and will be made available to other K-12 schools via the Web and through professional development workshops during the coming year.

Education partnership yields high-quality evaluation tools for Maine Sea Grant education programming. Maine Sea Grant/UMCE has been working with the University of Maine Center for Science and Mathematics Education Research to provide graduate students in the UMaine Master's in Science Teaching program with opportunities to supplement their educational experience through developing and implementing evaluation tools for Maine Sea Grant/UMCE **Outcome:** The high quality data produced through this partnership provide new mechanisms to assess student

learning gains achieved through Maine Sea Grant/UMCE educational programming, and to refine program designs and objectives for subsequent years. The graduate students involved in these programs gain “on the ground” experience in program evaluation prior to entering the workforce, and they have used these opportunities to produce some of the data and develop evaluation tools used for their graduate theses.

Education coordinator pivotal in organizing successful national marine education conference. The National Marine Education Association (NMEA) annual conference is organized and hosted by a different regional association each summer. In July 2007, the Gulf of Maine Marine Education Association (GOMMEA) hosted the 500-person conference after more than a year of planning and preparation. Maine Sea Grant’s education coordinator sits on the GOMMEA Board, and served on the conference planning committee, for which she coordinated over 51 exhibits, reviewed abstracts, and developed the program. **Outcome:** The conference evaluations were overwhelmingly positive, and the experience strengthened Maine Sea Grant’s marine science education partnerships and professional collaboration with GOMMEA member organizations. Since the conference, GOMMEA has had a surge in membership and attendance at its educational programs. In response, the GOMMEA Board broadened the scope and increased the frequency of its activities, such as marine science lectures, and professional development opportunities for educators throughout the Gulf of Maine.

PROGRAM MANAGEMENT ACCOMPLISHMENTS

Maine Sea Grant reorganizes for efficiency. Taking advantage of planned staff attrition, the Maine Sea Grant management team developed a plan to reorganize the program. **Outcome:** The administrative and leadership functions will be more streamlined and more funds will be available for the research competition.

Maine Sea Grant director makes a difference in D.C. Maine Sea Grant’s director, as president of the Sea Grant Association, works at the national level to increase the appropriation to the National Sea Grant College Program. Working with the Washington-based lobbying firm of Lewis-Burke Associates, he has provided testimony at several congressional hearings and met with NOAA and National Sea Grant Office staff. **Impact:** This effort resulted in a slight increase in the appropriation to the National Sea Grant College Programs in 2008 from \$55M to \$57.1M at a time when most NOAA programs suffered budget cuts. This effort is continuing with new tactics and opportunities to testify and build support for the program and could yield significant increases in the program’s federal allocation in the coming years.

Sea Grant/Cooperative Extension partnership strengthened. Maine Sea Grant has once again renewed the Memorandum of Understanding with the University of Maine Cooperative Extension to continue the Marine Extension Team Partnership. **Outcome:** Working with the Cooperative Extension Administrative Council, several improvements were made to the agreement to ensure continued effective collaboration, and the agreement has been expanded from its past 3-year term to a 5-year term.

Maine Sea Grant network covers the coast. Maine Sea Grant staff members are continually asked to play a leadership role in organizing conferences and workshops, planning events, and in facilitating meetings throughout the state. Following are some examples of their participation in the last year.

Workshops, Conferences

Anderson, P.

- Sea Grant Week Planning Committee (chair), October 1-4, 2007, San Diego, CA.

Bartlett, C.

- 15th Annual Northeast Farmed Fish Health Management Workshop (planning committee), March 27, 2007, Washington County Community College, Eastport, ME.

Bisson, B.

