

New Hampshire Sea Grant College Program



Briefing Book

Sea Grant Site Review
May 6-7, 2015
University of New Hampshire
Durham, N.H.

N.H. Sea Grant: 2010-2013 Fast Facts

Sea Grant funds invested in research to address coastal issues in N.H. \$3,362,710		
4 Knauss Fellows	Brian E. Doyle Undergraduate Fellows 9	1 Coastal Management Fellow
UNH Marine Docents providing marine education 181	32,895 hours volunteered by NHSG-trained individuals	Citizen scientists involved in CRV 125
33,917 K-12 students learned about marine science from NHSG-trained educators		
Tech writing students mentored 22	\$4,529,294 leveraged funds managed by N.H. Sea Grant	Meetings, conferences and workshops organized or sponsored 720
31 journal articles published	189 tons of marine debris removed	21 theses and dissertations written
Undergraduates who collaborated on Tech 797 ocean research projects 90		

N.H. Sea Grant Briefing Book



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Program Management and Organization

The first sections of the Briefing Book provide overviews of how the major components of N.H. Sea Grant are organized and managed. These include the overall organizational structure within the University of New Hampshire (UNH), the Executive Committee and the Policy Advisory Committee, which are the main internal and external leadership groups for the program, respectively.

N.H. Sea Grant Executive Committee: Leadership for N.H. Sea Grant is provided by an executive committee made up of the director, the associate director (who currently is also the assistant director for research), the extension program leader, and the assistant directors for education and communications. The committee meets monthly to review ongoing activities, discuss development proposals, prepare for major events, and otherwise handle the direction of the program. Every other month the full NHSG staff join the Executive Committee to discuss current efforts, opportunities and potential new collaborations.

N.H. Sea Grant Policy Advisory Committee: To serve the Sea Grant mission and to identify particular state and regional priorities, N.H. Sea Grant is guided by a Policy Advisory Committee (PAC) made up of federal, regional and state leaders and managers, university faculty and researchers, and community and industry advocates. Our PAC members play a significant role as liaisons and conduits for information transfer between our program and our stakeholders/constituents.

The PAC is integrally involved in the development of strategic priorities, the identification of changing opportunities and needs, and providing general advice to the program. The PAC generally meets two or three times per year, with additional

meetings scheduled as needed, such as during development of the Strategic Plan and when particular opportunities present themselves.

N.H. Sea Grant Policy Advisory Committee (2015)

Joe Boyer — Director, Center for the Environment, Plymouth State University

Erik Froburg — Education Coordinator, Leitzel Center for Mathematics, Science and Engineering Education, UNH

Ellen Goethel — Fisheries and Education Specialist, Hampton, N.H.

Cynthia Hays — Assistant Professor, Biology, Keene State College

James Houle — Outreach Coordinator and Program Manager, Stormwater Center, UNH

Pam Hubbard — Representative, State of New Hampshire

Dave Kellam — Communications Consultant, Exeter, N.H.

Jennifer Kennedy — Executive Director, Blue Ocean Society for Marine Conservation

Julie LaBranche — Senior Planner, Rockingham Planning Commission, Exeter, N.H.

Richard Langan — Director, NOAA/UNH National Estuarine Research Reserve System Science Collaborative

Ken La Valley — Dean and Director, Cooperative Extension, UNH

Wendy Lull — President, Seacoast Science Center, Rye, N.H.

Betsy Nicholson — NOAA Regional Coastal Program Specialist

Rachel Rouillard — Director, Piscataqua Region Estuaries Partnership

Debby Scire — Executive Director, Compact New Hampshire

Paul Stacey — Research Coordinator, Great Bay National Estuarine Research Reserve, Durham, N.H.

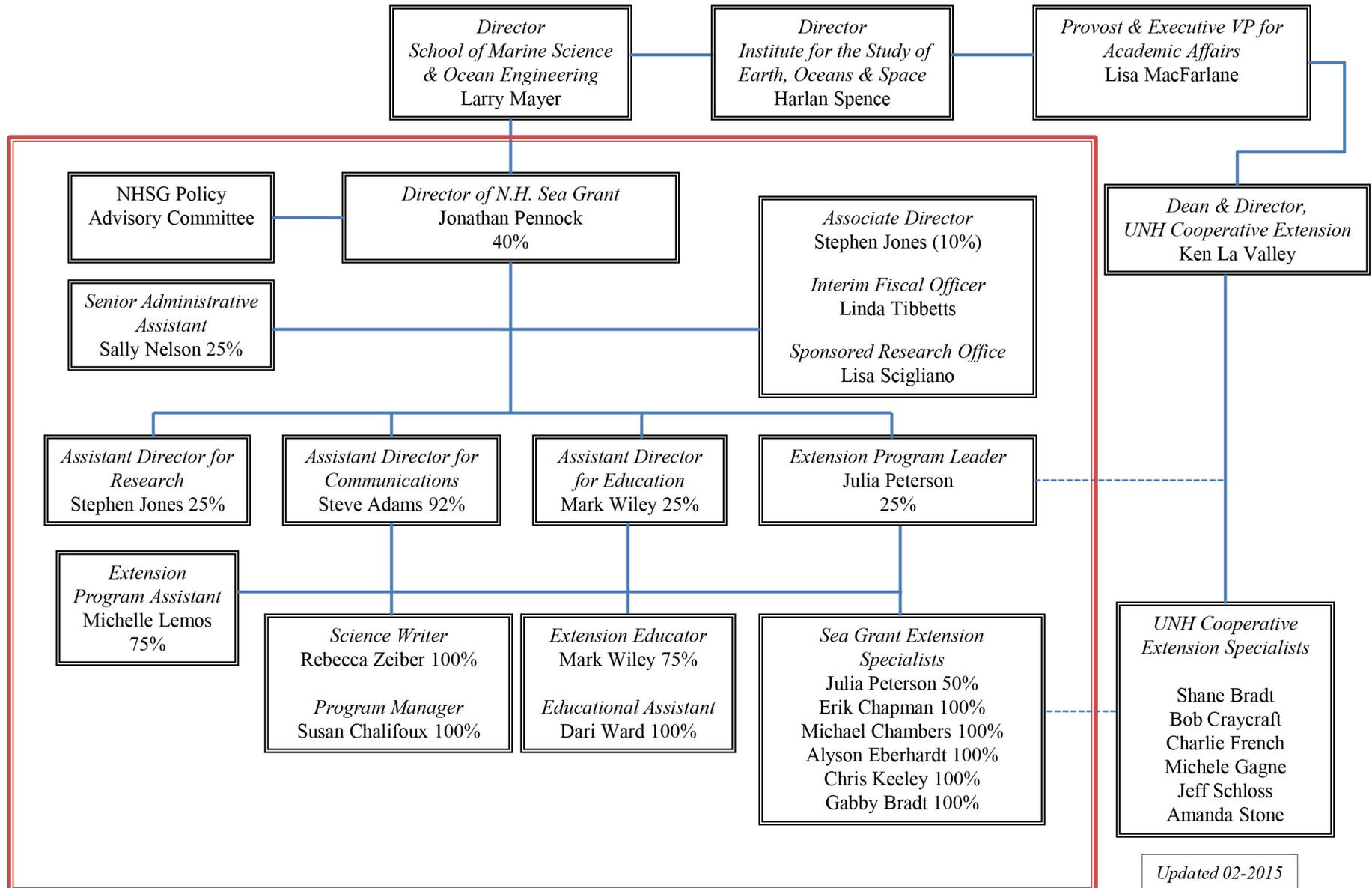
Roger Stephenson — Principle and Senior Counsel, Stephenson Strategic Communications, Portsmouth, N.H.

Cameron Wake — Research Associate Professor, Complex Systems Research Center, UNH

Kim Williams — Chair, Biology, Great Bay Community College

New Hampshire Sea Grant College Program

Organizational Structure



NHSG Staff and Responsibilities

Steve Adams, *Assistant Director for Communications* — Serves on the Executive Committee and provides communications support for all elements of the program. Oversees all communications activities, including publications, news releases, social media and website development. Manages the National Sea Grant website marinecareers.net.



Michael Chambers, *Marine Aquaculture Specialist* — Provides support for aquaculture development in the state, including permitting, site selection, production methods and marketing. Conducts research to improve aquaculture growout systems and economics. Transfers this information to farmers through site visits and workshops.



Steve Jones, *Associate Director and Assistant Director for Research* — Serves on the Executive Committee, organizes Policy Advisory Committee meetings, and oversees the full process of research proposal review and funding decisions for the omnibus proposal. Oversees the research component of PIER reporting and is the program director for the Coastal Research Volunteer Program.



