Sea Grant
Rhode Island

RHODE ISLAND SEA GRANT PROGRAM GUIDE

2012–2014

CONTENTS

<<< Detail from *Cities and the Sea* by Susan Schultz, 2005 Visual Arts Sea Grant Awardee.

CONTACT

Rhode Island Sea Grant / URI Graduate School of Oceanography / Narragansett, RI 02882 / Tel: (401) 874-6800 / Online: seagrant.gso.uri.edu

PROGRAM ADMINISTRATION

Barry Costa-Pierce
Director
bcp@gso.uri.edu

Alan Desbonnet
Assistant Director
aland@gso.uri.edu

Jennifer McCann
Extension Director
mccann@gso.uri.edu

Heather Rhodes
Program Manager
hrhodes@gso.uri.edu

Monica Allard Cox
Communications Manager
allard@gso.uri.edu

Meredith Haas
Marine Research Communications Specialist
mhaas@gso.uri.edu

Tracy Kennedy
Program Administrator
tkennedy@gso.uri.edu

RESEARCH

Alan Desbonnet
Assistant Director
aland@gso.uri.edu

EXTENSION PROGRAM

Jennifer McCann
Extension Director
mccann@gso.uri.edu

Michelle Carnevale
Coastal Management Extension Specialist
M.Carnevale@crc.uri.edu

Teresa Crean
Coastal Management Extension Specialist
tcrean@crc.uri.edu

Susan Kennedy
Coastal Management Extension Specialist
skennedy@crc.uri.edu

Pamela Rubinoff
Coastal Management Extension Specialist
rubi@crc.uri.edu

Sarah Smith
Coastal Management and Sustainable Seafood Extension Specialist
sarah@crc.uri.edu

Lori Pivarnik
Coordinator, URI Nutrition and Food Sciences, Food Safety Outreach/ Research Program
pivarnik@uri.edu

Nicole Richard
Research Assistant/Food Safety Specialist
URI Nutrition and Food Sciences
nicolerichard@uri.edu

Kathryn Manning Butler
Grants Accountant
kmanning@crc.uri.edu

Amber Neville
Extension Program Coordinator
amber@crc.uri.edu

LEGAL PROGRAM

Susan Farady
Director
sfarady@rwu.edu

Julia Wyman
Staff Attorney
jwyman@rwu.edu

Charlotte Ferris
Program Coordinator
cferris@rwu.edu

EDUCATION

Heather Rhodes
Program Manager
hrhodes@gso.uri.edu

Rhode Island Sea Grant is part of a network of over 30 Sea Grant programs nationwide that together, by blending research with outreach and education to address pertinent local issues, create an integrated system that provides critical support and services to resource managers and coastal residents throughout the United States.

Program Administrator Tracy Kennedy and Program Manager Heather Rhodes

ABOUT RHODE ISLAND SEA GRANT

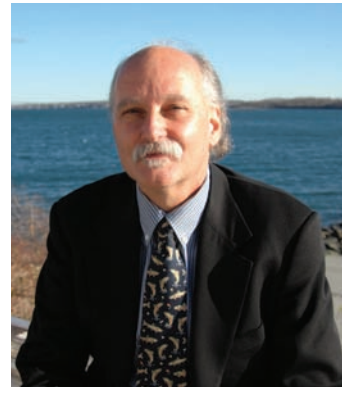
Based at the University of Rhode Island (URI) Graduate School of Oceanography, Rhode Island Sea Grant is a partnership of the university, the National Sea Grant College Program, the National Oceanic and Atmospheric Administration (NOAA), and the state of Rhode Island. Rhode Island Sea Grant has the distinction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

The program supports research, extension, legal, and education programs that address issues in the thematic areas of sustainable coastal development, healthy coastal ecosystems, and safe and sustainable seafood.

To find out more about the work we do, visit us on-line at **seagrant.gso.uri.edu** or call (401) 874-6800.