- National Ocean Sciences Bowl (recruitment of judging teams, and judging team member) February 10, 2007, Biddeford, ME.
- Maine Fishermen's Forum (invasive species session organizer and facilitator), March 2, 2007, Rockport, ME.
- Expanding Your Horizons Conference (invasive species session organizer and facilitator for 4 groups of 20 middle school girls) University of Maine, March 15, 2007, Orono, ME.
- 2007 Maine Water Conference (education session organizer and facilitator), March 21, 2007, Augusta, ME.
- Aquatic Invaders in Maine (AIM): Education, Exploration, and Stewardship Program, 5-day professional development institute for middle and high school teachers, June 25-29, 2007, Darling Marine Center, Walpole, ME.
- National Marine Educators Association Conference (planning committee member and exhibits coordinator), July 23-27, 2007, Portland, ME.
- Interrupting the Flow: A Northeast Regional Sea Grant Education and Outreach Collaborative Addressing Vectors of Marine Invasive Species, diver training workshops on identifying and monitoring marine invasive species
 - Maine Department of Transportation Dive Team, and Maine Department of Environmental Protection Dive Team, March 5, 2007, Augusta, ME.
 - Southern Maine dive clubs, July 10, 2007, Portland, ME.
 - Maine-iac Dive Club and Mid-Coast Maine divers, August 16, 2007, Brunswick, ME,
 - Southern New Hampshire dive clubs, August 20, 2007, Portsmouth, NH.

Grant, K.

- Maine Beaches Conference Steering Committee, June 22, 2007, Southern Maine Community College, South Portland, ME.
- Wells Gateway Community Design Workshop (coordinator), September 2007, York County Community College, Wells, ME.

Morse, D.

- The Spring Running Planning Committee (chair), June 2, 2007, Augusta, ME.
- Maine's New Working Waterfront Current Use Taxation workshops (coordinator).

Boards, Committees, Meetings and Facilitation**Anderson, P.**

- Investigation of Nearshore Migration of Atlantic Salmon in the Gulf of Maine, (steering committee and facilitator).
- Gulf of Maine Regional Ocean Science Initiative (steering committee), January 25, 2007, Cambridge, MA.
- National Sea Grant Review Panel spring meeting, February 21-22, 2007, Washington, DC.
- Sea Grant Association (president), March 5-6, 2007, Washington, DC; September 29-30, 2007, San Diego, CA.
- Maine Fishermen's Forum (board president), March 1-3, 2007, Rockport, ME.
- Maine Aquaculture Innovation Center (board of directors), March 16, 2007, Belfast, ME.
- Northeast Regional Association of Ocean Observing Systems (NERACOOS) (facilitator), April 26, 2007, Durham, NH; July 12, 2007, Woods Hole, MA; August 1, 2007, Durham, NH; November 12, 2007, Boston, MA; November 29, 2007, Boston, MA.
- Maine Sea Grant Policy Advisory Committee, May 1, 2007, Orono, ME.
- Environmental Solutions Initiative, George Mitchell Center (review panel), June 8, 2007, Orono, ME.
- Herring Gut Learning Center (board of trustees), several meetings throughout the year, Port Clyde, ME
- Marine Dialogue Planning (convener), several meetings and locations throughout 2007.
- Response Integration Team, National Sea Grant Office (facilitator), periodic conference calls throughout 2007; planning retreat, August 27-30, 2007, Providence, RI.
- Department of Marine Resources Peer Review of the Shellfish Sanitation Program (facilitator), organizing meeting, June 29, 2007, Freeport, ME; Industry Advisory Panel Meeting, October 4th, 2007, Orono, ME; statewide site visit, October 28-November 2, 2007, Boothbay Harbor, ME.

Bartlett, C.

- Infectious Salmon Anemia Technical Board (chair).

Beard, R.

- Taunton Bay Advisory Group (co-facilitator), August 7, 2007, Hancock, ME.
- MDI Tomorrow Steering Committee.
- Maine Feeds Maine (facilitator), statewide discussions, November 13, 2007; November 27, 2007; December 7, 2007; December 11, 2007; January 25, 2008.
- Cove Brook Watershed Council (facilitator), February 26, 2007, Eddington, ME.

- Maine Solutions (coordinator and facilitator), Town of Selectmen, March 26, 2007, Thomaston, ME.
- Maine Natural Resource Agency Task Force.

Hoyt, S.

- Muscongus Bay Project Steering Committee.
- Herring Gut Learning Center (board of directors).
- Taunton Bay Advisory Group (co-facilitator), August 7, 2007, Hancock, ME; September 18, 2007, Hancock, ME; October 16, 2007, Hancock, ME; November 27, 2007, Franklin, ME; December 18, 2007, Franklin, ME.
- Aquaculture lease application scoping session (co-facilitator), August 28, 2007, Vinalhaven, ME.
- Maine Solutions Steering Committee.
- Georges River Regional Shellfish Management Committee.

Grant, K.

- KEYS Community Wellness Coalition Board.

Lindberg, K.