Chris Keeley, *Communities and Climate Program Coordinator* — Implements local coastal community development and climate change adaptation projects with communities. Participates in regional collaborations to coordinate with partners who also support communities in preparing for climate change.



Gabriela Bradt, *Commercial Fisheries Specialist* — Works extensively on direct marketing and branding of locally harvested seafood and with fishermen and non-profit organizations on a variety of marine debris-related projects, as well as in marine habitat conservation and restoration efforts.



Erik Chapman, *Commercial Fisheries Specialist* — Works extensively with New Hampshire and regional fishing industry on projects designed to support sustainable marine fisheries. Focuses on marine ecology, climate change, fishing gear technology, and the marketing and branding of locally harvested seafood.



Michelle Lemos, *Administrative Assistant* — Supports Education, Extension and Communications by developing and maintaining portions of the program's website and by creating and maintaining databases for Coastal Communities and UNH Marine Docent SeaTreks. Assists in managing docent activities and events, and creates, compiles and analyzes questionnaires and surveys. Provides general office support regarding supplies, equipment and maintenance.



Susan Chalifoux, *Program Manager* — Coordinates all reporting activities and interacts with the national Sea Grant PIER database. Maintains NHSG publications and project databases and helps manage the program and marinecareers.net websites. Assures compliance with National Sea Grant Library mandatory distribution requirements.



Alyson Eberhardt, *Coastal Ecosystems Extension Specialist* — Works with communities, schools and scientists to research, monitor and restore coastal habitats. Coordinates a citizen science program called the Coastal Research Volunteers that trains citizens to work with researchers on local coastal research projects.



Sally Nelson, *Senior Administrative Assistant* — Provides administrative support to the director and administrative office with particular leadership in preparation of the omnibus proposal, preparation and management of research proposal competition, interactions and communications for the Executive Committee and Policy Advisory Committee, and review processes associated with the Knauss and Coastal Management fellowship programs.



Jonathan Pennock, *Director* — Provides overall leadership to the program and is the primary lead for omnibus proposal preparation/oversight, national fellowship competitions (e.g., Knauss and Coastal Management), and interactions with the National Sea Grant Office (NSGO). Provides national leadership as the N.H. Sea Grant delegate to the Sea Grant Association, having served as treasurer, president and past-president during the 2010-14 period, as well as a member of the NSGO Strategic Planning and Allocation Committees. Serves as deputy-director of the School of Marine Science and Ocean Engineering at UNH, as chair of the Northeast Sea Grant Consortium, and on the boards of numerous NHSG partner organizations.



Julia Peterson, *Extension Program Leader and Extension Specialist* — Serves on the Executive Committee. Represents NHSG's Extension team within the Sea Grant Assembly and for national scale efforts. Designs, delivers, implements and assesses educational programming with community-based audiences through projects focused on nonpoint source pollution reduction and climate adaptation.



Lisa Scigliano, *Senior Grant and Contract Administrator/Sponsored Programs Administration* — Oversees grants and contracts on behalf of UNH, providing service and guidance to faculty and staff involved in the pursuit of research, scholarly and creative activities. Works collaboratively with the NHSG director and fiscal officer to submit the omnibus proposal. Assures compliance with the federal solicitation and submits the grants.gov package.



Linda Tibbetts, *Interim Fiscal Officer* — Manages pre- and post-award administration, and coordination with the UNH Sponsored Programs Administration office.



Dari Ward, *Extension Program Associate* — Assists with facilitation of the UNH Marine Docent Program, volunteer management, program scheduling and newsletter production and distribution. Plans programs and special events, and oversees equipment inventory, ordering and maintenance.



Mark Wiley, *Assistant Director for Education* — Serves on the Executive Committee and directs education efforts for the program. Directs the UNH Marine Docent Program, which is a volunteer-based education effort that provides ocean literacy programming for K-12 and adult audiences. Serves as a member of the UNH Cooperative Extension Science Literacy team working with organizations statewide to address the state's STEM challenge.



Rebecca Zeiber, *Science Writer* — Creates stories, designs publications, takes photos and produces videos to spread the word about NHSG research, education and outreach activities. Populates the NHSG website with these items and manages social media efforts. Coordinates NHSG communications activities with colleagues at UNH and UNH Cooperative Extension.



Recruiting Talent

N.H. Sea Grant follows a rigorous process for soliciting, reviewing and selecting proposals within its core research program under the direction of our associate director and an electronic proposal submission and review process. There are several key steps and activities within this process.

Working with the PAC and from the Strategic Plan, the Executive Committee identifies and articulates a series of core priorities for inclusion in calls for pre-proposals. These priorities are discussed with extension staff to facilitate maximum integration of future research and extension efforts, and presented to the PAC for discussion and adoption.

1. As part of the call for pre-proposals, the associate director and other staff hold open meetings with potential researchers to alert them to the opportunity and priority research areas, and work to identify new/early career researchers and assist them in the development of ideas and in the application process. The call for pre-proposals is also distributed to all identified marine researchers at all academic institutions in the state.

2. Submitted pre-proposals are sent to an external panel, which subsequently meets to prioritize the pre-proposals received based on research excellence and the framework of the priorities in the Strategic Plan. Based on the recommendations of the panel, the Executive Committee identifies those proposals of highest quality to be recommended for full proposal development. In general, our goal is to be able to fund 40-50% of those proposals recommended to the full proposal stage.

3. In requesting full proposals, NHSG provides masked copies of all review comments to the principal investigators for incorporation into the full proposals. We also recommend extension staff who may best be able to assist in developing outreach components of the full proposal and offer to provide any assistance that may be required (particularly for new investigators) in the proposal development process.

4. Full proposals are reviewed by three to six technical experts through mail review. Blinded mail reviews are then provided to the principal investigators to provide an opportunity for rebuttal. This is followed by a technical review panel that is asked to assess the technical merit of the full proposals. All review materials are taken in combination with an assessment of program priorities and institutional and programmatic balance to develop a recom-

Pre-Proposal Review Panel		Full Proposal Review Panel		
2011	Kate Burns	Gulf of Maine Research Institute	Ralph Abele	U.S. Environmental Protection Agency
	Fred Dillon	South Portland Water Resource Protection Dept.	Verna DeLauer	Clark University
	Anamarija Frankic	University of Massachusetts	Christian Krahforst	University of Massachusetts
	Mark Green	St. Joseph's College	Judy Pederson	MIT Sea Grant
	Christian Krahforst	University of Massachusetts	Michael Pol	Massachusetts Division of Marine Fisheries
	Dana Morse	Maine Sea Grant		
	Charles Tilburg	University of New England		
2013	Nicholas Brown	University of Maine	Anna Bass	University of New England
	Ellen Douglas	University of Massachusetts	Curtis Bohlen	Casco Bay Estuary Partnership
	Stephen Eddy	University of Maine	Cynthia Hays	Keene State College
	Cynthia Hays	Keene State College	Kathy Mills	Gulf of Maine Research Institute
	David Kellam	SeaPlan	Chris Sherwood	Woods Hole Oceanographic Institution
	Loren Launen	Keene State College		

mended list of projects for funding that is offered to our National Sea Grant Office (NSGO) program officer for approval.

5. During the entire process, significant effort is made to ensure that there is no conflict of interest in any part of the process and that all deadlines

and policies are fair and equally enforced. Masked copies of all reviews and the panel summary are provided to all principal investigators.

The make-up of the 2011 and 2013 pre-proposal and full proposal review panels are shown in the table on page 5 and the research RFP metrics in the tables on page 6.

Northeast Sea Grant Consortium and Regional Research Competitions

In 2008, N.H. Sea Grant and the six other Sea Grant programs from the Northeast — New York, Connecticut, Rhode Island, Woods Hole, Massachusetts Institute of Technology and Maine — signed a memorandum of understanding (MOU) forming the Northeast Sea Grant Consortium (NESGC). The goals behind forming the NESGC were to: (1) create a mechanism for highlighting and addressing regional issues and solutions in the Northeast; (2) provide a mechanism for minimizing indirect costs for large multi-institutional proposals; and (3) enhance funding for regional research priorities that were developed as part of the National Sea Grant Office support for the development of research priorities in the Gulf of Maine and the New York Bight, and the formation of Regional Ocean Science Initiatives.

The two most significant outcomes of the NESGC have been the organization of biennial NESGC regional meetings of our extension, education and communications staff, and the development and offering of NESGC Regional Research Requests for Proposals (RFP) for the 2010-11, 2012-13 and 2014-15 funding cycles. To date, each program in the NESGC has committed \$25,000 per year, a total of \$350,000 per biennium, to these projects. In addition, for the 2012-13 and 2014-15 cycles, we focused the RFPs on social science research needs and were able to leverage the NSGO National Strategic Initiatives in Social Science to augment our state program funding and expand these investments (see table on page 7).

