

RHODE ISLAND

2014–2016

GRANT

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Photo by Pamela Rubinoff.

CONTENTS

2 About Rhode Island Sea Grant	13 Program Development
3 Letter from the Director	14 Extension Program
5 Funded Research 2014–2016	17 Legal Program
11 Regional Research	19 Education Program
	21 Communications

ABOUT RHODE ISLAND SEA GRANT

Rhode Island Sea Grant seeks to foster vibrant, healthy, coastal communities and marine environments that are resilient in the face of change. The program strives to achieve this vision by improving understanding and management of Rhode Island's coastal and marine ecosystems. Rhode Island Sea Grant supports research, extension, communications, legal, and education programs that address issues in the thematic areas of healthy coastal ecosystems, sustainable fisheries and aquaculture, resilient coastal communities and economies, and environmental literacy and workforce development.

Rhode Island Sea Grant is part of a network of 33 Sea Grant programs nationwide.

By supporting integrated research, outreach, and education programs to address pertinent local issues, Sea Grant creates a support system that provides critical services to resource managers and coastal residents throughout the U.S.

Based at the University of Rhode Island (URI) Graduate School of Oceanography, Rhode Island Sea Grant is a partnership of the university, the National Sea Grant College Program, the National Oceanic and Atmospheric Administration (NOAA), and the state of Rhode Island. Rhode Island Sea Grant has the distinction of being one of the first four Sea Grant programs in the U.S., and is home to one of just five Sea Grant Legal Programs in the country—and the only one in the Northeast—located at Roger Williams University School of Law.

To find out more about the work we do, visit us on-line at seagrant.gso.uri.edu.



LETTER FROM THE DIRECTOR

In 2013, I was asked to serve as Rhode Island Sea Grant's fourth director, and since joining the program I have been impressed with what Rhode Island Sea Grant has accomplished and am even more excited about what we plan to do over the next two years.

"Science Serving the Coast" has been a Sea Grant slogan for years, and our planned mix of research, education, and outreach activities helps fulfill the vision that Rhode Island's Senator Claiborne Pell had when he sponsored the National Sea Grant College Act of 1966. In this research cycle, we responded to a request from the leaders of the state Coastal Resources Management Council and Department of Environmental Management to answer some basic scientific questions that related to the management of Rhode Island's shellfish resources. A call for proposals produced some excellent ideas for applied research; they were then reviewed for both their scientific merit and utility in the management process. Concurrently, our extension team based at the Coastal Resources Center is managing a facilitated process that will culminate in the production of a new Shellfish Management Plan for Rhode Island that will incorporate the findings of the ongoing scientific investigations. Rhode Island Sea Grant serves as the neutral broker of information that will enable stakeholders and managers to reach common ground. A major contributor in that process is the Rhode Island Sea Grant Legal Program, which is providing legal review that will assist in the development of the plan.

Our extension efforts go much further than our support for the Shellfish Management Plan. The glancing blow that Rhode Island received from Superstorm Sandy was a major wake-up call for both state regulators and the coastal communities that suffered serious damage. We have been asked to step in and help develop a new Shoreline Management Plan that will help property owners, communities, and state agencies address the challenges of eroding shorelines and sea level rise that are particularly vulnerable in coastal storms.

Our education programs are targeted to support our research and extension programs, a long tradition in Rhode Island Sea Grant. As a graduate student in marine affairs in 1975, I received a Sea Grant assistantship to work with our Coastal Resources Center to help Rhode Island develop its plan to participate in the fledgling coastal zone management program. That tradition continues today, with students supported in a wide range of programs related to our mission of effective marine resources management.

As we consider new areas for investment, we will proceed with guidance from our Senior Advisory Council, and we welcome input from all of our constituents throughout the state. This is an exciting time to be working on coastal issues, and I'm sure there will be no shortage of ideas. Rhode Island is known as the Ocean State, and we are proud to serve as the source for the best science and management practices to maintain and improve our vital coastal resources.