- Maine Healthy Beaches Program, 13 meetings, 22 trainings, and four presentations in 2007.

Morse, D.

- Aquaculture lease application scoping session (co-facilitator), August 28, 2007, Vinalhaven, ME.
- Oyster Gardening Program (coordinator).

Schmitt, C.

- Penobscot River Science Steering Committee (coordinator and facilitator).
- Lower Penobscot Watershed Coalition Steering Committee (Research and Monitoring subcommittee co-chair).
- Investigation of Nearshore Migration of Atlantic Salmon in the Gulf of Maine (steering committee).

Springuel, N.

- Governor's Task Force on Nature-based Tourism (Downeast representative).
- Vacationland Resources Committee (co-chair).
- Bar Harbor Chamber of Commerce Tourism Committee.
- Maine Island Trail Association (board of directors).
- University of Maine Tourism Economic Development Advisory Committee.
- Downeast Birding Trail Committee.
- Washington County Community College Adventure Recreation and Tourism Advisory Committee.

Stancioff, E.

- Maine Healthy Coastal Beaches (33 meetings, 36 trainings, and six presentations in 2007).

White, S.

- Cove Brook Watershed Council (vice president).
- Penobscot Bay Alliance (vice president).
- UMaine Employee Assistance Program Advisory Council.

a. Explanation for Change from Previous Year

In the past year, there have been no significant changes in personnel, funding, or strategic direction for the Maine Sea Grant Program. As indicated in last year's report, we have initiated discussion and begun needs assessments related to some of the emerging issues, such as climate change, but these activities are part of our current strategic and implementation plans. In coming year(s), there will be some changes in the administrative leadership of the program due to upcoming retirements. We have begun to formulate a plan for addressing these changes and are working with University Administration and Human Resources in order to expedite a plan that will meet our program's needs within our budget. We can also expect a shift in programming to include as many regional projects as practical in the coming years. This is due to an emphasis and set of expectations coming from NOAA leadership and Congress that is based on the assumption that the management of natural resources is best accomplished inter-disciplinarily and regionally.

IX. Goals for Next Year

During the early part of 2008-2009, the staff at the Maine Sea Grant College Program will work with the Policy Advisory Committee and other stakeholders to determine how the current implementation plan should be updated to meet local, regional, and national needs. As required by the National Sea Grant College Program, Maine Sea Grant must inform the National Sea Grant Office in the fall of 2008 how our program's current and future strategic and implementation plans will align with the newly developed "National Sea Grant Action Agenda 2008-2012: Meeting the Challenge." This national plan includes the following four focus areas:

1. Sustainable Coastal Development
2. Hazard Resilience in Coastal Communities
3. Healthy Ecosystems
4. Safe Sustainable Seafood Supply

It is no coincidence that Maine's recent strategic plan echoes these theme areas very well. As a seafood producing state, with a long marine coastline, many of the challenges faced elsewhere in the nation are shared here along Maine's coast. The programming that we implement in these areas in Maine will help the National Sea Grant College Program meet the demands for science-based solutions to the related challenges. Some specific goals for the coming year include:

Goal 1: Maine Sea Grant will design and implement outreach programming that helps Maine's coastal residents understand and respond to the challenges faced by climate change in this region. Building on the University's report to Governor Baldacci (fall 2008), the Marine Extension Team will work with industry sectors, communities, and other collaborators to identify and implement approaches to mitigating and/or adapting to the effects of climate change.

Goal 2: Through its research and outreach programs, Maine Sea Grant will help the aquaculture industry in Maine to implement studies and approaches aimed at ensuring that aquaculture is economically successful while having minimal impact to the health of Maine coastal ecosystems.

Goal 3: Through formal and informal education initiatives, Maine Sea Grant will inform residents and visitors about the importance of Maine's integrated working waterfront, its cultural history, and the ecological integrity in helping to ensure vibrant coastal communities.

Goal 4: Through outreach efforts, Maine Sea Grant will create opportunities for Maine citizens to engage in and understand marine science through stewardship and informal educational efforts.

Goal 5: Maine Sea Grant will continue to implement a credible peer review-based research competition and will strive to make awards for meritorious projects that are highly likely to satisfy information needs for coastal communities, businesses, and decision-makers.

