



# Sea Grant

## CONNECTICUT



ANNUAL REPORT 2022

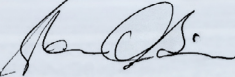
## LETTER FROM THE DIRECTOR

Welcome to another issue of Connecticut Sea Grant's annual report. We offer highlights of Connecticut Sea Grant (CTSG)'s accomplishments over the 2021-22 Sea Grant fiscal year, which includes February 2021 through January 2022, a year marked with continued adjustments to the COVID-19 pandemic, and a lot of Zoom calls! This brief and simplified report documents our efforts at developing partnerships and leveraging resources from within and outside the Sea Grant core budget. It provides a glimpse into the sources and allocation of our funds, and the research, extension and education efforts supported.

Some of our success stories appear as highlights summarizing selected accomplishments and impacts across our areas of investment. These range from continuing to work on developing a strong seafood sector, which we helped support during COVID-19, to helping communities become more resilient to a changing climate, maintaining healthy coastal ecosystems and training tomorrow's scientists, workforce and citizens. You can find out more about our program via articles in our award-winning *Wreck Lines* magazine or on our website, <https://seagrant.uconn.edu>. We are proud to continue to work with many different stakeholder groups (including industry, government, non-government and academic partners) towards achieving our mission. Simply stated, we seek to sustain and support "thriving coastal ecosystems and communities" by integrating research, outreach and education in partnership with stakeholders, as outlined in our Strategic Plan.

I look forward to hearing from anyone who would have feedback to offer on this report specifically, or on the program in general.

Yours,



Sylvain De Guise, Director



## SUMMARY OF CONNECTICUT SEA GRANT ACHIEVEMENTS:

- ▶ CTSG managed **\$1,390,830** in core Sea Grant funding; **\$816,701** in state core match funding; **\$1,725,928** in other competitive Sea Grant competitive funds with **\$746,623** in associated competitive funds match, and an additional **\$3,386,702** in leveraged funds from federal, state and private sources, for a total of more than **\$8 million**.
- ▶ The Return on Investment ratio for state matching funds is **4.1:1**.
- ▶ The Return on Investment ratio for core federal funds is **4.8:1**.
- ▶ CTSG activities contributed to creating or retaining **28 jobs** and **20 businesses**, for a combined economic (market and non-market) benefits of at least **\$865,000**.
- ▶ Reached **90** K-12 educators through professional development, which benefited their students.
- ▶ Leveraged **2,777** hours of volunteer time towards CTSG-supported activities, despite the pandemic.
- ▶ Supported **32** new and continuing undergraduate and graduate students in research, extension, workforce development and education activities.