<<< Coastal Management Extension Specialist Pamela Rubinoff

Major changes in the approaches to marine ecosystems and resource management are occurring in Rhode Island and throughout New England. Rhode Island Sea Grant recognizes that the many coastal challenges we face can best be addressed by funding the best science and interpreting it for use to improve decision-making. For decades Rhode Island Sea Grant has had strong research, education, and extension programs leading that interpretive work. The increased complexity of emerging coastal/marine issues, however, has created a need for Rhode Island Sea Grant to develop more cohesive, integrated, cost-effective, and efficient approaches to its programming and management.



Director Barry A. Costa-Pierce

LETTER FROM THE DIRECTOR

I am pleased to present to you this package of Rhode Island Sea Grant's investments for 2012-2014. We again present herein an outstanding research portfolio in all of Sea Grant's Focus Areas; as well as a more diverse and far-reaching extension portfolio under the leadership of Jennifer McCann, Director of Extension Programs. This portfolio includes thematic priority areas that span from ecosystems, spatial planning, climate, ports and harbors, to seafood health and safety, fisheries, and aquaculture.

Extension Director Jennifer McCann

Our Legal Program remains one of the shining stars of all of our investments. During this period we intend to expand our legal

programs—under the guidance of Director Susan Farady and Staff Attorney Julia Wyman we will have more Sea Grant Law Fellows and Joint Degree students than ever.

Legal Program Director Susan Farady

Those who watch us closely will notice that our effort in the realm of fisheries has changed in this Omnibus, shifting to a larger "seafood" focus as featured in the National Sea Grant Strategic Plan. Our program now includes a greater emphasis on aquaculture, resource economics, and integration with management, as well as continues our efforts in seafood safety.

Lastly, Rhode Island Sea Grant plans to play a pivotal role over the next two years in the further developments of our Senior Advisory Council (SAC) and the Northeast Sea Grant Consortium by funding innovative SAC evaluations and assessments, by investing in regional research and extension, and by playing a leadership role in our new partnership with the Northeast Regional Ocean Council (NROC). We look forward to the next two years of building a stronger Rhode Island Sea Grant with this larger community of innovative practitioners and team-builders, as well as accelerating our role to bring to Rhode Island lessons learned from many of our regional and national partners for application to local problems.

Rhode Island Sea Grant seeks to fund research efforts that will support better management decisions for Rhode Island's coastal and marine resources, and the communities that depend upon them. For the 2012-2014 omnibus period the program will venture into new venues of research concerning fish and shellfish aquaculture, as well as build upon ongoing efforts bringing together social and climate change sciences. Rhode Island Sea Grant will also continue investment in the critical issue of nutrient dynamics and its implications for ecosystem-based management in Narragansett Bay.

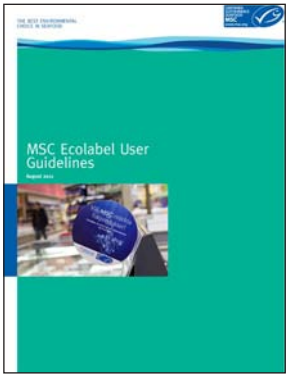
RHODE ISLAND SEA GRANT FUNDED RESEARCH

FISHERIES

What are the costs and benefits of fisheries certification?

Sea Grant–funded researcher Jeremy Collie (URI) will be looking at the status and trends of various fish stocks, and comparing certified vs. non-certified fisheries to see if certification of sustainability by an organization such as the Marine Stewardship Council affects the sustainability of a stock, and whether a certified product commands a premium price,

Rhode Island Sea Grant funds research intended to benefit coastal communities such as this one in Newport.



Does certification of sustainability affect price?

as expected. The economic and ecological outcomes of this research will aid the decision-making process of the many Rhode Island commercial fisheries considering fisheries certification.

AQUACULTURE

Fishmeal alternatives
Could replacing fishmeal with soybean meal as an alternative in fish foods be beneficial for the environment and reduce production costs of aquaculture efforts?

Sea Grant–funded researcher Marta Gomez-Chiarri (URI) will be investigating the attributes of soybean meal alternatives. This research may also reveal if there are properties in soybean meal that reduce disease in fish culture practices, in addition to providing a better economic model for aquaculture and reducing the need for pharmaceuticals involved in fish husbandry.