Leadership of the NESGC rotates among the state program directors. Currently, Jon Pennock

Research RFP: Number of Proposals*						
	N.H. Sea Grant RFP		Northeast Regional RFP		Totals	
	2011	2013	2011	2013	2011	2013
Number of pre-proposals submitted	25	31	31	30	56	61
Number of full proposals submitted	16	14	10	9	26	23
Proposals funded	5	6	4	3	9	9
Proposals funded from home institution (UNH)	5	6	1	0	6	6

**This table updates table D on page 2 of the PIER report to include 2013 minibus projects and the Northeast Regional RFP competitions.*

See page 7 of the Briefing Book for a full list of funded regional projects

Research RFP: Numbers of Institutions Represented, New Projects and New Principal Investigators						
	N.H. Sea Grant RFP		Northeast Regional RFP		Totals	
	2011	2013	2011	2013	2011	2013
Number of institutions – pre-proposals	11	11	39	28	50	39
Number of institutions – full proposals	7	6	19	12	26	18
Number of institutions – funded projects	2	2	4	5	6	7
Number of new projects (no projects were continuing)	5	6	4	3	9	9
Number of new PIs	10	8	7	5	17	13

serves as chair of the NESGC and is working with the other directors to develop the 2015 RFP for 2016-17 NESGC funding, this time working with the National Oceanic and Atmospheric Administration (NOAA) Ocean Acidification (OA) Office to provide leveraged funding. NHSG will lead the 2015 RFP as Woods Hole Sea Grant and Connect-

icut Sea Grant did in 2013 and 2011, respectively. In 2015, the Lake Champlain Sea Grant Program became the eighth member of the NESGC.

Strategically, N.H. Sea Grant sees the NESGC as a mechanism to address important regional needs while enhancing partnerships with our neighboring Sea Grant programs and significantly

expanding the number and diversity of principal investigators and universities that we serve. It should be noted that this funding only appears in the NHSG budget in years in which projects with a principal investigator from N.H. are supported.

Northeast Sea Grant Consortium Regional Projects

N.H. Sea Grant contributed \$25,000 per year towards these research projects to address regional coastal issues.

The 2012-2013 and 2014-2015 projects are all social science projects.

Title	PI	Affiliation	Focus Area	Sea Grant Funding
2010-2011				
Mitigating risk to whales from lobster fishing	Hauke Kite-Powell	Woods Hole Oceanographic Institution	Safe and Sustainable Seafood Supply	\$117,091
Using technology to assess the invasive sea squirt, <i>Didemnum vexillum</i> , impacts on fisheries and ecosystems	Franz Hover	Massachusetts Institute of Technology	Healthy Coastal Ecosystems	\$53,493
2012-2013				
Climate change adaptation and ecosystem service resilience in Northeast coastal communities	Robert Johnston	Clark University	Hazard Resilience in Coastal Communities	\$199,947
Decision support for the economic analysis of trade-offs in Coastal and Marine Spatial Planning (CMSP) for the U.S. Northeast Region	Porter Hoagland	Woods Hole Oceanographic Institution	Sustainable Coastal Development	\$199,696
The governance role of local authorities in marine spatial planning: a legal assessment of prospects and problems	John Duff	University of Massachusetts	Sustainable Coastal Development	\$79,582
Social and economic impact assessment of catch share management in the Northeast multispecies fishery	Christopher Glass	University of New Hampshire	Safe and Sustainable Seafood Supply	\$118,131
2014-2015				
Buy out or build back? A comparative assessment of approaches to employing public funding to vulnerable coastal properties in the Northeastern United States	Porter Hoagland	Woods Hole Oceanographic Institution	Resilient Communities and Economies	\$175,000
Coastal hazards and Northeast housing values	Robert Johnston	Clark University	Resilient Communities and Economies	\$175,000
Social and ecological factors influencing shoreline hardening in the Northeast	Jonathan Grabowski	Northeastern University	Resilient Communities and Economies	\$175,000

2011 Site Review Suggestions and Responses

The last site review of the N.H. Sea Grant College Program was conducted in April 2011. The review team provided several suggestions for improving the program:

Suggestions:

1. Communications appeared to be a support function to extension and education. The SRT suggests that NH SG elevate and more fully integrate communications into its programmed team approach.

Due to the tight site visit schedule, we didn't include a communications presentation and we didn't do a good job of integrating communications activities into the other presentations. Because of this, the review team left with an inaccurate and incomplete understanding of our communications activities.

NHSG Communications provides communications support and counsel to the program and its administrators, researchers and extension personnel. The communications staff provides a full range of services (advising, writing, editing, photography, videography, desktop publishing, media relations, website development, blogging, social media, etc.) and seeks to get involved in an undertaking as soon as possible in order to help shape the communications component of the effort as efficiently as possible. Staff members also maintain the program's website as well as marinecareers.net, a well-received national Sea Grant resource for students that averages 500-600 visitors a day, and manage the program's compliance with Sea Grant's mandatory distribution guidelines. Finally, a member of the communications staff oversees the program's participation in PIER and eSeaGrant.

2. NH SG Executive Committee members have multiple responsibilities, and it is unclear who could serve as acting director if the director is absent. The SRT team is concerned that NH SG does not have the stability of having a deputy director and suggests filling this position.

The 2011 SRT occurred at a time when N.H. Sea Grant was reorganizing following the untimely death of our long-time associate director and extension program leader, Brian Doyle. We subsequently completed our searches for both the Associate Director and Extension Program Leader positions and are pleased that Steve Jones and Julia Peterson respectively have assumed these positions.

3. The SRT suggests the NH SG may benefit by having a brief outline of duties (i.e., Terms of Reference) and appointment periods (e.g., two or three years, with option for reappointment) for PAC members.

In response to this suggestion, we developed a Policy Advisory Committee – Terms of Reference document and implemented it as part of our recruitment of new members in 2014 and going forward.

4. The SRT was impressed with the general composition of the NH SG PAC (e.g., number, gender, and diversity of backgrounds) but suggest a representative from national nongovernmental organizations (NGOs) be invited to serve on the PAC since NH SG collaborates with these NGOs on projects.

We value this suggestion and have worked to recruit additional national Non-Governmental

Organization (NGO) representation on our Policy Advisory Committee. The addition of Jennifer Kennedy of the Blue Ocean Society partially fulfills this representation, but we will continue to focus on this area as the committee goes through its natural turnover in the coming years.

5. The SRT suggests that NH SG consider hosting its successful monthly seminar series and round-table discussions with state and federal partners to share information and identify opportunities for further collaboration.

We continue to engage our stakeholders effectively through our extension focus areas. At the overall program level, we have initiated an annual research symposium to which our partners and stakeholders are invited. Also, Jon Pennock and colleagues from the Northeast Association of Coastal Ocean Observing Systems (NERACOOS), the Great Bay National Estuarine Research Reserve (NERR), the N.H. Coastal Program, and the Piscataqua Region Estuaries Partnership (PREP) have formed a N.H. Coastal Roundtable to serve as a venue for inter-program integration of coastal research, management and educational efforts.

In addition to the N.H. Coastal Roundtable, collaboration opportunities are identified regularly because our small coast requires it. N.H. Sea Grant staff are active members in the most prominent collaborations (e.g., N.H. Coastal Adaptation Workgroup and N.H. Natural Resources Outreach Coalition) that are Sea Grant-relevant in the region and often lead particular efforts with those collaborations. These coalitions meet monthly or bimonthly and include representatives of local, regional, state and federal agencies.

6. *NH SG actively solicits feedback from stakeholders for extension and education, however, the SRT suggests this model would be enhanced by documenting the methods for soliciting such feedback.*

The methods that we use to solicit feedback from our stakeholders are formally documented through our partnership with UNH Cooperative Extension and use of the Cooperative Extension reporting system. They include formal and informal methods, such as post-session questionnaires, interviews, discussions and/or surveys, as well as local and regional research carried out by us or collaborators. One recent example of local research includes the work of Doyle Fellow Ally Phillip on the needs of community climate champions.

7. *Although NH SG takes a bottom-up approach to needs assessments and stakeholder engagement, the SRT suggests the program critically examine any potentially underserved stakeholders and what the program can do to address their needs.*

New Hampshire's small, fairly homogenous coast allows Sea Grant's staff good access and close connections to many coastal stakeholders. Staff use a variety of inclusive practices to ensure that stakeholders are aware of and able to engage with Sea Grant's resources. Over the last several years, N.H. Sea Grant has identified and begun working more closely with relatively new stakeholders – local restaurateurs, local food aficionados, citizen scientists and inner city youth (HERO program) among others. Emerging new stakeholders include businesses, investment firms, manufactured home associations and cultural resource agencies concerned about climate effects. Tools like NOAA's Digital Coast and partnerships with UNH's Carsey School of Public Policy and the UNH Cooperative Extension Community Development Program are helping N.H. Sea Grant

learn more about the needs of its coastal populations.

