



# Sea Grant

**CONNECTICUT**  
ANNUAL REPORT 2021

## LETTER FROM THE DIRECTOR

Welcome to Connecticut Sea Grant's annual report. We offer highlights of Connecticut Sea Grant (CTSG)'s accomplishments over the 2020-21 Sea Grant fiscal year, which runs from February 2020 through January 2021, a year marked with onset of the COVID-19 pandemic, and a lot of adjustments for our staff and stakeholders. This brief and simplified report documents our efforts at developing partnerships and leveraging resources from outside the Sea Grant core budget. It also provides a glimpse into the sources and allocation of our funds and the research efforts supported.

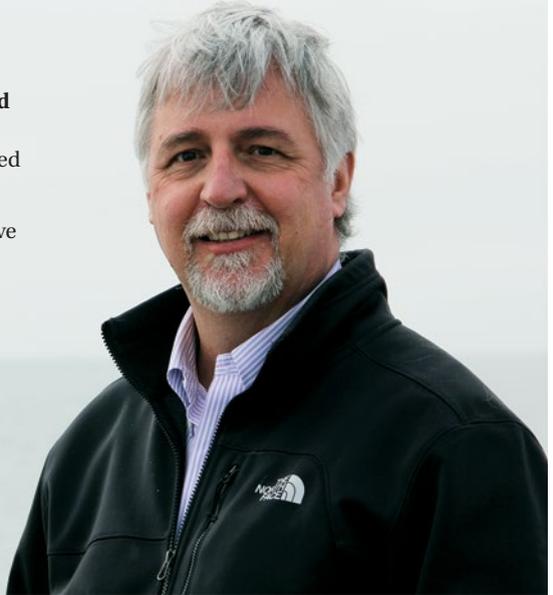
A few of our success stories appear as highlights summarizing selected accomplishments and impacts across our areas of investment. These range from continuing to work on developing a strong seafood sector, which we helped support when the restaurant market collapsed during COVID-19, to helping communities 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 *Wrack Lines* magazine or on our web site, <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:

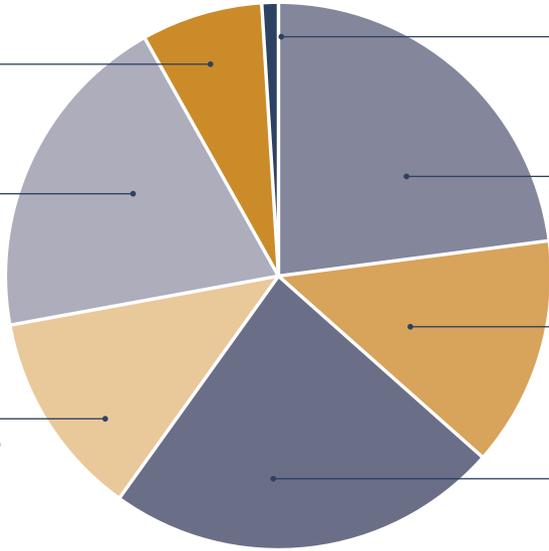
- ▶ CTSG managed **\$1,310,344** in core Sea Grant funding; **\$776,566** in state match funding; **\$1,335, 861** in other competitive Sea Grant funds (competitive grants) with **\$697,595** in associated state match, and an additional **\$1,592,196** in leveraged funds, for a total of over **\$5.7 million**.
  - ▶ The Return-on-Investment ratio for state matching funds is **2.9:1**
  - ▶ The Return-on-Investment ratio for core federal funds is **3.4:1**
- ▶ CTSG activities contributed to creating or retaining **70 jobs** and **47 businesses**, for a combined economic (market and non-market) benefit of **\$4.1 million**.
- ▶ Reached **44** K-12 educators through professional development, which benefited their students.
- ▶ Hosted **33** public events and workshops that involved **1,672** stakeholders, despite the pandemic.
- ▶ Leveraged **1,812** hours of volunteer time towards CTSG-supported activities, despite the pandemic.
- ▶ Supported **38** new and continuing undergraduate and graduate students in research, extension, workforce development and education activities.

