



**RHODE ISLAND SEA GRANT
PROGRAMS 2008-2010**


Rhode Island



Rhode Island Sea Grant Contacts

Mail: Rhode Island Sea Grant, University of Rhode Island Bay Campus, Narragansett, RI 02882
Tel: (401) 874-6800 **Fax:** (401) 789-8340 **Web:** seagrant.gso.uri.edu

| | | |
|--|---|---|
| Barry Costa-Pierce Director bcp@gso.uri.edu | Susan Kennedy Coastal Management Extension Specialist skennedy@gso.uri.edu | Lori Pivarnik Coordinator, Nutrition and Food Sciences, Food Safety Outreach/Research Program pivarnik@uri.edu |
| Alan Desbonnet Assistant Director aland@gso.uri.edu | Kathryn Manning Scientific Research Grant Assistant kmanning@crc.uri.edu | Barbara Somers Fisheries Extension Specialist barbs@uri.edu |
| Malia Schwartz Assistant Director for Research and Development malias@gso.uri.edu | Amber Neville Coastal Program Coordinator amber@crc.uri.edu | Susan Farady Director, Marine Affairs Institute and Rhode Island Sea Grant Legal Program sfarady@rwu.edu |
| Heather Rhodes Fiscal Officer hrhodes@gso.uri.edu | Pamela Rubinoff Coastal Management Extension Specialist rubi@crc.uri.edu | Megan Higgins Research Counsel, Marine Affairs Institute and Rhode Island Sea Grant Legal Program mhiggins@rwu.edu |
| Monica Allard Cox Communications Manager allard@gso.uri.edu | Laura Skrobe Extension Co-leader for Fisheries Programs lskrobe@uri.edu | Charlotte Ferris Program Coordinator, Marine Affairs Institute and Rhode Island Sea Grant Legal Program cferris@rwu.edu |
| Tracy Kennedy Program Administrator tkennedy@gso.uri.edu | Kathleen Castro Extension Co-leader for Fisheries Programs kcastro@uri.edu | |
| Jennifer McCann Extension Leader for Coastal Programs mccann@crc.uri.edu | David Beutel Fisheries Extension Specialist dbeutel@uri.edu | |

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URI Cooperative Extension
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U.S. Minerals Management Service
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Warwick Harbor Commission
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Williams Mystic Maritime Studies Program of Williams College and Mystic Aquarium
Woods Hole Oceanographic Institution, Marine Policy Center
Woonasquatucket River Watershed Council
World Wildlife Fund



State and federal submerged lands law and policy assessment

Jay Udelhoven

Senior Policy Advisor, The Nature Conservancy Global Marine Initiative

\$14,800

Can private organizations acquire interests in submerged lands for conservation purposes? Jay Udelhoven, senior policy advisor at The Nature Conservancy Global Marine Initiative, will answer this question by assessing laws and policies for private submerged lands in southern New England state waters. The Nature Conservancy and its partners (URI, Roger Williams University, Rhode Island Sea Grant, the Coastal States Organization, and NOAA's Coastal Services Center) have recently completed assessments of submerged lands conservation in Massachusetts and Rhode Island. But there is still a dearth of information regarding the ability of private conservation organizations to acquire proprietary rights to submerged lands through ownership or leasing in Connecticut, through ownership in Rhode Island, and through leasing in the U.S. Exclusive Economic Zone off the coasts of Connecticut, Massachusetts, and Rhode Island.

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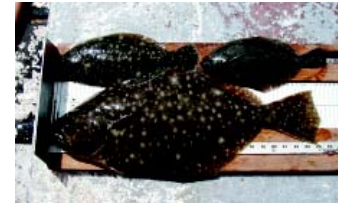




Rhode Island Sea Grant fosters increased stewardship of marine ecosystems and economies



maintaining effective in large-scale industrialized fisheries. Uchida will use the proposed CBM measure in the Rhode Island fluke fishery as a motivating case. Results of this research will inform stakeholders, managers, and fishery economists of the likely effectiveness of sector allocation as a fishery management measure in the fluke and groundfish fisheries.



Re-visioning women in the Southern New England fishing industry

Caroline Karp, Senior Lecturer, Brown University Environmental Studies

\$52,050

Around the world, women are involved in fisheries and fisheries management. In the United States however, women's roles in those fields are often considered to be marginal—fisheries management councils are dominated by men who are assumed to be the key stakeholders. Researchers Caroline Karp, Brown University senior lecturer in environmental studies, Gail Cohee, director of the Brown University Sarah Doyle Women's Center, and Helen Mederer, URI sociology professor and department chairwoman, propose to interview women who are involved in the fishing industry in Southern New England—as owners and/or skippers of fishing vessels, holders of federal and/or state fishing licenses, crew or NOAA observers, as well as women employed in shoreside fisheries-related activities or fisheries science, management, advocacy, and outreach—to see whether there are gender-based differences in conceptions of community-based fisheries management that would enrich and stimulate ongoing policy discussions about how to achieve sustainable fisheries in New England. The researchers propose to identify factors that encourage or limit women's participation in informal fisheries and marine resource management decision-making, and determine whether gender-based differences in occupations within the southern New England fishing communities result in different fisheries and marine resource management preferences. This knowledge can then be applied to better consider the role of gender in fisheries management endeavors.