FUNDED RESEARCH 2014-2016

Rhode Island Sea Grant funds research that leads to improved understanding of the natural world, and that supports improved decision-making for better management of coastal and marine resources. During the time period 2014–2016, Rhode Island Sea Grant is placing research emphasis in the areas of shellfish biology, the ecology of the resources that support shellfish, and shellfish management. This emphasis was chosen based upon requests from resource managers, permitting agencies, commercial and recreational shellfish harvesters, and shellfish aquaculture business owners for new knowledge and improved understanding of shellfish and shellfish resources.

Outcomes of Sea Grant-funded research will be used in support of an initiative undertaken by the R.I. Coastal Resources Management Council and the R.I. Department of Environmental Management, in partnership with Sea Grant and other entities, to develop a Shellfish Management Plan for the state of Rhode Island. Our understanding of the important role that shellfish play in the economy and ecology of Rhode Island will also be enhanced by outcomes of this research agenda.

A new call for research proposals will be issued in early 2015 for research that will take place during 2016 and 2017. Rhode Island Sea Grant advisors, constituents, stakeholders, and coastal resource users and managers will provide input to the direction and focus of this future call for research.



Little is known about whelk in Rhode Island waters. Photo by Melissa Devine.

To effectively manage whelk as a sustainable resource, we need to better understand their ecology. Whelks are large marine snails that are rapidly becoming a market commodity in both the U.S. and Asia. Some of the basic ecology and biology of New England whelks has been described, but there is still much that needs to be known to manage these species as sustainably harvestable resources in Rhode Island. Kathleen Castro from URI,

in collaboration with the Rhode Island Whelk Fishermen's Association, will capture the knowledge of local whelk fishermen, and conduct targeted research that will better define the biology of the species in Rhode Island waters. Outcomes of the research will be used to help the Whelk Fishermen's Association harvest, and the R.I. Department of Environmental Management manage, the species on an ecologically and economically sustainable basis, and to inform

whelk management initiatives now being formulated by the Atlantic States Marine Fisheries Commission.

Shellfish aquaculture provides an opportunity to more effectively manage nutrients in Rhode Island waters. Excess nutrients in marine waters, particularly nitrogen, can lead to conditions that promote algal blooms, reduce oxygen availability in the water column, and contribute to fish kills. Shellfish incor-

porate nitrogen into their tissues while feeding; the nitrogen is then removed from the ecosystem when the shellfish are harvested. Robinson Fulweiler from Boston University, in collaboration with several Rhode Island oyster growers, will experiment with optimal nitrogen removal based on farm site characteristics. Her research will help oyster growers determine how to best

configure their farms for optimal nitrogen removal, which also means fastest oyster growth. Fulweiler's research will help Rhode Island's growing aquaculture industry improve performance in providing the additional service—above and beyond that of providing jobs and fresh seafood—of improving water quality in Narragansett Bay and the south shore coastal lagoons.

Superior knowledge of prime spawning and settlement areas of quahogs in Narragansett Bay would improve management of the species. The hard clam, familiar to most Rhode Islanders as the quahog, supports more than 500 active shellfishers and has a market value in excess of \$5 million annually. It is suspected that parts of the Bay act as sanctuaries for adult clam spawning, others as settlement areas for the next generation of clams; both areas are important to the long-term sustainability of the species. Scott Rutherford from Roger Williams University, in collaboration with Chris Kincaid and Dave Ullman from the URI Graduate School of Oceanography, will use sophisticated oceanographic models and biological data on quahog larval characteristics to locate spawning sanctuaries and areas where clam larvae



Quahogs support more than 500 active fishermen in Rhode Island, like these in Greenwich Bay. Photo by Melissa Devine.

settle on the bottom to grow to adult size. This information can be used to develop prudent management strategies for the quahog—an important, iconic Rhode Island species.

