



SPRING 2022 | Newsletter of the Long Island Sound Study | longislandsoundstudy.net

SOUND UPDATE

LISS's 2021 in Review

In January 2021 two scientists from the University of Connecticut published a paper documenting water quality improvements in Long Island Sound despite clear, opposing trends in climate warming. Professors Michael Whitney and Penny Vlahos, funded by the Long Island Sound Study (LISS) Research Program to analyze thirty years of LISS water quality data, found that lower nitrogen concentrations in the Sound resulting from environmental management efforts have increased summertime dissolved oxygen levels.

Why is this important? Seasonal hypoxia (low dissolved oxygen conditions) in coastal waters is among the most serious water quality issues confronting coastal communities and ecosystems around the world. The cause? Increasing population and agriculture generate nutrient-rich wastewaters and runoff that make their way to coastal waters, leading to eutrophication (excessive nutrients and algae growth), increased biological oxygen demand, and worsening hypoxia in estuaries. Further compounding the problem, global warming is increasing coastal water temperatures. The warmer waters have lower oxygen solubility and can inhibit mixing between the surface and near-bottom waters, reducing oxygenation of near-bottom waters and increasing the severity and duration of hypoxia.

LISS documented the extent of this problem in the Sound in the late 1980s and has been monitoring conditions and implementing action plans to reduce nitrogen pollution. With wastewater reductions in annual nitrogen loading of more than 49 million pounds to the Sound now achieved, the billion-dollar questions (\$2.5 billion actually) were “Will dissolved oxygen levels and water quality improve? Will improvements be enough to counter the increase in Long Island Sound water temperatures?”

The answer to both questions is a resounding yes. Despite warming waters, decreasing nitrogen concentrations have increased bottom dissolved oxygen. In fact, the improvements in hypoxia would have been 27 percent greater if warming-induced oxygen solubility loss had not occurred. Long Island Sound is now one of the few examples worldwide of a coastal ecosystem in recovery from nutrient-induced hypoxia. But there is a caution: Whitney and Vlahos note that these improvements will not be sustained in the warming climate without continued intervention.

Hence, the focus on reducing nitrogen pollution will continue, both to protect and expand the improvements in open water hypoxia and to tackle other impairments from nitrogen pollution. We can make a difference—and we are.

— Mark Tedesco, Director, EPA Long Island Sound Office

THE CONNECTICUT RIVER (top) is the largest source of freshwater into the Long Island Sound estuary.

Long Island Sound Study National Estuary Program (LISS) is a partnership working to protect, conserve, and restore Long Island Sound. Through its grant program, the Long Island Sound Futures Fund, run by the National Fish and Wildlife Foundation, it has achieved since 2005:

\$32 million invested in local and regional conservation projects.

\$81 million generated for conservation projects, between LISFF investments and \$49 million in grantee matching funds.

529 conservation projects funded.

115 river miles opened for fish migration by removing dams and installing fishways.

805 acres of coastal habitat restored.

201 million gallons of stormwater pollution treated through installations such as rain gardens and other green infrastructure.

4 million people engaged through education and outreach efforts.

Long Island Sound Futures Fund (LISFF) Grants

The LISFF grant program supports implementation and planning projects to restore and protect the health of the Long Island Sound estuary. Established in 2005, the program is managed by the National Fish and Wildlife Foundation, and supported by the Long Island Sound Study, the Environmental Protection Agency, and the Long Island Sound Funders Collaborative. The map across these pages reflects the latest round of projects funded in 2021.

The LISFF is organized around four themes:

- Clean Waters and Healthy Watersheds
- Thriving Habitats and Abundant Wildlife
- Educating + Engaging Sustainable and Resilient Communities
- Sound Science and Inclusive Management

