

# Long Island Sound

Ours to Protect, Restore and Enjoy.



**Sound Vision: An Action Plan for Long Island Sound**

**2011-2020**

## Introduction

Sound Vision is a product of a collaborative process that included an extensive review of the existing Long Island Sound Comprehensive Conservation and Management Plan (CCMP), tracking expenditures and program outcomes, surveys of the Long Island Sound Study's (LISS) Citizens Advisory Committee (CAC) members, facilitated workshops and input from a wide range of stakeholders. The result is a short- and long-term citizen's action plan for the protection and restoration of Long Island Sound that includes a set of integrated goals/themes with desired results, steps to achieve those results with the type of measure they each represent—outreach, policy, science, stewardship—as well as an outreach strategy that can be implemented by the Long Island Sound community. More details of the process and findings of Sound Vision can be found in Appendices A through F.

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Cover photo courtesy of Patricia Aitken, Friends of the Bay

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- Action Step 2: Coordinate LIS and embayment water monitoring of the Sound and its embayments
- Action Step 3: Use the Sound Vision Framework to form new alliances and move the LISS Partnership forward

Sound Vision Process

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Long-Term Sound Vision Framework

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## Setting a Course for a Vibrant Sound

Nearly two decades ago, a plan to restore an ailing estuary began to take shape. A unique partnership that included government, non-profits, universities, private industry and the public uncovered a common hope for our regional treasure:

*"The 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."*

—The Audubon Society, "Listen to the Sound" Citizen Hearings



Since this community goal was established, new issues affecting the vitality of Long Island Sound have arisen, access to its shores has been impinged upon, the Sound's economic value has been threatened, and its ability to sustain its wildlife has diminished. However, even with these ongoing changes, one thing remains constant: the expectation that one day this region will be home to a healthy Long Island Sound.

## Short-Term Action Agenda: 2011–2013

### **Investing in an Economically Vibrant Long Island Sound**

Action Step 1: Continue public investments, including federal funding, in Long Island Sound. Explore public/private partnerships to fund major capital investments (e.g. Infrastructure Investment Banks)

Action Step 2: Advocate for state capital investments that improve water quality and create jobs while also considering the development of a comprehensive Long Island Sound capital investments plan

Action Step 3: Further research, habitat protection and outreach by creating new CT and NY investments, like expanding voluntary public donations to various LIS funds and considering a total mix of revenue policies.

### **Protecting Clean Water to Achieve a Healthy Sound**

Action Step 1: Update the Comprehensive Conservation and Management Plan for LIS (CCMP) by 2014

Action Step 2: Reduce the low oxygen dead zone

Action Step 3: Update our nitrogen pollution reduction plan

Action Step 4: Realize progress toward a sewage-free Sound

Action Step 5: Promote green infrastructure projects in neighborhoods and in large city sites

Action Step 6: Ensure that new construction in the Long Island Sound region uses low impact development to avoid stormwater pollution

Action Step 7: Develop and publicize guidance for non-pollution lawn care

Action Step 8: Protect natural forests and vegetation along streams and rivers

### **Creating Safe and Thriving Places for All Sound Creatures**

Action Step 1: Improve management and acquisition of key coastal and island Stewardship sites by acquiring additional acres of important coastal stewardship areas, protecting the undeveloped portions of Plum Island, and creating a LIS-wide *Islands for People and Wildlife Program* that assesses and protects other important vulnerable sites

Action Step 2: Protect and acquire Important Bird Areas

Action Step 3: Restore critical habitats to protect wildlife populations in light of climate change

Action Step 4: Balance the biology of the Sound by piloting a Bronx River mussel project, piloting at least one LIS oyster sanctuary restoration project, and piloting engagement of citizens as shellfish cultivators

Action Step 5: Monitor water to understand our local bays, coves and harbors

Action Step 6: Invest in Ecosystem Management by analyzing correlations between fishery health and climate

### **Building Long Island Sound Communities that Work**

Action Step 1: Invest in creating and maintaining clean water, habitat restoration, and green infrastructure jobs around the Sound

Action Step 2: Implement effective and environmentally sustainable dredge management to maintain access to recreational areas

Action Step 3: Encourage sustainable recreational and commercial fishing and shell fishing to protect a way of life and the Sound

Action Step 4: Engage urban and diverse coastal neighborhoods

Action Step 5: Work with communities to better prepare for sea level rise

Action Step 6: Begin underwater area planning to balance industrial recreational and environmental uses of the Sound for the future and to protect our economy

Action Step 7: Protect and expand the marine-dependent working waterfront as well as other public access to Long Island Sound

## Protecting Clean Water to Achieve a Healthy Sound

*What goes on the ground, goes in the Sound*

### Goal

We envision a Sound that is an accessible waterway fed by open and fishable rivers whose diverse and protected watershed habitats keep water clean and serve as home for local wildlife and refuge for migrating birds.