8. *The SRT suggests NH SG seek outside expert review of current IT system and recommendations for improvements to incorporate up-to-date information technology tools.*

Since the 2011 SRT, N.H. Sea Grant contracted with UNH Web Solutions to completely update the Sea Grant and marinecareers.net websites. In addition, we have worked within the Sea Grant Association Research Coordinators network to join with nearly half of the state Sea Grant programs to invest in and become part of the new eSeaGrant initiative. These efforts, along with an increased social media effort by our communicators and staff, have significantly improved our internet technology presence and effectiveness.

9. *The SRT suggests the UNH administration to work closely with NH SG to minimize any negative impacts of budgetary changes on such a strong and vibrant program.*

Since the 2011 SRT, N.H. Sea Grant has continued to receive state funds in support of the program through UNH and that commitment has not wavered despite significant challenges to the state budget. In addition, we have renegotiated our MOU with UNH Cooperative Extension to include a greater commitment of state funding for our extension specialists and educators through Cooperative Extension.

10. *The SRT suggests NH SG, with input from Cooperative Extension and other partners should identify other niches for growth potential, which could be achieved through competitive funding awards or new partnerships.*

We have continued to be particularly effective

in securing additional extramural funding for our aquaculture, fisheries, climate, education and healthy coastal ecosystems initiatives. New efforts with Cooperative Extension in the areas of Science, Technology, Engineering and Math (STEM) education within the state have particular momentum.

11. *There are many acronyms representing the collaborative work occurring in the Northeast. In the future, it may be helpful to provide a list of acronyms for new or outside individuals to fully understand and appreciate the extent of collaboration.*

In this briefing book we have attempted to minimize the use of acronyms and we will be providing a full acronym reference list at the site review.

12. *Twice the review team found themselves in a situation where they were asked to engage with panelists without having appropriate background information on the collaborations or staff backgrounds. In the future, please do not assume that reviewers know all the issues enough to directly engage without contextual information.*

We will be providing a full list of participants including bio sketches for each person at the review.

Partner and Stakeholder Engagement

N.H. Sea Grant engages its partners and stakeholders in many ways, but these can generally be divided into three broad categories.

First, our Policy Advisory Committee consists of individuals who are leaders of many of our partners and stakeholder groups (e.g., regional planning bodies, fisherman's cooperatives, federal partners, etc.).

Second, our extension and education activities are by far the most diverse and effective way in

which we engage partners and stakeholders. This is accomplished through facilitated workshops, targeted educational and outreach programs, and one-on-one interactions.

Third, our staff are active on numerous local and regional boards/committees in which we integrate N.H. Sea Grant into the science, policy and educational matrix within the state and the region. Through these approaches, our program is continuously connected with our stakeholders and ensures

that we are responding to the highest priorities within our state.

The diversity of interactions of N.H. Sea Grant staff at the local, state, regional, national and international levels can be seen in the following list of memberships and the descriptions of how Sea Grant engages its partners and stakeholders to meet its strategic goals on pages 12-18.

Memberships on Boards and Committees

International, National and Regional

- American Soybean Association U.S./Cuba Coalition Aquaculture (Chambers)
- Casco Bay Estuary Partnership Science and Technical Advisory Committee (Jones)
- Consortium for Ocean Leadership (Pennock, alternate delegate)
- Ecosystem Indicator Partnership Contaminants Committee (Jones)
- Gulf Coast Marine Life Center Board, Destin, Fla. (Chambers)
- Gulf of Maine Council on the Marine Environment – Gulfwatch Contaminants Monitoring Subcommittee (Jones)
- Gulf of Maine Marine Educators Association (Ward and Wiley)
- Gulfwatch Program – Gulf of Maine Council on the Marine Environment (Jones, project coordinator)
- International Conference on Molluscan Shellfish Safety International Advisory Committee (Jones)
- International Council Offshore Aquaculture Development Steering Committee (Chambers)
- International partner with SINTEF Fisheries and Aquaculture, Trondheim, Norway (Chambers)
- LocalCatch.org, National Network of Community Supported Fisheries Steering Committee (Chapman)
- Maine Healthy Beaches Advisory Committee (Jones)
- Maine-New Hampshire Experimental Program to Stimulate Competitive Research Track 2 Project Executive Leadership Team (Jones)
- National Estuarine Research Reserve System Science Collaborative Board of Advisors (Pennock)
- National Marine Educators Association Ocean Literacy Committee (Wiley)
- National Nonpoint Education for Municipal Officials Network (Peterson)
- New England Ocean Science Education Collaborative Leadership Council (Wiley)
- NOAA-OAR Senior Research Council (Pennock)
- Northeast Academic Consortium for U.S. Integrated Ocean Observing System Board of Directors (Pennock)
- Northeast Sea Grant Consortium (Pennock, chair)
- Northeastern Regional Association of Coastal and Ocean Observing Systems Board of Directors (Pennock)
- Piscataqua Region Estuaries Partnership Management Committee and Executive Committee (Pennock)
- Piscataqua Region Estuaries Partnership Technical Advisory Committee (Jones, chair, and Pennock)
- Regional Association for Research in the Gulf of Maine (Pennock, delegate)

- Responsible Aquaculture Foundation (Chambers, educational advisor)
- Seacoast Science Center Board of Directors (Pennock)
- Seacoast Science Center Education Committee (Pennock, chair)
- U.S. Department of Agriculture Climate Hub (Keeley, UNH liaison)
- World Aquaculture Society (Chambers)

State and Local

- Dover Energy Commission (Keeley, chair)
- Fish Locally Collaborative (Bradt, communications co-organizer)
- Great Bay National Estuarine Research Reserve Research Advisory Board (Pennock)
- Hodgson Brook Watershed Coalition (Jones)
- N.H. Climate Summit Planning Committee (Keeley)
- N.H. Coastal Adaptation Workgroup (Eberhardt, Keeley and Peterson)
- N.H. Community Seafood Board (Chapman)
- N.H. Estuarine Spatial Planning Advisory Committee (Eberhardt)
- N.H. Natural Resources Outreach Coalition (Peterson and Keeley)
- N.H. Shoreline Management Conference Planning Committee (Eberhardt)
- Partners to Restore New Hampshire's Estuaries (Eberhardt)
- Science, Technology, Engineering and Mathematics N.H. Board (Wiley)
- Shoals Marine Laboratory Executive Committee (Pennock, chair)
- UNH ADVANCE Program Internal Steering Committee (Jones)

- UNH Atlantic Marine Aquaculture Center Board (Chambers)
- UNH Communicators Network (Zeiber)
- UNH Cooperative Extension Program Leader Team (Peterson)
- UNH Cooperative Extension Science, Technology, Engineering and Mathematics Committee (Wiley, past chair)
- UNH Cooperative Extension Time Management and Work Family Balance Action Committee (Bradt and Eberhardt)
- UNH Cooperative Extension Volunteer Management Team (Eberhardt, chair, and Ward)
- UNH Department of Biological Sciences Extension Faculty (Chapman)
- UNH Department of Natural Resources Extension Faculty (Chapman)
- UNH Dive Control Board (Chambers)
- UNH Extension Aquaculture Area of Expertise (Chambers)
- UNH Extension Educator Council (Chapman)
- UNH Extension Wildlife and Fisheries Area of Expertise (Chapman, chair)
- UNH Marine Operations Board (Chambers)
- UNH Ocean Discovery Day Planning Committee (Nelson, Ward and Zeiber)
- UNH School of Marine Science and Ocean Engineering Annual Symposium Planning Committee (Chapman)
- UNH School of Marine Science and Ocean Engineering Outreach Committee (Wiley)
- UNH Systems Biology Ph.D. Program Steering Committee (Jones)

NOAA and Sea Grant

- eSeaGrant Approval Committee (Chalifoux)
- NOAA Seafood Marketing Committee (Bradt)
- Northeast Sea Grant Regional Conference Planning Committee (Eberhardt and Keeley)
- Sea Grant Allocation Committee (Pennock)
- Sea Grant Association Board of Directors (Pennock, past president)
- Sea Grant Climate Network (Peterson and Keeley)
- Sea Grant Communicators Network (Adams, Chalifoux and Zeiber)
- Sea Grant Educators Network (Wiley, past chair)
- Sea Grant Extension Assembly (Peterson)
- Sea Grant Fisheries Extension Network (Chapman, chair, and Bradt)
- Sea Grant Sustainable Coastal Community Development Network (Peterson)
- UNH/NOAA Coastal Response Research Center Advisory Board (Pennock)

Engaging Partners – How N. H. Sea Grant Does It

Ultimately, all of the details presented earlier in this Briefing Book are intended to support an approach to addressing strategic goals that are important to New Hampshire, our region and the nation in the most impactful ways. Whenever possible, NHSG seeks to integrate our research, extension, education and communications efforts

and engage our partners to address these goals. In the following section, we provide a number of examples that demonstrate how NHSG works to address our strategic goals, in this case using the goals identified in our 2011-13 Strategic Plan. Importantly, the approaches to addressing specific goals can vary depending on the nature of the

question/problem, the needs of our stakeholders, our programmatic expertise, and the relative strengths and needs of our partners. In using this format, we have chosen to rely on the Site Review PIER Report (pp. 6-12) to document the long list of our partners and stakeholders that we have previously reported and to use this section to focus on examples of how we engage our partners to achieve our strategic goals.