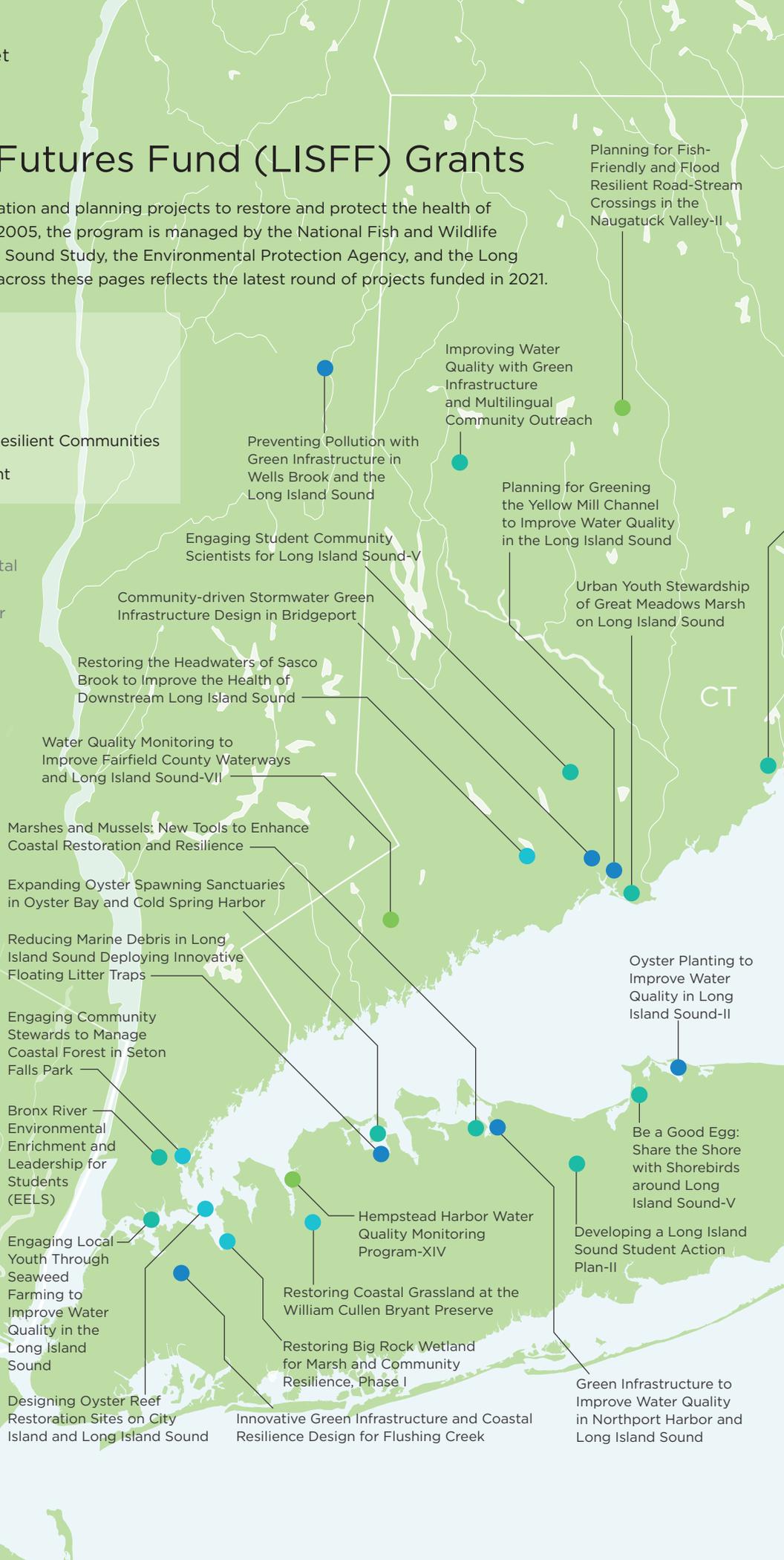
PREVENTING NITROGEN POLLUTION (Below top): The Vermont Department of Environmental Conservation will create water resource maps and teach managers how to use them to better plan nitrogen prevention projects.

PROTECTING POLLINATOR PATHWAYS (Below bottom): The Eastern CT Conservation District will install rain gardens and riparian buffers along two pollinator pathways in CT, engaging 6,400 community members in educational workshops in the process.

Vermont Dept of Environmental Conservation



Eastern Connecticut Conservation District, Inc.



