

MAINE SEA GRANT

COLLEGE PROGRAM



Annual Report to
Office of the Vice President for Research
and Dean of the Graduate School for
the period February 1, 2017 through January 31, 2018

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EXECUTIVE SUMMARY

The Maine Sea Grant College Program is a federal-state partnership based at the University of Maine that supports research, outreach, and education with dedicated base funding from the National Oceanic and Atmospheric Administration. Maine Sea Grant is part of a network of 33 programs across the nation's coastal and Great Lakes states and territories. As part of the National Sea Grant Network, Maine Sea Grant draws on the expertise of more than 3,000 scientists, engineers, public outreach experts, educators and students to help citizens better understand, conserve and use America's coastal resources. Maine Sea Grant rigorously competes and awards funds to scientists and community organizations throughout the state to address the mission of delivering science relevant to Maine people. These grants are strategically and actively extended and communicated to coastal communities from Wells to Eastport by the Marine Extension Team, a partnership with University of Maine Cooperative Extension. The following report contains performance measures and metrics that were submitted to NOAA Sea Grant for 2017.

MAJOR ACCOMPLISHMENTS

The base funding from NOAA allows Sea Grant to be flexible and strategic in securing external grants and leveraging existing funds to advance the work of our many statewide partners. In 2017, University of Maine MEIF funds (\$375,479) were matched with \$1,038,000 core NOAA funds and \$1,432,554 additional National Strategic Investment (NSI) in Aquaculture and \$624,053 matched other sources, resulting in a secured return on investment (ROI) of 8.2 to 1.

Research and extension combined yield significant economic returns in coastal communities, roughly \$6M in 2017. Examples in 2017 include Maine Sea Grant supporting new production of cultured sea scallops and oysters, helping advance ecotourism in eastern Maine, and pilot-testing a new method for towns to evaluate the economic impact of their working waterfronts. With Maine Sea Grant funding, researchers at the University of Maine worked on issues facing the American lobster and Northern shrimp fisheries, and helped the Town of Waldoboro re-open clam flats. Helping communities respond to a changing environment requires outreach as well as research. Marine Extension Team members work with citizens to improve community discussions, monitor, and plan for the effects of a changing climate.

HIGHLIGHTS

Strengthening and diversifying Maine's seafood economy

- ▶ Decades of Maine Sea Grant-coordinated research and development of **sea scallop aquaculture**, including use of state-of-the-art technology to demonstrate product safety, reached a milestone in 2017 when live, whole scallops entered the market for the first time.
- ▶ More than 30 participants in the Maine Sea Grant-coordinated Aquaculture in Shared Waters training program are now involved in aquaculture and many of these are new enterprises. In 2017, two program participants started **new oyster farms** (in Casco Bay and Tenants Harbor) and Midcoast fishermen expanded a working waterfront and lobster business to include aquaculture.
- ▶ With Maine Sea Grant leadership and coordination, 20 organizations advanced the goals of the **Alliance for Maine's Marine Economy**. Activities focused on enhancing infrastructure and workforce development support for Maine seafood, fishing, and aquaculture sectors, with more than \$14 million in state bond funding and matching funds invested in public and private infrastructure in 2017.

Research to understand and improve fisheries populations and management

- With Sea Grant research funding, Richard Wahle of UMaine studied the population of juvenile lobsters in deep water to address a key information gap, and generated industry support and funding for continuing the monitoring program.
- The Atlantic States Marine Fisheries Commission has modified its stock assessment for Northern shrimp based on Maine Sea Grant-funded monitoring (in partnership with fishermen and Maine Department of Marine Resources) and research by Yong Chen at UMaine.

Building community capacity for resource planning and management

- Maine Sea Grant worked with UMaine to offer the *Strengthening Your Facilitation Skills* course in southern Maine to train 54 municipal staff and officials and local organizational leaders to effectively solicit community input and resolve conflicts in **municipal planning activities**. The Community Engagement Academy, a collaboration with UNH and New Hampshire Extension, is developing new outreach approaches for municipal officials.
- Maine Sea Grant support for research and monitoring by a local task force resulted in water quality improvements, **opening 360 acres of clam flats** for harvesting in the Medomak River.

Communities responding to change

- Maine Sea Grant-funded research by Alice Kelley at UMaine has developed a rapid assessment tool for coastal shell middens, and led to a developing network of volunteer “Midden Minders” to monitor and protect cultural resources threatened by sea-level rise.
- A volunteer citizen science program to monitor the shape or “profile” of Maine beaches initiated by Maine Sea Grant in 1999 continues to inform resource management decisions by Maine Geological Survey, county emergency management agencies, the National Weather Service, and nine coastal municipalities. With Maine Sea Grant’s leadership, the program was accepted as a model for a new National Sea Grant Network citizen science initiative in 2017.
- Maine Sea Grant co-chairs the Climate Change Adaptation Providers Network, a framework and forum for sharing issues and solutions with coastal communities. Representatives from more than 20 federal, state, and local governments and organizations participated in 2017 and initiated new projects with successful grant proposals.

Economic development

- Maine Sea Grant worked with NOAA’s Office for Coastal Management to develop and pilot a method for communities to assess the local economic impact of their working waterfronts, and produce a national report with guidance for other working waterfront communities to follow.
- Maine Sea Grant and partners have created four new interpretive tours to view seabirds in rural Washington County, where ecotourism provides an economic development opportunity in the beautiful but economically depressed area.

OVERVIEW

MISSION

Maine Sea Grant's mission is to support the responsible use and conservation of coastal resources in order to sustain thriving coastal communities and ecosystems.

VISION

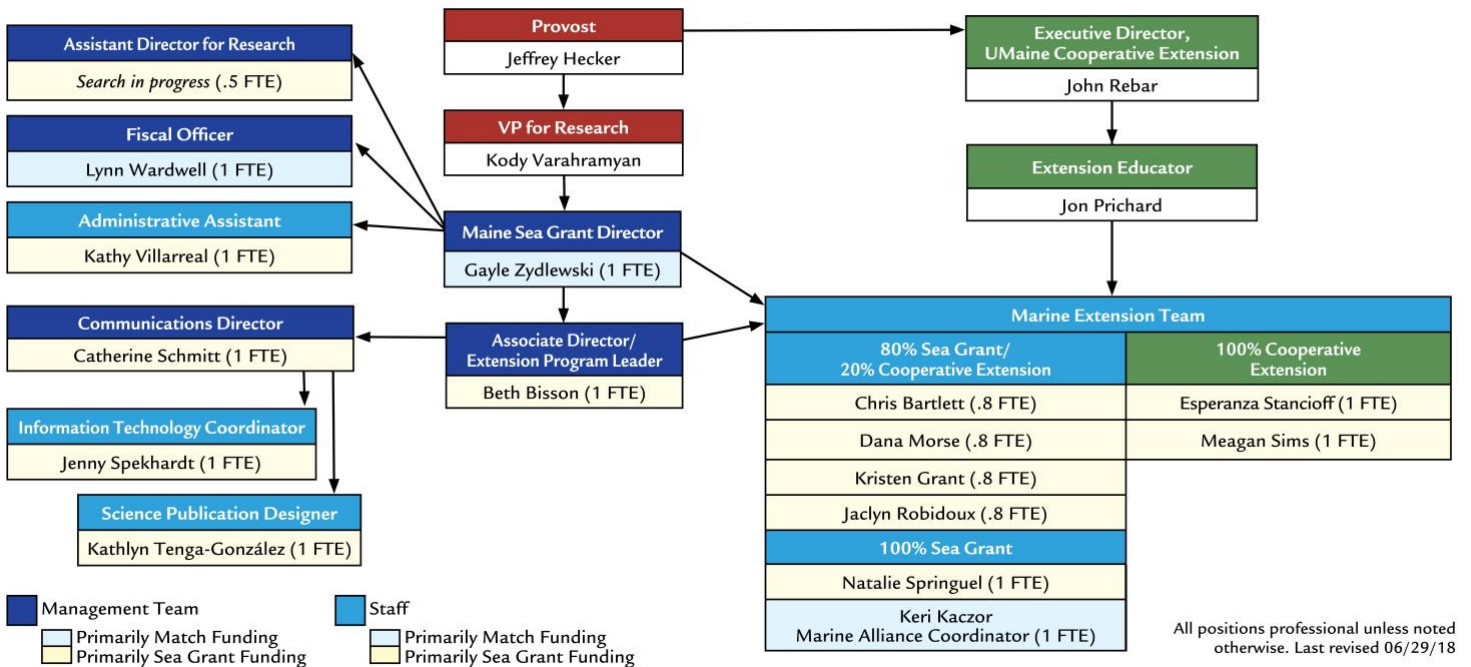
Our vision, from our current strategic plan, is a Maine where thriving coastal communities and ecosystems are supported by an engaged public and informed decision-makers.

STATUS OF STRATEGIC PLAN

Maine Sea Grant began its 2018-2021 strategic planning process in November 2015 and completed the plan in October 2016. The final plan, approved in April 2017 by the National Sea Grant Office and in alignment with the national NOAA Sea Grant plan, reflects our intent to advance our efforts to provide high quality, science-based information, outreach, education, and support needed by Maine's coastal communities as they face economic and environmental transitions of the near future.

ADMINISTRATION AND STAFFING STRUCTURE

Maine Sea Grant College Program at the University of Maine—Organization Chart



COMMUNITY ENGAGEMENT

Community engagement is a strength of Maine Sea Grant, as our mission is statewide and we support communities from Wells to Eastport via the Marine Extension Team. In 2017, Sea Grant staff and funded students and researchers presented, coordinated, funded, or assisted with

- 106 presentations to public audiences throughout Maine and beyond, attended by 10,362 people;
- 238 meetings, workshops, and events, attended by 54,463 people;
- 13 technical reports; and
- 46 outreach publications, including magazine and newspaper articles, posters, kiosk displays, podcasts, radio programs, webinars, brochures, websites, fact sheets, reports, and curricula. A complete listing is available in [Appendix A](#), and publications are archived at the [National Sea Grant Library](#) and Fogler Library Digital Commons. Media coverage can be found in [Appendix B](#).