Photo courtesy of Bob Lorenz, "The Preserve" in Old Saybrook, CT

### Challenge

The health and condition of the waters, habitats, and residents of Long Island Sound are directly affected by the waters that drain from the surrounding lands. These watersheds have a critical function in the health of the Sound: they provide a natural filter for materials washed from the land surface, a means to convey surface water gradually to the sea, a buffer for floods and storm surges and a secure pathway for migrating and spawning wildlife. When the watershed functions naturally, it serves as the key interface between land and sea, allowing the Sound to absorb a sustainable balance of freshwater, nutrients, and sediment. When the watershed is unable to function naturally (impaired by channelized streams, untreated sewage, industrial discharge, unmitigated paved areas, dams, degraded lands, and eroding banks) the Sound may absorb an unsustainable load of nutrients, pollutants, silt, and trash. In this case the cycles of biological productivity on land and in the Sound can be altered and lead to loss of wildlife, fisheries, water quality, and the protective function of coastal marshes and beaches.

Excessive nutrient loading results in a greater susceptibility for embayments and poorly flushed areas of the Sound to develop seasonal low dissolved oxygen conditions called hypoxia. This condition can stress or kill fish, shellfish, and their critical food resources and habitats.

### Recent Accomplishments

- The total 2009 nitrogen load from the 106 New York and Connecticut sewage treatment plants (STPs) that discharge into Long Island Sound is estimated at 39,011 Trade-equalized (TE) pounds per day. Under the Long Island Sound Total Maximum Daily Load (TMDL) for nitrogen, each STP is assigned a numerical factor that provides a mathematical means of calculating the relative impact of nitrogen it discharges, depending on the STPs' distance from the Sound. The 2009 discharge represents a decrease of more than 20,000 TE lbs/day from the TMDL baseline of

59,146 TE lbs/day. Annualized over the 15-year life of the TMDL, the 2009 TE discharge total represents achieving 55 % of the 2014 goal of 22,774 TE lbs/day.

- The maximum area of low dissolved oxygen less than 3 milligrams per liter in the Sound in summer 2010 covered an estimated 101 square miles at peak, lasting for 40 days. The pre-TMDL average from 1987-1999 was 208 square miles and 58 days, while the post-TMDL average from 2001-2009 was 186 square miles and 58 days.
- Toxic pollutants continue to decrease in the Sound as sources are better identified and controlled and legacy levels are naturally cleansed or degraded in the environment. State and federal permit and reporting programs, such as the National Pollutant Discharge Elimination System and the Toxics Release Inventory program, and other public information and education programs have helped to control and to require reporting of toxic releases to the environment.

### **Action Steps: Protecting Clean Water to Achieve a Healthy Sound (PCW)**

#### **PCW Action Step 1: Reduce point-source pollutant loads for a swimmable, fishable Sound**

The LISS in cooperation with the States and municipalities surrounding LIS, have been working to reduce nutrient and toxic inputs to the Sound from known “point” sources. These include permitted municipal sewage treatment plants and industrial sources. Combined sewer overflows (CSO) and Sanitary sewer overflows (SSO) allow untreated waste to be discharged, primarily when heavy rain mixes stormwater with sewage, into the nearby waterbody. In Connecticut alone, the CTDEP has identified \$1.8 billion of CSO infrastructure needs for the future. Tools to reduce loads include regulations and management actions to limit permitted discharges and funding to upgrade treatment facilities.

#### ***Immediate actions***

- PCW1.1: Encourage the Long Island Sound Study, Connecticut, and New York to update the Total Maximum Daily Load for nitrogen by 2012. *Technology, Science, and Policy*
- PCW1.2: Assure that projects to remedy combined sewer overflow (CSO) problems in key communities like New York, NY and Bridgeport, New Haven and Hartford, CT comply with established Long Term Control Plans. *Stewardship and Policy*
- PCW1.3: Encourage innovative green infrastructure efforts in CSO & SSO communities and at major existing schools and facilities. *Stewardship and Policy*
- PCW1.4: Reduce loads of personal care products through pharmaceutical turn-in programs and public outreach. *Policy*

#### ***Intermediate actions***

- PCW1.5: Monitor progress in meeting the reduction targets of established TMDLs. *Policy*
- PCW1.6: Ensure state general permits are supportive of improved water quality. *Stewardship and Policy*



### ***Long- term actions***

- PCW1.7: Support the over \$6 billion in waste water treatment facility upgrades needed in Connecticut and New York, particularly in New York City and Bridgeport, New Haven, and Hartford Connecticut. *Policy*
- PCW1.8: Evaluate phosphorous, silica, and chemical interactions in Long Island Sound. *Science*
- PCW1.9: Enhance bio-extraction removal of nitrogen and phosphorous. *Science*
- PCW1.10: Establish priority goals for approaching atmospheric deposition of nitrogen. *Policy*

### **PCW Action Step 2: Reduce loads from non-point sources**

Nutrients and toxics also enter the watershed and the Sound from widely distributed “non-point” sources. These include stormwater runoff from residential and agricultural land.