Nixon, professor of oceanography at the URI Graduate School of Oceanography, will measure the impact of changes in the timing and magnitude of phytoplankton blooms to the bottom community in Narragansett Bay. His research will assess the potential impact of nitrogen reduction in sewage effluent during summer on the growth rates and condition of important benthic animals and on benthic-pelagic coupling. The results of this research will help to document some of the impacts of climate change on benthic ecology and productivity in the Bay, tell us if these changes are contributing to the decline of some important Bay fishery resources, and predict the impact of changes in nitrogen discharges to the Bay.

Developing community-based fishery management in New England—studies of traditional fishing communities and laboratory experiments

Hirotsugu Uchida, Research Assistant Professor, URI Environmental and Natural Resource Economics
\$190,000

Both harvesters and regulators are growing interested in decentralized fishery management, such as community-based management (CBM), that uses the knowledge and involvement of local resource users as an alternative to conventional centralized regulations. However, this reassignment of management responsibility is only one component of success in CBM—the other is the actual system used for managing fishing effort. One such overexploited fishery in search of creative management is the Rhode Island fluke (summer flounder) fishery. Recently, a subset of fluke fishermen formed an alliance called the Rhode Island Fluke Conservation Cooperative (RIFCC) and proposed a sector allocation under which the RIFCC will have its own share of Rhode Island’s federal allocation of the total allowable catch that will be managed collectively by the members of RIFCC separate from the state’s possession limits—effectively managing by CBM. Despite increasing interest in CBM, more information is needed to understand how a CBM effort can succeed. Hirotsugu Uchida, URI professor of environmental and natural resource economics, will evaluate the incentives of existing management structures to assess their portability beyond the traditional fishing communities in which they were developed. Uchida hopes to identify CBM systems that use local knowledge while re-

Introduction


Letter from the Director

As I reflect on Rhode Island Sea Grant’s accomplishments and look to the future of our investments, I am pleased to report that our program has marked several recent achievements—in ecosystem-based management and planning that has preserved public shoreline access; in bycatch reduction, with a new net technology that garnered an international prize from the World Wildlife Fund; and with the publication of a book on ecosystem-based science and management of Narragansett Bay. We have provided students in oceanography, biology, journalism, fisheries, marine affairs, and law with a better understanding of the coastal and marine issues society faces.

Our staff has built strengths in the creation of successful public policy processes, adult informal education and training, the development of fisheries management and new technologies, facilitation and conflict resolution, legal research, and communications. We have tackled complex problems, such as dealing with the effects of climate change and nutrients, and we have put together multidisciplinary research and outreach teams, with results ranging from sharing information with decision makers and users to the creation of new policies and regulations adopted by the state.

The next two years will see the continuation of these efforts. Our program administration, research, extension programs, Legal Program, and education activities from 2008 to 2010 are described in the following pages, and flow from our strategic and implementation plans. We look forward to interacting with our constituents through our science and legal symposia, workshops, partnership projects, and public events such as Coastweeks and our summer lecture series. Please keep in touch.

Sincerely,



Barry A. Costa-Pierce
Director, Rhode Island Sea Grant College Program
Professor of Fisheries and Oceanography, University of Rhode Island

Who we are

The Rhode Island Sea Grant College Program is a federal-state-university partnership based at the University of Rhode Island. The program offers research, outreach, and education programs that address two core themes—Sustainable Coastal Communities and Ecosystems and Sustainable Fisheries.

Rhode Island Sea Grant is one of 31 programs that make up the National Sea Grant College Program, a part of the National Oceanic and Atmospheric Administration's Office of Oceanic and Atmospheric Research. Rhode Island Sea Grant collaborates with federal, state, and local partners to achieve its goals. Administrative offices and the Sustainable Coastal Communities and Ecosystems Extension Program are located at the URI Graduate School of Oceanography, the Sustainable Fisheries Extension Program is located in the URI College of the Environment and Life Sciences at the East Farm Campus, and the Legal Program is located at Roger Williams University. Research is supported at many departments and colleges at URI, Brown University, and Roger Williams University.

Our mission

Rhode Island Sea Grant implements integrated research, education, and outreach strategies designed to foster leadership dedicated to the increased stewardship of marine ecosystems and their allied marine economies. Our core mission is to apply university-based talent to creating more sustainable and secure “coastal futures.”

Senior Advisory Council

The Rhode Island Sea Grant Program Senior Advisory Council (SAC) assists the program in defining focus and achieving excellence for resolving critical marine environmental issues.

The SAC advises the leadership of Rhode Island Sea Grant on how best to forge partnerships, avoid duplication, and facilitate science-based activities of importance to multiple stakeholders. The group also advises about new or proposed activities important to Rhode Island Sea Grant in marine, coastal, and environmental research, education, and outreach, and helps identify funding opportunities.

application of a method that allows reliable discrimination of human and non-human microbial contamination when evaluating surface and groundwater quality. This is especially true for southern Rhode Island, where houses not connected to sewers are the norm, and many have failing cesspools and/or aging septic systems. Brad Moran, professor of oceanography at the URI Graduate School of Oceanography, is undertaking a project that will use an innovative method of microbial source tracking to identify human and non-human microbial sources entering Rhode Island salt ponds. The project will also characterize circulation, flushing rates, and groundwater quality in the ponds, and relate these ecosystem functions to changes in microbial contaminant sources over the course of an annual cycle.