Leveraged state funds  
\$410,467

Leveraged federal funds  
\$1,125,552

**SOURCE OF CTSG FUNDS**  
**\$5,712,562**

State match for other competitive Sea Grant funds  
\$697,595



Leveraged private funds  
\$56,177

Core federal funds  
\$1,310,344

State matching funds  
\$776,566

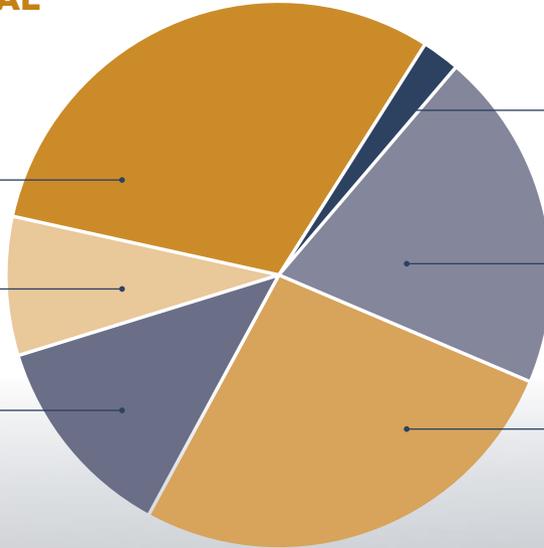
Other competitive Sea Grant funds  
\$1,335,861

**CORE FEDERAL DOLLARS INVESTED**  
**\$1,310,344**

Research  
31%

Education  
8%

Communication  
12%



Program development  
2%

Administration  
20%

Extension  
27%





## 2021 ANNUAL REPORT

### FISHERIES AND AQUACULTURE

1. Implemented crisis response to COVID-19 impacts to commercial aquaculture in partnership with state Bureau of Aquaculture: shellfish industry restored 1,800 acres of public shellfish beds in exchange for the ability to harvest \$1.9 million worth of northern quahogs or receive direct financial compensation; shellfish workers hired to reclaim buried shell to provide shell and oversized oysters to be planted on public shellfish beds. Nearly two-thirds of the industry participated, resulting in getting crews back to work during market closures. Worked with other Sea Grant programs to raise awareness about COVID impacts on shellfish businesses, leading to revised federal policy making aquaculture farms eligible for expanded CARES Act relief.
2. Led partnership of nine Sea Grant programs in seaweed aquaculture initiatives: organizing first national seaweed symposium; establishing National Seaweed Hub; creating work groups to address challenges; completing needs assessment for industry; and connecting global textile company with researchers and farmers to produce string for kelp seed.
3. With National Sea Grant Law Center and state Bureau of Aquaculture, developed a best practice guide for regulating raw seaweed for human consumption; also developed first domestic public health hazards guide for seaweed aquaculture.
4. Advanced nascent coral aquaculture industry by supporting Capital Coral and Aquatics in developing a new testing system to distinguish healthy from stressed corals and marine invertebrates, and a new commercial food for corals.



“There aren't that many minorities in marine science, and I want to be an inspiration and help to change that.”

— Larissa Tabb, one of three recipients of undergraduate research fellowship for underserved students

5. Updated direct sales regulatory guidance document and created website in partnership with state Bureau of Aquaculture where consumers can access local CT seafood growers and harvesters offering direct sales of their products. CT seafood distribution has now expanded to online sales, farmers markets and other specialty markets.
6. Established Southern New England shellfish aquaculture hub to research and address issues of public perceptions and aquaculture development, identify and streamline permitting and policies relevant to aquaculture; and create digital tools to support decision-making for aquaculture operations.
7. Collaborated with NYSG and other Sea Grant programs in Northeast to conduct extension activities in support of the American Lobster Initiative

“CT Sea Grant was instrumental in allowing me to engage local college students at a new level through their support to foster research in tropical corals. My company benefited from the work done by local college students to develop new aquaculture and biomedical products and they were able to reciprocally learn while in New England all about tropical corals. It was a win-win for all involved.”

— Michael J. Gerdes, CEO of Capital Corals Inc. (formerly Credabel Coral Lab)



### WORKFORCE DEVELOPMENT

1. Continued availability of seafood safety training throughout pandemic by co-teaching classes virtually, training 137.
2. Enabled Climate Corps students to apply skills to real-world projects including: completing climate vulnerability assessment for town of Wethersfield and thus contributing to silver designation in Sustainable CT program; identifying tree and shrub species to lessen forest vulnerability amid climate change; assessing opportunities for green stormwater infrastructure in Groton; and assessing sea level rise impacts on brownfields in New Haven, Stratford and Bridgeport.



“With our changing climate and weather patterns, Sea Grant offers the training opportunities and resources Connecticut municipalities need, and truly rely on, to adapt to our dynamic environment. The Managed Retreat workshop is just one example of the important work Sea Grant accomplishes, bringing critical dialogue to our stakeholders.”

— Diane S. Ifkovic, CT DEEP,  
Land & Water Resources Division

“The activity was welcome. It was constructive... Hopefully, this rehabilitation work will help supply small oysters down the road for other people to grow out.”

