

# Program Guide

## 2018–2020

*Helping Massachusetts communities understand and address coastal challenges and identify economic and environmentally sustainable opportunities*



### Research

Sea Grant supports the work of scientists in a wide variety of disciplines from institutions throughout Massachusetts and beyond. Sea Grant researchers conduct cutting-edge research in the areas of marine life, coastal processes, hazards, energy sources, climate change, stormwater management and tourism.



### Education

Sea Grant educators and communicators provide valuable leadership in marine and aquatic science education activities for K-8 students, professional development workshops for educators, and public education and outreach in coastal communities.



### Extension

Woods Hole Sea Grant employs marine specialists with the Cape Cod Cooperative Extension to create an effective outreach partnership providing reliable technical and science-based information to distinct groups within our region, e.g. shellfish wardens, river herring wardens, aquaculture growers, municipalities, coastal homeowners.

### Focus areas

Our research, technical assistance and education activities are focused in four broad areas of national importance:

- Resilient communities and economies
  - Healthy coastal ecosystems
- Sustainable fisheries and aquaculture
- Environmental literacy and workforce development



# Woods Hole Sea Grant 2018–2020 Research Projects

*Six research projects were funded representing a total anticipated research investment of nearly \$1.5 million over the next two years from the National Oceanic and Atmospheric Administration and other non-federal matching funds.*

- A team of biologists and marine chemists from WHOI led by Mark Hahn and Chris Reddy will examine the **potential risk to human health posed by halogenated marine natural products** (HNPs) in seafood. Some HNPs have been found to be persistent and bioaccumulative and to occur at similar concentrations as their industrial counterparts such as PCBs. Preliminary research suggests that HNPs could make a substantial contribution to the total “dioxin equivalents” in marine animals, and thus to the total risk of dioxin-like effects from consuming seafood. This research will help inform decisions regarding consumption of seafood by humans, including sensitive subpopulations such as children and pregnant women.

- WHOI oceanographers Steve Elgar and Britt Raubenheimer will examine the **resilience of sandy shorelines**, and in particular the recovery of beaches after storm-induced erosion or inlet breaching. The work focuses on the shoreline of Martha’s Vineyard, where sediment transport is affecting water quality, shellfish farms, tourism, and homes and other

structures. Although focused on the southern shoreline of Martha’s Vineyard, the results will apply to a range of coasts and be of interest to the USGS, Cape Cod Cooperative Extension, conservation commissions, environmental groups, homeowners, coastal engineers, shellfish farmers, fishermen, and swimmer safety personnel.

- Biologists Joel Llopiz and Rubao Ji of WHOI, with colleagues Martha Hauff of Stonehill College and Hannes Baumann of the Univ. of Conn., want to better understand the **ecological role of the northern sand lance in the Gulf of Maine**. Ecological hotspots off Massachusetts’s shores such as the Nantucket Shoals

## Other Funded Programs

### Aquaculture Projects

In 2017, the NOAA Sea Grant Program funded two new grants to Woods Hole Sea Grant totaling more than \$650,000 to support research intended to expand aquaculture production in Massachusetts.

- The first project aims to **simplify the process and reduce the cost of obtaining permits for aquaculture** in U.S. waters. Led by Hauke Kite-Powell, a WHOI research specialist, the two-year project will conduct a range of necessary reviews on selected offshore areas to pre-permit the areas and reduce the regulatory burden for

aquaculture growers. With the pre-permitting process completed, aquaculture ventures will have a mechanism to gain access and begin production.

- A second project will explore the potential to **broaden the shellfish aquaculture market in Massachusetts** to include two other native clam species, surf clams



Abigail Archer, Woods Hole Sea Grant and Cape Cod Cooperative Extension

region and Stellwagen Bank are critical foraging grounds for such iconic marine species such as humpback whales, bluefin tuna, and cod, and the sand lance is one reason these hotspots exist. As management efforts are increasingly directed towards entire ecosystems rather than single species, focused research on the more influential components of these ecosystems, such as sand lance, can provide a major contribution.