Experimental studies of benthic-pelagic coupling in a changing Narragansett Bay

Scott Nixon, Professor, URI Graduate School of Oceanography
\$239,999

The timing and magnitude of the traditional winter-spring diatom bloom has changed markedly in Narragansett Bay over the past 25 years, presumably driven by changes in grazing pressure by copepods due to climate warming. This predation pressure is exerting an effect on primary production in the Bay. Additionally, shifts from winter to spring/summer blooms have resulted in less organic matter reaching the benthos and appear to have reduced growth rates of commercially and recreationally important juvenile demersal fish and shellfish. This is a significant change because plankton are an important food source for the benthic community and are essential for the denitrification process. Concurrently, a management initiative to sharply reduce the amount of nitrogen entering the Bay from sewage treatment plants during summer may further reduce the summer blooms in the mid- and lower Bay, and may have a negative impact on secondary production, especially in the benthos. Scott

Solving a squid processing waste disposal problem through bioconversion into organic fertilizer

Chong Lee, Professor, URI Nutrition and Food Sciences
\$159,174

Historically, Rhode Island seafood processors have faced processing waste disposal problems, primarily with squid processing byproduct, since squid is harvested at one of the highest landing rates. This trend is likely to continue in the future. It is estimated that squid processing plants in the region generate in excess of 10 million pounds of processing waste annually, and squid processors must currently pay to dispose of this waste. Squid processing byproduct is high in protein, nitrogen, and phosphorus, making it viable for consideration for bioconversion into squid hydrolysate, which can be used as an aquaculture nutrient additive and organic fertilizer. Chong Lee, URI professor of nutrition and food sciences, will develop a streamlined, low-cost, bioconversion process and will test methods for producing squid hydrolysate in large quantities at a commercial facility. This work will provide the industry, and potential investors, with first-hand technical information on product performance and the feasibility of commercial development. Ultimately, it opens the door to not only reduce the waste-stream of one sector of the commercial fishing industry, but to turn that waste from an expense to a possible source of income.

An integrative study of changes in physical circulation, ground-water nutrient supply and plankton community structure in Rhode Island coastal waters

Bradley Moran, Professor, URI Graduate School of Oceanography
\$212,978

Microbial contamination of Rhode Island's coastal waters, in particular its coastal salt ponds, poses a major human health risk through consumption of shellfish from the ponds as well as through recreational exposure. This growing problem of bacterial contamination, as well as eutrophication, of the salt ponds is related to complex issues of water supply and usage and wastewater treatment and disposal. A key challenge is tracking the source of microbial contamination and differentiating between human and non-human sources of contamination. Therefore, there is a critical need for the

SAC Members

Peter August, Director, URI Coastal Institute

Ronald C. Baird, Former Director, National Sea Grant College Program; Research Professor of Marine Science, University of North Carolina Wilmington

Ames Colt, Chair, Rhode Island Rivers, Bays & Watershed Coordination Team

Ben Cuker, Professor of Marine & Environmental Studies, Hampton University

Shelley Dawicki, Communications Specialist, National Marine Fisheries Service

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Kristen Fletcher, Executive Director, Coastal States Organization

Grover Fugate, Executive Director, R.I. Coastal Resources Management Council

Brent Haglund, President, Sand County Foundation

John Hoey, Research Fisheries Biologist, Northeast Fisheries Science Center

Ambrose Jearld, Director of Academic Programs, Northeast Fisheries Science Center

Chris Mantzaris, Deputy Regional Administrator, National Marine Fisheries Service

Eugene Lyman, Associate Dean for Development, URI Foundation, URI Graduate School of Oceanography

Stephen Medeiros, President, Rhode Island Saltwater Anglers Association

Sunshine Menezes, Executive Director, Metcalf Institute for Marine & Environmental Reporting

James Miller, Professor, URI Department of Ocean Engineering

Kate Moran, Associate Dean, URI Graduate School of Oceanography

Dennis Nixon, Associate Dean, URI College of Environmental and Life Sciences

Rick Rhodes, Associate Dean, URI College of Environmental and Life Sciences

Richard Ribb, Program Director, Narragansett Bay Estuary Program

Roylene Rides-at-the-Door, State Conservationist, USDA Natural Resources Conservation Service Rhode Island Office