Goal 6: Maine Sea Grant will continue to provide unbiased and trusted convening and facilitation services to our clients and partners in the spirit of nurturing a collaborative approach to problem-solving for coastal and marine issues.

X. Challenges and Solutions

Like other departments/research units at the University of Maine, and like other Sea Grant programs around the nation, Maine Sea Grant has budgetary challenges that continue to be problematic in the coming year. Increasing costs for staffing—exacerbated by employee contracts, fringe benefits, and indirect expenses—are affecting the amount of funding that the program is able to dedicate to competitive research and program development awards. The Maine Sea Grant management team is approaching this problem in several ways in the coming year:

1. Taking advantage of planned staff attrition, the program will reorganize over the 2008-2009 period to streamline administrative and leadership functions to maximize the amount of funds available for competitive awards. This reorganization plan is in place and has received endorsement from upper administration at the University.

2. Maine Sea Grant is working at the national level to increase the appropriation to the National Sea Grant College Program. If successful, this effort could yield significant increases in the program's federal allocation in the coming years. This national effort will only be successful if the 32 Sea Grant programs work collaboratively towards common goals within a national plan for Sea Grant and NOAA. Maine's Sea Grant director is currently presiding over this national effort on behalf of the Sea Grant Association.
3. The Maine Sea Grant management team will pursue opportunities to partner with other organizations in the deployment of funds for competitive research. For example, we will approach the Department of Environmental Protection to encourage an increase in the available funds for the Maine Oil Spill Advisory Committee (MOSAC) research program, which is administered by Maine Sea Grant. Currently authorized at a level of \$250,000 per year, the DEP has only allocated \$100,000 per year in recent years.

Other challenges/solutions are:

4. Maine Sea Grant leadership has charged the Marine Extension Team with developing mechanisms to engage their stakeholders and the science community to improve on the integration of science into management and to add value to the Sea Grant investment. As a follow-up to the Maine Sea Grant research and outreach symposium held on April 28, staff will be analyzing the outcomes of the symposium during a planning retreat in the summer of 2008 that will result in an engagement plan for the Marine Extension Team and the outreach component of the program. Aligning extension staff with research projects, as well as developing more opportunities for similar interactions, will be discussed.
5. Maine Sea Grant will always need to aggressively promote the products of our investments in research, education and extension. Though public relations is not the primary purpose of a public service organization like ours, we recognize the need to continually improve the public's perception of the program and to ensure that our materials are having as much positive impact as possible. To that end, Maine Sea Grant has developed a marketing plan that will be aggressively implemented in the coming year. This effort will be enhanced by the engagement of a graduate student in the Communication and Journalism Department who will help the program to assess the mechanisms for communicating and determine how best to improve the visibility and impact of the program. This opportunity is made possible by an investment by Cooperative Extension, the Office of the Vice President for Research, the Office of Research and Economic Development, and the related academic departments. If successful, we see the outcomes of this assessment being beneficial not only to Maine Sea Grant and the University of Maine Cooperative Extension, but also to other units and the University as a whole.

XI. Long-term Priorities

1. Depending on the budgetary situation, Maine Sea Grant will make the competitive research and program development programs priorities for funding. It is

impossible to predict the national budgetary situation at present, but the national allocation plan calls for small programs to see incremental increases in federal funding and, to the extent possible, Maine Sea Grant will dedicate new funds to these programs.

2. Maine Sea Grant would like to implement a student fellowship program, possibly placing a student intern with the Joint Standing Committee on Marine Resources in Augusta to provide an experiential learning opportunity for a University of Maine student that will help this legislative committee to develop sound policy by providing linkages to University-based marine research.
3. The Maine Sea Grant program intends to investigate the feasibility of restructuring the awards to graduate students through the competitive research program by making them Sea Grant fellowships. This is a fairly common practice elsewhere in the Sea Grant network and could help these students to have a better sense of the process of applying for and administering competitive research grants, and enable them to identify with a national peer group of Sea Grant-funded graduate student scientists.
4. The Maine Sea Grant program intends to develop and implement its realigned strategic plan over the next few years, in preparation for the program's performance assessment by the National Sea Grant Office. The process for conducting these assessments is being modified, and we anticipate a brief site visit by the National Sea Grant Office and the National Sea Grant Review Panel (soon to be titled National Sea Grant Advisory Board) in late 2009 or 2010. The next comprehensive review of the program may not be until 2012, but it is likely that an interim assessment will take place at the end of 2010, which may result in a new rating for the program. It is critically important that the program continue to be one of the highest achieving Sea Grant programs in the national network in order to fully capitalize on the potential funding increases that will be awarded meritoriously. To that end, the program will be conducting the planning activities carefully, to ensure that our programming and expenditure of resources will provide maximum impact and outcomes for the state, region, and nation, thereby setting the framework for a successful program evaluation.