In 2017, Maine Sea Grant staff worked with 125 partners throughout the State of Maine, the Northeast, and across the National Sea Grant Network, including 8 academic institutions beyond UMaine, 25 municipalities and local government organizations, 8 departments of Maine state government, and 8 federal agencies. We worked with more than 20 private business partners and 50 non-governmental organizations. Individually and collectively, these partnerships broaden, strengthen, and extend the reach and impact of Maine Sea Grant's research, outreach, education, and communications programming. See [Appendix C](#) for a list of partners.

ECONOMIC DEVELOPMENT

Maine Sea Grant activities generated an estimated \$5,937,375 in economic benefit to the state (based on Bureau of Labor standard metrics), including creation and retention of 125 businesses and 205 jobs and associated wages. These benefits were generated by multiple projects, e.g., by private foundation support to employees at two local businesses and businesses created and sustained as a result of Maine Sea Grant-coordinated Aquaculture in Shared Waters training programs. Further details are available upon request.

WORKFORCE DEVELOPMENT

Maine Sea Grant's workforce development opportunities are designed to help train and support a diverse workforce skilled in disciplines critical to the ecological health, economic vitality, and resilience of Maine's coastal communities and ocean-related resources. They include student fellowships and scholarships, research and program development funding criteria that favor meaningful involvement of K-16 and graduate students, coordination of workforce development initiatives of the Alliance for Maine's Marine Economy, and professional training for both students and adult professionals through Maine Sea Grant extension, education, and communications programs.

Aquaculture in Shared Waters, a Maine Sea Grant-coordinated program in partnership with Maine Aquaculture Association, Maine Aquaculture Innovation Center, and Coastal Enterprises Inc., provides comprehensive aquaculture training, technical and business support, and networking assistance to Maine fishermen as they seek to diversify their incomes.

The Sea Grant-UMaine Extension course, *Strengthening Your Facilitation Skills*, and a new Maine-New Hampshire Community Engagement Academy offer comprehensive group facilitation and community

engagement training for municipal officials, community leaders, and others who are helping their communities manage complex decision-making and planning processes.

Multi-sector workforce development needs assessment and planning was one of three areas of focus for the Alliance for Maine's Marine Economy in 2017, and will move into the implementation phase in 2018.

Maine Sea Grant recruits applicants for several NOAA and National Sea Grant fellowship programs each year. In 2017, Emily Chandler (2016 UMaine, M.S. in Earth and Climate Sciences), served her Knauss Fellowship position with the Office of the Oceanographer of the Navy, and we were honored to have three more University of Maine alumni selected for the National Sea Grant John D. Knauss Fellowship in Marine Policy, Class of 2018: Skylar Bayer (2017, Ph.D. in Marine Biology), Mattie Rodrigue (2017, Dual M.S. in Marine Science and Marine Policy), Kevin Staples (2017, Dual M.S. in Marine Science and Marine Policy).

ONE UNIVERSITY INITIATIVES

University of Maine Machias: Participation in Downeast Fisheries Partnership

University of Maine Machias: Signs of the Seasons Phenology Program

University of Maine Machias: Downeast Institute Board of Directors

University of Maine Machias: Undergraduate scholarship support

University of Maine Machias: EPSCoR SEANET aquaculture research in Cobscook Bay

University of Southern Maine: Undergraduate scholarship support

University of Southern Maine: EPSCoR SEANET aquaculture research in Cobscook Bay

FINANCIAL SUSTAINABILITY

Maine Sea Grant received a total of \$375,479 in MEIF funding in 2017. The following table details all other sources of competitive funding awarded to the program or leveraged from Maine Sea Grant awards (\$3,094,607), proposals submitted but not awarded (\$2,542,682), and proposals that were still pending at the close of this reporting period (\$369,000). Awarded funds include proposals for Maine Sea Grant staff applied research, extension, and outreach activities, research awards received and administered by program, and funding leveraged from prior Maine Sea Grant awards in 2017. The full list of leveraged awards is available upon request. Maine Sea Grant extension staff are engaged in multiple awards and are not always listed as PI or co-PI.

Proposal Title	PI or Co-PI	Requested	Funder	Status
2014-2018 Maine Sea Grant Omnibus - Year 4 award	Beth Bisson Maine Sea Grant	\$1,038,000	NOAA Sea Grant	Awarded
An integrative approach to addressing sea lice control in the commercial culture of Atlantic salmon	Heather Hamlin University of Maine	\$998,733	NOAA Sea Grant Aquaculture Initiative	Not Awarded
Sustainable post-harvest processing and value-addition of aquaculture seaweed	Balu Nayak University of Maine	\$908,015	NOAA Sea Grant Aquaculture Initiative	Awarded
Commercializing the aquaculture production of sea scallops through the Japanese method of ear-hanging	Dana Morse Maine Sea Grant UMaine Extension	\$879,021	NOAA Sea Grant Aquaculture Initiative	Not Awarded
2018 Sea Grant Knauss Fellowship (6 applications)	Beth Bisson Maine Sea Grant	\$369,000	NOAA Sea Grant	Pending
Assessing the capacity for sustainability of fishing-dependent communities in coastal Maine in the face of environmental and socioeconomic change	Heather Leslie University of Maine	\$275,301	NOAA Saltonstall-Kennedy	Awarded
Large-scale culture methods for blue mussel seed production in Maine and the Northeast: Experiment laboratory & field trials	Brian Beal Downeast Institute	\$249,238	NOAA Sea Grant Aquaculture Initiative	Awarded
2017 Sea Grant Knauss Fellowship (4 applications)	Beth Bisson Maine Sea Grant	\$226,000	NOAA Sea Grant	Awarded \$56,500
Ecology of toxic Pseudo-nitzschia blooms in coastal Maine: Implications for the coastal aquaculture industry	Peter Countway Bigelow Laboratory	\$149,988	NOAA Sea Grant Aquaculture Initiative	Not Awarded
Measuring change in chef perceptions of aquaculture	Barton Seaver For Cod and Country, LLC	\$149,755	NOAA Sea Grant Aquaculture Initiative	Not Awarded
Maine aquaculture apprentice program: A model for a national program	Sebastian Belle Maine Aquaculture Association	\$147,260	NOAA Sea Grant Aquaculture Initiative	Not Awarded
Mapping ocean stories: past, present, future	Natalie Springuel Maine Sea Grant	\$67,873	College of the Atlantic Fund for Maine Islands	Awarded
National Sea Grant Resilience Planning Initiative (Network Visioning)	Beth Bisson Maine Sea Grant	\$29,999	NOAA Sea Grant	Awarded
NOAA Penobscot Habitat Focus Area Outreach and Communication Year 3	Catherine Schmitt Maine Sea Grant	\$29,827	The Nature Conservancy NOAA	Awarded
FRAMES for Fisheries: Developing a science communication mentorship program for climate change news	Catherine Schmitt Maine Sea Grant	\$29,524	National Academy of Sciences	Not Awarded

Proposal Title	PI or Co-PI	Requested	Funder	Status
Working Local, Acting Regional: An approach to implementing climate change solutions in Midcoast Maine	Kristen Grant Maine Sea Grant UMaine Extension	\$18,901	WNERR, NEER Science Collaborative	Not Awarded
Leveraged Grants 2017	Multiple	\$439,854	Multiple	Awarded

INTELLECTUAL PROPERTY GENERATION

N/A

REVENUE GENERATED

Beach Profile Monitoring	\$ 9,600.00
Contributions toward Beaches Conference:	\$ 12,200.00
Registration income for Maine Beaches Conference	\$ 6,500.00
Royalties Income	\$ 178.43
Total	\$ 28,478.43

PRIVATE GIVING/ALUMNI CULTIVATION

N/A

INITIATIVES TO INCREASE FISCAL EFFICIENCY

In 2017, due to an expanding portfolio of Sea Grant awards and extramural grants, Maine Sea Grant reclassified an administrative assistant position to an administrative specialist for responsibilities associated with accounts payable/receivable, Concur and P-card expenses and other post-award accounting. This has allowed the program to create additional flexibility and capacity for fiscal management while retaining our existing staffing structure.

CULTURE OF EXCELLENCE

FACULTY MENTORING AND PROFESSIONAL DEVELOPMENT

Although Sea Grant is not an academic department or center with faculty, the staff are all professional employees of the University and continually work to stay up to date on the latest research and practice in the fields of outreach, education, communication, and their specialty scientific areas.

Each year during annual performance evaluation meetings, Sea Grant staff identify individual and team professional development opportunities, based on their planned activities for the next year. Every staff member is encouraged to engage in at least one such activity per year. For example, in 2017, Kristen Grant used a sabbatical leave to study stakeholder engagement in planning for flood defense in the Netherlands and New England. Catherine Schmitt attended the Association of Writers & Writing Programs annual meeting and the World Conference of Science Journalists, including a working session with public information officers from scientific organizations across the country.

EXAMPLES OF OUTSTANDING MENTORING INITIATIVES

Science communications assistant Aliya Uteuova, a senior undergraduate journalism and political science major, began her position at the Darling Marine Center in summer 2017 and continued with Maine Sea Grant for the 2017-18 school year. The position, mentored by Sea Grant communications director, Catherine Schmitt, offered the opportunity to interact with journalists and editors at newspapers and magazines, participate in weekly UMaine news meetings, and publish articles.