Carol Shumway, Director of Conservation Science, The Nature Conservancy

David Smith, Associate Dean, URI Graduate School of Oceanography

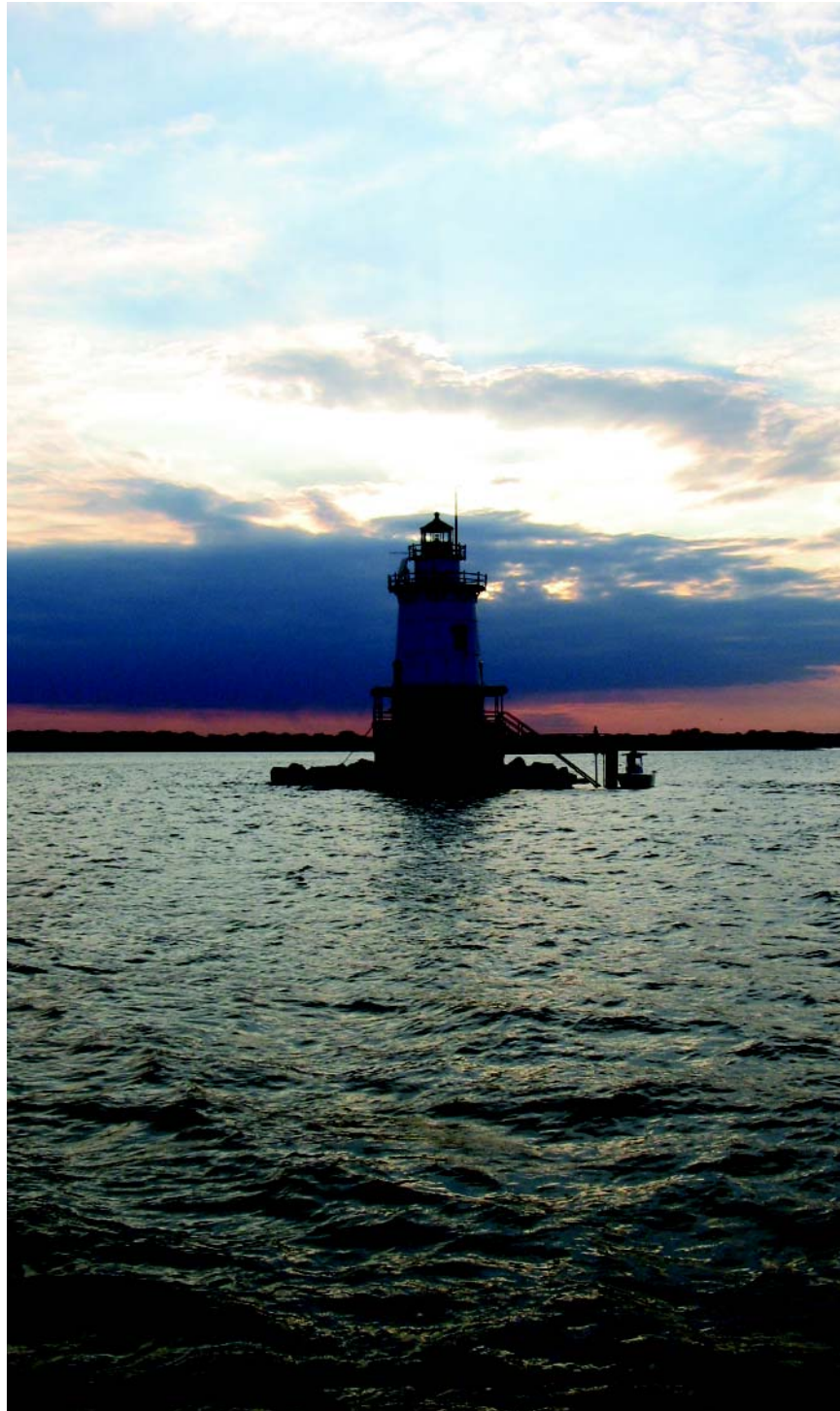
Robert Smith, Fisherman, National Fishermen's Group

Michael Sullivan, Director, R.I. Department of Environmental Management

Judith Swift, Vice Provost, URI Academic Affairs

Nancy Thompson, Director, Science and Research Northeast Fisheries Science Center

Robert Weygand, Vice President, URI Administration



nitrogen fixation. The proposed research links advanced biogeochemical and molecular techniques to determine how fast these processes are happening and what microbial communities are responsible.

BayMap: A proposal to image the seafloor, map and ground truth the habitats, and document the cultural landscape of Narragansett Bay and Rhode Island and Connecticut coastal environments

John King, Professor, URI Graduate School of Oceanography
\$247,000

Effective integrated management of marine resources, infrastructure development, and environmental protection require a scientific understanding of seabed bathymetry, sediments, and habitat types, biological communities, and underwater archaeological resources. This project, led by John King, professor of marine geology and archaeology at the URI Graduate School of Oceanography, is a continuation of previously funded work, and will produce a comprehensive series of high-resolution seafloor maps and images of Narragansett Bay and adjacent Rhode Island and Connecticut coastal environments to create a complete picture of their geology, habitats, biological communities and archaeology. The BayMap initiative is providing valuable information that can be used for habitat and cultural resource management in reviewing environmental assessments dealing with major projects such as coastal construction, dredging, location of aquaculture sites, habitat restoration and preservation, and dredge disposal. It can also be used to develop mitigative measures and a better quantitative understanding of the productive capacity of benthic ecosystems. Already the map products from previous efforts are being used to site restoration efforts, to track species distributions, and to assess proposals for aquaculture ventures. These map products will continue to play an increasingly important role in coastal management efforts into the future.



Researchers obtain underwater core samples.



known reflex behaviors of flounder after capture can be used to predict how well they will survive after being returned to the water. A Reflex Action Mortality Predictor (RAMP) assay will be developed for on-deck use by observers and fishermen to estimate the survival rate of discarded fish. This research will shed light on a critical problem facing the commercial fishing industry, and will provide fisheries managers with information essential for more effective regulation of the summer flounder resource.

Climate change and nitrogen cycling in Narragansett Bay: a coupled biogeochemical and molecular approach

Bethany Jenkins, ADVANCE Assistant Research Professor, URI
Department of Cell and Molecular Biology
\$190,004

Estuaries have long been considered nitrogen “sinks,” whereby bacteria in the sediments remove substantial quantities of the nutrient through a process called denitrification. However, recent research has shown that a decrease in the amount of organic matter deposited on the bottom of Narragansett Bay has switched the sediments from being a major nitrogen sink to a significant nitrogen source (nitrogen fixation). These changes have been linked to warming surface waters over the last three decades. In order to properly manage nitrogen inputs to Narragansett Bay, it is important to understand the mechanisms controlling denitrification and nitrogen fixation. This project, led by Bethany Jenkins, URI assistant professor of cell and molecular biology, and Robinson Fulweiler, a GSO graduate now at Boston University, seeks to link, for the first time, nitrogen flux measurements with microbial communities in Bay sediments with the idea that organic matter controls sediment nitrogen fluxes. By knowing which organisms are responsible for the measured fluxes, the researchers hope to predict how fast the sediment microbial community responds to changing environmental conditions, and to determine whether the reversal in the nitrogen cycle is part of a stable long-term trend or whether nitrogen fluxes show different patterns seasonally and annually, and whether the process observed in the mid-bay is similar elsewhere in the bay and in the Providence River estuary. This work will inform management of nitrogen inputs to Narragansett Bay by improving understanding of the fundamental controlling mechanisms behind denitrification and

