

ANNUAL REPORT

2022



Sea Grant
NEW JERSEY
SEA GRANT CONSORTIUM

I am pleased to present to you the 2022 Annual Report. Reflecting on this past year, I cannot help but think of 2022 as a year of spring. Like the seasons, 2022

started in the dead of winter, still in the grips of the Covid pandemic, but as the year progressed our NJSGC bloomed with the promise of spring as our programs, projects, and activities felt more normal and familiar, coming back to life after a dormant winter. It was good to stretch our legs and take a walk with our stakeholders and students as the sun's warmth strengthened and Covid concerns continued to recede. While we continued to work in a hybrid manner, more days were spent at our home on Sandy Hook.



**EXECUTIVE
DIRECTOR
DR. PETER
M. ROWE**

This awakening was dramatically seen through our Education Program as in-person summer camps, scouting programs, and school field trips populated more than fifty percent of our pre-Covid levels. It was wonderful to see fresh faces outside and inside our building. Our extension staff continued to work with their constituents, often meeting them in person after two years of being separated. Communications staff held annual events in person, grew our presence on social media, and mentored a summer intern. We started a new set of two-year research awards and continued with older ones that had been delayed due to the pandemic. We could tell that our funded researchers were pleased to be able to fully engage in their projects. We competed successfully for National Sea Grant funding opportunities and implemented those projects. We are veterans at virtual meetings as that is now part of our culture, but it was very refreshing to see long-time colleagues and meet new peers and constituents in person.

This general success could not have been completed without the hard work and dedication of NJSGC's staff, board members, partners, stakeholders, and friends. We said goodbye to staff transitioning to their life's next adventure and welcomed new NJSGC colleagues to our crew. Our dedicated and nimble staff allows NJSGC to respond to New Jersey's coastal and marine concerns of its people and through sustaining our state's marine and coastal resources. Despite our small numbers, our mission and vision shine in our work with our stakeholders through our marine and coastal research, education, communication, and extension programs. I know this report will speak to that spirit and our accomplishments in 2022. Thank you for your interest and support for NJSGC. I hope you enjoy this Annual Report.

BOARD OF TRUSTEES CHAIRMAN'S MESSAGE



**DENNIS
KEARNEY**

Change surrounds us. The pandemic brought the world to its knees with the smallest of germs. Places that rarely see rain or snow witness floods and blizzards. Powerful hurricanes wallop coastal communities with devastating destruction. The sea rises. But there are constants.

The rhythm of nature assures that dawn will surely follow the darkest night. The tides rise and fall with predictable precision.

And the New Jersey Sea Grant Consortium is ever vigilant to its three-part commitment to research, outreach and education.

Marine science helps us understand how change affects our ocean, bays and marshes. This research benefits our recreational and commercial sectors.

Marine science partners us with our stakeholders and communities to find ways to cope with new problems. This leads us to build better dunes and make our waters safer. Marine science engages our children. This instills the next generation with wonder and hope.

NJSGC is virtually unique among other Sea Grant organizations due to its independence. We partner with more than 20 member institutions of higher learning to give New Jersey the best in marine scientists. But none of this works without the fuel that drives the engine: our committed staff on Sandy Hook. To a person, their passion for the mission is inspiring.

Want to see for yourself? Join us at our Ocean Fun Day celebrations in May 2024. Surf through our website and discover the exciting and important world of marine science. Learn how the NJSGC works for you.

Consider how you might help. Donate to our cause. Use fewer plastic bottles. Stay off the dunes. Keep the faith. Whenever I have doubts, something happens to remind me that all our efforts matter.

One day last summer, I stood at the shoreline on Sandy Hook wondering if we were bailing against an incoming tide. In that moment of uncertainty, a humpback whale breached 50 yards out. Our work has not gone unnoticed.

On behalf of our staff, membership, stakeholders and board of trustees, I am proud to present this Annual Report.