SAFE AND SUSTAINABLE SEAFOOD SUPPLY

Goal: A healthy domestic seafood industry that harvests, produces, processes and markets seafood responsibly to meet public demand.

Supporting alternative markets for seafood

Important stakeholders: N.H. commercial fishermen, restaurants and seafood consumers.

How NHSG does it: N.H. Sea Grant supports alternative markets for seafood in a variety of innovative and engaging ways that take into consideration the producers of local seafood products, purveyors of those products, and consumers. Sea Grant Extension staff work to connect N.H. fishermen with their customers using social media, value-added product development, and seafood branding efforts. By increasing awareness and knowledge about local seafood and the fishermen who harvest in N.H. waters, NHSG works to meet the needs of seafood consumers for fresh and local product while at the same time encouraging fishermen to think “outside the box” and access different revenue streams.

Example: N.H. fishermen have had to explore different options in order to sell lesser known but still plentiful species of fish. Consumers’ lack of understanding and knowledge about these lesser known species, which are often cheaper, more sustainable and equally flavorful alternatives to the better known species, has been a big

obstacle. NHSG has increased efforts to raise awareness, explore and develop new markets for “under-utilized” fish species such as dogfish, pollock, redfish, soft-shelled lobster and whiting, through partnerships with restaurants, farmers markets and fishermen; the support of a Community Supported Fishery (CSF); and the efforts of the Sea Grant communications staff.

Key partners: N.H. Commercial Fishermen, N.H. Community Seafood, The Black Trumpet, Stages at One Washington, Moxy, Seacoast Eat Local, UNH Cooperative Extension, Prescott Park Arts Festival.



N.H. fisherman Erik Anderson and UNH fisheries technician Jess Cranney harvest steelhead trout for sale at local markets. With technical assistance from N.H. Sea Grant, fishermen have taken on daily operations of the trout aquaculture endeavors near the mouth of the Piscataqua River. This effort has helped to supplement fishermen’s incomes during a time of the year when they may not be able to fish commercially.

Generating jobs, reducing nutrient pollution and providing healthy, domestic seafood

Important stakeholders: Aquaculture entrepreneurs, seafood wholesalers, restaurants and seafood consumers in New England.

How NHSG does it: N.H. Sea Grant advises and educates aquaculture entrepreneurs on ocean farming practices. This involves species selection, site evaluation, permitting, growout technologies and marketing. Species include oysters, mussels, kelp and steelhead trout. In addition, NHSG works with regulatory agencies to improve permitting processes and reporting that creates efficiencies in the aquaculture industry. Workshops are organized to update farmers on policy changes, technology updates and general information. The benefits of shellfish farming, including nutrient uptake from the environment and the production of sustainable, healthy seafood, are presented at local, regional and national forums.

Example: New Hampshire's oyster farming industry has grown from one to 15 farms in the last five years. This was due to streamlining the regulatory process with a lead agency (N.H. Fish and Game) for aquaculture permitting and increasing bottom licenses from one to five years. Today, over six million oysters are growing in the estuarine waters of N.H. valued at > \$4 million. More than 30 people are now employed part time or full time in growing, harvesting and transporting fresh oysters.

Key partners: N.H. oyster farmers, N.H. fishermen, N.H. Fish and Game, N.H. Department of Environmental Services, Environmental Protection Agency (Sector 1), oyster farming equipment manufacturers, Seaport Fish, JP Shellfish Company, and restaurants in N.H., Maine and Massachusetts.

Goal: A resilient fishing community with the capacity to adapt to a dynamic regulatory environment and changing marine ecosystems.

Moving toward sustainable fishing and supporting innovation on the water

Important stakeholders: Commercial fishermen along the N.H. Seacoast.

How NHSG does it: N.H. Sea Grant facilitates the flow of information and ideas among fishermen, managers, scientists, non-profit organizations and gear technologists. Staff work closely with fishermen to assess needs and identify opportunities to move commercial fishermen toward sustainable fishing practices and to entrain resources, expertise, capacity and strategic planning to develop programming that targets clearly defined goals.

Example: For Gulf of Maine fishermen, making a living on the water depends on finding ways to avoid cod

while catching other marketable species. NHSG partnered with N.H. Groundfish Sectors to support testing of a modified gillnet designed to avoid cod while targeting more abundant species, such as pollock, by raising the footrope of the net several feet off the seabed. The idea for the raised gillnet was a fisherman's, brought forward at a Sector meeting facilitated by NHSG staff. The NOAA Northeast Region Cooperative Research Program is funding the project and early results are promising. NHSG is now working to extend the program so that more fishermen in the Northeast can test the nets in the hope of speeding industry adoption of the modification.

Key partners: N.H. Groundfish Sectors XI and XII, The Nature Conservancy, NOAA Northeast Cooperative Research Program, Gulf of Maine Research Institute, Mass. Division of Marine Fisheries, UNH Cooperative Extension, Yankee Fishermen's Cooperative, University of Mass. Dartmouth, N.H. Commercial Fishermen's Association.

HAZARD RESILIENCE IN COASTAL COMMUNITIES

Goal: Coastal communities in New Hampshire improve their resilience to severe weather, sea level rise, flooding and other climate effects that pose risks to life, health, property and infrastructure.

Building capacity in coastal communities for climate adaptation

Important stakeholders: Community leaders, emergency management professionals, planning professionals, research scientists, state agencies.

How NHSG does it: Since 2010, N.H. Sea Grant has provided technical assistance, education and facilitation with other members of N.H.'s Coastal Adaptation Workgroup (CAW) to assist coastal communities with their climate preparedness. NHSG and CAW identify gaps in community capacity; offer assistance; locate technical and human resources; apply for funding to support projects; and design, develop, deliver and

evaluate programming to meet community needs. Since its inception, CAW members have secured over \$2.75 million in grant funding for technical tool development, technical assistance and community engagement, and CAW has received a regional planning award.

Example: CAW delivers outreach to communities and professionals through a workshop series, Water, Weather, Climate and Community. CAW held its first workshop in 2010 and two each year in 2011-2013. By the end of 2013, CAW had worked with representatives from over 35 communities in three states. These workshops fostered communication between communities and assistance providers, yielding informed programming and projects, and developing and sharing research in response to local needs.

Key partners: CAW includes Great Bay National Estuarine Research Reserve, N.H. Department of Envi-



Residents of Exeter, N.H., look over a map of their community to determine where natural resources and infrastructure could be impacted by increased flood events.

ronmental Services, N.H. Coastal Program, Piscataqua Region Estuaries Partnership, NOAA Coastal Services Center-Northeast Region, UNH, Antioch University-New England, N.H. Natural Resource Outreach Coalition, Rockingham Planning Commission, Strafford Regional Planning Commission, UNH Cooperative Extension, Climate Solutions-New England, Union of Concerned Scientists, The Nature Conservancy, GZA Environmental, Geosyntec Consultants, Pax World Investment, Portsmouth, Seabrook and Newington. Other partners include Newfields, Dover, Exeter, Hampton, Hampton Falls and Lamprey River Watershed towns.

Addressing barriers to the use of “new” floodplain maps in a N.H. coastal watershed

Important stakeholders: Municipal officials, planning professionals, emergency management personnel, Lamprey River Watershed floodplain property owners, Federal Emergency Management Agency.

How NHSG does it: N.H. Sea Grant improves access to and use of tools that protect people, places and property from hazardous climate conditions. Community

leaders are sometimes reluctant to adopt new tools and techniques. Sea Grant addresses barriers to implementation of new knowledge by serving as a trusted educator and responsive facilitator.

