

National Sea Grant Advisory Board
October 28, 2024
Virtual Meeting
Briefing Book



Virtual Meeting Tips for Board Members

To help keep us on track during the webinar, please follow the below tips.

- Board members are asked to log-in 20 minutes before the meeting's start time to get settled and address any connectivity issues.
- We would like to recreate as much as possible an in-room presence, so we encourage you to share your video at all times.
- Say your name before you speak.
- When you are speaking, please speak loudly and clearly.
- This is a public meeting, so be aware of your background surroundings that will be viewed from the video.
- This webinar is not recommended for telephone-only participation. If you have to use a telephone-only connection, please make sure that you know how to mute and unmute yourself. If you need to step away from a telephone-only connection, please do not put your call on hold; it may broadcast your phone system's background music.
- Plan to connect from the strongest internet connection you have (ideally a grounded, ethernet cord if feasible).
- Please connect from a quiet space with as few distractions as possible.
- Please close any non-essential computer programs during the meeting to help with internet connection speed.
- Turn away from email for the short duration of the meeting.
- Headphones or a headset are recommended to reduce background noise and feedback.
- Remember to use your mute/unmute button. Please mute yourself during the meeting unless you are verbally sharing with the rest of the Board. We may mute you from our end if we are having noise issues.
- The questions box will be available if you are having technical issues that need to be addressed.
- Please do not use the questions function or chat box for side conversations. Due to FACA rule requirements for capturing meeting minutes we ask that you refrain from side conversations in the chat or question boxes.

National Sea Grant Advisory Board, 2024-2025



Jim Murray, Ph.D. (Chair) Naples, FL

Current term (1 year extension) ends 1/25/2025

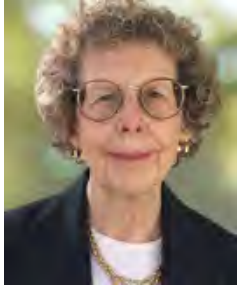
Dr. James Murray retired in 2011 as Deputy Director of the National Sea Grant College Program. He spent his entire 37-year career with Sea Grant including Sea Grant Scholar at SUNY College of Environmental Science and Forestry, Extension Specialist at Minnesota Sea Grant, Extension Leader at New Jersey and North Carolina Sea Grant Programs, National Sea Grant Extension Leader and finally Deputy Director of the National Sea Grant College Program. Murray was the recipient of the President's Award, Sea Grant Association, and the Wick Award for Visionary Career Leadership by the Sea Grant Extension Assembly. Currently he is a member of the Florida Sea Grant Extension Program Advisory Committee and volunteers at NOAA's Rookery Bay Estuarine Research Reserve.



Nancy Targett, Ph.D. (Vice Chair) Portsmouth, NH

Current term (1st) ends 6/5/2026

Dr. Targett is Distinguished Professor Emerita and Dean Emerita, University of Delaware, College of Earth, Ocean, and Environment (CEOE). She has more than 38 years of experience in higher education and served 10 years as Director of Delaware Sea Grant and Dean of CEOE. Then, as Acting President at UD, she guided the institution through a 15-month period of transition. Dr. Targett also served as Provost and Vice President for Academic Affairs at the University of New Hampshire. At UD she led the team that formed First State Marine Wind (FSMW), a joint venture between the university and Gamesa Technology Corporation that built a commercial scale wind turbine on the marine campus. She served on the FSMW Board of Directors for six years. Dr. Targett also served a three-year term as the Chair of the Board of Trustees for the Consortium of Ocean Leadership, six years on the Mid-Atlantic Fisheries Management Council, and three years on the Ocean Studies Board. While DESG Director she held multiple elected positions for the Sea Grant Association. Dr. Targett was named an Aldo Leopold Leadership Fellow in 1999 and in 2016 received the Order of the First State from then-Governor Jack Markell in recognition of her contributions to the State of Delaware. Dr. Targett received her M.S in Marine Science from University of Miami, and her Ph.D. in Ocean Science from University of Maine.



Deborah Stirling, J.D. (Past Chair) Columbia, SC
Current term (2nd) ends 9/6/2026

Ms. Deborah Stirling is a researcher in the Burroughs and Chapin Center for Marine and Wetland Studies at Coastal Carolina University in South Carolina. She manages the Southeast Atlantic Ecoregion program (SEA Ecoregion), which is the National Weather Service's presence in the Southeast for the National Mesonet Program. In addition, she is CFO of Infinite Habitat @ Innovista, an engineering design and sustainability company which offers consulting particularly in renewable energy, and other aspects of the built environment. Ms. Stirling is a retired SC attorney specializing in science, engineering, technology, environment, and climate research. In addition, she was a legislative advisor to the National Academy of Sciences for several years. Ms. Stirling spent 10 years as Subcommittee Counsel for Oceans and Atmosphere for the U.S. Senate Committee on Commerce, Science, and Transportation, and then was Legal Counsel for the University Corporation for Atmospheric Research (UCAR). She currently serves as a Commissioner on the South Carolina Floodwater Commission. Ms. Stirling has a J.D. from the University of South Carolina Law School.



Peter Betzer, Ph.D. (Member-at-Large) St. Petersburg, FL
Current term (2nd) ends 6/25/2025

From 2008 to 2018 Dr. Betzer served as the President of the St. Petersburg Downtown Partnership, a group focused on expanding the cluster of technological businesses that are associated with St. Petersburg's extensive marine and medical research complex. Prior to joining the partnership in 2008, Dr. Betzer served as Founding Dean and Professor of The University of South Florida's College of Marine Science. Dr. Betzer is the author of over 60 scientific publications in journals and books and in 1985 was a co-recipient of a Distinguished Authorship Award from the National Oceanic and Atmospheric Administration. Dr. Betzer was appointed to the Ocean Sciences Advisory Panel for The National Science Foundation (NSF) in 1986, was elected to The University National Oceanographic Laboratory System (UNOLS) Council in 1990 for which he served two terms (1992-1996) as Vice-Chair. In 2005 Dr. Betzer was appointed to the Ocean Research and Resource Advisory Panel (ORRAP) a 15-member group that formulates recommendations about ocean research to federal agencies. Dr. Betzer received a Distinguished Achievement Award in 2010 from the University of Rhode Island. Dr. Betzer has a Ph.D. in chemical oceanography from the University of Rhode Island's Graduate School of Oceanography, and a B.A. in geology from Lawrence College.



Carole Engle, Ph.D. Strasburg, VA

Current term (2nd) ends 9/6/2026

Dr. Engle is a nationally recognized and highly-respected aquaculture and natural resource economist. She served as a Professor of Aquaculture Economics and Marketing at the University of Arkansas – Pine Bluff (UAPB) and created and directed UAPB Aquaculture and Fisheries Center. Dr. Engle has produced numerous economic and market analysis oriented peer-reviewed, extension and grey literature papers, book chapters and books to the benefit of commercial fish and shellfish farmers, prospective farmers, government agencies, and the public. She also has shared her expertise, research, and experience in a wide variety of capacities as an officer or member of several professional associations and as chair or member of numerous public and private advisory groups. Dr. Engle has a Ph.D. and M.S. in Aquaculture Economics from Auburn University and a B.A. in Biology/Rural Development from Friends World College.



Dijanna Figueroa Ph.D. Inglewood, CA

Current term (1st) ends 4/22/2028

Dr. Figueroa is the director of the Lucas Scholars STEM program, a community based social justice and equity program designed to engage young people in science, engineering, design, and art. She loves the ocean and is committed to making ocean science accessible to all people. Recently, Figueroa has become an advocate for STEAM education—adding art and design to the science, technology, engineering, and math equation. She's spent more than two decades teaching STEAM to grades K–8 in the greater Los Angeles area, formerly served as global director of the Muse School National Geographic Society's Green STEAM program and has advisory roles with many STEM/STEAM nonprofits. She was recently featured on MTV's Women Crush Wednesdays Women in STEM series. She currently teaches middle school science at St. Matthew's Parish School and runs programs that teach students how to fly drones, scuba dive and build underwater robots. Dijanna Figueroa has made a career of exploring the mysteries of the deep. She was featured in James Cameron's documentary Aliens of the Deep, which follows Cameron and NASA scientists as they explore some of the deepest parts of the ocean and learn about the unique life forms that inhabit those spaces.



Deidre Gibson Ph.D. (Member-at-Large) Yorktown, VA
Current term (1st) ends 6/5/2026

Dr. Gibson is the Chair of the Department of Marine and Environmental Science at Hampton University. She is a broadly trained biological oceanographer with research interests centered on the trophic ecology, reproductive biology, and population dynamics of zooplankton, but more specifically, gelatinous zooplankton, and currently oyster restoration. Her research harbors an emerging emphasis on identifying mechanisms through which climate change and anthropogenic alterations of habitats affect gelatinous zooplankton and other aquatic organisms. While at Hampton University, she has served as PI on several NSF and NOAA grants that continue to train the next generation of African American marine scientists. Dr. Gibson earned her B.S. in Oceanography from the University of Washington and Ph.D. in Marine Science from the University of Georgia/Skidaway Institute of Oceanography.



Meghan E. Marrero, EdD New Rochelle, NY
Current term (1st) ends 1/30/2028

Dr. Meghan Marrero is a Professor of Secondary Science Education at Mercy University and co-Director of the Mercy Center for STEM Education, working primarily to improve access to STEM education for diverse learners. Her research centers on ocean literacy of students and teachers, as well as STEM teacher education. Meghan was a Fulbright Scholar to Ireland in 2018, where she focused on teaching and research around family learning in science and engineering for early childhood students and their families. A former high school science teacher in New York City, Meghan has been involved with several national and international ocean literacy initiatives and currently serves as the United States National Coordinator for the All-Atlantic Blue Schools and USA Blue Schools. She served as President of the New York State Marine Education Association (NYSMEA) from 2009-2014, and President of the National Marine Educators Association (NMEA) in 2018-19. Meghan holds a B.S. in Biological Science from Cornell University, an M.A. and EdD in science education from Teachers College, Columbia University, and an advanced certificate in educational leadership from Queens College.



Kristine Norosz Petersburg, AK
Current term (2nd) ends 12/9/2026

Kristine Norosz has worked in multiple sectors of the Alaska seafood industry for close to four decades. She started at the Alaska Dept. of Fish & Game in 1979 as a fisheries technician and biologist doing field work for both the Sportfish and Commercial Fisheries Divisions. Moving to the commercial harvesting sector she worked as a deckhand using a variety of gear types to target halibut, salmon, crab and black cod. In 1989, she entered the policy arena and served as executive director of two harvester organizations before being recruited by a major seafood processing company. Kris was employed as the Director of Government Affairs for Icicle Seafoods, Inc. until she retired in 2017. Kris has served in various capacities on many fisheries and public policy bodies: member of the International Pacific Halibut Commission and Alaska's Arctic Policy Commission; advisor to the North Pacific Anadromous Fish Commission, North Pacific Fishery Management Council and the Northern Panel of the US/Canada Pacific Salmon Commission. She continues to promote workforce development programs for Alaska's maritime industry. A resident of Petersburg, Alaska for the past 46 years, Kris serves on several state-wide non-profit boards and actively promotes philanthropy.



Jack Payne, Ph.D. Gainesville, FL
Current term (1st) ends 1/30/2028

Jack Payne recently retired as the Senior Vice President for Agriculture and Natural Resources at the University of Florida and the Administrative Head for the Institute of Food and Agricultural Sciences. Prior to his position at Florida, he served as a Vice President at Iowa State University, and, previous to Iowa State, he was Vice President and Dean at Utah State University. Jack also has experience at two other land-grant institutions: Pennsylvania State University, where he served on the faculty of the School of Forest Resources, and, later, at Texas A&M University, where he served as a faculty member in the Fisheries and Wildlife Department. After leaving Texas A&M University, Payne had a long career with Ducks Unlimited (DU), as their National Director of Conservation. While at DU, some of his successes included the development of DU's private lands program with agriculture, the development of a national conservation easement program and the expansion of their Mexican program to Central and South America. Payne received his M.S. in Aquatic Ecology and his Ph.D. in Wildlife Ecology from Utah State University and is a graduate of the Institute for Educational Management at Harvard University. Jack is a member of the Farm Foundation Round Table, a member of the Senior Advisory Board for Solutions from the Land, and a Board Member of the Bonefish and Tarpon Trust. He recently was appointed for a 4-year term to the National Sea Grant Advisory Board by the U.S. Secretary of Commerce Gina Raimondo.



Larry Robinson, Ph.D. Tallahassee, FL
Current term (1st) ends 1/17/2027

Dr. Robinson serves as Florida A&M University's (FAMU) 12th president and as a distinguished service professor at the University. Dr. Robinson is also actively engaged in research with students and faculty as

the director and principal investigator of the Center for Coastal and Marine Ecosystems. Through the Center, FAMU is leading the partnership and collaborating with five universities to make a major impact on coastal and marine ecosystems education, science and policy. Dr. Robinson's recent honors include an appointment in July 2018 to serve on the national STEM Education Advisory Panel. Congress authorized the creation of the panel to encourage U.S. scientific and technological innovations in education.



Martin Tadlock, Ph.D. Sherman, TX

Current term (1st) ends 1/30/2028

Dr. Martin Tadlock is a Professor of Education at the University of South Florida where he served as Regional Chancellor of the USF St. Petersburg campus. Dr. Tadlock has a 43-year history of leadership in higher education as a professor, chair, dean, provost, and interim president across five different universities. While at USF St. Petersburg, he received the 2021 National Association of Student Personnel Administrators President's Award and led collaborative efforts of four colleges and universities to create a Truth, Racial Healing and Transformation Center for St. Petersburg/Pinellas County. Prior to Florida, he was instrumental in securing a state financial award in 2006 creating a Manufacturing and Applied Engineering ATE Regional Center of Excellence in Minnesota, one of two National Science Foundation Applied Technology Education Centers in the state. While at Utah State University from 1993-2001, he established the first middle level teacher licensure program in the state and the largest graduate seminar in the western U.S., providing professional development to over 500 middle school teachers and administrators each year. Dr. Tadlock began his career as a middle school teacher in the 1980's, then as a professor and director of the National Center of Education for the Young Adolescent, a University of Wisconsin Center of Excellence and the largest provider of professional development for middle school teachers and administrators in the U.S. Dr. Tadlock's Ph.D. is in Educational Administration and Leadership from Miami University of Ohio.

**National Sea Grant Advisory Board
 October 28, 2024
 Virtual Meeting
 Draft Agenda**

Monday, Oct 28, 2024

Open to the public 3:00 - 5:00 pm eastern

<p>3:00 - 3:15 pm</p>	<p>Welcome</p> <p>Designated Federal Officer Brief; Roll Call</p> <p>Call to Order; Approval of Agenda; Approval of Spring Meeting Minutes</p>	<p>James Murray - Board Chair</p> <p>Susan Holmes - Designated Federal Officer</p> <p>James Murray - Board Chair</p>
<p>3:15 pm</p>	<p>Public Comments</p>	<p>Susan Holmes - Designated Federal Officer</p>
<p>3:15 - 3:30 pm</p>	<p>Mission Support Membership - <i>(Decisional)</i></p>	<p>Nancy Targett - Board Vice Chair</p> <p>Deborah Stirling - Board Subcommittee Chair</p>
<p>3:30 - 4:45 pm</p>	<p>“State of Sea Grant” Report to Congress - <i>(Decisional)</i></p>	<p>Jack Payne - Board Subcommittee Chair</p>
<p>4:45 - 5:00 pm</p>	<p>Wrap up</p>	<p>James Murray - Board Chair</p>
<p>5:00 pm</p>	<p>Adjourn</p>	<p>James Murray - Board Chair</p>

National Sea Grant Advisory Board Public Meeting
August 18, 2024
Draft Meeting Minutes

Marriott Savannah Riverfront
Savannah, GA

Sunday, August 18, 2024

OPEN TO THE PUBLIC - 8:30 AM- 5:00 PM (Eastern)

WELCOME (Dr. Jim Murray, Board Chair)

Dr. Jim Murray (Board Chair) welcomed everyone and officially called the meeting to order. He then turned the meeting over to Ms. Holmes (Designated Federal Officer (DFO)) for a DFO briefing and Roll Call.

DFO BRIEF and ROLL CALL (Ms. Susan Holmes, Designated Federal Officer (DFO))

Ms. Holmes (Designated Federal Officer (DFO)) read an official federal statement explaining her role to the group, discussed the meeting ground rules, welcomed everyone, and took the roll call of the members of the Board. Ms. Holmes thanked everyone for their diligent work in preparing for the meeting. She then turned the meeting over to Dr. Murray who called the meeting to order.

Members of the National Sea Grant Advisory Board (Board):

Dr. Martin Tadlock, Dr. Meghan Marrero, Dr. Dljanna Figueroa, Dr. Deidre Gibson, Dr. Peter Betzer, Deb Stirling, Dr. James Murray, Dr. Nancy Targett, Dr. Carole Engle, Dr. Jack Payne, Dr. Larry Robinson

Board Ex Officio Members:

Dr. Jonathan Pennock – (*ex officio*) Director of the National Sea Grant College Program (NSGCP);
Dr. Darren Lerner (*ex officio*), President, Sea Grant Association (SGA).

Invited Presenters and Panelists:

Steve Sempier, Mississippi-Alabama Sea Grant Consortium (Chair, SGEA); Amy Schrank, Minnesota Sea Grant; Savanna Barry, Florida Sea Grant; Amalia Almada, USC Sea Grant; Chris Petrone, Delaware Sea Grant; Michael Ciaramella, New York Sea Grant.

National Sea Grant Office (NSGO) organizers in attendance:

Ms. Susan Holmes; Dr. Nikola Garber; Ms. Donna Brown; Ms. Patricia Razafindrambinina; Dr. Madison Willert; Ms. Mary Collins.

Public Attendees:

Kelly Samek; Marie Thomas (MNSG), Nikola Garber (NSGO), Chris Petrone (NSGO/DESG), Karla Heidelberg (USCSG), Steve Sempier (MS-AL SG), Mike Ciaramella (NYSG), Maya Walton (HISG), Sarah Kolesar (ORSG), Julie Lively (LASG), Laura Picanello (TXSG), Melissa Boyce (WISG), Hameed Ajibade (NSGO), Beth Lenz (HISG), Erik Chapman (NHSG), Seung Buhm Woo (GISG/Korea), Susan Lovelace (SCSG), Amalia Almada (USCSG), Maia McGuire (FLSG), Matt Gorstein (SCSG), Kelly Samek (NSGO), Julia Peterson (NHSG).

APPROVAL of AGENDA and MINUTES (Dr. Murray, Board Chair)

Agenda

Dr. Murray gave an overview of the agenda and asked for a motion to approve it.

Motion to approve the August 18, 2024 agenda: Dr. Peter Betzer

2nd: Dr. Carole Engle

Vote: All in Favor

March 2024 Meeting Minutes

Dr. Murray asked for a motion to approve the March 2024 meeting minutes.

Motion to approve the minutes from the March 2024 meeting: Dr. Jack Payne

2nd: Dr. Meghan Marrero

Vote: All in Favor

PUBLIC COMMENTS (Ms. Susan Holmes, Designated Federal Officer (DFO))

There were no public comments.

TOPICAL ITEMS

8:50: Board Executive Committee Membership (Dr. Murray)

Dr. Murray outlined that the Executive Committee positions include: Chair, Vice Chair, Past Chair and two Members-at-Large. He then noted that the upcoming 2 year term starting on January 1, 2025, has several positions to fill: Chair, Vice Chair, and one Member-at-Large.

Dr. Murray thanked the members of the Board for their participation in the Board Executive Committee and welcomed future engagement as terms cycle in and out.

Dr. Murray presented the nominees for these open positions; Dr. Nancy Targett as chair, Dr. Deidre Gibson as vice chair, and Dr. Martin Tadlock as member-at-large.

Dr. Murray asked for a motion to accept the ExCom members of Chair, Vice Chair, and Member-at-Large as nominated.