### ***Immediate actions***

- PCW2.1: Identify barriers to green infrastructure implementation. *Stewardship and Policy*
- PCW2.2: Adopt stormwater performance standards in NY and CT in order to assure that new development is designed so that the site acts like its natural condition—retaining and returning stormwater runoff into the ground, rather than sending it into rivers and streams. *Policy*
- PCW2.3: Investigate opportunities for implementing green infrastructure in urbanized shoreline communities. *Stewardship*
- PCW2.4: Ensure NY and CT stormwater permits—construction and municipal separate storm sewer system (MS4)—are strong and enforced. *Policy*

### ***Intermediate actions***

- PCW2.5: Advocate for implementation and enforcement of Long Island Sound protective model stormwater ordinances that incorporate low impact development (LID) and green infrastructure best management practices. *Policy*
- PCW2.6: Develop incentive program to encourage LID and green infrastructure and disincentive programs to discourage impervious surface cover. *Policy*
- PCW2.7: Expand storm-drain stenciling program. *Stewardship and Outreach*
- PCW2.8: Develop or incorporate an outreach strategy that outlines the prioritized actions of “preserve land, limit hardening, and undevelop when possible.” *Stewardship and Policy*
- PCW2.9: Investigate sufficiency of NY and CT Department of Transportation stormwater permits and measures. *Stewardship and Technology*

### ***Long-term actions***

- PCW2.10: Fund research to identify sources and cost-effective techniques for non-point source pathogen reduction in Long Island Sound embayments. *Policy*
- PCW2.11: Encourage and monitor stormwater management best management practices that reduce soil loads. *Stewardship*
- PCW2.12: Continue developing new methods to educate the public about what they can do in their own backyard. *Stewardship and Outreach*

### **PCW Action Step 3: Restore our low oxygen dead zone to health**

Areas of the Sound experience annual depletion of oxygen in the waters near the seafloor when surface waters are enriched with nutrients from sewage effluent, surface runoff, and ground water and when bottom waters are relatively slow-moving. The high levels of nutrients can act as fertilizer and stimulate intense growth of plankton. When the plankton dies it sinks to the bottom and decomposes, using up the oxygen in the slow-moving areas of bottom waters. In addition, excess zooplankton that efficiently consume the overgrowth of phytoplankton can release excessive stool. This high-carbon and nutrient-rich material also consumes oxygen in the bottom waters. These low oxygen zones create temporary “dead zones” where animals dependent on oxygen cannot live. Those animals that cannot leave perish, and the productivity of the Sound is reduced. Extensive efforts are underway to monitor and minimize these dead zones, but managing the balance of nutrients and plant growth is challenging, in part because the water movement in the Sound and embayments is strongly affected by weather.

Atmospheric deposition is a significant source of nitrogen in many water systems, including the Sound. Proposals are being considered at the national level by EPA to further reduce this source. An increased emphasis on reducing the air component of nitrogen load will take pressure off expensive wastewater treatment alternatives, and will help to reduce climate change impacts. It may also be possible to capture the biological material produced in the water, harvest this material (algae, shellfish, fish) and remove it from the cycle of production and decomposition (bioharvesting/bioextraction).

### ***Immediate actions***

- PCW3.1: Fully fund, through over \$800 million in leveraged state capital investment, sewage treatment plant improvement projects necessary to achieve the 58.5% reduction in nitrogen pollution—our 2014 CCMP target. *Policy*
- PCW3.2: Investigate the feasibility of an Infrastructure Investment Bank. *Policy*
- PCW3.3: Support coordination of citizens’ monitoring in embayments with state agency monitoring efforts. *Stewardship and Policy*
- PCW3.4: Support experimental studies of bioextraction such as the Bronx River ribbed mussel project. *Science*

- PCW3.5: Examine efficacy of an oyster gardening program. *Science*
- PCW3.6: Pilot at least one oyster reef restoration project. *Science*

***Intermediate actions***

- PCW3.7: Enhance bioextraction through expansion of shellfishbeds and fish that feed on plankton. *Science*
- PCW3.8: Build scientific understanding of hypoxia-related interactions and causes. *Science*

***Long-term actions***

- PCW3.9: Support reduction in atmospheric nitrogen release. *Policy*

#### **PCW Action Step 4: Protect streams, embayments and shorelines**

The parts of LIS that are in our neighborhoods—the streams, coves, beaches—are most immediate to us and are also at greatest risk from their proximity to our towns, cities, and activities. Each of these represents an “edge” of the Sound, a border between land-based human uses and the water flow that feeds and sustains the ecosystem. The importance of the edges for filtering, flood control, and resilience of the ecosystem have become increasingly apparent as the number of people using and enjoying our waterways increases. These edges can be degraded with overuse, hardening, erosion and neglect. Restoration of the natural buffers that once lined these edges (shrubs, dunes, marshes) can help improve the function of the Sound and our enjoyment of our neighborhoods.

***Immediate actions***

- PCW4.1: Encourage implementation of “best management practices” (BMPs) for Riparian and Tidal Buffers. *Science, Policy, and Outreach*
- PCW4.2: Enhance and expand citizen coastal clean-up efforts. *Outreach*
- PCW4.3: Adopt policies that have a proven track record of reducing plastic use and resulting coastal debris, such as the five cent/bag program in Washington, D.C., that has drastically cut down on disposable plastic bags. Consider a bag fee approach in CT; and in Westchester, Nassau, Suffolk counties of NY. *Policy and Outreach*

***Intermediate actions***

- PCW4.4: Enact land use reform to protect buffer areas. *Policy*

***Long-term actions***

- PCW4.5: Implement recommendations of New York and Connecticut’s Sea Level Rise Task Forces. *Policy*

### **Action Step 5: Eliminate raw sewage and bacteria impacts**

Many of our local beaches and coves are closed for swimming after rainstorms when waste-water treatment plants are overwhelmed with stormwater runoff that has leaked into the sewage collection system. The treatment plants overflow and discharge partially treated sewage mixed with stormwater into the coastal waters. While communities are required to separate sewage and stormwater systems, there are many legal and illegal connections between these systems that contribute to CSO and SSO discharges and lead to closed beaches and swimming areas. The challenge is particularly acute in urban areas where runoff from streets and paved areas can easily overwhelm treatment capacity. Slowing runoff and filtering runoff before it reaches collection systems (green infrastructure) can dramatically lessen discharges of bacteria and pollutants to coastal waters.