FACULTY ACHIEVEMENTS

Achievements by Sea Grant staff and funded community partners in 2017:

Paul Anderson, Sea Grant Directors' Award, Sea Grant Association

Bailey Bowden, 2016 Longard Award from Gulf of Maine Council on the Marine Environment

Sara Rademaker, Peoples' Choice Award, Fish 2.0

Sara Rademaker, 2017 Gotham Savings Bank Launch Pad Emerging Idea Award

Marissa McMahan, John Annala Fishery Leadership Award

Glen Melvin and the Medomak Taskforce, Outstanding Contribution by an External Partner to Sustainability Research, George Mitchell Center at the University of Maine

Esperanza Stancioff, Promotion to Full Professor

RESEARCH AND SCHOLARSHIP SUMMARY

Sea Grant-funded researchers and staff authored 13 peer-reviewed publications and gave 66 scholarly presentations in 2017. A complete listing can be found in [Appendix A](#).

Catherine Schmitt serves as Managing Editor of *The Catch: Writings from Downeast Maine*; Natalie Springuel is on the Editorial Board. Catherine Schmitt is on the Editorial Board of *Chebacco: Magazine of the Mount Desert Island Historical Society*.

CURRICULAR INNOVATIONS IN PARTNERSHIP WITH ACADEMIC UNITS

Maine Sea Grant provided funding to Gene Felice in the Coaction Lab at the University of Maine for Oceanic Scales, a mobile application game system and associated lesson plans for elementary and middle school students about phytoplankton. Part art exhibit, part game, Oceanic Scales uses interactive experience to show users how climate factors affect phytoplankton.

In 2017, Maine Sea Grant formed a new, privately funded partnership with College of the Atlantic and Island Institute to support Mapping Ocean Stories, which combines oral history with geo-referenced mapping in order to build both individual accounts and a collective picture of how fishermen and community members live, work, and access the water. Documenting and aggregating these stories transforms individual anecdotes into a body of knowledge that provides fine-grained insights into regulatory actions or environmental changes. Collecting and sharing stories instills a strong sense of community that fosters resilience to change. Extension professional Natalie Springuel leads Maine Sea Grant in this partnership, and she co-teaches a new course of the same name at COA. The first Mapping Ocean Stories class had students conducting interviews with more than 30 people in three communities, and presenting their work to the Northeast Regional Planning Body. The partnership led to interview and story mapping projects with the Independent Maine Marine Worm Harvesters Association and Acadia National Park, the Maine Fishermen's Forum, and the National Working Waterfront Network.

STUDENT ENGAGEMENT, STUDENT SUCCESS

STUDENT RESEARCH, SCHOLARSHIP OR CREATIVE ACTIVITIES

Maine Sea Grant supported a total of 71 students in 2017, through scholarships, graduate fellowships, program development awards, research assistantships, and internships, as well as through engagement in Marine Extension Team research and outreach initiatives. These include 21 graduate students, all from UMaine, and 50 undergraduate students, 21 from UMaine, and 3 from UMaine Machias.

A total of 19 Maine Sea Grant-supported students received degrees in 2017 (12 undergraduates and 7 graduate students), 14 from UMaine. Of the 27 students who received Sea Grant-supported degrees in 2015 and 2016, 22 accepted professional or academic positions in their chosen fields within two years, a performance metric that National Sea Grant tracks as an indicator of workforce development success.

Out of a total of 107 conference and workshop presentations given on Sea Grant-supported research projects and outreach initiatives in 2017, 22 were given by Sea Grant students, who reached a total of 3,340 conference and workshop participants.

See [Appendix D](#) for a full list of 2017 Sea Grant-supported students and recent alumni.

AWARDS TO SEA GRANT-SUPPORTED STUDENTS

Jie Cao, UMaine, Best Reviewer, *Canadian Journal of Fisheries and Aquatic Sciences*

Jacque Miller, UMaine, Richard Hay Award, Archaeological Geology Division, Geological Society of America

Kisei Tanaka, UMaine, College of Natural Sciences, Forestry and Agriculture Graduate Research Award

Catherine Thompson, UMaine, Best Poster MAFES award at the student showcase

Aliya Uteuova, UMaine, Dorothy Clarke Wilson Peace Writing Prize

Dongmei Xie, UMaine, Michael J. Eckardt Dissertation Fellowship Award

MAINE SEA GRANT AWARDS

2017 Maine Sea Grant Scholar Award Parker Gasset, UMaine (1-year graduate fellowship)

2016-2017 Maine Sea Grant Undergraduate Scholarship

Rose Edwards (UMaine), Aisling Farragher-Gemma (UMaine), Beretta Ficek (MMA), Emma Kimball (COA), Chelsey Mitchell (UMaine), Gillian O'Neal (MMA), Sophia Prisco (COA), Melissa Rosa (UNE), Grace Shears (COA), Olivia Streit (UMM)

2017-2018 Maine Sea Grant Undergraduate Scholarship

Brittany Bills (UMM), Rachel Borisko (MMA), Andrew Davidsohn (UNE), Michelle Dufault (UNE), Mimi Edmondson (UMaine), Laura Paye (UMaine), Ashley Sarra (UMaine), Jessica Stumper (UNE), Kaitlyn Clark (COA)

NOAA National Sea Grant, Knauss Marine Policy Fellowship

Emily Chandler, '16 UMaine (Awarded in 2016, Served in 2017)

Skylar Bayer, '17 UMaine (Awarded in 2017, Serving in 2018)

Mattie Rodrigue, '17 UMaine (Awarded in 2017, Serving in 2018)

Kevin Staples, '17 UMaine (Awarded in 2017, Serving in 2018)

SUMMARY OF ANTICIPATED CHALLENGES

Coastal communities need support as they contend with the acute impacts of a changing environment and coastal demographics, which create challenges and opportunities for resource-dependent commercial harvests, aquaculture and recreation activities, and the broader economy and culture of Maine. Maine Sea Grant's primary challenge in this is to continue to be a valued and trusted source of information and assistance as we serve communities with limited staff capacity (including the loss of a research coordinator position). We have to remain flexible yet strategic, with forward-thinking and targeted research, outreach, and communications initiatives based on the strengths of our small and skilled team of professionals and funded faculty, and the strength of national Sea Grant's integrated research-to-outreach model.

These challenges with our capacity to serve the needs of coastal communities are further stressed by the Trump Administration's proposed elimination of the National Sea Grant College Program in the Fiscal Year 2019 federal budget. Advocacy efforts, led by the national Sea Grant Association and amplified by the voices of hundreds of our constituents and partners, successfully restored funding for FY2017 and FY2018, and have continued for FY2019. Due to Sea Grant's demonstrable positive impacts and outcomes in Maine and across the country, bipartisan Congressional support for Sea Grant is strong and widespread.

Maine Sea Grant is coming to the end of a transition in leadership, which began with Paul Anderson's departure in August 2017, and concluded with Gayle Zydlewski's appointment as the new director, with a start date of July 1, 2018. After nearly a yearlong transition, with Beth Bisson serving as interim director, we are eager to re-envision our leadership structure, capacity, and opportunities for growth under Gayle's leadership. This is a crucial time for the program to evaluate organization structure, procedure, and direction, while staying engaged with our statewide partners to address the concerns of coastal communities. In this period of transition, and because of recurring funding uncertainties, it is more important than ever that we maintain and enhance the level of excellence we have achieved over our 40-plus years serving Maine.

APPENDIX A: SEA GRANT COMMUNICATIONS & OUTREACH 2017

PEER-REVIEWED JOURNAL ARTICLES (13)

Brawley, S.H., et al. 2017. Insights into the red algae and eukaryotic evolution from the genome of *Porphyra umbilicalis* (Bangiophyceae, Rhodophyta). *Proceedings of the National Academy of Sciences* 114(31):E6361-E6370, doi: 10.1073/pnas.1703088114

Cao, J., J. Thorson, R.A. Richards, and Y. Chen. 2017. Spatio-temporal index standardization improves the stock assessment of northern shrimp in the Gulf of Maine. *Canadian Journal of Fisheries and Aquatic Sciences* 74(11):1781-1793, dx.doi.org/10.1139/cjfas-2016-0137

Cao, J., Y. Chen., and R.A. Richards. 2017. Improving assessment of *Pandalus* stocks using a seasonal, size-structured assessment model with environmental variables: Part II: Model evaluation and simulation. *Canadian Journal of Fisheries and Aquatic Sciences* 74:363-376, dx.doi.org/10.1139/cjfas-2016-0021

Cao, J., Y. Chen., R.A. Richards. 2017. Improving assessment of *Pandalus* stocks using a seasonal, size-structured assessment model with environmental variables: Part I: Model development and application. *Canadian Journal of Fisheries and Aquatic Sciences* 74(3):349-362, dx.doi.org/10.1139/cjfas-2016-0020

Frederick, C., D. Brady, and I. Bricknell. 2017. Landing Strips: Model development for estimating body surface area of farmed Atlantic salmon (*Salmo salar*), *L. Aquaculture* 473:299-302.

Jiang, X., Q. Zou, and J. Song. 2017. Peak dynamic pressure on semi- and quarter-circular breakwaters under wave troughs. *China Ocean Engineering* 31(2):151-159, 10.1007/s13344-017-0018-1

Madeiras, I.D., A.C. Mathieson, and N. Rajakaruna. 2017. Heavy metals in seaweeds from a polluted estuary in coastal Maine. *Rhodora* 119(979):201-211, bioone.org/doi/full/10.3119/16-25

Peng, Z., Q.-P. Zou, and P. Lin. 2017. A partial cell technique for predicting the morphological change and scour. *Coastal Engineering* 131:88-105.

Snyder, J., E. Boss, R. Weatherbee, A.C. Thomas, D. Brady, and C. Newell. 2017. Oyster aquaculture site selection using Landsat 8-derived sea surface temperature, turbidity, and chlorophyll a. *Frontiers in Marine Science* 4:190, 10.3389/fmars.2017.00190

Stancioff, E., B. Bisson, S. Randall, J. Muhlin, C. McDonough, and S. Gallo. 2017. Signs of the Seasons: A New England Phenology Program. *Maine Policy Review* 26(2):19-26, digitalcommons.library.umaine.edu/mpr/vol26/iss2/5

Tanaka, K.R., S.L. Belknap, J.J. Homola and Y. Chen. 2017. A statistical model for monitoring shell disease in inshore lobster fisheries: A case study in Long Island Sound. *PLoS ONE*, 12(2): e0172123.