Appendix A: Maine Sea Grant Publications & Media 2007-08

BROCHURES, REPORTS, GUIDES, FACT SHEETS, ETC.

1. 15th Annual Farmed Fish Health Management Workshop Program Guide and Abstracts.
2. Penobscot River and Penobscot Bay panels for Penobscot Narrows Bridge Observatory visitor display
3. Kenduskeag Stream, Penobscot River Salmon Club posters for waterfront kiosks.
4. Resource Guide for Sustainable Tourism in Down East Maine and Southwest New Brunswick
5. Access to the Waterfront: Issues and Solutions Across the Nation (report)

6. The Future of Maine's Changing Beaches: Diverse Interests and Common Goals (program and collateral materials)
7. Maine Healthy Beaches Program. Maine Healthy Beaches Program 2006 Report. MSG-E-07-01/NA06OAR417108. Orono, ME: Maine Sea Grant College Program.
8. Healthy Boating Equals Healthy Beaches (brochure)
9. Research in Focus: Field Trials of 4" Rings in the Inshore Scallop Fishery of the Gulf of Maine (fact sheet)
10. Profile Monitoring Guides Beach Management (fact sheet)
11. Southern Maine Beach Profiling: Mapping the State of Maine's Beaches (updated brochure)
12. Maine Sea Grant display
13. Island monitoring Task Force Three-year Pilot Project 2004-2006 Final Report (notebook)
14. *Maine's Marine Invasion*. Revised and updated marine invasive species fact sheet. January 2008.
15. Penobscot River Watershed Education Program fact sheet. October 2007.
16. Midcoast Fishermen's Association (flyer)
17. Ebbin, S., and Pomeroy, R. 2008. An Evaluation of the Georges River Shellfish Management Committee: An Enduring Co-management Experiment. Research Summary January 2008. Department of Agriculture and Resource Economics, University of Connecticut Avery Point. Connecticut Sea Grant Publication CTSG-07-16. Groton: University of Connecticut.
18. Slovinsky, P., and Dickson, S.M. 2008. Ogunquit Beach Current Survey of July 12, 2007. Maine Healthy Beaches Program Coastal Circulation Study. Augusta, ME: Maine Geological Survey.
19. Slovinsky, P., and Dickson, S.M. 2008. Microbial Pollution Levels and Transport Pathways at Ogunquit Beach. Maine Healthy Beaches Program Oceanographic and Meteorological Study. Augusta, ME: Maine Geological Survey.
20. Slovinsky, P., and Dickson, S.M. 2008. Kennebunk River Current Survey of August 9, 2007. Maine Healthy Beaches Program Coastal Circulation Study. Augusta, ME: Maine Geological Survey.
21. USDA APHIS Veterinary Services, Maine Department of Marine Resources, and Maine Aquaculture Association. 2008. Infectious Salmon Anemia Program Standards, January 2008. Washington, DC: USDA.
22. Maine Geological Survey. 2007. State of Maine Beaches. Augusta, ME.
23. Other:
 - a. Marine invasive species education and outreach materials: Keytainers, magnets, and stickers
 - b. Emergency Telephone Numbers for Coastal Maine Waters (laminated card)

MEDIA PLACEMENT (from press releases)

Machias Workshop on New Current Use Taxation and Other Tools for Preserving Working Waterfronts—February 14, 2007

- Preserving Waterfront Topic of Workshops, *Bangor Daily News*, February 19, 2007

Maine Sea Grant and Partners to Research Tools for Preserving Access to the Coast

- University of Maine News Online, March 5, 2007
- University of Maine home page, March 5, 2007

Farmed Fish Health Workshop Celebrates Fifteenth Year—March 19, 2007

- WCCC Site of March 27 Fish Health Workshop, *Bangor Daily News*, March 23, 2007