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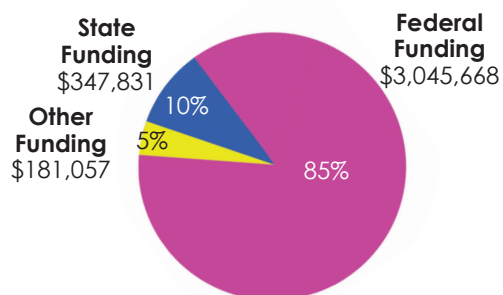
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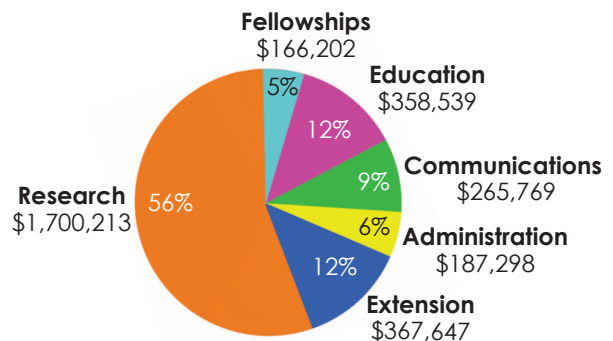
BUDGET OVERVIEW - FISCAL YEAR 2021-2022

SOURCE OF FUNDS

Total Funding \$3,574,556



INVESTMENT OF FEDERAL FUNDS



EXTENSION

COASTAL RESILIENCE SPECIALIST/COASTAL PROCESSES SPECIALIST

Coastal Resilience Specialist Laura Kerr and Coastal Process Specialist Jon Miller, continued to be actively involved in activities that support resiliency projects in coastal towns and fostering student development in the field of coastal processes. In 2022, this included participating in and leading activities such as the Coastal FloodHub, New Jersey Coastal Resilience Collaborative (NJRC), Going Coastal Podcast, State of the Shore Report, National Coastal Processes Group, student engagement, and advancements in engineering living shorelines.

Laura provided support to the New Jersey Coastal Resilience Collaborative and has most recently launched a Technical Resilience Directory for municipalities looking for support in addressing coastal resiliency in their towns. The Specialists worked with students and student organizations to help students find careers in coastal science and engineering. At a time when coastal science and engineering expertise is critical due to the threats posed by climate change, the workforce is aging. Engaging students at this time is critical in order to replace this workforce and address the challenges of the future. Jon continues to work with the State of New Jersey, its municipalities and NGO's on topics related to living shorelines and utilizing them for wave attenuation projects.

MARINE RECREATION AGENT

The Marine Recreation Agent, Michael Danko, continued efforts to reduce the impacts that recreational boating and fishing can have on the marine environment while helping coastal businesses comply with regulations and remain sustainable. In 2022, there was renewed interest in pursuing designation as Clean Marina and recycling shrink wrap. The Recreation Agent provided technical assistance to 4 marinas and helped them meet the requirements to be designated as Clean Marinas. In addition, he worked with a recycling company to implement a pilot shrink wrap collection for marinas located in Atlantic and Cape May counties and worked with Morris county and the Lake Hopatcong Foundation to establish a program for marinas on Lake Hopatcong.

The Marine Recreation Agent has continued to work with the NJDEP and members of the Harmful Algal Bloom Expert Team to develop guidance documents designed to help lake managers and lake communities reduce Harmful Algal Bloom (HAB) impacts and the occurrence of them. Several NJSGC member institutions serve on the

panel along with members from federal agencies and private consultants. NJSGC Member institutions include George Mason University, Monmouth University, Montclair University, Rowan University and Rutgers University. The Expert Team recently completed a review of New Jersey's water quality data and provided answers to a series of charge questions the HAB Expert Team was presented with. The information compiled by the HAB Expert is being developed into a document that can be used by lake associations, municipalities, consultants and other similar groups to develop a lake specific HAB management plan along with training opportunities to implement recommended monitoring and management measures.

The 6th Jersey Shore Junior Science Symposium (JSJS) was held virtually on March 24, 2022 and hosted by Ocean County College. The NJSGC provided awards at the 2022 Symposium, for the Top Environmental Paper to Saachi Kuthari, Millburn High School, Millburn, NJ for his paper presentation on Inactivation of MS2 Bacteriophage for Water Disinfection via Microwave Irradiation and an award for the Top Environmental Poster to Eric Wang, Millburn High School, Millburn, NJ for his poster on Effects of Various Soil Microbiomes on Native and Invasive Plants Land Based Seagrass (*Zostera marina*) Germination to Determine Optimal Plant Growth and as a Restoration Initiative.