Program Administration

Rhode Island Sea Grant, administered under the management of Director Barry A. Costa-Pierce and Assistant Director Alan Desbonnet, with the assistance of Fiscal Officer Heather Rhodes, Assistant Director for Research and Development Malia Schwartz, and Program Administrator Tracy Kennedy, and with the communications support of Communications Manager Monica Allard Cox and Publications Manager Jean Gallo, provides a unique opportunity to approach marine-related education, research, and extension activities in an interdisciplinary manner. This enables program management staff to work closely with a variety of individuals on complex, real-life problems, incorporating expertise from a broad range of scientific and educational resources, while attempting to provide solutions that will benefit the state, New England, and the nation.

Program management staff work with local, regional, national, and international coastal and marine stakeholders, local communities, the state of Rhode Island, other states, URI and other higher education institutions, and the National Sea Grant Program and other federal agencies to develop and administer a comprehensive, effective, and fiscally responsible Sea Grant College Program.

Education/Environmental Literacy

Fellowships

The last two years have seen major expansion of Rhode Island Sea Grant fellowship programs, including URI Year for Action program internships, URI Research Fellows, Rhode Island Sea Grant Fellows in Aquaculture, Sea Grant Coastal Fellows, Rhode Island Sea Grant Coastal Management Fellows, Rhode Island Sea Grant Knauss Fellows, Rhode Island Sea Grant NMFS/NOAA Fisheries Fellows, and Rhode Is-



Rhode Island Sea Grant 2008 Knauss Fellows Christine Patrick (URI), Jennifer Mehaffey (RWU-URI), Marselle Alexander-Ozinskas (Brown University), and Karen Hyun (URI)

land Sea Grant Legal Fellows. In 2008-2010, we will support further fellowships in Sustainable Seafood, International Sea Grant, and at Brown University, while continuing to build opportunities for both graduate and undergraduate students.

Ronald C. Baird Sea Grant Science Symposium

This annual event features expert speakers who address coastal and marine issues important to Rhode Island and beyond. In 2008, the 7th Baird Science Symposium brings experts on physical oceanographic modeling, ecology, and management together to discuss “Sound Connections: The Science of Rhode Island and Block Island Sounds,” with a focus on the known science and gaps of Rhode Island’s seas. Rhode Island Sea Grant will use these findings as additional guidance in Rhode Island’s Ocean Special Area Management planning process and developing the 2010-2012 Omnibus cycle and regional partnership opportunities.

Rhode Island Sea Grant Visual Arts Awards

The Visual Arts program was established to encourage New England professional visual artists to address the environment of the ocean and its coastal communities. Grants of up to \$2,000 annually are available to individual and/or collaborating artists. The program is run by the URI Department of Art and Art History. Previous awardees have produced traveling art and photographic exhibitions, children’s stories, and other interpretations of science for the layperson. More information is available at www.uri.edu/artsci/art/v_a_grant.html.

Program Development

In order to augment and leverage our collective talents and resources, Rhode Island Sea Grant pursues fundraising opportunities with state and federal agencies, nongovernmental groups, and philanthropic organizations. Our goal is to build multidisciplinary and multi-institutional collaboratives involving research, outreach, and education to address coastal and marine issues locally, regionally, nationally, and internationally.

During 2008—2010, Rhode Island Sea Grant is also investing in a new initiative directed by Professor Cathy Roheim in the URI De-

photographs of extensive salt marsh die-offs on the Cape. During a subsequent visit, Bertness discovered tens to hundreds of square meters of dead cordgrass in an area that was riddled with crab burrows. This prompted Bertness to bring a team of students to the area for an impromptu experiment that suggested that a little-studied nocturnal crab, *Sesarma reticulata*, that feeds on young cordgrass is ravaging salt marshes on Cape Cod. But what has prompted this crab, long known as a marsh inhabitant, to suddenly have such an impact on the salt marshes? Bertness hypothesizes that human impacts may be to blame: increased nitrogen from fertilizers may have made the cordgrass more nutrient-rich, and more appealing to the crabs, and overfishing of predators may be leaving the crab population unchecked. In this research project, Bertness will be examining whether those human impacts are indeed driving crab consumption of cordgrass, and whether the salt marshes of Narragansett Bay are poised to suffer in the same way as salt marshes on Cape Cod.



This salt marsh dieoff was caused by crab herbivory. Researchers are trying to understand why they are widespread regionally on Cape Cod and in a few locations in Narragansett Bay.

A collaborative study for the development of a behavioral assay to estimate discard mortality in summer flounder

Terence Bradley, Professor, URI Fisheries, Animal and Veterinary Science

\$152,636

Summer flounder, a highly valuable and very important commercial species in Rhode Island, is managed by quotas, or catch limits, based on estimates of how many fish exist in the population. Fishermen must discard flounder caught outside of their quota. Knowing what percentage of the discarded fish will live is important in determining population size and would assist in defining more sustainable quota levels. Researchers Terence Bradley, URI fisheries professor, and Laura Skrobe and Kathleen Castro, Rhode Island Sea Grant fisheries extension co-leaders, propose to study how

Research

Every two years, Rhode Island Sea Grant sends out a request for proposals (RFP). Rhode Island Sea Grant considers proposals that coincide with its strategic plan goals; that contain a degree of, or potential for, interdisciplinary collaboration; that have scientific merit and feasibility; and that have an applicable outreach component.