Planning for Fish-Friendly and Flood Resilient Road-Stream Crossings in the Naugatuck Valley-II

Improving Water Quality with Green Infrastructure and Multilingual Community Outreach

Preventing Pollution with Green Infrastructure in Wells Brook and the Long Island Sound

Planning for Greening the Yellow Mill Channel to Improve Water Quality in the Long Island Sound

Urban Youth Stewardship of Great Meadows Marsh on Long Island Sound

Engaging Student Community Scientists for Long Island Sound-V

Community-driven Stormwater Green Infrastructure Design in Bridgeport

Restoring the Headwaters of Sasco Brook to Improve the Health of Downstream Long Island Sound

Water Quality Monitoring to Improve Fairfield County Waterways and Long Island Sound-VII

Marshes and Mussels: New Tools to Enhance Coastal Restoration and Resilience

Expanding Oyster Spawning Sanctuaries in Oyster Bay and Cold Spring Harbor

Reducing Marine Debris in Long Island Sound Deploying Innovative Floating Litter Traps

Engaging Community Stewards to Manage Coastal Forest in Seton Falls Park

Bronx River Environmental Enrichment and Leadership for Students (EELS)

Engaging Local Youth Through Seaweed Farming to Improve Water Quality in the Long Island Sound

Designing Oyster Reef Restoration Sites on City Island and Long Island Sound

Hempstead Harbor Water Quality Monitoring Program-XIV

Restoring Coastal Grassland at the William Cullen Bryant Preserve

Restoring Big Rock Wetland for Marsh and Community Resilience, Phase I

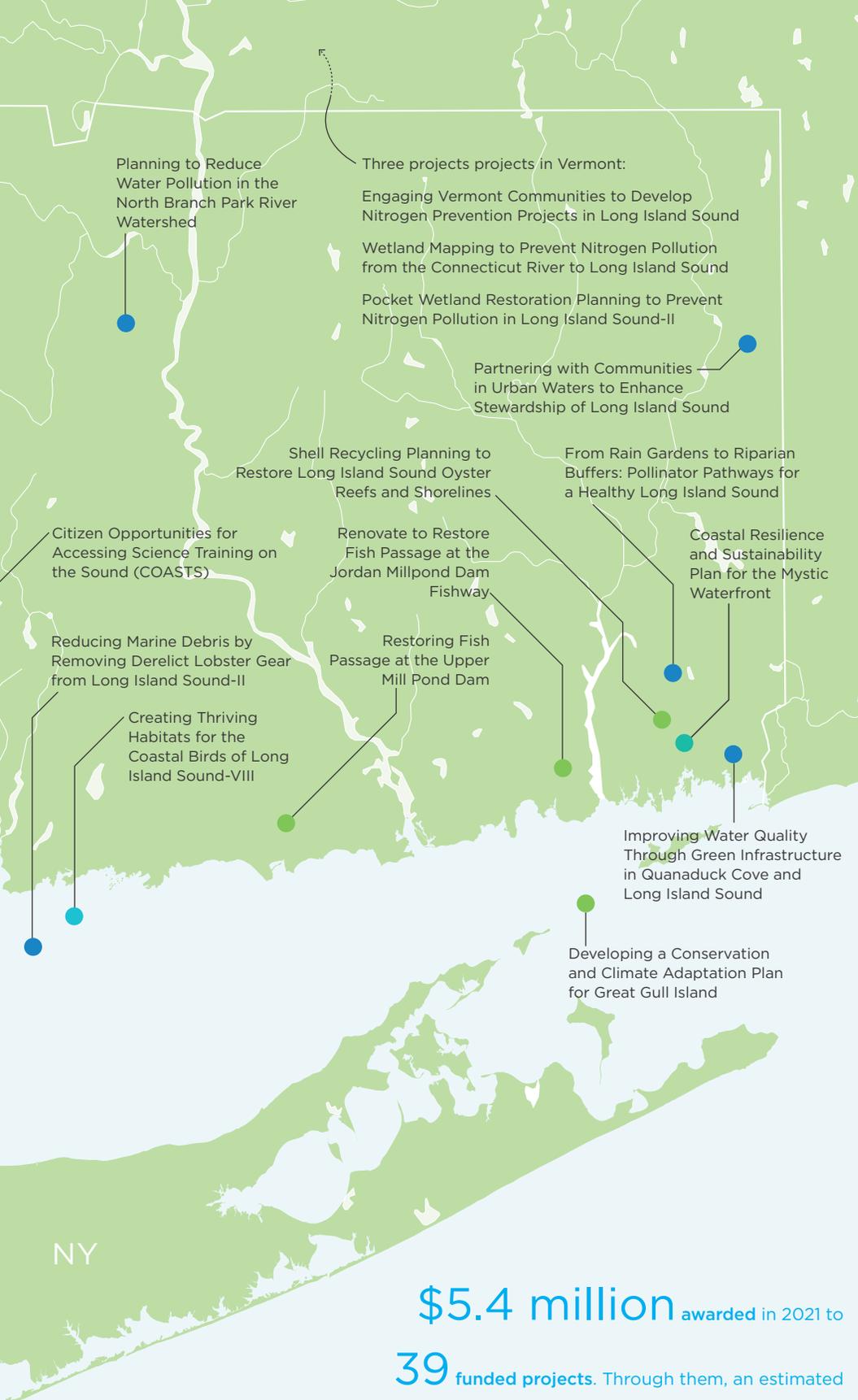
Innovative Green Infrastructure and Coastal Resilience Design for Flushing Creek