RESILIENT COMMUNITIES AND ECONOMIES SPECIALIST

Resilient Communities and Economies Specialist (RCES), Tom Herrington, partnered with Naval Weapons Station Earle (NWSE), Monmouth County and the municipalities of Aberdeen Township, Highlands, Avon-by-the-Sea and Bradley Beach to advance coastal resilience projects identified in a Joint Land Use Study (JLUS) conducted by NWSE, Monmouth County and the surrounding municipalities. Hurricane Sandy resulted in \$50 million in damages to NWSE facilities and millions of dollars more to surrounding communities. NWSE also suffered extensive disruption of utilities, support services, and vehicular access, as well as increased Bayfront erosion that could have long-term impacts to its future mission. Since Sandy, improving local community resilience to limit the disruption of the facility, its military mission and Navy personnel, has been a priority for NWSE. The RCES received funding to advance the proposed coastal resilience projects in Aberdeen Township, Highlands, Avon-by-the-Sea and Bradley Beach

EXTENSION

from conceptual design through site assessment, preliminary design and permitting.

The New Jersey Sea Grant Resilient Communities and Economies Specialist (RCES) continued to collaborate with NY Sea Grant, on the NY/NJ Metro area social media BEach SAFELY campaign. As the densely populated NY/NJ Metro area saw pandemic restrictions lifted in summer 2022, public messaging to reinforce beach safety continued to ensure tourist have a safe and enjoyable beach experience. Additional messaging related to digging deep holes on the beach and one to raise awareness of marine life were created. Revising the digital graphics to remove pandemic messaging and expanding the content allows the highly successful summer Beach SAFELY social media campaign for many years to come and reinforces public safety messaging annually to ensure beach visitors have a safe and enjoyable beach experience.

SHELLFISH AQUACULTURE PROGRAM COORDINATOR

Lisa Calvo, Shellfish Aquaculture Program Coordinator and Rutgers University's Haskin Shellfish Research Lab and New Jersey Sea Grant Consortium have joined together to create a groundbreaking career-readiness project that will introduce middle and high school students to oyster aquaculture as a career opportunity and an important food production system. Our project, Building aquaculture career interest and competencies through student engagement in a

school-based enterprise oyster farm was launched in August with a professional development workshop for educators. The workshop featured farm tours and presentations from shellfish growers, NOAA Office of Aquaculture, Minorities in Aquaculture, Fishadelphia, and the hospitality industry. This winter she continues to work with attendees to develop classroom and apprenticeship opportunities in aquaculture for their students.

WATER RESOURCES AGENT

Water Resource Agent, Richard Kelly continues to see a strong demand for programs on rain gardens, green infrastructure and other stormwater management related projects. The Green Infrastructure Champions Program, a program that empowers local stakeholders to play a dominant role in encouraging municipalities and other property owners to implement green stormwater infrastructure projects, was held for a fourth consecutive year. The Green Infrastructure Champions Program was successfully conducted in 2022 with 79 participants from primarily from New Jersey but included participants from Maine, Washington and Pennsylvania. Participants included students, consultants, academic institutions, environmental commissions, watershed groups, consultants, municipalities, and other similar organizations. In addition, the Water Resources Agents continued their work on designing and implementing green infrastructure projects for numerous communities around the state.

COMMUNICATIONS

Ocean City remained undefeated as New Jersey's overall "Favorite Beach" in NJSGC's popular annual poll, which drew several thousand voters. The awards ceremony was held on the Ocean City boardwalk in July!

NJSGC outreach continues growing with over 5,000 "COASTodian" subscribers. This quarterly online newsletter provides information on NJSGC's funded research, education and outreach activities. As interactive content continues boosting social media presence, updates were shared with more than 2,400 Facebook followers, 2,230 Twitter followers, 1,094 Instagram, and 266 on LinkedIn.



The 20th annual State of the Shore media event was held once again in Asbury Park in May. NJSGC's Coastal Processes Specialist Dr. Jon Miller and NJDEP Commissioner Shawn LaTourette gave reports on the condition of New Jersey's beaches along with coastline forecasts for the summer season.