All proposals are subject to peer review and examination by an external scientific panel. After considering the panel's advice, Rhode Island Sea Grant program management decides on the package of proposals to be included in the core program, and sends it to the National Sea Grant Office for final approval.

During this omnibus period, 10 research projects have been funded that will provide further examination of Narragansett Bay's ecology and oceanography, including climate change impacts; will explore women's roles in the southern New England fishing industry; and will address coastal pollution, submerged lands ownership, and fishery, fish processing, and fishery management issues, including bycatch.

Here is the research agenda for the 2008–2010 funding cycle:

Is crab herbivory driving New England salt marsh die offs?

Mark Bertness, Professor, Brown University Ecology and Evolutionary Biology
\$193,999

New England salt marshes, which are important nurseries for marine species and which act as buffers against coastal storms, are exhibiting bare patches of mud where saltmarsh cordgrass used to thrive. According to Mark Bertness, Brown University biology professor, researchers have traditionally considered "bottom-up" physical forces, such as soil salinity, oxygen content, and nutrients, to be the keys to healthy salt marshes, and so salt marsh management has focused on maintaining natural hydrological conditions. In 2006, a plant ecologist at the Cape Cod National Sea Shore sent Bertness

partment of Environmental and Natural Resource Economics. The URI Sea Grant Sustainable Seafood Initiative is intended to promote understanding and consumption of seafood produced in a sustainable, environmentally friendly manner. A website is being developed to provide one-stop shopping on information pertaining to sustainable seafood to both consumers and producers.

Rhode Island Sea Grant will also be investing in innovative mechanisms to better link philanthropy with coastal stewardship at local, national, and international levels by providing opportunities to bring donors and coastal management practitioners together. This is the Ecosystem Stewardship in the Americas (ESTA) initiative, whose goal is to improve the programmatic financial sustainability of coastal ecosystem efforts through improved understanding by donors and by building partnerships among both the donor and practitioner communities in the Americas, and meeting the goals of our "glocal" approach, featured in our strategic plan.

Contact

Barry A. Costa-Pierce
Director
Tel: (401) 874-6800
bcp@gso.uri.edu

Monica Allard Cox
Communications Manager
Tel: (401) 874-6937
allard@gso.uri.edu

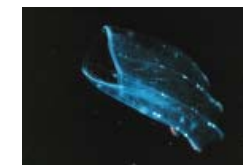
Alan Desbonnet
Assistant Director
Tel: (401) 874-6813
aland@gso.uri.edu

Tracy Kennedy
Program Administrator
tkennedy@gso.uri.edu
Tel: (401) 874-6800

Heather Rhodes
Fiscal Officer
Tel: (401) 874-6805
hrhodes@gso.uri.edu

Jean Gallo
Publications Manager
Tel: (401) 874-6842
jgallo@gso.uri.edu

Malia Schwartz
Assistant Director, Research
& Development
malias@gso.uri.edu
Tel: (401) 874-6936



Sustainable Coastal Communities and Ecosystems Extension Program

While coastal counties cover less than 17 percent of the United States, they host 53 percent of the nation's population, which is expected to grow by 12 million people over the next decade (NOAA 2005). Coastal communities are challenged to balance development opportunities with protection for significant social and environmental coastal assets. Rhode Island Sea Grant has been a pioneer in the implementation of an innovative method of ecosystem-based management called Special Area Management Planning. Led by Sustainable Coastal Communities and Ecosystems Extension Leader Jennifer McCann, Rhode Island Sea Grant works with coastal communities on building waterfront vibrancy and diversity, qualities that encompass disaster-resilience, coastal public access, and an economic base that balances traditional and emerging uses, including industrial uses, mixed-use developments, and recreational activities.

Addressing storm impacts of climate change at regional scales

What will Rhode Island's coastline look like after a major hurricane? What new building will be allowed, and where, given increasing storm frequency and intensity, climate change, and rising sea levels? How will a post-hurricane landscape meet Rhode Island's needs? The Sustainable Coastal Communities Extension Program, under direction of Coastal Extension Specialist Pamela Rubinoff, is working with the Washington County Regional Planning Council to transform post-storm recovery tactics into a proactive, intentional design process. This project will serve as a pilot to be transferred to other parts of the state and the nation. Rubinoff is also leading a similar process in the Western Indian Ocean.

Creating sustainable island communities

The Aquidneck Island municipalities are participating in creating a Special Area Management Plan (SAMP) to better prepare the island

Fisheries for the Bench

Fisheries for the Bench is a national effort, funded by the National Sea Grant Law Center and the Sand County Foundation, to provide fisheries information and analysis to federal judges. The project offers curriculum and an educational seminar to judges regarding fisheries management and law and groundbreaking community-based approaches to marine resource management. The Legal Program seeks to provide judges who consistently hear fisheries cases a more thorough understanding of the complexities of fisheries management and the doctrines and precedent of fisheries law. Program staff are also developing a curriculum that can be exported to non-legal audiences including members of the fishing industry, fisheries managers, and interdisciplinary audiences.