Viehman, H.A., and G.B. Zydlewski. 2017. Multi-scale temporal patterns in fish presence in a high-velocity tidal channel. *PLoS ONE* 12(5): e0176405, doi.org/10.1371/journal.pone.0176405

Xie, D., and Q. Zou. 2017. Effect of wave-current interaction on waves and circulation over Georges Bank during storm events. *Coastal Engineering Proceeding* 1-9.

TECHNICAL REPORTS (13)

Bartlett, C., editor. 2017. Maine Infectious Salmon Anemia Virus Control Program Standards. Eastport, ME: Maine Sea Grant and University of Maine Cooperative Extension.

DeFranco, E. 2017. Best Practices for Healthy Beaches and Watersheds in Maine: Potential Bioremediation Strategies for Improving Water Quality. Orono, ME: University of Maine.

Johnson, C. 2017. Report on American eel (*Anguilla rostrata*) mark recapture study: Year 1. Passamaquoddy Tribe: Sipayik Environmental Department.

Kaczor, K., and M. Sims. May 2017. Maine Healthy Beaches Program Excerpts from Data Analysis, 2006-2015. Waldoboro, ME: University of Maine Cooperative Extension and Maine Sea Grant.

Kaczor, K., and M. Sims. July 2017. Maine Healthy Beaches Program 2016 Annual Report to U.S. EPA. Waldoboro, ME: University of Maine Cooperative Extension and Maine Sea Grant.

Sims, M., and K. Kaczor. 2017. 2016 Goosefare Brook MST Summary and Next Steps. Waldoboro, ME: University of Maine Cooperative Extension and Maine Sea Grant.

Sims, M., and K. Kaczor. July 2017. Summary Report of Enhanced Monitoring and Pollution Source Tracking Efforts in

Goosefare Brook, Maine, 2012-2016. Waldoboro, ME: University of Maine Cooperative Extension and Maine Sea Grant.

Sims, M., and K. Kaczor. July 2017. Summary Report of Enhanced Monitoring and Pollution Source Tracking Efforts in the Willard Beach Watershed, Maine, 2012-2016. Waldoboro, ME: University of Maine Cooperative Extension and Maine Sea Grant.

Slovinsky, P.A., S.M. Dickson, and D.B. Cavagnaro. 2017. The State of Maine's Beaches in 2017. Open-File 17-14. Augusta, ME: Maine Geological Survey Department of Agriculture, Conservation and Forestry.

Stokesbury, K., J. Parsons, and S. Shumway. 21st Annual Pectinid Workshop Abstracts and Program. Portland, ME.

Taylor, A., and A. Farrell. 2017. Jordan River Monitoring Report. Bar Harbor, ME: Community Environmental Health Laboratory at the MDI Biological Laboratory.

Wahle, R., and J. Carloni. American Lobster Settlement Index Update 2016. Orono, ME: University of Maine.

Wahle, R., and K. Lavalli, eds. The 11th International Conference and Workshop on Lobster Biology and Management. Orono, ME: University of Maine.

OUTREACH PUBLICATIONS (46)

- Bernier, M. Penobscot River Habitat Focus Area 2016 Annual Report. Orono, ME: NOAA Fisheries.
- Brunswick High School. Clamming in Maine (poster). Orono, ME: Maine Sea Grant College Program.
- Experience Maritime Maine. Salts and Water, Stories of the Maine Coast: A Podcast Series. experiencemaritimemaine.org/salts-water-podcast-series/
- Gallo, S., E. Stancioff, B. Bisson, and S. Randall. The State of Maine's Loons. Recorded July 13, 2017, Orono, ME: University of Maine Cooperative Extension. extension.umaine.edu/signs-of-the-seasons/training/
- McDonough-MacKenzie, C., E. Stancioff, B. Bisson, and S. Randall. Uncovering the past through Maine's historic phenology data. Recorded August 4, 2017, Orono, ME: University of Maine Cooperative Extension. extension.umaine.edu/signs-of-the-seasons/training/
- Maine Healthy Beaches Program. Healthy boating equals healthy beaches. Orono, Maine: Maine Sea Grant College Program.
- Maine Healthy Beaches Program. Contamination Advisory (signage). Orono, ME: University of Maine Cooperative Extension, University of Maine School of Economics, and Maine Sea Grant.
- Maine Healthy Beaches Program. 2017. What to do with doo (brochure). University of Maine Cooperative Extension, Waldoboro, ME.
- Maine Sea Grant. 2017. seagrant.umaine.edu. Orono, ME: Maine Sea Grant College Program at the University of Maine.
- Maine Sea Grant. 2017. The Catch: Writings from Downeast Maine, Volume V. Orono, Maine: University of Maine Fogler Library. catchjournal.org
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- Maine Sea Grant. 2017. Downeast Fisheries Trail Five-Year Report. Orono, ME.
- Maine Sea Grant. 2017. Maine Sea Grant College Program Annual Report 2016-2017. Orono, ME.
- Maine Sea Grant. 2017. The Beaches Conference (program + website). Orono, ME.
- Maine Sea Grant. 2017. Oyster Trail of Maine (map brochure + web content). Orono, ME: Maine Sea Grant College Program. oystertrailmaine.org
- Maine Sea Grant. 2017. All About Maine Oysters. Orono, ME: Maine Sea Grant College Program.
- Maine Sea Grant. 2018. Sea-run fishes of Maine (poster). Orono, ME: Maine Sea Grant College Program, NOAA Fisheries, and The Nature Conservancy.
- Morse, D. Japan visit offers new view of scallop aquaculture. *Fishermen's Voice*, March 2017, pp. 10-11.
- Muhlin, J., E. Stancioff, B. Bisson, and S. Randall. 2017 Signs of the Seasons Coastal Research Update. Recorded, June 20, 2017, Orono, ME: University of Maine Cooperative Extension. extension.umaine.edu/signs-of-the-seasons/training/
- Schmitt, C. 2017. Arctic warming and Maine. *Maine Boats, Homes & Harbors* 145:64-68. maineboats.com/print/issue-145/arctic-warming-and-maine
- Schmitt, C. New model accounts for Northern shrimp's sensitivity to temperature. *Fishermen's Voice*, March 2017.
- Schmitt, C. Estuary Beat: Cleaning the Medomak, a beach conference, and fish passage in the Bagaduce. *The Working Waterfront*, 19 June 2017.
- Schmitt, C. Estuary Beat: Casco Bay and oil, hydro-acoustic in PenBay. *The Working Waterfront*, 17 July 2017.
- Schmitt, C. Estuary Beat: Storm surge, stripers, and the oyster trail. *The Working Waterfront*, 21 August 2017.
- Schmitt, C. Estuary Beat: St. George clam flats, Saco River islands, and sturgeon. *The Working Waterfront*, 2 October 2017.
- Schmitt, C. Estuary Beat: Red tide, Downeast river quality, and alewives. *The Working Waterfront*, 1 November 2017.
- Schmitt, C. Estuary Beat: Fish on the York River, saving Morse River watershed, and Portland's Presumpscot. *The Working Waterfront*, 17 November 2017.
- Schmitt, C. 2017. Rising seas at Acadia: implications and strategies for a changing landscape. *Friends of Acadia Journal*, Summer.
- Schmitt, C. 2017. Why we love the ocean. *Maine Boats, Homes & Harbors* 148:36-41, September/October. maineboats.com/print/issue-148/why-we-love-ocean
- Springuel, N., P. Anderson, and C. Schmitt. Coastal Conversations public affairs radio programs. WERU.org. 2017 Archives for Coastal Conversations. East Orland, Maine. archives.weru.org/category/coastal-conversations/seagrant.umaine.edu/coastalconversations
- January 22, 2018: Biotoxins and Red Tide, From Marine Ecology to Public Health (N. Springuel)
- December 22, 2017: The World of the Maine Oyster (C. Schmitt)
- November 24, 2017: Whale Mortalities in the Northwest Atlantic (N. Springuel)
- October 27, 2017: Transportation and Congestion in Acadia National Park (N. Springuel)
- September 22, 2017: Salts & Water, Stories from the Maine Coast (N. Springuel)
- August 25, 2017: Fisheries History at Penobscot Marine Museum (N. Springuel)
- July 28, 2017: The Beaches Conference (N. Springuel)
- June 23, 2017: Alewife Restoration & Monitoring (N. Springuel)
- May 26, 2017: Downeast Fisheries Partnership (N. Springuel)
- April 28, 2017: Sea kayaking safety and stewardship (N. Springuel)
- March 24, 2017: What is the Sustainable Ecological Aquaculture Network? (P. Anderson)
- February 24, 2017: Maine's salt marshes (C. Schmitt)

OUTREACH PUBLICATIONS *continued*

Oceanic Scales. 2017. **Oceanic Scales Lesson Plan #1: The Invisible World of Plankton**. Orono, ME: Coaction Laboratory, University of Maine and Santa Cruz, CA: Open Laboratory, University of California Santa Cruz.

Oceanic Scales. 2017. **Oceanic Scales Lesson Plan #2: Phytoplankton Cards**. Orono, ME: Coaction Laboratory, University of Maine and Santa Cruz, CA: Open Laboratory, University of California Santa Cruz.

Oceanic Scales. 2017. **Oceanic Scales Lesson Plan #3: Microplastic Solutions**. Orono, ME: Coaction Laboratory, University of Maine and Santa Cruz, CA: Open Laboratory, University of California Santa Cruz.

Oceanic Scales. 2017. **Oceanic Scales Lesson Plan #4: The Power of Recycling Graph**. Orono, ME: Coaction Laboratory, University of Maine and Santa Cruz, CA: Open Laboratory, University of California Santa Cruz.