Motion to approve to accept the Board Executive Committee Members of Chair, Vice Chair and Member-at-Large: Dr. Jack Payne

2nd: Dr. Larry Robinson

Vote: All in Favor

9:00 : New Board Subcommittee Discussion on Minority Serving Institutions (Dr. Deidre Gibson)

During the prior Sea Grant Advisory Board meeting, the Board discussed Sea Grant's work with Minority Serving Institutions (MSIs) and Historically Black Colleges and Universities (HBCUs), and agreed to the importance of continuing the discussions.

Dr. Gibson introduced her thoughts to the Board, reflecting how she seeks to capture 'synergistic work' as opposed to creating a new sub-committee on MSIs and HBCUs. She provided an example of what synergistic work might look like; if students from an MSI or HBCU are interested in applying to a John A. Knauss Fellowship, Dr. Gibson envisions there would be a cross-sector structure of support for the students.

Dr. Murray- Responded, noting that what Dr. Gibson has proposed is straightforward and that he likes that there are current examples from SG programs that could be broadened across the network. He also mentioned that this model of collaboration with MSIs and HBCUs could have broader appeal beyond Sea Grant to other Federal Programs.

Dr. Marrero- Encouraged the committee to consider education as well as the science that may come with these partnerships.

Dr. Gibson- Provided an example of this type of collaboration; Virginia Sea Grant partnered with an MSI to create an aquaculture program with education at the center of the partnership.

Dr. Pennock- thanked Dr. Gibson and noted his enthusiasm and support for this effort. He then mentioned that it is within the Sea Grant programs where these partnerships happen.

Dr. Robinson- provided an example: he highlighted that research and development (RND) is a critical part of supporting undergraduates, and there are current HBCU partnerships with NOAA that can be identified and strengthened. He noted that as he understands it, there is no restriction on SGAB on working with these institutions and thinking outside of the box

Dr. Betzer- provided an example: an institution provided the match funding required for an entire state of MSI student fellows/ interns, therefore lessening the cost burden on their host institutions and decreasing the barrier for fellows and interns for being eligible to receive federal funds.

Dr. Murray- suggested that if the board moves forward on considering how to work with MSI and HBCUs, he suggested that Dr. Gibson develops a 2-pager that outlines the proposed work (a charge), with direction to bring it to the next board meeting as a decisional motion. He urged anyone in the board interested in this to talk to Dr. Gibson.

9:15: New Board Subcommittee to Assess how Sea Grant is Delivering on its Mission, Charge and Membership (Dr. Nancy Targett and Dr. Jim Murray)

Dr. Murray recognized that there has been waning support from NOAA's proposed budgets, and given coastal population increase, and increased need for support from Sea Grant programs due to the effects of climate change, the demand on Sea Grant programs is thus increased. He noted, over the last 21 years Sea Grant has lost more than 41% of core buying power despite the increased demand for services. NSGAB is concerned that this erosion of the base is increasingly preventing Sea Grant from fully achieving its legislative mandate. Therefore, Dr. Murray introduced a new board subcommittee to assess how Sea Grant is delivering on its mission in the face of expanding needs and eroding federal support. The new sub-committee's purpose is to conduct a holistic review of Sea Grant's ability to deliver on its mission.

Dr. Targett proposed this sub-committee be composed of NSGAB members as well as external community of experts. Dr. Targett proposed to convene the new sub-committee in the fall of 2024 to:

- Estimate the impact the expanded coastal science and outreach needs will have on Sea Grant in the years ahead;
- Identify resources (financial, human capital, university support, etc.) should a Sea Grant program have to ensure that it meets its legislative mandate in light of significantly expanding constituent needs;

- Suggest the minimum amount of funding required to establish a basic and viable core infrastructure (research, extension, education, communications, and administrative services); and
- Examine SG's place in the federal budget system and how Sea Grant's value is communicated within it (NOAA, DOC, and Congress).

Dr. Murray noted that current proposed subcommittee membership include; Deb Stirling, J.D. (co-chair), External Expert (co-chair), Russell Callender, Ph.D., Letise LaFeir, Ph.D., Jack Payne, Ph.D., and Joel Widder.

Dr. Murray welcomed the Advisory Board members to consider membership on this committee and also to consider recruiting those who may be suited and willing to serve on an external community of experts.

Dr. Murray asked for a motion to accept the charge and membership.

Motion to approve the Mission support charge and membership: Dr. Carole Engle

2nd: Dr. Martin Tadlock

Vote: All in Favor

Dr. Betzer: noted the terminology 'External Community of Experts' as a confusing term, requesting an alteration to the verbiage for clarity. He then thanked the presenters and suggested a colleague for consideration as a member of the external community of experts.

Dr. Target agreed with Dr. Betzer that there is a need to clarify the language, and that the motion voted on today is done so with the caveat that the language will be updated.

Dr. Murray noted that the sub-committee continues to search for a co-chair.

10:00: "State of Sea Grant" Report to Congress (Dr. Jack Payne)

Dr. Payne thanked the many contributors who provided their time and expertise towards the report. The report included issues, including: Climate Adaptation & Community Resilience, Regional Ecosystem-Based Management Collaborations, and Commercial Seafood Industry Support and Workforce Development. The report also included emerging opportunities, which include: Understanding Energy Transitions and Coastal Resilience, Sea Grant's Role in Promoting Food Security through Aquaculture and Sustainable Fisheries, and Strengthening Extension and Education for Science-based Decision-Making.

Dr. Murray asked others on the committee to reflect on their experience.

Dr. Engle thanked the committee for their work and especially Dr. Payne for his leadership.

Dr. Tadlock noted that he was impressed by the organization of the committee and thanked the committee for providing such an educational opportunity.

Dr. Figueroa noted that membership on the committee was the perfect opportunity to get to know Sea Grant more broadly as an organization, and thanked the members for their work on the report.

Dr. Payne noted that getting into the weeds of the report instilled great admiration and respect to those involved in this organization (Sea Grant).

Dr. Murray asked the board whether there are any particular comments from the board about the content of the report.

Ms. Marrero noted that the map on pg. 4 could use improvements, noting that Guam and Puerto Rico appear not proximal. Marrero suggested some visual separation between the two islands.

Dr. Lerner replied to Ms. Marrero agreeing and also suggesting that the text be increased in size to better clarify the separation of the separate programs.

Dr. Pennock asked to confirm whether the sea grant programs are aware that their case studies and information was used for the report.

Dr. Payne confirmed that sea grant programs individually submitted information to inform the contents of the report.

Dr. Robinson praised the highlighted points of the report, and provided input that there is value in also providing additional points.

Dr. Payne noted that the report will be sent to the hill to communicate and educate others about Sea Grant and its work.

Ms. Holmes added information about a standard rollout of the report with NOAA and the Hill.

Dr. Garber suggested that the report be included in communication to the hill during Knauss placement week.

Dr. Robinson asked whether engaging partners, such as universities and other institutions, in using the report in their communication with members of the hill would help further communicate and educate about Sea Grant.

Dr. Lerner noted that university interest in using such materials and engaging with the hill in an educational manner may vary largely from institution to institution.

Dr. Murray outlined that Ms. Holmes will work with the committee moving forward to clarify the report's rollout plan.

Dr. Pennock thanked Dr. Murray and reminded the Board that this is a congressionally requested report.

10:00: Strategic Discussion of the National Sea Grant College Program (NSGCP) (Dr. Murray)

Board participation on SG Network Groups

Discussion:

- Dr. Tadlock: Would like to clarify the role of Sea Grant Network Groups and ask for any information that a board member may share with these groups.
- Dr. Murray replied by noting that Dr. Martin can report on what the National Sea Grant Advisory Board is doing.
- Dr. Pennock replied by noting that he supports these conversations and encouraged Board members to be trusted partners to these Sea Grant network groups.
- Ms. Holmes noted that Board members can always reach out to request support for talking points and information for use in Sea Grant network group meetings.
- Dr. Garber noted that board members can also always pass along relevant questions and topics discussed in these board-to-sea grant network group meetings.

Board role in SRT visits

Discussion:

- Dr. Figueroa asked for clarification in the Board's role in upcoming SRT visits.
- Ms. Holmes noted that program officers may reach out to board members in the 6 months approaching visits to share additional information.
- Dr. Murray noted that the opportunity for Board members to visit during SRTs is a great chance to see and learn from the work being done on the ground.

Board meeting Frequency

Discussion:

- Dr. Payne proposed meeting more frequently.
- Ms. Holmes reminded the Board that due the Federal Register and internal approval processes, a meeting notice requires 3 months in advance of the meeting date. She also noted that legislation and the Board Charter specifies meeting twice a year. On occasion a third meeting is set up for time-sensitive decisional items, like the report to congress and the upcoming October virtual meeting.

Communicating success stories during Board meetings

Discussion:

- Dr. Betzer proposed that board agendas include highlights of the good work and success stories achieved by the Board.
- Dr. Murray noted that during spring meetings the Sea Grant Association and National Sea Grant Office provide presentations to the Board, which often provides good work and success stories. In addition, NOAA leadership are invited to spring meetings, in which additional successes are shared.

Sea Grant Association update

Presentation (Dr. Lerner):

- Dr. Lerner directed the Board's attention towards the Sea Grant Association 'message from the president'.
- He noted that Sea Grant works with NOAA regionally and the need to scale beyond regional groups.
- Proposed decreasing travel as a means to decrease carbon footprint.
- Highlighted the steps taken to broaden and strengthen Knauss involvement; such as the Knauss reception and the Sea Grant Association visit with Knauss Legislative Fellows.
- #1seagrants2066 - 100 years of Sea Grant - bringing folks together to discuss the opportunities we have, and to 'move forward'.
- Lastly, he noted that Sea Grant Association elections are upcoming.
- Dr. Murray thanked Dr. Lerner and he noted that there will be an opportunity to discuss more this afternoon.

National Sea Grant Office Update

- Dr. Pennock discussed the current state of the proposed Federal Budget, those marks, and uncertainty.
- Reminded the Board that NSGO is onboarding new online systems, such as BAS and eRA and congratulated the staff for their work and leadership as these NOAA systems transition.
- Reminded the Board of several updates to NSGO communication guidance, such as a new Sea Grant logo and use of the NOAA emblem.

1:00 pm: Sea Grant Extension Panel (Dr. Jack Payne, Sea Grant Extension Assembly Representatives)

Members of the Sea Grant Extension provided an informational panel to raise awareness of the depth and breadth of the Sea Grant Extension work across the network and illustrate how the Sea Grant Extension works at local, regional, and national levels and enhances NOAA and other's work through partnerships.

Introductory Remarks

Dr. Murray called attendees to return to the meeting and introduced Dr. Jack Payne to start the session.

Dr. Payne gave his remarks on the importance of Sea Grant's Extension work.

Dr. Steve Sempier gave the panel's opening remarks. Dr. Sempier first outlined the state of Extension today: how it has kept its service focused mission, non-advocacy, need to build and maintain trust across all groups, focus on application of science and technology to improve communities and the environment,

Dr. Sempier described the audience of Sea Grant Extension, which include, but is not limited to fishing and aquaculture industry members, coastal tourism industry members, industry leaders, local business owners, emergency responders, professionals from NGOs, Health professionals, government officials, agency personnel and resource managers, environmental consultants, community leaders, general public, educators and students

Dr. Sempier emphasized that the core of Extension is Building Bridges:

- Sea Grant Extension's approach focuses on engaging with the audience that it serves.
- Extension asks what the needs are, crafts solutions, implements them, and continuously adapts and updates those programmings as needs change.
- Sea Grant Extension conducts programming in all four Sea Grant Focus areas, and engages at all levels, local to national.
- 20% of 857 Extension agents are funded by Federal Sea Grant funds - the rest are match, and other sources.
- There is room to improve on partnerships.
- By the numbers, in 2022, Sea Grant Extension has:
 - >24,000 fishermen, seafood processors, or aquaculture industry personnel modified practices
 - >5,500 resource managers used ecosystem-based approaches resources

- >2,000 new HACCP (food safety) certifications
- >1,000 trainings/technical assistance to communities
- >850 communities adopted sustainable development practices
- >350 communities increased their resilience to hazards

Dr. Sempier noted that the NOAA demand signal for Sea Grant extension is high and increasing - and expressed that this may be an opportunity for partnerships. Additionally, other agencies and organizations across the country are currently, or may be interested in partnership.

Dr. Sempier continued his presentation by introducing the Extension Assembly Executive Committee (Steve Sempier - MS-AL SGC, Julia Peterson - NHSG, Matt GOrstein - SC SGC, Sara Stahlman - PASG, Tory Gabriel - OHSG), Regional Chairs (Pat Charlebois - IL-IN SG, Mike Ciaramella - NYSG, Gabe Dunham - AKSG, Rex Caffey - LASG, Maia McGuire - FLSG, Chris Petrone - DESG), and Extension Assembly Liaisons (Jack Payne - NSGAB, Susan Lovelace - SGA/SC SGC, Chris Petrone - NSGO)

Dr. Sempier also shared a list of SG Extension’s professional development priorities

- Sea Grant Academy
- Fundamentals of a Sea Grant Extension Program
- Annual Meetings
- Sea Grant Week
- Webinar Series

In the following section, Dr. Sempier shared recent award recipients:

- 2023 Wick Career Leadership: James Fawcett - USC Sea Grant
- 2022 Superior Outreach: Calling the Coast Home Realtor Education - SC SGC

Dr. Sempier then introduces the meeting attendees to the Panel format, objectives, and panelists (Amy Schrank - MNSG, Savanna Barry - FLSG, Amalia Almada - USC SG, Michel Ciaramella - NYSG, Chris Petrone - DESG)

Panel Presentations

Dr. Amy Schrank shared her presentation titled *Hazardous Material Transport Outreach Network*

- Motivation: Increase in oil production in the US - Extension wanted to find out effects of hazmat transportation.
- HazMaTON is a trusted source of information on spill science, spill response tools and technologies, rules and regulations and current research. It has four goals:

- Emergency response planning
- Ecological impacts of spills in freshwater environments
- Transport industry structures/Flow of hazardous materials
- Economic and social impacts of hazardous material transportation
- HazMaTON's impact include increased network and user group coordination, strengthened connections among the research community, and enhanced awareness of spill preparedness and response efforts
- Dr. Schrank ended her presentation by outlining HazMaTON's next steps for the next 12 months:
 - August - September 2024: HazMaTON Summer Webinar Series
 - November 2024: Oil spill science themed issue of Lakes Letter
 - January 2025: Publish a revised HazMaTON Strategic Plan
 - February 2025: New hazmaton.org website goes live
 - June 2025: Freshwater oil spill science session (International Association for Great Lakes Research Annual Conference)

Dr. Sempier thanked Dr. Schrank and introduced the next presenter, Dr. Savanna Barry

Dr. Savanna Barry shared her presentation titled *Online Angler Education: Florida Friendly Angler & Florida Friendly Fishing Guide Programs*

- It was noted that there has been an increase in professional small boat captains and recreational anglers in FL - which puts a strain on resources. As such, a needs assessment was done, which resulted in the Florida Friendly Anglers Program.
- Currently, topics covered in the Florida Friendly Angler program include Environmental Ethics, Best Practices for Catch and Release Fishing, and Intro to Fisheries Management
- Results of this program includes
 - 181 enrolled, 148 certified : 74% inshore saltwater captains
 - Pre/post results
 - Knowledge +33%
 - Attitude/confidence +144%
 - Planned behavior change +44%
 - Long-term follow-up
 - 30 ± 3 new BMPs implemented (of 79)
 - Changes in how communicate with clients
 - Overwhelmingly positive testimonials
 - Peer-reviewed paper in preparation
 - Broader Outcomes: Economic, Environmental and Social

Dr. Sempier thanked Dr. Schrank and introduced the next presenter, Dr. Amalia Aruda Almada

Dr. Amalia Aruda Almada presented her talk titled *Seafood Equity Hub in South Central Los Angeles, CA*

- Village Market Place functions as a food hub that creates a pipeline from local and regional producers to consumers and buyers.
- A pilot program was launched in 2021
- Partners of this program described SG extension as:
 - SG extension held all the pieces and pulled the program forward and helped build partner capacities, as well as helped educators to come up with materials and topics.
- Dr. Aruda Almada then summarised what was learned, which includes
 - There is demand and interest in seafood products in South Central Los Angeles (including for mussels!)
 - Barriers include cost, availability and information/knowledge
 - Trusted community partner is critical to address barriers to adequate seafood consumption & to diversify customer base
 - Understanding consumer barriers & seed funding to address barriers is critical to producer participation
- Lastly, Dr. Aruda Almada concluded her presentation by noting the goals and future plans of this Extension project.:
 - Engage more producers: explore shared values, interest in participating, barriers to participation
 - Broaden network of community-based organisations as Food Hub partners
 - Engage more community members to understand demand, barriers, and map local seafood resources
 - Deliver education and outreach on seafood & local aquaculture

Dr. Sempier thanked Dr. Almada and introduced the next presenter, Dr. Michael Ciaramella

Dr. Michael Ciaramella presented his talk on Community Science titled *Engaging Citizens to Monitor and Document Shoreline Flooding and Erosion in the Northeast*

- Dr. Ciaramella opened by describing common interests and needs in this space, what has been done by Extension, and currently available key programs and tools (MyCoast NY and CoastSnap)
- Project outcome include
 - Communities Tracking Coastal Change website
 - Best Practices Primer, which was led by RISG

- Expansion of CoastSnap Program of the Northeast Network
- Implementation of MyCoast New York
- Project impacts were identified as:
 - Learned how to develop effective citizen science monitoring programs
 - Made this type of citizen science monitoring more accessible
 - Digital Clearinghouse (website)
 - Step-by-step Primer
 - At least 3 Sea Grant programs were able to expand their programs

Dr. Sempier thanked Dr. Ciaramella and introduced the next presenter, Mr. Chris Petrone

Mr. Petrone presented his talk titled *Laurel, Delaware: A story of transformation & resilience*.

Key points in his talk include:

- Laurel is not a major metro area, but it is home to 5 registered historic sites, and is home to Broad Creek.
- DESG was asked by Dept of Nat Resources to assist with a watershed implementation plan (WIP) to let community leaders plan the future and growth of Laurel. Part of that plan is The Ramble (2014-2015), which is a waterfront/riverwalk area along Broad Creek.
- In 2016, Nanticoke rotary and partners built a kayak launch at broad creek, and launched the inaugural watercolors event to bring the community together.
- DESG also helped Laurel on water quality improvements to “the mudhole”, which successfully stopped flooding at Tidewater Park.
- Most recently, A Nanticoke Indian inspired play area at Tidewater park was established, and the Paint Laurel Plein Air event was held.
- Affordable housing comes to laurel as a result of the cumulative effort of this program
- This all also led to the establishment of DESG’s Coastal resilience design studio.

Dr. Sempier thanked all the panelists, and opened the Q&A session.

Dr. Betzer asked Dr. Almada. “Why are mussels grown in Santa Barbara, but the featured project is in LA?”

Dr. Almada remarked that it is due to the water quality in LA - and “local” is defined as mid and southern california. Dr. Almada also noted that she will follow up with Dr. Betzer on numbers, stats, and standings.

Dr. Targett asked how panelists can share the word on these projects out to the broader community.

Dr. Sempier remarked that a common thread among these extension projects is that they are all based on relationships that were built from the ground up. He also remarked that there may be an opportunity to leverage relationships with NOAA to elevate SG Extension work.

Dr. Targett emphasized that the key to success that Extension has done is the continuous feedback and engagement with the community.

Dr. Engle asked the panelists, “What the constraints and challenges are being faced by extension, and what can the Board do to support?”

Dr. Petrone noted that the easy answer is additional funding and people (capacity). Ideally, Sea Grant would build the capacity, not just be the capacity.

Dr. Schrank built on this response, and mentioned that a challenge is also retention and people who are in that position for a long time. Especially when some personnel are only built into a grant for a limited time.

Dr. Barry further emphasized the importance of building continued engagement into the grant.