**SOURCES OF  
CTSG FUNDS  
\$8,000,000**

Leveraged  
state funds  
\$779,811

Leveraged  
federal funds  
\$2,445,540

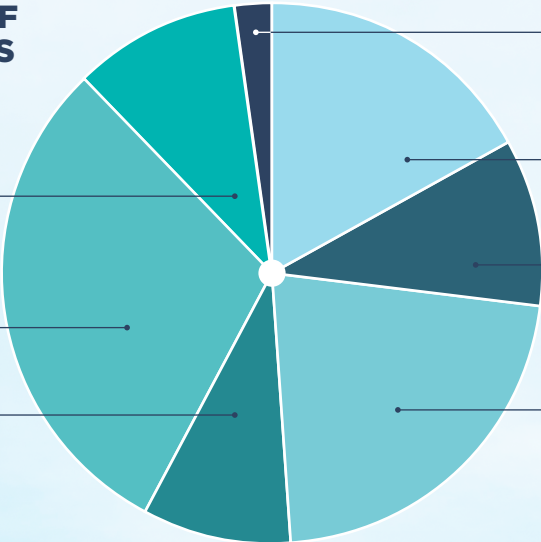
Competitive  
funds match  
\$746,623

Leveraged  
private funds  
\$161,351

Core Sea  
Grant funds  
\$1,386,830

State core match  
\$816,701

Sea Grant  
competitive funds  
\$1,725,928



**DISTRIBUTION  
OF CORE  
FUNDS**

Research  
29%

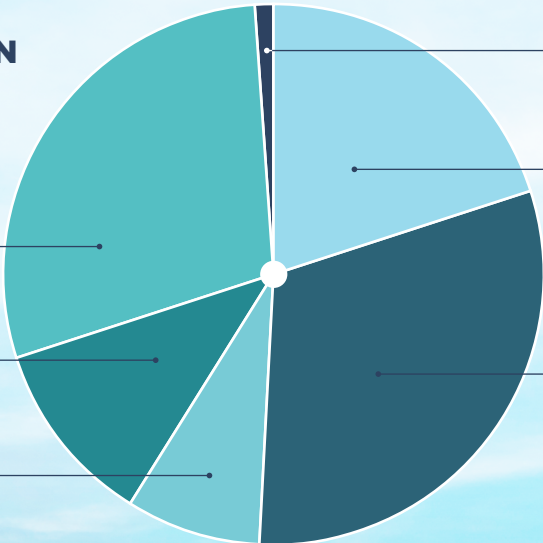
Communication  
12%

Education  
8%

Program  
development  
1%

Management  
20%

Extension  
31%





## 2022 ANNUAL REPORT

### FISHERIES AND AQUACULTURE

1. CTSG and partners supported development of business planning and management tool for seaweed industry to improve industry knowledge of investors and potential market entrants and increase access to investment capital. Seaweed industry further supported with addition of CTSG extension specialist to UN-affiliated international coalition to advance world seaweed industry.

“One of the most valuable things to come out of the Seaweed Hub, which CTSG launched in 2020, are the seaweed farming tools and guidance developed by Hub Work Groups. Last year, the production-focused work group I helped lead created an online Directory of Seaweed Nurseries to help seaweed growers across the country find sources of ‘seed’ for their farms. This is a perfect example of what can happen when you invite stakeholders to identify what their industry needs, and support them in developing their own solutions—which is really what Sea Grant is all about!”

— Meg Chadsey, carbon specialist,  
NOAA Pacific Marine Environmental Lab Liaison  
Washington Sea Grant

2. Work groups of National Seaweed Hub, a coalition of 10 programs led by CTSG, made progress in identifying industry and regulatory priorities, including production systems, regulatory aspects of food safety and permitting and consumer education.
3. Study helped fisheries managers boost populations of alewife, an economically and ecologically important river herring species, by improving and expanding spawning habitat.



“I always attend Sea Grant’s annual CT Seaweed Stakeholder workshop. It is the only time farmers can meet with regulators and researchers to discuss challenges and how to solve them. I always learn a little something at each one of these meetings and hopefully provide some input from my own experience that might help other kelp producers.”

— DJ King, owner, DJ King Lobsters

4. The first economic assessment of recreational shellfishing in CT determined that it had an economic impact of more than \$1 million in 2015 and supported 16.7 jobs, mainly in marinas and retail stores.
5. Northeast Sea Grant Extension piloted three types of oyster aquaculture gear and identified the type of gear that produces faster growing, higher quality shellfish. This led to the adoption of the SEAPA baskets by a Connecticut commercial oyster farm.
6. Partnership of CTSG, state agencies, UConn CLEAR and Extension, NRCS and Pew Charitable Trusts created the CT Shellfish Restoration Map Viewer, a digital tool to aid local and state agencies and habitat restoration experts in the site selection process.
7. CTSG and partners developed a sustainable shellfish bed management strategy to increase annual oyster recruitment on natural beds that are a main source of seed for the industry, implemented an oyster restoration effort and began a pilot shell recycling program.

### WORKFORCE DEVELOPMENT



1. CT, NY, RI Sea Grant programs partnered with the University of Maine to teach six virtual seafood HACCP trainings, enabling 96 seafood processors to meet FDA requirements in 2021. The training supported 16 businesses in nine states, with an economic impact of more than \$770,000.



2. With funding from the National Sea Grant Office and the Northeast Fisheries Science Center, CTSG hired a new Sea Grant extension educator who is based at the NOAA Milford Lab and serves as a regional liaison to accelerate technology transfer from the lab to the North Atlantic aquaculture industry.
3. CTSG administered NOAA Knauss Marine Policy Fellowships for three Connecticut-based graduate students. This experience provided them with policy-relevant career advancement opportunities.
4. Four undergraduate students from underrepresented and underserved groups were supported by faculty mentors and \$5,000 stipends to pursue summer marine-science related research projects. The fellowship aims to increase diversity in marine and coastal-related professions. Their projects focused on: suitability of restored “living shorelines” for nesting horseshoe crabs; gene expression in killifish exposed to changing water temperatures and salinity; the biodegradability of three types of plastic bags; and biogeochemical cycling of mercury in aquatic ecosystems.