Oyster Planting to Improve Water Quality in Long Island Sound-II

Be a Good Egg: Share the Shore with Shorebirds around Long Island Sound-V

Developing a Long Island Sound Student Action Plan-II

Green Infrastructure to Improve Water Quality in Northport Harbor and Long Island Sound



Citizens Campaign for the Environment

Earthplace- The Nature Discovery Center, Inc.

Save the Sound

\$5.4 million awarded in 2021 to
39 funded projects. Through them, an estimated
97,700 pounds of marine debris will be collected,
33 pounds of nitrogen will be prevented from polluting the Sound, and
290,000 people will be reached through education and outreach efforts.

DEVELOPING A STUDENT ACTION PLAN
 (Above top): Citizens Campaign for the Environment will lead a second year of this education program where NY students design action plans to help address local environmental challenges.

MONITORING WATER QUALITY (Above middle): Earthplace will collect water quality data for use by local governments to reduce sewage pollution in Fairfield County communities.

IMPROVING WETLAND AND COMMUNITY RESILIENCE (Above bottom): Save the Sound will establish a natural shoreline along Memorial Field in Udalls Cove in Little Neck Bay, Queens, NY to help reduce erosion from storms.



Clean Waters and Healthy Watersheds

THE GOAL OF THIS THEME is to improve water quality by reducing contaminant and nutrient loads from the land and the waters impacting the Sound.



Alexa Hoyer

THE GREEN PLAYGROUND is estimated to have captured about 236,665 gallons of stormwater during Hurricane Ida, helping address local flooding and storm impact issues on site.

Elmhurst Students Design Green Playground for their Community

In November 2021, the Trust for Public Land (TPL) unveiled the results of their latest green infrastructure project: a green playground at the Elmhurst Educational Campus in Queens. With funding from LISFF, TPL worked in partnership with the community organization YouthBuild and a core team of 30 students to transform the previously barren asphalt space. The students collected ideas from their classmates on what they would like to see done with the yard, learned about the schoolyard’s relationship with stormwater and Flushing Bay, and designed the green playground to contain elements for both community and environmental health. The new

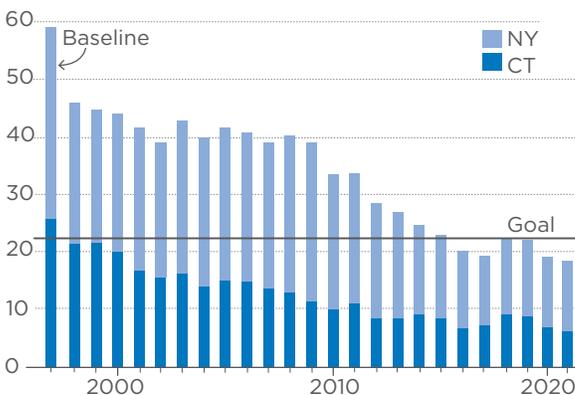
space has as an outdoor classroom, a running track, and a gazebo, as well as 9,260 square feet of bioretention areas, a 100 by 100 turf field with a gravel sublayer, and 19 trees and tree beds. It is anticipated to absorb around 1.5 million gallons of stormwater annually, helping reduce flooding and stormwater pollution in the community.