Oceanic Scales. 2017. **Oceanic Scales Lesson Plan #5: Understanding the Nutrient Cycle**. Orono, ME: Coaction Laboratory, University of Maine and Santa Cruz, CA: Open Laboratory, University of California Santa Cruz.

PRESENTATIONS (106; 10,362 people attending)

Anderson, P. The Future of Maine's Fisheries (panel). Natural Resources Council of Maine, 29 June 2017, Portland, ME. (100 est.)

Bartlett, C. River herring biology, ecology and management. Pembroke Elementary School, 23 May 2017, Pembroke, ME. (38)

Bartlett, C. River herring biology, ecology and management. Shead High School, 31 May 2017, Eastport, ME. (13)

Bartlett, C. Engaging partners to build an ecosystem-level understanding of Cobscook Bay and Western Passage, 20 October 2017, Eastport, ME. (15)

Bartlett, C. Winter seabirds of Passamaquoddy Bay. Eastport Arts Center, 28 January 2018, Eastport, ME. (45)

Bayer, S.R., P.D. Countway, and R.A. Wahle. Developing a genetic toolkit to detect and quantify sea scallop spawning events. International Pectinid Meeting and Workshop, 24 April 2017, Portland, ME. (75)

Beal, B.F., C. Jourdet, K. Pepperman, S. Shumway, and C. Davis. Growth and survival of cultured juveniles of the Arctic surfclam, *Macrumeris polynyma*: Intertidal field experiments in eastern Maine. National Shellfisheries Association Annual Meeting, 15 March 2017, Knoxville, TN. (40)

Boenish, R. Dynamics of effective effort in a dynamic trap fishery: Maine American lobster (*Homarus americanus*). University of Maine Research Symposium, April 2017, Bangor, ME. (200)

Boenish, R., and Y. Chen. A quasi-stationary approach to estimating effective effort in the Maine American Lobster (*Homarus americanus*) fishery. 11th International Conference and Workshop on Lobster Biology and Management, 4-9 June 2017, Portland, ME. (50)

Cannon, J.W. Coastal flooding in Maine. Island Institute Sea Level Rise/Coastal Flooding Symposium, 27 November 2017, Portland, ME. (150)

Cannon, J.W. Wave run-up and coastal flooding. Gulf of Maine Research Institute, 11 June 2017, Portland, ME. (35)

Cannon, J.W. Storm surge verification. Wells National Reserve Summer Lunch and Learn Series, 25 June 2017, Wells, ME. (35)

Cannon, J.W. Coastal flooding forecasting techniques. Biddeford City Hall Commerce Meeting, 4 October 2017, Biddeford, ME. (25)

Cannon, J.W. Island Institute and Weather Blur Education Meeting, 10 October 2017, Gray, ME. (5)

Cannon, J.W. Marine hazards. New Hampshire Roundtable, Urban Forestry Center, 6 September 2017, Portsmouth, NH. (30)

Cao, J., and Y. Chen. Spatial and interannual variability in northern shrimp (*Pandalus borealis*) distribution in the Gulf of Maine: implications for stock assessment and management. Canadian Conference for Fisheries Research, 6 January 2017, Montreal, Canada. (50 est.)

Farr, E., and J.S. Stoll. How fishers understand marine ecosystems in eastern Maine. Regional Association for Research in the Gulf of Maine Annual Conference, 12 October 2017, Portland, ME. (150)

Frederick, C. A sentinel exploration of sea louse infestations in Cobscook bay, Maine. Maine Aquaculture R&D Education Summit, 6 March 2017, Belfast ME. (50)

Goldstein, J. A fishery in flux: Claw removal and its impacts on survivorship, behavior, and physiological stress in the Jonah crab (*Cancer borealis*). Society for Integrative and Comparative Biology, 4-8 January 2017, New Orleans, LA. (50)

Goldstein, J. Jonah crab: An emerging fishery in a changing climate. UNH Marine Docents, 11 July 2017, Rye, NH. (30)

Goldstein, J. A fishery in flux: Claw removal and its impacts on survivorship, behavior, and physiological stress in the Jonah crab (*Cancer borealis*). Isles of Shoals Marine Laboratory, 13 August 2017, Kittery, ME. (12)

Grant, K. Working waterfront economy. Coastal Erosion Conference, 27 April 2017, Hampton Beach, NH. (54)

Grant, K. The myth of dry feet. The Beaches Conference, 14 July 2017, Wells, ME. (23)

Grant, K. The myth of dry feet. Wells National Estuarine Research Reserve, 11 April 2017, Wells, ME. (19)

Grant, K. The myth of dry feet. Marine Extension Team, 12 June 2017, Walpole, ME. (15)

Grant, K. The myth of dry feet. CAW. 26 October 2017, Portsmouth, NH. (14)

Grant, K. The myth of dry feet. Climate Change Adaptation Providers Network, 1 November 2017, Wells, ME. (7)

Grant, K. Southern Maine Beach Profile Monitoring Program. Wells High School, 26 October 2017, Wells, ME. (4)

PRESENTATIONS *continued*

- Grant, K. Southern Maine Beach Profile Monitoring Program. Wells-Ogunquit Adult Community Education, 13 September 2017, Wells, ME. (4)
- Grant, K. Southern Maine Beach Profile Monitoring Program. Kennebunk Environmental Action Alliance, 19 June 2017, Wells, ME. (6)
- Grant, K. Southern Maine Beach Profile Monitoring Program. Wells-Ogunquit Adult Community Education, 9 March 2017, Wells, ME. (5)
- Hillyer, G., D. Brady, B. McGreavy, B. Beal, K. Evans, and G. Melvin. Participatory modeling of tidal circulation to understand water quality issues and improve shellfish harvesting on a Maine mudflat. Coastal Estuarine Research Federation, 5 November 2017. (1,500)
- Hillyer, G., D. Brady, B. McGreavy, G. Melvin, B. Beal, and K. Evans. Participatory modeling to improve shellfish harvesting in Waldoboro, Maine. Waldoboro Town Selectmen, 23 May 2017. (20)
- Hillyer, G., D. Brady, B. McGreavy, G. Melvin, B. Beal, and K. Evans. Participatory modeling to improve shellfish harvesting in Waldoboro, Maine. Medomak Taskforce, 5 Dec 2017. (15)
- Kelley, A.R., A. Spiess, J.T. Kelley, and J. Miller, Cultural (geological) resource heritage: it's not just archaeology anymore! Geological Society of America Annual Meeting, 20 March 2017, Seattle, WA. (55)
- Kelley, A.R. Lost to the sea: Maine's ancient cultural and environmental heritage. Medomak Land Trust, 17 December 2017, Waldoboro, ME. (30)
- Kelley, A.R. Burning Libraries: Environmental impacts on heritage and science (panel). Society for American Archaeology Annual Meeting, 31 March 2017, Vancouver BC, Canada. (75)
- Kelley, A.R. Lost to the sea: Maine's ancient cultural and environmental heritage. The Beaches Conference, 14 July 2017, Wells, ME. (150)
- Kelley, A.R. Lost to the sea: Maine's ancient coastal heritage. 18-19 August 2017, Walpole, ME. (25)
- Lasley-Rasher, R., J. Stevens, K. Wilson, and D. Brady. The estuarine transition zone as a dynamic habitat for anadromous fishes in the Penobscot Estuary. Coastal and Estuarine Research Federation, November 2017, Providence, RI. (50)
- Leeman, C., W. Gray, and D. Brady. What can we learn? Comparing the Presumpscot River's nitrogen load to Chesapeake Bay's Patuxent River, SEA Fellows Summer Science Symposium, 16 August 2017, Walpole, ME. (60)
- Li, B. Geographically varied relationships between American lobster and climate variables in the Gulf of Maine. 11th International Conference and Workshop on Lobster Biology and Management, 4-9 June 2017, Portland, ME. (50)
- Maxwell, E., and T.R. Johnson. Examining fisheries co-management across Maine's geographic and cultural contexts: Maine's soft-shell clam fishery. University of Maine Student Symposium, 24 April 2017, Bangor, ME. (20)
- Maxwell, E. Small-scale fisheries management. SMS321 - Fisheries Science, 25 April 2017, Orono, ME. (40)
- Mazur, M., B. Li, J.H. Chang, and Y. Chen. Using an individual-based model to evaluate effectiveness of Maine lobster fishery management. American Fisheries Society, August 2017, Tampa, FL. (50)
- Mazur, M., B. Li, J.H. Chang, Y. Chen, and T. Johnson. Evaluating the V-Notching conservation measure in the Maine lobster fishery. 11th International Conference & Workshop on Lobster Biology & Management, June 2017. (500)
- Mazur, M. et al. R Workshop. Maine DMR, April 2017, Hallowell, ME. (15)
- McMahan, M.D. Investigating a green crab fishery in Maine. West Bath Elementary School, 25 April 2017, West Bath, ME. (22)
- McMahan, M.D. Investigating a green crab fishery in Maine. Georgetown Elementary School, 4 May 2017, Georgetown, ME. (10)
- McMahan, M.D. From soft-shell clams to soft-shell crabs: Exploring solutions for adapting to a warming Gulf of Maine. Georgetown Historical Society, 19 August 2017, Georgetown, ME. (50)
- Miller, J., A.R. Kelley, J.T. Kelley, D. Belknap, and A. Spiess. Making rapid cultural resource management decisions using ground-penetrating radar. Geological Society of America Annual Meeting, 10 March 2017, Seattle, WA. (55)
- Morse, D. Update on scallop farming in Maine. Maine Fishermens Forum, 4 March 2017, Rockport, ME. (65)
- Morse, D. Scallop farming. Maine Fishermen's Forum, 4 March 2017, Rockport, ME. (55)
- Morse, D. Scallop farming in Maine. Aquaculture R+D Forum, 6 March 2017, Belfast, ME. (140)
- Morse, D. Aquaculture training in Maine. Aquaculture R+D Forum, 6 March 2017, Belfast, ME. (140)
- Morse, D. A bit of history and an update on scallop farming in Maine. National Shellfisheries Association, 28 March 2017, Knoxville, TN. (45)
- Morse, D. Scallop farming in Maine. International Pectinid Workshop, 19-25 April 2017, Portland, ME. (125)
- Morse, D., and H. Cowperthwaite. Scallop farming. Aquaculture in Shared Waters, April 2017, Ellsworth, ME. (20)
- Morse, D. Some who, what, why, when, where and how about shellfish farming in Maine. Penobscot Bay Stewards Program, May 2017, Belfast, ME. (30)
- Morse, D. An update on shellfish farming in the New Meadows River. Friends of Casco Bay, 13 June 2017, Brunswick, ME. (10)
- Morse, D., and C. Schmitt. Maine Sea Grant Oyster Aquaculture Materials, Damariscotta River Celebration, 24 June 2017, Damariscotta, ME. (100)
- Morse, D. Scallop farming in Maine: history and current activities. Darling Marine Center, Walpole, ME. (45)
- Morse, D. Shellfish aquaculture overview. Waynflete School, 12 July 2017, Walpole, ME. (20)

