

Long Island Sound Study

The Long Island Sound Study (LISS), a partnership led by Connecticut, New York, and the US Environmental Protection Agency (EPA), was launched in the 1980s to investigate the problems plaguing Long Island Sound at the time, including fish kills, degraded shoreline habitats, and polluted beaches. In 1994, the states of Connecticut and New York and EPA approved a Long Island Sound Comprehensive Conservation and Management Plan (CCMP) to restore and protect the health of Long Island Sound. Today, much has improved through the partners' water quality, stewardship, and habitat restoration initiatives. But more still needs to be done. That is why LISS has revised the plan proposing new actions and developing ecosystem targets for the next 20 years to fulfill LISS's mission to restore and protect the Sound. The complete plan is available at www.longislandsoundstudy.net.



Department of
Environmental
Conservation

ON THE COVER: Rocky shoreline
with New Haven, CT skyline
and harbor in the background.
(Photo by iStock photo
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Long Island Sound Comprehensive
Conservation and Management Plan, 2015
Returning the Urban Sea to Abundance | PUBLIC SUMMARY

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Called the “American Mediterranean” by the statesman Daniel Webster, Long Island Sound is a national treasure. Its sheltered waters are a place for recreation, fabulous views, and natural bounty—a place where one can go to breathe a little easier. The Sound supports diverse populations of flora and fauna. Its wetlands and dunes provide flood and storm protection for coastal communities. And many individuals and families earn their livelihoods from the Sound. Active efforts to protect and restore the Sound have succeeded to the point of considering a return to abundance—not to a pristine past, but to an “Urban Sea,” where humans enjoy both a healthy environment and a thriving economy. Returning Long Island Sound to abundance for future generations—for living, working, and playing—requires clean water, healthy habitats, and sustainable and resilient communities.

Our vision for the Sound is of waters that are clean, clear, safe to swim in, and charged with life. It is a vision of waters nourished and protected by extensive coastal wetlands, by publicly accessible, litter-free beaches and preserves, and of undeveloped islands. It is a vision of abundant and diverse wildlife, of flourishing commercial fisheries, of harbors accessible to the boating public, and of a regional consciousness and a way of life that protects and sustains the ecosystem.

Many historical challenges remain in meeting this vision and new challenges have emerged, such as the impacts of climate change. The 2015 Comprehensive Conservation and Management Plan is the blueprint for action that revises the 1994 plan. It is organized around four themes:

<p>Clean Waters and Healthy Watersheds Improve water quality by reducing contaminant and nutrient loads from the land and the waters impacting Long Island Sound.</p>	<p>Sound Science and Inclusive Management Manage Long Island Sound using sound science and cross jurisdictional governance that is inclusive, adaptive, innovative, and accountable.</p>
<p>Thriving Habitats and Abundant Wildlife Restore and protect the Sound's ecological balance in a healthy, productive, and resilient state to benefit both people and the natural environment.</p>	<p>Sustainable and Resilient Communities Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.</p>



ECOSYSTEM TARGETS

The vision and goals have been translated into specific ecosystem targets to be achieved by 2035, unless otherwise noted.

Clean Waters and Healthy Watersheds

- Measurably reduce the area of oxygen-depleted zones.
- Attain nitrogen reduction plan targets.
- Improve water clarity to support healthy eelgrass communities.
- Reduce impervious surfaces by 10 percent through green infrastructure and low impact development.
- Increase natural vegetation near water bodies by 10 percent.
- Reopen 5 percent of restricted or closed shellfish beds.
- Reduce the area of the Sound with polluted sediment by 20 percent.

Thriving Habitats and Abundant Wildlife

- Restore 350 acres of coastal habitat by 2020 and a total of 3,000 acres by 2035, including 2,000 additional acres of eelgrass and 515 acres of tidal wetlands.
- Make 200 additional miles of river accessible to migratory fish.
- Increase the sustainable harvest of oysters, clams, and scallops.
- Restore and protect habitat connections to support migratory pathways and increase biodiversity.
- Conserve an additional 4,000 acres of Connecticut coastal land and 3,000 acres of New York coastal land.

Sustainable and Resilient Communities

- Ensure that all coastal municipalities have shoreline resiliency and infrastructure sustainability plans by 2025, with all new development compliant by 2035.
- Maintain navigability of harbors and bays and manage dredged material in an environmentally sound and cost-effective manner.
- Increase the public's knowledge of Long Island Sound issues and their engagement in its protection and restoration.
- Reduce beach closures due to poor water quality by 50 percent.
- Decrease marine debris and litter in Long Island Sound.
- Increase by at least 10 percent the number of public access points to the Sound and its rivers.