Maine Sea Grant Receives Top Rating in National Review—April 20, 2007

- Maine Sea Grant Receives Top Rating in National Review, University of Maine News Online, April 30, 2007

- Maine Sea Grant Receives High Marks, *Bangor Daily News*, April 21-22, 2007
- University of Maine President Kennedy “Go Blue Message,” May 1, 2007
- *UMaine Today* (inside back cover), July/August 2007

Tapping into the Global Market for Green Tourism in Down East Maine and Southwest New Brunswick—May 2, 2007

Pressure on Coastal Waterfronts Increasing on U.S. Shores—May 9, 2007

- Maine Sea Grant Report Addresses Coastal Access Head On, Sea Grant E-Currents (newsletter), May 21, 2007
- Pressure on Coastal Waterfronts Increasing on U.S. Shores, *NOAA Research Web site*, May 24, 2007
- Waterfront Access Issues Are Subject of Sea Grant/ Coastal Zone Management Report, *Smart Growth Online*, May 24, 2007
- Pressures on Coastal Waterfront Increasing, *The Ellsworth American* and City of Ellsworth Web site, May 31, 2007
- How the Public Lost Rights to the Beach, *The News Journal*, June 6, 2007
- The Selling of Maine’s Coast, *Boston Sunday Globe* (front page), June 17, 2007
- Pressures on Coastal Waterfront Increasing: Communities Turn to Creative Solutions, *Fishermen’s Voice*, June 2007
- Waterfront Access, *Commercial Fisheries News*, July 2007

Conference to Highlight the Changing Future of Maine’s Beaches—May 17, 2007

- The Future of Maine’s Changing Beaches: Diverse Interests and Common Goals, *Maine Coastline* (newsletter), Spring 2007
- Conference to Highlight the Changing Future of Maine’s Beaches, *NOAA Weekly Report*, May 22, 2007
- Conference to Highlight the Changing Future of Maine’s Beaches, *Fishermen’s Voice*, June 2007

- Conference to Highlight the Changing Future of Maine's Beaches: South Portland Event to Feature Climate Scientist Cameron Wake, *University of Maine News Online*, June 11, 2007

The Spring Running Festival Set to Get Underway June 1 and 2—May 29, 2007

- Spring Running Riverfront Festival, *Kennebec Journal*, June 1, 2007
- Sea Grant-sponsored Spring Running Festival Underway June 1, *National Sea Grant Program Web site*, May 29, 2007

What Does the Future Hold for Southern Maine's Beaches?—June 15, 2007

- The Future of Maine's Changing Beaches: Diverse Interests and Common Goals, *Maine Coastline* newsletter, Spring 2007
- EPA Provides Over \$250,000 for Environmental Monitoring, *News Blaze*, June 28, 2007
- EPA Provides Over \$250,000 for Environmental Monitoring of Maine's Coastal Beaches, *U. S. Environmental Protection Agency Online Newsletter*, June 28, 2007
- Beaches Conference set for Friday: Focus is on climate change and beaches, *Seacoast Online*, June 28, 2007
- What Does the Future Hold for Southern Maine's Beaches: Friday Event to Feature Climate Scientist Cameron Wake, *University of Maine News Online*, June 28, 2007
- Maine Beaches Conference, *fosters.com*, June 17, 2007

***Journalists are from Venus, Scientists are from Mars*, September 17, 2007**

- UMaine to Feature Talk on Bridging Science and Journalism, *University of Maine Web site*, September 17, 2007
- Science, News Make Odd Pair: Presentation Bridges the Gap Between Scientists and Journalists, *Maine Campus*, September 24, 2007

Listed in Program at Shows/Festivals

Maine Boats, Homes, & Harbors Show, August 2007

UNSOLICITED PRESS

UNE Hosts 2007 Nor'Easter Ocean Sciences Bowl Feb. 10th, Media-Newswire.com, February 6, 2007

Help Protect Ogunquit Beach and the River this Summer, *The Independent*, February 14, 2007

Council to Consider Local Management of Groundfishery on Feb 8, *Earthtimes.org*, February 7, 2007

UMaine Researcher Opens New Doors for Sea Vegetable Aquaculture, *MaineSci Journal*, March 5, 2007

USA: Researcher Makes Waves in Sea Vegetable Aquaculture, *Fish Farmer*, March 6, 2007