PRESENTATIONS *continued*

- Morse, D. Fishing (and farming) scallops in Maine. Chebeague Island Aquaculture Festival, 30 July 2017, Chebeague Island, ME. (30)
- Morse, D. Overview of marine aquaculture in Maine. Camden Yacht Club Sunset Seminar Series, 23 August 2017, Camden, ME. (40)
- Morse, D., C. Schmitt, and M. Britsch. Shellfish farming in Maine. Pemaquid Oyster Festival, 24 September 2017, Damariscotta, ME. (1,500)
- Morse, D. Overview of marine aquaculture in Maine. Merryspring Nature Center, 10 October 2017, Camden, ME. (20)
- Morse, D. A little report on shellfish and biotoxins from the other end of Route 1. Red Tide Stinks Workshop, 7 November 2017, Tampa, FL. (55)
- Morse, D. Maine aquaculture bootcamp. Sustainable Ecological Aquaculture Network (SEANET), 17 November 2017, Walpole, ME. (15)
- Morse, D. Shellfish aquaculture in Maine. The Lincoln Home, 28 November 2017, Damariscotta, ME. (20)
- Morse, D. Some whowhatwhenwherehowwhy of Maine shellfish aquaculture. Bath Middle School, 14 December 2017, Bath, ME. (150)
- Runnebaum, J. Improving management and conservation of cusk (*Brosme brosme*): habitat distribution, bycatch interactions, and conservation practices. University of Maine, 17 July 2017, Orono, ME. (50 est.)
- Schmitt, C. Beyond words: communicating science in pictures and numbers. Gulf of Mexico Oil Spill Ecosystem Science Symposium (pre-conference workshop), 5 February 2017, New Orleans, LA. (10)
- Schmitt, C. Atlantic salmon. SMS History, Management and Ecology of Fisheries in the Gulf of Maine, 22 February 2017, Orono, ME. (10)
- Schmitt, C. Communicating science to public audiences. SMS 598 Environmental Toxicology, 22 February 2017, Orono, ME. (10)
- Schmitt, C. Maine Sea Grant display at Maine Water Conference, 30 March 2017, Augusta, ME. (200)
- Schmitt, C. Science in Acadia National Park: Early history and its role in conservation. Road Scholars, 25 April 2017, Bar Harbor, ME. (25)
- Schmitt, C. The Atlantic salmon: fit for a president. Penobscot Bay Stewards, 11 May 2017, Rockland, ME. (40)
- Schmitt, C. History and politics of Atlantic salmon in the Penobscot River. International Appalachian Trail Maine Chapter, 18 May 2017, Shin Pond, ME. (20)
- Schmitt, C. A history of Atlantic salmon, dams, and the Penobscot River. Penobscot Marine Museum, 1 June 2017, Searsport, ME. (20)
- Schmitt, C. How to become better science communicators to influence policy (panel), Society for Environmental Toxicology and Chemistry North Atlantic Chapter, 15 June 2017, Amherst, MA. (35)
- Schmitt, C. The Champlain Society logbooks. Institute for Documentary Editing, 22 June 2017, Buffalo, NY. (25)
- Schmitt, C. Penobscot River Habitat Blueprint. Celebration of the Bagaduce, 16 September 2017, Sedgwick, ME. (50)
- Schmitt, C. The President's Salmon. The Nature Conservancy Director's Circle Book Club, 13 November 2017, Brunswick, ME. (10)
- Snyder, J. et al. Oyster aquaculture site selection using Landsat 8-derived sea surface temperature, turbidity, and chlorophyll-a. Maine Aquaculture R&D Forum, 6 March 2017, Belfast, ME. (100)
- Springuel, N. Tourism opportunities for aquaculture. Aquaculture in Shared Waters, 20 April 2017, Ellsworth, ME. (20)
- Springuel, N. MDI's working waterfront, then and now. College of the Atlantic, 13 July 2017, Bar Harbor, ME. (25)
- Springuel, N. Maine fisheries history. College of the Atlantic Mapping Ocean Stories, 14 September 2017, Bar Harbor, ME. (15)
- Springuel, N, L. Gordon-Fox, P. Gallardo Garcia Freire, T. Mason, H. Miller, and T. White. Mapping ocean stories: how local stories turn into map data. Northeast Regional Planning Body Meeting, 16 November 2017, Durham, NH. (200)
- Springuel, N. Fisheries of Norway, marine mammals of the Nordic Sea, Norway's whale hunt. A Prairie Home Companion Cruise to Norway and Scotland, June 2017. (1,300)
- Stancioff, E., B. Bisson, H. Webber, and J. Muhlin. Signs of the Seasons: working with citizen scientists and research partners in New England to compare current and historical phenology data for growth and reproduction in upland and marine species (poster). Citizen Science Association Conference, 19 May 2017, Saint Paul, MN. (600)
- Stancioff, E. Working with fishermen on climate change. Young Lobstermen Leaders Institute, 2 May 2017, Northport, ME. (18)
- Stancioff, E. Advancing solutions to ocean and coastal acidification in Maine. Maine Sustainability and Water Conference, 30 March 2017, Augusta, ME. (45)
- Stancioff, E. Things are changing in Maine: How citizen scientists are helping. Belfast Garden Club, 14 November 2017, Belfast, ME. (60)
- Staples, K.W., Y. Chen, and D.W. Townsend. Spatiotemporal variability in the spring molt phenology of American lobster in a changing Gulf of Maine. 11th International Conference and Workshop on Lobster Biology and Management, 7 June 2017, Portland, ME. (50)
- Staples, K.W. Though the eyes of industry: an investigation of how stakeholders in the lobster fishery synchronize their behavior with the spring lobster molt. 11th International Conference and Workshop on Lobster Biology and Management, 7 June 2017, Portland, ME. (50)
- Suskiewicz, T.S., F. Ferrario, C.A. Narvaez, D.B. Rasher, and R.S. Steneck. A tale of two gulfs: urchins and seaweeds in the Northwest Atlantic. Biologie Colloque, Université Laval, 29 March 2017, Quebec City Canada. (60)
- Tanaka, K.R. Incorporating environmental variability into assessment and management of American lobster (*Homarus americanus*). University of Maine Research Symposium, April 2017, Bangor, ME. (200)

PRESENTATIONS *continued*

Tanaka, K.R., J-H. Chang, and Y. Chen., Mesoscale climatic impacts on the distribution of *Homarus americanus* in the U.S. inshore Gulf of Maine. 11th International Conference and Workshop on Lobster Biology and Management, 7 June 2017, Portland, ME. (50)

Tanaka, K.R., S.L. Belknap, J.J. Homola, and Y. Chen. A statistical model for monitoring shell disease in inshore lobster fisheries: A case study in Long Island Sound (poster). 11th International Conference and Workshop on Lobster Biology and Management, 7 June 2017, Portland, ME. (50)

Wahle, R.A. The American lobster in a changing climate. Maine Lobster Leadership Institute, 2 February 2017, Northport, ME. (30)

Wilson, K.A., A. Webb, G. LaBonte, K. Limburg, and R. Lasley-Rasher. Juvenile alewife in a north temperate estuary: diets, movement and growth rates. ICES ASC Annual Meeting, September 2017, Fort Lauderdale, FL. (50)

Wilson, K.A., A. Webb, G. LaBonte, R. Lasley-Rasher, and K. Limburg. Diets, movement and growth rates of juvenile alewife in a north temperate estuary. Coastal and Estuarine Research Federation, November 2017, Providence, RI. (50)

Xie, D.M., Q.P. Zou, and J.D. MacRae. Hydrodynamic and sediment transport modeling in Saco Bay, Maine. Coastal and Estuarine Research Federation, November 2017, Providence, RI. (50)

Zou, Q.P., D.M. Xie, A.R. Mignone, and J.W. Cannon. Coastal flooding in Northeastern US in a changing climate, NSF-ICNET workshop, 6-7 April 2017, Portsmouth, NH. (50)

Zydlowski, G., and C. Bartlett. Filling gaps and documenting a historic and current picture of Western Passage. Community Meeting, 20 October 2017, Eastport, ME. (18)

MEETINGS, WORKSHOPS, ETC. (238; 54,463 attending)

Maine Healthy Beaches

- 37 local water quality meetings, February-June 2017. (53)
- 17 interagency and other collaborative meetings, February-June 2017. (26)
- 8 regional and local beach manager meetings, March-June 2017. (42)
- 24 field trainings, May-June 2017. (137)
- 2 laboratory trainings, June 2017. (5)
- 3 seaweed management meetings, June 2017. (4)