Dr. Ciaramella added that with competitive grant is useful to bring in extension, but does not provide room to bring in support staff (communication, admin, etc.)

Dr. Marrero asked, “How can other Sea Grant programs leverage build on what you have done, and how do you share the resources?”

Dr. Ciaramella shared that regional meetings are an opportunity to do so. In the last decade there has been a large increase in cross program collaboration (e.g. hubs), but there is more that can be done.

Dr. Almada added that Extension has focused area communities of practice meetings which has been a place for knowledge sharing.

Mr. Petrone highlighted the National Sea Grant Office’s communications capacity and that they have been a force in sharing extension news.

Dr. Robinson applauded Extension's effort in building long-term relationships. Dr. Robinson also highlighted that festivals have shown to be more relatable to congressional staff in comparison with site/research labs, as festivals better showcase the impacts of extension and its economic valuation/impact.

Dr. Tadlock asked Dr. Barry whether there is a plan for Florida Friendly Anglers program to expand seafood information to consumers (i.e. how to pick out seafood, how to cook it).

Dr. Barry Explained that it is being done, and has been since the pandemic. This also includes promoting locally sourced and aquaculture products.

Dr. Tadlock then asked the panel whether a city could approach a Sea Grant program, for example TXSG, for a consultation.

Mr. Petrone said that yes, it is possible. TXSG used to have a community development specialist who built community input to the planning process.

Dr. Sempier highlighted that the city does not need to pay Sea Grant, but can work together to source the required funding.

Dr. Pennock asked the panelist, "what is the tagline that we need to use for Sea Grant Extension that validates the current Sea Grant Extension approach which is currently very broad and wide?"

Dr. Barry shared her elevator pitch is that she helps people apply science in everyday life.

Mr. Petrone. This is a challenge as our focus areas are broad, but it is also why some folks like working in Sea Grant.

Dr. Sempier highlighted that breadth of topic does not mean there is no depth, but it emphasizes on the adaptability of the extension network.

Dr. Figueroa asked if there are plans to leverage networks with technology and social Media.

Dr. Ciamarella said that social media campaigns have been done, and are being done regularly. In NYSG, activity on social media depends on availability and interest of support staff.

Dr. Amy Schrank shared that it has been very useful to have the support of a graphics and video person.

Mr. Petrone shared that the most effective way to reach the younger generation is tiktok, however, some universities and organizations prohibit the use of tiktok.

Dr. Almada added that she has found success with taking student interns to do communications.

Dr. Barry emphasized that you can use network and community members to share (businesses, guides, people who are thought leaders, teachers, etc.).

Dr. Targett suggested that the tagline may be “building better communities through science”.

Dr. Engle asked if there is a need for assistance for administrators from the university for extension.

Dr. Amanda stated that she would love to see a panel that’s even broader than this conversation.

Dr. Garber just wrapping up what you said I think I heard vision grant - when we think about where did all these funding sources come from? These were 2014-2015 vision grants and what will it take to get us to this next topic?

Dr. Murray thanked everyone for their participation on the panel and introduced the next topic for discussion.

Dr. Sempier presented his talk on Emerging Issues Identified by the Extension Assembly. He opened the topic by giving a quick overview of the history of Sea Grant Extension and the key issues identified in the 2003 Report:

- Climate extension: a NOAA partnership
- SmartPorts: a partnership with NOS
- Environmental literacy: a national campaign
- Seafood science and safety: increasing effectiveness
- Sustainable coastal communities: outreach for coastal America
- Fisheries management: improving fisher-manager partnerships
- Ocean observations: developing an outreach network

Dr. Sempier then continued to list a fresh vision for the next 25 years for Sea Grant Extension.

- Adaptation required due to diversification in funding streams
- More efficient use of extension resources (e.g. admin, reporting, other demands)
- Adopting new technology
- Partnership building at all levels within NOAA and external of NOAA
- Reinforce engagement through national level extension-focused leadership
- Resources and time for state programs to build new partnerships
- Increase visibility of Sea Grant Extension within and beyond NOAA

Dr. Sempier remarked that Sea Grant Extension would appreciate and benefit from NSGAB and leadership support, thoughts, and input.

- References:
 - 2000 Report: [A Mandate to Engage Coastal Users](#) (Byrne Report)
 - 2003 Report: [Implementing the Mandate to Engage Coastal Users: Opportunities for National Sea Grant Outreach](#)

Dr. Payne thanked Dr. Sempier and congratulated the panelists and the Extension network on the outstanding work that they have done.

Dr. Murray stated that he was involved in creating the mandate to engage the coastal users report committee, as he found that communities used to be unaware of what Extension was. He also encouraged the Extension network to continue to come up with questions on how to approach/set up a committee to answer the right questions and present it at the next meeting.

Dr. Lerner stated that SG extension is highly integrated with research that is being done, and that is a very important and critical strength, and what is most important is increasing the visibility of this work and relationship.

Dr. Targett agreed with Dr. Lerner, and added that Extension needs to be framed correctly up front such that research does not seem left to the side.

Ms. Stirling followed by stating that this has ramifications for the mission committee. This space will have to be looked into carefully. For example, there should be an educational element to this program as well. It needs to be emphasized that extension, research, education have to be a continuous relationship, and not simply handing things off. Ms. Stirling said that promoting/selling this process may be what needs to be done.

Dr. Pennock brought up his concern about having a mission analysis (mission committee), and following that with extension as it may be too big of a task to take on. Timing will need to be considered carefully.

Dr. Murray commented that in the future, the value of extension is in its connection and ability to generate practical information for users. Dr. Murray urges the assembly to dig deeper into the questions posed.

Dr. Susan Lovelace from the audience commented that the discussion was missing one piece. Community needs are driving the research, but there is not enough of that yet. It is worth asking the question if Sea Grant truly is the conduit for the communities.

Dr. Sempier thanked all attendees and emphasized that the Extension network is aware of the integration with research and education.

Dr. Jim Murray closed the session, and announced a 30-minute break

3:30 pm: Strategic Discussion of the National Sea Grant College Program (NSGCP) (Dr. Jim Murray)

Dr. Murray continued the discussion on Sea Grant Extension and the Mission Committee.

Dr. Jack Payne noted that he sees the two as separate.

Dr. Murray responded that there is an overlap, and brought up that there needs to be a discussion on where to put resources.

Dr. Sempier said that the identity of Sea Grant Extension has been shrinking, as the proportion of funds has been less. A broader perspective is useful for this. Additionally, Extension is currently working on the fundamentals of extension and academy, but it is worth noting that we have a lot of new staff that need to be trained up. Best practices that come up from the Sea Grant Site Review Team visits could also add to the input to this perspective.

Dr. Pennock noted that the Board subcommittee to assess how Sea Grant is delivering on its mission will include extension. If we can find the dividing line, and for this focus on the extension side, like a Byrne Report 2. I think that this is possible as long as there is the capacity. However, I don't want to over-tax the Board. The third rail we have to be careful of is that it sounded like the assembly is charging the Board, which is not allowed.

Dr. Engle followed up by agreeing with Dr. Murray. She noted the needs that were expressed by the extension assembly are important.

Dr. Murray mentioned that one of the key needs that remains from the Byrne report is Extension's relationship with NOAA. The Byrne report is a Mandate to Engage coastal communities.

Dr. Target questions why we are singling out Extension when we keep saying that Sea Grant is a three legged stool. She suggested that the Board subcommittee to assess how Sea Grant is delivering on its mission will include extension at a higher level, but is concerned with how much load that puts on the Board. If extension was to make a general request, further discussion will be needed.

Dr. Murray noted that there have been opportunities for SG to connect with other government agencies, and highlights that there were many things that could have been done, however, he was only one person, and there is only so much one person can do. He also mentioned that it also brings up the question the role of NSGO

Dr. Robinson cautioned all that it is important to emphasize the integration of education, extension, and research

Dr. Payne noted that there are also opportunities to work with the Land Grant network,

Dr. Betzer agreed, and added that this would strengthen all 3 legs of the Sea Grant stool (education, extension and research).

Dr. Garber posed the question on how to build upon what system/infrastructure that we already have?

Dr. Murray expressed that he is looking forward to seeing what the mission committee and extension assembly will bring up in the Spring Meeting, and introduced the next topic of discussion.

Dr. Pennock expressed that he would like feedback related to program site review team visits (SRTs. SRT visits are in the planning phase, and the board will be busy at work with SRT visits this coming year. He also mentioned the importance of One SG 2066, but at the moment, he does not have a lot to add.

Dr. Figueroa opened a new topic: Sea Grant's connection to emerging technologies. AI will continue to disrupt how businesses do their work. Is there an opportunity for us to examine that moving forward? I don't want Sea Grant to be left behind on this. Can start with defining emerging technologies. As a board, what would be the next steps in engaging in this as Sea Grant?

Dr. Pennock expressed his support for Dr. Figueroa's idea. An important thing he could see is to find out what the 34 programs have been doing. We need to match up what we do and add in new thought leaders. He did caution that the national office will not be the organization that does that quickly. The national office will likely lag by many years behind due to federal security constraints - this topic may rely on the network.

Ms. Holmes added that a lot of the network university programs are advancing in that space.

Dr. Marrero suggested that we need to ask the programs what they are doing in this space. The role of the Board on this topic might be more to explore, learn, and facilitate learning from each other.

Dr. Payne connected the ideas above with telling the Sea Grant story better and how to do that beyond writing an op ed (i.e, documentary, videos, etc.).

Dr. Target spoke about trying to have a committee on education and thinks the tools we use should be a part of that discussion in order to get to an outcome that Dr. Figueroa spoke about and the future of these programs.

Dr. Murray stated that Dr. Figueoa raises a really good issue. Jack also related a good issue as well. But thinks that Sea Grant has been great in the publication realm but not so much in technology. This whole technology question needs to be explored with a communicator and maybe another potential sub-committee?

Dr. Garber added that this may be something that Dr. Figueroa might bring up during the March 2025 meeting?

Dr. Figueroa said that those are all great ideas to gather information and will connect with Ms. Holmes on how to formulate that.

Dr. Targett suggested bringing a research panel sometime soon to dig deeper on this topic.

CLOSING & ADJOURNMENT

As the meeting drew to a close, Dr. Murray proceeded to provide a general recap of the day:

- Dr. Deidre Gibson to follow up in the next meeting to find people and set up a committee on MSI Issues.
- Dr. Nancy Targett to work with Ms. Deb Stirling to find a co-chair for the Mission Committee.
- Dr. Jack Payne will present a final “State of Sea Grant” Report to Congress, with recommended changes incorporated during the October 28 virtual meeting.

With no final comments from the board, Dr. Murray thanked the Board members, speakers, participants, and organizers for their presence and contributions, and officially closed the meeting.

Meeting adjourned at 4:30 PM

National Sea Grant Advisory Board 2024 October Meeting

Agenda Item: Sea Grant Delivering on Mission Charge and Membership

Purpose

Decisional - To determine the final membership for the Board subcommittee.

Three Things You Must Know

- 1) An ever-expanding coastal population, along with the effects of climate change on the coastal environment, have greatly increased the demand for Sea Grant research, extension and education resources.
- 2) To provide additional services to meet its customer demands and legislative mandate requires a functioning core infrastructure at the NSGO and within its 34 university-based administrative entities, yet Sea Grant's core buying power has eroded despite the increased demand for services.
- 3) The Board established the subcommittee at the August 2024 Meeting to undertake a holistic assessment of Sea Grant's ability to deliver on its mission.

Background

- Sea Grant was provided strong endorsement by the IRP and the very favorable reviews by the 34 site visit teams which reviewed each Sea Grant program making it clear that overall Sea Grant performance is at a very high level.
- Sea Grant has a broad congressional mandate to address the Nation's highest priorities regarding the understanding, assessment, development, management, utilization and conservation of ocean, coastal and Great Lakes resources.
- Over the past 21 years, Sea Grant has lost more than 41% of its core buying power despite the increased demand for services.
- The Board is concerned that this erosion of the base is increasingly preventing Sea Grant from achieving its mission.
- The subcommittee is established and tasked with analyzing why this has occurred and what steps should be taken to change course.

Red Flags/Comments

- None

NSGAB Action Items

- It is proposed that a Board subcommittee be established which requires a vote and decision by the full Board.

Links

- Attached below is the charge to the Board to stand up a subcommittee.

Charge to the National Sea Grant Advisory Board to Create a Committee to Assess How Sea Grant is Delivering on its Mission

Purpose

To undertake a holistic assessment of Sea Grant's ability to deliver on its mission.

Background

The National Sea Grant College Program (Sea Grant) is a Federal-University partnership program that brings science together with a wide range of communities for sustainable solutions. Sea Grant was established by the U.S. Congress in 1966 and works to create and maintain a healthy coastal environment and economy.

The Sea Grant network consists of federal-university partnerships between the National Oceanic and Atmospheric Administration ([NOAA](#)) and 34 university-based programs in every coastal and Great Lakes state, Puerto Rico, and Guam. The network draws on the expertise of more than 3,000 scientists, engineers, public outreach experts, educators and students to help citizens better understand, conserve and utilize America's coastal resources.

An Independent Review of Sea Grant (2021) found that the place-based Sea Grant model linking research to application to community is well recognized, highly effective, and highly valued by Sea Grant's many partners. It recognized the role of the National Sea Grant Office (NSGO) in leading the network with its strategic guidance, facilitating individual program success, aggregating program outcomes into network wide accomplishments, and identifying new opportunities for partnership and growth. The Independent Review Panel (IRP) found the Sea Grant Planning, Implementation and Evaluation (PIE) system and its associated PIER database captured impacts and outcomes at local, regional, and national levels. The metrics and outcomes evaluated across all programs during the last site review (2018-2019) are impressive and reflect the strength of the program-driven science and outreach.

Sea Grant has strong support from its stakeholders, particularly the business sector, Non-governmental Organizations, and local and state governments that value its integrated approach. In 2022, the Sea Grant economic benefit was conservatively estimated at nine to one.

Charge

Given the strong endorsement by the IRP and the very favorable reviews by the 34 site visit teams which reviewed each Sea Grant program, it is clear that overall Sea Grant performance is at a very high level. However, an ever-expanding coastal population, along with the effects of climate change on the coastal environment, have greatly increased the demand for Sea Grant research, extension and education resources. To provide additional services to meet its customer demands requires a functioning core infrastructure at the NSGO and within its 34 university-based administrative entities. Yet

when adjusted for cost of living, Sea Grant core funding has not kept pace with inflation. For example, over the past 21 years, Sea Grant has lost more than 41% of core buying power despite the increased demand for services. Sea Grant's authorizing legislation says "...the National Sea Grant Advisory Board shall advise the Secretary and Director concerning...strategies for utilizing the Sea Grant College program to address the Nation's highest priorities regarding the understanding, assessment, development, management, utilization and conservation of ocean, coastal and Great Lakes resources...". The Board is concerned that this erosion of the base is increasingly preventing Sea Grant from achieving its legislative mandate. This subcommittee is tasked with analyzing why this has occurred and what steps should be taken to change course. The committee will be composed of members from the Board and the external community of experts. It will be co-chaired by a member of the Board and an external expert. The NSGO, SGA, SG Network and SG's many partners will be valuable resources for the committee. At the conclusion of its work, the subcommittee will advise the Board, NOAA, and NSGO of its findings. The analysis should include;

- What impact the expanded coastal science and outreach needs will have on Sea Grant in the years ahead,
- What resources (financial, human capital, university support, etc.) a Sea Grant program should have to ensure that it meets its legislative mandate in light of significantly expanding constituent needs,
- What minimum amount of funding is required to establish a basic and viable core infrastructure (research, extension, education, communications, and administrative services), and
- An examination of Sea Grant's place in the federal budget system and how Sea Grant's value is communicated within it (NOAA, DOC, and Congress).

Further Details and Timeline

- The full Board should plan to approve the charge and committee membership during the Summer (August 2024) Board meeting.
- The Board subcommittee should plan to provide updates to the Board during subsequent meetings and deliver a full report no later than Fall 2025.
- Following approval by the Board, the report will be forwarded to the NOAA Administrator, NOAA Assistant Administrator for NOAA Research, and the Sea Grant Director.

Commented [1]: @jim.murdog@gmail.com
Meeting notes from the Aug meeting noted language change for this charge. Peter noted that the terminology 'External Community of Experts' as a confusing term, requesting an alteration to the verbiage for clarity.
Assigned to jim.murdog@gmail.com

Commented [2]: We've always used the term external experts for our subcommittees. If you can and want to come up with a new terms, I'm open to it.

Commented [3]: @ntargett@udel.edu
Meeting notes from the Aug meeting noted language change for this charge. Peter noted that the terminology 'External Community of Experts' as a confusing term, requesting an alteration to the verbiage for clarity.
Assigned to ntargett@udel.edu

Commented [4]: We've always used the term external experts for our subcommittees. If you can and want to come up with a new terms, I'm open to it.

Commented [5]: I am OK with the "external community of experts" although we could change it to "outside experts." which would serve the same purpose and may be more to Peter's liking.

National Sea Grant Advisory Board 2024 October Meeting

Agenda Item: 2024 Biennial Report to Congress

Purpose

Decisional - This session is to discuss and vote on the 2024 "State of Sea Grant" Report to Congress.

Three Things You Must Know

1. The Biennial Report Committee has finalized the 2024 *State of Sea Grant* report to Congress based on input from the National Sea Grant Office, the Sea Grant Association, and the Sea Grant Network.
2. The Board will need to vote to approve the final report before it is shared with Congress and the public.
3. The report is to be submitted to Congress no later than January 2025. The Board will need to approve the final version during this meeting.

Background

- The State of Sea Grant 2024 is the Official Report to Congress from the National Sea Grant Advisory Board. The Report summarizes Sea Grant's contributions to the Nation in 2021-2024 and offers the following relevant topics that provide a better quality of life for American citizens and a healthy environment for America's coastal and Great Lakes communities:
- Responses to the 2020 Report's recommendations have been addressed and new recommendations have been made.
- Sea Grant's four major focus areas are represented in the report: Sustainable Fisheries and Aquaculture; Healthy Coastal Ecosystems; Resilient Communities and Economies; and Workforce Development and Environmental Literacy.
- Featured Issues include Climate Adaptation and Community Resilience, Regional Ecosystem-Based Management Collaborations, and Commercial Industry Support and Workforce Development.
- Emerging Opportunities describe Energy Transitions and Coastal Resilience, Sea Grant's role in promoting food security through aquaculture and sustainable fisheries, and the strengthening of extension and education for science-based decision-making.
- The major impacts and highlights of each state Sea Grant programs are listed.
- With the reauthorization of Sea Grant in 2020, the Board shall report to Congress at least once every four years on the state of the National Sea Grant College Program and shall notify Congress of any significant changes to the state of the

program not later than two years after the submission of such a report. The Board shall indicate in each such report the progress made toward meeting the priorities identified in the strategic plan in effect under 33 U.S.C. § 1123(c) of the Act and provide a summary of research conducted under the program.

Red Flags/Comments

- None

NSGAB Action Items

- Decisional session - a vote is required for approval

Links

- 2024 Biennial Report to Congress (attached below)
- [2022 Interim Report to Congress](#)
- [2020 Biennial Report to Congress](#)
- [2018 Biennial Report to Congress](#)
- [2016 Biennial Report to Congress](#)
- [2014 Biennial Report to Congress](#)
- [2012 Biennial Report to Congress](#)



THE STATE OF



Sea Grant

2024 BIENNIAL REPORT TO CONGRESS

LETTER FROM THE CHAIR

Dear Members of the United States Congress,

On behalf of the National Sea Grant Advisory Board (Board), it is my privilege to share with you The State of Sea Grant 2024 Quadrennial Report to Congress, developed by the Board as directed by the 2008 Sea Grant Act (PL 110-394). The State of Sea Grant 2024 provides an update on the National Sea Grant College Program (Sea Grant) over the past four years and is the seventh such report to Congress.