On Long Island there are 27 embayments under a pathogen TMDL. Unlike urban areas like New York City, Bridgeport or New Haven, these areas are impacted by non-point source pollution, not CSOs.

Many other portions of the watershed in New York and Connecticut also contribute pathogens pollution from non-point sources like agriculture, improperly maintained septic/cesspool systems, wild animal and pet waste, un-naturally concentrated wildlife, even gardening. This provides conditions in stormwater systems that allow bacteria to be discharged into coastal waters.

#### ***Immediate actions***

- PCW5.1: Complete green infrastructure feasibility scans for New Haven and Bridgeport, CT. *Technology*

#### ***Intermediate actions***

- PCW5.2: Secure financing and enforcement to eliminate CSOs and SSOs. *Policy*
- PCW5.3: Reduce beach closings by 50% in five years with coordinated monitoring and targeted stormwater management plans. *Policy, Science, and Technology*
- PCW5.4: Develop cost effective DNA testing for pathogens to identify the source of pathogen contributions so that municipalities can concentrate efforts on eliminating highest contributing sources. *Science*
- PCW5.5: Develop BMPs to reduce non-point source pathogen contributions. *Science and Policy*
- PCW5.6: Assure that CSO separation projects continue in key communities like New York City and Bridgeport, CT while encouraging innovative green infrastructure efforts to limit or eliminate CSO flow by 2020. *Stewardship and Policy*

#### ***Long-term actions***

- PCW5.7: Focus attention and funding on implementing urban stormwater green infrastructure projects. *Policy and Outreach*



### **Action Step 6: Manage the LIS watershed so that it functions as a healthy landscape and ecosystem**

Much of the water that flows to the Sound first drains off 16,000 square miles of land, through wetlands, and into streams and rivers. As the water passes through this watershed it interacts with plants, animals, soils and the air. A healthy landscape permits well-oxygenated water to filter through soils and vegetation, provide animals with life-giving nutrients and water and maintains natural flood control. Water that drains from a healthy watershed has a sustainable load of nutrients and oxygen and supports a healthy Sound. Many of the watershed areas around the Sound are intensely developed, and support communities, recreation, water supplies, and agriculture. Allowing more natural functions in these developed areas can have dramatic effects on the water quality and flood risk in the communities as well as the Sound.

#### ***Immediate actions***

- PCW6.1: Adopt cost-effective LID stormwater performance standards in NY and CT. *Policy*
- PCW6.2: Develop innovative methods to fund stormwater control. *Policy*
- PCW6.3: Expand and fund citizen coastal cleanup and monitoring efforts. *Policy and Outreach*
- PCW6.4: Engage and educate residents in upland areas about their connection to the Sound. *Outreach*

#### ***Intermediate actions***

- PCW6.5: Limit pesticides and manage fertilizers throughout the Sound's watershed. *Policy and Outreach*
- PCW6.6: Work with local Soil and Water Conservation Districts to promote soil conservation and develop management strategies to retain hydrologic function throughout the Sound's watershed. *Policy, Technology, Outreach, and Stewardship.*

#### ***Long-term actions***

- PCW6.7: Enact land use reform that incentivizes Best Management Practices (BMPs) and green infrastructure retrofits to restore hydrologic function to critical areas of watershed. *Policy*

## Creating Safe and Thriving Places for All Sound Creatures

*Ecosystems are made of living things and the places they call home*

### Goal

We see a Sound whose storm dampening array of salt marshes, meadow grasses and wetlands can adapt to changing coastlines while serving as a critical nursery for fledgling creatures. These areas ensure inhabitants like terrapins, herons, and lobsters and seasonal visitors, like osprey, bluefish, dolphins, and harbor seals, have the web of sustenance and the healthy waters they need to flourish. We want a Sound whose unique island formations are appreciated for their value both as wildlife habitat and nesting sites, and as places for the public to access and enjoy the Sound.



### Challenge

People in the Long Island Sound Region depend on the unique habitats of the estuary watershed and the ecological processes they maintain. Managing biological diversity and healthy ecosystems on the landscape level is a proven and cost-effective way to sustain the vitality of human communities, especially when faced with environmental change. Biologically diverse habitats and ecosystems prevent the spread of diseases and pests and provide both pollinators and rich soils for growing food. Wetlands absorb floodwaters, and forests allow water to filter through soils and recharge our water supplies. Grasslands and forests stabilize soils that might otherwise erode during storm events. Municipalities can reduce the costs of clean drinking water by protecting the watershed's wetlands, forests and streams.

The LISS's habitat restoration goal continues to be hampered by the inherent complexity of coordinating and managing on-the-ground construction projects with the various levels of state and local governments and public and private property owners. Obtaining adequate funding for restoration projects remains problematic. Often funding sources need to be cobbled together and coordinated with on-the-ground work, adding to the difficulty of accomplishing projects.