An understanding of native disease threats to mussels is instrumental to assessing the potential for mussel aquaculture in Rhode Island. The blue mussel is a common item on the menu of restaurants specializing in seafood around the globe, and Rhode Island is well poised to be a major player in that market. Naturally occurring pathogens have been known to decimate natural mussel beds, and could be a major risk to mussel aquaculture endeavors. The circumstances leading to mus-



Rhode Island may be poised to grow mussels commercially, if disease threats can be avoided. Photo by Melissa Devine.

sel mortality however, are not well known. Roxanna Smolowitz from Roger Williams University will explore the prevalence and life history traits of mussel pathogens common to Narragansett Bay. The information gleaned from this research will bring understanding of the interplay between mussel population densities and the growth and spread of pathogen populations. Resulting findings can be used by prospective mussel growers to design and implement husbandry practices that will minimize the probability of, or better yet exclude, on-farm disease outbreaks.

Understanding the perceptions of residents and users for aquaculture in Rhode Island waters can help minimize conflict and maximize economic potential. When shellfish aquaculture is proposed, it is not generally the ability of the ecosystem to accommodate the farm that is a limiting factor in granting the permit, but the perceptions of adjacent landowners and user groups. Perceptions, and sometime misperceptions, influence decisions to support or oppose siting of aquaculture operations. Tracey Dalton and Robert Thompson from URI, in collaboration with Di Jin from the Marine Policy Center at the Woods Hole Oceanographic Institution, will identify the key influences on people's perceptions to support or oppose aquaculture in Rhode Island waters. This information will improve understanding of why people support or don't support aquaculture endeavors, which can then be used to minimize conflict where possible and practical, and to suggest changes to current aquaculture practices that could lead towards improved support.

Coastal resources can be more effectively managed if we understand how people use the resources, and how they value that use.

In order to effectively manage a resource, it is necessary to understand who uses the resource, how they use it, and how they value it. Robert Thompson, Tracey Dalton and James Opaluch of URI, in collaboration with John Lake and Eric Schneider of the R.I. Department of Environmental Management Division of Fish and Wildlife, will inventory and map coastal resources and their recreational and commercial uses along Rhode Island's south shore. They will improve this inventory with information about how users value the resource, for instance for boating and shellfishing. This information will assist resource managers in developing plans of use that avoid, or at least minimize, conflicting uses, and that will help develop management strategies that preserve and enhance those assets that users value highest.



Research will examine how people value Rhode Island's coastal resources. Photo by Monica Allard Cox.

REGIONAL RESEARCH

Rhode Island Sea Grant partners with Sea Grant programs in Maine, New Hampshire, Massachusetts, Connecticut and New York to form the Northeast Sea Grant Consortium. The consortium fosters regional approaches to issues and problems that are common among programs but extend beyond state borders. The consortium partners with other regional groups, such as the Northeast Regional Ocean Council, to more effectively and efficiently address issues of regional scale. For the 2014–2016 omnibus period, Rhode Island Sea Grant, through the consortium, is helping to fund the following regionally relevant research projects. Outcomes of the research are appropriately disbursed through extension and communications programs located within each Sea Grant program, where they are provided for use in resource management endeavors at local, state, and regional scales.

Municipalities and state agencies need mechanisms by which to assess—post-natural disaster—the pros and cons of build-back vs. buy-out scenarios. Decision-makers also need to better understand how their decisions impact neighboring properties and communities, and visa versa. Porter Hoagland, John Duff, Di Jin, and Hauke Kite-Powell, all of the Marine Policy Center at the Woods Hole Oceanographic Institution, will evaluate existing law and policy as it relates to build-back or buy-out post-destruction scenarios. They will undertake cost-benefit analyses and develop models that will estimate the economic consequences of alternative approaches to buy-out or build-back. These



Superstorm Sandy batters coastal Massachusetts. How should communities respond to natural disasters? Photo by Brian Burke.

tools will provide coastal communities in the Northeast with the ability to evaluate various options and their economic consequences, and to develop disaster mitigation policies for adoption.