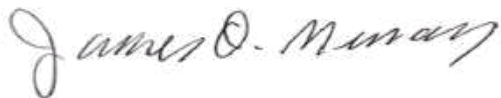
This report is flush with examples of how Sea Grant creates a culture that connects esteemed, peer-reviewed actionable science with robust and dynamic capabilities in extension and education. Sea Grant's cutting-edge planning, implementation, and evaluation system allows for intricate programmatic accountability. The summary metrics contained in this report are evidence of that adherence to programmatic accountability. The societal impacts highlighted in this report are organized within four strategic areas Sea Grant has chosen to focus its resources. Those areas are Sustainable Fisheries and Aquaculture, Resilient Communities and Economies, Healthy Coastal Ecosystems, and Environmental Literacy and Workforce Development. Please note that Sea Grant has made considerable progress on the four recommendations found in the Board's 2020 report to Congress, which include:

- (1) support implementation of its Network Visioning
- (2) amplify efforts to incorporate social and environmental justice, equity, diversity, and inclusion in its structure and programming
- (3) seek opportunities and collaborations to leverage Sea Grant's unique strengths in building coastal community resilience
- (4) make improvements based on the findings and recommendations of the Independent Review Panel and Board Evaluation Committee.

Through extensive deliberations, and in the spirit of promoting continued excellence, the Board offers four new recommendations for Sea Grant to pursue over the next four years. These include that Sea Grant: (1) should work with NOAA and Congress to strengthen core capacities with its university partners in support of research, extension, and education to achieve community impacts; (2) needs to continue environmental stewardship, balancing it with the blue economy to promote sustainability and community stability; (3) should focus on improving environmental awareness and literacy, including coastal, ocean, and Great Lakes literacy, to aid in decision-making that builds safer and more resilient communities within the communities it serves; and (4) should enhance efforts to ensure that all initiatives contribute to equitable outcomes reflecting the diverse communities we serve.

As Sea Grant funding expands to address ever more pressing societal needs, it will be critical that investments in Sea Grant's core infrastructure at the state and local levels keep pace and are balanced with the funding of new initiatives. It is because of Sea Grant's core infrastructure that such significant achievements as shown in this report are made possible. The Board also recognizes and appreciates the U.S. Congress' longstanding bipartisan support for Sea Grant, often during difficult budgetary times, and is grateful that Congress entrusts Sea Grant to address the nation's most urgent coastal needs. We look forward to continuing our work with you to address critical needs of our nation.

Sincerely,



James D. Murray,
Chair of the National Sea Grant Advisory Board



SEA GRANT PROGRAMS

Alaska Sea Grant (AK SG)
California Sea Grant (CA SG)
Connecticut Sea Grant (CT SG)
Delaware Sea Grant (DE SG)
Florida Sea Grant (FL SG)
Georgia Sea Grant (GA SG)
University of Guam Sea Grant(UOG SG)
Hawai'i Sea Grant (HI SG)
Illinois-Indiana Sea Grant (IL-IN SG)
Lake Champlain Sea Grant (LC SG)
Louisiana Sea Grant (LA SG)
Maine Sea Grant (ME SG)
Maryland Sea Grant (MD SG)
Massachusetts Institute of Technology Sea Grant (MIT SG)
Michigan Sea Grant (MI SG)
Minnesota Sea Grant (MN SG)
Mississippi-Alabama Sea Grant (MS-AL SGC)
New Hampshire Sea Grant (NH SG)
New Jersey Sea Grant Consortium (NJ SGC)
New York Sea Grant (NY SG)



- North Carolina Sea Grant (NC SG)
- Ohio Sea Grant (OH SG)
- Oregon Sea Grant (OR SG)
- Pennsylvania Sea Grant (PA SG)
- Puerto Rico Sea Grant (PR SG)
- Rhode Island Sea Grant (RI SG)
- South Carolina Sea Grant Consortium (SC SGC)
- Texas Sea Grant (TX SG)
- University of Southern California Sea Grant (USC SG)
- Virginia Sea Grant (VA SG)
- Washington Sea Grant (WA SG)
- Wisconsin Sea Grant (WI SG)
- Woods Hole Sea Grant (WHOI SG)
- National Sea Grant Law Center (NSGLC)



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Researchers observe a gray whale swimming through kelp off the Oregon coast. Photo courtesy of Oregon Sea Grant

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EXECUTIVE SUMMARY

The State of Sea Grant 2024 is the Official Report to Congress from the National Sea Grant Advisory Board. The report summarizes Sea Grant's contributions to the Nation in 2021-2024 and offers recommendations and opportunities that provide a better quality of life for American citizens and a healthy environment for America's coastal and Great Lakes communities.

Sea Grant consists of a National Office staff and 34 university-based programs, which include extension professionals, educators, communicators, and researchers, who, along with other partners, accomplish program goals in four major areas: Sustainable Fisheries and Aquaculture, Healthy Coastal Ecosystems, Resilient Communities and Economies, and Environmental Literacy and Workforce Development. Sea Grant's partners include government agencies, academia, industry, non-profit organizations, and individuals.

The recommendations made in the 2020 Report have been addressed. Actions taken are described in this report. For the 2024 Report, the Board recommends that Sea Grant:

1. Strengthen Core Capacities with University Partners

The National Sea Grant College Program collaborates with NOAA, Congress, and its university partners to strengthen its core capacities to support research, and engage in extension and education that collectively

achieve community impacts. This enhancement will support research, extension, and education, ultimately achieving significant community impacts and addressing growing societal needs for climate readiness and resilience.

2. Balance Environmental Stewardship with the Blue Economy

The program continues to promote environmental stewardship, including topics like renewable energy, aquaculture, and mariculture, while promoting sustainability and community stability. This balance can be achieved through workforce development and ensuring healthy coastal ecosystems.

3. Improve Environmental Awareness and Literacy

The program enhances its focus on environmental awareness and literacy, including ocean, coastal, and Great Lakes literacy, which is crucial for safer and more resilient communities, aquaculture, and healthy coastal ecosystems.

4. Ensure Equitable Outcomes Reflecting Diverse Communities

The program deepens its commitment to social and environmental justice, equity, and inclusion. This involves assessing, broadening, and embedding these principles within its organizational framework and activities to ensure all initiatives contribute to equitable outcomes and accurately reflect the diverse communities served.

RESPONSES TO 2020 RECOMMENDATIONS

RECOMMENDATION ONE

The National Sea Grant College Program should continue to support the implementation of the Network Vision Plans.

RESPONSE

The National Sea Grant Office (NSGO) and the Sea Grant Network successfully used the 11 Network Visioning Plans to guide and implement Sea Grant strategic priorities during the 2020-2024 period. In 2020, the NSGO provided competitive funds that supported implementation of the plans and the development and enhancement of formal Communities of Practice (CoPs) for most of the network visioning topical areas. The plans and CoPs served as important cornerstones for the development of new partnerships and the development of the 2024-2027 National Sea Grant College Program Strategic Plan. Specifically, NSGO staff designated as Focus Area Leads for the strategic planning effort reviewed and incorporated the vision documents relevant to their focus area during the first phase of Strategic Plan development, which informed the 2024-2027 Strategic Plan. NSGO staff also supported the Sea Grant functional or topical networks (such as the Fisheries Extension Network and the Water Resources Network) in implementing specific Network Vision Plans through supporting network and community meetings, facilitating partnership development and, where possible, providing new financial support for network liaisons and direct implementation of goals. Notably, the Diversity, Equity, Inclusion, Justice and Accessibility (DEIJA) CoP was supported in the development of the new Community Engaged Internship Program for underserved undergraduates and network-wide engagement evident throughout this document and acknowledged specifically in the Executive Summary.

RECOMMENDATION TWO

The National Sea Grant College Program should continue and amplify efforts to incorporate social and environmental justice, equity, diversity, and inclusion in its organizational structure and programming.

RESPONSE

Serving all of the nation's coastal and Great Lakes communities has been a cornerstone of Sea Grant since its inception in 1966. Over the past four years, the National Sea Grant Office (NSGO) has implemented several practices supported by peer-reviewed studies to enhance diversity, equity, inclusion, justice, and accessibility (DEIJA) in its granting processes. These changes include: modifying Sea Grant competitive applications to better serve applicants from diverse backgrounds; requiring bias awareness training for reviewers; and developing and implementing a demographic survey to assess the communities served by grant awards; encouraging applications from diverse groups through a DEI statement in funding opportunities; and surveying aquaculture engagement at Minority Serving Institutions (MSIs) to determine how to better support these efforts. Internally, Sea Grant has brought on Knauss fellows and federal employees to support DEIJA efforts, and continues to participate in broader NOAA and interagency groups focused on social and environmental justice, equity, diversity, and inclusion.

With funding from recent legislation, Sea Grant established new competitive opportunities focused on climate workforce development, marine debris prevention, and technology development for marine debris removal, with several designated as Justice40 programs to support historically underserved communities.

RECOMMENDATION THREE

The National Sea Grant College Program should continue to actively seek opportunities and collaborations to leverage Sea Grant's unique strengths in building coastal community resilience.

RESPONSE

Sea Grant has deep roots in communities across coastal and Great Lakes states and U.S. territories and works with them to improve resilience and reduce impacts from extreme weather, climate change, and coastal hazards. Over the past four years, through direct investments supported by additional Congressional funding and new partnerships, Sea Grant programs across the U.S. scaled up hands-on community engagement and science capacity and projects in support of community resilience (see 2023 Resilience Investments and USCRP Partnership for more detail). Highlights include a continued partnership with NOAA's Disaster Preparedness Program to support innovative all-hazard initiatives; partnering with the Department of Defense to assist military and adjacent communities; leading research to understand needs related to climate-induced mobility by leveraging National Science Foundation funding; and developing a user-friendly guide for an interagency sea level rise report. Sea Grant also successfully increased engagement with Tribal, Indigenous, and historically marginalized and/or underserved communities, to improve resilience and reduce impacts from extreme weather, climate change, and coastal hazards by supporting local and Indigenous knowledge sharing, and additional research, bringing communities and decision-makers together to co-develop information and actions to improve community preparedness and adaptation. In 2022 (as reported in 2023), Sea Grant's work resulted in: 1,099 communities receiving training to improve resilience with 354 of those communities implementing sustainable development practices to improve resilience to date; and 1.1 million acres were restored or protected as a result of Sea Grant activities.

RECOMMENDATION FOUR

The National Sea Grant College Program should make adjustments based on the findings and recommendations of the Independent Review Panel and Board Evaluation Committee.

RESPONSE

In 2020, the National Sea Grant Advisory Board (NSGAB) thoroughly reviewed the site review visit process and concluded that it has matured into a highly effective tool, providing valuable insights for the Sea Grant community. They also identified opportunities for improvement. The NSGO incorporated feedback and recommendations from the NSGAB into a revised Site Review Visit Guidance document, aiming for continuous improvement in future site review processes. In 2021, an independent review of the National Sea Grant College Program was conducted and concluded that Sea Grant delivers substantial accomplishments and impacts, with a strong return on investment. The NSGO was found to effectively administer and grow the program's ability to achieve its mission, and four recommendations were given to facilitate NSGO's continued improvement: 1) upgrade and improve the Sea Grant Planning, Implementation, Evaluation and Reporting (PIER) database; 2) align Sea Grant Planning, Implementation, Evaluation (PIE) policy with the new OAR line office review policy; 3) revisit Sea Grant's Allocation of Funds policy; and 4) revisit the Sea Grant Partnership Framework.

Since 2022, the NSGO has worked to address these recommendations by: 1) working with NOAA IT to make critical improvements to the PIER database while awaiting platform stability and resources/funding to support the development of a new PIER database system; 2) working with OAR to ensure that the upcoming Independent Review of the National Sea Grant college Program and the NSGO in 2026 achieves the review goals for both Sea Grant and OAR; 3) carrying out an Advisory Board-led assessment of the 2014 Allocation Policy and issuing an updated Policy for the Allocation of Funds, FY 2024 and Beyond (Allocation Policy); and 4) reassessing and updating the Sea Grant Partnership

Framework to ensure that it is focused and responsive to the strategic priorities in the 2024-2027 Sea Grant Strategic Plan. Each of these items will continue to be revisited on a regular basis to ensure that Sea Grant's commitment to continual improvement is achieved.

SEA GRANT MODEL

In 1966, Congress passed the National Sea Grant College and Program Act, which charged the federal government to develop a network of Sea Grant Colleges modeled after the Land Grant College system. This model combines research with public engagement through its extension, legal and communication services and education programs. Sea Grant extension can be defined as the delivery of scientific research and knowledge to fishers, community leaders, and other Sea Grant constituents, while identifying their needs in order to inform new scientific inquiry.

From the beginning, it was anticipated that the three pillars (research, extension, education) and the network of cooperating universities would be mutually supportive. Time shows that the vitality of coastal and Great Lakes communities, their habitats, and their ecosystems, together with the marine resources upon which these communities depend, benefit from Sea Grant's programs far more profoundly than Sea Grant's founders imagined.

Those benefits come from the power of the Sea Grant model, a synergistic interplay of goal-directed research, conducted by many of our nation's finest scholars, with the rapid and sustained application of that knowledge to solve problems and make better informed choices. Sea Grant's use-inspired research agenda is informed by constituent input and then directed toward solving local and national coastal and Great Lakes issues.

The education and development of new generations of researchers and staff from diverse fields are integrated into Sea Grant's research, education and extension activities. That integration, along with a balanced investment in research, extension, and education, is the commitment of a multitude of individuals in academia, government, and industry throughout the Sea Grant network. Their contributions support the economic, environmental and social vitality of our nation's oceans, coasts, and Great Lakes and the communities that depend on them.

SEA GRANT'S FOCUS AREAS

SUSTAINABLE FISHERIES AND AQUACULTURE

Since Sea Grant's inception over 55 years ago, its support of Sustainable Fisheries and Aquaculture has focused on topics including species improvements, production methods, gear technology, management, workforce development and training, processing, food safety, business development, economics and marketing, permitting, and restoration. From revitalizing shellfish beds to pioneering seaweed farms, the Sea Grant network is making waves in the aquaculture industry. Through innovative research, collaborative extension programs, and timely responses to crises like the COVID-19 pandemic, Sea Grant initiatives across the U.S. are bolstering commercial fishing, supporting sustainable aquaculture practices, and ensuring the safety and accessibility of seafood. Below is a snapshot of the diverse projects undertaken by Sea Grant, highlighting their impact on both the economic vitality and environmental health of coastal communities.

Aquaculture

A sustainable U.S. aquaculture industry creates jobs in the blue economy and can help reduce the \$20.3 billion federal seafood trade deficit (2023 value). Aquaculture research, education and engagement (communications, extension and legal) programs implemented by Sea Grant are grounded in the needs identified by the aquaculture community. These programs cover applied and basic research, education and engagement.

FL SG's long-term aquaculture research and extension programs continue to support Florida's clam and shellfish industry. The industry currently supports 543 jobs and \$14.7M in labor income annually in underserved, rural coastal counties.

AK SG and partners developed a program to provide tools and training for aspiring Alaskan seaweed farmers. At least four new seaweed farms and two seaweed hatcheries were established as a result of these programs.



A man holds up a cord of cultivated sugar kelp in Washington. Photo by Stephen Schreck, Puget Sound Restoration Fund

SEA GRANT'S FOCUS AREAS

Sea Grant supported the creation of specialized aquaculture hubs to focus on priorities of the industry:

CT SG led the Sea Grant National Seaweed Hub and served as a contributing expert to the 2022 Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) report on food safety for seaweed.

MN SG brought much-needed expertise and networking to Great Lakes-region aquaculture. Sea Grant's Great Lakes Aquaculture Collaborative, a project inclusive of all the Great Lakes Sea Grant programs, provided training, resources, funding opportunities, expertise, marketing, consumer services, and networking for aquaculture producers, consumers, and marketers across the region.

A history of working in restoration aquaculture allowed Sea Grant to quickly pivot during COVID-19 to support the shellfish industry when many restaurants were closed:

NJ SGC created a habitat restoration market opportunity for oyster farmers whose markets collapsed due to the COVID-19 pandemic. Seventy-three thousand oysters were purchased from sixteen New Jersey farmers to enhance oyster reef habitat at four locations.

MS-AL SGC used COVID-19 Rapid Response funding to purchase approximately 575,000 oysters from farmers, when markets were limited, to place onto reefs for restoration in Alabama and Mississippi. This was the equivalent of restoring 29 acres with an economic value of \$764,634.

Commercial, For-Hire, and Recreational Fishing

The Sea Grant Network's support of outcome-based programs for the commercial wild capture, for-hire charter and recreational fishing industry has endured for more than 50 years. Sea Grant's research, education and engagement programs develop the best available science that is applied by industry and resource managers.

GA SG and **NC SG** organized a Ropeless Fishing Gear Technology Workshop, to review and assess the applicability of the gear for use in the commercial black sea bass pot fishery. The workshop led to the South Atlantic Fishery Management Council including black sea bass on-demand pot gear in their black and gag grouper framework amendment.

FL SG supports the state in managing, deploying and monitoring its network of 3,800 artificial reefs that are used by 48% of Florida's saltwater anglers targeting reef fish in the Gulf of Mexico, and generating \$3B in economic activity.

WA SG worked to bridge the gap between commercial harvesters and seafood buyers through an ongoing consumer marketing awareness campaign to encourage direct sales of seafood in Washington.



Gray Snapper congregate around an oil platform jacket at the Port Mansfield Liberty Ship Artificial Reef Site. Photo courtesy of Texas Sea Grant.

SEA GRANT'S FOCUS AREAS

MI SG's Great Lakes Angler Diary (GLAD) program recruits anglers to use an app to submit numerical and geographical data about fish they catch. Data has helped the Michigan Natural Resources Commission and Michigan Department of Natural Resources make informed decisions about steelhead harvest limits and other fishery policies.

OH SG organizes the annual Ohio Charter Captains Conference to help Lake Erie charter businesses be more successful through training in business management, regulatory requirements, and environmental issues.

Seafood Marketing



A man holds a Golden Shiner bait fish. Minnesota Sea Grant and partners developed the Sea Grant Great Lakes FreshFishFinder.org website to connect consumers directly to fresh fish suppliers. Photo courtesy of Minnesota Sea Grant



Robby Brandano, head of purchasing and sales at Great Eastern Seafood, examines fresh haddock ready for processing in Boston. Photo courtesy of the Cape Cod Commercial Fisherman's Alliance

Marketing seafood ranges from highly processed products sold nationwide to niche marketing at the local level. To help with seafood marketing,

MI SG and partners developed the Sea Grant Great Lakes FreshFishFinder.org website as a Great Lakes region wide website to connect aquaculture producers, bait dealers, and commercial fishers directly to consumers in response to the shift in market conditions and supply chains caused by the COVID-19 pandemic. The website was an initiative of the Sea Grant Great Lakes Aquaculture Collaborative.

RI SG's Legal Program provided essential analysis to Manna Ocean Foundation to enable them to launch an organic seafood label. The U.S. had not established any organic standards for seafood, making it difficult for domestic products to satisfy consumer demand or participate in market growth for organic products.

MIT SG applied COVID-19 Rapid Response funds to help develop alternative markets and revenue streams for sustainable fisheries in Massachusetts. Creating new markets for smaller haddock and skate as a sustainable long-term model to support the fishing community and contributing to food banks and food pantry systems in Massachusetts and the region are an added benefit for constituents.

CT SG implemented a three-phase project providing short-term work and income to industry contractors to offset the economic hardships from COVID-19 that directly benefited 33 companies by providing alternative marketing strategies, updated direct marketing guidance, help with financial applications, a web site featuring shellfish businesses and compensation to those participating in the natural bed rehabilitation and broodstock planting program.

HEALTHY COASTAL ECOSYSTEMS

The United States manages millions of square miles of coast that contains diverse and productive ecosystems. These ecosystems span the tropics to the Arctic to the Great Lakes and support a variety of recreational, commercial, and subsistence activities, from tourism to coastal hazard preparedness to reducing marine debris. Sea Grant collects, translates, and applies scientific information to maintain and restore healthy coastal ecosystems. Sea Grant's comprehensive approach underscores its indispensable contribution to safeguarding marine ecosystems and coastal communities.