“This research fellowship has provided me with exposure and experience to new insights and perspectives. I have learned under the guidance and mentorship of an experienced professor who has allowed me to support and communicate science in a practical, actionable manner, making science real and applicable. Throughout the fellowship I have thought about how to balance human use and conservation of coastal ecosystems. I have come to understand that our livelihoods and health depend on these dominant species that makeup the base of our coastal food webs.”

— Cithlaly Palacios,  
Sacred Heart University graduate

5. Coastal/Marine Economics Graduate Fellowship was established to provide support for a new generation of coastal/marine economists. A Yale University doctoral candidate awarded the first fellowship developed economic approaches to quantify ecosystem values, assessing the relationship between healthy dunes ecosystems and property values.



## RESILIENT COMMUNITIES

1. CTSG joined six other Northeast Sea Consortium programs in committing to work locally and regionally to provide expertise to stakeholders potentially impacted by offshore energy development. In addition to engaging with fishing and aquaculture industry representatives, CTSG is participating in a regional community of practice to learn, relate concerns and assess needs and opportunities. To further advance understanding of impacts of offshore renewable energy on coastal communities, six research proposals that have received federal funding are being administered through the consortium.
2. A fact sheet addressing questions about eminent domain, flooding and legal authority posed by participants in a 2020 workshop titled “Managed Retreat in the Age of Climate Change” was created by a legal fellow and made available on the CTSG and Adapt CT websites.
3. CTSG worked with Avalonia Land Conservancy and UConn Extension foresters to improve the resilience of Hoffman Evergreen Preserve, a coastal forest. The project involved UConn Climate Corp student research to identify tree and shrub species adaptable to changing climate conditions that were subsequently planted.
4. CTSG extension expert consulted on a dune restoration project at Sherwood Island State Park that was spearheaded by volunteers who raised money for plants and supplies including erosion control cloth to enhance planting success.
5. A video on legal issues and flood resilience in CT and RI highlighting planning and zoning issues was created for municipal officials in coastal and inland communities. It describes actions that can reduce liability.
6. Two new extension professionals based in CT and three in NY were hired to advance sustainability, resilience and environmental justice goals, as well as enhance the involvement of people impacted by local and regional decisions in response to climate change.



## ENVIRONMENTAL LITERACY

1. New Haven artist Joseph Smolinski received a CTSG arts support award to create original artwork relevant to coastal environments. His project, "Carbon Adrift: Sea Coal in the Long Island Sound," provides a means of public outreach and engagement.
2. CTSG and NYSG worked with a graduate student and an undergraduate intern to develop a new Story-Map titled "A Virtual Tour of Long Island Sound Habitats," with versions for both teachers and students and based on Next Generation Science Standards. The new resource was introduced to 30 educators through a webinar.
3. CTSG's education coordinator served as one of three co-editors on *A Handbook for Increasing Ocean Literacy: Tools for Educators and Ocean Literacy Advocates*, a handbook developed by the National Marine Educators Association with NOAA support.
4. CTSG communications coordinator worked with the director of The Drop-in Learning Center in New London to offer a series of marine and coastal-related lessons and hands-on activities for 50 K-5th grade inner-city students.



5. CTSG research coordinator and UConn faculty member partnered with UConn Maritime Studies colleagues and Project Oceanology to engage local high school and undergraduate students in the development of the Thames River Explorations - Digital Stewardship (TREDS) resource, highlighting environmental science, maritime history and environmental justice issues along the Thames River.

“The Thames River Explorations - Digital Stewardship (TREDS) project was the cornerstone of my junior year at UConn. The research I conducted on behalf of the project gave me an in-depth look into historical and contemporary environmental justice issues in the Thames River estuary and especially spoke to my interests in the accessibility of natural spaces, land use and the public's ability to influence policymaking.”