— Jonathan Waters, oyster farmer

3. Advised creation of a new master's degree program in marine policy and management at University of New Haven.
4. With UConn Extension, supported undergraduate interns on projects including public education and removal of aquatic invasive plants in Connecticut River, and production of the second in series of climate change videos for municipal officials.
5. Supported two high school senior research assistants in applying aquarium husbandry and aquaculture techniques to validate feed products for clown fish, an ornamental aquarium species; assisted with integrating aquarium trade into high school aquaculture science program.
6. Established new undergraduate research fellowship to expand opportunities in marine science careers to underserved students. One of three 2020 recipients analyzed data from 20 wetlands along the CT coast to quantify ecosystem services of the common reed grass phragmites, and the carbon and nitrogen removal functions of native grasses.

## RESILIENT COMMUNITIES

1. With NY Sea Grant and the Long Island Sound Study, developed five-year work plan for five new staff to be hired as resilient and sustainable community extension educators. Plan laid groundwork for expanded capacity to assist municipalities in sustainability and resilience.
2. With UConn CLEAR, hosted virtual Climate Adaptation Academy about managed retreat attended by 130 state and municipal officials.
3. With UConn CLEAR, created first Connecticut 3D Lidar Viewer of summer aerial imagery, providing fast and easy way for land use professionals and others to view and work with large numbers of elevation points.
4. Collaborated with Avalonia Land Conservancy to design a coastal forest project transforming Hoffman Evergreen Preserve into climate-resilient forest.





## ENVIRONMENTAL LITERACY

1. As part of efforts to research and evaluate impacts of integrating arts into conservation and teaching pedagogies, CTSG organized special issue of *Parks Stewardship Forum* in partnership with Mystic Seaport and UConn Maritime Studies. Issue focused on integrating arts and humanities into ocean literacy.
2. Partnered with Project Oceanology to develop a new climate adaptation pedagogy for marine science students, including creation of educational game for seventh graders and two full-day trainings for educators from Norwich.
3. Developed Maritime Studies/American Studies course incorporating a service-learning assignment in which students collected oral histories of individuals' experiences in working waterfront careers. Stories were shared with NOAA National Marine Fisheries' Voices project, the joint CT-NY lobster extension program and the Blue Heritage Trail effort.
4. Worked with CT DEEP and the Long Island Sound Study to develop the online Long Island Sound Resource Catalogue for Educators and Parents. Catalog includes curricular resources aligning with CT and NY frameworks and standards and Ocean Literacy Essential Principles.
5. Represented national marine educators at planning meeting related to UN Decade of Ocean Science.
6. Partnered with CT DEEP to present a three-day virtual workshop on climate change for educators. Twenty-three attendees heard presentations on climate change topics, learned about hands-on activities and engaged in lessons and demonstrations.
7. Selected two artists for Arts Support Award; both created projects exploring ocean pollution issues. Artists conveyed messages about human connections to the sea and threats it faces, one through an original puppet show and the other through creation of large contour maps of Long Island Sound with discarded fabric.
8. With NY Sea Grant, Long Island Sound Study and other partners, led fourth year of #DontTrashLI-Sound campaign of social media posts and beach cleanups, with special emphasis on PPE litter associated with pandemic. Joined 40 volunteers in one

beach cleanup and submitted op-ed articles about campaign published in 11 print and digital media outlets statewide.

9. Continued long-term sponsorship of the Coastal Perspectives Lecture Series. The virtual lectures about coastal zoning, citizen science, integration of art and microplastic research and cetacean health were attended by 266 community members.
10. Updated and reprinted the popular CT Sea Grant book *Living Treasures: The Plants and Animals of Long Island Sound*, and its Spanish version, *Tesoros Vivientes: las plantas y animals del Long Island Sound*. Both are distributed free of charge by CT and NY Sea Grant programs.
11. New teacher resource, *Impacts of Climate Change on Long Island Sound Salt Marshes*, was developed by researcher Beth Lawrence and teachers.

“The support of Connecticut Sea Grant allowed me to create art informed and illuminated by scientific and historical research, and, in turn, to perform work which expressed my ecological findings. This funding was a critical part of my ability to engage in a creative process which provided opportunity for exploration of both science and the arts.”

— Felicia Cooper, recipient of 2020 Arts Support Award and creator of puppet show *Ish*



“With CTSG’s funding, we were able to show that marshes at two of Connecticut’s state parks have migrated significant distances upslope over the past half century; this dynamic response to sea-level rise gives us hope that, if we make room for them, Connecticut marshes may still be able to thrive in a time of climate change.”