### Recent Accomplishments

- The program restored or protected over 750 acres from 1998 to 2009.
- The LISS exceeded its goal to reopen 100 miles of river corridor to diadromous fish passage, with over 150 miles reopened by 2009.

## Action Steps: Creating Safe and Thriving Places for All Sound Creatures (CSP)

### **CSP Action Step 1: Gather information for adaptive ecosystem management**

#### ***Immediate actions***

- CSP1.1: Fund analysis of 100 year fisheries and climate data. *Technology, Policy, and Science*

#### ***Intermediate actions***

- CSP1.2: Investigate the development of signature species to help the public more fully understand the intricate connection of habitats found at various points within the Sound's watershed. *Outreach*
- CSP1.3: Develop invasive species mascot for consistent messaging on the impacts of invasives. *Outreach*

#### ***Long-term actions***

- CSP1.4: Develop an inventory of landscapes and habitats that are at greatest risk from development and climate change. *Stewardship*
- CSP1.5: Monitor vulnerable wildlife and bird populations. *Stewardship*

### **CSP Action Step 2: Support regional fisheries to strengthen traditional industries and ecosystem health**

Management of commercial fisheries by the federal government is not focused on areas as small as the Sound. Regional fisheries are assessed and managed by Connecticut and New York through monitoring and licensing of recreational fishing and shellfishing (including lobsters). The health of the regional fisheries is vital to coastal communities as well as the Sound ecosystem.

#### ***Immediate actions***

- CSP2.1: Promote restoration of fish passages in New York and Connecticut by opening 250 more miles of river by 2016. *Science, Stewardship, and Policy*

#### ***Intermediate actions***

- CSP2.2: Identify support in the LIS region for regional fisheries and develop a coalition to work for improved management. *Policy and Outreach*

#### ***Long-term actions***

- CSP2.3: Explore continuing opportunities to support the long-term sustainability of marine fisheries resources. *Science, Policy, and Outreach*

### **CSP Action Step 3: Improve management and acquisition of key coastal and island wildlife refuges**

The highly developed coastline around the Sound provides homes, jobs, and recreational opportunities for humans but limits space for wildlife species that contribute to the health and function of the entire ecosystem. Creating and managing wildlife refuges supports birds, mammals, reptiles, and amphibians as well as the habitats they rely upon (marshes, beaches, rocky shores, ponds, and streams). The proposed sale of Plum Island, an 850-acre stewardship site with critical bird and wildlife habitat, has created an opportunity to limit unsustainable development and potentially preserve an important island.

#### ***Immediate actions***

- CSP3.1: Acquire an additional 50 acres of important coastal stewardship locations along the NY and CT coastlines. *Policy*
- CSP3.2: Protect and acquire Important Bird Areas. *Stewardship and Policy*

#### ***Intermediate actions***

- CSP3.3: Protect Plum Island from unfettered development and encourage the US Fish and Wildlife Service to add it to its network of preserved habitats. *Stewardship and Policy*

#### ***Long-term actions***

- CSP3.4: Focus conservation efforts on Long Island Sound's unique island habitats for people and wildlife. *Stewardship and Policy*
- CSP3.5: Enhance bird habitat protection. *Stewardship*

### **CSP Action Step 4: Restore critical habitats to protect wildlife populations**

Outside of defined wildlife refuges, many critical habitats can be managed and restored to enhance mobile and migratory wildlife. It is particularly important to identify and prioritize habitats that can be connected to provide pathways for movement and exchange of species. Opening up rivers and streams along the Sound to migratory fish will restore access to historical breeding grounds and support population growth. Submerged eelgrass beds provided excellent habitat for fish, shellfish, and crabs until the die offs in the 1930s.

#### ***Immediate actions***

- CSP4.1: Restore ten fish passage projects in NY and CT. *Stewardship and Policy*
- CSP4.2: Evaluate LIS as a compatible eelgrass location. *Science*
- CSP4.3: Expand 175 acres of coastal and marsh restoration in response to projected sea level rise. *Science, Stewardship, and Policy*



***Intermediate actions***

- CSP4.4: Highlight species that cross habitats to help the public understand the complexity of the Sound and its watershed. *Science and Outreach*
- CSP4.5: Expand pilot eelgrass restoration projects in the Sound to six new locations and measure success. *Stewardship and Policy*
- CSP4.6: Restore 350 additional acres of coastal habitat in New York and Connecticut by 2016. *Science, Stewardship, and Policy*

***Long-term actions***

- CSP4.7: Establish 10-year habitat restoration goals and evaluate potential projects for success. *Science and Policy*

**CSP Action Step 5: Increase awareness of, manage, and protect our local LIS neighborhoods (coves, embayments, and estuaries)**

The most immediate environment where we encounter the Sound is in our neighborhood at the land-sea edge. These areas are familiar to us and have powerful meaning to each community. They are also amongst the most important resource areas within the Sound. Each neighborhood links together to create a critical transition area that is highly vulnerable to pressures from development and climate change.