Many beautiful photos were submitted in the 2022 Jersey Shore Photo Contest. The public selected the 12 finalists via a voting poll. The winners can be viewed on our website: njseagrant.org. The 12 winning photos will be featured in the 2023 Jersey Shore Photo Contest Calendar.

EDUCATION

K-12 PROGRAMS

The Education Program's rebound from the COVID pandemic is most notable through its K-12 Program. Outdoor experiential learning programs increased from 10 classes with 326 students in 2021 to 341 classes with 8,525 students in 2022. With focus on essential principles of ocean and climate literacy, NJSGC's educators facilitate learning activities and engage students from visiting school groups that explore species diversity and coastal ecosystems. The remote synchronous learning programs developed during the COVID pandemic continue to remain in the Education Program's portfolio to meet the needs of schools that are either unable to or located too far to travel to NJSGC's headquarters at Gateway National Recreation Area on Sandy Hook.

SCOUTS

Scout group engagement continued to increase post-COVID pandemic with 35 programs implemented that engaged 875 boy and girl scouts in 11 different programs. A renewable energy teaching model was developed by Eagle Scout candidate Jonathaun Lauria through mentorship with NJSGC's Scout Program Coordinator and showcased at Ocean Fun Days. As a result, a new program was developed to educate scouts about climate change and the importance of utilizing renewable energy sources.

OCEAN FUN DAYS

The 19th annual Ocean Fun Days returned to an in-person outreach event after 2 years in virtual format. Ocean Fun Days is an eco-friendly celebration of the sea that promotes ocean discovery, coastal stewardship, and energy conservation. Together with founding partners New Jersey Natural Gas, National Park Service-Gateway National Recreation Area and Island Beach State Park, the event was supported by 161 volunteers and reached approximately 15,000 participants at the Island Beach State Park and Gateway National Recreation Area, Sandy Hook Unit locations over a 2-day weekend in May. Complimenting the event, oceanfundays.org provided unique educational videos and materials on topics that varied from marine animals and current ocean research to marine careers and energy saving with an environmental impact.

PROFESSIONAL DEVELOPMENT

NJSGC offered two summertime workshops for educators to increase content knowledge and pedagogical strategies in their practice. In partnership with Jacques Cousteau National

Estuarine Research Reserve on "TOTE: Teachers on the Estuary", NJSGC was able to collaborate on a 3-day hybrid workshop that provided an opportunity for 20 educators from throughout the state to visit locations in central and southern New Jersey to learn about the importance of estuaries for human use while remaining natural resources. Judith Weiss, PhD, NJSGC Board of Trustees and Professor Emerita of Biological Sciences at Rutgers University, presented a recent study that focused on the challenges that estuaries may encounter in the face of rising sea levels. In addition, NJSGC worked with seven elementary school educators to increase their ability to teach climate change science to their K-6 th grade students. Teachers learned basic climate science and classroom-ready activities to share in their classrooms.

PARTNERSHIPS

NJSGC and its Gateway National Recreation Area educational partners, National Park Service and Jamaica Bay-Rockaway Parks Conservancy, received funds for a third granting cycle from the National Park Foundation to participate in the Open Outdoors for Kids – Every Kid Outdoors project. This initiative encourages students in grades 3, 4 and 5 to visit national parks as they learn to appreciate the cultural history and natural beauty of these national treasures. Funding provided the opportunity for 4,582 participants to visit a national park and to be engaged in outdoor experiential learning programs such as field trips and scout programs that focused on Gateway's coastal ecosystems. All programs were provided free of charge thanks to the generous grant.

WORKFORCE DEVELOPMENT

NJSGC received funding from the National Sea Grant College Program to develop and implement a pilot apprenticeship program for high school students to introduce them to shellfish aquaculture as an emerging food source and a viable career path. Apprenticeship in Shellfish Aquaculture (ASAP) was developed in collaboration with researchers from Rutgers University and extension specialists along with a focused group of educators and industry professionals to create aquaculture literacy awareness and prepare high school students for entry-level aquaculture work. ASAP engaged six students in a synchronous remote mini-course, week-long "boot camp" at partner aquaculture facilities, and 20-hour farm work experience, and resulted in one student securing part-time employment on an oyster farm in summer 2022.