— Shimon Anisfeld, Yale University

“Funding from CTSG has boosted research efforts on endangered Atlantic Sturgeon in our waters. Because of this funding, an intern at CT DEEP was able to pursue her masters thesis and realize her dream to become a resource manager at CT DEEP. It has succeeded in fostering strong collaborative ties between UConn’s Marine Sciences and CT DEEP that continues to bear fruit beyond this particular grant.”

— Hannes Baumann, UConn

## COASTAL ECOSYSTEMS AND WATERSHED

1. Long Island Sound Blue Plan, a marine spatial plan co-led by CTSG, moved forward through legislative process. While final approval was deferred due to COVID-19, the plan and associated Blue Plan Map Viewer were already being used for information and decision support by local, state and federal stakeholders.
2. Partnered with NY Sea Grant program and other organizations to begin developing five-year Long Island Sound Marine Debris Action Plan.
3. Collaborated with UConn CLEAR and URI on development of N-Sink, a web-based tool for identifying important sources of nitrogen. Tool used by local land use managers to explore relationship between land use and nitrogen pollution in waters and watersheds.
4. Co-led process to designate National Estuarine Research Reserve in Connecticut.
5. With UConn CLEAR, updated land cover analysis for Connecticut using NOAA high-resolution data. High-quality information on changing land cover conditions is a valuable tool used by many organizations for variety of applications.
6. Updated *Connecticut Coastal Planting Guide*, with emphasis on native plants and those with pollinator and wildlife value, was posted on the CTSG website.



## CTSG-SUPPORTED RESEARCH

1. Impacts of proposed East River, NY, storm surge barrier on Long Island Sound tidal amplitude and impacts on Connecticut towns assessed. **James O'Donnell**, *UConn*.
2. Factors influencing migration of salt marshes to coastal forests due to sea level rise assessed at five sites to inform modeling and management efforts. **Shimon Anisfeld**, *Yale University*
3. Growth and genetics of *Spartina alterniflora* grasses sourced from different states compared at six restoration sites in Connecticut to understand efficacy of salt marsh restoration. **Sarah Crosby**, *Earthplace*.
4. Examination of the uptake of microplastics generated by shellfish aquaculture farms by cultured oysters. **Evan Ward**, **Sandra Shumway**, *UConn*
5. Age and telemetry data used to study the potential existence of re-emergent Atlantic sturgeon spawning population in Connecticut River. **Hannes Baumann**, *UConn*.
6. Capacity of riparian floodplains to act as secondary stormwater treatment systems is assessed. **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 role of land use in nitrogen management; use of sediments for marsh rebuilding; impediments to juvenile alewife migration; bioindicators of microplastics; seaweed aquaculture and nutrient bioextraction; the role of iron in restoring eelgrass beds; and water and sediment biogeochemistry and conditions.



## OTHER RESEARCH

Research team led by CTSG director found consistent abnormal immune responses in dolphins exposed to Deepwater Horizon oil spill in Gulf of Mexico. **Sylvain De Guise**, *UConn*.

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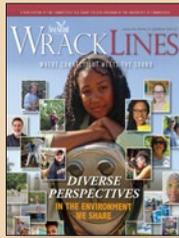
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**Tracy Romano**, Executive Vice President of Research and Zoo-  
logical Operations, Mystic Aquarium

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

**Thaxter Tewksbury**, former Director, Project Oceanology

**Richard (Dick) West**, Rear Admiral, U.S. Navy (ret.),  
Past President, CORE



**Wrack Lines**, Fall-Winter 2020-21 issue won the silver award in the Diversity Category in the Association for Communications Excellence 2020 Critiques and Awards Program, and an Award of Excellence in the 2020 APEX Contest run by Communications Concepts. With the theme of "Diverse Perspectives in the Environment We Share," the issue tapped the voices of writers and photographers from diverse backgrounds for articles about diversity in science education; environmental justice; the career of CTSG's Robert Pomeroy helping small-scale fisheries in developing countries; how the Shoreline Greenway Trail is expanding outdoor access for all; and CTSG's new undergraduate

research fellowship for underserved and underrepresented students. The Spring-Summer 2021 issue, "Born out of Crises: Responses, Research and Reflections on a Better Future," looks at how CT seafood sellers responded and adapted to the COVID-19 shutdown; and lessons that can be learned from the pandemic to improve our communities and environment. Research into impacts of the Deepwater Horizon oil spill on Gulf of Mexico dolphins led by CTSG Director Sylvain De Guise is also explored, along with the issue of responses to rising seas and managed retreat in coastal communities in Connecticut and North Carolina. Our mailing list and list serve for print and electronic copies of the magazine continues to grow, now reaching more than 4,000 households, schools, colleges, libraries, tourist welcome centers, nature centers, marinas and other outlets.