13 Beaches Conference planning meetings, February-July 2017. (20)

13 Strengthening Your Facilitation Skills and Community Engagement Academy trainings, meetings, workshops, etc., February 2017-January 2018. (212)

12 Aquaculture in Shared Waters class meetings, February-May 2017, Ellsworth, ME. (30)

10 Infectious Salmon Anemia Working Group meetings. (12)

9 Signs of the Seasons trainings, March-June 2017, coastwide. (82)

8 Eastport Harbor Committee meetings. (25)

7 Southern Maine Volunteer Beach Profile Monitoring Program volunteer trainings, February-October 2017. (16)

7 Happy Healthy Lobster Tour Workshops, coastwide, 4-8 March 2017. (150)

Lobstering & the Maine Coast, Maine Maritime Museum, 2017, Bath, ME. (35,700)

Sea-run fish art show, Karen Talbot Art Gallery, 2 February 2017, Rockland, ME. (25)

Acadia National Park Intertidal Management meeting, 13 February 2017, Bar Harbor, ME. (25)

Maine Fishermen's Forum, 2-4 March 2017, Rockport, ME, including sessions on Aquaculture for Fishermen; Scallop Aquaculture. (3,500)

Aquaculture R+D Forum, 6 March 2017, Belfast, ME. (140)

Schoodic Marine Center Community Meeting, 7 March 2017, Winter Harbor, ME. (25)

Experience Maritime Maine Eastport Forum, 8 March 2017, Eastport, ME. (11)

Maine Science Festival, 16-18 March 2017, Bangor, ME. (10,000)

Maine Coast Fishermen's Association Shellfish Committee Meeting, 21 March 2017, Brunswick, ME. (15)

Acadia National Park Intertidal Management meeting, 21 March 2017, Bar Harbor, ME. (25)

Volunteer phytoplankton monitor training, 24 March 2017, West Boothbay Harbor, ME. (8)

Community Engagement Workshop, Darling Marine Center, 25 March 2017, Walpole, ME. (12)

Acadia National Park Intertidal Management meeting, 28 March 2017, Bar Harbor, ME. (25)

12 Sanford Stenton Mill Area Revitalization workshops, site visits, and other meetings, April-September 2017, Sanford, ME. (170)

Maine Island Trail, Human Ecology Forum, 11 April 2017, Bar Harbor, ME. (25)

International Pectinid Workshop, 19-25 April 2017, Portland Maine. (125)

Sustainable Ecological Aquaculture Network stakeholder meetings, 1-2 May 2017, Eastport, ME. (15)

Young Lobster Leaders Workshop, 2-3 May 2017, Northport, ME. (18)

Aquaculture in the New Meadows, 3 May 2017, Bath, ME. (80)

Downeast Fisheries Trail Celebration, 9 May 2017, Winter Harbor, ME. (45)

Sustainable Ecological Aquaculture Network community meeting, 18 May 2017, Penobscot, ME. (35)

Industry Exchange Workshop: Opportunities in Tourism for Fisheries and Aquaculture, 24 May 2017, Damariscotta, ME. (67)

MEETINGS, WORKSHOPS, ETC. *continued*

Aquaculture in Shared Waters Frenchman Bay Field Trip, 25 May 2017, Bar Harbor, ME. (25)

Maine Ocean and Coastal Acidification Spring Update Webinar, 31 May 2017, Waldoboro, ME. (35)

11th International Conference and Workshop on Lobster Biology and Management, 4-9 June 2017, Portland, ME. (257)

Ocean and Coastal Acidification Monitoring Working Meeting, 19 June 2017, Walpole, ME. (30)

Shellfish Working Group, 22 June 2017, West Bath, ME. (45)

Damariscotta River Oyster Festival, 24 June 2017, Damariscotta, ME. (500)

Coastal Marine Science Academy, 26-29 June 2017, Beals, ME. (9)

Western Passage Ecosystem meeting, 27 June 2017, Eastport, ME. (25 est.)

Sea-run fishes at Karen Talbot Art Gallery, 28 June 2017, Rockland, ME. (30)

Schoodic Marine Center Community Meeting, 29 June 2017, Winter Harbor, ME. (30)

Environmental Intersections: Water, 7 July 2017, Newcastle, ME. (90+)

Frenchman Bay Aquaculture Tour, 10 July 2017, Bar Harbor, ME. (7)

The Beaches Conference, 14 July 2017, Wells, ME. (250)

Atlantic States Marine Fisheries Commission Northern Shrimp Technical Committee stock assessment workshop, 17-19 July 2017, University of Maine, Orono, ME. (16)

Northeast Coastal Stations Alliance intertidal biota sampling-training webinar, 26 July 2017, Winter Harbor, ME. (22)

Lost to the Sea, 17-18 August 2017, Walpole, ME. (45)

Environmental Intersections: Fire, 25 August 2017, Newcastle, ME. (50)

5 Mount Desert Island High School Island Pathways Program oral history workshops. September and December 2017, January 2018, Bar Harbor, ME. (12)

Mapping Ocean Stories, September-December 2017, Winter Harbor, Isleford, and Southwest Harbor. (48)

Maine Marine Fare, 9 September 2017, Searsport, ME. (30)

Estimating Your Local Ocean Economy Workshop, 12 October 2017, Wiscasset, ME. (32)

Maine Ocean and Coastal Acidification social, 12 October 2017, Portland, ME. (30)

Cobscook Bay Community Meeting, 20 October 2017, Eastport, ME. (15)

Environmental Intersections: Earth, 26 October 2017, Portland, ME. (80)

Climate Change Adaptation Providers (CCAP) Network and Coastal Adaptation Working Group Annual Meeting, 1 November 2017, Wells National Estuarine Research Reserve, Wells, ME. (37)

Coastal and Estuarine Research Federation, 6-9 November 2017, Providence, RI. (1,643)

Northeast Coastal Stations Alliance, 17 November 2017, Winter Harbor, ME. (20)

Winter Harbor Oral History Project Community Presentation, 9 November 2018, Winter Harbor, ME. (65)

Northeast Coastal Station Alliance planning retreat, 17 November 2017, Winter Harbor, ME. (12)

Schoodic Marine Center Community Meeting, 4 December 2017, Winter Harbor, ME. (20)

Maine Ocean and Coastal Acidification Science Seminar and Winter Meeting, 18 December 2017, Bigelow Laboratory, East Boothbay, ME. (48)

APPENDIX B: MEDIA COVERAGE

- Parrish, C. Kelp economy to make a big splash in 2018. 28 December 2017, *The Free Press*.
- n.a. Students host ocean sustainability exhibition. 11 December 2017, *The Times Record*.
- Beckwith, W. Lost to the Sea. *UMaine Today*, Fall/Winter 2017, Vol. 17 No. 2, pp. 50-57.
- Berlin, A. Scallop farm first of its kind in local waters. 30 November 2017, *Island Ad-Vantages*.
- n.a. Make way for alewives. 30 November 2017, *Castine Patriot*.
- n.a. Talk on oyster harvesting on the Damariscotta River on November 28 at The Lincoln Home. 23 November 2017, *The Free Press*.
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* = press release issued

APPENDIX C: MAINE SEA GRANT PARTNERS, 2017-2018

American Unagi	KKA Chamber of Commerce	Pemaquid Oyster Company
Bar Harbor Marine Resources Committee	Lobster Institute	Penobscot East Resource Center
Bigelow Analytical Services	Maine Aquaculture Association	Penobscot Marine Museum
Bigelow Laboratory for Ocean Sciences	Maine Aquaculture Innovation Center	Pine Point Oysters
Blue Hill Heritage Trust	Maine Audubon	Piscataqua Region Estuaries Partnership
Bowdoin College	Maine Boats, Homes & Harbors	Road Scholars
Bremen Lobster Co-op	Maine Center for Coastal Fisheries	Rockingham Planning Commission
Broadreach Fund	Maine Coast Heritage Trust	Schoodic Arts for All
Casco Bay Estuary Project	Maine Coastal Program	Schoodic Institute
City of Rockland	Maine Department of Agriculture, Conservation and Forestry	Schoodic National Scenic Byway
City of Saco	Maine Department of Conservation	Southern Maine Planning & Development Commission
Coastal Enterprises, Inc	Maine Department of Environmental Protection	Sunrise County Economic Council
College of the Atlantic	Maine Department of Inland Fisheries and Wildlife	The Nature Conservancy
Community Shellfish	Maine Department of Marine Resources	Town of Bar Harbor
Connecticut Sea Grant	Maine Fair Trade Lobster	Town of Camden
Cooke Aquaculture	Maine Geological Survey	Town of Damariscotta
Cranberry Isles Fishermen's Coop	Maine Healthy Beaches Program	Town of Kennebunk
Curtis Thaxter	Maine Innkeepers Association	Town of Kennebunkport
Dalhousie University	Maine Maritime Academy	Town of Kittery
Damariscotta River Association	Maine Natural History Observatory	Town of Lincolnville
Damariscotta River Cruises	Maine Office of Tourism	Town of Old Orchard Beach
DC Air and Seafood	Maine Outdoor Heritage Fund	Town of Penobscot
Down East Spring Birding Festival	Maine Restaurant Association	Town of Rockport
Downeast and Acadia Regional Tourism	Maine Scallop Company	Town of Scarborough
Downeast Institute for Applied Marine Research and Education	Manomet	Town of South Portland
Downeast Resource Conservation and Development (USDA)	Medomak Valley Land Trust	Town of Southwest Harbor
Downeast Salmon Federation	Mook Sea Farm	Town of Waldoboro
Frenchman Bay Regional Shellfish Municipal Joint Board	Mount Desert Biological Laboratory	Town of Wells
FV Lindsay Marie	National Marine Fisheries Service (NOAA)	Town of Winter Harbor
Gouldsboro Steuben Shellfish Committee	National Oceanic and Atmospheric Administration (NOAA)	Town of York
Great Bay National Estuarine Research Reserve (NOAA)	National Working Waterfront Network	University of Maine
Gulf of Maine Research Institute	New Hampshire Coastal Program	UMaine Cooperative Extension
Hancock County Planning Commission	New Hampshire Sea Grant	UMaine School of Marine Sciences
In a Half Shell	NOAA Office for Coastal Management	University of Maine Machias
Independent Maine Marine Worm Harvesters Association	NOAA Research Ocean Acidification Program Office	University of New Hampshire
Island Institute	Northeast Regional Association of Coastal Ocean Observing Systems (NERACOOS)	UNH Cooperative Extension
Kennebec Estuary Land Trust	Northeast Regional Planning Body	US Department of Agriculture
Kennebunk Savings	Northeastern University	US Environmental Protection Agency
		Walsh Engineering
		Washington County Council of Governments
		Watershed School
		Wells National Estuarine Research Reserve (NOAA)
		Winter Harbor Historical Society