— J. Wierski, UConn Maritime Studies student



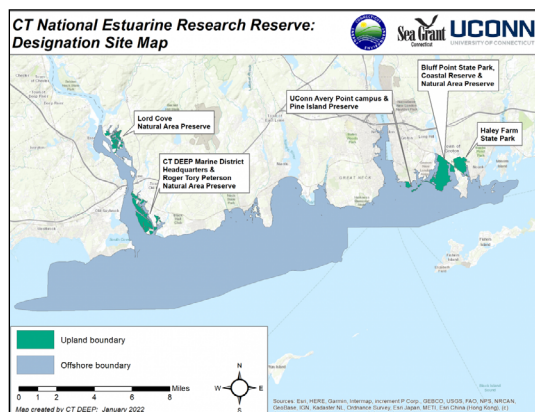
## COASTAL ECOSYSTEMS AND WATERSHED

1. A five-year marine debris action plan for Long Island Sound was drafted by CT and NY Sea Grant programs with NOAA Marine Debris Program and input from more than 50 regional partners. The plan includes strategies and actions to reduce single-use plastic and other consumer debris, microplastics and microfibers, and abandoned and lost fishing and aquaculture gear.
2. CTSG leads partnership to define strategic role for Sea Grant programs nationally to address contaminants of emerging concern. The project included a comprehensive review of CECs research; a national survey and regional workshops; completion of a scoping report and an Atlantic coast research competition.





3. The Long Island Sound Blue Plan, a marine spatial plan co-led by CTSG, was formally adopted by the CT General Assembly, establishing it as the framework for identifying and protecting its most valuable assets for humans and wildlife.



4. An effort co-led by CT DEEP, UConn Marine Sciences and CTSG resulted development of a management plan required for designation by NOAA of the CT National Estuarine Research Reserve. The nation's 30th NERR is comprised of an assemblage of aquatic and upland sites in the lower Connecticut and Thames rivers.

## CTSG-SUPPORTED RESEARCH



1. Scientists used age analysis and telemetry data to study a potential new Atlantic sturgeon spawning population in the Connecticut River. Results will help determine whether juveniles caught in the river in 2014 were the result of a one-time event or evidence of a re-emerging spawning population of this endangered species. **Hannes Baumann, UConn**
2. Genetics of *Spartina alterniflora* plants from different sources used in salt marsh restoration were analyzed to understand the role of particular plant characteristics related to different strains on plant growth and marsh restoration success. **Sarah Crosby, The Maritime Aquarium**
3. Rising sea levels are impacting fringing salt marsh habitats. This research examines four factors influencing salt marsh migration into coastal forests: the role of large storms; the ecological character of the marsh-forest ecotone; “invisible migration” not detected by aerial imagery; and tree species and soil types in the uplands. **Shimon Anisfeld, Yale University**

“With this funding from CT Sea Grant, a collaborative team of scientists, students, and restoration practitioners was able to explore salt marsh structure, function, and population genetics in 12 of Connecticut’s natural and restored salt marshes. This research will be used to improve the resilience of salt marsh restoration activities by incorporating plant genetics into restoration planning, as well as help us to understand differences in how our marshes respond to climate change.”

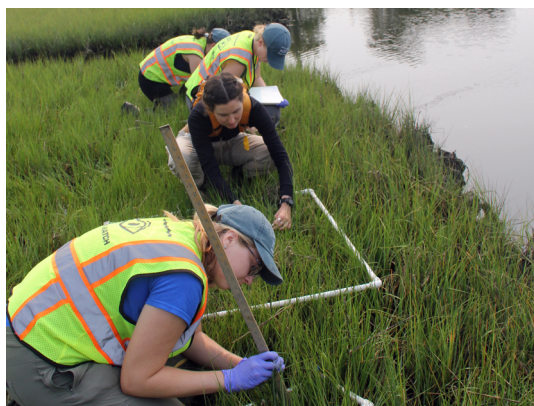
— Sarah Crosby, *The Maritime Aquarium*

4. Aquaculture gear and microplastic ingestion by oysters were investigated to determine whether there are correlations between the plastics used in gear and the types and concentrations of plastics found in dissected oysters. **Evan Ward**, *UConn*
5. The researchers developed and refined models to assess potential impacts of a proposed storm surge barrier on New York's East River on the tidal dynamics of the river, Throg's Neck and LIS. **James O'Donnell**, *UConn*
6. The capacity of riparian floodplains to serve as secondary treatment systems for stormwater runoff and enhance contaminant removal is assessed by researchers. **Timothy Vadas**, *UConn*

**“Riparian floodplains are biogeochemically active environments where nitrogen typically occurs. With Sea Grant support, we were able to establish field plots and column studies to assess nitrogen removal via denitrification following artificial stormwater discharge to these floodplains.”**

—*Timothy Vadas, UConn*

7. With NY Sea Grant and the EPA Long Island Sound Study, supported \$2.83 million in research projects focusing on the ecology of LIS. Eight projects included investigations of: the function of land use in nitrogen management; use of sediments for marsh rebuilding; impediments to juvenile alewife migration; identifying bioindicators of microplastics; the role of seaweed aquaculture in nutrient bioextraction; the impact of iron in eelgrass restoration; and the biogeochemistry and conditions of LIS waters and sediments.



