

## **RHODE ISLAND SEA GRANT FUNDED RESEARCH 2014-2016**

Located at the University of Rhode Island Graduate School of Oceanography, 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. 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.

### **Christopher Kincaid, professor at the URI Graduate School of Oceanography, for “Quahog larval dispersion and settlement in Narragansett Bay”**

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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 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.

### **Kathleen Castro, researcher in the URI Department of Fisheries, Animal, and Veterinary Science, for “Developing information and local capacity to manage the R.I. whelk fishery”**

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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.

**Roxanna Smolowitz, visiting assistant professor of biology and director of the Aquatic Diagnostic Laboratory at Roger Williams University, for “Could disease in blue mussels affect commercial culture in the Northeast region?”**

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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 mussel 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.

**Robinson Fulweiler, assistant professor in the earth & environment and biology departments at Boston University, and associate director of the Boston University Marine Program, for “Nitrogen cycling processes across an oyster aquaculture chronosequence”**

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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 incorporate 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.

**Tracey Dalton, associate professor in the URI Marine Affairs Department, for “A model for understanding public support for aquaculture and estimating social carrying capacities for shellfish aquaculture in R.I. waters”**

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Comprehension of 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.

**Robert Thompson, associate professor in the URI Marine Affairs Department, for “A geospatial inventory and preliminary valuation of human uses of Rhode Island coastal ponds: A mixed methods approach”**

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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.