Conservation Forum This Saturday, *Village Soup Online*, April 4, 2007

Event Celebrates Maine Oysters and Mussels, *Working Waterfront/Inter-Island News*, April 2007

USA: Researcher Makes Waves in Sea Vegetable Aquaculture, *Fish Farmer*, March 2007

Event Celebrates Maine Oysters and Mussels, *Working Waterfront/Inter-Island News*, April 2007

Conservation Forum this Saturday, *Village Soup*, April 4, 2007

Web Site Features Local Communities, *Seacoast Online*, April 6, 2007

Seeds of Recovery, *Bangor Daily News* (front page State section), June 12, 2007

Officials Deny Magazine Claim that Short Sands Polluted, *York Weekly*, July 11, 2007

Clammer Earns Approval for Goose Cove Experiment, *Ellsworth American*, July 12, 2007

Improving Water Quality Deserves Attention, *Maine Sunday Telegram*, July 15, 2007

New Resource Guide for Sustainable Tourism Available, *Conservation News-Maine* newsletter, July 2007

Sand, Seafood and Access, *Coastwatch* magazine, Summer 2007

Beach Pollution Fight Heads Inland, *Portland Press Herald*, August 15, 2007

Things Are Just Beachy in York, *Fosters.com*, August 15, 2007

The Boat School in Eastport is Changing Hands, but Can It Change Direction? *Mainebiz*, August 21, 2007

Funds Help Preserve Fishing Access, *Bangor Daily News*, August 27, 2007

Natalie Springuel on the Gulf of Maine, *College of the Atlantic Web site*, September 5, 2007

Recreational Anglers Are Being Surveyed, *The Quoddy Tides*, August 10, 2007

COA Offers Community Development Class, *The Bar Harbor Times*, August 23, 2007

Pemaquid Oyster Festival: Entertainment, Education, Celebrities (and Oysters), *The Lincoln County News*, September 24, 2007

Maine Sea Grant Deserves Kudos, *October Go Blue Message* (from UMaine President Robert Kennedy), October 11, 2007

NAMA Enters New Era; Begins Leader Search, *Commercial Fisheries News*, November, 2007

Talking Lobsters, *UMaine Today*, November/December, 2007

Eelgrass Restoration Effort Had Good Start, *Ellsworth American*, December 13, 2007

Pearls of Wisdom, *Grist Environmental News and Commentary*, December 13, 2007

York Tourists Undaunted by Bad Beach Rating in 2007, *York Weekly*, December 26, 2007

Lawmakers Aim to Quell “Hostility” Between DMR, Clammers, *The Times Record*, January 21, 2008

Sea Grant Publications, Making Waves at the University of Maine Darling Marine Center, January 2008

FEATURE ARTICLES

Bisson, B.

Old Town Elementary Students Get Hands-On Ecology Lessons. *The Penobscot Times*, October 18, 2007.

Morse, D.

Bay Tender Shellfish Banks on Sea Scallops. *Fish Farming News*, 2007.

Schmitt, C.

Uniting efforts to restore Eastern brook trout. *Natural Resources Year in Review 2006*. Reston, VA: National Park Service, December 2007.

Where have all the herring gone? *Fishermen's Voice*, Vol. 12, No. 11, November 2007.

Planning for the Penobscot. *Working Waterfront*, Vol. 20, No. 8. September 2007.

Known Positions. *Working Waterfront*, Vol. 20, No. 7. August 2007.

The Salters of Stanley Brook. *Friends of Acadia Journal*, Vol. 12, No. 1, Summer 2007.

New system opens new vistas for lobster fanciers. *Wild Catch*, Vol. 2 No. 3, May/June 2007.

Scallops Reseeding at Jonesport. *Fishermen's Voice*, Vol. 12 No. 5, p. 11-12. 2007.

Despite their golden color, these still flourish in the cold water of the Gulf of Maine. *Wild Catch*, Vol. 2 No. 2, Mar/Apr 2007.

Seaweed beyond sushi. *Maine Boats, Homes & Harbors*, Issue 93, March 2007.



Maine Sea Grant College Program

5784 York Complex

University of Maine

Orono, ME 04469-5784

Phone: 207.581.1435 Fax: 207.581.1426

www.seagrants.umaine.edu



Photo: ©iStockphoto.com/Tom Allen

MSG-RF-08-01
NA06OAR4170108
100