A Marine Debris Action Plan for the Sound

Every year, countless groups across NY and CT address marine debris in some way—from organizing local cleanups to running major educational campaigns. In 2021, NY and CT Sea Grant led the development of a Marine Debris Action Plan for Long Island Sound to unify these efforts. Supported by the NOAA Marine Debris Program, the plan helps track and coordinate marine-debris related projects across both states and establishes unified goals and the actions needed to meet them. Nearly 45 organizations volunteered to be a part of the plan. “Anyone is welcome at any time to join the effort”, says CT Sea Grant Associate Director Nancy Balcom, “It’s a big challenge here as well as globally and we hope at the end of five years to be able to show demonstrable progress”. The plan, approved in spring 2022, addresses single-use plastic pollution and other consumer debris, derelict fishing gear, and microplastics, with actions focused on education, prevention, research, and clean-up.

NITROGEN INPUTS TO THE SOUND from wastewater treatment plants have decreased from a 1990 baseline of 59,000 TE lbs per day to 18,338 in 2021.

LIS Point Source Nitrogen Trade-equalized Loads (Thousands TE pounds per day)



1,040 square feet of green infrastructure installed through LISFF in the last reporting period, helping keep nutrient pollution out of the Sound.

975,000 gallons of stormwater treated through LISFF green infrastructure installments.

925 pounds of nitrogen per day: average daily nitrogen inputs from wastewater treatment plants decreased by this amount in 2021 compared to the previous year, making N inputs in 2021 the lowest ever on record for the Sound!

142 square miles of hypoxia (low oxygen) were registered last year in the Sound. Many factors can affect how far the low-oxygen area stretches, including how rainy or warm the weather has been, for which a 5-year-average is calculated to measure longterm change. While last year’s area of hypoxia was higher than in 2020, the 5-year average was 83 sq miles, lower than last year’s 94 sq miles.

47 days of hypoxia were measured in the Sound in 2021. This was longer than last year’s 43 days but still lower than the overall average of 54 days of hypoxia.

191 lbs of marine debris per mile of coastline were recovered at Sound beach cleanups in 2021.

Thriving Habitats and Abundant Wildlife

THE GOAL OF THIS THEME is to restore and protect the Sound's ecological balance in a healthy, productive, and resilient state to benefit both people and the natural environment.

Projects Now, River Miles Later

A fish passage was constructed, and a dam removed in 2021 in Connecticut! These kinds of projects help make longer stretches of river available for migrating fish travelling upstream to reproduce in freshwater. Once more barriers are removed further downstream, the fish passage constructed this year will open around **32 river miles**.

24 sites monitored by volunteers in Westchester and the North Shore of Long Island to help survey eel and river herring migrations in 2021. The LI Volunteer River Herring and Eel Survey is a community science program run by the Seatuck Environmental Association in partnership with LISS, the Peconic Estuary Partnership, and the South Shore Estuary Reserve.

480+ acres of coastal habitat acquired in 2021. Resource managers acquire land to protect it from development.

8,128 acres of coastal habitat have been protected since 2006.

Conservation Planning for NY's Long Island Sound Marsh Complexes

Marshes are travelers by nature. As the waters they border begin to rise, the plant populations that make up the marsh migrate upland to avoid getting permanently flooded. This is a natural process. However, as sea level rises on one end and urban development remains unyielding on the other, marshes are finding themselves between a rock and a hard place (or, more accurately, between water and a hard place) with no place to go. Further, rising sea levels cause coastal erosion, urban flooding, and loss of important wetland habitat. Some coastal regions are already seeing the effects of sea level rise and are requiring tools to adapt.

A project completed in 2021 sought to address this need for marsh migration and coastal resiliency tools in NY. Victoria O'Neill, the LISS Habitat Restoration and Stewardship Coordinator, worked with Warren Pinnacle Consulting to develop an easy-to-use Marsh Fate Viewer, which depicts marsh migration over time under various sea level rise scenarios. The Viewer uses the results of the Sea Level Affecting Marshes Model (SLAMM) for 20 of the largest marsh complexes in New York's LIS watershed. They also created detailed fact sheets for each of the marshes, held webinars to present the tool, and worked with interested stakeholders to develop two marsh conservation plans: one for Westchester County and one for Mattituck Creek. Equipped with these tools, stakeholders will now be able to make more informed decisions on land conservation.



Victoria O'Neill, NYSDEC

RESOURCE MANAGERS explored how sea level rise could affect coastal marshes along the Blind Brook in Rye, NY.