***Immediate actions***

- CSP5.1: Increase and financially support citizen monitoring of embayments and coordination with agency efforts. *Outreach, Policy and Stewardship.*

***Intermediate actions***

- CSP5.2: Create consistent annual local innovation fund to help interconnect activities, results, and suggestions of local embayment programs. *Technology and Policy*

***Long-term actions***

- CSP5.3: Support the enhancement and expansion of local embayment planning. *Stewardship and Outreach*

**CSP Action Step 6: Encourage adaptive management to recycle excess biological energy**

The cultivation of rich habitats of shellfish has historically provided an important natural function in the Sound. Dense shellfish beds filter prodigious amounts of water, removing algae and organic particles that are food for shellfish.

***Immediate actions***

- CSP6.1: Create a 10 year Biological Recycling Plan. *Science*

***Intermediate actions***

- CSP6.2: Enhance bioextraction by shellfish. *Science and Policy*
- CSP6.3: Study utility of encouraging plankton-grazing fish. *Science*

***Long-term actions***

- CSP6.4: Explore the feasibility of developing natural reefs of shellfish in the Sound. *Science and Policy*

## Building Long Island Sound Communities that Work

*The Sound's communities unite and sustain us all*

### Goal

We imagine a vibrant, thriving Sound where all citizens understand that this waterbody fundamentally belongs to them, and in that ownership they not only accept, but strive to protect, restore, and celebrate their home. We value a Sound whose harbors, embayments, and beaches are open and accessible to the residents of the region, whose residents are supported in exploring and celebrating the neighboring wonders; whose traditional fishing industries are valued and encouraged to blossom through increased investment.



### Challenge

The Sound has sustained human communities for thousands of years, but the sheer number of people now in the region creates demands and needs that are hard to sustain. Access to the shoreline and Sound for water dependent industries and recreation is critical to sustain working Sound communities and to provide a linkage for communities far removed from the Sound. Maritime industries can co-exist with and stimulate tourism, recreation, and residential activities but issues surrounding property values, zoning and degraded urban waterfronts present challenges. Commercial fishing, aquaculture, and recreational fishing can also co-exist but need planning and adaptation to thrive in changing conditions. If corridors for transmission of electricity and natural gas are proposed, they must minimize conflict with all other uses and future needs. Harbors require safe navigational access to function and maintain economic viability but must also be sensitive to the Sound's ecosystem.

### Recent Accomplishments

- Progress has been made on both assessing dredging needs for the next 30 years and on identifying potential upland placement sites and dewatering sites.
- The Long Island Sound Study's new and revised website, [www.longislandsoundstudy.net](http://www.longislandsoundstudy.net) continues to resonate with the public as new features and information have been added. Website page visits are on the increase, showing a steady public interest in the Sound and its ecosystems.
- The Small Grants program continues to provide opportunities for citizen involvement and citizen education by funding projects at the local level.

## Action Steps: Build Long Island Sound Communities that Work (BCW)

### **BCW Action Step 1: Build jobs through a healthy Sound**

Virtually all of the water dependent industries that line the shores of the Sound benefit from a safe and healthy Sound. When shipping, shipbuilding and repair, commercial and recreational fishing, aquaculture, water-based tourism, marinas, yacht clubs, aquariums, and museums are all perceived as contributing to a vital economy and desirable waterfront, they all prosper. When the Sound is perceived as healthy and a regional treasure, waterfront communities and industries prosper. These industries provide critical jobs and infrastructure but are under economic and environmental stress.

#### ***Immediate actions***

- BCW1.1: Support commercial and recreational fishing industries and shipping while ensuring habitats and wildlife are protected. *Policy*
- BCW1.2: Build support for new investments in green infrastructure to access state capital funding programs (will also leverage federal Clean Water State Revolving Fund investments). *Policy and Outreach.*

#### ***Intermediate actions***

- BCW1.3: Develop transition plans for industries affected by climate change. *Science, Technology, Policy, and Outreach*
- BCW1.4: Support investment in creating, 7000 jobs in green infrastructure by investing \$700 million investment in these innovative CSO and stormwater management practices. *Policy*
- BCW1.5: Expand balanced and environmentally and community sensitive water dependent industries. *Policy*
- BCW1.6: Expand shellfish and restoration jobs. *Policy*
- BCW1.7: Establish public image of a clean and healthy Sound. *Outreach*

#### ***Long-term actions***

- BCW1.8: Create frameworks in NY and CT that encourage and develop lasting and diverse green infrastructure jobs. *Policy and Outreach*

### **BWC Action Step 2: Expand awareness of the Sound**

A key element to the success of a Sound Vision is to inspire the majority of residents and visitors to the Sound region to feel a stake in the outcome of efforts to effectively manage the Sound. Many residents and visitors do not know how to “get to the Sound” and perceive access to be restricted to landowners and waterfront communities. Thousands pack the public beaches but do not personally connect with marshes, mudflats, rocky shores or islands. It is particularly hard to establish an emotional connection between the inland communities and the Sound despite the evidence that ecologically they are linked.