Municipalities should know how natural disasters impact property values and the town's tax base. Given that property value drives a municipality's tax base, it is critical for municipal officials to understand how natural disturbances such as hurricanes, floods, and rising sea level, will impact property values and hence their tax base. Robert Johnston from Clark University, in partnership with Klaus Moeltner and Christine Blinn from Virginia Tech University, and Christine Feurt from the Wells National Estuarine Research Reserve, will develop a model that estimates changes to property values based on natural disaster impact, including sea level rise due to changing climate, and the resulting changes implied in a town's tax base. Municipalities can use this planning tool to project town tax base based on various sea level rise scenarios as well as for impacts of natural disasters such as hurricanes.

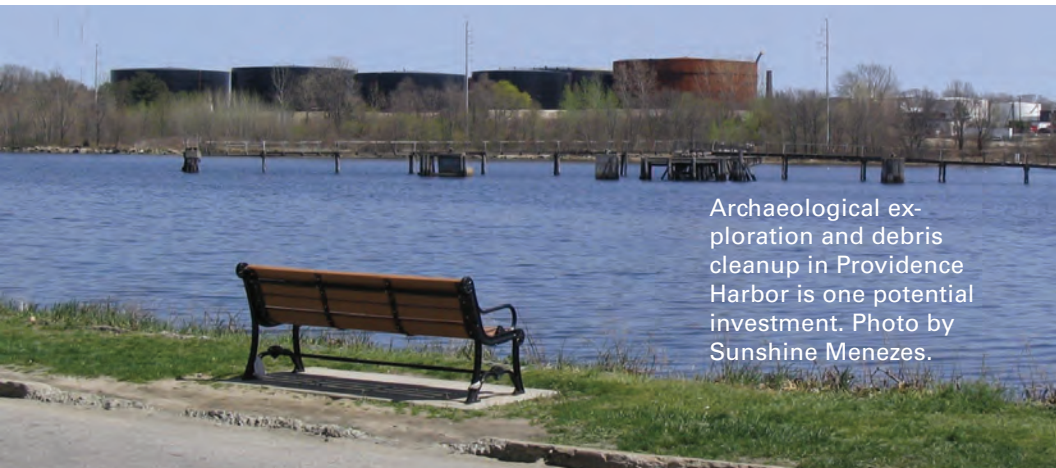
PROGRAM DEVELOPMENT

Rhode Island Sea Grant sets aside funds for unanticipated projects and initiatives that arise over the course of the omnibus period, as well as for promising science investments that may fuel significant benefits from small infusions of funds. These dollars may go to an investigator needing startup capital to do a proof-of-concept experiment before seeking further funding, or to address an important issue that has newly arisen and needs investigation.

In 2014-2016, Rhode Island Sea Grant anticipates allocating Program Development funds for exploring opportunities to expand Legal Program engagement in the Northeast, developing new opportunities for undergraduate students through the URI Landscape Architecture Program, continuing efforts to establish graduate opportunities in journalism between the Rhode Island Sea Grant Communications Program and the URI Harrington Institute, and ex-

ploring new avenues with the Visual Arts Sea Grant Program.

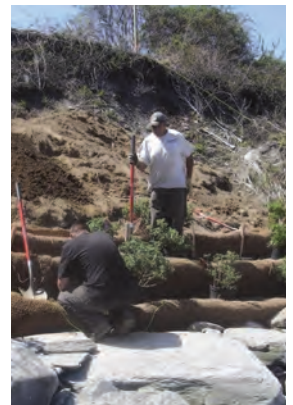
Potential investments, based on constituent interest, include expanding Sea Grant efforts in fisheries extension, conducting archaeological exploration and debris cleanup in the Providence Harbor area, and developing capabilities for the recycling of derelict fiberglass boats. The Senior Advisory Council will help to assess these opportunities as well as other avenues of potential interest.



Archaeological exploration and debris cleanup in Providence Harbor is one potential investment. Photo by Sunshine Menezes.