EELGRASS OFF FISHERS ISLAND (Photo by seagrassli.org); Volunteers plant dune grass shoots and native shrubs at Rocky Neck State Park, a Long Island Sound Stewardship Area, East Lyme, CT. (Photo by Bob Lorenz for Save the Sound); Adult common tern (Photo by Lisa Franceski); Wetland monitoring (Photo by Amy Mandelbaum)



CLEAN WATERS AND HEALTHY WATERSHEDS

GOAL: Improve water quality by reducing contaminant and nutrient loads from the land and the waters impacting Long Island Sound.

Despite improvements, Long Island Sound still suffers from seasonal oxygen-depleted zones, beach closures, and other effects of pollution that keep the Sound from meeting water quality standards. Resolving these issues requires integrated approaches to manage excess nitrogen, reduce contaminants of concern, and plan for land uses that protect water resources. These efforts must also include plans for resiliency of natural and built infrastructure, including adaptation to changing climate and extreme weather, and ensuring the sustainable use of the Sound's resources. Also needed is increased emphasis on assessing and improving the water and habitat quality of the Sound's embayments.

THE LOWER CONNECTICUT RIVER, a Long Island Sound Stewardship Area, Old Lyme, CT.
(Photo by Jerry Monkman/Ecophotography)

CHALLENGES

- Smaller and more diffuse sources of nutrients need to be mitigated.
- Polluted runoff continues to close beaches and shellfish beds.
- Aging infrastructure leaks untreated sewage to coastal waters.
- Water quality must be improved in bays and harbors.

SOLUTIONS

- Reduce nitrogen from septic systems and fertilizer applications.
- Work with states on additional nitrogen upgrades to wastewater treatment facilities.
- Document the economic and ecosystem consequences of nitrogen pollution.
- Minimize the impact of new development while adding green infrastructure to existing development.
- Invest in repairing and upgrading wastewater treatment infrastructure.
- Use community-based programs, including citizen science, to identify and control local pollution sources.

PRIORITY ACTIONS

- Pursue opportunities to further improve nitrogen removal, particularly low-cost retrofits, at wastewater treatment facilities and septic systems throughout the watershed.
- Enhance implementation of the nitrogen pollution control plan, and evaluate the plan to attain water quality standards.
- Improve the reporting requirements of municipal separate storm sewer communities to better quantify and track the effectiveness of nutrient control measures.
- Develop a nonpoint source and stormwater tracking system tool for the Long Island Sound watershed.
- Develop improved policies for use and performance of decentralized and on-site wastewater treatment systems.
- Improve understanding, management, and design of denitrifying decentralized and residential, on-site wastewater treatment systems.
- Improve efficiency and resiliency of existing/new waste treatment systems, including septic, wastewater treatment facilities, and stormwater infrastructure, to accommodate sea level rise.
- Promote establishment and protection of riparian corridors and wetland buffers at the municipal level through development of local ordinances and increased permanent land protection.
- Maintain and enhance the utility and efficiency of water quality monitoring of nutrient loads to Long Island Sound.
- Determine sampling needs to assess the impacts to Long Island Sound water quality from climate change drivers, such as sea level rise, warming, and acidification.
- Assess sources of nutrient and pathogen contamination to Long Island Sound embayments.
- Monitor and track occurrences and contributing factors of biotoxin and harmful algal bloom outbreaks.



THRIVING HABITATS AND ABUNDANT WILDLIFE

GOAL: Restore and protect the Sound's ecological balance in a healthy, productive, and resilient state to benefit both people and the natural environment.

The natural habitats of Long Island Sound are home to diverse populations of wildlife and living resources, and provide services to people such as flood protection and recreation. Much still needs to be done to improve and protect those species and the habitats upon which they depend. Global climate change, including sea level rise, poses new threats to habitats and wildlife, and there is improved understanding of the impacts of previously reported threats, such as nitrogen pollution and invasive species.

GREAT GULL ISLAND, a Long Island Sound Stewardship Area, supports the largest nesting population of common terns in the world. (Photo by Venu Challa)

CHALLENGES

- Coastal habitats are threatened by sea level rise if they cannot effectively migrate.
- Coastal resiliency is diminished due to alteration of key habitats by development.
- Remaining open spaces along the coast are under development pressure.
- Invasive species threaten ecosystem diversity.
- Human use of the coastal zone conflicts with the habitat needs of some wildlife.

SOLUTIONS

- Identify and conserve open space landward of coastal habitats to allow for migration.
- Enhance the resiliency of existing coastal habitats.
- Understand and restore the natural balance of functions provided by the ecosystem.
- Prioritize protection of remaining high-value undeveloped lands.
- Develop site management plans for eliminating invasive/nonnative species.
- Involve communities in the stewardship of wildlife.