Applying upwellers for faster growth of shellfish
Can altering water flow and circulation patterns help oysters or clams grow faster?

Sea Grant funded–researcher Dale Leavitt (Roger Williams University) will be focusing on the use of upwellers in shellfish aquaculture systems to determine if altering the amount,

timing, and pattern of water flow through the systems will speed oyster and hard clam growth to market size. An anticipated benefit is a reduction in the energy used when flow is manipulated, reducing costs and improving the economic viability of shellfish production in hatchery-based systems.

Building mussels

While oysters are currently the major aquaculture crop in Rhode Island, mussel aquaculture has huge potential.

Sea Grant funded-researcher Scott Lindell (Marine Biological Laboratory) will be conducting biological and ecological experiments to define mechanisms by which mussel aquaculture can most effectively be developed as an industry in Narragansett Bay.

Highly restrictive policies regulate the use of closed (to shellfishing) waters in the Bay for rapid mussel growout to near-market size. The Rhode Island Sea Grant Legal Program will devote one of its Law Fellows to conduct the research necessary to bring this issue into the management arena for analysis and debate.

This project has the potential for significant impacts on the aquaculture industry in Rhode Island, and has the interest and cooperation of both industry and the regulatory community in making change to enhance the economic viability of aquaculture in the state.

<<< Mussel aquaculture has huge potential in Rhode Island.

DOC SEARLES

Research in nutrient dynamics seeks to better understand Narragansett Bay from top to bottom.

NUTRIENT DYNAMICS

Changes and impacts of nutrient inputs

To provide research needed to more fully develop nutrient criteria for the Bay that could assist better management of water quality, four projects will be funded that are closely integrated and overlap.

Sea Grant–funded researcher Bethany Jenkins (URI) will focus on interactions between various members of the microbial community in Narragansett Bay sediments, paying particular attention to changes in their makeup or function as nutrient input to the Bay is reduced according to current management plans. Her findings will help shed light on the relationship between nutrient inputs, microbial community response, and the onset of hypoxic (low dissolved oxygen) conditions.

As Jenkins focuses on the upper region of the Bay, researchers Scott Nixon (URI) and Theodore Smayda (URI) will be exploring the dynamics of nutrients at a scale encompassing the entire length of the Bay.

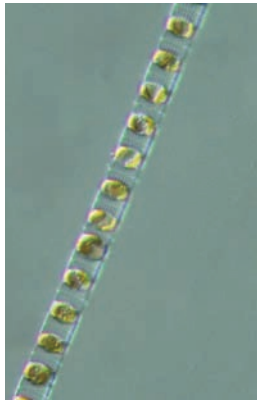
Nixon's work will explore two models of ecosystems function for Nar-

ragansett Bay. The first model is based on an eco-functional approach that looks at the fertilization aspect of the upper Bay, the nutrient assimilation zone of the mid-Bay, and the input of nutrients from offshore waters into the lower Bay.

The second model makes the assumption that the nutrient enriched upper Bay provides the fuel for all primary production throughout all Narragansett Bay. Anticipated results of the outcomes of comparing and contrasting the validity of each model should provide a more realistic ecosystem-based model for resource managers to use in managing nutrient inputs to the Bay and impacts to the ecosystem.

Smayda's work further tests the eco-functional approach model by examining a 40-year time series of plankton and environmental data to look for change linked to nutrient inputs and/or to changing climate signals, such as the increase in water temperature. More specifically, Smayda will be focusing on a complex of species that are the major primary producer in the Bay—*Skeletonema*.

As a complement to Smayda's work, researcher Tatiana Rynearson (URI) has developed a protocol that allows the distinction of species within the *Skeletonema* complex, as well as a methodology that allows her to test archived (preserved) samples. By running tests on current-day conditions to validate her methodologies, Rynearson can look back into time via archived samples to greatly enhance the research efforts by Smayda and others investigating nutrient dynamics in Narragansett Bay.



BENGT KARLSON

Looking at *Skeletonema* may offer insight into Bay dynamics.