Marine Law Symposium

The program sponsors a biennial marine law symposium on critical issues. The 7th Marine Law Symposium, *A Viable Marine Renewable Energy Industry: Solutions to Legal, Economic, and Policy Challenges*, focuses on offshore wind, hydrokinetics (wave, current, and tidal), and ocean thermal energy conversion. Panel topics include jurisdictional issues and permitting/licensing schemes; research and development for environmental, technological, and human-dimension issues; economic and financial incentives; and the role of the public and nongovernmental organizations in these areas. An issue of the *Roger Williams University Law Review* will be dedicated to the symposium.

Contact

Susan Farady
Director
Tel: (401) 254-4613
sfarady@rwu.edu

Charlotte Ferris
Program Coordinator
Tel: (401) 254-5392
cferris@rwu.edu

Megan Higgins
Research Counsel
Tel: (401) 254-5734
mhiggins@rwu.edu



Admiralty and Environmental Moot Court teams, the RWU/URI Joint Degree Program, and the Marine Law Summer Program.

Sea Grant Law Fellows

The Legal Program has partnered with RWU and URI to fund Sea Grant Law Fellows who conduct research and analysis on marine law issues. Recently, Law Fellows have provided legal research and analysis to the R.I. Coastal Resources Management Council, Bluewater Wind, the URI Department of Environmental and Natural Resource Economics, the R.I. Land Trust Council, Environmental Defense, the National Marine Fisheries Service, The Nature Conservancy, and other partners.



2008 Environmental Law Moot Court team members Ashley Medeiros, Greg Klipp, and Jeannine Casselman

Leadership training

The Institute for Graduate Environmental Leaders is an interdisciplinary program that trains law and graduate students in problem solving and facilitation. The training includes a keynote address, a problem-solving workshop, and follow-up discussion of the challenges and tools necessary to address problems in an interdisciplinary way. The training has focused on facilitation training and environmental justice and energy issues.

Outreach

The Legal Program provides outreach on priority issues for Rhode Island Sea Grant's core thematic areas and on cutting-edge legal issues in the state, New England, and the nation.

Law & Policy Associates Program

The Law & Policy Associates Program is a regional effort to foster a network of experts working in ocean and coastal law and policy towards solutions through a web presence and listserv.

for a natural disaster and to protect and promote an interconnected island-wide corridor system that is sensitive to the natural environment and that provides recreational opportunities. The Sustainable Coastal Communities and Ecosystems Extension Program is working with the R.I. Coastal Resources Management Council (CRMC), the local municipalities, the U.S. Navy, and other partners on the SAMP, which will support and implement critical portions of the Aquidneck Island West Side Master Plan, which provides a strategy for managing coastal development and resources along the majority of the island's western coast. The master plan, though comprehensive, lacks the mandate to ensure state or federal conformity to its policies. The SAMP, however, offers such a mandate. Once formally adopted, federal, state, and municipal policies must comply with the SAMP. Thus, the U.S. Navy, should it excess property, will be required to comply with land-use priorities identified by the community in the West Side Master Plan.

Redeveloping Newport Harbor

The city of Newport and its residents recognize that Newport Harbor is one of their most valuable economic, historical, cultural, and natural assets. As working waterfront is lost and markets change, Newport is recognizing the need for proactive planning and a new vision for the harbor, much of which is poised for significant redevelopment. At the same time, although several Rhode Island waterfronts are working to become more diverse and vibrant, there is no statewide or regional effort to provide them with the appropriate technical assistance to meet these needs. The need to build this capacity is critical as waterfront stakeholders are likely to play a growing role in addressing problems of waterfront waste disposal, public access, energy storage and distribution, and transportation.



Newport Harbor is the focus of a redevelopment effort geared to develop a harbor walk, maintain the working waterfront, and build a leadership constituency; Coastal Extension Specialists Teresa Crean and Susan Kennedy are engaging stakeholders in this process.

Assessing ocean resources

With support from URI's Center of Excellence in Offshore Renewable Energy, the Coastal Recourses Center, and Rhode Island Sea Grant, CRMC will develop and adopt an Ocean/Offshore Renewable Energy SAMP to ease Rhode Island's entry into the exploration and development of offshore energy resources. While the Ocean SAMP focuses on the identification of renewable energy zones, it also addresses policy needs regarding recreational and commercial uses, including fisheries issues; environmental assets, such as critical species' habitats; cultural and historic assets; public infrastructure such as cables and submarine corridors; water quality; and hazardous materials, including waste and dredge material management.

Contact

Jennifer McCann
Extension Leader for Coastal Programs
Tel: (401) 874-6127
mccann@crc.uri.edu

Teresa Crean
Coastal Management Extension Specialist
Tel: (401) 874-6626
tcrean@crc.uri.edu

Susan Kennedy
Coastal Management Extension Specialist
Tel: (401) 874-6107
skennedy@crc.uri.edu

Kate Manning
Grants Accountant
Tel: (401) 874-6027
kmanning@crc.uri.edu

Amber Neville
Coastal Program Coordinator
Tel: (401) 874-6106
amber@crc.uri.edu

Pamela Rubinoff
Coastal Management Extension Specialist
Tel: (401) 874-6135
rubi@crc.uri.edu

Legal Program

The Rhode Island Sea Grant Legal Program is one of four Sea Grant Legal Programs in the nation. The Rhode Island program entered its fourth year in 2008 with exciting initiatives on the horizon, made possible through a partnership of the URI Department of Marine Affairs, Roger Williams University (RWU) School of Law, and Rhode Island Sea Grant. The program, with Susan Farady as director, Megan Higgins as research counsel, and Charlotte Ferris as program coordinator, provides objective research and analysis on law and policy issues, and trains law and graduate students in research and problem solving.