APPENDIX D: STUDENT SUPPORT

Graduate Students (21), *asterisk denotes degrees received in 2017-2018 reporting period

Name	School	Degree Program	Project/Type of Support
Skylar Bayer*	UMaine, SMS	PhD, Wahle Lab	Scallop research travel support (Program Development)
Sam Belknap	UMaine, Anthropology, CCI	PhD, IGERT Fellow	Participatory Lobster Project (NOAA COCA)
Robert Boenish	UMaine, SMS	PhD, Chen Lab	Sea Grant Scholar, Bycatch/lobster research (Chen)
Catherine Frederick	UMaine, SMS	PhD, Bricknell Lab	Sea lice research, RA (Bricknell, National Sea Grant)
Parker Gassett	UMaine, SMS	Dual MSc in Marine Biology and Policy	Sea Grant Scholar, Climate/adaptation research (Strong)
Amalia Harrington	UMaine, SMS	PhD, Wahle Lab	Lobster research, RA (Whale)
Gabrielle Hillyer	UMaine, SMS	Dual MSc in Marine Biology and Policy	Water quality, circulation research (Brady, Program Development)
Bai Li	UMaine, SMS	PhD, Chen Lab	Lobster research (Chen)
Elisabeth Maxwell*	UMaine, SMS	Dual MSc in Marine Biology and Policy	Sea Grant Scholar, Clam co-management/acidification (Johnson)
Mackenzie Mazur	UMaine, SMS	PhD, Chen Lab	Sea Grant Scholar, lobster research (Chen)
Jacquelynn Miller	UMaine, CCI, Earth Science	MS, Earth and Climate Science	Coastal erosion/heritage preservation research, RA (Kelley)
Maura Niemisto	UMaine, SMS	MS, Marine Biology	Lobster research, RA (Whale)
Charlotte Carrigan Quigley	UMaine, SMS	PhD, Brawley Lab	Sea vegetable research, RA (Brawley)
Nicole Rahmberg-Pihl	UMaine, SMS	PhD, Greig Lab, IGERT Fellow	Salmon predation/climate research, RA (Greig)
Charlotte Royer*	UMaine, SMS	PhD, Brawley Lab	Macro algae research, RA (Brawley)
Jocelyn Runnebaum*	UMaine, SMS	PhD, Chen Lab	Sea Grant Scholar, Bycatch/Barotrauma research (Chen)
Jordan Snyder*	UMaine, SMS	MS, Brady Lab	Primary productivity mapping/AQ suitability, RA (Brady, National Sea Grant)
Kisei Tanaka	UMaine, CCI,EES	PhD, Chen Lab	Lobster research (Chen)
Katherine Thompson	UMaine, SMS	PhD, Chen Lab	Northern shrimp research, RA (Chen)
Michael Torre	UMaine, SMS, CCI	PhD, Chen Lab	Sea Grant Scholar, Scallop/climate research (Chen)
Dongmei Xie	UMaine, SMS	PhD, Zou Lab	Coastal erosion/hazards, modeling, RA (Zou)

Undergraduate Students (50), *asterisk denotes degrees received in 2017-2018 reporting period

Name	School	Degree Program	Project/Type of Support
Aliya Uteuova	UMaine	Political Science and Journalism	Science Communications Intern
Brittany Shea Bills	UMM	Marine Biology	'17-'18 Undergraduate Scholarship
Kaitlyn Clark	COA	Human Ecology	'17-'18 Undergraduate Scholarship/ Mapping Ocean Stories
Rachel Borisko	MMA	Marine Biology and Small Vessel Operations	'17-'18 Undergraduate Scholarship
Andrew P. Davidsohn	UNE	Marine Biology	'17-'18 Undergraduate Scholarship
Michelle N. Dufault	UNE	Marine Biology	'17-'18 Undergraduate Scholarship
Mimi Edmondson	UMaine	Marine Sciences	'17-'18 Undergraduate Scholarship
Laura E. Paye	UMaine	Marine Sciences	'17-'18 Undergraduate Scholarship
Ashley Sarra	UMaine	Marine Sciences	'17-'18 Undergraduate Scholarship
Jessica Stumper	UNE	Ocean Studies and Marine Affairs	'17-'18 Undergraduate Scholarship
Leelou Gordon-Fox	COA	Human Ecology	Mapping Ocean Stories
Patricio Gallardo Garcia Freire	COA	Human Ecology	Mapping Ocean Stories
Corina Gribble	COA	Human Ecology	Mapping Ocean Stories
Morgan Heckerd	COA	Human Ecology	Mapping Ocean Stories
Ela Keegan	COA	Human Ecology	Mapping Ocean Stories
Taylor Mason	COA	Human Ecology	Mapping Ocean Stories
Hannah Miller	COA	Human Ecology	Mapping Ocean Stories
Laura Montanari	COA	Human Ecology	Mapping Ocean Stories
Kenya Perry	COA	Human Ecology	Mapping Ocean Stories
Heather Sieger	COA	Human Ecology	Mapping Ocean Stories
Raiatea Speek	COA	Human Ecology	Mapping Ocean Stories
Vanessa Taylor	COA	Human Ecology	Mapping Ocean Stories
Nicholas Tonti	COA	Human Ecology	Mapping Ocean Stories
Teagan White	COA	Human Ecology	Mapping Ocean Stories
Rory Morgan	UMM	Marine Biology	Brian Beal Research Assistantship
Alexander McCarthy	UMM	Marine Biology	Brian Beal Research Assistantship
Dylan Landry	UMaine	New Media	Oceanic Scales Program Development Project (Felice)

Undergraduate Students (continued)

Name	School	Degree Program	Project/Type of Support
Jack Britton	UMaine		Oceanic Scales Program Development Project (Felice)
Jacob Dawson	UMaine		Oceanic Scales Program Development Project (Felice)
DeCorey Bolton	UMaine	Zoology	Salmon predation/climate research (Greig)
Tyson Porter	UMaine	Wildlife Ecology	Salmon predation/climate research (Greig)
Spencer Kelley	UMaine	Wildlife Ecology	Salmon predation/climate research (Greig)
Mitchell Paisker*	UMaine	Ecology and Environmental Science	Salmon predation/climate research (Greig)
Cassido Bigos*	UMaine	Biology and Anthropology	Salmon predation/climate research (Greig)
Rose M. W. Edwards	COA	Human Ecology	'16-'17 Undergraduate Scholarship
Aisling K. Farragher-Gemma	UMM	Marine Biology	'16-'17 Undergraduate Scholarship
Beretta Ficek*	MMA	Marine Biology	'16-'17 Undergraduate Scholarship
Emma M. Kimball*	COA	Human Ecology	'16-'17 Undergraduate Scholarship
Chelsey B. Mitchell	UMaine	Marine Science	'16-'17 Undergraduate Scholarship
Gillian H. O'Neal*	MMA	Marine Biology	'16-'17 Undergraduate Scholarship
Sophia D. Prisco	COA	Human Ecology	'16-'17 Undergraduate Scholarship
Melissa A. Rosa	UNE	Marine Biology	'16-'17 Undergraduate Scholarship
Grace M. Shears*	COA	Human Ecology	'16-'17 Undergraduate Scholarship
Bethany M. Stevens*	UMaine	Marine Science	'16-'17 Undergraduate Scholarship
Olivia T. Streit	UMM	Marine Biology and Biology	'16-'17 Undergraduate Scholarship
Kyle Capistrant-Fossa*	UMaine	Marine Biology	Sea vegetable research (Brawley)
Alexandra Pergerson*	UMaine	Marine Biology	Sea vegetable research (Brawley)
Kathryn Liberman*	UMaine	Marine Science	'15-'16 Undergraduate Scholarship
Lauren Rice*	UMaine	Marine Science	'15-'16 Undergraduate Scholarship

APPENDIX E: POLICY ADVISORY COMMITTEE

Rebecca Van Beneden
University of Maine School of Marine Sciences

Paul Dest
Wells National Estuarine Research Reserve

Paul Dobbins
Ocean Approved

Susan Farady
University of New England

Don Hudson
Chewonki Emeritus

Nathan Johnson
Ocean Renewable Power Company

Alvion Kimball
Tourism Business Owner

Walter Kumiega
Maine Legislature, Marine Resources Committee

Rich Langton
NOAA Northeast Fisheries Science Center

Kathleen Leyden
Maine Coastal Program

Joyce Maker
Maine Legislature, Marine Resources Committee

Pam Parker
Maine Department of Environmental Protection

Kristan Porter
Fisherman, F/V Whitney and Ashley

Jon Prichard
University of Maine Cooperative Extension

Cathy Ramsdell
Friends of Casco Bay

Dwayne Shaw
Downeast Salmon Federation

Diane Tilton
Downeast Institute

Kody Varahramyan
University of Maine Vice President for Research &
Dean of the Graduate School

Stephen Von Vogt
Maine Composites Alliance

Carl Wilson
Maine Department of Marine Resources