New tools to track nutrient movements

Sea Grant–funded researcher Christopher Kincaid (URI) will be utilizing and refining modeling technology to explore physical conditions found in shallow water environments to track nutrient movements so that resource

managers can begin to predict the occurrence and potential longevity of hypoxic (low dissolved oxygen) events in upper Narragansett Bay.

CLIMATE CHANGE

Social and economic adaptations to climate change
The third and final year of the Climate Change Collaborative, led by Pamela Rubinoff (URI Coastal Resources Center), will continue to investigate changing human behaviors for adaptation to the impacts brought on by a changing climate, such as sea level rise and increased storminess.

The project team is adopting a methodology used to change behaviors that reduce cancer rates through smoking cessation, following a five-step process moving from acknowledgement of a problem to finding solutions.

The intention of this research is to build awareness of climate change through an interdisciplinary approach that utilizes expertise across various scientific fields and to encourage behavioral change in coastal communities through adaptation and mitigation to prepare for anticipated changes caused by a changing climate.

In order to improve understanding of the tradeoffs to be considered—both societal and economic—in the decision-making process concerning climate change adaptation, Rhode Island Sea Grant and other Sea Grant programs in the Northeast through the Northeast Sea Grant Consortium will fund two regional projects that address such tradeoffs.

Porter Hoagland (Woods Hole Ocean-

Collaborative research projects seek to help communities deal with the consequences of climate change, such as increased flooding. >>>

ographic Institution Marine Policy Center) will explore the regional economic base and will define and evaluate tradeoffs involved in the rapidly evolving field of coastal marine spatial planning.

Robert Johnston (Clark University) will examine costs and benefits of climate adaptation strategies, and their impacts on ecosystem services and ecosystem resilience.

These projects define behavioral change models under development by adding another layer of depth and understanding in the decision/choice processes.

PROGRAM DEVELOPMENT

Rhode Island Sea Grant sets aside a small amount of funds for unanticipated projects and initiatives that arise over the course of the two-year omnibus period, as well as for promising science investments that may fuel significant benefits from a small infusion of funds. These funds may go to an investigator needing a small amount of startup funds 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 the 2012–2014 omnibus period, Rhode Island Sea Grant will be funding pilot projects examining the impacts of climate change on septic system function in the coastal zone, implementing a sediment flux model for Narragansett Bay, and assessing the use of sea scallop viscera as a feed product for European sea bass.

Impacts of increased precipitation and rising sea level on septic systems

Due to wetter weather conditions

Research will examine climate change threats to septic systems in salt pond ecosystems. >>>

and rising sea level as a result of changing climate, nitrogen inputs into the groundwater from septic systems may increase and impact coastal lagoon ecosystems, specifically in Rhode Island's south shore, as well as the functioning of onsite wastewater treatment systems.

Sea Grant funded researcher George Loomis (URI Cooperative Extension)—the expert who helped define the existing septic system management regime for Rhode Island's lagoon ecosystems—will undertake preliminary work to assess the impacts of increased precipitation and rising sea level on the functioning of those septic systems. He will also make preliminary estimates of impact to the lagoon ecosystems. The findings of this research will inform municipal and state resource managers of a potentially new, emerging threat resulting from changing climate.

Validating and improving a mechanistic sediment flux modeling framework to simulate a climate and nutrient management driven transition from eutrophication to oligotrophication
Researcher Damian Brady (University of Maine) will be taking a sediment flux model developed in the 1980s, and still in use today for managing nutrient loading to waterbodies, and calibrating it for use in Narragansett Bay.

Brady will use long-term datasets for the Bay, as well as new data collected by researchers funded by Rhode Island Sea Grant during its 2010–2012 omnibus (Fulweiler, Nixon, Rich) to improve the model for use in predicting impacts to Narragansett Bay based upon various nutrient reduction and climate change scenarios. Outputs of the model will prove useful to resource managers for setting nutrient control guidance in the face of changing climate.

Will European seabass such as these enjoy scallops?