Example: With funding from the National Sea Grant Law Center, NHSG coordinated legal research to accompany the development of new 100-year floodplain maps for a coastal watershed. The new maps reflect risk from current and projected precipitation rates and land use and were developed by a UNH-led team of researchers. An advisory committee to the mapping project identified a fear of legal challenges as a potential barrier to community map usage. Sea Grant responded to this input by coordinating a legal research project with the Vermont Law School to address five primary

concerns. The study’s findings indicate that communities can minimize the likelihood of legal challenges by basing their actions on sound planning, appropriate statutes and clear purposes, and that they should preserve economic viability for the land affected.

Key partners: National Sea Grant Law Center, Vt. Law School, UNH Institute for the Study of Earth, Oceans and Space, UNH Complex Systems Research Center, UNH Stormwater Center, Lamprey River Advisory Council, UNH Cooperative Extension, Great Bay National Estuarine Research Reserve, N.H. Department of Energy and Planning, N.H. Coastal Program, Rockingham Planning Commission, Strafford Regional Planning Commission.

HEALTHY COASTAL ECOSYSTEMS

Goal: Coastal communities effectively plan for the future and mitigate existing problems associated with coastal development and deleterious natural events.

Helping N.H. towns manage stormwater

Important stakeholders: Coastal communities, citizen volunteer groups.

How NHSG does it: N.H. Sea Grant helps coastal communities mitigate existing problems associated with development by supporting citizen volunteer and research projects, and through direct participation in local and regional advisory boards and forums. Close collaboration with municipal resource managers helps to direct NHSG efforts to priority areas and issues related to stormwater runoff and contamination of receiving waters. Volunteers and local citizens are trained to collect data on water quality in their towns and are encouraged to become stewards of their local watersheds. Sea Grant Extension efforts include serving on advisory boards to help inform local citizens and managers about best management practices and to harness additional resources to help mitigate problems.

Example: Local municipalities are facing increasing

requirements from EPA to eliminate sources of contamination from stormwater runoff. NHSG’s Coastal Research Volunteer (CRV) program recruited citizens from two local towns, Exeter and Greenland, and, in collaboration with the UNH Stormwater Center and the N.H. Department of Environmental Services Volunteer River Assessment Program (VRAP), trained a large cadre of volunteers on how to collect water samples and take measurements in storm drain discharges. Sea Grant staff met with town managers to determine priority areas to collect data, and teams of volunteers were deployed weekly to one or the other town to monitor stormwater pipes. The effort benefitted the two towns by identifying which drains were problems. The overall approach was written up as a manual for other towns to adopt and the findings and approach were presented in several town and regional stormwater management forums. When the new regulations are put into place, several towns intend to engage the CRV program and NHSG-supported best management practices for stormwater mitigation.

Key partners: UNH, local towns (Exeter, Greenland, Portsmouth), UNH Stormwater Center, N.H. DES VRAP, Coastal Research Volunteer Program.

Goal: Critical coastal habitats and their ecosystem function are restored.

Teaming volunteers with researchers on coastal restoration projects

Important stakeholders: Local citizens.

How NHSG does it: N.H. Sea Grant's Coastal Research Volunteer (CRV) Program trains and organizes local citizen scientists to work side-by-side with researchers on coastal research projects, including habitat restoration efforts. By teaching local citizens the skills to assist with coastal habitat restoration, the CRV increases local capacity to accomplish restoration objectives and increases the knowledge of community members about these efforts. In 2012 and 2013, the CRV program successfully engaged over 125 volunteers who contributed 1,883 hours assisting with coastal restoration, monitoring and research projects.

Example: Participants in NHSG's CRV program worked in concert with scientists from UNH's Jackson Estuarine Laboratory and the New Hampshire chapter of The Nature Conservancy to assist in raising over 11,000 oysters and restoring a quarter million new oysters to a two-plus acre plot in the Great Bay Estuary. In addition, volunteers assisted in salt marsh restoration efforts through removal of the invasive common reed *Phragmites australis* as well as the collection of post-restoration monitoring data. In a recent survey of CRV participants, 97% of respondents reported increased knowledge as a result of training and field activities. Generally, volunteers valued working with scientists to gain from their expertise in field settings. In turn, CRV involvement in restoration projects provided scientists with the help they needed to conduct coastal research as well as provided an economic savings to researchers by offsetting the need for paid staff.

Key partners: The Nature Conservancy, UNH's Jackson Estuarine Laboratory, the UNH Department of Biological Sciences.



UNH research professor of zoology Ray Grizzle (left) works with members of the Coastal Research Volunteer (CRV) program to count and measure baby oysters, or "spat," that have settled on old oyster shells. These efforts are helping to restore oyster reefs in Great Bay, and the CRV members offer researchers like Grizzle an opportunity to collect data they might not otherwise have the time or manpower needed to record.

Goal: Coastal waters are safe for recreation and locally harvested seafood is safe for consumers.

Providing assistance to shellfish industry

Important stakeholders: Seafood industry, oyster farmers, local beach-side municipalities.

How NHSG does it: N.H. Sea Grant supports research that addresses emerging and entrenched water-related public health issues in the N.H. Seacoast. The goal is to provide industry and regulators with improved strategies for reducing sources of contamination and the detection of pathogens, as well as strategies for mitigating contamination. NHSG researchers, extension specialists and other staff work collaboratively with shellfish growers, municipalities and management agencies for shellfish and beaches to bring resources to investigate problems, support educational forums and produce communication pieces to help inform growers

and the public about the nature of local problems and to provide sustainable solutions for managing public health safety issues.

Example: Oyster farming has recently emerged as a viable endeavor with substantial economic and social benefits to the Seacoast. There are several public health threats that oyster growers face. No shellfish growing or harvesting can occur within extensive safety zone areas around wastewater treatment discharges. Recent Sea Grant National Strategic Initiative aquaculture research has identified conditions and post-harvest treatment strategies that are now included in rule changes to allow limited seasonal harvesting within these safety zones, thus expanding opportunities for aquaculture nationwide. Food and Drug Administration research partners on that project have brought additional resources and studies to the state to help the N.H. Shellfish Program set up safe management strategies. The most pressing issue for oyster farmers, however, is abiding by guidance from the Shellfish Program about when they can harvest oysters and post-harvest practices that minimize the risk to consumers from pathogenic *Vibrio* species. NHSG-supported research has provided direct support to the Shellfish Program by helping to analyze samples, providing greater amounts of spatial and temporal data on *Vibriosis*, and providing new detection methods that more accurately assess risks. Extension specialists have organized forums for growers, researchers and regulators to discuss these issues and coordinate efforts to minimize costs to growers while maintaining safe seafood.

Key partners: N.H. Department of Environmental Services (Beach and Shellfish programs), N.H. oyster farmers, UNH.

SUSTAINABLE COASTAL DEVELOPMENT

Goal: Coastal communities in New Hampshire's coastal watersheds employ strategies that protect ocean and coastal resources from degradation associated with the built environment and growing demands on coastal resources.

Training natural resource professionals and volunteers on stormwater principles

Important stakeholders: Community leaders, landscapers, foresters, farmers, volunteer stewards, watershed association members, nature enthusiasts, Master Gardeners, UNH Cooperative Extension.

How NHSG does it: Through its partnership with UNH Cooperative Extension, N.H. Sea Grant has access to hundreds of volunteers and professionals working on natural resource and agricultural stewardship efforts. These individuals often serve as community opinion leaders. NHSG staff offer training for these influential leaders, providing an opportunity for knowledge about the connections between land use and water quality to spread exponentially.

Example: NHSG staff present information on stormwater management in the Natural Resources Stewards training course, a credit course offered through the local technical college by UNH Cooperative Extension staff for approximately 50 professionals and volunteers yearly. The presentation is based on a guide,

Protecting Water Resources and Managing Stormwater: A Bird's Eye View in New Hampshire and Throughout New England, developed by NHSG in conjunction with the UNH Stormwater Center and Cooperative Extension. The training uses the Watershed Game developed by the Northland Nonpoint Education for Municipal Officials team to help course participants learn about nutrient loading and reductions based on implementing best practices as well as the necessity for watershed-wide action to reduce pollutant loads.

Key partners: UNH Cooperative Extension, Natural Resource Stewards, Master Gardeners, N.H. Dept. of Environmental Services, N.H. Natural Resources Outreach Coalition.



Landscapers, gardeners, watershed association members and others learn how to install a rain garden as part of NHSG's overall efforts to teach stormwater management techniques. Another tool, *Protecting Water Resources and Managing Stormwater*, provides communities with a suite of strategies they can use to protect water resources from the land conservation scale all the way down to the property scale.

Promoting innovative stormwater management

Important stakeholders: Community leaders, landscapers, Master Gardeners, agricultural specialists, watershed association members, UNH Cooperative Extension, UNH Stormwater Center.