Habitat Restoration and Coastal Resilience

Sea Grant programs are actively involved in coastal habitat restoration and resilience projects.

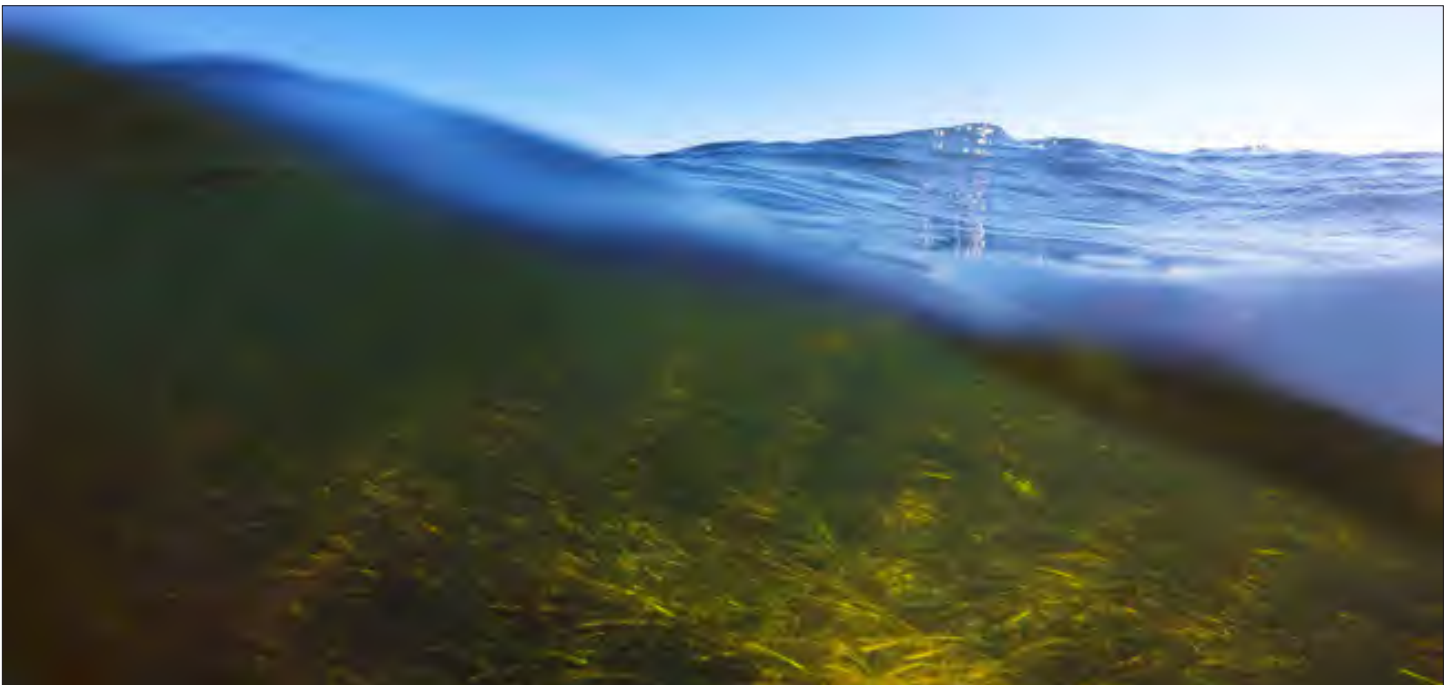
WA SG is working on the application of coastal resilience models that mitigate risks, protect infrastructure, and enhance community preparedness and is involved in King Tides and sea level rise research in coastal communities.

OR SG is helping to create a carbon-neutral future by reducing pollution that causes climate change and other actions, as well as accelerating nature-based solutions that store greenhouse gas emissions.

NY SG is evaluating the potential of seagrasses for carbon sequestration, identifying heat and disease resistant strains of bay scallops and investigating opportunities for the aquaculture industry, such as the cultivation of seaweeds, cold storage of shellfish larvae, and perceptions of ecosystem benefits of oysters.

DE SG is involved in environmental DNA (eDNA) research and monitoring projects to study aquatic ecosystems and biodiversity in Delaware's coastal waters.

UOG SG conducts engagement and research programs on a recurring issue of eroding soil bleeding into the sea. The resulting sedimentation smothers and kills coral reefs and harms nearshore fisheries.



A seagrass meadow underwater. A New York Sea Grant-led team is assessing the ability of seagrass to draw down carbon dioxide from the aquatic environment. This could reduce the effects of ocean acidification. Photo by Kaitlyn O'Toole, New York Sea Grant



A landscape photo of Narragansett Bay, Rhode Island. A research team led by Rhode Island Sea Grant showed that ecosystems in the bay are affected by nitrogen output from the Rhode Island Sound. Photo courtesy of Rhode Island Sea Grant

Water Quality

Sea Grant programs across the nation are involved in efforts to improve coastal and Great Lakes water quality.

OR SG helped the Oregon Department of Environmental Quality develop ocean acidification and hypoxia assessment methods to address Oregon's requirements for the Federal Clean Water Act and related submission to the EPA.

RI SG elucidated connections between Rhode Island Sound and Narragansett Bay. These water flows play a critical role in transferring nitrogen in this system, with the potential for improvement and degradation of water quality in this system.

SC SGC implemented "Water Chats", a water quality technical training program that connects natural resource professionals and decision-makers with the latest water quality research in the state to inform management decisions.

NJ SGC helps improve coastal water quality through its Extension, Education, and Research activities. Their Extension Program has coordinated the Clean Vessel Act program in New Jersey for over twenty years, reducing boat sewage waste from entering our estuarine and coastal waters by transferring the waste at pumpout stations at marinas and designated clean vessel boats.

Marine Debris

Sea Grant programs across the nation play a pivotal role in addressing marine debris, showcasing their commitment to mitigation through diverse strategies and collaborative efforts. Sea Grant action plans extend beyond community cleanups, effectively mitigating single-use plastics and engaging in innovative recycling initiatives.

AK SG spearheaded a multi-partner response to Arctic marine debris, engaging communities, Tribes, businesses, and government agencies to tackle the challenge posed by increased maritime vessel traffic in the northern Bering Sea and Bering Strait, which served as a model for coordinated response efforts, spotlighted in key reports like the NOAA Arctic Report Card and the NOAA Marine Debris Program.

DE SG, along with partners and volunteers removed 340 derelict crab pots from the Delaware Inland Bays. Derelict crab pots can cause damage to boat propellers and often trap other sea creatures.

MS-AL SGC marine debris program led 162 cleanup events resulting in more than 95 tons of debris removed and included over 7,300 volunteers that contributed more than 20,000 hours of volunteer service during the past four years.

OH SG led efforts to prevent and mitigate marine debris. Their beach cleanups have removed 286 pounds of trash, restored 37 acres, and gathered 384 volunteer hours.



A volunteer walks along a beach in Georgia collecting trash in a bag made from an old shrimp net. Georgia Sea Grant began the “Trawl to Trash” program, purchasing discarded nets from shrimpers to re-use as trash collection bags. Photo courtesy of Georgia Sea Grant

SEA GRANT'S FOCUS AREAS

The **WHOI SG** shrink wrap recycling program educates residents and businesses about single use plastic and provides a mechanism to recycle the plastic wrap used to protect boats in the winter months. In 2021 more than 20,000 pounds of plastic was diverted from the landfill, incinerator, or improper disposal, and reused in new products.

CT SG and **NY SG** led an effort with 45 partner organizations and institutions to complete the 2022-2027 Long Island Sound Marine Debris Action Plan, identifying strategies and actions to address single-use plastic and other consumer debris.

GA SG's Trawl to Trash project brings together commercial fishers, coastal residents, and local K-12 students to prevent litter from entering the marine environment while also inspiring behavior change in Georgia's coastal communities.

RESILIENT COMMUNITIES AND ECONOMIES

In 2020, 129 million people – or 40% of the United States' population – lived in coastal counties of the United States (US) and its territories. This represents an increase of 46% over the past 50 years (NOAA Office for Coastal Management Economics and Demographics). Within those counties, 54.6 million people were employed. They earned \$4 trillion in wages and produced \$10 trillion in goods and services (2020 NOAA Report on the US Marine Economy). By 2020, the marine industry alone – the businesses that rely upon the ocean or Great Lakes for their existence – supported more than 163,000 businesses and 3 million jobs nationally. This represents an average increase of 15% in marine industry businesses since 2010. The growth of coastal communities and economies increases their vulnerability to extreme weather, tsunamis, and catastrophic events such as Hurricanes Ian, Ida, Typhoon Mawar, and various atmospheric rivers that have hit the US mainland west coast. Communities located near sea level are at particular risk of damage during such storms and events. Communities can build resilience to such events through planning, education, use of nature-based solutions, and disaster response preparation and implementation. Sea Grant's research, extension, and education build capacity at the local level to assess and reduce risk to local communities.

Training and Education

SC SGC and **LC SG** and partners teach 12 unique continuing education courses for real estate professionals. These focus on coastal and shoreland ecosystems, water quality, flooding, floodplain mapping, flood insurance, septic and drinking water systems, and building regulations in critical coastal and shoreland areas.

These courses build real estate professionals' knowledge, and both knowledge and resilience of home buyers and sellers to water resource-related, coastal, and ecosystem challenges such as flooding, sea level rise, and erosion. More than 1,875 real estate professionals were educated in 80 workshops



A home sits atop a hill near the embankment of a body of water. Lake Champlain Sea Grant hosts several real estate continuing education classes that familiarize realtors with coastal home information to pass on to their clients. Photo courtesy of Lake Champlain Sea Grant

SEA GRANT'S FOCUS AREAS

sponsored by the two programs since 2014, which allowed them to expand their knowledge and share resources with their clients. In FY2021 alone, the economic value of Lake Champlain Sea Grant's real estate professionals' education program was estimated at \$22 million.

PR SG collaborates with the National Disaster Preparedness Training Center (NDPTC) to coordinate sessions of the Natural Disasters Awareness for Community Leaders and Planning for Disaster Debris Management.

PR SG has provided certified courses in Spanish to 74 community leaders, and other professionals from Puerto Rico and the U.S., free of charge.

Planning and Implementing: Building Resilience in Military Communities

GA SG made connections with the U.S. Department of Defense (DOD) that led to a \$6.8 million grant to **MS-AL SGC** to install living shoreline at Keesler Air Force Base in Biloxi, Mississippi to reduce wave erosion, prevent marsh degradation and improve the base's resilience to extreme weather events.

Legal and Policy: Partnering to Create Model Flood Insurance Bylaws

WHOI SG partnered with the National Flood Insurance Program (NFIP) office and with FEMA Region I to create a model bylaw for NFIP compliance statewide. The bylaw is now required to be adopted by the 341 coastal communities in Massachusetts that participate in the NFIP. This work contributed to the profitability of over 350 small family businesses, supporting over 600 jobs.

ENVIRONMENTAL LITERACY AND WORKFORCE DEVELOPMENT

Environmental Literacy



Students from Vigor High School (Prichard, Alabama) build remotely operated vehicles (ROVs) as part of Mississippi-Alabama Sea Grant Consortium-funded programming with Discovery Hall Programs at Dauphin Island Sea Lab on Dauphin Island, Alabama. (Photo by Discovery Hall Programs)

Environmental Literacy involves fostering opportunities for all to understand their place in the environment. It includes professional learning for formal and non-formal educators, as well as opportunities for students, youth, and community members to participate in a variety of experiences provided by Sea Grant programs.

A knowledgeable and skilled population is crucial for the future health of the planet. Sea Grant tackles this challenge head-on by fostering an environmentally literate public that reflects the range of diversity in coastal communities. From training middle schoolers in Maine to identify microplastics to equipping Alaska's coastal residents with climate resilience tools, Sea Grant empowers citizens of all ages through lifelong formal and non-formal learning opportunities.

SEA GRANT'S FOCUS AREAS

Additionally, Sea Grant cultivates a diverse and skilled workforce equipped with the scientific, technical, and communication expertise needed to address pressing local, regional, and national ocean and coastal challenges.

An Environmental Literacy model is the Center for Great Lakes Literacy (CGLL), a collaborative effort led by Sea Grant educators throughout the Great Lakes watershed (**IL-IN, MI, MN, NY, OH, PA, and WI**). CGLL is a regional network of Sea Grant educators and partners that foster basin-wide Great Lakes stewardship by providing hands-on experiences, educational resources, and networking opportunities among an engaged community of educators, scientists, and youth. In 2022, the CGLL team enhanced coordination with the Great Lakes Sea Grant Directors Network, launched a regional newsletter, started a teacher mentorship program, and presented it at meetings and conferences. But most importantly, the team developed innovative virtual learning materials accessible to educators on issues of critical importance to the region. In March 2023, CGLL launched two new modules featuring aquatic invasive species (AIS) and the urban water cycle. In one year, CGLL has supported professional learning opportunities for 150 educators and directly impacted 3,800 youth.

Workforce Development

Sea Grant invests in building a knowledgeable and skilled workforce through targeted initiatives. This includes providing undergraduate and graduate students, as well as postgraduates, with valuable hands-on experience and access to cutting-edge scientific resources. By empowering individuals to develop expertise in coastal and marine resource management, Sea Grant ensures a future workforce prepared to adapt and thrive in a changing environmental, social, and economic landscape. Sea Grant's workforce development initiatives:

- Grow awareness among the nation's diverse population of career paths that support the needs of the nation's coastal communities.
- Increase opportunities for undergraduate and graduate students, and post-graduates to gain knowledge, skills, and experiences in the science and management of watershed, coastal and marine resources.
- Ensure the existing and future workforce can adapt and thrive in changing environmental, social, and economic conditions.

An example of a targeted workforce development initiative is the Delaware Technical Community College Green Infrastructure Workforce Development Program. In 2019, **DE SG** formed a collaborative partnership with Delaware Technical Community College, the state's open-admission institution of higher education, to provide workforce training for students and early career professionals. The paid internship program focuses on the lifecycle of a green infrastructure project, emphasizing: (1) site assessment and design, (2) materials procurement, (3) construction, (4) post-construction monitoring, and (5) long-term site management.

Participants learn job-specific skills through hands-on fieldwork, explore careers by working directly with industry professionals, and develop a resume/cover letter and interview skills. Projects range from working in headwater ecosystems (constructed wetlands, riparian buffers) to the coast (living shorelines, subtidal oyster reefs). Over four years, 34 participants engaged in over 10,000 hours of training in the program. Preliminary evaluation of the program showed that the program has been broadly beneficial and has had a positive impact in terms of increased career awareness, technical skills, and confidence in gaining meaningful employment.



SEA GRANT'S FEATURED ISSUES

Climate Adaptation and Community Resilience

Community resilience in the context of climate adaptation refers to the ability of communities to prepare for, withstand and recover from, the impacts of climate change. It involves building adaptive capacity, social cohesion, and resourcefulness within communities to effectively respond to environmental challenges and disruptions caused by climate-related disasters. Community resilience strategies aim to enhance the ability of communities to bounce back, adapt, and thrive in the face of changing climate conditions.

Ocean Climate Action Plan

Sea Grant supports the goals of the Ocean Climate Action Plan (OCAP). The Plan, announced by the White House in 2023, is a comprehensive strategy aimed at addressing climate change impacts on the ocean and coastal areas. Key components of OCAP are:

- Creating a carbon-neutral future
- Accelerate nature-based solutions
- Enhance community resilience to ocean change.

Some examples of Sea Grant programs to create a **carbon-neutral future** are the Clean Boating Program offered by **FL SG**, publications provided by **HI SG** on the ramifications of increasing temperatures of the world's oceans, research by **MIT SG** on coastal carbon sequestration, and **WA SG's** research on Kelp Aquaculture (which grew out of the ability of macroalgae to absorb nutrients and carbon dioxide as it grows). Kelp and other seaweeds also can be grown for food, animal feed, organic fertilizer, biofuels and other sustainable products.

Regarding the second component, the acceleration of **nature-based solutions**, one notable publication is "Nature-Based Solution Manual for Kiawah Island" by **SC SGC**, which aims to enhance community resilience on Kiawah Island. **WI SG's** "Nature-Based Shorelines for Wisconsin's Great Lakes Coast" uses or mimics natural features to stabilize the coast. These natural features can include vegetation, beaches, dunes, and reefs.

A landscape image of Hanauma Bay, Hawai'i. Hawai'i Sea Grant has produced new research showing the consequences of raising ocean temperatures. Photo courtesy of Hawai'i Sea Grant.

SEA GRANT'S FEATURED ISSUES

LA SG is helping the Pointe-au-Chien Indian Tribe develop nature-based solutions to mitigate climate related hazards, which threaten the Tribe's continued existence in the region and ability to thrive.

In the third component, **enhancing community resilience to ocean change**, Sea Grant plays a significant role in supporting communities to prepare for and adapt to ocean changes. A key example is in **Hawai'i**, where Sea Grant is assisting efforts to assess the readiness of the state to handle the impacts of climate change on its communities.

In Georgia, Sea Grant is helping coastal communities in low lying areas build resilience into planning efforts. **GA SG** is partnering with the US Dept. of Defense to help protect coastal installations and surrounding communities from climate change, shoreline erosion, extreme weather, and flooding. This work by Georgia Sea Grant is now spreading to Dept. of Defense installations across the country.

Climate adaptation planning capacity for coastal communities & Tribes

The National Sea Grant College Program is active in helping communities in their climate adaptation and resilience, from planning to implementation. Programs are helping to identify vulnerable communities most affected by climate change and develop science-based, expert-informed resources and approaches to implement climate change adaptation and resilience strategies. Sea Grant assists coastal and Tribal communities with climate adaptation planning by providing scientific research on climate impacts, facilitates community engagement, and offers technical support. Sea Grant integrates traditional ecological knowledge with western scientific research to address unique climate challenges effectively. Sea Grant helps communities understand vulnerabilities to sea level rise, coastal erosion, and severe weather events through tailored resources like vulnerability assessments and mapping tools. Furthermore, Sea Grant's educational initiatives raise awareness and inform policymakers, while partnerships with local agencies and organizations enhance resource coordination.

FL SG, LA SG, MS-AL SGC, TX SG, and at least nine communities have incorporated adaptation strategies into their hazard mitigation and/or comprehensive plans, and funded 25 overall community adaptation projects as part of The Gulf of Mexico Climate and Resilience Community of Practice initiative. The group also has recognized four individuals, four communities, and one community-based organization for excellence in climate resilience through the Spirit of Community Award.



Boats on Bayou Pointe-Au-Chien, Louisiana. Due to climate change, this area experiences one of the highest global rates of sea level rise. Louisiana Sea Grant assisted the Pointe-au-Chien Indian Tribe in developing nature-based solutions to mitigate climate related hazards. Courtesy of Louisiana Sea Grant

SEA GRANT'S FEATURED ISSUES

LA SG created detailed time-series maps of land loss that shows Hurricane Ida's impact on the Pointe-au-Chien Indian Tribe's traditional lands, information that the Tribe is using to help inform local climate adaptation and protection planning processes and communicate their needs externally to identify sources of support for their efforts in becoming more resilient to future storm impacts.

ME SG's Climate Resilience Coordinator led critical stages of information gathering, report writing, and communication for the Community Resilience Workbook which offers an inventory of best practices, useful tools, available resources, technical experts, and all current climate adaptation activities across the state. This led to secondary state and NGO investments to use the resource as a scaffold for a state-wide education and technical assistance program beginning in 2023. This statewide effort aligned activities and galvanized a commitment for a Maine climate preparedness best practices information clearinghouse which can evolve under the oversight of state agencies.

AK SG and partners developed a new resilience planning tool that provides a five-step resilience planning process with resources and case studies. This tool was made available to over 80 Tribes in Alaska that have received funding from the Bureau of Indian Affairs to create climate adaptation plans. These climate adaptation plans help communities envision the future and develop actions now to support increased future well being.