Assessment of scallop viscera hydrolysate for its feeding attractant and growth stimulant properties in juvenile European seabass
Nutritional scientist Chong Lee (URI)

has developed ways to take squid processing wastes out of the trash can and turn them into lawn and garden fertilizers. Lee now has his sights set on taking sea scallop wastes and turning that into fish food.

NOAA NORTHEAST FISHERIES SCIENCE CENTER

Fishermen shuck scallops at sea; finding a use for the viscera may bring additional revenue.

Rhode Island Sea Grant will fund URI student Elizabeth Gamez to work with Lee in his laboratory exploring mechanisms to process sea scallop viscera into high quality feed for fish, testing this on European seabass.

The research has potential economic benefits for sea scallop fishermen—turning their wastes into dollars—as well as for the finfish aquaculture industry, which may gain a new feed product for consideration.

RONALD C. BAIRD SEA GRANT SCIENCE 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 10 years, the series has covered the ecology of Narragansett Bay, marine wind farms, emerging marine diseases, and sustainable seafood.

The 2012 Baird Symposium is an international event that will focus on the economic, ecological, and regulatory issues and questions that managers face in implementing effective marine spatial planning. A symposium focused on nutrient management for Narragansett Bay is tentatively scheduled for 2013. For more information, visit **seagrant.gso.uri.edu/baird.**

Extension Director Jennifer McCann talks with a participant at a training program.

Rhode Island Sea Grant Extension brings university-based research results and scientific and technical expertise to bear on a variety of issues in the thematic areas of Sustainable Coastal Communities and Safe and Sustainable Seafood Supply. In turn, it brings the needs of resources management professionals and stakeholders to the scientific community. The program fosters a dialog between researchers, practitioners, and the public, and offers a neutral platform to address complex and sometimes controversial issues regarding coastal and marine resources.

RHODE ISLAND SEA GRANT EXTENSION PROGRAM

SUSTAINABLE COASTAL COMMUNITIES

Sustainable Coastal Communities Extension efforts, based at the University of Rhode Island's Coastal Resources Center, work with state and local governments and coastal community members to create policies that help them manage their resources comprehensively. This work is being carried out through two projects—one testing ocean spatial planning as a management tool for coastal and offshore waters, and the other fostering diverse and vibrant waterfronts. The ocean spatial planning effort is being applied in Rhode Island through the Ocean Special Area Management Plan, which is allocating and protecting resources in state ocean waters. It is also being shared through trainings with other coastal communities around the nation and world. The diverse and vibrant waterfront effort is assisting the city of Newport with harbor planning, and is helping the state

<<< A participant at a marine spatial planning training .

Flooding in Wickford during a 2011 extreme high tide.

develop guidelines for municipalities to consult when siting renewable energy projects. Climate change science education is an increasingly critical component of coastal management, and is provided through each of the efforts.

SAFE AND SUSTAINABLE SEAFOOD SUPPLY

Rhode Island is undertaking efforts to strengthen its commercial fishing community by encouraging the development of local seafood marketing in much the same way as local agriculture has benefitted from the "local food" movement. Safe and Sustainable Seafood Supply Extension efforts respond to this, focusing on providing science- and research-based expertise to the local public and private sector groups who are interested in promoting sustainable and local seafood. This effort is also a response to national trends that show consumers want a healthier diet, of which seafood is a part. National health-promoting efforts to increase seafood consumption, a worldwide demand for seafood that is outpacing supply, and the need for aquaculture to supplement capture

<<< Locally caught haddock at the 2011 Baird Symposium.

fisheries in order to meet that demand, are all issues that demonstrate the need for increasingly finer tuned understanding of market science in seafood sustainability.

The program also focuses on seafood safety and health issues in partnership with other Sea Grant programs and universities nationwide, and continues seafood safety trainings (HACCP) for government and professional groups. During 2012–2014, the program is additionally working to engage the fishing community in renewable energy planning and to expand outreach and technical services for fisheries research.

Above: Chef Chris Aerni of the Rossmount Inn prepares sustainably farm-raised Atlantic salmon at the 2011 Baird Symposium. Inset: Symposium participant David Beutel of the R.I. Coastal Resources Management Council fillets a haddock.