RESILIENT COASTAL COMMUNITIES AND ECONOMIES

Rhode Island is facing increasing rates of sea level rise, as well as increased storm frequency and severity. State policy projects 3 to 5 feet of sea level rise by 2100, although research now suggests numbers closer to 6 feet by 2100. With higher sea level, storm events will have even greater impacts on the coast, bringing higher wave heights and more inundation. Communities are asking how they can protect people and property, as well as vital infrastructure such as drinking water supplies, utilities, and roadways. Rhode Island Sea Grant is playing a leadership role in the preparation of a plan to address these problems, which are threatening communities in many areas along the state's coast. The R.I. Shoreline Change Special Area Management Plan (Beach SAMP) is being designed to improve coastal resiliency through the collection of new data and the development of effective policies. The Beach SAMP is working to identify where and how the shoreline is changing and what is at risk from these changes, and



The Beach SAMP is helping communities address erosion and flooding. Photos by Melissa Devine.

will develop new—and improve existing—state coastal policies. The project will also provide practical guidance for communities adapting to short-term and long-term shoreline change.

SUSTAINABLE FISHERIES AND AQUACULTURE

Shellfishing has been part of the Rhode Island way of life for centuries, but threats to the resource, user conflicts, and other challenges prompted the state call for a comprehensive Shellfish Management Plan (SMP) and to invite Sea Grant to play a leadership role in developing the plan. Sea Grant has brought together stakeholders and scientists to engage in developing and implementing the SMP, which will address wild harvest, aquaculture, and restoration of shellfish.

Rhode Island Sea Grant also focuses on seafood safety and health issues in partnership with other Sea Grant programs and universities nationwide, and conducts seafood safety trainings (HACCP) for government and professional groups.

HEALTHY COASTAL ECOSYSTEMS

Rhode Island Sea Grant will continue to facilitate stakeholder engagement for R.I. Ocean Special Area Management Plan (Ocean SAMP) implementation. Through stakeholder meetings, workshops, and lectures, stakeholders will have an opportunity to continue to engage in the implementation of the plan and understand new research and policy decisions related to Rhode Island's offshore waters.

RHODE ISLAND SEA GRANT LEGAL PROGRAM



Former Sea Grant Law Fellow Scott Gunst '12 had "a great experience" working with "real clients." Graphic courtesy Roger Williams University School of Law.

The Rhode Island Sea Grant Legal Program, located at the Marine Affairs Institute at Roger Williams University School of Law, is one of only five formal Sea Grant Legal Programs in the country and the only one in the Northeast. The program's mission is to educate the next generation of marine

policy professionals, to provide legal research to constituents, and to act as a clearinghouse for information sharing among marine law and policy practitioners.

SEA GRANT LAW FELLOWS

Sea Grant Law Fellows are compet-

tively selected law students who conduct legal research and analysis for constituents on marine law questions, such as the impacts of fisheries management decisions or the legal implications of siting alternative energy facilities. Law Fellows present their findings annually at a Law Fellow Col-

loquium at the URI Graduate School of Oceanography.

CURRICULUM

Legal Program staff play an essential role in the instruction and oversight of the marine law curriculum at the Roger Williams University School of Law, one of the country's leading comprehensive marine law programs. The Legal Program also supports the joint degree program offered by the School of Law, in conjunction with the University of Rhode Island Department of Marine Affairs. Joint degree students complete both their Juris Doctor and Master of Marine Affairs degrees by combining course work at the two institutions to reduce the overall time necessary to obtain the two degrees.

OUTREACH

The Legal Program provides a neutral forum for gathering state, regional, national, and international policy experts, and exports its expertise through diverse outside venues. The biennial Marine Law Symposium is a centerpiece of the Legal Program's outreach activities. Symposia address issues that are topical, relevant, interdisciplinary, and rigorous in legal content. Previous symposia have addressed the state of offshore renewable energy, future fisheries law developments, the legal legacy of the Deepwater Horizon oil spill, the future of the Magnuson-Stevens Act, and implications of climate change and sea level rise on existing coastal policies and law.

RESEARCH

Legal Program staff undertake research and present findings at state, regional, and national events on topics such as climate change, renewable energy law and policy, marine spatial planning, and ocean management reform.