WA SG partners on the Northwest Resilience Collaborative's Tribal Coastal Resilience Portfolio develop a better understanding of the climate readiness of Northwest Tribes, provide actionable knowledge for advancing climate adaptation, and enhance the capacity for addressing climate risks.

HI SG led the five-year update of the Hawai'i State Sea Level Rise Vulnerability and Adaptation Report in 2022, in partnership with the State of Hawai'i and University of Hawai'i Climate Resilience Collaborative. The updated Report was published in December 2022 and summarizes advances in global climate predictions, provides updated projections for sea level rise throughout the Hawaiian Islands, catalogs the actions taken in response to the nine recommendations and 49 recommended actions in the previous Report, and sets updated priority recommendations over the next five years to guide Hawai'i's response to sea level rise.



Boats rest at the dock in Hydaburg, Alaska. Hydaburg, home to the native Haida Tribe, experienced shrinking populations and harvest of salmon, hooligan, herring, and shellfish as a result of climate change. Alaska Sea Grant and partners developed a resilience planning tool that was made available to over 80 Tribes in Alaska. Photo by Davin Holen, Alaska Sea Grant

Regional Ecosystem-Based Management Collaborations

Individual Sea Grant Programs are greater than the sum of its parts. In addition to working at the local and state levels, State Sea Grant programs collaborate at regional and national levels to address larger geographic issues including chronic and acute disasters. Regional-based management collaborations of Sea Grant programs involve partnerships and initiatives that focus on enhancing aquaculture, coastal community resilience, and advancing Indigenous aquaculture practices. These collaborations aim to promote sustainable practices, research, and communication within specific regions. Regional examples include:

The four **Gulf of Mexico Sea Grant College programs (TX, LA, MS-AL, and FL)** develop and implement Gulf of Mexico-wide Extension programs focused on diverse topics including reef fish, oil spill science outreach after the Deepwater Horizon Spill, and climate and resilience topics through leading a climate and resilience Community of Practice.

In the **South Atlantic region, Sea Grant College Programs from SC, GA, and FL** are leading contaminants of emerging concern research programs with priorities informed through community engagement. Programs from NC, SC and GA are developing a regional commercial fishing workforce training program; and all five South Atlantic programs (NC, SC, GA, FL and PR) recently held a regional climate resilience workshop to share resources and best practices and develop collaboration opportunities based on shared priority issues and needs.

In the **Pacific region, Sea Grant College programs, including AK, WA, OR, CA and USC**, collaborate on strengthening the renowned commercial fishing industry and the growing aquaculture industry through the west coast seafood marketing efforts, development and provision of resources for businesses; training and apprenticeship programs for producers throughout their careers; and applied research that increases the resilience of fishing, aquaculture and seafood products and communities in the face of uncertainty, such as climate change, pandemics, global market cycles and new ocean uses, such as offshore wind energy.

Students participate in trawling aboard a research vessel as part of Mississippi-Alabama Sea Grant Consortium-funded programming with Discovery Hall Programs at Dauphin Island Sea Lab on Dauphin Island, Alabama. Photo by Discovery Hall Programs



SEA GRANT'S FEATURED ISSUES

The **Mid-Atlantic programs, including DE, MD, NC, NJ, NY, PA and VA** collaborate on a number of initiatives, including oyster aquaculture as in hatchery operations, field and classroom-based educational programs; invasive species education; and rip current and surf zone safety in the wake of numerous fatal and near-fatal events along their popular beaches. Several state programs are currently working together to develop unbiased offshore wind resources in hopes of clarifying misconceptions and misinformation.

The **Great Lakes Sea Grant Network's Center for Great Lakes Literacy** is a collaboration effort led by Sea Grant educators throughout the Great Lakes watershed to foster informed and responsible decisions that advance basin-wide stewardship by providing hands-on experiences, educational resources and networking opportunities promoting Great Lakes literacy among an engaged community of educators, scientists and youth.

The **Northeast Sea Grant Consortium** supports the region's coastal ecosystems, economies, and communities, as part of the 34 programs in the National Sea Grant College Program. It is a regional collaboration that includes eight Sea Grant programs in seven Northeast states: Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont. The eight Sea Grant programs work together to build a future where people live, work, and play sustainably along our region's coasts, collaborating on regional initiatives in research, education, extension, and communications, leveraging local expertise to create regional benefits and accomplishments. Specific regional projects and initiatives include: Ocean Acidification, Human Dimensions of Coastal and Marine Ecosystems, American Lobster Initiative, Regional Aquaculture Hubs, Ocean Renewable Energy, and Fisheries and Offshore Wind Interactions RFP. For more information, please see www.northeastseagrants.com



Surfers in the ocean at Carolina Beach, North Carolina. The Mid-Atlantic Sea Grant programs collaborate on several initiatives to benefit their region, including rip current and surf zone safety. Photo courtesy of North Carolina Sea Grant

Commercial Seafood Industry Support and Workforce Development

A shortage of qualified employees is a recurring theme identified by members of the seafood producing sectors. Working waterfront businesses rely on a skilled and reliable workforce. Supporting the workforce needs of the seafood industry will aid improving the resilience of our Nation's working waterfront and rural communities. Most Sea Grant programs provide workforce development programs.

AK SG initiated the On-Board project with funding through the Young Fishermen's Development Act. This collaboration among 3 NGO's and AK Sea Grant resulted in commercial fishing crewmember trainings held in Sitka and Petersburg, with future trainings planned for Kodiak and Nome.

AK SG also developed the Business of Fishing Program, a one-day class offering commercial fishing business training in coastal communities around the state. It is designed for boat owners, permit holders and fishermen looking to improve their business management skills. Sea Grant is making a concerted effort to work with communities of people who have not yet benefited from Sea Grant workforce programs.

SC SGC partners with Minorities in Aquaculture to offer hands-on aquaculture training to women of color through internships on South Carolina oyster operations. Three university women of color conducted internships on SC oyster farms in 2022.

FL SG helped create and sponsor a multi-day in-person conference to provide professional development, training, and networking among non-traditional aquaculturists in Florida. To date, over 150 individuals have participated including representatives of several minority groups and numerous students.

HI SG is leading internship, training, education, and outreach opportunities to strengthen a diverse aquaculture workforce in Hawai'i, American Samoa and Guam. Industry workforce priorities identified via the Hawai'i Aquaculture Collaborative are being supported through 30 internships that engage community members with seven academic institutions and 14 aquaculture businesses and nonprofits that provide training, skill and knowledge acquisition, and experience in aquaculture in Hawai'i and the Pacific region.



Olivia White, an undergraduate student majoring in biology with a concentration in environmental science at South Carolina State University, grades oyster seed in an aquaculture nursery. South Carolina Sea Grant Consortium teamed up with nonprofit Minorities in Aquaculture to provide aquaculture internships to women of color. Photo courtesy of Lowcountry Oyster Company

ORGANIZATIONAL EXCELLENCE

To achieve its research, extension, and education goals, Sea Grant seeks organizational excellence by investing in the following:

Sea Grant Rigorously Plans and Evaluates

Sea Grant is committed to careful planning and rigorous evaluation to ensure programs have local, state, and national impacts. Strategic plans are developed for each program, consistent with the plans of NOAA and the U.S. Department of Commerce. Quadrennial reviews are based on the goals and objectives in each program's approved Strategic Plan and comprise site visits to assess performance, management, scope and success of engagement with interested parties, and degree of collaboration. Results, along with an assessment by an Evaluation Committee to ensure consistency across the network, are used by the NSGO to determine whether each program is: 1) qualified for recertification as a Sea Grant program, and 2) eligible for merit funding. In response to a 2018 recommendation from the Board, Sea Grant expanded its evaluations to include the NSGO and Sea Grant overall.

Sea Grant Assesses Economic Benefits and Impacts

Due to Sea Grant's matching requirement, there is at least one dollar of state and local funds for every two federal dollars spent. Sea Grant has collected economic benefits and impacts data since 2010 and began a public-private partnership in 2017 with Eastern Research Group, Inc. to increase the network-wide capacity to more reliably and more consistently value the economic

benefits that Sea Grant programs provide their coastal communities. By 2020, this partnership created more than a dozen tools and best practices that can be used by non-economists in the form of methodology guides and other job aids, to help Sea Grant economically value its work.

Sea Grant Ensures a Strong Legal Framework

The National Sea Grant Law Center is a nationally recognized and respected resource on ocean, coastal, and Great Lakes law. In 2019, Sea Grant designated the Law Center a "coherent area program," elevating it from a temporary project in recognition of its excellence. The Law Center has conducted critical law and policy research, translated scientific information for policy makers, and reduced legal barriers to the adoption of innovative management strategies that address emerging community needs. The **Sea Grant Legal Network** has programs in five states (**Alabama-Mississippi, Louisiana, North Carolina, and Rhode Island**) and attorneys working with Sea Grant across the country. For example, as the shellfish aquaculture industry grows, legal conflicts can arise as states seek to develop and expand the industry. In response, in 2019-2020, the Law Center and four members of the Sea Grant Legal Network examined legal impediments to shellfish aquaculture. Resulting research and outreach informed policy changes that reduced permitting barriers.

Education and Workforce Development is Enhanced through Sea Grant's Experiential Fellowships

On Capitol Hill and among federal agencies, Sea Grant's national fellowship programs are well known. Since 1979, the John A. Knauss Marine Policy Fellowship program has provided opportunities for students with advanced degrees to work at the forefront of marine science and policy. The collaborative National Marine Fisheries Service Sea Grant Fellowship program has, since 1999, been placing individuals in research positions focused on either population and ecosystem dynamics or marine resource economics as a step towards workforce leadership. The Coastal Management Fellowship program fostered by Sea Grant for NOAA's Office for Coastal Management within the National Ocean Service enables postgraduate students to work on projects identified by individual state coastal zone management programs. In addition to national fellowships, individual Sea Grant programs provide opportunities through over 20 state fellowship programs.

Sea Grant Addresses Program-Wide Challenges through Visioning

Since 2017, the NSGO has funded Network Visioning to increase the capacity of Sea Grant programs to work and plan together on priority topics. The Diversity, Equity, and Inclusion (DEI) Network ensures that Sea Grant continues to infuse DEI principles into its leadership and culture and has led several state and national initiatives. In collaboration with the NSGO and external partners, the DEI community of practice organizes professional development opportunities for Sea Grant employees.

Two-Way Communications are Fundamental to Sea Grant

Every Sea Grant program is committed to building strong two-way communications networks that bring together Sea Grant's extensive resources with the needs and expertise of coastal businesses and communities.

DE SG's recent Coastal Resilience Design Studio brought together educators, students, scientists,



A boat sails among aquaculture fish pens in the ocean. The Sea Grant Legal Network researches possible and actual legal obstacles to aquaculture to inform future policy changes that will ensure fewer barriers to permitting. Photo by Tapani Hellman.

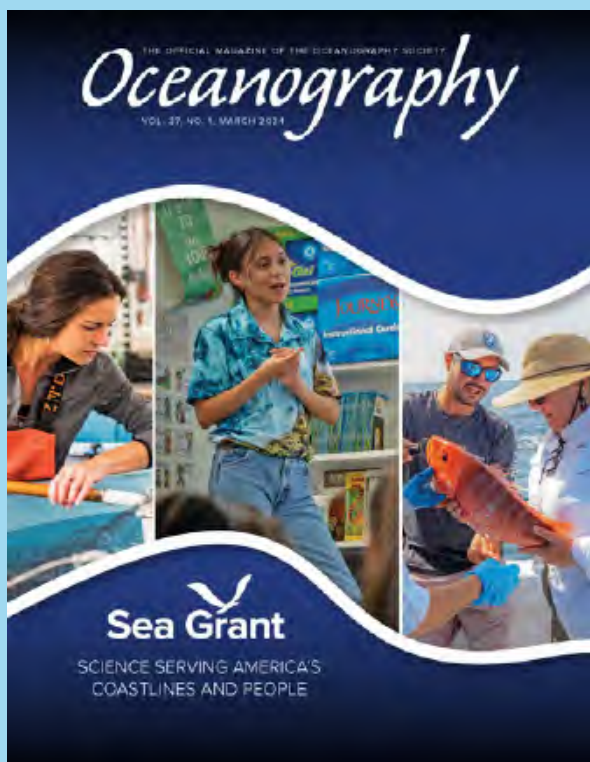
science volunteers, engineers, designers, artists, and other academic institutions to develop a large-scale green infrastructure project along a tributary to the Chesapeake Bay that provided habitat, pollution reduction, biodiversity, and recreational opportunities.

USC SG organized and facilitated a regional workshop on improving oil spill preparedness and response in Santa Barbara, CA as part of a workshop series with five Sea Grant programs and the National Academies of Sciences Gulf Research Program.

LA SG's Louisiana Discovery, Integration, and Application (LaDIA) program builds better connections among researchers, extension personnel, and constituents to: increase awareness of the sophistication of local knowledge, better target their investigations, and share results, producing more robust research and outreach plans that include input from local partners.

Sea Grant Leads National and Regional Partnerships

Sea Grant partners with other NOAA programs to bring NOAA's research to the network and interested parties through Sea Grant Partnership Liaisons. In addition to leveraging funds, the liaisons provide a pathway between new research and community audiences. Sea Grant currently hosts 10 liaisons in NOAA labs and programs and announced an opportunity to fund additional liaisons with federal science and service agencies. The Mississippi-Alabama Sea Grant Consortium is a regional and national leader in multi-state, multi-region strategic initiatives, managing \$15.8 million in projects covering a broad range of topics related to fisheries, oil spills, hurricanes, flooding, waterways, and restoration. Working with the **HI SG** and **AK SG** programs, **WA SG** is leading a three-year grant to advance sustainable Indigenous aquaculture practices and enhance seafood production in the Pacific region. The first summit highlighted traditional Hawaiian aquaculture practices and technologies and included representatives from 13 Pacific Northwest Tribes and many more from across the globe. The immediate outcome is shared practices, shared communications, and a long-term commitment to integration of traditional and local knowledge with research, extension, and education.



NOAA Sea Grant funded research and work with coastal and Great Lakes communities across the nation have been highlighted in a special issue of “Oceanography” the official journal of The Oceanography Society. To learn more about Sea Grant’s important impacts please visit:

<https://tos.org/oceanography/issue/volume-37-issue-1>



A SMART INVESTMENT IN OUR COASTAL ECONOMY

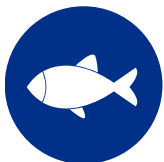
For over 50 years, the National Sea Grant College Program (Sea Grant) has supported coastal and Great Lakes communities through research, extension and education.

IN 2023, A FEDERAL
INVESTMENT IN SEA GRANT OF
\$94 MILLION RESULTED IN
**\$828.3
MILLION**
ECONOMIC BENEFIT*



Oregon Sea Grant

Sea Grant's 2024-2027 Strategic Plan addresses the following four focus areas:



Sea Grant's work in **sustainable fisheries and aquaculture** includes advancing aquaculture through research and informing regulation, sustaining wild fisheries through research to test new catch strategies, training young fishermen and aquaculture professionals, and listening and responding to the needs of fishing communities.



Sea Grant's work in **healthy coastal ecosystems** includes research to understand ecosystem change and test new recovery techniques, identifying and testing new methods to mitigate water pollution sources, guidance and expertise on planning and management, and habitat monitoring and restoration efforts.



Sea Grant's work in **resilient communities and economies** includes long-term community planning, climate and ecological research, social science research to engage more effectively, increasing access to existing tools, disaster recovery, and working with communities on needs and solutions.



Sea Grant's work to advance **environmental literacy and workforce development** includes fellowship opportunities, on-the-job training, support for undergraduate and graduate research, experiential education programs, educational tourism programs, and teacher training workshops.

*The 2023 federal investment represents Sea Grant Core and Aquaculture Appropriations. Metrics are direct results of Sea Grant work between Feb 1, 2023, and Jan 31, 2024, as reported by Sea Grant programs in Summer 2024. Economic benefit = market & non-market value of Sea Grant's work; value of jobs & businesses (\$613.9M), total leveraged funds (\$205.2M) & value of volunteer hours (\$9.1M).



BY THE NUMBERS

Sea Grant's mission is to enhance the practical use and conservation of coastal, marine and Great Lakes resources in order to create a sustainable economy and environment.

Learn more about Sea Grant's work at seagrants.noaa.gov

15,971,268

acres of habitat restored or protected

Hawaii Sea Grant

34

programs across the U.S., Puerto Rico and Guam

Maine Sea Grant



Florida Sea Grant

1,479 businesses created or supported
22,251 jobs created or supported



311 peer-reviewed journal articles published



704 supported graduates hired in their field of interest

Georgia Sea Grant

2,146

seafood Hazard Analysis Critical Control Points safety certifications as a result of Sea Grant training



New Hampshire Sea Grant

49,228

seafood industry personnel adopted responsible fishery practices based on knowledge gained from Sea Grant

7,736

resource managers who used ecosystem-based approaches to management as a result of Sea Grant's work



Illinois Indiana Sea Grant

826

Sea Grant extension agents stationed in communities across the U.S. to advance the co-production of knowledge and actions for more resilient communities and economies. As a result,

646 communities implemented sustainable practices, and

2,213,482 people engaged in education programs*

Metrics are direct results of Sea Grant work between Feb 1, 2023, and Jan 31, 2024, as reported by Sea Grant programs in Summer 2024.

* "Education programs" refers to informal education, K-12 and secondary education programs

2024

SEA GRANT RECOMMENDATIONS

RECOMMENDATION ONE

The National Sea Grant College Program works with NOAA, Congress, and its university partners to strengthen core capacities to support research, and engage in extension and education that collectively achieve community impacts.

In response to growing societal needs to continue to address climate readiness and resilience, the board recommends that the National Sea Grant College Program work with NOAA and Congress to strengthen core capacities (here defined as human infrastructure) with its university partners. This would allow enhanced support of research, extension, and education, and achieve lasting community impacts.

RECOMMENDATION TWO

The National Sea Grant College Program continues to promote environmental stewardship while balancing it with the blue economy to promote sustainability and community stability.

The Board advises the National Sea Grant College Program to continue to build upon its environmental stewardship which may include but is not limited to the topics of renewable energy, aquaculture, and mariculture, while at the same time ensuring the promotion of healthy coastal ecosystem and community stability, which can be done through workforce development.



UH Mānoa graduate student Seanna Correa-Garcie at Waikalua Loko I'a stands over a basket of red limu. Photo by HI SG

2024

SEA GRANT RECOMMENDATIONS

RECOMMENDATION THREE

The National Sea Grant College Program focuses on improving environmental awareness and literacy, including ocean, coastal, and Great Lakes literacy, to aid in decision-making for safer and more resilient communities, aquaculture, and healthy coastal ecosystems.

Awareness and literacy are the foundation of resilient communities, aquaculture, and healthy coastal ecosystems. Within the context of this recommendation, the Board recommends the National Sea Grant College Program strengthen opportunities to develop environmental awareness and literacy to enhance informed decision-making regarding ocean, coastal, and Great Lakes resources.

RECOMMENDATION FOUR


The National Sea Grant College Program enhances efforts to ensure that all initiatives contribute to equitable outcomes that reflect the diverse communities served.

As the National Sea Grant College Program progresses, it recognizes the critical importance of deepening its commitment to social and environmental justice, equity, and inclusion. To achieve this, the Program should enhance its efforts in assessing, broadening, and embedding these principles throughout its organizational framework and activities. These efforts should work toward the development of a more inclusive and dynamic environment that accurately reflects the diverse communities it serves. This approach can help ensure that all its initiatives and programs contribute to equitable outcomes for all.



Students working on shoreline plant production at Norfolk State University's greenhouse facility and biology lab.