The Rhode Island Sea Grant Legal Program, located at the Marine Affairs Institute at Roger Williams University (RWU) School of Law, is one of only four Sea Grant Legal Programs in the country and the only one in the Northeast.

Legal Program Director Susan Farady and Staff Attorney Julia Wyman

The Legal 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.

RHODE ISLAND SEA GRANT LEGAL PROGRAM

EDUCATION

Sea Grant Law Fellows

Sea Grant Law Fellows are competitively 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 Colloquium 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 RWU 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 RWU School of Law, in

conjunction with the URI Department of Marine Affairs. Joint degree students complete both the 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 marine law and 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, and the legal legacy of the Deepwater Horizon oil spill. The 2012 symposium will explore legal issues implicated by the effects of climate change on ocean and coastal resources.

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**.

Law Fellows offer high quality, supervised law and policy research.

Rhode Island Sea Grant offers educational opportunities for both college students at the undergraduate and graduate levels and for the public at large.

RHODE ISLAND SEA GRANT EDUCATION PROGRAM

Public programming takes place year-round through such activities as marine science lectures, tours of historic waterfront areas, seafood cooking demonstrations, and other events.

Fellowship and internship programs allow students to explore careers while working hands-on with marine science professionals.

Rhode Island Sea Grant supports fellowship 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.

<<< The Sea Grant Law Fellows program continues to grow.

LEARN MORE

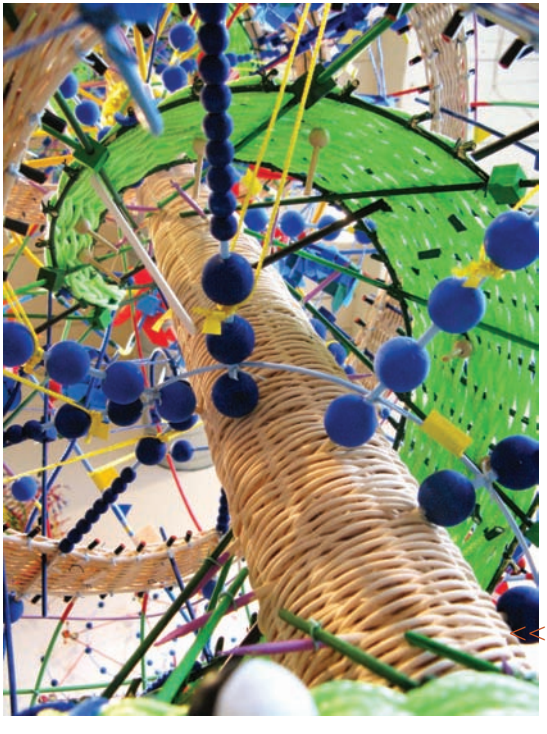
Visit seagrant.gso.uri.edu or contact Tracy Kennedy at (401) 874-6800.

Rhode Island Sea Grant has long supported deepening appreciation and understanding of the marine realm through the visual arts.

The Visual Arts Sea Grant program, run by the URI Department of Art and Art History, was established in 1988 to encourage New England artists to address the issue of the environment of the ocean and its coastal communities. Grants are awarded annually and intended to financially assist individuals and/or collaborating artists whose works are related to themes of the marine environment.

One of artist Timothy Murdoch's *Tidal Flowers.*

VISUAL ARTS SEA GRANT



In 2012, several past awardees will show their work at the Hale House in South Kingstown, and in 2013, the program will celebrate its 25th anniversary with a planned gallery exhibit at the URI Fine Arts Center in Kingston.

For information, visit **www.uri.edu/artsci/art/grant.php**.

<<< Artist Nathalie Miebach visually articulates scientific observations.

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.

RHODE ISLAND SEA GRANT COMMUNICATIONS

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**.

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.

Science writer Meredith Haas covers research for Rhode Island Sea Grant.

To receive either of these publications, contact Tracy Kennedy at (401) 874-6800 or tkennedy@gso.uri.edu.