Acquisitions/Easements:

- A. Herman E. Sheets Family Forest
- B. Sheep Farm South
- C. Lowry Woods
- D. Medlyn Farm
- E. 760 Oldfield Road
- F. Allen Property
- G. Glenwood Lake Habitat
- H. von Bothmer Property
- I. Goldstein Property
- J. Wilk Property
- K. Carman Property
- L. Wells Property
- M. Big Bing Property
- N. Soundview Avenue Preserve

Restorations:

- 1. Picker Pond Dam Removal
- 2. 52 Canal Rd Living Shoreline
- 3. Fresh Pond
- 4. West Meadow Beach Park



Lucy Reading-Ikkanda



Sustainable and Resilient Communities

THE GOAL OF THIS THEME is to support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.



NYC Parks

VOLUNTEERS and NYC Parks staff formed a chain to help build oyster castles at Alley Pond. The oyster castles are made of concrete blocks that fit together like building blocks.

Community Science Long Island 2021: From Data to the So What?

From January to July of 2021, LISS partner NY Sea Grant and the Seatuck Environmental Association hosted Community Science LI (CSLI), a series of seven webinars each spotlighting a volunteer monitoring program in Long Island. The webinars covered river herring, horseshoe crabs, river otters, and more, with each coinciding with the program’s monitoring season. “We wanted to highlight community science opportunities while showing people how the data they help collect can really make a difference in local conservation,” said LISS Outreach Coordinator Jimena Perez-Viscasillas. “After the webinars, we had folks reach out to us

interested in learning about getting involved in their area. It was really great to see!” Over 760 people attended the webinar series, with 22% of surveyed participants reporting they had become involved in a local monitoring program as a result of CSLI.

Volunteers Help Build Oyster Castles at Alley Creek

Oysters might not be royalty, but they can still appreciate a good castle when they find one! In the spring of 2021, on the mudflats of Alley Creek, NYC Parks installed four ‘oyster castles’—structures built to help protect the nearby marsh while providing habitat for animals like oysters. Funded through the LISFF program, the 150-ft long living shoreline project engaged 27 volunteers in helping construct the structures. Each oyster castle was made up of 563 concrete blocks stacked together into a pyramidal shape 18 feet long along its base. These structures are designed to help prevent erosion in the marsh by buffering wave energy and accruing sediment. An additional 65 volunteers also helped restore 14.5 acres of the upland forest habitat within Alley Pond Park, removing invasive plants and planting native species.

VOLUNTEERS help monitor horseshoe crab populations as part of CCE’s NY Horseshoe Crab Monitoring Network, which was highlighted at CSLI.



NYSDC / CCE

288 volunteers engaged through LIS Futures Fund projects during the 2021 reporting period.

2,893 observations logged by participants of the LI Coastal Bioblitz using the iNaturalist app. The observations were then used by resource managers to monitor for potential invasive species.

5 interns and fellows contributed to Long Island Sound projects in 2021, from building a LIS Habitat StoryMap for educators, to writing, creating new mapping tools, and identifying research needs.

350 total hours of work put into environmental outreach projects by 26 participants of the Coastal Certificate Program in 2020 and 2021. The program teaches Master Gardeners about the links between gardening and local water quality, and requires participants to implement an outreach project based on what they learn. Projects included invasive species control and restoration, native plant sales, and pollinator pathway demonstration sites.

2,953 volunteers in NY and CT participated in Long Island Sound beach, park, and river cleanups as part of the Ocean Conservancy’s International Coastal Cleanup in 2021.

Sound Science and Inclusive Management

THE GOAL OF THIS THEME is to manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.

0.48 mg/L of oxygen per decade: Despite warming temperatures, decreasing nitrogen concentrations in the Sound have increased bottom dissolved oxygen levels!

\$2.8 million in funding were awarded to research projects in 2021 through the LISS Research Grant.

24 monitoring groups participating in the Unified Water Study. The program, run by Save the Sound, measures water quality parameters of bays and inlets across Long Island Sound. In 2021, **Guardians of Flushing Bay** joined the program and began monitoring Flushing Bay.

41 embayments monitored in 2021 as part of the Unified Water Study.