Photo by Jay Clark, VA SG



*A boat sails on the ocean with wind mills in the background. Sea Grant programs have been assisting in offshore wind energy development.
Photo courtesy of Rhode Island Sea Grant*

EMERGING OPPORTUNITIES

New and exciting programs being developed within Sea Grant are: Understanding Energy Transitions and Coastal Resilience, Sea Grant's role in Promoting Food Security through Aquaculture and Sustainable Fisheries and Strengthening Extension and Education.

Understanding Energy Transitions and Coastal Resilience

Sea Grant programs support outreach to provide the best information about sustainable and renewable energy sources and address environmental and economic challenges. Through its core strengths of extension, research, education, and communication and by partnering with a diverse network, Sea Grant is contributing to a better understanding by local communities of our Nation's rapidly evolving pace in renewable energy, such as offshore wind energy (OWE) development.

Some key areas of Sea Grant's involvement in OWE:

- **Environmental Impact Assessment:** Sea Grant programs conduct research to assess the potential environmental impacts of offshore wind energy projects on marine ecosystems, wildlife, and coastal communities. This includes studying the effects of turbine placement, noise, electromagnetic fields, and construction activities on marine species and habitats.
- **Engagement:** Sea Grant facilitates engagement with interested parties and public outreach to promote dialogue among developers, regulators, coastal communities, fishermen, environmental organizations, and others involved in offshore wind energy planning and decision-making processes.
- **Policy and Planning Support:** Sea Grant provides scientific expertise and policy guidance to inform the development of regulations, permitting processes, and best practices for offshore wind energy projects. This includes addressing regulatory frameworks, spatial planning, and ecosystem-based management approaches.
- **Workforce Development:** Sea Grant programs collaborate with industry partners, educational institutions, and workforce development agencies to support the training and education of a skilled workforce for the offshore wind energy sector. This includes providing resources for job training, internships, and educational programs in renewable energy fields.

SEA GRANT'S EMERGING OPPORTUNITIES

- **Technology Innovation:** Sea Grant supports research and innovation in offshore wind technology, including advancements in turbine design, installation methods, monitoring systems, and grid integration. This research aims to enhance the efficiency, reliability, and sustainability of offshore wind energy development, such as changes in marine ecosystems, navigation routes, and coastal economies. This includes assessing socio-economic impacts, community benefits, and risk mitigation strategies.

Some state program-specific examples:

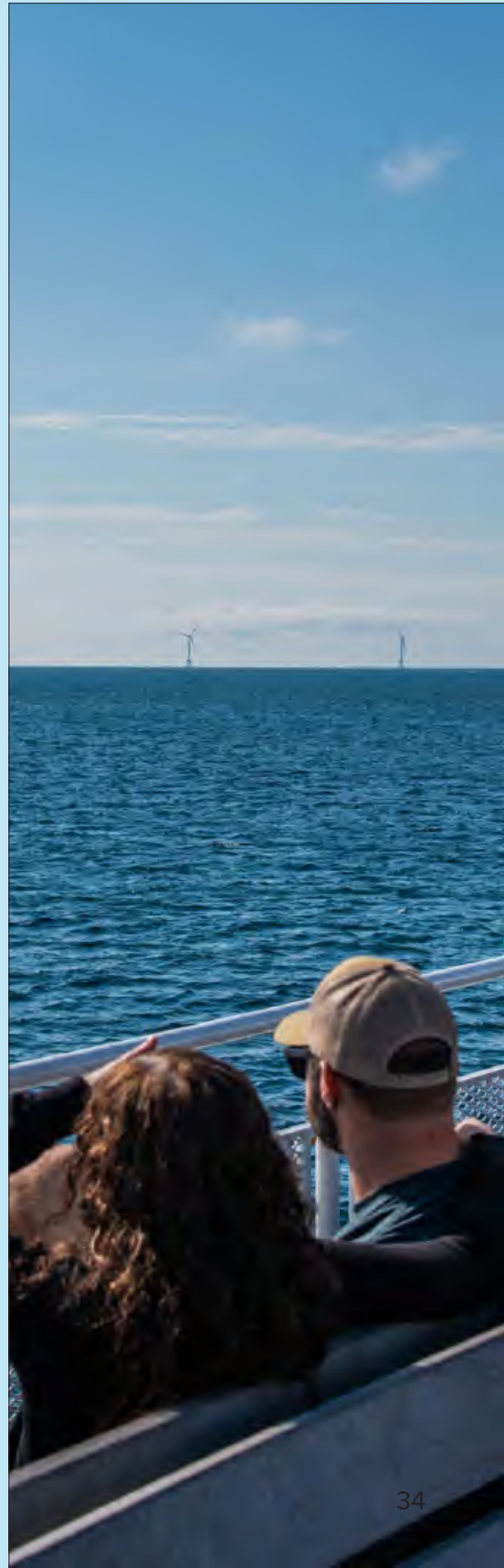
HI SG is collaborating with the Hawai'i State Energy Office (HSEO) to develop an extension program focused on sustained dialogue and relationship building between island communities across the state and HSEO to inform the state's energy future. The effort seeks to develop information pathways and trusted relationships through reciprocal knowledge transfer and to support community-based energy planning to unlock ocean energy development, including assessment of whether a community is well-suited for and interested in future development of an ocean-energy focused community-based renewable energy (CBRE) project.

NY SG's development of the "Offshore Wind Energy Federal Participation Guide," with the purpose of demystifying the federal OWE process, helping communities learn the language, proofing past development examples, and reducing barriers to submitting public comments on federal agency actions. The guide has been shared with communities outside of New York.

CA SG is compiling science-based non-advocacy information about Central Coast Offshore Wind Development through social-media and informational sessions, and making it accessible to regional partners via a website and community seminars and workshops.

ME SG is serving as the Maine Offshore Wind Research Consortium Program Manager to establish and implement a research strategy to better understand the local and regional impacts of floating offshore wind power projects in the Gulf of Maine.

A couple sits on a pier with a view of offshore wind turbines. The Northeast Sea Grant Consortium worked with partners to fund research on the impact of renewable energy development in coastal communities. Photo courtesy of New Hampshire Sea Grant



SEA GRANT'S EMERGING OPPORTUNITIES



The **RI SG** Law Program is collaborating with each Northeast Sea Grant program to respond to key OWE legal questions identified by their local communities. Topics include community benefit agreements, cable transmission, and Tribal engagement.

CA SG and OR SG are in the process of building programmatic capacity in aspects of offshore wind development.

The **Northeast Sea Grant Consortium (NESGC)**, in partnership with the National Oceanic and Atmospheric Administration's Wind Energy Technologies Office and Water Power Technologies Office, joined together to fund a research competition in 2021. The competition sought proposals to improve understanding of the effects of ocean renewable energy development on coastal communities, including the fishing industry. This includes wind and hydrokinetic waves, currents, and tidal energy in the U.S. northeast, from New York Bight to the Gulf of Maine.

These funded research projects aim to catalyze social science and technology research in the Northeast that will further our understanding of the effects of ocean renewable energy on community resilience and economies. Through this research competition, NEFSC and its funding partners are providing a regional approach to supporting objective research on ocean renewable energy across interested parties, including developers, communities, fishers, etc. Jointly, with additional funding from the NEFSC, the regional Sea Grant programs are implementing actions to ensure that research results are appropriately communicated to local and regional decision-makers and community members.

Not only do Sea Grant members sit on national OWE-advisory boards, but through the National Sea Grant OWE Liaison Initiative Sea Grant is investing in bolstering the capacity of the Sea Grant network and implementing targeted collaborative initiatives. In addition, the National Sea Grant Office participates in NOAA's internal OWE working group and engages with other experts and responds to shared goals.

By addressing these key areas, Sea Grant programs play a vital role in advancing offshore wind energy development in a sustainable and responsible manner, while considering the environmental, social, and economic implications of renewable energy projects in coastal and marine environments.

Towers and blades for the South Fork wind farm being built off the Long Island coast are staged and prepared for transport to the site at State Pier in New London. Photo by Judy Benson, Connecticut Sea Grant

SEA GRANT'S EMERGING OPPORTUNITIES

Waterman Tommy Leggett works on his oyster cages located along the York River in Hayes, Virginia. Sea Grant programs are working to enhance aquaculture in the U.S. to address food insecurity. Photo by Aileen Devlin, Virginia Sea Grant



Sea Grant's Role in Promoting Food Security through Aquaculture and Sustainable Fisheries

Food security is a fundamental concept that refers to the availability, access, utilization, and stability of food for all individuals at all times. Ensuring food security is essential for promoting human health, well-being, and sustainable development. Food security remains one of the greatest challenges facing humankind today, as it is vulnerable to various threats that can jeopardize the availability, access, and stability of food for individuals and communities. These threats can be influenced by a range of factors including environmental, social, economic, and political issues. Some examples are climate change, natural disasters, water scarcity, land degradation, cultural insensitivity and hegemony impacting traditional subsistence fishing, conflict and instability, economic shocks, food waste, and inadequate infrastructure. Addressing these threats to food security requires a multi-faceted approach that integrates sustainable agricultural practices, climate adaptation strategies, disaster risk management, and policy interventions to build resilient food systems and ensure food security for all.

With the human population predicted to reach 10 billion by 2050, food security will be a critical issue in the very near future. Using traditional cultivation, 58% more food must be produced on additional land the size of India. Clearly, agricultural science must discover how to grow more food on less land with fewer inputs of water and fertilizer.

Aquaculture and sustainable fisheries also must play an important role in meeting this global food security need. Sea Grant, a national network of programs focused on marine and coastal issues, plays a significant role in promoting food security through aquaculture and sustainable fisheries. Sea Grant programs work on research, education, and engagement initiatives to enhance food production from the ocean and coastal ecosystems while ensuring the long-term sustainability of marine resources. Here are some ways Sea Grant contributes to food security using aquaculture and sustainable fisheries:

- 1. Collaboration and Partnerships:** Sea Grant collaborates with government agencies, academic institutions, industry partners, and non-profit organizations to address food security challenges through aquaculture and sustainable fisheries. By fostering partnerships and

SEA GRANT'S EMERGING OPPORTUNITIES

collaborations, Sea Grant programs leverage expertise and resources to develop innovative solutions for enhancing food production and sustainability in marine ecosystems.

The **Indigenous Aquaculture Collaborative** is a network of Pacific-region Sea Grant programs (**AK SG, CA SG, HI SG, OR SG, WA SG**); Northwest Tribes and First Nations, Native Hawaiian and Indigenous communities; and organizations and universities working as a community of practice to advance Indigenous Aquaculture. The collaborative integrates community engagement, restoration, applied research, and education to share experiences, knowledge, and strategies that enhance local and cultural seafood production in the broader Pacific region.

- 2. Aquaculture Development:** Sea Grant programs support the development of sustainable aquaculture practices to increase seafood production and meet the growing demand for seafood. By conducting research on aquaculture technologies, species diversification, and best management practices, Sea Grant helps aquaculture producers improve their operations and enhance food production from marine resources.

FL SG worked to develop ways of raising and shipping young red snapper, boosting the growth of a nascent aquaculture industry for this high-value marine finfish in the Southeast U.S.

MS-AL SGC created The Commercial Oyster Aquaculture Sector Training (COAST) program and provided funding to five apprentices that received hands-on training and on-farm work experience in the oyster aquaculture industry. The COAST program is being expanded.



Seafood on display at a fish market. Florida Sea Grant has worked with the aquaculture industry to develop ways of raising and shipping young red snapper, a high-value marine finfish in the U.S. Photo courtesy of Florida Sea Grant

SEA GRANT'S EMERGING OPPORTUNITIES

- 3. Technology Transfer and Extension:** Sea Grant programs facilitate the transfer of aquaculture technologies and knowledge to industry, including aquaculture farmers, seafood processors, and coastal communities. Through extension services and outreach activities, Sea Grant educates interested parties on best practices for aquaculture production to promote food security and economic development.

DE SG is educating the public about aquaculture, specifically oyster aquaculture, oyster hatchery production, oyster grow out, recirculating aquaculture systems and aquaponics. They are working with private industry to engage in on-bottom oyster culture and with non-profit groups in habitat restoration. In addition, DE SG gives public lectures on these subjects and provides tours to the public of their aquaculture facilities. They are also working directly with private industry, and non-profit organizations to better aid in the sustainable application of aquaculture throughout Delaware.

NY SG Administers and Modernizes the National Seafood Hazard Analysis and Critical Control Point (HACCP) Alliances Internet Training Course that helps ensure the safety of the seafood consumed.

SC SGC worked with local breweries in the Charleston area to examine the utility of spent grains as a nutrition source for red drum by providing protein and digestibility. Analysis of the spent grains after 12 monthly samples are promising for using this byproduct.

- 4. Sustainable Fisheries Management:** Sea Grant programs work on fisheries management initiatives to ensure the sustainable use of marine resources. By conducting research on fish stocks, ecosystem dynamics, and fishing practices, Sea Grant helps inform fisheries management decisions that promote long-term sustainability and resilience of fish populations. Sea Grant responds to the needs of the fishing industry identified by Congress through research and engagement programs. For example Sea Grant programs in the Northeast, Southeast and Gulf of Mexico are involved in major research and engagement initiatives including:

CT, NH, NY, MIT, RI and WHOI SG support research and extension efforts of the American Lobster Initiative to address critical knowledge gaps about American lobster and its iconic fishery including an informational website on the American Lobster Initiative (Maine Sea Grant).



An orange bucket full of fresh lobster. Sea Grant's American Lobster Initiative funds research and extension aimed towards supporting the lobster industry. Photo by Tim Briggs, Maine Sea Grant

SEA GRANT'S EMERGING OPPORTUNITIES

NC SG is involved with highly migratory species (HMS) through its research and funding initiatives. HMS include tuna, billfish, and shark, which are important to the ocean's ecosystem health and commercial and recreational fisheries.

MS-AL SGC partnered with **FL, SG, LA, and TX SG** to respond to a Congressional request to estimate the red snapper abundance in the Gulf of Mexico to support a regional team of scientists who employed a novel large-scale population survey to independently estimate that there are 87 million adult red snapper. These results influenced how the fishery is being managed across the U.S. Gulf of Mexico.

SC SGC has a project underway to use genetic markers to estimate the absolute abundance of red snapper in the Southeast Region.

MS-AL SGC also has a project underway to estimate the absolute abundance of Greater Amberjack in the Gulf of Mexico and Southeast Regions in partnership with **VA, NC, SC, GA, FL, LA and TX SG**.

- 5. Food Safety and Quality:** Sea Grant programs focus on ensuring the safety and quality of seafood products from aquaculture and fisheries. By conducting research on seafood safety, handling, and processing practices, Sea Grant helps improve the overall quality of seafood products and enhance consumer confidence in the sustainability and safety of seafood

VA SG validated thermal processing methods to improve seafood safety and increase the shelf-life of seafood products.

IL-IN SG helped fish farmers from around the Midwest to explore fish processing for local markets and engage in food safety training.

The **NSGLC**, through SG National Seaweed Hub, produced a seaweed food safety publication.

- 6. Community Engagement and Education:** Sea Grant programs engage with coastal communities, seafood industries, and policymakers to raise awareness about the importance of aquaculture and sustainable fisheries for food security. Through educational programs, workshops, and outreach events, Sea Grant teaches sustainable seafood practices and encourages community involvement in marine resource management.

VA SG provided bilingual training to increase the understanding and application of food safety practices.

NH SG trains students and early career workers in laboratory and field methods for assessing seafood safety.

Overall, food security is a complex issue that requires a holistic approach to ensure that all individuals have access to safe, nutritious, and culturally appropriate food to meet their dietary needs and lead healthy lives. Promoting food security is crucial for achieving sustainable development and addressing hunger and malnutrition worldwide.



Strengthening Extension and Education for Science-based Decision-Making

Critical societal challenges, including sustainability, resilience, healthy ecosystems, renewable energy, and food security are complex and affected by the daily actions of the hundreds of millions of people across the U.S. A public that is well-informed with the most recent and reliable scientific information offers greater opportunities to resolve complex issues—individually and collectively. The rapid pace of scientific discoveries, our understanding of the ecosystems within which we live, and technologies to meet the food and energy needs of the expanding human population require robust, comprehensive educational efforts at the K-16 level. Far-reaching extension programs are also needed, to engage with communities, making their needs known to researchers and then assisting interested parties to adapt new information to their specific conditions.

The Sea Grant network includes active extension professionals and educators well-positioned to expand efforts to enhance understanding in important emerging areas such as offshore wind energy and aquaculture and to expand existing programs in environmental literacy as related to ocean, coastal, and Great Lakes resources. Thus, the National Sea Grant College Program (NSGCP) is particularly well-suited to improve science-based decision-making through its model of research, extension, and education. This three-pronged approach contributes to resolving complex societal issues in the following ways:

- 1. Extension provides a two-way conduit to convey community needs to researchers and then work with communities to adapt new, improved technologies and strategies to meet their needs.**

The extension component of the NSGCP model ensures that critical community needs are communicated to researchers and educators, directing efforts to those that will provide the greatest assistance to communities. Research results then flow back to communities through

Angee Doerr (in red sweater), a marine fisheries specialist with Oregon Sea Grant and the Oregon State University Extension Service, teaches fishermen about first-aid during a training in Newport, Oregon. Photo by Trav Williams of Broken Banjo Photography

SEA GRANT'S EMERGING OPPORTUNITIES

the ongoing engagement of extension personnel who assist individuals in adapting research results to their specific conditions.

2. Education is the foundation of informed communities at multiple levels of society.

Education is a core function of Sea Grant and encompasses formal, informal, and non-formal learning approaches. It is the essential foundation of all four focus areas, ensuring that natural and social sciences are infused at a broad societal level to support science-based decision-making. Sea Grant educators cultivate key relationships in their communities and are sought after for their expertise in creating innovative and transdisciplinary programs and serving in influential leadership roles. Previous NSGAB reports have called on Sea Grant to strengthen its role in Environmental Literacy (2014). The fundamental element is providing educators with the resources and support required at program, regional, and national levels. With backgrounds in both education and science, Sea Grant educators provide on-the-ground expertise that drives informed decision-making and facilitates lifelong learning.

3. Strengthening the extension and education programs of the NSGCP will enhance the adoption of effective approaches to meeting societal challenges.

Increased community engagement through strengthened extension and education efforts will enhance connections with diverse communities through participatory science and hands-on programming in real-world scenarios. Greater adoption of effective practices and enhanced workforce development will enhance the capacity to meet current and future challenges, empowering coastal communities to thrive.



Teachers participate in the Coastal Ecosystems Field Course taught by Virginia Sea Grant extension. Increasing environmental literacy in the public is a foundation of all Sea Grant's focus areas. Photo by Lathan Goumas, Virginia Sea Grant

PROGRAM LISTINGS & HIGHLIGHTS

Alaska Sea Grant

AK SG partners with Kodiak Area Native Association (Adapt Alaska, 2024) to develop resilience and adaptation models for their Tribal Climate Adaptation Plan and co-hosts an AK SG State Fellow to develop an ocean acidification monitoring plan for Kodiak Archipelago Tribes.

AK SG operates the Kodiak Seafood and Marine Science Center (2020), which serves as Alaska's workforce development and applied research center focused on seafood harvesting, processing and mariculture industries.

AK SG has secured over \$7 million in grants and is providing leadership to manage and prevent marine debris (Alaska Sea Grant, 2024) in Alaska through community-led removal efforts, innovative recycling business models, and increased coordination among partners and communities.

California Sea Grant

CA SG is supporting the Wiyot Tribe in securing 46 acres of ancestral coastal wetlands for ecocultural restoration (California Sea Grant, 2024), increasing the Tribe's total land holdings by 10%.

CA SG, in collaboration with USC Sea Grant is researching deep ocean DDT contamination (Amalia, 2023) off the Southern California coast through community-based research.

CA SG, together with the Noyo Ocean Collective, organized and hosted the first Fort Bragg Blue Economy Symposium and Learning Festival, focused on exploring ways to use the ocean's resources sustainably to create jobs and improve the local economy, while also protecting and restoring the marine ecosystem.