Ocean and coastal research

The program's mission is to conduct legal research relevant to coastal issues in Rhode Island and the region, and that contributes to the national dialogue in the ocean and coastal law community.

Research and writing by staff and law students in climate change and sea-level rise, submerged lands conservation, the public trust doctrine, and ocean and coastal management have yielded articles published in nationally recognized journals, books, and presentations at national conferences.

Research on submerged lands ownership

For 2008-2010, Rhode Island Sea Grant, for the first time, funded law and policy research through a separate competitive research process for the program that focused on the needs of the state and the New England region. The Nature Conservancy was awarded a grant to analyze state and federal laws, regulations and policies, case law, and traditional practices to determine whether private conservation organizations may acquire proprietary rights to submerged lands through ownership or leasing in Connecticut, through ownership in Rhode Island, and through leasing in federal waters off the coasts of Connecticut, Massachusetts, and Rhode Island.

Education

The program trains law students in research, writing, and oral advocacy in maritime, coastal, and environmental law through the

to encourage students and faculty to embrace extension activities and become better informed fisheries scientists and managers. These programs are also designed to encourage the public to participate knowledgeably in fisheries science and management issues.

Contact

Laura Skrobe
Extension Co-leader for
Fisheries Programs
Tel: (401) 874-9360
lskrobe@uri.edu

Kathleen Castro
Extension Co-leader for
Fisheries Programs
Tel: (401) 874-5063
kcastro@uri.edu

David Bengtson
Co-principal Investigator
Tel: (401) 874-2668
bengtson@uri.edu

David Beutel
Fisheries Extension Specialist
Tel: (401) 874-7152
dbeutel@uri.edu

Barbara Somers
Fisheries Extension Specialist
Tel: (401) 874-2012
barbs@uri.edu

Lori Pivarnik
Coordinator, Nutrition & Food
Sciences, Food Safety
Tel: (401) 874-2972
pivarnik@uri.edu



Sustainable Fisheries Extension Program

By providing a neutral platform for discussion of important—and often contentious—issues, the Rhode Island Sea Grant Sustainable Fisheries Extension Program assists stakeholders to play critical roles in the science and management of sustainable fisheries while creating new opportunities and options for decision makers. The program, under the direction of Fisheries Extension Co-Leaders Laura Skrobe and Kathleen Castro, also creates and fosters innovations in sustainable fisheries technology, and helps to bring those technologies to stakeholders to improve economic viability and protect natural resources.

The program has six overarching priority areas: collaborative research and management, science and technology of reducing bycatch, ecosystem-based science, health benefits and quality and safety of seafood, regional and national Sea Grant, and education.

Collaborative research and management

The Sustainable Fisheries Extension Team engages local, regional, and national industry, academic, and government partners in collaborative fisheries research and management in partnership with other resource users. The program works to educate and engage stakeholders. A foundation of this approach is the Food and Agriculture Organization (FAO) of the United Nations industry-based Code of Conduct for Responsible Fisheries. In 2000, a three-year effort of Sustainable



Fisheries Extension program staff culminated with Rhode Island becoming the first state in the Northeast to have all its major fishing associations voluntarily adopt these FAO international guidelines. These guidelines call for increased cooperation in the research and management of the fisheries, as well as individual responsibility and accountability.

Science and technology of reducing bycatch

The program works with local, regional, and national partners to develop appropriate technologies for the sustainable production and conservation of marine resources, and to disseminate techniques and tools to assist fisheries managers and society. Gear engineers, fishermen, and managers are working together to develop bycatch-reduction technologies and share their results with others. Previous accomplishments directed by Sustainable Fisheries Extension Specialist David Beutel and Laura Skrobe include the Eliminator Trawl, a net designed to target haddock while reducing the bycatch of other species. This technology won the World Wildlife Fund 2007 International Smart Gear Competition Award.

Ecosystem-based science

The program undertakes research, workshops, and educational activities that foster an ecosystem approach. The program will synthesize data to increase knowledge of biology and stock assessments of commercially and recreationally valuable species.

Health benefits and quality and safety of seafood

The program seeks to maximize health benefits to seafood consumers while minimizing risks by working within the full spectrum of seafood consumption and processing, from health and wellness to hazards and quality control. This work, under supervision of Nutrition, Food Science, and Food Safety Coordinator Lori Pivarnik, integrates Cooperative Extension and Sea Grant Extension efforts in research on seafood quality and outreach to both consumers and health information providers. The program has been involved in the Hazard Analysis and Critical

Control Point (HACCP) Food and Drug Administration (FDA) program, which requires seafood processors to follow the food safety system. The HACCP program has improved seafood safety and quality by identifying the critical points of seafood contamination and requiring the monitoring of these areas by trained staff.

Regional and national Sea Grant

The Sustainable Fisheries Program has taken a national leadership role in Sea Grant fisheries extension. The National Sea Grant Fisheries Extension Enhancement Initiative was established to serve local, regional, and national stakeholders; to promote collaboration among fisheries agencies, management councils, and constituents; and to expand information exchange. Kathleen Castro, with assistance from Sustainable Fisheries Extension Specialist Barbara Somers, coordinates the Northeast region and serves on the national committee, currently as chairwoman.

Education

The Sustainable Fisheries Extension Program, which is embedded in URI's College of the Environment and Life Sciences, conducts workshops, training, and other educational programming



Jonathan Knight, net designer, describes how the Eliminator Trawl exploits fish behavior to reduce bycatch in the haddock fishery.