PRIORITY ACTIONS

- Complete coastal habitat restoration projects.
- Complete habitat connectivity projects and generate supporting geographic information system data.
- Develop or apply habitat connectivity models.
- Use design tools to prioritize conservation and management plan development for significant and imperiled coastal habitats.
- Conduct an ecological assessment of land surrounding Long Island Sound Stewardship Sites and design green infrastructure/low impact development pilot projects.
- Purchase high-priority conservation land and create a registry of protected properties.
- Develop and promote the use of living shoreline habitat protection methods and monitoring protocols.
- Collect data on, and restore habitat for, listed and forage species.
- Continue Long Island Sound eelgrass abundance surveys and promote eelgrass management.
- Assess the locations of and contributing factors to tidal marsh loss, and create a model to determine restoration sites.



SUSTAINABLE AND RESILIENT COMMUNITIES

GOAL: Support vibrant, informed, and engaged communities that use, appreciate, and help protect Long Island Sound.

The coastal communities bordering Long Island Sound are among the most densely populated in the country. Local government decisions affecting development, land use, and population density have a strong impact on water and habitat quality in the Sound and its tributaries. Ultimately, local government leadership, private sector engagement, community organization empowerment, and individual stewardship are vital to efforts to restore the Sound.

YOUTH FROM ROCKING THE BOAT, a Bronx environmental organization, on board a student-built boat on the Bronx River. (Photo by Joaquin Cotten)

CHALLENGES

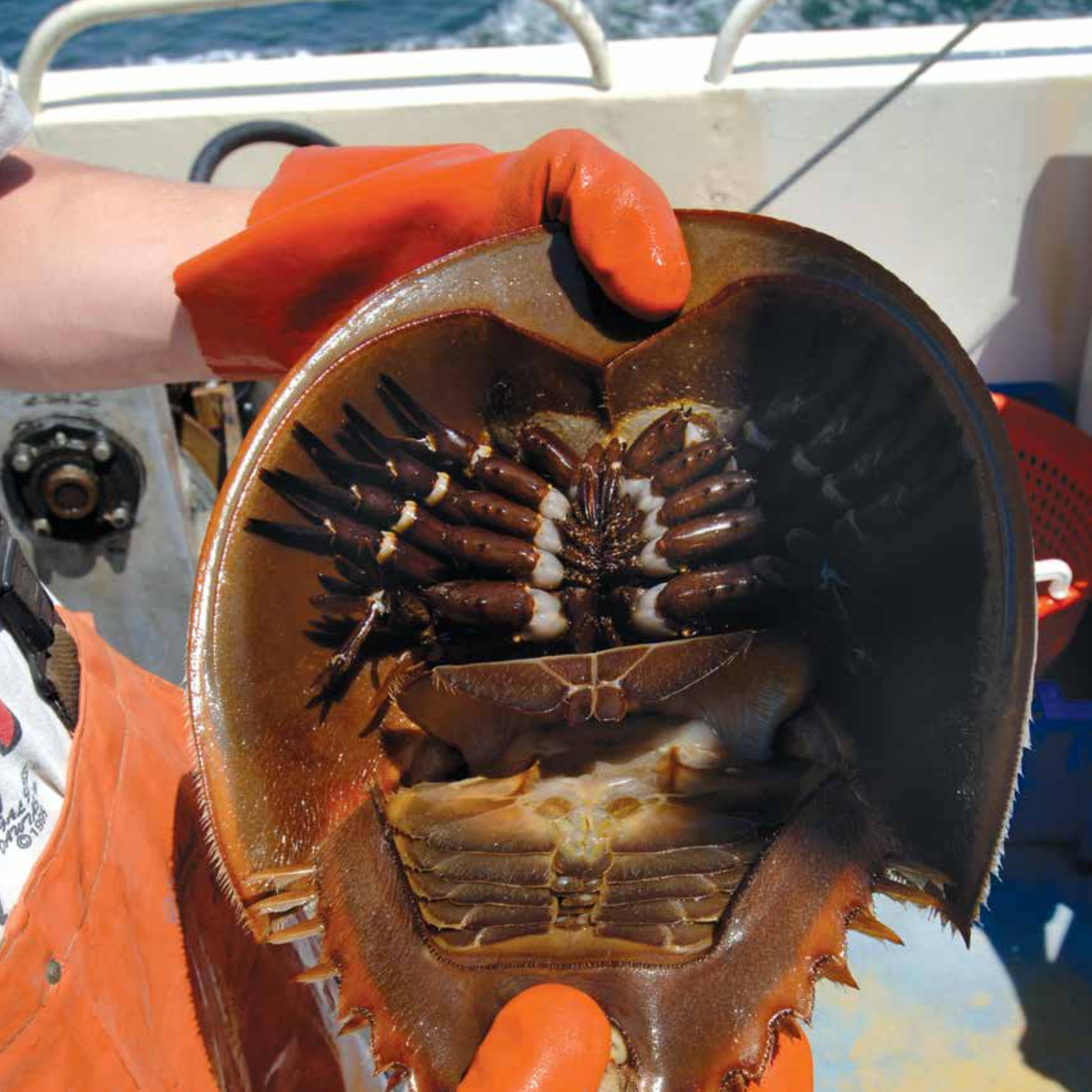
- Coastal properties are at risk from rising waters and more intense or frequent storms.
- Environmental protection and economic development are not fully integrated into local community planning and development.
- Building environmental stewardship for urban waters.