How NHSG does it: N.H. Sea Grant uses its close association with UNH Cooperative Extension and the UNH Stormwater Center to bring together technical experts and outreach specialists in agriculture, environmental engineering and marine resource protection to address stormwater management challenges. Through a variety of methods, including publications, skills-based trainings, conferences and community-based projects, N.H. Sea Grant has played an integral role in helping cross disciplines to ease the integration of innovative stormwater management techniques into community planning, policies and landscaping practices.

Example: Rain gardens are bioretention areas that help infiltrate and filter stormwater as well as add aesthetic and ecological value to a property. In consultation with agriculture specialists from UNH Cooperative Extension and stormwater engineers from the UNH Stormwater Center, N.H. Sea Grant staff help train dozens of professional landscapers, gardeners, conservation commission members, department of public works officials and others about the benefits of rain gardens and how to install them. These trainings are targeted at influencing opinion leaders in order to help promote the integration of innovative stormwater management techniques at the residential scale.

Key partners: Hodgson Brook Restoration Project, Rutgers University, USDA Northeast States and Caribbean Islands Water Quality Program, UNH Stormwater Center, UNH Cooperative Extension.



A volunteer from the UNH Marine Docent Program (far right) teaches students from the Higher Education Readiness Opportunity program (HERO) about sea star biology at the pier in New Castle, N.H. Eighty students traveled from Washington, D.C., to spend a day with the Docents learning about marine science and ocean engineering.

Goal: Formal and informal educators utilizing ocean, coastal and climate curriculum and programming grounded in nationally supported standards and principles.

Strengthening science standards and educator professional development

Important stakeholders: Local, regional and national science educators.

How NHSG does it: N.H. Sea Grant collaborates extensively with ocean science education entities locally, regionally and nationally to strengthen both the adopted science standards that drive literacy efforts and the related professional development programming for educators. Sea Grant staff serve on literacy committees, providing significant input to standards development, and as presenters at ocean literacy professional development workshops.

Example: A NHSG staff member served on the Ocean Literacy Committee of the National Marine Educators Association to provide significant input to the development of the earth, ocean and climate science standards adopted in the Next Generation Science Standards (NGSS). The NGSS are nationally recognized science standards that have been adopted by numerous states and districts as the basis for their science instruction. This set of standards significantly increases the depth and breadth of earth, ocean and climate science to be taught. Sea Grant staff also work to provide professional development to both formal and informal science educators through membership and active participation in the New England Ocean Science Education Collaborative (NEOSEC), a nationally recognized model for effective collaboration among science literacy providers.

Key partners: National Marine Educators Association, New England Ocean Sciences Education Collaborative, Sea Grant Education Network, UNH Marine Docents, Seacoast Science Center, Great Bay Discovery Center, Gundalow Company, Blue Ocean Society.

MARINE LITERACY

Goal: An environmentally literate and engaged public supported by formal and informal education and outreach opportunities in ocean, coastal and climate sciences.

Training volunteer educators to deliver ocean literacy programs

Important stakeholders: New Hampshire public school students and teachers.

How NHSG does it: N.H. Sea Grant provides nationally recognized training and professional development to volunteers who comprise the UNH Marine Docent Program. This extensive training enables the volunteers to deliver scientifically accurate and pedagogically appropriate ocean literacy programming to N.H. schools and at outreach events.

Example: Numerous national commissions have identified increased ocean and environmental literacy as a

priority. In addition, the new Next Generation Science Standards (NGSS), a national effort to improve science education, place significantly increased emphasis on earth, ocean and environmental science than previous standards. UNH Marine Docents, trained in NGSS-aligned ocean science, deliver hundreds of programs to thousands of students and adults each year. In addition, the program seeks out opportunities to educate under-represented populations like the Washington, D.C., based Higher Education Readiness Opportunity (HERO) program, which has visited the N.H. seacoast twice to participate in hands-on ocean science activities. Docents also volunteer at other marine education programs in the state that are able to take advantage of the extensive training the Docents receive from NHSG.

Key partners: N.H. public schools, UNH Marine Docents, Seacoast Science Center, Great Bay Discovery Center, Gundalow Company, Blue Ocean Society.

Goal: A workforce skilled in science, technology, engineering and other disciplines critical to the resolution of environmental issues.

Providing science literacy programming

Important stakeholders: N.H. formal and informal science, technology, engineering and mathematics (STEM) educators and students.

How NHSG does it: A N.H. Sea Grant staff member serves on the UNH Cooperative Extension Youth and Family Science Literacy Team.

Example: As a member of the Science Literacy Team, a Sea Grant staff member works closely with a statewide STEM literacy collaborative, STEM-NH, to develop statewide STEM programming, resources and facilitation. In that capacity, the staffer worked with members of the governor's STEM Literacy Task Force to develop recommendations to the state that will support increased STEM programming and resources aimed at increasing the numbers of New Hampshire students pursuing STEM careers. In addition to work with STEM-NH, NHSG staff work with UNH Cooperative Extension colleagues to provide direct professional development programming in STEM to N.H. educators at UNH Cooperative Extension events and at N.H. Science Teacher Association professional development events.

Key partners: N.H. Science Teachers Association, UNH Cooperative Extension, UNH Leitzel Center, STEM-NH.

Collaborative Sea Grant Network and NOAA Activities

As a board member of the **Sea Grant Association (SGA)** from 2007-2014, Jon Pennock most recently served as President and Past-President of the SGA, leading the network and serving as the primary liaison for the SGA with the **National Sea Grant Office (NSGO)**, the **National Sea Grant Advisory Board (NSGAB)**, and the **NOAA Division of Oceanographic and Atmospheric Research (OAR)**. As part of these activities, Pennock served on the **National Sea Grant Strategic Planning Committee** and the **Sea Grant Allocation Committee**. He also met with, and provided testimony on behalf of Sea Grant to, several Congressional appropriations and authorization committees. Within OAR, Pennock represented Sea Grant on the **OAR Senior Research Council** and served as the liaison to the **NOAA Cooperative Institutes Working Group**.

Regionally, Pennock has served on the board of directors for the **NOAA Northeast Regional Association for Coastal Ocean Observing Systems (NERACOOS)** and the advisory boards for the **NOAA Great Bay Estuarine Research Reserve (NERR)**, the **NOAA-UNH National Estuarine Research Reserve System Science Collaborative**, and the **NOAA-UNH Coastal Response Research Center (CRRC)**. He is a founding director of the **Northeast Sea Grant Consortium (NESGC)**, detailed on page 6), and currently serves as Chair of the NESGC.

Finally, in partnership with the Great Bay NERR, Pennock has served as principal investigator on the **NOAA Great Bay System-Wide Monitoring Program (SWMP)** that provides the monitoring backbone for the Great Bay. He is also a co-principal investigator on a **NOAA-NERACOOS Great Bay Buoy** project that serves as a

test site for advanced estuarine sensor technologies in the Gulf of Maine.

Steve Jones is in the initial phases of discussions with various NOAA scientists at the **Northeast Fisheries Science Center** about best approaches for developing models to frame the dynamics of pathogenic *Vibrio* species in Northeast U.S. coastal waters that currently are causing increased incidences of human illnesses associated with shellfish consumption.

The current chair of the **National Sea Grant Fisheries Extension Network**, Erik Chapman has a long history of participation in marine research and in projects designed to help fishermen move toward sustainable fishing. For example, he has recently worked as an extension leader and researcher on **REDNET** and **GEARNET** projects, regional programs funded by NOAA's **Northeast Collaborative Research Partners Program** that aim to help support development of sustainable fishing practices in the redfish and groundfish fisheries, respectively. These projects were innovative, network-based programs that established partnerships among regional fishermen, net manufacturers, fisheries scientists and managers. Chapman has also recently partnered with the **Northeast Regional Association of Ocean Observing Systems (NERACOOS)**, The Nature Conservancy, and local fishermen to establish a **Community-Based Ocean Climate Observing Network** making bottom temperature and ocean data available to both fishermen and climate scientists.

A recent graduate of the **Sea Grant Academy**, which brings together Sea Grant personnel from all over the country, Gabriela Bradt has cultivated relationships within the **Sea Grant Network** in order to enhance her own programming through shared ideas and experiences. For example, in collaboration with **Louisiana Sea Grant's** Twyla Herrington, she proposed and carried out a "Sea Grant Exchange" among the Sea Grant programs in Louisiana, New Hampshire and Maine where both Bradt and Herrington were able to travel to the different programs and exchange ideas and establish collaborations with their colleagues within the Sea Grant Network. As a result several collaborations occurred: Bradt was a speaker at the Louisiana Fisheries Summit in Houma, La.; Dana Morse (Maine Sea Grant) and Herrington collaborated on an ecotourism workshop; and Bradt and Sarah Redmond (Maine Sea Grant) collaborated on seaweed workshops in N.H.