For more information on the Legal Program, visit seagrant.gso.uri.edu/law or law.rwu.edu/sites/marineaffairs.

RHODE ISLAND SEA GRANT EDUCATION PROGRAM

Rhode Island Sea Grant offers educational opportunities for both college students at the undergraduate and graduate levels and for the public at large. Fellowship, assistantship, and internship programs allow students to explore careers while working hands-on with marine science professionals. Rhode Island Sea Grant supports fellowship and assistantship programs including the URI Coastal Fellows Program, the Rhode Island Sea Grant Law Fellows Program, the Marine Affairs Coastal Management Fellows, and the Masters in Environmental Science Management Fellows. Rhode Island Sea Grant also nominates local graduate students to the National Sea Grant Knauss Marine Policy Fellowship Program,

the National Marine Fisheries Service/ National Sea Grant Fisheries Science Graduate Fellowship Program, and the Coastal Services Center Coastal Management Fellowship. The program also offers communications and extension internships.

BAIRD SYMPOSIUM

Addressing the complex issues facing coastal communities, ecosystems, and economies requires sharing insights among scientists, professionals, decision-makers, and stakeholders. The annual Ronald C. Baird Sea Grant Science Symposium provides a forum for this dialog. In its 12 years, the series has covered such topics as the ecology of Narragansett Bay, marine wind farms, emerg-

ing marine diseases, sustainable seafood, shellfish ecology and management, and marine spatial planning.

COASTAL STATE SERIES

The Coastal State Series is a discussion forum that highlights current scientific research. It brings together scientists, resource managers, professionals, students, and interested stakeholders to generate ideas and collaborations in service of Rhode Island's coastal communities and environment.

COMMUNITY LECTURE SERIES

In partnership with the URI Department of Nutrition and Food Sciences and the R.I. Coastal Resources Management Council (CRMC),



Visual Arts Sea Grant recipients exhibited their work at URI in 2013. Photo by Meredith Haas.

Rhode Island Sea Grant sponsors an annual lecture series for the public at local libraries and community centers. Topics have included seafood and health, marine animal strandings, the history of coastal areas, and seafood cooking demonstrations.

COASTWEEKS

Coastweeks is an annual celebration of the coast, and is sponsored in Rhode Island by Sea Grant and the CRMC. Events have included

beach cleanups, boat tours, guided walks, and lectures.

For more information, and to see symposia and other conference and event topics as they become available, visit seagrants.gso.uri.edu/news.

VISUAL ARTS SEA GRANT

The Visual Arts Sea Grant program, run by the URI Department of Art and Art History, annually awards grants to artists in the region whose works are

related to themes of the marine environment. In 2012, several past awardees showed their work at the Hale House in South Kingstown, and in 2013, the program celebrated its 25th anniversary with a gallery exhibit at the URI Fine Arts Center in Kingston. For information, visit www.uri.edu/artsci/art/grant.php.

RHODE ISLAND SEA GRANT COMMUNICATIONS

Rhode Island Sea Grant Communications produces a variety of public educational materials for audiences interested in everything from quick daily updates from our Twitter and Facebook pages to the in-depth treatment of issues that our magazine *41°N* offers.

41°N

41°N is a magazine that focuses on ocean and coastal issues affecting Rhode Island. It is produced twice a year in partnership with the URI Coastal Institute. Its purpose is to bring readers

science-based perspectives on critical issues such as climate change, the status of marine resources, and economic issues facing coastal communities. Online at seagrant.gso.uri.edu/41N.

COASTAL AND OCEAN NEWS

This monthly e-newsletter helps readers stay informed about the latest marine and coastal information and events important to the state and beyond.

To receive any of these publications, contact Sea Grant at (401) 874-6800 or tkennedy@mail.uri.edu.

NOTES FROM RHODE ISLAND SEA GRANT

This small newsletter—on a postcard—helps readers understand more about local climate change, seafood nutrition, Narragansett Bay water quality, and other topics.