- University of Massachusetts Dartmouth biological oceanographer Jefferson Turner will use Sea Grant funding to expand the 30-year data collection record of phytoplankton abundance and community composition in Buzzards Bay (Mass.). The extended program will focus on patterns of **appearance and abundance of harmful phytoplankton species** in relation to those of other phytoplankton species that may utilize different nutrients and hydrographic niches. The research may provide the state agency responsible for ensuring the safe harvest of shellfish with new management approaches to predicting and dealing with these harmful blooms.
- New England had a decades-old practice of digging ditches in salt marshes to increase marsh drainage and reduce the habitat for breeding mosquitoes. A new project led by WHOI marine chemist Amanda Spivak will be the first to quantify how nearly 90 years of **ditch digging and maintenance have impacted marsh elevation, accretion rates, pond density, and carbon storage**. The information will help wetland managers and restoration practitioners assess the long-term outcomes of ditch maintenance decisions.

- With environmental change and rising sea levels, coastal communities are developing strategies to protect and stabilize their shorelines using natural materials. This 'living shoreline' concept may be more costly than traditional methods, but can provide added benefits in terms of ecosystem services. Three researchers from the WHOI Marine Policy Center, Di Jin, Porter Hoagland, and Hauke Kite-Powell, will develop a **framework for an effective and 'rapid' assessment for living shoreline designs and their ecosystem benefits**. Their results will give coastal communities a decision-making tool to evaluate these new designs and compare them with traditional shoreline protection techniques.

and blood arks, as well as shucked oysters. Led by WHSG Marine Resource Specialist Abigail Archer, the project will conduct a market analysis of the potential consumer demand for and economic value of culturing alternative species, as well as for shucked oysters. The work will be done in collaboration with Cape Cod Cooperative Extension, the Cape Cod Commercial Fishermen's Alliance, and Wellfleet SPAT (Shellfish Promotion and Tasting).

### 2018 Knauss Fellow

Woods Hole Sea Grant-sponsored candidate Rebecca Certner was selected for the prestigious John A. Knauss Marine Policy Fellowship, a unique educational

and professional experience for graduate students interested in national policy decisions affecting the coasts. Certner, a recent PhD graduate from Northeastern University, began her one-year placement with NOAA National Ocean Service Policy and Constituent Affairs Division in February.

Rebecca Certner, Courtesy of Woods Hole Sea Grant



## Extension

Woods Hole Sea Grant conducts an effective outreach and extension program in collaboration with the Cape Cod Cooperative Extension of Barnstable County. This program focuses its attention on marine and coastal resource users and managers in coastal communities and emphasizes the application of research in social and natural sciences to coastal resource issues.

## Fisheries and Aquaculture

The Fisheries and Aquaculture program conducts applied research and demonstration projects on issues such as oyster restoration, municipal shellfish propagation, and the management of shellfish diseases, and disseminates information generated by research sponsored through Sea Grant and other funding agencies. It provides professional and technical expertise and education to public officials, educators, and user groups involved in aquaculture and shellfisheries. It manages several marine environmental monitoring programs and oversees a long-term marine water-quality monitoring program. It also assists with a variety of marine resource restoration and shellfish projects and coordinates activities of the Massachusetts River Herring Network.

## Coastal Resilience

The Coastal Processes and Hazards program focuses on educating coastal resource managers and the general public about the forces that shape our coastal landforms. Guidance is also provided for modifications to existing coastal structures that improve the sustainability and function of coastal resource areas, as well as the valuable ecosystem services they provide. The program provides technical assistance on coastal processes, shoreline change, erosion control alternatives, potential effects of various human activities on coastal landforms, coastal floodplains,



coastal hazards and hazard mitigation analyses, and dune restoration techniques. The program also provides assistance with floodplain management, helping communities apply for and maintain participation in the National Flood Insurance Program's Community Rating System (CRS). This work helps communities determine new floodplain management activities that will improve the flood safety and coastal resiliency within their communities, as well as educating coastal managers and the public about flood risk and safety.

## Education and Outreach

The people involved in every component of the Woods Hole Sea Grant program—whether a researcher, an extension agent, or educator—provide valuable leadership in marine and aquatic science education and outreach activities. These activities are designed to inform citizens and help prepare the next generation of professionals involved with our nation's coastal resources, communities and economies. Woods Hole Sea Grant's education portfolio includes undergraduate and graduate education, fellowships, informal education for the general public, specialized training programs for industry and much more. In addition, the Woods Hole Sea Grant's education coordinator works closely with researchers, extension agents, education associations, federal agencies, and other partners to develop formal education programs for K-8 students, and conducts classroom visits and professional development programs for educators.



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