### ***Immediate actions***

- BCW2.1: Create a challenge grant to seed social marketing efforts and work with the Communications Committee of the LISS to craft a major social marketing campaign designed to market a clean sound and how we can protect it. *Outreach and Policy*
- BCW2.2: Promote exhibits at The Maritime Aquarium at Norwalk, SoundWaters, Bruce Museum, the Mystic Seaport, The Long Island Maritime Museum, and other local museums—like those in the Thimble Island region and Stony Brook's Museum of Long Island Natural Sciences—that focus on Long Island Sound; and promote activities that highlight the Sound, like Westchester County's "Long Island Sound Revolutionary Exploration." *Outreach*
- BCW2.3: Promote shipboard educational tours of Long Island Sound aboard The Maritime Aquarium's *RV Oceanic*, *Schooner SoundWaters*, The Water Front Center's *Christeen*, and *Schooner's Quinnipiac*. *Outreach*
- BCW2.4: Promote activities of Long Island Sound education institutions like Project Oceanology, Soundwaters, The Maritime Aquarium, The Sound School, and the regional Aquaculture schools. *Outreach*
- BCW2.5: Support the planning of the LIS 400<sup>th</sup> Anniversary celebration to encourage pride in our local heritage. *Outreach*

### ***Intermediate actions***

- BCW2.6: Develop innovative tools for access to the Sound and public amenities (smart phone apps, computer kiosks, distinctive signage, museum displays, etc.). *Technology*
- BCW2.7: Partner with Connecticut and New York Tourism Departments to hold a competition to solicit Long Island Sound marketing videos and develop new partnership opportunities. *Outreach and Technology*
- BCW2.8: Develop common signage design for all restoration and investment activities to encourage numerous and similar messages opportunities. *Technology and Policy*

### ***Long-term actions***

- BCW2.9: Hone and promote a common curriculum for K-12 that includes shore- and water-based activities. Advocate for its inclusion in NY and CT state education standards. *Policy and Outreach*
- BCW2.10: Create and install "Long Island Sound Watershed" signs around the region. *Policy and Outreach*
- BCW2.11: Expand the BlueWay trail system several Long Island embayment communities are developing to other Long Island Sound points of interest. *Outreach and Stewardship*

### **BCW Action Step 3: Expand opportunities to explore and enjoy the Sound**

Barriers do exist for citizens to directly engage with the Sound. Many urban waterfronts are restricted, unsafe, degraded, or serve as rail and highway corridors. Many coastal communities and commercial interests limit or discourage access. Marinas and harbors struggle to efficiently dredge navigational channels to allow boat access. Increasing opportunities for casual appreciation of the shoreline, shore-based angling, walking and bike paths, wildlife observing and historic tours would broaden the base of engagement in the Sound.

#### ***Immediate actions***

- BCW3.1: Engage citizens in monitoring, cleanup and restoration activities. *Outreach*
- BCW3.2: Develop a smart phone application that identifies clean up and restoration days, river walks, salt marsh walks, trips to islands for bird watching, and other Long Island Sound related engagement events. *Technology*
- BCW3.3: Engage recreational and commercial fishing and shellfishing interests in common objectives like increasing shellfishing activity and public access. *Outreach*

#### ***Intermediate actions***

- BCW 3.4: Support protection and expansion of the marine-dependent working waterfront as well as other public access to Long Island Sound. *Policy and Outreach*
- BCW3.5: Expand public access broadly, both in scope and constituents served (ex: anglers, recreation, aesthetic, eco tourism). *Outreach and Policy*
- BCW3.6: Build the message that Long Island Sound is our region's heritage. *Outreach*
- BCW3.7: Purchase coastal open space to encourage citizen connection with Long Island Sound. *Policy*

#### ***Long-term actions***

- BCW3.8: Ensure that navigability of our harbors for boat access is paired with ecologically supportive dredging windows and dredged material disposal. *Science, Policy, and Outreach*

### **BCW Action Step 4: Develop effective planning for multiple uses**

As our uses and understanding of the Sound increase, it is critical to develop effective planning for overlapping and conflicting uses as well as long-term adaptation to changing conditions. Planning in marine areas begins with mapping of coastal and subsurface distribution of habitats, geology, depths, infrastructure, regulatory boundaries, water currents, and uses. It continues with a systematic examination of existing and potential uses, community-led prioritization of uses, and some form of public definition of allowable uses in a spatial form (zoning, "land use," management plan). Extensive geological mapping of the Sound has been conducted and efforts are underway to map seafloor habitats and compile existing knowledge of boundaries and infrastructure (cadastre).

#### ***Immediate actions***

- BCW4.1: Support marine habitat and human uses mapping. *Science, Technology, and Policy*

#### ***Intermediate actions***

- BCW4.2: Develop a plan for energy infrastructure development (both for renewable and fossil fuels) that avoids, minimizes, and/or mitigates impact to the Sound. *Technology and Policy*
- BCW4.3: Develop Marine Cadastre for LIS. A marine cadastre is an integrated marine information system that provides legal, physical, ecological, and cultural information in a common geographic information system (GIS) framework. All organizations considering an offshore activity can benefit from this comprehensive, visual approach to data analysis. A national Marine Cadastre exists but the data in the Sound is limited. *Technology*

#### ***Long-term actions***

- BCW4.4: Develop a Coastal Marine Spatial Plan for the Sound. *Technology, Science, and Policy*
- BCW4.5: Identify lands at risk from sea level rise. *Science*
- BCW4.6: Pilot restoration efforts that provide information on the type and scope of projects which could be used to mitigate the impacts of climate change along our coasts. *Science and Policy*

### **BCW Action Step 5: Implement an effective Dredged Material Management Plan**

To ensure safe navigation, channels must be dredged to safe depths into ports, harbors and marinas. The materials removed during dredging must be relocated to environmentally safe, economically feasible locations. Defining this process in the Sound for a 30 year period will facilitate effective management of navigable waterways and permit economic development and environmentally sustainable practices. The US Army Corps of Engineers is currently leading a planning effort (Long Island Sound Dredged Materials Management Plan) to achieve this goal. Implementing the plan may require additional studies, permits, and funding.