Connecticut Sea Grant

CT SG, along with partners, sustained the shellfish aquaculture industry (Benson, 2020) through COVID-19 restaurant closures by facilitating direct marketing to the public, and buying back oversized oysters, providing assistance (Benson, 2020) to 67% of Connecticut shellfish businesses.

CT SG educational coordinator participated in the Intergovernmental Oceanographic Commission (IOC) group of Experts in 2022 which is tasked with communicating with the Ocean Literacy international community, providing guidance on the application and evolution of the Ocean Literacy Framework of Action for the UN Ocean Decade and reporting to the IOC Assembly.

CT SG continues to host the Connecticut Sea Grant-led Climate Corps program (Benson, 2020), a new model of undergraduate STEM education combining classroom instruction, service learning and Extension outreach, with more than 25 climate adaptation projects completed for municipalities and other community partners.

Delaware Sea Grant

DE SG provided instrumental support to Sussex County in adopting a county-wide Buffer Ordinance, the first comprehensive environmental policy passed in Sussex in 30 years.

DE SG designed and constructed a small-scale shellfish hatchery aimed at producing between 50-75 million oyster larvae each year.

DE SG formed a collaborative partnership with Delaware Technical Community College, to provide workforce training for students and early career professionals in the field of green infrastructure.

Florida Sea Grant

FL SG collaborates with the NOAA Restoration Center to grow the Return 'Em Right program to more than 30,000 Gulf of Mexico anglers now actively participating in training and reef fish release gear programs.

FL SG partners with the Florida Fish and Wildlife Conservation Commission to manage six new personnel to coordinate the state's response to stony coral tissue disease targeting threats over 350 miles of reefs that include the Biscayne National Park and the Florida Keys National Marine Sanctuary and span from Dry Tortugas National Park to the St Lucie Inlet.

FL SG, through its leadership of regional hazard resilience initiatives, helped the City of Cape Canaveral secure \$26.6M in funding for nature-based solutions to acquire land and conservation easements to protect transportation infrastructure from chronic flooding due to rising sea levels.

Georgia Sea Grant

GA SG collaborates with military communities, federal and state partners, and community leaders to improve resilience to coastal hazards through the Coastal Resilience DoD Liaison Program.

GA SG coastal ecotour certification program provides ecotour companies with best practices for water-based tourism activities and guides for educating visitors about responsible recreational use of coastal resources.

GA SG brings together commercial fishermen, fisheries managers, and right whale researchers to assess the applicability of Ropeless Fishing Gear Technology for use in the commercial black sea bass fishery, resulting in the South Atlantic Fishery Management Council approving new gear in their black and gag grouper framework amendment.

University of Guam Sea Grant

UOG SG runs a biannual research competition that supports the goals and objectives of the program, including cross-cutting principles to cultivate partnerships and enhance diversity and inclusion.

UOG SG launched "Chalan Diskubre", a place-based educational magazine for students and young adults, at the Micronesian Mall.

UOG SG implemented a "Fishing for Future

Famagu'on" campaign to encourage more sustainable fishing habits.

Hawai'i Sea Grant

HI SG produces an award winning television series Voice of the Sea (VOS) which reached a decadal milestone of broadcasting on television in Hawai'i and the Pacific region; VOS has been awarded a total of 43 national Telly Awards in recognition of its television excellence since it first aired in 2014.

HI SG collaborated with local nonprofit organizations to develop and publish Kūlana Noi'i, which provides guidance for building and sustaining long-term relationships between communities and researchers to promote more collaborative and mutually-beneficial partnerships.

HI SG assisted the Hawai'i Department of Health (DOH) to identify regions that should be prioritized for cesspool conversion based on the risks posed to human and environmental health.

Illinois-Indiana Sea Grant

IN-IL SG loaned water quality monitoring equipment to classroom educators who, in turn, spent up to two weeks of additional time teaching aquatic science and Great Lakes information in their classrooms.

IL-IN SG conducted a scoping process resulting in funding for four research projects focusing on the socioeconomic impacts of PFAS in the Great Lakes region.

IL-IN SG led a collaborative workshop between federal, state, and Tribal management agency personnel and academics to identifying priorities that guide regional science and monitoring activities in Lake Michigan.

Lake Champlain Sea Grant

LC SG contributed to road salt reduction initiatives including developing resources and organizing training that resulted in implementation of reduced-salt practices across the area.

LC SG developed curricula and provided watershed science education to thousands of

Kindergarten to 12th grade students, teachers and members of the public including aboard a new, state-of-the-art research vessel.

LC SG provided free continuing education opportunities in support of water quality information and regulations for real estate professionals through eight different courses to Vermont and New York-based real estate professionals both online and in person.

LC SG supported volunteers to monitor more than 80 lakes to collect data that informed state of Vermont management decisions.

National Sea Grant Law Center

NSGLC Conducted research for IL-IN SG leading to expanded coverage for aquaculture species under the Emergency Assistance for Livestock, Honeybees, and Farm-Raised Fish (ELAP) Program.

NSGLC Ocean and Coastal Law Fellowship Program provides post-graduate research opportunities for attorneys that successfully prepares them to pursue careers in the fields of ocean, coastal, and Great Lakes law.

NSGLC provided grant funding to GA SG supporting the first Sea Grant Blue Carbon Symposium in May 2023 where legal scholars, marine scientists, and industry decision-makers convened to create a whole-field understanding of coastal blue carbon investment.

Louisiana Sea Grant

LA SG leveraged existing partnerships and relationships to provide a first-of-its kind, two-day science communications conference for 52 graduate students from eight Louisiana universities.

LA SG celebrated the 30-year anniversary of the LA SG oyster hatchery and lab which produces high-quality oysters to benefit aquaculture, coastal restoration and research needs and provides training and guidance for new and established farmers in conjunction with LA SG alternative oyster culture (AOC) efforts.

LA SG assisted Louisiana seafood companies in participating and successfully bidding in the USDA Shrimp Purchase Program – resulting in more than 174,000 cases of shrimp valued at more than \$19.6 million sold to the USDA. Also aided the state’s largest catfish processing facility in receiving a \$7 million USDA grant to expand its capacity, equipment and workforce.

Maine Sea Grant

ME SG co-hosted a Seafood Educator’s Summit to promote industry-connected, hands-on learning opportunities as part of the Maine Seafood Economic Accelerator’s (SEA Maine) Workforce Development Initiative.

ME SG continues to coordinate efforts through the Northeast Regional Lobster Extension Program in partnership with six Northeast Sea Grant Programs with a four-year American Lobster Initiative (ALI) award from the National Sea Grant Program.

ME SG developed and tested scenario planning exercises from 2019 to 2023 to improve coastal storm preparedness with eight Midcoast Maine communities; exercises which were implemented in early 2024 when severe coastal storms caused widespread damage to coastal infrastructure.

Maryland Sea Grant

MD SG Law and Policy Fellowship has supported three postgraduate fellows in working with state agencies on coastal and environmental law and policy issues since the program launched in 2020.

MD SG provided a watershed restoration specialist to work with underserved communities along the Chesapeake Bay to address flooding issues while emphasizing sustainable resilience and water quality.

MD SG funds researchers at Morgan State University to develop and refine Maryland’s first native oyster lines.

Michigan Sea Grant

MI SG trains paddlers to identify, report, and prevent the spread of aquatic invasive species through the MI Paddle Stewards program.

MI SG partners with The Michigan Fish Producers Association and Michigan Aquaculture Association on “Mi Fresh Fish,” a consumer education marketing campaign raising awareness of fish raised, caught, or processed by Michigan businesses.

MI SG co-leads the Center for Great Lakes Literacy (CGLL), a regional collaborative Sea Grant network that fosters a community of Great Lakes and freshwater stewards by engaging, inspiring and supporting educators, scientists, and youth.

Minnesota Sea Grant

MN SG led a collaborative One Block at a Time project with local community members, partner organizations, and Illinois-Indiana and Pennsylvania Sea Grant programs to identify climate hazards, understand and collect community knowledge, and implement community projects to address local water challenges in marginalized neighborhoods in Duluth, Minnesota, Hammond and Michigan City, Indiana, and Erie, Pennsylvania.

MN SG brought expertise and networking to Sea Grant’s Great Lakes Aquaculture Collaborative, a project inclusive of all the Great Lakes Sea Grant programs, providing training, resources, funding opportunities, expertise, marketing, consumer services, and networking for aquaculture producers, consumers, and marketers across the region.

MN SG partnered with the Spark-Y youth nonprofit group to develop and share educational materials about seafood and aquaculture, including the Spark-Y cookbook and demonstration videos on seafood preparation and recipes.

Mississippi-Alabama Sea Grant

Consortium

MS-AL SGC funded programming to support the establishment and sustainability of commercial oyster farming in Mississippi and Alabama which has grown into a multi-million dollar industry.

MS-AL SGC increased STEM skills and understanding of healthy coastal ecosystems, fisheries, and resilience for more than 186,000 K-12 students through the MI-AL SG consortium supported environmental education programs.

MS-AL SGC provided leadership for a regional program that delivered oil spill science to diverse audiences reaching more than 248,000 people and helping other communities and regions facing oil spill disasters.

Massachusetts Institute of Technology Sea Grant

MIT SG applies artificial intelligence (AI) technology to diverse challenges in fisheries, aquaculture, and climate adaptation by working with partners to develop computer operated automated video monitoring and assessment systems to improve fisheries monitoring and population assessments, aquaculture hatchery production and operations, aquaculture robotics and autonomous farm assistance vehicles, and monitoring and forecasting of coastal and ocean acidification in the Gulf of Maine region.

MIT SG developed aquaculture oil spill preparedness workshops and training programs for the Mashpee Wampanoag Tribe enabling the Tribe to better prepare for responding to and protecting the Tribe’s shellfish farm and cultural resources.

MIT SG and WHOI SG partnered to develop an internship program focused on diverse communities that provides basic training, wraparound services, and immersive experiences prior to placement with a farm, regulator, or other element of the industry.

New Hampshire Sea Grant

NH SG continued collaboration with the NH Offshore Wind Stakeholder Outreach Workgroup

to encourage community conversation and engagement as offshore wind energy is sited and developed in the Gulf of Maine.

NH SG research results have helped evolve policy to allow for consideration of oyster seed importation from a wider array of regional areas to address the increasing incidence of shellfish-borne illnesses caused by *Vibrio parahaemolyticus* (Vp) in the Northeast

NH SG has trained students and early career workers in laboratory and field methods for assessing seafood safety, preparing them for work in seafood safety and related jobs.

New Jersey Sea Grant

NJ SGC developed, implemented, and evaluated a pilot aquaculture apprenticeship program (2022) to introduce six high school students to shellfish aquaculture as a career path and emerging food source, resulting in the summer employment of a student participant.

NJ SGC celebrated 20 years of its family-friendly signature two-day outreach event promoting environmental literacy, marine resource stewardship, and energy conservation and reaching more than 15,000 lifelong learners with exhibitors, hands-on activities, free field trips, scavenger hunts and accompanying website with host partner New Jersey Natural Gas.

NJ SGC has been funded by two National Sea Grant Aquaculture Initiatives to develop and expand the Regional Shellfish Seed Biosecurity Program that serves the Atlantic and Gulf of Mexico coasts and now the west coast to facilitate biosecure transfers of shellfish seed in support of commerce and restoration of shellfish.

New York Sea Grant

NY SG engages communities state-wide to document and communicate risks and impacts of flooding, storm damage, and coastal shoreline change through a public app-based MyCoast NY portal; uploaded photos are georeferenced to real-time environmental conditions to generate

reports for and inform decision-making by state and federal agencies, emergency managers, local planners, and residents.

NY SG Seafood Incentives Program implemented in partnership with seafood markets and businesses to educate consumers and create awareness about locally fished and farmed seafood.

NY SG coastal Processes and Hazards Specialists assist shoreline property owners and managers in Lakes Erie and Ontario, and other waterbodies in the Great Lakes Basin, to manage erosion and flooding through virtual and in-person site visits, shoreline consultations, and workshops and targeted information products, empowering residents to make science-based decisions and remain resilient to coastal challenges.

North Carolina Sea Grant

NC SG led an architecture design studio collaboration with the city of New Bern, North Carolina to support efforts for a planned redevelopment of the flood-prone historically Black community Duffyfield neighborhood after the devastating Hurricane Florence.

NC SG led StriperHub, a project to improve striped bass aquaculture methods and economic production models and to help establish competitive commercial striped bass businesses through technology transfer, marketing support and industry development partnerships.

NC SG partners with the Waccamaw Siouan Tribe to build citizen science soil and water testing network

Ohio Sea Grant

OH SG provides training for sustainable angling and conservation for Ohio fishing guides through the creation of the Erie PrOH certification program empowering fishing guides to promote the industry, fishery, and conservation-oriented practices.

OH SG's Business Retention and Expansion

program identified needs and concerns of coastal marina businesses with partners from three state agencies.

OH SG educates underserved youth from Cleveland about single-use plastic bottles and trash trapping technologies through the new Beach and On-water Trash Trapping Tech Team for Lake Erie (BOTtttle) program.

Oregon Sea Grant

OR SG funds research to optimize feeding and rearing of wild-caught “zombie” sea urchins from overgrazed kelp forests guides and inspires new aquaculture businesses.

OR SG organizes day-long “STEM at Sea” research cruise expeditions for high school students to participate in authentic research experiences that are mentored by graduate students and early career scientists.

OR SG -supported investigators estimate that gray whales ingest up to 21 million microplastics and microfibers a day by feeding on contaminated zooplankton.

Pennsylvania Sea Grant

PA SG collaborated with property owners, land trusts, and state agencies to permanently protect nearly 16 acres of land in the Lake Erie watershed.

PA SG developed aquatic invasive species (AIS) identification and reporting tools, including a field guide and a smart phone application.

PA SG continues to lead the Lake Erie Watershed Cooperative Weed Management Area (LEW-CWMA), focusing on the stabilization of habitats of conservation concern in western Pennsylvania.

Puerto Rico Sea Grant

PR SG promotes the consumption of the invasive lionfish since 2015 by including lionfish in the menu of 26 local restaurants through collaboration between environmental partners, local fishermen, and the restaurant industry.

PR SG develops an outstanding Commercial Fishers Diving Certification Program certifying 29 fishers as PADI Open Water, nine community members as PADI Emergency First Responder and PADI Emergency Oxygen Provider in Cabo Rojo and Vieques.

PR SG’s information dissemination and advice about the value of the Maritime Terrestrial Zone (MTZ), influences coastal communities and environmental NGOs demanding the demolition of a private illegal swimming pool and other recreational facilities developed with crooked permits at a famous beach and marine turtle’s habitat.

Rhode Island Sea Grant

RI SG developed a training video demonstrating how users can upload reports with images to the MyCoast app to track shoreline change and flooding and to prioritize resilience and mitigation efforts.

RI SG conducted legal research and analysis to determine a municipality’s ability to create a voluntary buy-out program for relocation efforts in response to increased flooding, and engaged municipal officials in a workshop where the findings were applied in their towns.

RI SG facilitated a series of community meetings that assessed and reviewed aquaculture permitting in the state that created suggested changes for the permitting process which resulted in administrative and regulatory changes to the state’s coastal zone management program.

South Carolina Sea Grant Consortium

SC SGC provided essential planning, assistance, and information resources to multiple coastal communities to help them assess vulnerabilities to flooding and implement plans for climate adaptation.

SC SGC developed Calling the Coast Home - a program that won the prestigious Sea Grant Superior Outreach Programming Award (SOPA)

in 2022 - a series of 4 courses for real estate professionals training about risk, flooding, and the natural history of the coast.

SC SGC researchers worked with local breweries to test the utility of spent grains as a food nutrition source for red drum (an important mariculture species).

Texas Sea Grant

TX SG Extension Program assisted in the creation of 4 Cultured Oyster Mariculture farms, an emerging industry in Texas, resulting in 12 new jobs and generating an economic impact of \$565,230 during 2023.

TX SG's Monofilament Recovery and Recycling Program engaged 88 volunteers across the state, sponsoring 271 collection bins, collecting and recycling of 143 pounds of used fishing line removed from the environment in 2023.

TX SG raises public awareness about artificial intelligence's (AI) crucial role for disaster resilience planning, resulting in design and dissemination of a crowdsourcing application, Blupix, which uses Geographic Information System (GIS) information along with user-contributed photos to calculate floodwater depth and communicate results back to users for risk mitigation.

University of Southern California Sea Grant Program

USC SG partnered with multiple local sustainable aquaculture producers and a South Central Los Angeles community organization, the "South Central Seafood Hub," to pilot one of the only pipelines to improve equitable access to local seafood among middle- and low-income communities of color in Los Angeles.

USC SG in collaboration with several Sea Grant programs and funded by NSF, hosted one of five national workshops addressing climate-induced human mobility and its socioeconomic consequences, and published the workshop findings in a report for city planners, decision-makers, and practitioners. It is now being used as

a model for the other five regions of the country.

USC SG has educated over 30,000 people in the last two years through K-12 education programming for formal and nonformal venues and development of a marine biology book as part of a series aimed at priority communities of Latinx, Black, Indigenous, and other underrepresented and underserved populations.

Virginia Sea Grant

VA SG supports living shoreline plant production and testing by working with the Knott-Alone Hold Fast program for veterans and Norfolk State University students.

VA SG Communications Center launched the Aquaculture Information Exchange allowing members of the aquaculture industry access to an online community, working groups, information resources, networking events, and educational opportunities.

VA SG extension personnel at the Virginia Institute of Marine Science's Marine Advisory Program ran the VA SEA program which connects graduate students' science with K12 classrooms around the world. Over the last 6 years, the program has provided professional development training and mentorship to 59 graduate students who have developed 66 K12 lesson plans that have been downloaded more than 16,000 times across 159 countries.

Washington Sea Grant

WA SG lead 10 years of detecting and monitoring invasive European green crab in Washington state by providing volunteer training, scientific expertise and original research to proactively inform response and management of this damaging invasive species in Washington.

WA SG partners with USGS and others to expand the Coastal Storm Modeling System (CoSMoS) for place-specific, long-term resilience planning along Washington's coast.

WA SG Expand student horizons and jumpstart early careers in marine science through a robust

suite of fellowship programs with a demonstrably regenerative nature: six out of seven host offices in Washington are now led by former Washington Sea Grant fellows.

Wisconsin Sea Grant

WI SG facilitated a positive change in Great Lakes seafood sustainability ratings that is worth \$15 million in economic value, helps domestic businesses and supports at least 83 jobs tied to the lake whitefish and lake cisco commercial fishing industry.

WI SG researchers studied tree-ring records of managed fire history and Indigenous knowledge about pine communities along two Lake Superior peninsulas to understand Indigenous resiliency practices, which are now being incorporated into public land management plans in at least one coastal city.

WI SG Wisconsin Sea Grant supported a first-of-its-kind study of natural foams in more than three dozen rivers and lakes, quantifying 36 PFAS compounds and finding high concentrations, which validates a current Wisconsin Department of Natural Resources warning that people and pets avoid foam due to health risks.

Woods Hole Oceanographic Institution Sea Grant

WHOI SG Explores the diverse ecosystems and sustainability challenges of Cape Cod and Cape Verde through an exhibit for the Cape Cod Cape Verdean Museum and Cultural Center developed by a Community Engaged Internship student from Bridgewater State University.

WHOI SG Establishes CoastSnap stations to engage communities in coastal monitoring across the Northeast, enabling individuals to use smartphone camera mounts to capture and upload photos that generate a record of beach erosion and recovery, enhancing public participation and understanding of coastline change.

WHOI SG offers a 10-week interactive course,

Fundamentals of Shellfish Farming, covering shellfish biology, hatchery production, field grow-out, safe handling, pest management, and business practices to support the growth of Massachusetts's \$30.9 million shellfish aquaculture industry.

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On the Cover

United States Capitol Building on a Sunny Day. Photo by Andy Feliciotti

Back Cover

A seal dives off the coast of Nihoa. Photo by: NOAA Fisheries




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