New Web Application to Measure Hypoxia Sheds Light on Improvement

Hypoxia (low dissolved oxygen) in the Sound has for many years been determined the same way: by measuring how much area of its bottom waters have 3mg of oxygen per liter or less. Last year, CT DEEP and Professor James O'Donnell of UCONN unveiled a new web application to make exploring those data easier for users. Funded by LISS, the tool allows users to calculate LIS hypoxic area and for the first time, volume, using a variety of dissolved oxygen threshold values. Volume is an important addition because it describes the extent of hypoxia not just on one plane, but throughout the water column, which better describes how it could impact organisms in that space. Using the tool to evaluate 26 years of data, researchers concluded that despite the annual variability in the area and volume of hypoxia, there is convincing evidence that dissolved oxygen levels have improved over time due to the decrease in nitrogen loading from wastewater treatment plants in the western Sound. This is important because it shows that the 60% reduction in nitrogen loading that was achieved in 2017 has had the desired impact. Hypoxia has always been the overriding concern for the Sound's health, and few other major estuaries have managed to reduce it.

New SRC Extension Professionals and Outreach Coordinator Hired to Support LIS Communities

Over the past year, partners of LISS developed a work plan to address the needs of communities in the face of resiliency issues, climate change, and environmental justice (EJ). Since the Fall of 2021, New York and Connecticut Sea Grant have hired a team of



Jimena Perez-Viscailias, NYSG

NEW OUTREACH COORDINATOR for NYC and the Western Basin, Lillit Genovesi, at Alley Pond!

five Extension Professionals to work locally and as a team to help coastal communities and municipalities prepare for sea level rise. The team is composed of Elizabeth Hornstein, Sarah Schaefer-Brown, and Sara Powell in NY, and Deborah Abibou and Alicia Tyson in CT. The group has kicked off their work plan by reaching out to meet leaders in their local communities and learning about what their needs are to improve local resiliency. Based on community input, they will be hosting workshops and creating a clearinghouse of resources to help them. New York Sea Grant also hired a new LISS Outreach Coordinator, Lillit Genovesi, to work in the NYC and Westchester regions. Based in Queens, Genovesi is helping to educate, involve, and connect people to the Sound and address issues related to climate change and EJ.

\$106M in Infrastructure Funding for the Sound

The Bipartisan Infrastructure Law passed in 2021 awarded LISS \$106 million to be used over the next 5 years. Some of the efforts this funding will support include: an EJ program to help administer grants and improve capacity of local groups, green infrastructure and stormwater infrastructure installations, and the restoration of habitats critical to protecting coastal communities from flooding and storm damage.

The LISS budget is organized into the nine Program Activities outlined below. The FY2021 LISS budget breakdown by Program Activity is:

Coordination	\$1,254,498
Water Quality Planning and Implementation	\$2,718,962
Modeling	\$4,000,000
Monitoring	\$3,675,940
Research	\$3,650,984
Habitat Restoration and Protection	\$6,746,233
Public Education and Outreach	\$1,033,418
Stewardship and Resiliency	\$1,139,965
Implementation Assistance	\$6,880,000
TOTAL	\$31,100,000



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The Long Island Sound Study is sponsored by the States of New York and Connecticut and the EPA. The LISS Management Committee consists of representatives from the EPA, NYSDEC, NYSDOS, CTDEEP, NYCDEP, USDOJ, IEC, NEIWPCC, NY and CT Sea Grant Programs, co-chairs of the Science and Technical Advisory Committee and Citizens Advisory Committee.

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Department of Environmental Conservation

What You Can Do

Did you know there are things you can do right in your backyard to help keep your local waterbodies safe? Here is a basic checklist:

- Fertilize sparingly, or not at all. If you're going to fertilize, use organic, slow-release fertilizers.
- Keep grass clippings on your lawn to recycle nutrients.
- Direct downspouts into plant beds (rather than down the driveway).
- Plant native plants – they need less fertilizer and help local pollinators.
- Do not fertilize during the winter or drought seasons, nor before a rainstorm.
- Consider using compost instead of fertilizer! It helps retain moisture and conserve water.
- Eliminate or reduce pesticides on your property.
- Take the Reduce Nitrogen Pledge! Find out more here:
<https://lirpc.org/our-work/long-island-nitrogen-action-plan/nitrogen-pledge/>