#### ***Immediate actions***

- BCW5.1: Support the Long Island Sound Dredged Materials Management Plan (LIS DMMP) process. *Policy and Outreach*

#### ***Intermediate actions***

- BCW5.2: Establish 10 year window for dredging permits and develop a uniform process. *Policy*
- BCW5.3: Develop a public message that demonstrates the link between soil conservation and reduction of dredging. *Policy and Outreach*
- BCW5.4: Encourage soil conservation practices. *Policy*
- BCW5.5: Educate congressional delegates on importance of recreational harbors. *Policy*

***Long-term actions***

- BCW5.6: Support development of Regional Sediment Management Plans to reduce erosion and promote natural transport of sediments along shorelines and through estuarine systems. *Policy and Outreach*

**BCW Action Step 6: Increase beneficial use of dredged material**

Dredged material can be used for a variety of purposes, depending on the type of material and location (grain size, contaminant load, proximity to need). These uses include beach nourishment (for sand), brownfield restoration, landfill cover, concrete and asphalt production, roadbeds, and marsh restoration. The reuse of dredged material may require some additional cost, detailed planning and the cooperation of communities and agencies overseeing resources in the area.

***Immediate actions***

- BCW6.1: Influence process of LIS DMMP to support beneficial reuse. *Policy*

***Intermediate actions***

- BCW6.2: Encourage federal support of beneficial reuse projects. *Policy*

***Long-term actions***

- BCW6.3: Support coastal brownfield redevelopment by working to reduce regulatory roadblocks. *Policy*



## Enhance the Long Island Sound Partnership

*Forming alliances to build and measure our progress*

### Goal

Meeting the goals outlined above will require investment in effort, money and resources. As part of Sound Vision we recommend development of a set of metrics and measurement processes to ensure that investment has succeeded in progressing towards these goals.



### Recent Accomplishments

- The 2009 federal budget for the Study totaled \$3.5 million, which funds key base program functions and staff positions for the Management Conference. The Long Island Sound base program consists of the water quality monitoring program conducted by the Connecticut Department of Environmental Protection; the public information, education and outreach program conducted by the New York and Connecticut Sea Grant programs; the Long Island Sound Futures Fund large and small grants program administered by the National Fish and Wildlife Foundation; the CCMP Enhancements Projects grant program administered by the New England Interstate Water Pollution Control Commission; and the Long Island Sound Research grant program jointly administered by the New York Sea Grant program and the Connecticut Sea Grant program.
- For federal fiscal year 2010, which runs from October 1, 2009 through September 30, 2010, the LISS budget totaled \$7.8 million, a significant increase from 2009 and the most funding ever appropriated for the LISS.
- Ongoing LISS-funded research projects include the development and publication of a synthesis of the scientific research and data on the Sound, a synthesis of water quality monitoring, and planktonic data. Projects completed in 2009 include development of a water quality index using cluster analysis and analysis of the System Wide Eutrophication Model (SWEM).

### Action Steps: Enhance the Long Island Sound Partnership (ELISP)

**ELISP Action Step 1: Prepare regular performance reports that describe investments in and efforts toward LIS goals**

#### *Immediate actions*

- ELISP1.1: Identify all substantial Long Island Sound investments. *Technology*

***Intermediate actions***

- ELISP1.2: Develop a biennial investment report that includes a visual geographic distribution of projects that benefited from the investments. *Policy*

***Long-term actions***

- ELISP1.3: Develop a Long Island Sound Report Card. *Outreach*

**ELISP Action Step 2: Coordinate water monitoring of the Sound and its embayments**

***Immediate actions***

- ELISP2.1: Develop a centralized portal for regional water quality data. *Technology*

***Intermediate actions***

- ELISP2.2: Develop and implement a framework for coordinated and financed regional citizen monitoring programs. *Stewardship and Policy*

***Long-term actions***

- ELISP2.3: Ensure representational coverage of the entire region. *Science, Stewardship and Policy*
- ELISP2.4: Use data developed to improve water quality. *Technology and Policy*

**ELISP Action Step 3: Use the Sound Vision Framework to form new alliances and move the LISS Partnership forward**

***Immediate actions***

- ELISP3.1: Develop new Long Island Sound stakeholder alliances. *Outreach*
- ELISP3.2: Strengthen and coordinate existing Long Island Sound stakeholder collaborations. *Outreach*
- ELISP3.3: Develop a single “Outreach Theme,” which changes on a yearly basis, to encourage leveraged messaging opportunities by all LISS members. *Outreach*

***Intermediate actions***

- ELISP3.4: Update the LIS Comprehensive Conservation Management Plan. *Policy*

***Long-term actions***

- ELISP3.5: Create a biennial Action Agenda. *Outreach*