The **NOAA Aquaculture Program** has been a vital partner for N.H. Sea Grant aquaculture programs. Michael Chambers has been engaging fishermen on the small-scale, integrated multi-trophic aquaculture of steelhead trout, blue mussels and sugar kelp. A group of eight fishermen have adopted this method part time and are now subsidizing their wild catch. Other fishermen have taken up offshore mussel farming with submerged longlines. Their first sales will be in the summer of 2015.

Julia Peterson and Chris Keeley participate with two NOAA Sea Grant Networks, the **Sustainable Coastal Community Development Network** and the **Climate Adaptation Network**. Peterson regularly coordinates or collaborates with staff from the **NOAA Coastal Services Center** to deliver trainings for extension staff, colleagues and

partners at regional and national events. These trainings have focused on project design and evaluation and on incorporating human dimensions into natural and coastal resource science projects.

Peterson and Keeley work with staff from the **Northeast Regional Coastal Services Center**,

the **N.H. Coastal Program** and the **Great Bay National Estuarine Research Reserve**, all NOAA related programs, on climate adaptation education. They work together with other members of the **Coastal Adaptation Workgroup (CAW)**, to help New Hampshire's coastal watershed communities learn about and utilize technical assistance

A national Sea Grant website managed by N.H. Sea Grant Communications, **marinecareers.net** has been providing students and their parents, teachers and guidance counselors with information on careers in the marine sciences since 1998. Divided into sections devoted to marine biology, oceanography, ocean engineering, social and policy science, and related fields, the site features question and answer profiles of over 50 marine professionals.

In their profiles, the profilees talk about what they do and how they came to be doing it, what they like and dislike about their careers, what they do when they're not working, what they see for the future in their fields, and what they see for their own futures. Many of the scientists profiled on the site also interact with site visitors via email links posted with their profiles.

In addition to the profiles, **marinecareers.net** contains a number of other resources. These include an aptitude test as well as information on colleges and universities, internships and fellowships, summer and volunteer opportunities, professional development and other aspects of career advancement. Each day, some 500-600 students and others visit the site in search of information. Via the site's feedback form, we have had appreciative feedback from site visitors from 49 U.S. states and 76 countries on six continents.

Maintaining the site involves, among other things, many short-term collaborations with other Sea Grant programs. In order to maintain a great diversity among the profilees in terms of education, specialty, geographical location, employer and ethnicity, we work with other programs to identify and recruit appropriate profilees to the site as well as to advertise the site's resources. The Sea Grant programs in Wisconsin, Texas, Florida, Maryland, Illinois-Indiana and Rhode Island have been particularly helpful recently.

to better prepare for climate effects and protect their social, economic, human and environmental health. The workshop series Water, Weather, Climate and Community is a result of their collective efforts and has been delivered at nine educational events over the last four and a half years.

Peterson and Keeley also work closely with staff from the **N.H. Coastal Program** and the **Great Bay National Estuarine Research Reserve** on sustainable coastal community development efforts through **N.H.'s Natural Resources Outreach Coalition** (NROC). NROC is a member of the **National Nonpoint Education for Municipal Officials** (NEMO) program. Both NROC and NEMO benefit from strong NOAA support. The educational programs that result from this coalition help coastal community staff and volunteer board members recognize the relationship between land use and water quality and develop plans, policies and practices that protect water resources. A current collaboration will result in a community-hosted educational fair that will introduce participants to home and yard maintenance practices that reduce the potential for polluted runoff into Great Bay.

Peterson and Keeley also work occasionally with faculty and staff at the **UNH Stormwater Center**, which is supported in part through NOAA. The Stormwater Center is a leader in the evaluation of conventional and innovative stormwater treatments and management techniques. These collaborations are designed to promote more innovative and integrated stormwater management in communities through projects, documents and trainings. Most recently, Keeley collaborated with the Stormwater Center on a two-year coastal watershed-wide green infrastructure initiative to provide small grants and assistance to communities for implementing green infrastructure, resulting in half a dozen innova-

tive installations and policy changes. A recent collaboration with Peterson resulted in a regional guidance document for installation of tree box filters based on an actual installation and field monitoring of the system in a small coastal city in New Hampshire.

Peterson is also involved with a project that includes providing training to community leaders on findings from a 2010 **Sea Grant Law Center** grant funded project that investigated the legal authority, measures and consequences of new 100-year floodplain maps for the Lamprey River Watershed. The new maps are based on current and projected precipitation and land use data and may be adopted and used by communities for hazard management-related decisions. The legal research was conducted by faculty and students at the Vermont Law School and coordinated with the UNH-led project.

Mark Wiley is active on several local, regional and national marine education committees and currently serves as the Past-Chair of the **Sea Grant Educators Network**. He is Past-President of the **Gulf of Maine Marine Educators Association** and a member of the **National Marine Educators Association Ocean Literacy Committee**, both of which benefit from heavy Sea Grant involvement. Wiley is also working closely with education research staff from the **NOAA Education Office** to develop professional development programming for improved impact reporting for the Sea Grant Education Network.

Alyson Eberhardt serves on the advisory committee for the **N.H. Estuary Planning and Valuation Project**, an effort led by a NOAA Coastal Management fellow. Eberhardt served on the planning committee for the N.H. Shoreline Management Conference in the fall of 2014, an effort spon-

sored in part by the **National Estuarine Research Reserve System Science Collaborative**, the **N.H. Coastal Program**, the **Great Bay National Estuarine Research Reserve**, **N.H. Sea Grant**, the **Hudson River NERR**, **NOAA** and the **N.H. Coastal Adaptation Workgroup**. She is a member of the planning committee for the **Northeast Sea Grant Consortium** regional conference in the fall of 2015. Eberhardt also serves as a member of the **Partnership to Restore N.H.'s Estuaries**, a coalition launched to increase the pace and scale of restoration efforts to improve long-term sustainability of the state's estuaries of which the **NOAA National Marine Fisheries Service** and the **N.H. Coastal Program** are partners.

Eberhardt has recently been funded by NOAA through a competitive **N.H. Coastal Program Resiliency Technical Assistance Grant** to lead a community-based sand dune restoration effort in Hampton and Seabrook, N.H. She is part of a regional Sea Grant effort to prevent the invasion of the Chinese mitten crab. She is collaborating with staff at **Maine Sea Grant** and **Massachusetts Institute of Technology Sea Grant** to create an early detection network and draft a rapid response plan for the mitten crab for the Northeast region. Also, as part of her work coordinating the **Coastal Research Volunteers**, a citizen science program that pairs local citizens with scientists to work on local coastal research projects, Eberhardt collaborates with the **N.H. Coastal Program**, the **Great Bay National Estuarine Research Reserve**, and the **Wells National Estuarine Research Reserve**.

N.H. Sea Grant Awards: 2010-2013

2010 Northeast Sea Grant Network Outstanding Outreach Achievement Individual Award	Ken La Valley was NHSG assistant director for extension and commercial fisheries specialist when he received this award for his efforts in helping to develop the "N.H. Fresh and Local" brand and Community Supported Fisheries (CSFs) in the Seacoast region.
2011 UNH Presidential Award of Excellence	Ken La Valley was extension professor of biological sciences and NHSG commercial fisheries and aquaculture specialist and assistant director when he received this award for his innovative collaborations between the fishing industry and research communities at UNH.
2012 Daniel Quinlan Award for Outstanding Achievement in Community and Regional Planning	The N.H. Coastal Adaptation Workgroup, a coalition of 19 organizations including NHSG, received this award recognizing significant contributions to sound community and regional planning and fostering inter-municipal cooperation and collaboration.
2012 President's Award, National Marine Educators Association (NMEA)	NHSG Assistant Director for Education Mark Wiley, Chair of the Sea Grant Education Network (SGEN), accepted this award on behalf of the SGEN. SGEN was cited for its extensive leadership contributions to NMEA.
2013 Northeast Sea Grant Outstanding Outreach Achievement Group Award	Erik Chapman, NHSG fisheries extension specialist, was part of the team that received this award for the Lobster Trade Adjustment Assistance program.
Bancroft Prize Albert J. Beveridge Award James A. Rawley Prize	UNH Professor of History W. Jeffrey Bolster wrote <i>The Mortal Sea: Fishing the Atlantic in the Age of Sail</i> based in part on historical analyses of 19 th century fishing records funded by N.H. Sea Grant. His book won these three prestigious awards in 2012 and 2013.
2013 Ocean 180 Video Challenge finalist	UNH researchers produced a video about their NHSG-funded lobster research and entered it into this competition designed to inspire scientists to communicate the meaning and significance of their research to non-scientists.