## CONNECTICUT SEA GRANT STAFF

### Sylvain De Guise

Director  
sylvain.deguise@uconn.edu  
(860) 405-9138

### Nancy Balcom

Associate Director  
and Extension Leader  
nancy.balcom@uconn.edu  
(860) 405-9107

### Deborah Abibou

Sustainable and Resilient  
Community Extension Educator

### Juliana Barrett

Extension Educator Emerita–  
Coastal Habitats

### Judy Benson

Communications Coordinator

### Anoushka Concepcion

Associate Extension Educator–  
Aquaculture

### Michael Dietz

Connecticut NEMO Director  
Extension Educator-Sustainable  
Communities

### Syma Ebbin

Research Coordinator

### Tessa Getchis

Senior Extension Educator–  
Aquaculture

### Michael Gilman

Aquaculture Extension Assistant

### Zachary Gordon

Regional Aquaculture Liaison

### Michelle MarcAurele

Fiscal Officer

### Diana Payne

Education Coordinator

### Robert S. Pomeroy

Research Professor, Aquaculture  
and Fisheries  
Extension Specialist Emeritus

### Judy Preston

Long Island Sound Outreach  
Coordinator

### Alicia Tyson

Sustainable and Resilient  
Community Extension Educator

## SENIOR ADVISORY BOARD

**Radenka Maric**, UConn President,  
previously Vice President for Research (chair)

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**Robert Johnston**, Director, George Perkins Marsh Institute,  
Clark University

**Bill Lucey**, Long Island Soundkeeper, Save the Sound

**Kelly Matis**, Vice President of Education and Conservation,  
Mystic Aquarium & Institute for Exploration

**Thomas Morgart**, State Conservationist, USDA-Natural  
Resources Conservation Service, Connecticut

**Donald Murphy**, Chairman, Stonington Shellfish Commission/  
U.S. Coast Guard (ret.)

**Christine Nelson**, Director of Land Use, Old Saybrook (ret.)

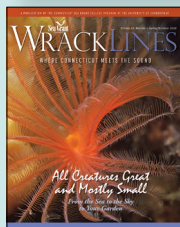
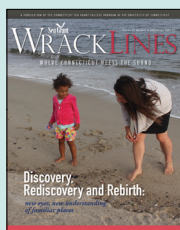
**Tracy Romano**, Vice President of Research and  
Chief Scientist, Mystic Aquarium & Institute for Exploration

**Mark Tedesco**, Director, EPA Long Island Sound Study

**Michael Theiler**, Captain and Owner, Jeanette T Fisheries

**Brian Thompson**, Director of the Land and Water Resources  
Division, CT DEEP

**Gerald Torres**, Professor of Environmental Justice, Yale School of  
the Environment, Professor, Yale Law School



Salt marshes, tidal rivers and coastal forests of the newly designated CT National Estuarine Research Reserve are explored in compelling personal stories in the Fall-Winter 2021-22 issue of *Wrack Lines*, CT Sea Grant's biannual magazine. Other articles delve into research into the invasive seaweed problem in Little Narragansett Bay and the transformation of one of Connecticut's cultural and educational treasures, the Peabody Museum. The articles and photos demonstrate how the issue's theme of "Discovery, Rediscovery and Rebirth: new eyes, new understanding of familiar places," is being realized by those who work in, care about and enjoy Connecticut's natural places and institutions. In the Spring-Summer 2022 issue, the theme of "All Creatures Great and Mostly Small: from the sea to the sky to your garden," carries readers through a tale of the lesser-known and amazing undersea life in Long Island Sound, then to a fascinating account of bird painter Rex Brasher and efforts to bring attention to his masterful collection, much of

which is housed at UConn. Another piece explains research into copepods' ability to adapt to climate change conditions, yielding a complex picture of the future cost to these tiny but essential marine animals and other wildlife populations. Readers can then learn about some important and interesting native insects such as the burying beetle why they deserve appreciation, and about a storied oyster reef in Fairfield that has captured the dedication of researchers and volunteer shellfish commission members alike working to further enhance it. Distributed in print and electronically free of charge to more than 4,000 households, nature centers, libraries, schools, colleges, marinas and other outlets, it is also made available at visitor welcome centers, state parks and tourist destinations as one of Connecticut Sea Grant's main means of carrying out its public service mission through educational outreach.