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OMNIBUS RESEARCH AWARDS

OMNIBUS 2020-2022

Developing and Implementing an Index to Assess the Resiliency of New Jersey's Fishing Communities to Climate Change Impacts

Lisa Auermuller, Jacques Cousteau National Estuarine Research Reserve; Rutgers, The State University of New Jersey

Interactive influences of Dermo disease and the Microbiome on *Crassostrea virginica* disease susceptibility and microbial dynamics

Dr. David Bushek, Rutgers, The State University of New Jersey

"Local catch-of-the-day": Connecting NJ seafood harvesters with culturally and economically diverse customers

Dr. Cara Cuite, Rutgers, The State University of New Jersey

Demographics, survivorship and post-released behavior of sharks captured in the land-based recreational shark fishery using fisheries-dependent data

Dr. Keith Dunton, Monmouth University

Developing capacity for microplastics extraction from an archived New Jersey larval fish time series

Dr. Thomas Grothues, Rutgers, The State University of New Jersey

Optimizing Atlantic striped bass aquaculture through the integration of duckweed and macroalgae

Dr. Gal Hochman, Rutgers, The State University of New Jersey

Impacts of Oyster Aquaculture Gear on Submerged Aquatic Vegetation Recruitment and Recruitment Processes

Dr. Elizabeth Lacey, Stockton University

Mapping eastern black rail habitat to aid coastal conservation and climate resiliency planning

Dr. Julie Lockwood, Rutgers, The State University of New Jersey

Project SEA: Science, Education, and Action

Dr. Lauren Madden, The College of New Jersey

Physics-Based Assessment of Hurricane-Induced Wave Hazards Under Climate Change: Barrier Islands of New Jersey

Dr. Reza Marsooli, Stevens Institute of Technology

Shorebird Distribution in Relation to Horseshoe Crab Eggs

Dr. Daphne Munroe, Rutgers, The State University of New Jersey

Development of Point-of-Use Trace Metal Sensor and In-situ Sediment Extraction New Jersey

Dr. Philip Sontag, Rutgers, The State University of New Jersey

Microplastic ingestion by New Jersey breeding seabirds

Dr. John Wiedenmann, Rutgers, The State University of New Jersey

OMNIBUS 2022-2024

The tropical cyclone impacts and climate resilience of maritime forests of New Jersey

Dr. Nicole Davi, William Paterson University

Advancing Techniques to source track fecal microbes in estuarine and coastal waters to engage civic scientists

Dr. Nicole Fahrenfeld, Rutgers, The State University of New Jersey

Impacts of climatic shift of essential habitats on economically and ecologically important fish and invertebrate species

Dr. Elizabeth Lacey, Stockton University

Expanding Project SEA: Science, Education, and Action

Dr. Lauren Madden, The College of New Jersey

Prioritizing Hazard Mitigation Investments for Equitable and Efficient Adaptation of Coastal Residential Communities

Dr. William Payne, Rutgers, The State University of New Jersey

The Impact of Offshore Wind Farms on Local Physical Oceanography and Summer Flounder Distribution

Dr. Ruo-Qian Wang, Rutgers, The State University of New Jersey

Predicting the response of salt marsh methane emissions to sea-level rise through field and numerical experiments

Dr. Charles Schutte, Rowan University

Application of Coenzymes to Marine Oil Spill Mitigation

Dr. Philip Sontag, Rutgers, The State University of New Jersey

Combining eDNA with acoustic and video data to assess the ecology of submerged coastal structures

Dr. Peter Straub, Stockton University

NATIONAL

Atlantic and Gulf Shellfish Seed Biosecurity Collaborative

Dr. David Bushek, Rutgers, The State University of New Jersey

Innovative Restoration Aquaculture of Freshwater Mussels in the Tidal Freshwater Zone of the Delaware Estuary Watershed for Water Quality Improvement

Dr. Danielle A. Kreeger, Partnership for the Delaware Estuary, Inc., Drexel University

Optimizing Green Infrastructures and Low Impact Developments to Mitigate Runoff and Pollution Impacts on Freshwater Systems

Dr. Dibyendu Sarkar, Stevens Institute of Technology



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Cover Photo - Jani Kovacs Jonas - Barnegat Bay from Beach Haven docks