SOLUTIONS

- Coastal communities develop and adopt resiliency plans.
- Coastal communities develop and adopt sustainable development plans that address energy and water conservation and pollution control.
- Fully involve underserved communities and respond to their needs and perspectives.

PRIORITY ACTIONS

- Develop guidelines, resources, and best practices for municipalities to support the development of sustainability and resilience plans and their integration into comprehensive plans.
- Identify and recommend removal, relocation, and/or protection of sensitive built infrastructure in the coastal zone and prevent future siting in vulnerable floodplains. Enhance natural infrastructure that enriches coastal and community resilience.
- Implement standards, best practices, and incentives to support green infrastructure/low impact development planning and implementation.
- Develop a Public Access Plan to increase shoreline access to the Sound and rivers in its watershed.
- Provide technical and grant assistance to support initiatives that promote behavior change and increase appreciation, understanding, and stewardship, particularly for underprivileged and non-traditional audiences in urban areas.
- Produce informational materials that can be distributed through multiple communication channels to increase the public's understanding of the ecological, cultural, and recreational value of Long Island Sound to encourage stewardship.
- Develop and implement outreach and training programs for municipalities to develop and implement innovative/sustainable flood and erosion control measures.
- Conduct social science research to enhance understanding of the human dimensions of Long Island Sound stewardship, and use that information to build support for solutions that require the commitment of residents, municipal leaders, and businesses to reduce pollution and improve water quality.



SOUND SCIENCE AND INCLUSIVE MANAGEMENT

GOAL: Manage Long Island Sound using sound science and cross-jurisdictional governance that is inclusive, adaptive, innovative, and accountable.

Our estuarine and coastal systems have been impaired primarily from overharvesting of living natural resources, pollution, and habitat loss and degradation. Invasive species and climate change also have an impact on Long Island Sound. To address these drivers and pressures successfully, management must develop and support integrated, adaptive, and coordinated relationships among fisheries, coastal zone, and pollution management programs in the context of human use of the Sound.

CONNECTICUT DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION SCIENTISTS conduct trawl surveys of Long Island Sound marine life, including horseshoe crabs, on board the Research Vessel *John Dempsey*. (Photo by Richard Howard)

CHALLENGES

- Coastal waters are becoming warmer and more acidic.
- Incorporating social, environmental, and economic benefits into finance strategies and decision making.
- Loss of ecosystem services has made Long Island Sound more susceptible to excess nutrients.
- New proposed uses of Long Island Sound can conflict with existing uses.
- Linking the health of Long Island Sound to the human pressures that impair it.

SOLUTIONS

- Integrate climate change science into management and adaptation activities.
- Use value of ecosystem services to inform finance strategies for restoration and protection.
- Promote actions that increase the capacity of Long Island Sound to assimilate nutrients.
- Increase collaboration among marine users and stakeholders through coastal and marine spatial planning.
- Integrate research and monitoring, including citizen science, to refine and adapt management solutions.

PRIORITY ACTIONS

- Identify and communicate high priority science needs, and support research to meet management goals.
- Coordinate and leverage citizen science water quality monitoring programs.
- Improve the use and utility of data for mapping the condition of Long Island Sound.
- Enhance eutrophication modeling to support nitrogen management and improve water quality.
- Optimize the structure and function of the Long Island Sound Management Conference.
- Support involvement and communication with local governments.
- Reach out and engage traditionally underrepresented stakeholders.
- Develop a framework for Coastal and Marine Spatial Planning.
- Develop innovative funding approaches to restore and protect ecosystem services.
- Refine environmental targets to identify the characteristics of a “restored” Long Island Sound.
- Issue a “report card” on water quality conditions in Long Island Sound.
- Regularly revise a specific, target-oriented implementation plan engaging all Long Island Sound partners.